Perspective

Electronic Archives: Integrity and Access in the Network Environment

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Abstract: Computer networking presents opportunities to enhance access to archival records and to preserve rich, detailed documentation of human interaction and communication. This article discusses conceptual, technical, and economic challenges to access and preservation of electronic archives in the evolving network environment. The author argues that respect for the evidentiary nature of archival records cannot be sacrificed for the sake of enhanced access to the contents of archival materials. She encourages archivists to reconsider why, when, and for whom archival records are kept and to find a balance between the utilitarian and the cultural value of archives.

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MOST ANALYSES OF NETWORKING celebrate the potential for electronic communications to improve access to all types of information. A common vision for the library of the future is a network of networks that provides ubiquitous access to digital information in all media, including text, photographs, drawings, sound, moving images, and multidimensional representations of objects.[1] Archivists also imagine a future with a network of distributed data bases—some containing indexes and finding aids for conventional archival materials, and others containing electronic data, documents, and digital images. If this vision is realized, researchers will benefit from rapid, remote access to a growing array of sources that are easier to locate, view, analyze, and copy. Yet grave risks to the survival and future availability of archival records also accompany the transition to the network environment. For humanities scholars, what is at stake in this transition is the potential loss of the evidentiary nature of archival records for the sake of improved access to information; subordination of older historical records to current, active information; and the ascendancy of popular, frequently used sources over materials that are less in demand.

Digitally recorded information is inherently at risk of loss as a consequence of several interrelated factors. The media used to store electronic information is much less stable than microfilm or paper, and hardware and software are required to retrieve and view electronic information. The media and the hardware and software needed to retrieve and read electronic information have short life spans because of their physical nature and the rapid innovation in computer technology. At the same time, the traditional organizational structures and patterns of communication that provided a framework for identifying, evaluating, and selecting material for preservation are changing rapidly due to financial pressures, new technological capabilities, the emergence of a global market, and changing patterns of work.

This article explores the challenges that preservation and access to archival materials entail and suggests how the perspective of archival theory and practice contributes solutions to those challenges in a network environment. Electronic archives will require special management techniques that are not always recognized in current works about network communications and digital libraries because archival records differ from other types of information. Archivists have developed some effective strategies to preserve electronic records, but these methods have been applied successfully only to data in simple formats or to electronic records that directly benefit well-established government programs, large firms, major scientific investigations, and major research institutions. Deciding which records warrant preservation will become more critical because a much smaller percentage of documentary evidence will survive despite declining storage costs. Ensuring continuing access to electronic records requires strategies that are much more interventionist than has been the case in the past. Reshaping archives so that they meet the needs of humanities scholars will require serious rethinking about the purpose of archives, the communities they serve, and their role not only in supporting research but also in keeping records that are critical to society and culture.

The Nature of Documentary Evidence and the Significance of Archival Principles

Traditionally, records have been defined as structured documents, purposefully created to retain evidence of decisions, actions, or transactions. Bureaucratic organizations

[1]John R. Garrett, "Digital Libraries: The Grand Challenges," *EDUCOM Review* 28 (July–August, 1993): 18.

maintain records of certain communications to document decisions, provide a corporate memory, and enhance accountability. For individuals, records form the basis for keeping memories alive; they provide a means for passing ideas, values, and a sense of accomplishment from one generation to the next. Humanists and other scholars construct their understanding of society from the documentary evidence that either unconsciously or intentionally organizations and individuals leave behind. Archives organize and manage records to protect their integrity as documentary evidence and to provide successive generations with materials for fresh interpretations of collective actions and consciousness.

During the last few years, archivists have begun to develop a much clearer sense of what it takes to preserve an electronic record in a way that will protect the integrity of the record as documentary evidence and ensure that it can be retrieved and understood at a time and in a context that may be far different from our own. Preservation of an electronic record entails retaining its content; maintaining the ability to reproduce its structure; and providing linkages between an archival document and related records, its creator and recipient, the function or activity that it derived from, and its place in a larger body of documentary evidence. Future access and interpretation will require both data and metadata that will be dependent on sophisticated software tools for retrieval, reconstruction, display, and transmission.

Basic archival principles remain relevant to the management and preservation of electronic records. Consequently, archival programs and methods must be based on an understanding of the nature of records.[2] The concept of a *record*—in all of its changing formats, structures, and media—remains at the core of archival work. As the central focus of archival activity, records provide the basic evidentiary link between past generations and the present. Likewise, the principle of *provenance* is central to strategies for managing archives in the network environment. Respect for the principle of provenance means that records must not be separated conceptually from the broader context of their origin, creation, and use. Contextual information, captured through the organization of archives and provided through description of records, enables researchers to judge the authenticity of documents and to interpret their contents.

In the last few years, leading archivists have moved beyond questioning whether basic archival theory ought to be applied to electronic records and are now searching for policies and techniques that put archival principles into practice in modern information systems. This is especially challenging because of the dynamic interaction among technological, organizational, and cultural change.[3] Not only do electronic records have physical structures and logical attributes that differ from those of conventional archival materials, but the processes that produce records are being transformed by new technologies for document creation, information handling, and communication.[4]

Historical interpretations of earlier shifts in recording and communications technologies, such as the emergence of written documents in an oral tradition or the introduction of printing into a society that previously had known only handwritten manuscripts, indi-

[2]Terry Cook "Easy to Byte, Harder to Chew: The Second Generation of Electronic Records Archives," *Archivaria* 33 (Winter 1991–92): 205–08.

[3]Margaret Hedstrom, "Understanding Electronic Incunabula: A Framework for Research on Electronic Records," *American Archivist* 54 (Summer 1991): 343.

[4]Tora Bikson, "Organizational Trends and Electronic Media," *American Archivist* 57 (Winter 1994): 48–68; and Ronald F. E. Weissman, "Archives and the New Information Architecture of the Late 1990s," *American Archivist* 57 (Winter 1994): 20–34.

cate that fundamental changes in technologies for recording and disseminating information alter the social and cultural practices that give meaning, legitimacy, and value to various forms of documentary evidence.[5] Ample evidence indicates that computer technologies and networking are changing the ways that individuals and organizations communicate; carry out their work; organize their activities; and record evidence of their decisions, thoughts, and actions. These transformations create new types of institutions and conventions for managing documentary materials, and they render older institutions and practices obsolete.

Our society inherited many of its institutions and practices for documenting human activity from the paper-and-print era. Records were defined as physical entities on which information is recorded in a logical structure. Although the definition of records has been expanded to encompass new media, such as photographs, motion pictures, and video recordings, the physical record and its logical structure were considered inextricably linked until the advent of electronic recordkeeping.[6]

During the paper-and-print era, an intricate system of document structures evolved to organize information into a logical sequence of words, sentences, and paragraphs, and to provide indispensable visual information about the origins and meaning of records. As one archivist reminds us, "It is as a result of these structural signals that literate people in our culture can immediately recognize the difference between a job application, a greeting card or a legal summons without reading the words that appear on each."[7] Researchers use familiar document structures as tools that establish the context for interpreting documents and as navigational aids that orient the reader to their location in a text.[8]

Document structures reflect the broader historical, cultural, and technological context in which documentary evidence is created. Elaborate rules governing business correspondence, for example, which require letterheads, an addressee block in the upper left, a signature block at the bottom, and a list of persons receiving copies, provide important information that helps current and future readers place the document in a context. A signature shows that the letter was approved for delivery, while the recipient's date stamp indicates that it was received. These conventions did not evolve accidentally. Rather, they represent the convergence of culture, administrative practices, and technology. Contemporary conventions for business documents reflect the historical forces of the late nineteenth century that brought together the multidivisional firm, the transfer of print-based conventions to the typewriter, and a culture of formalism and risk reduction.[9]

New forms of documentation are emerging with the ascendancy of the global corporation, the creation of an international system of communication, the technological possibilities of networking, and changing styles of work. On the most basic level, electronic records are not inert physical items; rather, they are dynamic, interactive documents that combine information from

[5]M. T. Clanchy, *From Memory to Written Word: England 1066–1307* (Cambridge, Mass.: Harvard University Press, 1979); and Elizabeth Eisenstein, *The Printing Press as an Agent of Change*, Vol. 1 (Cambridge: Cambridge University Press, 1979).

[6]Charles M. Dollar, *Archival Theory and Information Technologies: The Impact of Information Technologies on Archival Principles and Methods* (Macerata, Italy: University of Macerata, 1992), 36–40.

[7]David Bearman, "Archival Principles and the Electronic Office," in *Information Handling in Offices and Archives,* ed. Angelika Menne-Haritz (Munich: K. G. Saur, 1993), 186.

[8]David A. Bantz, "The Values of the Humanities and the Values of Computing," in *Humanities and the Computer*, ed. David S. Miall (Oxford: Clarendon Press, 1990), 31–32.

[9]JoAnne Yates, *Control Through Communication: The Rise of System in American Management* (Baltimore: Johns Hopkins University Press, 1989).

many different sources and several different formats into complex, virtual documents that do not have analogous forms in the print-and-paper tradition. The content of an electronic document is recorded separately from the software that organizes it into an intelligible, logical structure for transmission or viewing on a screen. In an electronic business communication, for example, the "letterhead" is generated by the system; software stores the style sheet for arranging the content; and the transmission and receipt of the communication are tracked by the system's audit trails. Networking accelerates the creation of new forms of documents by distributing the means for interactive communications to more and more users, eroding hierarchies within organizations, and enabling spontaneous, informal communications.

Our culture is inventing new forms of documentary evidence that are technologically complex, yet socially and culturally primitive. Electronic mail systems, for example, deliver a variety of messages ranging from formal transactions, to deeply personal communications between friends, to anonymous postings on bulletin boards, in an undifferentiated structure. Document conventions have not evolved sufficiently to support effective management of electronic records or consistent interpretation of their contents. The current generation of software can combine and display text, data, and images in dynamic multimedia documents, but contextual information essential for understanding the origin, validity, and accuracy of these documents is missing. Important interpretative clues are often presented as confusing header messages, or they remain hidden in the network software.

The printing press also gave our culture a convenient means for distinguishing libraries from archives. Libraries became repositories for published sources that assembled the results of scholarly research, preserved definitive editions of literary works, and acquired printed sources for dissemination to popular audiences. In contrast, archives became repositories for unique and unpublished materials. They preserved the only copy of original records and provided access to primary sources in support of scholarship. These distinctions are no longer the most meaningful ones for the network environment. With the emergence of electronic journals, bulletin boards, and other forms of electronic publishing, dissemination of information products no longer depends on producing multiple copies of physical entities, such as books and journals. Electronic documents can be copied and reproduced easily and cheaply, and there is no obvious difference between an "original" and a "copy," or between a "published" and an "unpublished" source.

Libraries and archives have also traditionally applied different conceptual frameworks to the organization of recorded information. Libraries organize their holdings through classification schemes that reflect a temporal, social, and cultural perspective on the organization of knowledge.[10] Access to library materials is gained through bibliographic conventions based on author, disciplinary authority, or subject. Archives, by contrast, are organized according to the principle of provenance. In the past, archivists protected the integrity of documentary evidence by physically keeping together records that were created or collected by an individual or an organizational unit or that were produced as a result of a common business function. Archivists have avoided creating artificial collections of documents around particular topics, people, or places because such collecting practices and organizational schemes reflect the disciplinary, cultural, and personal perspectives of the

[10]Peter Lyman, "Invention, the Mother of Necessity: Archival Research in 2020," *American Archivist*, 57 (Winter 1994): 114–125.

collector and of the period in which the collection was assembled.

In the network environment, *electronic archives* could easily be subsumed under the concept of *digital libraries*, but they are not the same thing. Rather, principled distinctions are needed to differentiate electronic archives from digital libraries, distinctions that acknowledge the unique characteristics of documentary evidence and the special requirements for its management. One of the greatest challenges facing archives in the network environment is protecting records' characteristics that establish their reliability, authenticity, and utility as evidence—not only in a legal sense, but for a wide variety of practical and scholarly endeavors—while exploiting network communications to enhance access to the information in records. Just as the future of digital libraries rests on resolution of such organizational, social, and technical issues as peer review, attribution, and copyright, the future of electronic archives depends on the ability to protect the evidentiary nature of archives in light of changing technologies.

Strategies for Electronic Archives in the Network Environment

Archivists are pursuing a variety of strategies to influence the policies, standards, and practices for creation, management, preservation, and use of electronic records, particularly within government agencies, private firms, and other formal organizations. These strategies represent a radical departure from the role of the traditional archivist who, until recently, appraised and acquired records when an organization or individual was prepared to discard them, and for whom preservation and access involved physical transfer of records to a central archival repository. The new environment presents opportunities to reassess the custodial role of archives, to shape recordkeeping practices through policy and standards, and to redesign the methods that archivists use to ensure adequate documentation of society.

Laws and policies that define what a record is, assign responsibility for creating and maintaining documentary evidence, and establish the terms and conditions for access are undergoing scrutiny and revision in response to new issues raised by networking. New laws regulating transborder data flow, for example, will affect how archives capture records that document transnational communications. The recent U.S. Appellate Court ruling in the case of *Armstrong v. Executive Office of the President* affirmed that electronic mail messages are federal records if they document official government business.[11] New rules of evidence, which delineate the terms and conditions under which courts admit electronic records as evidence, will have a broad impact on the credibility and legitimacy of electronic records. Likewise, proposals to define all electronic communications as private communications similar to telephone conversations would exclude large segments of network communications from the documentary record.

Within institutions, efforts are also under way to modify requirements and practices for documenting decisions and transactions. Archivists in a few institutions have proposed electronic records management strategies that require creation of adequate documentation and establish standards and guidelines for electronic records management.[12] In this endeavor, archivists become allies of the legal community, auditors, accountants, and man-

[11] *Armstrong v. EOP*, U.S. Court of Appeals, District of Columbia Circuit no. 93-5083.

[12] United Nations, Advisory Committee for the Coordination of Information Systems, *Management of Electronic Records: Issues and Guidelines* (New York: United Nations, 1990); and *Electronic Records Management Program Strategies*, Archives and Museum Informatics Technical Report No. 18, ed. Margaret Hedstrom, (Pittsburgh: Archives and Museum Informatics, 1993).

agers in organizations whose increasing reliance on electronic information to support decision making, program delivery, and accountability raises concerns about the survival of their records and the preservation of corporate memory.[13] Accountable managers share with archivists a concern for documenting decisions adequately, determining the legal status of electronic information, finding effective strategies to ensure long-term preservation and future retrieval, and maintaining sufficient descriptive and contextual information about electronic records to establish their authenticity and permit accurate interpretation of their contents.

These strategies alone do not represent a universal solution to the problems of electronic records preservation. They appear to work most effectively in well-established, structured organizations that have an identified interest in keeping electronic records. Their success requires an organizational commitment, large investments, and a generally known, recognizable benefit to the institution. Consequently, these strategies may not be effective to identify, select, and ensure preservation of the types of archival records that humanities scholars will need and seek in the future.

Archivists are also attempting to influence the development of selected national and international standards for hardware, software, and telecommunications that show the greatest promise of producing records that are transportable and meaningful in a network environment. A few emerging standards appear to have the greatest potential to support archival objectives, including the message-handling service (X.400), the directory service (X.500), Standard General Markup Language (SGML), Information Resource Directory System (IRDS), Structured Query Language (SQL), and Electronic Data Interchange (EDI).[14] The X.400 and X.500 standards for electronic messaging systems, for example, can capture and structure essential information about the provenance of messages transmitted through electronic mail systems.[15]

Standards offer a high-level solution to some of the technical obstacles to long-term access and preservation of archival materials, but several conditions must be met before proposed standards will support archival objectives. First, archival requirements for identification, description, access, and preservation must be incorporated into the text of the standards themselves. Second, hardware and software developers must design and market products that comply with the standards. Finally, the organizations and individuals who create and receive electronic information must select and use standard-compliant products. At the moment, networking appears to push the standards issue in opposite directions. On the one hand, network communications, remote access, and exchange of information require a significant degree of standardization. On the other hand, networking fosters innovation and creativity among diverse communities of users for whom rigid, inflexible standards seem unpalatable, both conceptually and culturally.

The methods that archivists use to select, preserve, and provide access to archival electronic records must also change in response to the challenges posed by electronic record-keeping. In the network environment, decisions about which records warrant retention and preservation must be made much earlier in the records' life cycles. With electronic records, it is not possible to wait several decades to determine which records have survived and then—with the benefit of distance

[13]John McDonald, "Archives and Cooperation in the Information Age," *Archivaria* 35 (Spring 1993): 110–18.

[14]Victoria Irons Walch, "The Role of Standards in the Archival Management of Electronic Records," *American Archivist* 53 (Winter 1990): 30–43.

[15]Dollar, *Archival Theory and Information Technologies*, 108–9.

from the past—to choose for archival preservation the truly valuable records. Were archivists to wait to appraise records until their creators no longer needed them, archivists would inherit incomplete records in obsolete formats, often without sufficient contextual information to permit their use for research. Retention of electronic records requires a conscious decision to make and keep a record with careful planning for preservation and access throughout the record's life cycle. As a consequence, those individuals who decide what to keep will have the potential to influence the documentary record to a far greater degree than has been the case in the past. Few records will survive "by accident," thus providing grist for a fresh look at a process, an event, or an individual.

The descriptive practices that archivists use to provide access to archival records will also have a discernable impact on the ease of locating archival materials for research and scholarship. Archivists are developing standards for description of conventional archival materials that will support network access to descriptive information about archival records.[16] Scholars today can access machine-readable descriptions of a half million collections of archival records located in several hundred repositories in North America through on-line data bases or remote connection on the Internet.[17] A few repositories are experimenting with imaging technologies for retrospective conversion of traditional documents to digital form, both as a preservation medium and as a method to support remote access and network delivery of records in traditional paper and microfilm formats.

The use of computers and networking technologies to disseminate descriptive information about archival records and to provide remote access to their contents shows promise of vastly improving access to archival records. Limited resources and the lack of coordination and coherent priorities, however, still present significant obstacles to realizing this potential. Only a small percentage of all archival records are described in network-accessible data bases, and most descriptions provide access only at the very general level of the collection or records series. Only a minuscule portion of current archival records have machine-readable finding aids, indexes, and other access tools that help researchers locate specific documents or items, and only a tiny portion of current holdings have been converted to digital formats for network delivery.

Archivists are also investigating alternatives to the custodial role of archives that preserve records permanently in the physical custody of specialized repositories. Research suggests that physical transfer of electronic records to an archives is neither the most feasible nor the most cost-effective way to provide continuing access to them. Transfer of such records to separate archival facilities is becoming exceedingly difficult because few of them today are useful outside of their native software environment. Providing continuing access to electronic records also entails great expense for ongoing maintenance of increasingly complex operating and applications software, frequent migration of electronic records from obsolete formats to the current generation of technology, and periodic recopying of data to new media. Both David Bearman and Charles Dollar have argued that the costs of removing electronic records from their native software environments for acquisition

[16]Working Group on Standards for Archival Description, "Archival Description Standards: Establishing a Process for Their Development and Implementation; Report of the Working Group on Standards for Archival Description," *American Archivist* 52 (Fall 1989): 431–537; and Bureau of Canadian Archivists, Working Group on Archival Descriptive Standards, *Toward Descriptive Standards: Report and Recommendations of the Canadian Working Group on Archival Descriptive Standards* (Ottawa: Bureau of Canadian Archivists, 1985).

[17]Lisa Weber, "Putting Archival Cooperation into Focus" (paper presented at the annual meeting of the Society of American Archivists, Montreal, September 1992), 7.

by a central repository far exceed the resources and technical capacity of current archival programs.[18] Rather, centralized archival repositories should become the archives of last resort, assuming custody for electronic records only if the creating organization is unable or unwilling to maintain electronic records with continuing value.

This strategy is appealing for several reasons. It distributes more of the expense and responsibility for maintaining electronic archives to the creating organizations, which often have both the superior technical resources to maintain the records and the firsthand knowledge of their content, context, and structure. It delays decisions about physical transfer of records to an archival repository for many years, thus mitigating the urgency of appraisal decisions and providing archivists with a better perspective on the records' continuing value.[19] This approach could also support a network of distributed electronic archives that users could access remotely to download and store locally selected materials that they can enhance and manipulate for their research. If archival methods respect the principle of provenance, then records produced in a distributed environment should remain in a distributed environment unless there is a demonstrable benefit to be gained from their transfer to a central repository.

Although remote access to archival records will diminish the role of central repositories, it will heighten the need for leadership and coordination from the archival community. Development of a network of electronic archives will require expanded archival authority as well as greater responsibility on the part of organizations and individuals to save and permit access to their records. If archivists leave the identification of archival records to chance, the documentary evidence of contemporary society that survives will reflect the practical needs of dominant institutions for ongoing access to records, or the eclectic, personal interests of a few individuals. Left to market forces, electronic archives will contain those sources most heavily in demand, most profitable to distribute, or most critical for corporate survival.

A recent guide for Internet users warns: "Don't be misled by the term *archives*." The author reminds readers that the "archives" that are appearing on file servers scattered across the Internet may not be permanent, are not necessarily coordinated, and may not retain files.[20] Without a strong presence of the archival community in the network environment, who will decide which records warrant investments in migration and conversion to new systems so that they remain accessible and usable? Who will establish and enforce standards for fair access and ease of use of decentralized electronic archives? Who will be accountable for the integrity, authenticity, and continuing access to electronic archives? Who will provide funding for, or manage, the archives that serve as the repository of last resort?

Currently the archival community lacks a mechanism for identifying the most significant archival records; setting priorities for description, preservation, and access; or coordinating research and program development activities that take advantage of the

[18]David Bearman, "An Indefensible Bastion: Archives as a Repository in the Electronic Age," in *Archival Management of Electronic Records*, Archives and Museum Informatics Technical Report No. 13, ed. David Bearman (Pittsburgh: Archives and Museum Informatics, 1991), 16–20; and Dollar, *Archival Theory and Information Technologies*, 53–55.

[19]Dollar, *Archival Theory and Information Technologies*, 55.

[20]Daniel P. Dern, *The Internet Guide for New Users* (New York: McGraw-Hill, 1994), 468–70.

potential of networking.[21] There is no assurance that the most significant documentation of contemporary society will be identified so that it may survive to provide a record of the challenges we face, the diversity of human experiences, or the accomplishments of our time. There is no systematic plan in place to ensure that the most important archival records are described and made accessible through networks. No mechanism exists to ensure that the limited resources available for research and development are directed toward the most critical problems, nor is there sufficient coordination to advocate effectively for the increased resources required for preservation and access to our documentary heritage in this new environment. What computers, telecommunications, and networking have wrought, however, is a thorough reexamination of the role of archives, even though effective strategies and methods for this new environment are still in their formative stages.

Implications for Humanities Scholars

The network environment presents archivists with a series of dilemmas that will demand rethinking of the basic purpose of archives and the basis on which records are selected for preservation. Networking challenges the relationship between the archivists and the humanities scholars who traditionally have provided both justification and support for the preservation of primary sources. In a period of competing demands for limited resources, it appears that archivists must achieve a balance between the utilitarian purposes of archives and the broader social and cultural mission that has shaped the collecting practices, access methods, and clientele of many archival repositories.

It is ironic that electronic systems can capture much more information about many more transactions and communications than was feasible in the paper-based environment, while it is uncertain whether archives will have the resources, authority, or capacity to ensure continuing access to this documentary record. Replacing telephone calls with electronic mail and voice mail, substituting electronic funds transfers for cash payments, and using scanners to tally supermarket purchases all are examples of transactions that now create recorded evidence of what once were face-to-face or one-on-one informal communications. In the network environment vast quantities of data pass through telecommunications systems where information about actions and interpersonal communications could be captured, if organizations designed systems to do so. At the same time, a heightened concern about personal privacy and the difficulty of predicting future demand for such information make decisions about what to keep exceedingly challenging. It is increasingly difficult to justify spending limited resources on the costly actions needed to retain electronic records, to make descriptive information available through networks, or to convert traditional documents to digital form, unless there is an identifiable demand for access.

Devising strategies to meet research needs of humanities scholars is complicated by the diversity of sources that these scholars use and by the unpredictable nature of trends in humanities research. Unlike natural and social scientists, who

[21]Several U.S. organizations have sponsored noteworthy efforts to set priorities, encourage cooperation, and raise awareness of archival preservation and access issues. The Research Libraries Group (RLG) has provided leadership in developing data bases of archival and cultural resources, promoting standards for description and preservation, and setting priorities for improved access to research resources. The Commission on Preservation and Access has been especially effective in raising public awareness of preservation issues and in sponsoring research. An electronic records research agenda, developed under the sponsorship of the U.S. National Historical Publications and Records Commission (NHPRC), has identified ten priority areas for electronic records research and program development.

actively collect data for their research or draw on large bodies of observational data, humanities scholars use the informational and cultural by-products of society.[22] In recent decades, humanities scholarship has changed dramatically. Research concerns have shifted away from interpretation of canonical texts toward inquiry into the context for interpreting a text or an idea.[23] Humanities scholars continually extend their definition of what constitutes acceptable evidence for research, build new research methods, seek new types of sources, and construct new disciplines.[24] This process has accelerated recently as scholars have challenged power, authority, and control across disciplinary and institutional boundaries, and as information technology presents new possibilities for sharing information and collaborating in research.[25]

The electronic records management strategies that have been developed to date will not ensure continuing access to archival sources for the diverse and unpredictable questions raised by humanities scholars. No strategies exist to capture and preserve informal electronic communications or documentation of creative endeavors, such as correspondence shared between friends through an electronic mail system, the evolution of a literary manuscript produced with a word processor, or the discussions that occur daily on any of thousands of list servers or electronic conferences.[26] Few initiatives are under way to raise awareness of the vulnerability of electronic communications, to shape the culture of personal recordkeeping, or to teach individuals how to be responsible stewards for the records that keep their memories alive. Even if current strategies succeed in helping institutions and organizations create the electronic archives needed for corporate survival, humanities scholars may not find the evidence they would like to help them to understand contemporary society or the past.

To address this problem, archivists must carefully reexamine the basic purpose of archives. Archives are not created primarily to serve the needs of humanities scholars, but for other social purposes. We are trying to build archives that are neither socially nor culturally determined, in which no one voice or set of voices is privileged. We are trying to avoid archives that are technologically determined, in which certain forms of documentary evidence survive because they are more durable or easier to save. In this endeavor, we must avoid the dual illusions of an exhaustiveness that we cannot afford and a representativeness that we cannot achieve.

In an era of rising demands and stagnant resources, archivists face considerable pressure to justify the existence of archives by preserving the records that society needs, rather than those it wants. As Hugh Taylor has noted, "Increasingly we have to retain not only the vital personal records, the people's evidence in support of their rights and freedoms, but evidence of that which may in the long run place our life and culture in jeopardy: nuclear waste sites, for example, and other forms of pol-

[22]Stephen E. Wiberley, Jr., "Humanists Revisited: A Longitudinal Look at Implementation of Information Technology" (paper presented at the 56th Annual Meeting of the American Society for Information Science, Columbus, Ohio, October 1993), 6–8.

[23]Lawrence Dowler, "Implications of Electronic Information for National Institutions," in *Technology, Scholarship, and the Humanities: The Implications of Electronic Communications*, Summary of Proceedings, (Falls Church, Va.: American Council of Learned Societies and the J. Paul Getty Trust, 1993), 21.

[24]Lyman, "Invention, the Mother of Necessity," 122–24.

[25]Avra Michelson and Jeff Rothenberg, "Scholarly Communications and Information Technology: Exploring the Impact of Changes in the Research Process on Archives," *American Archivist* 55 (Spring 1992): 260–82.

[26]Anne J. Gilliland-Swetland and Carol Hughes, "Enhancing Archival Description of Public Computer Conferences of Historical Value," *American Archivist* (Spring 1992): 316–330.

lution, together with the evidence of inappropriate technology that has failed and of successful regenerative activity.''[27] This dilemma creates a tension between those who assume that archives exist primarily to preserve authentic and reliable evidence for the practical benefit of society, and others who would encourage archivists to expand their definition of evidence and think imaginatively about its possible uses. Some archivists fear that archives will become deluged with more documentation than we can even imagine, let alone afford to preserve—much of it consisting of ''sediment'' or ''electronic chatter.''[28] Others are concerned that archives will be forced to focus only on the essential: the rarest and most valuable records, the information that is critical to survival, and those records that have ongoing, practical uses.

In response to this dilemma, archivists must turn away from attempts to appraise and select the records that are deemed worth keeping toward efforts to identify the human actions that are worth remembering.[29] We are witnessing a watershed period in our history with momentous change in technology, the role and significance of nation states, the way that individuals define their identity, and the mark that human society is leaving on the environment. Future scholars will seek sources to explain such renowned problems as the limits of state power, nationalism, and ethnicity, and the emergence of new sources of group cohesion. Archives have the potential to provide fertile soil for such research because they transcend national boundaries, academic disciplines, and the vagaries of the moment.

The question remains, however, whether archives can transcend a fundamental transformation in the nature of records from the stable world of static media to the dynamic world of electronic communications. Although the network environment holds promise for making archives more readily accessible and easier to use, we are a long way from realizing this potential. More research is needed into the impact of networking and electronic communications on organizational behavior and interpersonal communications.[30] As more individuals, informal work groups, and ''virtual'' communities use networks to communicate, carry on discussions, and conduct business, archivists will need to understand these forms of communication as well as they understand the use of electronic systems in more traditional organizations. Research efforts directed toward specific archival problems also are critical to the development of more effective strategies and methods for preservation. The research agenda sponsored by the National Historical Publications and Records Commission (NHPRC) in the United States is one example of an initiative to identify the most significant research problems for preservation of electronic archives, encourage projects that advance the profession's knowledge of basic issues, and produce solutions to critical problems.[31]

In the network environment, where archives will be distributed and where archival institutions will not take custody of many archival records, actions taken by individuals and organizations to save and care for their own archives can enrich the archival record. Strategies, therefore, should also focus on changing the norms of individual recordkeeping, increasing awareness of the practical and cultural value of documentary

[27]Hugh Taylor, ''Some Concluding Thoughts,'' *American Archivist* 57 (Winter 1994): 141.

[28]Luciana Duranti, ''Commentary,'' *American Archivist* 57 (Winter 1994): 38.

[29]David Bearman, *Archival Methods* Archives and Museum Informatics, Technical Report No. 9, (Pittsburgh: Archives and Museum Informatics, 1989), 59–67.

[30]Bikson, ''Organizational Trends and Electronic Media,'' 48–68.

[31]U.S. National Historical Publications and Records Commission, *Research Issues in Electronic Records* (St. Paul: Minnesota Historical Society, 1991).

evidence, and developing simple tools that help individuals and organizations save and protect their records. Current software tools that save or archive documents, whether designed for individuals using microcomputers or for complex networks, fall far short of what is needed to capture and preserve meaning-rich records. To the extent possible, standards and practices designed to enhance research use of records should be integrated into the process of records creation and maintenance, support the access and retrieval requirements of the records creator, and protect the integrity and authenticity of records.

Archivists will need support from humanities scholars to obtain the financial resources, technical expertise, visibility, and credibility necessary for archives to prosper in the network environment. Undoubtedly, it is difficult for humanities scholars to consider and advocate measures to secure the future of archives when current research needs are not supported adequately. Yet it is essential to turn attention to the changing nature of documentary evidence and the systems needed to support its preservation. Decisions are being made today about the design of information systems, the standards and software that support retrieval, the balance between privacy and access, and the norms for documenting human interactions. These decisions will have a lasting effect on the nature of documentary evidence, the rights of individuals to gain access to records, and the degree to which social institutions will accept electronic information as reliable evidence of actions and deeds.

Our actions should be guided by a series of questions about our fundamental goals. How shall future generations look back on the faltering steps we are taking today to nurture the germination of an electronic heritage? Will they thank us for having the foresight to engage in a vigorous debate over the types of archives we envision and hope to build for the future? Will they scorn our failure to see the lasting values and principles that link the past with the future because we are blinded by the glamour and hyperbole of technology? Or will they find our efforts trivial and insignificant in relation to the magnitude of change? Will they curse us for lack of foresight, poor judgment, or just plain lack of action? These questions are impossible to answer because we lack a critical assessment of networking technologies and a clear consensus about the purpose of archives. We might begin by agreeing that society needs archives so that it has a basis for collective memory, cultural continuity, and regeneration. If we can build archives that serve those purposes in the network environment, then we may achieve a balance between the utilitarian and cultural values of archives and go a long way toward meeting the needs of humanities scholars.