How Do Archivists Make Electronic Archives Usable and Accessible?

Margaret Hedstrom

Margaret Hedstrom is an Associate Professor at the School of Information, University of Michigan where she teaches in the areas of archives, electronic records management, and digital preservation. Before joining the faculty at Michigan in 1995, she worked for ten years at the New York State Archives and Records Administration where she was Chief of State Records Advisory Services and Director of the Center for Electronic Records. She has published widely on many aspects of archival management and electronic records and she is currently writing a book on digital preservation. Her current research interests include digital preservation strategies, the impact of electronic communications on organisational memory and documentation, and remote access to archival materials. She is a fellow of the Society of American Archivists and was the first recipient of the annual Award for Excellence in New York State Government Information Services.

Electronic records research and program development has focused on the creation, management, appraisal, custody and preservation of electronic records. Archivists have paid little attention to description of electronic records and even less to effective methods for providing access. This article discusses the limitations of access methods which rely on separate directories and finding aids for electronic records and require retrieval and copying of records from off-line storage for delivery to users. The author argues that in developing systems and methods for access to electronic records archivists must consider user needs and expectations, develop affordable methods for access and delivery, and consider how the availability of electronic archives can improve the processes and results of research. This article was prepared originally for the Documenting the Digital Age Conference held in San Francisco, California, February 10 - 12, 1997 and revised for readers who are engaged in recordkeeping professions.

This is a refereed article.

In thinking about how to make electronic archives usable and accessible, I began with an analysis of the access process in many electronic archives today. The following description of current access methods provides a starting point for considering improvements in access methods from the perspectives of both users and providers of electronic records.

> A junior in college is working on a research paper about women and the Gulf War Syndrome. She has read newspaper and journal articles, two books on the topic, and several government reports. She would like to find some quantitative data so that she can compare the experiences of women and men. She also read that there was an on-line discussion group of women who served in the Gulf War and she would like to find its archive to analyse how women have reacted to Gulf War Syndrome.
>
> She finds several on-line catalogues from repositories of electronic records and identifies potentially useful sources. She sends an e-mail request to one repository where the staff photocopy the finding aid and user documentation for each data set of interest and mail them to her. After reviewing the documentation, she selects two files of interest, faxes an order for them, and sends a check to the repository for the copying fee. One file is available on a floppy disk; the other is available only on magnetic tape. The archives has a three day backlog of copy requests. When her request reaches the front of the queue, archives staff copy the requested files and mail them to the student. Three weeks elapse between the student's initial interest and receipt of the data. The student has to locate a computing facility on campus that maintains a tape drive. She has to reformat the data and arrange to transfer it through the campus network to her personal computer. She cannot find the address or any information about the e-mail discussion group so she decides to abandon that part of her analysis.
>
> Meanwhile, the archives staff has compiled data on the use of its collection. The use figures are appalling. Although they receive several hundred e-mail questions each month asking about specific data sets, most requesters lose interest when they learn that they have to purchase data on diskettes or magnetic tape and wait for it to be copied and shipped. Administrators are asking: why are we keeping all of this stuff when no one uses it?

Although this vignette does not describe the only way that electronic archives are made accessible today, it illustrates all too common problems with access to archival materials in electronic form.[1] Locating potentially useful sources can be frustrating and undependable because access tools are not comprehensive or integrated into a uniform access system. Retrieving materials from off-line storage and delivering them in outdated formats is time consuming and labour intensive

for both the repository and the researcher. Little used archives are difficult to justify, especially when ongoing investments in physical maintenance of the collection are necessary to avoid physical deterioration and technological obsolescence.

More importantly, this vignette illustrates the relationships between accessibility, convenience, levels of use, and the costs of delivering services. Although there are no comprehensive analyses of the use patterns among established electronic archives, anecdotal evidence suggests that the more readily accessible the materials, the more likely they are to be used.[2] Moreover, making electronic records accessible on-line may be more cost-effective for the repository than producing custom made copies on demand. This article explores these relationships and recommends alternative methods for delivering electronic records to the user community.

Debates within the archival community and research on electronic records issues have concentrated primarily on creation, management, appraisal, and preservation of electronic records. Much of the discussion about electronic archives has concerned how organisations can design recordkeeping systems which produce reliable and authentic records, which criteria archivists should apply to the appraisal and selection, who should be responsible for long-term preservation and access, and how archivists can ensure long-term preservation.[3] Likewise, research and programme development have concentrated on methods and processes to ensure adequate documentation, identify valuable electronic records, and arrange for their long-term custody and maintenance.[4] Archivists have done relatively little to develop standards and practices for description of electronic records and even less to address the ultimate question of who will use electronic records and how users will gain access to them.[5]

The purpose of this article is not to revisit debates about creation, maintenance, and custody of electronic records. Rather, my intent is to examine the relatively unexplored territory of access to electronic records. Because of the paucity of both research and experience with providing access to end users of electronic records, the article is necessarily speculative and suggestive of new areas for research and development. It begins with the basic premise, however, that greater accessibility is imperative for electronic archives, not only to meet rising user demands and expectations, but to develop an economically sustainable model of archival services. Archivists should use several criteria to devise and select strategies

that will make electronic archives more accessible and easier to use. Firstly, archivists should identify approaches to access that best satisfy users' needs and requirements. Secondly, archivists should consider how to provide access to electronic archives at a reasonable cost and in a more economical manner than is common in archives today. Finally, archivists should make certain that providing access to electronic archives will improve the processes and results of research. Access systems for electronic records must satisfy all three of these sets of requirements to be acceptable to users, affordable by providers, and justifiable to society.

In exploring models for access and use of electronic archives, I begin with the assumption that electronic archives are widely distributed and that a variety of institutions and individuals will take responsibility for preserving digital information. Some electronic archives will be maintained by special repositories dedicated exclusively to preserving and providing access to digital information; others will be extensions of traditional archives with hybrid collections of paper-based and electronic records. Many valuable electronic sources, however, will be made available directly by their original creator or producer because it is impractical to transfer custody to a special repository or because the institution or individual who created the records has ongoing needs for them. Rather than assuming that the archival community will succeed in transferring all valuable electronic records to archival institutions for preservation and future access, archivists must develop strategies and methods for accessibility and usability that can span a variety of custodial arrangements.[6]

The use of computer and network 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. National and international databases, such as the Research Libraries Information Network (RLIN) maintained by the Research Libraries Group (RLG), contain catalogue records that describe more than half a million archival collections in repositories around the world. The archival community is in the final stages of developing and promulgating a standard for Encoded Archival Description (EAD) which uses SGML to produce structured, browsable, and searchable on-line finding aids for archival collections.[7] These are important building blocks in the development of comprehensive and integrated access systems for archival materials, although much remains to be done to realise their full potential. Only a small percentage of all archival records are described in network-accessible databases, and most

descriptions only provide access at the very general level of the collection, record group, 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. Archives that have programmes for acquiring electronic records usually do not integrate descriptive information about electronic records fully into their finding aid and access systems.

One of the first steps that archivists can take to make electronic archives accessible is to integrate descriptive information about them into existing access systems for archives, special collections, and other primary source materials. This is important for several reasons. Users should be able to locate electronic sources through local, national, and international access systems without having to search separate catalogues or databases which are segregated by format or form of material. As electronic archives become comprised of multifarious and highly heterogeneous types of information, segregation by format (electronic versus non-electronic) will present obstacles to accessibility. It made sense to establish special access systems for machine-readable data archives when the term 'machine-readable' was largely synonymous with numeric and statistical data files. Now electronic archives can contain any form of material - textual documents, photographs, sound, moving images, maps, drawings, or data. We still live in a hybrid environment where many processes are only documented adequately through a combination of electronic and paper sources. Maintaining linkages between different formats of materials will become increasingly burdensome if archivists do not find ways to develop integrated access systems. Multi-media products defy categorisation by format, and I would urge archivists to avoid the temptation to establish yet another format-based archive - the multi-media archive.

Archivists should take the notion of integrating electronic archives into access systems for traditional archival materials one step further by investigating ways to integrate or link access systems for archives (paper and electronic) with the access systems for information resources that reside in traditional and digital libraries, museums, and other cultural institutions, as well as those that are maintained by the office of origin or initial creator. Access systems for electronic archives should allow users to navigate through layers of increasingly detailed descriptions that will help them identify, locate, and evaluate primary source material. Making

electronic resources available on-line will not obviate the need for cataloguing and descriptive information about each resource and it may, in fact, make such information even more critical. Access systems should provide core descriptive elements that identify the origin or creator of the source, its title, inclusive dates, extent, and some minimal level of subject access. The Dublin Core metadata elements, developed through a workshop sponsored by OCLC and the National Center for Supercomputing Applications, offers one model for such a high-level directory that could support initial discovery of network resources.[8] This level of description should lead to a more detailed finding aid, appropriate for archival materials, which describes the scope and content of the resource, provides evaluation criteria, and explains the origin and provenance of the source. For some resources, detailed indexes linked to the finding aid would provide access to files, documents, or specific items. For some types of material, technical documentation should be provided detailing such attributes as the file structure, coding or representation schemes, hardware and software requirements, or other features of the source. Users could navigate through these layers of description to identify and select materials relevant to their problem or research question.

Even if the archival community could develop an internal consensus on access methods for electronic records, efforts to make electronic archives accessible and usable will be hindered by the lack of knowledge about current and potential users of archives. The user community for archival materials has become increasingly diverse in recent decades and the possibility of remote access will only serve as a catalyst to the trend toward more diverse users. Once the sanctum of historians and other scholars, archives have become known by and appealing to a larger, more popular, and more diverse user population. Alex Haley's book *Roots* is accredited with fueling a nascent movement of avocational researchers seeking records for genealogy and family history.[9] The use of compelling primary source materials as illustrations in books or as the basis for documentary films, such as Ken Burns' documentaries on the Civil War and Baseball, introduce primary source materials to large and popular audiences. Archival materials have played an increasingly central role in uncovering evidence from the past that supports legal claims against violations of civil rights or implied contracts, reveals patterns of negligence, or establishes linkages between exposure to certain agents and medical consequences which can have life threatening effects.[10] Teachers have begun to work with archivists to select archival materials for use in the curriculum because students find primary sources engaging and they provide excellent tools for learning

how to evaluate and interpret various forms of evidence.

Aside from the issues that a more diverse user community raises for appraisal and selection, this question has significant implications for accessibility of electronic records. Although the general trends I described above are reinforced by anecdotal evidence of changing user needs and by scattered statistics from reading rooms, the archival community does not have a good understanding of its current or potential user community, their interests, their facility for using and understanding archives, or their needs. When we add to this the potential for making electronic archives accessible to a much larger user community, with different needs and abilities, often without the human mediation of the reference archivist, we add another layer of complexity to the question of accessibility.[11] I would argue strongly for systematic studies of why users seek archival materials, what mechanisms they use to discover sources, how satisfied they are with the materials they find, how much they are willing to invest in finding and gaining access to archival materials, which delivery mechanisms they prefer, and what problems they encounter in using and interpreting the sources they find. Such research would be useful only if it were extended beyond the current user population to identify potential and future users whose needs may differ considerably from those of the current user population. Without such data, archivists will not be able to design access systems that address user needs effectively.

Building electronic archives that are accessible to a wide variety of users in the formats they most prefer is only half the battle. Archivists will have accomplished little if they cannot deliver sources that are usable by requesters. There are numerous options and tools for delivering electronic documents to users with Internet access, but many of these approaches are not robust enough to deliver reliable, authentic, and usable archival records. The characteristics of archival records as documentary evidence of human activity demand specific strategies and management methods that will protect their integrity while enhancing access to their contents.[12]

One of the primary concerns is that most archival records have to be presented in a larger context because they rarely can stand alone as unique, bounded objects that are self explanatory. Contextual information about the creator, purpose, events surrounding the creation of a record, and its chain of custody is essential for determining the reliability of electronic documents and for interpreting their contents. The principle of provenance remains at the core of strategies for

managing archives in the network environment. Contextual information, which is critical for interpreting the contents of archival records in any format, includes knowledge of the relationships among documents, the circumstances that gave rise to their creation, their intent or purpose, their receipt and use, and the chain of custody from the originator to the present custodian. Integrating description of electronic records into archivally-based access systems is one way to ensure that this contextual information is not lost.

Contextual information can be provided through a variety of means. Specific metadata that explicitly describe the context from which archival sources were derived can be attached or linked to each record or document. Structural elements can be embedded in documents to provide visual and other cues about their origins. Adhering to the principle of provenance often demands examination of legal mandates or bureaucratic regulations which require the creation of certain types of records, biographical research about individuals, and knowledge of the administrative history, organisational structure, and business processes of the entities that generate records. At least at the outset, the people who are building electronic archives will have to make a concerted effort to capture or supply sufficient contextual information about the contents of digital archives, because much of the digital information being generated today is not self-documenting. Document conventions have not evolved sufficiently to support effective management of electronic records or consistent interpretation of their contents. Documentary forms are becoming more sophisticated and refined, however, with increasing possibilities for creating self-referential documents, and archivists are beginning to understand the core descriptive elements that must accompany content to make it meaningful.

Recent research on electronic records management has identified metadata models and elements that should accompany digital objects to support their authentication and long-term management. Although there is no single model or set of metadata specifications, several initiatives have proposed ways to attach metadata to electronic documents or files in order to address problems of authentication, interpretation, and archiving. One such model, developed in a research project at the University of Pittsburgh, divides descriptive information about electronic records into six categories:

1) registration metadata which uniquely identifies each electronic object;

2) terms and conditions metadata that contains information about access restrictions or other conditions of use;

3) structural metadata with information about the file or document structure;

4) contextual metadata with information about the creation and provenance of the document;

5) content metadata describing the logical and physical aspects of the content; and

6) metadata on use of each record.[13]

Presently, archivists would have to extract, compile, and structure this metadata because few systems have been designed to supply and organise metadata in a consistent standardised manner. If models such as this become widely adopted, however, one can envision a time when more electronic records will be self-documenting and when the archivists' role will focus more on integrating existing metadata into archival access systems.[14]

Archivists should also develop the means to distribute the software needed to open, view and analyse electronic materials with the records themselves. The problem of software dependency and software obsolescence is one of the most intractable obstacles facing electronic archives. Few archives have the technical resources to maintain obsolete versions of software that might be required to open, view, and analyse archival records which were created using software that has been updated or replaced. The notion of a distributed electronic archive offers a partial solution to this problem. It should be technically feasible for a few sites to maintain older versions of software or emulators of older versions that run on the current generation of hardware and operating systems. Users needing access to older software in order to use electronic records in obsolete formats would be able to download and install the software on their own workstations or submit requests to a server that supports the software. Such an approach would serve a dual purpose. It would provide users with access to software tools that are difficult

to locate and install and it would provide a means to preserve software as an important intellectual and cultural resource in its own right. This approach will not eliminate the need for periodic migration of electronic records because eventually the incompatibilities between older software and current hardware and operating systems will become insurmountable. Nevertheless, this strategy could reduce the frequency of migrations, provide access to records with the same look and feel as their original format, and curb maintenance and migration costs.

There is a great deal that archivists and designers can do to build electronic archives that are accessible and usable, but archivists should be cautious about placing all of the functionality into the archival system itself. Adequate descriptive information and techniques like time/date stamps and encryption, can be employed to prevent alteration of records.[15] But archivists will need to launch a parallel effort to teach the users of electronic archives how to be discriminating and skeptical consumers of digital information. Learning how to evaluate and interpret evidence has always been an implicit goal of our educational system. While the specific skills needed to evaluate digital documents may differ from those used for older forms of records, they are no less essential. Here archivists can learn from the experience of European scholars and archivists who, upon discovering that many medieval documents were fakes and forgeries, developed the discipline of diplomatics in the seventeenth century to analyse and authenticate documents.[16] Some archivists today are applying the principles of diplomatics to digital information with the intent of building into modern information systems the capability of producing reliable and authentic records. But archivists must also think about ways to teach users the principles of a new digital diplomatics so that they can apply these principles themselves to make educated judgments about the accuracy, reliability, and authenticity of the documents that they retrieve from electronic archives. Archivists need to educate the next generation of scholars as well as the general public how to approach digital evidence with a questioning mind about how it was generated, why it was preserved, and how it might be interpreted. Until most members of society feel as comfortable with electronic evidence as they do with traditional forms of documentation, archivists will have a responsibility to help users evaluate, understand, and interpret new documentary forms.

The actions taken by individuals and organisations to save and care for their own archives will also play a vital role in enriching the archival record. Archivists

should pursue strategies that change the norms of individual recordkeeping, allow people to build their own digital archives, increase awareness of the practical and cultural value of documentary evidence, and develop simple tools that help individuals and organisations save and protect their records. Current software tools that 'save' or 'archive' documents, whether designed for individuals using microcomputers or for complex networks, fall short of what is needed to capture and preserve meaning-rich records. While personal and organisational collections of digital materials might be turned over to specialised archives at some point, the ability of archival repositories to provide meaningful access to such collections will depend to a large extent on the measures that the original creators take to organise, describe, and care for their records. To the extent possible, recordkeeping standards and practices should be integrated into the processes of records creation and maintenance, support the access and retrieval requirements of the records creator, and protect the integrity and authenticity of records.[17]

No discussion of accessibility and usability would be complete without raising the issue of access restrictions. Increasing concerns about personal privacy, efforts to gain or retain control over intellectual property, and the growth of fee-based access services all threaten wide accessibility of electronic archives. Archivists and researchers will not be able to shape individual or societal norms about privacy and access to personal or confidential information, but there are some practical measures that the developers of digital archives can take to mitigate privacy concerns and support legitimate access to private or confidential information. Any electronic archives should develop comprehensive policies that define the terms and conditions for release of records, the degree of access restrictions acceptable to the archives, and the requirements for use of restricted sources. Prior to acquiring or gaining control over materials, the archives should negotiate with each donor a clear statement of access restrictions. Some archives will need to develop redaction capabilities that mask individual identities or permit the selected release of portions of files or documents. In developing policies for access, electronic archives can learn much from the experience of repositories of traditional formats of materials. Respectable archives have formal access policies and the archival profession as a whole embraces the principle that restrictions on access should be kept to a minimum. If access restrictions are necessary to comply with privacy or other concerns or to secure donations of materials, access restrictions should apply equitably to all categories of users.[18]

The law and policies around intellectual property and user fees will also be decided by forces outside the archival community. Nevertheless, developers of electronic archives must be cognisant of the impact of intellectual property issues on both the usability of the archive and the complexity of its administration. From the user's perspective, electronic archives should encourage, if not require, donors to place their materials in the public domain. If this is not possible, the archives should negotiate for liberal fair use provisions. Regardless of the outcome of such negotiations, it will be essential for the archives to carefully document the copyright status of its holdings and the provisions for requesting permission to use materials that are subject to copyright. Likewise, keepers of electronic archives should resist the temptation to impose user fees for personal, scholarly, or educational uses of the archives. In building electronic archives, archivists are creating a cultural resource and serving a larger public good. While charges for the commercial use of the archives might provide one source of revenue, we should not subordinate the larger social and cultural objectives of electronic archives to their commercial viability.

Resisting efforts to turn archives into fee-based services does not mean that institutions providing access to electronic records can dismiss cost implications or the funding models for various approaches to access. The archival community has accepted uncritically the argument that off-line storage is most appropriate for archival materials because archival records are not requested frequently enough to justify on-line or near-line storage and access. A model based solely on a comparison of the storage costs for off-line and on-line storage, however, fails to consider the human costs for retrieval of records from off-line storage, copying, and physical distribution. Nor does this model consider the costs and inconvenience to the user in waiting for the delivery of records and incorporating them into the user's work environment. A systematic analysis of alternative storage and delivery methods is needed which takes into account the full spectrum of costs to the repository and to the user for storage, access, and delivery of electronic archives.

Finally, archivists should be more aware of the potential for electronic archives to contribute to the quality of both the research process and the results of that process. The real test of whether an archives is succeeding in accomplishing its mission is not based on the number of electronic files it has accessioned, how many finding aids it has completed, or how many researchers used the reading room, visited the web site, or requested copies of files. The real test is whether

users seeking evidence from the past were able to find the evidence they needed and use it, for themselves or for a larger community, to answer questions or interpret events in ways that would not have been possible without access to electronic archives.

In closing, I would like to present an alternative vision of accessible and usable electronic archives:

> The college junior with her research topic on women and the Gulf War Syndrome in mind searches a high-level directory using natural language to describe her research question and define the types of sources of interest. The search returns a list of eighteen possible sources at five different sites ranked by relevance to her selection criteria. She is most interested in the third and fourth items on the list and asks for additional information about them. The search returns the full text of the finding aid and a database with all of the data elements in each file. She searches these to discover that only one of the data files breaks down the data by gender. She then looks at other attributes and discovers that this source is a complete registry of Gulf War veterans who have been treated for Gulf War Syndrome. She can download a public use version of the file which includes data on each case but does not include personal identifiers. She requests the file and four minutes later, it resides on her hard drive. The initial search also listed the address of an e-mail discussion group of women afflicted with Gulf War Syndrome with instructions about how to access the archive. She had not considered a source like this, but now decides to use it as well to analyse how women are coping with Gulf War Syndrome. As she proceeds with her analysis, she discovers strikingly different patterns in some of the characteristics of men and women afflicted with Gulf War Syndrome. Although she lacks the research skills to interpret these results, she reports her findings to one of the teams of epidemiologists studying Gulf War Syndrome who take the story from there.
>
> Meanwhile, the archives is keeping detailed statistics on requests and use of its collection. Staff notice that those sources which can be downloaded directly by users are almost fifty times more likely to be used than those that have to be ordered and shipped using off-line media. They have noticed a fifteen-fold increase in requests since they started the remote access service, but since most of these requests are self-service, the demand for technical services has actually declined. The reference staff is very busy answering e-mail and helping users interpret their data. The head of the archives uses these statistics, along with several letters from requesters praising the service, to make the case to his Board that this is a valuable service. He secures an increase in funding that will be used to hire more reference staff and put more collections on-line.

This is the future that archivists should strive for in electronic archives.[19] In order to achieve this vision, archivists will need to enhance and link access systems so that electronic records are widely known or easily discoverable through the

access systems that requesters normally use when seeking archival materials. Archivists will have to develop the means to deliver materials as seamlessly as possible, with the minimum restrictions on reuse, and at little or no cost. The objects that are delivered will be useful only if they are accompanied by or can be linked to rich resources of descriptive and contextual information. This contextual information will help end users assess the quality, reliability, and relevance of the documents to their problem or question. Pointers will help them find similar or related materials if they wish to delve further into the electronic archive or find relevant print sources. But archivists should not expect to build all of the selection and evaluation capabilities into the archive itself. We must also educate users to become discriminating consumers of archival records and critical readers of electronic evidence.

Endnotes

1 The most current and comprehensive survey of policies and practices for access to electronic records in archives was conducted by the International Council on Archives Electronic Records Committee. Through a survey of access provisions in national and state archives during 1994 and 1995, the Committee found that very few archives have the capability of allowing users to have direct access to the information in their electronic holdings. Only Australia, Canada, Denmark, Finland, Germany, Norway, Switzerland and the U.S. reported that they are able to make duplicate copies (on magnetic tapes/diskettes) for researchers. Most archives that do provide access also charge a fee for usage and/or copying, and the U.S. National Archives was the only repository experimenting with on-line access to selected records. See International Council on Archives, 'Electronic Records Programs Report on the 1994/95 Survey', *Studies-Etudes* 9, ICA, Paris, December 1996, pp. 16-17, 63-70. The report is also available on-line at: <http://www.archives.ca/ica/p-er/english.html>.

2 Thomas J. Ruller, 'Open All Night: Using the Internet to Improve Access to Archives. A Case Study of the New York State Archives and Records Administration', in *Reference Services for Archives and Manuscripts*, ed. Laura B. Cohen, Haworth Press, New York, 1997, pp. 161-70.

3 For an overview of electronic recordkeeping research, see the special issue of the *Bulletin of the American Society for Information Science*, Vol. 23, No.5, (June/July 1997) and Luciana Duranti and Heather MacNeil, 'The Protection of the Integrity of Electronic Records: An Overview of the UBC-MAS Research Project,' *Archivaria*, No. 42 (Fall 1996), pp. 46-67. The issue of physical custody of electronic records is the subject of an ongoing debate among archivists. For recent discussions of this question see David Bearman, 'An Indefensible Bastion: Archives As a Repository in the Electronic Age,' in *Archival Management of Electronic Records*, ed. David Bearman, Archives and Museum Informatics Technical Report, No. 13, Pittsburgh, Archives and Museum Informatics, 1991, pp. 14-24; Kenneth Thibodeau, 'To Be or Not To

Be: Archives for Electronic Records,' in *Archival Management of Electronic Records*, pp. 1-13; Margaret Hedstrom, 'Archives: To Be or Not To Be? A Commentary,' in *Archival Management of Electronic Records*, pp. 25-30; Terry Cook, 'Leaving Archival Electronic Records in Institutions: Policy and Monitoring Arrangements at the National Archives of Canada,' *Archives and Museum Informatics* Vol. 9, No. 2, 1995, pp. 141-49; and *Archives and Manuscripts*, Vol. 24, No. 2, November 1996, which was devoted to the issue of custody and post-custodial archives.

4 For summaries of programme development and research see ICA, *Electronic Records Programs Report on the 1994/95 Survey*, *Electronic Records Research and Development*, Report of an Invitational Conference held at the University of Michigan, June 28 and 29, 1996, sponsored by the Bentley Historical Library and the School of Information, University of Michigan, Ann Arbor, 1997 on-line at <www.si.umich.edu/e-recs/>; and *Electronic Records Management Program Strategies*, ed. Margaret Hedstrom, Archives and Museum Informatics Technical Report, No. 18, Archives and Museum Informatics, Pittsburgh, 1993.

5 Most work on description has focused on one of two issues. One question concerns whether electronic records have distinct attributes and require separate standards and processes for description or whether as archives they can be accommodated by archival descriptive standards. The second question concerns the debate over the usefulness and adequacy of metadata supplied by the records creator as a starting point for building archival descriptions of electronic records. See Margaret Hedstrom, 'Descriptive Practices for Electronic Records: Deciding What is Essential and Imagining What is Possible', *Archivaria* , No. 36, Autumn 1993, pp. 53-63; David Wallace, 'Managing the Present: Metadata as Archival Description', *Archivaria*, No. 39, Spring 1995, pp. 11-21; Heather MacNeil, 'Metadata Strategies and Archival Description: Comparing Apples to Oranges', *Archivaria*, No. 39, Spring 1995, pp. 22-32; and Wendy Duff, 'Will Metadata Replace Archival Description? A Commentary', *Archivaria*, No. 39, Spring 1995, pp. 33-38.

6 The growth of the World Wide Web provides the most compelling evidence of the multitude of institutions and individuals engaged today in making digital information accessible. While there are well documented problems with both the reliability and longevity of web-based resources, we can only speculate about the extent to which organisations and individuals who use the web to disseminate information will maintain their resources for the long-run.

7 The authoritative web site for information about the EAD is <http://www.loc.gov/rr/ead/eadhome.html>.

8 For information about the Dublin Core and the subsequent Warwick Framework,see <www.oclc.org:5046/conferences/metadata/dublin_core_ report.html>; and Lorcan Dempsey and Stuart Weibel, 'The Warwick Metadata Workshop: A Framework for the Deployment of Resource Description', *D-Lib Magazine*, July/August 1996 at <www.dlib.org/dlib/july96/07weibel.html>.

9 Alex Haley, *Roots*, Doubleday, Garden City, New Jersey, 1976.

10 One example of this type of resource is the Comprehensive Epidemiologic Data Resource developed by the U.S. Department of Energy to provide public access to data about health and exposure data at DOE installations <http://cedr.lbl.gov/>. Another example is the release and distribution through the World Wide Web of internal documents from various

tobacco companies which provided evidence of the companies' knowledge of the addictive character of nicotine and harmful effects of smoking <http://www.library.ucsf.edu/tobacco/>.

[11] Theodore J. Hull, 'Reference Services for Electronic Records in Archives', *Reference Services for Archives and Manuscripts*, ed. Laura B. Cohen, Haworth Press, New York, 1997, pp. 147-60. Hull argues that one of the reasons for insisting on custody is the role that the reference archivist plays in assisting users to locate and use electronic records. The role of human mediation should not be overlooked or underestimated in developing access systems. This question, however, is distinct from the issue of physical custody of records. Archives which provide on-line access to the electronic records in their physical custody will also have to face the question of human mediation in the access process and how that role will be transformed, but still remain essential in remote access systems.

[12] Margaret Hedstrom, 'Electronic Archives: Integrity and Access in the Network Environment', in *Networking in the Humanities: Proceedings of the Second Conference held at Elvetham Hall*, Hampshire, UK, 13-16 April 1994, Bowker-Saur, Kent 1995, pp. 77-95; reprinted in *The American Archivist* No. 58, Summer 1995, pp. 312-24.

[13] David Bearman and Ken Sochats, 'Metadata Requirements for Evidence', 1995, at <http://www.lis.pitt.edu/~nhprc/meta96.html>.

[14] Hedstrom, 'Descriptive Practices for Electronic Records,' pp. 53-63.

[15] The potential uses of cryptography and time/date stamping to protect authenticity of electronic records is discussed in my article, 'Building Electronic Recordkeeping Systems: Archivists are Not Alone on the Wild Frontier', forthcoming in *Archivaria*, No. 44, Autumn 1997.

[16] Luciana Duranti, 'Diplomatics: New Uses for an Old Science', Part VI, *Archivaria*, No. 33, Winter 1991-92, pp. 6-24; Don C. Skemer, 'Diplomatics and Archives', *American Archivist* No. 52, Summer 1989, pp. 376-82; and Leonard Boyle, 'Diplomatics', in *Medieval Studies: An Introduction*, 2nd edition, ed. James M. Powell, Syracuse University Press, Syracuse, 1992, pp. 82-113.

[17] A good example of effective recordkeeping standards and practices is the Statement of Common Position on Electronic Recordkeeping entitled 'Corporate Memory in the Electronic Age'. The statement, issued in May 1996, was produced by a meeting of key industry participants, individual practitioners, and professional organisations, sponsored by the Australian Council of Archives in Sydney on October 23, 1995. See <www.archivenet.gov.au/aca/Corpmenw.htm>

[18] Society of American Archivists/American Library Association, 'Joint Statement on Access to Original Research Materials', *The American Archivist* Vol. 42, No. 4, Fall 1979.

[19] The network architecture for this vision is in place with the wide accessibility of the World Wide Web. What is missing is the selection, organisation, and contextualisation of archival electronic records in the mass of digital information. In an unscientific test, I used a common

901 items, one of which ultimately led to a searchable database maintained by the U.S. Department of Defense as well as countless other resources. A search of the National Archives Locator System (NAIL) and the Center for Electronic Records Title List, however, produced no results. Interestingly, the Alta Vista search yielded information and links to many sites which provided bibliographies, abstracts, e-mail lists, and recommendations for additional sources of information, but none of them pointed to established archival institutions.