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Electronic Information and the Functional Integration of Libraries, Museums, and Archives

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ABSTRACT

The increasing availability in electronic form of information generally and of new kinds of information more particularly will lead to a redefinition and integration of the different categories of 'information' organizations. Traditionally these have been created to manage different formats and media such as print and its surrogates (libraries), objects (museums), and the paper records of organizational activity (archives and records repositories). Differences in organizational philosophy, function, and technique have arisen from the exigencies presented by these different formats and media. These exigencies no longer apply in the same way when there is a common electronic format. It is clear that, if electronic sources of information are to be effectively managed for future access by historians and others, differences between libraries, archives, and museums will largely have to disappear and their different philosophies, functions, and techniques integrated in ways that are as yet unclear.

INTRODUCTION

The thesis of this chapter is that the advent of electronic sources of information and their ever-increasing volume and variety will require a major redefinition and integration of the role of archives, museums, and research libraries. It is my view that the distinctions between all of these apparently different types of institutions will eventually make little sense, though we can anticipate continuing turf battles between the professional groups that manage them as we get to this point. Moreover,

some of the functions typical of these institutions will be performed—are already being performed—by other players in the information generation and dissemination game, especially publishers, networks, data archives, and various kinds of information brokers.

New kinds of functional realignments between the agencies involved with electronic information sources, and a new approach to understanding the kind of market in which they operate, are needed. Until the fact of these realignments is accepted and understood, until the integration of the roles and functions of libraries and archives especially is accepted, we will not be able properly to come to grips with the information needs of historians. These and other scholars need access to more information in electronic form than is currently available through commercial and non-commercial services of various kinds. Problems created by new kinds of information and the possibilities of new kinds of information access and manipulation for scholarly purposes will not be solved. The key issues are the impact of new electronic technologies on the custodial, keeping, archival role of 'collecting' institutions such as museums, libraries, and archives and the increasing availability of information sources in electronic form.

THE TRADITIONAL COLLECTING INSTITUTIONS

In the past the distinctions between libraries, museums, and archives rested on the formats of the typical artefacts that were in their care. Specialized techniques were required to manage these different formats. Libraries and librarianship have been centred on the acquisition of printed books and journals, or surrogates of them such as microfilm. To manage the collections that they created, librarians have developed special techniques for cataloguing, classification, and physical arrangement of these materials. In addition, extensive and often complicated systems of bibliographic control, backed up by interlibrary lending procedures, have been devised to provide 'intellectual' and physical access to what has not been acquired.

Modern librarianship has tended to stress the importance of the library as an access mechanism because of the volume, complexity, and cost of the information sources which fall within the purview of libraries but which no one library, no matter how great a research collection it aspires to acquire, can hope to obtain. Though librarians talk of information storage and retrieval as their *raison d'être*, they usually do not tell

an enquirer what he or she might want to know: they provide texts or locations for texts that might be useful in a particular case. They perform their professional functions by identifying and retrieving whole or parts of recorded texts that are held in their own collections or in the collections of other libraries to which they have access. The texts are printed and written collections of books, manuscripts and personal papers, for example. They may also be images derived from collections of documentary photographs, maps, prints, or pictures.

The research library in particular has a clear archival function. It preserves texts over time against possible future uses. The size and comprehensiveness of its collections set it apart from other kinds of libraries and provide the basic criteria for its usefulness to many kinds of scholars. Such libraries are literally documentary archives.

In another sense they are also museums of printed or written artefacts, though this notion seems more appropriate to the rare and other special materials that they contain in an original format. The parts of their collections in print-surrogate form, such as microfilm, would not normally be seen to have the kind of artifactual value that typically attaches to museum objects. Nevertheless, most research libraries functioning to this extent as museums, segregate certain items in their collections for special treatment, including exhibition or display. These items are usually books and manuscripts whose texts, illustrations, and binding are important examples of the book arts. They may also be considered rare, valuable, or 'curious' for other reasons, as might be the case of books with foredge paintings or a collection of miniature books. The texts of these items are of secondary—or of no—interest. It is their artefactual importance as 'codicological' printed or manuscript objects that counts. Another major category of these special materials comprises items whose physical characteristics provide important evidence for the scholarship centred on the texts—the province of analytical bibliographers and others concerned with establishing the authenticity of texts and patterns of textual transmission, for example. While these texts, like any texts, are readily reproducible in microfilm or electronically, for example, there are scholarly needs for access to the physical documents as such.

In general, however, the major functionality required of the library is to retrieve the texts in its own or other collections so that the texts can be read or consulted. Except in the instances outlined above, the form in which the text is made available, apart from convenience of consultation, is not an issue. Original book or journal or microfilm or electronic

versions are equally acceptable. In libraries, collections of images, such as photographs or print and picture collections, are usually not permanently exhibited but form part of the stored collections of the library and are retrieved and consulted in the same way as other texts.

The objects collected by museums theoretically have no limit. There are natural history, science and technology, and ethnographic museums; there are museums of musical instruments, costumes, furniture, and household equipment, maritime and railway museums. Aquaria and botanical gardens are 'living' museums; national and regional art galleries are museums.

Museums are identified by their commitment to the collection, storage, and educative display of physical, three-dimensional, objects which are in some way representative of the classes of objects, the genera and species, to which they belong. The major use to which the museum puts the objects in its collection is exhibition. They are typically 'viewed'. Nowadays, touring 'blockbuster' exhibitions or special temporary exhibitions for which items are borrowed are important aspects of the work of many museums, especially art galleries.

Most museums have an important research function. This typically involves identifying, acquiring, and processing the objects that fall within a particular museum's ambit. It also underpins the museum's display activities and informs the labelling of items and the special guides to collections or catalogues produced for exhibitions. Depending on the nature of the material, this research function is usually carried out by a permanent staff of specialist personnel such as ethnographers, palaeontologists, archaeologists, art historians, and so on. In terms of their permanent collections, whether in storage or on permanent display, museums may be considered in a general way to be archives or libraries of objects or specimens. They preserve objects as evidence of the past.

Traditionally, archives collect the records that government and other organizations create as part of their day-to-day operation. Special techniques have been required to appraise what is often the vast bulk of these records in which individual items are of relatively little predeterminable value—although, subsequently, identification of such items may well be crucial for the research of a particular investigator—to determine what will be retained and for how long. However, as Bearman observes, unlike the case of bibliographic material in libraries, 'when we accession, transfer, arrange, weed, document and inventory archival material we change their character as well as enhance

their evidential and informational value. The fact of processing, exhibiting, citing, publishing and otherwise managing records becomes a significant fact in their meaning as records, which is not true of library materials' (Bearman 1992: 10)—but may well be true of museum objects.

The anchor of modern archival science is the principle of provenance or *respect des fonds*, the identification of the agency creating the records essentially in terms of its institutional relationships and the maintenance of the integrity of the body of records as originally created (Gavrel 1990). This is not dissimilar to the extension that librarians have had to make to what once seemed the relatively simple idea of the author of a book or article which has now become 'primary responsibility' for a 'work'. Because of the nature of the activities of government and other organizations, traditionally archives have contained much library-like material as well as many museum-like objects—maps, printed documents, photographs, motion pictures, sound recordings, architectural models, and so on. Unlike libraries and museums, these items are acquired as part of the records that document a particular activity, function, or responsibility of the creating body.

AN UNDIFFERENTIATED PAST

It is clear that modern libraries, museums, and archives are different mainly because of the nature of the materials for which they have primary responsibility and because of the ways in which they provide for the educative and research uses of these materials. The emergence of their specialized functions can be traced in modern times from the previously undifferentiated collections of books and objects of seventeenth- and eighteenth-century rulers, aristocrats, and scholars. In England at the time of the great intellectual movement that began with Bacon and was fuelled by the Puritan rebellion, many scholars and divines speculated about how knowledge of God's creation might be more effectively advanced and disseminated than in the past. For the circle of reformers that surrounded Samuel Hartlib, for example, the advancement of learning required the creation of a centrally located complex of new kinds of institutions. These would undertake, when appropriate, the systematic collection of antiquities, items of natural history and books and manuscripts. In this complex

of institutions would be found scientific colleges and societies, herbaria, laboratories, workshops, and specialized information bureaux called Offices of Publick Addresse which would function in association with new kinds of professionalized library services (Webster 1975; Rayward 1994a).

The cabinets of curiosities, so much a feature of the households of gentlemen of the period, reflected not only an interest in what was rare, valuable, and out of the ordinary but, as Hudson (1988: 21) has pointed out, also an acute, eager interest in the natural world. There was little of the division between the sciences and humanistic disciplines so widespread today. All learning was seen as having a fundamental unity, ultimately deriving from religion. 'Curiosity' and 'antiquarian' were terms widely in use then with strongly positive connotations. They have acquired in recent times a more restricted, in the latter case indeed a pejorative meaning, that they did not have in this earlier period. What was important was the acquisition of whatever artefacts—books or objects—were appropriate to the social status, world view, and broad, multi-disciplinary intellectual interests of these individuals. No real distinction of library and museum, nor, at another level, of personal from government papers, was contemplated.

Thus, towards the end of the seventeenth century, the Ashmolean Museum at Oxford, reflecting John Tradescant's Closet of Curiosities in which it had originated, consisted among other things of collections related to natural history and antiquities, a library, and a chemical laboratory (Hudson 1988: 21). Some seventy years later, Sir Hans Sloane's great collection, the basis of the British Museum, 'contained specimens of plants, animals, birds, fossils, minerals, as well as antiquities, works of art, coins, books and ethnographical materials' (Hudson 1975: 18). It is only today that the final separation of the library from other parts of the British Museum, set up by Act of Parliament in 1753, is occurring, though the natural history collections were removed to South Kensington in 1857. It should also be noted that the other foundation collections for the Museum were the extensive manuscript collections of Sir Robert Cotton and the earl of Oxford, Robert Harley, which contained large and important collections of state papers and other archives, along with the library of George III which came to the Museum in 1827 (Miller 1974).

An interesting expression of the early complementary relationship of library and museum was the Charleston Library Society. Created in South Carolina in 1748, its collections contained scientific instruments

as well as books, and it lent both to its members. In 1773 it initiated an appeal for natural-history specimens and in a few years it had amassed 'an extensive collection of Beasts, Birds, Reptiles, Fishes, Warlike Arms, Dresses and other Curiosities'. This became the nucleus of the collections of what was described in the mid-nineteenth century as 'one of the best museums in the United States' (Hudson 1975: 32–3).

The point being made here is simple and perhaps obvious. It is that the functional differentiation of libraries, museums, and archives as reflected in different institutional practices, physical locations, and the specialist work of professional cadres of personnel is a relatively recent phenomenon. This functional differentiation was a response to the exigencies of managing different kinds of collections as these have grown in size and have had to respond to the needs and interests of an ever-enlarging body of actual and prospective users. It does not reflect the needs of the individual scholar or even the member of the educated public interested in some aspect of learning or life. For the individual, the ideal is still the personal cabinet of curiosities that contains whatever is needed for a particular purpose or to respond to a particular interest, irrespective of the nature of the artefacts involved—books, objects, data, personal papers, government files.

How to regain this functional integrity has been an implicit theme in speculations over the recent centuries about how to mobilize the growing knowledge that is potentially available in the service of society, if only a firm enough grip could be taken on it. Hartlib's Office of Publick Addresse, Leibniz's Encyclopedia, Otlet's Office of Documentation and Palais Mondial, Wells's World Brain all imply distress at, or explicitly lament, the problems of complexity and dispersion created by the ever-escalating growth of knowledge. Each represents a special suggestion for a single institutional framework within which the world of learning might be encompassed and better managed (Rayward 1994a).

'INFORMATION-AS-THING' AND ITS ELECTRONIC REPRESENTATION

The distinction between 'information-as-thing' and its electronic representation is found in an important paper by Michael Buckland. Buckland suggests that the institutional arrangements of libraries, museums, archives, and the like are concerned with 'information-as-thing', things

which are informative, which constitute evidence which 'could change one's knowledge, one's beliefs, concerning some matter' (Buckland 1991: 353). He seeks to reintroduce into the analysis of information and information systems the extended notion of 'document' formulated by Paul Otlet at the turn of the century in Europe and accepted by the English and European 'documentalists' (Buckland 1991*b*; Otlet 1991), a notion that reaches across institutional distinctions.

Buckland observes that:

information storage and retrieval systems can only deal directly with 'information-as-thing', but the things that can be stored for retrieval in actual or virtual collections vary in significant ways. Historic buildings, films, printed books, and coded data impose different constraints on the tasks associated with information retrieval systems: selection, collection, storage, representation, identification, location, and physical access. Put simply, a museum, an archive, [a] library of printed books, an online bibliographic database, and a corporate management information system of numeric data can all be regarded as species of information retrieval system. But differences in their physical attributes affect how the stored items can be handled.   (Buckland 1991*a*: 359)

Increasingly, 'information-as-thing', as text, image, object, datum, specimen, record group, or file, is represented or representable electronically or indeed may be available only in that form. In so far as these electronic representations are adequate for a particular purpose, the physical distinctions between the different formats or media of record disappear. That is to say, digitization eliminates physical distinctions between types of records and thus, presumably, the need for institutional distinctions in the management of the systems within which these records are handled.

Modern telecommunications systems now make it of little concern to the individual researcher where the record he or she wishes to access is held—library, archive, museum, commercial database vendor, or any personal or institutional location on the Internet—provided only that what is wanted is available electronically. In effect he or she can at will create ever-changing virtual 'cabinets of curiosities' in which any kind of digitized document—text, image, or object—can be introduced and used. The kind of almost science fiction-like speculations of Paul Otlet, are now realizable practically (Rayward 1994*b*). Nevertheless, the information retrieval functions outlined by Buckland remain of the greatest importance, though they may be distributed institutionally in new and different ways that require urgent attention.

The fundamental question is: *what is to be collected, by whom, and under what circumstances of preservation, availability, and access.* This is not a new question. Modern libraries, archives, and museums represent historically determined, institutionalized answers to it. Now, however, answers to such a question are no longer certain. In so far as the media of the past continue to be centrally involved, there is little problem—books for libraries, objects for museums, and government and organizational records for archives. But the electronic versions of these media create problems as to who has responsibility for identifying and collecting them, preserving them physically, and maintaining systems of access to them. The new kinds of electronic information sources in their turn present even more pressing problems of this kind, because there is no real precedent for dealing with them.

PROBLEMS OF 'ELECTRONIFICATION'

Traditionally the library has served as a major intermediary between the publisher of bibliographic and substantive information and the scholar. An important function of the library has been to provide access to bibliographic services and to the journal and other literature represented in these services. As the publication of what were formerly printed materials—books and journals particularly—increasingly takes an electronic dimension, publishers and the brokers of on-line database services are exploring new ways of packaging and marketing this material. It is now possible for individuals quite independently of libraries to search bibliographic databases and to acquire copies of articles and reports and so on from databases held by commercial organizations. These organizations have entered the document-supply business, and their new services are intended to circumvent what they would consider to be the slowness cumbersomeness and inefficiency of traditional libraries. These bibliographic and document-supply services, however configured and labelled, are performing important 'library' functions, clearly recognizable though not usually acknowledged as such.

To what extent are these services based essentially on what is currently available and commercially practicable to supply at the moment? The complement to this question is the extent to which older, out-of-date, less-used parts of these electronic files will be effectively and permanently 'archived'. These issues have hardly become a problem yet, because

most of the files now being dealt with cover a relatively short period of time. But in two or five or ten or fifty years, one may assume that the commercial organizations responsible at the moment for these services, given the rapidly increasing size of most of the files and assuming that the pace of technological change will continue unabated, are unlikely to want to preserve the files permanently in an always currently accessible database. Presumably the responsibility for the preservation and the provision of access to these files after their current commercial exploit-ability has passed will at some point be given over to what have hitherto been called libraries or data archives.

It may well be that libraries will enter the life cycle of formally published material of this kind, the knowledge food chain, if you will, at a later point than in the past. Less concerned with current availability than now because of the way in which commercial organizations have taken over this aspect of their work, they will become essentially archives of databases that no longer have current commercial viability. Critical in this electronic archival process will be the extent to which the files will have to be 'remastered' or converted for preservation and access, as system software and hardware change.

Museum collections have been undergoing similar processes of digi-tal representation and transformation. In some cases, the traditional 'viewing' function that they have performed has been amplified by new kinds of information systems. In these systems, electronic representa-tion of objects allows for manipulation, a more intimate, detailed, multidimensional inspection than is possible conventionally. It can also provide a variety of explanatory and/or analytic contexts for them. Museum information systems involve the enormously complex business of contextualizing and indexing and retrieving images. The systems use a variety of library-related or language-based techniques and graphical expert-system techniques. In 1988 it was suggested that there were 'almost 250 automated projects of various types... including databases for institutional collections, typological corpora and invent-ories of monuments' (Cawkwell 1992: 308). Multimedia or hypermedia applications—from museum tours to recreations of eighteenth-century Montreal to the exploration of Piero della Francesca's fresco *Legend of the True Cross* (Bearman 1991; Trant 1993)—pose special problems of storage and access beyond the occasion of their initial development and use as working databases. They are important electronic information sources about which typical 'library' decisions about collection, physical preservation, and the maintenance of access systems have to be made.

Similar decisions have to be made for the various manifestations of expert systems used in architecture, engineering, city planning, astro-nomy, and medicine, for example. They represent the status of specialist knowledge at a given time.

Apart from current use, they too have important archival value in documenting the development and history of the aspects of science and scholarship to which they relate. If they are routinely updated as new information comes to hand or if they go through various stages of development, unless 'copies' of earlier versions—'editions?'—are kept and 'archived', there will be an incomplete record of these develop-ments, and potentially valuable historical information will be lost.

A similar 'edition' problem is presented by various reference data-bases that are constantly updated without new versions of the database being created. The information handled in this way knows theoretically no limit. It can be cartographic, economic, social and demographic, meteorological, and company and business related, for example. These databases are electronic versions of directories, handbooks, and other reference sources. They are regularly updated in traditional libraries by new editions and supplements, one coincidental function of which allows changes in the information presented over time to be tracked. Knowledge of such changes may be critically important for particular purposes. Of course, loose-leaf services present this same problem in the paper environment. Unless libraries implement some sampling proced-ure for these databases, important historical, developmental, time-series information will be lost.

Certain new forms of electronic 'information-as-thing' that have now to be brought within the set of functions that libraries, archives, and museums entail, present these problems in a particularly striking way. Like the databases mentioned above, electronic journals and hypertext systems contain text that may be regarded as unstable, as shifting in meaning as it accumulates commentaries, revisions, and interpolations. The hypertext document, it has been observed somewhat hyperbolically, 'functions as an elastic palimpsest allowing access to and reworking of layered texts'. For Davenport and Cronin, 'Hypertext may transform the practice and culture of science by opening up texts for comment and verification in ways which previously have been impossible' (Davenport and Cronin 1990). As texts shift and change and merge, not only are general questions raised about the responsibility of the author and the integrity and authority of the document, but practical issues of what parts or states of the text will be kept and how changes in it will be

monitored and recorded become pressing. Perhaps this is an area to which archival appraisal techniques, which focus centrally on the evidential value and uses of records and are concerned as much with disposal as retention, may well be brought to bear.

The electronic office which utilizes an enormous range of software and hardware has dramatically affected the work of archivists. It epitomizes some of the major problems that are created by electronic information sources that originate in new processes of communication based on telecommunications and electronic networks. As Gavrel points out,

sophisticated systems provide access to a variety of software and hardware, as well as gateways to exterior information systems. In most cases, these systems do not have record management capabilities and documents can be destroyed voluntarily or involuntarily by the creators at any point in time. Naming conventions for documents are not standardised within organisations and the choice of document names is left to the creators of the documents.... The knowledge of file classification systems within a particular organisation is limited and documents are often given acronyms which may have meaning at the time of the creation of the document but usually not several weeks later and certainly have no meaning to others in the organisation. Most creators manage their documents within their own personal filing systems without reference to any corporate system or link to existing hard copy records within the organisation. (Gavrel 1990, 18)

Gavrel notes that, while hitherto few documents related to policy development, programme management, and other organizational activities have been maintained in electronic form, with the development and use of more and more local area networks this can be expected to change. She also points out that many of the sources of information 'do not reside inside the organisation but are accessed by communication links or gateways outside the organisation' (ibid. 19). Not only, then, do the records have to be appraised and account taken of the particular problems of inter-organizational databases, but

it may also be necessary, to ensure that the archival record is complete, to preserve certain software and access records of the system. If certain records only existed for seconds on the screen, it may be important for the archivist to select, along with the records, the access logs for the system which identify by whom and when the system was accessed. The value of these logs will not be in the records themselves but in providing proof that certain systems were accessed at a particular time and by whom. In a similar vein, it will become important to retain certain software, particularly if decision-making processes are a fundamental part of the software. (ibid. 22)

THE ARCHIVAL FUNCTION

It can be expected that archival records in electronic form make possible the use of indexing techniques that have been developed for more general applications. The principle of provenance or *respect des fonds* is essentially inadequate for all but the few users of archives who are interested in the nature of the organization that the record arrangements reflect. Most users are interested in general problems or topics on which they are seeking information. With records in electronic form, it should be possible instantly to recreate or change information about provenance to reflect shifting organizational alignments of functions and offices if this is required. The records themselves can be copied and manipulated in any way that available software allows; their original order should be capable of being regenerated automatically. It should be possible to search them for personal, corporate, or geographic names and by subjects either in full text mode or on text surrogates to the degree that such surrogates have been provided. Effectively the archive and the library become identical as bodies of text, though record volume in the archive, its 'legal, fiscal and operational need for evidence' (Bearman 1992), and the complexity and variability of record structures may remain a problem for the design of the data content of archival documentation and for information-retrieval techniques.

Equally appropriate for the application of archival techniques is the ever-changing list servers and electronic noticeboards available through the Internet (Samuel, Chapter 7, this volume). Who is to assume responsibility for the appraisal of these 'record groups' and the development of a permanent archive from them? This is an important conundrum, given the near universality and the informality of access that is possible to them. Are there to be special libraries or computer-based archives into which these 'records' will go. Certainly contemporary data archives pay no attention to them. How are the bulletin boards and list servers to be monitored, weeded, sampled, acquired, processed, and stored? Is it sufficient to leave this to chance, in the same way that in the past libraries have left to chance the collection of ephemeral materials that document social movements or other phenomena, relying not on their own collecting activities to ensure continuous contemporary coverage but on later bequests and donations? Is someone cumulating a special-interest file related to an issue or subject now being explored nationally or internationally through these Internet functions? In what form might this file come to a library?

This raises the more general problem of casually created files that might be of later value—what might be called a personal archive. In the past this took the form of drafts, sketches, notebooks, files of correspondence, all involving the creation of paper records whose preservation was often purely accidental. Libraries and archives have collected these 'personal papers' as an important part of their archival function. These personal records are now increasingly kept electronically on hard disks or downloaded onto floppy disks.

Managing access to the contents of these electronic files constitutes a far greater problem for libraries and archives than managing access to the contents of paper documents. The disks that contain the electronic files, like their paper counterparts, will be found in drawers and boxes and attics, either separately or as parts of machines (e.g. hard disks), at long periods after their creation, perhaps at long periods after the death of their authors and the obsolescence of the machines. In principle of the greatest value for biographers, historians, literary critics, and others, just as their paper counterparts were, they cannot be appraised visually as paper records can. They require software and hardware that so far has quickly been superseded and become obsolete. Thus with the passage of time these electronic records may not easily be converted from one format to another, if at all. All of the problems mentioned above in relation to the electronic office characterize such files. As industry standards become more widespread and inter-convertibility easier, some of these technical difficulties will lessen. Nevertheless, how to acquire these files and from whom, and how to manage them—above all how to read them—will constitute, are currently constituting, important challenges for the librarian and archivist. They will need access to museums of computer hardware and software that are supported by historical research collections of system documentation. These will be the tools with which technical specialists, who will function in effect as system archaeologists and cryptographers, will in the future decode the mysteries of 'found' electronic files.

It is becoming possible to replace paper materials with electronic versions which can be manipulated in various ways not possible in the original versions. As new kinds of high-volume scanning techniques and new kinds of cheap, high-density storage media emerge, it will be possible to capture electronically the text, the information content, of printed materials ever more quickly and cost effectively. Preservation and space problems that bedevil libraries attempting to manage huge paper collections might well then be obviated by electronic storage. The

'electronic' archive, representing runs of journals or large bodies of special materials—texts in the Short Title Catalogues, for example, or the correspondence and other papers of important historical or literary figures—may replace microfilm as the way to build up research collections. Such archives will become increasingly easy to create; they are readily duplicated and are certainly saleable.

It may be that for libraries, for example, the increasing volume of information available in electronic form may not only require them to redefine their archival function as discussed in this chapter it may also change their relationship to their traditional materials. If paper is largely replaceable for everyday library use by text in electronic form, then libraries will begin to view paper sources differently. Perhaps some of the paper-based sources will be for current casual use, to be replaced by electronic forms for preservation and storage. The analogy here is the cumulation on microfilm of the issues of newspapers and journals, the paper copies of which are then discarded when the microfilm copy becomes available. Other sources, as mentioned earlier, may have artistic, evidential, rarity, or exemplary value that electronic versions of text cannot replicate. These will tend to be relatively few in number, if past experience is anything to go by. What is fundamentally important about them is their physicality as books and manuscripts, and they become functionally little different from traditional museum objects. Thus libraries, because of the emphasis they place on the artifactual value of materials that are retained in that format, will begin to resemble museums. The question may well become: why would one wish to retain materials in printed form except for what they represent as artefacts if their texts can be cost-effectively transferred to electronic systems which provide better storage and access capabilities?

PRESERVING ACCESS TO DIGITAL INFORMATION IN LIBRARIES, MUSEUMS, AND ARCHIVES IN AUSTRALIA

In Australia there have been sustained attempts to find practical and policy-based answers to the questions raised in the preceding sections. In 1985 the Australian Council of Libraries and Information Services (ACLIS) created a Task Force on the Preservation of Australian Electronic Information, observing that 'the preservation of Australian information in electronic format will be the responsibility of Australian libraries, archives and possibly museums' (ACLIS 1992: 4). The work

of the ACLIS task force, with its limited approach and slow development, was eventually subsumed by a much more comprehensive and far-reaching initiative. In March 1992, sponsored by the National Library of Australia, a national conference, 'Towards Federation 2001: Linking Australians with their Heritage' was held in Canberra. Its purpose was to explore how to provide cooperatively across the range of national heritage and other interested organizations improved access to the Australian documentary heritage. One of its resolutions was 'that the Australian Archives, the Australian Council of Library and Information Services (ACLIS), the National Preservation Office and the National Film and Sound Archive establish a working party to develop guidelines for the management of material in electronic format' (URL http://www.nla.gov.au/dnc/tf2001/pr9496.B.html). The involvement of the archive sector in this venture 'was identified as critical since the issues were seen to be basically the same regardless of the nature of the organization' (URL: http://www.nla.gov.au/dnc/tf2001/auccrep2.html). The working party, known simply as PADI (Preserving Access to Digital Information), now comprises as well as the organizations listed above representatives of the Mathematical and Information Sciences Division of the Commonwealth Scientific Industrial and Research Organization (CSIRO), the Commonwealth Government's Department of Communications and the Arts, and the National Museum of Australia.

PADI's 'major goal' is 'providing mechanisms that will help ensure that digital information is managed with appropriate consideration of preservation and future access'. The Medium Term Plan, available only in digital form through the World Wide Web, lists six objectives for the working party:

- to facilitate the development of national strategies;
- to develop and maintain a Web site for information and promotion purposes;
- to establish a forum to exchange views;
- to develop preservation and access guidelines and strategies;
- to impact on preservation aspects of national digital information initiatives;
- actively to identify and promote relevant activities (URL: http://www.nla.gov.au/dnc/tf2001/medplan.html).

The Working Party has developed a range of strategies by which it hopes to meet its objectives and each strategy is targeted at major players in

the game. 'While collecting institution, governments and the records management industry will remain the key players in PADI's activities, attempts will be made to involve universities, the information technology industry, publishers and creators of digital information, and commercial business sectors' (URL:http://www.nla.gov.au/dnc/tf2001/med plan.html). With funding from the Australian Vice Chancellor's Committee, in 1996 PADI commissioned a survey of 242 cultural bodies grouped as archives, galleries, libraries, museums and others 'to determine policies and procedures associated with the acquisition, production and preservation of Australian digital information. A Web site has also been established.'

PADI represents a coordinated, sophisticated policy initiative as well as a practical attack on the problems thrown up for the historian and other scholars by 'electronification' of information. Implicit in its work is a recognition that the boundaries between collecting organizations such as libraries, archives, and museums are now necessarily blurred, as has been argued in this chapter. It is clear that the active involvement of representatives of all of these kinds of organizations is necessary in the search for solutions that will allow appropriately managed preservation of electronic information for the future.

CONCLUSION

It is clear that the availability of increasing volumes of information in electronic form and the emergence of new kinds of electronic information sources are presenting critical professional challenges for librarians and other 'information professionals'. How they meet these challenges will determine how the institutions under their care respond to the needs of historians and other scholars for the sources they need to fulfil their scholarly roles and responsibilities. Being able to respond to these challenges effectively will largely depend on how well these 'information professionals' are able to transcend the limitations that their highly developed professional cultures impose upon them. These professional cultures have defined themselves to some extent in opposition to each other, and personnel influenced by them necessarily tend to see the world differently. Libraries, archives, and museums are agencies that represent institutionalized organizational practices that the different professional cultures have evolved and sanctioned. The key element around which the cultural differences have crystallized has been the

different kinds of artefacts for which historically the different professional groups have assumed responsibility.

At least for the foreseeable future each of the professional groups will still have to continue to deal—perhaps preponderantly—with its 'traditional' materials. Thus there is no reason to suggest that differences between them will cease to exist and that we must envisage their complete amalgamation in the near future. Nevertheless, the argument of this chapter is that 'electronification' can be dealt with adequately only by questioning and rising above traditional modes of territorial demarcation between these groups, and this is beginning to happen. To the extent that they are having to deal with the same kinds of 'thing'— electronic records—we must begin to explore the idea of functional integration between the agencies—libraries, archives, and museums— that are responsible for collecting and managing the public's access to them. In this way we will be able to secure a future for historians and others in an increasingly electronic past.

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