Transformation in the Archives: Technological Adjustment or Paradigm Shift?

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The transformation of culture

If there is one symbol which epitomizes the relationship of the archivist to the automated record (whether document or finding aid), it is surely the transformer toy which presently delights young boys. The most ingenious are designed all of a piece as ambiguous constructs filled with options ranging from robots to rockets to racing cars; the pattern changes, the meaning changes, the information changes, but the data — the given "bits" — remain the same. Contrast this with the jigsaw puzzle fractured into a thousand separate pieces which has only one solution, one answer, one option. The jigsaw is also popular, but its form is very much a product of the industrial age, mass produced, interlocking with very similarly shaped pieces but fitting correctly only in one place. My father used to make much more artful jigsaws by hand, as his father did before him, which, apart from the border, did not interlock; in large areas of sea and sky they were cunningly ambiguous, harking back to a much older tradition, and they were double-sided; again a large variety of choices and options were tested before a correct solution was reached.

The archivist has long seen the heap of textual public records on the floor as an inter-locking jigsaw with a predestined solution based on a rigid articulation derived from industrial bureaucracy. The reconstruction is satisfying; there is (or appears to be) a right answer; the "fonds" and "original order" are givens. The manuscript collection would be more like a hand-cut puzzle so subtly crafted that several pieces fitted correctly in different places on the pattern. The final order is liable to be more idiosyncratic, reflecting *one possible* arrangement of the collection, and perhaps a distorted arrangement at that.

The modern archivist has grown up in the industrial, technological world of the following five "transcendencies:" the natural world is desacralized; only humans have spiritual qualities; what is not mind is mechanism; technology is the paramount "progressive" imperative; and nature cannot stop us overwhelming the natural processes.[1] That kind of jigsaw fits together beautifully, but like a jigsaw it is simply another artifact which scarcely corresponds to reality as we now know it to be. History is the engine which drives this machine through time, or at least a kind of history which sees time pointing like an arrow into the "future" as an extension of a "past" conceived in linear terms.

I have discussed elsewhere the part played by the documentary record in cultural perceptions,[2] but however one looks at it (and I am not a technological determinist), from earliest times the media have had an impact on the way we have interpreted reality, in particular paper, the phonetic alphabet, and printing with movable type. These records have been the mainstay of our archives and libraries and we have until recently tended to "read" other media in textual terms.

Meanwhile, it has been said that:

> With the invention of atomic weapons, the world changed forever. History turned on nature and threatened to destroy it utterly. Before the bomb nature could be treated as if it were no more than the stage on which history was played. Now nature's very existence came into question ... history has always depended on nature as its source of support.[3]

The bomb is itself pure information defining our present obsessions and modes of thinking which Einstein also warned us would have to change and change quite fast. This applies as much to archivists as anyone else. If you find this metaphor hard to take, then the exploitation, destruction, and pollution of natural resources, vast economic inequalities, and the power of transnational corporations and the military-industrial complex bear witness to the consummation of the industrial age, grossly accelerated in the electronic world of a so-called "information society" in its transitional stage from the old order. I make no apology for moving outside the narrow bounds of the bureaucratic office, the records centre, and the archives, because I believe that the malaise which both Terry Eastwood and Terry Cook perceive as haunting Canadian archival practice is closely bound up with the breakdown of one culture and the emergence of another which affects society as a whole.[4] We are awash in a sea of mega-choice as we lay down the jigsaw puzzle and take up the transformer. Finding a way through may be a matter of finding our way back, not to some happy simplicity of some idealized archival past, but to the nature of our humanity, who we are and what we are about, as we grapple with the extraordinary freedoms and constraints of automation and electronic communication in general.

We should realize that a sense of time does not necessarily require a sense of history. "Time is something that has been enriching in me so that time is neither something external nor something unknown ... [so that] knowledge is fundamentally the possibility of prevision, of foreseeing the future and thus also of mastering it."[5] This does *not* mean crystal-ball gazing along a path of cause and effect but, like the artist, initiating causes to produce certain calculated effects. With information moving at the speed of light, we are faced with an "implosion" which buries us in data available instantly from all directions and levels, as opposed to the old "explosion" which moved away from the centre down fixed and dispersing chains of force or command. Our only possible response is to think mythically and in depth. "As we come back to ourselves we join again with the oldest wisdom of information processing, mythical structures of the so-called primitive."[6] We have to bring all our senses to bear — not just intellectual rationality and the old linear approaches. There is emerging "a transnational theory within social science characterized by a fundamental rejection of the adequacy of a linguistic reconstruction of the world and our conduct in the world, but this involves a different type of knowledge and rationality."[7]

We will remain numbed and paralyzed by our merciless, automated, electronic media if we go on thinking that all we have there are bits of a jigsaw, the same old text and image

moving a bit faster and taking up rather less room, to which we must make some tech-
nological adjustments to stay in business. We have to learn what is going on in a totally
new environment and emerging culture, which has itself helped us perceive the nature of
our old environment and measure the consequences of our continued self-destruction.
Only the massive aggregated patterns of information revealed by the computer enable us
to track the extent and damage caused, for instance, by acid rain and low-level radiation.
There will still be paper and the rest, but the paper record will no longer have the impact
on society that it once did. Perhaps we can be thankful for that because, properly used and
understood, the electronic environment can stimulate interpersonal relations and dis-
course in an interactive quasi-oral mode at odds with the old analytical detachments of
the age of paper, although there is, of course, a place for these.

As archivists we need, I believe, to re-examine how our present and emerging culture
organizes its necessary information and wisdom at the macro level. "Encyclopaedias are
mirrors of our epistemology, the way in which we seek to know."[8] When we classify
knowledge, we impose a form on it and control it through the pattern of its presentation.
We are "informed" and we call it "information." It is this very act of classification,
essential as it has been, which in a sense diminishes knowledge, as we all know when
struggling with a poor finding aid.

Paedeia was the knowledge conveyed in bringing a Greek youth to adulthood and not
just a compendium of facts.[9] As with the Homeric epic, the Bible became the filing system
for information and wisdom for centuries, the reflection of our ordered social hierarchy.
Religion *was* wisdom and knowledge, but by the end of the Middle Ages, reference books,
arranged alphabetically, began to "access" the Bible through loaded "key words" which
broke up the totality.[10] This was a powerful instrument of retrieval but, like all indexes,
the process reflected changing ideologies, and could impose them as well. Scientific
reductionism, whereby investigation extended from the general to the particular through
subdivided categories, was reflected in this approach.

The entries in our encyclopaedias, and archivists' inventories generally, follow this
pattern today. We should not assume that it need always be so. Diderot's "circle of
knowledge" was built around the stout tree of reason, with religion "out on a limb" with
superstition. I do not want to argue about that. Such structures were of enormous value,
but we should not take them for granted.

Today we are facing a breakup in this kind of "knowledge theory" based on the three-
centuries-old ideal of the autonomy of science and "the fundamental concepts of the
nature of things."[11] All the old categories are being eroded; interdisciplinary activity is the
order of the day and the two meanings of "order" become significant. All this is rubbing
off on the archivist precisely at a time when descriptive standards are emerging through
the requirements of that same automation which is imploding information and helping to
cause the above breakup. No wonder Charlie is having his problems, and no wonder he is
receiving little help from his colleagues in this field of endeavour.[12] Moreover, we know
that user studies have also tended to show that "cognitivism has been joined by a rival
viewpoint which stresses the emotions as a more fundamental component of social
interaction and of the human actor."[13] Behind every finding aid there has to be a warm
body somewhere. Likewise, archivists are or will be involved at one and the same time
with global, national, and local interests in history and related studies, which diverse
approaches will have to be met in retrieval systems. In a similar way, this also concerns

sociologists with their need "to integrate micro and macro theories in the same frame-work"[14] and "to revive the internal and external analyses of organisations and to integrate them with the dynamic and environmental perspective touted by the population ecologists."[15] We might do well to talk over the garden fence with sociologists about this, because increased concern with global education and awareness is now matched by an intense interest in the local scene and family roots. Archivists identify strongly with the nation, the region, the community; perhaps in addition we will have to pay more attention at whatever level we operate (and "level" is not a good word for this) to those documentary evidences which relate to the wider scene as well as to our bailiwick. This is particularly true of environmental evidence.

So what about this so-called "information society?" Is it a fair label? There can be no society without information, for this is the stuff of living. Daniel Bell has described us as a post-industrial society,[16] but we have seen that much still survives from the industrial era including the treatment of information as a commodity rather than a service.[17] Certainly all sectors are more information-intensive as a result of the electronic implosion with its wealth of alternative choices. William Melody writes of the mediaeval monks protecting and monopolizing access to knowledge in an age of information scarcity, and contrasts them with the new electronic monks protecting decision-makers from drowning in a surplus of information. In both cases, it is the monk who is at the information gateway. There are dangers, of course, of over-zealous information professionals withholding information through their knowledge of software and databases and thereby exercising power beyond their assigned role.[18] As the control of information by senior managers decreases and the basis of their influence is thus reduced, their role will increasingly become that of coach, goal-setter, and teacher living in the future to the extent that today's events are already ancient history.

For administration as for academic research, "facts that could be established beyond all reasonable doubt remain trivial in the sense that they do not in themselves give meaning or intelligibility to the record of the past." A catalogue remains a catalogue. "Pattern recognition is the *chef-d'oeuvre* of human intelligence."[19] We have to recognize the elastic, inexact character of truth, and symbolic interpretation rather than literalism allows us to err, to change, to adapt. This will be particularly necessary if we are to realize the strength and purpose of the thesaurus, a symbolic metaphor which has its origins in the chest where treasure and ancient writings were kept as the source of power and authority. As Allen Kent reminds us, there are certain things, however, that we cannot know: as, for instance, what words will mean and how, in the future, people will view events.[20]

And so we leave the certainty of the jigsaw puzzle for the ambiguity of the transformer with its paradoxes and choices. David Gracy has nicely detailed several archival paradoxes,[21] but the ancient proverbs which stand as a timeless monument of contradictions are witnesses to the ever-present paradox which we have tended to overlook, but which the information age has once more revealed through the plethora of multi-faceted information.[22] We cannot, and should not try, to resolve the paradox which adds so many dimensions to our activities; sufficient that we are seeing "the final dissolution of the big project of western civilization to arrive at the good, the true and the just by means of rationality."[23]

David Spangler has proposed four stages in the emergence of the new culture with which, as archivists, we can identify:

1. Self-discovery, challenge, investigation and exploration, pain, false starts, wrong turnings.

2. Self-development, discernment, implementation, networking.

3. Integration with history and the larger environment in a planetary sense.

4. The embodiment of new values in service, resulting from inner strength and maturity.[24]

Culture, of course, has a variety of meanings, one of which is derived from its Latin origins in the soil: agriculture and cultivation. Jacques Barzun argues for culture as cultivation and enrichment of the self through meditation on experience and discourse over against instruction and scholarship which has its place in bringing order and clarity and preparing the material for culture.[25] If we do not distinguish these two approaches, we leave the field to the "expert" with a passion for collecting and making available (in our case) archival materials, the "specialist" bent on heaping up factual knowledge through unrestrained index cards. Surely we have to move beyond this if we are to find our true role.

The transformation of records

Information has been transferred from one medium to another since the beginnings of literacy and earlier through signs and the translation of languages; the monastic scribes were constantly doing it and their letter forms became the type fonts of the early printing presses, as manuscripts were transformed into what at first amounted to printed facsimiles. From the highly personal telegraph and telephone, the newspapers developed a wire service which transformed electric messages into a mass medium of record and exploded the information and point of view in an early form of "broadcasting" to the accompaniment of rapidly reduced costs in terms of distance; photographic images, likewise, encircled the globe through half-tone and photogravure, their meanings subtly transformed by caption and context. The ephemeral nature of radio and television created a massive incentive to record and capture their sounds and images. Thereafter, the digital technologies of automation have provided the power not only to mirror but also to enhance as they move the record onto paper, microfilm, and video disc.

Transmedia shifts provide vast stores of information resources, but the reader/audience shares in the cost of their use, which compared, for instance, with books and manuscripts, has risen sharply. Likewise, the cost of storage coupled with problems of hardware obsolescence present their own problems and together all these factors are restricting the availability of much of this new information resource to those countries and institutions that can afford to pay for it. The monks are at the gate once more; power is still the flip side of wealth. We can see that just as "stand alone" machine tools became the empowered forms of hand saws, drills and so on that previously had to be linked to large, immobile steam engines, so the independence of the personal computer from main-frame is transforming the nature and use of information handling and retrieval, but for all their increased power and falling price they are still relatively expensive for some societies.

Meanwhile, amid all these metamorphoses, the archivist will experience increasing difficulty in securing the "original," as oral and scribal modes of input and manipulation via the terminals of microcomputers erode the sanctity of the authorized, canonical text

and we return to a pre-Gutenberg environment. One should not push this probe too far because, of course, there are ways of protecting automated texts, but in our world of uncertainties, fluidity, and abandonment of fixed positions so prevalent in the age of print, maybe the "original" is not so important as it was. The lessons of structural anthropology and semiotics suggest that truth does not reside in any one statement which itself is a galaxy of symbols — whether text or image. Statements have gained their authority from being printed, published, and distributed. This authority may have little relationship with truth and authenticity.

Again, copyright did not exist in oral and scribal society, but grew out of the publication of printed books. Is an electronic text "published" or "written?" With handwriting, printing, and even the telegraph, what went "in" came "out." Electronic messages conversely approach oral communication in their capacity to constantly modify without leaving behind a clear record, as the unseen messages within the airline reservation system bear witness. "The reused floppy will be the most opaque palimpsest of all" in a constantly revolving and evolving record and "the years between 1750 and 1950 will be seen in retrospect as the historians' centuries."[26]

Yet how important is all this? Archivists wring their hands over the loss of the automated record which is, at present and proportionately, so much higher than is the loss of paper records. Is this because we continue to value it as if it were a paper record and apply all those historical criteria which we have inherited from the age of paper? If "history" itself comes to be viewed differently, and I do not just mean the subjects that interest the historian, then we may have to radically alter our criteria for selection and appraisal. Perhaps our capacity to manipulate what we do save may compensate in some measure for the bulk of what is lost, which in paper form would have been totally unmanageable. In an oral society where the daily chatter and decision-making is without written record, the human memory preserves only that which is absolutely necessary for cultural survival. What do we really need? Perhaps we must learn to retrieve more from less. How much of the paper record stored in our archives is, or ever will be, retrievable, given the shelf-life of paper and the cost of transmedia conversion which is unlikely to be cheap within the life-time of the paper involved?[27] Perhaps we have been trapped in the illusion that more and more records represent a proportional increase in knowledge and wisdom, but there may be a law of diminishing returns operating here. "A library ... is first of all an archive or repository in which society can find what it has already learned."[28] This is written by a librarian with, at first sight, rather a curious use of the term "archive," yet a library might be considered as a printed "archives" of countless authors recounting what they have learned, because books are "about" primary materials. Is there any more to be learned from some of the primary materials in our archives? Perhaps appraisal should embrace a wider field if we are to preserve permanently only what we need. Likewise, libraries which also have the problem of paper deterioration may dispose of their less valuable material based on primary sources if these sources still survive in archives. This, of course, is simply an idea which can be rejected without further consideration. You must be the judge. Appraisal cannot, in any case, avoid being subjective.

I have not discussed so far the impact of the various media of record on society and the individual, and this is not the place for discussion in detail.[29] However, I believe we should pay far more attention to the nature of these media, the way they work us over, and the way they affect our culture. Harold Innis saw them as economic staples vulnerable to

monopoly and making their impact according to the ease or difficulty with which they were moved. Marshall McLuhan was more concerned with their personal impact on the senses, about which relatively little is known, and many of his assertions were little more than brilliantly perceptive "probes" and metaphors for reality. David Olson has an approach which is, I believe, of particular value to archivists as we seek a deeper understanding of the material in our care: "The key, I suggest, to linking the media of communication to the structure of the mind is through the concepts of representation and interpretation." He maintains that we must focus on the symbolic form rather than the technology and "analyze the structure of information which is explicitly represented in that medium" through the appropriate interpretive procedures, which may include semiotics.[30] Derek de Kerckhove (quoted by Olson) has said that "there is no representation without interpretation."[31] Writing does not preserve the "meaning" of the text; it has to be interpreted, and this leads to altered uses of mind and memory. Put another way, "words do not mean anything, *people* mean things by words ... information means nothing, but *people* are informed."[32]

Eric Havelock describes the Homeric epics as a "panorama of happenings" rather than a "program of principles" in showing how oral society structures knowledge.[33] This is particularly interesting when one considers the approach to appraisal and description based on function of activity rather than on hierarchy or type of document. This surely suggests a return to conceptual orality in the wake of automation.

Information has been described above as being "represented" in the media, that is "re-presented," a meaning which takes into account transmedia shifts from speech to writing or writing to automation with its accompaniment of altered perceptions by the user in the face of new symbolic structures. If indeed ours is the age of the symbol, there is no better illustration than the television commercial:

> The meaning of an ad is created when the viewer [or reader or listener] imbues the correlatives with meanings and values, and then transfers these onto the product. Henceforth the product itself points to the same meanings and values — it *means* them now as well.[34]

Should one then spend more time considering the "meaning" of our archival materials in terms of the activities which produced them and of which they are symbols? Will this help our appraisal of them? I do not mean the minute examination or interpretation of their content (that is the role of researchers), but a more overarching consideration of the symbolism of documentary forms as an extension of diplomatic. Semiotics can help us here, but it will need careful study in terms of our needs since it "endeavours to reveal and analyze the extent to which meanings are produced out of the structural relations that exist within any sign system, and not from the external reality they seem so naturally to depict."[35]

If we take these other dimensions into account, perhaps we will end up creating "mythistories that fit experience better and allow human survival more often, sustaining in-groups in ways that are less destructive to themselves and to their neighbours than was once the case or is the case today" by "emphasizing the really important aspects of human encounters" and omitting "irrelevant background noise."[36]

An appropriate end to this section is a final word from Derek de Kirckhove:

> The [Greek] chorus is the collectivity: the actor, the single person. The collectivity contains history as lived, not history as thought, history as myth, not history as logic or patterns of knowledge.[37]

In a "post-literate" age, where we paradoxically become "literate" in all media, we may very well move again in this direction.

The transformation of the computer

It must already be all too apparent that my neat and totally simplistic division of "transformations" is breaking down. It is impossible to separate automation from discussions of culture or the new media, and it runs as a thread through the following discussions of user studies and the archivist's role. That, of course, is what "implosion" is about: "Things fall apart, the centre cannot hold." Sharply defined centralized lines of force, command, and hierarchy tumble in on each other and I am faced with the same problem that so many others have tackled far better than I: the difficulty of writing diachronically and serially about a phenomenon which is essentially synchronic. All these transformations are in parallel and interactive, but it may be helpful to consider the engine which drives automation and its impact on the record.

The printed page has remained much the same as it was five hundred years ago and, indeed, much the same as the manuscript page long before that. The book, or for that matter a well-organized body of papers, is a remarkably effective format: a description of the ideal medium of communication beyond the voice is almost a description of the book. This is a striking way of demonstrating its properties of portability, convenience, simplicity of access, and so on; automated full texts, abstracts, tables, and spread-sheets mimic the book, and the "menu" relates directly to the culinary choice on the familiar card in a restaurant. We work from what we know; alphabetical arrangement and the extensive use of indexes came with the uniform pagination which print made possible; the device is still with us on our terminal screens. We should not, however, assume that these forms, which so admirably suited the book, will remain forever. McLuhan has often pointed out that, to begin with, the content of a new medium is usually the previously dominant medium; the computer when it first came into service was programmed to produce "books," much as the incunabula of the fifteenth century contained manuscripts. The computer first produced account books from entries on cards; the hard copies were (reasonably) user friendly and the sheets were bound into volumes. Statistics received similar treatment and as the forms multiplied, so did the paper printouts. The automated input had no status as a record; the computer was a printing machine which did clever things with the copy, and this is still one of its roles.

Setting aside for a moment the social implications of automation discussed above, what are the characteristics of the computer which boggle our poor battered minds when, as archivists, we contemplate the problem? Speed, size, cost, flexibility, issues of permanence — all these remained relatively stable factors with paper and the book. Pages are turned by hand no faster than they ever were; paper size has remained remarkably stable; costs are still relatively reasonable; a book's weight is limited by the ability to heft it; access has been at the mercy of fixed content arrangement and indexing; permanently valuable materials have to be printed or written on better paper to survive (they often are not, however).

The computer now sweeps all these comfortable familiarities away: "pages" and all they contain move (or "turn") at the speed of light; the "book" becomes a file of virtually limitless size, and whole libraries and archives can be compacted into rapidly decreasing shelf space; costs of the user remain high and hardware obsolescence is a nightmare; access depends on friendliness or "the monk at the gate;" permanence depends on re-run, enhancement, and transference, in other words, constantly moving to stay the same, with some hope of near permanence in optical technology.

Once information enters the computer via the keystroke, OCR, or Raster Scan (used for enhancement), space and time as an archivist generally understands them are demolished. The equivalent of 503 running feet of textual records collapses into one 2,400 foot reel of tape.[38] "In 1976 one megabyte of memory occupied about 512 cubic inches or roughly the size of a soccer ball. Seven years later the development of 65K chips reduced the requirements to about two cubic inches. In 1985 the 256K chip had reduced the space to one millionth of what was required in 1959."[39] Meanwhile, fibre optics has made possible a laser pulsing hundreds of millions of times a second which can be seen as the descendant within a century and a half of the morse code and the telegraph. "Fujitsu American has announced an optical fiber transmission system that can support 12,096 voice data and video signals over a single fibre.... The trend towards the integration of voice data and computer technologies is now a reality" and the ability to digitize all media opens the way for the Integrated Service Digital Network (ISDN) to be reached through standard user interfaces.[40] Finally, semi-conductors will continue to compact so that there may well be one million components per chip by 1990, with comparable increases in processing speeds as photography and engraving merge to achieve this photo-engraved marvel.[41] Printing has moved from content to process, with the Chinese wood block print as a distant ancestor. Already, the entire thirty volumes of the *Encyclopaedia Britannica* could be transmitted from Washington to Los Angeles in a matter of several minutes at a speed of 3 megabits a second.[42]

These statistics are not paraded to "wow" anyone; some may be a bit exaggerated, but there is enough here to show that the old formats may well dissolve with the new software. We talk about the sun "rising" and "setting" because the illusion has been with us for millions of years and we once thought it worked that way. We have continued to speak of the "file" long after the thread ceased to pass through the hole in the paper, and will do so long after the stiff paper covers disappear. We may have to abandon old categories and hierarchical levels in records creation; it is significant, perhaps, that the record group/record series controversy, which began to render arrangement, description, and retrieval more flexible, emerged at about the time that computers began to challenge the archivist, though there may not have been a conscious connection.[43]

Terry Cook tells us that "the era of the million dollar main frame and complicated MARC formats is over"[44] and he may well be right. Automation is both centralizing and decentralizing, in that the early hardware required a centralized facility fed by "hard wired" terminals, with usually severe limitations on the partially decentralized archivist with regard to possible software. The rise of the microcomputer has broken this umbilical cord (which can be reattached if appropriate) and has allowed a thousand personal computers to bloom in a highly decentralized mode. What remains centralized is the consensual agreement on descriptive and other standards which is central to an effective network and ultimately to a national or international system of communication or sharing of information with the personal computer. With its marked increase in user friendliness,

"the monk at the gate" may have to move over to allow end-users (as opposed to the archivists) to find their own way through the labyrinths of information retrieval.

Meanwhile, whole nebulae of databases with their complex command languages must still be served by our electronic monks, but history and archives lack "universal" on-line database coverage.[45] The available literature can be unhelpful, and user studies scarcely scratch the surface of the real problem of how much retrieved material turns out to be useful and how much is missed or irrelevant. "Recent overviews of bibliographic databases for end users concentrate more on available services than on getting the most useful information from them,"[46] which is very similar to the archivists' attitude to the user public: "To help people search effectively for themselves, we must know how they search alone."[47] Most citations to end-user on-line search behaviour is within the environment of the library and not the home or workplace.[48] Fifty to 60 per cent of office workers are expected to have microcomputers by the mid-1990s, and data processors have embraced the concept of the end-user; "applications programming will be done by the person who will be running the application rather than by the professional programmer" in the office and in the home.[49]

Meanwhile, on-line bibliographical searches have been a matter of trial and error, "successive iterations in modifying the search formulation until we find, finally, the one best formulation of the query."[50] Marcia Bates suggests a far better process which she calls the "barn door" approach, followed by "docking" on the precise subject required. Since a display of headings early on reduces user impatience, she favours a front-end user programme with a vast array of terms greatly in excess of the thesaurus within the database, but linked to them. This would mean that any term remotely connected would hit the barn door and produce headings from which to choose. Docking is then a method of "getting a feel for the rules and to begin [sic] interaction in some common topic area" nudging forward into a semantic funnel much as some ferries now head for a dock wide at one end and narrow at the point of tying up; space craft also "dock" on this principle. "On-line catalogs to date have added powerful capabilities to the traditional catalog, yet systems designs generally have still not gone beyond implementing the card catalog in on-line form with some established on-line search features tacked on,"[51] and hence this approach.

My account is grossly over-simplified and those who wish to explore this concept should read Bates' article. The point I wish to make is this: here is a search strategy devised in terms of automation and the computer, and not in terms of index cards. We are often told if a system works well manually it will work on the computer, which is true, but it almost suggests that the system should first be capable of manual operation when in fact we are here talking about a mental operation with perhaps no manual counterpart. Old forms and procedures will dissolve simply because they were manual in origin. The semi-conductor of the 1990s with hundreds of thousands of components and interconnectors would take one person ten years to produce soldering components on printed wire boards.[52] There is a manual alternative there — just; but no one is going to try it *that* way round first!

The transformation of the user

Until quite recently, there has been a relative scarcity of archives and records. This will seem an outrageous statement to my colleagues labouring under vast backlogs and

struggling to improve access to the front logs. A log-jam there may still be, but the users' expectations have been quite limited and the likelihood of success very unpredictable. A researcher was content to be content with the variable quality finding aids and idio-syncratic indexes offered by the archivist, but mostly of value to the archivist who understood the system through personal familiarity. I think we have to admit that most inventories are control documents, "snapshots" of the volumes and boxes on the shelves with a rather dreary emphasis on physical description. The user was mercifully ignorant of the backlog and was content to mine the available seams for the appropriate infor-mation. There was even a sense of great satisfaction in stumbling upon material about which the finding aids were silent, and a proprietary right, at least for a while, to this discovery; success was achieved in spite of the archivist and this was part of the fun. It was essentially a static architectural world with columns of descending sub-groups and series within the inventories and whole streets and suburbs of row housing in the form of cards with subject headings as a street plan. A journey through this metropolis of information could be pleasurable or frustrating as doors opened and closed. In short, the finding aids stayed put, the user moved, and when documents were produced they stayed put as well. There was some comfort in this. The problem was that not all the streets were marked and only the sketchiest information was available about the houses. This limited access has had, of course, a profound effect on historiography and research in general. In much the same way, "historical researchers view information files accumulated by scientists and engineers in the nineteenth and early twentieth centuries as evidence of thought processes, because the files provide a record of scientists and engineers access to information."[53] Access to the available literature can now be assumed.

The search room of the near future will house not a city of scant entries, but a blizzard of information through which the researcher must find a way. Seated at a terminal the user stays put, the information flies past and, if the records to be retrieved are automated, they will fly past as well. There is, moreover, not likely to be a records scarcity given the increasing density of automated storage. Moving successfully through such a research visit, with or without an electronic monk as guide, requires a somewhat different approach:

> In an automated environment, the user must apply two types of knowledge: knowledge of the mechanical aspects of searching (syntax and semantics of entering search terms, structuring a search and negotiating a system) and knowledge of the conceptual aspects, the 'how and why' of searching — when to use which access point, ways to narrow and broaden search results, alternative search paths, distinguishing between no matches due to search error and no matches because the item is not in the database, and so on.[54]

The user will have to do some technical homework, though much of this may have come gradually through the school system. "Research in psychology has shown that Boolean logic is an inherently difficult task and one that is not 'common sense' ... on-line catalogue users tend to perform simple searches using only the basic search features."[55] Likewise, varying frequency of use presents different problems in terms of experience and, again, is the technology yet up to the intellectual search tasks and conceptual problems? "Can we distinguish between searchable and unsearchable questions?" Despite the time allotted to on-line search techniques in library schools, users feel they should be able to grasp any search system in thirty minutes, which is perhaps all the time the manual systems took to master.[56]

Increasingly we will have to spend more time understanding the users' approach: "To state their needs, people have to describe what they do not know. In effect, people do not naturally have 'queries,' rather they have ... 'an anomalous state of knowledge'." Matches between systematic information and queries "may be requiring a match between two fundamentally dissimilar sorts of texts."[57] Users also have problems with indexes where the uncertainty principle applies in full measure and the notion of "the perfectly objective observer is simplistic and naive." Newtonian mechanistic assumptions of an ideal indexing system are impossible.[58]

The spread of microcomputers and the increase in their capability will lead to an increase in unmediated end-users who, if they are in an office complex, may be mediating for someone senior to them. The automated record with its superior retrieval character- istics is likely to be the object of extended research, even before it reaches the archives, by professional, technical, and managerial personnel, which has some implications for the archivist. Unmediated searchers also learn from their colleagues and "the major reasons for searching themselves is convenience, speed being a key facet. Performance of the system is not particularly important to them. If the on-line search does not come out well they will find an alternative."[59] This observation is within a bibliographic context, but there may be a message here too for archivists. We had better devise systems that are usable by our clients, and user oriented; otherwise, they will be back consulting us "monks at the gate" and much of the advantage of automation will be lost. We will always be available for consultation, but it should be increasingly to clarify questions rather than provide answers.

Other characteristics of the user fraternity deserve consideration. The genealogists were one of the earliest groups to set up their own networks for information exchange. There are some profoundly "tribal" attributes to genealogy which accounts for this collec- tive approach long before the electronic "implosion," and many archives have benefitted from receiving details of family histories and pedigrees. Sue Gavrel has reported a similar willingness among researchers of machine readable archives to share information, in that over 76 per cent said they would supply information about their files for inclusion in a union list.[60] Archivists in general may expect an increase in cooperation of this kind as, through networking among archivists and users, a more collective approach to re-search, that is the recovery of what was once known, is implemented. Learning and scholarship may well become less the isolated activities of individuals and more the collective, cooperative achievements of groups. Through automation the archives can now go to the researcher, but the nature of the medium makes for less isolation in the research community.

As expert systems, the artificial intelligence, and other front-end user programmes render the complexity and sophistication of the software more "transparent," the barriers between users' needs and their fulfilment will grow less, but there is perhaps yet another paradox here. Historians in the past fashioned what they could retrieve into narratives built upon the fragments of evidence that survived, and from this emerged the notion that meaning increased in proportion to the raw data extracted from the primary records. This pursuit is asymptotic; you never arrive at "what actually happened:"

> Historiography that aspires to get closer and closer to the documents — all
> the documents and nothing but the documents — is merely moving closer

and closer to incoherence, chaos and meaninglessness. That is a dead end for sure. No society will long support a profession that produces arcane trivia and calls it truth.[61]

With the automated record so detailed and the retrieval systems so fine-tuned, the available source documents become so vast that history must begin to take on mythic proportions to avoid an electronic antiquarianism. This surely is the lesson of super-abundance. Meanwhile, "as historians go through the older records they see how much has been irretrievably lost. The desire to capture the present becomes urgent."[62] They are right and there is much of contemporary value which is not automated to add to the accession lists. The rules of the game are, however, changing and with it the relationship of archivist to researcher. "The problem today is to find a system of organising knowledge that reflects a coherent and shared view of the world, something that you or I can use easily and with which we may find valid connections between things ... in our pluralistic culture."[63] This is as true of archival retrieval systems as encyclopaedias.

Behind the information and the data lies the "act and deed." We need a new form of "social historiography" to make clear how and why records were created; this should be *the* archival task, and it may be that a typology of actions will help us see the records in new ways and respond to the "shifting paradigm ... in the modern research world."[64] The breakdown of knowledge theory, "which can be taken to mean that the research is connected with a basic conception of what knowledge is and how knowledge is gained, is yielding to forms of approach-based research ... undertaken for the purpose of promoting certain considerations or reflections ... taken to mean vaguely defined or implied interests, views and goals," such as feminism and research in technology.[65] Hence the need for the barn door and docking as discussed above, since these approaches are not based on basic interpretation patterns and formulated understanding about ethical rules and so on.

Germane to all this is the development of networks, and archivists might do well to examine some of the findings of the social scientists:

> Network research began as an empirical field and it has only gradually begun to go beyond desciption to acquire some generalisable theory. ... Networks are highly empirical representations of actual human interaction ... as it actually happens.[66]

Networks are highly charged sources of power whether they be political interest groups or human grids for information exchange; they are very much a part of, and a product of, the automated environment. We can see how "approach-based research" is often generated in networks which challenge conventional wisdom and knowledge theory. Donna Smyth, a Professor of English, who became deeply involved in the Nova Scotia lobby against uranium mining, has declared:

> Official knowledge is not only institutionalised, it is compartmentalised and specialised. It is taken out of the citizens' sphere and placed in the hands of experts who then advise politicians who rely on the experts. In effect, we have a short circuitory of democracy whereby citizens are excluded from the decision making process.[67]

Experts, just because they are specialized, can only know a part of the total scene and it is surely part of the librarian's and archivist's role to push for the kind of holistic access which database searchers allow to sources and documentation across departmental barriers

which otherwise obscure the truth. Patterns of knowledge adopted in the *Encyclopaedia Britannica* reveal the cult of the expert which is now beginning to wane as its limitations are perceived.

The transformation of the archivist

In many ways we archivists resemble plumbers. Our records are like pipes through which the information flows towards the user; finding aids provide suitable taps along the way and our pipes are beautifully soldered and sealed with various branches, which makes sure that the "hot and cool" media (to use one of McLuhan's metaphors) and their sources do not get mixed up; we call this provenance. Our chief concern is that our storage tanks do not leak, our taps work, and the information comes out in a nice steady stream. Our plumbing systems are very traditional and most of us are reluctant to question principles which seem to work quite well. Most of our customers do not complain since we enjoy a monopoly of the business. There is nowhere else to go. We do not seem concerned with falling levels in the catchment areas or losses from the big conduits which lead from them, or that the purification plant may be screening out materials of value. I fear this metaphor is leading me into deep water and I will let it be!

Frank Burke in his well-known article on archival theory[68] has posed some of the larger questions which I too believe we should be addressing, and I have added a few of my own in the foregoing remarks. Cook and Eastwood are quite right in deploring the lack of general involvement of most archivists in these theoretical debates,[69] because such discourse *is* important to us if we are not to go on plumbing in the same old way when so much around us is changing. I have tried to say something about the nature of society in relation to its records in the "information age" and to suggest the usefulness of recovering certain insights and precepts which have become obscured and which I hope bear further examination. Gregg Kimball contends that "the level of theory that Burke advocates will not emerge from the study of archival practices and principles save in the general framework of human institutions. Theory of this sort is likely to be borrowed from one of the social sciences."[70] So be it. Defining our theories and principles solely within the terms and resources of our own discipline can be highly incestuous and suggests that records exist for their own sake and are not to be confused with the society which creates them.

In this regard, Cook asks: "Should archivists (with producers and users) not approach records description in a more global and holistic fashion?"[71] Why only description? He goes on to discuss the possibility of itinerant archivists riding their circuits like the old preachers, which is a novel and fruitful idea for North America and may well complement networks of very small archival accumulations. Such an arrangement existed for some cities and towns of West Yorkshire, England, during the 1950s when money was particularly scarce, and it worked quite well. We desperately need to think new and different thoughts, "sinful" though they may appear to the more conventional of us,[72] and we must not be afraid to be "put down" for them. Anyone working in a special interest group which does not have majority acceptance gets used to that. For instance, "relatively little has been done on written communication at the more dynamic organizational and personnel levels" in contrast to the mass media,[73] yet much of our record lies within this field. Because of his awareness of the record as a dynamic vehicle of communication with ramifications other than as an element in a static knowledge theory, Cook can say that "the older narrower, institutionally based provenance approach of archives ... no longer suits the new producer or creator."[74]

And so we return to that mythic, dynamic quality of documents as acts and deeds.[75] Perhaps, therefore, it is not surprising that Helen Samuels and others have developed a typology of functional gerunds for the appraisal of the records of modern science: funding, planning, hypothesizing, communicating, patenting, and so on, rather than focusing on the physical format of the document. Again, Trudy Peterson stresses that "the act of fixing the information not the type of base nor the type of impression, nor the character of information, nor the length of time it is fixed" constitutes the record, but I cannot agree that "the format makes no difference to the fundamental nature of a document or a record."[76] The format makes a difference because the medium imposes its own meaning which cannot be separated from the document. We cannot recapture the act; all we have is the document, the residual instrument, and that is why the document *became* the act or deed,[77] limited by the symbolism of its language (itself a mass medium) and of its documentary nature. These limitations and ambiguities have sustained lawyers ever since.

It is this perception which causes David Bearman to ask "what is the purpose of archival information systems?" He replies: "to provide documentary accountability. Such accountability is important, not so much to tell us what is in the archives as to tell us how it came to be there," why it was created, and what it really did as opposed to saying it did. Access and analysis of the contents of archives are something else again. "Documentary accountability" had us looking again at our old definitions as indeed we always should.[78] Archivists must cast off the model that holds that records have only a single referent and create a system that recognizes instead that they are created and maintained as part of complex bureaucratic networks.[79]

For Peterson, "archival theory is as much a map of where archivists have been as an atlas for future travels;"[80] we have forged practical experience into general operating principles. I realize that we have here no more than a metaphor, but I would suggest that maps can become dated, their information misleading and ambiguous, and that regular revisions, where necessary, are in order. We need to examine these and other assumptions of our profession to see whether they still hold up in our mythopaeic "information age."

Notes

1   Tom Berry in "History and the New Age," Canadian Broadcasting Corporation (hereafter CBC), "Ideas" programme, transcript (1984), p. 6.
2   "The Media of Record: Archives in the Wake of McLuhan," *Georgia Archive* 4 (1978), pp. 1-10.
3   Lister Sinclair in "History and the New Age," p. 1.
4   Terry Eastwood, "Going Nowhere in Particular: The Association of Canadian Archivists Ten Years After," *Archivaria* 21 (Winter 1985-86), pp. 186-90; Terry Cook, "Shadows in the Canadian Archival Zeitgeist: The Jeremiah of Terry Eastwood Considered," *Archivaria* 22 (Summer 1986), pp. 156-62.
5   Raimundo Panikka in "History and the New Age," p. 3.
6   Derek de Kirckhove in *ibid.*, p. 8.
7   Nils Mortensen, "Knowledge Problems in the Sociology of the 80s," *Acta Sociologica* 29 (1986), p. 335.
8   William Barker in "The Circle of Knowledge," CBC "Ideas" transcript (1985), p. 2.
9   Walter Ong in *ibid.*, p. 2.
10 Barker in *ibid.*, p. 3.
11 Mortensen, "Knowledge Problems," p. 327.
12 A fictitious character in my "From Dust to Ashes: Burnout in the Archives," to be published shortly in the *Midwestern Archivist*.
13 Randall Collins, "Is Sociology in the Doldrums?" *American Journal of Sociology* 91 (1986), p. 1348.
14 *Ibid.*, p. 1349.
15 *Ibid.*, p. 1351.

16 David Lyon, "From 'Post-industrialism' to 'Information Society': A New Social Transformation?" *Sociology* 20 (1986), p. 578.
17 *Ibid.,* p. 585.
18 William H. Melody, "The Context of Change in the Information Professions," *ASLIB Proceedings* 38 (August 1986), p. 226.
19 William H. McNeill, "Mythistory, or Truth: Myth, History and Historians," *American Historical Review* 91 (1986), p. 2.
20 Allen Kent, "Unsolvable Problems," *Information Science: Search for Identity,* Anthony Debons, ed., (New York, 1973), pp. 299-311.
21 David B. Gracy II, "Our Future is Now," *American Archivist* 48 (Winter 1985), pp. 12-21.
22 Kim S. Cameron, "Effectiveness as Paradox: Consensus and Conflict in Conceptions of Organisational Effectiveness," *Management Science* 32 (May 1986), pp. 539-57.
23 Mortensen, "Knowledge Problems," p. 329.
24 David Spangler, *Emergence: The Rebirth of the Sacred* (Dell 1984), p. 91ff.
25 Jacques Barzun, "Scholarship *versus* Culture," *The Atlantic Monthly* (November 1984), pp. 93-104.
26 R.J. Morris, "Does Nineteenth-Century Nominal Record Linkage Have Lessons for the Machine-Readable Century?" *Journal of the Society of Archivists* 7 (October 1985), p. 509.
27 For a perceptive study of the problems of obsolescent hardware, see David Bearman "Optical Media: Their Implications for Archives and Museums," *Archives and Museums Informatics* (1987).
28 Abraham Kaplan, "The Age of Symbol: A Philosophy of Library Education," *Library Quarterly* 34 (1964), p. 297.
29 A recorded version of my course, "Society and the Documentary Record," designed to be heard and not read, consists of thirteen ninety-minute tapes and is deposited in the School of Library, Archival and Information Studies, University of British Columbia, Vancouver, and in the National Archives of Canada, Ottawa. This is as close as I will ever get to writing a book on the subject.
30 David Olson, "Mind, Media and Memory: The Archival and Epistemic Functions of Written Text," working paper 13, Ontario Institute for Studies in Education (OISE), and the McLuhan Program in Culture and Technology (1986), p. 1.
31 *Ibid.,* pp. 1-2.
32 Kaplan, "Age of Symbol," p. 296.
33 *Ibid.,* p. 3, quoting Havelock.
34 Marc D. Lewis, "In Sheep's Clothing: An Analysis, and Discussion of the Thank You Very Much, Milk Commercial," working paper 9, OISE (1986), p. 3.
35 Tim O'Sullivan *et al., Key Concepts in Communication* (London; NY, 1983) p. 210.
36 McNeill, "Mythistory," p. 9.
37 Derek de Kirckhove in "History and the New Age", p. 5.
38 Harold Naugler, *The Archival Appraisal of Machine Readable Records: A RAMP Study with Guidelines,* UNESCO (1984), p. 26.
39 Charles M. Dollar, *Electronic Records Management and Archives in International Organizations: A RAMP Study with Guidelines,* UNESCO (1986).
40 Richard Dick, "Views on Telecommunications: Implications for the Future," *Journal of the American Society for Information Science* 37 (1986), p. 424.
41 Dollar, *Electronic Records Management,* p. 6.
42 *Ibid.,* p. 30.
43 Peter Scott published his article "The Record Group Concept: A Case for Abandonment" in 1966. See the *American Archivist* 29, pp. 493-504.
44 Terry Cook, "The Vancouver Island Project Revisited," Chad Gaffield and Peter Baskerville, eds., *Archives, Automation and Access* (Victoria, 1986), p. 12.
45 Richard Janke, "Full Circle: Archival Studies On-Line: Where From Here?" *Archives, Automation and Access,* pp. 27-38.
46 Winifred Sewell and Sandra Teitelbaum, "Observations of End-User On-Line Searching Behaviour Over Eleven Years," *Journal of the American Society for Information Science* 37 (1986) p. 234.
47 *Ibid.,* p. 325.
48 *Ibid.,* p. 234.
49 Marydee Ojala, "Views on End-User Searching," *Journal of the American Society for Information Science* 37 (1986), p. 199.
50 Marcia J. Bates, "Subject Access in On-Line Catalogs: A Design Model," *Journal of the American Society for Information Science* 37 (1986), pp. 357-76.
51 *Ibid.,* p. 357.

52   Dollar, *Electronic Records Management*, p. 6.
53   Joan K. Haas, *et al.*, *Appraising the Records of Modern Science and Technology: A Guide* (Chicago, 1985), p. 44.
54   Christine L. Borgman, "Why Are On-Line Catalogs Hard To Use? Lessons Learned From Information-Retrieval Studies," *American Society for Information Science* 37 (1986), p. 388.
55   *Ibid.*, p. 390.
56   *Ibid.*, p. 396.
57   Bates, "Subject Access," p. 365.
58   *Ibid.*, p. 360.
59   Sewell and Teitelbaum, "Observations," p. 243.
60   Katherine Gavrel, "Issues Associated with Accessing Machine Readable Records," *Archives Automation and Access*, p. 111.
61   McNeill, "Mythistory," p. 8.
62   William Barker in "The Circle of Knowledge," p. 27.
63   *Ibid.*, p. 16.
64   Peter Baskerville and Chad Gaffield, "Shifting Paradigms and Emergent Technologies: Archives in the Modern Research World," *Archives, Automation and Access*, pp. 15-26.
65   Mortensen, "Knowledge Problems," p. 325.
66   Collins, "Is Sociology in the Doldrums?" p. 351.
67   Donna Smyth in "Finding Out: The Rise of Citizen Science," CBC "Ideas" transcript (1985), p. 14.
68   Frank Burke, "The Future Course of Archival Theory in the United States," *American Archivist* 44 (Winter 1981), pp. 40-46.
69   Eastwood, "Going Nowhere in Particular," pp. 186-90; Cook, "Shadows in the Canadian Archival Zeitgeist," pp. 156-62.
70   Gregg D. Kimball, "The Burke-Cappon Debate: Some Further Criticisms and Considerations for Archival Theory," *American Archivist* 48 (Fall 1985), p. 371.
71   Cook, "Vancouver Island Project," p. 9.
72   Maynard J. Britchford, "Seven Sinful Thoughts," *American Archivist* 43 (Winter 1980), pp. 13-16.
73   Clark A. Elliott, "Communication and Events in History: Toward a Theory for Documenting the Past," *American Archivist* 48 (Fall 1985), p. 358.
74   Cook, "Vancouver Island Project," p. 8.
75   An increasing body of scholarship is now appearing which urges archivists as their central task to explore the nature and meaning of archival documents as revealed in their form, purpose, and impact on society. The following are some excellent examples that have appeared in *Archivaria*: David A. Bearman and Richard Lytle, "The Power of the Principle of Provenance," *Archivaria* 21 (Winter 1985-86), pp. 14-27; Terry Cook, "Nailing Jelly to a Wall; Possibilities in Intellectual History," *Archivaria* 11 (Winter 1980-81), pp. 205-18; "From Information to Knowledge: An Intellectual Paradigm for Archives," *Archivaria* 19 (Winter 1984-85), pp. 28-49; and "Leaving Safe and Accustomed Ground: Ideas for Archivists," *Archivaria* 23 (Winter 1986-87), pp. 123-28; and Tom Nesmith, "Archives from the Bottom Up: Social History and Archival Scholarship," *Archivaria* 14 (Summer 1982), pp. 5-26; and "Archives and the 'Circle of Knowledge'," *Archivaria* 21 (Winter 1985-86), pp. 10-13. In addition, the valuable "Studies in Documents" series, which began in *Archivaria* 20 (Summer 1985), examines in detail the use made by their creators, based on form and context (a modern "diplomatic") rather than content of specific archival material.
76   Trudy Huskamp Peterson, "Archival Principles and Records of the New Technology," *American Archivist* 47 (Fall 1984), p. 385.
77   Hugh A. Taylor, "My Very Act and Deed: The Role of Documents in Relation to Process," to be published shortly.
78   David Bearman, "Who About What or From Whence, Why and How: Intellectual Access Approaches to Archives and Their Implications for National Archival Information Systems," *Archives, Automation and Access*, p. 40.
79   Max J. Evans, "Authority Control: An Alternative to the Record Group Concept," *American Archivist* 49 (Summer 1986), p. 260.
80   Trudy Huskamp Peterson, "The National Archives and the Archival Theorist Revisited," *American Archivist* 49 (Spring 1986), p. 126.