Access in the Future Tense

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Introduction

As we move into the twenty-first century, libraries, archives, and other collecting institutions—our primary stewards of information resources for education and research—are facing unprecedented challenges to collect, describe, and serve materials. A primary challenge is posed by the growth of information and the diversity of its formats. A second challenge—of equal, if not greater, concern—is how to preserve the expanding number of increasingly fragile resources to which users demand quick and convenient access. Twentieth-century recording media, from film to sound to digital file, are able to hold greater amounts of information than the print-on-paper resources libraries have been designed to collect and serve. These new media make more information readily accessible, but they pose serious challenges to its long-term use.

The ways in which we have defined the problems of preservation in the print-on-paper domain, and the solutions we have designed to address those problems, are largely irrelevant to other media and formats. Print-preservation strategies are based on fixing information to a stable medium and on having ownership as well as physical possession of the materials. Other media—moving image, recorded sound, digital simulations, and so forth—are simply not amenable to these strategies.

Libraries and archives are grappling with these complexities in a rapidly changing environment characterized by new distribution mechanisms, expanding copyright monopolies, ever-greater technology dependencies, and changing user expectations. It is therefore not surprising that a recent survey report by Anne Kenney and Deirdre Stam[1] concludes that library preservation programs are not keeping pace with these changes and may even be losing ground.

To gain a better understanding of how this situation has come about and what can be done to reverse it, the Council on Library and Information Resources (CLIR) organized an invitational conference in May 2003. The purpose of the conference was to examine the key factors shaping the information environment in which libraries operate and how these factors will affect stewardship of the cultural and intellectual resources vital to education and research. Scholars, library directors, university administrators, publishers, collectors, and representatives from the legal and preservation communities came together to explore the challenges posed by the shifting information landscape and to propose directions that can be taken by all in research and education who have an interest in the well-being of research and cultural heritage collections.

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[1] *The State of Preservation Programs in American College and Research Libraries: Building a Common Understanding and Action Agenda*. December 2002. Washington, D.C.: Council on Library and Information Resources.

To frame the discussion, CLIR asked four experts to address key features of the changing landscape. Their papers are presented here, prefaced by a brief overview of the information landscape and followed by a concluding essay on the implications of their findings.

Daniel Greenstein of the California Digital Library looks at the changing behaviors and preferences of users, especially users of print collections within the University of California system, and proposes changes necessary for maintaining responsible stewardship of those collections. Anne Kenney of Cornell University Libraries examines the pressures that new information technologies are placing on organizations traditionally charged with stewardship. She suggests how organizations and their staffs should retool their strategic approaches to preservation. Bill Ivey of the Curb Center for Art, Enterprise, and Public Policy at Vanderbilt University addresses the incorporation of nonprint materials into libraries and archives and argues for a series of changes in the policy environment that will encourage good stewardship on the part of both copyright owners and institutions with a preservation mission. Finally, Brian Lavoie of OCLC examines through the lens of an economist the roles and responsibilities of all stakeholder communities concerned with long-term access. His analysis of the costs of archiving and of who bears these costs underscores just how fragile is the business model that preservation institutions have relied on for years.

Each speaker was rejoined by a respondent, and the valuable insights of Wendy Lougee (University of Minnesota), Paula Kaufman (University of Illinois at Urbana-Champaign), Annette Melville (National Film Preservation Foundation), and Winston Tabb (Johns Hopkins University) are incorporated into the concluding essay. While most of the discussions initially focused on libraries and special collecting organizations attached to research and teaching institutions, the implications of the trends being discussed for museums, historical societies, and, above all, archives were frequently identified.

Before we can identify and promote practical solutions to any serious challenge, we must thoroughly understand its nature. The ultimate value of the conference discussions was, therefore, in some sense diagnostic. For example, discussions at the conference made it clear that the pressures on preservationists extend far beyond those associated with the physical preservation of media. The primary obstacles are economic and legal; they are not limited to the overwhelming scale of information production, challenging as that alone might be.

Discussions of preservation are seldom wholly separated from those of access, but it is remarkable the extent to which people who are not professionally involved in preservation or conservation talk about preservation exclusively in terms of access. This meeting was no exception. Whenever the subject of institutional commitment to the preservation mission arose, the

word *preservation* was used infrequently. That may be quite understandable in the digital context, but it was also true when reference was made to artifactual collections, at least those that are not rare or unique. What will happen to the preservation mission of libraries or archives when they will not have to preserve materials in order to provide access? How do we prevent preservation from being further marginalized within these institutions?

Drawing on the discussions and the questions they raised, the concluding essay is a sober attempt to identify all factors that determine the abilities of libraries to ensure long-term access, both internal to the library and external.

By publishing this report, CLIR hopes to broaden understanding of how creators, publishers, distributors, and information seekers can work more actively with libraries and archives to ensure the usability and accessibility of recorded information into the future. As one presenter after another exhorted us to redefine preservation as an integral part of access, the terms of the debate shifted. The strategic integration of preservation into all phases of information management, from creation to use and reuse, results in "extending the useful life of information," as Anne Kenney phrased it, and requires striking a new balance between the demands of allegiance to the past, access in the present, and accountability to the future.

Abby Smith
Director of Programs

Mapping the Preservation Landscape

Abby Smith

T he purpose of preserving physical objects that contain infor-
mation or hold memories is to ensure access to that informa-
tion or those memories at some time in the future. Books,
manuscripts, maps, photographs, home movies, postcards—each
object is its own memory palace, waiting to be explored at some un-
known time hence.

Happy are those who decide what to save with some person or
purpose in mind: the mother who squirrels away childhood memen-
toes when her daughter goes to college; the taxpayer who assembles
all pertinent papers from a tax year into a folder, marks the folder
with that year, and places it carefully in a filing cabinet. They are se-
cure in the knowledge that when those items are called for—by the
daughter now grown with children of her own, or by the Internal
Revenue Service on a quest for records of past transactions—they
can be found and delivered to a satisfied user.

These individuals are content because they possess the most
important pieces of information necessary for successful preserva-
tion: They know what to preserve, for whom, and for how long.
After that, they just face a series of second-order issues: space, media
stability, labeling, and organization. Daunting perhaps, but second-
order nonetheless.

Libraries are not so fortunate. While they can presume to know
what present-day users want, libraries, especially research librar-
ies, collect and preserve on behalf of future users as well. They do
not know for certain for whom they preserve, what that future user
might really need, and for how long a resource must be preserved
and kept ready for use in order to meet that unknown user's needs.

How well have libraries done in meeting the needs of current us-
ers for old or retrospective resources? Recent evidence suggests that
libraries have been unable to keep up with current demand for pres-

ervation (Kenney and Stam 2002) and too often have proved unable to anticipate what users really want (Baker 2001). Indeed, it seems that users of research libraries want these facilities to expand greatly the scope of what they collect, what they serve and how, and to what they will ensure future access (Nichols and Smith 2001).

As we compare the expectations of library users with reports from the preservation profession, it is hard to feel sanguine about the future of the historical and cultural record. What does the landscape for preservation in this new century look like? Are libraries really facing new challenges that demand new strategies? Do transformations in the ways that information is recorded and disseminated in the digital world render obsolete our current assumptions about what to preserve for posterity and how? How can we map the journey ahead?

First, a cautionary note: A map is only a depiction of where someone has already been. You may plan your trip according to a map, but you are placing your trust in those who claim to have gone before. When we depart for someplace that is uncharted, we can do one of two things: look at the large blank before us and mark it "terra incognita" or fill in the empty space with depictions of things reported—or simply fabricated—by others. One of the most enchanting genres of recorded information is the map of exploration. It is more often a feat of the imagination than one of daring and bravery leading to actual discovery.

Perceptions of the Road Ahead

Reports from early reconnaissance missions into the future information landscape are mixed—indeed, often contradictory—but we can see a few trends emerging. As people look for familiar landmarks in this new, largely digital, environment, many professional practices and tried-and-true preservation strategies are called into question. Here are some observations about what is new, what is familiar, and what paths forward present themselves.

- In the future, as in the past, the fundamental purpose of preservation will be to ensure access to information to some user at some point in the future. But who that user will be has become unclear, especially for the abundance of materials created and distributed on the Web. Users who seek information from the Web are a far larger and more heterogeneous group than any one library ever sees in its reading rooms. Now we must reckon with the possibility that the user could be in any location and seeking information in any format, and that he or she will remain completely unknown to the library that collects and preserves.

- As in the past, selection will be necessary. But selection is more difficult in a world where there is too much information for any one institution to filter, assess, and acquire. The value of Web-distributed information in particular is not immediately apparent. New genres and formats are appearing and disappearing in rapid succession, before we have time to assess their long-term value.

And yet we must make decisions quickly about whether and how to hold on to these evanescent forms of expression. Some of the most bizarre or ephemeral forms could turn out to be incredibly important (or not).

- Then again, maybe selection is not necessary. Storage is getting cheaper; for this reason alone, some people maintain that we should save everything. Others counter that preservation is not storage and that saving everything is not a service to future users. The new methods of distributing information only complicate things, because much of what appears to have value—a faculty Web page, for example—is not created or disseminated in the ways that were typical in traditional publishing and does not naturally fall within the collecting scope of libraries. How do we know what is of value now and in the future? How do we acquire it if it does not come to us? And what are we supposed to do with that Web site our English faculty member created using Flash?

- In the past, preserving information in a fixed form on an archival medium was the preferred means of ensuring long-term access. How are we expected to bound or fix an information object for preservation if it has no clear boundaries and is by nature dynamic—appearing in many versions, often simultaneously, as it is on the Web? The concept of fixity of content or medium is inoperable in the digital realm, because information is not fixed and there is no such thing as an "archival medium."

- Ownership of and access to collections are no longer synonymous. Given the complexity of digital preservation in a networked environment, it is likely that a few institutions will have to preserve on behalf of the many. The issues that arise under these conditions are many. Who pays for preservation? How do we determine what the benefit of preservation is and to whom? How can we support scholarly and cultural resources without turning them into commodities?

- Preservation cannot be deferred for long in a digital environment, but the myriad technology dependencies of this content make the library world dependent on manufacturers and a consumer-driven marketplace. While it might be easier to capture, describe, and preserve digital objects if there were more standards, achieving agreement on which standards to adopt is tremendously time-consuming. Moreover, if adopted prematurely, standards can stem innovation.

- Everyone in the chain of information creation and transmission needs to consider preservation now. How a person creates, in what file formats, and using which hardware and software can predetermine the life span of a digital object. Libraries cannot achieve all their preservation goals on their own; they will need to enter into a series of relationships with so-called preservation stakeholders, whoever they are. Moreover, libraries will have the additional challenge of motivating others to engage in preservation—of explaining to communities at large, from scientists to photographers to digital cartographers, why they should care about preservation and what they should be doing about it.

These are some of the early reports from the field. But are these reports really describing a new landscape? Before we depart for our reconnaissance into the future using these often vague and contradictory descriptions as guides for our journey, we should glance backward, take in all the places we have already been, and try to see what we can learn of the journey ahead on the basis of the position from whence we start. I would argue that very little of what lies ahead, while admittedly uncharted, will turn out to be completely unfamiliar.

New but Familiar Territory

Many innovations in technology have cumulatively revolutionized information creation and dissemination. In the past 150 years alone, we have seen the introduction of mass-produced paper, the invention of photography, and the development of technologies for sound recording, moving image, telegraph, radio, television, and video.

With each successive innovation in recording technology, some sector of the cultural heritage world has risen to the challenge of collecting and preserving the new media. The first efforts are usually made by visionary individuals who collect in the new media or sometimes—though not often enough—by the industries that publish in the new media. Libraries—at least the average academic and public library—have not routinely incorporated these new media; they remain print-centered worlds. Most significant collections of twentieth-century media—television and radio, moving image, and recorded sound—are either outside of libraries altogether or are kept apart from the books and journals. These collections often suffer from inattention; they are uncataloged or under-cataloged and are segregated from print collections in so-called special collections, archives, or media collections.

And why not? Libraries are conservative organizations, as befits their mission of stewardship. Modern libraries developed in large part to provide access to books and other printed materials, and that is how they got into the collecting business. Few libraries have been driven by their leadership or their primary patrons to expand beyond that domain to keep pace with new information technologies. Happily for libraries, printed materials have proved to be among the longest lived and most stable of media for information, and many notions that librarians and library users have about preservation derive, consciously or not, from our experiences of books as being fixed, stable, and enduring.

That paradigm of longevity and stability, barring occasional catastrophic destruction, was first and most grievously wounded by the discovery of acid in paper and of the subsequent effect that physical degradation of a medium has on the integrity of information inscribed on it. In the 1980s, this discovery spawned an aggressive rescue operation known as the Brittle Books Program. That program went about the reformatting of information from paper to film on the postulate that an aggregation of local preservation actions could,

with some effort at coordination and standardization and a bit of outside funding, become an effective national preservation strategy.

We have come a long way since the inception of the Brittle Books Program. First came a recognition of the need to preserve not only the informational value of books and journals but also their value as cultural artifacts. That need applies, we discovered, even to humble, intentionally ephemeral items such as yesterday's newspapers that do not bear the traditional hallmarks of artifactual value: scarcity, associational value, age, uniqueness, and market value, among others. We are now able to articulate a meaningful, if at times hotly contested, distinction between information that is intrinsic to an object as object, and that which is fungible and can be moved successfully from one format or physical carrier to another.

The Lesson from Audiovisual Archivists

With the growth and popularity of moving image and audio resources, which appeared on increasingly unstable recording media, a different understanding of preservation emerged. Collectors of audiovisual materials, from individuals to federal agencies, contend not only with fragile media but also with machine and manufacturing dependencies that obviate fixing on artifacts to the degree possible in paper-based collections. Audiovisual archivists are resigned to a life of reformatting, cold storage, and reference copies. They seldom repose trust in a preservation solution that promises fixity, stability, and ready access over even short periods of time. Moreover, audiovisual materials are usually fraught with a host of copyright entanglements that confound timely preservation intervention. Business models in the industries that produce and disseminate these items do not encourage third-party preservation. Even noncommercial audiovisual resources are in peril because too often preservation responsibilities must be assumed by the sometimes-untraceable owners of intellectual and performance rights, not by professional librarians and archivists.

The disjunct relationships between access and ownership, between ownership and stewardship, and between intellectual and privacy rights and preservation are old issues to stewards of audiovisual collections. It is regrettable that archivists in these fields have so little professional intercourse with librarians, even when both types of professionals work in the same institutions. Many librarians in research institutions are encountering these vexing issues for the first time in the digital realm. They seem unaware of the vast experience and expertise among their colleagues in other media.

It would be misleading to say that audiovisual archivists have met these problems and solved them. They are, however, well versed in the woes of property and privacy rights, and the vicissitudes of curating commercially valuable information assets. Just as important, they are used to evaluating dynamic and real-time information sources for acquisition and later for preservation—that is, things that keep changing, such as broadcasts, performances, or other informa-

tion that one must absorb in real time, such as film and sound.

Certain genres of contemporary media are so technology-intensive, complex, and expensive to handle and preserve—35mm studio film productions are a good example—that they defy the traditional preservation-and-access practices of text-based librarianship. Books and journals are wonderfully consumer-friendly, just like music CDs. Everyone, including local libraries, can have their own collection of them. But film collecting is so demanding that only a few highly specialized organizations can effectively manage to do it; they engage in preservation on behalf of many. This type of preservation model tells us something about how to find our path into the territory of digital collections. Film archivists have had to enter into complicated, multilayered relationships with the producers of the content they curate and preserve. A business model, as we would call it today (or a distribution model, as it was called until recently), has developed to bridge the gap between those who have stewardship over film assets and those who want to see films. Be they researchers or movie fans, individuals who want to view a film after its theatrical release rarely have recourse to a screening room and 35mm projection prints. Film is preserved in one place, in its "native format," and viewed in a million other places in a consumer format, such as video or DVD.

Selection and the Lesson from Collectors

How do we grapple with the question of selecting for preservation in an age that appears to have an unprecedented glut of information? Before there were libraries and archives and canons of collecting and best practices for preserving, there were collectors. In the beginning, collectors were kings and emperors and potentates with disposable incomes and either great curiosity or something to prove. But over time, and with a wide range of financial resources to deploy, an astounding and heterogeneous population of "passionate individuals" has found value and stimulation, consolation and excitement, solace and thrill, and much else in amassing coherent bodies of what can be crudely called "information objects"—artifacts that carry information and memories above and beyond any financial value they might have. Collectors are often the first to behold a new or heretofore neglected form of human expression. They want to bring it in from the wild, hold it, and describe it and show it off to others so that they, too, might take pleasure or find wisdom in it. Collectors, in other words, have been acting as front-line preservationists for millennia by bringing in things from the wild and ensuring their continued physical survival, if not always wide access.

We see a new generation of collectors spawned by the new digital technology—computer-game collectors and Brewster Kahle of Internet Archive fame are only the most talked about. In the digital realm, it is currently thought, preservation is an opportunity that can happen only with acquisition. Acquiring and ensuring long-term access are virtually synonymous, because "long term," in digital parlance means "through the next hardware or software upgrade." This

is perhaps why keeping digital content for more than a few months is commonly referred to as "archiving." What can collectors tell us about how to define value in a large universe of worthy candidates?

There are probably few features of this future information landscape that have no precedent. But the basic questions remain unanswered: What are we to collect and preserve, for whom and for how long, and who should assume the burden of stewardship? New information technologies leave us with more information to sort through and less time to take appropriate action before information starts disappearing. This phenomenon did not begin with digital technology; it started with the appearance of cheap paper and an array of analog technologies. That said, we will need new strategies to deal with the problems presented by a lack of time, a corresponding abundance of information, and a constantly shifting technological infrastructure. Meanwhile, the old preservation challenges will remain, bigger and seemingly more intractable than ever.

Has the basic purpose of preservation been affected in any way by the developments of the last two centuries? The underlying assumptions about the nature of recorded information and access to that information are certainly different than they were before mass publishing began to enfranchise so many readers and writers. Just as surely, the proximate goals of preservation have changed. They are no longer to fix, to stabilize, to conserve, or to reformat onto an archival medium. We speak now of ensuring continued access through maintaining collections that are fit for use. Increasingly, we hear that our users and potential users want more access to more resources, and they want them delivered in ways that promote customization and repurposing.

As we think about meeting these responsibilities as best we can, it is important to remember how morally charged that work is. We engage in preservation, as individuals and as a society, to influence the future. As we preserve, or choose not to preserve, we shape the resource base that is our common memory, the playground of what Thomas Jefferson called "reason, memory, and imagination," and that our nation's founders sought to nurture and protect, through copyright, as the source of innovation, knowledge, and progress. People will continue to rely on libraries and sister institutions such as archives and museums to secure our common memory into the future, through careful stewardship of collections that are authentic, complete, reliable, and accessible.

But perhaps there are limits to what can be learned from the past, and reassurances that the future will not be unfamiliar to us could be completely misplaced. We laugh when we look at the maps made of the New World that depict California as an island, because we have been there and know that it is not. But perhaps we are mistaken, and the map is actually a map of the future, depicting California when it will be an island once again. Sometimes maps are not accurate but merely prophetic.

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Library Stewardship in a Networked Age

Daniel Greenstein

Introduction

Academic libraries are all about access—even where they claim a role preserving our cultural and scholarly heritage. In the traditional library, access and stewardship are served by the same strategy—assemble in a single place the books, journals, films, sound recordings, prints, photographs, and other artifacts that carry our society's scholarship and knowledge and combine to shape and reflect its culture. Access requires physical proximity to and handling of the artifacts in question; so does stewardship. In their traditional setting, great academic libraries are great because of the breadth and depth of their holdings and the facilities they maintain to support their use and to manage them persistently (for example, conservation and preservation laboratories, appropriate storage facilities, and access controls). Use is measured in terms of gate counts, on-site use and circulation of library materials, and the number of interlibrary loans supplied and received. User satisfaction is closely associated with the size and scope of the holdings, and the services the library puts in place to support their discovery, location, and predominantly on-site or local use (Troll 2001).

With the proliferation in the late twentieth century of telecommunications networks and information technologies, the traditional academic library has been forced to evolve fundamentally new practices simply to retain its historic roles as gateway to and steward of the world's scholarship and knowledge. After briefly reviewing some of the key drivers that compel libraries to change, this paper takes a detailed look at evolving collection-development strategies, focusing on opportunities and challenges in the development of shared print collections.

Drivers of Change

Academic libraries assemble and conserve the world's scholarly knowledge and its societies' cultural records and make it available in support of research, teaching, learning, and cultural and civic enrichment. Maintaining the breadth and depth of their collections is possibly the single greatest challenge confronting academic libraries today. The challenge stems in part from the runaway inflation in both the cost and volume of publication. As figures 1 and 2 show, library acquisition budgets are unable (or at least highly unlikely), even in good years, to keep up with the rising cost and volume of scholarly journals and monograph publications, respectively. Simply put, an academic library cannot continue to fulfill its access or its stewardship functions by relying solely upon the traditional "Buy it and put it here" approach to collection development.
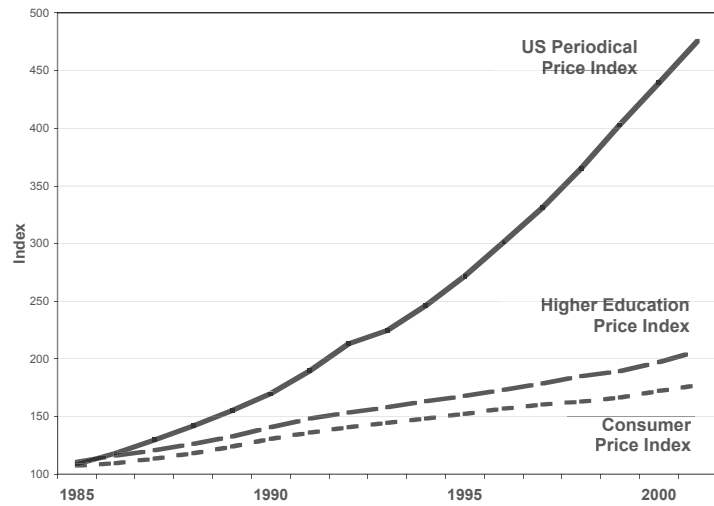
Fig. 1. Periodical price increases in comparison with common inflation indexes, 1985–2000
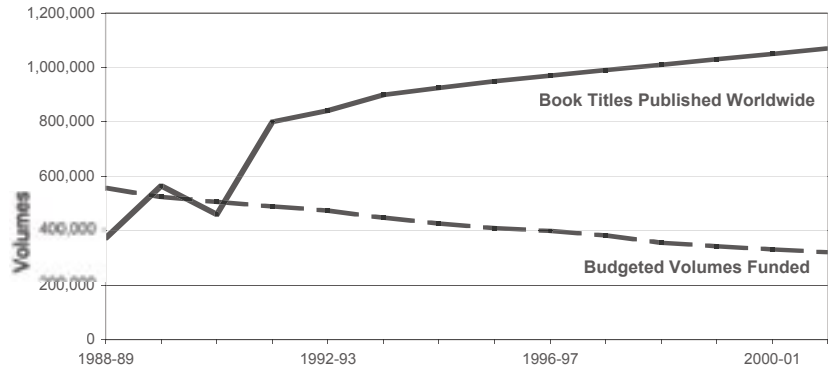
Fig. 2. Growth in publishing and decline in library buying power, 1988–2001

The rapid increase in the volume of information is also problematic. Since its inception not much more than a decade ago, the World Wide Web has transformed the nature and precipitously increased the volume of cultural and scholarly expression. Figures 1 and 2 do not account for the vast proliferation of Web-based material, at least some of which is well within the libraries' traditional collecting purview. Indeed, the World Wide Web is increasingly becoming the exclusive source of government, pamphlet, and other ephemeral publications that libraries have historically collected and preserved. If collections of print-based publications are beyond any single academic library's financial reach, then those comprising both traditional and nontraditional formats are entirely out of the question.

Finally, change is forced upon the library by its patrons, who now use digital information intensively and sometimes in preference to print materials. A study conducted in 2002 by the Digital Library Federation (DLF) and Outsell Inc., looked at how faculty, graduates, and undergraduates at leading universities and colleges use information resources in their research, teaching, and learning (Friedlander 2002). On the basis of more than 3,000 telephone interviews, the study demonstrated that the academic library's users are as comfortable with printed (95%) as with digital (94%) information, and that they prefer going online to find information for research, teaching, and learning.[1] The study also demonstrated that users are finding more of the information they need online. Nearly half of all faculty in most disciplines reported that they use online information resources for their research "all" or "most" of the time (figure 3). They are also finding that a large proportion of the research information they require is actually available online (figure 4). Another study, conducted at the University of California (UC), demonstrates that where information is available in both printed and electronic forms (as is the case with scholarly journals that libraries make available in both printed and digital formats), users overwhelmingly prefer to use the digital (figure 5)(UCOP 2003).

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[1] When asked where they go to find information, more scholars reported that they are going online to look for the information they need for their research and teaching, even where that information is ultimately available in a printed or analog format. When asked where they go to look for information, 83 percent of university and college faculty and students who were surveyed responded that they went online. By contrast, only 43 percent claimed to use printed sources (including card catalogs and printed reference works), while 23 percent claimed that they seek personal assistance (e.g., from a reference librarian, colleague, or friend).
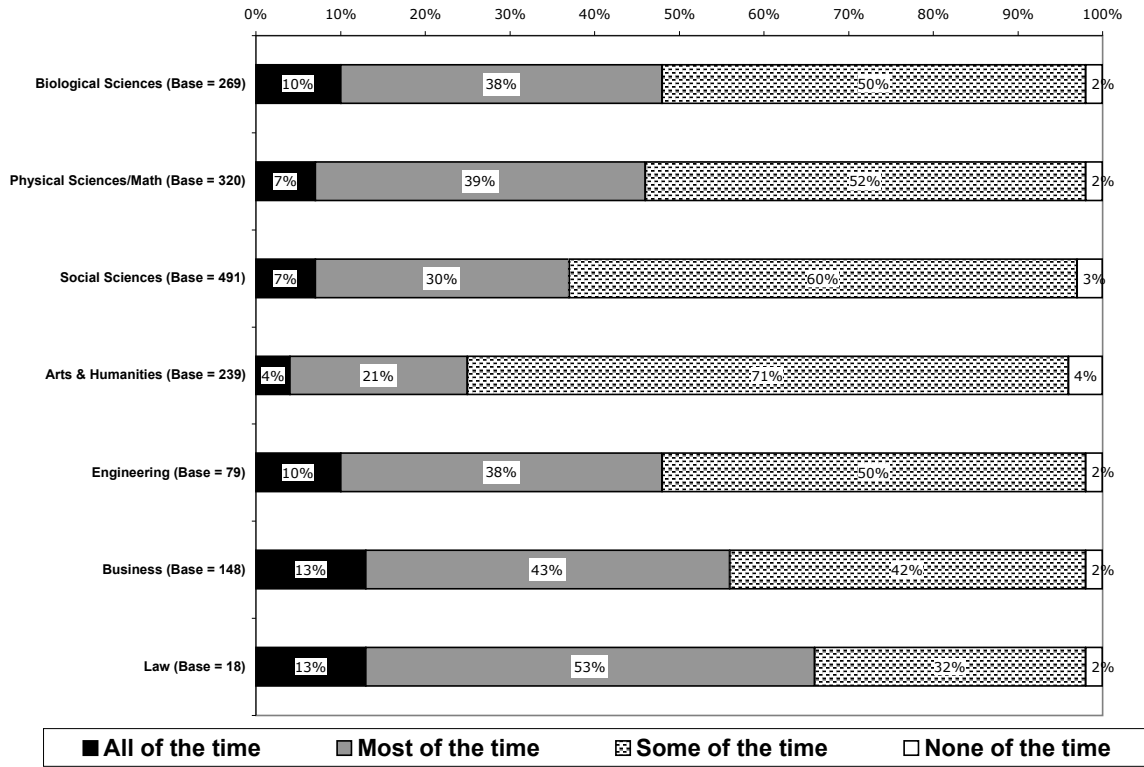
Fig. 3. Frequency of faculty members' use of online information resources for research, by discipline
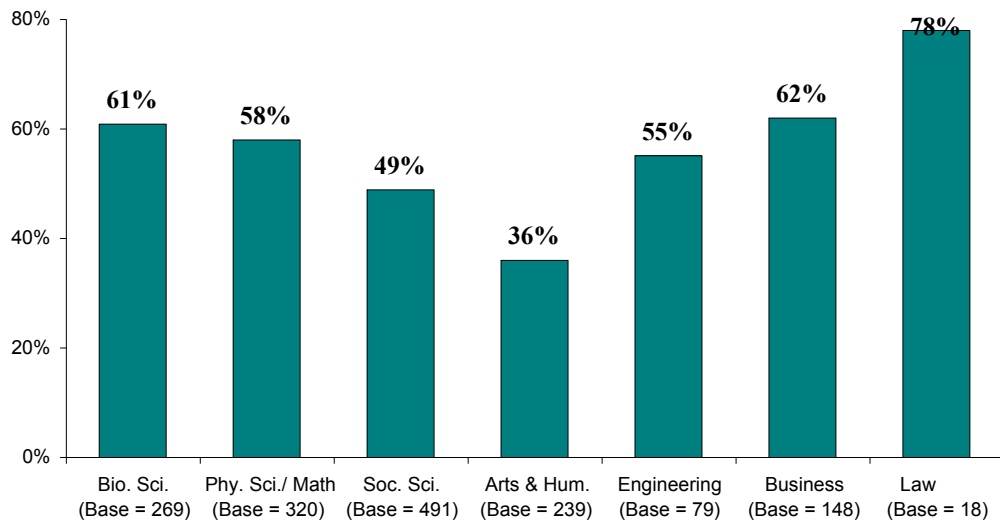

Fig. 4. Percent of information that is required for research in different disciplines that is available online
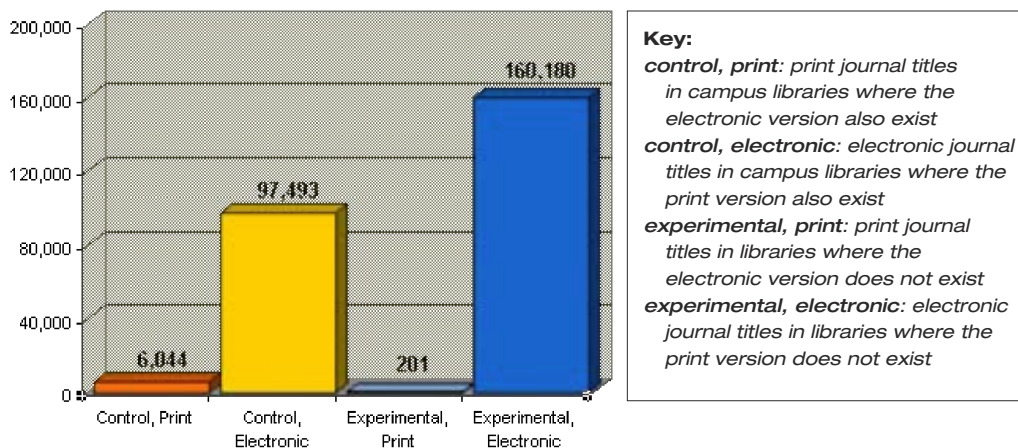
Fig. 5. Journal usage by format. Study period: October 1, 2001–September 30, 2002

Given their growing acceptance of and selected preferences for digital information, it is not surprising to discover in the DLF/Outsell study that 42 percent of the faculty and students interviewed reported that they work and study off campus more than they did two years ago, and that 35 percent claimed they use the physical library less than they did two years ago. The study also demonstrated the extent to which these extensively networked populations (most claim an Internet connection at their residence, their office, or at both places) work outside the physical library. On average, faculty respondents to the DLF/Outsell survey, for example, reported that three-quarters of the time they spent each week working with scholarly information was spent in their offices. Eleven percent of that time was spent from home; only 10 percent was inside the physical library. For students, undergraduate students in particular, the library remains an important place to work with information. Thirty-four percent and thirty percent of the time that undergraduates and graduates, respectively, spend working with information is spent in the physical library.

These same trends are reflected in the data that libraries gather to determine how their collections, services, and building are used. Use of online journals and reference databases that the library licenses (but rarely manages) grows dramatically year on year (CDL 2002). Use of online public access catalogs (a measure of demand for the library's physical holdings) declines, as if in inverse proportion. The number of searches tried on Melvyl—the union catalog of the UC's 10 campus libraries—has declined by nearly 40 percent in the last eight years (figure 6). The number of online information sources grows more rapidly, the argument runs, than does the time available to scholars to use them. Accordingly, the market share of the online catalog, once the primary portal to a world of information, has declined precipitously. Data published by the Association of Research Libraries (ARL) reveal a similar trend, documenting declines both in the in-house use and in the circulation of the library's physical hold-
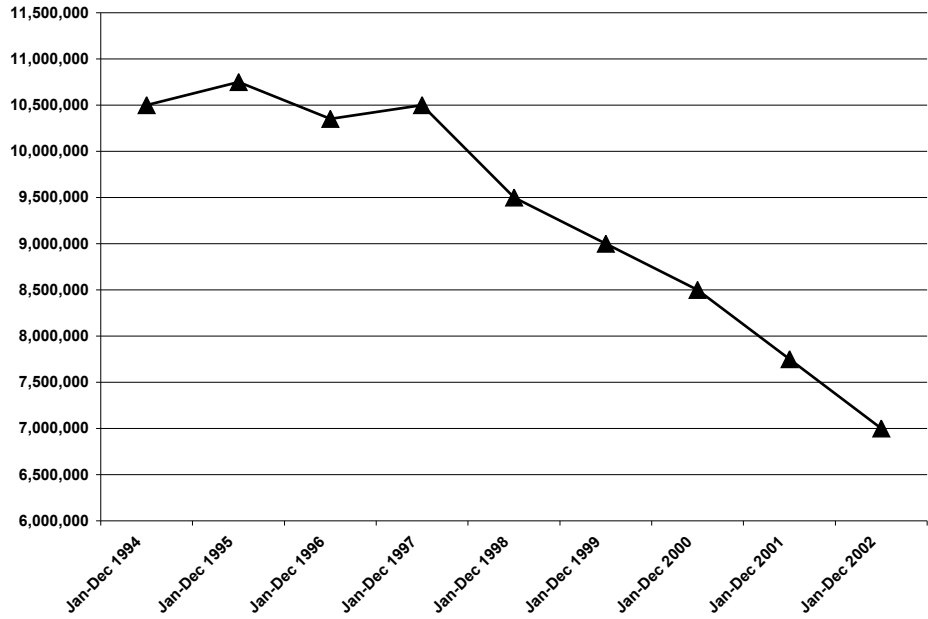
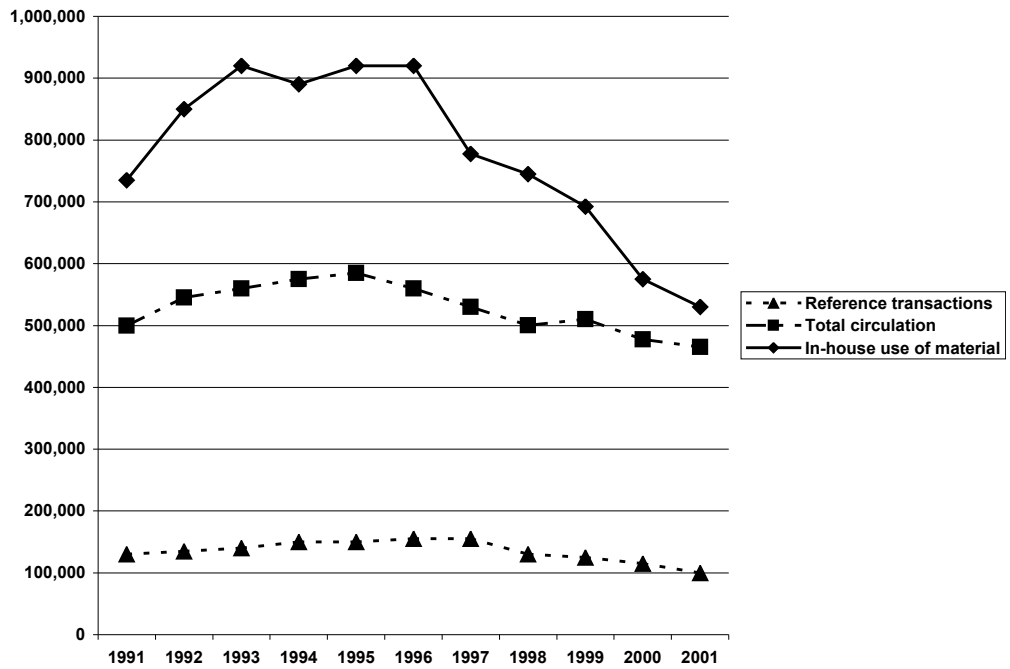**Fig. 6.** Melvyl catalog (CAT)—search totals (includes Web and Telnet)

Fig. 7. ARL library trend data, 1991–2001

ings. More materials are being accessed remotely and online (figure 7). Gate-count data are trickier because they are not systematically available; nonetheless, they also seem to indicate decline. (One exception to this trend is libraries that are renovating and repurposing spaces once occupied by card catalogs or by various print materials that are now available in digital formats.) This suggests that the shift toward the digital has diminished the library's role as a physical place to come to find and obtain information, but it has possibly enhanced its civic functions as a congenial place to study, learn, and meet colleagues, teachers, and students.

The Compelling Logic of Shared Collections

While rapid increases in both the cost and volume of "published" information compel libraries to consider collectivist strategies for maintaining broad and deep collections, changing patterns of information use may enable them to do so. In a networked age when access to so much information no longer requires physical proximity to it and when those who use information increasingly accept (even prefer) electronic access, the place-based and organizationally independent focus of the library collection development becomes inadequate and obsolete. Simply put, it makes little sense for libraries to redundantly acquire and locally manage some collections.

Academic libraries are not unused to cooperative effort. In the United States, they have worked together since the 1940s on a national level—often with other kinds of libraries—in building a comprehensive bibliographic record that is more or less consistent, and in managing low-use yet important materials (for example, in the Center for Research Libraries and in various regional repository initiatives). On the regional level, libraries have shared in the construction of highly specialized collections, often of non-English language materials (CPMG 2003). As scholarly information became available online in the 1990s, academic libraries extended cooperation to this new medium. Networked digital information does not need to be located anywhere in particular to be accessible. Accordingly, it enables library systems (for example, the 11 UC libraries, the 66 academic and public libraries of OhioLINK, and the 12 university libraries affiliated with the Committee on Institutional Cooperation) to coordinate the acquisition of substantial electronic collections that are served to and accessible by patrons of system members.

As the cost and volume of scholarly publications continue to escalate and as more publications become available in digital form, we are seeing a new interest in sharing more aggressively in the development of selected print as well as digital collections. The UC libraries have made considerable progress in this area but are certainly not alone. Their aims in developing shared print collections mirror those that underpinned efforts at sharing locally held printed materials through interlibrary loan and developing digital collections. These aims are as follows:

- enhancing collections and services that each UC campus library makes available to its faculty and students;
- expanding the breadth and depth of collections available system-wide to support the university's teaching and research programs;
- reducing unnecessary duplication of campus holdings; and
- saving substantially in cost and effort.

Planning for shared print collections began in 2000 with a study into the use that faculty and students make of scholarly journals available in both printed and digital formats.[2] The study suggests that faculty are entirely comfortable with, and even prefer, digital formats. At the same time, the study surfaced compelling reasons for retaining at least some print copies in the library system. Where journals are available in both print and digital formats, the digital editions are lacking in key respects. They do not systematically or comprehensively include ephemeral information that may be important to some scholarship (letters to the editor, notes and comments, and lists of editorial board members are notoriously absent from digital editions). Visual materials in some print editions do not always reproduce adequately. The question for the UC libraries is whether the desirability of having some print versions translates into the necessity that each campus library maintain a print version.

In 2002–2003, unprecedented cuts in state funding for the University of California jolted a research and planning initiative into a practical one and led to a partial answer to this question. As some campus libraries seek individually to save costs by canceling print subscriptions for selected journal titles that are available online (for example, as part of UC's shared digital collection), they seek collectively to build a print archive so that print editions of these titles are not eliminated entirely from the system (at least not by accident or oversight). Initially, the print archive will be developed prospectively—that is, with new issues of those titles that are made available at no cost or at a deeply discounted rate to the UC system in respect of its site license for the digital editions. Another initiative is looking at how libraries can coordinate monograph acquisitions by harmonizing approval plans that they place with book vendors. The initiative is investigating the application and development of technologies that allow each campus library to know in real time what books other campus libraries are purchasing. It would also permit each library to compare its own planned acquisitions and those of other campuses with the universe of books available in a particular area.[3]

The libraries are also establishing mechanisms capable of dealing with retrospective print materials—that is, materials that are held by the campus libraries in greater redundancy than may be desirable or affordable. The retrospective collection is likely to concentrate on scholarly journals that are available in both print and digital formats.

[2] For information on the study, see http://www.slp.ucop.edu/initiatives/cmi.htm.

[3] The initiative is based on one being tried by OhioLink libraries with systems developed by YBP Library Services. See Gammon and Zeoli 2002.

There are also a number of planning activities under way that look at high-volume, low-use collections (for example, at the seven campus libraries that, as members of the Federal Depository Library Program, have built highly redundant collections of printed government publications)(SOPAG 2004).

Key Challenges in the Development of Shared Print Collections

By planning for and beginning to implement a shared print archive, the UC libraries have uncovered a range of challenges that are likely to confront other libraries that seek to develop shared collections of print materials. Two of these challenges—building trust in the shared collection and overcoming resistance to and skepticism about the shared collection—are discussed in the paragraphs that follow.

Building trust in the shared collection. A shared print collection can meet its aims—minimizing redundancy and cost while maximizing access to printed information—only if it is trusted. Libraries that forgo the acquisition of or discard selected print materials because they know that those print materials will be available from the shared print collection in case they are needed, must trust that those materials truly will be accessible.

Issues of trust raise a number of implementation problems for the shared print collection.

- *A trusted shared print collection must be complete*. Unfortunately, it is not always clear how (that is, against what master list) completeness can be measured. The problem is particularly complex with serial publications because the bibliographic record, though adequate at the title level, is rarely adequate at the issue level. This is as true for back issues as it is for new issues of journal titles that are being acquired. The latter (prospective) collections are complicated by the fact that journal titles change hands so frequently among publishers that some of the larger publishers themselves are hard pressed to document accurately what their current list comprises.

- *A trusted shared print collection's completeness must be maintained so that it is always available in case of need*. The best way to maintain a collection's completeness is to prohibit access to it. Yet prohibiting access undermines a key component of a shared collection's credibility. Items in inaccessible ("dark") collections are unavailable in time of need. Alternatively, shared print collections may be "dim"; for example, access to certain items, such as photocopied or scanned images, may be restricted to readers in secure reading rooms. But if access to shared print collections is restricted, how restricted should it be? The level of access that a shared collection permits will clearly have a direct impact on its size, scope, and effectiveness. Where shared print collections are very dim, libraries will be unable to rely upon them for materials that occasionally need to be available on site or even for circulation. In these cases,

libraries may retain materials locally and in so doing impinge on the shared print collection's effectiveness in minimizing redundancy.

Overcoming resistance to and skepticism about shared print collections. Libraries and library users have an enormous stake in the "Buy it and place it here" model of collection development. It offers the comfort of the familiar. It is thoroughly tried, tested, and understood, even if it is unsustainable economically. Shared print collections are new, and their aims are easily misunderstood. Developing shared print collections, even if only modestly, requires extensive consultation and communication with library professionals and the communities they serve. The following are some of the key concerns that UC libraries have discovered among their staff and faculty patrons.

- *Shared print collections will eliminate books from local (in UC's case, campus) libraries*. This isn't true at all. At least isn't true at UC, where the shared print is one (easily the smallest one) of several strategies intended to enrich and enhance the collections that may be made available to UC faculty and students. The most important strategy for print materials is and will undoubtedly remain campus investment in locally held monographs and serials. What is interesting about UC's work on shared collections is that it challenges the hypothesis that access and stewardship require local library acquisition and management of scholarly information. By asserting that not all print materials need to be available locally, libraries are able to explore a far more interesting question—notably, what print materials need to be available locally and for what reason.
- *Shared print collections are highly centralized libraries unavailable and unresponsive to the needs of participant libraries and their patrons*. This is essentially an issue of organization and governance. While shared print collections may emerge as central and monolithic bureaucracies, they do not have to. Indeed, if they follow in the tradition of the shared repositories and compact storage facilities (at UC and elsewhere), they won't.
- *Shared print collections will jeopardize the viability of university presses and scholarly societies upon which the academy depends*. This is more a hypotheses than a misconception. Still, it reflects a very real concern. Three things are patently obvious. First, monographs continue to play an important role in the recruitment, retention, and reward of scholars in several disciplines. Second, library demand for monographs is declining. A publisher that 15 years ago could count on U.S. libraries buying 1,500 copies of a new monograph might sell only 200 or 300 copies of a new monograph that is published today. Third, scholarly publishers have responded to diminishing demand for monographs by drastically curtailing the number of new titles that they publish annually. The impact of this trend is particularly hard-felt on scholars in disciplines where monograph publication is a prerequisite for tenured (even ten-

ure-track) jobs. The cycle, if unbroken, will become a vicious one; nonetheless, libraries, publishers, and faculty alike are uneasy (albeit for different reasons) about breaking out of the mold.

To deal with this challenge, the California Digital Library is looking to work with university presses to evaluate new business models for monograph publishing—models that enable libraries to reduce their dependence on redundant print acquisitions without undermining publisher revenues, the monograph publication process that is so critical to academic advancement, or patrons' access. In one particularly compelling scenario, the UC libraries might acquire a limited number of print copies of selected monographs (for example, for the shared print collection) plus the right to distribute the monographs digitally within UC. The terms of digital distribution would need to be agreed on with the publisher but should be developed in order to help the publisher recoup revenues lost from substantially reduced hard-copy sales (to UC). For example, the digital edition might be made available
— for reading online;
— for downloading to a handheld device (with a Digital Rights Management record to prohibit additional copying);
— for low-cost, perfect-bound printing at the point of use (e.g., the local library); and
— for purchasing as a paperback or hard copy that may be ordered online from the publisher or from any bookseller that stocks its books.

In this scenario, the user has numerous access paths, some of which are free and others that are not. Further, the model does not require a new funding source—library patrons have always paid for convenient access (e.g., in campus bookstores and in-library and off-site photocopying services). The model has particular interest at UC, which will open a new campus, Merced, in September 2004, with very limited physical holdings in the library. It needs to be tried and tested collaboratively with monograph publishers (presumably on a time-limited basis and in a highly secure environment). If successfully developed, it may offer hope to
— scholars who rely on the monograph's continued existence (university presses could grow monograph lists without requiring equal or greater growth in hard-copy sales);
— libraries that need to provide access to comprehensive collections but cannot do so by locally acquiring, owning, and managing all of the print and digital items in them; and
— university presses and scholarly societies whose operations are vital to the scholarly communications process but are not easily sustained by the current model of monograph production and distribution.

• *Shared print collections will discourage local investment in participating libraries.* This, too, is more a hypothesis than a misconception, and it reflects a serious concern about the so-called free-rider problem. Why should a university or college invest in its library's acquisi-

tion of print materials, if print materials are going to be made available to local users from a shared print collection? One way to address the free-rider problem is to demonstrate the benefits that have accrued historically to libraries through their participation in resource-sharing activities (e.g., shared cataloging, interlibrary loan, development of shared digital collections) and to show that success in the past has been tied directly to a high level of sustained local library investment.

Another strategy is to ensure that local investments are properly recognized. The Association of Research Libraries' (ARL) membership index provides a means of recognizing library investments. Rankings are closely monitored and very significant. The rank order of a university's library within the ARL membership index is used to recruit and retain faculty, appeal to donors, and justify, reward, and encourage local library investments. The problem is that the index gives disproportionate credit to the number of volumes that a library holds. It does not count materials that are shared (whether electronic or print). As such, the index may actually impede shared collection-development strategies that, to be effective, require participating libraries either to discard or forgo acquisition locally of holdings that are otherwise available to the group.[4] In effect, the ARL's membership index is calculated in a way that rewards campus libraries for outmoded practices that may curtail their ability to deliver access to collections that are broad as well as deep. At the same time, it actively discourages shared collection-development strategies that can counter this narrowing tendency. A number of solutions have been proposed to refashion the reward structure in a manner befitting local circumstances. One compelling solution suggests a tiered approach in which local investments are clearly identified. In this approach, libraries might keep three sets of books:

— items to which their patrons have access (including items in local and shared print and digital collections as well as those that are readily available through interlibrary loan or other similar means);

— items they have acquired (including items acquired for a local collection, those acquired by the libraries cooperatively with others, and those once acquired by a library for its local collection but then contributed to or discarded in light of the development of a shared collection); and

— physical items that a library manages and for which it is responsible (for example, as required for insurance, space-planning, and other purposes).

4 There is some evidence of libraries maintaining in on-site compact storage items that are available to their patrons from shared repository facilities because those items are owned and counted by another library.

Shared Print and Preservation

Shared collections of printed materials also suggest a rather new approach to preservation. Currently, cultural heritage organizations (a phrase that I use to refer broadly to libraries, archives, historical societies, and museums of every flavor) take responsibility for preserving the unique and distinctive materials that make up part of their collections. Some libraries additionally contribute to the preservation of non-unique printed materials. In many instances, their contributions are passive—the highly redundant holdings of research libraries have always been seen as an uncoordinated but nonetheless effective preservation strategy for print. More proactive efforts are also evident, for example, through reasonably widespread library involvement in national and regional microfilming programs (the National Endowment of the Humanities' microfilming program for brittle books and serials is one example).

Despite these different approaches to the preservation of non-unique printed materials, research libraries seem to agree that they are rapidly losing ground. Moreover, as preservation resources that are available to libraries decline, they are spread more thinly. Forced to decide between the unique and the non-unique, libraries will choose what is distinctive, and rightly so. Accordingly, one wonders whether research libraries really do undertake the preservation of non-unique materials as a matter of mission. History suggests that libraries' efforts to preserve non-unique materials are episodic, infrequent, and poorly supported. In this light, the crisis of library preservation that has received so much attention lately is less a crisis than it is a reflection of the status quo: Institutional investment in the preservation of non-unique materials is less a return to some historic mission than the creation of an entirely new one.[5]

In this regard, the shared print collection could enable the essential innovation necessary for libraries to undertake the preservation of non-unique materials as a matter of mission. Shared print collections will essentially contain non-unique materials (few if any incentives will exist to encourage libraries to submit unique holdings to some kind of shared governance). Libraries will pool investment in the selection, storage, and use of these materials. In theory, conservation of materials held in shared print collections may be achieved at marginal additional costs to the resources pool. Further, the utilities that are likely to grow up around shared print collections in order to facilitate access to them—notably, facilities able to scan holdings on demand and to deliver them to users online for screen-based browsing or for local print on demand—will support conservation efforts (e.g., by limiting physical handling of the material). Finally, by sharing in the conservation of the non-unique materials that become available in shared print collections, libraries may have more resources available for the conservation of the distinctive materials that they hold and feel less anxiety about expending those resources almost exclusively on such materials.

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5 For a good assessment of the dimensions of this "crisis" see Kenney and Stam 2002.

The model is compelling. It also suggests that shared print collections, to be an effective strategy in the preservation of non-unique materials, cannot and should not develop in isolation. Rather, they must exist as part of a global network of shared collections whose holdings are somehow registered and publicly notified. In order to undertake preservation outside such a network, a shared collection would require at least two copies of everything it sought to manage persistently—one inaccessible or dark (because inaccessible copies are less at risk of loss or damage through handling than accessible copies are), and one accessible or dim. Otherwise, few incentives would exist for participating libraries to contribute holdings to the shared collection or to withdraw holdings from a local collection where they existed redundantly in the shared one.

Finally, in a network, the economics of print collection and of print preservation may improve considerably. Shared collections may alternate responsibility for and, where appropriate, participate in the use of dim and dark collections, respectively. In a network, it may be possible to distribute the costs involved in selecting, acquiring, cataloging, and managing access to shared collections. Some libraries could participate on an in-kind basis, that is, by providing volumes, storage space, or personnel. Others might contribute in cash. The source of funding for shared collections could be distributed to any who benefit from it. Inevitably, the free-rider problem rears its head. Why should an institution contribute to the persistent management of print materials when it knows that others may pick up the tab? Since the benefits of the shared collection accrue only to those able to rely upon its contents, the problem may not be an obstacle. A library's access to a dim collection or its ability to rely on a dark one for copies of last resort may be tied directly to its contribution.

In summary, the compelling logic of shared collections is at once a challenge to libraries to think in new ways about collection development—in part to help them confront difficult economic challenges, and in part to develop strategies that allow them to take seriously a role preserving non-unique print. It is also an invitation. This article has been based on the early experiences of the University of California libraries. Though very preliminary, those experiences suggest how much more may be achieved by a network of shared print collections than by a single repository based in a particular institutional setting. And there is no need in this case to RSVP.

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Collections, Preservation, and the Changing Resource Base

Anne R. Kenney

Introduction

L ibraries in the first decade of the twenty-first century face enormous challenges, including challenges of identity and purpose. As traditional institutions of long standing, libraries manage legacy holdings of inestimable value. As purveyors of information, they are profoundly affected by the dizzying pace of technological change. Libraries' constituents are more varied and more demanding than ever. Their detractors dismiss libraries as institutions that are no longer necessary in an age of networked information or, even worse, as potential enemies of the state in its fight against terrorism. And as the economy falters, libraries everywhere are on the chopping block. It is no great exaggeration to say that libraries are undergoing a crisis on par with any experienced in the past 100 years. Yet rumors of their demise are greatly exaggerated.

Recent studies characterize libraries as hybrid institutions, straddling the print world and the digital realm. Certainly more attention and resources are devoted to things digital: ARL reports that expenditures for electronic journals jumped 75% in the past 2 years and are up 900% since they were first reported in 1994/95 (Association of Research Libraries 2002). Yet, reliance on hardcopy books and journals remains strong; they represent more than 80 percent of materials expenditures, according to ARL. In addition, libraries of all types, but especially academic and research libraries, are expanding their collecting scope to include new media and formats, software, data sets, instructional materials, and samizdat Web resources. By and large, these resources complement, rather than substitute for, print resources (Friedlander 2002). As OCLC concluded in its report on five-year information format trends, "the universe of materials that a library must assess, manage and disseminate is not simply shifting to a new set or type of materials, but rather building into a much more

complex universe of old and new, commodity and unique, published and unpublished, physical and virtual" (OCLC 2003).

In sum, libraries are expected to support the full gamut of information at the very time they are under pressure to cut costs and develop new services. These pressures have been made acute by the current financial crisis. Most states are facing serious budget deficits, investment income is down, and libraries everywhere are threatened. The American Library Association (ALA) is tracking the budget crisis through its "Campaign to Save America's Libraries." ALA reports that 32 states have suffered cutbacks in support to state, local, and academic libraries (American Library Association 2003). The figures are chilling:

- The budget of the California State Library was cut 29 percent in FY 2003 and the library anticipates an additional 15 percent cut within the fiscal year, followed by an additional 30 percent cut in 2004.
- The Colorado State Library has sustained a 50 percent cut in state revenue and expects an additional 10 percent cut within the current fiscal year.
- In 2002, the Seattle Public Library instituted its first-ever two-week shutdown of the entire system to help meet a 5 percent budget cut.
- Thirty-one of forty-eight respondents to an ARL survey of library directors in February 2003 anticipated significant budget cuts next year.
- In 2003, the University of Michigan library met a $2 million budget cut by eliminating more than 30 positions (*Library Journal Academic News Wire* 2003).

Libraries, then, are under tremendous pressure to maintain the old, embrace the new, and do so with declining resources. Given this state, where does preservation fit into the picture? I see two major causes for concern. The first is economic vulnerability. Because preservation programs are relative latecomers in libraries, they may well suffer from the "last-hired, first-fired" syndrome. Recent reports confirm this may already be under way. A second concern is process uncertainty. In the 1980s and 1990s, preservation programs developed to address a serious threat (acid paper), and they could rely on a trusted methodology (microfilming). Today's threat—digital obsolescence—is even more pressing, but libraries are plagued by a lack of clarity about how and when to do preservation in the digital realm.

Facing the Economic Challenge

The current budget crisis may provide the catalyst for libraries to rethink how they organize themselves to ensure the most effective and efficient way to deliver services. When reductions are small or one-time, the tendency is to absorb them, rather than to reconceptualize. Libraries in the next several years will need to consider dramatically different ways of doing business, including preservation. Four op-

tions present themselves here: reengineering, mainstreaming, collaboration, and automation.

Reengineering

Some areas, such as technical services, have reengineered their processes significantly. At Cornell, for instance, the central technical services unit has decreased its workforce by 20 percent in the past seven years, while reducing the backlog and the time from point of receipt to point of use. They have done so by replacing manual processing methods with technology-based methods, eliminating redundancies, streamlining workflows, minimizing handling, and making selective use of outsourcing. They have redefined "quality" as the appropriate balance between processing speed, cost, and fullness of bibliographic treatment. This effort has required considerable consultation with other divisions within the library system to ensure that the elimination of processes in technical services did not result in simply shifting the workload to other services.

Reengineering has been built on establishing priorities and accepting trade-offs in some areas. At the heart of this process are tough choices. Libraries have operated under the assumption that standards and best practices are the mainstay of operations. Quality cataloging in 1990 meant that each institution tweaked its records or would accept copy only from the Library of Congress. By 2000, the notion of acceptable copy had changed, and the need to address growing backlogs forced a shift in practice that includes not only conformance to bibliographic standards that are "good enough" but also to timely and cost-effective processing. Ross Atkinson calls the "demise of the completeness syndrome" one of the key management transformations occurring today (Atkinson 2003).

"Good-enough" practice is beginning to make head roads into preservation programs as well. This can be most clearly seen in binding practices. Next to personnel, binding is the largest expense associated with preservation. In fiscal year 1984–1985, Cornell University spent more than $184,000 on the conventional binding of periodicals and monographs. In 1985, John Dean became the first director of preservation. He introduced two alternatives to conventional binding: (1) the quarter buckram binding of periodicals, which more than halved the unit cost of binding and rendered the item more stable at the shelf and more flexible in use; and (2) the stiffening of paperbacks, which reduced the unit cost of binding a single book to less than $1. Initial resistance to these changes was based on aesthetics, but the savings were considerable. In 2000–2001, Cornell spent only $173,000 on binding, despite handling significantly more volumes than in previous years. That year, Cornell ranked eleventh in volume count among ARL libraries but forty-third in commercial binding expenditures. As funds dry up, institutions are turning to these alternative forms of binding as well as to shrink wrapping serials, off-site storage, or post-use binding of paperbacks sent directly to the shelves.

Mainstreaming

A second strategy for coping with budget reductions is to mainstream processes. A recent study on the state of preservation programs in academic libraries noted that various definitions of preservation practice prevail among library staff, some of whom would define it very narrowly (Kenney and Stam 2002). When preservation is viewed narrowly, it gets separated from mainstream functions, becomes identified as someone else's domain, and can be considered a luxury when budget cuts must be made. This tendency is reinforced by the way libraries have measured preservation activity. Research libraries assess preservation capability through statistics such as whether the library has a preservation administrator or the number of staff in a preservation unit. Implicit in these measures is the assumption that preservation is distinct from other activities. This may lead institutions to feel inadequate if they do not have a separate preservation program or to assume that preservation is something they cannot afford. The extent to which preservation can be protected in this economic environment may well depend on the degree to which libraries can develop a more inclusive understanding of preservation—one that infuses the full range of library operations and encompasses all actions and policies designed to prolong the useful life of information. Assisting library staff to develop an appreciation for their roles in preservation can help the library meet its preservation objectives more effectively and economically.

Collaboration

Collaboration has been touted as a critical path for libraries. But the counter forces at work—competition, institutional ranking, self-interest, ownership, user resistance—make putting it into practice problematic. However, the twin pillars of digital access and a deepening economic crisis may force libraries to embrace collaboration more fully.

Libraries point to a long history of cooperation, most successfully in such areas as shared cataloging and interlibrary loan. More recently, they have joined forces to secure more favorable rates for electronic resources. In 2000–2001, ARL libraries spent nearly $15 million on e-resources through centrally funded consortia. This figure was dwarfed, however, by institutional expenditures on electronic resources, which topped $132 million (Association of Research Libraries 2002). Libraries have also established shared storage facilities, but too frequently these are characterized by separated spaces where each institution stores little-used, often duplicated, holdings. The Tri-College Library Consortium concluded that the partners could gain shelving space and maximize purchasing power by eliminating duplicated, low-use materials and building a single research collection. However, faculty members at the three institutions expressed serious reservations about relinquishing institutional collections to build a more integrated collection (Luther et al. 2003).

The movement to cooperate in shared collections and preservation responsibility is gaining ground. The Center for Research Li-

braries is spearheading an effort to investigate a network of regional print repositories and is collaborating with JSTOR to preserve the paper version of every journal in its stable (JSTOR 2001). Budgetary woes appear to be the catalyst for higher-level collaboration in California. The California Digital Library is building a shared storage facility for the University of California system to ensure the preservation of a print copy of record and enable campuses to eliminate paper subscriptions for journals available electronically. Long-term plans include cooperative collection development and access programs as well as preservation programs for print and electronic materials.

Cooperation as a preservation strategy may indeed be most promising near term in the area of print preservation, but it does require a rethinking of preservation principles. In the future, preservation will be decoupled from use, and the strategy of multiple redundancy will be replaced by single-copy archives. Born out of economic necessity and the convenience of network access, true collaboration will be dependent on the degree to which institutions are willing to relinquish ownership and share control over very long timeframes.

Automation

Three years ago, Bill Arms published a thought-provoking article in which he speculated on the degree to which automated processes can provide a satisfactory substitute for skilled librarians (Arms 2000). He correctly pointed out that the greatest expense in libraries is personnel—at Cornell University Library, for example, salaries and benefits represent 57 percent of the library budget. Arms argued that "brute force computing," coupled with simple algorithms, can often outperform human intelligence and that the future of digital libraries will depend on making that switch. Although librarians responded negatively to this piece, we are indebted to Bill Arms for provoking such ideas and questioning current assumptions. The field of artificial intelligence is premised on the notion that computers can imitate human cognition; for example, IBM and others predict that the processing power of computers will equal the speed of the human brain within two decades. It may be difficult to pinpoint when a machine will be able to think, act, and emote in the same way as a human being does, but clearly libraries are turning to automation to reduce costs, increase productivity, and enhance decision making.

Libraries have successfully automated in a number of areas, but the impact on traditional preservation programs has been minimal. Digital preservation, however, will be possible on a grand scale only through the automation of archival processes. In recent years, various digital library projects have incorporated automated routines that, while still in the proof-of-concept stage, will become key to the development of sustainable digital preservation programs. Chief among these has been the use of Web harvesters, replication strategies, and automatic extraction of metadata.

Web harvesting is at the root of many archiving initiatives that focus on collecting publicly accessible Web resources. Several of these are fully automated, utilizing powerful Web crawlers to locate and download content. For others, such as Preserving and Accessing Networked Documentary Resources of Australia (PANDORA) and the Paradigma Project in Norway, ingest also includes some manual creation and clean-up of metadata and the establishment of content boundaries. The use of Web crawlers to automatically build synthetic collections on various subjects is an active line of research, which could have tremendous potential in establishing preservation priorities (Bergmark 2002).

Replication. It is perhaps ironic that while paper preservation may be moving away from multiple redundancy as a preservation strategy at the institutional level, replication is very much a piece of the puzzle in the digital world. Current research focuses on how much replication is necessary, the degree to which it promotes repurposing of content, and how automated the process can be made. Projects such as Lots of Copies Keep Stuff Safe (LOCKSS 2003) and the work at Stanford on data-trading networks are beginning to address these questions (Cooper and Garcia-Molina 2002).

Metadata extraction. Some digital library projects, such as the National Science Digital Library Project, are focusing on automated metadata extraction, and search engines are employing increasingly sophisticated algorithms to rank search results. But an assessment of trends over the past five years by OCLC revealed that while the use of metadata—including data that are automatically created through HTML editors—is on the rise, such data are not particularly deep or detailed. There is also a very slow take-up of formal metadata schemes, including the most basic, Dublin Core, which grew only marginally—from 0.5 percent of public Web site home pages in 1998 to 0.7 percent in 2002 (O'Neill, Lavoie, and Bennett 2003).

Automated metadata creation and extraction that may be critical for preservation purposes is even more elusive. For example, most of the 34 major elements identified by the OCLC/RLG Working Group on Preservation Metadata and derived from the Open Archival Information System (OAIS) Information Model would require human intervention to be captured fully (OCLC/RLG 2002). HTTP headers contain many fields that could be useful for preserving Web pages. In analyzing header field use from crawls involving more than seven million documents, Project PRISM observed that only three fields—date, content type, and server—were returned for virtually every page. These fields are useful for long-term as well as current management. But other desirable header fields for preservation purposes are not commonly used, such as use of the "frequency of content-length" and "last-modified" headers, which ranged from 35 percent to 85 percent in test sets (McGovern et al. 2003). Efforts to automate processes in other domains, most notably in network security, will be critical for digital preservation, but the focus of cur-

rent efforts is typically on system performance and does not extend to long-term viability considerations.[1]

Automation is necessary but insufficient, at least for now, in meeting the digital preservation challenge. One of the down sides of the focus on automated routines is the tendency to adopt a false sense of security that technology is the full answer. Consider the case of the Internet Archive. The Internet Archive has been sweeping the Web since 1996, saving whatever pages it can find. It currently holds about 100 terabytes (TB) of information and grows at a rate of 12 TB per month. The Internet Archive provides the best view of the early Web as well as a panoramic record of its rapid evolution. Nevertheless, it would be a mistake to conclude that the Internet Archive has solved the Web preservation problem.

The Internet Archive and similar efforts to preserve the Web by copying suffer from common weaknesses (Kenney et al. 2002) such as the following.

- Snapshots may not capture important changes in content and structure.
- Technological development did not always keep pace with the growth of the Internet. For instance, crawls in 1999 contain few images because the Internet Archive did not have enough bandwidth for text plus images. There were also months when there was no crawling at all while the crawler was being rewritten.
- Technology development, including robot exclusions, password protection, Javascript, and server-side image maps, inhibits full capture.
- A Web page may serve as the front end to a database, an image repository, or a library management system, and Web crawlers capture none of the material contained in these "deep" Web resources.
- The volume of material is staggering. The high-speed crawlers used by the Internet Archive take months to traverse the entire Web; even more time would be needed to treat anomalies associated with downloading.
- Automated approaches to collecting Web data tend to stop short of incorporating the means to manage the risks of content loss.
- File copying by itself is insufficient: Repositories must commit to continued access through changing file formats, encoding standards, and software technologies.
- The Internet Archives lacks authorization for its actions, and legal constraints limit the ability of crawlers to copy and preserve the Web.

Despite these drawbacks, there are those who believe that the Internet Archive does preserve the Web, as the recent "Sex Court" trademark trial illustrated. Playboy Enterprises brought suit against Mario Cavalluzzo's pay-for-porn Web site, sexcourt.com, over use

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[1] Examples include SiteSeer and SiteScope from Mercury Interactive (www.mercuryinteractive.com) and Honeypots from the Honeynet Project (http://project.honeynet.org/).

of the trade name. Playboy's lawyers introduced evidence in court using the Internet Archive's Wayback Machine that the earliest entry for Cavalluzzo's sex court Web site was January 1999, four months after Playboy aired the first installment of its cable show of the same name. But attorneys for Cavalluzzo submitted evidence that his page was on the Internet by May 14, 1998. A chagrined Playboy settled out of court.

Addressing the Digital Preservation Challenge: More Than Just Technology

Despite increasing evidence about the fragility and ubiquity of digital content, cultural repositories have been slow to respond to the need to safeguard digital heritage materials. Survey after survey conducted over the past five years provides a bleak picture of institutional readiness and responsiveness. Why this lag in institutional take-up? In part the answer lies in the fact that most of the attention given to digital preservation has focused on technology. This emphasis has led to a reductionist view wherein technology is equated with solution, which in turn is deferred until some time in the future when the technology has matured. Even when the technology solution is purportedly at hand—D-Space, for example, has been characterized as a "sustainable solution for institutional digital asset services"—technology is not the sole solution, but is only part of it (Bass et al. 2002).

The focus on technology has mimicked computational methods that reduce things to an *on* or *off* status—either you have a solution or you do not. This either/or assessment gives little consideration to the effort required to reach the *on* stage, to a phased approach for reaching the *on* stage, or to differences between institutional settings. It is not surprising then that organizations are uncertain as to how to proceed. Postponing the development of digital preservation programs because one cannot create of whole cloth a comprehensive program will ensure that vital digital resources will be sacrificed in the interim. Lack of organizational readiness, not technology, is the greatest inhibitor to digital preservation programs (Kenney and McGovern 2003).

In an article on institutional repositories, Cliff Lynch voiced a fear that institutions would establish repositories without committing to them over the long term: "Stewardship is easy and inexpensive to claim; it is expensive and difficult to honor, and perhaps it will prove to be all too easy to later abdicate" (Lynch 2003).

Libraries in the first decade of the twenty-first century face tremendous responsibilities and opportunities. Preserving cultural heritage is more difficult when the path ahead is not clear. It is important, however, that libraries maintain their historic role as flame bearers from one generation to the next. They must find new ways to do so by taking risks and forging new partnerships, not only with other cultural repositories but also with creators, publishers, and ordinary folk. Recently, concerned individuals established

AfterLife.org, a not-for-profit organization whose mission is to archive Web sites after their authors die. Their motives are pure, but America's memory should not be measured by the lives of either creators or volunteers. That is what libraries and archives are for.

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Issues in Intangible Cultural Heritage

Bill Ivey

Heritage Preserved and Heritage Ignored

In the early 1960s, in what *Billboard* correspondent Bill Holland described as a "most spectacular case of wholesale vault trashing," RCA Records demolished its Camden, New Jersey, warehouse by first dynamiting the building and its contents, then bulldozing the rubble into the Delaware River. Through this single action, the record company notched a rare triple crown of destruction: It blew away a historic structure, polluted a famous waterway, and blasted four floors of cultural heritage—vinyl and metal master disc recordings—into oblivion.

The scope of this multifaceted demolition remains startling even today, but I find a related point more relevant; less than a decade after RCA destroyed a portion of its heritage, the company's insensitive trifecta would have been nearly impossible. No laws securing historic recordings had been passed, but, by the late 1960s, public policy *had* evolved a set of laws and regulations designed to protect both the warehouse and the river itself—historic structures and the natural environment.

Over the past four decades, movements concerned with the natural and built environments have been spectacularly successful. Today, the Delaware River boasts its own River Basin Commission, and the Delaware State Historic Preservation Office lists, among its Web site's frequently asked questions, "What can I do to save a threatened building?" So, today, those RCA masters would be indirectly protected, but if it avoids damaging old buildings and doesn't blast the residue into a river or lake, a record company can still legally dynamite its master discs.

It is notable that America at mid-century ignored historical recordings and films even as governments at every level crafted policy aimed at securing the future integrity of the nation's natural and

built environments. This neglect has been unfortunate, for America's intangible cultural heritage is uniquely significant. Until the early twentieth century, when technology gave permanence and portability to American vernacular expression, it was understandable that observers might dismiss American culture as the rural ramblings of unlaundered rubes. But once drama found its way to film, vaudeville to radio, and blues, hillbilly music, and jazz to 78-rpm discs, the stage was set for a fabulous flowering of American creativity. It is, in fact, Orson Welles, Billie Holliday, Buddy Holly, Flaco Jiminez, Leonard Bernstein, Loretta Lynn, Norman Lear, and Steven Spielberg—with thousands of other artists—who created America's twentieth-century cultural heritage. And by mirroring the diversity of our society so well, this expressive heritage has helped spread the dream of democracy around the world.

The significance of our twentieth-century expressive heritage deserves separate and lengthy treatment that cannot be engaged here. But as we turn our attention to preservation issues, it is critical that we understand that the immense cultural value of this body of material is a kind of "given" that justifies this conversation.

The Complex Character of America's Intangible Heritage

The term "intangible cultural heritage" is somewhat problematic, because it denotes two things. First, it identifies heritage that is in fact intangible—for example, choreography, the baton techniques of legendary conductors, or the mentoring methods employed by a great master of blues or jazz. These cultural artifacts are not only intangible but in a sense ephemeral. They are examples of culture not yet fixed in any medium. In a very real sense, the unfilmed dance, the uncollected folk song, the undocumented master, like the unheard falling trees, do not exist.

At the same time, the phrase encompasses items that are thoroughly tangible—manuscripts, sound recordings, interview tapes, films, photographs, and the like. These cultural artifacts—what Abby Smith somewhat dryly labels "information objects"—function as containers for music, moving images of people and landscapes, still photographs, the spoken word, the jottings of authors, and the like. These thoroughly tangible objects—made of glass, paper, acetate, plastic, and so on—possess negligible intrinsic value. They acquire significance only in relation to the sights, sounds, and words they contain. My comments will concentrate on the preservation of these items.

The character and context of America's intangible heritage present a number of unique preservation and access challenges. These challenges are more formidable than those surrounding preservation of the built and natural environments, and more daunting than those that have historically been faced by most segments of the library field. The complex character of intangible heritage may, in part, account for the slow evolution of public policy mandating or encouraging preservation and citizen access.

It is important to note that most of our twentieth-century legacy of music, film, television, and radio exists simultaneously as *cultural heritage* and *corporate asset*. Most intangible heritage involves collaborative art forms such as recorded music or filmed drama. These art forms were facilitated by emerging technologies such as moving pictures, disc recording, and broadcasting. They combine the creative efforts of many artists and technicians, and in the world of intellectual property are considered "work for hire." Thus, the copyright to movies and records are controlled and exploited by those arts companies that financed their production by "hiring" collaborating artists, engineers, cameramen, and the like. In fact, the "work-for-hire" character of those art forms that today define American culture provided arts industries with asset value and revenue streams that fueled a century-long expansion of American media. As copyright-protected revenue generated by arts companies grew through the twentieth century, arts property was bought, sold, rented, or held back (and sometimes destroyed) by owners pursuing maximum earnings from records, films, and radio and television programming.

Today, few policies restrain the owners of intangible heritage. Old master discs can be destroyed. Absent laws or regulations protecting cultural patrimony (save those involving Native American heritage), intangible culture can be sold to foreign owners and even transported to another country.

Here's one example: A few years ago, in preparation for a reissue of groundbreaking jazz recordings by Charlie Parker, Miles Davis, and other be-bop pioneers, original acetate master discs were shipped *back* to the United States for rerecording at an Atlanta laboratory. These recordings possessed a significant place in jazz history, because Savoy, the New Jersey company founded in the early 1940s by curmudgeonly entrepreneur Herman Lubinsky, was home to some of the first recordings of "modern" jazz. But during the 1980s, the entire catalog of the legendary Newark-based label had been purchased by a Japanese corporation, Denon, and the entire Savoy archive had been loaded in a chartered jet and shipped to Japan. Now a few of the most-significant discs were, in a sense, coming home for a visit—just long enough to be electronically enhanced for a state-of-the-art re-release.

It's not only boutique arts companies such as Savoy that have been acquired by non-U.S. media giants. Vivendi, BMG, EMI, and Sony all own vast film, audio recording, and television assets, including the archives of such "apple-pie" American brand names as RCA, Universal, MCA, Capitol, Decca, and Columbia. In good economic times, the dangers inherent in foreign ownership of cultural heritage may be largely hypothetical. But when the fortunes of multinational companies sour, mandated cost-cutting measures can all too easily convert intangible cultural treasures into collateral damage. After all, when RCA blew a billion bars of music to smithereens, nobody made a conscious decision to bulldoze cultural heritage into the Delaware. Instead, the judgment was probably made by a guy with his name embroidered over his shirt pocket dutifully carrying out a top-down

mandate to eliminate a few hundred thousand square feet of warehouse space.

Preservation and Access Go Hand in Hand

In matters pertaining to intangible heritage, *access* is just as important as preservation. Access is less meaningful in policy surrounding the natural and built environments. After all, you don't need to hold a spotted owl in your hand or sit by the fire at Monticello to benefit from the preservation of a forest or a historic structure; you don't have to climb Mount Rushmore to admire a monument. But it means very little to know that a film such as *Black Orpheus* is in a vault if you can't view it, or to know that Willie Nelson recorded Hank Williams's "I Told a Lie to My Heart," if the record company won't release it.

America's prevalent attitude of passive consumption, accepting of whatever heritage property manages to make it through the multigated system of manufacture, marketing, and retail, does not advance the issue. Instead, as Abby Smith has written, we must influence public policy in order to actively "shape the resource base which is our common memory." We must collectively engage the arts industries as advocates supporting the public good represented by a close and meaningful connection between citizens and heritage.

We must acknowledge that in an environment in which media corporations are increasingly threatened by freewheeling consumer access to arts products on the Internet, a heritage access movement may encounter significant resistance. To date, even our biggest public and nonprofit preservation institutions have shied away from this realm of obvious potential conflict, but the negotiation between the public purpose and rights of ownership must be taken on.

The challenges are very real, for even when films, recordings, and photographs—even original "masters"—are held by public agencies or NGOs, copyright protection of works for hire encourages corporations to aggressively limit the ways in which nonprofits can make use of these assets. Late in my tenure as Director of the Country Music Foundation, the Country Music Hall of Fame developed an exhibit on the life of legendary singer/songwriter Hank Williams. As part of the exhibit, the museum produced a CD-ROM that contained 10 seconds of every song Hank ever recorded, linking the music to discographical information and historical photographs accessible to museum guests via a computer-driven touch screen display.

This project would seem to be a straightforward application of the museum's core mission—to inform the public about the history of country music. But the music publisher then in control of the Hank Williams catalog objected, arguing that the nonprofit Hall of Fame should be required to negotiate a synchronization license for the use of Hank's music because the music had been combined with text in the CD-ROM. The publisher offered to issue a "sync license" for $1.00 per year.

Despite the insignificantly low proposed fee, the Country Music

Foundation refused the license, indicating that the CD-ROM consti-tuted a routine museum practice and was "fair use," and that even a token payment would set a precedent that would likely prevent us from carrying out our tax-exempt mission in the future. This conflict was headed straight for the U.S. Supreme Court. (The publisher was Acuff-Rose, the company that had pursued the sampling infringe-ment case involving rappers Two Live Crew all the way to the top.) The conflict was averted, but never fully resolved. At the eleventh hour, influential trustees of the CMF approached the publisher with a simple message: "Just back off," and the exhibit went forward as planned.

However, a "back-off" message delivered in a back room is not public policy. Sooner or later, the Library of Congress, the Smithson-ian Institution, and major nonprofits such as the Institute for Jazz Studies, the Rock 'n' Roll Hall of Fame, the Country Music Founda-tion, and other libraries and archives need to move beyond their assignment as the mere caretakers and preservers of intangible heri-tage. These institutions must take the lead in pushing back against the growing footprint of restrictive intellectual property law and help stake out a lasting public right of access.

Ownership in Intangible Heritage is Aggressively Protected

The legal and regulatory framework surrounding intangible cultural heritage is copyright and its close relations, trademark and name-and-likeness rights. (This is the same structure that surrounds the world of books and libraries, but, until recently, the world of print conducted its affairs with a lighter touch than did corporations con-trolling music, film, radio, and television assets.)

Throughout the twentieth century, arts industries grew by at-taching protected revenue streams to a growing array of products. In fact, copyright advanced hand in hand with art forms such as film, recordings, and broadcasting, and copyright protection in turn facilitated the growth of arts industries. Although new technologies challenged the control mechanisms of the system from time to time, the overall trend through the twentieth century was toward greater revenue derived from an ever-expanding set of revenue streams pro-tected by legislation over a longer period of time.

The term of copyright was extended again and again—a process grudgingly certified by the Supreme Court only months ago. And the size of copyright and its cousins—the aforementioned "footprint"—grew apace. Activities that would have dropped immediately into a de facto public domain 50 years ago are today aggressively exploited as intellectual property.

For example, the King Family Foundation was paid "several hundred thousand dollars" (*60 Minutes* transcript) for the use of Martin Luther King, Jr.'s "I Have a Dream" speech in an Alcatel commercial. Subsequently, the foundation threatened to sue *USA Today* when the national newspaper published the same King speech

without permission. And, in nearly every edition of *The New York Times* readers are offered the opportunity to purchase what is, for the *Times*, a recently discovered heritage product—archival photographs. Only a few decades ago, the remarks of political, business, and cultural leaders—and the work of newspaper photographers—were treated as though these items moved immediately into the public domain.

Examples abound. Just months ago the Martha Graham Company wrapped up a court battle to secure the right to perform its founder's dances. A year ago, a *New York Times* writer chastised city police and fire departments for failing to monitor the exploitation of their NYPD and NYFD trademarks. Would issues of ownership and revenue have attached themselves to such intangible cultural products even twenty year ago? Probably not. But today, as never before, the perceived potential value of revenue streams attached to products or activities possessing even the slightest degree of artistry, creativity, or originality has caused copyright and an "intellectual property mentality" to seep into what used to be everyday life. Driven by the perception of value and profit, ownership rights attached to America's expressive life are today more extensive and longer lasting than ever.

Technology Complicates the Preservation Picture

Digital technology has not and will not save the "preservation and access day." Technology has, instead, spun off a cluster of thorny problems affecting both preservation and access in intangible heritage. Most vexing is the electronic Tower of Babel built out of layers of obsolete hardware and software introduced and abandoned during the past 20 years. In Nashville's entertainment industry, music publishers began transferring songwriters' work tapes and "demos" to Beta and other early digital formats in the mid-1980s. Little did they know that, in what seemed like the blink of an eye, those machines would become museum pieces. Today, many early digital tapes will play back only on the exact machine on which they were recorded—not the same *type* of machine but one that bears the same *serial number*. Woe to those publishers who completed digital transfers and then discarded their analog disc and tape originals. (Most did.)

Today, as the notion of a "master" or an "original" is replaced by temporary space on a computer hard drive, we are increasingly deprived of the central "information object" around which we can structure a preservation system. The combined result of proliferating recording technologies and vanishing "originals" is that for the first time in history, the recent past is significantly more difficult to retrieve and preserve than the early era of discs and film.

In fact, it is digital technology and its magical ability to produce perfect duplicates of original work that have made today's guardians of corporate heritage simultaneously excessively cautious and overly exploitative—cautious lest some undervalued treasure escape for a

pittance, exploitative to ensure that, if it does vanish into the digital ether, it will leave behind a substantial cash offering. Simply put, in a digital age it costs more to license heritage art.

Further, technology provides public and private organizations with the means to unburden themselves of the task of managing bulky, unprofitable historical collections. When Corbis—the Microsoft cultural-assets spinoff—purchased the Bettmann Archive of photographs, it shrank the number of images available from the collection's 17 million total to 225,000 that would be digitized. The remaining 16.75 million images were banished to Iron Mountain, cared for by a staff of one.

The Patent Office has taken to digitizing paper documents, then discarding originals. Items of "digital merit" to some unspecified beholder have, in a sense, made the cut; those images and performances will be seen and heard again and again. But photographs, films, and sound recordings not digitized may, for practical purposes, constitute culture lost.

It is perhaps easy to see why preservation of America's intangible cultural heritage has lagged. Big global companies have distanced decision making from cultural concerns and on-the-spot archival practice. The expanding term, reach, and perceived value of copyright and its cousins have diminished access to heritage property, and technology has handed us a parade of obsolete formats—a preservation nightmare that, ironically, mostly affects arts products created in the past twenty years.

There's a final reason why the development of policies engaging preservation of buildings, monuments, and the natural environment so energetically outstripped work in intangible heritage. When the fate of old structures and Mother Nature is in question, it's not hard to distinguish the characters who wear white hats from those who wear black ones. Paper companies, chemical plants, developers, and real estate tycoons are easy targets for public wrath, and the road to public policy is smoothed when the only interests compromised are those of big corporations and "fat cats."

However, recorded music, film, radio, and television exist only through the efforts of many creative individuals. The livelihood of many artists is linked to the effectiveness of copyright control. When we argue the public purpose in advocating reasonable access to intangible heritage, our efforts can be viewed as detrimental to the financial well-being of artists whom we admire and whose work we value. Certainly, the arts industries are not shy about trotting out songwriters and performing artists to argue on behalf of copyright extension or the criminalization of infringement. But well-founded or not, the perception that any resistance to the policy agenda of U.S. cultural industries hurts struggling artists has unquestionably hobbled efforts to define and advance broader issues of citizen access.

Despite corporate obfuscation and the inherent complexity of the task, efforts to advance a preservation agenda possess a distinct moral dimension. After all, if the expressive traditions that flourished under the umbrella of twentieth-century arts industries constitute

both our shared heritage and the finest metaphor for our nation's democratic experiment, shouldn't we, as citizens, assert reasonable control over our creative past?

Intangible Heritage and the Public Purpose

Absent a clear voice advancing the public interest, recent trends in public policy have, if anything, moved in the wrong direction; the marketplace has steadily expanded its authority over culture. Given recently demonstrated limits to the moral capacity of the marketplace, it appears especially important that we today assert the public purpose, pushing back against the reach of corporations and the copyright community.

How can we proceed?

First, I do not think it is useful to browbeat corporations or to demand that they shrink shareholder value by advancing a preservation or access agenda. Today, more than ever, public corporations and managers are held to the rigid pursuit of profit by diligent and demanding owners. Asking a media giant to act like an NGO is like trying to teach a pig to sing: It won't work, and it annoys the pig. Instead, we must develop a set of public policy principles and programs that will both protect intangible cultural heritage and ensure that the public retains reasonable access to heritage property. To be effective these programs must be more "carrot" than "stick," offering incentives to companies that will preserve and make available archival holdings of recordings, movies, manuscripts, and photographs.

A word or two about libraries: Every preservation and access movement functions beneath a public policy umbrella, and the library model is one of the most venerable and widely accepted of all public interventions in cultural life. Library values are deeply entrenched in global culture. It would come as no surprise to me if a typical community were to view public funding of a music archive or tax-supported film series as controversial and marginal, but never question appropriations for the local library.

The historical relationship between libraries and publishers, in which publicly funded libraries functioned as good customers who supported the publishing enterprise while absolving publishers of preservation responsibilities, can be seen as an ideal preservation model. (Although our public libraries do not have a preservation mandate, they have nonetheless preserved many treasures. Our research libraries have, as far as I can tell, done quite wonderfully.) Unfortunately, because of cost, inconvenience, lack of expertise, and a DNA hardwired to favor print, our libraries have made only tentative forays into the world of intangible heritage.

Preservation efforts in other sectors mentioned here in passing offer interesting models. For example, without actually "taking" private property, the environmental and historic preservation movements have instituted a web of incentives and deterrents designed to protect the built and natural environments. While paper companies and real estate developers may resent even minor limitations on their

absolute ownership rights, these industries have gradually learned to live with modest constraints on private property that advance a set of perceived public purposes. We can do the same with intangible heritage.

Drawing upon experience with old buildings and the environment, it is not difficult to imagine arts-industry tax credits earned for preservation efforts or for programs that make heritage sights and sounds available in classrooms. Public funding could be applied more generously to the preservation efforts of nonprofit archival institutions, or could be used to compensate arts companies so that designated historical copyrights could be duplicated and distributed solely at the discretion of an educational institution. Perhaps corporations could deduct a spectacularly appreciated value of archival holdings if the rights to a performance were conveyed to a nonprofit organization?

On the other hand, it is not beyond reason to imagine that, at some point in the future, the Federal Trade Commission or the Securities and Exchange Commission might require a corporation to develop a "cultural assets plan" as a precursor to a corporate merger or acquisition. Further, it seems reasonable that the sale of an arts company to foreign owners could be contingent upon assurances that American cultural material would be preserved and that American citizens would not be unduly deprived of access to heritage films, recordings, and photographs.

Developing and implementing these policies will be challenging. Unlike the average book, most heritage "information objects" are highly collaborative. Films, sound recordings, and broadcast transcriptions can best be viewed as bundles of rights and obligations protecting multiple revenue streams flowing to corporations, artists, producers, authors, composers, directors, and others. Although a single arts company generally controls the completed film or recording as a work for hire, many additional interests outside that company must be satisfied before a public policy program of preservation and access can be advanced. In this, as in other particulars, issues embedded in intangible heritage are more complex than those facing specialists in the natural and built environments.

Today, arts industry leaders are no more interested in a public preservation agenda than were their counterparts in chemical plants and real estate back in 1960. A few years back, the Recording Academy's educational arm approached the Recording Industry Association of America with a request for assistance in developing a database listing all recorded master recordings in major label archives. The industry resisted. As the RIAA's lack of support for the Grammy Foundation's national database indicates, the arts industries remain both protective of intangible assets and suspicious of any outside interference in their business, even if that involvement appears innocuous.

To develop and implement a preservation and access strategy we must do three things. First, we must persuade the public that this important segment of America's artistic legacy is at risk. At the

moment, the level of public outrage is low, although arts industry attacks on downloading, file sharing, and disc duplication are triggering an important secondary conversation about access, fair use, and the appropriateness of fees and penalties involved in the use and misuse of intellectual property.

Second, we must come together around a common message in those arenas where public policy concerning heritage property is debated and developed. The library community has been the only component of the cultural sector consistently involved in the copyright debate, but library concerns, though important, are inevitably narrower than the broad public purpose of preservation and access. In other public policy settings, such as Federal Communications Commission deregulation of radio and television station ownership or the sale of arts assets to foreign corporations, the cultural community has not been at the table at all.

Finally, we need to do everything in our power to nurture a policy community, and a policy sensibility, within the arts industries. I have a specific interest in this field, for the Curb Center at Vanderbilt is dedicated to analyzing the ways in which cultural policy is developed and implemented within American arts industries and within our federal legislative and regulatory systems. In fact, in the U.S., most of the policies that shape our cultural landscape are not created by cultural specialists, but by business regulators and industry leaders. We need to find ways to provide browbeaten executives and federal legislative and agency staff with the knowledge, resources, and sense of the public good necessary to enable them to act in the public interest in an atmosphere of bottom-line pressure and partisan politics.

Compared with big oil, big technology, and high finance, the arts industries—film, records, and the like—are "small potatoes"—high-risk activities that generate, for the most part, millions, not billions, of dollars. Leaders in the arts industries almost never work merely to "follow the money." If you scratch a film or music executive hard enough, you'll almost always find someone deeply passionate about his or her chosen art form. These caring corporate leaders must be identified and made part of a preservation and access agenda.

(A quick note of concern: The U.S. arts system developed in the early twentieth century and is dependent upon the capacity of corporations to exploit revenue streams attached to multiple arts products. Today, there are some indications that the digital environment is permanently dismantling that century-old system. If the system itself comes apart, the remains of shattered companies, including heritage assets, will be scattered or will be absorbed by a handful of global media industries. Even if the possibility is slight, the prospect of systemic failure in the arts industries adds urgency to our efforts.)

There exist some encouraging signs. The Library of Congress digital preservation program has finally gathered up an impressive head of steam. The National Film Preservation Foundation has achieved great things over just a few years, and the newly authorized National Recording Preservation Foundation (which I chair)

promises to engage corporate owners of heritage recordings in new and creative ways.

And the arts companies themselves sometimes find the capacity to do the right thing. In my last year as chair of the National Endowment for the Arts, the RIAA joined the endowment in a "Songs of the Century" program that provided music of historical significance free of charge to thousands of classrooms across the country.

Despite copyright bloat, a disarmed public, a technological rat's nest, and disengaged parent media companies, it is not too late to put intangible heritage in its deserved high position on America's preservation agenda.

Of Mice and Memory:
Economically Sustainable Preservation for the Twenty-first Century

Brian F. Lavoie

Introduction

Stewards of the scholarly and cultural record have grappled with the difficulties of preservation since the advent of recorded information. Necessity is the mother of invention, however, and preservation objectives have been met in some highly innovative ways:

On the dissolution of the Jesuit Order in 1773, the books from their Brussels house were allotted to the Royal Library. As the Library had no space to accommodate the new accessions, the volumes were left temporarily in the Jesuit church. The building was infested by mice, and the problem of how to protect the books was anxiously debated. The solution was to employ the secretary of the Literary Society to make a selection. "Useful books were to be placed on shelves in the middle of the nave, and the remainder left on the floor. In this way, it was calculated, the mice would satisfy their appetite on the latter, leaving the former unharmed" (Hobson 1970, 15).

New threats, such as "yellow snow," "vinegar syndrome," and "bit rot," have long since succeeded mice as the bête noire of preservationists. Yet even as the enemies menacing the perpetuation of society's memory change over time, one challenge is as familiar to modern preservationists as it was to the eighteenth-century Belgian Literary Society: the difficulty in marshaling sufficient resources to counter the ravages of mice and their modern equivalents. Unfortunately, the eighteenth-century solution to this problem persists to this day: Hard choices must be made, and all too often, only a portion of the materials at risk—and not always the most valuable—are selected for preservation, leaving the rest to be nibbled away over time.

Technological innovation leaves in its wake a steadily improved capacity to create and disseminate information. Recorded information is the raw material that serves as input to the preservation pro-

cess; consequently, as we extend our ability to make more of it, there is a corresponding need to expand the scale and scope of the processes aimed at securing its long-term retention. But the capacity to produce information has overtaken, and indeed is accelerating away from, the capacity to preserve it. As a result, preservation efforts are left to cope with the twin challenges of an ever-increasing quantity of at-risk materials, recorded in formats of ever-increasing sophistication.

These challenges can be partially met by nurturing the continued development and improvement of preservation techniques, processes, and workflows: in other words, by building and refining the technical infrastructure needed to support the long-term retention of the scholarly and cultural record. In concert with this, however, must come the development of the associated *economic infrastructure*: the mechanisms by which resources are allocated and organized to achieve preservation objectives.

This issue is certainly not new. The rapid development and proliferation of digital technologies have only amplified the scale and scope of the problem. But the digital revolution has also exposed weaknesses in traditional strategies for confronting the economic imperatives of preservation and, in doing so, has reinforced the need to revisit the question of how preservation can be shaped into a sustainable economic activity.

Preservation: Past, Present, and Future

The scope and scale of preservation, as well as the form its processes take, are, like many activities, constrained by limited resources. Responding to Nicholson Baker's charge that librarians, archivists, and other information professionals have overseen the loss of countless information resources in their original form through misguided reformatting initiatives, Richard Cox argues that "preservation is expensive and . . . preservation that assumes the maintenance of all originals is expensive beyond our (or Baker's) wildest dreams" (Cox 2001).

Partly as a consequence of its significant cost, preservation has frequently been characterized by procrastination. This in turn has led to sporadic bursts of preservation activity and funding, often taking the form of large-scale, Manhattan Project-type programs aimed at retrieving a situation that has already reached a state of crisis. The Brittle Books Program established by the National Endowment for the Humanities in the 1980s in the United States was a response to the belated recognition that materials printed on acidic paper were disintegrating into "yellow snow." The discovery that motion pictures produced on nitrate cellulose film stock prior to the 1950s were also crumbling led to the establishment of organizations such as the Hollywood-based Film Foundation and the Library of Congress National Film Preservation Board, tasked with arresting the process of decay and loss. Information resources are not the only subjects of this crisis-management approach to preservation: The famed American

frigate *Constitution* was a deteriorating hulk, relegated to service as a floating barracks, when she was rescued and restored in time to celebrate her one-hundredth anniversary in 1897.

As digital technologies for creating and disseminating information proliferated rapidly in the 1990s, a new preservation crisis loomed. The widely cited 1996 Task Force on Archiving of Digital Information report warned that "failure to look for trusted means and methods of digital preservation will certainly exact a stiff, long-term cultural penalty" (Task Force 1996, 3). Anecdotes illustrating the danger of inaction circulated widely: the oft-told story of the unreadable tapes containing a portion of the 1960 U.S. Census is but one example. The task force even recommended a few initiatives on a Manhattan Project-scale to address the crisis, including the creation of a "deep infrastructure" for preserving digital materials, as well as the establishment of a legal right for certified archival repositories to "exercise an aggressive rescue function" on behalf of significant materials perceived to be at risk (Task Force 1996, 8).

Up to this point, the crisis of digital materials has seemed to parallel the crises of embrittled paper, disintegrating motion pictures, and, to some extent, even decaying warships. A significant corpus of material has fallen into a state of disrepair through a failure to anticipate the need to take steps to secure its long-term retention. Programs and initiatives have sprung up to address the problem, supported by an ambitious research agenda focused on the processes needed to perpetuate these materials over the long term. These efforts have largely taken the form of "one-off" activities, funded by grants from public agencies or philanthropic organizations. It would seem, at least from an economic standpoint, that very little has changed in the preservation landscape.

In fact, the digital age has indeed wrought changes on the landscape, and these changes are of sufficient magnitude that the traditional paradigm of preservation through crisis management, or rescue ex post facto, will likely prove inadequate for meeting the preservation requirements of the twenty-first century. A growing proportion of the scholarly and cultural record takes the form of complex, networked digital resources. These resources are characterized by a degree of fragility and technology dependence far exceeding that found in most analog media. Some knowledgeable sources believe it is not an overstatement to say that in the case of digital materials, the preservation process must begin at the time of creation and proceed as a relatively continuous process over time—perhaps not far removed from the day-to-day management of collected materials. The difficulties in achieving the transition from preservation as a discrete event to preservation as an ongoing process will be amplified by the scale of the problem, as well by as the fact that there is little scope for postponing the time when preservation issues are confronted. In short, there is every indication that preservation activities will increasingly become immediate, large-scale, and sustained.

Preservation from an Economic Perspective: Three Key Areas

Much of the preservation research associated with the newest forms of information resources addresses the technical aspects of securing their long-term retention, that is, developing and refining the techniques by which these fragile materials can be maintained over long periods of time. But technical issues are only one aspect of sustainable preservation activities. Ultimately, these technical processes must be coordinated with the *economic* process of marshaling and organizing sufficient resources to achieve preservation objectives. In this regard, preservation in the twenty-first century will represent a significant departure from traditional practice. From an economic perspective, preservation will be redefined in three areas: responsibilities, incentives, and organization.[1]

Responsibilities

Preservation can be construed as an economic activity, in the sense that decision makers evaluate the associated costs and benefits and, in light of the result, determine the level of resources, if any, they will commit to it. Therefore, in considering the economic implications of preservation in the twenty-first century, a useful starting point is the identity of the decision makers who are likely to bear the responsibility of committing the resources necessary to meet preservation objectives.

Some of these decision makers are quite familiar with and have deep roots in the preservation community; they include collecting institutions such as libraries, museums, and archives, which perceive the perpetuation of the scholarly and cultural record as a fundamental component of their organizational mission. But the newest technologies for recording and communicating information have introduced new stakeholders into the preservation process. These stakeholders also embody a decision-making capacity in regard to preservation, and consequently, the division of labor traditionally governing preservation activity—in terms of the distribution of both responsibility and cost—has become unsettled.

A distinguishing feature of the networked digital age is that culturally significant materials are often outside the custody of the traditional stewards of the scholarly and cultural record. Digital materials that are licensed or subscribed to, such as e-journals, e-books, and online databases, are prominent examples; Web sites are another. The common theme across all these resource types is that the function of providing access to users is often separated from that of maintaining custody of the materials themselves, that is, physical possession of the "bits." The consequence of this separation of access and custody is that the entity who perceives the value or benefit of taking steps to secure the long-term retention of these materials is often distinct from the entity who owns the materials and therefore controls their long-term disposition.

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1 The following discussion is based in part on Lavoie 2003.

The likelihood that the preservation process will increasingly locate its starting point in the earliest stages of the information life cycle, at a time when custodianship of culturally significant materials may lie outside the custody of collecting institutions, suggests a need for at least a partial reallocation of the responsibility for preservation away from traditional stewards of society's memory to entities with no long-standing commitment to, or interest in, preservation of the materials under their control—for example, commercial content providers, software developers, and Web masters. It is imperative that these new decision makers in the preservation process be aware of their responsibilities and take steps to meet them.

There are signs of a growing recognition that the need to address preservation responsibilities extends beyond collecting institutions to encompass other stakeholders. A joint statement in 2002 on "preserving the memory of the world in perpetuity," issued by the International Federation of Library Associations and Institutions and the International Publishers Association, observed that "Libraries have traditionally taken care of the publications they have acquired, and have saved the physical artifact to safeguard the information contained in it. With digital information the safeguarding of the content becomes more of a shared responsibility between the producer and the collector of the information" (IFLA and IPA 2002).

It is easy to imagine the responsibility for preservation becoming even more diffuse than a two-part division of labor between collecting institutions and content providers. Efforts to collect and perpetuate materials of cultural significance may be undertaken by individuals and organizations motivated by nothing more than a keen interest in, and a willingness to assume the trouble and expense of, preservation. This approach has been successfully adopted in regard to preserving portions of the Web perceived to be of long-term significance. A useful example is September11News.com, a Web site that describes itself as a "permanent Internet archive of the events of September 11, 2001." Created by an individual named A. D. Williams, the site contains images, news articles, speeches, and other content documenting the tragedies of September 11.

Incentives

Preservation of the scholarly and cultural record cannot rely solely on ad hoc, informal efforts. The bulk of preservation activity must take place through professionally managed, programmatic efforts undertaken by stakeholders directly associated with the information life cycle of creation, management, and perpetuation. The decision makers among whom preservation responsibilities are apportioned must take steps, either severally or in concert, to achieve preservation objectives. To ensure that this occurs, each decision maker must perceive appropriate incentives to participate in the preservation process.

As mentioned above, it is likely that preservation in the twenty-first century will increasingly take the form of an ongoing process, rather than a one-off activity conducted at irregular intervals. In a

sense, this suggests a reinterpretation of what is meant by preservation, that is, preservation as *process*, rather than *event*. Transformation of the preservation process into an ongoing, perhaps even day-to-day, activity is likely to affect the allocation of resources to preservation in two ways: first, by increasing, in absolute terms, the amount of resources that must be committed to preservation; and second, by making the availability of these resources a matter of continuous, rather than occasional, concern. The incentives to preserve—the underlying motivations that collectively induce an entity or set of entities to contribute toward the realization of preservation objectives—must reflect these new imperatives.

But the question of incentives runs squarely into the issue discussed in the previous section, namely, the likelihood that preservation responsibilities will extend beyond the customary stewards of the scholarly and cultural record to encompass decision makers not traditionally associated with preservation. For a collecting institution, the incentives to preserve are couched within their mission of collecting, managing, and providing access to information resources. But for other stakeholders, the incentives to preserve are not fundamental to their organizational missions and therefore will be subjected to careful scrutiny prior to any resource commitment.

So, even as the incentives to preserve become more important, in the sense of needing to reflect an expanded commitment to preservation on a relatively continuous basis, they also become less assured. The new forms in which the scholarly and cultural records are manifested—in particular, as networked, digital materials—have driven a wedge between the objectives of preservation and the incentives to carry it out. In the past, collecting institutions typically dealt with physical materials that were purchased outright and transferred into their custody. The incentives for preserving materials of this kind, as well as the legal right to preserve, were vested in the same entity. But as a growing proportion of collections takes the form of materials that institutions provide access to, but do not physically possess, the incentives to preserve, as well as the right to preserve, may be distributed over multiple entities.

What are the prospects that a set of materials, perceived to be at risk, will in fact be preserved? Answering this question must begin with an examination of the incentives to preserve in the context of all relevant decision makers acting as stakeholders in these materials. Three key decision-making roles are of particular importance: the decision maker constituting the *need* to preserve, in the sense of recognizing a value in securing the long-term retention of the materials in question; the decision maker constituting a *willingness* to preserve, in the sense of setting up and managing the necessary preservation processes; and the decision maker embodying the *right* to preserve, in the sense of being vested with the authority to permit (or not permit) the preservation process to go forward.

A single entity may embody one, two, or even all three of these decision-making roles, leading to a host of possible relationships between the need to preserve, the willingness to preserve, and the

right to preserve. The organization of these decision-making roles, in regard to their distribution among one, two, or three distinct entities, can have profound implications for the underlying incentives to preserve. Imagine, for example, if the right to preserve is embodied in a decision maker distinct from the one that identifies a need to preserve? What are the incentives for the former to commit resources toward achieving the preservation objectives of the latter? An economically sustainable preservation activity must be supported by sufficient incentives to preserve, and these incentives are shaped largely by the organization of the decision-making roles underlying the activity.

In circumstances where the incentives to preserve are not sufficient to achieve preservation objectives, policies and other measures may be instituted to correct for any perceived incentive gaps. A variety of instruments may be employed to enhance, or artificially create, preservation incentives. These include, but are not limited to, government subsidies to fund preservation in the absence of private incentives to do so; legislation that makes preservation compulsory in certain circumstances, either by forcing the owner of the materials to undertake it or by requiring the transfer of the right to preserve to another entity willing to undertake preservation; and negotiation among relevant stakeholders to strike a balance between preservation objectives, preservation incentives, and the distribution of responsibilities and costs. The appropriate policy instrument will be a function largely of the circumstances surrounding a particular set of materials.

Organization

An appropriate distribution of preservation responsibilities among relevant stakeholders, accompanied by sufficient incentives, or motivations, for preservation to be undertaken, still falls one step short of characterizing the components of the complete economic infrastructure that is needed to support sustained preservation activities. The last piece that must be addressed concerns the organization of these activities: more specifically, strategies for organizing preservation resources to realize preservation objectives in the most efficient way.

A number of alternatives are possible. Historian Robert Darnton proposes the establishment of a national agency, tasked with "maintain[ing] a record of everything printed, painted, sung, acted, and composed within the public sphere." Darnton goes on to observe that a "collective memory bank of this sort should not be an expansion of the Library of Congress but rather a new entity—public but independent of politics, open to all but closed to lobbying, autonomous but administered in the public interest by a board of trustees" (Darnton 2002).

The creation of a national agency entrusted with such a diverse portfolio of preservation responsibilities is both ambitious and, in all probability, unrealistic. However, Darnton's suggestion hints at what is likely to be one of the most important themes regarding the organization of preservation activities in the twenty-first century:

that preservation will become an increasingly centralized, large-scale activity. Several factors point toward this conclusion.

The media on which information is recorded are becoming more sophisticated and functional, but also more fragile and technology dependent. Consequently, the time horizon beyond which preservation issues must be addressed is shrinking. In the extreme, the preservation process may begin as soon as an information resource is created and proceed on a continuous basis over time. Preservation will almost certainly become a more ubiquitous component of the day-to-day collection-management responsibilities of custodial institutions and will absorb a commensurately larger portion of their operating budgets. In these circumstances, it is reasonable to imagine preservation undergoing a transformation from something akin to a cottage industry, performed by a relatively small number of highly trained practitioners, to something that more closely resembles an assembly-line operation, performed more frequently and on a larger scale than in the past.

If preservation does in fact become an increasingly routine component of collection management, rather than an activity that can be postponed indefinitely or even disregarded altogether, several consequences are likely to follow. First, as discussed above, more institutions, organizations, businesses, and individuals will come to perceive themselves as stakeholders in the preservation process. Second, the increased frequency and scale of preservation activities will encourage the development of a consensus in terms of what "successful preservation" means in regard to particular classes of information resources. Third, the emergence of a consensus of this kind will eliminate much of the idiosyncratic nature that currently characterizes the preservation of complex digital materials, leading to preservation processes that are well understood and standardized across broad communities of stakeholders.

These consequences suggest that in the twenty-first century, stakeholders in the long-term retention of culturally significant materials may realize considerable benefits by organizing preservation as a collaborative enterprise, in which broad communities band together to achieve shared preservation objectives and, in the process, leverage common infrastructure, lower costs, and eliminate redundancies. There are multiple strategies for organizing preservation efforts to realize the advantages of centralized, large-scale economic activities. One approach is the development of a sustainable market for preservation services. Such a market would consist of, on the demand side, groups of stakeholders who have a common interest in the preservation of a particular set of at-risk materials, and, on the supply-side, trusted entities specializing in the provision of preservation services. A market of this type could yield a number of benefits, chief among them being that specialization in preservation services creates the opportunity to achieve lower costs and higher production efficiencies through economies of scale. In addition, a growing demand for preservation services, combined with a centralized, large-scale approach to organizing the provision of these services, might

serve to expand the menu of standardized preservation services that could be offered in an economically sustainable way, compared with what might be possible if preservation were organized as a highly dispersed, small-scale activity conducted by institutions for which preservation was but one of many responsibilities.

Key to the development of a sustainable market for preservation services is the cultivation of trust between those who would supply preservation services and those who potentially would avail themselves of these services. Even with the efficiencies realized through economies of scale, preservation will remain an expensive proposition. Preservation is an investment—a cost incurred up front in order to obtain benefits that might not be realized for decades. The risks associated with failure are potentially enormous, not only in monetary terms but also in terms of the incalculable loss that would attend the destruction of some portion of the scholarly or cultural record. Institutions that are willing to invest in preservation services will need assurance that these investments will be protected.

Conclusion

From an economic perspective, many of the obstacles to preserving the scholarly and cultural record in the twenty-first century seem quite familiar. In the broadest sense, they can be distilled into the venerable economic problem of matching scarce means to competing ends. But the scale and scope of the current preservation challenge suggest the need to reexamine the mechanisms by which resources are channeled to preservation activities. Fundamental to the development of a new economic infrastructure for preservation is the recognition of an increasingly diverse set of decision makers associated with the preservation process; an understanding of the complex relationships that might arise between the need to preserve, the willingness to preserve, and the right to preserve; and a reevaluation of how to organize preservation resources to meet preservation objectives in economical ways. By engaging all stakeholders in the preservation process, ensuring that appropriate incentives to preserve emerge, and organizing preservation activities in ways that leverage resources and maximize efficiency, significant progress will be made toward preventing the twenty-first century equivalents of mice from eating around the edges of society's memory.

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In Support of Long-Term Access

Abby Smith

Setting the Stage

This is neither a commentary on the preceding papers nor a summary of the discussions held in May 2003. Instead, I will try to give a sense of the various views expressed by the presenters and respondents, identify the issues raised in the subsequent discussions, and highlight the implications of the day's deliberations.

The central question that the papers address is whether or not the infrastructure in place for preservation is appropriate to the new information environment. In the case of libraries and archives, the preservation infrastructure that supports print-on-paper collections is well developed and relatively well resourced. Despite the difficulties seen by Anne Kenney and Deirdre Stam and others in funding and staffing this infrastructure, it still serves as a benchmark for other preservation services.

Kenney, as well as Dan Greenstein, Bill Ivey, and Brian Lavoie, believe that this model is inappropriate for digital and audiovisual materials. Based on decentralized, locally oriented, ownership-based preservation strategies—strategies that make up what Dan Greenstein calls the "buy it and put it here" model—the infrastructure in place for books and serials runs up against a host of technical, legal, and policy difficulties when used for moving image, recorded sound, and electronic resources. Moreover, these strategies will not, Greenstein argues, even serve the needs of imprints that are not rare. As Lavoie points out in his economic analysis of archiving of (nonunique) digital materials, the very incentive for any single institution to preserve commonly held materials disappears in this scenario. Thus it is not only digital and audiovisual collections that are undercut by a strategy of decentralized, ownership-based preservation. In the long run, the print collections that form the core of library and archival collections today are equally affected.

If this decentralized, ownership-based model for preservation is not scalable for the present and future, then what model or models will be? And what is an appropriate infrastructure to support preservation in the twenty-first century? What are the economic models, policy and legal sanctions, human and financial resources, tools, and technical expertise that will make possible the myriad actions necessary to ensure long-term access? After examining the changing nature of users, collections, and collectors, I will then discuss specific features of the infrastructure that need to be changed.

Patterns of Collecting and Use

Answers to the core questions of preservation—what are we to collect and preserve, for whom, for how long, and who should assume the burden of stewardship—have changed dramatically in the past few decades. While there is agreement on the proximate causes of these changes—the growth of digital information technologies, the explosion in the production and dissemination of information, the constraints imposed by expanding copyright monopolies, the static or shrinking resources devoted to preservation, and the destabilization of cultural and intellectual canons—the ultimate cause is hard to identify. That cause is no doubt rooted in the fundamentally different roles that information resources and the intangible cultural heritage that Ivey describes play in our lives. The demand for access to these resources has escalated, as have the means to deliver them. This escalating demand for access has been accompanied by clear user preference for direct access—access that is unmediated both physically and intellectually. Study after study shows that most users prefer desktop delivery of information. (As the Digital Library Federation [DLF]/Outsell study confirms, the user perceives such delivery, even when mediated by the library, to be Web-based and thus unmediated [Friedlander 2002].) Peer-to-peer file swapping happens not only among students trading favorite music tracks but also among high-energy physicists using the preprint service arXiv.org. Indeed, there is a growing movement among scholars to "disintermediate" their communications from publishers and libraries, some in the hope of making their work accessible in a more timely way, others in the hope of lowering publishing costs.

The emerging paradigm of peer-to-peer, Web-enabled communication ends up inadvertently eliding the traditional guarantors of long-term access, not to mention authenticity and reliability. Scholars and the public alike recognize the socially beneficial function that libraries and archives perform in protecting these attributes of information. Nonetheless, given the enormous costs of ensuring long-term access—costs that are largely hidden from the view of the primary beneficiaries—it becomes crucial that preservation serve the purpose of access directly and that this be generally recognized. As Ivey and Lavoie remind us, without the promise of near-term access, preservation will not find the widespread public support—financial, regulatory, and otherwise—that it needs.

By defining preservation in the context of access, present and future, we are forced to recognize that preservation demands active management of information resources. Moreover, this management should begin well before the resources end up in the institutions traditionally charged with their long-term care. Preservation cannot be managed by libraries, archives, and other so-called memory institutions with the kind of autonomy they have had in the past. Preservation organizations must enlist the help of the users, the creators, and the numerous nonprofit and for-profit stakeholders that Brian Lavoie describes. What do we know about who these users are and what would motivate them to contribute to or support long-term access?

The User

The user for whom collections in libraries and archives have been assembled over the past two centuries is not the same user whom those institutions anticipate serving in the near future. Wendy Lougee noted in her response to Dan Greenstein that the use of research collections has expanded beyond the walls of the library and even the grounds of the campus. The off-site users who come to publicly available academic and research collections through the Web and Web-accessible catalogs are not the usual self-selected experts, such as faculty and graduate students, who are well versed in searching the hierarchical orders created by libraries and archives. Among these nonexperts are many undergraduates, who tend to use Google and other search engines as their default mode of searching. But an increasing number of today's users are in the expansive category of "lifelong learners," which includes schoolchildren, hobbyists, and independent researchers of all stripes from around the globe. These users often seek direct access to both primary and secondary sources, though the former are more likely to be in the public domain and hence accessible to those not affiliated with a university or college. There is a growing number of commercial users as well—users who only a decade ago would come to the reading rooms of audiovisual and rare book collections but who are now able to gain access to what they want through the Web.

In her response to Greenstein, Lougee argues that the trinity of content, access, and users is the only meaningful context in which to understand changing patterns of use. Greater access can drive increased use; the example of JSTOR and the changing nature of use of the JSTOR journal articles provided early instruction on this point. Another lesson derived from the JSTOR experience is that content must be structured in a way that facilitates access and use. People often prefer the easily accessible over the more reliable, when the latter is more difficult to get to. Lougee cautions that what users really want is an impossible mixture: the ease of finding that is common to the Web, the sophisticated functionality of complex and intelligent systems, and the depth and reliability of collections found in libraries and archives that provide access to value-added electronic resources.

This law of convenience applies to both sophisticated and casual users, as shown by the DLF/Outsell data. This preference probably

has more to do with individual users' sense of the value of their time than it does with the value of the information they are seeking at a given time for a specific purpose. Not all searchers settle for what they find through the path of least resistance. What is important to note is that they wish to be the ones who decide about the investment of their time in search and retrieval; they do not want librarians and other information brokers to make these decisions.

Participants agreed that there is an ongoing need to follow more closely the emerging patterns of use. Recent studies, such as the DLF/Outsell report, OCLC's study of college students (OCLC 2002), and the overview of user studies compiled by Tenopir (2003), are frequently cited to lend statistical weight to anecdotal reports.

The Collection

Many of the most significant disagreements at the meeting centered on the issue of selection and assessment of value, which has been a cornerstone of preservation strategies to date. The issue of selection for preservation, or what archivists call "appraisal for long-term retention," has preoccupied preservationists for decades. Assessing the relative value of an object or collection routinely precedes the decision to take an action to preserve. Although individuals have long debated the criteria for deciding value, there has been little argument about the importance of assessing value as such. But this, too, has changed.

There is a sharp disagreement on the question of selection. Many believe that it is worthwhile for collecting institutions with a preservation mission—libraries, museums, archives, historical societies, and so forth—to dedicate time and resources to selecting items first for acquisition and subsequently for preservation. Those who disagree feel that such activity is not feasible or desirable in the current information landscape.

The fault line is clear. Many participants at the meeting, for example, asserted that one of the fundamental purposes of memory institutions is to select information and cultural resources that meet a certain benchmark of value. That benchmark could vary from one institution to another, depending on its core clientele. Moreover, within a single institution, those benchmarks could evolve over time.

Nonetheless, setting limits to collecting is important for several reasons. It is only by careful editing that we can build collections that provide depth and breadth on chosen subjects and, at the same time, exclude those resources with dubious provenance, uncertain authenticity, and lack of relevance. Selective collecting is also an economic mandate, many argue. Since institutions cannot afford to acquire and serve everything of potential interest to some patron at some time in the present or future, selection is a matter of engaging in good husbandry and maximizing service to the communities they serve. Some have expressed concern that users expect that anything found in the collection of a library or archives carries a certain warrant of value and authenticity. If something is found in a library, this means that the library ranks its intrinsic value above that of other information

resources that have been excluded. To give one lighthearted but not exceptional example, many lay visitors to special collections libraries that have a research collection of, say, pulp fiction or first-edition paperbacks need to have an expert—the librarian—explain why these materials are worthy of collecting in such depth at a serious institution. The explanation often entails a short discourse on the principles of selection that makes it clear that such items are valuable *only* if collected in depth: Context is highly prized among collectors. That said, the object's intrinsic merit has nonetheless been validated by inclusion within the library's walls.

Other meeting participants argued just as strongly that this kind of selection is, in the words of one historian, a "waste of time." It is a waste of time because the flood of information makes collecting en masse and migrating digital data less time-consuming and requires fewer human resources than does selecting among electronic resources or, for that matter, the voluminous paper trails that many historical figures and organizations leave in their wake. The promise by some technologists that collecting and migrating digital data will soon be automated, and that metadata will be automatically extracted in due course, encourages those who see intellectual flaws in selection per se. Looking at what is and is not available for present researchers in institutions leads them to conclude that human judgments are unreliable for shaping the historical record, at least in the context of the present deluge of new information. We cannot predict what people will find valuable in the near or distant future, they contend.

At heart, it is the scale of distribution on the Web, the richness of its content, the diversity of its genres, formats, and authors, and its unpredictability that lead to skepticism about the feasibility and desirability of selecting Web-based materials for long-term access. One technologist proposed the model of "harvest and purge" for Web-based materials; that is, to crawl and store Web data, then migrate or otherwise manage it for as long as it can be or needs to be kept. One can always throw it away later, but once it disappears from the Web, it is next to impossible to get it back. One can even keep these digital objects alive for several migrations before a user or collector comes along to add value to the data through description, curation, and so forth, and the data find a new home where they will be actively managed over time.

Some argued that selection of digital data for long-term access (that is, preservation) no longer occurs at point of acquisition, as it has with books and other analog formats. When libraries find themselves in the business of providing access to information they license from a third party, they can forgo the notion that "acquiring" to provide access obliges them to preserve the resource for long periods of time. In the world of archives, this is a familiar pattern. Archives can manage a vast amount of records for fixed periods of time without committing to their long-term access. The decision to maintain records over time is made during the appraisal process, which often takes place years after records are acquired. There is no reason why managing digital data for access cannot happen in a similar way,

with disposal and retention decisions being made much later in the life cycle of the information.

The issue of completeness of information is one that librarians and scholars pressed, both those who value and those who argue against careful selection for collections. A user must have confidence that the information provided by a library or archives is complete to the extent possible, and that when it is not, that fact must be marked. That relates to the reliability of the information.

The collection's breadth is crucially important for the nonquantitative disciplines in general and the humanities in particular. Many researchers believe that access to a largely unedited collection of resources (for example, a text with all drafts or a set of complete, unexpurgated business records) will enable them to better understand the nature of the environment under study and how it shaped the final outcome—the context of an event or condition or creation, in other words. A corollary of that belief is that there is risk to ultimate knowledge in not saving something, even if its present value is unknown or appears to be slim. Given the role of contingency in historical phenomena, that risk is greater in the humanities and studies of culture than in the physical sciences (though this is changing, particularly in the observational sciences). Scholars in all fields have long understood the value of context in hermeneutics and have thus hailed the signal purpose of archives and special collections to preserve the context in which information arose or was fixed, used, or collected. This fact alone would argue for the massive collecting of Web-based materials.

A final factor that makes it difficult to weed out nonrelevant digital data is that they are seldom fixed or bounded into final forms that remain stable for long. A digital publication can have many versions as it changes over time; unlike print-based publications, it is often designed to be updated by the creator or publisher. Because few digital objects are fixed, basing decisions about what to select and preserve on the old model of fixing information to an archival medium can be perplexing.

Broadcasting archivists have to grapple with information that has temporal instability. Taking a cue from them, those who wish to preserve and maintain access to a constantly changing Web publication should decide on a sampling strategy that best reflects what is essential to that site. Broadcasting archivists offer an equally important lesson for digital archiving because broadcasts, moving-image materials, and audio are all constituted from myriad elements that are edited time and again to produce different versions. Most "final products" in audio or visual collections comprise many "production elements" that are recycled and recombined for different times, audiences, and purposes, and are often reborn into new consumer products or are integrated into new productions for broadcast. Indeed, it is their constant selection for reuse that appears to favor their long-term persistence. Use drives access, which in turn drives preservation.

The Collector

One element in this changing information landscape that has stayed remarkably the same is the individual collector. The role of the collector in identifying value and context, and bringing in uncollected materials for curation and long-term access, remains crucial in the transmission of knowledge from one generation to another. One of the best-known collectors among the "digerati" is Brewster Kahle, and his forays into Web collecting bear many lessons, not the least of which is that people routinely refer to what the Internet Archive does as "archiving," when it is in fact collecting and providing access, pure and simple. (Indeed, the fate of Kahle's collection after his demise is unclear.) Kahle collects in ways similar to those of broadcast archivists. The Web crawlers at the Internet Archive sample certain parts of the World Wide Web every month; they sample other sites at differing rates. What they crawl is determined by Kahle's assessment of which features of the Web he finds most essential to document. He has identified the essence of the Web as its ephemerality, its democratic nature and dynamism, and its ubiquity. While his crawlers do exclude some parts of the Web for his collections, such as many commercial sites and all those devoted to pornography, the crawlers are in turn excluded from countless others because they are gated. The exclusive ownership of so much information of the Web, which parallels information in other formats, presents formidable challenges to the harvest-and-purge model of building persistent digital collections.

A final point about the difficulty of assessing value casts doubt on one's faith in the "past is prologue" theory of preservation. Lougee, in her response to Daniel Greenstein, pointed to a growing body of evidence that the new uses made of digital texts are altering the ways in which their users perceive value in the print collections. She mentioned The Making of America site at the University of Michigan as one example of books whose value and use were transformed through digital distribution. Out-of-print public domain American imprints that were virtually unused in print form see very heavy use in digital form. Is there really any way to extrapolate what we know about the use of print into the digital realm?

In sum, all we seem to have learned so far is that digital text users value highly the ability to reuse and repurpose resources. That would lead one to see digital texts as one sees moving-image and audio objects, that is, in terms of their "elements." We can imagine the digital user as one who is now able to build private collections and libraries of his or her own from existing digital objects taken from all over. In a way simply not possible in the analog world, users in the digital realm can now become collectors as well. The full implications of this phenomenon are just beginning to be thought through by digital scholars, teachers, and serious researchers.

Use in the digital context upsets certain concepts of value for the collector from the analog world, and this has significant implications for libraries as collecting institutions. In some sense, scarcity as a value is replaced by ubiquity as a value: The more things are used,

the more they will be used and the more likely they will be preserved. This has serious consequences for the fate of libraries' long-held print collections, which continue to grow rapidly but which, according to this scenario, will be superseded by digital delivery of text. While digital content is currently only 20 percent of most Association of Research Libraries (ARL) acquisitions, both Greenstein and Lougee reported that it is more heavily used than that number might suggest. While the DLF/Outsell study shows us that people value hard copy, it also shows that they prefer it for a limited set of research and pedagogical tasks. For delivery of content, academic users, like others, prize convenience. This has been borne out in practice by the University of California's Collection Management Initiative.

As more quotidian titles are available in digital form, library collecting will change. Given Greenstein's observation that libraries are unwilling to preserve nonunique imprints systematically, we can predict that, in the future, there will be little willingness to collect and retain nonunique items that are commonly available through various subscriptions if there is some guarantee—from the publisher or a central archiving service (or both)—that they will persist. This will be true not only of such genres as newspapers and journals but also of the audio and visual resources that will find greater and greater use in the coming decades. The question then becomes who is responsible for ensuring their long-term access if that is no longer a routine activity of libraries. Neither libraries nor publishers see that mission as core to publishing and distribution companies, especially those in the commercial sector. Yet few if any libraries would say that they are now able to expand their preservation activities to include stewardship both of the full range of analog formats and of the increasing load of digital information.

The question therefore turns to the nature of institutional commitment to preserve obsolete or nonrare analog formats. All archives and libraries that identify themselves as research libraries see preservation as core to their mission. But as the perceived value of print collections, not to mention that of LPs, audiocassettes, and videotapes, lessens over time because of dramatically reduced demand, will research libraries be willing to devote resources to their preservation? If not, which institutions will see that as their responsibility, and what is their capacity to undertake this work?

Institutions and their Readiness

Early in the discussion, participants agreed that preservation failures of the past—be they the loss of census data from the 1960s, the occasional failure by libraries or publishers to follow reformatting standards, the decisions not to retain original materials after reformatting, or any other that can be cited—are more often organizational than technological in nature. Some who believe in the promise of the Internet to democratize collecting and preserving also tout its ability to obviate such organizational problems by going around organizations altogether. Others caution that those who do this risk finding

out for themselves what private collectors have known for centuries: Collections need a stable organizational environment to survive for more than one generation. Organizations alone endure long enough to provide the "perpetual care" that collections require to remain fit for use. Institutional longevity allows them to build and sustain the infrastructure necessary to carry on the work of preservation. That infrastructure comprises not only physical support—technology and buildings most notably—but also human resources and relationships, from skilled experts to relations with both scholars and the local fire department to an institutional commitment in the executive offices. Organizations can commit to the long term, and doing so is not a one-time investment.

Need for Systemic Changes

But, as Kenney correctly notes, the very institutions that have preservation as their core missions are themselves in a period of extraordinary instability. She advises libraries and archives to streamline preservation handling and treatments, mainstream specialized activities, and embrace "good-enough" practice in order to keep pace with the demand for preservation. That involves a significant adjustment in the professional practice of many preservationists, trained as they are to seek the best-possible solution to a problem. But such a change in approach is achievable, given some appropriate resources and strong leadership at all levels of the organization.

There is a need to move away from fixed solutions tied to carefully developed standards and to move toward good-enough solutions that can be adapted as both the environment and the technology change. Kenney and others call not only for development of automated techniques for preservation treatments but also for the assurance of completeness and authenticity that users expect from libraries and archives. Such automated solutions may ease the burden on preservationists in the long run, but only if those technologies embed the core values of preservation. Kenney, for one, does not believe that the kind of crawling done by the Internet Archive meets those high standards.

While arguing that technology may aid preservation in discrete and identifiable ways, Kenney asserts that preservation is not essentially a technical problem. The fundamental challenge she sees facing preservation organizations is the same one Greenstein identified: how to cope with the scale of information production. Kenney and Greenstein agree that any strategy to effect the economies of scale necessary for satisfactory solutions would demand a change in professional and organizational cultures that extend beyond the preservation community. Those solutions will demand a collaboration among libraries and archives and many stakeholders that is so fundamental and so radical that it becomes, in effect, an interdependence.

The notion that libraries must collaborate to preserve access to print collections is widely shared. But the call for interdependence is likely to be quite controversial, once its implications for organizations and their governance practices are fully grasped. For decades,

libraries have cooperated with varying degrees of success on the collection and preservation of specialized literature. Such arrangements have enabled them to have access to niche imprints that they would not otherwise have, while sharing the responsibility of preservation. Required now, however, is a wholly different kind of shared collection management: the collection and preservation of common imprints, widely held among institutions, even if not regularly used by faculty and students. Furthermore, as Kenney notes, the decoupling of ownership and governance necessary for that to happen demands an interinstitutional trust that goes beyond contractual agreements, though these will be necessary as well.

Why Cooperate?

What incentives will motivate libraries to cooperate and become interdependent where they have competed before?

The primary motivations will be economic—what a capitalist might hail as "enlightened self-interest." As digital delivery supersedes analog as the preferred access mode for most information, the level of collection redundancy that was necessary for local access actually becomes a potential liability. If collecting institutions take seriously the expressed preferences of their users, they will conclude that they must collect, manage, and preserve print differently. The availability of digital information, even if not currently widespread for whole classes of information resources, is already fundamentally changing the ways people use collections, which collections they use, and the values that they place on various collections. If institutions do not seize on the economies of scale now available for the management of print through digital technologies—technologies that will, when fully implemented, lead to better service and lower costs—they will be swamped by the rising tide of information resources demanded by their users.

Both Kenney and Greenstein see in functional streamlining and shared collection development the possibility of redeploying resources for emerging needs. Those resources will be needed for the initial costs of work redesign and staff training. Maintaining a shared collection management environment will incur costs. These changes will also be costly in time. The need to build and nurture relationships of trust will be an ongoing cost that will require reliable systems of information sharing, both technological and personal. Consultation with colleagues takes time, a resource that is growing scarce. But automated information sharing and technologies for remote conferencing may ease the way, once relations of trust have been engendered.

Paula Kaufman, in her response to Kenney's paper, cites the infamous case of Xerox "fumbling the future" when it let the mouse and the GUI interface "leak out the front door" to be developed by competitors. If libraries and archives are not quick to respond to the need to reach beyond traditional approaches, she warns, then others will. If that happens, the current generation will simply grow up without using the library, because other entities, such as search engines, meet

their information needs more conveniently. Looking to the example of the Internet Archive as a nonlibrary preservation entity (or competitor), some librarians lamented that it does not rigorously follow good archiving practices. Others rebutted that the Internet Archive is a clear case of good-enough practice, especially in the near absence of library- or archives-led efforts to collect the Web on such a scale.

The role for memory institutions has become more complex in today's heterogeneous information environment. It is, therefore, more critical than ever that these institutions focus on the core missions that are unique to them. Among the most crucial and socially valued is to warrant the authenticity and completeness of their information resources—to remain a highly reliable source of highly reliable information. This becomes their competitive advantage in the information landscape of the twenty-first century.

Building Stakeholder Support

Kaufman discussed the need for libraries and archives to develop trust with several communities of stakeholders. Stakeholders include not only users, such as faculty and students, but also governing boards, administrators, government officials, and the general public. Faculty members, for example, increasingly fear that their campus library will, in a shared-collections scenario, subsume the needs of local users to those of a larger and, they assume, more homogeneous and impersonal collection. Under scenarios of shared collection management described by Greenstein and others, in fact the opposite would be true: These shared metacollections could afford to be more diverse and specialized. But that assumes the careful shaping of collections among partners and possibly greater commitment on the part of some faculty in advising the collection development staff.

Faculty who are paying attention to the rising cost of journals and monographs also express the fear that reducing redundant purchasing, a likely result of shared collection development, will exacerbate the economic problems of academic publishers. This fear points to the need for libraries to put the series of related problems—the crisis in scholarly publishing, the crisis in preservation funding and management—into the larger context so that faculty and other stakeholders can see that treating the symptoms (for example, a decreased demand for monographs) rather than the underlying causes of the scholarly publishing crisis will be harmful in both the near and long terms.

Again, we see that patterns of use are very important to consider when developing effective and cost-effective preservation strategies. Monographs, in contrast to scientific journal literature, are used intensively but not frequently. The former tend to have a longer productive shelf life. This argues for spreading the cost of long-term access across a network of institutions, just as Greenstein and others propose. A more cost-effective means of ensuring long-term access to back files or retrospective literature ultimately has a beneficial effect on the whole chain of scholarly communication; it is good for the entire system, even if it may be of no immediate benefit to the particular problems of specialized monographic publication.

Libraries and archives have a vital role in forging the alliances that will ensure a healthy and accessible research resource base. Libraries, for example, are uniquely positioned as an all-campus resource to present the broadest possible view of the information landscape that we now inhabit. An educated and committed consumer is a vital part of organizational readiness.

Leveraging Past Investments for Future Gains

Another key element of institutional readiness is the ability and willingness to leverage past investments by cooperating with other collecting institutions to achieve economies of scale. One of the more controversial topics at the meeting was the need to develop and sustain centralized service centers for a variety of preservation activities, beyond shared collection storage. Several managers advocated strongly for the development of centralized provision of such services as preservation reformatting, deacidification, conservation treatments, and other actions requiring highly skilled labor and expensive equipment. Arguing all libraries and archives would require serious, sophisticated preservation provisioning but that only a dozen or so of these institutions would be able to afford in-house facilities to meet that demand, participants called for moving quickly to develop these "industrial" facilities by several willing libraries. These facilities would then be able to serve the larger library community, most likely by spinning off nonprofit entities. Developing the idea further, one could see different service centers specializing in different formats or different media, for different sorts of artifacts. All emerging models of digital preservation are seen as being embedded in a larger network of preservation partners, from the Library of Congress's National Digital Information Infrastructure and Preservation Program (NDIIPP) to the network of libraries collaborating with the Massachusetts Institute of Technology in its deployment of the DSpace digital archiving program. Why should the same not be true of analog format preservation?

In response, several people expressed serious concerns about the trade-off between quality and quantity—that industrial-scale "preservation factories" would not provide the level of treatment many artifacts warrant. There will still be a need for highly specialized or custom treatments. Others expressed a different concern—that institutions that were not leaders in this endeavor would be marginalized. Those concerns were rebutted strongly by others who contested that it is precisely the small- and medium-size institutions that would benefit from the affordable availability of such services. At the same time, those with specialized expertise in one format or treatment or another would not be disadvantaged because, as one computer scientist said, "in a network, size does not matter."

Old habits of competition among institutions of higher education and their libraries die hard. However, there are many examples of colleges and universities choosing to cooperate in certain areas (for example, preserving information resources) while continuing to compete in others (for example, vying for faculty and students).

The idea of shared preservation facilities, like the proposal for shared collections, was contested on largely political rather than economic or technical grounds. These proposals appear to be at risk of foundering over the lack of sufficient trust among libraries that historically attach a good deal of prestige to claiming a preservation mission. The successful examples of collaboration cited—those of the Five Colleges in western Massachusetts and of the University of California—are based on relationships of trust built up over years through cooperation in other areas of endeavor.

It is not only among other libraries and archives that preservation institutions must cooperate to ensure long-term access in the present century. They must cooperate with the commercial sector as well. Such partnerships will depend on trust that must be built up and sustained over time, and that trust will be crucially dependent on a policy environment that supports cooperation.

The Policy Environment

Knowing that there will be many new preservation partners that are far beyond the walls of libraries and archives—from computer and materials scientists to legislators to for-profit publishers and distributors—it becomes vital to ensure that the laws, regulations, and enabling agreements needed to support these partnerships are in place. The area of policy that has received the greatest attention is copyright and the host of rights that encumber information resources. But the monocular focus on rights management can blind us to equally important concerns, such as the continuing failure of business models too dependent on copyright for revenue and the erosion of information as a public good that fuels innovation and creativity. The proliferation of information produced within the academy, particularly specialized literature, is widely remarked, usually with some dismay. But of far greater significance in the information landscape is the increasing amount of material that falls outside the purview of the academy—neither created nor consumed by it, except as an artifact of culture to be studied (such as pop music, animated cartoons, and television programs). For audiovisual and digital materials, commercial and noncommercial actors must work in concert to ensure the preservation of cultural heritage. Strong partnerships between the commercial and nonprofit sectors are the linchpin of the NDIIPP strategic plan. This includes direct relations between content producers, such as music and book publishers, as well as academic society publishers, the National Science Foundation, and the supercomputing centers.

Ivey makes a strong case for special efforts to include the arts community in the network of preservation partners. He calls for libraries, as centers of public trust, to play a leading role in bringing the creators and distributors of these arts into the evolving network. His argument starts from the observation that our culture does not value intangible heritage as a public good that demands public protection and that it will therefore always be at risk from larger social

threats. A case must be made for the value and long-term steward-
ship of the creative work that is often seen primarily as commercial
product if it is not to suffer the fate of the RCA Records vault. He
argues that libraries are uniquely positioned to make this case.

This clarion call for libraries to take up the cause of intangible
heritage—materials, as Ivey points out, that in America are both
"cultural heritage and corporate asset"—comes at a curious juncture.
It comes at precisely the time that libraries, not used to seeing their
print collections as "corporate assets," face the fact that their new
digital collections are viewed as such by the companies that license
them. Print-based research libraries find themselves facing the same
legal and market environment as, for example, music libraries and
film archives do. Suddenly, the institutions that we have relied upon
to take the long view, as he maintains, are struggling to find in the
new digital rights regime their sanctioned ability to do so.

This new environment is hostile to the long view by which pre-
serving institutions abide. The legal environment will no longer al-
low libraries and archives the luxury of making fine, but heretofore
useful, distinctions between access and preservation. Access will be
driving preservation, and to succeed in their preservation mission,
libraries must therefore "stake out a public right of access." Fair use
is an exemption from the copyright law whose power, if not asserted
regularly, will erode as markets grow up to meet access demands.
Ivey is, in short, calling for an active public campaign by libraries—
one that should be on a scale comparable to that for brittle books and
waged in Washington.

The public campaign should be informed by economic reality
and be based on the assumption that commercial partners in preser-
vation have more to gain through cooperation than through competi-
tion. The primary role of the libraries would be to inform the public
about what is at stake if this heritage is lost and to increase the level
of outrage. The volume could be great if libraries and archives were
to make common cause with museums, scientific societies, indige-
nous peoples, and other communities also struggling with the threats
to heritage that the property and rights regime poses.

In her response to Ivey's discussion of a renewed strategy of
activism for libraries, Annette Melville pointed to the successful ex-
ample of the film archivists, creators, producers and distributors, and
academics who came together as a consequence of the National Film
Preservation Act. Among the act's important outcomes was to raise
the visibility and prestige of film as an endangered and irreplaceable
part of our culture. The film community is making great strides in
cooperative preservation for a number of reasons. Foremost among
them has been its ability to create a sense of community and a com-
mon commitment to preservation. That occurred under the national
leadership at the Library of Congress, starting at the top with the
director of the library. That leadership was well matched by the
impassioned moral suasion of celebrities and influential studio and
industry individuals and the well-timed appearance of technologies
that added economic incentives for preservation through the ability

to repurpose old films for new markets.

Melville highlighted the successful strategy taken for "orphan films"—films lacking champions in the corporate world because they have no well-endowed institution committed to their long-term well-being. The National Film Preservation Foundation receives federal funds to match those of the cultural heritage institutions that will preserve them. Melville reported that a critical part of the orphan film rescue efforts under way is building and sustaining public support of preservation. It is imperative to make what is preserved readily accessible in consumer formats to keep making the case for their preservation, restoration, and access. The best advocate for preservation of film is the film legacy itself, and access to the legacy must always be put first. In this case, as in all others, the demand for access will push the demand for preservation.

Economic Factors

All hopes and aspirations for long-term access ultimately rest on our ability to provide resources in a timely way to those who are doing the preservation work. How are we going to pay for preservation, especially in light of the fact that it is invisible to, or little valued by, those who are its chief beneficiaries?

Looking at the demands of digital preservation, in which active management must take the place of intermittent interventions, Lavoie argues that decentralized, locally oriented, ownership-based preservation strategies will not hold. The preservation landscape he depicts is one in which initial investments are steep and in which ongoing costs, while as yet unknown, are predictably intensive. Add to that the ineluctable drive for the disintermediation of delivery, and it is hard to see how creators, let alone archivers, can recoup their costs. As some participants noted, it is not in the interest of creators, publishers, and distributors to raise the barriers to access, because assets that do not circulate freely in the marketplace cannot earn revenue there. Publishers and distributors are not trying deliberately to create scarcity; they would like to be able to create demand, not limit access. Nonetheless, locking down information assets for fear of piracy has been one reaction to the uncertainty about maintaining revenue, and it has cast a pall over the conversation in which all stakeholders need to engage. How do we re-create a world in which information flows through well-regulated systems and those who add value to the information or the system are rewarded commensurately?

Lavoie defines who the critical stakeholders are, how their roles are changing, and what incentives and disincentives they have for good preservation behavior. Given the fundamentally different roles that information resources and intangible cultural heritage now play, together with their ability to be repurposed and released anew for some markets, there may be ways to imagine a rights regime that itself provides incentives for good stewardship. Among the ideas proposed were some that actually reinforced libraries and archives in their historically valuable roles as guarantors of authenticity and

reliability. A simple example is the notion that preserving institutions can serve as trustworthy repositories of complex media objects, themselves comprising a number of "production elements" that are repurposed for access but that need to be preserved at the highest-possible resolution or sampling rate. Just as in the print world it has been financially unfeasible for publishers to carry inventory for long periods of time, so it will be in the digital world (though the meaning of "long" in the context of digital asset management systems is not yet clear). Maybe preserving institutions, if they choose to act as neutral third parties, can provide a service—carrying that inventory in its authentic state—and receive compensation from the digital asset owners for that service. That compensation could come in any number of forms; for example, the asset owner could provide a dowry to accompany the information as it moves to its new home in a preservation repository. Commercial firms could be rewarded by tax credits or the other incentives that donors of collections have traditionally been offered.

As Lavoie makes clear, current economic models do not support good preservation behavior. But new models can be put into place. The business models we need to develop must have robust policies that not only regulate the behavior of stakeholders but also encourage and reward the right behavior. As has often been noted in current debates about copyright, our country's founders created through copyright what were, at that juncture, appropriate incentives for creators to create. The advancement of science and the useful arts was deemed good for the republic, and so the government offered a limited monopoly of rights to authors to reward their investment of time and resources. While the wisdom of limited monopolies may be obscured to many in today's heated market for entertainment and intellectual resources, the expectation remains that the copyright owner is responsible for ensuring that its assets survive for the benefit of future generations. Most people recognize that it is unwise to rely on commercial firms to preserve materials for a future that consists of at least several human generations and business cycles. What is important, however, is to make preservation planning a good business practice for these firms.

Lavoie cautions that the cost of preservation will rise as the information landscape becomes increasingly digital. Preservation, he argues, will go "from intervention to process" and in doing so will demand a greater share of resources. Furthermore, those resources need to be leveraged among many institutions: A number of preservation partners must agree to become interdependent, as Greenstein would have it, in order to optimize preservation across the network. The incentive for such partnerships would be that as the level of redundancy goes down across the system, cost savings would accrue to several institutions and user communities.

Lavoie also predicts that core preservation activities will be centralized and large-scale, a prediction that maps to current plans for preservation at the National Archives, the Library of Congress, and other national libraries. The optimal levels of redundancy for

these centralized services are not known and not clearly sanctioned by current digital copyright law. As the example of LOCKSS (Lots of Copies Keep Stuff Safe) archiving shows, some people oppose the strategy of reducing redundancy. They argue that high levels of redundancy are both necessary and not that expensive. These two opposing views of digital preservation will most likely continue to coexist for some time, and this is totally appropriate. It is perilous to assume that there is only one model for preservation.

Winston Tabb noted in his response that national institutions, specifically the Library of Congress, are uniquely positioned to take leadership roles in developing models of shared responsibility for preservation. Unfortunately, such institutions are often slow to act without vociferous encouragement from the field. He mentioned the Library's authority to set aside one of two copyright deposit imprints as a "heritage copy" for permanent retention, but added that this authority is not exercised, for a number of reasons. Adding his voice to that of Ivey in calling for public advocacy, Tabb urged that a number of issues, from that of heritage copy to authority for the Library of Congress to harvest Web sites as part of its copyright mandate, be put on the agenda for memory institutions to take to Washington.

Tabb also took issue with the notion that the primary model of preservation in the twenty-first century will be centralized. On the contrary, Tabb asserted, the scale of production of preservation-worthy information and the consequent inability of any central collecting agency to develop a "collection of record" means that there will have to be a network of preservation institutions working closely together in a way heretofore unprecedented. He suggested a model of "centralized coordination and tracking with distributed preservation," that is, a collaborative solution with shared responsibilities.

Although this model has perhaps a better chance of meeting the challenge of preservation and access in this century than did models we know from the last, it may differ little theoretically from the distributed preservation model attempted for brittle books, with individual libraries taking on preservation responsibilities for certain materials and working in theory with other independent libraries through commonly shared tracking systems. But in fact the systems could not be more different. The system Tabb elaborated requires that the copyright regime demand deposit from creators and that the law "deputize" certain institutions to share the collecting and preserving responsibility with the Library of Congress, which is now the only authorized agent of copyright deposit in the United States. The collaborative solution Tabb described would entail the kind of policy change, buttressed by law, for which Ivey also advocates. It is not yet clear what kind of actions need to be taken and who would effect these changes. But Tabb concurred that libraries, archives, and other collecting institutions are uniquely positioned to be leaders in bringing about needed change.

The only things we can be sure of are that resources for preservation will continue to be scarce in relation to demand and there will continue to be a need to leverage common infrastructure, exploit

economies of scale, and avoid unnecessary redundancies, however defined. To ensure access in the future to the information that is created, used, or otherwise valued, we should be expansive in our thinking about who can and should preserve. We will need to be comfortable with many good-enough practices alongside the best practices. We can think of selection, for example, on a sliding scale of evaluation and curation, so that libraries may continue to have highly selected and curated collections, archives will have collections characterized by greater inclusion and volume with lesser degrees of description and curation, and individuals will continue to play a vital, often prophetic role in creating collections of value.

At its best, preservation can be defined as a part of the infrastructure of the knowledge economy that is so fundamental it is virtually invisible. And like most critical infrastructures—the electrical grid, the water and sewage system, or the Internet—preservation is too often remarked only in failure. Now, a combination of new information technologies and faltering business models in scholarly communication and the entertainment industry is stressing preservation to the breaking point. At this juncture, when national governments are willing to make major investments in overhauling the preservation infrastructure and billion-dollar industries are recycling old "product" for new markets, there is a unique opportunity for preservation institutions to make a compelling case to their stakeholders, from information creators and educational administrators to the general public, for investing now in access for the future.

As Ivey reminds us, the environmental movement has been successful in large part because it staked a claim for the environment as a public good where none existed. Without such a claim for our common intellectual and cultural heritage, continuing to be good stewards will get harder and harder. In this new century, when information and cultural heritage have taken on radically new roles in private and public life, libraries and archives may be able to fulfill their preservation missions if, and only if, they are willing to stake a claim for public access.

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APPENDIX 1

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Redefining Preservation in the Twenty-first Century

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