Thinking inside and outside the Boxes: Archival Reference Services at the Turn of the Century*

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RÉSUMÉ Cet article examine le service de référence comme une forme de gestion de la connaissance pouvant aider les organisations et les individus en matière de création de connaissances et de processus d'apprentissage organisationnel. Il suggère de réorienter les activités de référence de fournisseur d'information ou de livraison de document vers un processus de création de connaissances par le truchement d'un examen de quatre contextes dans lesquels s'exerce le travail des archivistes de référence : contexte des services de référence, contexte des répondants (ou utilisateurs), contexte des documents ou sources primaires et contexte du personnel de référence.

ABSTRACT This article looks at reference service as a form of knowledge management that assists organizations and individuals in the knowledge creation and organizational learning processes. It proposes reorienting reference activities from an information provision or document delivery process to a knowledge creation process through an examination of four contexts in which reference archivists work: context of reference services, context of referees (or users), context of the records or primary sources, and context of reference personnel.

One of the side effects of digital technology is that it makes those containers irrelevant. Books, CDs, filmstrips – whatever – don't need to exist anymore to get ideas out. So whereas we thought we had been in the wine business, suddenly we realized we were in the container business.[1]

Archivists are in the container business, and the creation of appropriate containers continues to be a critical task for archivists. The containers archivists deal with are both physical and intellectual. The reference room, archival boxes, finding aids, and descriptive tools such as Encoded Archival Description (EAD) are all physical containers that structure and organize archival holdings as well as services. Archivists also supply intellectual containers by maintaining provenance and the evidential context of primary sources. Furthermore, archivists deal with issues of containment, such as those concerning privacy and security that restrict, or contain, the use of certain records. At the same time, archivists provide access to primary sources physically as

well as intellectually through their policies, reference tools, and advocacy efforts.

The importance of archival containers and managing containment, or access, persists and perhaps grows more significant in the digital environment. Digital technologies may even make the containers more critical if they incorporate means of maintaining an authentic context and essential evidence for records of enduring value. Digital technologies also make containment both harder and easier. Containment is harder because of the fluidity, or changeability, of these technological applications. Yet, digital technologies can also present possibilities for opening the containers in more powerful and diverse ways than ever before. Within all types of organizations, individuals are attempting to harness these technologies to take advantage of intellectual capital by using the techniques of "knowledge management" and "digital asset management." Neither archival managers nor the users of archives automatically see archivists associated with these terms. By focussing more on the intellectual and physical aspects of containers and containment, archivists may become better equipped to make their unique, vital, and relevant contribution to diverse clienteles.

This article argues that reference services should be seen as a part of knowledge management, assisting organizations and individuals in the knowledge creation and organizational learning processes. It asserts that, in order to assist users in this way, archivists should develop and maintain appropriate containers and types of containment (e.g., rules that govern access) so that diverse archival clienteles can effectively use records. In today's world of knowledge workers and knowledge-creating organizations, can archivists still afford to be seen as curators of data and, simply, information providers? It is time to rethink the archivist's role in providing service to a whole range of users – administrators, scholarly and recreational researchers, as well as other types of users – of primary sources. In doing this, we may need to reorient the reference function from simple information provision or document delivery to a process of knowledge. As archivists move in this direction, we must break out of our current mold as curators of data and explore the following issues of context: context of reference services; context of referees (or users); context of the records or primary sources; and the context of reference personnel.

Archivaria readers may recognize some parallels between these four areas of context and the "transformations" in culture, records, computers, and the archivist discussed by Hugh Taylor in his 1987 article.[2] This is intentional. The present article seeks to further some of Taylor's arguments and revisit some of the changes he predicted and identified.

Context of Reference Services

"Where is the knowledge we have lost in information?" T.S. Eliot, *The Hollow Men*

In introductory courses and workshops, budding archivists are taught the three meanings of the term archives: archives as place or building, archives as materials or primary sources, and archives as administrative unit or agency.[3] In the current digital or, as some archivists would like to see it, post-custodial world, the contexts in which reference services occur change.[4] Specifically, the location, timing, and relationships among the archivist, the user, and the evidence are all altered.

First, the centrality of the reference room as the primary container of user services is eroding. In the past, archivists could assume that at some point the archivist, the user, and the sources would physically come together. Yes, there were many users who never stepped into the archives, but their letters and telephone calls acted as proxies. Now, the concept and contexts of reference services have expanded. They are not contained in any one physical location. Most significantly, this has been accomplished virtually on the Internet through the multiplicity of archival home pages.[5] In essence, many repositories have set up virtual reference rooms. Never before has so much archival information been publicly available, including information on the various ways to contact the archives, holdings descriptions, and even sample images of holdings.

Second, the timing of reference services has changed. As Thomas J. Ruller observes in his article "Open All Night," users can partake of archival services on the Internet twenty-four hours a day, seven days a week.[6] Reference services are no longer temporally contained during business hours. The reference archivist is no longer in the position of awaiting some communication from a user, but instead has to plan ahead to prepare services for researchers to use at any hour without the assistance of archival reference personnel. This differs fundamentally from the usual preparation of subject or repository guides, the creation of machine-readable cataloguing (MARC) records, and the drafting of pathfinders to specific subjects represented in an archival institution. These products are static and often out of date when published. Users crave Web pages that are dynamic, real time tools, although analyses of archival Web pages have demonstrated that they rarely are such.[7] The personalization of reference services is changing to broad service directed towards targeted audiences. One example is the recent on-line offering of the records of the Genealogical Society of Utah and the overwhelming response that brought down the server.[8] Gabrielle Blais and David Enns identified this as a problem even before the advent of computers, noting the following:

> ... the emphasis on individualized service has diverted the attention of archivists to some degree away from the production of the finding aids that are capable of standing alone; that is, reference tools which respond to the needs of users rather than the administrative requirements of archivists, and which will lessen user dependence on archivists.[9]

Third, archivists have too long been concerned only about use of archival information as defined by location, that is, in the archives. In the post-custodial environment, reference services will no longer be linked to records physically in the domain of the archives. Rather, reference services are expanded to include records not under the archival agency's physical control but still under archival responsibility. The records are archival records because of their value as evidence, not because of their physical location.[10] The archives, however, exercises responsibility for the records (which may include ensuring access to those records), regardless of who possesses physical custody. Although the literature on electronic records focuses on this type of post-custodial arrangement, it could encompass any type of records – paper, electronic, or other media in virtual containers, on disks, or in boxes.[11] In this instance, archival reference occurs regardless of the time and place of either the services or the records.

These changes in the temporal and physical containers of reference services and the expanded reference responsibilities for the archivist lead to a major realignment of the relationships among users, reference archivists, and sources. The archival system is no longer predicated on direct interaction between the user and the archivist.[12] In the past, the archivist was instrumental in containing reference services, acting as a boundary *marker.* The reference archivist served as a filter, although I suppose one could also say a censor at times. For example, in the reference interview, the archivist helped the researcher hone his or her reference question, identify the specific information need, and separate the wheat from the chaff in the collections.[13] During the reference process, the reference archivist assisted in molding the reference question to fit the contents of archival containers in their domain. When this process was completed, the archivist "opened" the containers to allow access. With increased information from collections on-line, growing numbers of digitized images, and, potentially, electronic records available through the Internet, the reference archivist can no longer contain access as before; the reference archivist must increasingly act as a boundary *spanner.* Reference archivists must learn new ways of helping users to access the contents of the boxes, develop other types of services to meet new user needs and expectations, and ensure that the relationships among the archivist, the referee, and access tools work harmoniously. Thus, an examination of the changing context of users or referees is important.

Context of Referees

"Information. Any difference that makes a difference." Gregory Bateson[14]

I refer to users as referees because that is ultimately what they are. Users are individuals who refer to our holdings, and they are simultaneously our judges. With this in mind, archivists need to target potential users and anticipate

information needs. As knowledge workers, archivists need to be more savvy about who users are and why, when, and how archival information is consulted. Archival information is not the appropriate response for every reference inquiry. At the same time, many questions in need of archival information never reach the archives. Archivists need to be better equipped to be able to identify and predict instances where archival information can make a difference.

There are three road-blocks in archivists' understanding of referees. First, there is little research concerning who these users are, particularly in virtual space. It is simply not good enough to claim "anyone is a potential user on the Internet." This is too amorphous, too uncontained. Second, archival information needs have not been fully delineated. Finally, little is known about what types and how much information users can or will accept under different conditions or circumstances.

Who are our users?[15] Archival user studies have either concentrated on one kind of user, such as scholars,[16] administrative users,[17] or profiled users in one category of repository.[18] Two of the more broad-based studies have concentrated on the U.S. National Archives and Records Administration.[19] Recent studies have begun to focus on archival users in the electronic environment.[20] While these studies have served their stated purposes, large gaps continue to exist in archivists' overall knowledge of users. As a profession, archivists have generalized from these studies, whether we should have or not. But archivists still have comparatively little knowledge of information needs or information-seeking behaviors for most types of users (e.g., genealogists, researchers of public documents, etc.). Hugh Taylor cautioned archivists to think more broadly about who our clienteles may be: "Archivists identify strongly with the nation, region, the community; perhaps in addition we will have to pay attention at whatever level we operate ... to those documentary evidences which relate to the wider scene as well as to our bailiwick."[21] More recently, Barbara Craig urged archivists to design and carry out more user studies, in all types and sizes of archives, because "...measuring gives a common meaning to the experience of diverse users."[22] Among other things, the results of measurement can assist archivists in designing appropriate containers to facilitate access.

The Web makes it possible to identify user search patterns within, and destinations to, our Web sites with a high degree of granularity and precision. However, the value of automatically generated Web statistics has limits. They do not tell archivists whether or not a user's (surfer's) information need was satisfied, whether or not the referee understood the information provided, and what it meant that a user spent fifteen minutes on one page. In the latter instance, did the user find some information essential and read through it carefully, or was he or she interrupted by a small child and paused to attend to that child?

These gaps in our knowledge may become more critical with the advent of the Internet. Unlike mediated reference where archival services are geared to an individual researcher, Internet reference services must be geared more towards audiences. In the past, reference was a one-on-one activity in the reading room, on the telephone, or through snail mail between an archivist and a researcher. Web presences cannot be geared to one particular person but must be focussed on larger constituencies. The challenge, then, is to create audience-specific contexts containing search tools and descriptions of services geared towards particular user groups, instead of a one-size-fits-all or a one-size-fits-none Web site. Moving to an audience-based approach does not mean that individual personalized reference services should be abandoned in the on-line environment. But, in electronic mail reference interactions, for example, the problem of maintaining individualized service may be formidable. E-mail negotiations lack all kinds of contextual clues; the user who has never set foot in a physical repository may not have any context in which to place the answers supplied by the archives.[23]

The reference imperative, then, may be to preserve locality (defined by users, not geography), by which I mean our ability to respond to the specific needs of each repository's unique clientele (both in person as well as virtual) by designing Web sites (creating a container) that both present and represent archival information accurately and flexibly (opens up the container in different views) for groups of users.

Just as the context of reference services and the referees changes, so does the context of users' information needs. As more and more individuals are exposed to archival information through intranets or on the Internet, how will their information needs change, or will their sense-making processes and the types of questions, such as those outlined in depth by Louise Gagnon-Arguin, remain the same?[24]

The Context of Information Needs

Closely linked to the identification of users is the context of their information needs. Since the author's expertise is in the area of administrative users, let us examine the context of information needs of administrative use. Several decades ago, Herbert Simon located organizational control as well as memory in the files of organizations.[25] While this may still hold true to some extent, organizational memory (data, information, and knowledge) is also present in routines, stories, rituals, and gossip, among other things.[26] Where does this leave archivists as managers of documentary evidence when two-thirds of all information used by managers comes in face-to-face meetings or in telephone conversations (and not with archivists, I may add)?[27] Archivists need to become more aware of how and when records are used. For example, in the media richness theories, methods of communication are selected according to

the ambiguity of the decision being addressed or the type of knowledge needed. According to the media richness theories, if an individual poses an ambiguous question, such as what is the effectiveness of a new human relations evaluation policy, that person is more likely to prefer an answer conveyed in a face-to-face encounter where body language, tone of voice, and other contextual clues provide additional meanings, reduce the ambiguity, or provide an interpretative frame for the recipient. Less ambiguous, routine questions, such as what is the new human relations evaluation policy, are more readily answered using documentary sources.[28] This ties in with Mintzberg's finding that seventy-five per cent of managerial work is face to face or over the telephone. What also comes out in Mintzberg's studies is that managers rely on information from documentary sources filtered and contextualized by subordinates.[29] In fact, a large amount of managerial time is spent in search of information, as shown by the following example: "In a recent informal study done at Hughes Aerosearch...[we] estimated that between fifteen and twenty per cent of managerial time is spent specifically in knowledge search and responding to requests for knowledge."[30] Hugh Taylor had predicted that "the spread of microcomputers and the increase in their capacity will lead to an increase in unmediated end-users who, if they are in an office complex, may be mediating for someone senior to them."[31] These findings demonstrate two interesting developments associated with information technology. First, users can have more direct access to unmediated information and, second, the site of mediation shifts from the interaction between the archivist and the user to interactions among the users themselves.

Differing types of use. Reference archivists have long been aware that all types of referees use archives in different ways and, according to Fredric Miller, in different intensities.[32] Robert S. Taylor proposes that there are eight types of information uses: enlightenment (information is used to establish a broad context), problem understanding (information is aimed to reduce ambiguity in a specific instance), instrumental (procedural information), factual, confirmational (verify other data), projective (information to help predict the future), motivational (information to help one make a choice to sustain a course of action, e.g., buying a new car), and personal or political (information used to develop relationships, enhance status, etc.).[33] Archivists find users falling into each of these categories upon occasion. Administrative users are more associated with the actual or procedural categories and historians with the enlightenment category. Genealogists, generally associated with factual information, may be interested in learning more about the context of some event, such as the westward journey, to better understand what their ancestors went through. In summary, while certain user groups are more likely to fall into a certain category of information need, this is by no means the only type of information they will need. As a result, the containers archivists develop must be malleable.

Moreover, information needs do not occur in a vacuum. Administrators, as well as other types of archival users, operate under constraints such as time and the availability of other resources required to filter large amounts of information. For managers, information is usually required in a given time frame. Anecdotally at archival meetings, archivists hear horror stories of calls from college or corporate vice-presidents' offices in search of information needed now, if not an hour ago. In fact, Martha Feldman and James March cite instances where documentary evidence is actually collected after the fact to justify a decision or to create the impression that a rational decision-making process occurred.[34] Another timing issue concerns what type of information is sought during different stages of an information-seeking process. For example, Carol Saunders and Jack Jones found that internal information sources were used most heavily in the stages of problem identification and definition.[35] Information needs, therefore, are not just a question of *what* but also a question of *when*. Reference archivists need to be sensitive to the context and constraints under which their users work.

As noted, finding the right information can be a question of having the resources (time, money, and personnel) to sift through large amounts of data. Elsie Freeman suggests that the archival assumption has been that users want all possible data related to an information need.[36] This is not true for all users and may also depend on a given situation, the dimensions of the problem, and of issues timing. According to Thomas Davenport and Laurence Prusak, "[f]irms pile up data because it is factual and therefore creates an illusion of scientific accuracy. Gather enough data, the argument goes, and objectively correct decisions will automatically suggest themselves."[37] The downside is that "too much data can make it harder to identify and make sense of the data that matters."[38] Reference archivists may be tempted to do a version of the same thing, that is, provide researchers with many options of collections where data may be found or which may have some bearing on the research question. Although this is appropriate for some types of users, for others this creates problems. The idea of archivists selecting information for users should raise concerns; however, as regards administrative users, this is a long-standing practice. Also, archivists are seemingly hired by institutional archives for their expertise in analyzing documentary evidence and providing a context or interpretative container for the use of primary sources.

In a study of the impact of the special library on corporate decision making, Joanne Marshall found that managers praised special libraries for supplying new knowledge in decision-making situations and corporate libraries for contributing to an increased managerial confidence level in the decisions they made.[39] From an archival standpoint, however, the most interesting thing about this study was that the managers rated their own files as the most important source of information and other types of internal memoranda, reports, and databases as less important.[40] The question arises, then: is this phenomenon an

example of the law of least effort at work or is it that one's own files contain context and a known level of reliability and authenticity? Previous research points to the law of least effort even when that information is known to be of a lower quality.[41] These are not very encouraging findings for archivists. This leads to a discussion of the documents themselves.

Context of Primary Sources

Mediation between primary sources and users is also changing, as is the archivist's understanding of how to mediate this activity. In some senses, matching up users and sources is easy. In other cases, providing that link between referee and source poses increasingly complex problems. As Hugh Taylor noted, there is no longer the one-to-one correspondence between question and answer. In the electronic world, primary sources or the representations of primary sources (that is, finding aids) can be displayed in various ways; "the pattern changes, the meaning changes, the information changes, but the data – the given 'bits' – remain the same."[42] In this environment, archivists must design containers flexible enough to facilitate these transformations, yet sturdy enough to maintain the appropriate context, authenticity, and evidential value of the records or representations.

There is currently more information available on archival holdings than there has ever been in the past. Previously, archival reference suffered because of the inability to locate primary sources effectively and efficiently through existing union catalogues, guides, and databases. Although there is still no universal source one can search, archival reference is easier and the sources are more exposed through use of the *Rules for Archival Description* (*RAD*), MARC, HyperText Markup Language (HTML), and Standardized General Markup Language document type definitions such as Encoded Archival Description (EAD). These initiatives have led to the development of several virtual locations of archival information, such as the Research Libraries Information Network (RLIN) or the Canadian North West Archival Network[43] for MARC records; lists of repositories on the World Wide Web, such as the "Repositories of Primary Sources," Web site compiled and maintained at the University of Idaho for a variety of information encoded in HTML;[44] and databases of EAD finding aids at the Online Archive of California (OAC)[45] and the RLIN archival resources database[46] for searching across repositories. Although a union or universal database of archival holdings is still far in the future, for the first time these recent developments have provided a feasible means for accomplishing this task.

The Internet also offers a way for actual documents to "get out of their boxes" through the digitization of (parts of) collections. On the one hand, digitization provides researchers with a different kind of context, previously available only in the repository. Representation of the whole creates entirely

new problems concerning the maintenance of context and representing the physical and intellectual relationships of records. With digital images, researchers can understand more about the actual look and feel of a document and the type of information it contains before entering a repository's doors. This type of orientation can be invaluable. In the future, digitally born documents, those pesky electronic records, may be wholly virtually available to researchers without the mediation of the reference archivist. Hugh Taylor observes that "once information enters the computer ... space and time as an archivist generally understands them are demolished."[47] As with reference services, spatial and temporal changes in the records themselves will necessitate new approaches to containers and containment.

Other problems also arise in the digital environment. Bonnie Nardi and Vicki O'Day note that "information changes shape and function dramatically when its broadcast boundaries are altered."[48] Given such changes, the question becomes: how much and what types of context are needed? When researchers do not have the context of the reference room, the finding aids, the reference archivist, or the archival boxes and files, are there virtual equivalents that can be developed? Should we even be thinking about virtual equivalents or should we be planning on delivering entirely different tools and services to provide the needed context? One type of response to these questions is the development of archival tutorials by various repositories, such as Yale[49] and University of California at Berkeley.[50] Less ambitious repositories have mounted smaller orientations, glossaries, or explanatory notes. What is clear is that archivists must provide context, mold to the new shape and function, and respond to the new context of presentation. At the same time, archivists need to maintain a focus on the record as evidence: "While we must remove the 'mystery' which cloaks archival research, we must not at the same time purge the unique character of archival information."[51]

Finally, despite advances in publicizing our holdings, has use increased, and where are archives realizing these gains? "We need to remember "...that this new information technology is only the pipeline and storage system for knowledge creation. It does not create knowledge and cannot guarantee or even promote knowledge generation or knowledge sharing."[52] In a chapter entitled "Farewell to the Information Age," Geoffrey Nunberg discusses the difficulty of preserving content intact "...when its material and social supports are stripped away."[53] Nunberg's argument here is very archival: it is necessary to provide an evidential context to convey the information properly. Resources that are simply scanned and mounted on the Web lack evidential context and are largely without meaning. The archival challenge on the Web becomes one of establishing a container that preserves or represents the evidence of the record while making explicit the thought process often involved in mediating between documents and users, in other words, translating the user's subject-based question into a provenance-based one. The versatility and ability of

technology to generate the same information in different "views" is perhaps an answer to this perpetual problem. Furthermore, it may be a means of satisfying the problem previously identified by Blais and Enns, namely, maintaining an appropriate evidential context that can satisfy both users and the administrative requirements of archivists.

In spite of the seeming barriers that technology is breaking down to provide information about archival holdings, John Brown and Paul Duguid remind us that organizational knowledge is usually as divided as the organizational structure, and there are cultural, intellectual, and structural barriers for knowledge to cross that often cannot be spanned by technology (intranets, local and wide area networks) alone.[54] Knowledge sharing within organizations is dependent not only on understanding the technical aspects of the knowledge, but also the shared practices that produced it. In more archival terms, understanding provenance and the record-keeping system, that is, the practices and procedures either implicitly passed along through oral tradition or explicitly written down in procedural manuals used to create records, is essential for understanding the documents themselves. In other words, a record "is not a passive container of 'content' but active processes" of the record-keeping system that created the record.[55]

This leads to the key question concerning primary sources: are archives data, information, or knowledge? Terry Cook has stated, "...archivists must transcend mere information, and mere information management, if they wish to search for, and lead others to seek, 'knowledge' and meaning among the records in their care."[56] This is important to consider because reference activities and the role of the reference archivist, to be discussed later, will vary depending on the answer to this question. Davenport and Prusak argue that data, information, and knowledge are not interchangeable concepts, although they are related. Data are discrete, objective facts about events. "[D]ata is most usefully described as structured evidence of transactions."[57] Furthermore, they note that "[r]ecordkeeping is at the heart of these 'data cultures' and effective data management is essential to their success."[58] Information, however, changes the way the receiver interprets, reacts to, or thinks about the world. Echoing Bateman, Davenport and Prusak ask us to "think of information as data that makes a difference."[59] Nunberg identifies the number of definitions for information, ranging from news to a more abstract concept bridging the gap between data and the more charged term, knowledge.[60] Amplifying this idea, Davenport and Prusak describe five characteristics of information: contextualized, categorized, calculated, corrected, and condensed. One can easily see the essential archival functions of appraisal and arrangement and description among these characteristics.

Information is essential for organizations because it reduces uncertainty and guides decisions. But, it is also unevenly distributed and progressively accessi-

ble in geographically dispersed locations at various points in time.[61] Arthur Stinchcombe argues that organizations develop information-collecting centres that spot trends and filter data from the environment. These structures operate throughout the organization and function differently in these various locations according to their reasons for collecting information and the filtering rules established.[62] Given this model, how do archives fit in? More importantly, what becomes the role of the reference archivist? Is the role of the reference archivist to understand only the information that is filtered and stored in the archives, or to understand the other loci of information filtering and collection? According to Davenport and Prusak,

> Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms.[63]

Knowledge derives from information much as information comes from data. However, knowledge is much harder to harness, maintain, learn, and continue to learn from over time. The enduring value of archives is partly that certain records can be continuing sources of knowledge. However, as Hugh Taylor notes, archival containers can impede knowledge at times:

> When we classify knowledge, we impose a form on it and control it through the pattern of its presentation. We are "informed" and we call it "information." It is this very act of classification, essential as it has been, which in a sense diminishes knowledge, as we all know when struggling with a finding aid.[64]

Knowledge management, then, is the administration of everything from framed experiences and values to selected documents recounting events, policies, and actions. A model of reference services based on primary sources as part of the knowledge creation process requires a new approach to reference activities by the archivist, and different activities, skills, training, and contextualization of the archival materials than one based on archives as data or information. Perhaps this new role is suggested by the following anecdote, told by Davenport and Prusak in *Working Knowledge*. During a research project on new approaches to information management, the authors asked twenty-five client companies, including American Airlines, Hewlett Packard, IBM, and AT&T, "what they most needed to know that they didn't currently know, and how we [Davenport and Prusak] could best help them know it." The executives almost all replied they had no idea how to manage value-added information and knowledge.[65] It seems that there is a role for the reference archivist here.

Context of the Reference Archivist

Bonnie Nardi refers to the different cultures that manage knowledge as "information ecologies." Information ecologies are systems of people, practices, technologies, and values.[66] However, information ecologies are designed, not organic.[67] For reference archivists, this presents a set of issues concerning what role to play in relating between the sources and the users, and what type of container to develop for reference services. This conception of information ecologies differs slightly from Hugh Taylor's in his 1984 article. He saw an information ecology as one characterized by non-aggressive stewardship, sensitive interplay, and an ongoing enrichment of resources rather than their exploitative use.[68] While Nardi and O'Day would agree with the ideas concerning a sensitive interplay of actors and the need for ongoing enrichment, they envision a very visible hand and active stewardship in any information ecology.

Aggressive care of the information ecology by the reference archivist is a priority. Users can be largely unaware of the invisible archival role and responsibility behind the data they are using, particularly in a networked environment. Thus, they may see the role of the archivist as essentially preserving the data or perhaps managing the information, but not as having anything to do with knowledge creation. Nardi argues that much of the work of librarians is invisible and therefore undervalued and unacknowledged, thus threatening their existence.[69] This could also apply to archivists, particularly those who refuse to move beyond the reference desk. Visibility of information professionals is key. In fact, Eric Ketelaar argues that visibility, along with transparency and access, is a sister to accountability.[70] Mediating between sources and users, and providing or preserving context are largely invisible activities that can easily go unrecognized. An expanded role for the archivist is not a new thought. As far back as 1969, Philip Brooks asserted that "A competent archivist is to be looked upon as a scholarly colleague of the researcher, far more than solely a preserver and a caretaker. His knowledge of the sources can contribute materially to the user's evaluation and understanding of them.[71] Furthermore, invisibility leads users to confuse the roles and responsibilities of different information professionals. Ian Day notes the following:

> Traditionally, the information profession has been compartmentalized into groups of people called records managers, archivists, librarians, and IT specialists, each group having some distinctive knowledge and skills offering some similar and other specialist information services. Information users, however, do not necessarily identify these different compartments when they need to find and access information, and it is unreasonable to expect them to know what to do.[72]

For archivists, this has several implications. First, archivists must be able to articulate collection strategies and criteria for archival appraisal (referred to,

above, as filtering by Stinchcombe). Second, it becomes more critical for archivists to be responsible for maintaining the authenticity and reliability of the archival records. How archivists fulfill this responsibility may vary depending on whether the records of enduring value are actually acquired by the archives, or the archivist acts as an auditor and must ensure the ability to verify content and context within virtual record-keeping systems. Third, it is significant that archivists either maintain the information within its original context (evidence) or supply a context that enables use in a contextualized way. Finally, archivists must learn how to harness the knowledge created in other departments and develop ways to share it, as well as understand the data collection and filtering rules in other parts of our organizations, or of the individuals' or organizations' records we collect. If only one third of the information managers get comes from documents[73] and, as noted, these documents tend to come from their own files, are we fated? This problem becomes worse in a post-custodial age when electronic records will remain with their creators, perhaps permanently. The role of the reference archivist then, must not only be linked to data and information (although knowing which specific data, information, and knowledge exist elsewhere is also valuable), but it must also expand to include the reference archivist as an equal and active participant with users in the knowledge creation process.

It is time archivists think about reference services as an information ecology and consider some of the options for delivering that service. In this vein, there are four distinct roles, each with related strategies and containers, for promoting knowledge creation under diverse circumstances. They are translator, knowledge broker, boundary spanner, and gardener. These are not necessarily distinct, nor exhaustive, but represent a tool kit of roles reference archivists may adopt with different types of users or in various situations.

The role of translator is one of mediator.[74] Translators frame (or contextualize) the issues from one group in terms that can be understood by another group. Translators must be knowledgeable about both communities and instill trust in both communities. For archivists, this role as translator could be either negotiating between two groups of people or between users and records. Nardi and O'Day caution that there is a down side to the role of mediator. A mediator's work is often seen as peripheral to the core functions of the workplace and therefore expendable.[75]

Knowledge brokers are participants, rather than mediators. Knowledge brokers have overlapping memberships in communities and thus help to diffuse knowledge across networks. This analogy can be extended to organizations as a whole. Davenport and Prusak note that there are knowledge buyers, sellers, and brokers in organizations. Regarding brokers, they write that "[l]ibrarians frequently act as covert knowledge brokers" because librarians often serve the whole organization and have contacts with people from a variety of departments; they have general and widespread knowledge about knowledge needs and possessions.[76] This enhances and facilitates their role as brokers. This

could also be said of archivists who move throughout organizations scheduling records, identifying records for transfer to the archives, and interacting with referees from different departments. Talk is essential to the transfer of knowledge in organizations.[77] In order to capitalize on our role as knowledge brokers, archivists need to realize that, when moving throughout organizations or communities, information is not unidirectional, that it flows in and out.

Boundary objects form coordinating links among communities or organizations.[78] Brown and Duguid argue the following:

> Contracts are a classic example of boundary objects. They develop as different groups converge, through negotiation, on an agreed meaning that has significance for both. Documents generally pay a similar role, and forms and lists that pass between and coordinate different communities make significant boundary objects. Plans and blueprints are another form of boundary object. Architectural plans, for instance, define a common boundary among architects, contractors, engineers, city planners, cost estimators, suppliers, and clients. Severally, and collectively these groups negotiate their different interests, priorities, and practices around the compelling need to share an interpretation of these important documents.[79]

Clearly, the role of the reference archivist in providing access to boundary objects through contextualization is significant. As archivists, we are responsible for those objects and therefore must be boundary spanners, rather than boundary markers, in other words, linking people to rather than dividing them from records.

Finally, another potential role for the archivist is as gardener. Gardeners are individuals who "can translate concepts and mechanisms back and forth between the domain of the work and the technology itself."[80] Gardeners move back and forth between their own domain and the domains of others, assisting coworkers in learning how to accomplish tasks themselves. Nardi and O'Day remark that gardeners are one sign of a healthy information ecology. Significantly, a key dimension in information ecologies is learning how to cultivate gardeners. In addition to honing our skills as gardeners, reference archivists must ensure that these skills are passed along and that the next generation of gardeners is cultivated.[81]

Robust information ecologies, like their biological counterparts, are characterized by a great deal of diversity.[82] Reference archivists must sustain diversity in clientele, diversity in their methods, and diversity in how they contextualize primary sources. Finally, reference archivists need to get out of the box and read outside the archival literature. Reading in history, library and information science, organizational theory, systems analysis, and so on, will help maintain this diversity, enabling reference archivists to bring in new ideas to adopt, adapt, and generally add to the tool kit. Reference archivists must ponder their bailiwick both inside and outside the physical confines of the ref-

erence room and think broadly about the intellectual containers used to represent primary sources.

Conclusion

The quotation at the beginning of this paper initially appeared to me to be quite ominous for archivists, but, upon reflection, I have changed my mind. From records storage boxes to *RAD*, from provenance to evidence, archivists have long been in the business of containers and have considered issues of containment. In conclusion, there are four salient points about context, containers, and boxes that point to possible directions for reference archivists to pursue. Regarding the context for reference services and of our referees, our expectations and services have to move beyond the reference desk, the reference room, and the stacks. In addition to providing access to information, evidence, and document delivery services, reference archivists must look at methods of knowledge generation and coordination through networking among their referees, communities, and organizations. Heeding Nardi, archivists need to identify and preserve locality without the geographical boundary of the reference desk by identifying and addressing specific audiences and continually adapting to change. Reference archivists need to capitalize on the record as a boundary object. Primary sources need not end the discussion concerning a reference query; they can also initiate ongoing conversations with users about their information needs and search behaviors.

Most important, reference archivists need to think about how best to contain and maintain the focus on the authenticity and value of the records as evidence. The best means of doing this is through an understanding of the context of the record-keeping system. Bearing this in mind, the challenge is to represent or translate this context for referees. The containers archivists work within are relevant, vital to our own and users' creation of knowledge as we move beyond and also build upon the record. In this way, the boxes, whether physical or virtual, are critical to the archival role and also to the integrity of the collection.

Archivists need to pay attention to their own information ecologies: "it is up to all of us to participate in our information ecologies."[83] As we maintain the integrity of the boxes, we have to think creatively outside of the containers. A healthy ecology is all about balancing people, practices, technology, and values and adapting as these elements evolve. The traditional ecological balance is being disturbed, and reference archivists must identify means of re-establishing not just equilibrium but better methods of serving and working together with users to manage knowledge throughout communities or organizations. Technology is a tool for reference archivists, not a master to be served.

Reference archivists are already experts at responding to a variety of questions from users with very different needs. However, they must become even

more adept at thinking inside and outside the boxes. This means that archivists cannot avoid technological discussions but should thoughtfully engage and evaluate technology and the reasons, such as political, economic, or social, to implement a given technology or not. As reference services evolve, we need to keep in mind that we are in the container business and that this is important, serious, and essential to the larger goal of maintaining historical, legal, and cultural evidence. Reference archivists must continue to provide context for users and to help them span the divide between the inside (evidence or content) and the outside (information need and context) of the boxes. While doing this, reference archivists need to think about what role they will play and how they will package (container) their services, in relation to different audiences and at different times. Knowledge broker? Translator? Boundary spanner? Gardener? We have to be smarter about choosing a particular role given the circumstances, be more flexible about applying the different skills required of each role, and carefully implement the strategies needed for each type of container. Being a reference archivist has never been an easy task, but it is an important role now and will be in the new century. In closing, the following quotation applies well to reference archivists and also underlines the importance of containers: "[k]nowledge is a difficult thing to 'manage.' It does not do well in captivity and it does not survive for long outside its native habitat."[84]

Notes

* Earlier versions of this paper were given at the Society of Rocky Mountain Archivists' Annual Meeting in June 1999 and the Society of American Archivists' Annual Meeting in August 1999.

1 Geoffrey Nunberg, "Farewell to the Information Age," in Geoffrey Nunberg, ed., *The Future of the Book* (Berkeley, 1996), p. 103.

2 Hugh Taylor, "Transformation in the Archives," *Archivaria* 25 (Winter 1987–88), pp. 12–28.

3 Lewis Bellardo and Lynn Lady Bellardo, *A Glossary for Archivists, Manuscript Curators, and Records Managers* (Chicago, 1992).

4 For a discussion of post-custodialism see Terry Cook, "Electronic Records, Paper Minds: The Revolution in Information Management and Archives in the Post-custodial and Post-modernist Era," *Archives and Manuscripts* 22, no. 2 (1994), pp. 300–328 or Terry Cook, "The Concept of the Archival Fonds: Theory, Description, and Provenance in the Post-Custodial Era," in Terry Eastwood, ed., *The Archival Fonds: From Theory to Practice* (Ottawa, 1992), pp. 31–85.

5 For a listing of archival home pages see the list of "Repositories of Primary Sources" compiled by Terry Abraham at the University of Idaho. <http://www.uidaho.edu/special-collections/Other.Repositories.html.>

6 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 Laura B. Cohen, ed., *Reference Services for Archives and Manuscripts* (New York, 1997), p. 162.

7 For analyses of archives' Web pages see Jenni Davidson and Donna McRostie, "Webbed Feet: Navigating the Net," *Archives and Manuscripts* 24 (November 1996), pp. 330–351 and David A. Wallace, "Archives and the Superhighway: Current Status and Future Challenges," *International Information & Library Review* 28, no. 1 (March 1996), pp. 79–91.

8 Lisa Guernsey, "News Watch: The Line Is Out the Door At a Genealogy Library," *New York Times* (Thursday, 27 May 1999).

9 Gabrielle Blais and David Enns, "From Paper Archives to People Archives: Public Programming in the Management of Archives," *Archivaria* 31 (Winter 1990–91), p. 108.

10 This vision is admittedly very different from and in opposition to that proposed by Luciana Duranti. See Luciana Duranti, "The Archival Bond," *Archives and Museum Informatics* 11, nos. 3–4 (1997), pp. 213–18.

11 Recently, the literature concerning reference and access to electronic records has grown. In addition to Ruller, "Open All Night," see for example two articles by Margaret Hedstrom, "How Do Archivists Make Electronic Archives Usable and Accessible?" *Archives and Manuscripts* 26, no. 1 (May 1998), pp. 6–22 and "Electronic Archives: Integrity in the Network Environment," in *Networking in the Humanities: Proceedings of the Second Conference on Scholarship and Technology in the Humanities held at Elvetham Hall, Hampshire, UK, 13–16 April, 1994: Papers in Honour of Michael Smethurst for his 60th Birthday* (London, 1995), pp. 77–95. Also see Theodore J. Hull, "Reference Services for Electronic Records in Archives," *Reference Librarian* 56 (1997), pp. 147–60 and Theodore J. Hull and Margaret O. Adams, "Electronic Communications for Reference Services: A Case Study," *Government Information Quarterly* 12, no. 3 (1995), pp. 297–308.

12 This is a restatement and unravelling of the relationship as noted by Mary Jo Pugh, "The Illusion of Omniscience: Subject Access and the Reference Archivist," *American Archivist* 45, no. 1 (Winter 1982), p. 36. For a current update on the decline of intermediacy see Edwidge Munn and Denise Rioux, "La référence : une fonction archivistique à part entière," *Archivaria* 45 (Spring 1998), p. 109.

13 The reference process and some of the theories behind it are discussed in depth by Louise Gagnon-Arguin, "Les questions de recherche comme matériaux d'études des usagers en vue du traitement des archives," *Archivaria* 46 (Fall 1998), pp. 86–102.

14 Gregory Bateson, *Mind and Nature: A Necessary Unity* (New York, 1979), p. 242.

15 Elsie Freeman, "In the Eye of the Beholder: Archives Administration from the User's Point of View," *American Archivist* 47, no. 2 (Spring 1994), pp. 111–123. Freeman asked this question fifteen years ago; however, in spite of a spate of user studies in the mid-1980s and then again in the early 1990s, research has not been consistent nor have any of these studies been replicated.

16 See, for example, Fredric Miller, "Use, Appraisal, and Research: A Case Study of Social History," *American Archivist* 49, no. 4 (Fall 1986), pp. 371–92 and Jacqueline Goggin, "The Indirect Approach: A Study of Scholarly Users of Black and Women's Organizational Records in the Library of Congress Manuscript Division," *Midwestern Archivist* 11 (1986), pp. 57–67.

17 William E. Brown Jr. and Elizabeth Yakel, "Redefining the Role of College and University Archives in the Information Age," *American Archivist* 59, no. 3 (Summer 1996), pp. 72–87.

18 Paul Conway, "Research in Presidential Libraries: A User Study," *Midwestern Archivist* 11 (1986), pp. 35–56.

19 Paul Conway, "Partners in Research: Improving Access to the Nation's Archive," *Archives and Museum Informatics* (1994) and Ann Gordon, *Using the Nation's Documentary Heritage* (National Documents Study Report) (Washington, 1992).

20 Wendy Duff and Penka Stoyanova, "Transforming the Crazy Quilt: Archival Displays from a User's Point of View," *Archivaria* 45 (Spring 1998), pp. 44–79.

21 Taylor, "Transformation in the Archives," p. 15.

22 Barbara L. Craig, "Old Myths in New Clothes: Expectations of Archives Users," *Archivaria* 45 (Spring 1998), p. 125.

23 For a much more in-depth treatment of virtual reference see Helen Tibbo, "Interviewing Techniques for Remote Reference: Electronic versus Traditional Environments," *American Archivist* 58, no. 2 (Summer 1995), pp. 294–310.

24 Gagnon-Arguin, "Les questions de recherche comme matériaux d'études des usagers en vue du traitement des archives," passim.
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27 Thomas H. Davenport and Laurence Prusak, *Working Knowledge: How Organizations Manage What they Know* (Cambridge, MA, 1998), p. 12.
28 Richard L. Daft and Richard H. Lengel, "Information Richness: A New Approach to Managerial Behavior and Organizational Design," *Research in Organizational Behavior* 6 (1984), pp. 191–233.
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31 Taylor, "Transformation in the Archives," p. 23.
32 Miller, "Use, Appraisal, and Research," p. 377.
33 Robert S. Taylor, "Information Use Environments," in Brenda Dervin and M.J. Voigt, eds., *Progress in Communication Science* (Norwood, NJ, 1991), pp. 217–54.
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35 Carol S. Saunders and Jack W. Jones, "Temporal Sequences in Information Acquisition and Decision Making: A Focus on Source and Medium," *Academy of Management Review* 15, no. 1 (1990), pp. 29–46.
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50 University of California-Berkeley, *Library Research Using Primary Sources.* <http://www.lib.berkeley.edu/TeachingLib/Guides/PrimarySources.html>
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