Counterpoint

When is the Future? Comparative Notes on the Electronic Record-Keeping Projects of the University of Pittsburgh and the University of British Columbia[1]

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Any observer of archives and archival literature over the last five years cannot escape the growing preoccupation of archivists with the impact of electronic technology on record creation, maintenance, and use. What in the late 1980s was the occasional article or review has grown into a widespread recognition that electronic records represent a fundamental challenge to archival methods, theories, and institutions, and the individuals who work within them. Most archival journals now regularly include two or three articles and reviews directed at this field, and associations turn over whole conferences to the subject. Yet, despite this significant volume of work, it is difficult for one to escape the observation that much of the literature in this field possesses little in the way of immediate assistance, that there is not a great deal to relate to one's current reality or experience. Nor is this just the perspective of the archivists with "paper minds."[2]

Archivists appraising, acquiring, and describing electronic records today have very little to assist them in their work. In large part, this arises from the pace of technological change; everything is new and the systems we appraise today may bear little resemblance to what lies five years down the road. This, in turn, provokes many commentators to feel a need to offer their predictions for the direction technology will take and how archivists need to prepare themselves for this future rather than dealing with the present. Yet, in doing so there seems to be a tendency for theory to be such a distance ahead of method and practice as to disconnect the two entirely. The result is a body of archival literature on electronic records possessing not just a confident didactic tone, but a tone of presentation which casts doubt upon the current context and practices of archivists, indeed calls upon them to recast their minds. One witnesses a constant redefinition of terms and the appropriation of others, all of which leaves a sense that whatever archival footings remain, they are on very unstable ground. For most archivists, however, the need is not to attack the past nor to resist the future. They are largely disinterested in such theoretical debates and want merely to reconcile the present and the past with the future so that they can

continue practising their profession. Archivists are expectant of the assistance or guidance that will allow them to make the transition from the present to the future, and to do it in a way that does not create a disjunction or schism in their charge, the archival record.

The models of record-keeping represented by the University of British Columbia (UBC) School of Library, Archives, and Information Science and the University of Pittsburgh School of Information Studies projects offer an unusual opportunity to explore some of the fundamental issues related not just to electronic records, but to archives in general. Furthermore, given the number of articles and presentations on both of these projects, there seems an obvious need for some discussion of the findings and conclusions of both.[3] While it may not be as stark as the question posed in the title of this piece, these two projects do offer their own perspectives on the future. The approach here is not theoretical, but instead a comparison of these models with current reality. It will be shown, in following some selected aspects of these two projects, that they have each ended up providing a model for electronic record-keeping that serves or stresses two different types of electronic documents: in the case of Pittsburgh, records are consistently-structured records of transactions, while UBC conceives of records in more diverse forms and contexts. This article explores some of the points of intersection and divergence, beginning with the origins of the projects, their use of definitions and terms, and some brief remarks on the consequences and implementation of these two models, both for archivists and record-keepers.

Origins

The beginnings of these two very different projects are quite similar. The broad context for both is the same: the inescapable and well documented requirement for theoretical and practicable models to confront the intersection of technology and the management of records and information. In the case of UBC, the project states its purpose as "to define the methods for ensuring reliability and authenticity of electronic records on the basis of diplomatic and archival concepts and principles." The Pittsburgh Project describes the challenge to archivists "to explicitly define what requirements must be met by record-keeping systems so that they [archivists] can intervene in organizational policy, systems design, and program implementation to ensure the creation of records, preserve their integrity and provide for access."[4] Although they choose deliberately different terms to focus the issue—"Authentic, Reliable, Complete" (UBC), and "Accurate, Understandable, Meaningful, Coherent" (Pittsburgh)—both have at their centre a concern with maintaining the integrity and essential nature of records throughout their existence, whether it be for the "life cycle" (UBC), or the "continuum" (Pittsburgh).[5] Neither project set out to design a "system"; instead they aimed to create models incorporating the requirements

necessary to ensure the integrity of "electronic evidence," a term they both share. Yet from this zone of convergence, the two projects set different courses.

The UBC Project has embedded in its statement of purpose and in its deductive approach a fundamental faith in concepts, archival and otherwise, which were well established before Charles Babbage conceived of the "Analytical Engine" in the mid-nineteenth century. The grounding of this model in diplomatics links it, according to Luciana Duranti, one of the project's principle investigators, to a tradition which can be traced back to Roman Europe. Duranti states that "The primary contribution of diplomatics to modern record-making and -keeping is its definition of the archival document, or record, in its own terms, by rules or attributes that have evolved out of a scientific study of the documentary process."[6] This is not a denial of the impact of technology on record-keeping, as we will see below, but rather a derivation of current practices from defensible past ones. Not all current practices are defensible; UBC argues that records managers and many corporate bodies have, for reasons of efficiency in managing larger and larger quantities of records, discarded important elements of the records management canon. Thus computer technology is a tool to implement and facilitate proper record-keeping, not to replace it, and its impact on the *attributes* of a record is the focus of this project. UBC makes this abundantly clear in their requirement to manage records regardless of medium.[7]

The Pittsburgh Project finds its intellectual origins in the work of David Bearman and its birth in a National Historical Publications and Records Commission grant to determine the "record-keeping functional requirements for electronic information systems." The approach was more unabashedly teleological, identifying best practices, and then conceptualizing and defining the issues for a model which could meet all requirements—operational, legal, and archival—for the production of reliable evidence. This was justified, in the view of Pittsburgh, by the demonstrable inadequacy of any of the existing archival methods and strategies to cope with both paper and electronic records.[8] In a widely read series of articles beginning in the mid-1980s, Bearman set out his interpretation of the state of archival theory and method. Large descriptive backlogs, vast quantities of unscheduled records, and inadequate reference tools all demanded a new approach, particularly as the complexity of electronic records was predicted to eclipse anything encountered in the traditional paper environment. To this end, those working at Pittsburgh probed and questioned the validity of some of the most fundamental concepts underlying records management and archives.[9]

The Concept of the Record

While the Pittsburgh Project found that the principles of *respect des fonds* and provenance maintained much of their relevance in an electronic context, the

record as a product of a business function/activity was introduced by Pittsburgh to sharpen the archival focus on the issue of evidence rather than information. In the eyes of many commentators, archives are awash in information, not records. And while there are many explanations for this, one critical factor has come to be seen as a penchant for archivists to pursue content and informational value. By focusing on the record as the evidence of a transaction, Pittsburgh encourages archivists to look not just at the content of records, but also the context of their creation and their structure.[10] With a strong grounding in business process analysis and system design, the members of the project see organizations creating records as a result of predictable business events, such as qualifying a client to receive benefits, a purchase or a sale, or making a patent application.[11] This is not an entirely new concept or redefinition, being found in the writings of both Jenkinson and Schellenberg, and is only a forceful restatement of the latter's concept of evidential value. However, it does possess a new resonance for electronic records at the end of the century. Pittsburgh and many other commentators hold the view that archivists must anticipate appraising the archival value of systems in the design phase, concentrating on the processes and actions which will require a record to be created prior to there being any content to judge, studying the site of record creation and the function which necessitates record creation.[12] In doing this, archivists must engage themselves in the design of record-keeping systems, for only they possess the skills for determining evidential value and what constitutes sufficient evidence at this site.[13] They must be ready to advise on what a record-keeping system must entail if it is to produce records that would be verifiable as evidence of action and which would be accessible over time.[14]

In pursuing its deductive approach, UBC took observable practices and diplomatics and produced a more familiar definition of the record. It is described as: "Any document created by a physical or juridical person in the course of practical activity." The definition is given further substance in noting the assemblage of information by the office and the organizing or "setting aside" of this information with other records, which strengthens its status.[15] Without linkage to other records, no single document can speak for itself as to why it has been set aside, while a series of documents linked to others more forcefully indicates process and purpose. The importance of this process of "setting aside" also has a clear pragmatic aspect to it, particularly with respect to the "virtual document." A number of commentators have warned of the vaporous qualities of electronic records, such that a user can produce a view on their screen—the virtual document—which would not be found printed to disk. UBC quite rightly points out that if there is no perceived business need to capture this document or set it aside to provide evidence of an action, then its status as a record is dubious at best.

There is a further important difference in the UBC view of a record from that of Pittsburgh. In the IDEF modelling exercise undertaken by UBC, in conjunc-

tion with the US Department of Defence, the concept of the record can be expressed as: "an agency, establishes an office, which has a competence, and the same agency carries out a function(s), which is in turn carried out by a procedure, which is composed of acts, being mere acts, or transactions."[16] While this decomposition of acts into mere acts or transactions is not elaborated in any detail, one can only assume that "transactions" were perceived as not encompassing all purposes for which documents are set aside to become records. This crucial difference at the most fundamental point, the definition of a record and what an electronic record-keeping system is to manage, is more than just nuance. It provides an insight into how the two projects view the objects of their study and the context of record creation.

The definition of a record as evidence of a transaction is one of the most distinctive features of the Pittsburgh Project and it has already gained currency in a number of jurisdictions, particularly in Australia, where its application has been promulgated in the *Policy on Managing Electronic Messages as Records* and the resultant *Guidelines on Managing Electronic Messages as Records.* The Australian government has embraced this distinction, noting "Records are distinguished from information by the fact that records function as evidence of business transactions."[17] In many corporate and government contexts this is straightforward enough. Banks, insurance companies, social security agencies, immigration offices, and procurement agencies conduct thousands of business "transactions" a day, and evidence of these events is vital to the organizations that conduct them. Further, the application of technology to capture evidence of these transactions is by no means a new development, as most of the above-described transactions have been captured in an electronic form since the late 1970s. Yet, it is also true that few archives have had experience or success in acquiring such records. Therefore, the concept of records as evidence of transactions provides a framework for the identification, appraisal, and acquisition of this type of record. Furthermore, Pittsburgh's concept of metadata-encapsulated objects would result in less resource-intensive processing and description of records.[18]

However, Pittsburg's placement of "business transactions" at the centre of all record creation is an over-simplification of the concept of the record. Some find this reduction both misleading and disturbing, and this is because in some environments it potentially excludes from the status of records documents with long term legal and evidential value. In fact, there are really two types of records excluded, one deliberately and the other less obviously so. In the first instance there is no attempt to disguise the point with respect to information systems, which are described as databases and other stores of data unlinked to any transaction and which do not, therefore, produce records.[19] It is properly pointed out that many "information systems" have not been designed to capture all inputs and outputs in an auditable trail. One such on-line system is used by the Canadian federal government to identify all aboriginal Canadians with

status under the *Indian Act*. As this system only maintains current data, an annual archival snap shot will miss the infant who is born and dies between two snap shots. While the Department of Indian and Northern Affairs views this database as a record, it is clear that it does not meet all of Pittsburgh's thirteen functional requirements for electronic evidence. Whether it is a record or not is no small question and the impact on archives is significant whatever the response. On the one hand, if such systems lose their status as "records" in archival legislation, archives would be relieved of the myriad transfer and processing problems these systems present. On the other hand, archives would also be losing sources of evidence of government action and inaction. Even though many such systems are not "record-keeping" systems, they do inform the policy and programme areas of public and private institutions.

The discussion on this point must be broadened before such an easy distinction between "information systems" and "records systems" can be accepted. In much of the recent archival literature, it is not clear what an information system is, except by a negative definition, i.e., a system which does not keep records, only information. When Emergency Preparedness Canada keeps information about disasters, natural and man made, tracking the costs in dollars and other resources, recovery time, and other data, is it keeping an information system or a record-keeping system? The only transaction is the recording of data, leaving one to believe that this is an information system. However, it is a tool to assess trends, allocate resources, and plan for future events. Similarly, the economists in central banks and government financial agencies use economic data for the modelling of budgetary expenditures and revenues. The data may originate with thousands or millions of individual transactions, but it has been aggregated to a point where such distinctions are irrelevant. Again, there is no doubt about the utility of such tools in framing the context for the decision-making processes of governments, but are they record-keeping systems or information systems?

The perspective that one holds on this issue is also dependent on when the archivist confronts an electronic system. It can be argued sensibly, as both these projects do, that if archivists are involved in the design and development phases, many of the pitfalls that result from systems which do not confront long term evidential requirements could be avoided. Not to detract from the validity of this point, it does not, however, address the fact that many such systems exist and many more will be implemented before archival requirements are widely understood and accepted.[20] In the meantime, can non-record-keeping systems be consigned to neglect or destruction because they are inadequate in meeting long term evidential requirements and because they present difficult and time consuming processing problems? The example of the Trade Negotations Office records at the National Archives of Canada provides a perfect case for the point. Acquired as monthly LAN back-ups, the method of acquisition was neither systematic nor simple; the records, however, represented unique evi-

dential material on the decision-making behind the most significant Canadian economic and trade event in the last twenty years.

One can argue that the need for discussion on this point is not just an archival one, it is a wider social requirement. Whatever the degree of consistency and rigour in the appraisal, acquisition, and description of records, archives are viewed by society as repositories of social, political, and cultural accountability. In a time when governments are combatting widespread public distrust and scepticism, it might be awkward for government-employed archivists to stand up and say that certain types of information which governments are creating, accumulating, and maintaining can be destroyed out of hand as they are no longer of interest to archivists and, by extension, society because they do not qualify as "records." While archivists and archives do hold unique places in the field of record-keeping, society at large also has certain expectations of archives. Freedom of information legislation in particular has turned not just academics and journalists but ordinary citizens into archival clients. It is unlikely that the public would understand or have any time for such nuances as "information systems" versus "record-keeping systems." If one harbours any doubt as to the ability of the public to take note of archival decisions to keep or destroy government information, one need only look to the debate generated in the Netherlands on Project PIVOT for a demonstration. In this "debate" we have users threatening to spit on the grave of the Dutch national archivist because of their dissatisfaction with the appraisal methodology and decisions of PIVOT.[21] The role of archives in political and social accountibilty is uncontested, but this role would be perceived as diminished by any such a categorical retreat.

But "information systems" are only half of the records which are not conceptually accounted for in the model which represents records solely as evidence of a transaction. There are countless offices in any government or corporation where what goes on could be described as the conduct of business, but not a business transaction, the point being that the latter can encompass the former but not vice versa. Examples which illustrate this point are abundant. When a foreign service or defence analyst assembles information—almost always copies—from open sources, diplomatic reporting, intelligence reports, and other sources for an assessment of a foreign affairs, defence, or security requirement, there is no measurable transaction, unless it is the act of assembling information. Similarly, in the formulation of all manner of government policy, bureaucrats accumulate information to determine the need for an initiative, and establish the context of the initiative and ultimately its form, nature, and duration. This policy formulation process can go on for days or years, and at the end of the process there may be no programme result, for example, universal health care in the United States. The assemblage of information is evidence of an activity and therefore constitutes a record. David Bearman's critique of the obsession of archivists with information without

context is well founded, yet that criticism is also based on the relationship between the information and the archivist at the moment when the latter appraises for value. When we look at information and how it relates to activities, functions, and mandates, seldom is it the case that offices accumulate information without reference to their operational objectives. It would appear that the definition of a record adopted by UBC, particulary the setting aside of records and the formation of the "archival bond" with other records, comes closer to accommodating this reality. When such records constitute the policy framework for a sale, or for who qualifies for what benefits, they comprise the evidential framework on which the transactional records rest.

The conceptual problem created by electronic records of this nature can be viewed as one of system design. Records created as the result of structured business transactions are easily modelled, for the transactions have finite variations, and their "recordness" is driven by an acknowledged business requirement. In this vein, it has been pointed out how the requirement for the creation and maintenance of records should be removed from the context of records management and placed in the context of the business process which they serve.[22] Business process and systems analysis seek out patterns and event sites, where the relationships between data entities and processes are measurable and predictable. However, the type of record noted above, which may be loosely described as "policy records," arrive in an undefined number of forms, are created in an unspecified number of administrative contexts, and the contents of which may be linked to any number of administrative activities and functions. The result is that the system designer sees no immediately discernable relationships between data generating events, which are necessary to model and develop the system. This has been implicitly recognized by Bearman, who recently wrote that "Other implementation projects can explore the marriage of document management systems with record-keeping, which will prove more difficult because the transaction nexus from which paper flows cannot be automatically linked to the resultant documents. Human analysis at the item level will be necessary to correctly locate the evidential source of documents."[23]

The problem, however, is much more than one of data modelling and systems design. There is the issue of the form and nature of the offices and agencies which create and accumulate such records and the tools they employ to create and receive them. Offices creating "policy" records can be found at any level of the organizational heirarchy, responding to requests for information and providing inputs based on the demands and relationship to other offices in the organization or bodies outside the organization. Successive waves of centralization and decentralization, complete with their economic and political justifications have not altered this reality. Even deputy heads of federal departments—who in theory hold a central coordinating and accountability role in their agencies—only make final decisions based on inputs from a

number of sources. In a traditional paper environment, archivists are usually fortunate to encounter centralized file classification systems. The trail of evidence almost always leads back to an office of primary interest at a lower level, which holds the records used to form the recommendation to the deputy head. Any number of structural units end up having an impact on any one function, and the outcome is, at best, a fragmented record. Today the tools of production are e-mail, word-processed documents, electronic and paper faxes, web documents, and a host of other applications, all operating in an unstructured reality caught between paper and electronic media. It is this lack of control and documentation that one American legal commentator has described as "Our Vanishing Public History," noting that this disappearing record results both from the nature of the organizations creating such records and, of course, from the advent of computer technology for records creation and communication.[24]

Implementing Record-Keeping Solutions

The record-keeping solution to the burgeoning bureaucratic structures in the late nineteenth and early twentieth centuries was the modification of the traditional registry system to a subject-based central registry system, introducing classification to organize and catalogue records according to the subject and/or activity involved. The strength of these systems was the intuitive and logical structuring of documents as files, providing a more retrievable form for storage and reference by the corporate body and the ability to accomodate change. The UBC project sees the strength and endurance of the registry model as the basis of the solution to the modern problem of electronic records. Indeed, under "Manage Archival Framework" in the UBC model one will find processes and activities which are familiar to anyone who has read a records management text in the last twenty years. Record holdings are surveyed, inventories are made, and a classification scheme is created, which is used, along with integrated business and documentary procedures, to design and implement a record-keeping system.[25] UBC acknowledges that there are fundamental differences between electronic records and traditional paper records, and eight templates were produced by the project to present the differences in what constitutes a complete, authentic, and reliable record in either medium.[26] The four templates for electronic records describe what conditions must be met for a record to attain a reasonable standard of completeness, reliability, and authenticity. Many of these conditions entail the completion of a document profile that would accompany each document in the system, including such data as time and date of creation, time and date of receipt, author, addressee, subject, classification, and the routing of the document by the system according to the profile, all of which are well known elements of a traditional record registry. In this regard, UBC is not unique in applying the registry or formal

records management model to problems posed by electronic records: more than ten years ago the National Archives of Canada produced an overview for such a system and since that time a number of electronic document management software (EDMS) packages have been produced which incorporate many of the records management requirements of that document and most of the profile fields set out in the UBC model.[27] The difference, however, is that many charactertistics which were intrinisic or automatic in the paper world require more than just some form of software or operator intervention in the electronic context. The archival framework must also acknowledge the competences of individuals to act in a capacity to create or transmit records. It is in this area that the influence of Luciana Duranti's work on diplomatics is most evident.[28] The careful construction of the triad of *complete*, *reliable*, and *authentic* is forcefully translated to the electronic records context.

Of course, some might question how automating the registry model can resolve the problems in the electronic work environment when it proved so ineffective in many large organizations trying to cope with the explosion of paper in the post-war welfare state. The response of the UBC project to such criticism can be found, in part, in the utilization of the principles of diplomatics, but also in the manner in which the model deals with the inclusion of integrated business and documentary procedures in the record-keeping system and the processes of revision found under "Maintain Archival Framework." The failure of many organizations in the past was to consign their records management programmes to administrative backwaters and then fail to notify these programmes of changes in the organization and mandate having an impact on the creation and maintenance of records. UBC responds by establishing a record-keeping framework that accommodates institutional change within the record-creating organization and strategically locates it so that a characteristic of change is a revision of the "archival framework."[29] While the difference of this approach with the original matrix of functional requirements presented by Pittsburgh may not be great, it would seem that there is a contrast in the presentations. Pittsburgh originally emphasized records as evidence to the point where organizational context is all but neutral. More recently the notion of the "compliant" organization has been brought in to correct this imbalance.[30] UBC, on the other hand, has presented the "Manage Archival Framework" core of their model as a dynamic on-going relationship between the agency and the archival framework and has more clearly accommodated change.

Although this is conceptually straightforward and logically argued by UBC, one is also aware that this form of relationship requires a degree of centralization that is contrary to current information management theory and practice. UBC's insistence on maintaining structures such as a "Records Office" and an "Archives Committee" belies a pragmatic approach. After all, it is often only in structures such as these that one finds the understanding of the value of records, the standards required to maintain reliable records, and the greater appreciation

of record-keeping requirements across the organization. At this time, this type of awareness is not to be found in information technology shops, and creating it is one of the fundamental challenges faced by those working with electronic records. Yet, instead of supporting such structures, many organizations have savaged their records management shops in search of economies, betting that enough hardware and software can be thrown at the problem and the solution will still cost less than labour-intensive traditional records management programmes. John McDonald, amongst others, has explored this trend, outlining a future where record creation, storage, and maintenance is a seamless part of the business process without need of records administration. This vision encompasses such concepts as individualized desktops which utilize information on the user's organizational position and contents of the records to determine the proper "filing" or storage of documents produced from that desktop.[31] While this future may be some way off, it does illuminate the trend away from centralized control.

Indeed, the highly centralized model of UBC appears to possess too much that is in contradiction with current organizational trends. Another area in which this seems obvious is the view that there must be a one-to-one relationship between an agency and a record-keeping system.[32] A corollorary effect of the slashing of administrative overhead in governments and business is a downloading of these tasks to programme areas. There are no longer resources for classifying and reclassifying documents, or to provide the quality control necessary to ensure the integrity of the records and the record-keeping system as demanded by the UBC project. It is hard to imagine how anything short of a major crisis in accountability resulting from poor record-keeping could reverse this trend, and while UBC has conducted some very interesting research into artificial intelligence and its application to records management, this too is over the horizon.[33] A more likely scenario, therefore, is for independent offices and directorates to set up their own record-keeping systems, providing localized accountability. These more compact systems will have more discernible outlines in terms of their relationships with organizational entities and activities, making the appraisal archivist's task that much easier. Situated locally, such systems avoid the constant adjustment of centralized record-keeping systems resulting from organizational change. Both in terms of corporate memory and archival effects, this is far superior to those large agencies where central records offices have failed to keep abreast of programme area adjustments, changes, and elimination, and where archivists have had to resort to an item by item examination of the record to determine the site and context of record creation. The mitigating factors are, however, not negligible; there is a loss of overall corporate accountability and, in spite of shrinking bureaucracies, there are more independent record creators than there are archival resources for the identification, appraisal, and acquisition of the records they create.

Two Models, Two Forms of Electronic Records

An examination of these two projects, therefore, reveals that in conceiving of records differently, each has produced a model with its own strengths and which achieves its stated objective of protecting electronic evidence for a specific record-creating context. The model outlined in reference to the functional requirements of Pittsburgh conceptualizes records as the products of transactions, and if an organization wants to minimize its risk and maximize its accountibility in this context, control and accessibility to its records is the way to achieve it. While technically the UBC record-keeping model could accomplish a similar result, its strength is in gaining control over the diversity of records which form the administrative and operational context for business transactions. To demonstrate this point one can look to the National Historical Publications and Research Commission funded pilot project being conducted by the City of Philadelphia to test the functional requirements of Pittsburgh.[34] The Human Resources Information System (HRIS) has been established by the city to record all transactions with its workforce and to do this in a way which is compliant with as many of Pittsburgh's thirteen functional requirements as possible. Conceptually, this would appear to be a relatively straightforward task; there is a plethora of off-the-shelf and customized human resources software packages available and although Philadelphia has a large workforce, it is not anything like the biggest employer in the United States. Technically, the task is complicated somewhat by the encapsulation of metadata, broadening the data structure well beyond the bounds of the off-the-shelf solutions, and by the requirement that every instance of access to the system be recorded, even if records are merely viewed. Yet, even with this fully accomplished, will this record-keeping system provide complete evidence of the management of the human resource function at the City of Philadelphia? Will it encapsulate records and documentation of the collective bargaining process, or state standards on safety in the workplace, or City Council background and debate on employment equity? These are not transactions in the context of the Philadelphia Electronic Records Program, but they are activities which in their entirety and in their diversity form the context of the Human Resources Information System. Or put another way, the records of the HRIS have form and content, but are not complete in their contextual sense. The human resources department could maintain a system modelled on the UBC project to document the policy context of human resource management, but to incorporate the transactional records into this system would add the complexity of managing two different forms of records, the mass of one dwarfing the other, and both of them having quite different archival requirements. Indeed, if one broadens the example to include issues related to value and appraisal, it is quite possible to conceive of an appraisal hypothesis which identifies only one or the other of

these records for long term archival preservation. If the records from a record-keeping system are not required to be preserved for their enduring archival value, then which requirements are absolutely necessary for strictly business purposes?

It is in dealing with questions such as this that one senses other differences between the projects, but also some similarities. Undoubtedly proponents of the Pittsburgh project would respond by saying that the requirements for archival retention are no different from those of business accountability, and that that has been the whole point of the project: the dovetailing of business and archival requirements. Thus, there is no discernable archival boundary, for the creator requires the same record integrity as the archivist or the court, and the records continuum describes the existence of a record. There seems to be little accommodation of the reality that the need for some records is very limited in comparison to others, and, therefore, that compliance with requirements is a needlessly expensive proposition. Consistent with its faith in established archival principles, UBC views the archival framework in terms of the life cycle of the record; at the end of its primary operational use, a record passes over the archival boundary, after which it becomes the charge of the neutral third party, who is in a position through custody and description to bear witness to the authenticity and reliability of the record.[35] How this passage over the boundary is to take place is the next phase of the UBC project.

Considerable discussion has been stimulated on this aspect of the two projects, drawing on the post-custodial/custodial debate for added fuel. In this regard, each project has untested assumptions about the record-keeping systems they have modelled, which will only become clearer in time. In the case of Pittsburgh, these are largely assumptions about organizational behaviour or compliance which need to be tested under real economic conditions in a variety of corporate bodies. While it might be argued that non-compliance involves risking the loss of essential and valuable evidence, risk is not a constant but a relative measure, so presumably compliance is too. UBC, on the other hand, will soon confront technical issues such as migration and functionality on the other side of the archival boundary. With the passage of very little time, the mass of records on the archival side of this border will surpass that of the operational records, and appraisal will have to be incorporated into the process of migration over the boundary.

Conclusion

The only clear thing about the different perspectives of these two models is that it is entirely dependent on one's vantage point. While it is not entirely fair to describe the projects as diametrically opposed, the scope and relevance of these two projects and the models of record-keeping which they represent will be dependent on the institutional setting in which they are situated. Both projects

claim explicitly and implicitly to represent models for the protection of all electronic records and neither acknowledges a conceptual shortcoming. Neither represents a "grand unified theory" for electronic record-keeping systems, but rather ideal solutions for different organizational contexts. This is an important and under-emphasized point; we are not dealing with one model for electronic records but a number of possible models based on the convergence of technology and organizational setting. Many record creators will not require ideal solutions and will choose whatever product meets their business requirements, and hopefully many more will recognize the importance of preserving the long term integrity of their electronic records.

Even so, these projects have done a great service in bringing sharply to the fore fundamental archival issues of accountability. Now is the time for a much broader examination of these issues and a host of new ones which they have presented to us. Can information systems be differentiated from record-keeping systems without reference to organizational context and requirements? How do different models of electronic record-keeping systems adjust to organizational change? How far can archivists go in asserting archival requirements in the design and creation of record-keeping systems and the records they produce? How and when is appraisal to be carried out? In seeking to answer these questions and many others we must bring the discussion down to a level of empiricism which up to now has been largely missing from the writings on electronic records. If this debate is not joined, the future of electronic record-keeping will never happen for archivists.

Notes

1 This article represents two presentations by the author, one at the Association of Canadian Archivists Annual Conference in Regina, 1995, and the other delivered at the Annual Meeting of the Society of American Archivists in San Diego, 1996. The author wishes to acknowledge the contributions of Richard Brown, Brien Brothman, and Terry Cook, with whom he discussed many of these issues.

2 Terry Cook, "Electronic Records, Paper Minds: The Revolution in Information Management and Archives in the Post-Custodial and Post-Modern Era," *Archives and Manuscripts* 22, no. 2 (1996), pp. 302-28.

3 Both projects have produced a considerable output of articles and documentation. The most convenient overview of the Pittsburgh Project is David Bearman, *Electronic Evidence* (Pittsburgh, 1994). Since the publication of this collection of previously published articles a number of pieces elaborating on the model have been published, including Wendy Duff, "Ensuring the Presevervation of Reliable Evidence: A Research Project Funded by the NHPRC," *Archivaria* 42 (Fall 1996), pp. 28-45 and David Wallace, "Managing the Present: Metadata as Archival Description," *Archivaria* 39 (Spring 1995), pp. 11-21. The UBC Project has published three progress reports on their work, all of which are found in *Archivi & Computer, issues* 3 (1995), 1 (1996), and (5) 1996. An overview of the project's findings is provided in Luciana Duranti and Heather MacNeil, "The Protection of the Integrity of Electronic Records: An Overview of the UBC-MAS Research Project," *Archivaria* 42 (Fall 1996), pp. 46-67. Both projects have produced web pages for the purpose of disseminating information, which contain excellent

documentation, including bibliographies and links to implementations and related projects. The University of Pittsburgh's project homepage can be found at www.sis.Pittsburgh.edu/~nhprc/ and the University of British Columbia Project is at www.slais.ubc.ca/users/duranti/index.html. Hereafter the projects are referred to as Pittsburgh and UBC.

4 Luciana Duranti and Heather MacNeil, "Protecting Electronic Evidence: A Third Progress Report on a Research Study and its Methodology," *Archivi & Computer* 5 (1996) and David Bearman, *Electronic Evidence: Strategies for Managing Records in Contemporary Organizations* (Pittsburgh, 1994), pp. 2-3.

5 The debate over the applicability of these two terms to describe the life of a record can be found in *Archives and Manuscripts* 23, no. 4 (November 1996).

6 Luciana Duranti "The Concept of Appraisal and Archival Theory," *American Archivist* 57 (Spring 1994), pp. 328-44.

7 Luciana Duranti "The UBC Research Project on Electronic Records," a presentation to National Archives of Canada staff, November 1996.

8 See David Bearman, "Archival Methods" and "Archival Strategies," both published by *Archives and Museum Informatics* on the failure of current archival theory and practice to accommodate both existing paper records and the emerging electronic record.

9 In addition to the issues confronted in the above-cited "Archival Strategies" and "Archival Methods," this also involved a direct challenge to the "custodial approach" of traditional archives. This debate will not be directly confronted here, but readers should consult *Archives and Manuscripts* 24, no. 2 (1996), which includes a number of papers from a 1996 Australian conference dealing with custodial debate. For the extended unexpurgated version of the debate users can refer to the archive of the Australian listserv "aus.archivists@asap.unimelb.edu.au."

10 David Bearman, *Electronic Evidence*, pp. 16-17.

11 Ibid., p. 35.

12 Richard Cox, "What is an Archival Record, and Why Should We Care?" *American Archivist* 57 (Fall 1994) Editorial, pp. 592-94.

13 *Electronic Evidence*, p. 36.

14 In contrast to Pittsburgh, UBC advocates a far less intrusive role for archivists in the design of systems and the creation of records. The form and content of records are driven by operational and evidential purposes, according to Luciana Duranti, and the role of archivists in systems design is not to determine record form, but to set and monitor standards which will allow records to cross the archival boundary.

15 Luciana Duranti and Heather MacNeil, "Protecting Electronic Evidence: A Third Progress Report on a Research Study and its Methodology," in *Archivi & Computer* 5 (1996).

16 From Entity Relationship drawing in annex to Second Progress Report, *Archivi & Computers* 1 (1996).

17 See "Guidelines on Managing Electronic Messages as Records," available at www.aa.gov.au. This definition is almost verbatim from the Pittsburgh Project, the influence of which has been acknowledged by many Australian archivists. See "State of Electronic Records Management Worldwide, Spring 1996," *Archives and Museum Informatics* 10, no. 1 (Spring 1996) for some other international examples of the adoption of this definition and the concepts of the Pittsburgh Project. One should note that Australian Archives does not disregard records not controlled by a record-keeping system, as they indicate that "Stored messages in uncontrolled environments are, nonetheless, records or parts thereof, and are subject to discovery and subpoena and need authorization for destruction."

18 David Wallace has been the most active author in describing the encapsulation of metadata objects in record-keeping systems design. In particular see "Metadata and the Archival Management of Electronic Records: A Review," *Archivaria* 36 (Autumn 1993), pp. 87-110 and "Managing the Present: Metadata as Archival Description," *Archivaria* 39 (Spring 1995), pp. 11-21. The limitations of metadata as an alternative to archival description are forcefully laid

out by Heather MacNeil in "Metadata Strategies and Archival Description: Comparing Apples and Oranges," *Archivaria* 39 (Spring 1995), pp. 22-32.

19 David Roberts, "Defining Electronic Records," *Archives and Manuscripts* 22, no. 1 (May 1995), p. 14-16.

20 In broadening this discussion, one should also be mindful of smaller organizations and private records. Terry Cook brought up this important issue in his commentary on a session of the 1995 ACA Annual Conference, where Wendy Duff presented a report on the Pittsburgh Project and Luciana Duranti did the same for UBC.

21 "Ons nationale geheugenverlies," in *NRC Handelsblad, weededitie*, 13 August 1996. The situation created by PIVOT is, in fact, far more defensible than a categoric retreat from certain types of information because it lacks certain requirements of form, content, and context. PIVOT does provide a clear appraisal methodology and the reaction of archival users has still been scathing. I thank Bob McIntosh for drawing my attention to the article.

22 Margaret Hedstrom described the need for this shift in a paper given at the Association of Canadian Archivists Annual Meeting in Ottawa, 1994.

23 David Bearman, "State of Electronic Records Management Worldwide," *Archives and Museum Informatics* 10, no. 1, (Spring 1996).

24 "Working Papers of Federal Policy Makers: Our Vanishing Public History," *The Public Historian* 16, no. 4 (Fall 1994).

25 Luciana Duranti and Heather MacNeil, "Protecting Electronic Evidence: A Third Progress Report on a Research Study and its Methodology," *Archivi & Computer* 5 (1996).

26 The most readily accessible and current copies of these templates is at www.slais.ubc/users/duranti/tem1.htm.

27 National Archives of Canada, "Functional Requirements for Formal Records Management in Electronic Office System Technology," 1991. The recent initiative by the Treasury Board Secretariat and Public Works and Government Services Canada to identify system requirements for EDMS/RM software incorporates many such features, and a number of companies with off-the-shelf packages or suites were able to respond to a request for proposal.

28 Luciana Duranti "The UBC Research Project on Electronic Records," A presentation to the staff of the National Archives of Canada, November 1996.

29 Luciana Duranti and Heather MacNeil, "Protecting Electronic Evidence: A Third Progress Report on a Research Study and its Methodology," *Archivi & Computer* 5 (1996). See Maintain Archival Framework in the IDEF diagrams, Node A1, number 3, Sub Node A14.

30 Wendy Duff, "Ensuring the Preservation of Reliable Evidence: A Research Project Funded by the NHPRC," *Archivaria* 42 (Fall 1996), pp. 38-39 and pp. 41-42.

31 John McDonald, "Managing Records in the Modern Office: Taming the Wild Frontier," *Archivaria* 39 (Spring 1995), pp. 75-76.

32 Luciana Duranti and Heather MacNeil, "Protecting Electronic Evidence: A Third Progress Report on a Research Study and its Methodology." See endnote number 4.

33 William Underwood, "Artificial Intelligence and Records Management," paper presented at the Annual Conference of the Society of American Archivists, August 1996, San Diego.

34 Information on the Philadelphia Electronic Records Project can be obtained at www.phila.gov/records/.

35 Duranti and MacNeil, "Third Progress Report," and Heather MacNeil, "Implications of the UBC Research Results for Archival Description in General and the Canadian Rules for Archival Description in Particular," *Archivi & Computer* 3-4 (1996).