Appendix 3

Appraisal of Electronic Records: A Review of the Literature in English

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Purpose and Scope

The purpose of this paper is to review the literature in English written on the subject of appraisal of electronic records in order to refine the research questions in Domain 2 of the InterPARES Project. As a preliminary measure, those questions have been articulated as follows:

- What is the influence of digital technology on appraisal?
- What is the influence on appraisal of retrievability, intelligibility, functionality, and research needs?
- What are the influences of the medium and the physical form of the record on appraisal?
- When in the course of their existence should electronic records be appraised?
- Should electronic records be appraised more than once in the course of their existence, and, if so, when?
- Who should be responsible for appraising electronic records?
- What are the appraisal criteria and methods for authentic electronic records?

The final question expresses the overall aim of the work in this domain. That broad question needs to be refined into more specific questions around which pointed investigations can be made. It should also be noted that our work does not address appraisal criteria specific to juridical systems and cultures but rather how to conduct appraisal to ensure that records of enduring value are actually preserved in authentic form. This review aims to begin the process of doing that. Once the questions are agreed upon, the intention is to review policy and procedure documents detailing existing practices in a select number of institutional settings where there has been a significant experience of actually appraising electronic records for long-term preservation. Following upon the completion of the case studies of electronic records undertaken by the Authenticity Task Force of the project, which will provide an empirical base for analysis of appraisal considerations, models of the entities and activities involved in appraisal and a related glossary will be developed. When the knowledge gained in these investigations is done, it will be combined with the knowledge achieved in the work to develop a typology of electronic records and in the study of storage media to develop methodologies and strategies for appraisal of particular classes of electronic records. At this stage, it is an open question what those methodologies and strategies should be.

Because the aim is to refine the research questions, the authors did not attempt to provide a comprehensive review of everything said about the subject, but rather to summarize the important issues. They concentrated on literature specifically on appraisal of electronic records, although some reference is made to the general discussion of management issues for current electronic records. References to the literature are restricted to marshalling some measure of support for the refinements suggested.

Organization of This Paper

This paper is organized into the following sections:

- Changing Environment of Electronic Records. This section aims to characterize how the computing environment has evolved over time and what implications this has for appraisal.
- Factors Affecting the Archival Management of Electronic Records. This section aims to characterize certain of the most prominent factors that have affected the ability of archival institutions to appraise and preserve electronic records.
- Tactical and Methodological Issues and Questions. This section addresses three questions: when should electronic records be appraised, what should be appraised, and who appraises?
- Technical Analysis. This section reviews what the literature says about evaluating technical aspects of electronic records.
- Content Analysis. This section reviews what the authorities say about evaluating content.
- Summary of Conclusions.

Changing Environment of Electronic Records

The Committee on Electronic Records of the International Council on Archives (ICA) summarizes the change in the technological environment in these words in its Guide for Managing Electronic Records from an Archival Perspective.

> The evolution of information technology falls into three overlapping phases: the mainframe era, the era of the personal computer (PC), and the networking era. Each succeeding innovation in information technology made new uses for information technology feasible without necessarily displacing older systems. Depending on when computers were introduced into an organization, archivists may encounter electronic records that were accumulated under any of the phases.[1]

In the first phase, "data were entered into the computer system, processed in batches, and then output was used in summaries, bills, accounts, and other business documents or in reports and analysis of scientific research." For the most part, one administrative entity purchased the expensive hardware required, another programmed it, and yet another decided "the tasks that lent themselves to automation." The ICA committee concludes that:

> The prevailing view of electronic records at the time was they were special media records which were primarily valuable because of their informational content while records that were needed for evidence of actions and decisions were printed on paper and stored in established filing systems.[2]

In the second phase, beginning with the introduction of the first personal computers in 1981, computing rapidly decentralized as action officers acquired their own computers and used them, particularly for word processing. The ICA *Guide* notes that "the rapid proliferation of text and data files" made inventorying, appraising, and preserving electronic records difficult, and turned archivists' attention to the question of developing policies and practices to ameliorate this decentralized and uncontrolled situation.[3]

"The next significant advance in computing," the *Guide* says, "began in the mid-1980s with the rapid integration of telecommunications and computing into vast computer networks." Mainframe computers still handled large databases and highly complex operations, but the client-server approach allowed organizations to combine "the autonomy that the PC offers with some of the central controls of the mainframe environment," with important implications for records creation. As the Guide puts it,

> With the growth of networking and the development of paperless transactions, archivists have become increasingly concerned about the long-term preservation of electronic records. These new archival concerns arise out of both the capabilities of the new technologies and the ways in which these technologies are being used in organizations.[4]

These changes in the application of computing to work processes have had a profound influence on the way organizations operate. The result has been "changes in workflow, communications, and formal organizational structures" that can "affect the provenance, ownership, and physical location of records." Many organizations are rapidly working towards a situation in which "electronic records become the most complete evidence of the business process and paper records begin to function as convenience copies." In this rapidly evolving environment, "archivists have been driven to examine a broader set of records management issues in order to carry out the archival function in the digital environment."[5]

The *Guide* also discusses the problem of technological obsolescence. Both hardware and software have a relatively short life.

Organizations replace their systems when their supplier ceases to support an obsolete system or when new products offer advantages over older software. To ensure that records created in the old system will

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[1] International Council on Archives, Committee on Electronic Records, Guide for Managing Electronic Records From An Archival Perspective (Paris: International Council on Archives, February 1997), 13. From now on, cited as Guide.

[2] *Guide*, 14.

[3] *Guide*, 15.

[4] *Guide*, 15.

[5] *Guide*, 16–17.

remain available, understandable, and usable to users of the new system, the organization must migrate its older records to the new system. Transferring records from older proprietary systems—called legacy systems—to current technology may require substantial reformatting and restructuring of record. As long as information technology continues to evolve and organizations find new ways to apply computers to information handling and communications, archives will have to be prepared to offer advice and guidance in a dynamic environment.[6]

Elsewhere, the *Guide* says that "in order to preserve electronic records, they must from time to time be migrated to new technological platforms (i.e., be copied to new storage devices and in some cases converted to a format suitable for new computer systems).[7] However, a major issue for the research is whether and when conversion or migration will be necessary, and whether and when other strategies of long-term preservation may be appropriate.

The implications for appraisal of this situation are many. First, because the products of the various phases differ greatly, somewhat different approaches may be needed for each. An objective of this part of the research should be to detail the ways in which these approaches need to vary. This would constitute one of the ways in which the technology has an influence on appraisal. Of course, it may be that there is no fundamental difference, only a different strategy. This remains to be seen. Certainly, it is an important task to distinguish the common elements of appraisal of electronic records from the particularities in given classes of cases, assuming that those classes can be identified and characterized. It is also clear that the problem of technological obsolescence impinges on appraisal of records for long-term preservation as it does on everything else to do with electronic record keeping. What is not clear are the methods to be employed in given cases for long-term preservation and what implications this decision-making has for appraisal.

Factors Affecting the Archival Management of Electronic Records

Almost all writers on appraisal of electronic records begin, as Harold Naugler did in his ICA Records and Archives Management Program (RAMP) study, the Archival Appraisal of Machine Readable Records, published in 1984, by identifying "a number of factors which could have a major impact on [appraisal] of electronic records." He identifies them as follows:

- Legislation may prevent or inhibit archives from acquiring electronic records.
- Data held by an agency might belong to another body.
- The data may be encumbered by contractual agreements.
- Source agencies may have poor data management programs.
- It is difficult to schedule records after systems are designed and implemented.
- Archivists and records managers are not trained to appraise electronic records.[8]

Some of these factors are obviously connected with the trends and developments already discussed, but others need elaboration. The legal issues identified by the ICA *Guide* are:

- the legal definition of a record, especially when it does not encompass records in electronic form;
- laws that do not accept electronic records as legitimate evidence in legal proceedings;
- legislation that defines the role of archives strictly as a custodial one;
- laws and policies that impose long waiting periods before the archives can appraise records or influence their disposition;
- legislation governing privacy and access to records;
- alienation of [public] records from public oversight.[9]

The point here is that these legal impediments often make it impossible for archival institutions to conduct appraisal to select and acquire electronic records.

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[6] *Guide*, 18.
[7] *Guide*, 25.
[8] Harold Naugler, *The Archival Appraisal of Machine Readable Records: A Ramp Study with Guidelines* (Paris, Unesco, 1984), 8.
[9] *Guide*, 19.

The question of ownership and provenance of records has, if anything, become more complicated since Naugler wrote. In today's world, as the ICA Guide makes clear, "powerful new networks provide rapid communications and make it possible to share information across geographical boundaries as well as across organizational hierarchies."[10] Careful analysis of these contextual circumstances, including contractual arrangements, will have to be taken into account in appraisal. The template for analysis developed by the Authenticity Task Force takes into account the various elements of context. The result should be case studies that produce a rich sense of the contextual factors that need to be taken into account during appraisal.

Perhaps by far the greatest concern of archivists has been about records and information management practices as they relate to electronic records. By the late 1980s and early 1990s, archivists were beginning to see that their attempts to integrate electronic records management into the traditional pattern of records inventory, appraisal, accessioning, preservation, and reference were not working, for a variety of reasons not necessarily associated with the applicability of those patterns. These concerns were expressed from many quarters. The experience of the State Archives of New York, as communicated by Margaret Hedstrom and her colleagues in numerous articles, represents them fairly well. As Alan Kowlowitz argues, "the most pressing issues facing electronic records appraisal today are not narrowly technical and methodological but broad program development and information management issue." He also observes that "progress in addressing these issues has been glacial" in organizations and agencies.[11] Hedstrom and Kowlowitz concluded from their experience that

- long-term preservation depends on improved records and information management programs and on a clear statement of the archives jurisdiction in the matter;
- an integrated system for managing electronic and hard copy records is needed on a organization wide basis;
- schedules have to be developed at the time of design of systems;
- the archival authority needs more resources to tackle electronic records problems;
- policies and procedures must be in place to regulate the making and receiving of records by archives officers.[12]

In short, archivists have had to concentrate on getting organizations and their various arms to integrate electronic records management concerns into the broader picture of both records and information management. They have also been concerned to develop a clearly understood role for themselves in the process and to convince the powers that be to devote sufficient resources to the archival task. In many cases, the situation Hedstrom and Kowlowitz describe explains why so few institutions have actually appraised electronic records, data, or information.

Tactical and Methodological Issues and Questions

Much of the archival literature on electronic records in general and the specific literature on appraisal are concerned with questions about the desirability and nature of the involvement of archivists in design of systems for generating and keeping current electronic records. As the ICA Guide observes, "it seems less clear in the electronic environment that the record creator can be relied upon actually to create a record." Archivists have therefore looked to insinuate themselves into the design stage of electronic systems, to a time before it has been traditionally assumed the life cycle begins.[13] This early involvement is justified on more than the grounds of appraisal, of course, but it has also been supposed that, as the Guide says, "retention requirements based upon archival considerations should be built into an electronic system at the time of its design." The ICA document observes that this requirement "suggests that new approaches to appraisal and selections tasks may be warranted," but that they should be "directed toward the

[10] *Guide*, 16.

[11] Alan Kowlowitz, "Appraising in a Vacuum: Electronic Records Appraisal Issues—A View from the Trenches," in David Bearman, ed., "Archival Management of Electronic Records," *Archives and Museum Informatics Technical Report 13* (1991): 31.

[12] Margaret Hedstrom and Alan Kowlowitz, "Meeting the Challenge of Machine Readable Records: A State Archives Perspectiv" (1988), 22.

[13] *Guide*, 26–27.

functions of the originating body, the business processes and activities through which those functions are carried out, rather than towards the records themselves."[14]

Even though there is general agreement on the need to situate appraisal in this manner, it is useful to review some of the discussion, for it raises important issues.

When should electronic records be appraised?

Early in the debate about appraisal of electronic records, Trudy Peterson recognized that with "records of the new technology" the potential to lose information was an aspect of computer systems and thus a practical concern for archivists, if not a theoretical one. She says that "we all know that paper records are lost because records creators throw them away, but it normally takes a certain amount of decision making to haul files from a file drawer and dispatch them to the trash. With machine-readable files, however, the elimination of records may be built into the system."[15] Because a complete view of the record creation process may not be possible if one "asks for a yearly cutoff of . . . [a] file, all you will get will be a 'snapshot' of the operation at the time of cutoff."[16] As a consequence, she further argues that if "the archivist wants to maintain the records of stages of a project, he must work with the computer programmers to capture it all."[17]

Peterson is speaking of the kinds of databases or data files common in the first phase of computing. Despite what she says, there are important theoretical issues of whether such databases or data files contained records or not, with important implications for appraisal. In particular, Peterson's suggestion that the aim is to capture "a complete view of the record creation process" is problematical. There is in fact no way to "capture" a dynamic database, but neither is there a way to capture a "complete view of the records creation process" except insofar as the records selected for retention give it. It is one thing to ensure that records in the electronic form are set aside and controlled properly so that they will be there and can be managed throughout the various stages of their existence. It is quite another to go into the system and extract information ex post facto for preservation purposes.

Catherine Bailey discusses the viability of the life-cycle model for electronic records appraisal in her article "Archival Theory and Electronic Records." She argues that the difficulty with the life cycle concept rests with the common identification of active, semi-active, and inactive with "physical state or activity."[18] With electronic records, the method of storage on computer systems makes the traditional view of the life cycle difficult to apply. It is necessary to view the life cycle in a fashion that will facilitate the scheduling and appraisal of electronic records.[19] Like Peterson, she argues that archivists will have to intervene early in the process:

> They cannot wait until inactive electronic records are offered to them for appraisal, as they might have for paper records; too many computer records have vanished by then, and the documentation necessary for their proper appraisal has been lost, destroyed, or is hopelessly outdated. The sheer volatility of electronic records should be a powerful inducement for archivists to accept increased involvement in the scheduling process, beginning at the systems design stage. Again, however, this is not an issue of new or revised theory or principle, but merely one of timing and strategy.[20]

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[14] *Guide*, 27.

[15] Trudy Huskamp Peterson, "Archival Principles and the New Technology," *American Archivist* 47 (Fall 1984): 386.

[16] Peterson, 386.

[17] Peterson, 386.

[18] Catherine Bailey, "Archival Theory and Electronic Records," *Archivaria* 29 (Winter 1989–90): 183.

[19] She suggests that "the answer to the question lies in treating the life cycle model on a more conceptual level. If archivists consider the life cycle as an abstract expression of the legal authority over a record rather than a designation of its physical state or activity, then the differences between a paper record and electronic record disappear. It does not matter whether a record is located on a disc pack in an organization or department, on storage tapes in a record centre tape library, or on tapes or disks in an archives; its administrative and, especially, legal status is still determined by the amount of use it gets and the jurisdiction that controls it." Bailey, 183.

[20] Bailey, 184.

She sees an even more serious problem in the growing trend towards data resource management in which many entities “combine their resources to create and maintain a single large system or database which can serve all their diverse but related needs at once," as Bailey writes.

> Electronic information then becomes so fluid that not only does it become difficult to determine the active, semi-active, and inactive stages of records, but it also becomes next to impossible to determine the provenance of records. There is no longer a single application on which to focus attention. . . . Where [and when, we can add] do archivists begin to schedule the contexts of these shared databases? Can they legitimately break them down into smaller units . . . or will this act destroy the true nature of the system? Or will such a system require a scheduling technique completely different from that of the system overview?[21]

Bailey then outlines a three-step appraisal methodology framed within a life-cycle concept. The first step would require "a greater emphasis on the appraisal of computerized information as soon after its creation as possible," presumably by some method akin to scheduling. In the second step, or stage of appraisal, "if a machine readable record has already been assessed as being valuable in the first stage of appraisal, then it will be necessary to separate it from the non-essential records around it and much time and energy will be saved.” The third stage outlined is, in essence, a reappraisal step. Bailey reasons that because "records can conceivably lose their value, data files should be reappraised occasionally to ensure that their archival values have not been overemphasized."[2222] It should be noted that, like many authors addressing the subject, Bailey considers that the first stage in the appraisal process is most important, because there is no guarantee that all electronic records will survive until the second stage when inactive records are appraised.

However, many of the writers who argue for new appraisal methodologies emphasize the need to abandon the traditional life-cycle concept in favour of the continuum approach to records management. Glenda Acland argues that within the traditional life-cycle approach, the archivist is positioned at the end of a process, and can apply traditional archival theories only to what is passed on by the creator. This is "a passive role, an accepting role," and "the archivist is the undertaker who then acts as keeper for selected 'permanent' material, the selection often being de facto as well as archival." Acland, in fact, asks whether "the management of current records is simply the first stage in archival methodology or whether the archival concern, fundamentally the requirement to preserve permanently valuable records, is merely the first step in a comprehensive records management process." Clearly coming out in favour of the latter, she argues that "the split between the records management and the archival phases of record keeping is no longer an acceptable alternative, it is no longer sufficient to exclude archivists from an active role in the process of data or information management."[23]

Greg O'Shea, one of Acland's Australian colleagues, argues similarly that "the need for archivists to intervene in the records creation process has never been stronger than it is with electronic records.[24]

> It is precisely at this last point that the principles and practices of Archives and Records Management merge. The need to adopt this interventionist approach at the very outset of the records life cycle, which for electronic records is the systems development phase, in order to preserve the archival record finally kills the notion that archivists are passive spectators at the genesis and over the formative years of the life of the record.

Essentially, O'Shea argues that appraisal decisions will have to be built into the system before the records are created. He suggests that "archivists in the appraisal process for electronic records now need to specify [which] records are [to be] kept."[25]

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[21] Bailey, 184.

[22] Bailey, 186.

[23] Glenda Acland, “Archivist—Keeper, Undertaker or Auditor: the Challenge for Traditonal Archival Theory and Practice,” in *Keeping Data: Papers from a Workshop on Appraising Computer-Based Records*, ed. Barbara Reed and David Roberts (Sydney: The Australian Council of Archives and the Australian Society of Archivists Incorporated, 1991), 116. From here on, this volume is cited as Keeping Data.

[24] Greg O'Shea, “The Medium is not the Message,” in *Keeping Data*, 76.

[25] O'Shea, 88.

According to O'Shea, this involves working closely with information technology managers "who will (a) physically capture the records and (b) develop or redevelop systems to ensure that records are identified and retained for the appropriate period of time."[26] The fact that archivists work with systems design experts requires a shift from appraisal of the record to appraisal at the logical level, "i.e. the high-level diagrammatic representation of the system where it is relatively easy to see what functions the systems manages and where records may be kept."[27] Through this high-level analysis, O'Shea argues, records worthy of preservation can be identified before creation, and the retention of records can be built into the system.

Another Australian, Michael Hoyle, speaking in the context of a particular case—involving appraisal of reports on cash transactions tendered to a special agency supporting the work of tax authorities—questions how much can be done at an early stage in the development of a system. “It seems that it would be more productive for the Archives to have an advisory role at the early stage. . . . Rather than taking a detailed appraisal . . . perhaps an overview could be prepared . . . with a view to assessing the system’s acceptability in terms of the Archives Act.” Later, when the system has matured and action officers have a better understanding of its uses, appraisal can be undertaken.[28]

Charles Dollar also urges archivists to become involved in information systems design to ensure that appraisal concerns are met. "From an archival point of view, the appraisal and retention functionalities should be incorporated into the design of information application systems in order to ensure the identification and retention of records of continuing value." He goes on to say that "one of the most useful contributions archivists can make to information systems design is to incorporate into it the concept of the life cycle management of recorded electronic information." However, Dollar notes that archivists have not done enough to analyze the life-cycle concept in a way that it can be adapted to the electronic environment. “Consequently, archivists have not articulated clearly the functional requirements of the life cycle of recorded information that could become part of the design of a complex information system."[29]

More recently, Hans Hofman has argued similarly that, in establishing the groundwork for managing archival records, archivists need to take an integrated approach to the management of electronic records. More specifically, he argues for a management regime based on three interrelated factors or layers. The first layer is "an intellectual infrastructure for inspection, appraisal and intellectual control"; the second "a technological infrastructure for records creation, preservation and research/service delivery"; and the third an organizational infrastructure to facilitate the carrying out of the first two structures. This framework must encompass all agencies.[30] As such, the archives should be involved in the management of records at all stages of the life cycle:

> The ideal situation would be if archives [institutions were] involved from the moment that electronic records are created or (even better) when the information system is conceived and developed. This would only be necessary for those records that are of archival value. To know this, the archives have to develop an appraisal method that allows them to determine this as early as possible.[31]

An important discussion that has emerged from the appraisal debate, particularly as it relates to life-cycle/continuum concepts, is the continuing relevance of permanent value as a concept in the modern record environment. According to Acland:

> Should Archivists “select for permanent retention” as we have all be schooled or “appraise and eliminate” with a shift in axis to the determination of continuing, rather than

[26] O'Shea, 77.

[27] He argues further that “functional/logical level appraisal, is seen as producing simple, integrated and non- redundant definition of the permanent records that is independent of frequent system and software changes.” O’Shea, 77.

[28] Michael Hoyle, “Case Study: Cash Transaction Reports Agency,” in *Keeping Data*, 83–84.

[29] Charles Dollar, *Archival Theory and Information Technologies: the Impact of Information Technologies on Archival Principles and Methods* (Macerata, Italy: University of Macerata, 1992), 58

[30] Hans Hofman, “Off the Beaten Track: the Archivist Exploring the Outback of Electronic Records,” in *Playing for Keeps: the Proceedings of an Electronic Records Management Conference Hosted by the Australian Archives, Canberra, Australia, 8–10 November 1994*. Accessed at <http://www.naa.gov.au/govserv/techpub/keeps/hofman.htm>, p. 5.

[31] Hofman, 6.

> permanent, value. To the corporate archivist frequently falls the responsibility for determining continuing value because of the direct and integrated relationship that exists with the creators and major users of the records and because they may subsequently be expected to conjure up information or evidence required by their organization on request, irrespective of physical custody or even time lapse.

Acland then goes on to say that "the strength of an integrated corporate archival appraisal program based on continuing value is that it combines systems analysis with cost-benefit efficiency."[32] Kowlowitz agrees. In reference to the United Nations Advisory Committee for Coordination of Information Systems (ACCIS) report, he observes that "appraisal must become a flexible and continuing activity suited to an ever changing automated environment . . . [and] archivists should appraise electronic records in terms of their continuing value rather than their permanent value and that records be reappraised at the time the data is migrated to new media and software environment."[33]

This discussion raises several questions about (1) the timing of appraisal, (2) the procedures or methods of appraisal, and (3) its aim. From the discussion, we may suggest some refinements to the research questions:

- Does the life cycle of electronic records differ from that for traditional records?
- When and how should the various classes of electronic records be scheduled?
- Do schedules consider only primary value or both primary and secondary value?
- Is secondary value considered only at the time records become inactive?
- Should electronic records be reappraised, if they are to be converted or migrated?

What is to be appraised?

Hofman argues that the only sound methodology for electronic records is functional appraisal. Discussing conclusions of the Dutch Project for Implementation Reduction Transfer-period (PIVOT), he states:

> The nature and mass of electronic records make it necessary to approach them from a higher, more abstract level. In other words, it is not the records themselves that need our first attention, but the context in which they are created. In the Netherlands such a method is being developed by PIVOT. . . . The basic principles of this are: identify the spheres of government activity, the organisations involved (the “actors”) and their functions. Based on this overview the functions are appraised.[34]

This functional approach to appraisal attaches value to the various activities in which the creator engages, and allows appraisal to be conducted across the organizations’ spectrum of activity and for large volumes of records, without necessarily engaging in a detailed examination of every records series or system.

The Australian Archives has adopted a similar approach. According to O'Shea, it has focused on developing appraisal methods based on the context of records creation rather than the records themselves. He outlines the three main reasons why functions need to be examined.

> Firstly, the Archives' primary responsibility is to select and preserve archival records. Secondly, the resources devoted to the exercise must produce the most worthwhile outcome in terms of identifying the records with the highest values. Thirdly, it has been recognized, from experience, that a significant proportion of most records and data on systems will be of temporary value. Because of these three factors, agency functions and recordkeeping systems need to be examined at the broadest level. From that point the activities and processes employed to manage these functions are examined in more detail and the values of the records created as a result determined.[35]

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[32] Acland, 116.

[33] Kowlowitz, 37.

[34] Hofman, 6. For an explanation of PIVOT, see Peter Horsman, “Appraisal on Wooden Shoes: the Netherlands PIVOT Project,” *Janus* (1997.2): 35-41.

[35] O'Shea, “The Medium is Not the Message,” 77.

O'Shea argues that the logical extension of this principle implies that the archivist determines which records need to be preserved before they are created. "In the electronic environment, because the content, context and structure are not self evident, experience has led to the conclusion that it is imperative to specify which records are to be captured. As a consequence, to enable the records to be physically selected, more specific details about what data might be needed to make the record needs to be provided linked to good descriptions of the functions to which they relate."[36]

The National Archives of Canada also developed a functional approach to appraisal. In this approach, according to Terry Cook, the first and most important question in appraisal concentrates on identifying the functional responsibilities of the person creating the records. Who, he asks, "would have had cause to create a record, what type of record would it be, and with whom would that corporate person cooperate in either its creation or its later use."[37] This focus on the function behind the creation of the record leads to a top-down appraisal strategy. According to Bailey, careful functional analysis provides archivists "with an understanding of the numerous factors which will influence their examination of the physical records."[38] In the Australian, Canadian, and Dutch approaches, the emphasis on functional appraisal is meant to provide a practicable means to appraise the large volumes of twentieth-century records in organizations such as governments in which there many functional interrelations.

Cook has also argued that appraisal of electronic records should not be treated as a special project, but rather as part of a strategic acquisition policy that follows traditional rhythms of analysis of the mandate, functions, activities, and record-keeping procedures of all agencies of the organization. This approach, he says, "can only succeed, however, if the organizational and intellectual distinctions between textual (paper) and data (electronic) archivists are obliterated, as well as those between textual and electronic analysis."[39]

The approach of the National Archives and Records Administration of the United States (NARA) reflects the traditional practice of appraising the record rather than the function. In discussing the work of a task force looking into the appraisal of federal databases, Ken Thibodeau notes that one aspect of the project was to "identify databases with long-term research value."[40] The task force used a number of experts to establish appraisal criteria based on informational value. It did not use the method of functional analysis. Linda Henry, an archivist at NARA's Center for Electronic Records, considers the NARA approach sound. In fact, she warns that appraisal by function may be dangerous:

> An appraisal archivist could easily find this approach troublesome or unworkable. For example, one important function of the U.S. Patent and Trademark Office (PTO) is granting patents. NARA appraised the important electronic patent records a few years ago. In 1996 PTO submitted schedules for 54 additional electronic systems. The appraisal archivist could have considered only function--an important one--and not have looked at the records, presumably appraising all 54 as permanent. Instead the archivist considered the content of all the databases and appraised only one as permanent.[41]

Henry further argues that archivists "can give advice about creating and managing reliable records"; however, "if archivists usurp the role of creator by defining what records should be created, archivists make records "less genuine, less authentic."[42] It is very likely, however, that part of the reason for this apparent divergence is that NARA was appraising databases, rather than the kind of record-keeping systems assumed by the other authors. This only points out the need to situate discussion in terms of classes of electronic records that can be assumed to have similar characteristics in different juridical contexts.

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[36] O'Shea, 76.

[37] Terry Cook, "Mind Over Matter: Towards a New Theory of Archival Appraisal," in *The Archival Imagination: Essays in Honour of Hugh A. Taylor*, ed. Barbara L. Craig (Ottawa: Association of Canadian Archivists, 1992), 47.

[38] Catherine Bailey, 94.

[39] Terry Cook, "Appraisal in the Information Age: A Canadian Commentary," David Bearman, ed., "Archival Management of Electronic Records," *Archives and Museum Informatics Technical Report 13* (1991): 54.

[40] Ken Thibodeau, "Archival Strategies for the Treatment of Databases: Their Implementation at NARA," 2.

[41] Linda J. Henry, "Schellenberg in Cyberspace," *The American Archivist* 61 (Fall 1998): 317.

[42] Henry, 319.

Luciana Duranti has also observed that problems develop when archivists attempt to build appraisal decisions into systems before records are created. In reference to the ACCIS report,[43] she argues that building systems that establish which records need to be captured implies that "such an appraisal decision is to be made item by item." The ACCIS report is not explicit about how this is to be done, or by what criteria. Rather it attempts to facilitate this approach by redefining the record as a business transaction. Duranti observes that the very act of distinguishing those records that are recorded transactions from those that are not is in and of itself an appraisal decision. As she puts it, "somehow the fact that a piece of information is identified as a 'record transaction' means that it must be retained, and indeed, throughout the report there is the sense that the decision that an entity constitutes a record is an appraisal decision." She notes that there are both difficulties and unresolved ambiguities with this concept when she asks: "On which basis can one segregate a record from a non-record?" Unfortunately, as Duranti notes, little investigation had been conducted in this area despite its obvious significance.[44]

This discussion poses the following questions.

- Does functional appraisal provide a solution to the determination of value criteria? If so, what is the precise methodology involved?
- On what basis does the archivist decide that certain functions are worth documenting and others not?
- Is appraisal responsible for determining which "recorded transactions" are to be preserved?

Who Appraises?

Another important question raised by current reconsideration of appraisal theory is who does the appraisal at each stage. Linda Henry observes that the records continuum approach tends to blur the distinction between archivists and records managers. Whereas "the traditional life cycle delineates clear responsibilities to creators and records managers for the primary value of records and to the archivists for the secondary value," in the continuum model "archivists hold responsibility beginning before creation, through maintenance, preservation, and use."[45] In a sense, then, the question becomes not who is in charge of appraisal but what an archivist is in the electronic world. As Edward Higgs says:

> The role of the archivist would, therefore, lie in ensuring that the suitable archival principles are embedded in computer systems at the design stage, ensuring intellectual control, and providing gateways to electronic information. In addition, archivists might cooperate with historians in designing search engines to locate and contextualize relevant records via networks. The archivist appraising, selecting, and listing documents, and placing them in published guides would be a thing of the past.[46]

This discussion suggests the following question.

- Does the role of the archivist/archival institution change in the appraisal of electronic records, and, if so, how?

Technical Analysis

In his RAMP study, Harold Naugler observes that "machine readable records cannot be appraised solely for their content. They must also be examined in terms of their technical requirements." At the time Naugler was writing, the main technical issues were:

1. Are the materials readable by a computer? This problem, of course, is related to the durability of the medium and to the problems created by the rapid rate of technological change, but, in fact, unreadable electronic records cannot be appraised.

[43] United Nations, Advisory Committee on the Co-ordination of Information Systems (ACCIS), *Management of Electronic Records: Issues and Problems* (New York: United Nations, 1990).

[44] Luciana Duranti, "The Thinking on Electronic Records," *Janus* (1997.2): 53.

[45] Henry, 318–319.

[46] Edward Higgs, "Historians, Archivists, and Electronic Record Keeping," in Edward Higgs, ed., *History and Electronic Artifacts* (Oxford: Clarendon Press, 1998), 145.

2. The adequacy of documentation is vital. This was a particularly serious problem in the first phase of computing, when a record of programming decisions was necessary to understand the data.
3. Each potential accession had to be assessed as to the internal structure of files and the degree of dependence on hardware and software, and then a determination made as to whether the data could be preserved in that format or needed to be transferred to a standardized format.
4. Each potential accession had to be evaluated considering the cost of preservation and the benefits of preserving the data for continuing research purposes.
5. Certain servicing implications had also to be taken into account because the complexity of the records (or data) and their format affect service to users and the cost of reproduction.
6. In some cases, privacy or confidentiality considerations may require providing a "public use" version of non-restricted data. The cost and viability of this had to be taken into account.

Naugler then identifies a number of other issues:

1. the problem of confidentiality of personal information;
2. the implication of exchange of data across national borders;
3. the viability of sampling electronic records or data; and
4. the question of whether initial appraisal decisions need to be reviewed in the light of the cost of continuing maintenance and use.

In the second period of computing, the kind of technical analysis Naugler outlines gave way to systems overview in a first phase of analysis. Greg O'Shea characterizes it as a gathering of information on:

- the title of the system or application
- purpose of it
- an overview of the subject content of the data
- an overview of the major stages of data flows
- the number of logical records or units of measurement associated with the application
- background on its development
- cross references to documentation elsewhere
- data collection procedures.

In a second phase, the following are assessed:

- ability to manipulate the data/records (usually now referred to as functionality)
- level of aggregation of the data in the system
- whether the records themselves can be accessed
- internal arrangement of the data in the system
- frequency at which the data are replaced
- software and hardware of the system/application
- physical condition of the medium
- usability if the data are in their current state
- quantity of material versus its long-term costs of maintenance

The more recent literature avoids discussion of the details of technical analysis. Given that many of the writers on this aspect derived their criteria for technical analysis from Naugler, the questions are:

- Which technical aspects of electronic records need to be taken into account during appraisal?
- How do these aspects vary depending on the type of electronic record?

Content Analysis

Naugler uses the traditional notions of legal, evidential, and informational value. The main question as to legal value at the time of his writing was whether electronic records could be admitted to court proceedings. He passes over evidential value without much comment, and concludes that "the main appraisal judgment" concerns informational value, in which the main considerations are:

- the uniqueness of the information
- the importance of the information

- the degree to which researchers can manipulate the information
- the level of aggregation
- the potential for linkage with other data through common identifiers.

He then distinguishes the types of data found in computer systems according to purpose/function as:

1. administrative or housekeeping data
2. personnel data
3. supply data
4. financial data
5. project management data
6. operational data
7. measurement (or instrumentation data)
8. license data
9. survey data
10. registry data
11. automated office information (correspondence, reports, memoranda, and other documents stored in electronic form).

Naugler discusses the factors to be taken into account in each case, in order of importance. For instance, for registry data, the factors in order of importance are: "[the character of] the activity registered; the individuals or events being registered; the number of variables of information provided."

These kinds of criteria recommended themselves when it was mostly a matter of evaluating the continuing research utility of data. More recent literature is relatively silent on content analysis. Much of the discussion has given way to consideration of the value of the functional approach, as reviewed earlier in this paper. As archivists recognize that they are in fact dealing with records in electronic form, there seems to be no need to discuss special problems of content analysis such as were considered earlier on.

However, it is evident from Naugler's discussion of appraisal of the various classes of data that it will be necessary to discuss appraisal of the various classes of electronic record that exist today, for each of them will present special issues. The work in Domain 2 will therefore be instrumentally assisted by the work on an electronic records typology. Therefore the question is:

- Is there any difference in assessing the content of electronic records as compared to traditional records?

Conclusion

The literature on the appraisal of electronic records raises many important issues, some of which are relevant to appraisal of records in any medium and form, and some of which relate to the overall strategy and tactics of appraising electronic records in a difficult environment. It is evident that the work of the Appraisal Task Force is primarily to identify the particular issues that apply to long-term preservation of authentic electronic records. To do this, the task force needs to do two things. First, it needs to model the process of appraisal to identify the various activities involved in selection and acquisition. Then it needs to use the results of the work of the Authenticity Task Force in developing a template for analysis, case studies, and a typology to identify the specific issues relevant to appraisal of electronic records.