Issues for Libraries and Information Science in the Internet Age

Bruce A. Shuman

LIBRARIES UNLIMITED, INC.

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2001
LIBRARIES UNLIMITED, INC.
Englewood, Colorado

Come al solito, per mia moglie ed i bambini . . .

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Preface

■ The Internet is, by far, the greatest and most significant achievement in the history of mankind. What? Are we saying that the Internet is more impressive than the pyramids? More beautiful than Michelangelo's *David*? More important to mankind than the wondrous inventions of the industrial revolution? Yes, yes, and yes.[1]

■ An invasion of armies can be resisted, but not an idea whose time has come.[2]

■ The real voyage of discovery comes not from seeking new landscapes but from having new eyes.[3]

■ The Internet; Don't just get onto it—get into it![4]

A Confession

Let's begin with an embarrassing admission of truth, and get it out of the way. So here it is: The term *Internet* does not appear once—not even *once*—in my previous work along similar lines, titled *Foundations and Issues in Library and Information Science*.[5] And what accounts for such an egregious lapse in up-to-dateness? Ignorance? Carelessness? Inadequate scholarship? Perhaps any or all of the above apply, granted, but I prefer to think of such an omission as blatant and convincing evidence of the swift currents of change at work in our information professions.

To illustrate the rapidity of such change, consider that the H. W. Wilson Company's periodical index, *Library Literature,*[6] which did, for most of the twentieth century, a very creditable job of indexing the written output of our professions by author and subject, didn't even list the subject heading "Internet" until the 1992 annual volume, and in that year, devoted only a scant two columns (approximately one page) to subject indexing of articles concerning the new communications technology. Considering, therefore, that my prior work has a 1992 publication date (but the writing of it was actually completed in 1991) and had to sit—decaying as all information does—while the publishers readied

the manuscript for press, perhaps I may be excused and forgiven for any perceived oversight.

But maybe *Library Literature* is not an apt example. Turning to a more general popular periodicals index to underscore my previous point, I refer to the latest volume of *Readers' Guide to Periodical Literature*[7] that contains a total of 19 pages of Internet and Internet-related headings and subheadings, including: Anonymous messages, Backup storage services, Consumer information, Educational use, Electronic mail, Fees, Games, Government information, Hate speech, Investment use, Laws and regulations, Library use, Marketing use, News, Personal information, Political use, Programs, Scientific use, Security measures, Shopping services, Traffic, Travel use, and Unauthorized use. Additionally, there are See Also links (cross-references) to such related topics as Bookmarks—Internet, Chat rooms—Internet, Collaborative filtering technologies, Extranets, Electronic mail, Instant messaging—Internet, Internet2, Intranets, Next Generation Internet, Push technology—Internet, Internet protocols, Internet search engines, Internet servers, and Internet service providers. Other search services abound with Internet references. *FirstSearch* (an automated indexing service) in early 2000 listed 4,480 records in response to the search term "Internet." When a limiter restricting recall only to items in the English language was placed on the search, the total was still 4,277, and even when the time period was limited to the years 1998-2000, 1,251 records were still remaining to be viewed.

The rise of the Internet is one of the most astonishing developments of this or any other century, compared by some writers in importance to the capture of fire and to Gutenberg's printing press, and yet, in some ways, it came about as an unintended consequence of the efforts of a group of scientific researchers to exchange information more quickly. Many technological inventions have, in fact, had unintended consequences, whereby nothing remotely like it was anticipated by those who created it. As a solitary example, some 3M engineers, looking for a new good adhesive, failed in their efforts, but instead developed an inadequate result into today's ubiquitous Post-its® or sticky notes. Another singularity of the Internet is that it has become, for the most part, a government-free zone, and thus uncensored, despite having been created under the auspices of the national government. In this sense, the free Internet can be seen as an unintended, but welcomed, consequence of government action.

After its general acceptance, the Internet has made life far more convenient for a great number of people, in the United States and pretty much all around the world. How many people? The total number of users grows every day. Estimates vary, and even recent figures are likely to be out of date a month or two later, but the sheer number of Internet users grows continually and exponentially. Back in the early 1970s, there was no such medium of communication, and what was to become the backbone for the Internet started out as basically some computer scientists on different campuses who wanted to set up their computers to exchange and share information easily—a diversified

network for communication with one's "invisible college," people who share common research interests but are geographically distant from one another. It took only a couple of million dollars to set up the initial network, and it involved about 40 users. The Internet that people think of today, however, began about 20 years later when the government opened the Internet to commerce and the general public with about 100,000 users, initially. To put that figure in perspective, there are more than 100 million users in the United States today, with more than 200 million, worldwide.

The growth rate of the number of people using the Internet is staggering in comparison with other technological breakthroughs of modern times. The Internet took less than five years to catch on with the general public, whereas radio took 6, VCRs 8, television 9, cell phones 10, cars 18, and air-conditioning 22 years. Measuring its success in dollars, the new "Internet economy" has grown from $7 billion in 1998 to $20 billion in 1999, $40 billion in 2000, and a projected $80 billion in 2001, with no end to this every-year-doubling-time acceleration in sight.

For many families now, traditional brick-and-mortar stores have been to a greater or lesser degree replaced by Web sites, and purchasing merchandise is less a matter of getting into the car and visiting a shopping mall and more a matter of pushing mouse buttons and entering credit card numbers. In some offices, telephones have become nearly obsolete, replaced by e-mail, which is quicker, cheaper, and generally more efficient. It is now possible to use Internet access to buy cars, groceries, airline tickets, stocks, horses, and hotel rooms, permitting people to act as their own travel agents or stockbrokers.

As every Internet parent knows, homework has been transformed; research projects now often involve the World Wide Web rather than books, and people keep in touch with friends and relatives in other states and countries simply, economically, and with minimal time delay. Information on an amazing (and virtually limitless) range of topics is astonishingly easy to get and download—every home computer with Internet access is, in a very real sense, now a world-class library. Problem: Although it's true that the Internet may correctly be termed a "government-free zone," many people are increasingly uneasy about possible harmful consequences for privacy, politics, and cultural life, as well as dire warnings about the pollution of the minds of young people. Such freedom as the Internet grants, therefore, may, to some minds, carry risk equal to its promise. In certain ways we are, with respect to cyberspace, akin to the situation of Eastern Europe after the fall of Communism a decade ago. People are exhilarated by new possibilities of individual freedom, but unprepared to manage, or even to perceive, the problems and the dangers that lie ahead. However, for ordinary users, the Internet is often a godsend and the future appears truly limitless.

Of course, there are financial interests at work and the freedom to browse the Net is sometimes vulnerable to subtle manipulation by vast corporate enterprises. Microsoft's Web browser (slogan: "Where do you want to go today?")

in reality seems to be saying, "Where do you want to go today within the Microsoft universe?" In this way, a major corporate player in Internet commerce now is unashamedly directing users toward (only) the content it wants them to see, and making the rest difficult to get at. This may lead to the valid concern that companies are sending a constant stream of self-referencing content to everyone's computer screen, and filtering out the competitors' products, while the consumer is often numb to what is happening. These worries aside, we're here (at least in this preface and in Chapter 1) not to worry about where it's taking us but rather to sing the praises of the Internet as a tremendous boon to society, in general, and to libraries in particular.

To jump-start our discussion of the multiple and palpable virtues of the Internet for librarians, let me relate a single, personalized example:

■ In connection with the teaching of a basic Reference Sources and Services graduate course, a few years ago, I became curious, while enjoying the mild temperatures and relatively longer days of a Florida winter, as to what comparable day length and atmospheric conditions are like at that time of the year for people living far to the north, near the Arctic Circle. Fortuitously, I knew exactly who to ask in an effort to enlighten myself on that topic. Consequently, and without even leaving my office chair, I turned to my Internet-equipped computer and typed in the e-mail address of a close friend and former colleague who was at that time working in a "county" library in northern Norway. I told my friend that my local newspaper listed sunrise for the winter solstice (December 21st) for my hometown of Sarasota as 7:05 a.m., with sunset at 5:55 p.m., I requested that he do me a favor, check his own local newspaper, and provide the comparable local time of sunrise and sunset on the shortest day of the year for his small city in northern Norway. Daily high and low temperatures for that date would also be nice to have, I added.

■ Within half an hour from the moment that I "sent" my message out across the vastness of cyberspace, in the general direction of Norway, his answer was waiting for me in my electronic mailbox. From that message, I found out, not surprisingly, that people up there in reindeer country don't get a whole lot of daylight in late December (sunrise comes about 10:30 a.m.; nightfall, less than three hours later). I also learned that the typical nighttime low temperature for late December was cold enough to turn my Florida-accustomed body into a Popsicle, just thinking about it. As it turned out, my friend had

> some information requests of his own, and satisfied his own curiosity via information provided in my next message concerning atmospheric conditions in my own, subtropical, corner of the world.

Think about this everyday miracle and marvel. I mean, is that totally awesome, or what?

But, perhaps you are thinking, "So what? Where am I going with this?" Well, for a start, notice what's missing from our exchange of e-mails: (1) stationery, (2) envelopes, (3) international postage and other costs, and, perhaps most importantly, (4) the normally extensive time lag involved in sending "snail-mail" letters between southern Florida and northern Norway during the busiest season of the postal year. Within minutes (most of which, it turned out, were taken up not by technological procedures but rather with my friend's locating and consulting a copy of his local newspaper), we had exchanged greetings and factual information across more than 6,000 miles of cyberspace, the stormy North Atlantic, and (largely) frozen terrain.

Oh, right, sure, I might have, with considerable effort, obtained more or less the same information in at least four other ways:

1. Personal mail (which can, and often does, take weeks to make the round-trip between two nations separated by an ocean, especially during the pre-Christmas season).

2. A long distance, international, person-to-person telephone call, which, although it might have been pleasant to have heard my friend's voice and to have spoken to him one-on-one, would have been seriously expensive, necessarily brief, and doubtless difficult or impossible to justify to my employer as a legitimate "business call."

3. An exchange of faxes between our offices; also very pricey.

4. Finding the desired information on my own, by consulting the resources of my institution's academic library or a nearby public library, which may well not have actually turned up the desiderata for such a small foreign city.

In point of fact, I did, out of experimental curiosity, subsequently try to exercise that last option and, to no particular surprise, came up empty. The closest I could come to finding the desired statistics, in fact, was to get corresponding data for Oslo, Norway's national capital, which is a long, arduous full day's drive south of the city in question, even in favorable weather, and having quite different sunrise and sunset figures. Close enough? Would that information have sufficed? Hardly. Oslo's climate, although harsh, doesn't offer anywhere near the same severity of winter darkness as do the few cities at the other end

of Norway. To accept figures for Oslo would have been tantamount, stateside, to judging conditions in, say, Atlanta by what could be found for New York City. I was further hampered by having no useful knowledge of the Norwegian language, just in the unlikely event that I could have located the needed copy of my friend's hometown newspaper. Bottom line: when it comes to fast, authoritative access to information held far distant from oneself, Internet wins the competition against conventional (print) sources, hands down. It took me no more than 20 minutes to discover what I needed to know—all the way from Norway. My library can't compete with that turnaround time, and neither can yours.

I hope my point—conveying my pure and brave-new-world delight verging on wonder in the Internet and its capabilities—has been adequately made by this solitary example. Impressive, isn't it? Astonishing, even. My request message, in my own words, "slammed" down the wires and then across space from Florida to the far end of Norway in seconds flat, and turnaround was achieved in only a matter of minutes. The United States Postal Service (or, for that matter, *anybody's* postal service) cannot now, or in the foreseeable future, hope to match or even approach such timing, regardless of cost. What's more, the same information might well have been obtained in much the same time frame had my colleague been located anyplace on the globe, just as long as we were both equipped with Internet connections, and periodically check our e-mail. Distance, after all, is technically irrelevant in electronic communication. Only the Internet has the power to speed messages around the world (vast oceans not a problem) and back again in seconds. Only the Internet could even try.

Why This Book?

Access to huge mines and streams of information for the asking would have seemed to any previous generation like either pipe dreams or science fiction, almost impossible for most ordinary individuals even to imagine. But in today's world of communication, such transactions are (usually, and even frequently) effortless, problem-free, and, for many of us, becoming routine. However, there's an ancient Chinese statement that fits the case: "You can't step in the same river twice."

Today's Internet may be described as a work in progress, always changing, a network continually under construction to make computer systems more efficient at communicating and more compatible, and adding new services, such as electronic commerce, flight booking, health information, education, polling, and so forth. In planning for writing this book, I gave the spectrum of capabilities of the Internet a lot of hard thought, but wanting to be fair, I deemed it useful, after devoting the first chapter ("Ecce Internet!") to the myriad beneficial and positive attributes of the Internet, to devote a second chapter ("Caveat Internet!") to the flip side of the rampant enthusiasm of its predecessor, treating, by way

of counterpoise, some of the traps, pitfalls, hazards, problems, and concerns connected with Internet access.

Chapter 3 gets specific to our field of interest: the impact of the Internet on libraries—are libraries and the Internet natural partners in information provision, or bitter rivals instead, doomed to fighting it out for their very existence and incapable of coexistence . . . or somewhere in between?

Chapter 4 examines some of the multitudinous legal and ethical challenges that necessarily accompany Internet provision to patrons in libraries, while Chapter 5 explores some of the subject content of the Web from a librarian's point of view, featuring selected (and admittedly subjective) lists of favorite, useful search engines and Web sites, which librarians may find helpful in performing client-based research and in supplying information to the public. Chapter 6 discusses the problems of archiving the Internet's past and planning for an uncertain future.

There's something for everyone on the Internet and the World Wide Web—the youngest or most untutored to post-doctoral research fellows can profit from using such systems for whatever purposes they wish (which may be seen as both the good news and the bad news, but more about that later). For this reason alone, it's important to understand both the nature of the Internet and what's available via this revolutionary information retrieval system that is so radically changing libraries and communication, and get practical advice on how best to get to it, on it—and at it efficiently and effectively. For this reason, I wrote this book, which may not provide all (or even any) of the answers to the problems it raises, but will certainly help the reader understand some of the salient questions.

The phenomenal growth rate and constant burgeoning and spreading of the Internet, especially in a library context, is why there is a need for this book. One can acquire both a basic introduction to the Internet for students and practitioners of this fast-moving field most of us still call—for want of a more precise name—"Library and Information Science," and at least partly get up to speed on the new technology, focusing on the evermore capable tools that librarians and private citizens using the library now have at their command for satisfying information needs without the necessity of travel, delay, or inordinate expense.

Tempus Fidgets

■ It takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that.[8]

With this preamble, I fully realize and confess that, due to the ever-changing nature of the Internet and the Web, anything said in this preface (or for that matter, in the entire book) might well be outdated, no longer accurate, or superseded by the time this book appears in print. That's the nature of the technology—improvements and change are occurring every day, and it takes increasing amounts of time and effort just to keep up with it.

For all these demonstrable and dramatic changes, what is equally stunning is how little we understand their impact. Accept that no one—not even the best-known and brightest experts in our information professions—can fully and completely realize the changes that the Internet has brought about (and will in the future) because it is in a continual state of flux, and just won't sit still for a portrait, or behave and remain static long enough to let us study it. Every day brings something new, exciting, and potentially life-altering on the Net, for better or for worse. Every week brings news of some refinement, experiment, or new capability. Every month witnesses the birth of thousands of new Web sites that you can access with a click of your mouse or track pad. Don't expect to know everything about the Internet or the Web—it's an impossibility, and change is the only constant. Even if we could fully realize such changes, we'd have knowledge applicable only to the present—to today but not to tomorrow—and certainly not to either the short-term or long-term future.

But to take a thoughtful look at our subject, here's an important question: Is the Internet an unalloyed boon to mankind, a totally positive force, utterly without a downside? Many have pronounced it so in print, but as you might expect, in truth, the jury is still out on that one. The Internet and the Web have millions of boosters and enthusiastic cheerleaders, certainly, but the answer to the question of its unalloyed goodness depends greatly on whom you ask. Internet pioneer (and renegade) John Perry Barlow, describing the value of using computers to access the Internet, said, "The development of computer networks was the most transforming technological event since the capture of fire."[9] Many would agree. However, if you listen, there are dissenting voices raised on the same subject by thoughtful communicators, and not mere fundamentalists or Luddites:

> ■ It says something that I have been able to survive the past 15 years without using a word processor. . . . In my line of work, I could not get along for a day without the telephone, TV, radio, automobile, and fax. But I shall happily live out my days computer-free. Fact is, I think that (Steve) Jobs, (Bill) Gates, and all the other cyberspace billionaires have bamboozled the world. Not only is a computer slower than a typewriter in the long run, its research function is also faulty; and worst of all, it encourages a society of increasing isolation (though it claims the opposite). What the computer has done is to make a few clever fellows rich.[10]

Many writers in the popular press are clearly so enamored of the Internet, in fact, that they judge its invention and development to be more important than . . . well, than anything yet known. Rosenblatt, however, seems proud to proclaim himself a modern-day Luddite, rejecting both computer and Internet technology for the most part as sucker games and scams that have so addled the minds of many Americans that they never stop to analyze what they have gained and what they have lost in embracing it.

Rosenblatt, although perhaps unnecessarily negative and cynical on the new technology, could have a point: Before 1992, most of us in academia and the information professions managed, somehow, to conduct our professional and personal lives, and serve our patrons, well enough (or so we thought) without having immediate and continuous access to millions of electronic data sources and instantaneous e-mail. Today, however, such capabilities are an important part of routine daily life for a great number of Americans, and sorely missed when not available. However, keep in mind that, despite all the great strides the information industry has taken thus far, we are still in a very early phase of the digital revolution, and no one can predict with any precision how it's all going to come out.

Other warning voices may be heard regarding the Internet, if you know how and where to listen, concerned and claiming that too many of us are rushing blindly and headlong into its embrace, and not bothering to stop to assess what we may be giving up and what we stand to gain. There is some truth in this when someone purchases a computer and all the necessary peripherals, takes it home, installs it, and then sits in front of a blinking cursor, thinking "Now what?" Others buy computers because they don't want to be left out or left behind, and then find themselves using them principally to play solitaire and other games . . . representing in one sense an investment of over $1,000 to buy an electronic deck of cards.

And so the argument rages on. For every dozen or so ecstatic utopians, enthusiastically singing the praises of the Internet and its capabilities, there is, somewhere out there, a dystopian or two, counseling caution, hesitation, further research, and suspicion concerning the new medium, and predicting dire consequences for society if the growth and spread of the Internet is left unchecked and unsupervised. Are these pessimists merely reactionaries, trying desperately and futilely to stem the seemingly inexorable tide of progress, or are they, perhaps, visionaries, capable of seeing something important that the rest of us can't or won't? Only time will tell.

Today's Internet is a work in progress, always changing, a network continually under construction to make computer systems more efficient at communicating and more compatible, and continually adding new services.

Note: The observant reader will probably notice, in browsing through this book's chapters, that certain topics concerning the Internet as it pertains to library provision tend to crop up again and again under different headings. That eventuality,

I have decided, is not only unavoidable but even beneficial, because so many subtopics of the general subject pertain to more than one area of the Internet and the Web. Thus, the "Dodge City" portion of Chapter 2, for example, necessarily gets into the area of censorship and restriction (dealt with in both Chapters 3 and 4), and the idea of government intrusion into personal matters "Big Brother" (primarily discussed in Chapter 4) finds its way into each of the preceding two chapters, as well. The reader is therefore asked to be indulgent if the appearance of redundancy manifests itself. I prefer to think of it as diversification and reinforcement. There would seem to be a pervasive interrelatedness at work that binds most (if not all) of the issues under discussion together, and I hope that you, upon reflection, will agree.

Notes

1. Harley Hahn and Rick Stout, *The Internet Complete Reference* (New York: McGraw-Hill, 1995).

2. Victor Hugo, *Histoire d'un Crime* (London: Lord, Lock & Co., 1880).

3. Marcel Proust, *A la Recherche du Temps Perdu* (Paris: Gallimard, 1954).

4. International Business Machines, television commercial for Pentium III processor, 1999.

5. Bruce A. Shuman, *Foundations and Issues in Library and Information Science* (Englewood, Colo.: Libraries Unlimited, 1992).

6. *Library Literature* (periodical index), (New York: H. W. Wilson Company).

7. *Readers' Guide to Periodical Literature* (periodical index), (New York: H. W. Wilson Company).

8. Cass R. Sunstein, "Code Comfort," *The New Republic,* January 2000: 38.

9. John Perry Barlow, "One Man's Declaration of the Independence of Cyberspace." An Internet-accessed manifesto, 1996. Accessed March 2000 at www.telefonica.es/fat/cyberspa.html.

10. Roger Rosenblatt, "Why I Don't Compute," *Modern Maturity*, November-December 1998: 22.

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1 Ecce Internet! Capabilities

Overview

This chapter is intended to serve both as a descriptive introduction to the overall subject of the Internet and a broad treatment of various *positive* aspects of the Internet as it affects libraries and other agencies that provide information. Admittedly, I am an unalloyed, enthusiastic cheerleader for the Internet as a mind-expanding tool in the hands of librarians and other information professionals. Why deny it? Put simply, I love the Internet, and cannot now truly remember how my working life (or correspondence) was effectively conducted before its advent. Yet, I cannot help but notice those hazard lights and that freezing fog along the information superhighway. Although I am, therefore, committed to providing a balanced treatment of such a vast and controversial subject domain, the affirmative, enabling qualities of the Internet are treated here, whereas some of the less salubrious potential consequences are covered in Chapter 2.

What Is the Internet?

Many people, including some experienced Net riders, don't have a good grasp of what the Internet really is. For them, it's sort of a virtual embodiment of Gertrude Stein's description of Oakland, California: There's no "there" there. Peel away the layers of the Internet onion, and all you have are layers of technology—a bunch of rules for moving data around.[1]

Let's begin with an attempt at a working definition of the Internet (although arriving at a consensual, or more precise definition is growing more difficult all the time). The Internet, for present purposes, can be defined as an interconnection of thousands of separate computer networks worldwide, originally developed in the late 1960s by the U.S. government to link government agencies with colleges and universities. Internet's real expansion, however, began much more recently—in the early 1990s—at which time thousands of companies and millions of individuals found that they could afford to acquire the telecommunications technology and graphical browsers requisite to accessing information and exchanging "mail" or messages. However, as we delightedly and quickly learned that the Internet is capable of shuttling messages and information around the world in fractions of a second, there is no monitoring, oversight, or supervision of its content, which could be seen, depending on your point of view, as its best or worst feature.

The Internet can be visualized as a vast "computing machine" of countless thousands of components, whose exact size and boundaries are unknown because both are increasing every day, every hour, and every minute. All we can say with any certainty is that new segments and new uses are being added to the existing Internet at such an accelerating rate that it can be thought of more as an explosion than a thing. In addition, for the most part, it is an explosion that increases in value the more it explodes.

The Internet is a distributed computer consisting of millions of individually maintained computers in perpetual upgrade, with no one in charge, no one in customer service, and no complaint department. Perhaps bothersome to many novice users is the blatant fact that this ad-hoc mega-machine has no manual (although there are dozens of "guides") and no system of hard-and-fast rules. What we must remember about the Internet is that there is no fact-checking "editor" who separates truth from untruth or distortion from reality. By eliminating any semblance of automatic filter or middleman, the Internet has become an anything-goes medium in which anybody with a means of gaining access to it can become a published writer and exchanger of information (along with misinformation and disinformation).

So vast is this embryonic machine—and so quickly developing into something else—that no single human mind can fathom the Internet deeply enough to claim expertise of the whole (although some have tried), as one might boast mastery of a specific microcomputer or software system. All we have are knowledgeable experts to guide us, and to let us sneak peeks at their notes.

Approaching our definition from another direction, the Internet can be seen as an enormous network of networks (the World Wide Web [The Web], by the way, is a part of it, but by no means all of it) of globally connected computers that permits users to search for and access information from all over the world. The Web, considered the star of the Internet and the true information superhighway that everyone is really talking about, is an interconnected collection of more than a million sites or home pages, the total growing at the rate of almost 1,000 per day, according to conservative measurement. Searches of the Web can be accomplished in two ways: (1) simply by typing in or clicking on broad keywords—finance, sex, or medicine—or (2) by formulating a specific, narrow search query and running it against various Web sites to see what falls out as "hits."

The term *hit*, by the way, does not necessarily refer to an article or other source that actually pertains to (or answers) a specific search request. For a journal article, book, or other source to become a hit in an automated search, the source need only meet the search criteria expressed by your query. The trouble is that the system receives its written instructions in words, and words comprise a language, and language, although a necessity in all searching, can be a serious impediment to finding what you really want due to its inherent imprecision. Words, after all, are not thoughts. Computers, as everyone who has ever used one to find information already knows, do not do what you want

them to; instead, they do what you *tell* them to, which is often a very different thing. Garbage in, garbage out, and all that.

Although there are currently seemingly limitless Web pages, with more being posted every hour, one must have the use of a browser such as Netscape Navigator® or Microsoft Internet Explorer® to view even a single Web page. Without a browser, the Web pages would be invisible. However, this requirement is not, for most (more affluent) users, a serious obstacle to getting on the superhighway and traveling around: it's easy to get into a browser. All you do, once connected to the Internet, is to type in a Web address (such as, say, www.Netscape.com) and off you go.

A front page identifies the browser and briefly lists its domains and contents. From there, you can branch out to other pages simply by clicking your mouse button on anything underlined or highlighted in the text, which means "linked" to the first page. Those links connect, in turn, to other links, and so on, ad infinitum. In fact, these so-called hyperlinks make just about everything available on the Web link to something else, and newcomers to the Web can—and often do—spend hours "surfing" or "cruising"—trying to see what they can find, and getting literally "lost" in an infinitude of data sources.

The Internet was viewed—and not so long ago—by the average citizen as a new and strange land, mysterious and possibly more than a little menacing except for geeks, techies, and people with advanced academic degrees. However, the Web that the Internet connects one to nowadays is not confined just to vast conglomerate information companies that have Web pages. Just about anyone—individuals, political movements, companies, single-issue pressure groups, hate spewers, government agencies, schools, publications, museums, young children, and independent entrepreneurs—maintain individual Web pages, which can be accessed just by clicking on the underlined links or names. There are millions of those pages out there in cyberspace, with more coming every day, and no likely end in sight. As to whether this proliferation of information sources and destinations is a good or a bad thing is left to the reader's judgment—and, eventually, that of history.

Where, Exactly, Is the Internet?

■ Where do you want to go today?[2]

The Internet is not a place, in the sense that you can go there, open the door, walk in, and be seated. The Internet exists (if it can be said to exist, at all) in a place called cyberspace, out there somewhere past your computer's wiring, in the immense region of ether, riding the waves of electronic communication. This concept is difficult to grasp and can be confusing for some people—they're accustomed to dealing with organizations consisting of flesh-and-blood

people, living or working in physical buildings, and having telephone numbers you can call to reach them. Cyberspace, however, is a new concept, an idea that some people find hard to get their minds around. Because it's not a place, it's everywhere and nowhere, a vast arena enabling huge switch engines designed to facilitate communication to send messages in all directions simultaneously.

What Is the World Wide Web?

The Web was created in the early 1990s by the European Laboratory for Particle Physics and had, as its primary goal, that of allowing researchers to work together on projects and to make project information easily accessible. The Web's genesis is attributable to Tim Berners-Lee, who was working, in 1989, at a high-energy physics lab in Switzerland, when he got the idea for a system that would link scientific documents via the Internet, making them available to researchers worldwide. In late 1990, the Web consisted of one server at the lab in Switzerland, and one file, the lab's phone book. Today, the number of files is up into the millions and there are almost half a million servers in operation. Good news travels fast and corporations have not failed to see and exploit the potential of such opportunities; commercial sites now number into the tens of thousands as people are finding out that there are ways to go "shopping" without getting dressed, leaving the house, and walking or driving somewhere.

The Web, often confusingly and inaccurately referred to in the literature as synonymous with the Internet, is a stand-alone entity, in and of itself. When a company or other site proclaims that it provides Internet access, all it is doing is giving you an e-mail box and a point of entry to the often chaotic and fast-moving river of information contained on the World Wide Web. Consider the analogy that writers employ to refer to the system as the information superhighway. If you consider the Web to be like the interstate highway system, search engines then become "on-ramps," as opposed to destinations, putting you in the flow of traffic but leaving you on your own, navigating around an infinite system, with only confusing billboards and road signs (Web page links) as possible destinations.

The Web is a vast collection of text, graphics, sound, and video files linked together (through highlighted or underlined words or expressions known as links) that make it possible for the user to jump or travel from one document to another, even if these documents reside (as they often do) on different servers, in different geographical locations. All you need is a specialized software program (there are different types, calling themselves Web browsers, graphical search engines, directories, and portals) and you can view any material found on the Web just by pointing the cursor and clicking (or double clicking) a button. There are millions of Web pages already, and the doubling time of the total corpus of information is continually growing shorter.

A search engine, created by automated search programs, grows larger by using a computer "spider" or "crawler" program that roams the Web, scanning in hundreds of thousands or perhaps millions of new pages or documents per day. It stores the contents of these Web sites in a massive database, where directories (organized hierarchies of Web sites) are chosen and assigned to categories (often called folders) for convenience of browsing. Because such directories are created by humans, rather than computers, and are thus much slower, they store a much smaller number of sites than search engines, where acquisition is continuous and automated. Once you're linked into a given site or Web browser, where you go and what you do (unless you're using a filtered computer) is strictly up to you—depending on what you're entitled, permitted, or willing to pay to get into, of course.

The Web's best feature can be that virtually anyone can set up and maintain a personal or corporate Web site. For evidence of this assertion, browse around on a major search engine: the White House has a site, so does the Roman Catholic Church in the United States, and so do hundreds of earnest pornographers. In fact, there are sites devoted to every imaginable subject, hobby, interest, or taste, from archery to zoology, and from movie star fan clubs to religious organizations. Curiously, many people have somehow acquired the notion that the Internet and the Web are one and the same, or perhaps parts of the same entity. Such an assumption might seem warranted due to the common practice in the literature of referring to the Net and the Web interchangeably. The truth, however, is at variance with such an assumption, in the following way: The Internet, by its most elemental definition, exists wherever electronic devices communicate over publicly accessible networks using a digital common language or protocol. The Web, however, is not identical to or co-extensive with the Internet. Rather, the Web is an electronic system in which hypertext information, in a format called HTML, is exchanged via a protocol called HTTP.

Today, the Web constitutes roughly three-fourths of all the traffic on the Internet. It wasn't always so, however. Back in 1991—a long time ago, as Internet time is measured in this field—the World Wide Web was in competition for ascendancy in the information retrieval area with several systems (such as commercial online systems like DIALOG and NEXIS/LEXIS and other experimental Internet-based systems known as Gopher and WAIS), striving to be adopted by Internet providers as formats for their products and services. What followed were three years of struggle and confusion, as software developers, publishers, and users tried to anticipate which system would become the industry standard (much like the struggle between VHS and Betamax for control of the videocassette market, a decade earlier). By the end of 1993, the Web emerged from the fray victorious, when the National Center for Supercomputing Applications released the Mosaic Web Browser, which could be adapted to all browsing systems. Thus, the Web that we now use and accept as a common medium of communication exchange, is a relatively recent development, and just a decade ago, was fighting for its existence against strong competition.

What, exactly, are Web pages? Following our previous analogy, if the Internet is like a superhighway, then individual Web pages are the billboards and other advertising that you see as you drive. There is, however, a significant difference between signs in the physical world and those on the Internet for the "driver." Web pages can be equipped, at the provider's discretion and financial ability, not just with arresting images, but also with "hot button" links, audio, movies, pictures, text, and software that you can download and "have" on your own system.

How Big Is the Internet?

■ 2.1 billion—Average number of e-mail messages sent daily in the United States in 1998; 630 million—Number of pieces of mail handled daily by the United States Postal Service, as of May 1998.[3]

■ Estimated total population of Internet users at the end of 1998 = 147 million individuals.[4]

■ America Online's 13 million customers (11.5 million of them in the United States) generate 34 million e-mail messages a day, and 290 million "instant messages," real-time, back-and-forth exchanges between users who are logged on simultaneously.[5]

■ There are seven new people on the Internet every second. By the year 2002, there will be over 100 million people online. Soon, all our communication will be free of borders.[6]

■ A new survey of the World Wide Web has turned up at least 1 billion unique Web pages, underscoring the startling growth of the Internet during the past few years. The survey, conducted by search engine company Inktomi Corp. and the NEC Research Institute, provides one of the most accurate pictures yet of the size of the Web. Inktomi embarked on the survey (in September 1999) using automated programs called "spiders" that "crawled" across the Internet, marking every Web page and computer connected in the network. More than 58 percent of all Web pages were in English. Two percent were in French. The most linked-to Web page on the Internet

was *Yahoo!*, with more than 750,000 other pages linking to the site."[7]

■ 64 percent of Americans 12 and older have gone online during the past year. 31 percent of all U.S. residents 12 or older go online daily. 86 percent of those online are e-mail users. Nearly half of all users have purchased something online. Internet use is now exploding globally. There are 56 countries on the Net, and the world's 259 million users should nearly double by 2002. The rest of the world is starting to make a dent in U.S. dominance on the Internet. However, Americans still account for 59 percent of the world's electronic mailboxes, 43 percent of Internet users, and 54 percent of online buyers.[8]

Already immense in size, the Internet stubbornly refuses to sit still for a portrait or to stop growing (and changing) at an exponential rate. Once a novelty, with strictly scholarly users, it has now gone mainstream, providing a new and important dimension of everyday life for millions of people all over the world. However, although problems can—and do—occur, the overall effect of Internet technology on the quality of life of the average American is overwhelmingly positive. Now, even people who do not (or cannot) invest in a computer can manage to have fully functional access to the Internet, either by going to the nearest library and availing themselves of public access terminals, or by accessing the Web via "Web TV," in which one's family television set becomes the doorway and launching pad to surfing.

How much information is available on the Web? Understandably, that is a hard figure to pin down. In 1999, experts estimated the total number of pages of available information in English at more than 320 million, with at least a million more being posted every week, meaning that it is possible to project that the corpus of existing and available pages should double in something less than six years. But what percentage of all this . . . uh, stuff . . . is useful? That is even harder to assess. The fact is that most of the information available to everyone will never be called for or accessed, and once-fresh information will become hopelessly outdated, availing no one of its (one-time) value.

How many of these uncountable Web pages contain valuable, accurate information that will actually end up being put to good use by anyone? Estimates coalesce around approximately one-third of it all as useful and relevant to someone, which means, unfortunately, that two-thirds of all that information and other data stored on the Web will probably never have any practical application at all. But just like the *New York Times* likes to boast, even if you don't read it all, it's nice to know that it's all in there, isn't it? However, if we accept the notion that we're all drowning in data that comes at us in such numbing inundations that its sheer volume seriously impedes our ability to

use any of it, finding specific nuggets of information amid all that clutter is becoming a more daunting task with the passage of time.

Why is the corpus of Internet-accessible Web information growing so wildly and out of control? For one thing, millions of common individuals have found to their delight that they can be their own publishers and promoters. Creating and posting a Web page has enormous appeal—it's comparatively easy to do, it tells the world that you exist, advertises your products or services, and it allows you to favor millions of potential readers with your opinions, what you have for sale, or what you want to say about yourself. Governments, schools, companies, and individuals who have created Web pages make information available on the Internet to anyone who wants it, while dozens of news services keep people up-to-the-minute on fast-breaking stories, stock prices, and weather-related information, and advertisers swarm onto commercial systems, hawking their wares.

The growth of the Internet—and Internet use—has been almost incomprehensibly rapid, and those growth figures promise (or perhaps threaten) to continue at much the same pace well into this new century, with no foreseeable end in sight. How rapid is that rate of growth? Consider this comparison: Suppose we take the arbitrary figure of 50 million users as a measurement of the effect of a communications medium. According to the U.S. Commerce Department's April 1998, report, "The Emerging Digital Economy,"[9] radio existed for 38 years before an estimated 50 million people were tuned in, whereas television required only 13 years to reach the same benchmark. Yet, once the Internet—the "network of networks" that connects computer-users around the globe—was opened to the general public, early in the 1990s, it crossed the 50-million-user threshold in a mere *four* years. By the end of 1997, more than 100 million people were using the Internet, and traffic on it was doubling about every 100 days. Projecting trends, by the time you read this, the total will have multiplied again and again.

All such figures, however, are merely estimates. In truth, nobody knows for sure just how big the Internet really is, because computational methods are imprecise when one considers such a diffuse and expanding medium of communication. Trying to count either the precise number of Web surfers or the total of documents stored on the Internet is equivalent to attempting to come up with the number of stars in the sky or grains of sand on a beach. About all researchers can hope to do (even with the help of sophisticated computer programs) is to venture an estimate for a specific date and then to extrapolate from that point and update the figures continuously.

Despite justifiable curiosity, the question of how big the Internet actually is is not worth trying to answer, because any estimate of its size put forward would only apply to the moment. Because of its continual and eclectic acquisition (think of an industrious spider continuously spinning, connecting points on its web while expanding the web's overall size), nobody really knows how big it is at any given time. It's huge. Trust me on this. Enormous,

even. And tending toward the infinite, as we speak. Trying to count the exact number of Web surfers online at any moment in time is another exercise in futility, because of the constantly accelerating proliferation of subscribers and Web pages.

There were, a few years ago, more than one million Web sites, and more than 100 million Web pages accessible to the public, according to "The State of the Net: The New Frontier," a 1998 market-oriented survey of the demographic groups using the World Wide Web.[10] The Internet has been adopted by U.S. consumers faster than any previous communications technology, including television, radio, and telephone. Personal computers—the primary means of accessing the Internet today—can now be found in almost 40 percent of U.S. households. This percentage is certain to increase with the general drop in price of Internet-accessible computer systems, and some current programs offering free computers to those willing to sign up for several years of e-mail service. For those who can be tolerant of the targeted and often intrusive advertising that is part of their "free" package, this can be a true bargain, enabling those with scant resources to get into the game. So is it impossible or a waste of time to try to count the number of sites available on the various search engines? Several of the larger ones have attempted to take "snapshots" of their sizes (Table 1.1). Although the list is illustrative, rather than exhaustive, the figures are revealing of the enormity of such search utilities, as of 1999:

Table 1.1.
Accessibility and Distribution of Information on the Web[11]

Name of site	**No. of URLs (approx.)**
AltaVista	250 million
Excite	150 million
Fast Search	200 million
Google	125 million
Inktomi	110 million
Lycos	100 million
Northern Light	200 million

Bear in mind that computer speed is doubling approximately every 18 months and has done so since the first commercially marketed UNIVAC computer came out in 1950. This phenomenon, called Moore's Law, accounts for the fact that computer speed has increased one billion-fold since 1950. Moore's Law further predicts the doubling of computer speed every 18 months. Extrapolating from these ratios, we can assume that Internet traffic will continue to double every 100 days. Yet, such projections might be unwarranted: Just 10 years ago, this entire form of communication and way of doing business did not exist for most of us. Yet, accelerating trends in technology have been borne out. The exponential growth of technology in the first two decades of the twentieth century matched that of the entire nineteenth century. The exponential growth of technology in the first five years of the twenty-first century, therefore, is widely expected to match that of the entire twentieth century, with no end to such exponential growth foreseen.

How Important Is the Internet?

The Internet is too young for anyone to foretell its ultimate significance—and time might vindicate the brashest prophecies. However, some present claims aren't true. It is not true that no major innovation has spread so quickly. In 1990, only a handful of computer buffs used the Internet; by 1999, perhaps 38 percent of households were connected, reports Morgan Stanley Dean Witter. This roughly matches the adoption of the radio (which went from 0 to about 46 percent of households in the 1920s) and lags television (which went from 9 percent of households in 1950 to 87 percent in 1960). Of course, the Internet is a work in progress. "Technologies acquire historical weight by reshaping the human condition. Gutenberg's press led to mass literacy, fostered the Protestant Reformation (by undermining the clergy's theological monopoly) and through the easy exchange of information enabled the scientific revolution. . . . All the large issues remain unsettled. Will the Net enhance individual autonomy or infringe upon privacy? Will it increase people's economic independence—or expand corporate power? Before answers become clear, the Internet will have to attain economic viability. Although booming, it is now largely a capitalist charity. Almost everything on it is being given away or sold at a loss."[12]

For some perspective on the question of size versus importance (clearly two different things), consider this array of quoted excerpts from various media:

- Every day the headlines scream the latest about the Internet. It's huge. It's hot. It's growing every minute. Companies large and small are setting up shop online. Grandmothers are sending e-mail, and before long every school will be wired up to the Net.[13]

■ This almost spiritual vision that people have while on the Internet is all the more remarkable for how unexpected it has been. The Internet, after all, is nothing more than a bunch of highly engineered pieces of rock braided together with strands of metal or glass. It is routine technology. Computers, which have been in our lives for 25 years, have made our life faster, but not that much different. Nobody expected a new culture, a new thrill, or even a new politics to be born when we married calculating circuits with the ordinary telephone; but that's exactly what happened.[14]

■ Here comes the revolution! The more you hear about the Internet, the more that pronouncement fits. . . . You hear about the Net everywhere these days: how it is transforming government, international relations, communications, and commerce. How it is remaking our lives. . . . The Net allows us to take control of our own lives. . . . Individuals are asserting themselves in ways that they never really could before.[15]

■ What we have unleashed is not about computers. Just as sex, drugs, and rock 'n' roll were the defining common ground of the generation previous, the emerging culture in this millennial era has all of those sharp edges plus one other besides: the Internet. Like sex, drugs, and rock 'n' roll, the Internet is a consciousness-raising event. It is a state of mind more than anything else.[16]

The question of the importance of the Internet to society is one on which not all the experts can agree, but most will concede that the new communications medium is revolutionary, for better or worse. Such phenomena are rare. Only a few truly revolutionary events can be said to have completely and irreversibly transformed the growth of recorded knowledge in the Western world. Scholars are apt to argue about how many—and which—are the most powerful historical forces for change, but Table 1.2 lists and briefly describes my candidates for seven of the most important milestones in the history of communication, all of which have had demonstrable and widespread effects both on society and on libraries.

Table 1.2.

Timeline: Seven Revolutionary Milestones in the History of Communication

- 1300: Paper as a cheap and durable writing surface was introduced into Europe from the Islamic world (replacing, for the most part, such earlier surfaces as stone and clay tablets, papyrus, vellum, parchment, and tree bark), leading to the growth of a new industry: paper mills and the ready availability of a new, more convenient communications medium.
- 1456: Midway through the fifteenth century, the printing press, stamping ink on paper pages from movable metal type (generally credited as the invention of the German publisher Johannes Gutenberg), added exponentially to the use of paper and the publication and the dissemination of written information. Literacy suddenly became much more important and mechanized book printing soon spread rapidly throughout Europe.
- 1844: The invention of the telegraph, perhaps the most significant technological triumph of the nineteenth century, first allowed people to send messages back and forth rapidly over wires, to the next town or across the nation, and eventually around the world, with the benefit of being able to receive responses equally quickly and accurately.
- 1876: Bell's invention of the telephone surpassed the telegraph because it made two-way voice transmission with no appreciable time lag possible, first locally, and later, across great distances.
- 1945: Despite experimental attempts years earlier, the electronic computer was ultimately perfected to the point that it was possible for a machine both to input, output, and store large amounts of information (unlike the typewriter, which until recently had no storage capability) and to access it selectively and remotely from a central processing unit.
- 1975: An outgrowth of the computer phenomenon was the microcomputer with its subsequent portability and ubiquitousness, increasing affordability, and miniaturization, causing the microcomputer revolution of the 1970s and 1980s to occur, whereby ordinary citizens could use diskettes or other storage media full of information, which could then be transported or mailed around the globe.
- 1991: The dual phenomena known as the Internet and the World Wide Web, employing improved telephonic and computer connections, became available to the general public and evolved so quickly that the lives of millions of us have been changed by it. The smart money says, moreover, that the Internet and its related technologies will continue to grow, develop, and change in ways as yet unknowable, with an impact on libraries and their services in ways equally unknowable, but profound.

So is it fair to say, as many do, that the Internet is the greatest thing since sliced bread (or beer in cans), or, as some people think, a device to be viewed with suspicion, a menace that threatens the foundations of civilization in frightening and not-fully-realized ways? Different people, naturally, would give you different answers.

> ■ E-mail is only as reliable as the sender, but the Internet is the biggest, grandest encyclopedia anywhere. I can find revolving, 3-D images of the inside of the space shuttle and pictures of the Louvre in Paris or the Sistine Chapel in Rome. I can read the *Washington Post* or the complete works of Shakespeare, get the latest news from Reuters or order a book for my mother's birthday. Saying the Internet is just a form of communication is like saying that the Library of Congress is just a lot of books or that Yale is just a lot of buildings. To lump e-mail chat rooms in with the highly reputable sites that are available through the Internet is inaccurate. Saying, "I read it on the Internet" could be the same as saying, "I read it at the library." The Internet is a tool. How you use it is up to you.[17]

> ■ If I were pressed to name the most significant change wrought by the Internet over the last few years, I would nominate its enormously democratic effect, especially in rendering Net users' geographical location largely irrelevant. One of the best examples of this change that I can think of involves, not surprisingly, books. As a lifelong urban dweller, I have often wondered what it would be like to live in the remote country, many miles from any library or bookstore, with a limited (and quite possibly non-literary) circle of local acquaintances for company. Today, thanks to the community of book lovers on the Internet, the boundaries of intellectual and cultural life—its journals, discussions, bookstores, and correspondence—have expanded to encompass even the most remote points of the globe. I know now that, given an e-mail program, a Web browser, and a phone line, I could be happy in Outer Forgetaboutit.[18]

Viewed in a certain light, there is plenty of good news for society in general to be construed from the basically anarchic format of the existing Internet:

> ■ The Net is the ultimate grassroots phenomenon. Here's the Internet, a world controlled by no one, like a vast television station without programmers or a newspaper without editors—or rather, with millions of programmers and editors. It's a frontier,

> befitting its origins: unruly, impolite and anarchic. But it's also democratic. From this point onward, everyone wired to the Internet owns a printing press. . . . The means of mass communication has been democratized."[19]

Today, digital information transmission and storage are converting information traditionally delivered in the form of print (e.g., newspapers, magazines, and books) into bits—compressed electronic streams of 1s and 0s that can be zapped from point to point—across the country, or even around the planet—in a heartbeat or two. An important thing to remember about the Internet and the Web, as distributed networks with no central point or authority, however, is that they are vast, unedited, uncensored compendia of "information," not all of which is knowledge, some of which might not be deemed acceptable for all people to view or access, and certainly, not all of which is true or verifiable. Personal viewpoints also abound on the Web, sometimes masquerading as "fact," and in "chat" rooms, users enjoy taking the opportunity of getting their opinions off their chests, without the worry or expectation that they could be punished for so doing. Pornography (please don't press me for a definition; all I can say for sure is that, like you, I know it when I see it) is widely available on the Internet, and countless hate- and issue-oriented pressure groups have their own Web sites, from which they attempt to win recruits and converts by promulgating anger, fear and loathing, and conspiracy theories, often expressed as vicious slurs against minorities, for the benefit of like-minded, resentful, and impressionable young people, while misinformation—deliberate or accidental—abounds in every subject area of access or investigation. Sometimes, these organizations and individuals have even been blamed for crimes, after they have called for the death or physical harming of others.

This is a free country, granted, but should such distortions, hateful screeds, and outright filth be permitted to be out there and accessible, where innocent or easily impressed people can read them? The problem is that curtailing such freedom of expression flies in the face of the First Amendment to the United States Constitution—that's the one that says that Congress shall make no law abridging the freedom of the press and of speech. And therein lies the problem: To censor the Nazis, the Klan, the Skinheads, and other hate groups by barring them from—or kicking them off—the Web or out of cyberspace appears to contravene the constitutional protections for which we in a true democracy are all so grateful. *Note*: Because I keep slinging it around, a brief word about the term *cyberspace* seems in order here. The expression has grown—since first used in a science fiction novel (William Gibson's *Neuromancer*, 1984)—into a term now enjoying wide acceptance, even if people cannot precisely agree on what—or where—it is. You are asked to accept on simple faith that it exists, and within it, all the transactions that constitute Internet exchanges and Web searching.

> ■ I'm a pretty Net-savvy guy. I read my morning newspaper online. I buy discount airline tickets online. I participate in animated sports banter online. I even manage my finances online. . . . Still, I have never been to the magical land called cyberspace. Cyberspace isn't on any map, but I know that it must exist, because it is spoken of every day. People spend hours in chat rooms. They visit Web sites. They travel through this electronic domain on an Information superhighway. The language we use implies that cyberspace is a place as tangible as France or St. Louis or the coffee shop on the corner. But why should we think of the Internet as a geographic location? There's no "there" there. Cyberspace isn't anyplace . . . it's everyplace.[20]

As previously stated, the Internet has changed just about everything. However, how profound and how permanent a change are we talking about?

> ■ We can perhaps assume that the use of a medium of communication over a long period will to some extent determine the character of knowledge to be communicated and suggest that its pervasive influence will eventually create a civilization in which life and flexibility will become exceedingly difficult to maintain and that the advantages of a new medium will become such as to lead to the emergence of a new civilization.[21]

> ■ Remember that the technology, in and of itself, does nothing. Rather, it makes it possible for you to shape your own world-within-the-world.[22]

> ■ Ultimately, there are probably only two things we can say for certain about the Internet: (1) it's bound to keep on growing, and (2) it will offer the best opportunities to those who become the most skilled at using and developing material for this new medium.[23]

For better or for worse, just about everything connected with the process of information seeking has changed for those acquainted with (and empowered to use) the Internet. It is now possible—given a little knowledge, a little patience, and a Net access provider—to skip the middleman and become your own researcher, reference librarian, and seeker and discoverer of knowledge. In the process of doing so, you can then capture that knowledge and use it for your own purposes, generally at no additional cost. In the "old days" (up to

about ten years ago) when you felt that you needed or wanted factual information on any subject, you had several options at your disposal (see Table 1.3):

Table 1.3.
Information-Seeking Choices Available to the User Before the Internet

- Casting about in your own (imperfect) memory for the answer (example: trying to remember the name or composer of that popular song or symphonic phrase that keeps running through your head all day or night long and won't let you stop thinking about it) until you either remember it or force yourself to forget about it.
- Rummaging for an answer to your question in your own book collection and/or personal files of data and materials (which could be adequate to the task or not, organized for convenience of use or not, partially or completely disorganized and scattered, or perhaps even consisting of inaccurate, out-of-date information, which will prove to be of little use to you in your quest).
- Asking a friend or colleague (whose knowledge or expertise on the subject presumably—but not necessarily—exceeds your own) for the information (success will depend, of course for its evaluation on who your colleagues are and what they know, as well as your ability to recognize the truth).
- Visiting a library in your geographical area and trying to find the answer to your question, making use of the materials or services available. Such time spent at the library, however, entails the necessity of having a way of getting to and from the library building, an adequate amount of discretionary time to perform your research, and a certain level of ability in data seeking, sifting, and evaluation for success.
- Visiting or telephoning a library and asking a trained and experienced reference librarian or information professional to find the answer for you.
- Hiring (or requesting a favor of) someone else to perform the search for the desired information and relying on the currency, accuracy, and/or completeness of the answer that person brings you.
- Giving up, because it's too difficult, or inconvenient, or taking too long to find the answer, and consequently deciding that you can just get along without the information, figuring that you didn't need it all that badly, anyway.

Most of these options entail effort and a commitment of time requisite to solving your problem. With an Internet account and an appropriate system and search engine, however, you can frequently accomplish the same thing easily, quickly, and without even having to go to the "office" to get online, or even, for that matter, without putting on your shoes. Many people are already telecommuting, working in the information industry without having to leave home. However, before we can assign a uniformly positive value to the effects of having so many people working at home, answers to some of the social questions involved (as opposed to the technical ones) will have to be found, which will call for years of social, economic, and psychological research, and analysis of such studies' findings.

A person engaged in communication via the Internet sees the world in a different light, viewing the world as global, its power decentralized, and every member both as producer and consumer (or "prosumer," a coinage by *Future Shock*'s Alvin Toffler), all parts of it equidistant from one another no matter how large it gets, and every participant responsible for finding and teasing out "the truth" amid a cacophony of biases, ideas, opinions, and facts. There is no central meaning, no official canon, little in the way of common, shared experience, and no consensus from which one can formulate an informed viewpoint. Instead, every idea has a proponent, every proponent an idea, while contradiction, paradox, irony, half-truth, and multifaceted truth swirl and commingle. This scheme can sound democratic and empowering, but demonstrably, it is not without its problems. How did we get to this point? How did the Internet become so important in modern life in such a short time? Let's review. . . .

History: The Internet's Birth and Development

■ Technology marches on: The first experimental network using Internet-like technology involved four computers and was built in 1969. This was 56 years after the invention of the zipper, 37 years after the introduction of the first parking meter, and 13 years prior to the development of the first IBM personal computer.[24]

Ancient History: The Internet, a relatively new medium, offers, to some people's minds, the potential of becoming a truly universal information system, containing everything ever written or written about. However, the search for a universal information machine is far from new. For centuries, people in literate societies have dreamed of a single information source that would contain all the recorded knowledge in the world, indexed in such a way that it could be accessed easily. Although earlier attempts to collect and display all the world's knowledge are documented, French mathematician, philosopher, and man of letters Denis Diderot (1713–1784) is generally credited with the

original idea of an "encyclopedia," (1745) one of the principal works of the Age of Enlightenment; a work celebrated as the first effort in history to assemble information about, well, *everything*, in a single printed source. Diderot labored for years to bring forth the impossible dream—a universal fact compendium about the known world and the people in it, covering every known art and science as of that time, with as little censorship as practicable, given conditions of his times.

Diderot's dream, doomed to failure as it might have been (and would be even now), has followed him down through the centuries, with numerous encyclopedias attempting to bring together everything that is known in a single, convenient information source. Encyclopedias running to 30 or more volumes are published in dozens of languages, each with its own strengths and weaknesses. Yet, because of the immense amount of information available (and the ever-shortening doubling time of that information), no single encyclopedia, library collection, or union catalog of recorded information has ever succeeded in making available (and preserving) all the world's information in such a manner that seekers and searchers could access it thoroughly and conveniently in pursuit of knowledge. Over half a century ago, Dr. Vannevar Bush, in a much-reproduced essay titled, "As We May Think," imagined a mechanical device he called a "Memex," which would index and hold all the world's recorded information within it, and make it accessible to anyone who chose to request it.[25]

His fanciful conceptualization led to a lot of speculation about the feasibility, possibility, and desirability of such devices. So how did society get from that article to today's Internet? Reading Bush's ideas, somebody (or more likely, a lot of somebodies) with the technological know-how must have said, "Well . . . why *not*?" and the rest is, as they say, history. Perhaps the best thing about speculative fiction is its capacity to foster attempts at implementation in the real world.

The Internet (then called the ARPANET) had its origins In the 1960s and early 1970s, within the life spans of most of us. Of course, no one called it the Internet until comparatively recently, which would explain why you probably never heard or read about it until just over a decade ago. The word *Internet* entered the common lexicon on or about November 4, 1988 when many large American newspapers first mentioned the network in their coverage of a computer virus story. It did not immediately capture the public's imagination, but within a year or two, the term had more or less officially been accepted as a word by most published dictionaries.

The crowning achievement of the system, and what made it so unique, was the deliberate lack of a central node or switching center, meaning that, in the absence of one or more nodes, the others could still function normally and work around the one that was inoperative. In the worst-case scenario, envisioned by cold warriors of the time, the system could bypass "trouble spots" (read: vaporize campuses) if such bleak contingencies arose, and direct traffic around the network via various alternate routes.

The ideas and talents of many people created the Internet. Organizations and individuals have worked together for many years to make it the valuable resource it is today. In the late 1960s, the U.S. Department of Defense, fearful of the intentions and capabilities of our nation's enemies, created a distributed (noncentral) network that linked military computers together. The network was connected in such a way that was supposed to ensure that, in a worst-case scenario for the nation (i.e., global nuclear warfare), if one section of the network were damaged or obliterated, the remaining computers on the network would still be able to communicate with each other. Second, ARPANET could permit computers (and their users) to interact with one another, thus allowing defense researchers at various universities to share computing resources. However, to the government researchers' surprise, ARPANET users turned out to be using the network mostly to send electronic messages to one another (today, we call it e-mail), including chat and humor, and not, as was intended, for the exclusive exchange of scientific data.

Starting in 1972, hundreds—and then thousands—of early users began to discover electronic mail as a new basis for communication. Consequently, the government tried to sell off the ARPANET to the private sector, notably AT&T. The company declined, concluding that the new technology was incompatible with the AT&T network. Eventually, the ARPANET expanded to multiple uses, operating under the auspices of the National Science Foundation (NSF). By the late 1980s, the network had been renamed the Internet, and over the subsequent handful of years, the term gained currency and eventual universality, referring to the many networks linked by shared communications protocols.

Other technologies converged fortuitously and enabled the rapid growth and development of the new medium of communication. The first word processor appeared in 1970, greatly enabling the ability of ARPANET users to exchange messages. The following year, the first silicon chip made computers smaller and faster. Finally, the first personal computer was put on the market in 1975, making it possible for at least more affluent families to own them and have them in their homes. Yet, it wasn't until the last decade that the ordinary person would (or could) exploit the potential of the Internet. As recently as the 1980s, there was no particular rush to acquire personal computers, because of considerable costs and the fact that many people couldn't figure out what they would do with one, even if they bought one. Even as late as 1984, only eight percent of American households owned a computer. In just two years, however, the figure doubled. By the late 1980s, the network, now modified into a network run by the National Science Foundation, first admitted numerous universities and schools to connect to each other and later, as the network grew faster and larger, to the general public. Whereas the original users of the Internet had been military personnel, and later, academics, by the early 1990s, many companies began to offer access to home users. This allowed anyone with a telephone, a modem, and a computer

with a minimum amount of memory to access the Internet and become a member of a rapidly growing number of the world's population now potentially linked to one another. The Internet, as it came to be called, admitted new participants to its web of communications sites and became first national—and then global—in nature; because it was no longer being supported by the U.S. government—it became open to anyone wanting to join, as long as each new member had access to a computer, a telephone line, a modem, and compatible communications protocols.

The Internet wasn't always such a free-for-all marketplace of communication and ideas. By the mid-1980s, the NSF created a national electronic "skeleton" that absorbed the Defense Department's earlier efforts, and the system was entirely out of government funding and control by 1990. The Internet gained a much wider following in 1995 when the NSF turned the management of the World Wide Web portion of the Internet over to a group of public companies. As commercial concerns increasingly interested themselves in the Web, its use virtually exploded with intriguing information and data—all for the cost of a local phone call, at least for those resided near enough to telephone utility sites that calls were billed at local rates.

At first, or at least prior to the advent of the popular version in 1991, you had to know a lot about computers to be able to get into the Internet system, navigate around the Web, transfer files and/or send e-mail to other users. However, by gradual stages, the system became much more user-friendly (and thus more accessible to ordinary citizens), thanks to Berners-Lee and his group in Europe who proposed a simple protocol for distributing information. This simple protocol, after going through various stages of development, became the embryonic prototype of what we call today the World Wide Web, so named because the global network had no centralized server or hub, but consisted, rather of an interconnection of computers via a literal web of networks, much like a spider's web might have no center but can cover a vast area of space where its proprietor is free to roam at will. The Internet rapidly became a widespread and useful tool for ordinary citizens to exploit because of numerous felicitous factors, chief of which were the advent of the World Wide Web and the contemporaneous development of e-mail capabilities.

In 1990, researchers at CERN, the European Laboratory for Particle Physics in Switzerland, created and named the World Wide Web, a multimedia branch of the Internet, capable of handling images, action film, and sound effects, in addition to text. The Web, as part of the Internet, consists of a vast collection of documents stored on computers all around the world. These documents are often known as Web pages and can include text only, or some mix of text, pictures, sound, and video. Each Web page has a unique address, called the Uniform Resource Locator (URL), and knowing the URL of a site permits you to display its Web page instantly, or, in many cases, write to its providers.

So much has happened so quickly as a result of the Internet explosion that it is not much of a stretch to refer to the events of the early years of 1990s as "way back when." Way back when, therefore, in 1990-91, the Internet was not at all what it is now, boasting multiple millions of confirmed subscribers and users, with multiple thousands more linking up and logging on each day, worldwide. At that time—only about a decade ago—the Internet was still almost exclusively the province of a comparatively elite and esoteric number of academic scholars, researchers, and other members of the scientific community, who used it almost exclusively for exchanging data, queries, findings, and results.

Word of mouth is a powerful communications medium and selling tool. Once word got around concerning the Internet's vast capabilities (in particular, e-mail), and generally affordable access charges, millions of people (both institutionally affiliated and working out of their homes) jumped on it, planning to use it as a cheap, fast way to send and receive mail and other information. Once the imp got out of the bottle, and word continued to spread, naturally, there was no feasible way to get it back inside, assuming that anyone wanted to do so. Now that the Internet's vast range of capabilities is widely known, there's unlikely *ever* to be a way to find a way (assuming that one is desired) to get people to stop using it. Why would they want to? Where else can one person sitting quietly in front of a computer screen find access to the entire world and its knowledge?

The key to such a system is connectivity, accomplished by means of hypertext documents (Web pages) that contain highlighted (or underlined) text that connects to other pages on the Web. Highlighted text allows the user to navigate easily through a vast amount of information by jumping from one Web page to another. Then hot links on a Web page can be clicked on to display another page located on the same computer—or on a computer anywhere across the country, continent, or even the world.

But back to our timeline. . . . When CERN failed at convincing various private companies to build the World Wide Web, Tim Berners-Lee, the lead researcher and the man generally credited with having been the inventor of the Web, reluctantly accepted responsibility for building it on his own. The consequence of the World Wide Web was the linkage of about 800 computer networks, comprising approximately 160,000 computers around the world, attached to the Internet. Shortly thereafter, the first browser was unveiled, making it comparatively easy for users to use the Internet for information retrieval. Once the browser was in place, the commercial possibilities of the new network became manifest, and restrictions requiring the use of the Net for strictly scholarly activities were withdrawn. In the early 1990s, the backbone of the national network was sold to a private consortium of corporations, with one company given the exclusive right to register domain names (for a fee). This left the Internet, created by the federal government, almost entirely out of federal supervision, a state of affairs variously described as "freedom" or "anarchy," depending on whom you ask.

Commercial activity on the network exploded, accelerating rapidly as the 1990s wore on. Whereas in 1996, educational sites could still be said to dominate the Web, by the end of the decade, almost all of the busiest sites were devoted to sales of products and services. However, not until comparatively recently did the Internet become truly ubiquitous. Only in recent years has the Internet's immense reservoir of electronically held and accessible information been in existence, and available for scholars, casual browsers, lonely people, and searchers after truth to find—or lose—their way. Thanks to modern telecommunications technology libraries of all types have embraced (with varying degrees of enthusiasm and financial ability) this new communications vehicle and offered their patrons access to it as a supplement to (and increasingly, a replacement for) the print reference sources that had for so many years lined the shelves and stacks of library buildings.

By 1994, there was at least one computer in more than one-third of American homes. Meanwhile, computer speed was said to be increasing at a rate of 55 percent per year, and e-mail and Internet use were just starting to become commonplace. The electronic linkage of telephones, computers, and the media kept pictures, sounds, and data continually coursing on a nonstop, high-speed track, saturating our environment with information. It was realized that the more that society depends upon electronic information flow and entertainment, the more our everyday lives need to keep up with its speed-of-light pace, because our economic and emotional existence is wired into its circuitry.

Domain names (Internet addresses) were, until 1999, the monopolistic privilege of a single company, Network Solutions. Until then, Network Solutions enjoyed the lucrative and exclusive right to receive applications for, process, approve, and register all Internet addresses ending with the suffixes ".com," ".net," and ".org." For their service, the company received a nominal fee from all registrants. Whereas in 1992, only about 7,000 registered domain names existed, now there are more than 3 million and the number is growing by 70,000 per week.[26] No one is quite sure of the implications of this. Visionary entrepreneurs who have come to be known in the industry as "cybersquatters" began eagerly buying up domain names that they hoped eventually to sell for large sums (examples: drugs.com, business.com, porno.com). In some cases, they eventually sold their rights for huge sums of money to companies who needed to buy them.

Demographics: Who's on the Web?

It might seem a gross exaggeration to declare that "the Internet has changed everything," yet there is more than a grain of truth in such a statement. The Internet has indeed changed much about the way a majority of Americans conduct their personal and business lives—that is undeniable fact. Technology is becoming so integrated into daily living that it is changing not

just the words we use, but the meaning of words as well. For example, "on line" used to mean waiting in a line in some parts of the country; "flaming" was sometimes used to mean outrageously effeminate; and "spam" was originally only a reference to a commercial brand of a canned meat product. Although those original meanings still exist, they are no longer automatically the first thing people think of when they hear those words. The desire to be part of the Internet has taken the country by storm, as can be seen in Table 1.4.

Table 1.4.
Estimated Number of Global Internet Users[27]

1990	1.3 million
1992	6.5 million
1994	32 million
1996	55 million
1998	100 million
2000	200 million

About 62 million people in the United States (almost one-fourth of the total population) now (2000) use the Net, according to IntelliQuest Information Group, Inc., of Austin, Texas.[28] Some other estimates are even higher than that. Membership in this hot new club of Internet users is ever-expanding, meaning that today's figure, only an estimate, will no longer be accurate tomorrow. Even if we accept the IntelliQuest estimate, that current figure represents about 30 percent of U.S. residents ages 16 and older. Of those 62 million online users, more to the point, an estimated 25 percent are Internet newcomers, which suggests exponential growth in a steady upward spiral. New users flock to the Internet for good reasons. For a start, once an Internet provider fee is paid, access remains more-or-less free; because there's so much available on it that there's literally something for everyone; and because *not* to be involved in it can and often does promote the haunting feeling of being left out of something really important.

So, who are they—the users of this phenomenon that has so taken over the world? How can we describe them, as a sort of family portrait? Despite a tendency toward mainstreaming, Table 1.5 shows that the average Internet user is still not precisely like the average U.S. citizen:

Table 1.5.
A Profile of an Internet User, 2000

- Age: Internet users tend to be younger, but more and more older Americans are overcoming fear of technology and learning how simple (and how important) basic Internet skills really are. In the area of age distribution, the average age of Web users actually approximates the average age of the general population (about 37 years and falling) because a new generation of young users is graduating with Internet skills (and desire) from the nation's schools.
- Income: Web users tend to be more affluent than nonusers. Several studies have shown that Internet use tends to correlate with income; however the introduction of Internet availability in the nation's schools is expected to blur this disparity in the near future. In terms of income, the average Web user is reported to earn about $55,000 a year, more than double the national average, with people earning over $75,000 representing 18 percent of Web users, as compared with only 4 percent of Americans, at large. Some Internet services are actually "free" of direct cost, if you do not count the commercial messages that sponsors inflict on the users as the price tag for no-charge access and use. Other entrepreneurs turn the equation around, offering free Internet-accessible computers to those willing to sign multiyear contracts with service providers.
- Education: Users are better educated (about 43 percent of adult Web users have a college baccalaureate degree or higher, compared to about 31 percent of the general population) and younger than nonusers. Of course, it isn't difficult to establish that education level and income are correlated and tend to vary together.
- Gender: Males presently outnumber females (approximately 58 percent to 42 percent), but the gap is closing and it is expected that parity of the sexes will soon be established.
- Awareness and attitude: In general, Internet familiarity and usage is deemed a positive ability (and increasing numbers see it as a necessity) for an informed citizen. In addition, as previously mentioned, more and more children are introduced to it at school.
- Addiction: There are some reported cases of a new psychopathology known as "Internet addiction," proving that, as with everything else in life, Internet use requires a healthy balance of interest, time, and attitude.
- Library use: Internet users tend to be library users, too, even if they have complete Internet access from their own homes.

- Market penetration: Odyssey, a San Francisco research firm, estimates that online usage in 1998 reached 23 percent of American homes, up from 17 percent a scant year previously.[29] Although that figure represents a huge number of households, the Internet is still a long way from being pervasive. Consider what the Odyssey figure also implies: Three-fourths of American homes currently *lack* Internet access, meaning that 75 percent of the population, if they want to find an Internet connection, must find it outside the home.

- Ethnicity: As hundreds of thousands of new users come online every month, the typical Internet user is becoming more mainstream, thanks to the availability of access to the Web and generally cheaper rates, because of intense competition among the companies offering Internet access.

- Satisfaction: How satisfied are users with their Internet service? In an effort to determine an answer, World Research,[30] a California company, surveyed 3,950 randomly chosen Internet users in 1998 to determine their expressed levels of satisfaction with their online and e-mail services. Of that number, the average level of satisfaction (on a scale of 1 to 5, with 1 being "very unsatisfied" and 5 being "very satisfied") was pegged at 3.1, which shows an intermediate or moderate level of pleasure, but not much more than that. Subsequent studies are expected to show ascending levels of satisfaction, because the succeeding years have helped Internet providers to refine their products and to get "the bugs" out of their systems.

Of course, the system is highly volatile. All these numbers and trends could change significantly in coming years, because 41.6 percent of users said that they had been with their current ISP (Internet Service Provider) for less than a year, and another 45.6 percent for two years or less. Notably, 15.6 percent of respondents expressed the intention to change their ISP in the next few months. Why wasn't the respondents' satisfaction level higher? The most frequent complaints received, in descending order, were (1) slow login, (2) too many busy signals, (3) service or subscription cost, (4) poor tech support, and (5) not enough dial-up numbers (leading to annoying busy signals and messages). Each of those complaints is being addressed by the industry: some immediately, others will be dauntingly expensive to fix, and/or will require more time and study.

In a random poll of 1,000 Internet-using Americans, taken by the Roper Organization in August 1998 revealed that people who get linked to the Internet tend to develop a strong passion for the new medium of communication. Nearly one-half of the Internet users queried stated that they now consider the Internet a necessity, and most said they would pick the Internet over the telephone or a television if they had to be stranded on a desert island. Nearly 80 percent described the computer as the most important invention of the twentieth century (despite some very impressive competition from air-conditioning,

television, canned beer, and night baseball). However, keep in mind that people are fickle: Not long ago, few Americans had even heard of the Internet, and even had they been informed of what was being cooked up in computer labs, few of them could have imagined themselves using it at all, let alone on a daily basis.

According to a Rutgers University study, conducted in early 2000, "Nothing But Net: American Workers and the Information Economy," people use their Internet service (both on the job and at home) for a variety of reasons. Table 1.6 shows how American workers who have access to computers say they use them (with the implicit warning that some workers intentionally distort such reporting to save their jobs).

Table 1.6.
Self-Identified Computer Use Activity (combined: work and home)[31]

Job-related	34%
E-mail	40%
Word Processing	42%
Internet Browsing	33%
Getting News or Information	30%
Games	9%
Shopping	8%
Paying bills/Managing money	8%

Capabilities: What You Can Do, Find, Visit on the Web

■ *Tulipmania . . . Computer evaluations and comparisons . . . Christmas shopping without leaving home . . . Outbreaks of ebola virus . . . Arguments for and against affirmative action . . . Global warming . . . Weapons of mass destruction . . . Reviews of current movies . . . Homeless children . . . Post-traumatic stress disorder . . . Trivia tests . . . Interactive Jeopardy!™ games . . . Local ferret fanciers clubs*

Only a decade ago, no one was able to perform from the comfort of home a whole list of everyday tasks that many of us nowadays do routinely, such as checking personal stock portfolios without looking in either the newspaper or going downtown to see a broker, getting an online weather forecast or city map for any locality, checking schedules and fares and booking airline reservations, or exchanging e-mails with relatives, friends, and total strangers, worldwide, for business reasons or just for pleasure.

■ *Names and addresses of local abortion providers . . . Viagra research and side effects . . . The Final Report of the Assassination Records Review Board . . . Horse breeding associations in your area . . . USDA criteria for determining prime vs. choice meats . . . Free software by mail . . . Background on the plight of the ethnic Albanians in Yugoslavia . . . Restaurant reviews . . . Interviews with Stephen King . . . Advice from expert day-traders on timing the stock market . . . Where to buy the finest extra virgin olive oil and have it delivered to your door . . . Do-it-yourself genealogy . . . Grocery store coupons . . . Medical diagnosis online . . .*

People use the Internet every day to correspond with other people without the expense and hassle of stamps, envelopes, and delays; get their daily horoscopes; do marketing research for work; check the weather in their own or distant cities; shop for music and books; make plane and hotel reservations; view maps and directions to locations nearby or far away; or check reviews of a restaurant they're thinking of visiting. A select (and by no means exhaustive) list of the various things you can do, once you've hooked yourself up to the Internet, is listed in Table 1.7.

Table 1.7.
Some Internet Capabilities

- visit virtual museums
- buy books
- search for jobs, and even begin the process of applying for them
- perform your own research into limitless topics, at any level of specificity
- network with other professionals in your field

Table 1.7 continues on page 28.

- investigate your family tree
- get news from around the world, tailored to your personal interests
- take courses through distance education
- consult (free and privately) with health professionals, and other experts
- find health information on any condition or treatment
- rediscover old friends and make new ones
- read restaurant menus and reviews at your vacation destinations
- check schedules for buses, trains, and airplanes, and book reservations online
- get the latest government information on topics of your choice
- participate in electronic auctions for merchandise
- gamble, whether it's poker, slot machines, or the state lottery
- express your opinions and argue with those holding contrary views
- tap into various kinds of humor networks of various types for your daily chuckle
- send and transfer money, securely and instantly to someone else's account
- view color photographs of people, places, and things online

Among its additional and numerous advantages, the Internet can sometimes be described as liberating, and even therapeutic, as well as enlightening for those whose lives seem to them bleak or even hopeless:

> ■ Tapping into my computer allows me access to classic literature, movie memorabilia, travel information, an entire city library, dozens of daily newspapers and hundreds of magazine articles. I can look up job openings anywhere in the country or read interviews with major newsmakers. I can chat with people from all walks of life who teach me more in one sitting than I could learn in a year. I get up-to-the-minute world, national and local news, weather and sports, and humor of every kind imaginable.[32]

As further evidence of Internet capabilities, author Andrew Boyd waxes lyrical about the liberating things you can do on the Web:

> ■ *Suspend belief . . . Logon in search of community . . . Be a willy-nilly citizen of the world . . . Without history, without heroes, rebel against the blindness of information . . . Go digital . . . Tweak your consciousness . . . Help yourself . . . Be, like, whatever . . . Mess around . . . Be wherever, whenever . . . Imagine you're a nomadic, desiring machine, without limits . . . Read between the lines . . . Move without changing your electronic address . . . Negotiate truth . . . Break the frame . . . Think again . . . Schmooze . . . Network . . . Cross borders . . . Wallow in an orgy of information . . . Hack . . . Continue the tradition of breaking with tradition . . . Break the tradition of breaking with tradition . . . Visit the public square on your private screen . . . Expand your possibilities and your sense of inadequacy . . . Logon to an electronic prosthesis . . . Take pleasure . . .*[33]

There isn't space enough in a book of this type and size to enumerate everything you can locate or link to on the Web (some personal favorite or particularly important Web sites to libraries are listed and described in Chapter 5), but in addition to the e-mail capability, which makes it possible and (normally) easy to send a message to anyone else plugged in, anywhere, you can participate in a discussion in a chat room, find news stories, track or trade a stock (or a whole portfolio), browse around in the holdings of libraries thousands of miles distant, access and download reams of corporate and government information, find tourist information and street locations, shop for all manner of consumer goods, and play interactive computer games, just to mention a few of your options.

In addition to being a boon to consumers, on numerous occasions the Internet has been enriching and empowering for its creators, while allowing others to assume fictitious roles and identities:

> ■ One of the really impressive things about the Internet is that anyone—no matter how inconsequential his or her position in life—can talk and get listened to. One of the perks of being an early arrival—one of the pioneer *digerati*—in a boom town is that you get to wear any hat you choose. That's been my experience as I've watched the wired world go from subculture to mass culture in five years. These chaotic early years have been a golden period for self-invention, when just about anyone could declare to be the Final Online Authority. This refurbishing of self isn't rocket science: Identify a community function that has yet to be met, create a platform for yourself, add an

impressive title, and . . . a significant portion of the Net community will be playing along.[34]

In a widely circulated cartoon from a magazine, a dog, speaking to another dog as they sit before a computer screen, says, "On the Internet, nobody knows you're a dog." In such fashion, it is possible for ordinary people to don disguises, assume new and intriguing identities, and deceive their correspondents, which can be good or bad, harmless or criminal, depending on the circumstances. The Internet can also be considered emotionally enriching and empowering and even, in some cases, life saving. Consider a letter to Ann Landers, from "Married to the Monitor," a divorced wife lamenting neglect by former husband, and praising the Internet for saving her sanity:

■ About five years ago, we bought a computer and subscribed to an Internet provider. It was my ticket to freedom. I couldn't leave the house, so I brought the world to me. I found wonderful friends online. I could "travel" to foreign places. I could look up medical information and join support groups. I discovered I loved history and started doing my family's genealogy. I felt like a real person.[35]

In addition, it's not just the grown-ups who derive the vast range of benefits that the Internet has to offer:

■ OK, Hang on . . . I'm conducting an online search and should have an answer for you in a minute or two.

—Very young grade school student hunched over her laptop, in answer to a teacher's blackboard question "2+3=?"[36]

The potential for anyone to get involved and express individual thoughts freely to others is one of the most seductive lures of the new communications medium. Rapidly, as the Internet has continued its exponential growth, it has developed into a vast, messy, global, distributed network (the Web) of data sites that now literally spans the globe, and anybody, with an absolute minimum of training and rules to remember, can play.

■ *Comparative mortgage information online . . . Finding a nanny online . . . Irresistible fishing lures . . . Where to buy old Frank Sinatra records . . . The chemical composition of bowling balls . . . Cloning of mice . . . Gambling addiction . . . Hedge funds . . . Laptop computers . . . Injection of glucose . . . Recipes for diabetics . . . Escort services . . . Satanism . . . Summer internships for minorities . . . Addresses and phone numbers of neighborhood florists . . . Columbus (Christopher) . . . Columbus,*

(Ohio) street maps and sightseeing information . . . Fish culture . . . Funnel cake recipes

Today, because Internet access has become a capability of almost one-half of Americans, you (assisted by a computer connected to a modem) can go searching on your own—and at your own pace—for the answer to virtually any query (whether the answer sought is a name, a fact, a list of sources, a poem that suits your mood, mutually exclusive theories, or even a reason for something) from your home desktop, without having to get dressed, look your best, or even venture outside your homelike surroundings.

■ *Liposuction . . . World's most venomous snakes . . . Celebrity publicity photos . . . Cable descramblers . . . Dilbert clips . . . Conspiracy theories concerning the death of Princess Diana . . . Global warming . . . Security flaws in Internet browser software . . . The debate over Palestinian statehood . . . Calorie counting diets . . . Comparative lawn mower evaluations . . . Alligator farming . . . Preventing loss of life on nuclear submarines*

Your ability to satisfy your information needs is, in fact, so powerful that such a capability would have been unimaginable just a generation or two ago. Today, for example, it is possible for you to track your spending, plan your future, pay your bills, reconcile your accounts, monitor your investments, and even buy and sell securities at online sites, merely by using your own computer's Web browser, without even having to put on your shoes.

■ *Elvis Lives! fan clubs . . . Dolphin intelligence . . . Hormone therapy for menopausal women . . . Authentication of miracles . . . Insurance scams . . . The Sundance International Film Festival . . . Jenny McCarthy . . . Impeachment of presidents . . . Mating habits of bald eagles . . . Information on Roth IRAs . . . Growing exotic wholesale flowers . . . Chocolate as a source of endorphins . . . Transvestitism and sexual reassignment counseling . . . Alleged racism in the broadcast media . . . Year-end stock quotations*

The topics mentioned here in random groupings constitute only a sampling (and tiny fraction) of actual online queries all of which can produce results in a single Web site (yet each producing different results) and are presented as evidence and examples of what people are asking Internet search engines to search for on a typical day. Each topic, if pursued diligently and intelligently, will yield some (or often, a great deal of) useful information when searched on the Web. For the average, intelligent information seeker, the Web offers more

comprehensive and up-to-date information (and information sources) than any physical library ever could, in a format (once you get used to it) as comfortable and familiar as (and normally much more colorful than) your daily newspaper—and much easier, thanks to the presence of links, to exploit in pursuit of your information gathering.

■ *Biographical data on Washington politicians . . . Retailers' online clothing catalogs . . . Breeding elephants in captivity . . . Cheap airfares . . . Updates and play-by-play accounts of baseball games in progress . . . English-language guides to the museums of Italy . . . Instructions for applying for Medicare . . . Condo reservations for vacation resorts . . . Interactive children's games . . . Discounted sports event tickets . . . Information on joining (or organizing) a fan club for a favorite celebrity . . . A blow-by-blow account of the Battle of Culloden (1746) . . . Brokerless stock trading . . . Numbered Swiss bank accounts . . . Cochlear implants*

E-Mail and the Internet

About two-thirds of all U.S. workers use e-mail—89 million—according to Messaging Online, an online electronic message information site. In addition, about one-half of all American households—50 million—also use electronic correspondence. Each home has an average of four mailboxes.[37]

Exchanging electronic mail (e-mail) is the most popular feature on the Internet. You can exchange electronic mail with people around the world, including friends, colleagues, family members, customers, and even people you never meet in person but have managed to "find" on the Internet. Among its numerous advantages over traditional communication by ordinary mail, electronic mail is easier, increasingly inexpensive, and much quicker than "snail mail," and carries with it another signal advantage: e-mail saves paper, as well. You can exchange e-mail with people around the world economically, conveniently, with a reasonable degree of security, and all at a rate of "turnaround" that is unmatched by any other form of communication.

E-mail and the research potential of the Internet combine to create a newfound ability for everyone, regardless of affiliation or workplace, to find the information they seek amid untold millions of pieces of information, found amid millions more. Once you pay a service provider for a connection to the Internet, there is no charge either for sending or for receiving e-mail. You don't have to pay anything extra even if you send long messages that travel around the world or to multiple recipients.

Online research and e-mail have become indispensable tools for students, business people, and millions of home users. I, personally, correspond not just with my students about their class assignments, but also with faithful correspondents in nine other states and three foreign countries. Increasing numbers of people are surfing the Net for news and entertainment, and even enjoying the convenience of shopping for about anything they want by secure credit transaction. All you need is a valid credit card account and an Internet hookup and you can—if you wish—do most of your browsing, shopping, and purchasing without leaving home. To meet such needs or demands, entrepreneurs and their products are increasingly meeting consumers in cyberspace, with significant results. And unlike most physical stores and markets, such services are available "24/7," (or 24 hours a day, seven days a week), to match everybody's lifestyle.

When information is available, it is demonstrable that business and commerce, determining that there's a buck in it for them, are never very far behind. Companies large and small have set up shop on the Internet and are wheeling and dealing in ways that conventional, physical stores (and home shopping television channels) couldn't possibly imagine a few short years ago, let alone compete with today. Senior citizens and young children are sending e-mails back and forth every day, and soon, it's anticipated that almost every school in the nation will be wired to the Net.

Today, e-mail has become the most popular component of the Internet and is provided by a variety of commercial online services, which allow you (for a fee, or, in some cases, free) to write brief messages or complete formal letters and send them instantly to anyone, almost anywhere on the planet. Although initially created for business use, e-mail has become by now a serious rival of the U.S. Postal Service for several reasons as shown in Table 1.8.

Internet-facilitated e-mail permits lonely people to find a way to meet hundreds of other people who have similar concerns and interests, and to share information in "chat rooms," where one can find discussion of such topics as politics, celebrities, current events, hobbies, and sex merely by switching from one address to another, and perhaps best of all, without having to identify oneself specifically to others. Chat rooms (the modern-day equivalent of party lines) are very popular with young people, and for some, represent the computer equivalent of attending a party or club without having to look your best, travel from home, or spend money. Some chat room discussions are free-range forums for participants to explore life and love, whereas others tend to focus on hobbies, obsessions, or the political or social issues of the day. Usenet groups, also known as discussion forums, are for people with more structured and detailed ideas than those who merely drop by in chat rooms on a regular or infrequent basis, to see who's talking to whom, and what they're talking about.

Table 1.8.
Advantages of E-mail vs. Conventional (Snail) Mail

- Convenience of use (no stationery, pens or pencils, writer's cramp, postage, walking to the mailbox, etc.).
- Correctability (you can work on your message until it's "letter perfect" and send it, without erasures, strikeovers, or "patches" only when you're satisfied).
- Availability (the system is available 24/7, anytime, day or night, fitting every lifestyle).
- Speed of transmission (your message travels—at optimum conditions—at greater than 3,000 miles per second. Let's see your letter carrier do that!).
- Multiple recipients or tailored audience options (you could send the same message to hundreds of recipients simultaneously or, if you choose, you could send a private and personal note to a single target or correspondent).
- Security, via the use of encryption programs, makes it possible to send "eyes only" and coded messages of sensitive content, without inordinate fear that hostile or prying eyes can intercept, "open," and read your messages.
- Despite modest increases in hourly costs of some e-mail providers, descending hardware costs tend toward the removal of price or wherewithal as major obstacles to Internet access.

It is also possible to further one's education by connecting—often without paying any tuition or fees—to the world's major research libraries, browse their collections, and either read their books' contents or arrange for articles to be mailed to your home address, at nominal cost. Convenient gateways and search engines (electronic information directories that organize tens of thousands of individual Web sites and make them available to the "Web surfer," whether the surfer has a clearly defined mission or is just browsing around or trolling for useful or interesting information) keep proliferating. Fascinating games (and often addictive games) are also available via the Internet and might be played online or downloaded to your computer's memory. Music and sound effects accompany many programs available via the Internet and the Web, enhancing the experience of visiting them, assuming that your computer has speakers and sound cards installed.

Using e-mail, it is already possible to go long periods of time without the burden of having to write letters to one's correspondents. As just one final example of what it can do, the Internet has gone a long way toward superseding printed travel guides; when one is contemplating travel, it is possible and

convenient to do your own comparison shopping, advance work, and bookings. It's also a piece of cake (and only a small number of keystrokes), in addition to investigating any location's climate or weather forecast, to reserve suitable lodgings, find your way around, and be advised of anything going on during your stay, simply by visiting that community's Web site.

The lure of the Internet (and its most salient feature, e-mail) is, for most of us, undeniable. It's easy and it's fun. Just learn a few basic procedures, then jump on the Web and communicate or explore until your heart's content (or, as often happens, you run out of discretionary time). However, undeniably, the Internet has changed the lives of millions of Americans by altering the way we do our jobs, conduct our relationships, and even manage our time. Although not all change can fairly be described as progress (and not all progress is necessarily forward), the age of the Internet has demonstrably changed most of our lives significantly, already, and is likely to keep on changing them in the years to come.

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2 Caveat Internet! Potholes, Hazard Lights, and Glare Ice on the Information Superhighway

■ The Internet is designed to afford its users complete anonymity if they so choose. Many choose that option and rightly so. Why? Because the Web is a lot like the real world, populated by all kinds of people, good and evil. Far from being the intellectual medium we would like to believe it is, the harsher truth is that anybody who can type can gain access to this far-from-elite society. Plain and simple . . . an astounding 90 percent of all e-mail pals that we've (investigated) have lied about their age, occupation, marital status, or some other key attribute of their personality or background.[1]

Overview

The preceding chapter served as both introduction and cheerleader for the Internet and the World Wide Web, cataloging and chronicling the wondrous and useful things that the Internet has already done for Americans and what it plans to do for us in the immediate future. This chapter, in fairness to our treatment of the subjects under discussion, presents a corresponding number of caution flags and warning signs that accompany the new electronic phenomenon: a list of potential but very real problems underlying the new capabilities we can now exploit. Remember, that all progress presents problems, many of which, once fully realized and comprehended, can be overcome. Still, it seems appropriate to discuss some (the list is by no means exhaustive) of the bad things that can result from Internet service, and what we can do about it before things go from bad to worse.

The Times, They Are a-Changin'

We are all connected. . . . After the invention of the telegraph in the 1840s, instantaneous communication has been possible, and wires connecting people to one another have spread like kudzu across the face of the planet. The telephone network and, more recently, the Internet (the convergence of telecom and computing) are further tangible, visible expressions of the ties between people. It is an increasingly networked world.[2]

In the early 1960s, Marshall McLuhan predicted that accelerating technology was, even then, creating a vast "global village," meaning that the barriers of time and distance that keep people apart (and at odds) would soon disappear because of vast improvements in communication in future decades. Moreover, McLuhan went on to prophesy optimistically that with increased communication would come increased understanding and an end to war and conflict. Oh, well. Win some . . . lose some. Nobody's perfect.

Manifestly, however, things don't seem to be working out the way that McLuhan anticipated or expected. Instead of bringing us together in a global village, the Internet revolution (and the computer revolution out of which it grew) appears sometimes to be leading not to one-world, love-one-another, global harmony, but rather to its opposite: fragmentation, misunderstanding, isolation, alienation, a rise in the number of reported sociopaths, and an increased chance of global conflict. This might be so because so many people now work and play alone, going one-on-one and not with other people (in the sense of getting up close and personal) but interacting primarily (and in some cases, almost exclusively) with a computer, the two of them hermetically sealed in a home office, shut off from the fellowship of social interaction.

Alvin Toffler coined the phrase "future shock," referring to the feeling of being unable to cope with the technological transformations going on in one's world.[3] Information overload, once unheard of, but a growing part of the problem of future shock, is now a serious problem for Internet users and likely to grow increasingly more severe as time passes.

Dogbert to Dilbert (first speaking, then shouting, and finally pointing and screaming): "So, according to you, the Internet is a passing fad. You moron! Look around you! The Internet is everywhere! And there's nothing you can do about it! *Nothing!*"[4]

Internet users, growing exponentially in numbers every year, keep finding new and interesting uses for the new electronic technology, some appropriate to its power and uses, whereas others have unforeseen, unintended, or even dangerous consequences, as a few devious or criminal minds have figured out how to exploit the system's awesome capabilities for their own, nefarious ends. The times are in a continual state of flux, and innovations in technology have wide-ranging effects on the way things get done, and on society as a whole. The Internet came on the present scene amid enthusiastic claims that the new technology would serve to "bring us together" and make each member of the planet's populace connected to all the rest. But has it?

As promised in the preface to this book, this second chapter is devoted to discussion of the problems inherent in (or thrust upon) individuals and organizations that have become "wired" and full partners in the new technology, adrift on the vastness of the furiously rushing torrent of information known as the Internet and the World Wide Web.

Despite the seeming oxymoron embedded in the idea that change is the only constant in modern life, it rings true, nevertheless: Continual change has become the only constant you can count on; the only thing as sure as death and taxes in this increasingly complicated world. And although the "packaging" of information seems to have changed almost every time you turn around (remember when we were using 5.25" floppy diskettes for information storage?), it's still largely incremental change, a case of old wine in new bottles. Only rarely (as in the case of the Internet, itself) is change truly revolutionary. The printed page, whether on paper or as an image on a computer monitor's screen, is still the same. We just have to understand, get used to, and accept those new bottles, or else one day soon we'll have no other way to access the wine of knowledge that we require to conduct our lives successfully.

The most important problem with the condition of constant change is that you never really get a chance to stop things—freeze frame—and inspect what has happened, or steer a reasoned, coherent course toward what you want to happen next. Too many people react to what's happening, rather than take steps to try to ensure that what's happening is what they want to happen, and therefore likely to result in a desired end.

Another looming problem is the increasing dehumanization of communications networks (think about how many times you've tried to call a company and had to deal with a menu of button-pressing options before even having a chance to speak to a person about your concern, if such an opportunity is even available). Machines, because they often work better, cheaper, and faster than people, are now becoming "self-aware," in a very real sense, and thus capable of being taught new "tricks," as they develop self-diagnostic routines and a measure of what we are pleased to call "intelligence." Possibly, in the not-too-distant future, there will even be machines capable of reproducing themselves without human intervention or instruction. Question: Is that something we should anticipate with pleasure or view with mounting alarm?

Mid-twentieth-century Canadian humanities professor Marshall McLuhan, in his celebrated work, *Understanding Media* (1964), foresaw the nagging downside of creating "smarter" machines as part of the new technology.[5] That prophetic book warned the world that things aren't just changing—they're changing *us*, as well. One memorable photograph inserted into the text displays a black-and-white enlargement of a fingertip holding a tiny, late-model microcircuit of the time. The circuit, a simple, and now-rather-primitive, miniature square of wires and terminals, might appear to be sitting innocently on that fingertip, but the caption for the photograph is neither simple nor primitive:

"When this printed circuit learns *your* job" McLuhan's author's voice asks, politely but with emphasis, "what are *you* going to do?"

The familiar fear of becoming superannuated and obsolescent is a very real concern of many modern individuals. The legend of John Henry, a cherished part of nineteenth-century American folklore, is a useful parable for what ails

many people now in contemplating the reach and power of the Internet. John Henry's story depicts the clash and confrontation between old and new technologies. Big John thought he had a workable answer to the questions raised by the new technology. He was wrong.

As the colorful legend goes, John Henry, a huge "steel-drivin' man," made his living hammering into solid rock to create mining tunnels. One day, the owner of the mining company trotted out a revolutionary new tool: the steam drill. Promoting his steam drill by saying that it could do the work of ten or more strong men for a fraction of the cost, the owner challenged John Henry to a contest: new technology versus muscle and sweat. During the contest, the steam drill got off to an early lead, burrowing into the mountain at a rate no mortal could match, but after a while technological problems incapacitated the device, causing the triumphant John Henry to point out that "the hole done choke; the drill done broke, and you can't drive steel like me (Lord, Lord)," as he hammered on to victory. Ironically, his labors overstressed the great man's heart and in his very moment of triumph, he laid down his hammer and died. Relevance: Although virtually all drilling into mountains, nowadays, employs diamond-bit pressure drills, the impressiveness of one man's refusal to let a machine get the best of him, and his determination to fight the good fight and die (if he must) with a hammer in his hand, are still frequently sung about and discussed.

Modern-Day Luddites

The application of that legend to the situation at hand is that millions of people in the United States (and billions more, elsewhere) are modern-day John Henrys, defiantly leaning on their hammers and watching the march of technological progress with suspicious and resentful eyes. Such people could be termed contemporary Luddites, a reference to Ned Ludd and his followers, described as members of the working class in early nineteenth-century British society so resistant to modern technology that they committed willful sabotage to machinery to retard its progress. It was after the Luddites that the expression, "throwing a spanner (sometimes called a "monkey wrench") into the works," came about, referring to intentional sabotage of technology in the hope of protecting workers' jobs.

Today's neo-Luddites reject the Internet as a mere fad or even a menace to society, and therefore generally would not agree with Einstein: They just don't deem it possible for the Internet and the traditional forms of work to coexist symbiotically. Others, however, take a more conciliatory approach, merely asserting the necessity for skilled and determined people to augment and work with the machines we use in our daily encounters with information and information systems, and affirming that neither is as good alone as both people and machines are when they work together.

New inventions are seldom universally acclaimed. Unlike earlier times, a single generation can make an amazing difference in what is available to consumers and how to get at it. In addition, when a new technology becomes widely available, no matter how much it is hailed publicly as a wonderful invention, great convenience, or facilitator, not everybody wants to go along for the ride. Voices can always be heard condemning the new technology and inveighing against its use (and users). Nevertheless, detractors are always going to be with us. Not only have many people deplored the Internet revolution, they have even railed against the computer, itself. Typical arguments ("Luddite" or otherwise) against filling library rooms with computers or terminals are listed in Table 2.1.

Table 2.1.

Reasons to Be Leery of Abandoning Books in Favor of Internet Terminals

- Computers in libraries are still (despite a gradual decline in price over time) expensive when compared to other methods of obtaining information now and could well become increasingly expensive in the future.
- Money spent on computers and Internet terminals is money taken away from the book budget and the provision of journals, magazines, newspapers, and other vital library materials.
- Internet is uncensored, unfiltered, and can become a conduit for unwary or unsophisticated users into a "river of filth" via access to pornographic Web sites or hate-group propaganda and instruction in the assembly of destructive weapons. This can force librarians to have to assume the role of "morals police," snooping on users to see what they are accessing and punishing those guilty of "inappropriate" access.
- Librarians increasingly find themselves dividing their precious work time between their normal, assigned duties and the unwelcomed role of "traffic cop," having to adjudicate and referee disputes among users signing up for time on public Internet terminals.

Even renowned public figures, whom normally no one would suspect of anti-technology sympathies, have weighed in on this intellectual (and emotional) battle for our hearts and minds, as many prominent people are quick to point out in their public addresses. Such comments can, of course, be variously viewed as reactionary or as legitimate criticism of technology, or at least our use of that technology.

> ■ Technology . . . has let people down, leaving an ugly scar on the face of history. An ideology designed to empower the masses (has become) one of the most ruthless instruments of oppression. . . . It is not enough to wire the world if you short-circuit the soul. Technology without heart is not enough. . . . Hate hate, become colorblind, and take care of each other.[6]

Clearly, the Internet is a revolutionary device, collecting just about everything ever written into one enormous database and thus offering its users whole new worlds of information, with links to all the rest. However, for all the wondrous opportunities it offers, or claims to offer, for many people, there's a dark side (or multiple dark sides) to the Net, a seamy underbelly to this world of wonderful possibility, and a series of persistent problems that we keep hearing about.

Not Dodge City; Who's in Charge, Here?

> ■ The Net is the largest gathering of human beings ever, and one of the ground rules is that there is No One in Charge.[7]

In the past, no matter how frightening conditions became in various sectors of communication, there was almost always someone in charge, someone you could see about your complaint, someone up in the tower to whom requests for clarification or redress of grievances could be addressed. Here's an example of the comforting feeling of knowing there's "someone in charge," taken from a gone-but-not-forgotten television program that was an important part of my youth, and, at least in part, a shaper of my youthful cognitive view of the world:

Scene: The bar of the Long Branch Saloon in Dodge City, Kansas, on a typical raucous, Saturday night, circa 1870. Sam, the bartender is serving whiskey to thirsty trailhands and cowpokes. Miss Kitty, the proprietor, is upstairs on the balcony, doing her accounts. In a corner, a piano player in black vest and arm garters is enthusiastically slamming out an out-of-key rendition of "The Camptown Races." Amid the prevailing atmosphere of hilarity, however, a drunken cowboy at the bar is attempting to take slobbering liberties with one of Miss Kitty's bar girls, and she, resenting his rough treatment, loudly voices her protest. Their struggle gains the attention of the tall lawman at the other end of the bar, having a quiet beer with his friends, Doc and Festus. He decides to intervene. Let's listen:

Bar Girl: (struggling to break free of the man's hold on her) "Get your filthy paws off me, you disgusting animal!"

Cowboy: "Oh, now, come on, Missy, relax!; You ain't bein' neighborly a-tall. I mean, I done bought you a couple of drinks, ain't I? An' you know zackly what I want in return, so just quit yer caterwaulin' an' c'mon upstairs to one of them rooms with me, all right?"

Marshal: (striding toward the struggling couple): "That's enough! Hold it right there, Cowboy! Let her go!"

Cowboy: (still holding the girl with one burly arm, eyeing the Marshal while dropping his free hand to his holster): "Oh, a lawman, huh? A Yew-ess Marshal. Big one, too. Now Marshal, I figure you ain't got no call to interfere in a private conversation 'tween me an' this here pretty little lady, so unless you're hankerin' to get dropped right where you stand, why'n't you just turn around and go back to your friends an' leave us be?"

Marshal: (left hand extended, right hand slipping down toward his own holster, then the camera gives us a close-up of his seamed, stern face): "Think about what you're doing, son. You've just had too much to drink. Come on, now, it's Saturday night and we're having a pleasant evening here. You don't want to draw that gun. This doesn't have to happen. So just let go of Lulabelle, there, and give me the gun and you can walk away from this with nothing worse than a hangover in the morning."

Cowboy: (releasing the girl, speaking to her) "Now you just stand over there, li'l gal, so's you don't get shot up when I put this here buttin'-in lawman in Boot Hill Cemetery. But we got unfinished business, hear? So mind you don't go too far off. (turning to Marshal) Now, the way I see it, Marshal, you butted in an' dealt yerself into this hand, and now you gonna haveta play the cards you dealt yerself. So I'm fixin' to count to three, and when I say 'three,' if you ain't a big ole yeller-belly, you'll draw yer gun an' die like a man. An' hurry up about it, 'cause this little lady and me, we got some bidness to take care of upstairs. Now I'm fixin' to start countin', Marshal. Ready?"

Marshal: (tight close-up of his weary, narrow eyes): "Don't be a fool!"

Cowboy: (close-up: twitching hand stealing lower) "Here we go, now, Marshal. One . . . two . . . thr . . ." (a loud, single shot; the cowboy crumples and falls slowly, discharging his own weapon harmlessly into the sawdust floor as he dies).

> **Marshal:** (close-up of his leathery, saddened, face, sighing, and then speaking to bystanders): "All right, folks. Show's over. Go on about your business. And one of you men go get the undertaker." A man departs hurriedly; the rest of the bar's occupants slowly return to their conversations and their drinks as the piano player resumes belting out his spirited tune.

On the durable and popular Western television series, *Gunsmoke*, incorruptible, modest, tree-tall, likable, and always righteous Marshal Matt Dillon kept law and order in an otherwise anarchic 1870s frontier town by intimidating most of the town's visiting would-be troublemakers, and, albeit reluctantly, shooting the rest. Now *that* was somebody in charge.

How does this slice of fictionalized nineteenth-century drama pertain to the Internet, the subject at hand? The basic problem (and perhaps one of its greatest advantages, as well) with the Internet (unlike, say, broadcast television) is that it is a distributed network of millions of broadcasters and originators, with no central governing authority. It exists not in a building with telephones, desks, and clearly defined areas of responsibility, but out there in cyberspace somewhere, an imaginary place in the network where electronic communications meet and interact.

Such a distributed network means that there is no hierarchy of responsibility; all Internet users are potential communicators; no one is relegated to the role of passive spectator. Anyone and everyone can play. We're all publishers, of a sort. Millions upon millions of participants post documents—messages and data, containing truth, half-truth, personal opinion, and fiction—every day, where others can read them and react to them. However, on such an apparatus, documented facts exist alongside intentional and accidental distortions and fallacies, rumors masquerade as gospel truth, and unadulterated hate speech coexists with words of kindness, inspiration, and solace.

The problem is that the Internet is still a wide-open frontier town sort of place, without much in the way of hard-and-fast rules or anyone capable of enforcing them, unlike Dillon's Dodge City. There's no Internet headquarters, no central authority, and no one is in charge. Consequently, no one is responsible or subject to prosecution for harm that might come to others as a result of their words, and although the good news is that each user is free to speak what he believes to be the truth (a meritorious aim in a true democracy), the bad news is that it is difficult (where possible at all) to stifle, refute, or knock down someone for what that user has said. The networked Internet is value neutral, and completely impartial, embodying the thoughts of wise and thoughtful contributors, enraged and hate-fueled fanatics, time wasters, and babbling idiots, alike. Even more nettlesome, perhaps, is the fact that such contributors to Web sites cannot always be readily distinguished.

Most of the individuals and corporations that advertise on the Net are respectable, legitimate businesses; however, because nobody's in charge of this vast network of information, nobody's responsible or even available to face down (or put out of commission) the occasional scam artists, criminals, perverts, or troublemakers. When you encounter a problem on the Internet, for better or for worse, you're pretty much on your own.

Suppose, for example, that you have a complaint about something you read or see (e.g., hate speech, pornography, detailed instructions for making of bombs and other weapons of mass destruction, incitements to violence, congressional reports on alleged presidential misdeeds in the Oval Office) on the Internet. Let's say that you believe that its message or content is highly offensive and potentially dangerous, especially to the minds of the young and easily impressionable. Who can you talk to about that?

The individual supplier or information source would be a first place to apply, perhaps, but clever originators of genuinely offensive messages have been known to take great pains to conceal their true identities, for obvious reasons, and, if revealed despite their attempts at anonymity, might seek and invoke the constitutional protections of "free speech" to justify and shield their activities from legal sanctions. Still, let's say that you, knowing all this, still want to register a complaint, what then?

> ■ I promise you, sooner or later, something on the Net will offend you. There is no censorship. This freedom is the prime reason that the Net has become so important and why there are so many diverse resources. Still, some people have a little trouble getting used to such license. Eventually, we all come to realize that if we don't like something, we can ignore it. . . . Indeed, if there is one Internet Golden Rule, it is "Censor yourself; not others." Realistically, we all come to learn that we can't do anything about how other people use the Net, so there is no point in even trying. The idea is to share and enjoy. If you don't like something, forget about it.[8]

No doubt, this has a ring of truth to it. You can find millions of viewpoints amid the millions of Web pages accessible through the Internet. However, just suppose you log on and become not merely offended, but actually so alarmed or enraged by something you read or view on the Web that you decide that you cannot just let it pass. Suppose you want to register a complaint because you are unhappy or even incensed with the way the Internet or some of its millions of participants are treating you or your concerns. Who do you see about that?

That's the whole problem: There is no one to complain to. No control tower. The buck stops . . . nowhere. Nobody's in charge. There's probably nothing you can do to suppress or refute what you find odious, untrue, or dangerous.

There are, of course, a few obvious remedies, for such anarchy: First of all, if you don't like what you read or see on the Internet, you can disassociate yourself from it, change sites, or post your own (hopefully more reasoned) messages on the Net in the hopes of swaying others' minds. The analogy of the present-day Internet to what the Dodge City of more than 100 years ago would have been like without Marshal Dillon makes the domain of cyberspace an anarchic, vulnerable place, full of fear and confusion, a wide-open frontier town, where the vulnerable are defenseless against assault and ripe for the plucking by ruthless hands.

The Internet, by its very nature, lacks the stability and other advantages of having a single governing body to handle complaints and disputes, sort out boundaries, enforce laws and rules, generally regulate things, and protect the populace from various forms of violence. As with a Dillonless Dodge, there's nobody in charge, and it's only quite recently that legislative attempts at the state and federal levels have begun to pass laws (and prescribe punishments) to deal with those who transgress agreed-upon boundaries of ethical, fair, and legal practice in dealing with this medium and with other users of it.

Hazardous Driving Conditions on the Infobahn

Even the broadest and best maintained superhighway requires plenty of careful oversight, especially when, belying the placid surface of the road, there could be potholes, hazard lights, and glare ice lying in wait for the unsuspecting drivers. Just as life is normally balanced between bitter and sweet experiences, so the totality of human encounters with the Internet is likely to contain elements of elation and frustration. What was overlooked, perhaps, in designing such a vast information system, was human nature. People are still pretty much the same as they were hundreds of years ago, and most of us prefer our information in slow drips, not in clumps, and certainly not in the torrents often encountered in Internet searches. True, we live in a wonderful communications age, where more raw information is out there than the human mind can easily comprehend, and available to users of the Net and the Web. Largely as a function of that size, there are several problem areas that seem to be getting worse. Table 2.2 examines a few.

All of these problems have to do, directly or otherwise, with the technology, but what about the ways in which it is used? The jury's still out on that one and might never actually render a binding verdict. The impact of the new technologies on human feelings, thought, and behavior is still unknown. Further research into the social factors of Internet use and other technology could lead to increasingly reliable findings.

Table 2.2.
Some Problem Areas on the Internet

- Increase in quantity of information: With the accelerating doubling time of the entirety of recorded information (the time it takes for X words or documents to become 2X words or documents) steadily dropping and an infinitude of choices and possibilities confronting the searcher, it's easy to get lost, frustrated, and unsatisfied when searching for a specific nugget or seam of information.

- Increased access to information and misinformation: Internet users tend to think that they are entitled to all the information there is. They want their money's worth, after all, and barriers are viewed with resentment. This has led to "feeding frenzy" conditions in the information arena. Privacy is often sacrificed, because people resent and even reject the idea that some information should be restricted to only those people who need it or are capable of understanding it. Americans are very much aware of their "rights" and disinclined to accept much in the way of restriction or abridgment. The slightest mention of censorship, in fact, invariably provokes howls of outrage. We want it all, and we want it all now. Compounding the problem, people who post information on the Web are not held to anyone's standard of acceptability. Anything goes. Even those innocent of malicious motivation are frequently careless, making mistakes, transposing numbers, misquoting authors, and failing to attribute their sources. All those factors can contribute to misinformation, and often do. Although we all seek reliable, trustworthy information, no one knows how much information accessible conveniently from an Internet terminal is bogus, malicious, or just plain wrong.

- Decrease in sharing: We might want other people's information now, but, unless we are altruistic in nature, we tend to be disinclined to share our own, proprietary information with other users without what we deem to be fair compensation. Thus, users acquire at the same time a sense of entitlement to information and, frequently, a marked decrease in willingness to share the information they have produced, developed, or acquired. There is a tendency toward selfishness. Many people feel no obligation or civic duty to participate in the collection and dissemination of information for the public good. Economically, there's a good reason for such attitudes: People who have labored to produce or develop information typically want to be paid for sharing it and could refuse to part with it unless their price is met. This trait might be a less attractive facet of materialism, but is undeniable.

Table 2.2 continues on page 48.

- Decrease in the quality of information: Granting the rampant proliferation of information, it is equally undeniable that more and more of the information available is of (at best) dubious merit, ranging from outdated information to outright falsehood. Because most of us are lazy, we seek the easiest way to get things done. Information now residing and proliferating on the Net and the Web might be skewed or even hopelessly inaccurate. However, just as it is common for some people to believe that "if it's in the newspaper, it must be true," these same people credit information on the Web with accuracy, fairness, and truth. They might even invest it with gospel-like qualities if it comes out of a computer, even when there is no basis for the information's "facts," assertions, or conclusions. This could be especially troublesome for young persons, who have not yet learned the necessary skills (and healthy skepticism) that cause adults to seek out alternate sources so that they can attempt to verify their information before they decide whether or not to believe it.

- Fewer, larger information sources: The trend toward consolidation of information, because of mergers, acquisitions, hostile takeovers, and bankruptcies, in the hands of fewer and fewer people and organizations leads to less competition of news sources and a general homogeneity of those sources' viewpoints. For example, when one media giant buys or otherwise acquires another, a potentially variant and differing opinion has been removed from the universe of discourse, resulting in fewer findable viewpoints on events, people, and trends. Such consolidation can also lead to declining quality of data because competitive researchers are no longer motivated to dig away for data, attempting to refute or debunk each other's assertions.

- Impermanence of information on the Web: Electronic information is normally valued for its currency, meaning that if you don't jump on something straightaway and download it to your files, six months later the chances are good that you will not be able to find it at all. As with print media, people want the very latest: what's hot and timely sells. What becomes of older information? It depends, but unlike print media sources, archives of online Web files are rare, and rarely complete even when found.

- Increase in barriers to information: Whatever the founders of the Web might have hoped for in terms of creating a democratic, global village, in which everyone is linked to everyone else and barriers to free communication crumble and come down, it hasn't necessarily worked out that way. Some people use online searching as an excuse to dodge person-to-person interaction and the lost art of conversation. Additionally, many organizations with a mandate to collect and disseminate information to the public use their Web sites as a way to avoid answering questions person-to-person. For verification of this assertion, try telephoning an association or a government department (and especially the headquarters of a large search engine or online provider) and see what happens. Odds are good that you will have great difficulty (and spend considerable time on "hold") reaching an actual human being. More likely, a recorded voice may give you a menu of preselected options, and instruct you to hang up the phone and instead

visit their Web site for the information you seek. The possibility that the Web site, when reached, might not answer your particular question(s) among their preset lists of FAQs (frequently asked questions) seems to be of little concern to such organizations, who have long ago taken the decision to sacrifice the personal touch in favor of efficiency, cost-effectiveness, and payroll reduction.

- Laziness: As previously mentioned, a sad fact of most human nature is the propensity to seek the easiest way to get what you want, and unwillingness to expend the extra effort requisite to crashing through imposed barriers and persisting until you reach a data source or person who actually knows the answer to your question(s) and is willing to take the time to respond. When the desired data does not appear on the computer screen, many people are apt to say, "Oh, well . . ." and live with what they can get. Admittedly, it is irritating and time-consuming to wait on "hold," listening to recorded music, until someone finally answers your questions, causing many people to give up and accept what is easier to obtain. However, remember: when you stop asking questions, you're getting told what to do.

- Decrease in courtesy: Ever been flamed? It's happened to lots of us. In the realm of e-mail, it is amazing how much *ad hominem* nastiness and vitriol gets sent from person to person across e-mail and the endless chat-room channels of the Internet. Because simple letters forming words cannot show the sender's emotions as readily as can facial expressions, tones of voice, and body language, Net users have formulated alternate ways of showing their feelings within the limited structure of e-mail postings. Thus, frequent e-mail users have learned to use abbreviations (e.g., LOL for "laughing out loud" and BTW for "by the way") and "emoticons" (cartoon faces that can be made with punctuation; e.g., when e-mail participants become irritated with others, they can now resort to what is known as "flaming," the sending of messages of anger, scorn, threat, and reproof, the electronic equivalent of chewing someone out in public (before thousands of onlookers in many cases), and telling them, in essence, to shut up. Such strongly worded messages, although sometimes fascinating to observe from the safety of the sidelines, do little to enlighten everyone else, even when the "flamee," in your opinion, richly deserves to be flamed. This is all part of a larger societal trend of rude behavior that has become commonplace (and often tolerated) in our society. Although free speech is one of the benchmarks of our Constitution and our nation's heritage, vicious slurs and angry rhetoric certainly cannot be said to lead to the augmented level of human connectedness and mutual understanding foreseen by the developers of the Internet.

- Dishonesty: Along with discourtesy, another demonstrable trend seems to be a general increase in dishonesty on the Net, or, perhaps merely a turning away from the truth and honesty in Web communicants. For examples, consider cheating and plagiarism (e.g., downloading entire essays and term papers and slapping one's own name on them), spreading false and misleading electronic stories, and hoaxes (e.g., false warnings of computer viruses that can travel by e-mail), all of

Table 2.2 continues on page 50.

which provide ample evidence of a climate of deceit and certainly a lack of ethical behavior. Ethics on the Internet (see Chapter 4) are frequently situational, and most of the rules are made up as we go along. Some users, cloaked in protective electronic anonymity, reckoning that they will not (or will only with great effort) be caught for spreading falsehood, hatred, or misinformation, feel little need to subscribe to any code of ethical behavior.

- Decrease in skills: Those who use the Internet for deceit are taking the shortest way, figuring that it is unnecessary to learn how to do something if some other person is (wittingly or unwittingly) doing it for you. With convenience overcoming effort, one casualty of Internet searching becomes the skill of critical evaluation. The ability to access enormous amounts of information does not automatically confer on the searcher the ability to evaluate what has been retrieved. In fact, the lack of exercise of one's critical faculties might well be the worst loss that the lazy Internet searcher suffers. If today's (and tomorrow's) Web searchers corral mountains of information coming from fewer sources, yet do not seriously question its truth, and lack the know-how to evaluate the information or verify what they've found, have no choice but to accept what they get. And if they proceed on the assumption that if the desired information is not available on the Web, then it isn't worth knowing, then the world is going to be a more dangerous place for us all.

- Naïveté, gullibility, or both: In a world with widespread access to a much narrower range of information, controlled by fewer and fewer individuals, the next generation could possess a naive belief in the abilities and general truthfulness of the computer, yet fewer skills to defend itself against falsehood and its consequences. "The stage is set for this generation to be led astray," warns Deborah Sawyer, who adds, "Get ready to welcome the electronic Pied Piper."[9] She thinks that it is only a matter of time until someone perpetrates a hoax or deception on the Net that has devastating repercussions for the nation, and possibly for the entire world.

- Internet-caused depression: According to recent studies, Internet use appears to be associated with a decline in psychological well-being and can even lead to severe and chronic depression in some individuals. The researchers even found that people who spend just a few hours a week on the Internet (including me, and probably you) experience more depression and loneliness than those who log on to the Net less frequently. Most startling of all, the researchers conclude that the problem isn't that people who are already feeling bad spend more time on the Net, but that the activity of using the Net actually appears to cause the bad feelings, in addition to reducing the user's time available for family and friends. "Virtual" communication is suggested to be psychologically far less satisfying than actual face-to-face conversation, and the relationships formed in such a way tend to be shallower. Another reason for Internet-related depression might be that exposure to the wider world via the Net can make some Internet users less satisfied with their own humdrum lives, leading to feelings of sadness and inadequacy.

Drowning in Data: Information Overload

■ Your e-mail queue is a yard long, your beeper won't stop chirping, the fax machine drops yet another page on the floor. You're flipping between CNN and The History Channel while you plow through piles of magazines and newspapers. Your head starts to spin. You can't seem to catch up. There's just too much information.[10]

■ This is the Internet. You're looking for a needle.[11]

■ We've created a bit of a monster with e-mail. We need to really help people learn how to better manage it.[12]

■ In 1998, the average U.S. worker either sent or received 190 messages a day, according to a Gallup study commissioned by Pitney Bowes. A year earlier, the figure was 178.[13]

With torrents of information coming at us via Internet access, and with the volume of messages increasing every year, something needs to be done, and soon, about this problem or we'll all be in information gridlock, unable to pick and choose the messages we really want or need, amid the great numbers of other communications sitting in our electronic mailboxes. Yes, when people first log on to the Net, they typically undergo a flurry of communication, seeking vast quantities of information, just because it is there. However, just because this new technology exists is no command that we actually access it and use it. You can only process so much information at a time. After that, you're a good candidate to fall ill of what psychologists have begun calling "information fatigue syndrome." And information fatigue, it turns out, can, like physical fatigue, lead to stress-related health problems brought on by too much information and a pervasive feeling of being incapable of coping with it all. Symptoms of this new syndrome can include any or all of the following: depression, anxiety, insomnia, inability to focus, headaches, high blood pressure, irritability, dysfunctional relationships of various types, and social withdrawal.

Recognizing that people need help managing the flood of information at work and at home, researchers and corporations are taking (possibly belated) steps to help people relieve the distress felt by many dealing with an overabundance of information.

Finding your way around inside the Internet with its vast and rich information has been likened to groping and blundering your way around an unfamiliar city in the dark. Why? Because the latest estimate points to more than 360 million Web sites available. To find anything of use (without relying on simple, dumb,

blind luck), the searcher needs to employ one of the numerous search engines available. Chapter 3 of this book discusses alternate remedies for the problem of being deluged in data on the World Wide Web and points to methods by which librarians and other information professionals can work symbiotically with their clients to get the blizzard of information to give up specific items efficiently.

Truth and Accuracy: Information and Mis*information*

■ Unlike trade magazines, newspapers, and other "archaic" print sources, the Internet does not vet its information. There is little or no copy editing or fact checking. Anything and everything gets circulated in electronic form, including wild rumors, junk science, appalling misinformation, and inane gibberish.[14]

■ Computer technology puts all the information in the world at one's fingertips, quite literally. This is both a blessing and a curse. No longer do we have to spend long periods of time hunting down a source or a person—these can now be found instantaneously. Soon we will not even have to type in an instruction to learn the capital of Montana, the population of Korea, or Ohm's law; we will be able to simply ask a question out loud and the computer will print out or speak the answer. Thus, people will achieve instant "cultural literacy." Less happily, the Internet has no means of quality control; "anyone can play." Information and disinformation commingle comfortably and, as of yet, there are no reliable ways to distinguish sense from distortions and downright nonsense on the Net.[15]

■ For reasons unknown, Internet users often put untrue stories and unfounded rumors out into cyberspace, where, like the battery bunny, they just keep going and going. And what can the victim do? How can one sort out fact from fiction? It is hard (maybe impossible) to figure out where the attack came from. It is (also) hard (maybe impossible) to quash it.[16]

■ Spy on your friends! Get the dirt on your boss! Harass your enemies! All by using the Internet you are already using on a daily basis.

> CYBER-DETECTIVE is an amazing new tool that allows you to find out EVERYTHING you ever wanted to know about your friends, family, neighbors, employees, even your boss! Do background checks, get criminal records, locate missing family members, get a copy of your FBI file, and you can do it all in the privacy of your own home. Start your investigation today![17]

Although the Internet is unquestionably the greatest information source ever devised, and becoming larger and thus more powerful every day, it is regrettable that, along with good, accurate information, uncountable quantities of false and misleading information also proliferate unchecked, and we are often unable to verify what we read or distinguish as one type of expression from the other variety.

The Internet does, in fairness, provide a platform for average folks to exchange ideas, but it has also provided a platform for cowards, dullards, and haters, as well. A decade ago, people kept rhapsodizing about how the Internet would democratize communication. The ability to disseminate information no longer would be monopolized by the few folks rich enough to own a broadcast tower or a printing press. Suddenly, everybody could have a voice, and anybody could be a publisher.

Hoaxes and hokum abound on the Internet, and because there are few empowered Internet cops, anything goes. Are people fatally vulnerable to accepting what they read? Are too many of us ready to believe without question what we find on the Internet? Sawyer, after recounting the facts of Orson Welles's famous Halloween eve (1938) broadcast of "The War of the Worlds," a science fiction fable designed at entertainment but which spread panic throughout the land, tells the story of a far more recent news item that one day appeared on the Internet.[18]

> ■ The news story concerned a woman—reportedly a member of the advertising and communications community—who was assaulted by a cab driver one night in a park in a large North American city. The account, although it tastefully did not name the woman, did name the cab driver, his employer, and his cab number. The story promptly began to spread like wildfire, zapped around the city from listserv to listserv, and shortly thereafter spread throughout the Internet community, causing widespread alarm in those who read it.

Being assaulted late at night with no one around to come to your aid is everyone's nightmare and being alarmed by such an account is therefore justifiable. However, this story had just one minor flaw: It was untrue. It turned out to be a hoax, spawned by someone for personal reasons, who will never be

found or punished for it. How do we know it was a hoax? City police, when they investigated the account, could not find the woman, or the taxi driver, or even that the cab company for which the driver allegedly worked even had a cab with the number given, but still the hoax continued to spread. *Conclusion*: Even when the truth becomes known, reasonably well-educated people might prefer to believe a lie simply because it appeared on the Internet and seemed plausible, in the light of other events they might have heard about.

Change in the Workplace

Because the Internet renders distance between its millions of communicants technically negligible, fewer people are going to need to report to a physical office and punch a clock to receive their paychecks. The complex issue of what is to be gained by working at home and what is to be lost, however, although it could present new opportunities, could also present a serious problem, albeit not a new problem. Years ago, a respected author, peering into the murky and somewhat ominous future even before the Internet became available to the general public, foresaw a grim view of the likely future of work and the workplace:

> ■ Most of what needs to be done by way of human interaction will be done out of the home. One forms an eerie vision of the high industrial future: a vista of glass towers standing empty in depopulated business districts where only machines are on the job networking with other machines.[19]

> ■ By now we know that the (Internet) revolution will never abate. In the next few years, as advances in digital technology continue to emancipate information from the printed page, the nature of work and our notion of the job will change profoundly. It stands to reason that the office—as the place where work is performed, information shared and knowledge created—will undergo a similar, and no less startling, metamorphosis. In fact, a brave new breed of digital technologies has already begun to transform the familiar office landscape from a highly structured, physically constrained workplace into a virtually unbounded collaborative spouse.[20]

The implications of such change for our daily lives are likely to be immense for those affected directly by it. Take the nature and location of work, for example: If in the near future, few people will commute, as they did before, to physical workplaces, and working out of the home will become commonplace, and when workers have everything they need in their private homes to perform their assigned duties, it is important to ask ourselves what will be gained and what lost in such a working environment.

There will, of course, be many tangible benefits to more workers telecommuting, as fuel and energy consumption (and especially the fouling of the air with hydrocarbons from traffic and internal-combustion engines) will drop dramatically in most communities, while few people, if any, will have to relocate every time they change jobs, and workers will enjoy the convenience of setting their own hours and working in familiar, comfortable surroundings. The frenzied routine of catching a bus or train, meeting a car pool, or getting stuck in a traffic jam, will give way to the comparatively leisurely pace of waking up in the bedroom, having breakfast in the kitchen, and then going to work just down the hall in the den, study, or office. However, at the risk of seeming to be unduly alarmist, several corresponding potential problems and costs are also entirely possible in such a future; for example, we're going to need to determine answers to the questions in Table 2.3.

Table 2.3.
Questions About Future Directions for Society in the Internet Age

- Will many Americans become unemployed, and unemployable, particularly those without the requisite skills and equipment to conduct their work at home?
- What will happen to tens or thousands of office buildings, occupied at present but soon to be vacant of commercial tenants? Who will compensate their owners for loss of rentals, or pay for their demolition or conversion into living space?
- Will workers who were previously employed in large buildings (e.g., custodians and janitors, factory workers) lose their livelihoods when the office buildings either stand empty or get torn down?
- Because physical distance from one's employer will be technically irrelevant when the work force becomes "wired," will foreign (i.e., cheaper) labor steal American jobs out from under domestic workers?
- Who, if anyone, is going to provide medical insurance and pensions to stay-at-home workers (who might lose many of their benefits and be treated like other contractual laborers)?
- What will the shift of work from office to home do to present-day central city neighborhoods, which still, for the most part, thrive because people enjoy the convenience of a short commute to work?
- Will the effect of such workplace changes fall disproportionately on minorities and the poor, and, if so, what is the government and the private sector prepared to do about resultant unemployment, or augmentation of welfare rolls?

Table 2.3 continues on page 56.

- Will widespread working at home cause significant cases of increased friction in presently otherwise acceptable relationships among family members who do not at present have to spend too much time together?
- What potential psychological effects will emerge from the necessary isolation and alienation from coworkers that will accompany working at home, and as employees lose the normally beneficial effects of social interaction at the office?

Change in Us

■ Every day my modem seems to get slower. No, it's not broken. Rather, more and more sites use the latest and greatest fancy graphics with frames and images that flash and move repeatedly, and Java applets that make new things happen nonstop. There seems to be some law of human nature on the Internet that everyone needs to push the limits of the technology, using all the graphics and multimedia effects that they possibly can, to prove to themselves and to the world that they can do it.[21]

■ But the deeper isolations occur within those very functions of computer life that hackers praise most lavishly. Take a trip on the Internet and link up with people exactly like yourself. The emerging technologies are simply imposing a new class system on the existing ones. Their overarching context is the ability to use computers at all; if everyone has one, theoretically, everyone belongs to the same class.[22]

■ Only crazy people spend all their time on the Internet.[23]

There is also recent research that points to the possibility that some Internet devotees can be become seriously addicted to it, and that such addiction can lead to problems such as alienation, broken marriages, deteriorating relationships, friendlessness, job loss, and loss of self-esteem. Should such sketchy and preliminary evidence concern us? It should, because previous rosy predictions are not always panning out as positive forces in daily life. Today, daily excursions into Web crawling appear to be a phenomenon of the present day, but such behavior could be said to have had its philosophical roots over a generation ago.

A couple of years ago, noted advice columnist Ann Landers printed a letter from a woman reader calling herself, "Wits' End in the Midwest," complaining that the Internet was responsible for the collapse of her marriage.[24] "Wits' End" added her poignant and sad experience to a growing mountain of evidence that the Internet could drastically affect relationships, and underscoring that of an earlier writer, "Bye Bye Forever in Texas," who had undergone not just alienation but eventual separation and divorce from her husband. "Wits' End" says that her husband of 22 years has, since the Internet came into their home, become a recluse. He refuses social invitations, has quit attending their children's activities, and lies to her about the amount of time he spends surfing the Net. Like an alcoholic, she explains, he apologizes when confronted about his actions, and promises to taper off, or quit, or do better, but once the computer clicks on (which it does every day and every evening), he sits there, transfixed, until the wee hours of the morning.

"Wits' End" loves her husband, clearly, but she says she doesn't understand the attraction. "Most of what I've seen is garbage—pornography, crackpot philosophy and nonsense." She notes that the young boy in Oregon who, in late spring 1998, murdered his parents and then shot two schoolmates to death had also constructed five lethal bombs using instructions he obtained from the Internet. Finally, the woman, after saying that she and her children do not wish a divorce, admits to being sick of attending events alone and inventing excuses for her husband's absence. Claiming that she believes that he has a full-blown addiction, and that he refuses to get counseling, she beseeches Ann Landers to tell her what to do.

By way of response, Ann concedes that the man suffers from a new but powerful addiction, and offers the grieving "Internet widow" two choices: (1) either live with her husband's problem, or (2) issue an ultimatum, threatening him with the loss of his family if he decides that his computer is more important. The same Ann Landers column, however, balances the complaints of such writers with a much more heartwarming story of a woman whose son has suffered a mountain-bike accident that left him first comatose and then, later, dead. During that difficult time, she claims, her "friends" in her chat room kept her going with expressions of condolences, kindness, and encouragement, an outpouring of support from over a dozen people she had never met, but whose minds she had touched by pouring out her grief and disappointment, none of which could have been possible without the Internet and its e-mail facility.

Some people are "communications addicts," and often have a hard time spending even brief periods of time without access to e-mail, a cellular telephone, or a pager.[25]

But is this so-called Internet addiction likely to become a significant and alarming social malady, right up there with (or near?) alcoholism and drug abuse? A paper by six researchers at Carnegie Mellon University (published in September 1988 in *The American Psychologist*) reported the startling news

that the Internet, the very touchstone of the new American capitalism, is actually bad for some people's psychological well-being.[26]

In their recent study, described as the first concentrated study of the social and psychological effects of Internet use at home, researchers at Carnegie Mellon University in Pittsburgh have found that people who spend even a few hours a week online experience higher levels of depression and loneliness than they would have if they used the computer network less frequently.[27] The researchers were led to the conclusion that Internet use appears to cause a decline in psychological well-being. This result ran completely contrary to expectations of the social scientists who designed it and to many of the technology companies that financed the $1.5 million study.

Other commentators on the social scene have become similarly alarmed: Department store founder Stanley Marcus, writing for "Viewpoints," a frequent column for the *Dallas Morning News,* had this to say (in November 1998) on the topic of growing human isolation as a result of the proliferation of the Internet:

> ■ Every day, it becomes clearer that computers are not only simplifying our lives but complicating them as well. The world itself is being remade by the increasing number of computer users that reduce the amount of human interaction, but a computer keyboard lacks the warmth of a handshake, and a printout is correct but as cold as the eye of a dead fish at the Fulton Street Market.[28]

Marcus is not entirely pessimistic, however, ending his remarks by stating, "We are in the early stages of a transition between human and electronic service, so there is reason to hope the Internet eventually will make adjustments to humanize its service." Marcus's even-handed observation thus both praises the power of the Net to do so much for so many, yet warns of the loss of the human touch in electronic transactions. Economics, however, would seem to militate against a whole lot of the "human touch" in the future, because computers, once purchased and programmed, are much cheaper to run and more efficient to maintain than human operatives, despite the impersonal nature of the service they provide.

In summary, fascination with the capabilities and variety of the Internet and the World Wide Web are as understandable as they are compelling and can lead to positive or negative consequences for the subject and for family members and friends. As with so many other of life's entertainments and pleasures, some users are always going to overdo it, and slip off into a damaging (and even hopeless) addiction. There is much discussion as to what, if anything, needs to be done about the problem, and research is ongoing.

> ■ People who seem addicted to the Internet often show a bumper crop of psychiatric disorders such as manic depression. Treating those conditions might help them rein in their urge to be online, a study suggests. On average, Internet addicts in the study reported having five different psychiatric disorders at some point in their life. . . . Half had an anxiety disorder such as "social phobia," which is a persistent and unreasonable fear of being embarrassed in public . . . (others) suffered from Bellamy or binge eating (or) uncontrollable bursts of anger (or) buying sprees, (and) half abused alcohol or some other substance.[29]

As the result of quickly changing technologies, it is fair to say that numerous opportunities will present themselves, but myriad problems can arise (or already have) in connection with widespread access to the Internet and its companion, the World Wide Web.

> ■ You do not know our culture, our ethics or the unwritten codes that already provide our society more order than could be obtained by any of your impositions.[30]

People might be fascinated with bad news, but they take comfort and pleasure from reading or hearing good, encouraging news, as well. Predicting a bright tomorrow, when we can all make our living at home and not have to drive to work, has for many writers become a trend in the print media:

> ■ One problem the new leader faces is the isolation of self-directed workers. With so many people working from homes and cars at all hours, it is difficult to maintain a sense of belonging. People can lose touch with their organizations and begin to miss the normal camaraderie of the traditional workplace. . . . This sense of isolation will be serious. . . . The need for people to feel a part of a human organization is critical to achievement. People want to connect with other individuals, not just electronic message pads or laptop computers.[31]

It's entirely possible, and even likely, that, 20 or so years from now (or possibly even sooner), most of us who are still around are going to be telecommuting, while the commercial or academic office as we know it—a physical place to which we must travel to go to work—will enter history as a symbol of a bygone era. On the plus side, workers will then know the convenience of being able to earn their salaries without the various hassles of wasted time, driving hazards, breathing polluted outside air, risking crime in the streets or in public buildings, or spending escalating amounts of their funds on various transportation costs.

But there is a downside to relying on the Internet for social interaction as a growing (and perhaps) alarming segment of society already does. One social commentator whose observations span over eight decades puts it this way:

> ■ My problem with the Internet is that it's about facts and figures and information. But without the flesh and blood and the breathing that goes on, who am I talking to? What do they look like? Is it a multitude? Are there 25 people there? . . . That part—the human touch—that's what's missing.[32]

Evidence of the all-encompassing changes wrought by the Internet and its availability can be seen everywhere. The question remains: How desirable is that? The central problem is that the Internet, although it is an empowering system removing previous barriers to the gaining of knowledge, also allows people of all social statuses and ages (and others who wish to assert themselves) the power they crave. E-mail, for example, permits a form of role-play and self-expression that children almost never have in "real life," and which their parents never dreamed possible when they were growing up, and which they might not be able to understand, even now. For the most part, however, that's all part of the fun. It permits role-play freely, for those who want to, and every night is Halloween night; a continuous costume party. On the Internet, for example, a pimply 12-year-old boy or a weary, overweight married man can, by masking his identity and assuming a new screen name, portray himself as a suave, wealthy, handsome bachelor, well over six feet tall, who drives a Porsche, whereas a shy, insecure young girl or a lonely older woman can represent herself as a beautiful, voluptuous, self-assured career woman of 27, who owns her own condo in a high-rise building.

Most people with Internet access enjoy Web surfing and exchange of e-mail messages, yet never permit the new technology to take over their lives or crowd out other activities. However, like other "drugs" of choice available, there are always going to be people who don't know when to quit, when to say "No," and who develop addictive (and therefore pathological) behavior.

According to the largest study of Web surfers ever conducted (to date), almost 6 percent of Internet users can be said to be suffering from some form of addictive behavior with regard to its presence in their lives. "Marriages are being disrupted, kids are getting into trouble, people are committing illegal acts, (and) people are spending too much money."[33] The findings, released at the annual meeting of the American Psychological Association in Boston in August 1999, appear likely to bolster the expanding acceptance of adding compulsive Internet use to the growing list of recognized psychological disorders. Greenfield added, however, and even more alarmingly, that his 6 percent figure is lower than some estimates of 10 percent or more stemming largely from recent research on college students.

Access Issues: Haves and Have-Nots

■ There are only two families in the world, the Haves and the Have-nots.[34]

■ The Internet is an elite organization; most of the population of the world has never even made a phone call.[35]

■ Of course, the Internet itself is neutral. It's neither good nor bad. But there's a possibility that Internet access will create a new form of segregation in this country. That's downright scary.[36]

Regarding the worrisome digital divide (the gap between the "information haves" and "information have-nots,") opinion is divided as to how sweeping the divide actually is. It is becoming clear that a great number of people will be left out of such a great leap forward in technology, as they were when telephone service first became common and general. However, there could be an important difference between the Internet and the telephone. Telephones allowed you to talk with other people, whereas the Internet, although it allows you to, among other things, download music, see pictures of naked people, and get free trial copies of video games, lets you stay at home, locked up in your room. True, the Internet also, like the telephone, helps you talk with other people. It even offers educational resources that many low-income households lack, such as the *Encyclopaedia Britannica*. . . . But how many low-income teenagers are going to spend their online time browsing through the *Encyclopaedia Britannica* when they could be exploring the wilder shores of Internet service? For that matter, how many higher-income teenagers? I, a former teenager myself (in a simpler time when computers were huge machines tucked away in the basements of big buildings), think I know the answer; and so do you.

A persistent issue of Internet access has to do with the distribution of its use—the easy availability of remarkable communications technologies to some but not to others, in a way that threatens to exacerbate existing disparities in social opportunities. For many Americans of all ages, the Internet has already become like some combination of telephones, televisions, and libraries—second-nature, a familiar part of life, a place where you go if you want to communicate with others or learn about people, places, or things.

However, tens of millions of Americans remain computer illiterate. These same inequalities can be found among nations: about one-half of Internet users are American, and in many countries, e-mail is unreliable and the Internet is barely used at all. Now that we have described the vast, sometimes uncharted

variety of information and material that one can access on the World Wide Web, we should turn our attention to the problem of equal access. Granted, the Web is a vast structure, where search engines and other spider-like Web crawlers are free to roam cyberspace to comb out rich streams of information, but social thinkers, in asking the question of whether the Web is available equally to *all* spiders, have found the answer and that answer is "No."

Affirmative action and other programs, designed to remedy previous inequities based on race-based or ethnic-based prejudices, have been designed and implemented in an attempt to "level the playing field" for all players. However, the goal of equal opportunity will not be easy to come by when it means giving everyone (regardless of circumstances and ability to pay) access to the Internet and the Web. Economists have cited a large and growing income inequality in America, with the gap between the richest and poorest citizens becoming wider every year.

> ■ Millions of Americans gained access to the Internet last year, but they were more likely to be rich than poor, white than black, and married rather than single, the U.S. Commerce Department reported Thursday.[37]

> ■ 8.0 is the percentage of world population whose native language is English; 56.5 = the percentage of Internet users whose native language is English.[38]

Experts are in general agreement that the disparities among Americans of different races and ethnic origins have grown into what some now call a "racial ravine." And those disparities matter because telephones, personal computers, and modems—all requisite to Internet access—are becoming economic essentials for success in the world of work. Internet service, as one might suspect, given the costs involved, follows structured lines of social status and, inevitably, racial groupings.[39] According to Robert Lee Hotz, writing in 1998, a racial divide can be seen in Internet provision and use, with minority families less plugged into the Internet than white families.[40] According to Hotz's study, the reasons for this disparity are numerous and complicated, but a simple statistic will suffice to explain much of it: Less than one-third of black students live in homes with computers, compared to almost three-quarters of white students.

However, eliminating race and other socioeconomic problems from the equation, it is still manifest that the Internet has changed (or soon will change) almost everything about our world and has already altered forever the ways in which people communicate, search for and locate information, and relate to one another. That would suggest that anyone NOT plugged into the Internet and free to search the Web is going to be at a serious disadvantage in future society.

The good news is that computer access reportedly doubled in 1996–2000, and millions more Americans have access to the Internet—40 percent more than in 1999, but far too many Americans are not part of this. "While these items may not be necessary for survival," the Commerce Department report states, "arguably in today's emerging digital economy they are necessary for success."[41]

All of this seems ironic, because when the Internet was first envisioned, it was seen as the great leveler. When you're online, nobody knows if you're black or white, and nobody knows if you're poor or rich, unless you choose to share such information. But it's only natural that any new technology would be adopted first by the prosperous; and so far, it's mostly been prosperous white families on the Internet.

> ■ We don't have a clue what's going on because we're all part of this culture that is spinning out of control. And a lot of people are falling off. We talk about the information highway. There's a lot of breakdowns. A lot of hitchhikers! A lot of people waiting for assistance. It's become more and more clear that it's for the advantaged. The privileged! It's for those who can afford to stay on the road! The rest are camping on the roadside, under the overpasses! That's my take on it.[42]

Information Overload

Despite all the good things that can be counted about the prospect of having everyone, regardless of race, religion, social status, or ability to pay, become connected to the Internet and the Web, the idea has many detractors and critics, many of whom decry the people making obscene amounts of money through catering to the bandwagon effect the new technology has created, while others warn of potentially adverse consequences that can ensue because of an unregulated and unrestrained Internet. Just as one example of such consequences, research points to a new (and apparently growing) psychological problem that Sigmund Freud could never have imagined: Internet addiction, with all its symptoms and problems.

So, what is to be done? "I sure believe there ought to be some affirmative action and some outreach efforts to increase computer use and access among blacks," said Al Gore, former vice president of the United States. "Otherwise, they'll be disadvantaged in the increasingly technology-driven job market." Jesse Jackson, social activist, has threatened to lead a boycott of Silicon Valley companies guilty of "under-hiring" blacks. Jackson and other critics of these companies claim that a "silicon ceiling" is in place, while defenders of the companies blame the disparity in race ratios as a lack of qualified black applicants for high-tech jobs.

Now we turn our attention to the persistent (and some say growing) problem of equal access. Granted, the Web is a vast structure, where search engines and other spider-like Web crawlers are free to roam cyberspace to locate rich streams of information, but demonstrably, the Web is not available equally to all spiders.

In college admissions and hiring practices, Affirmative Action programs were designed to remedy previous inequities based on race-based prejudices. In the Internet arena, however, disparities are largely based not on racial or ethnic discrimination but on ability to pay for such service. Clearly, most Americans would agree that no one should be effectively disenfranchised from Internet use because that individual lacks the wherewithal to purchase the requisite equipment and services. However, consider the financial implications of having equal opportunity for all. Would that mean giving everyone (regardless of circumstances and ability to pay) access to the Internet and the Web. If so, what's the remedy going to cost, and who's going to foot the bill?

For libraries, this circumstance presents an opportunity. One factor that favors the continuation and enhanced usage of public libraries in the future, has to do with the necessary prerequisites of accessing the Internet to access the basic services. Buying all the equipment it takes to go Web surfing is prohibitively expensive for a large segment of American society. As an example, to have an adequate (but not state-of-the-art) home-based setup, one requires (at the very minimum) the following components in Table 2.4.

Table 2.4.
Minimal Requirements for Getting Started Surfing the Net

- *Hardware*: a microcomputer or terminal with a certain minimum of storage and addressable memory.
- *Software*: a disk-based program that, when installed on a computer, puts the user in touch with a network provider.
- *Modem*: a device (internal or external) to convert digital signals to analog tones (for sending along telephone lines), effecting the telecommunications connection of one computer with others and reconverting those analog tones to digital signals when received.
- *Telephone line and telephone:* to transmit and receive encoded signals to a commercial service provider or institution.
- *Printer:* to capture (when desired) information received over telecomputing lines and convert it to portable hard copy as a paper document.

In addition to these bare essentials, desirable additional options include a fax machine, to transmit and receive entire pages of information electronically across great distances, and a scanner, a device that converts printed pages and graphic images to computer text, where they can be inserted into documents, altered or rearranged. For a really capable system, there are numerous software and hardware peripheral goodies available to enhance your capabilities still further and enrich your telecomputing experience. Once you've purchased the hardware and software you'll need, you have already incurred considerable (and sometimes prohibitive) costs, especially because your total outlay of money can vary considerably, depending on the cost of the equipment you decide to buy, the purposes to which such equipment is used, frequency of use, and so on. Because not everyone can afford to buy the necessary equipment for them to do their Web surfing and e-mailing from the comfort of their own residences, libraries visualize one of their roles as being the Internet connection for the rest of society's members.

In short, the harsh economic reality is that our nation is confronted by two mutually exclusive choices in attempting to assure all citizens equality of access to information: We can (1) accept the disparity as a harsh reality of life, deploring it publicly yet doing nothing substantive to mitigate the problem; or (2) we can decide to establish a system of subsidy for society's have-nots, thus effecting universal library provision. Subsidy, if that is the option chosen, would require a vast bureaucratic apparatus similar to those already in place to deal with welfare and food stamps, which would be charged with the responsibility to ensure that everyone, regardless of financial status, has the same shot at getting online and plugged in.

Failing a total commitment to option (2), the gap between the haves and the have-nots in society will continue—or even widen—meaning that ability to pay will remain the primary criterion of Internet use, with only people of substantial economic means able to afford computer access to the information superhighway. If subsidy is chosen, some sort of fair and evenly applied means-testing will be required to sort out who is eligible for such assistance and who must pay for what they receive. Arriving at criteria for establishing who can and can't afford to pay and how much financial assistance, will be difficult, and could lead to fraud, perceived inequities, criticism, and many unfortunate people "falling through the cracks" of the system and being no better off than they were before.

The "assistance" option, however, would present libraries as a boon to society. Libraries, and particularly public libraries, would be used in the latter option as the "people's on-ramp" to the information superhighway. However, what would such legislation guarantee? Minimum requirement (and most libraries are already well on their way) would be to ensure the conditions in Table 2.5 universally.

Table 2.5.
Desiderata for American Universal Internet Access

- Most citizens live close enough to a public library facility that they can travel to it and return in the same day without undue hardship in distance traveled or expenses incurred.
- Each library outlet provides a sufficient number of interactive Internet terminals such that all who desire access to the Internet or the Web can get it promptly, or with minimal waiting time.
- Adequate workspace, consistent with the demands of Internet research, is provided at each Internet workstation.
- Access to Internet terminals is as barrier-free as possible, in both the physical and emotional senses.
- The library's hours of operation are expanded to accommodate persons whose work schedules, physical limitations, or lifestyles do not permit between-nine-and-five visits to the building.
- Censorship issues such as those involving Internet filters and other restrictions of the availability of files have been resolved in such a way that the citizenry is satisfied that young people are "protected" against harmful encounters while searching, yet empowered to search freely for information of their choosing.
- Secure transaction protocols that ensure that each individual user's private business is kept private, and free from intrusion and prying eyes.

What About Children? Filtering and Censorship on the Web

■ Freedom of expression is an inalienable human right and the foundation for self-government. Freedom of expression encompasses the freedom of speech and the corollary right to receive information. These rights extend to minors as well as adults. Libraries and librarians exist to facilitate the exercise of these rights by selecting, producing, providing access to, identifying, retrieving, organizing, providing instruction in the use of, and preserving recorded expression regardless of the format or technology. . . . The rights of users who are minors shall in no way be abridged.[43]

What cybercrime activity do you most fear? (1,402 responses)

11%	A stranger approaching my child in a chat room.
49%	A hacker stealing my credit card number.
9%	An e-mail spy.
6%	A business meddler.
26%	A nasty computer virus.[44]

The framers of the U.S. Constitution declared that any powers not specifically granted to the federal government became powers of the respective states to decide. Libraries, however, are for the most part local entities. Does that include them in the powers of the states? Only constitutional scholars can decide. Just how does the First Amendment's guarantee of free expression apply to local and county libraries?

Consider the meaning of the term *speech*, for a start. Not all speech is expressed in words, according to the leading jurists of our age. With regard to the Internet, for example, speech would comprise not only written words but also images that appear on computer screens, and some of those images, admittedly, are definitely beyond "contemporary community standards" for decency.

Are there categories of speech that are regulated, forbidden, or sanctioned by our governments? Yes, demonstrably so. The hoary old example of the prohibition against shouting "Fire!" in a crowded theater, for example; speech designed to incite people to violence, and even defamatory or offensive speech. Finally, there is obscenity, defined by the U.S. Supreme Court as referring to a book or other work that (in the Court's opinion) meets all three of the criteria in Table 2.6.

Table 2.6.

Criteria That Must Be Met for a Work to be Deemed Obscene (Miller vs. U.S., 1973)

1. The item must go substantially beyond contemporary community standards.
2. The item must lack serious artistic, literary, scientific, or cultural value.
3. The item must cater to the prurient interest and must include certain terminology or depictions having to do with sex, body parts, or excretion.[45]

Of course, even a cursory inspection of this judicial stab at a definition reveals problems straightaway. Note, for example, that in criterion No. 1, there is no attempt to define the pertinent community. Whether the intent of the Supreme Court's definition is to make the city, the county, the state, or the nation the "community" of record is not delineated. More to the point, how do you define community when it becomes cyberspace, not really a place at all, but rather an electronic milieu with millions of participants as affected recipients of speech. Syndicated columnist George Will defines cyberspace as "the mere interconnection of electronic pathways, with speakers and listeners capable of masking their identities."[46] Consequently, Will says, "Laws restricting obscenity for a given community become meaningless because they're not amenable to laws that operate in the physical world. Obviously, such a distinction complicates the problem of deciding who can say what or listen to what, and the difficulty of establishing a clear and consistent law becomes enormous."

"Police Say Arkansas Teen Learned Scam on Internet," reads a recent glaring newspaper headline, telling of how a 17-year-old high school student learned and then decided to employ a check-kiting scheme on the Internet, proceeding to purchase by fraud two new cars and some personal watercraft.[47] The question then becomes, Who is responsible for such a crime: the student, the author of the how-to-do-it article; the source from which it was contributed; the search engine that carried the information; the Internet, or all of the above, in varying degrees? And in the event that the young person acquired enough criminal lore to be able to freelance his own scam using one of the computers of the local library, to what extent is the library guilty of aiding and abetting his criminal act?

Yet, the public library is considered to be a public forum, intended for the fullest, most open exchange of ideas. So why isn't anything found in (or available through) the public library protected under the First Amendment constitutional guarantees? Well, it's complicated but recent court decisions have found public libraries not to be public forums, per se, but rather to be "limited public forums," meaning that a certain amount of regulation is deemed permissible, especially where protection of children from harm is a potential factor.

Legally speaking, what is important in the determination of whether censorship by a public library on Internet content or Internet access is permissible and defensible. We reserve, for the time being, the question of whether such regulation is desirable, or even possible, but will return to the matter later.

The basic problem of legal regulation of communication via the Internet is that the medium, itself, and the rapid emergence of—and easy access to—the Internet has created a new form of communication, in which anybody is potentially a source of information, opinion, and communication. Yet, as a new and very powerful medium of communication, the Internet just doesn't fit comfortably or conveniently in any previous or existing philosophical or legal framework. Therefore, those attempting to deal with the new medium and its effect on such public forums as libraries have no retrievable precedent for their decisions.

They are pretty much flying blind, and some of them have resorted to making up policy as they go along. Naturally, this leads, occasionally, to no regulation at all, mainly because no one can decide and persuade others as to the "rightness" of individual arguments. In addition, naturally, such decisions as are made concerning the legal rights and responsibilities of libraries where the Internet is concerned are viewed by some other observers as arbitrary, capricious, unfair, and, in some cases, even wrong. There's no one to argue that there's anything unconstitutional about this or that argument. There is no accepted standard for Internet use, and no established guidelines dictating who can (or should) use it, when, for what purposes, and what can be made available. So, it has become an electronic Tower of Babel, where everyone with a point of view is empowered (and not necessarily in the good sense) to speak one's mind, or to put forward information, misinformation, fact, lies, and incoherent ranting, as one sees fit.

Good. Fine. That's democracy for you in a nutshell. But what about the children? Should we be concerned about the ways that the Internet affects the young? Specifically, should librarians worry about how their public access Internet terminals are being used by young persons to access information, Web sites of all descriptions, and graphically rendered materials that, if sold by bookstores, might result in prison terms for the owners? Such Internet regulations as there are today are very imprecise, because the Internet is continually changing and growing, and today's rulings might not apply to a whole new line of Web sites that arise tomorrow. Everything is open to discussion and few or no settled issues have as yet presented themselves. Consider this pair of statements, which appeared at the same time in the op-ed pages of a big city daily newspaper:

> ■ Filtering the Internet is contrary to the purpose of libraries and the First Amendment. You may as well remove all the naughty words from the dictionary. . . . Free speech is a matter of faith, and it requires confidence that, exercised or otherwise, it exists in full; on the Internet and in the library alike.

> ■ Decent citizens should not have to avoid their libraries to avoid being assaulted by a porn addict's choices. Citizens should be able to keep libraries open to everyone, including children, without the American Library Association's policy against filterware making our public libraries the only adult bookstores open to our children.[48]

Filters that block access to information on the Web are highly controversial. On one hand, they are imposed by libraries with the intent of preventing young and impressionable people from accessing such controversial and potentially harmful Web sites as pornography, bomb making, subversive political philosophy, and racist, sexist, and hate speech. Motivations for imposing filters on public access terminals can range from a belief that we are charged with protecting the young against materials and viewpoints that can be found on the Web to the earnest desire to avoid criticism and pressure from groups opposing free access to Web sites for certain classes of people. However, just as special prosecutors gathering evidence in an investigation of public officials' conduct can become overzealous in pursuing their goals, so proponents of filters, despite their generally meritorious motivations of protecting children from filth or hate, can (and do) often get carried away with their desire to block, prevent, and render impossible the ability of curious children to access things they "shouldn't" have access to.

Filters are preventive software designed to make it technically impossible for young people to gain access to forbidden or dangerous information on Internet-equipped computers. Advocates of filters worry that although Internet service in libraries attracts new users, tends to increase library visibility, and generally helps equalize the disparity between the "information rich" and the "information poor," it also can be an entry portal to uncensored obscenity. Filters are, to put it baldly, censorship. The question is whether censorship of the Internet can be justified in the light of the "clear and present danger" that some of its information could pose to the young and susceptible in society. Whether we like them or not, filters are likely to be around for a while in libraries, somewhat mollifying those in the community who worry about unrestricted access to what the Internet makes available. There are, however, several ways in which the library (voluntarily or by compulsion) can seek to filter out the "bad stuff" so that the access of young people to information is effectively sanitized, and rendered free from obscenity, pornography, or what, for lack of a better term, is sometimes called "filth."

Different filtering products (Websense, Bess, Cyberpatrol, and NetNanny) and filtering programs employ different modus operandi of accomplishing their task. Among the various types of filters available are the following:

1. keyword filters (secret stop lists/go lists);
2. site blockers (access denial);
3. phrase blockers;
4. specific program blockers (e.g., chat room/e-mail capability);
5. time blocking (in which certain hours of the day are off-limits to some or all patrons); and
6. client (specific password) blocking.

The choice (if a choice is mandated) among them is important. Of course, they are not necessarily mutually exclusive, and two or more types might be combined into a filtering program. Filters are available that can be switched on and off at the discretion of the librarian.

Why the need for filters? Opinions vary widely, of course, but in general, those advocating (or requiring) the imposition of filters on public access terminals worry that unregulated content constitutes a threat of being harmful to minors, and therefore a threat to public health and welfare. And what, specifically, is harmful to minors? Such an allegation has within it the implicit assumption that children (and others) require protection against harmful material that they might access—intentionally or by accident—on the Net, in the same way that they are not permitted to play with matches. Many prominent legislators have introduced or backed legislation at various levels of government that would require libraries to install filters on their computers or else forfeit discounted Internet or telecommunication service rates. Another problem with such implementation is that filters can be used to promote a hidden agenda of censorship, a very real imposition of filters to achieve political goals and impose political orthodoxy.

The Internet provider (or the library, itself) could use either site-blocking software or suspect-work category blocking, and such software can be installed on computers to restrict access to certain sites. The publicized goal of such filters is to promote a secure environment for learning without exposure or threat of sexual harassment when using the Internet in a library, and to keep susceptible persons away from hate speech, hate literature, and recruitment for hate groups. In truth, however, this presents a problem because Internet filters can be described as "mechanical tools wrapped around subjective judgment."[49] Another big problem with filters is the implicit assumption that words never have more than one meaning. This assumption will not hold up to scrutiny. What about such non-humorous, nonsexual double-entendres as these: (1) The bandage was wound around the wound, (2) The farm was used to produce produce, (3) The dump was so full that it had to refuse more refuse, and (4) We must polish the Polish furniture.

Such examples (and there are many more) lead to the contention that it becomes difficult or even impossible to perform research on a filtered computer whenever a term is deemed filterable because it could have multiple meanings (see "Internet Filters: Access Denied," Chapter 3). From the library's standpoint, and in keeping with both the First Amendment and the American Library Association, the imposition of filters becomes de facto censorship. However, the absence of filters creates in many minds the notion that unwary and immature persons can tap into a vast and flowing river of filth (or hate) unless some supervision is required. Librarians are disinclined (and normally far too busy) to volunteer as Internet police, walking behind each young Internet user to see what they're up to. So, what is the answer? One possible alternative to filters (and/or snooping) is mandatory parental monitoring and supervision,

whereby one of the child's parents must sign an Internet policy form, must be present and supervising the young person's searching, or both (see Table 2.7).

Table 2.7.
Questions About Filtering the Library's Internet Computers

- What is obscene? What is "harmful to minors"?
- Is allowing children to surf the Web freely really equivalent, as one legislator has said, to letting them play on a busy highway?
- Should there be levels of access, based on the age or grade level of the user?
- Should librarians accept the responsibility for patrolling the use of their Internet terminals?
- Should parents be required to accompany their young students during Internet searches?
- Should I-terminals be fitted with privacy screens so that only a person sitting (or standing) directly in front of the screen can view its contents, which would at least reduce the incidence of having library visitors inadvertently view the images on another user's screen?
- Even when filters work efficiently to block known sites, what about new sites (hundreds of which become available every day)?
- How well (effectively) does filtering perform?
- Because there is a considerable cost per terminal per year, in addition to an annual license cost and start-up fees, where will the money come from?
- What should be done about adult patrons who intentionally access adult Web sites and then either call the attention of female staff to what is on their screen or leave them there for others (perhaps children) to see? Is there a sexual harassment issue here?
- What about accidental discoveries of sexually oriented material while searching for something else? Although the find might be accidental on the part of the searcher, such an outcome could be far from accidental.
- Isn't free access to information a First Amendment issue that applies to all library users?
- Is the real issue one of constitutionally protected speech and other rights vs. parental control over what their children can see, hear, or participate in? And how can that thorny problem be resolved to everyone's satisfaction? (Short answer: it can't!)

So, what can a library do to resolve the question of filters? No solution is perfect, but Table 2.8 presents several alternative courses of action.

Table 2.8.

Alternative Remedies for the Problem of Children Gaining Access to Internet Information or Other Material Deemed "Harmful to Minors"

- Denial of access (the library can simply bar persons under a certain age or grade from using its terminals to search the Internet)
- A tap on the shoulder or other attention-getting move (when a kid is found doing something prohibited, give one warning; after that, "Out you go!")
- Suspension of privileges (the library can revoke the right of the patron to use its services)
- Parental summons (problem: school libraries can probably exercise that right by fiat, whereas public libraries would have to do so on a voluntary basis, having no legal means of enforcing such a summons)
- A good talking-to (a librarian could decide to lecture a child caught viewing things considered harmful or too mature, but the results of such a chat are unpredictable)
- Take no action (The library might decide that Internet access is a basic right of all patrons and that the only persons who have the right to interfere with it are the parents or guardians of the child or children involved)

American Libraries (May 1999) reports that Internet activists have released a report that blasts the overreach of Smart Filter blocking software on a statewide proxy server.[50] According to their report on censored Internet access in Utah Public Schools and Libraries, Smart Filter blocked access for some 40 public school districts and at least 8 public library systems to more than 500,000 sites in a single month in 1998. Among the sites blocked by the program were the Hasbro toy maker Web site, the Starr Report (on the impeachment of President Bill Clinton, 1999), the Koran, and the complete plays of William Shakespeare. We'll be returning to the question of filtered Internet terminals in Chapter 3, as part of the discussion of libraries and what they can do, should do, and are doing about restricting the free flow of information (see "Internet Filters: Access Denied").

■ Are you both attracted and repelled by the Internet at the very same time?[51]

In terms of the freedom one has in choosing where to go on the Internet, the classic "approach/avoidance syndrome" put forth by Sigmund Freud over a century ago (in which a person feels simultaneously attracted to and repelled by a person, thing, or idea) is still with us. Most of us, if we're candid, would have to answer, "yes" to such a question, and for a variety of good reasons. It's long been said that a million monkeys banging randomly on a million typewriters would eventually reproduce the entire works of Shakespeare. Now, thanks to the Internet, we know that this is not true.

Notes

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3. Alvin Toffler, *Future Shock* (New York: Random House, 1970).

4. Scott Adams, "Dilbert" (syndicated comic strip), *Dallas Morning News,* 28 March 1999.

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6. Tom Brokaw, NBC/TV News anchorman, speaking at commencement ceremonies at the College of Santa Fe (New Mexico), May 1999.

7. Harley Hahn and Rick Stout, *The Internet Complete Reference* (Berkeley, Calif.: Osborne McGraw-Hill, 1994), viii.

8. Ibid., ix.

9. Deborah C. Sawyer, "The Pied Piper Goes Electronic," *The Futurist,* February 1999, 42–46.

10. *Newsweek,* 28 April 1997, 85.

11. Intel Corporation magazine advertisement, October 1999, showing a color photograph of an enormous haystack.

12. Victor Godinez, "Stuffed: You've Got a Hassle," *Dallas Morning News*, 10 August 2000, 1A, 20A.

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3 Libraries and the Internet: Collaboration or Competition?

Overview

The two previous chapters explored at some length the relative pros and cons of Internet provision for society, in general. We turn now to the perceived effects—positive and otherwise—of the impact of the Internet and the World Wide Web on libraries, and on people—both those who work in libraries and those who visit them. People visit publicly supported libraries—as they always have—in search of entertainment (e.g., novels, videos) or to obtain the information they seek to fill in gaps in their personal knowledge. Libraries, no longer able to exist merely by providing the traditional package of information and entertainment, have accepted as part of their mission the provision of public Internet terminals and Web access for their patrons.

Many librarians and library users hail the Internet as the greatest thing ever to have happened to the library in their search to improve their ability to respond to patrons' information needs. Others, however—librarians and patrons, alike—remain dubious, suspicious, or even alarmed. These people might even wish that the Internet will soon turn out to be a brief, transient phenomenon, and then go away to die a quiet death, leaving libraries alone to do what they do best.

Clearly, the case has been made for the Internet as an important societal communications medium and change agent. Yet, our primary concern here is libraries, and therefore, our primary focus is on the library aspects of the Internet and the World Wide Web, and the divergent ways in which the two parallel information resources are potential allies—and potential enemies. The central question, then, becomes whether libraries and the Internet can coexist, peacefully, in twenty-first-century society.

Library Luddites

Luddites, in general, are discussed in Chapter 2, and the library world has its own strain of Luddites—people who fear or loathe technology and would much prefer that it stay far from libraries. Like the John Henry of legend (paraphrased in Chapter 2), many engaged in library provision want things to stay as they are (or go back to the way they were) and thus could be termed quasi-Luddites, to some degree. Maybe some of us are latter-day John Henrys,

perspiring freely, leaning on our idle hammers, and watching the future take shape around us with fearful, suspicious, and even resentful eyes. Even I, a former reference librarian and longtime educator of reference librarians, confess that sometimes I am loath to see my accumulated knowledge of print sources and valuable work as an information provider replaced by a vast network of high-tech metal junk that wires my former patrons into the world of information without my help or assistance. But I am not alone.

> ■ I put my (library) time to good use. I learn about stupid bosses and jobs I will never have, about parts of the world I will never see, and about diseases I hope I will never have, and about different kinds of dogs people have owned, and so on. By means of a computer? No, I do it by means of the lost art of conversation.[1]

Around the year 1456, German printer Johannes Gutenberg first made it known that it was possible to print books from plates of movable metal type. Subsequent to word getting out about his invention, the new technology spread rapidly, and the resulting "bandwagon effect" soon caused hundreds—and later thousands—of people to print not only the Bible and other religious works but also popular secular literature for the instruction and enjoyment of literate people. However, along with the spread of these newfangled printed books, another strange thing happened. It is reliably reported that among noble and refined people of the Continent, a negative reaction to the new technology was observed ranging from suspicion, to revulsion, and in some cases to utter rejection. Princes and other noblemen contemptuously refused to allow such printed books into their homes and private libraries. The general attitude among the aristocracy was, in fact, "The only proper books are hand-lettered books. As for those printed pages, well, I wouldn't dream of having such cheap, mass-produced rubbish in my collection." A large number of influential people of that time thought that the only books that had value were the good old, tried-and-true manuscripts (in the true sense of the word), carefully copied by hand, and, for extra cachet, sometimes lovingly illuminated or rubricated. To such nobles, Gutenberg and his ilk seemed crass purveyors of mass-produced *kitsch*, and entrepreneurs of inferior merchandise, doomed to eventual bankruptcy and sorrow for their headlong rush to embrace the "flash-in-the-pan" new technology at the expense of the proven, the venerable, and the truly worthwhile.

Despite the fact that comparatively affordable, printed books were scorned and inveighed against by fifteenth-century (and later) writers as inconsistent with true aesthetic values and possibly even dangerous to the minds and souls of readers, guess what happened to such predecessors of the nineteenth-century Luddites described in the previous chapter—they died. Every last one of them. By now, they're all centuries dead; today, printed books are so accepted

and commonplace that they are all that most of us own and very likely see during a visit to a library.

Recently, however, electronic storage and delivery media have challenged supremacy of printed words on paper and microforms of various kinds in the struggle for information dominance. The book business is generally thriving, nowadays, yet there is general consensus that libraries must welcome or at least accept the Internet or perish for daring to oppose it. The Internet is not just some distant, potential threat, coming soon to a library near you, but already here.

In the decade or so since the Internet went public with its vast and ever-growing digitized files of information, another truth has emerged: Those who seek information and its provision don't really care which format their information takes; what they really are interested in is getting the information, itself, delivered promptly and accurately. However, because of the implied threat that the Internet poses to those working in the area of library provision, modern-day Luddites have sprung up all over the place, some of them noisily condemning the Internet out of tradition, purism, aesthetics, resistance to change, suspicion, or concern that the centuries-old tradition of librarianship is, somehow, threatened by accommodating itself to the new electronic medium. In some respects, they could even have a point. Unlike the organization and logical arrangement of a good library, the Internet remains disorganized, inchoate, and anarchic; a huge jumble of information, incapable of being sorted out and compartmentalized.

The Internet is here to stay, whether we like it or not. No one is ever going to return that genie to its bottle and slam home the cork. It's just something we all have to deal with. However, it would be shortsighted to think of it as some radical, newfangled innovation. Computerized storage and retrieval of library files, the salient aspect of the Internet, has been with us for a long time. Internet technology, by adding e-mail capabilities and "hot links" from topic to topic, is merely a refinement of what libraries (and cross-referenced encyclopedias) have been making available to their patrons for generations.

Today, digital transmission and storage are converting information traditionally delivered in the form of print (e.g., newspapers, magazines, books) into bits and bytes—compressed electronic streams of 1s and 0s that can be zapped from point to point—across the country, or even around the planet in a heartbeat or two, and libraries (and librarians) are still scrambling around in search of an appropriate and concerted reaction to it. Are libraries and the Internet destined to be rivals for the right to exist, and therefore implacable enemies? Or will the library increasingly be seen as a means of "leveling the playing field," and by embracing the Internet, serve as a gateway by which society's have-nots can achieve parity with the more fortunate, and thus enhance the utility of both institutions by affording those who wish to access the information superhighway a convenient and affordable on-ramp?

On one hand, we may reluctantly choose to accept disparity as a harsh fact of life. The gap (some have even called it a ravine) between the haves and the have-nots in society will therefore continue, or even widen, meaning that ability to pay will remain the primary criterion of Internet use, as only people of substantial economic means will be able to afford computer access to the Net and the Web.

Alternatively, we may decide to establish a system of equitable subsidy for society's have-nots, thus enacting and funding universal library provision. Subsidy, if that is the option chosen, would probably entail a vast bureaucratic apparatus, and would be charged with the responsibility to ensure that everyone—regardless of financial status—has the same shot at getting online and plugged in.

Some sort of fair and evenly applied means testing would be required, but criteria for establishing who can afford to pay and who will deserve financial assistance could lead to fraud, perceived inequities, incompetence, and many unfortunate people "falling through the cracks" of the system and being inadvertently, but effectively, disenfranchised. Libraries—particularly public libraries—would be used in the latter option as the "people's on-ramp" to the information superhighway.

Who Needs Libraries? Who Needs Librarians?

■ Combining the skills of the librarian and the computer scientist may help organize the anarchy of the Internet.[2]

One of the more important characteristics of postindustrial (electronic) economies is a markedly greater emphasis on the production, codification, and dissemination of information, with the effect of increasing the status of the workers charged with its communication and management. However, not all librarians have seen their status enhanced as a result of becoming the gatekeepers to information. The public still accords our profession only a middle-level status, as evidenced by the deplorable average salary for an entry-level professional.

What, exactly, is a librarian, nowadays? Is there still such a thing in this age of the Internet? Maybe the time-honored profession of "librarian" has already begun a metamorphosis into something else—perhaps a "cybrarian." A special section of the *Los Angeles Times* listed "Tech's top 10" jobs, one of which was titled "Cybrarians," who are described as librarians of cyberspace, professional information gatherers who make it their business to know what kind of information is available on the Internet and where to find it so they can retrieve it for clients. The section goes on to say that "getting a handle on what is out there is more than half the battle."[3]

Clearly, there's an ongoing need for someone to act as guide and interpreter of this overwhelming wave of information to the public. Keeping in mind that there are already millions of Web sites and pages out there in cyberspace, a total that can confuse (and even depress) the most experienced browser, somebody's got to be able to sift through all that data and retrieve what is desired (and *only* what is desired) by the client. In that connection, it is important for information professionals to understand exactly what the Internet has to offer as they strive to provide useful sources of information to their patrons. Because many now have access to the vast information resources of the Internet on their own, it falls to librarians (or whatever we're calling ourselves now) to provide something extra—some added value. What we need to do for our clients is to put all that (largely unorganized) information into context; to boil down the huge corpus of recorded knowledge to manageable proportions; to provide analysis and perspective on what is retrieved; and to present the repackaged information to our consumers in an easily assimilated form.

> ■ As with any new technology, some librarians are finding it hard to adapt (to the Internet). In general terms, this technology is of interest to libraries, but it is frightening at the same time, setting off a struggle between academics who want knowledge spread around and librarians who want to control it.[4]

All human intermediaries have learned that do-it-yourself automated searching often provides either too little information or too much. A skilled human intermediary between the library patron (end user) and the enormous amount of material available via the World Wide Web can often find a middle course by applying informed relevance and pertinent judgments to what is retrieved, thus kicking out the chaff and leaving the important stuff. In other words, although the Web can deliver thousands of records in response to a given search algorithm, only a crackerjack reference librarian or other intermediary can sift through the output, finding valuable information nuggets in a stream of data.

A good, intuitive reference librarian, providing a small number of highly relevant hits, is normally preferable to an automated search engine that retrieves enormous numbers of potentially relevant documents without priorities or evaluation, which can cause frustration, fatigue, depression, and despair in the recipient. Many students or scholars who log on to the Net all bright-eyed and eager to search for and find something useful could suddenly begin thinking about the pleasures of computer solitaire, or even the benefits of taking a good afternoon nap after finding out that well over 1,000 hits have been returned in response to their search query.

Librarians have been around for millennia, whereas search engines just got here. Librarians staked out this territory long before anyone ever dreamed of electronic data files. For centuries, libraries paved the way for today's information superhighway by responding to people's questions and helping them find out what they needed to know. More recently, millions of children have had their first hands-on encounter with a computer at their school or public library. Today, a large and ever-increasing number of libraries offer access by computers to their own collections locally, and to worldwide databases via the Web. Librarians have a singular advantage over even the most capable search engines—they have become experts at getting the mountain of stored Web-based information to give up its secrets and at helping others master the skills requisite for them to navigate the Internet on their own.

Now that the Internet has gained such a reputation for delivering all the information a person could ever want or need, who needs libraries? If we can access library catalogs, online databases, stock market quotations, personal mail, and innumerable information resources from the comfort of home, why should we pay taxes to maintain a traditional library building in our community where the very same services are provided at public expense?

As the workplace changes, it is a safe bet that the library will similarly be transformed, resulting in entirely new concepts of information seeking and high-precision data mining. What we think of as the "library," in the sense of a public building with shelves of books and other physical media, providing worktables and personal workspace, will gradually morph into a new, cyberspace type of library, in which information and images are held electronically at a remote location, and can be consulted by great numbers of people simultaneously who never have to leave home. Even better, with the world's information resources only a mouse click away, it might soon be possible not only to retrieve the information in any book or report that exists anywhere in the world, but actually to get at the information long out of print, and not physically findable at all.

One thing is certain, however: Internet access in libraries removes the dual limitations of physical space and collection size, permitting users to go where they could never go before and bring back prizes, without necessitating out-of-town (or even across town) travel. Yet, such access (if you're not one of the lucky ones with home systems) requires that you visit the library, and all that that entails; something not possible for many of the residents of every community. Seeing to it that *everyone* has Internet access would seem to be a high priority goal for government and society, but as with so many commendable goals, funding is a daunting problem. It might not be too much of an exaggeration to say that the only serious remaining problem getting in the way of universal access to the Internet is one of financing, raising such questions as: (1) Who will pay for such services, and how much?; (2) How will they pay? (e.g., through fees or taxation); and (3) What provision will be made for persons lacking the required funds?

Actually, money could not be all that problematic if the notion that "information wants to be free" (and is vital to people's ability to conduct their daily lives) gains such widespread acceptance that no one would ever charge for it or have to pay for it. However, given the popularity of Western quid-pro-quo capitalism, the notion of free services runs counter to prevailing thought, and besides, lack of compensation for their labor, efforts, and products would have a discouraging effect on producers of new information, because not being paid a fair price is a strong disincentive to ambition.

- The pride and presence of a professional football team is far more important than 30 libraries.[5]

- New York Governor Mario Cuomo's announcement that parks and libraries are important, but they are not as crucial as New York's more urgent priorities, demonstrates that the agendas of public libraries, if he perceives them primarily in the context of providing pleasure or convenience, have not caught his attention.[6]

These quotes serve to demonstrate the obvious fact that not everybody (however we might wish it otherwise) sees the need for governments to tax themselves additionally to have adequately equipped, Internet-accessible libraries in the community. In the comparatively few years that the Internet has been on the scene, there have been vast changes in the ways in which many people communicate, the sheer numbers of people they might communicate with, and the ways in which they send and receive their messages. Yet, some things remain the same, and one of them is the self-interest of many individuals. They feel strongly that unless a tax benefits them directly, personally, and immediately, it is something to be opposed. This prevailing attitude is likely to have a depressing and delaying effect on any legislation that will fund libraries with enriched and enhanced Internet provision.

It is into this busy and somewhat chaotic electronic milieu that libraries have been plunged, getting along on streamlined budgets, yet continually seeking improved ways of serving their clients and finding information for their audiences. However, the struggle for supremacy between the library and the Internet could already have concluded in a "truce" that could, to some, seem equivalent to a hostile takeover. In fact, the library uses the Internet and the Internet uses the library—a symbiotic relationship that benefits both entities.

Internet access allows library users to communicate more widely than they ever could before via free e-mail channels. The Internet, serving as a gateway to the World Wide Web, permits users to do research faster, more efficiently, and more comprehensively than ever before. Costs of the new technology for libraries are generally and steadily declining. Some providers have

begun offering free Internet use (and sometimes even free computers on which to access it) but the conventional wisdom to the effect that, "There's no such thing as a free lunch" is truer all the time. "Free" computers, clearly, are not without their costs—that's what makes them, indeed, "free." The service carries no charge in exchange for continual targeted commercial messages on one's screen, or multiyear subscriptions to specific online service providers. Such terminals might or might not be regarded as suitable for library use, but they could provide a partial solution to the problem of the "have-nots" to become Internet surfers. The trap in such an offer lies in exposing vulnerable people to annoying and insidious propaganda. As to whether such tradeoff is acceptable, the jury is still out.

Internet use from a home workstation, however, has convenience as its principal feature. Home access removes the necessity of having to look our best, put on shoes, or heave ourselves out of our ergonomically designed chairs facing our computer workstations. Whether this brave new world that is developing before our eyes is, overall, going to turn out to be a great boon or an eventual detriment to society will require more study and research before a final verdict on its merits can be rendered.

The rapidity with which libraries first became acquainted with Internet access, and then, later, incorporated it into their services, and finally, embraced it warmly (if, sometimes, perhaps blindly), is astonishing. Almost everything published in the library press concerning the usage of the Net and the Web, however, is of comparatively recent provenance. We have entered a new century—less than a decade after the Wilson Company decided to include the term "*Internet*" to its indexing—and by now, only the smallest libraries (although millions of private citizens) find themselves without access to the Net.

Commercial providers and government agencies have created interfaces that put searchers in touch with the information, services, and access points available through them from remote terminals, with distance no longer a problem. A single service, America Online (AOL), for example, has brought Internet access into the homes and workplaces of more than 23 million users (as of the beginning of 2000),[7] who can, by using a simple gateway, move through and beyond AOL and out into other networks, which, in turn, put them in touch with the world's users and a number of electronic information resources that grows exponentially each day.

At this point, let us stipulate that we have answered the question, "Who needs libraries?" by answering "We do." Taking into consideration all the automated "search assistants" that now do the work formerly done by human beings, the next question is: "Who needs librarians?" It is easy, in the light of modern technology, to think of the librarian (meaning person working in a building full of printed information), once one has glimpsed the Internet's awesome capabilities, as a part of the past, a back number, and too slow and vulnerable to be of much assistance in the new electronic order.

Admittedly, a library—as a physical place—is expensive to maintain and staff, whereas the Internet—once you've acquired or found access to all the requisite hardware and software—has several obvious advantages. However, if we compare the two and itemize the comparative advantages of using the Internet to locate information versus the old, traditional, print-source way of using the human mind and paper products (albeit freely acknowledging the fact that it was the human mind that created the Internet), the equation changes in various ways. With this blurring of the barrier acknowledged, Table 3.1 is a partial list of advantages to using the Internet.

Table 3.1.

Ways in Which the Internet Is Superior to a Human Search Intermediary

- A computer system takes up little space in your home.
- It can be used for almost limitless purposes.
- Accessing it involves no sorties away from your normal workplace.
- It might even cost you nothing. (Some providers offer free computers to persons signing up for long-term service provider use.)
- You don't need a library card, or a membership, or to reside in a particular geographical jurisdiction.
- You needn't spend carfare or gas money, pay for parking, fight traffic, risk criminal assault, or dress in any way dictated by the rules of a public building. And you certainly don't have to worry about looking your best.
- You can ignore the restrictions of the library's hours of operation; your information system is available to you 24 hours a day, 7 days a week.
- You are not restricted to items in the library's collection or consultation of only those physical items available and locatable at the time you enter the building.
- Nothing needs to be checked out or borrowed, and nothing need be returned.
- You needn't worry about losing or damaging the information in your care.
- Discovering that the material you want or need has become lost, stolen, misshelved, or is in the bindery is (almost) never a problem.
- An enormous (almost limitless) amount of information is available and accessible on virtually any subject, from thousands of sources.
- Information isn't static or bound (as it necessarily is in books or print journals) and could be updated frequently to keep it current and useful.

Table 3.1 continues on page 86.

- Assuming that you are not a subscriber to a metered, pay-as-you-go access plan, your freedom to browse a vast collection of information resources is restricted only by the amount of time at your disposal (or how much telephone time you're taking up).
- Censorship is difficult to accomplish on the Internet (although some libraries impose filters between information and some users) and the embarrassment of having to explain what you want and why you want it is generally obviated.
- Shy, antisocial or taciturn persons can, if they wish, avoid reference interviews, asking questions of librarians, or other face-to-face interaction with others. With a little practice, they are capable of being their own reference librarians and researchers.
- Multiple users can access a given Web site or document at the same time with little awareness of queuing up or having to wait for service.
- "Hot" links, cross-references, and other subject referrals from one topic to another are provided, making it possible to browse, prospect for relevant information in places you might not previously have thought of, and research related subjects simply by clicking your mouse.
- Once purchased, computers and modems run on electrical power alone.
- Computers are industrious (working quickly and normally without supervision).
- Computers have little downtime, with routine maintenance (computers normally don't get sick, take mental health days, vacations, long breaks, lunch hours, etc.).
- Computers are available "24/7": around the clock, every day of the year.
- There are no behavior problems, worries, and distractions that tend to make people inattentive or indifferent to their work (computers are not subject to the pressing concerns and troubles of humans).

Those are only *some* of the more prominent advantages. No doubt, there are many more. Librarians have always striven to connect people of all ages, interests, and backgrounds with the resources they need for education and enjoyment. This role is more critical now than ever in the new era of electronic information, as there is much more than heretofore for people to know, or know about. Many users, of course, still visit libraries in search of books they can hold in their hand (or take to the beach, etc.), or for popular fiction, newspapers, rental videos, and a warm (or cool) place to spend time.

However, society's impoverished and homeless people, who cannot afford and do not own computers and modems, will also show up, seeking a place they can use as their on-ramp to the information superhighway—a place where they can tap into the enormous and continually growing mother lode of information available and of interest and value to them.

Many visitors to libraries are clever or experienced enough to be self-starters who can profitably use the services and collections provided, and need no help in accessing them. Others could seek the expert assistance of a reference librarian, or a facilitator-enabler, and the library normally provides such valuable help to users without requiring that users pay cash fees or join a subscription service that requires monthly charges for access.

The Role of the Reference Librarian

Computers are fast and very powerful; human minds are perceptive and sometimes intuitive.[8] Together, they are unbeatable as an information system. Yet, neither is as good or useful or good alone as the two are together. To contrast the impressing list of points (previous) in favor of the Internet, Table 3.2 is a list of some of the ways in which the services of a good reference librarian can demonstrate the great value of putting a human mind to work on a reference problem.

Table 3.2.
Ways in Which a Human Search Intermediary Is Superior to a Search Engine

- A trained and expert reference librarian can perform efficient question negotiation and get at the "nub" of the question quicker and more precisely than can any machine or search engine yet devised.
- A human search intermediary can teach people of all ages to use the new technology and set them free to explore it better than can a "hot button," a sheet of instructions, or an owner's manual. Automated tutorials, supplied with many information systems, are not "warm and fuzzy," like people.
- A human search intermediary can remember users and their preferences and match new documents encountered to known users more reliably than any program yet in existence.
- The social interaction of one-to-one communication between people is normally less threatening and more relaxing than trying to get a machine to understand what you "really" want.
- A reference librarian can, by staying abreast of the new technology, bring users up to date on what's available in the library's collection.
- Only human librarians can stand up to authority and advocate free and open access to information; machines can be programmed, and pretty much do only what they're programmed to do.

What About Books?

■ The book is dead.[9]

■ In the economic competition, books, magazines, and newspapers are already doomed. There is simply not enough money for print and electronic technology to coexist. Electronics are demonstrating that they are more cost-effective every day and every hour.[10]

■ As a way of spending time, reading produces enormous satisfaction for a few, is a valued activity by others, and is occasionally engaged in by many more people who usually find it more convenient to acquire the few books they need from some source other than the public library.[11]

The Internet is currently fulfilling the promise of being that Next Big Thing that everyone's been waiting for: it's hot, it's sexy, it's now, and it's almost irresistible, but does that necessarily mean that books—as physical objects—are going the way of the dinosaur? Marshall McLuhan prophesied back in 1960 (in a *book*, mind you!) that, "The book is dead." It was, he said, too static, too linear, and too boring to compete with the newer electronic media (like television). Predicting confidently that sometime before the turn of the century, the last physical book published in America would roll off the press and pass into history, leaving nothing but electronic information sources to deal with, McLuhan anticipated not just the electronic age, but the *totally* electronic age.

As prophetic as he might have been in some areas, it seems fair to say that McLuhan's observation has certainly fallen well short of the mark, proving only that even the best of crystal balls are often cloudy and that predicting the future with any confidence is inordinately difficult. Every time someone predicts the future, in fact, some invention, or unforeseen change knocks even the most carefully reasoned of forecasts and prognostications into a cocked hat.

McLuhan turned out to be wrong. Today's book publishing industry is alive and well, from all available statistical evidence, and many publishers report banner years for their sales year after year, despite almost inevitable price increases for their products. In early 2000, novelist Stephen King published *Riding the Bullet*, a reasonably priced novella, over the Internet, attracting thousands of greedy customers in the first few days of its availability. From this pioneer venture, it seems reasonable to imagine that some symbiotic relationship is at work, and that books and electronic media (like libraries and the Internet) seem nowadays to be on parallel streams, often touching or merging, but rarely engaged

in the kind of predicted war that would spell the extinction of one or the other. So, it seems safe to conclude that rumors of the book's demise are not just exaggerated, they just happen to have no truth to them.

Libraries, as communications media, have always reflected the trends and changes of society in general. Significant events taking place in the process of communication, therefore, have affected libraries significantly and changed the ways that they function as they pursue their time-honored and overarching missions: the maximization of the social utility of the graphic record and the preservation and dissemination of what is known about the universe.

Internet access—although well within the budget of many Americans—is still costly, especially for those without work access, or those whose jobs don't offer such access as a requirement or a perk. Most providers can give you a pleasing range of interconnected services (e-mail, access to the Web, and entree to search engines) for about $20 per month (current price as of 2001) for unlimited use, whereas others charge by the minute, and a few actually have begun to offer free access (but with a catch—commercial advertising). Many consumers are willing to accept such a tradeoff (advertising cluttering up "freenets"); others find it distracting and unacceptable and would rather pay for the privilege of being free of ads. However, that's where libraries of all types come in. That's where the library, and its accessible public Internet terminals, shows its mettle and value. Through the library, one can have the best of both worlds: uncommercialized and free access to information sources. Best of all, much of the software you're going to need is free, downloadable, or both. You can copy it free and take it home with you, without infringing on anyone else's proprietary rights.

In addition to providing all the traditional services they are known for, libraries are frequently charged with the responsibility for equalizing access for the have-nots. Time-honored and democratic institutions as they are, they serve as the Internet connection for the 75 percent of society who don't (as yet) have home access.

Now that the new century is here, the computer, the Internet, and the World Wide Web to which the Internet serves as a doorway, have not only come into widespread usage but, for many of us, have attained everyday familiarity bordering on necessity. Today's Internet, moreover, has so permeated the library world with which we are primarily concerned that the ways in which librarians conduct library business have changed forever because of it. Palatial, large new library buildings have recently opened in cities around the country, indicating civic pride in culture and brimming with the latest computer hardware. Main libraries in large cities now boast huge public rooms, chock-full of public access Internet terminals. Very impressive, but what about the books? Where are they? Don't they have a place in the twenty-first-century library?

For generations political leaders have been fond of justifying the economic hardships of daily life by saying, "You can't have guns and butter," meaning that choices among alternatives (e.g., necessity vs. luxury) must often be made.

Given that any library has only so many dollars per year to spend on "materials and services," and that a dollar spent on computers or Internet provision cannot also be spent on books and other print sources, forced choices become necessary. Guns or butter: computers or books.

Despite the compelling allure of the Internet, many Americans (perhaps even most) still view their libraries as places where they can consult or borrow books, and little more. As with so many other things, it usually comes down to a matter of money: Many libraries that have gone heavily into Internet provision have perforce shortchanged their book collections. The quality and quantity of book collections of many libraries have therefore suffered greatly because of the "bandwagon" effect of libraries turning heavily to computers. Among stated reasons for this are the political and public relations aspects of appearing to be cutting edge, and current with the technological times. Yet, it could also be alleged that some high-tech libraries have actually lost sight of their original mission—preserving and making available the graphic record of human knowledge—in favor of showing off all that impressive new equipment to admiring visitors. So, the question, "What about the books?" could actually be a question of, "Does anybody still remember this place's *raison d'être*?"

How important are books, then? Kurt Vonnegut, celebrated author of more than a dozen novels, and Joseph Fiennes, a British actor, put the matter clearly and boldly in their different and very personal styles:

> ■ It now appears that books . . . are obsolescent. My grandchildren are already doing much of their reading from words projected on the face of a video screen.
>
> *Please, please, please wait just a minute!*
>
> At the time of their invention, books were devices as crassly practical for storing or transmitting language, albeit fabricated from scarcely modified substances found in forest and field and animals, as the latest Silicon Valley miracles. But by accident, not by cunning calculation, books, because of their weight and texture, and because of their sweetly token resistance to manipulation, involve our hands and eyes, and then our minds and souls, in a spiritual adventure I would be very sorry for my grandchildren not to know about.[12]

> ■ I've got a vendetta to destroy the Net, to make everyone go to the library. I love the organic thing of pen and paper, ink on canvas. I love going down to the library, the feel and smell of books.[13]

Vonnegut and Fiennes are not alone in feeling nostalgia for the good old days when libraries were pretty much exclusively places of books. However, for books to remain part of the library landscape, which still seems to most of us a desirable aspect of any future involving knowledge, libraries will have to make intelligent decisions about such important matters as where the paper to print books will come from and how to ensure "fair" and affordable pricing of printed books, thereby keeping them affordable.

Many libraries—particularly smaller ones—have been forced to slash their print-source budgets drastically to pay for all the technology they have elected to make available to the public. This might not necessarily be a bad thing, as all progress invariably involves a certain amount of disorienting change in many people's lives, but having fewer and fewer books available for borrowing is nevertheless a necessary tradeoff for the automated library and could cause considerable dismay for those readers weaned on—and accustomed to—a good selection of shelved books. Some library users, already deciding to "vote with their feet," have abandoned libraries in favor of getting their education and entertainment in places like their own homes, bookstores, and video parlors. Despite this, curiously, library use has not suffered much from such defections, but has actually been driven up, in many areas, because of the presence of free Internet access for the general public.

The tremendous transformation that the Internet has brought to libraries of all types has greatly augmented and improved access to information. Without leaving your hometown, you can now browse and access entire collections and archives of up-to-date periodicals, newspapers, and rare manuscripts from major libraries anywhere in the world. These services are not only empowering, they are truly democratic: simultaneously available not just to affluent people in big cities, but to residents of small towns and to students in rural, isolated colleges. However, at least for the moment, the important question, "What about books?" is one that libraries are going to have to try to answer and justify their decisions to the satisfaction of their audiences or risk extinction.

Internet Capabilities in the Library

To understand how the growth of the Internet has impacted libraries, consider this: In contrast to the 1992 edition, recent annual volumes of *Library Literature*[14] devote, on average, more than 20 times as much "ink" to the Internet or Internet-related articles and books, and the Wilson indexers now subdivide the general subject "Internet" into the subtopics in Table 3.3.

Table 3.3.
General Internet Subtopics

aims and objectives	bibliography	case studies
censorship	college and research libraries	depository libraries
directories	evaluation	finance
government libraries	legal aspects	public libraries
rural libraries	school libraries	standards

Very little in today's modern library is as it was a generation or two ago. Nothing stays constant—if a library remains exactly the same over a long enough period of time, in fact, it becomes unused, unappreciated, underfunded, and eventually, it assumes the status of a cultural monument to its former purpose, while society moves on to bigger and better things. Every day, some library near you is being rehabbed, retooling, retrofitting, and gearing up to meet the challenge of this new century. To refuse to change is, in a very real sense, to die. Adaptation to the new ways and methods is imperative. However, just as in the 1830s, when Ned Ludd was throwing those spanners into the works of the Industrial Revolution, not everybody is on board. Some people are, intentionally or otherwise, being left behind. An intriguing television commercial for the new electronic technology has its large, international cast of players look straight into the camera and ask us: "Are you ready?"[15]

Thanks to portable Internet technology, anyone with a telephone jack, a keyboard, and a monitor can now do the same kind of deep-background, high-level library research previously only available to students and researchers in the largest (and most expensive) universities. Online searching for anyone, and from anywhere, is the fulfillment of the library's great, democratic mission: unfettered access to information for the people of a free society.

Although that mission is essentially unchanged, one should not imagine that the library of tomorrow will be a place where the physical book has gone the way of the horse and buggy. We can be certain that there will still be books in 50 years—and hopefully, there will *always* be books. The format could change—as books take the shape and configuration of electronic bit-streams (a la Stephen King) or books available for download or purchase on disk for play on special readers—but there will still be books! In fact, the entire definition of the term "book" has already changed and is continuing to change. Soon, it's easy to speculate, the term "book" will no longer—at least for millions of Americans—automatically bring to mind an image of cloth covers and paper pages.

Books have another significant advantage in that one doesn't need electronics to access them and make use of them. In Chapter 2, we spoke of the "information ravine" between the haves and have-nots in our society. Although such a divide is unacceptable in a modern and free society, there is at least one bright facet to the problem because such a deplorable set of circumstances foretells not only survival but increasing importance for libraries. It has been widely repeated that "Information is power." By making all its resources equally available to all members of its community, regardless of income, class, or other factors, the library gives everybody (and not just those with the money to purchase it) an equal chance at information, thus empowering people short of cash but full of ambition. The more the economic disparities between the "information rich" and the "information poor" are felt, in fact, the more likely it is that the have-nots of society will turn to the library as a place where they can find the access road to the so-called information superhighway. As the oft-repeated proverb, attributed to the ancient Chinese, goes: "Give a man a fish and he will have dinner tonight. Teach a man to fish and he will never go hungry." Give searchers access to the Web and they will always be able to locate and sift through their own information, putting it to optimal use.

What, then, is the optimal way to assist our patrons in getting the information they want or need? Shall we teach them or show them?

> ■ As accessibility and deliverability of information is priced accordingly, we will see discrimination based upon "information haves" and "information have-nots." And besides those who are priced out of the information market, those who want the information and can pay but find that the library does not provide the services, must then go elsewhere to get their information. Another differentiation between the "information haves" and "information have-nots" is in the knowledge that information exists and the skill to access it effectively. To address this growing problem, some librarians are teaching patrons information retrieval skills along with teaching skills.[16]

Teaching people how to be their own information retrieval specialists is a commendable goal for libraries. However, before today's libraries can lay claim to the title of access point for those who cannot afford the luxury of their own personal computers, several important issues, noted in Table 3.4 must be addressed first—and resolved.

Table 3.4.
Issues for Libraries Offering Internet Access to Their Patrons

- *Equity*. The same opportunities must be available for all, without regard to income level, ability to pay, race, religion, and so forth. (This plan would cost the federal and state governments some serious money.)
- *Open access*. Everything accessible for a fee to the "haves" must somehow be made available as well to the "have-nots." To produce that condition, some appropriate balance must be struck between financial return to copyright owners (authors, publishers) and the rights of library users to reproduce copyrighted materials.
- *Affordability*. Cost and ability to pay must not be determinants of an individual's access to the Internet. For a start, reduced telecommunication rates must be provided for libraries, similar to existing postal rates, and must be predictable, reasonably stable, and geared to inflation.
- *Confidentiality and privacy*. Although some sort of equitable means-testing will no doubt become necessary to determine whether an individual is eligible for free Internet services, everyone's personal privacy must be protected from unwarranted intrusion by means of secure electronic transaction protocols, and file access—regardless of format. Privacy must also be guaranteed such that all library use is as confidential as use from one's private home, and not subject to scrutiny by others; otherwise, free inquiry would be effectively curtailed by the so-called "chilling effect" of fear of governmental, pressure-group, or interest-group censorship.
- *First Amendment rights* must be guaranteed in library dealings, as they are constitutionally protected in the marketplace of ideas. Individuals must therefore have the right to choose the information they want to read, view, or receive without undue fear of reprisals by any other person, group, or governmental entity.
- *Ease of access*, meaning as close to barrier-free as is practicable, by which standardized procedures are encouraged among computer manufacturers, telephone companies, database suppliers, and other interested parties such that the user's convenience of access is maximized.

Information overload, once unheard of, but now a growing part of the problem of future shock, is now a serious problem for Internet users and likely to grow increasingly more severe as time passes. With the ever-increasing numbers of existing Web pages and Web sites—and those that are joining their number every day—how does anyone with a specific information goal or objective in mind ever find what he or she is looking for? Obviously, people need an index or directory to help them locate the stuff that interests them,

and—perhaps more importantly—to filter out the things they don't want or need to see. What you need to find can amount to a single needle in a huge and ever-growing haystack, and the larger the haystack, the less likely you are to be able to isolate and capture the sought-after needle. To help you locate the pages that interest you, indexing services such as AltaVista and *Yahoo!* have created huge search engines, which are Web sites in and of themselves, accessible to browsers, but which permit—through the entry of selected keywords or the simple clicking on underlined words or phrases—access to other sites that contain those terms.

As a single example, suppose your children, in connection with a school assignment (or you, for that matter, pursuant to your favorite hobby) want to find out more about Tiger Woods. Suppose in your search for information about him, you go into one of the big, comprehensive search engine's browsers and type in the search terms, "golf" and "tiger" and "woods." After a few seconds of electronic gathering, your screen is likely to display a dismaying and even discouraging result: there are upwards of 20,000 hits that contain all three terms you have chosen, some of which are actually about the young golfing phenomenon and others, actually "false drops," or off-topic results that just happened to contain the three terms "golf," "tiger," and "woods" (example: an article on golf courses in India where there could be tigers lurking in the woods). Twenty-thousand citations! An almost unbelievable number of "hits" waiting for you to do something. What to do now? Many people, unfortunately, when confronted by such almost unlimited information, discover that they are no closer to their goal than they were before they checked into the search engine and find it preferable to disconnect from the Web and spend their time more profitably using conventional look-'em-up reference materials.

The trick (and an increasingly harder trick it is all the time, considering the growth rate of the big engines) is to find the few nuggets of pay dirt you really want or need, while leaving all the irrelevant slag behind.

> ■ Bonsai very simple. Take clippers. Cut away everything *not* tree. (Advice from karate master to young student, who seeks instructions on how to trim a bonsai miniature tree, and is afraid of making mistakes.)[17]

Yet, all is not necessarily lost for those who persevere, even in the largest files. Refining and paring down a literature search that catches 20,000 documents requires a certain amount of "tweaking" one's search strategy, but it can be done. You might, for example, need to add a few more subject terms (e.g., specific tournaments, certain dates) to your query to narrow down the search and make the numerical citation retrieval more manageable. It is one of the truisms of modern life that people prefer their information in small, manageable amounts, and the finding of a vast number of hits in response to one's query, although it could seem gratifying at first, leads quickly to fatigue, frustration,

and even failure to find what is desired, should one begin doggedly and systematically reading every document.

Adding (ANDing) terms (especially when done logically and cleverly) refines a search, making it much higher in precision, and has the highly desirable by-product, as well, or cutting way down on the number of prospective hits to be plowed through. Returning to the bonsai analogy, the objective of searching through vast reams of collected data and citations for specific items of interest (especially for those highly relevant to your search) is to cut away the unnecessary tree limbs, while leaving the miniature tree as beautiful and healthy as possible.

Detractors refer to the Web as a vast group experiment in unfiltered publishing and communication. Although deemed by its proponents as the best information source ever and condemned by its detractors and critics as a hopeless, chaotic jumble of random, unverified, and potentially harmful information, it has been likened to a giant library with all the pages torn out of the books and left scattered in a mile-long rotunda.

> ■ Trying to find information on the Internet is often described as trying to get a sip of water from a fire hydrant. With just a few keystrokes, it's easy to flood your computer screen with endless lists of possible references. Finding and isolating the useful material can seem daunting. Giving up and looking for that drink elsewhere can be very tempting.[18]

Several writers liken the task of exploring the capacity and capabilities of huge search engines in search of specific information to one of those "good news, bad news" jokes we've all heard and (possibly) laughed at:

> ■ More and more journals are reviewed and published electronically, giving faster turnaround and quicker feedback. I can reach a researcher directly, and perhaps get an answer within an hour. Networks are terrific. On the other hand, I've watched researchers waste morning after morning, reading irrelevant Net news, plowing through e-mail and fine tuning their screen savers.[19]

> ■ Most houses have a catch-all closet, or attic, or junk drawer—a disorganized space strewn with dozens of odds and ends. We tolerate this messiness because it is *our* messiness. But imagine that people from all over the world could toss items into your junk drawer at will—and imagine that every item came wrapped in a virtually identical fashion, so that you couldn't

> tell a knickknack from a jewel from a lewd postcard without first opening the package. Welcome to the Internet.[20]

> ■ Not so long ago, you could search for information on the Net by "surfing," and making educated guesses about which links to follow from a few select Web pages to find the information you needed. But the phenomenal growth of the Internet makes that strategy about as successful as looking for a lost contact lens in the sand on the beach with your eyes closed. You may enjoy the heat of the sun and the sound of the waves, but you are not likely to find what you need.[21]

Looking for what you want to find on the World Wide Web is still a frustrating task because of its sheer size. You are, after all, doing the equivalent of searching for small, individual needles in enormous (and hurtling) haystacks, and your goal is that of finding not only information about what you want but *only* information about what you want.

Today's major English-language search engines, combined, boast well over an estimated 320 million pages of information, all available for free from one's Internet terminal. Can one really get at all of those reported millions of pages? Researchers have estimated that even the biggest and best of the commonly used search engines (e.g., *Yahoo!*, Lycos, Excite, Infoseek) each index only about one-third of the actual pages on the Web, without much overlap or redundancy, meaning that most pages will probably never be found or read, unless happened upon by chance. An additional problem is that, as with all electronic search media, browsing aimlessly, as opposed to searching for a specific document, is tricky, and usually so time-consuming that if you don't have a pretty good idea at the outset of where to look and what, specifically, to look for, you stand a pretty good chance of missing something you might have used, simply because of imprecision in your search strategy or failure to use proper identifiers and descriptors in the search.

People often imagine that once they have connected to a large, popular Web site, they have access to it all, but clearly, that isn't necessarily the case. Searching the World Wide Web has been termed tantamount to dealing with a massive telephone directory with most of its pages torn out. According to a study published in 1998 in *Science,* even the most thorough and comprehensive search engine manages to find only about one-third of the pages on the Web. Other search sites cover 10 percent or less of the electronic universe, and that's about as good as it gets. That leaves millions of pages of information floating out there in cyberspace, somewhere, unreachable by anyone lacking the specific Web address. Unfortunately, as the Web grows geometrically, the number of pages grows exponentially, making the task of the searcher all the more difficult.

Internet searching exudes an almost aphrodisiac aura for those not intimidated by the few items of knowledge necessary to performing a successful search. The seductive lure of an all-electronic environment is thus viewed by many persons as desirable in itself. And high-speed access to such immense stores of information renders the traditional method that many of us grew up with, entailing plodding, slow, methodical library research in books, indexes, and journals seem, by contrast, unbearably slow.

Economics, coupled with corporate naked greed, could turn out to be the villain in all this: Search services that are now free or part of one's monthly or annual subscription rates can in the future become analogous to "Pay TV." Anything and everything your heart desires can be yours at your workstation, but only if you can pay the price. As we come to depend more and more on centralized electronic sources, it is entirely possible that the information we seek (and often need) will become less free (in both senses) and more controlled.

Internet Filters: Access Denied

■ McCain Repeats Call for Internet Filters

■ Republican presidential candidate John McCain has called once again for an end to federal funding to libraries and schools that offer unfiltered Internet access to children. The Arizona senator repeated his demand at a town meeting at the Greenville (S.C.) Public Library January 21, (2000) the Associated Press reported. Following a visit to the area in December, McCain had attacked the library for not limiting children's online access after he was told that the nine public computers in the reference room are routinely used by adults to view sexually explicit material. "That this scourge can exist in this beautiful, religiously grounded, family-friendly town points out the enormity of the crisis," said McCain. "If you walk into any library and ask for a *Hustler* magazine the library will tell you it's not available because it's inappropriate. Yet a child can logon to the library computer and surf the Web for some of the most degrading and shocking pornography available." The AP said that McCain disagreed with the American Library Association's assertion that unlimited Internet access was free speech.[22]

Human nature, being what it is, predisposes children to be curious and adventurous, inclined to test their powers via each fascinating new medium. Deciding what to do about unfettered use of the Web from home-based computer systems is a problem of parental decision making, and beyond the scope of this book. Yet, when the public or school library is involved in making such decisions, then, admittedly, it's a problem everyone has to think about, and opinion is strongly divided over just what to do about it.

A strong case can be made for the view that Internet abuse by the young (for example, visiting a pornographic Web site) is not one requiring state or governmental monitoring and control, but rather one of individual, parental responsibility. Yet, many feel equally passionately that there is a matter of "clear and present danger" at work here, and it is government's role to protect the young and the innocent from harmful material that might reach them via the Net. Because many libraries now boast of dozens or even hundreds of available public online Internet access terminals, it is what libraries and information centers should (or are going to) do about such problems of access to the Web that concern us here. What many public figures are promoting, just now, is the notion that filters must be interposed between innocent children and some of the more licentious Web sites out there in cyberspace.

Filters imposed on massive databases and individual access terminals are intentionally and deliberately imposed barriers to free inquiry because, in the interest of public safety and the general welfare, it is best to keep certain information from those who either (1) aren't ready for it, (2) could be harmed psychologically by it, or (3) might subsequently use what they find for antisocial purposes. Advocates of filter imposition reason that it is best to be on the safe side, keeping everyone (and especially children) out of certain sites, because of the possibility that someone susceptible or innocent could get into these sites and misuse or be traumatized by their contents, to the detriment of others or themselves.

Such information barriers and blockades, however, beyond constituting both blatant ageism and an abridgment of basic individual rights in a free society, might have inadvertent and unexpected consequences. To demonstrate the problem, Table 3.5 shows some of the more salient examples of filtered-out or "access-denied" searches, taken from recent library literature, firsthand experience, and anecdotal evidence.

By the way, the last example includes an intentionally easy error to commit, which is exactly why the two sites are so similar in address. There is nothing illegal or preventable in current law about an enterprising merchant taking an Internet address that looks like or closely parallels a legitimate one. No one, it turns out, can obtain a patent or copyright on a screen name exclusive of domain. The only thing copyrightable is the *entire* name of the outfit. When a cybermerchant begins imitating a legitimate name deliberately (even with malice aforethought), the issue stops being a legal one and falls into the large and shadowy realm of ethics, where only one's conscience serves as one's guide (See Chapter 4).

Table 3.5.

Access Denied! Nine Examples of Access Inappropriately Denied to Library Patrons by Imposed Internet Filters

1. A young student wants to research the topic of "breast cancer" for a report she is doing in health and hygiene class in high school. She attempts to run an Internet search on her topic. ***Access denied***. Reason: Because the term "breast" can lead the browser to sites where the physical endowments of ample women are prominently displayed, she is forbidden by the program to consult medical and scientific material on breast cancer.
2. A newlywed homemaker and would-be Thanksgiving cook, who merely wanted to fix a turkey breast to feed the family. ***Access denied.*** Reason: The woman was using the search term *breast* to locate recipes for her family.
3. A sports fan, seeking accounts of NFL (National Football League) Superbowls of years past, wants to read about one game in particular. ***Access denied***. Reason: The program refuses access to information on "Superbowl XXX," because "XXX" is sometimes used as shorthand for super-erotic material on the Net.
4. In the wake of alarming news stories concerning foreign nationals spying on the proprietary secrets of the U.S. military, a patron seeks to access the site, "wiretap.spies.com." ***Access denied***. Reason: Someone in charge of imposing filters became alarmed at a quote on the site's home page from Christopher Morley's work *The Haunted Bookshop* that likens books to "intellectual gunpowder that can keep on exploding for centuries." When the filter encountered the word "gunpowder," it blocked access to the site.
5. A library patron wants to access the online catalog of Hasbro, perhaps the world's number one toy and game maker, in search of a suitable birthday gift for his young, budding-computer-genius nephew. ***Access denied***. Reason: The seemingly innocent site was blocked because its two-year-old URL (Internet address: www.candyland .com) had once been occupied by an online pornographer who relinquished the address only after Hasbro sued.
6. A woman seeking information on the evaluation of the current year's subcompact automobile, the Ford Escort, cannot find the information she seeks. ***Access denied***. Reason: The filtering program has screened out information on the term "escort" because some entrepreneurs offer a form of prostitution as "escort services."

7. A student doing research for a term paper wants to read a technical article about the making of biological and/or chemical weapons of mass destruction, strictly for research purposes. ***Access denied***. Reason: The commercial filter providers, fearful that terrorists, maladjusted teenagers, or both, might use the information on the site for evil purposes, ensure that no one will be able to see such information. Unfortunately, the serious student who only wants to understand how (and why) such weapons are constructed suffers the same censorship as would any teenage monster intent on whipping up a batch of anthrax or botulism in his family's garage sink.

8. A high school senior, seeking information online about the colleges and universities she was considering, found herself unable to access any information whatsoever about Beaver College (Pennsylvania). ***Access denied***. Reason: The term *beaver* is sometimes used in American slang as an anatomical descriptor with sexual connotations, so the library's imposed filter barred access to that site. *News update*: The president of Beaver College has (as of late 2000), albeit reluctantly, reported to be seeking permission of her Board of Trustees to authorize an official change of name for her venerable liberal arts institution, partially to avoid this problem in the future.

9. A library patron surfing the Web, in search of the current administration's thinking on certain matters of foreign relations, wants to access the Bush administration's official White House Web site. ***Access denied***. Reason: The searcher has misread the domain name in the site's address and accidentally typed in a very similar URL. The filtering program springs into action, "saving" him from stumbling by mistake into "Whitehouse.com," a pornographic site that has intentionally (but still legally) chosen its name in the hope that accidental drop-ins will become intrigued and linger awhile (at about $4.00 per access minute), subsequently deciding to purchase whatever the proprietors have for sale.

Prominent political candidates have often seized on the issue of unrestricted Internet access as opportunities to show how they are more moral, ethical, and concerned with protecting the young than their opponents. In their quest to keep "filth" and other so-called undesirable content out of the hands of children, the politicians, creators, and imposers of filters on public access computers, desirous of protecting the young and innocent from harm—and the rest of us from the subsequent actions of deranged browsers—undermine the ability for citizens to speak and read freely, without the government watching over their shoulders. They figure it's a matter of tradeoff: we give up a freedom or two in hopes of gaining a measure of security.

Most attempts to access banned material are denied by filters because these attempts seek information on the broad categories of drugs, criminal skills, hate speech, sex, and gambling. *Question*: When is such filtering or blockage an understandable (and even commendable) attempt to protect susceptible and impressionable minors from that which could be harmful to them, and when does such a practice constitute an illegal infringement on constitutionally protected speech?

Ironically, broad filtering applied to search engines could actually be counterproductive in blocking out things that our national leaders actually want people to get at. For example, seekers of information from "George Bush's War on Drugs" site and the "National Institute of Health's Marijuana: Facts for Teens" brochure could both be denied access because the search equation includes the *verboten* term "drugs."

Challenges to imposed filters and other blocking devices in libraries are springing up everywhere, as one might expect. These challenges raise interesting and nettlesome questions such as in Table 3.6.

Table 3.6.

Questions About the Imposition of Internet Filters on Library Terminals

- How can a library permit wide-ranging access to information and material dealing frankly with sexual matters, drug use, or terrorist groups without making it possible for patrons to access and download "pornography" or recipes for the manufacture of bombs or narcotics?
- Does the library have the right—or even the responsibility—to pay close attention to the viewing/accessing habits of its patrons via the Internet that it is denied in the realm of normal, print-source materials?
- Should librarians undertake the additional role of "information cops," snooping into their patrons' search behaviors? (Did somebody say, "Big Brother"?)
- What about patron confidentiality, privacy, and one's right to free inquiry and free access to information? Are there legal and constitutional issues at stake?

Although these matters are discussed at greater length in Chapter 4, it should be noted here that discussions of such controversial issues are strongly apt to raise more questions than they will ever put to rest. Money, as necessarily required in Internet provision, rears its ugly head in any discussion of access issues. Because money is finite, we have to be concerned about the cost-benefit ratio of what people (especially the young) can find on the Internet by using library terminals to access the information—and the benefits of potential use versus the abuse or harm that could result from unsupervised or uncontrolled use.

Such issues leave aside the access that millions of children already have (and are increasingly likely to have in the future) from home, where their family computers (and all the necessary access codes and passwords) are available to them at will, to rush out into the Web and go wherever they will, without Mom or Dad kibitzing over their shoulders.

The Dark Side of the Internet

Parents are worried about the potential effect of the Internet on their children because three things are happening at once:

1. There is a public perception that crime is on the rise—particularly violent acts committed by young people against others.
2. The Internet is becoming increasingly pervasive, unavoidable, and indispensable in everyday life.
3. There is a dawning realization that the Internet is different from radio, television, and newspapers because it is a totally open, interactive technology, with no built-in or supervisory editor, publisher, or censor.

Despite its importance and seriousness, however, we have elected not to get into home use, because this is a book about the Internet and the library. Yet, those in library provision need to formulate a reasonable and legal position concerning how library computers are used to access the Net and the Web, not because we wish to act as censors or substitute parents (or at least not *only* for that reason) but because we ought to be sure of our legal position and the possible consequences should some bright kid find a way to use a library's Internet terminals to accomplish any dark purpose using equipment traceable back to our library. Table 3.7 offers only a handful of examples, but there could be countless more to worry about.

Simply put, the framers and writers of the U.S. Constitution (and its amendments) could not have even imagined the Internet, its size, its power, or its pervasiveness, so all previous precedents don't apply. Even recent court decisions, such as those regulating print, radio, or television, can have no bearing whatsoever on the Internet and its use (or misuse or abuse) because of demonstrable differences in the way the new medium affects daily life.

Table 3.7.

Potential Problems for Libraries Granting Unrestricted Use of Internet Terminals

- Politicians in search of "hot button" (emotionally-charged) issues become successful in passing legislation designed to mandate filters on all library computers, in the interest of morality, safety, or whatever they want to call it.
- Someone whose motives are deemed credible uses one of the library's Internet terminals to send a death threat to the president or other public official.
- A child resentful of his parents' strict authority, uses a library terminal and forms a friendship with a very nice, flattering, older e-mail correspondent who offers to supply a free airplane ticket and promises "a wonderful time" if the child will come for a visit.
- Using instructions found on the Web, a patron learns how to hack into government or corporate computer systems and do various forms of snooping, mischief, and destructive behavior.
- Kids find and access a fascinating Web site where erotic, obscene, or pornographic visual materials are displayed freely.
- A depressed, unemployed man, seeking revenge against those he holds responsible for his misfortune, downloads recipes for constructing bombs, poison gases, and other weapons of mass destruction, looking for a little payback against his enemies (real or imagined) or to earn himself some misplaced self-respect.
- Teenagers stumble into a chat room where persons steeped in various kinds of hate, intolerance, racism, sexism, and anti-Semitism air their opinions, seeking to persuade like-minded readers to send checks and enlist in their causes.
- A confused and alienated young woman joins a cult, just by signing up. It's easy, it promises a sense of belonging, and it promises to get her out ahead of the rest of the neighborhood when the predicted end of the world finally occurs.
- Acquisitive children go get Daddy's or Mommy's credit cards and use them to order hundreds (or thousands) of dollars worth of merchandise via the Internet.

Internet Access Policies

Yet, there are ongoing attempts to grapple with the problem and to find and to employ already-existing precedents or formulas on which jurists and library administrators and boards can build a comprehensive, sensible, and fair Internet access policy. For well over 100 years, just as an example, newspapers and other informative communications media have generally followed the rubric of attempting to make each item answer these basic questions: who, what, where, when, how, and why. What seems to be important to the courts in the legal problem of library regulation (such as imposed Internet filters) is the consideration of the following questions: who is being spoken to (e.g., minor or adult), where is the speech being made, what kind of speech is it, and how is it being monitored or regulated?

The problem is that a library—formerly at least—could learn, understand, and conform to existing standards for obscenity and other forms of protected speech through its decisions as to which materials to purchase or subscribe to. In this way, the library met existing constraints of budget and space available, while carrying out a desired governmental mission of educating the populace and seeking to protect patrons (especially younger ones) from harmful material that could lead to damage, mischief, or psychological problems. No one wants to see young people corrupted. Even the most liberal, freedom-loving citizens (including many librarians) are normally willing to place a mental asterisk in front of some of the provisions of the Librarian's Bill of Rights, especially the part about how all citizens should be granted access to any and all information available in the library, or through the Internet. Especially concerned, understandably, are many parents of young children.

Are filters necessary to protect the young and easily susceptible from harmful material? Consider this: With one little mouse click, you can wander into the cyberspace equivalent of a Nazi beer hall or a richly stocked pornographer's library of images, hack the NASA computers, or roam the Sorbonne's library holdings, and no one is there to stop you or direct you. Free interaction with the network, via over a dozen powerful search engines, is easy and fun. Although filters do exist—and are increasingly becoming mandated for many library systems—the only really effective and proven filters against the corruption of youth would appear to be the parents of the young children and the values, knowledge, and judgment that kids bring to the Web in their own heads or hearts.

> ■ Every library in the country should have a sign on the door reading: "This library has something offensive to everyone. If you are not offended by something we own, please complain."[23]

People of all ages, thanks to massive advertising campaigns and word of mouth, want, need, and feel they have a right to information, and the Internet provides more information than most of us can even imagine. Not everything

available on the Net, arguably, is suitable for reading by all who have access to it. Some censorship is therefore—at least in the minds of most Americans—desirable, but the problem is, as with all other types of censorship, twofold: (1) Where should the line between the "safe" and the "harmful" be drawn? and (2) Who is going to be permitted to draw it?

Librarians continue to wrestle with such problems as what, exactly, if anything, should be kept away from whom, and who's going to have the responsibility for deciding such questions. Undeniably, it is a genuine dilemma. What is to be done? One obvious (if probably unconstitutional, and almost certainly undesirable) remedy for such a problem would be for Big Government just to decide to ordain the "cleaning up" of the Internet, by getting rid of all messages that are deemed potentially "harmful" to children or offensive to minorities and others. The resulting, sanitized Web could then be searched with impunity by anyone who mastered a few simple commands. Every day, in fact, new writers and speakers call for just such measures.

However, the constitutional First Amendment's clear and unequivocal language ("Congress shall make no law . . .") means that it is not going to be easy (or even legal, under the present system) to censor the writings or views of others unless a strong case can be made that viewing such information would present a clear and present danger arising from permitting it to continue to be legal. Even if we were to determine that we begin today, filtering or removing everything "harmful to minors" from the free section of the medium, there would never be any form of consensus on what should be deleted, or even why it should.

The Internet As a Free Forum

Therefore, the Internet exists (at present, at least) as a free forum for anyone with anything one wishes to say, read, view, or show to others, with the eventual consequences of such freedom and display unknowable and occasionally ominous. As previously mentioned, we're all living in Dodge City, folks, but this time, we can't depend on any stalwart lawman to keep order or to put the bad guys out of business for us. For better or for worse, we are on our own.

Despite all the good things that can be said about the prospect of having everyone "wired," the idea has many detractors and critics decrying the fact that a small group of people are making obscene amounts of money through catering to the bandwagon effect the new technology has created, while others warn of potentially adverse consequences that can ensue because of unregulated and unrestrained access to the Internet.

Researchers have determined that at least 200,000 American Internet users are hooked on porn sites, X-rated chat rooms, or other sexual materials online. Psychologists at Stanford and Duquesne universities surveyed a random sample of subjects and determined that approximately 1 percent of respondents fit

their definition for being "cybersex compulsives" (e.g., spending more than 11 hours a week visiting sexually oriented areas online). The researchers determined that sexual compulsives have more problems with relationships and jobs than do casual visitors to X-rated sites. "This is a hidden public-health hazard exploding, in part, because very few are recognizing it as such or taking it seriously."[24]

At the same time, commercial search engines are constantly tweaking their capabilities and (hopefully) improving their ability to focus on documents germane to the search statement. Such tinkering is of two basic types: (1) to increase their effectiveness and efficiency in conducting meaningful searches, and (2) to defeat spammers, those purveyors of wares for sale via the Internet, who use various tricks to get a search engine to give them a higher relevance ranking than they deserve by using particular keywords. Although such practices can be distasteful—or even unethical—they are not against any known laws, and so they continue apace.

Refinement of the process is thus ongoing and generally continuous. Although it is undeniable that improvements are continually being made to the capabilities of Internet provision, at present, the search engines in existence are simple pattern matchers, which can and do lead to false drops (e.g., look for information on bald eagles and you could come up with information on certain follicularly challenged players for Philadelphia's professional football team. This is often due to the propensity for puns in newspaper and magazine headlines as much as imprecision in language), but as the Net expands and evolves, so will the search engines. One day—perhaps soon but not for a while—you'll be able to enter (or sing, or hum), for example, a certain musical phrase and find out the name of that tune, or summon a particular image, drawing, photograph or movie scene simply by describing it. Other schemes call for personal electronic information and knowledge navigators that can learn and profile your personal interests and tastes so well that you'll get what you want and only what you want (and not what you don't want) almost before you ask it when you logon to your system. Your daily newspaper, for example, will never again be late or soaked with rain or thrown into your bushes, but will arrive at your terminal each day, consisting of only those sections that fit your profile of desired coverage. For example, if you like sports but have no interest in fashion stories, your "paper" will reflect your preferences. More precisely, if you like basketball and baseball but care nothing whatsoever for hockey and football, the news you receive will be tailored to your expressed interests. As a bonus, the need for the newspaper industry to cut down (or recycle) trees will disappear completely, as will the pollution caused by paper mills.

Yet, before search engines fulfill their potential as precision locators of knowledge from within your personal files or from faraway databases, it will be necessary for the movers and shakers of the industry to devote more time and thought to the ways in which we use these databases. Most people are by now familiar with the much used acronym, "GIGO," meaning "garbage in;

garbage out." In this context, GIGO means that the answers you get from your information system will always (as they always have in the past) depend largely on the quality and precision of the questions or queries you ask of it. "The best search engine," notes Infoseek's CEO Robin Johnson, concisely and logically, "is the one between your ears."[25]

Although acknowledging the capability of the Web, how can we cope? Check it out: there's so much stuff on the Internet! It can make you weary; it can make you weep; it can make you feel as though you're about to lose your mind. You can get to feeling—if you're not careful—as though you're drowning in data. Consequently, entrepreneurial companies like Excite, AltaVista, Lycos, Infoseek, and Open Text have evolved, making use of the new technology to devise powerful search engines (or data-fetching programs), designed to crawl around in cyberspace like fast, tiny electronic spiders, find the requested information wherever it resides electronically, and retrieve it for viewing on your home computer screen. These electronic software spiders are dispatched over the ether to canvass the Web (hence the name) and report back the information they find, which is then integrated into a huge index. When someone visits the Web site of one of these companies, one simply types in a query, and that index (the bigger ones are now running upwards of 100 million pages of information) will be fine-tooth combed by powerful computers at blinding speed to yield results, which then pop up on the visitor's screen.

Proliferation of Information

So much for the good news. There is, however, bad news as well. One spot of bad news is that there is frequently too much information. A typical Internet query could yield a response like "45,678 results returned, ranked by relevancy," along with the first ten matches, according to previously stored criteria within the search engine. Sometimes the first ten matches satisfy the information need and the client is completely happy with the result. In such cases, the visitor is apt to consider the search engine the most remarkable device ever invented. However, there are typically dozens of wasted searches, yielding false drops, or off-target hits in and among the valuable stuff, and finding what you really need or want (e.g., the one "valid" or meaningful document concealed among thousands retrieved by a specific search) is just a matter of chance.

Publicity for the new technology is a double-edged sword. Every day the headlines scream the latest about the Internet. From such lurid stories—both good and bad—one gets the general sense that whatever the Internet might be, it's huge! It's hot! It's growing every minute. More to the point, people think that it's something they need immediately, or, lacking it, they'll quickly go the way of the dinosaur, being left behind in the mud and dust by the tidal wave of progress.

Your Web browser, because of its simplistic, pattern-matching programming, will often respond to one-word search requests with tens of thousands of hits. Such an experience can give a first-time user a headache from which recovery is slow and often difficult. What, for example, if the one page or nugget of information you really need or want is not among the thousands retrieved in response to your request? What if you've actually missed the one page you want because you inadvertently designed your search strategy to overlook it? When such an event happens, many users will learn from their experience, shrug off their disappointment, and try again, respecifying, building more precision into the search in subsequent iterations. Others, however, especially the impatient or frightened will react to failure by throwing up their hands and possibly even giving up on using the Web to find what they are seeking.

More bad news: millions of pages are being added to the Web each year, making the statistical probability of finding of a specific and desired piece of information all the tougher in the future, unless the quality and capability of search tools improves. Most of us, if given the choice, would opt for quality over quantity, but we might not be in a position to evaluate the quality of a given search algorithm, so we are often lulled into false confidence by the immediate rush we feel when thousands of hits are posted in response to our queries.

Is size important? Are the larger search engines the better ones? The answer to that question will depend in many cases on the nature of the subject domain and the precision of the user's query. Well, then, can present-day search engines do better? Can more precision be built into our searches so that no one who takes the time to think before formulating a query need be faced in the future with tens of thousands of citations and documents to sift through? Or can built-in artificial intelligence (the equivalent of having a knowledgeable assistant sitting by your side when you search) be perfected such that it can keep us on target and can steer us around the various logic traps inherent in online searching?

What is needed is for search engineers to redesign future searches such that vital information is retrieved yet misinformation is avoided. It won't be an easy task. Researchers into the topic say that it is probably impossible to index an entire Web such that no one ever retrieves false drops in response to a search query. Why? For openers, searching tends to be idiosyncratic, suggesting that just as no two people look exactly alike, no two think alike, either.

There's so much stuff! We need programs and search assistants that can filter out what we don't want to see while leaving what we do want to see, and then get out of the way so that we can get at the good stuff. What is required, perhaps, would be not bigger, more complicated browsers, but smaller, more subject-specialized mini-Webs, incorporating artificial intelligence to provide knowledgeable and expert opinion of what is relevant and what is not in particular searches. What is needed then is an arsenal of more powerful and more sophisticated weapons and tools to rank search results in relevancy

order, and a degree of incorporated intelligence in the system that makes the term *relevancy* meaningful.

Powerful forces, however, are working hard to see to it that people (and libraries) get little—if any—choice in which browser they will use as an access portal into the Net. Although Microsoft's Internet Explorer (with almost 70 percent market share, as of mid-2000) and Netscape's Navigator (with a 25 percent share) have, for most of the past decade of Web access had a virtual stranglehold on browsers (with each company striving to ensure that its product is "standard issue" for all new computers sold), there are lots of other entities out there trying to get their piece of the pie, and some current and ongoing lawsuits are testing the legitimacy (and monopolistic tendencies) of those companies. Currently, there are over 80 known alternative browsers, but one seldom hears or reads about them because of the stranglehold the two giant companies have on the market.

When we get thousands of hits in response to our question, our first impulse is often to sign off and try to get what we need another way. Looking at thousands of potentially relevant items causes a condition Alvin Toffler named "information overload," referring to the human mind's inability to cope with too many pieces of information at once.[26]

Information overload, as bad as it might have been in 1970, is a much more severe problem now than even Toffler imagined a generation ago. Today's overabundance of information, although deemed generally good for a free society, is having some bad and unintended side effects on many individuals. The excess of data in our daily lives has created a noxious environment of overstimulation that pushes some people to (and beyond) their limits. Some writers point out that a single weekday edition of a major newspaper today contains more information than an average person a century or two ago would have encountered in a lifetime. David Shenk thinks it's the mass commercialization of the Internet that's pushing people over the edge into serious stress conditions, addictions, and burnout, even on weekends and during so-called leisure time.[27] In addition to all the information on paper that one must process, Internet and the World Wide Web users must now contend with electronic mail and the seemingly infinite variety of Web sites. This malady is taking its toll: Almost one-third of executives of major companies responded to a 1997 Gallup poll by responding that they feel "almost always or usually overwhelmed" on the job.[28] The human mind and body aren't really constructed to keep up with the high (and increasingly higher) speed of modern communications technology. So, what's the answer? Experts agree that modern workers need to slow down, and generally simplify their daily routines, both as a means of preserving their sanity and prolonging their lives. We've already embraced machines and adapted them to our needs, but maybe it's time to move on to the next stage of development: making them conform to our pace, for a change. Sounds great, doesn't it? The real problem is precisely how we're going to achieve such a worthwhile goal.

Anyone who has spent even a small amount of time chasing round the Internet in search of specific information is very likely to acquire quickly a sense of being overwhelmed by its vastness and its seemingly endless (and growing all the time) store of data, information, and knowledge. Although it has been around for approximately 30 years, the Internet is still evolving. It is enormous, multifaceted, and growing more complex by the day, and dozens of writers (including this author) have compared it to a wilderness, a border town, and a huge, uncharted terra incognita, acquiring new dimensions continually so that no one can pin it down precisely, or know its precise limits. If one were so rash as to attempt to describe or define its limits, that would be tantamount to substituting a photograph for a living person. Any reckoning of the dimensions of the Internet today will surely be outmoded tomorrow. The damn thing just won't sit still for a portrait. Whatever was true yesterday isn't necessarily equally applicable today. How big is it? How much bigger will it get? Is it finite, like the known universe, or does it intend to roll on forever? The best guess is that, short of a global holocaust, or a vast interruption of worldwide telecommunications, it's only going to continue to grow. Like the Energizer® bunny, it keeps going and going and. . . .

When people first begin exploring the Internet, they're amazed at the scope and depth of what they can get into, all the information available. What's really going to creep you out is the knowledge that, regardless of subject, what you see is only the barest tip of the iceberg. There's a huge amount of other information lurking around down there beneath the visible surface, which you might or might not want to see or know, or even know about.

As previously mentioned, people like their information in drips, not in clumps. The human mind shuts down when it is overloaded with stimuli. We are much better at accepting, digesting, and assimilating one or two things at a time. Although it is a wonderful thing to know that you can, with a minimum of keystrokes, search a medical database at a far-off university for the latest research on a specific disease or condition, read the early edition of your local newspaper (or any other online newspaper) long before the paper boy throws it into the bushes in front of your house, and you can monitor what Wall Street wizards think of that new stock offering you're considering investing in, but you not only don't want to try to do them at the same time, you cannot. When too many messages crowd onto your screen or your brain at the same time, it becomes a meaningless jumble of noise, and many people quickly seek the shortest way to reduce or eliminate such mind clutter: they flee.

■ There are only three essential requirements in blasting electronic messages and data files from point to point: sending and receiving the information must be effortless, accessible to all who have need of it, and as inconspicuous as possible, as transparent and accepted as the electrical current that makes such transmissions possible. In this way, improving the finding

of information for problem solving, often called knowledge engineering is devoted to the admirable goal of making machinery that for most of us was thought to be the stuff of science fiction only a brief decade or two ago now capable of melding imperceptibly into the office or library landscape, and quietly performing its wonders for workers and clients, alike.

■ Finally, the question of whether the Internet will completely replace books and libraries was recently addressed eloquently and forcefully by a letter-writer to the *New York Times*:

The technology of research online is fast and convenient, and the idea of not leaving your dorm room might appeal to some. But the pleasure of getting sidetracked in the stacks by an interesting book title or binding will be lost.[29]

To which I can only add my own fervent "Amen!"

Notes

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7. National Public Radio, "All Things Considered" broadcast, January 19, 2000.

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12. Vonnegut, op. cit., 121.

13. Joseph Fiennes, quoted in *Newsday* and repeated in the *Dallas Morning News*, 30 December 1998, A2.

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23. Dorothy Broderick, "Moral Conflict and the Survival of the Public Library," *American Libraries,* May 1993, 448.

24. "Study says 200,000 Web users are addicted to X-rated sites, chat rooms." *Dallas Morning News,* 1 March 2000, 3A.

25. Robin Johnson, quoted in *Newsweek,* 15 November 1999, 36.

26. Alvin Toffler, *Future Shock* (New York: Random House, 1970), 18.

27. David Shenk, *Data Smog* (San Francisco: Harper, 1997), 155.

28. Gallup Poll results reported by Greenfield, op cit., 69.

29. Joann Stolzar, letter to the editor of the "Circuits" section, *New York Times*, 22 June 2000, A36.

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4 Netizenship: Legal and Ethical Aspects of the Internet

Overview

No technology exists in a vacuum, free of the legal, ethical, and moral constraints that bind us together in modern society. This chapter surveys some of the varied problems that have arisen over the use of the Internet, encompassing both things that the law prohibits (legal) and things that aggregate society has ruled unethical, immoral, and just plain unacceptable, because they cause harm, discomfort, or irritation to other people. To do so, we begin by introducing the concept of today's "Netizen," the average citizen who is online and searching the Web, a useful abstraction, standing for Everyman, and useful as a guide to what goes and doesn't go in personal and professional conduct on the Internet.

Netizens: Rights and Responsibilities

Table 4.1 presents a brief list of consensual rules for conduct of those who venture out via the Internet into the realm commonly known as cyberspace.

Cyberspace, a term coined by science fiction writer William Gibson in 1982,[1] has now become common usage as the Internet continues to evolve into something everyone can access and exploit. Cyberspace has many properties of a physical place in that people go there, meet, and exchange information. But unlike, say, Italy or San Antonio, it is at once a place and not a place. Where is it? It's out there somewhere between our telephones and computers; it's where telephone conversations occur, but not inside your actual phone. It's the place between telephones; the place where two human beings, or a human being and a computer, or two computers actually "meet" and communicate. In one sense, however, cyberspace is becoming an actual place because many people "live" in it now. People have met there, disagreed there, conducted their business, and been married there. It is, in many senses, a real community: people plot and plan and dream there. Gossip is exchanged along with valuable data and malicious viruses. The problem is that we don't really understand how to live in cyberspace yet. "Cyberspace is a new place to live, and one way or another, we're all moving in," wrote Clifford Stoll in 1995,[2] and it's even truer now than it was back then.

Table 4.1.
Rules for Internet Users

- Don't do anything to other Net users that you wouldn't like done to you.
- Don't publicly post e-mail that another person has sent you unless the sender gives his or her permission.
- Don't send your messages to inappropriate discussion groups—especially if you're selling something and you post your pitch to all 14,000 groups on the Net (a practice known as "spamming").
- Never type your message IN ALL CAPS LIKE THIS—doing so is the Net equivalent of shouting, and it is enormously annoying to your readers.
- Don't engage in "flaming" or "flame wars" (exchange of hate-filled e-mail or discussion group messages).
- Don't waste Net resources: for example, don't copy a file from a computer in Japan when the same file can be found closer to home, or don't simply quote what someone else has said in a discussion group and then just add "I agree" to the end of your message.
- In short, don't do anything that your fellow Net users might regard as annoying or destructive. The Internet, for all its global reach, is remarkably like a small town in many respects, and those millions of people out there are your neighbors. Be a good neighbor.[3]

The term Netizen, however, is of more recent coinage, having been first written about in early 1998 by Steve Case,[4] president of America Online, who used it to refer to today's wired citizen of cyberspace, who has assumed the aggregate responsibilities of using the Net and its components to ensure that he or she acts legally, ethically, and responsibly. However, there is a vast difference between legal and ethical problems. Legal issues are more quickly disposed of, because a well-written law is clear and unambiguous, and equally intended to affect all citizens (Netizens) impartially. Perhaps a more interesting realm of discourse, however, arises when ethics come into play. Naturally enough, there is plenty of room for dispute and debate as to what represents ethical conduct, and numerous thinkers and writers address these issues, weighing in on all sides and, sometimes, engaging in spirited debate about what is "right" and "wrong" with regard to use of the new technology in information searching.

Along with the numerous new capabilities of people who have learned to use the Internet to acquire information, both in and outside of libraries, comes an inevitable set of corresponding responsibilities. Some of these responsibilities

are as simple as being aware of legal prohibitions and constraints on Net usage and deal with what is impermissible (and therefore punishable) by law. A second list of the responsibilities of Netizenship is a set of ethical or moral issues that pose vexing problems for many users because the operative question is not whether something is legal or illegal (a clear, two-valued orientation), but rather whether such an action is right or wrong, a highly subjective realm in which there are no absolute truths, and there is no manual to refer to when you have a question. This chapter deals with the various aspects of Netizenship, specifically with two types of problems that libraries could encounter in providing Internet access to its patrons: legal and ethical dilemmas. The ethical problems arising out of use of the Net and the Web afford readers the opportunity to ponder some of the issues that the Internet has created, and mentally "try on" various alternate solutions, in search of a good, comfortable fit.

Legal Issues on the Net

What is legal (and illegal) on the Internet? Our nation's legal system is loosely based on English Common Law, which seeks to enable judgments using precedent—past decisions by judges and magistrates—to act as a guide as to what to do about a present problem. The difficulty with attempting to apply such time-honored procedures to Internet decisions is that very little exists in the way of precedent, primarily because the Internet is new territory, with a very short history, and proponents and other stakeholders sometimes make up the rules as they go along.

Sometimes, questions of the legality of specific acts or procedures come down to one's interpretation of the First Amendment of the U.S. Constitution, and what one believes to be the role of the state (or other governmental jurisdiction) in the protection of youth. What does the First Amendment say concerning such a huge and ever-present problem of censorship? Here's the relevant part of the amendment: "Congress shall make no laws abridging . . . the freedom of speech." Very appealing language, admittedly, and certainly appropriate to a free and democratic society, but the question often arises as to whether there are (or should be) limits to this ringing statement, and if so, just where those limits lie, and who decides where and when to impose them. One salient legal problem that applies equally to Internet information and to all library materials is that of copyright; the protection of proprietary rights to information.

Copyright: Deciding What's Fair

Copyright protection, which differs from trademarking a product or patenting a process that is to be protected, is one of those thorny issues that librarians and other information professionals have had to deal with for generations,

and that will no doubt still be with us many years from now. To ensure that everyone understands exactly what we're talking about here (and what we're not), a brief definition of copyright is in order.

Copyright is the legal right granted to a copyright owner to exclude others from copying, preparing derivative works, distributing, performing, or displaying original works of authorship of the owner. Examples of copyrighted works can include literature, music, drama, pictures, graphics, sculpture, and audiovisual presentations, although there is some debate and dispute as to whether it is the product that is being protected or the ideas contained therein.

Copyrighted works on the Internet, like physical works, are intended to be protected under national and international laws, but there's an important difference. Whereas a physical book must be purchased or otherwise acquired by a library before being added to the collection, Internet information is available to all users—even casual browsers—without payment for the privilege. This state of affairs, as one might expect, threatens the livelihood of authors (who expect a fair return on their efforts), publishers (whose companies exist primarily because of money received for selling books), and wholesalers (who make their livelihoods, at least in part, by buying books from publishers and peddling them to libraries). Such interests, understandably, seek protection of their assets out of self-interest and a normal desire to be compensated for work performed, and copyright law is designed to compensate them fairly and equitably for use of their works.

Libraries and librarians, by contrast, find themselves on the other side of the debate from providers of information. It is in the nature of the library that it seek open and free access to information on behalf of its clientele, and it is thus natural for librarians to be resistant to any attempts to throw roadblocks in the path of such free and open access. Under copyright laws, you are expected to pay (unless specifically told otherwise) for the use of other people's "intellectual property," and to secure their express, written permission to use it, if you do. Publishing or distributing other people's writings (their intellectual "property") without their express and written permission can be considered a form of theft, and theft is illegal, and therefore punishable. So how can a librarian remain on the right side of the law?

> ■ Nearly all of the information you find via electronic sources has copyright protection. Electronic journals, news wires, and electronic versions of print material have the same copyright protection as material that has been published traditionally. You should work under the assumption that information posted is copyrighted. . . . The best alternative is to secure the permission of the creator of the work you want to use or quote.[5]

Because the Internet is still, in many ways, an "anything goes" environment with few universal rules or laws, there are, to date, few extant statutes regulating commerce in cyberspace, telling people what they can and cannot do under the law, and what will (or at least could) happen to them if they go ahead and do it anyway. Copyright law is intricate, complicated, ever-changing, and open to various interpretations, which could lead some librarians to an "innocent" form of copyright infringement; copying that which is forbidden by the "fair use" provisions of the copyright law. Whether ignorance of the law can serve as an excuse or defense, many people (librarians included) commit illegal, punishable acts every day (e.g., downloading protected information, borrowing the work of others without attribution—also known as plagiarism, copying read-only diskettes, disregarding shrink-wrap licensing provisions) without intent or malice but simply because they are unaware that what they are doing is forbidden.

We could clear up all of this confusion, of course, if copyright law was not just "fair" to all parties, but written in such a way that its provisions are clear to all readers. However, the law is full of legalistic language, which few understand fully, and others condemn as obscurantist gobbledygook. What is needed are clear and unambiguous laws and policies that will acquaint users of the Internet and the World Wide Web with two lists: (1) those things they are permitted to do with impunity, and (2) those things that are prohibited, and for which they could incur a punishment or fine. Still more complicating to an understanding of copyright laws is that those laws can vary considerably from state to state and, often, from locality to locality. Only in recent years, in fact, have those laws, or the provisions of those laws (originally intended to protect stakeholders in print technology), pertained to or addressed the vast, uncharted wilderness of Internet provision.

The Internet provisions of the federal copyright law is a codified series of documents in which government attempts to specify what you can safely and legally access, download, or reproduce, and what will happen to you if you don't comply with the law and happen to get caught. Yet, despite the complexity of the law, and the legalistic language, the news is not all bad for librarians. Consider the following passage from United States federal law, which should demonstrate to librarians that—in spirit, at least—the law is on their side. *Note*: This law, by the way, is of recent vintage, because until quite recently, the transmission of harmful or fraudulent information via computer communication was not just illegal—it was impossible.

> ■ Whoever knowingly causes the transmission of a program, information, code, or command to a computer or computer system, if the person causing the transmission intends that such transmission will damage, or cause damage to, a computer, computer system, network, information, data, or program; or withhold or deny or cause the withholding or denial

> of the use of a computer, computer services, system, network, information, data or program; and the transmission of the harmful component of the program, information, code or command . . . causes loss or damage to one or more other persons of a value aggregating $1,000 or more . . . shall be punished (for a first offense) by a fine under this title or imprisonment for not more than five years, or both.[6]

Copyright problems for libraries can arise in two varieties: (1) those infractions committed by citizens using library equipment or facilities, and (2) those committed by library employees, themselves. Sometimes infractions come about as a result of library employees being wired into the Net at their desks and workstations. Employee misuse and abuse of computers is costing libraries millions of dollars in lost productivity each year and, perhaps more importantly, has begun forcing libraries to spend millions of dollars on lawsuits. When staff members circulate inappropriate jokes by e-mail or download pornographic or copyrighted material from the Internet, they can open their employers to sexual harassment suits, discrimination suits, and copyright violations that can bankrupt the budget of the taxing body responsible.

No one can guarantee that copyright will not be infringed upon in libraries. However, well-crafted policies regarding copyright use and abuse can be of great assistance in sorting out who is guilty of what. Conspicuous signs posted next to public access terminals and photocopiers, for example, can serve to warn unwary library patrons that some of their actions could be illegal. Correspondingly, a library's best defense against copyright infringement by staff is a written employee policy on computer use and e-mail use. The policy should clearly and carefully delineate just what constitutes permissible use of the computer to access information and what constitutes copyright abuse. In the event of a lawsuit, having a well-written and clear policy in place could make the difference between civil or criminal liability for damages and early dismissal of the court action. Yet, you can't count on an acquittal every time.

Sexual harassment and discrimination suits based on e-mail evidence have resulted in judgments against employers and subsequent substantial settlements. Even offenses that might seem frivolous or minor to one person could be ruled actionable in court. In one case, a major corporation paid $2.2 million to settle a suit by women who alleged that the company permitted its internal e-mail system to be used to transmit sexually offensive messages, specifically a joke message listing "25 reasons beer is better than women." The plaintiffs were not amused, and neither, apparently was a sympathetic judge.

The average corporate employee spends an estimated three hours a week surfing the Net for nonbusiness reasons.[7] This could well apply to librarians as well, which would mean that, in addition to wasting the library's time and money, such nonbusiness surfing could make the library vulnerable to a broad variety of copyright violations. As a single example, if you download a "Dilbert" cartoon

from a database and e-mail it to a friend, it could, if Scott Adams (the cartoonist) sees fit, result in a copyright infringement suit for which the library, and not just you, the employee, could be found responsible.

Why do so many people transgress existing copyright laws? Admittedly, some do so without knowledge, being ignorant or innocent of what they are doing that is illegal. However, many others do it in full knowledge of their transgressions because it is so easy. They think that their chances of getting caught infringing on copyright are slim—and they are. Yet, aspects of the emerging technology increasingly make it easier for copyright owners to detect when their works have been used wrongfully and to seek legal punishment of violators.

How do those guilty of infringement get caught? Search engines, for a start. A growing number of "watchdogs" are now routinely using automated programs called "robots" or "spiders" to traverse the Web, trolling for violators, looking for unauthorized copies of copyrighted works, and noting the names and affiliations of the culprits. These programs can automatically scan the Web for copyrighted text, graphics, audio, and even video. When an unauthorized copy is detected, the program reports the location to the copyright owner, who then has the discretion to warn the perpetrator or initiate a lawsuit. It will not be long before this technology reaches e-mail, as well.

The best defense against the epidemic of copyright violations, amounting to a mini-crime wave in libraries because monitoring patron use is extremely time-consuming and monitoring staff use smacks of totalitarianism, is a policy that makes it clear that employees' computers and workstations belong to the library and are to be used for business purposes only. A policy document, requiring the signature of all library employees, should spell out what is unauthorized use and caution library employees against using the Internet for personal purposes or financial gain, such as sending mass mailings, advertising sideline businesses, or printing unauthorized files from the Web. In addition, there is the option of publicly posting summaries of employees' Internet activity—what sites each person visited and how long that person spent there—that can be an effective way of discouraging unnecessary Net surfing, although it can present a morale problem for administrators who become seen (with some justification) as playing the part of "Big Brother," spying on employees.

The written Internet policy should spell out specific content to be avoided in Internet communication and make it clear that e-mail must be drafted and sent with the same care as any other form of business communication. Finally, employees should be required to read, sign, and date the policy, acknowledging their understanding that violations, if detected, will lead to disciplinary action and possible termination.

Privacy on the Net

Some people are encountering increased amounts of tailored electronic advertising for flea collars, dog food, and worming treatments. How do advertisers know that they have dogs? E-commerce has made it possible for merchants to monitor your e-mail and develop a profile of you, your family, your income level, religious and social affiliations, and buying habits. Your private life has become public, despite the posted "privacy policies" of the companies with which you trade. For example, say you've sought information about a debilitating disease, spent time in a chat room for recovering alcoholics, surfed porn sites at night, or gambled online. How can you be guaranteed that no one else can become aware of your interests and pastimes? How long will it be before Web marketers have behavioral profiles of you to sell to your employers, your competitors, or your ex-spouse?[8]

> ■ Wouldn't it be great if the Web knew what you were looking for and just served it up, right there on your screen? For those of us accustomed to the keyword-and-search routine, it sounds nearly impossible, but that's precisely what a handful of companies are trying to make happen. Called "browser assistants," these new programs—available for free and downloadable from the companies' Web sites—try to anticipate your information needs, fetch relevant information out of the depths of the Web, and deliver it to you, saving you the effort of searching those depths yourself.[9]

These quotes from brief essays on the Internet in a weekly mass-circulation news magazine present opposite views on the ability of telemarketers to get information about us from monitoring our Web behavior and to act accordingly, thereafter. To what extent is Internet e-mail communication private? To what extent should it be? These and related questions continue to vex thinkers and practitioners holding positions in which Internet use is part of their jobs. Should your boss, for example, have the right to snoop in your e-mail to ensure that you are doing job-related work? Should your personal communications with other Internet users have at least a reasonable degree of privacy, such that the things you say (and have said to you) are secure enough to permit you a degree of free expression without fear of surveillance or penalty for speaking your mind?

> ■ The Internet's largest banner advertising company, DoubleClick, has raised a firestorm of protest after revelations that its new profiling methods can track Web surfers and match them to name, address, and other personal data. DoubleClick has collected information on browsing habits for several years

> using "cookies," text files that make navigating any of the 11,500 Web sites on its ad network easier.[10]

In an effort to prevent future attacks on Internet sites and computer networks known as DOS (denial of service) attacks, whereby sites are intentionally flooded with bogus requests and hits, a professor at the University of Texas has come up with a radical but simple solution: Charge visitors a fee to visit a Web site.[11] Traditionally, Internet users expect everything on the Web to be free, even things they would expect to pay for in the real world. However, free Internet, although it empowers people of limited means to go surfing where—and as often as—they will, also empowers hackers, crackers, and others bent on criminal trespass and assorted forms of mischief to overload the circuits of huge Internet providers such as *Yahoo!*, Amazon.com, and e-Bay, simply because it is free, easy, and difficult to trace.

Therefore, if a charge became requisite to visiting a Web site, most (but not all) hackers would be prevented from their denial-of-service attacks, which so tax large systems by flooding them with identical messages that they shut them down. Hackers have demonstrated that the existing model of letting people in the store for free simply doesn't work.

According to the American Management Association, about 30 percent of major U.S. companies snoop on their employees' electronic messages. *Wired* magazine, for March 2000, had an intriguing news item called "Naughty Word Alert," in which a new e-mail monitoring software package is described. Intended to let employers at their discretion peek at workers' messages in search of "inappropriate" activity, the named product can sift through as many as 50,000 e-mails an hour, comparing the text with a list of user-specified keywords. When a match is found, the entire message, including attachments, is forwarded to a designated manager for action.

Here's only a sampling of those startlingly diverse "hot-button" words, according to the software product's manufacturing company, designated "warning" terms, which will provide some insight into the thinking of bosses: bimbo, Aryan, resume, fondle, job offer, signing bonus, ammonium nitrate, reefer, "I'll show him/her," anarchy, bacteriological, meth, unfair, stress, pipe bomb. Even a cursory inspection of such a list will reveal that there is no common pattern or shared motif in such a list. Each term on the list is designed to alert a snooping, distrustful boss and cause that boss to investigate more closely (and covertly) the e-mail activities of the employees. So much for privacy.

Yet, privacy is a right that must be taken seriously because it is a universal human need, essential to one's sense of identity and well-being. Because privacy is a basic human need, the moral right to privacy achieves a primacy superior to that of other rights. Much as we might wish there were one, however, there is no specific constitutional right to privacy. Nor does the U.S. Constitution (or any of its amendments) provide for anything with regard to privacy or confidentiality of information on the Internet. Yet, privacy and security in Internet

transactions of all types are two essential guarantees of modern communication, even if neither of them can be ensured. The important thing to remember is that, unless "secure channel" protocols are announced, nothing you write (or read) on the Internet can be guaranteed as truly private and for-your-eyes-only, and secrecy should not be taken for granted by the user. As a matter of general procedure, it's a good idea to assume that everything you write over your e-mail channel, and all of your search requests, are accessible and readily readable by your boss, the authorities or others, and to act accordingly and circumspectly, lest your most closely guarded confidences be revealed, with unpleasant consequences for you.

There is publicly expressed discussion and concern about invasion of privacy in the various media of mass communication, but it's a good idea to define our terms. *The American Heritage Dictionary of the English Language* defines privacy as "1: the condition of being secluded or isolated from the view of, or from contact with, others. 2: concealment, secrecy."[12] In this age of the Internet and other technological innovations that have found their way into common library use, such definitions seem woefully inadequate to a full understanding of the concept of privacy in a library context. A better definition, perhaps, would include some notion of the right to be left alone, because without that right, there is no privacy.

Privacy can also be defined as a feeling of security that your personal and private transactions will remain personal and private, unless you voluntarily choose to share them with others. In a very real sense in this wired world, true privacy has become an early casualty of technology—it is already a victim of the capability of others to eavesdrop electronically. Moreover, unless steps are taken immediately to ensure a measure of personal privacy, serious damage can and will be done to our personal freedoms (e.g., privacy; the right to be left alone), and to the freedom to do as we choose in this democracy. When people know (or even worry) that they are under close or constant surveillance, they are no longer free to do as they like, for fear of reprisals. Those who have read George Orwell's *1984*, an exceedingly gloomy fictional meditation on government and society in the electronic age,[13] might feel the sense of eroding of that basic freedom, and possibly a sense of foreboding that, in the not-too-distant future, the only real privacy people will have will be inside their own minds. Even as we speak, there is evidence that some of the world's totalitarian governments are hard at work on the problem of getting inside people's minds to read their thoughts.

It is in this context that libraries must consider the concept of privacy—because only when people (like library users) feel secure in their freedom from prying eyes and unwarranted interference will they feel secure in maximizing their use of libraries and other public utilities. Insecurity creates (and can be created by) the so-called chilling effect that inhibits free choice for fear of reprisals. Without privacy, that chilling effect can cause fearful and sensible persons to avoid inquiry in areas that might incur undesired scrutiny, and to

fear the use of public channels (e.g., Internet) or libraries, themselves, for their transactions, lest they be called on to answer for what subjects they want to know about, and why they want to know about such things. As an example of the chilling effect, role-play a bit, imagining yourself behind a reference desk in a public library, and ask yourself how you would deal with a library patron asking your assistance in finding out some of the mechanics of bomb making and detonation. Do you feel that such a patron should be required to explain his motivation to your satisfaction before getting your assistance in finding the desired information?

> "Make Big $$$ Fast in Just Hours Per Week!"
>
> "Nude Young Girls: Hot Adult Sites!"
>
> "Consolidate Your Credit the Easy Way."
>
> "Find out anybody's secrets; spy on your neighbors without their knowledge."[14]

It's both amazing and chilling that, using ordinary library records (the kind found not just in government or specialized files but in public libraries) one can, with Internet access and a few hours of intensive work, assemble quite an impressive dossier about another person, consisting of that person's spending habits, medical history, financial holdings, and political affiliations. And it's all completely legal! In fact, there is nothing particularly cloak-and-dagger about it. The information is publicly available, after all, and just waiting for someone to access it and draw inferences from it, fairly or unfairly, or even, by applying such information, assuming the identity of another person enough to fool a computer to give up even more of a person's secrets.

Privacy has always been an issue in communication, but now that Internet use has become common and convenient, it is among the most-discussed problems of library access. Privacy is not only a personal issue, but is rapidly becoming a national priority, as well. The National Information Infrastructure is the result of a forum, the goal of which was to provide a mechanism for the library community to identify national policy issues and questions in the areas of telecommunications and information infrastructure. Among principles for the development of the national information infrastructure, listed under the heading of "privacy," are the criteria listed in Table 4.2.

Table 4.2.
Some Internet-Related Privacy Concerns

- Privacy (sometimes defined as the right to be left alone) should be carefully protected and extended.
- Comprehensive policies should be developed to ensure that the privacy of all people is protected.
- Personal data collected to provide specific services should be limited to the minimum necessary.
- Sharing data collected from individuals should only be permitted with their informed consent.
- Individuals should have the right to inspect and correct data files about themselves.
- Transaction data should remain confidential.[15]

These principles, taken together, are designed to protect the individual's right to privacy—or, put another way, the right to be left alone from undesired intrusion—while minimizing unwarranted and potentially embarrassing public disclosure of private records.

Ethics and the Internet

■ The world is in the midst of an electronic communications revolution. Based on its constitutional, ethical, and historical heritage, American librarianship is uniquely positioned to address the broad range of information issues being raised in this revolution. In particular, librarians address intellectual freedom from a strong ethical base (see Table 4.3) and an abiding commitment to the preservation of the individual's rights.[16]

Table 4.3.
The Ten Commandments of Computer Ethics

I.	Thou shalt not use a computer to harm other people.
II.	Thou shalt not interfere with other people's computer work.
III.	Thou shalt not snoop around in other people's computer files.
IV.	Thou shalt not use a computer to steal.
V.	Thou shalt not use a computer to bear false witness.
VI.	Thou shalt not copy or use proprietary software for which you have not paid.
VII.	Thou shalt not use other people's computer resources without authorization or proper compensation.
VIII.	Thou shalt not appropriate other people's intellectual output.
IX.	Thou shalt think about the social consequences of the program you are writing or the system you are designing.
X.	Thou shalt always use a computer in ways that ensure consideration and respect for your fellow human beings.[17]

An entire book (several books, in fact) could be written about the ethical aspects of Internet use. However, space precludes any in-depth discussion of such matters, but several of the notes listed at the conclusion of this chapter can be consulted for further information.

Identity Theft; Information Theft; Security on the Net

■ There is no such thing as information security. There are only various degrees of information *insecurity*.[18]

■ Good fences make good neighbors.[19]

Just checking my e-mail every day presents me with an array of unsolicited commercial messages (known in the industry as spam) offering me pornography, credit card applications, or chances to gamble in "casinos" without leaving home. It is relatively easy to acquire reams of data on almost any subject, nowadays, from any Internet-equipped computer terminal, but one thing is certain in this Internet age: It is harder than ever to keep a secret from prying

eyes when your computer is linked by telephone lines to other computers. Really determined "hackers" (people whose computer skills and resourcefulness greatly outweigh their ethics) can probably, given enough time, find a way past your defenses and into your library's database, where they can do pretty much whatever they please.

Of course, it's a two-way street—you can pry without inordinate difficulty in other people's records, as well. Using the Web, it is possible to turn yourself into a private detective, gaining access to reams of information on other people by accessing publicly accessible files. It is no longer necessary to go to dusty courthouses or obscure government offices to get information about other people. Now it is possible (for a price) to get vast amounts of online intelligence about individuals, corporations, and public officials—including things that they don't want anyone else to know. In many cases, as well, you will encounter *misinformation*—things that are inaccurately reported or simply aren't true. With libraries rushing to provide their patrons with access to the Internet, the concept of the librarian taking responsibility for the reliability of library resources is completely gone because the Internet, although it offers vast amounts of correct and useful information, could at the same time be one of the biggest wellsprings of misinformation ever developed.

However, there are rich streams of information available to you, whatever your ethics or your motivations. By using such information sources, you can, for example, covertly determine whether your son's boy scout leader has ever had any drunken driving or sexual molestation convictions, or the assessed value of your neighbor's house, your minister's income for the past five years, which house of worship your neighbors attend, or who owns the flashy new car you saw your former spouse driving yesterday. Not long ago, such information was either impossible for ordinary citizens to obtain, or only obtainable with the right "connections," sizable bribes, or both. The bottom line is that little personal information is truly secret anymore. It's easy to become paranoid in the face of such threats to your secrets. Some have determined that the best way to keep a secret is never to commit it to paper or electronic record. Others have resolved to trust no one, or to be extremely selective in those they do trust.

Using library-provided Internet terminals, it is possible for the average community resident to pay bills, request government information, file income tax forms, or lodge a complaint. Transactions—especially those involving financial information—are presumed to be "secure," meaning that outsiders cannot get into them. Although much is gained through connectivity of our computers to those of others, there is high risk involved, as well. There are no ironclad guarantees covering secure transactions—even when they're encrypted—and there is no real assurance that malevolent persons who are not supposed to be able to crack and enter our systems, but who, somehow, do, all the same, will not do so. Security is not an end point; it's a journey. Life is full of sources of insecurity. So, why wouldn't computer systems be so, too?

Accept as truth that there is no perfection (or absolute protection) in cyberspace, any more than there is—or ever will be—in your own life or dealings with others. People who insist on total security had better be ready to lock their equipment and information away behind strong walls and doors, and to avoid completely any exchange of information with other computers and computer users, while never letting other people have access to their own computer, password, or account number. This, of course, although prudent, entails great loss, because if everyone were distrustful of everyone else, the only information one could access would necessarily be that which that person has acquired or developed, or that which that person inputs manually into a personal system, and information sharing, that cornerstone of democracy, would effectively come to an end.

Privacy

> ■ The only system that is truly secure is one that is switched off and unplugged, locked in a titanium-lined safe, buried in a concrete bunker, and surrounded by nerve gas and very highly paid armed guards. Even then, I wouldn't stake my life on it.[20]

> ■ Get the Facts on Anyone! Confidential! . . . Locate Missing Persons, Find Lost Relatives, Obtain Addresses and Phone numbers of old school friends, even Skip Trace Dead Beat Spouses. This is not a Private Investigator, but a sophisticated SOFTWARE program that links to thousands of Pubic Record databases designed to automatically crack your case. Find out SECRETS about your relatives, friends, enemies, and everyone else!—even your spouse! With the NEW InterSpy it's absolutely astounding what you can learn.[21]

Putting it equally effectively (if a bit crudely), it might be said that the only way that two people can be sure of keeping a secret is if one of them is dead. There are, of course, several privacy issues embedded in all this capability to investigate all the world's information. You probably don't want to have your personal information accessible to all who, for reasons of their own, take an interest in it. Even the knowledge that all this information is presently available to anyone with a few basic skills, the money to spend, a computer, and a modem, is causing a backlash as people scramble to shut down the hemorrhage of information about themselves by keeping it out of their own computer files. Victims complain that it is too easy for criminals to perpetrate identity thefts in this way.

Identity theft refers to the impersonation of another person for fraudulent purposes with the goal of fooling a computer to "recognize" the perpetrator and giving the perpetrator access to its secrets. How? It's really not all that

hard to get a new driver's license with your face stuck on the front and someone else's vital statistics typed next to the photo. Critics of state departments of motor vehicles (DMV) say that the DMVs don't always question why someone is ordering a new driver's license and having it sent to a new address. Retailers are part of the problem, too. They are supposed to ask for other pieces of identification before replacing a lost credit card, but often do not.

Another problem is that there is a pervasive carelessness in handling personal information. For example, Winn Schwartau points to the rarity with which automobile dealers shred loan applications before putting them in the trash receptacle or recycle bin, "putting customers at risk because of the ease with which dumpster divers and even dishonest employees can retrieve them and use the detailed information to impersonate loan applicants."[22] In that context, is it any wonder that unscrupulous parties can get into certain library records (especially public library records) to gain illicit access to private information, and to use that information for whatever purposes they see fit?

Unwary citizens might feel that when they signed up for a local library card, they were entering in a tacit contract with the library that their personal information would not be used in any way detrimental to them. However, imagine the results if someone with access to the library's records (whether they are kept in a file drawer, cabinet, or an electronic storage medium) decided to find out who was borrowing books on such topics as bomb making, counter espionage, AIDS treatment, or homosexual sex? The implications for privacy of such unfortunate individuals targeted by the information thief are frightening.

Clearly, just reading about a subject (even bomb making) doesn't point to motivation, or accuse anyone of anything, but it then becomes a piece of cake for one's enemies or opponents to skew or distort "facts" into "smoking guns" of guilt and shame, and even cause law enforcement authorities to get interested in who's reading what, in the hopes of preventing crime before it happens. Now that there is Internet access to library records, there is even the possibility that those library records could be (from inside or outside) breached, replaced, defaced, or distorted, until they contain potentially false or damaging and compromising information about you and your reading, listening, or viewing habits—at least for those who see reading, listening, or viewing as somehow threatening to the state or the public welfare.

One ethical issue that has been exacerbated by the advent of the Internet is theft—in this case, information theft. There is no consensus on whether stealing another person's information is tantamount to stealing that person's wallet or books. Despite the teachings of the Ten Commandments (e.g., "Thou shalt not steal"), most libraries have reluctantly had to accept the idea that some people will use any means available to acquire the property (including the information) of others. What is needed to convince both employees and users of libraries who access the Internet that they must protect themselves from possible attacks by electronic predators and vandals as much as they do from physical theft?

As a means of self-defense, Table 4.4 shows some sensible, inexpensive, and privacy-oriented guidelines that will protect library users from hackers and others who would snoop in their Internet transactions.

Table 4.4.
Privacy Guidelines for Library Self-Defense

- Have a well thought-out and legally sound Internet policy in place.
- Check with appropriate legal authorities to make sure that you're on the right side of the law in your defensive safeguards.
- Stay alert and be suspicious: Better to be thought paranoid than to be too naive or trusting.
- Perform a comprehensive electronic risk analysis on a regular basis.
- Don't expect any real degree of privacy on the Internet unless you use encryption software.
- Don't write anything over the Internet that you wouldn't want persons other than the intended recipient to read.
- Place as many obstacles as possible in the path of unauthorized hackers and other electronic spies and snoopers.
- Encourage all employees and users to create hard-to-guess passwords, guard their passwords carefully, and change them regularly. Users should be dissuaded from picking default or easily guessable passwords, such as a first initial and a surname.
- Passwords should neither be requested nor given out over the telephone or the computer system, and all users should understand that they will never be asked to provide them by anyone via telephone or e-mail.

On that last point in Table 4.4, security devices such as firewalls (electronic checkpoints within which all attempts at access are tested, evaluated, and screened), electronic moats, tripwires, and alarms at strategic points in your system can detect unauthorized intrusion or attack. Throwing obstacles in the path of the would-be hacker might not actually prevent intrusion or theft, but could make the job so risky, difficult, and time-consuming that the hacker will leave your system alone and find another, easier victim.

Another ethical problem exacerbated by online access from remote terminals is identity theft; the intentional impersonation of another person to defraud or deceive others. This intentional electronic masquerading as another person is a powerful way to infect a victim's electronic life with misery. Firewalls are

good defenses, but it is possible to breach electronic firewalls if the attack allows you to illicitly impersonate or emulate another user by using a personal network password or address. When successful, such an attack causes the firewall to permit penetration because it "thinks" it's letting in a "friend," because its instructions for identifying a friend have been satisfied. The best defense against such crime is a continual change of passwords, coupled with encryption of data, such that even if the enemy can illegally access your system, the system's information content is rendered meaningless to hostile or prying eyes, while friends can still read it plainly.

Electronic Security

Although physical security is realized as a very real threat, electronic security is not always considered by libraries to be a serious concern. All public facilities (including libraries) normally take elaborate precautions to protect themselves against the statistical probability that a tornado will blow away their operations centers. The expectation that a flood will sweep through your building requires that you are insured and have planned for a natural disaster. What the great majority of companies and libraries have not prepared themselves for, however, is a well-organized offensive assault against their information systems, and against their information, itself, not by Mother Nature, but by a human enemy. It makes little sense to assume that you have secure information just because your library's computer sits in a dry, secure room in the basement of your building. In fact, such a naive assumption could be the first step in the destruction of your library's ability to render service to its community of users.

Staff and users must learn not to leave their computers on, and to guard their passwords and access codes the way they would their wallets. Staff and users must train themselves to notice when something suspicious might be going on in the computer center and report it promptly. This imperative could turn some users into reluctant "whistle blowers," but it's very important that users are willing to "tell" on criminal activity that they observe.

People in charge of computer systems need to secure data with firewalls, encryption, and other means of keeping private files private. Security at the server level, such that only authorized (and entitled) persons will have electronic access to the systems containing proprietary information or documents, is essential. All others will receive some version of the familiar "Access Denied" message, and be gently instructed as to what data their clearance affords them and how they can gain legitimate access to the desired information, by subscribing or belonging to a company or group. Restricted file access means that, although librarians will make a sincere effort to render as much information as possible available without charge or password to all users, some files will simply be "off limits."

Encryption, the conversion of words, characters, numbers, and other electronic information signals to code unintelligible to those lacking the "key," is among the safest means of protecting and safeguarding information. However, encryption is both labor-intensive and potentially vulnerable to hackers and crackers who relish the challenge and could spend long hours trying to break and decipher the codes of others. Digital signatures (also known as authenticators) are express, written authorization and permission for users to enter proprietary or sensitive areas of information. In other words, only authorized users will be able to access proprietary information, and the information will bear the (notarized) approval stamp of the proprietor(s).

The criterion for access should be based on the military idea of "need to know." There should be classes of users, having varying degrees of access to sensitive information in the library's computer system. Limiting exposure by restricting access to certain categories of information is not only a good idea—it is essential to information security. Only those with the need to know should be able to gain access to proprietary, confidential, or sensitive data. Proceeding from the basic assumption that all data held in library files belongs to the library—even when the library is a public institution, or part of one—unauthorized access to records can be viewed as theft. Theft, as all legal codes agree, is a crime, meriting prosecution to the fullest extent of the law.

Shred all waste. A resourceful information thief can find out a good deal just by browsing wastepaper baskets and dumpsters, so shredders should be used immediately on discarded printouts to turn all discarded paper products to harmless confetti. However, shredding applies not just to physical documents, but to electronically stored information, as well. Remnants of deleted files can lurk on your hard drive, and just because you don't see them, or can't call them up onto your screen, that's no guarantee that a determined hacker or other prying eyes can't access and download them. It's the electronic equivalent of dumpster diving, and some of your (ostensibly) best-kept secrets might be sitting there, just waiting to be discovered by prying eyes. That's why the U.S. Department of Defense is testing a software program designed to destroy all lingering evidence of deleted files from your hard drive by immediately overwriting text up to 12 times. In case of emergency, a programmable panic system can obliterate a designated directory in milliseconds, preventing anyone who you don't want to find it from ever discovering it, intentionally or by accident.

Public Data

Because technology has made records more accessible to anyone desiring to snoop in them, lawmakers at various levels have responded to the public outcry by seeking to limit the types and numbers of information items that can be accessed by the public. Federal legislation now requires states to shut off completely—or at least greatly restrict—public access to such files as birth and death records, marriage and divorce records, and motor vehicle records,

to prevent such classes of snoopers as stalkers and aggressive commercial marketers from misusing that information for their own unsavory purposes. Such safeguards make it extremely inconvenient for legitimate seekers of information to satisfy their needs, but that's the price we all pay for crime.

Until recently, a user I.D., a password, and a reasonable degree of prudence and caution as to who has access to it were all that most computer users needed to protect themselves and their data from unwanted and potentially damaging intrusion from the outside. Experience, however, has now shown that passwords can be "lifted" or stolen—with comparative ease, and without your knowledge—and used to intercept your communications, read your proprietary documents, and rearrange, alter, or destroy your private files.

To prevent such breaches in once-thought-secure transactions and files, the search has been underway for a long time to find a way to protect personal files, secure private mail and transactions, and defeat those who would acquire our passwords and masquerade as us to achieve their devious (and often criminal) ends. Encryption, as discussed earlier, is a promising method of protecting your information. Anyone who finds a way to tap into your files will find only meaningless "line garbage" that they are unable to understand or exploit. However, even good electronic encryption can be breached by persons determined and resourceful enough to take the time to "crack" your code. Something even more secure is necessary; something that makes it completely impossible for any individual to masquerade as or impersonate another.

Much promise has been shown by what are now called "biometric" passwords, a new technology that could well make all previous forms of security obsolete because it has become impossible for anyone to claim to be someone else. The use of fingerprint technology, voice analyzers, and retinal scanning, just to mention three methods, will match each person's "credentials" to previously stored information already on file and permit access only to those who are perfect matches. In this way, much computer crime should be eliminated because only you will exactly match your previously stored fingerprints, voice prints, retinal patterns, or all three. All that is holding up the widespread implementation of such high levels of protection is money. One day soon, programs or extensions will be provided with each "secure" computer (and the higher the need for security, the more safeguards will be built in) that will make tampering, interception, and theft rare enough to become almost unknown. Best of all, once biometrics become commonly used as passwords, the memorization or writing down of all access codes will be a thing of the past, useful only in discussions of how the "good old days" were really terrible.

Holes in Security

Breaches in Net security can occur anywhere, at any time. It is already possible, because the Web is chaotic, undisciplined, and unsupervised, for a casual or merely curious inquiry to lead to unintended and undesirable consequences for unwary users of the new technology. For example, when you visit the Web site of a commercial firm, that firm might use its search engine to drop a tracer or electronic "cookie" on the transaction, whether you buy anything or not, meaning that it will not only know that you've visited its site but also how to get in touch with you again, and will file away your expressed interest—real or potential—in their prospect file.

Not long ago, each computer was a standalone entity, and if information was to be shared between computers, it was necessary to carry diskettes or tapes containing that digitized information from one to the other. Part of the problem today is that vast computer networks are committed to "connectivity," and almost all developing systems are increasingly dependent on the networking of computers. The benefits of connectivity, of course, are enormous, as it is now possible to send attachments to e-mail anywhere on the planet, and to access information on the Web as easily as we access the files on our own hard drives.

Should more be done to protect computer security, and the security of the information we send to and receive from the Internet? Certainly, but there are intractable problems that we must deal with if we ever have any hope of attaining an acceptably high level of protection for our data and our messages. For one thing, software companies must go all-out to "debug" their programs for the identification and eradication of security flaws before they send their programs out to customers. Second, better diagnostic systems must be developed to help us detect, isolate, neutralize, and abolish viruses and other weapons of mass destruction on our systems. Third, it is imperative for all users to practice a rigorous, no-nonsense, no-exceptions, brand of "safe computing," so that attempts to trash our hard drives or invade our proprietary and previously-thought-secure information cannot sneak by our defenses and penetrate our systems. Once a hostile code finds a home in our system, unfortunately, it's probably in there for good (often enabled by convenient one-step "trap-door" programs left in our hard drives, for ease of return), and it's just about impossible to get them out again.

It is entirely possible that, soon, the library will cease to exist as a large building, containing books and other physical library materials. In fact, for some library users, that day has already arrived. For the rest of us, however, the date at which the library will exist only "out there in cyberspace" is still in the future. Patrons will not need to enter public buildings to accomplish their informational, educational, or recreational library needs. Everything will be available electronically, and it will be possible for citizens to "visit" the library and make full use of its services without leaving home, or even putting on their shoes.

Access to records and electronic files is granted to library employees as a privilege, and as a part of their jobs. The public, however, is authorized to use only read-only (unalterable) files. When a user finds some way to perform an action that is not permitted, that constitutes an abuse of privilege. Each employee requiring access at any level to the system is provided with a specified level of privilege and cannot exceed this level of authorization. The operative problems connected with such a scheme are authentication of each user, the use of a password known only to the employee, and perimeter-based security, by which a network is hardened by controlling access to all entry and exit points of the network. The most secure type of password, by the way, is a one-use-only temporary password that "turns into a pumpkin" at the end of the day. It's just too bad if users complain bitterly that they have to reapply daily, but such a harsh plan would prevent all manner of unauthorized intrusions.

Many methods have been tried to prevent unauthorized access, but the best antidote against unlawful system abuse is an overall hardening of the system so that it can better resist data-driven attack. Sometimes, such attacks on the system are encoded in innocuous-seeming data strings, camouflaging an attack in innocent commands or data. The essential purpose of a firewall is to detect and repel such trap-door attacks before they can get behind the firewall and attack the essential data. Although hardening systems is likely to be an expensive, labor-intensive process, the result—a high level of data security—is worth the cost in most situations.

Good, tough security, unfortunately, often entails issues regarding the privacy of information contained in patron databases that have resulted from online circulation systems. A certain amount of tradeoff is inevitable: The greater the degree of access, the more the threat to information security, whereas the greater the threat to security, the more incursions into personal privacy could follow. Every library needs to acknowledge the importance of information security, right alongside the two other vital concerns: materials security and personal security. The manual of library policies should contain discussions of these points as shown in Table 4.5.

In the past, because it was often not economically feasible to prevent intrusions, most service providers (like libraries) focused their efforts on controlling losses through reactive deterrent and control measures. Human beings are almost always the weakest links in computer security, so it is the human—rather than the technological—component of the system that needs the most concern and control. What is needed today is a coordinated and proactive security posture that's up and running at all times, with the clear and unequivocal goal of making the would-be thief's job of penetrating your system so difficult and fraught with risk that the thief says "Forget it," and goes and bothers someone else. Because absolute and perfect security is only a fantasy on which we ought to waste little time, what we should strive toward is security so stringent and strong that our clever enemy sees the task of penetration of our system as not worth all the trouble, and the risk of getting caught and punished as unacceptable.

Table 4.5.

Checklist of Internet Security Points to Be Included in the Library Security Manual

- Protect, to the extent possible, all information in patron records.
- Ensure compliance with all information policies.
- Limit to a bare minimum the data collected.
- Create and enforce security authorizations.
- Limit the number of people empowered to create and modify patron records.
- Practice safe disposal of sensitive documents.
- Recognize the need for continuous system backup and updating.
- Have a redundant arrangement so that all data are stored in at least two places.
- Create a plan for disaster—both natural and man-made.
- If your organization handles or generates sensitive reports or information, consider establishing a data classification system for your library (e.g., secret, confidential, classified, unclassified).
- Coordinate all physical and electronic security efforts.
- Test your security frequently—acting like "the bad guy," and probing for holes and evidence of intrusion, trespass, or data corruption.
- Continually make higher-ups in your organization aware of the need for a high level of security (and security funding).
- Publicize breaches of security (however embarrassing this might be) so that your community of users will understand the problem and the importance of practicing safe computing. (There is some potential tradeoff here, as there is always the possibility that persons to whom hacking hasn't occurred yet will begin thinking of finding ways into your system.)
- Resist pressure from higher-ups to keep intrusions a secret, so as not to cause embarrassment to the institution or system.
- Remember: There's no such thing as perfect security (there are only varying degrees of *insecurity*), and that there's always room for improvement in any security system.

Because Internet technology has become the ever-more powerful, it is a sad fact that, for every door or conduit that is "sealed" against unauthorized intruders, another (or possibly others) is opened as browsers on the World Wide Web discover deep streams of free, accessible information (sometimes quite accidentally by browsing or surfing) that they hadn't realized they could access at all. Thankfully, some of those streams require specialized communication software, entailing considerable outlay of funds, and keeping them out of the hands of low-rent criminals, but many are reasonably priced and available everywhere, few are illegal, and virtually none are very difficult to find, implement, and exploit.

Although most users seek only to exploit their new information-gathering capabilities as effectively as possible, the temptation for others sometimes proves overwhelming to seek to misuse their newfound capabilities for whatever purposes they choose, regardless of the privacy issues involved. In the area of criminal justice, for example, citizens of a neighborhood could demand the right to know the criminal background and histories of other citizens, due to an understandable concern for children, or for public safety in general. Nowadays, a whole industry has grown up around finding information about people, and the clients of such services need not state their credentials or motives to have access to assembled information, regardless of its "factual" content.

Therefore, it is possible for specialized information brokers to build an electronic dossier on any person by combining free, publicly available information with data held by credit bureaus, which is available by subscription or for a one-time fee. When this information has been compiled (regardless of its accuracy), it is for sale to anyone who meets the asking price, or, in competitive situations, to the highest bidder. On the subject of such accuracy, by the way, it is a classic case of the old cliche, GIGO (garbage in, garbage out), meaning that any record, or database, is only as good as the accuracy, timeliness, and truthfulness of the information entered into it.

Spam, Glorious Spam

■ On July 18, 2000, the (U.S.) House of Representatives passed the Unsolicited Electronic Mail Act of 2000. The bill requires "spammers" to preface their e-mails with a short and obvious notice saying that the message is in fact an advertisement. The measure aims to help e-mail users discriminate between important correspondence and junk mail. Advertisers caught violating these requirements would be fined $500 for each e-mail sent.[23]

Electronic chat rooms—cyberspace meeting halls, which are very popular features of all Internet providers—permit one to combine the high-tech wizardry of the Web with the low-tech, age-old approach to information gathering: the conversation. The new technology is very important, but it doesn't change human nature, or democracy. Citizens can, if they expend the effort, expand their political knowledge or social awareness from browsing the Web, and exchange thoughts, opinions and ideas with people they might otherwise never have met, and never actually—in the strict sense—will. If you're connected online, you probably receive vast quantities of unsolicited and unwelcomed e-mail messages from commercial suppliers—the kind of communication commonly known nowadays as "spam." Modern spamming technology has made it possible for a business to contact (and usually annoy) thousands, if not millions, of Internet users at the same time, not only cheaply, but highly effectively. How do they find us? Why so much unwanted e-mail? Although it might seem like it, tiny robot intelligences are not really crawling and swarming down your telephone line and into your computer at night, stealing your address so that their masters can bombard you the next day with junk e-mail. However, it frequently does seem that way, and the effect of what does happen afterwards (desired and undesirable ads and solicitations) can feel pretty much the same.

Some spam purveys unsavory (or even imaginary) products or services. When you "bite" into a chunk of spam, by agreeing to purchase something online, the people at the other end of the connection are going to want you to supply your credit card number for payment. Thousands of people have been bilked out of millions of dollars by falling for phony offers and investment opportunities that they found while browsing the Net. Some of them, in accessing their local library's Internet connection, in fact, could inadvertently involve the library (or civil jurisdiction) in the trouble or fraud caused by scam artists. In October 1998, for example, a California man was convicted on 54 counts of fraud (and sentenced to eight years in prison) for conducting a phony public stock offering over the Internet.[24] Authorities say he stole about $190,000 from 150 people who thought they were investing in an initial public offering (IPO) in high-tech stock that the man operated from his own home. Prosecutors alleged that he used advertising banners on investment-related Internet sites to direct potential investors to his company's Web site where they found a prospectus for the initial public offering and an e-mail form for interested investors.

Cookie Monsters and Electronic Footprints

As previously mentioned, the library is a facilitator in getting less-affluent people hooked up to the Web. To surf the Net via a library connection, you have no need of your own personal computer, or even a home telephone. All you need is a screen name and password to create your own Web page, but to

get into anybody else's Web page, you must identify yourself. Such access automatically becomes a two-way street.

When you open an electronic link to another entity on the Net, messages can and do travel in both directions. In short, if you can reach them, they can certainly reach you, and some owners of Web sites are busily exploiting the two-way nature of Internet connections by automatically dropping "cookies" (a term for small packets of coded information that signals their mainframes like a homing device on an airplane) on your drive. Thereafter, crawling down the wires to a cookie, once it's in place, unseen advertisers can find out a lot about you, your tastes, and your interests, without your knowledge or consent.

There is a genuine risk to privacy on the Internet. Many users have learned, to their chagrin or sorrow, that it is generally prudent not to express any ideas or write any sentiments over the Internet (especially e-mail) that you don't want others (either specific others or others in general) to read or know about you. It is supremely easy now for third parties—employers, companies, government agencies—to obtain information that you would no doubt prefer to keep confidential. The magazines to which you subscribe, for example, and any inferences about what your subscriptions say about your politics or preferences, are nobody else's business but your own.

Data collection is the dominant activity of some commercial Web sites. They collect personal data from Web users that they then aggregate, sort, and use. In a sense, this activity becomes a type of covert surveillance, whereby corporations attempt to engage in manipulation of people, based on what they have come to learn about them by means of dropping cookies on their accounts. Is that necessarily bad? Like so many other things, the inevitable answer is, "It depends." Many social critics believe that government should give consumers the power to retain or share personal information with commercial entities, or at least to be advised when their personal information is being acquired and collected, and how it will be used. The user should be able to express preferences as to how much privacy the user is willing to give up, and what conditions on disclosure will be required.

Cookies, also known as "Web bugs," can seriously compromise one's individual privacy. Loss of privacy because of the monitoring and retentive capacities of the computer, particularly in situations in which people are asked to give up a portion of their privacy in return for interactive services, can cause widespread problems.

Jane Bryant Quinn, a respected writer on financial matters, cites reports that people who log onto the Web are finding that they encounter pop-up screens hawking tailored electronic advertising for flea collars, dog food and worm treatments, and may wonder how the advertisers knew that they are canine fanciers. "If the Internet's e-mail program is so empowering because people can speak to other people unseen and believing themselves to be incognito," Quinn asks, "then how do the advertisers know that they have dogs?" *Answer*: e-commerce has made it possible for merchants to monitor your e-mail and

develop a profile of you, your family, your income level, religious and social affiliations, and buying habits.

Your private life has become public, despite the posted "privacy policies" of the companies with which you trade. For example, say you've sought information about a debilitating disease, spent time in a chat room for recovering alcoholics, surfed porn sites at night or gamble online. How can you be assured that no one else can become aware of your interests and pastimes? The short answer is that you can't. The reason is because little tags called "cookies" are quietly placed on your computer by the Web sites you visit. They can implant a unique identification number that tells a site exactly who you are when you return to it.

When you buy a new computer and transfer your data from the old one, the cookies come along. Quinn goes on to note, "When you're online and see banner ads on your screen, did you think they just happened to be there, like the ads in a weekly news magazine when you turn the page? Often those ads have been deliberately sent to your screen, because your cookies showed that that's the sort of thing you like."[25] *Result*: Someone (or plenty of someones) could be building a personalized cyberdossier on you, and placing in it information about you that might be used for whatever purposes they have in mind, sold to other parties with an interest in you, or both, and you have no way of knowing that you have such a file, or what's in it, let alone any right to examine it for accuracy. *Question*: How long will it be before Web marketers have behavioral profiles of you to sell to your employers, your competitors, or your estranged ex-spouse? Or what if someone else uses your computer to call up a public building with a bomb threat? How will you explain your way out of that one?

Are we selling (or giving away) our privacy too cheaply? It is possible to design a system that keeps track of all users' purchases and visits and hits on an individual Web site, thus enabling sellers—and others—to know what the user likes to buy and to see? Web bugs record activity at sites and report details to advertisers, without notifying the computer user. Other systems feature certain bookmarks or otherwise draw the user's attention to certain sites, in preference to their competitors. Therefore, it is easy to collect data about purchasers' preferences without informing them that it is being done.

There is a privacy tradeoff inherent in Internet access: To be able to reach so many sites out there in cyberspace, you are (perhaps unwittingly) trading away some of your privacy—including the cherished right to be left alone. You equally trade away the right to ask questions or visit sites without obligation or being contacted by those sites' follow-up staff, who can leave their electronic cookies (locators) on your system every time you contact them. Unless you take steps to protect yourself, it is then a matter of simplicity for these merchants to reach out and touch you with further information and solicitations whenever they want. Is such cookie dropping unethical? Possibly, but it is ubiquitous, nowadays, and it is perfectly legal, all the same.

Worse news: If you belong to any organizations or associations or purchase a product for which you are asked to register it, beware. Most of your associations and memberships sell membership lists to telemarketers to raise additional funds, and each "product registration card" you fill out and send in joins thousands of others in merchandisers' electronic lists of "prospects." Whenever you reach a Web site—even if all you do is go in just to see what it contains or represents and leave immediately—you could be leaving an electronic footprint on their database and unwittingly and unwillingly joining their firm's growing family of "customers."

This building of prospect lists can—and does—lead to multitudes (or even blizzards) of unsolicited advertising, the electronic equivalent of those annoying (and often intrusive) telephone calls we all receive at least once a week on behalf of charities and products. You know the ones: typically, they occur about dinnertime, and their operatives begin each conversation with a ritualized "How're you doing, tonight?" but hurry on, rarely paying any attention to your answer. In their defense, company executives and organizational officers often state that, although they might give advertisers aggregate information about groups of consumers, they never share personal identifying information (such as names and addresses) without express permission. Uh-huh. Right. Sure they don't. If that's the case, then why do we receive so many targeted (and often preselected) e-mail messages, offering cheap or discounted merchandise or special promotions and incentive offers on our screens, often before we can even get a chance to read our e-mail?

Giving them the benefit of the doubt, let's accept that commercial merchandisers don't really mean to intrude on our privacy. They're just exploiting this new medium to make a few more bucks. However, like the meritorious corporations that sponsor programming on educational television, even socially responsible companies are still going to try to sneak a few plugs and pitches in on us, all the same. The marketers who offer us things on our e-mail programs are at pains to assure us that they are aware of our concerns and take steps to protect our privacy as they offer us bargains. Yet, such assurances are not really promises or guarantees, unless their parent companies have signed contracts with one of the nonprofit organizations that seek consumer protection to abide by their stated privacy policies—or face legal action, which few have done, to date.

Electronic Eavesdropping

Then there is the problem of security in our e-mail, or—much more frightening—electronic eavesdropping on our own private and proprietary files. At least once a week, my local newspaper features a story about someone who has found a way to "hack" into a large public or commercial database and steal user I.D.s and passwords, to do with as they please. However, libraries offering public Internet access areas need not panic. The odds of being hacked

for malicious purposes are not as great as you might think. Still, if your files are worth protecting or of value to other persons, and unless you have a religiously practiced security routine or practice routine encryption of your records, documents, and transactions, you run a good risk of spending a good deal of your future time fending off both prying eyes and hungry merchants, possibly receiving all manner of unwanted and upsetting e-mail from them.

Whereas it costs a lot of money to print and stamp mass mailings, electronic spammers can conduct mass mailings as easily as they can send a single message to a single customer or prospect. In addition to being annoying, spam can seriously slow up your system's mail-handling program, especially troublesome when your account is structured such that you pay by the minute of use or if library users are storing their downloaded programs and records on the library's hard drives. Spammers can literally and deliberately flood your computer user network with solicitations for their merchandise or services, figuring correctly that even, say, a low, 3 percent return on a million messages (most of which are going to be deleted or ignored) would still amount to perhaps 30,000 new corporate customers. Some states have enacted new legislation making spamming illegal and punishable by fine, but telemarketers often find it more expedient simply to pay the imposed fines than to close up shop and leave such a lucrative mine of business leads.

Although spammers are trying to get into the library's computers, libraries are trying just as hard to keep them out. The telemarketing environment is becoming a sort of battleground for the conduct of information warfare: new programs are capable of detecting, filtering out, and deleting annoying commercial messages, while advertisers continually seek to alter, conceal, or improve the technology of the messages they send so that their messages will get through, despite our best efforts to block them. Some clever spammers have learned to make their mail appear important and legitimate, trying to baffle filtering programs with subject lines such as "re: the information you requested," which makes it appear that the message is both desired and welcomed by the recipient, and thus should be permitted to pass unmolested from cyberspace into the recipient's mail queue.

If spam is becoming troublesome to you, and you wish not to see it or be bothered with it, it is possible to fight back. Anti-spammers are creating filters (much like the filters that impose censorship on young and impressionable Net users) that separate legitimate mail from spam, and counterattacking by setting up Web sites that "mail bomb" the spammers, sending enough e-mail back to crash the advertiser's system, or choke out mass-mailing programs with phony addresses. The only risk in taking such stern countermeasures is that genuine (desired) messages might be automatically expunged from your mail (and never, for all intents, received) along with all that annoying advertising because spammers are getting better and more sophisticated in the way they package and address their e-mail solicitations.

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■ 82.9: Percentage of first-year college students who use the Internet to do research and/or homework.[1]

■ "Human beings are designed to see patterns . . . to come up with remarkable insights," says Umesh Vazirani, a computer scientist at the University of California at Berkeley, "but a computer's forte is speed—dazzling speed."[2]

■ Back when it was scarce, information was power. But now that the total volume of data doubles every nine months, information is as likely to devour (you) as give you a competitive edge. The way digital information is expanding, it will either become an asset or swallow you whole.[3]

Overview

Anyone who has spent even 10 minutes surfing and searching the Internet discovers an important truth: There are almost as many Web sites out there in cyberspace waiting to be discovered as there are stars visible in the heavens on a clear night. Therefore, it is not a matter of quantity that is involved in finding places where information is stored—it is a matter of sorting the wheat from the chaff. To borrow a metaphor from the physical world around us, you can literally throw a rock in any direction at all and hit something if you're not especially choosy about what you hit. However, sorting through this abundance of information riches and hooking up to the "good stuff," those sites that are at once useful, accessible, accurate, and up-to-date, takes a good deal of careful research. This chapter, proposes to discuss the ways in which valuable and useful Web sites can be located, the best the Web has to offer (the "cream of the crop"), how different search engines and Web sites are organized, and how they can best be exploited to yield valuable information.

Sites, Sites, and More Sites

There are many free services that you can use to find information on the Web, often called search tools. A search tool catalogs Web pages to make them easier to find. Some search tools record every word on a Web page, whereas others only record the name of each page. Still others record only terms considered significant (subject indicative), while omitting a class of words that the designers (or users) rule as "stop words," words so devoid of meaning that they do not facilitate subject searches. Search engines are normally arranged by categories such as arts, business, government, health, and so forth, which help to arrange the information held at a Web site by type, for convenience of use. Search tools find pages on the Web in response to specific queries by sending automated "spiders," robotic search programs that crawl around on the Web (much as a spider travels around its own web) looking for new pages. Searches can be performed by known item or specific topic of interest or by topic of interest.

Because of the proliferation of Internet publishing, together with a highly competitive environment, most Web search engines are in a continuous process of reinventing themselves. Literally, it is impossible to find things the same two months in a row. Because of the literally incalculable numbers of Web sites now available, how does anybody find anything specific on the Web? One answer comes from distinguished behavioral scientist Abraham Kaplan, who repeats an oft-told story to make a salient point that all information searchers will recognize as truth:

> ■ There is a story of a drunkard searching under a street lamp for his house key, which he had dropped some distance away. Asked why he didn't look where he had dropped it, he replied, "It's lighter here."[4]

The analogy of Kaplan's story to the problem at hand: With so many data sources available to today's librarian, and so many possible places to find desired information, it makes a good deal of sense to begin one's search where the light is best (and thus, the probability of being able to find something relevant is highest). In addition to the normal collection of physical resources (e.g., books, periodicals, journals, audiovisual media), today's Internet-accessible library can also boast uncounted (and uncountable) resources in the form of Internet files. Yet, as the section in Chapter 2, "Drowning in Data" explored at considerable length, the problem for the librarian in search of resources to provide to a patron is not finding those resources but in being able to sort through what is found and choose the best, most pertinent, or most up-to-date resources in response to a given search statement or query.

This chapter, attempts to sift through the enormous quantities of Web sites available to the library searcher and to recommend some of the most likely places to look. The reader is advised, however, to bear in mind the proviso that each search query is different, and that none of the suggested or listed sites may be able to provide the necessary information, or that the "answer" may be found somewhere else, in files not listed here. Still, it is our contention that looking where the light is better (or more focused) is better than just logging onto the Internet with some vague notion of one's query and blundering around in the dark. In such cases, finding the desired information becomes merely a matter of luck, and the odds of success are heavily against you.

Recall Versus Precision

It becomes obvious that it is not recall (the number of sources you retrieve in response to a given search query) that really counts, but precision (the number of retrieved resources that actually have some demonstrated relevance to the question at hand). As recall diminishes, precision tends to grow. Some delicate balance between too much recall (see Chapter 2, "Drowning in Data") and not enough (no usable sources in response to a search query) is highly desirable, and neither extreme is especially useful in refining a search process or in coming away with the answer or the desired information. *Note*: All Web sites mentioned in these pages are free of charge, except as noted in the annotations. For convenience of organization, the Web sites mentioned in this chapter are listed numerically, with a cross-reference (Appendix B) listing them alphabetically, for convenience of use.

Note: We're uneasy about this, but we are compelled in the spirit of fairness and inclusion to report that several of the major search engines now offer an optional family-filtered search option, designed to keep adult Web pages from appearing in search results. AltaVista, Lycos, and HotBot all offer that option, and other search engines are scrambling to follow suit. Alas, censorship is a sign of the times.

Effective Search Strategies for Web Information Finding

So how does the searcher-researcher go about finding worthwhile Web sites among all these options? Putting the question another way, what's the best way of separating the wheat from the chaff? The World Wide Web is an almost infinite storehouse of information that makes the chances of coming up with something useful (or a specific desired document or reference) vary considerably. Still, there are plenty of ways to enhance your odds of finding

what you want, and this chapter is devoted to discussing (and, in some cases, pointing the way to) techniques and site selections that will assist the searcher in getting what is desired out of a system almost incomprehensible in its size and scope.

Librarians and other Web searchers are confronted with a bewildering array of potential sites (see Chapter 2: "Drowning in Data") and might find it useful to have a Web guide (or several) to some of the more pertinent, useful, and well-done sites. Therefore, this chapter recommends Web sites, and each recommended site includes a brief description and an access address.

A first consideration is that there are two types of Web guides: (1) directories (organized and maintained by expert human skills), and (2) search engines (which make use of the computer's size and speed). Both are useful, although neither can do the best job of organizing information alone. Consequently, Web search companies are attempting to harness the different skills of the two types of tools to gather and effectively organize a huge amount of information into manageable proportions. The two types of systems differ considerably not only in size, but in how they are constructed and organized (those resulting from automated indexing and those created by human brains), and, consequently, in how they can best be used. Each has its strong points . . . and its weaknesses.

Human brains are designed not for speed or particular efficiency but to see relationships, recognize patterns, and, on occasion, to come up with remarkable insights and solutions to problems. A computer's forte, by contrast, is speed—dazzling speed. The central issue of designing Web guides and search engines is how best to harness those different skills to gather and effectively organize vast amounts of information so that mere mortals like us can exploit it, understand it, and avoid the dual pitfalls of retrieving, in response to a given search, either too little information or way too much.

The type of search engine created and organized by computers can provide, in response to a given query, literally hundreds of thousands of records. Naturally, computer-generated Web sites are massive and efficient in providing information. However, such vast sites, constructed by machines, can tend to overwhelm the user with too much information in response to a general or not-phrased-carefully-enough search statement, and it is human nature to be unable to assimilate or use screen after screen of likely looking references. The basic problem with human-derived sites is that they are seriously labor-intensive, require a certain amount of intensive thought and decision making, expensive (for the first two reasons), and consequently tend to be much smaller. Both types of databases, however, are important, and important to know about. Frequently, however, they complement each other in knowledge such that the searcher is much better off for having used both, but there are times when they clash.

Because there are an estimated 360 million Web sites out there, finding anything specific to a given search request can be problematical. By way of well-intentioned advice, however, the searcher is strongly advised to begin with one or more of the huge, general search engines and counseled to start with this simple experiment:

- Create a relatively simple search algorithm (statement), consisting of no more than three subject-oriented terms, and run it against each of the search engines listed later in this chapter. This will, at the same time, permit you to get the "feel" and rhythm of each site, while affording you the opportunity to examine your "catch," and see which sites require more precision in search statements and which offer a degree of intuitive searchability, meaning that you need not overspecify your terms to get appropriate and useful results.

Does the obvious fact that the Internet has access to everything published (or one day soon will have) mean that the reference librarian can simply abandon books as source material for finding information?

The Internet As a Reference Tool

Reference work is still very much the same as it always was: people have information needs, they pose questions to the library, the librarian seeks information on the subject and presents it as (or by way of) an answer. However, the Internet has transformed the way reference work is being done and made it possible for every individual to become an independent reference librarian/researcher. So, what is the impact of the Internet on a book-based reference service?

Although many conventional sources of information have been rendered obsolete, many of the best tools on the Internet are still out there—a case of old wine in new bottles—and have been forced to adapt to new ways of formatting and providing their information.

As an example of book-form materials that are still unparalleled in their ability to provide information, consider multivolume encyclopedias, and in particular, specialized encyclopedias. Table 5.1 presents some comparative aspects of Internet encyclopedias and adult, standard, print encyclopedias. The comparisons assume that the user is a novice, untutored, and unfamiliar with the use of such reference tools.

Table 5.1.
Comparative Advantages of Internet and Print Reference Sources

Variable	Internet Encyclopedia	Print Encyclopedia
storage	no storage requirement	requires shelf space
budget-dependent	very little	extremely
cost	no additional cost	expensive
cross-indexing	links from subject to subject	some indexing
user friendliness	may be daunting	familiar, non-threatening
vulnerability	no physical damage	subject to wear, fire, bugs
updating	continuous	annual
instruction in source	little	usually considerable
time required	may be substantial	needs no instructions
simultaneous users	multiple users simultaneously	not possible
intimidation	may be substantial	normally, zero
intermediary required	normally	no need
amount of information	may overwhelm	usually appropriate
fact-finding	finding specific facts difficult	frequently better
thoroughness of search	extremely	varies
adjusts to sophistication	little	much
full-text availability	sometimes	always
printer paper, ink costs	may be substantial	none
staff training	required	not required
censorship	filtering often imposed	only in selection
security precautions	for hardware, software	for books
connection charges	may be substantial	none
electricity-dependent	yes	no
amt. of info. available	unlimited	selected material

We'll begin our selective review of the vast mountain of literature available on the Web with a preliminary list (extensive, but by no means exhaustive) of recommended major Internet search engines that provide doorways and access ramps to the vast amount of information that resides on the World Wide Web. (*Note*: The 16 general sites available are listed, for consistency, in strict alphabetical order, and no presumption of relevance, preference, or quality among my selected sites should be inferred.) All Web sites mentioned are grouped by category or type, and numbered serially.

Comprehensive Internet search engines are retrieval devices that can accept a query submitted via the Internet and then go on an exhaustive hunt throughout the multitudes of databases in search of matches to the terms in the query. For sheer size and volume of retrieval of information, nothing succeeds like one of these vast engines.

Before we launch into a listing and brief discussion of the various Web search engines available for reference work, it seems useful to answer a frequently asked question: When you're talking about search engines, does size matter? That is, are the largest ones always going to be the most useful or the best? Does bigger mean better?

My answer is: probably not, in most cases—or at least not necessarily. For the average user, accuracy and relevance are more important. Information overload is part of the problem. A query too broad or ill defined can result in tens or even hundreds of thousands of "hits." So, it is the ability of search engines to separate out the good stuff from the dross, and list it first, that is more important, in most cases, than receiving a comprehensive (or even exhaustive) response to your initial search.

Unfortunately, relevance is an extremely difficult concept to pin down. Ultimately, only the person seeking the information (the end user) can truly determine what is relevant and what is not. No set of machine instructions can make that determination with a high degree of accuracy. There is no known mathematical formula for determining relevance—most of what we are pleased to call "relevance judgments" are functions of the searchers' (and end users') individual subjective perceptions and impressions, which doesn't constitute any sort of logical or empirical guideline on which to proceed.

Nevertheless, search engines have made significant progress in this area, but that depends on the searcher's expectations. Is, for example, a hit rate of 30 percent (finding three useful articles in a group of ten retrieved) adequate? Is 40 percent? 20 percent? Different searchers (depending on many factors such as their personalities, patience, time to spend on the search, the purposes for which they have undertaken the search, and other variable factors) will have different responses to those questions. Then there are the end user's expectations to consider, as well. Often, the searcher (librarian) will be reasonably satisfied with the findings of a search, whereas the end user exhibits general dissatisfaction with the same result.

There are also false drops, which do show relevance to the search query, but not in the same way as the searcher had hoped. As only two illustrative examples, a search for information on "consumption" of foodstuffs would yield a huge quantity of "hits" because consumption also was used, long ago, to refer to what today is known as "tuberculosis," and a search for "cubs" might retrieve information on immature animals or baseball players.

Bigger is better in some cases, however. For example, it is often preferable to begin a search in one of the meta-search engines (those boasting multiple millions of records) simply because the chances of getting hits in response to a particular query are enhanced.

Example: If there are 10 known-to-be-relevant documents hidden among 20 million available, and your search is broadly constructed, those 10 may find themselves concealed among thousands of other (nonrelevant) documents in a huge recall retrieved from a vast search engine, such as a meta-search engine, which sends your query to several databases simultaneously. However, in a smaller, more narrowly focused engine, a smaller, more narrowly focused search query may yield a much smaller number of "hits," say 40, of which 10 are truly useful to finding an answer to your query. In the former case, your success ratio may be approximately one useful document in 6,000 (or, expressed as a decimal, 0.0000167), whereas finding 10 useful documents amid 40 retrieved comes out to a 0.25 ratio, or one in four. Ideally, a search engine that ranks retrieved citations according to "relevance" to the specific query proves far superior to another that merely combs millions of possibilities and belches forth citations to thousands of candidate articles, of which a comparative few are of any use at all.

Automation has come a long way in creating and refining search engines that can sift through countless millions of documents and bring up relevant candidates. However, they are still only candidates, and not confirmed as relevant until someone says that they are. In the search for relevance, human intervention (e.g., reference librarians) still plays a key role. Leading directories such as *Yahoo!* and LookSmart are compiled by human indexers, and thus cannot escape the embodiment of the best and worst human traits in their compilation.

Different search engines handle treatment of "hits" in somewhat different ways. Technology displays several possible question-and-answer combinations before the Realnames display and before the regular search results, or index search results, as AltaVista calls them. The directory search results from LookSmart appear below the index search results under the heading "AltaVista Recommends." When using the Advanced Search, only the index search results are displayed. AltaVista has also added "phrase detection" to its Simple Search. Whereas double quotes still force AltaVista to search for phrases, the new phrase detection recognizes millions of commonly used phrases even in searches that do not use the quote marks. AltaVista's database of phrases includes those seen frequently in Web searches: famous people,

movies, and technical terms. AltaVista's spelling advisor will suggest alternate spellings to consider using for the next search.

Search engines are constantly tweaking their capabilities and (hopefully) improving their ability to focus on documents germane to the search statement. Such tinkering is of two basic types: (1) to increase their effectiveness and efficiency in conducting meaningful searches, and (2) to defeat spammers, those purveyors of wares for sale via the Internet, who use various tricks to get a search engine to give them a higher relevance ranking than they deserve by using particular keywords. Although such practices may be distasteful (or even unethical) they are not against any known laws, and so they continue apace.

Many search engines now feature "what's related" buttons (the actual wording varies considerably) that accompany a search, but the thinking behind what these buttons will lead you to is based on previous human behavior as exhibited by Web-traffic flow patterns and link popularity. The theory behind this is that because people tend to return to the most useful sites, so will you. Table 5.2 lists 144 personally selected Web sites categorized by type.

Table 5.2.

Recommended Internet Search Engines, Directories and Web Sites, by Category (number of entries per category)

Category	Number
(A) general/meta-search engines	45
(B) reference sites	18
(C) news and information sites	10
(D) business/financial sites	10
(E) sports sites	10
(F) travel sites	10
(G) food/cooking sites	10
(H) health sites	10
(J) technology sites	10
(K) children's/parenting sites	11

Notes: (1) Because not all useful or intriguing Web sites could be included because of space limitations, the total is reluctantly limited to 144. Thus, if one or more of your favorites has been omitted or overlooked, please excuse the oversight. (2) There is no category "I" (eye). It was eliminated from the sequence to reduce confusion with the number "1" (one).

The World Wide Web currently lays claim to well over 1 billion Web pages, with thousands being added every day and no end in sight to this burgeoning growth rate. A few of the following Web search engines have unique or distinguishing characteristics or features that make them stand out from the herd, but when you look at upwards of 40 of them, all in the same search session, they begin to resemble one another until it's hard to discern the proverbial "dime's worth of difference" in them. *Warning*: Most of the following search engines and browsers lay claim to being original, ground breaking, superior, more powerful, or more intuitive than their competition. Each one of the following listed engines has developed a slogan or motto designed to attract new users, or to lure them away from the competitors.

The reader is strongly counseled to take the time to enter each one, experiment with it a while, and decide personally as to whether its claims are accurate, merely exaggerated, or simply fraudulent. Not surprisingly, each proprietary engine wants you to believe that it can do for you what none of the others can. Not surprisingly, not all of their claims can be true at the same time. It's really just a matter of what you're looking for and what feels most reassuring or comfortable to you. As with most anything in today's competitive market of products in the information industry, "you pays your money and you takes your chances." Another old saying is also worth remembering when you're shopping for a search engine you can live with: *Caveat emptor!* (Let the buyer beware!)

A: General Web Search Engines and Meta-Search Engines

A1. About.com (www.about.com). Advertising itself as "the network of sites led by expert guides," About.com boasts noted historians, social scientists, health professionals, and others who answer people's questions, in addition to having information organized into 29 subject categories.

A2. Alexa (www.alexa.com). Their slogan is "Navigate the Web Smarter and Easier." Alexa works with your own home browser, providing useful information about the sites you are viewing while suggesting related sites.

A3. All-in-one (www.albany.net/allinone). A compilation of search tools on the Internet, broken down by topic. Notable for its "one-stop-shopping" approach to Web sites, most any search engine available can be launched from this site.

A4. Alltheweb (www.alltheweb). Claiming to be the largest of the search engines (as of early 2000), capable of tracking more than 200 million URLs, its product, (commercially known as Fast Search) boasts over 300 million Web pages nicely indexed. Searchers can ask for exact search-phrase returns, partial results, or all search terms in no particular order.

A5. AltaVista (www.av.com). The easiest way to get to cyberspace via a telephone line, this search engine boasts one of the largest databases on the Web. Comprehensive, easy-to-use commands make this an excellent search tool for beginning and advanced Web users. AltaVista has an incorporated spelling advisor that suggests alternate spellings to consider using for subsequent searches. AltaVista introduced its Full View Searching, available when using the Simple Search form. Full View Searching incorporates the question-and-answer search technology of Ask Jeeves, directory search, and index search. The index search is the usual AltaVista search while the directory search continues to rely on LookSmart.

A6. America Online (www.aol.com). Quality content highlights a selection of headlines, sports scores, local and national weather updates, and other useful information. A charter AOL user, I never let a day go by that I don't go looking for something on this site and come away happy. AOL.com search categories are broad, encompassing 16 areas from arts and entertainment through travel.

A7. Ask Jeeves (www.askjeeves.com/also: ask.com). This site takes as its motif a friendly and capable English butler, Jeeves, who doesn't just find information for you in response to given search statements, but actually claims to answer questions, hence the name. A refreshingly modest disclaimer graces the front page: "Not that Jeeves knows everything (he'll leave that for you to decide). . . ." Ask Jeeves has a cooperative working agreement with Direct Hit (A10), in which references and sites are cross-listed.

A8. Beaucoup (www.beaucoup.com). This meta-search engine bills itself as "a whole new way to search the Net" and claims to be a one-stop shopping site for its ability to query 10 meta-search engines at once, covering more than 2,500 specialized databanks providing, in turn, access to more than 40 subcategories that help organize results from the various search engines, indexes, and directories.

A9. C4 (www.c4.com). This is a meta-engine site (a huge search engine that sweeps ten large search engines). One advantage of such size is that everything available is likely to turn up in response to a given search, but that's also a signal disadvantage: too much recall at the expense of precision. One "Custom" option permits the searcher to hunt the entire Web via nine general categories, including company name. C4 brags that it has made searching as easy as talking—just type in your search query in natural language and the most relevant results on the Internet are retrieved and organized in response. The authors claim to be able to provide "what you want when you want it," which is a tall order for any search engine, however large or powerful.

A10. Direct Hit (www.directhit.com). Strives for high relevance of results to searches, based on popularity of the sites available, while displaying bright orange "relevancy ranking icons" to indicate how closely a retrieved item is to the question. This site takes much of the drudgery out of nonspecific searching because it targets Web pages that users most often click to (visit) after doing their own searches.

A11. Ditto (www.ditto.com). The front page displays intriguing color photographs, fully clickable for their source material. This site is especially good for finding visual material, such as photographs, drawings, and other images. Also provides links to each image's home page.

A12. Dogpile (www.dogpile.com). Despite the facetious and even unpleasant sound of this site's name, it offers access to, and very accessible information on, such everyday and diverse topics as: automobiles, furniture, travel, online trading, pharmaceuticals, free music, news, self-improvement, and computers.

A13. Excite (www.excite.com). Excite offers a search engine called Excite Search, a directory called Channels by Excite and Excite News Tracker, a specialty search engine that checks only news sites for recent stories. The Excite Search database is not as extensive as that of AltaVista, but it performs some unusual tricks such as "concept-based searching," in which the search engine looks not only for the exact words you type in, but also for similar words (based on an internal, stored, thesaurus). Excite now has a "more like this" feature, serving as a capable link to related material.

A14. Find it Fast (home.microsoft.com). A convenient portal to other search engines, ranging from 800 directories to zip codes to magazine article indexes and archives. Find it Fast is a directory of search engines, listing more than 800 individual directories and magazine article archives.

A15. FinderSeeker (www.finderseeker.com). This site is self-described as the "search engine for search engines," that is, a search engine that gives the user information that will help in decision making about which search engine would be best for a particular query of a particular topic. It contains hundreds of search engines, organized into 27 subject categories. As a specialty, this site provides search engines for 160 countries and lists engines for individual cities and states in the United States.

A16. Flyswat (www.flyswat.com). Their twin slogans are: "Answers-on-the-fly," and "The right info. right when you need it," while their front page says, "Have information delivered to you like never before." The Flyswat service is literally an answer engine, creating the direct links from any word anywhere to related information and resources. One difference from the rest: Flyswat points out words in search results that have lots of related content by highlighting them with a yellow-green underline. Clicking on one of the underlined items gets you the same concise menu of related resources. One interesting new twist: when you click on a "flycon," instead of getting whisked away to a new page as you do when you click on a regular link, a small box pops up on top of your browser page, leaving your previous reading experience intact.

A17. Google (www.google.com). This search tool, accessing the most popular—and thus most frequently consulted—Web sites, tends to be more accurate than some of the larger ones because it rates and ranks every Web site based on the number of other sites that link to it, thereby creating a sort of "reference check" for each result. A reliable retriever of useful information and indexed by librarians to maximize relevance while reducing recall, Google caches (archives) many of the Web pages it collects as a fail-safe against server crashes on other systems.

A18. Goto (www.goto.com). Slogan: "Let Go.to.com help you find what you're looking for on the Internet!" "Simply type what you're looking for and GoTo it!" says the masthead of this site that subtitles itself "Search made simple." Offers an "adult filter" option for grown-ups who want to permit their children access to the search engine without fear of exposing them to pornographic material.

A19. Gurunet (www.gurunet.com). Gurunet offers itself as "Your instant expert" and boasts that it is a free new one-click information service that works by automatically analyzing pointed-to text in context and then pops up a simple window without linking or leaving your document. Includes several useful reference sources (e.g., a dictionary, a thesaurus, and an encyclopedia) and the usual real-time information, such as continually updated sports scores, weather figures, and stock

quotations. Twist: click on any word within a document using a special key combination and a small Gurunet window opens, providing more information, pulled down across the Web from a distant server.

A20. HotBot (www.hotbot.com). This site uses the Inktomi search engine and provides crossover to other search engines, such as a directory from Looksmart. The interface for HotBot is particularly user friendly because it features pull-down menus for refining searches rather than relying on Boolean language, which can be confusing or challenging to the novice. HotBot also has several new search features. Truncation is now available by using the asterisk (*) symbol. It can be end truncation or internal, but must be preceded by at least two characters. Under More Search Options, HotBot has a check box for enabling "word stemming" that causes HotBot to search for grammatical word variants of search terms. HotBot has also added a language limit—for English, French, Italian, Dutch, German, Spanish, Finnish, Swedish, and Portuguese—plus a personal page type limit, available under More Search Options. Case sensitivity has been expanded beyond just unusual case recognition to match any usage of uppercase characters within the search terms.

A21. iNetNow (www.inetnow.com). iNetNow calls itself the first company to provide 24-7 (round the clock) access to the Internet and a professional Internet expert. Put simply, the masthead says, "You can call a toll-free number, talk to a person, tell them what you want from the Internet and they find it. No hard-to-remember instructions, no code words, no limitations! It's like calling a friend who's always online." *Warning*: The first three months of the service are offered free to the first 5,000 people who sign up. After that, charges apply.

A22. InferenceFind (www.inferencefind.com). Calling itself "the intelligent and fast parallel web search," this site differentiates itself from its peer group by claiming to be the first and only search tool that calls out in parallel all the best search engines on the Internet, retrieving results, removing redundancies, and clustering the results into neat, understandable groupings. Currently, however, InferenceFind calls (only) WebCrawler, *Yahoo!*, Lycos, AltaVista, Infoseek, and Excite, which puts it somewhat lower in coverage than meta-engines that scan 10 or more search engines.

A23. inFind (www.infind.com). The Web page claims that "inFind is the first and only search tool that calls out in parallel all the best search engines on the Internet, merges the results, removes redundancies, and clusters the results into neat understandable groupings."

A24. Infoseek (www.infoseek.com). This site offers a smaller search engine, but features a large, well-organized directory and easy-to-use special features for refining search queries. Offers both simplified and sophisticated (Boolean) searching options. A helpful feature in Infoseek is "Find similar pages," providing links to related material. Infoseek sorts search results by site or by date and has a "Find similar pages" link after each search result, which performs a follow-up search similar to Excite's better-known "more like this" feature. Infoseek has a free, multiple search engine desktop client called Express by Infoseek.

A25. Inktomi (www.inktomi.com). The Inktomi search engine offers a gateway to other sites' information through other search engines, but plans for full access on its own are in the works. A special and exclusive feature is its "shopping engine," through which users can compare merchandise, access reviews, and make informed product choices.

A26. InvisibleWeb (www. invisibleweb.com). This site contains over 10,000 search engines divided into 18 subject categories and hundreds of subcategories. Subjects include investments, legal, travel, sciences, and reference materials. Each meta-engine has chosen for itself a catchy slogan or motto, and this one is no exception. Terming itself "The Search Engine of Search Engines," this one, a product of IntelliSeek, considers itself "invisible" because it thinks of itself as a transparent and effortless gateway to other search engines, arranged into nine basic categories.

A27. iWon.com (www.iwon.com). An upstart company so hungry to steal business away from its more established competitors that it offers a gimmick: daily, weekly, monthly, and annual cash ($10 million) prize giveaways to users, with every access event acting as a chance, much like buying lottery tickets. One search (a hunt for a chicken soup recipe) yielded over one million hits of varying relevancy. Also provides latest news headlines, feature sections, and reference tools.

A28. Ixquick (www.ixquick.com). This engine modestly terms itself the "Most powerful meta-search engine on the Web" because it searches many prominent engines simultaneously (in parallel), and awards each site one star (*) for each search engine that placed it in its top ten for your search, clearly indicating the quality of the result. Thus, the number of stars should be an indicator of the relevance of a site to your search. Ixquick also eliminates duplicates and claims to know which search engines can handle wildcards and which don't and will automatically forward your searches exclusively to the search engines that can properly respond to them.

A29. LookSmart (www.looksmart.com). This smaller search engine appears on the Netscape Net Search home page and provides cross directories for AltaVista and HotBot. Helpful feature: A posed search request returns AltaVista listings whenever LookSmart fails to find any matches.

A30. Lycos (www.lycos.com). Lycos has a smaller search engine than HotBot or AltaVista but offers an extensive directory called Community Guides. The directory is unusual in that it uses both human and computer input. The basic organization is by people, but sites are added to the directory by the computer. The technology measures whether a document is similar to something already in the directory. Also, this search engine can locate both pictures and sounds in its searches. Lycos has bought Wired Digital, HotBot's parent company. The immediate effect for searchers is that HotBot and Lycos search results include a link to the other service at the bottom of the page.

A31. Mamma (www.mamma.com). Mamma, a meta-search engine, bills itself as "The Mother of all Search Engines," hence the name. When the user enters a query, Mamma simultaneously queries 10 of the major search engines and properly formats the words and syntax for each source, organizes the results into a uniform format, and presents them in order of anticipated relevance.

A32. MetaCrawler (www.metacrawler.com). Slogan: "Search the search engines," referring to this site's ability to enter your query simultaneously into at least 10 search engines, and rank the results from each site in 20 categories in three languages. Thus, the same search can be run at the same time in such sources as Lycos and *Yahoo!*, saving a great deal of the searcher's time. Ixquick, however, is fond of pointing out that Metacrawler can return pages of pornography because it blindly forwards search requests to "search engines that don't understand that no means no!"

A33. Netscape (www.netscape.com). Netscape Navigator recently changed its site to one featuring Excite's directory and search engine. Netscape, however, remains the default home page on millions of desktops worldwide.

A34. NorthernLight (www.northernlight.com). NorthernLight automatically displays results in folders by topic, which some searchers find very useful. It also has a set of about 1,800 special collection documents not found in most search engine databases, such as full-text journal articles and news wires. Searching through these documents is free, but there's a small charge to view them. NorthernLight now has the capacity to sort search results by site and date, with search results given a percentage

rating for relevancy. Some collections are fee-based, but there's plenty of free information on hand.

A35. Oingo (www.oingo.com). This site's slogan is, rather ominously, "We know what you mean," referring to its meaning-based search engine. By going beyond searching for just simple text characters, Oingo says it can bring the most relevant information to you by allowing you to refine your search based on questions designed to get at the actual meaning of your search words or phrases. Thus, Oingo claims to be a much more intuitive and human way of searching than many of its competitors, which rely entirely on pattern matching for finding results.

A36. Quiver (www.quiver.com). Quiver calls itself the "human powered directory," in which searches are performed, once received, by human intermediaries, rather than by electronic spiders, with presumably more intuitive results.

A37. Realnames (www.realnames.com). Affords the user the option of using conveniently remembered subject terms instead of long, confusing URLs. Example: Remembering http://www.fordvehicles.com/explorer /index.html isn't easy, whereas "Ford Explorer" is, for most surfers.

A38. Redesearch (www. redesearch.com). Bills itself as "The Next Generation Search Engine" because it permits one-click searching of 10 other search engines/directories (AltaVista, *Yahoo!*, Lycos, Excite, HotBot, WebCrawler, Infoseek, Snap, AOL NetFind, and Goto).

A39. Savvysearch (www.savvysearch.com). Quoting from the home page: "Savvysearch: The Search of all searches offers free Web site submissions to 17 search engines." The home page also shows a brief listing of searchable links called "search," "submit," "snoop," and "customize." "Snoop" seemed intriguing so I gave it a shot, but it turned out only to be another word for browse, which you can pretty much get anywhere else. One cool feature is that translations are available into/from 22 foreign languages, covering virtually all of Europe and a few non-European tongues.

A40. Searchpower.com (www.searchpower.com). This site contains the modest subtitle "World's largest search engine directory" and lists over 16,000 specialized search engines, divided into 14 subject categories, themselves further divided into many subcategories.

A41. Snap (www.snap.com). A smaller directory (spun off the NBC network) that also provides search results from Inktomi, and caters to the technophobe or first-time Web searcher. Provides the usual—news, sports scores, weather, and so forth—plus information from content

providers that don't have commercial partnerships with Snap. The first page boasts access to "Globalbrain," which provides the most popular sites reviewed by the editors, and strives to ensure that the sites one is looking for will be in the top search results.

A42. Start (www.start.com). Still in development at the time of writing, but being highly touted by parent company Microsoft.

A43. Third Voice (www.thirdvoice.com). This relatively new search engine quotes a review that gushes that "Third Voice has the potential to change the way people think about and use the Internet." Dividing its information categories into 12 areas of inquiry, this engine is currently beta testing a second release designed to be more powerful and to eliminate bugs in the first edition.

A44. WebCrawler (www.webcrawler.com). Motto: "It's that simple." Divides its knowledge base into 19 clickable categories.

A45. *Yahoo!* (www.Yahoo!.com). The oldest and largest Web directory of sites, arguably also the most popular, and still among the best search tools available. Its staff of Web surfers, who weed out stale sites and add fresh ones, helps to ensure that the entries stay up-to-date. Two additional helpful features: (1) If *Yahoo!* doesn't find the site you're looking for in its directory, it automatically enters the search term into the AltaVista search engine, and (2) it offers Inktomi search results, displayed after all the *Yahoo!* matches. *Yahoo!* employs an "intelligent default" for searching multiple terms. Enter two or more terms and rather than an automatic OR, the search defaults to an AND just as if each term had a + in front of it.

B: Basic Reference Sources Online: Essential Web Tools

In the "old days" (actually, not all that far back in time—so the expression encompasses everything up until perhaps 15 years ago), reference librarians in their off-hours discussions sometimes would ask questions of themselves like, "What reference sources should I place close to me, because they are used so frequently or answer many of the reference questions that come along every day at the information desk?" Then online searching made it possible for a library not to have to buy and own hard-copy print versions of such basic sources as general encyclopedias and dictionaries but rather to purchase CD-ROMs or access them via such online sources as DIALOG, Compuserve, and others.

Because the Web became commonly accessible (along with e-mail) something like six or seven years ago, there has evolved a group of reference-source Web sites and pages that have worked their way gradually into the daily work lives of all reference librarians with Web access, and have, in many places and cases, replaced the former means of acquiring and dispensing information. They are unique Web tools, designed to perform specific functions or to solve specific functions and they have the signal advantage of being as up-to-date as today's news. Here are only a few of them, but all are extremely useful, and thus, highly recommended:

B1. *Bartlett's Quotations*. (www.bartleby.com) Every quotation in the print source is searchable by author, word, and keyword.

B2. BigBook (www.bigbook.com) serves as one enormous compendium of commercial directories, offering listings from more than 5,000 Yellow Pages directories, throughout the United States and Canada.

B3. Books in Print (www.booksinprint.com). This electronic version of a longtime and reputable source of book-ordering information calls itself the book industry's most comprehensive source, providing, in addition to source and ordering information on books in print (in the English language, primarily), a roundup of publishing industry news and other features.

B4. Britannica Online (www.eb.com) is perhaps the best example of several online encyclopedias. Britannica is still the best all-around general reference encyclopedia available, and even more powerful online. Briefly, in late 1999, Britannica was offered as a free reference service to Internet users, but availability was suspended indefinitely shortly thereafter when millions of hits swamped the EB computers. This site renders searchable every page of each part of the historic and renowned *Encyclopaedia Britannica,* and whereas the print edition is extremely expensive and divides knowledge rather arbitrarily into three types: (1) the Propedia (outline of all knowledge), (2) the Macropedia (lengthy articles on major topics), and (3) the Micropedia (shorter articles similar to those found in more conventional encyclopedias). The main virtue of this source is that all three of the divisions are seamlessly connected by virtue of the links that typify Internet resources. Also, access is free (as of the time of writing) but may give way to a user's fee, once the introductory period ends.

B5. Dictionary.com (www.dictionary.com). To get useful, fast, authoritative definitions of words, consult this source. Reference works searchable on this site include *Webster's Revised Unabridged Dictionary,* a jargon file, a Bible dictionary, and the *CIA World Factbook.* The site also links to other online dictionaries and language resources.

B6. FamilySearch.org (www.familysearch.org) is the place to start if you're attempting to trace your family's genealogy. This site, launched by the Church of Latter-day Saints (the Mormons), is the largest online database in the world. More than 320 million online records, covering almost 400 million names from the famous "Mormon Church" collection of the Family History Library in Salt Lake City are accessible.

B7. FedStats (www.fedstats.gov). A good center and clearinghouse for government information, particularly about about the U.S. federal government and its agencies.

B8. 555-1212.com (www.555.1212.com). Consult this source before you pick up the telephone and you'll find the information you need without the costs associated with getting it from an operator. Yellow pages are also a valuable networking tool.

B9. Infoplease.com (www.infoplease.com). This continually updated almanac is an online compendium of much the same information contained in the popular annual *Information Please Almanac,* only better, because there is no stop date for events, meaning that there is continuous updating on a daily basis. Good for facts, figures, and more-current-than-print sources of a similar nature.

B10. Learn2.com (www.learn2.com) provides listings of continuing education opportunities. The pursuit of lifelong learning can be facilitated via this Internet directory, which calls itself "the ability utility." The site offers step-by-step instructions—or "2torials"—on a wide array of activities, hobbies, pastimes, and tasks. The skills taught in its nearly 200 tutorials range from such useful but workaday topics as "how to change a flat tire" to much more aesthetic topics (e.g., how to make stained glass).

B11. Library of Congress (lcweb.loc.gov). Lets users browse holdings of the world's largest library. Although you won't be able to read many of the titles, you can search for details (and sometimes even location) of any book held in a library in North America.

B12. OneLook Dictionaries (www.onelook.com). Combines many dictionaries of different types into one source: Via this single source, you can match your search query against more than 450 dictionaries at the same time, and compare the definitions you find.

B13. *Roget's Thesaurus* (www.thesaurus.com). An online way to find synonyms; an indispensable tool for writers.

B14. Switchboard (www.switchboard.com). Very useful for finding people and businesses. Especially useful features: maps, directions, nearby merchants, other locational information.

B15. U.S. Postal Service's ZIP Code Lookup and Address Information site (www.usps.gov/ncsc). Why wait on hold after calling your local post office in search of street addresses or zip codes? For Zip code and area code information, this site helps eliminate some of the problems that are associated with sending ordinary ("snail") mail to the proper destination. This source will help one find a zip code if only the address is known, or to locate postal abbreviations for the various states and territories. A similar source is available for those who use the telephone to communicate. If you know an area code, for example, but have no clue as to where addresses using the code are, or an international number but not the country that goes with it, this is the source for you.

B16. Virtual Reference Desk (thorplus.lib.purdue.edu/reference/index). A compendium of thesauri, dictionaries, telephone books, and similar reference tools, all in one source.

B17. Who's Alive and Who's Dead (www.neosoft.com/davo/livedead) is an extremely useful biographical directory. Searches by various categories (e.g., actors and actresses, sports figures) to find out whether a person is alive or dead. Continually updated for currency and offers e-mail delivery of updates, birth dates for everyone listed, and an icon indicating whether subjects are alive and at least 80 years old.

B18. The World Bank (www.worldbank.org) offers extraordinarily up-to-date geopolitical information, useful in a world where cities and even countries change their names frequently. An accessible knowledge base of the countries of the world, together with the latest news and assessment of the political situation for each nation.

C: News and Entertainment Sites

C1. ABCNews.com (www.abcnews.com). The powerful major news network offers a plentiful mixed bag of headlines (continuously updated), news summaries, financial news, stock quotations, feature stories, science features, technology reports, and chat rooms on diverse subjects.

C2. APB News.com (www.apb.com). APB, a law enforcement acronym, stands for All Points Bulletin. This Web site is concerned with crime, justice, and safety. It's the premier source, for example, for finding out who's on the FBI's Ten Most Wanted list, or entering a chat room to discuss whether animal rights activists are practicing domestic terrorism, or to vent your opinions on who killed JonBenet Ramsey. It's fascinating for its peeks into law enforcement and to become informed on all aspects of crime and criminal justice.

C3. *The Chicago Tribune* (www.chicago/tribune.com). This site offers a well-organized presentation of articles, features, and resources from *The Chicago Tribune*.

C4. CNN Interactive (www.cnn.com). A very comprehensive site for quick updates of fast-breaking and developing news stories. It is also commendably comprehensive, offering a complete list of the day's stories on its main Web page. Displays lead stories (which change as circumstances warrant) and multiple links to related stories. This site can also be customized so that the user can get only the information desired (thus avoiding the rest of the "newspaper") by filling out an online profile form.

C5. Excite NewsTracker (nt.excite.com). Select the topics that interest you and NewsTracker will scour the daily news from more than 300 online newspapers and magazines for articles that match the entered search terms.

C6. MSNBC (www.msnbc.com) offers an easy-to-navigate site that makes good use of the news resources of a major television-and-radio news network, plus local news, sports, and weather, as well as constantly refreshed streaming video and audio. Contains both late-breaking and in-depth reporting, but to keep it "free," the user is obliged to wade through quite a bit of on-screen advertising to find what the user is looking for.

C7. *The New York Times* (www.nytimes.com) indexes everything contained in the print version of the major newspaper, plus updates and access to the paper's archives, although sometimes a fee is charged. Emphasis is, understandably, on events that affect people most who live in or near to New York City, but also carries Associated Press and Reuters coverage for news from the rest of the world. Very thorough coverage of international affairs that most of us just can't get from our hometown newspapers, whether the paper product or the online version.

C8. *The Washington Post* (www.washingtonpost.com) provides the full text of the largest and most influential newspaper in the nation's capital, plus a linked archive of Associated Press articles. Especially good for reporting the deliberations and actions of Congress, the Executive branch, and the U.S. Supreme Court, along with comprehensive coverage of events in and around Washington, D.C.

C9. The Weather Channel (www.weather.com). A very useful way to get the latest weather and several-day forecast for just about anywhere you're going to be traveling. Enter a zip code and get the current conditions, an extended forecast, and current Doppler and satellite maps for that region.

C10. *Yahoo!* News (www.Yahoo!.com/headlines) is an accessible, easy-to-use source for tracking stories of current and popular interest, and features a customizable page, titled "*My Yahoo!*" (www.my.Yahoo!.com), which allows the readers to tailor their daily "newspapers" by selecting the categories of what kinds of stories they want to see, while avoiding the necessity of plowing through all the rest of the information retrieved, often a tiresome, and fruitless search process.

D: Financial News and Information Sources

D1. CBS MarketWatch (cbs.marketwatch.com). A free, real-time service for individual investors, featuring such useful information as continually revised quotes, charts, portfolios, and indexes. Boasts of having 82 full-time journalists working for the site and a well-rounded stable of knowledgeable columnists.

D2. CNNfn.com (www.cnnfn.com). A free news and information service with sections on small businesses, world business, and personal finance. Features include a technology-news showcase and information on specific industries and companies. This site has recently been

redesigned for increased navigability and now provides not only the latest news but also the tools (i.e., links) to allow investors to act on it.

D3. DBC Online Quote (www.dbc.com/). Dun & Bradstreet is one of the oldest and most respected companies in the industry. An excellent way of getting current stock quotes and other financial data quickly.

D4. Financenter (www.financenter.com) lets you calculate a hypothetical mortgage or weigh the pros and cons of a Roth IRA, and features almost 100 additional monetary calculators.

D5. The Motley Fool (www.fool.com). This popular, colorful online service (often augmented by daily or weekly columns in local newspapers) offers an array of financial reference tools, geared to the lay investor, and is an excellent source for Wall Street rumors and trends, and message boards where one is free to post personal queries or statements. Proceeds from the logic that everyone is, in the investor sense, at least, a fool—inept in certain ways about managing money—but willing to share and to learn. Note particularly the "Fool's School," a 13-step program guide that steers beginning investors through a financial glossary, market concepts, investment strategies, and basic advice.

D6. MSN MoneyCentral (www.moneycentral.com). Investor tool, with information arranged by broad topic, such as money and banking, retirement and wills, real estate, taxes, family finance, smart buying, and insurance.

D7. Quicken (www.quicken.com). Tools, resources, and information that is useful to have before making decisions about major financial undertakings, including investing, home buying, taxes, owning a small business, retirement planning, and so forth. Contains a multitude of tax calculators that make it especially useful just before tax time.

D8. TheStreet (www.thestreet.com) operates on two levels. The basic site includes free market news, stock and fund quotes, charts, and access to SEC (Securities and Exchange Commission) filings. For an additional monthly fee (around $10 per month), one can subscribe, which entitles you to tap into commentaries and more in-depth coverage of Wall Street events and trends. Noted for its astute commentary about market trends and rapid relaying of what market analysts talk about.

D9. *Wall Street Journal Interactive Edition* (www.wsj.com). For libraries whose patrons seek in-depth investment information, this service provides a complete WSJ archive, personalized news and stock portfolios, a library of articles from more than 6,000 business-news sources, and more than 10,000 publicly traded company reports—all

for a fee which works out to only about $5 monthly. Free offerings include stock news, current quotes, corporate annual reports, fund prospectuses, and the online version of the *Dow-Jones Business Directory.*

D10. *Yahoo!* Finance (quote.Yahoo!.com). A collection of links to financial and personal/business sites. Topics include financial and market news from Reuters, taxes, insurance, financial news, U.S. markets, world markets, and loans. Also quotes, charts, and even the number of brokers recommending a specific stock.

E: Sports Sites

E1. CBS Sportsline (www.sportsline.com). Sports coverage, augmented by the official Web pages of individual sports stats. Fee-based extra services include column archives and fantasy leagues. Features easy-to-navigate sports team pages. In the works are plans for live, streaming video. Also useful for its "rulebooks," in which the games are explained (at varying levels of specificity) for newcomers.

E2. CNNSI.com (www.cnnsi.com). News, statistics, standings, scores, and more, with contributions from *Sports Illustrated* writers. Especially good for international sports coverage, as some others aren't.

E3. ESPN (www.com). Scores, play-by-plays, statistics, standings, news, and commentary from noted sports writers and reporters affiliated with the ESPN Sports Network. Extremely thorough, well written, and as up-to-the-minute as possible. Very thorough coverage of all sports, and not just the "big three" (baseball, football, and basketball).

E4. Foxsports (foxsports.com). This site customizes its sports pages for various (18) areas of the country, offering a wealth of regional interest coverage as well as more comprehensive sports information for the world at large. Very good for high school sports, and not just the more publicized college and professional team coverage.

E5. Golfonline (www.golfonline.com). Everything you ever wanted to know about golf. A database of golf news, information on courses, statistics, earnings, player rankings, equipment information, instruction, and so forth.

E6. NASCAR Online (www.nascar.com). News, statistics, race results, track information, and calendar for automobile racing and stock-car fans, a spectator sport very big in the southern United States.

E7. NBA.com (www.nba.com). Covers the world of professional basketball. Mainly seasonal coverage, but offers comprehensive and team-by-team news, statistics, standings, polls, and information about teams and players in the National Basketball Association, and additional coverage of college basketball, women's basketball, and financial issues.

E8. NFL.com (www.nfl.com). Offers comprehensive and team-by-team news in professional football, including coverage and opinion on drafts, players, statistics, standings, polls, and information about teams and players in the National Football League.

E9. The Sporting News (www.sportingnews.com). Statistics and standings for all major team sports, but especially heavily weighted toward professional baseball during the season (March through October). Good writing, but team reports updated only twice a week. In addition to comprehensive sports coverage of current events, there is a link to archived coverage from "The Vault" for sports history of various kinds.

E10. Total Baseball Online (www.totalbaseball.com). Everything baseball, including news, scores, history, player profiles, records, standings, and scouting reports for each team.

F: Travel Sites

F1. Arthur Frommer's Budget Travel Online (www.frommers.com). Finds and lists the best travel deals available online and offline.

F2. Bestfares (www.bestfares.com). A site that specializes in inexpensive airfares between U.S. cities, featuring "you snooze, you lose" and other time-limited bargains. Recently rearranged to facilitate grouping by city/airport of departure. Membership (at additional cost) affords access to special deals not available to browsers.

F3. Biztravel.com (www.biztravel.com). A travel Web site that cannot only provide information about your destination and arrange for airline tickets, hotel reservations, or both, it can also arrange for rental cars, and automatically apply frequent-flyer benefits.

F4. CitySearch (www.citysearch.com). The best overall guide to nine major cities, with comprehensive restaurant, movie, theater, and event listings. CitySearch has formed partnerships with leading newspapers in the cities it covers, such as the *Washington Post* and the *Dallas Morning News.*

F5. Expedia (www.expedia.com). A good, easy-to-use, all-purpose travel site, especially useful for comparative pricing of airfares.

F6. Internet Travel (www.itn.net). Free, secure Internet site for making travel plans. Includes updated airline schedules, cruise dates, and can make ticket bookings via a local travel agent.

F7. Mapquest (www.mapquest.com). Driving directions and city maps for the entire country, as well as for more than 300 other metropolitan areas around the world.

F8. Preview Travel (www.previewtravel.com). An all-purpose travel site, featuring the complete texts of Fodor's Gold Guides to 86 cities.

F9. Salon.com/travel. (www.salon.com) contains a compendium of travel writing, for those who can't afford (in money or time, or both) to get out and away. At least they can read about it.

F10. Travelocity (www.travelocity.com). Good for finding airline schedules and flights that meet your schedule and hotel reservations to your specifications. This site has recently acquired travelscape.com, one of the largest consolidators of discount hotel rooms.

G: Food/Nutrition Sites

G1. CyberDiet (www.cyberdiet). Features customized nutritional profiles, meal planners, and a tracking system that profiles both calories and fat grams.

G2. Digital Chef (www.digitalchef.com). The leading shopping-oriented site, offering hard-to-find ingredients and professional cookware.

G3. Epicurious (www.epicurious.com). Features a searchable (and ever-growing) database of more than 10,000 recipes and an archive of articles from *Gourmet* and *Bon Appetit* magazines. Provides food experts and novice cooks alike with millions of recipes, capable of permutation to suit available ingredients or needs. Also be sure to check out the extensive food and wine dictionaries.

G4. Food & Wine Online (www.pathfinder.com/FoodWine). An archive of articles from *Food & Wine* magazine, detailed recipes, and a searchable wine guide.

G5. The Global Gourmet (www.globalgourmet.com). A strong, all-around site, with inventive recipes, cookbook reviews, and a conversion calculator.

G6. The Kitchen Link (www.kitchenlink.com) Perhaps the Web's most exhaustive compendium of food-related links. The compilers claim to have compiled more than 10,000 links to food-related articles and sites, and after you enter this site and dabble a bit, you'll believe it!

G7. Meals For You (www.mealsforyou.com). Nutritional analysis, printable shopping lists, and recipes that adjust measurements to the number of servings. Easy to use, this site is designed to help family cooks answer that simple yet potentially problematical question: "What am I going to fix for dinner?" All recipes included are searchable by ingredient, by nutrient content, and by calories. Special categories include vegetarian meals, desserts, and low-sodium diets.

G8. StarChefs (www.starchefs.com). Celebrity chefs contribute recipes, interviews, and useful information on cooking, largely for the benefit of professional chefs who get the most out of this Web site.

G9. Tavolo (www.tavolo.com). This site (whose name is taken from the Italian word for "table") bills itself as having everything for cooks because of its exclusive partnership with the Culinary Institute of America. Although it specializes in gourmet meals and hard-to-find ingredients, it can effortlessly tailor a recipe to the number of people being served.

G10. Tufts University Nutrition Navigator (www.navigator.tufts.edu). A clearinghouse for all things nutrition related, with ratings and links to sites that promise good advice. Not only does this site provide restaurant reviews nationwide, but it also rates the reviews and links to a growing list of more than 300 Web sites in the nutrition area.

H: Health/Medical Sites

H1. Ask Dr. Weil (www.drweil.com). Advice on vitamins and natural remedies from the leading alternative medicine proponent, Dr. Andrew Weil. Features a questionnaire you can fill out and return to decide which vitamins and nutritional supplements Dr. Weil recommends for you. Dr. Weil promotes a form of "integrative" medicine in which familiar Western medical practice meets and mingles with alternative treatments of peoples of various parts of the world. Especially recommended is his "self-help" department in which such topics as whether

vitamin supplements are useful are discussed at length in an even-handed style.

H2. Centers for Disease Control and Prevention (www.cdc.com). Information from the federal government on disease outbreaks, featuring useful tips for travelers to at-risk nations.

H3. Dr. Koop's Community (www.drkoop.com). Dr. C. Everett Koop, the former Surgeon General of the United States, maintains this site because he acknowledges that there is a lot of conflicting, discredited, and frankly wrong advice in health matters out there, and he wants to set the record straight. He provides backgrounds and symptoms on diseases, recommended treatments, and a medical insurance guide. Dr. Koop's site seems to be continually threatened with bankruptcy, but frequent influxes of cash from investors bail it out of jeopardy—at least for the time being.

H4. Healthfinder (www.healthfinder.com). A gateway to numerous English-language medical journals, news, libraries, agencies, organizations, and so forth.

H5. InteliHealth (www.intelihealth.com). A top site for medical news, condition-specific information, and drug data, designed for the intelligent consumer but not professional. Provides "24/7" answers to health questions on all subjects. Features an "Ask the Doc" forum, in which medical professionals on the staff of Johns Hopkins University Hospital answer users' health and medical questions.

H6. Mayo Clinic Health Oasis (www.mayohealth.com). More than 1,200 physicians, dietitians, and therapists on the staff of the renowned Mayo Clinic (in Rochester, Minnesota) are on call to deal with questions organized into categories such as cancer, nutrition, allergies, and so forth. Features links to other sites. Especially good for health news items, with thoughtful reporting and commentary.

H7. National Institutes for Health (www.nih.com). Not for the layperson, this site offers medical professionals a gateway to clinical-trial databases and health matters and conditions being investigated by the federal government.

H8. National Library of Medicine (www.nlm.nih.com). Also for the specialist or trained professional. Features MedLine, a free database of citations and abstracts from almost 4,000 medical journals.

H9. OncoLink (www.oncolink.com). A portal for cancer information, ranging from the basic to the highly technical.

H10. SeniorNet (www.seniornet.com). A wealth of information for and about the lives of persons 50 years of age and older. Mission: Enhancing seniors' lives through computer technology.

J: Technology Sites

J1. BrowserWatch (www.browserwatch.iworld.com/index/shtml). Evaluates and critiques the various Web browsers available and includes the latest news about what's coming next.

J2. CNET (www.cnet.com). A good place for finding tech news and resources, with sections of reviews of Web tools, software, and games. Also a powerhouse of consumer information and tech news and reviews.

J3. The Industry Standard.com (www.thestandard.com). A primary site for analysis of Internet business ventures, featuring a daily roundup and critique of coverage of technology news.

J4. RedHerring Online (www.redherring.com). Focuses primarily on tech business information, with articles on such topics as venture capital and technology investing.

J5. Service911.com (www.service911.com) What a concept! All types of computer support in a single site. Full of how-to video presentations and more than 5,000 tutorials on diagnosing and trouble-shooting "sick" computers. A related service even lets users engage in real-time, one-on-one chats with trained technicians. And (so far, at least), it's all free!

J6. Shareware.com (www.shareware.com). Without a doubt, the best (or at least most plentiful) place to download net games, utilities, updates, browsers, and fixes, many of them free.

J7. Slashdot (www.slashdot.org). A great source of "freeware" and "shareware," this site seeks to replace commercial software and operating systems with free or exchanged programs.

J8. TechWeb (www.techweb.com). Information technology professions will find a wealth of product reviews, Web tools, software downloads, and an updated calendar of upcoming tech trade shows and other events.

J9. Webmonkey (www.hotwired.com/webmonkey). A collection of well-organized tutorials and articles on the building of home pages and Web pages. Provides numerous tutorials of great value to anyone wishing to create or tweak a personal Web site.

J10. ZDNet (www.zdnet.com). News and features, product reviews, downloadable software, and a "gameSpot" for computer gamers. Provides thoughtful and informed commentary on fast-breaking technological developments, as well as expert advice.

K: Children's/Parents' Sites

K1. Ask Jeeves for Kids (www.askjeevesforkids.com). This site lets kids (and their parents) type in a question in plain English and then presents in response a list of matched questions, from which the user can click on the closest match. Thereafter, the child is taken to a site that was selected by the Ask Jeeves for Kids research staff as being especially appropriate to the question. Some filtering is, of course, applied to the types of information available, but that feature is designed to reassure worried parents that their children won't be exposed to any pornographic, lurid, or otherwise inappropriate material during the search.

K2. BabyCenter.com (www.babycenter.com). Like Dr. Spock's famous baby book, this site provides new parents and parents-to-be with a wealth of good advice on having, caring for, and raising babies.

K3. Best of the Pediatric Internet (www.aap.org/bpi). A gateway to links geared primarily to pediatricians, but there is information as well geared to parents.

K4. Family.com (www.family.com). This is a Disney affiliate site, full of information on things relative to or of concern to children (e.g., food allergies, fitness regimens). Localized news for various areas of the country can be used to identify activities in which one's children can participate. Parents can explore this site for healthy, quick recipes or suggested activities that can help children learn about history.

K5. Family Education Network (www.familyeducation.com). An outstanding site for parents of school-age children. Provides comprehensive answers to some of the most difficult questions parents pose to the experts. Contains articles from published journals full of helpful advice about what to do about common (and not-so-common) problems

of childhood and parenting, including tips for parents of gifted, learning-disabled, or unusual children.

K6. Funbrain (www.funbrain.com). Dynamic graphics and interactive fun quizzes covering children from kindergarten age through the eighth-grade reading level make this site helpful both for parents and teachers of young children. A link permits kids to take custom-designed quizzes themselves and then post their answers to their teachers. Accounts are free but teachers and parents must register with the site.

K7. Parents.com (www.parents.com). Advice from experts and news updates that will be of interest to parents.

K8. ParentSoup (www.parentsoup.com). A sort of support group chat room for parents, in which parents with similar concerns and interests can find each other and discuss their children's conditions and ailments without the burden of travel. Especially good for parents expecting their first child, with helpful and comforting advice on childbirth and post-partum problems, but may also be used to find out what the latest "teenspeak" terms mean, to help people to communicate better with their adolescent kids.

K9. ParentsPlace (www.parentsplace.com). Articles and features written by experts on all subjects pertaining to baby care and the raising of healthy children.

K10. ParentTime (www.parenttime.com). Features articles from *Parenting* and *Baby Talk* magazines, as well as original material on parenting. Permits users to e-mail their questions to the panel of experts. Contains a wealth of information on children's health, development, and problems. Experts on call offer advice on frequent family problems, and there are message boards and chat rooms through which like-minded parents can meet and exchange ideas.

K11. Yucky.com (www.yucky.com). Fun for kids who love to read about yucky stuff, with sections for parents and teachers, as well. Includes experiments for making (harmless) yucky stuff, with easy-to-follow scientific explanations and commentary.

Book and Other Library Media Shopping Sites

There are myriad shopping sites available on the Net, whereby interested parties can purchase just about anything that can be mailed out to them. It is not our purpose to attempt to itemize them all, but rather to indicate several places in which one can purchase books, recordings, and other library-type items for their own private consumption. However, libraries, themselves, can occasionally and profitably find good prices on the materials available, undercutting the costs they would otherwise incur through dealing with their contractual suppliers. Resistance to buying books online is gradually being overcome by the ease and availability of ordering information online, but many book buyers will never voluntarily give up the pleasant social experience of browsing in stores, drinking specialty coffees, and other delights of "being there."

No preference is to be construed from the following four listings, presented in strictly alphabetical order, and a really good idea would be to consult all four for the best price. Amazon.com Books (www.amazon.com) pioneered Internet book buying and revolutionized the publishing industry. Barnesandnoble.com (www.barnesandnoble.com), a relative newcomer to online book buying, features the stock of the ubiquitous bookstores, plus recordings, videos, and so forth. Books Online (www.cs.cmu.edu/) is a division of buy.com, and books are only one area in which one can order merchandise. Borders.com (www.borders.com) is a deep discounter of standard publisher's list prices.

Entertainment Sites and Chat Rooms

With the reader's indulgence, I wish to beg off on making recommendations in this area. Because these sites—many of them controversial—multiply exponentially almost every month, and because personal tastes vary extensively and because the library seeks to be more than merely an entertainment center, no specific Web sites have been selected for recommendation here. Besides, most library patrons rather enjoy random browsing, finding their own fascinations, and swapping information about them with others. Filters, of course, may make access to some sought-after sites impossible or difficult, but that's a matter that each library will be forced to address individually. Similarly, the number of discussion group sites (chat rooms) multiplies exponentially, and there is (literally) at least one chat room for every taste, interest, and hobby, no matter how arcane or bizarre. The reader is urged to get on, get in, and explore and is just about guaranteed to find a room full of fellow chatters who are sympathetic to the your interests.

Notes

1. "Ticker," *Brill's Content,* May 1999, 128.

2. Sara Robinson, "Searching the Web still hit-or-miss," *Dallas Morning News*, 3 November 1998, D1.

3. StorageTek product advertisement in *Newsweek*, October 4, 1999.

4. Abraham Kaplan, *The Conduct of Inquiry: Methodology for Behavioral Science* (San Francisco: Chandler Publishing, 1964), 11.

6 Preserving the Past: Anticipating the Future

■ We should all be concerned about the future, because we will have to spend the rest of our lives there.[1]

■ It is the business of the future to be dangerous.[2]

Overview

One of the challenges of writing this book on the Internet and the World Wide Web and their effect on libraries was that gathering data and specific information is always a work in progress. It is not possible, in fact, to say, "Good. My new book on the Internet is finished. Time to mail it into the publisher." What actually happens is that any book on this fast-moving subject is a "snapshot," depicting what knowledge and opinion can be found on a specific date. The reason for this is obvious: There's always something new coming along.

In my research for this book, I have discovered that just reading a daily newspaper and taking four or five weekly and professional news magazines permits me to clip and save a minimum of four stories a week that touch on our subject matter, detailing or commenting on new developments (or new problems) connected with getting the whole world "wired" and online. It seems, therefore, appropriate—and even necessary—to explore, as a final chapter, some of the speculative possibilities embedded in the Internet. This chapter deals with things that haven't happened yet, but could or probably will, and how we will deal with them when (or if) they do.

Preserving the Past: Archiving the Web

■ Manuscripts from the library of Alexandria in ancient Egypt disappeared in a fire. The early printed books decayed into unrecognizable shreds. Many of the oldest cinematic films were recycled for their silver content. Unfortunately, history may repeat itself in the evolution of the Internet—and its World Wide Web. No one has tried to capture a comprehensive record of the text and images contained in the documents that appear on the Web. The history of print and film is a story of loss and partial reconstruction. But this scenario

need not be repeated for the Web, which has increasingly evolved into a storehouse of valuable scientific, cultural, and historical information.[3]

■ Federal agencies can continue to destroy computer records as long as they keep a copy on paper or microfilm. Without comment, the U.S. Supreme Court turned away an appeal by the American Library Association, the American Historical Association, and Ralph Nader's Public Citizen. The groups, which were challenging a rule by the National Archives, argued that paper records cannot be searched and indexed as easily as electronic records. Agencies countered that materials deemed no longer useful were taking up valuable space on computers.[4]

For years, computer scientists said the ones and zeros of digital data would stick around forever. They assured us that the ultimate in computing had already been reached, and that further refinements, if any, would mostly be cosmetic or enhancements in processing speeds.

They were wrong.

Having congratulated ourselves on living in a time when everyone can get to the largest collections of information without travel and undue expense, it must also be admitted that there are at least two missions for every library, and one of those missions may not be accomplished as easily as the other. Disseminating information is one mission, but preserving it is quite another. So much of digital culture is pure commerce; it's generated by people eager to sell the latest technology, the next great thing, and by libraries eager to keep up with the times and acquire the things that are hot, things that augment the library's ability to perform mission No. 1.

The problem is (or could become) that what is new is appreciated, whereas what is dated is not. Libraries house our past, our collective memory, our literature. By contrast, the Internet is a medium continually and constantly jettisoning its own history in favor of the latest "stuff," consuming everything, but storing very little.

Demanding more desk space, more machinery, more training, more budget allocations from libraries and librarians, the Internet (and, for that matter, automation in general) is becoming a major component of the budgets of most libraries. *Question*: After diverting all of these resources to digital information, what will happen to the library's precious archives—the vital repository of previous information over the years, decades, and centuries—in a few more years, when its equipment has been rendered obsolete, and when available computer memory cannot any longer keep up with the demands for storage placed on it?

In a challenging, thought-provoking mini-essay titled, "History: We're Losing It. They Told Us Digital Data Would Last Forever. They Lied. How Do We Save the Past Before It All Disappears?"[5] Arlyn Gajilan, a technology writer, sounds the alarm concerning the impermanence of the information "stored" on the Internet and urges us to begin worrying about all the information lost, being lost, and about to be lost, because of the very nature of the great beast we all thought (or at least hoped) would save everything and make it available to us, our children, and their children.

Magnetic tapes might last only a decade, depending on storage conditions. The fate of floppy disks, videotape, and hard drives is just as bleak. Even the CD-ROM, once touted as indestructible, is proving to be vulnerable to stray magnetic fields, oxidation, humidity, and material decay.

However, it's not just the information—or even the software—that is disappearing. Much of the hardware presently used to derive information from preserved disks and tapes is disappearing in the name of progress or economy. My new Mac laptop, for example, doesn't have a floppy drive because that would add weight and cost to the computer. So, if I want to input information from my aging computer system to my portable machine, I have two choices: (1) go through the intermediate step of using a standalone (external) 3.5-inch diskette reader, or (2) buy an expensive option that will permit me to "dock" my computers to each other and have information "migrate" between them by use of phototechnology.

This leads us to this book's final issue—that of preservation of the Web's extensive treasures so that they will not become unusable or lost to us in the future. Possibly, it is already too late. So, say good-bye to a significant portion of the information that existed 10 or more years ago and was stored on optical disks, aging hard drives, and floppy diskettes. Most searchers of the Internet's vast wealth of information are interested in finding the latest stuff and most recent developments in various fields. What about the older stuff—information that could still have much value for research or general interest? After all, some of the best treatises and books about French impressionism, just to take one example, is now more than a century old, yet it is still of great value to art historians.

> ■ The Internet, and everything it involves, is continually in flux; a moving target. The days when every searcher who accessed an online search service saw the same front end and used the same commands are rapidly disappearing. The idealistic dream of a "common command language" has been superseded by the practical reality of browser functions. The migration of familiar online search services to the Internet has made it possible to offer multiple front ends with choices of search methodologies. The multiplicity of access options has

made it almost impossible to make exact comparisons between the old and the new. There is a definite sense of transition.[6]

Shouldn't somebody be archiving the Web? Shouldn't libraries (or somebody) be creating an ever growing, and thus ever more useful permanent record of all the information in it? As time marches on, it is very likely that staggering amounts of information will be lost to generations to come. Given how much has already been lost, we can prevent further hemorrhage in information if we act now. However, because of all that we must deal with, is this matter really something about which libraries should be concerned? In 50 to 100 years, how much information will be lost because current formats of information storage have been replaced? What about people who keep all of their old files on 5.25-inch diskettes that they can no longer access or salvage in any way?

Years ago, when I left one job for another, far away, I prepared for transfer of my information by storing all the information in my office computer on floppy diskettes, for which no provision is being made today. How many people are using computers today that can read and write to such diskettes? Will today's DVD/CD drives, zip drives, or 3.5-inch floppy drives even be used 10 years down the road? How many gigabytes of memory will still be considered adequate (regardless of format) in the future? In the future, will the World Wide Web hold today's recorded knowledge or will our grandchildren laugh at such an old form of technology?

Today, many researchers place their research on the World Wide Web, rather than publishing it in the traditional print media. Among reasons for this are that it's faster, it's more convenient, and there are no barriers or filters interposed between the writer and the reader. In Internet publishing, everyone is an independent publisher! Yet, the way technology is headed, there has already been a marked increase in the number of cited Web sites in authors' lists of references. The trouble is that Web sites are born, change addresses and domains, and die without prior notice. It is entirely possible, therefore, that articles from journal issues and theses deposited last year in libraries are no longer retrievable this year. Thus, it is easy to speculate that at least 40 percent of all Web sites cited in the literature are by now 404 (file not found). This condition, evidence of the disappearing record, only helps to make a compelling argument for archiving.

Previous generations of information are only represented spottily on the Web. Will we lose a generation of information because today's information fails to be preserved, once it passes its 15 minutes of fame? How can we archive the Web without having to worry about migration to another format every three or four years? What is the lifespan of most electronic formats? How long will a disk, CD, DVD, or 3.5-inch floppy diskette last and hold up physically? If we do not keep migrating the information to newer forms (which is extremely labor-intensive and correspondingly expensive) will we will lose the information, and how will that affect future researchers?

Libraries should look for ways to archive current Web sites on university or municipal Web servers. We can't do much about previous generations of published material, but universities and libraries should make it known that they reserve the right to archive all sites on their servers, and that the archives will not be sold but will be accessible for all future time to preserve this generation's published work.

Additionally, we should be asking ourselves some additional important questions. For instance: What percentage of the Web is worth archiving? Who will decide this? Furthermore, with hundreds of millions of Web pages out there (and the best search engines indexing only 20-30 percent, at best), how do we get to them all, even if we wanted to? In addition, of the remaining millions of Web pages that are indexed, what types of media should we use to store them? How will we find them again? Obviously, we will have to create search engines or indexes to accomplish this. Moreover, how long will search and retrieval take when you have to query an ever-growing Internet as well as an ever-growing database of archival information? Finally, if we determine that the job is worthwhile, how much time would we have to commit to such a daunting project?

> ■ The change from ink and paper to electrons is causing an upheaval at least as great as the introduction of printing, if not of writing itself. The record of the entire present period of history is in jeopardy.[7]

Modern information technology is creating (or perhaps only exacerbating) a worrisome problem that has not yet been solved, and may never be. It is the problem of how to preserve present knowledge for future generations. Librarians and archivists continue to warn that we're losing vast amounts of important scientific and historical material because of disintegration or obsolescence of the storage media we're using. Already gone is an estimated 20 percent of the data collected before 1976, and more information virtually disappears (or at least becomes unusable) every time a new medium or format becomes accepted for general use. In the year 2000, federal scientists estimated that approximately 75 percent of federal government records will be in electronic form, and no one can be sure how much of it will be readable in as little as 10 years.

Deciding to create a master archive of the Internet and the Web would not only entail enormous expense, but would raise numerous important questions that would require resolution before we proceed with the task, some of which are listed in Table 6.1.

Table 6.1.
Questions Concerning the Creation of an Internet Master Archive

- Should this be a national project, or comprehensive, international, and all-inclusive?
- Where is the money going to come from to underwrite such an enormous project?
- Who will undertake the project, and under what rules and criteria will they operate?
- Should everything be retained and archived, or only portions of the Web, and, if so, which portions?
- What about the issue of privacy? What will happen if someone insists that certain Internet information not be retained for posterity?
- Who (if anyone) owns information, and thus can acquire copyright protection for it, or demand just (or unjust) compensation for making it available?
- Should there be a provision for any information to be removed, and what procedures would need to be followed in deleting information from the Web, for whatever reasons?
- How much of the archived material will actually be shown to have value to individuals and groups, and what about the rest of it?

Such issues are not likely to be amenable to easy or quick resolution, and debate over them may continue through much of this new century. Debate, in itself, is a positive aspect of democracy, and legislators and scientists discuss the tasks involved in preserving a record of everything on the Net. Inevitably, in the interim, much of that information will decay, disappear, or become inaccessible; a great lost for future generations.

Another very real consideration is the threat of sabotage, hacking, cracking, and loss of information, discussed elsewhere in this book. No matter how carefully we attempt to protect our computer files and networks, it seems, someone, somewhere, is working tirelessly to break into them and do whatever they have in mind.

■ 72,057,594,037,927,936: Number of Data Encryption Standard (DES) keys needed to crack the 56-bit DES standard established and used by the U.S. government and many financial institutions to protect computer systems and data.

■ 56: Number of hours it took the Electronic Frontier Foundation to crack the code in the third $10,000 challenge sponsored by RSA Data Security.[8]

Recent hacking into supposedly "high security computer networks" would suggest that the information superhighway is no longer just virtual (if it ever was)—in the sense of existing only in cyberspace and not subject to the varied physical laws and consequences of the real world. Increasingly, it appears that, much as state troopers are employed to police the nation's interstate highways, so the Internet needs—and will always need—cops to police traffic on its communication routes. However, we need to consider carefully another question, as well: When we set out to police the Internet for the purpose of keeping it free of hackers, con men, and bogus commercial enterprises, what (for example, freedom of expression) is to be gained and what lost?

The Future?

■ Cyberspace will increasingly affect every area of our lives, with 75 percent of the world's population using the Internet by 2020. We will take access to the Net for granted wherever we are.[9]

■ Wouldn't it be great if the Web knew what you were looking for and just served it up, right there on your screen? For those of us accustomed to the keyword-and-search routine, it sounds nearly impossible, but that's precisely what a handful of companies are trying to make happen. Called "browser assistants," these new programs—available for free and downloadable from the companies' Web sites—try to anticipate your information needs, fetching relevant information out of the depths of the Web and delivering it to you, saving you the effort of searching those depths yourself.[10]

What of the Web's future? How is the Internet going to change our world permanently, or will it prove to be a flash in the pan? No one can predict the future with any real degree of certainty, but it sometimes seems as though everyone is giving it a try. In addition, the consensus is that there may be many possible futures among which to choose. For example, in a brief article titled, "Expect to Surf 6 Webs in Future, Guru Predicts," a co-founder and chief scientist at Sun Microsystems[11] articulates a vision of a new Internet consisting of six distinct but intertwined Webs, as shown in Table 6.2.

Table 6.2.
Alternate Possible Web Futures

1. The familiar Web that is accessed by a browser from a desktop computer, keyboard, and mouse, and is used for shopping, e-mail, and browsing.
2. A network clearly more organized for entertainment, similar to watching television and playing games. This entertainment Web will be designed for diversion, "a pleasant place to be."
3. A Web that contains the information that goes to a pocket PC, which will have a different kind of information because the screen is smaller and is always connected to the Net.
4. A network that will use voice recognition to navigate the Web.
5. An e-business Web through which, for example, one company's inventory system can "talk" to another company's inventory without any human interaction.
6. A Web that embeds systems or "sensors that confederate and work together to do things." Intriguing ideas, admittedly, but the author has, perhaps intentionally, left the details rather vague. The last of Steve Job's imagined "Webs," for example, sounds appealing, but he has apparently left its scope and abilities intentionally vague. More detail concerning the precise nature of "doing things" would help in deciding whether one truly appreciates Job's sweeping vision or may regard it as just another new complexity in the ongoing search for better and faster information.

> ■ Within five years, real-time video conferencing, voice-recognition equipment, and personal digital assistants will be standard office equipment. . . . (and) More than 137 million people worldwide, including one-third of the U.S. workforce, will telecommute at least part time.[12]

Undeniably, the Internet is a powerful force and potentially empowering all the world's citizens, even those who have never even heard of it. Using the World Wide Web and e-mail, individuals can now interact across and around the world as easily as they can down the hall or across town. Some idealistic writers imagine that national boundaries will disappear in the light of this transnational medium, but to me, such a radical restructuring seems highly unlikely, at least during our lifetimes.

Still, when we're talking about the Internet, anything is possible, and nothing should be ruled out without due consideration. Think of it: In 1993, there was a grand total of 130 Web sites. By the end of 1999, the number of sites exceeded 10 million, and by the time you are reading this, that figure will probably have doubled, or even tripled. What effect will this unbelievable growth rate have on the future? Well, for starters, everyone with Internet access, no matter where they are located physically, will be able to browse through an almost unlimited variety of commodities and information, as well as opinion and entertainment. To some, this suggests an irresistible trend toward world citizenship. In addition, almost certainly, people presently not empowered to use the Net will demand it of their governments or work to make its benefits available to them, removing them from the rolls of the have-nots and making them haves.

The Internet is growing and changing at an extraordinary rate. In the future, there are likely to be many new ways to access the Internet and different types of information. Modems, for example, represent a comparatively slow way to transfer information. Eventually, people will have much faster access to the Internet; and such high-speed access will allow users to watch movies or listen to CD-quality sound on the Internet, downloadable to one's home computer in seconds.

Fascinating developments await us in the twenty-first century such as the future of information retrieval. Most information on the Internet is poorly organized and thrown together in a comparatively random, haphazard manner, and not logically or for convenience of use. In the future, "personal knowledge assistants," programs that will exist on your home computer, will automatically find and retrieve information of interest to you because they will have a rather good knowledge of your interests, tastes, and specialties. How will this miracle of seeming "telepathy" come about? The personal knowledge assistant residing within your personal computer will have the ability to analyze the information you read and go looking for more information of the same type, also enabled to make decisions about what information to retrieve for you. Although such processes may never precisely mirror the human mind, the software will be able to conduct a dialogue with you, the user, and by being corrected and nudged in one direction or another, will "learn" to reflect much more precisely your individual quirks, preferences, and interests.

If e-mail seems like a vast improvement over "snail" mail as a means of communicating with others, imagine the possibility of video e-mail, whereby, instead of typing e-mail messages to your friends and colleagues, you will be able to record your voice (or just speak in a microphone) and send it live to them over the Internet—the equivalent of a mix of telephone, television, and computer technology. Of course, interactive voice mail may not be everyone's cup of tea because most of us will no longer be able to have the luxury of anonymity, having to look our best; and our privacy vanishes once our correspondents can see us and hear us, rather than just read our words.

Another refinement of the new technology is that, whereas to date, most of the information we have been able to retrieve has been either data or flat (two-dimensional images), the newer machines will be able to reflect (and even create) virtual reality, a computer-generated three-dimensional world. Virtual reality software will allow you to enter an alternate, electronic world and interact with the images and people you find there. For example, you will be able to "walk" through shopping malls or university library stacks, or even visit other planets, without ever leaving your home.

However, the Internet must find a way to get faster or risk becoming irrelevant to the faster and faster computers that keep coming out on the market, and will be available tomorrow. Today's optical fibers that carry Internet signals are capable of handling billions of bits of information per second, which sounds adequate to any task, but according to Moore's Law, regarding the doubling of information every 18 months or so, computers will increase in speed by a factor of 10 every five years, and access to the Internet must keep pace.

Clark speaks of "quality of service," which is the ability of the Internet to carry different types of traffic at the same time, each requiring a different sort of handling. Whereas once (and for most of us, now) the Internet carried only e-mail and World Wide Web search traffic, it must become capable of carrying, as well, visual images, film, telephone connections, sound, television signals, music, and multiplayer games, with no diminution of the speed of transmission, even during high-volume periods of the day. NGI (Next Generation Internet) is touted as being able to handle all the above types of media with little or no slowdown, even during peak periods. A further goal is that of keeping the cost of searching cost-effective while permitting users the luxury of searching without inordinate costs, to maximize their unplanned creativity.

One barrier is that such high-speed communications at relatively affordable costs spells the imminent end of the dial-up modem in favor of broadband communications alternatives. The problem is that the present-day modem for most of us is unlikely to offer a higher speed than the customary 56kbs, which is simply too slow for most of the planned applications that the Internet hopes to offer in the near future. The implications of the need to replace 56kbs modems in all those homes, schools, and libraries is likely to cost billions of dollars to bring everybody online up to speed; another likely demonstration of the obvious gap between the information-haves and have-nots discussed in Chapter 2.

There is (or at least should be) a symbiotic relationship between the reference librarian and the Internet—each complements the other as halves of everybody's personal information resource network. Today, technology can augment the library to the point at which a user can use the Internet as a gateway to a number closing in on half a million Web sites. Unfortunately, however, the high cost of technology makes it very difficult for some libraries to keep pace. Many libraries have found the wherewithal and motivation to join the community of "wired" libraries, thanks to the philanthropy of foundations, corporations, and individuals, the leadership of librarians, and support

from communities. However, there is still a long way to go before equity—in the sense of true equality of access for all citizens—is achieved.

Learning to use the Internet can be compared to learning how to play a board game, like chess, bridge, or Scrabble®. Anyone possessed of a reasonably quick mind can master the set of rules in an hour or two, but becoming an expert is a lifetime avocation, and many never get there. Unlike becoming expert at a game, however, one major problem in becoming "good" or "expert" at the Internet is that human time is out of sync with that of the machines we use to help us find the information we seek. Web searching typically relies on massive commercial search engines employing automated indexing, which operates almost incomprehensibly rapidly. Human indexing, by comparison, tends toward the slow and plodding.

Librarians cannot afford to abandon traditional reference functions because they assume that the Web has already analyzed and linked everything necessary to comprehensive searches. Human beings have the felicitous ability of being able to look for (and often see) patterns in data and to come up with remarkable insights in the way concepts relate to one another. To date, no machine can do that. One day, maybe, but not yet. It's the old speed versus accuracy problem again. Machines can now execute hundreds of millions of commands per second. Yet, to get what you really want (and need) out of an enormous search engine requires the skilled services of people (trained, intuitive reference librarians) to act as search intermediaries between you and that infinite repository of information.

What is required is people skilled at teasing the electronic system into giving up its treasures. Among functions of human search intermediaries interposed between the library patron and the Internet are interpreting the system's workings and findings to the patron and, sometimes, translating the terminology of the end user (patron) into language the information system can understand without ambiguity. Even the most capable machines are still irritatingly literal-minded pattern matchers, despite all the progress made in their speed and memory.

The central problem with search engines—electronic indexes to the millions of items of information available on the World Wide Web—is that they are notorious for retrieving not just the a handful of highly pertinent matches to an information need but far more information than is desired or can be conveniently processed in response to simple queries.

To illustrate my point concerning different ways in which people can view the same event, there's a well-known children's poem about six blind men who encounter an elephant (of which they've only heard) to "see" for themselves what an elephant is really like. The first of them, stumbling against the elephant's side, exclaims that the elephant is like a wall; another grasps the twisting trunk and declares the elephant to be like a snake; a third grabs the tail and announces that the elephant is like a rope; number four, finding a tusk, envisions a spear; the next encircles a huge leg and declares that the

elephant is like a tree; and the sixth blind man, groping an enormous ear, decides that the elephant is like a fan. The punch line: Each of them, in subsequent arguments as to the true nature of the elephant, is partly right, yet all of them are wrong.

And that's the worst problem with search engines: Internet browsers, capable as they may be, just aren't wired to be intuitive, even though recent refinements attempt to work in that direction. A computer cannot—at least at its present state of development—provide insight into anything. What it can do is scan thousands—even millions—of documents in a fraction of a second, looking for matches to a search query, a trick that no human mind could ever accomplish. The human seeker must sort out retrieved information in search of relevance and meaning. Complicating this problem is the fact that we're as unique as fingerprints: different human beings may view the same event in different ways. At the present stage of technology, somebody human has to perform relational indexing, no matter how many sites your system can access. Therefore, libraries can benefit greatly from automation—and specifically from Web access via the Internet—but they cannot abandon the human interface of a trained Internet reference librarian, for fear that something important will be missed for having relied upon computer logic rather than human power of association and insight.

In that sense, it may be a good thing that computers and peripheral equipment are still expensive enough to give library managers pause before buying and installing dozens (or even hundreds) of Internet terminals in place of the reference desk. At the risk of sounding like a Luddite, I submit that the old, slow, reliable reference librarian still has an important function that is unlikely to become obsolete in the future. Human intermediaries (interposed as "filters" between people and vast mines of information), in the form of competent librarians, may still prove to be the cheapest and best way of providing accurate, pertinent, and manageable information to Internet users and other library patrons.

Another drawback to reliance on machines is the inability of computer systems to differentiate between truth and lies, fact and fiction. Unfortunately, people are fooled all the time, believing that "It must be true—I saw it on the Internet." Biased information is likely to prevail wherever people decide to express their opinions and not just verifiable facts. Machine-based information systems like the World Wide Web, programmed to retrieve information in response to specific or general queries, were intended (and naively supposed) to deliver messages free of lies, distortions, deception, or bias. Yet, as with all information systems, it's a case of "garbage in, garbage out." If you submit a query to your information system, but the information in the system is subjective, inaccurate, misspelled, biased, outdated, or just flat wrong, you can only expect that retrieved responses to your query are going to be just as inaccurate, and so forth.

These quibbles aside, the Internet has become, in recent years, a great boon to library capability and provision by opening new vistas (and sometimes, rushing torrents) of information to persons who were formerly stuck

where they were, imprisoned by geographical realities, and having to accept only those sources of information available. Yet, despite the obvious virtues of the Internet, a series of important questions for libraries still remain unresolved.

As an example, if the Internet, and through it, the Web, can bring uncountable millions of information sources on all subjects to people sitting alone at remote terminals, wherever they are, what further need is there for librarians (or other types of information professionals) to assist people in finding the information they need? What will become of reference librarians when computers become sources of anything anyone might need by way of information? Almost 40 years ago, Marshall McLuhan illustrated his book *Understanding Media*[13] with a close-up photograph of a simple printed circuit sitting atop a human fingertip. The caption reads, "When this circuit learns your job, what are you going to do?" Paraphrasing McLuhan's frightening but intelligent question by bringing it up to the present, we of the information profession should now be asking ourselves, "When the Internet has learned my job, what am I going to do then?" This question assumes that it is not too late and that the Internet has not already learned your job, rendering you, as the British say with delicious understatement, "redundant."

Forever Free?

> ■ Free stuff. The idea of getting something for nothing always attracts interest. Internet businesses have been awkwardly embracing the concept of giving away their product, hoping that some day consumers will be so hooked on Web content that they will start paying for material they once got for free. Don't count on it, though. Some consumer habits may prove to be really hard to break. You're never going to get free content to be paid content.[14]

There is one remaining issue with enormous implications for libraries, and for the public in general: Can the Internet (and specifically, the World Wide Web) remain free of charge? Of all the qualities of the Web, from the way it bridges distances to the way it compresses time, perhaps the most compelling attribute of all is that so much is available for free. At some point, someone will pay for content—that's just basic economics. Of course, an argument could be made that the Internet has never been free, in the sense that one must pay (well, *someone* must pay) to get on the Net, at least in terms of a monthly charge or a licensing fee. To the user, however, Internet provision has always appeared to be free of charge, and we got used to the price. What's going to happen, then, if or when some of our favorite providers begin telling us that the "free trial period" that has gone on for years is now at an end, and

from now on, we will be expected to remunerate the providers for the labor and money invested in making their information available?

Maybe it won't be such a hard sell, at that. Because the Internet community enables people to do things they couldn't do before, perhaps most will reluctantly agree that it's only fair that the people and companies who make all the wonderful information available should be fairly compensated. One could look at such providers suddenly choking off the pipeline of free information as being tantamount to the old dope peddler, lurking around the school playground, offering the kids free reefers (marijuana), and then, when asked for more, announcing that from now on, it's going to cost them. Yet, there is a certain fairness in the idea. After all, under the right circumstances, people will shell out ridiculous amounts of money. Goldstein provides an instructive example: "If I asked you whether you'd buy a T-shirt for $35, you'd say, 'No way!' But people do it at concerts all the time." A parallel argument is cable or satellite TV—people are willing to pay to receive something they couldn't receive otherwise, or to avoid nuisances, such as commercial interruptions and arbitrary censorship of what they are viewing. Perhaps one solution to the dilemma of free versus fee service is already in play. *The Wall Street Journal Online* has for some time now offered two streams of access: (1) a free version for the merely curious browsers, and (2) a "souped-up," advanced and powerful version for serious investors; self-styled "day traders" and Wall Street financiers.

That's part of the fun of speculating about the future, and trying to figure out what's coming next. We all do it, even if our crystal balls are occasionally in the shop or on the blink. Still, futurists maintain that one must give some thought to the future—and perhaps even steer an institution's future in desirable directions (avoiding the hazards and pitfalls in other directions) to ensure viability of one's library, institution, or even one's personal future. Getting there may not be fun, but everyone is better off for trying to steer and navigate, rather than just letting fate and the eventual procession of events chart the future course.

■ The Internet revolution is less than 3 percent complete.[15]

A new Internet system currently being developed by a consortium of IBM, Qwest, Cisco and 3Com, and tentatively being called Internet2: the next generation of the global Internet, looms on the horizon. Internet2 is not intended to be a replacement for the existing global network. Rather, it's a project that focuses on the next generation of applications for the Internet. It is specifically targeted to the scholars, researchers, and educators who have been, in many ways, marginalized and crowded out by the general public who get on the Internet every day to check their e-mail and participate in chat rooms.

Universities and government agencies that need to collaborate on high-bandwidth projects are in need of a specialized, high-speed, and "members only" network that will avoid the high-traffic areas of consumers and

random surfers who create online traffic jams, especially during peak times of use. Internet2 members will be linked over specialized, high-speed, and secure connections for the effortless and rapid exchange of data, findings, papers, and opinions, with packets of information traveling through the system at speeds at least 10 times faster (and probably higher) than the present speed of normal Internet traffic. Best yet, no specialized equipment or updating of hardware will be required to make the new system a reality.

The transition from the existing technology to that developed by the Internet2 consortium will be transparent to consumers, as it will all happen at the back end. The collaborative opportunities offered by this refined and powerful new technology are almost limitless, but noticeably absent in all the promotional literature published on it to date is even a vague idea of what it will cost. As with most technologies, money is not an inconsiderable obstacle, and it is fairly safe to assume that the high cost of belonging to the elitist Internet2 community will have the net effect of leaving less fortunate—or less well funded—would-be participants on the sidelines. The only bright spot in such a gloomy forecast is that most technology tends to drop in price, and that further tweaking of this new system might yet render it affordable in the future even to the smallest academic and government stakeholders. How long it might take, however, for the price of getting on the bandwagon of the newest technology is a matter only for speculation at this time.

Planning: Getting the Future You Want

Certainly, the future cannot be predicted accurately, and prediction is not an exact science. However, that doesn't mean that individuals and organizations can't take positive steps intended to maximize the chances of getting the future they want, instead of just what will happen as a result of evolving events over which they have little or no control. In my opinion, what information professionals ought to be doing is to stop trembling at the prospect of a future where the Internet has completely taken over library functions, and few, if any, jobs are still available to human intermediaries in reference departments. Instead, we should be spending our time thinking about ways to coexist (and mutually prosper) because of the merged functions of the library and the Internet. In so doing, we'd be rejecting the idea that we are powerless in the face of change and progress, but rather we're working out the kind of future we want to have happen, and then plotting out strategies for bringing about that desirable future. We are not, after all, helpless—we can take actions today that may affect (positively) the tomorrow that will arrive, and in so doing, ensure our own job security and our profession's future.

How best can this be done? In short, how can we plan amid uncertainty? To create the kind of future for libraries (and librarians) that you'd like to see, try to avoid the most common excuses given for not working toward

the most desirable future. In Table 6.3 are some common statements of refusal to do strategic planning, together with advice for strategizing for the future you want and some common-sense advice for dealing with those apparent problems.

Table 6.3.

Questions for Planning for the Future, with Answers and Commentary

- "The future cannot be predicted with any precision, so what's the point?" (Prediction is not your goal; your goal is to create the future you want.)
- "Since I can't control other people, how can I set goals for them?" (You can't. However, controlling others isn't your goal. Planning is about choosing your own beliefs and behaviors. By clearly defining your goals and taking logical appropriate actions to achieve them, you may be able to influence other people and events in ways that are consistent with your values and objectives.)
- "I set goals all the time, but I seldom manage to meet them." (Your problem may be setting unrealistic goals. Break your goals down into smaller, more achievable steps.)
- "I can't think that far ahead." (Or, I think too far ahead. Think smaller—say in the one-to-three-months range if five years is too much. Work on creating plans and goals with a time span that feels comfortable for now.)
- "I don't have time to spend on goal-setting." (Make time. It's one of the most important activities you can perform because it affects everything yet to happen.)

Start small and modest, but work out some goals, clearly articulated, for yourself, personally, and for your library.

One of the salient benefits of selecting, working toward, and creating the future you want is deciding at the outset what you *don't* want to happen and therefore, what not to do. This will help in weeding out low priority activities. As an exercise, try writing down your goals, except write 10 times as many goals as you think you'll ever commit to, because goal writing is a useful creative exercise. Then prioritize your goals into rough groupings. The process of creating your most desirable yet realistic future can help you purge your to-do lists and clear the clutter from your calendar. Focus on fewer activities of higher value and let the little stuff take care of itself.

Such steps may assist you in visualizing (and thereafter working deliberately toward) the kind of future you'd like for your library (and yourself, as librarian, cybrarian, or whatever). It may turn out that, despite your best and most determined efforts, you cannot affect the ways in which your institution is changing. However, consider the opposite case: If you don't know where you're

going, or how you're going to get to the desired outcome, you have virtually no chance of achieving your goals. Plan, and your chances rise sharply.

> ■ We figured that we're going to be out of business in 10 years because people can look up things for themselves at home. But people call us more now and they expect more because they figure we can just hit a button and—blllllllip!—we'll get the answer.[16]

The central questions that libraries must really deal with in terms of the Internet are: (1) What will be the long-term impact of the Internet on both libraries and on society, and (2) How should libraries respond to that impact? As with all other prediction, there is no certainty. But one thing is clear: For society, the overall impact may be good or bad, depending mainly on the question of whether going online is determined by society to be a privilege or a right. If only a favored, fortunate segment of the population (the haves) gets a chance to enjoy the advantages of Internet provision, the network may actually exaggerate the disparity in the spectrum of intellectual opportunity. For libraries, however, there may be a silver lining in such a continuation of the status quo. In the next few decades, libraries will be at the forefront among institutions striving to overcome the disparity in access between society's haves and have-nots and may well assume a role of leadership in boosting the have-nots into the category of the haves (or even eliminating such distinctions).

In summary, the future of the Internet—and of the libraries that exist both within it and outside it—is potentially magnificent, but remains uncertain, with about one-half the pundits, prognosticators, and prophets who address the topic in the literature predicting a "brave new world" of bountiful, effortless information provision for all. The other one-half of writers, however, cite available evidence, cautions of problems, disparities, and possible catastrophes unless we think through what we are doing, and why. In addition, even in a brighter tomorrow, there will always be Luddites, of a sort.

> ■ As the new economy marches ahead into the twenty-first century, some are witnessing a growing populist backlash against technology and the Internet. Although 77 million U.S. adult consumers are active online users, 29 million U.S. adults stopped using the Net in 1999. That's nearly double the number of those who dropped out by 1998. According to Cyber Dialogue, 108 million American adults do not have any plans to go online.[17]

Whether the future will turn out to be rosy, bleak, or very much like the present, undeniably, we live in interesting times, for our libraries and for ourselves. As Al Jolson, the popular movie star and entertainer of a bygone era was fond of saying, "Stick around. You ain't seen nothin' yet!"

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16. Mary Long, supervisor, Ready Reference Service, Carnegie Library of Pittsburgh, quoted in *American Libraries,* September 2000, 37.

17. Leslie Miller, quoted in *USA Today*, 12 August 2000, A1.

Appendix A:
Selected Glossary of Internet-Related Terminology

The following are brief, highly nontechnical definitions (some of them nonstandard or slang) of terms used in this book that may be unfamiliar or new to the reader: This glossary is provided in the event that some of the terminology carelessly "slung around" in the book's chapters—which were imagined to be obvious or self-explanatory because of the author's long familiarity with them—require at least an attempt at definition.

Boolean (language, logic, operators). Words that function as commands to help refine a search. AND, OR, and NOT are examples of Boolean operators, referring, respectively, to the conjunction (A plus B), detachment (A or B), and negation (A but not B) of terms.

Browser. A software program that is used to access various kinds of Internet resources. Netscape and Internet Explorer are common examples of Web browsers.

Byte. The basic unit of storage needed to store a single character. Bytes taken in multiples may be referred to as megabytes, gigabytes, and so forth.

Caching. The intentional archiving of Internet communications, ideally such that nothing gets deleted or thrown away. The reason for caching is the very real possibility that something of value may be lost through deletion, despite the odds against it ever being called for or needed.

Cookie (also Web bug). A packet of coded information sent by a Web server to a Web browser as a kind of memory device. A cookie enables the server to tell where you left off in a previous interaction, or what preferences you might have chosen. Cookies allow the computer to "remember" login or registration information, and they allow customized information to be sent unbidden to the user. In another sense, a cookie may be viewed as an intrusive assault on the individual's privacy.

Copyright. The legal right granted to a copyright owner to exclude others from copying, preparing derivative works, distributing, performing, or displaying original works of authorship of the owner. Copyrighted works on the Internet are protected under national and international laws. Examples of copyrighted works include literature, music, drama, pictures, graphics, sculpture, and audiovisual presentations.

Cyberspace. A term coined by William Gibson in his 1984 sci-fi novel *Neuromancer*. Refers to all the sites that you can access electronically. If your computer is connected to the Internet or a similar network, then it exists in cyberspace.

Directory. An organized hierarchy of categories of Web sites. Sites are chosen and assigned to categories by humans rather than computers. Because humans can classify pages by their content, the Web pages are better computers, so directories store a much smaller number of sites than Search Engines (q.v.).

Domain name. The domain name is the location of the person's account on the Internet. Periods separate the various parts of the domain name from the user name and the suffix (e.g., com, edu, gov) in the address of the Web page. These last few characters in an e-mail address usually indicate the type of organization or country to which the person belongs.

E-mail. Electronic mail, a term with several meanings: the network for sending electronic (i.e., generating no paper) messages, the act of sending a message electronically, and the message itself. It all comes down to using a computer network to send electronic messages from one computer user to another.

Filter. A controversial, blocking software program that prevents certain messages, images, and words from being accessible to Web browsers. Filters are chiefly intended to protect youth from harmful materials, which is why some people view filtering as a prudent or necessary safety precaution, whereas others see it as blatant censorship.

Firewall. A mechanism to keep unauthorized users from accessing parts of a network or host computer. For example, anonymous users might be permitted to read documents a company makes public but could not read proprietary information without special clearance.

Freenet. A community computer network, often based in a local library, which provides Internet access to citizens from the library, or sometimes from their home computers.

Gigabyte. A unit (also GB) equal to 1 billion bytes. Gigabytes are currently used to measure the capacity of hard drives or other storage devices.

Hot links. Point-and-click shortcuts from one cyberstation (computer) to another; for example, one that makes it faster to link one's personal computer to the outside world via e-mail.

html. HyperText Markup Language; a computer language commonly used to create Web pages. You can easily spot an html document because it has the extension .html or .htm.

http. Hypertext Transfer Protocol, designed for global information transfer via the Internet, and now the initial part of each Web site's locator address.

Hypertext. An electronic document that contains links to other documents offering additional or related information about one or more topics. The link is activated by clicking on the highlighted or underlined area with a mouse or other pointing device.

Internet. (Also information superhighway, Infobahn, I-way.) An interconnection of thousands of separate networks worldwide, originally developed by the U.S. federal government to link government agencies with colleges and universities. Internet's real expansion started more recently with the addition of thousands of companies and millions of individuals who use graphic browsers to access information and exchange messages.

ISP. (Internet Service Provider.) A company that offers access to the Internet, and through it to the World Wide Web, for a charge or fee.

Knowbot. An information-seeking program (also called a Webcrawler or a Spider because of its ability to crawl the Web in search of data and retrieve what it finds). An intelligent program or artificial intelligence "agent" that you can instruct to search the Internet for information about a particular subject. Although still in their infancy, these agents are the focus of intense software research and development.

Link. A cross-reference from one subject term to another (or many others) on the Web, denoted usually by underlined words, a different color, or italics. Links make it possible to surf the Web, moving from one topic to related ones quickly and easily. Links allow the reader to select highlighted text or images to display other related Web pages.

Luddite. Ned Ludd was a (possibly fictitious) workman who deliberately smashed up machinery in Leicestershire, England, at the beginning of the nineteenth century in the hopes of saving his nontechnological job. In this connection, the term *Luddite* is used to describe a person who opposes the Internet and other forms of modern technological progress because that person believes that the use of technology will diminish employment or even change (for the worse) the world as we know it.

Meta-search Engine. (Sometimes called a Meta-crawler in keeping with the spider analogy [q.v.]). A search engine that incorporates multiple other search engines, such that a single search can scan up to a dozen sites at one time.

Modem. A mechanical component that enables a computer to transmit and receive information over telephone lines. Modems are the primary means by which computer users can connect to outside networks, such as the Internet.

Net surfing. Equivalent to channel flipping with a television remote control in your hand. The practice of accessing and browsing through various Internet sites or chat rooms to see what's available or what's happening.

Netiquette. A term referring to standards of agreed-upon and acceptable behavior and manners to be used while using the Net or the Web for communication.

Open-collar workers. People who work at home or telecommute, and thus need not wear ties or other formal wear.

Protocols. Rules or standards that describe ways to operate on or setting up a connection to the Internet to achieve compatibility. Protocols are rules that refer to the technical specifications that make things work.

Search Engine. An electronic system that uses a computer "crawler" program that roams the Web, scanning in millions of documents, or pages, in a typical day. It stores the contents of these Web sites in a massive database.

Service Provider. (Also ISP.) A company that provides a connection to the Internet.

Slamming. The practice of indiscriminately sending a message (especially a commercial solicitation) to hundreds or thousands of people on the Internet; e.g., unsolicited junk mail. Slamming is not considered to be good Netiquette.

Spam. The Internet equivalent of junk mail; unsolicited solicitations for business.

URL. (Uniform Record Locator.) A term often used to refer to a Web site.

Virus. A destructive computer program that invades your system by means of a normal program and can damage—or even destroy—the system. A worm, by contrast, is a computer program that intentionally replicates itself on other systems on the Internet. Unlike a destructive virus, a worm can pass on useful information.

Web. (See World Wide Web.)

Web site. (Also: URL.) A sequence of related Web pages normally created by a single person, company, or organization.

World Wide Web. (Also called The Web; WWW.) A hypertext-based collection of computers on the Internet that lets you travel from one linked document to another, even if those documents reside on different servers.

Appendix B:
Alphabetical Index of Web Sites

(With cross-references to numbered sites in Chapter 5)

Appendix C:
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