Media and the Messengers: Writings on Digital Archiving in Canada from the 1960s to the 1980s

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RÉSUMÉ En puisant largement, mais pas de façon exclusive, dans *The Canadian Archivist* et *Archivaria*, j'expose le développement de la pensée et de la pratique en matière des archives numériques au Canada entre les années 1960 et les années 1980, à partir des tout premiers essais de création d'instruments de recherche informatisés et l'établissement de la Division des archives ordinolingues aux Archives publiques du Canada. Je me penche surtout sur les tendances dans le développement des technologies de l'informatique et sur leur utilisation par les employés de bureau. Il s'agit souvent de voix qu'on avait marginalisées, notamment lors des premières phases. Un des premiers gestionnaires de la Division des archives ordinolingues, Michael Carroll, caractérisait l'archivage numérique comme une spécialisation liée à un support documentaire, une variation des archives textuelles, sur papier. Malgré l'appui de personnes très influentes comme Jay Atherton et Hugh Taylor, le courant dominant en archivistique canadienne est resté fixé sur les documents sur papier et sur les pratiques archivistiques qui leur sont propres, en dépit du fait que des ordinateurs de bureau peu coûteux et conviviaux ont commencé à faire leur apparition dans des environnements de travail, y inclus dans les centres d'archives, au courant des années 1980. Dans un second article dans *The American Archivist* 79, numéro 2 (automne 2016), je poursuis cet examen pour la période entre les années 1980 et 2011.

ABSTRACT Drawing largely, but not exclusively, on *The Canadian Archivist* and *Archivaria*, I trace the development of digital archival practice and thinking in Canada from the 1960s to the 1980s, starting with early experiments in computerized finding-aid creation and the establishment of the Public Archives of Canada's Machine Readable Archives (MRA) Division. I pay particular attention to trends in the development of computing technologies and their use by office workers. Particularly in its early phases, this is often a story of voices from the margins. Early MRA Division manager Michael Carroll characterized digital archiving as a media specialization, a variation on textual, paper archives. Despite high-profile boosters such as Jay Atherton and Hugh Taylor, the Canadian archival mainstream remained focused on paper-based records and archival practices, even as inexpensive and user-friendly desktop-computing systems began to appear in contemporary office environments, including archives, during the 1980s. In a second article in *The American Archivist* 79, no. 2 (Fall 2016), I take the story from the 1980s to 2011.

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> Hype hides history … Machine-centred history reinforces the hype and with it what one might call the 'impact theory' of the relation of technology and society. There is society strolling along, minding its own business, and, wham!, it gets impacted and is left reeling by a revolutionary technology, which changes everything overnight or in some similarly short time.
>
> – Michael S. Mahoney, "Histories of Computing(s)"[1]

Michael Mahoney's landmark article "Histories of Computing(s)" warns historians against hype, against technological determinism (which he calls machine-centred history), and against popular notions of computer revolutions. Mahoney understood that deep change takes time. Viewed from inside, change can seem long delayed and evolutionary; it is only when viewed from outside, by those not paying attention to the longer process, that change seems sudden and dramatic. Mahoney argued that computers, like other technologies, should first be understood within the contexts of their use, and particularly from the perspectives of communities of people who had grown familiar with them, and with precursor technologies, through long-term use. To do otherwise risks assigning historical agency to the machine rather than the people who made use of it.

For most of the second half of the 20th century, the majority of Canadian archivists seemed curiously inoculated against the hyping of the computer "revolution." This was a factor of infrequent, or non-existent, exposure to computing technologies. Prior to the arrival of relatively inexpensive, user-friendly desktop-computing technologies in the late 1980s and early 1990s, archivists were not commonly computer users and were slow to see the potential of computers either in producing valuable records for archival acquisition or in archival work. Computer records were viewed as a niche preoccupation, a form of media specialization. Like other media specialists, digital archivists of this era – specialists in what was then called machine-readable archives (MRA) – wrote and spoke about their work in relation to mainstream textual archives, highlighting points of similarity and contrast. Perhaps as a result, their writings were perceived to be secondary to and derivative of developments within textual archiving, rather than a distinct tradition of their own. When cheap, user-friendly desktop computers brought computing into the mainstream, MRA theories and practices continued to be viewed as ancillary and secondary.

1 Michael S. Mahoney, "The Histories of Computing (s)," *Interdisciplinary Science Reviews* 30, no. 2 (2005): 120–21.

Mahoney warns us, though, that dismissive attitudes toward early computing technologies, such as those expressed by the majority of Canadian archivists in the 1960s and 1970s, rather than being an inoculation against hype can represent a kind of precursor to hype: a failure to appreciate the longer and deeper roots possessed by computer technologies. When desktop computing became common in office environments during the late 1980s and 1990s, archivists fell into a classic hyping of computer technology, viewing the machine itself as revolutionary. Instead of seeing desktop computing as a continuation of mainframe and mini-computing, and of electromechanical data processing before it,[2] archivists appeared to believe that contemporary desktop computing lacked any precedent: a revolutionary technology that, like a whirlwind, had appeared from nowhere and threatened to sweep away all other recordkeeping technologies. Historian Thomas Haigh astutely characterizes this as computer exceptionalism, as problematic in its own way as American exceptionalism.[3] Mahoney, Haigh, and other historians of computing remind us that to study history is to understand contexts, roots, and consequences. To view a technology as unique and determinative – revolutionary – is to maintain a fundamentally ahistorical view of a technology and its use. To view machines as historical agents is to misunderstand the roles of humans in designing and creating the machines, and then transforming their meanings and uses by adopting them into existing contexts (such as the "modern office") and adapting them to new tasks.

This is the first article in a two-part analysis of writings about digital archives in Canada from the 1960s through to *Archivaria*'s second special issue on electronic records in 2011. In this article, drawing largely, but not exclusively, upon *The Canadian Archivist* and *Archivaria*, I trace the development of digital archival practice and thinking in Canada from the 1960s through to the middle of the 1980s. This is primarily a story of voices from the margins, when early digital archivists and managers like Michael Carroll, Harold Naugler, and John McDonald, with the support of boosters such as Jay Atherton and Hugh Taylor, struggled to bring MRA perspectives into the mainstream. In a second article, titled "How Soon Is Now?" and published in *American Archivist* 79, no. 2 (Fall 2016),[4] I pick up the story in the middle

2 Graham Lowe explores the use of electromechanical tabulators in Canadian bureaucracies in "The Enormous File: The Evolution of the Modern Office in Early Twentieth-Century Canada," *Archivaria* 19 (Winter 1984–85): 137–51. Thomas Haigh describes in more detail the transition from tabulators to mainframe computing in "The Chromium-Plated Tabulator: Institutionalizing an Electronic Revolution, 1954–1958," *IEEE Annals of the History of Computing* 23, no. 4 (2001): 75–104.

3 Thomas Haigh, introduction to *Histories of Computing*, by Michael S. Mahoney (Cambridge, MA: Harvard University Press, 2011).

4 Greg Bak, "How Soon Is Now? Writings on Digital Archiving in Canada from the 1980s to 2011," *American Archivist* 79, no. 2 (Fall/Winter 2016), pp. 57–93.

of the 1980s. In the 1990s, electronic records became a preoccupation of archival theorists even as the contributions and the history of digital archiving during the MRA era appear to have been forgotten. Then, in the 2000s, digital archivists returned to some of the fundamental theories and practices established during the MRA era, which have once again become foundational to digital archives theory and practice. In its broad outlines, then, this is a story – like Tom Nesmith's *Canadian Archival Studies and the Rediscovery of Provenance* or J.R.R. Tolkien's *Lord of the Rings* – of knowledge gradually won, carelessly lost, and painfully recovered.

This article is organized into two sections. In the first, titled "Media," I briefly examine the work of early digital archivists in establishing a set of core practices and principles that emerged from the work on computerized finding aids in the 1960s and the work on the acquisition, processing, management, and use of machine-readable archives in the 1970s and early 1980s. I will argue that this work was largely characterized by MRA archivists, and perceived by others, as a media specialization, a variation on textual archival theory and practice. Among the findings of this section are a number of striking parallels between how we understand digital archives today and how they were understood in the MRA era. In the second section, titled "Messengers," I examine the efforts of four authors (three individuals and one pair of co-authors) to break digital archival thinking free from the confines of its definition as a media specialization. Jay Atherton, Hugh Taylor, Richard Kesner, and the Vancouver Island Project team of Peter Baskerville and Chad Gaffield each perceived the challenges, opportunities, and urgency of digital archiving to be significant for all aspects of archival theory and practice. These authors sought to alert the mainstream majority that digital media offered new ways of understanding archival records and archival processes, and of effecting archival access.

The title of this article, and the subtitles of its sections, playfully reference period notions of media specialization, Marshall McLuhan's famous dictum "the medium is the message," and the much older metaphor of shooting the messenger. Carroll, Naugler, and other archivists working in the MRA Division of the then–Public Archives of Canada (PAC) avoided making any grand claims for digital archival theory and practice, even as they reworked mainstream archival assumptions and practices in sometimes major and sometimes minor ways. Atherton and Taylor align with media theorist Marshall McLuhan in asserting the special significance of digital media, and therefore digital archiving, beyond the narrow confines of MRA as a media specialization. For this reason I will treat, briefly, McLuhan's ideas and their influence. Atherton's and Taylor's efforts to raise the profile of digital archival work among archivists more generally passed largely unremarked on within *The Canadian Archivist* and *Archivaria*, seemingly met with indifference or incomprehension – at least in the pages of the journals, whatever the nature

of their reception at conferences and in hallways.[5] By the early 1980s, the increasingly urgent calls of Taylor, who had left PAC in 1978, and Atherton were stridently taken up by Kesner, an American archivist, while historians Baskerville and Gaffield, refusing to wait any longer for Canadian archivists to make use of available digital tools, themselves took up these tools to bring intellectual coherence to the physically dispersed archives of Vancouver Island. Kesner's work, and that of the Vancouver Island Project, was met with hostility, and an undercurrent of anxiety, within the pages of *Archivaria*.

Through the 1960s and 1970s computer usage in archives was constrained by the costs and difficulties associated with mainframe and mini-computing. Institutions such as PAC did not have computers in-house, but instead contracted with external providers for computer access. By the middle and late 1980s, the ready availability, widespread marketing, and decreasing costs of desktop computer technology, combined with their increasing processing power, memory, and ease of use, resulted in widespread adoption of computers for a range of bureaucratic and other tasks. As record creators and archivists took to desktop computing in the late 1980s and early 1990s, digital archiving became a common concern within mainstream Canadian archival thinking and writing. Nonetheless, even as they became computer users, Canadian archivists seemed disinclined to turn to digital archivists of the MRA era when it came to dealing with digital archives. I offer my attempt to explain why this was so in my second paper, which picks up the story in the mid-1980s.

Throughout these papers, my focus is on digital archival thinking and practice in Canada, as presented in *The Canadian Archivist* and *Archivaria*, and not simply on digital archiving at PAC. That said, PAC was a national leader in seeking to create computerized finding aids in the 1960s and in founding an MRA Division in the early 1970s. Moreover, the close association of *The Canadian Archivist* and *Archivaria*, especially during the period covered by this first paper, with editors and archivists based at PAC, results in a narrative that may seem PAC-centric.[6] This reflects the bias of the literature more than any conscious decision on my part.

5 Both Atherton and Taylor have noted the negative reception of, or resistance to, their ideas. See Taylor's various commentaries in Terry Cook and Gordon Dodds, eds., *Imagining Archives: Essays and Reflections* (Lanham, MD: Scarecrow, 2003); and Jay Atherton, "Automation and the Dignity of the Archivist," *Canadian Archivist* 2, no. 1 (1970): 56–58.

6 Laura Millar touches upon the strong support that PAC provided to *Archivaria* in its early years in "Explaining Ourselves: 40 Years of *Archivaria*," *Archivaria* 80 (Fall 2015): 9 n7.

Media

> The medium is the message.
>
> – Marshall McLuhan[7]

> Although the medium is the message, … the "content" … is always another medium. The content of the press is literary statement, as the book is speech, and the content of the movie is the novel.
>
> – Marshall McLuhan[8]

> The user is the content of every medium.
>
> – Marshall McLuhan[9]

The earliest digital records weren't electronic, and they weren't for computers. Punch cards used the presence or absence of a hole to encode data, and their widespread use predates the commercial availability of computers by more than half a century.[10] They initially were created for and read by electromechanical tabulators, the earliest of which were built by Herman Hollerith for the 1890 US census.[11] In the middle of the 20th century, when punch cards were redeployed as computer cards, IBM and other computing-equipment manufacturers were exploiting a mature and widely used information storage and processing medium.

Although computer cards are listed as a type of record in the Government of Canada's 1966 *Public Records Order*, PAC did not acquire any before 1972. Dominion Archivist W. Kaye Lamb contended that computer cards were "working papers" – transitory records – that need not be archived if their data

7 Marshall McLuhan, *Understanding Media: The Extensions of Man*, 2nd ed. (New York: Signet Books, 1964). The phrase occurs throughout the book. It is also the title of chapter 1.

8 McLuhan, *Understanding Media*, 266.

9 Quoted in W. Terrence Gordon, *Marshall McLuhan: Escape into Understanding – A Biography* (Toronto: Stoddart, 1997), 178.

10 We have become accustomed to thinking of "digital" as synonymous with computers. Luciano Floridi reminds us that digital media are any media that use discontinuous signals to encode data. These signals may be electronic impulses (presence of an impulse versus absence of an impulse), magnetic impulses, pits and lands on a CD or DVD, or – in their earliest form, dating back to the development of the Jacquard loom at the end of the 18th century – the presence or absence of a hole in a wooden slat, a piece of paper, or a piece of card. Analog media encode data through variations in a constant signal. See Luciano Floridi, *Information: A Very Short Introduction* (Oxford, UK: Oxford University Press, 2010).

11 Lars Heide, *Punched-Card Systems and the Early Information Explosion, 1880–1945* (Baltimore, MD: Johns Hopkins University Press, 2009). See also Lowe, "The Enormous File."

had been abstracted into a report.[12] In this, Lamb followed archivists at the US National Archives and Records Service (US NARS) who, in discussions from the 1930s through to the 1960s, had similarly concluded that computer cards could be destroyed as "intermediate papers."[13]

The most positive interpretation of PAC's reluctance to take in digital records during the 1960s is that it reflects a certain clear-eyed professional skepticism in the face of popular hype about the "revolutionary" nature of computers. It also reflects a kind of technophobia and a fear of further straining resources in a sector where institutional mandates, then as now, routinely outstripped resources. As at PAC, archivists at US NARS were reluctant to deem punch cards archival, despite their being listed as potential records as early as 1939. Margaret Adams suggests that archivists at US NARS feared the vast bulk of the hundreds of millions of punch cards created by government agencies since the 1890s.[14] More than this, in US NARS' 1956 *Bulletin* on "The Appraisal of Modern Public Records," T.R. Schellenberg suggests that the very "machine readable" nature of punch cards rendered them unarchival: "if records are to be preserved in an archival institution they should be in a form that will enable others than those who created them to use them without difficulty and without resort to expensive mechanical or electronic equipment."[15] Schellenberg provides no justification for or explanation of this precept; he merely states it, as though it were self-evident.

Dominion Archivist Lamb's reluctance to accept computer cards as archival records may also evince wariness learned from the difficulties of technologically inexperienced Canadian archivists, during the 1960s, in using computers in an efficient and effective way to produce archival finding aids. Jay Atherton, in a paper given at the Society of American Archivists annual conference in 1968, stated, "Just to mention the words 'computer' or 'automation' in some circles is to invite cold suspicious stares of hostility, making one feel as though he had just said something dirty."[16] Atherton, himself not inoculated against the hype of the computer age, may have contributed to Lamb's wariness. Atherton's 1965 article describing the computer-assisted creation of finding aids at PAC made several hype-filled promises: "Having eliminated the human error factor," Atherton maintained that "electronic data

12 Betsey Baldwin, "Confronting Computers: Debates about Computers at the Public Archives of Canada during the 1960s," *Archivaria* 62 (Fall 2006): 175–76.

13 Margaret O'Neill Adams, "Punch Card Records: Precursors of Electronic Records," *American Archivist* 58, no. 2 (Spring 1995): 182–201.

14 Adams, "Punch Card Records," 191–98.

15 T.R. Schellenberg, "The Appraisal of Modern Records," *Bulletins of the National Archives* 8 (October 1956), accessed 19 September 2016, www.archives.gov/research/alic/reference/archives-resources/appraisal-of-records.html.

16 Atherton, "Automation and the Dignity of the Archivist," 56.

processing … will provide us with more accurate and more complete finding aids at lower cost and in a fraction of the time (literally no time at all)."[17] Betsy Baldwin suggests that the series of crashing disappointments that resulted from Atherton's inability to deliver on these promises may have left Lamb and others sceptical and disillusioned regarding the application of computers to archival work.[18]

US NARS began inventorying and scheduling computer records in the late 1960s and made its first acquisitions in 1970.[19] At PAC, Lamb's retirement in 1968 and the appointment of Wilfred Smith as Dominion Archivist allowed for a new beginning. In 1969, Smith sent Michael Carroll to US NARS to study the American approach. In 1971, PAC hired Hugh Taylor as Director of the Historical Branch (which he soon renamed the Archives Branch), where he thereafter introduced various media specializations.[20] In 1973, PAC established its own Machine Readable Archives Division, with Carroll as its head.[21] Carroll described its operations in a *Canadian Archivist* article in 1974.

Carroll was anything but a revolutionary. He noted that "the first machine readable archives in North America was established over fifteen years ago" and maintained that MRA represented no major departure from ordinary archival practice: "the medium of the record is relevant only from the viewpoint of form and not substance." Carroll's assurances that MRA were not dangerously innovative foundered several times, but nowhere more obviously than when he described the division's provision of access. Since computers were required to render the records, and since there were no computers in the PAC reading room, "the nature of machine readable archives for the foreseeable future almost determines that archives will be going out to the

17 Jay Atherton, "The Application of Mechanization to Manuscript Catalogue Production in the Public Archives of Canada," *Canadian Archivist* 1, no. 4 (1965): 4.

18 Baldwin, "Confronting Computers," 176.

19 Thomas E. Brown, "History of NARA's Custodial Program for Electronic Records: From the Data Archives Staff to the Center for Electronic Records, 1968–1998," in *Thirty Years of Electronic Records*, ed. Bruce I. Ambacher (Lanham, MD: Scarecrow Press, 2003), 1–23.

20 Terry Cook, "Hugh A. Taylor, 1920–2005," *Archivaria* 60 (Fall 2005): 278; Terry Cook, "Total Archives," in *Encyclopedia of Archival Science*, ed. Luciana Duranti and Patricia Franks (Lanham, MD: Rowman & Littlefield, 2015). Gordon Dodds characterized this as "the unfortunate fragmentation of responsibilities along burgeoning media lines." Taylor, however, argued that media characteristics require media separation for acquisition, preservation, processing, and control, and he looked toward a time when "automated systems will in the future facilitate a more holistic intellectual control." See Gordon Dodds, "Canadian Archival Literature: A Bird's-Eye View," *Archivaria* 17 (Winter 1983–84): 23; and Hugh A. Taylor, "Canadian Archival Literature Revisited," *Archivaria* 18 (Summer 1984): 11. See also Jarad Buckwold, "Of Space, Time, and the Archives Between: The Life of Hugh A. Taylor and the Redefinition of the Archival Cosmos" (MA thesis, University of Manitoba, 2016).

21 Baldwin, "Confronting Computers."

researcher rather than the reverse." Lest any radical conclusions be drawn, Carroll immediately reassures: "This is not to imply the democratization of the archives. The users of machine readable archives must have considerable funding and access to computer systems. This marks such a researcher as belonging to a small elite group."[22] It is odd to read these lines today, when so much writing on digital archives trumpets the democratization of archives, particularly by reimagining the processes and forms of access. Context for Carroll's comment is provided, perhaps, by Hugh Taylor's casual observation in 1972 that "the staffs of most repositories were once conservative with a small and a large 'c.'"[23]

Despite Carroll's initial attempts to depict MRA as conforming, in broad terms, to standard archival practice, it is evident from Carroll's piece and from publications written by other MRA archivists over the next decade that this work differed in substantial ways from textual archival practice. In *Archivaria* 6 (1978), Harold Naugler, appointed director of the PAC MRA Division in 1976, provided a general update on MRA processes and operations, exploring the "similarities and differences which are apparent when this medium is compared with more familiar archival media" by considering MRA processes in appraisal and acquisition, processing, conservation, and access.[24] Dorothy Ahlgren and John McDonald, in *Archivaria* 13 (1981), argued that electronic records archiving only makes sense when embedded into a broader strategy of collecting archival records in all media, but maintained that the significant differences between paper and digital records required distinct practices for preservation and management.[25] Ahlgren and McDonald identified the information system as the appropriate level of appraisal and acquisition, and identified these systems as consisting of electronic data as well as various code books, reports, policies, and other records that explained the structure of the data and its significance in the policies, operations, and decision making of the larger organization.[26] McDonald summarized this position in a subsequent

22 Michael E. Carroll, "The Public Archives of Canada's Experience in Establishing a Machine Readable Archives," *Canadian Archivist* 2, no. 5 (1974): 53–4, 59.

23 Jay Atherton, Richard Huyda, Leo LaClare, Claude Le Moine, Betty May, Dave Newton, Lynn Ogden, and Hugh Taylor, "Archives 2002," *Canadian Archivist* 2, no. 3 (1972): 18.

24 Harold Naugler, "The Machine Readable Archives Division of the Public Archives of Canada," *Archivaria* 6 (Summer 1978): 176. For an overview of Naugler's career, see John McDonald and Sue Gavrel, "Harold Naugler, 1942–1992," *Archivaria* 34 (Summer 1992): 298–99.

25 This was a standard defence of Taylor's introduction of media divisions. See Taylor, "Canadian Archival Literature Revisited"; Andrew Birrell, "The Tyranny of Tradition," *Archivaria* 10 (Summer 1980): 249–53. The most persistent and vehement critic of the media divisions was Terry Cook in his articles "Tyranny of the Medium," *Archivaria* 9 (Winter 1979–80): 141–49, and "Media Myopia," *Archivaria* 12 (Summer 1981): 146–57.

26 Dorothy M. Ahlgren and John McDonald, "The Archival Management of a Geographic Information System," *Archivaria* 13 (Winter 1981–82): 59–65.

article in *Archivaria* 20 (1985), stating that "appraisal, the heart of the archival programme, must address all of the various physical forms that comprise a system and must be seen as the driving force behind decisions regarding the acquisition, preservation, and subsequent dissemination of individual stages of systems."[27] MRA writers, then, emphasized that digital records are distinctive and require their own processes, but that their acquisition should be fully integrated with other media, reflecting the broader goals of the appraisal program and in keeping with the resources of the institution.

In 1984, Naugler provided significantly more detail and nuance in his UNESCO Records and Archives Management Programme (RAMP) report and guideline on *The Archival Appraisal of Machine-Readable Records*. Naugler emphasized the unique properties of digital records, focusing particularly on their fluidity and interactivity:

> The information is accessible, interpretable, manipulable, and transmittable only by automated or electronic means. Information of this type does not exist as a defined and static set of data frozen in time on a specific physical medium, but should be viewed as a dynamic entity having certain organic properties being composed of unique, fundamental, and discrete bits of information or data elements which can be rearranged, changed, manipulated, merged, or deleted in order to generate a set of information on demand.[28]

Naugler's juxtaposition of frozen data on traditional media with dynamic electronic data was intended to highlight a distinctive strength of digital archives, a characteristic to be protected and preserved, not a problem to be solved. Electronic records were not simply more compact than traditional records but were also more flexible in their uses. Naugler explained that electronic records came in many forms, such as simple (or flat) statistical sets, complex relational databases, and "automated office information" that included "correspondence, reports, memoranda and other documents" often transferred in the form of "word processing diskettes." While he acknowledged that in many cases such records could be printed and filed, he noted that they might also be "used exclusively in a machine-readable form through a telecommunications network." Naugler expressed concern that using print copies as a justification for destroying digital originals overlooked the significance of keeping electronic records in their native form so as to understand "the operations of the institution from an administrative and historical perspective."[29]

27 John McDonald, "Scheduling Data in Systems: Three PAC Pilot Projects," *Archivaria* 20 (Summer 1985): 244.

28 Harold Naugler, *The Archival Appraisal of Machine-Readable Records: A RAMP Study with Guidelines* (Paris: United Nations Educational, Scientific and Cultural Organization, 1984), 14.

29 Ibid., 54.

Naugler split appraisal into two distinct processes. The first process, which Naugler called content appraisal, followed conventional appraisal principles of the day, derived from Schellenberg, emphasizing legal, evidential, and informational values for primary and secondary users. The second appraisal process, which Naugler called technical appraisal, considered hardware and software dependencies, the size of the data set, the complexity of the data architecture, and any other technical considerations that could affect the processing, preservation, and accessing of the data – and that determined the cost of archiving. Naugler explained that these costs are part of the assessment of the value of the records relative to the mandate of the archives and the resources available. As I suggest in my next article, Naugler's approach to appraisal is strikingly similar to approaches developed by current digital archivists.[30]

Current digital archivists would also find familiar the insistence of many MRA writers, including Carroll, Naugler, and McDonald, that electronic records should be appraised early and acquired as soon as possible, to make it more likely that supporting documentation (including information about the records as well as their use within the organization) could be collected, and in recognition of the fragility of magnetic media and the risks of format obsolescence. Carroll, in *The Canadian Archivist* in 1974, described media and format migration strategies that balanced costs, longevity, and functionality in a way that would seem familiar to digital archivists today. Perhaps most striking is the way that Carroll almost, but not quite, characterizes this as risk management:

> This archiving system offers no guarantee that 100% of the data will be retained over a ten year period. We can only talk in terms of minimizing the possibility of losing data permanently and maximizing the possibility of recovery should loss of data occur.[31]

Carroll and other MRA archivists characterized their work as interdisciplinary, though again without using that specific term. Carroll noted that "ideally, we would want a computer-archival expert but such a combination is rare, if not unavailable." Barring that, the PAC MRA Division looked to hire computer experts with broad experience as well as archivists with "statistical background, some training with one of the social sciences, and with some

30 Of course, current appraisal literature eschews Schellenberg in favour of macroappraisal and other forms of function-based appraisal. See, for example, Courtney C. Mumma, Glenn Dingwall, and Sue Bigelow, "A First Look at the Acquisition and Appraisal of the 2010 Olympic and Paralympic Winter Games Fonds: or, SELECT* FROM VANOC _Records AS Archives WHERE Value="true";" *Archivaria* 72 (Fall 2011): 93–122.

31 Carroll, "Establishing a Machine Readable Archives," 57.

programming experience in one of the social science programming packages."[32] Naugler, writing after the PAC MRA Division had been in operation for several years, noted that "while several MRA staff members have history degrees with some emphasis on qualitative methodology, most have received their educational training in political science, economics, sociology, and other social science disciplines which make use of the computer to undertake quantitative analysis."[33] In this, Naugler sounded a theme voiced previously by Hugh Taylor, who, as a manager at PAC, suggested that the archival profession "might well benefit from the admission … of those who have graduated in degrees other than history, and might include business administration and the social sciences."[34]

One early hiccup had to do with the lack of a relationship between PAC archivists and the technology and data managers in government agencies. Carroll, the first MRA Division director and an avowed traditionalist, stated his intention to build upon "our past record of success" with paper records, drawing on "our established contacts" among records managers. Carroll believed "the data processing people" simply "provide a service" with no role in the management of the records.[35] On this point, he could not have been more wrong, an error well realized by the time Naugler wrote for *Archivaria* in 1978. Indeed, by this point Naugler worried that this initial strategic error had been compounded over the years and had led to wariness between the archival and IT professions. "Several problems have arisen in connection with the scheduling of machine readable records," noted Naugler. "First, many departmental managers do not have training in the EDP [electronic data processing] field and are therefore unfamiliar with the medium. Second, many do not have control over machine readable records in their departments." Naugler noted that those who do have control over these records "are somewhat suspicious of our intentions, knowing very little about the PAC and even less about MRA."[36] Subsequent articles and reports agreed that electronic records archivists must establish partnerships and alliances broadly with record users and IT specialists.[37]

32 Ibid., 59.

33 Naugler, "Machine Readable Archives Division," 178.

34 Hugh A. Taylor, "Information Retrieval and the Training of the Archivist," *Canadian Archivist* 2, no. 3 (1972): 34.

35 Carroll, "Establishing a Machine Readable Archives," 55.

36 Naugler, "Machine Readable Archives Division," 177.

37 This is a major theme in the literature, among PAC MRA Division archivists and more broadly. See, for example, Richard M. Kesner, "Automated Information Management: Is There a Role for the Archivist in the Office of the Future?" *Archivaria* 19 (Winter 1984–85): 162–72; Jay Atherton, "From Life Cycle to Continuum: Some Thoughts on the Records Management–Archives Relationship," *Archivaria* 21 (Winter 1985–86): 43–51; Sue Gavrel, "Preserving Machine Readable Archival Records: A Reply to John Mallinson," *Archivaria* 22 (Summer 1986): 153–55; Barbara Lazenby Craig, "Meeting the Future by Returning to

A distinct MRA philosophy of archiving emerges from these writings, a philosophy whose particulars might elicit agreement from digital archivists today. MRA archivists viewed their work as fundamentally rooted in archival theory, with specialized elaborations required by the characteristics of digital records and digital media. Nonetheless, they valued collaboration and what today would be called interdisciplinarity, believing that their work benefited from diverse perspectives, as well as being aware that they required co-operation with multiple stakeholders, and not just records managers. They were sensitive to the multiplicity of systems, software, and record types, including simple flat files as well as complex relational databases, data sets, and office documents. Obvious differences in media, format, and characteristics of electronic records compelled their acceptance of media specialization, even in the face of protests against the balkanization that resulted from such media specialization.[38]

Messengers

To use the word "media" in Canada in the 1960s and 1970s – or "computer" or "automation" – was to participate in debates that went far beyond the archival profession. These concepts were linked together as electronic media, not least by Marshall McLuhan, the University of Toronto professor whose study of media effects had vaulted him from academia into popular culture and corporate boardrooms. McLuhan's *Understanding Media*, published in 1964 but building on insights from his earlier works, particularly *The Gutenberg Galaxy* (1962), *Report on Project in Understanding New Media* (1960), and *The Mechanical Bride* (1951), made media theory a primetime concern in North American culture, often distilled down to some of McLuhan's catchphrases such as "the global village," his division of media into "hot" and "cool" and especially his enigmatic statement "the medium is the message."

Despite this cultural cachet, few archivists cited McLuhan in their work. Those who did could be curiously dismissive, perhaps disliking the faddishness of McLuhan's popularity.[39] Hugh Taylor, the very prominent exception

the Past: A Commentary on Hugh Taylor's Transformations," *Archivaria* 25 (Winter 1987–88): 7–11; John McDonald, "Archives and Cooperation in the Information Age," *Archivaria* 35 (Spring 1993): 110–18; and Margaret Hedstrom, "Building Record-Keeping Systems: Archivists Are Not Alone on the Wild Frontier," *Archivaria* 44 (Fall 1997): 44–71.

38 See Cook, "Tyranny of the Medium," and Cook, "Media Myopia." See also Ahlgren and McDonald, "Archival Management of a Geographic Information System"; Ahlgren and McDonald wrote this as a response to Cook.

39 See, for example, Cook, "Tyranny of the Medium," or Greg O'Shea, "The Medium Is Not the Message: Appraisal of Electronic Records by Australian Archives," *Archives and Manuscripts* 22, no. 1 (May 1994): 68–93. Terry Cook's study of PAC head and McLuhan contemporary W. Kaye Lamb does not reference McLuhan but does note that Lamb looked

to this rule, agreed that McLuhan was not well received in archival circles. Taylor, describing reaction to "The Media of the Record: Archives in the Wake of McLuhan," his detailed application of McLuhan to archives, recalled that "no one was interested in publishing this paper." It eventually appeared in *Georgia Archives*, but only because Taylor was given carte blanche as vice-president of the Society of American Archivists – and so "space was found for a subject which at that time stirred very few hearts in our profession." Taylor also reminisced about his recruitment of Barrington Nevitt, one of McLuhan's collaborators, as keynote speaker at an ACA conference – and recalled the agonizing fallout when "the lead balloon fell with a crash." Though unrepentant, Taylor admitted, "Thereafter I was more circumspect with my McLuhanisms."[40] Reflecting back in the wake of archival postmodernism, Taylor opined that McLuhan's work remained relevant because McLuhan, unlike Foucault or Derrida, operated at the same level of abstraction as archivists, seeking to understand not specific instances of content but carriers and forms of content.[41] McLuhan's most famous aphorism – "the medium is the message" – appears in several of his published works and many times in his archives, and its meaning was not entirely stable.[42] Nonetheless, looking back on McLuhan's work today, it is hard to quibble with the very archival insight that the meaning of a work is as much a function of context, including the media of transmission, as it is of authorial intent or the configuration of a specific set of symbols. It took archivists a few years to catch up, but we eventually got there: the title of Joan Schwartz's prizewinning article in *Archivaria* 40 (1995), "We Make Our Tools and Our Tools Make Us," references an expression whose genealogy traces back to McLuhan.[43]

to sound, scholarly history as a "bulwark against the negative effects of mass communications," which Lamb called "the new ignorance." It is safe to say that Lamb was not convinced by the media theories that McLuhan promulgated in the 1950s and 1960s. See Terry Cook, "An Archival Revolution: W. Kaye Lamb and the Transformation of the Archival Profession," *Archivaria* 60 (Fall 2005): 193.

40 Hugh Taylor, "Commentary on 'The Media of the Record,'" in Cook and Dodds, eds., *Imagining Archives*, 73.

41 Hugh Taylor, "Commentary on 'My Very Act and Deed,'" in Cook and Dodds, eds., *Imagining Archives*, 145.

42 McLuhan was highly tolerant of ambiguity in his writing, which he intended to provoke thoughts in his readers as much as to deliver his own ideas to readers. W. Terrence Gordon provides a fascinating discussion of McLuhan's varied uses of the phrase "the medium is the message"; see Gordon, *Marshall McLuhan*, 173–79.

43 Joan M. Schwartz, "'We Make Our Tools and Our Tools Make Us': Lessons from Photographs for the Practice, Politics, and Poetics of Diplomatics," *Archivaria* 40 (Fall 1995): 40–74. On the genealogy of the phrase, see *McLuhan Galaxy* (blog), "We Shape Our Tools and Thereafter Our Tools Shape Us," 1 April 2013, https://mcluhangalaxy.wordpress.com/2013/04/01/we-shape-our-tools-and-thereafter-our-tools-shape-us.

McLuhan tried to signal in very broad terms that the shift from printed text to electronic communications was more than just a shift of medium: it was a fundamental recalibration of culture, and of humanity, within the electrified global West. Articles from MRA archivists do not generally make such grand claims, but there were a number of contemporary voices who *did* try to signal that something bigger was going on than the creation of a faster calculator or better typewriter. Perhaps the most important of these were Jay Atherton and Hugh Taylor. As we have seen, Atherton and Taylor played important roles in early experiments with digital archiving at PAC: Atherton led the experimental use of computers in processing analog records, while Taylor was responsible for creating and overseeing the operations of the MRA Division in its formative period. Both men were senior managers at PAC who absorbed, articulated, and expressed key aspects of contemporary digital archival theory and practice.

As noted above, Betsey Baldwin has suggested that Atherton's enthusiastic hyping of early archival automation may have contributed to wariness toward, and perhaps even a backlash against, digital archival practice at PAC. This can obscure Atherton's real contributions in posing and musing upon the timely question "How can [computers] be applied to the work of an archives?"[44] If some of Atherton's rhetoric confirmed society's greatest fears about automation – including the idea that machines could "eliminate human error" and perhaps replace human workers – he remained committed to identifying the proper place for bringing computers into archival practice.

In 1970, Atherton argued that computers were tools that could no more threaten human dignity than could "the wheel, the steam engine, or the electric generator." He placed computers within a longer history of Western technologies, identifying automation as merely "the third phase of the industrial revolution," following upon mechanization and the assembly line.[45] Viewed in this historical context, Atherton located the benefit of computer-assisted automation in the capacity for computers to receive real-time feedback and make adjustments to operations on the fly – a remarkably realistic assessment of the limits and the potential of computerization, no doubt informed by his experience with mainframe computing in the 1960s.[46] Atherton continued to think over the relationship between archives and computers as he witnessed the spread of computer usage within the public service and the rise of microcomputers in the 1970s and 1980s. Atherton's insight that the fundamental strength

44 Atherton, "Application of Mechanization," 3.

45 Atherton, "Automation and the Dignity of the Archivist," 56, 57.

46 In a contemporary survey, the Canadian government found that practical experience with computers correlated with realistic assessments of their value and usage. See Department of Communications, *Survey of Public Attitudes towards the Computer* (Ottawa, ON: Information Canada, 1973).

of computing lay not in simple speed (Haigh's "chromium-plated tabulator") or the ability to think (as in fictions like Kubrik's *2001: A Space Odyssey*, released in 1968), but rather in the ability to receive feedback and respond, led him to value, like Naugler, the dynamic interactivity of computer records. This insight is foundational to Atherton's "From Life Cycle to Continuum" in *Archivaria* 21 (1985).

This article is remarkable on several counts. It is usually remembered for Atherton's early use of the term "continuum" to de-emphasize distinctions between the work of archivists and records managers, and for the article's distinctly digital underpinnings. Atherton does not focus particularly on electronic records issues in the article, but his ideas are steeped in digitality. His observations stem from his own experiences with computers, including the difficult automation projects of the 1960s, as well as his observations of the impact of computers on government record making and keeping. Like Naugler, he neither condemned the spreading use of computers nor sought to freeze digital records into one particular configuration. Instead, he suggested that archivists and records managers must update their practices, procedures and, most importantly, their thinking to come to grips with the new reality that these records represent. As a first principle, Atherton accepted that "the nature and volatility of the recorded data" must be preserved; "application of schedules [must become] a continuous process, built into the system itself, because of the fluidity and continuity of the creation and re-creation of the data."[47] This fluidity and continuity, then, was an inherent, necessary, and valuable aspect of digital records, not something to be controlled, contained, and frozen.

Atherton's work attests to the influence of McLuhan, but it seems that Atherton preferred his McLuhan second-hand.[48] Not so for Hugh Taylor, as we have already seen. Taylor's debt to McLuhan and other scholars associated with the Toronto School of Communication, such as Harold Innis, Edmund Carpenter, and Derrick de Kerckhove, is often noted regarding the string of well-known articles he wrote after he left PAC in 1977, but it is also apparent in earlier articles published in *The Canadian Archivist*. Taylor was influenced stylistically by McLuhan as well, incorporating many of McLuhan's metaphors (such as information implosions, hot and cool media, and technologies as prostheses) as well as some of McLuhan's stylistic quirks, such as his use of deliberately controversial and ambiguous "probes" to provoke reaction and stimulate discussion. Like McLuhan, Taylor wanted his writing to incubate ideas in his readers rather than simply communicate his own point of view.

47 Atherton, "From Life Cycle to Continuum," 47.

48 Atherton's early articles cite McLuhan's ideas but attribute them to others, specifically William H. Desmonde (see Atherton, "The Application of Mechanization," 3n1n2) and Leon Bagrit (see Atherton, "Automation and the Dignity of the Archivist," 57–58n4).

"Transformation in the Archives," published in *Archivaria* 25 (1987), represents a high-water mark for Taylor's creative engagement with McLuhan.[49]

Like McLuhan, Taylor made predications that seem prescient today, not simply because he was right but because he understood the broader implications for archives and for society. "Transformation in the Archives" includes passages that point toward the evolution of computers into cheap, ubiquitous "hand tools," analogous to the evolution of handsaws and drills from the massive machines of the past. More impressive than this predication of the shrinking size and cost of computers (Moore's Law had been set forth in 1965, and others had made similar predictions before him) was Taylor's predication of the effect, which he saw as compounding difficulties in determining "the original" and eroding "the sanctity of the authorized, cannonical text."[50] In the same article, Taylor describes what he calls "docking," which was destined to become known as "fuzzy search" in the 1990s. It has become standard functionality in search engines today. This is significant not because Taylor predicted the development of the technology – again, computer specialists were there before him – but because he correctly saw that it represented a departure from traditional methods of information discovery.[51] Taylor predicted the rise of "networks for information exchange" among user "fraternities" or "tribes," which Taylor saw leading to "a more collective approach to re-search." Here Taylor seems to have foreseen social media – although once again computer specialists, going back to Vannevar Bush in "As We May Think" in 1945, had long pursued this as one of several holy grails.[52] It is more signficant to note that Taylor accurately predicted that this would generate expectations for archivist-user co-operation in building new paths to information discovery, leading to the formation of "tribes" of users that seem very similar to what Elizabeth Yakel and Deborah Torres, following Jeannette Bastian, would call "communities of records."[53]

49 This piece has its twin in another article by Taylor, published the following year; see Hugh Taylor, "My Very Act and Deed: Some Reflections on the Role of Textual Records in the Conduct of Affairs," *American Archivist* 51, no. 4 (Fall 1988): 456–69. Read together, the articles offer a potent application of McLuhan's ideas within archival studies.

50 Hugh A. Taylor, "Transformation in the Archives: Technological Adjustment or Paradigm Shift?" *Archivaria* 25 (Winter 1987–88): 16.

51 Taylor, "Transformation," 21.

52 Taylor, "Transformation," 23; Vannevar Bush, "As We May Think," *Atlantic Monthly* (July 1945), accessed 6 September 2016, http://www.theatlantic.com/magazine/archive/1945/07/as-we-may-think/303881.

53 Jeannette Allis Bastian, *Owning Memory: How a Caribbean Community Lost Its Archives and Found Its History* (Westport, CT: Libraries Unlimited, 2003); Elizabeth Yakel and Deborah A. Torres, "Genealogists as a 'Community of Records,'" *American Archivist* 70, no. 1 (Spring/Summer 2007): 93–113. Taylor, like Yakel and Torres, cites genealogists as his example of a user "tribe."

As with Atherton, Taylor's work includes elements shared with the MRA writers cited above. Along with Carroll, Taylor saw that digital technologies were redrawing the nature of access to and use of archives, observing that "seated at a terminal the user stays put, the information [i.e. finding aids] flies past and, if the records to be retrieved are automated, they will fly past as well." Unlike Carroll, who downplayed the significance of this reversal, Taylor celebrated the obviously democratizing effect of this kind of access. Taylor perceived and emphasized the ways that this would profoundly change the relationship between users and archives.[54]

Like Atherton and the MRA writers, Taylor understood the interactivity of digital archives to be fundamental to their value. MRA archivists maintained that machine-readable records must be kept in their machine-readable state to be useful.[55] Atherton made interactivity central to his conception of the records continuum. Taylor would go further, building upon Naugler's suggestion that the interactivity of the digital record represents a new way to value and use records, making them valuable in ways that have no equivalent in paper records. Ever the optimist, Taylor hoped this interactivity might compensate for the widespread loss of information resulting from the minimal intake of digital records by archives: "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."[56]

Finally, Taylor, like Atherton and the MRA writers, correctly perceived the need to bring new bodies of knowledge into archival practice and into archival theory, though Taylor expressed this more eloquently than most. Taylor declared that an archivist "must learn the language of the computer like his native tongue,"[57] noting that "we must learn to master technology and spring ourselves loose for creative activity that only a human being and a thoroughly professional archivist can accomplish."[58] This was a theme Taylor returned to repeatedly during the 1970s and 1980s, eventually drawing him into debates around the relationship between archives and history, in which he was often cited alongside Richard Kesner, an American who emerged as a key voice on digital archives in Canada through his *Archivaria* publications and his 1983 ACA keynote address.

Kesner, like Atherton and Taylor, started from the proposition that digital technologies represented not incremental but massive change to information

54 Taylor, "Transformation," 22.

55 Although he built on their insights, Taylor disliked the term "machine readable archives," which he felt obscured the true nature of electronic media; see Taylor, "My Very Act and Deed," 466.

56 Taylor, "Transformation," 17.

57 Taylor, "Information Retrieval," 33.

58 Atherton et al., "Archives 2002," 17.

creation, management, and use. Unlike Atherton and Taylor, who did most of their work during the mainframe/mini-computer era and had limited or non-existent personal experience with computers,[59] Kesner, in addition to reading widely, willingly experimented with new microcomputing technologies, reporting on his findings. In *Archivaria* 12 (1981), Kesner and Don Hurst personally tested the microcomputers that had been developed during the 1970s, including cheap and readily available consumer technology such as the "currently popular Radio Shack TRS-80, the Apple II Plus, and the Atari."[60] Like Atherton in his pair of early articles on automation, Hurst and Kesner explored how computers could be used in archival work, rather than focusing, like the MRA writers, on the archiving of digital records.

Hurst and Kesner provided cost information ($3,200 to set up an Apple II Plus); assessed the user-friendliness of the systems; and tested one available software package (the Microcomputer Archives and Records Management System produced by Archives of Appalachia). Their experience as microcomputer users shows in many ways, but especially in their careful positioning of the benefits of automation in staff training (allowing staff to gain comfort and experience with technology) and new possibilities created through automation (such as the use of network technologies to disseminate information about holdings), rather than promising reduced costs or straightforward process efficiencies.

Archivaria 19 (1984) included Kesner's keynote from the 1983 ACA conference. In this article, Kesner shifted his focus from microcomputers in archives to their use in records creation. His argument followed from his title: "Automated Information Management: Is There a Role for the Archivist in the Office of the Future?" Despite some positive signs, Kesner despaired that archivists were not keeping up with new technologies. Kesner observed "EDP [electronic data processing] and telecommunications products are altering the way people create, distribute, file and retrieve information," noting that "older paper-based modes of decision-making have atrophied to be replaced by electronic pathways of information exchange." Kesner's observation that "worker reliance on a micro will influence the way he stores and processes information as well as the means by which he will pass the data on to others" was fundamentally sound, in line with a McLuhan-ish focus on the interplay of media and content, and with traditional archival sensitivity to the ways that

59 Taylor wrote in 2000, "I have to admit to operational illiteracy where computers are concerned and I never got further than pen and ink"; see Taylor, "Commentary on 'Transformation,'" in Cook and Dodds, eds., *Imagining Archives,* 126. Atherton's access to computers when working on his computerized finding-aid project was limited to preparing data and discussing its processing with computer operators at the Canada Revenue Agency.

60 Don Hurst and Richard M. Kesner, "Microcomputer Applications in Archives: A Study in Progress," *Archivaria* 12 (Summer 1981): 9.

information systems influence information use, including decision making.[61] So far so good. But Kesner then veered into speculation of whether traditionally trained archivists had the conceptual tools to deal with this "electronic office." Kesner recommended replacing the traditional historical education of archivists with education in computers, telecommunications, and systems design. He called for "the evolution of the archivist into an information services specialist" who would be embedded directly into organizations, the better to guide them in electronic recordkeeping requirements and processes that he predicted, correctly, would be pushed down to the level of the individual worker.[62] In *Archivaria* 18 (1984) – one issue earlier – Hugh Taylor had similarly argued for the embedding of archivists into administrative units. Taylor, with his customary knack for turns of phrase, had despaired of archivists being transferred to "the historical shunt" instead of being embedded into organizations, where he felt they belonged.[63]

Archivaria in the 1980s differed from the journal of today. In addition to the familiar articles and reviews, the journal included a lively front section of editorials and letters that was occasionally complementary or playful, but could be surprisingly aggressive and negative. Authors responded to their critics, fuelling debates that might run over several issues. Taylor's "historical shunt" folded into a larger debate over the "historian-archivist," itself perhaps the longest and most complex of these debates, with people variously taking positions on the proper training of archivists, their role in the modern or electronic office, their professional identities, and so on.[64] Contributions from Terry Cook and General Editor Tom Nesmith in *Archivaria* 19 associated Taylor's position with Kesner's,[65] provoking separate responses from

61 Richard M. Kesner, "Automated Information Management: Is There a Role for the Archivist in the Office of the Future?" *Archivaria* 19 (Winter 1984–85): 165–66. This point has often been made with reference to paper-based recordkeeping systems. See, for example, Terry Cook, "Paper Trails: A Study in Northern Records and Northern Administration, 1898–1958," in *For Purposes of Dominion: Essays in Honour of Morris Zaslow*, ed. K.S. Coates and W.R. Morrison (North York, ON: Captus University Publications, 1989), 13–35; or Bill Russell, "Indian Department Headquarters Records, 1844–1861: A Case Study in Recordkeeping and Archival Custody," *Archivaria* 75 (Spring 2013): 187–223. To make this same point in "My Very Act and Deed," Taylor cited Cook, "Paper Trails," and an earlier piece by Russell; see Bill Russell, "The White Man's Paper Burden: Aspects of Records Keeping in the Department of Indian Affairs, 1860–1914," *Archivaria* 19 (Winter 1984–85): 50–72.

62 Kesner, "Automated Information Management," 170.

63 Hugh A. Taylor, "Information Ecology and the Archives of the 1980s," *Archivaria* 18 (Summer 1984): 25–37.

64 Laura Millar takes a look back at this debate in "Explaining Ourselves."

65 Cook, "From Information to Knowledge"; Tom Nesmith, "Toward the Discipline of Archives," *Archivaria* 19 (Winter 1984–85): 16–20. Nesmith returns to this analysis in an editorial two issues later; see Tom Nesmith, "Archives and the 'Circle of Knowledge,'" *Archivaria* 21 (Winter 1985–86): 25–37.

Taylor and Kesner.[66] The exchange evidently left Kesner feeling that his argument that archivists should possess practical, applied knowledge of contemporary information and communication systems had been overlooked. Instead, criticism focused on Kesner's and Taylor's arguments in favour of embedding archivists directly into organizations and the perception that Kesner and Taylor were cool toward the need for historical knowledge and skills for archivists (an interpretation that Kesner and Taylor strenuously denied).

Kesner responded by trying to bring the discussion back to the gap between contemporary computer and communications technologies and the collections and services of archival institutions, and the related gap between the skills that archivists demonstrated in managing analog materials and the skills they would need to appraise, acquire, and manage digital records. Kesner forcefully argued that electronic records posed new challenges, even when compared with other non-textual formats. He noted that computer records, unlike microfilm, audio, or video, lack standardized formats and playback equipment, and that they arrive at the archives not in final form but chaotic and raw. As in his earlier piece, Kesner declared, "If archivists do not lead the way, or indeed, even acknowledge the need for their participation in the changing information management environment, their users will seek assistance elsewhere."[67]

Kesner phrased this as a prediction, but he could just as easily have argued from recent history. Carroll had suggested in his 1974 article, discussed above, that the Public Archives of Canada was not innovative in establishing its MRA Division, citing the founding of an MRA repository in the university sector 15 years earlier. Carroll may have been thinking of the Inter-University Consortium for Political and Social Research (ICPSR), founded in 1962.[68] Margaret Adams suggests that it was the reluctance of US NARS to acquire punch cards that led to the founding of ICPSR, in addition to even earlier data repositories such as the Roper Center (established in the later 1940s).[69]

The reluctance of archives like PAC or US NARS to acquire punch cards may well have been rooted in the feeling that data repository services lay beyond the mandate of a public archives. Thus, there may have been little regret over the founding of dedicated data repositories to fulfill this function. The failure of archives to exploit the unique affordances of digital media

66 Hugh Taylor, "Through the Minefield," *Archivaria* 21 (Winter 1985–86): 180–85; Richard M. Kesner, "Whither Archivy? Some Personal Observations Addressed to Those Who Would Fiddle While Rome Burns," *Archivaria* 20 (Summer 1985): 142–48.

67 Kesner, "Whither Archivy?," 143.

68 ICPSR, About: History, "ICPSR: The Founding and Early Years," accessed 6 September 2016, https://www.icpsr.umich.edu/icpsrweb/content/about/history.

69 Adams, "Punch Card Records," 196; Cornell University, Roper Center for Public Opinion Research, About: Center History, "History of the Roper Center," accessed 6 September 2016, http://www.ropercenter.uconn.edu/about-the-center/history-of-roper-center.

in managing and providing access to archival holdings, however, resulted in researchers themselves performing what can only be described as digital archival work. *Archivaria* 17 (1983) and 19 (1984) include contributions from historians Peter A. Baskerville and Chad M. Gaffield on the Vancouver Island Project, their SSHRC-funded effort to describe scattered, local collections of Vancouver Island records, bring these descriptions together, and make them uniformly discoverable via an online database.[70] At the Canadian Archives Summit in 2014, Gaffield looked back on the project: "To our surprise, archivists reacted to the announcement of our intentions with scepticism at best and sometimes hostility."[71] Published comments on the project from Richard Berner and Gordon Dodds in *Archivaria* 18 (1984) bristle at the intrusion of historians into archival work and upbraid them for perceived gaffes in their use of archival terms and concepts.[72] Gaffield ruefully noted that calling their online database "an 'automated archivist' … undoubtedly did not help smooth our engagement with the archival community."[73] Regardless, the defensive reaction of archivists to the Vancouver Island Project, like the reaction against Kesner, perhaps reveals a creeping anxiety around computers and archives.

Terry Cook provided a more measured response in *Archivaria* 20 (1985). Cook described the Vancouver Island Project as "one of the most interesting recent developments on the Canadian archival scene," comparing it favourably to those other projects and articles (examples of which he does not cite, though he might well have been referring to the work of Hurst and Kesner) that "degenerate into the nitty-gritty of software and hardware comparisons, or worse into preachy pronouncements that archivists must wake up and smell the roses, for the age of the computer is HERE, and we must do SOMETHING ABOUT IT!"[74]

Unfortunately, Cook did not then note that some Canadian archivists had been "doing something about it" for decades, as we have seen. Previous to Hurst and Kesner's application of microcomputers to archival work in the early 1980s, PAC archivists had been experimenting with computer-aided access to paper archives since the 1960s and archiving digital records since the early

70 Peter A. Baskerville and Chad M. Gaffield, "The Vancouver Island Project: Historical Research and Archival Practice," *Archivaria* 17 (Winter 1983–84): 173–87; Baskerville and Gaffield, "Provenance and the Vancouver Island Project," *Archivaria* 19 (Winter 1984–85): 7–8.

71 Chad Gaffield, "Making an Archival Golden Age in the Changing World of Digital Scholarship," *Archivaria* 78 (Fall 2014): 181.

72 Gordon Dodds, "Provenance Must Remain the Archival Bottom Line," *Archivaria* 18 (Summer 1984): 4–7; Richard C. Berner, "Vancouver Island Project Fails to Grasp the Significance of Provenance," *Archivaria* 18 (Summer 1984): 7–8.

73 Gaffield, "Making an Archival Golden Age," 181.

74 Terry Cook, "Archives, Automation and Access: The Vancouver Island Project Revisited," *Archivaria* 20 (Summer 1985): 231–32. Incidentally, this quotation nicely foreshadows how Terry would use capital letters in emails to friends and colleagues. :-)

1970s. Cook was not alone in ignoring the MRA and other archivists' experience with and writing about computers. As I explore in "How Soon Is Now?" archival responses to digital records in the 1980s and 1990s are founded on a surprising tendency to overlook, or at least minimize the importance of, this longer history.[75]

Taylor's implementation of the MRA and other media divisions in the PAC Archives Branch had been controversial. In 1978, Taylor left PAC to become Nova Scotia's provincial archivist. In December 1986, the MRA Division was folded into the Federal Archives Division to make a new Government Archives Division. As Terry Cook and Eldon Frost explained in 1993, the new structure was intended to address the perception that Taylor's media divisions had prioritized media over context, or provenance.[76] The new Government Archives Division made provenance the guiding principle of all activities, with portfolio archivists responsible for records in paper and digital media. Though Cook and Frost brimmed with optimism when describing this development, they nonetheless cautioned that "readers should not infer from what has been said that the National Archives thinks it has solved all problems of dealing with electronic archival records. Hardly." Looking back on the ongoing, continuous digital work of the 1970s and early 1980s, followed by the sporadic, halting digital archiving of the later 1980s and 1990s, it is not hard to agree with this assessment.[77]

75 In the early 1990s, Cook would suggest that the work of MRA archivists was bravely innovative but not exactly foundational to digital archiving in the 1980s and 1990s. See Terry Cook, "Easy to Byte, Harder to Chew: The Second Generation of Electronic Records Archives," *Archivaria* 33 (Winter 1991–92): 202–16; and Terry Cook and Eldon Frost, "The Electronic Records Archival Programme at the National Archives of Canada: Evolution and Critical Factors of Success," *Electronic Records Management Program Strategies*, *Archives and Museum Informatics Technical Report* 18 (1993): 38–47.

76 The Government Archives Division described by Cook and Frost in "The Electronic Records Archival Programme" was structured along the lines described by Cook in "Tyranny of the Medium" and "Media Myopia." Primary responsibility for records in all formats was assigned to portfolio archivists, while a small cadre of digital archivists and technicians offered support.

77 I hasten to add that the elimination of the MRA Division as a distinct unit was not the only reason that the National Archives of Canada (NAC) and other Canadian archives struggled with the challenge of digital archives in the late 1980s and 1990s. Program review under the Liberal government of Jean Chrétien decimated records management throughout government and left NAC struggling to meet its operational requirements. Moreover, I would again tie the history of Canadian digital archives back to the history of digital culture and stress that the digital archiving challenge itself changed at this time, on account of the mainstreaming of desktop computing and the proliferation of hardware, operating systems, and applications, ushering in our current era of technological diversity and rapid obsolescence. Could NAC's MRA program have risen to these new challenges? The experience of the Danish National Archives, where an MRA-style system continued to be funded and to evolve with the times, suggests that it might have. See Eirikur Guðmundsson, ed. *Symposium about the Transfer, Preservation of and Access to Digital Records, Based on the Danish Experiences*, *Danish*

Conclusions

The predisposition of MRA archivists to discuss their processes and collections in relation to mainstream archival practice has contributed to a propensity to view computer records from this era through the lens of analog archival practice. Despite increasingly urgent calls from a small minority of non-MRA archivists who had, like Taylor, deeply pondered issues of technology and culture or who, like Atherton and Kesner, had direct experience with computer technologies, Canadian archivists were by and large inclined neither to consider electronic records to be important acquisitions nor computers to be part of the archival tool set.

As we have seen, Canadian archivists nonetheless had made use of computers in both of these ways by the 1970s. Atherton's experiments with computerized finding aids in the 1960s represent one of the earliest attempts in Canada to use computers as a tool in the management of archival holdings. This work preceded efforts by Hurst and Kesner to explore how microcomputers might be used by archives, and those of the Vancouver Island Project team of Baskerville and Gaffield to explore how a scattered record set – in this case, records related to the history of Vancouver Island – might be virtually united in a database.

In terms of the acquisition of computer records, my reading of *The Canadian Archivist* and *Archivaria* has not turned up a history of archival collecting of these records prior to the formation of the Public Archives of Canada's Machine Readable Archives Division in the early 1970s. In this instance, my reliance on the published record misrepresents the reality of Canadian archival holdings. Canadian archives hold computer records that predate this era, primarily in paper-based formats such as computer cards, paper tape and similar outputs (and inputs) from mainframe computers in the 1950s and 1960s. These records were appraised, acquired, processed, and described along with textual records. Since they are on paper or card supports, they do not have distinct preservation requirements, and they tend to be filed and boxed along with everything else.[78]

National Archives, 30–31 October 2008 (Copenhagen: Danish National Archives, 2009). On the loss of funding for recordkeeping in the Canadian government in the 1990s, see Terry Cook, "Macroappraisal in Theory and Practice: Origins, Characteristics, and Implementation in Canada, 1950–2000," *Archival Science* 5, no. 2–4 (2005): 101–61.

78 For example, among the 40 metres of records in the Confederation Life Insurance Company Fonds at Library and Archives Canada are more than a dozen files that deal with computer usage from the 1950s through to "decentralizing the data processing function" in the mid-1980s. Records include IBM and Confederation Life publications, as well as photos and computer programs or outputs. The computer-derived records are not identified as separate media in the fonds-level description of the records. See Library and Archives Canada, Confederation Life Insurance Company Fonds (1800–1994), boxes 48, 49, and 131.

Canadian archives *do* hold records of early computing, but the lack of differentiation of these records from other paper-based records means that they are not always surfaced in archival descriptions.[79] The preservation of these records is incomplete and scattered, but could contribute to a history of computer usage in Canada.[80] What has not been archived from this era, however, are electronic and magnetic computer records. To my knowledge, and based on my reading of *The Canadian Archivist* and *Archivaria*, the preservation of electronic and magnetic computer records did not begin in Canada prior to the founding of the PAC MRA Division. When it did begin, early MRA managers and authors like Michael Carroll and even Harold Naugler, on occasion, de-emphasized the unique features of digital records to highlight continuities with textual records.

This perspective tended to undercut the significant differences between digital and analog media. Michael Mahoney suggests that "what makes the history of software hard" is, among other factors, that software is executable.[81] In Mahoney's opinion, the history of software should be informed by actual use of the software. If a digital historian is working only from outputs or recorded programming code, it is difficult to understand the experience of computer usage.[82] This argument can be, should be, and *was* extended from software to content. We have seen that Harold Naugler, in his 1984 RAMP report, was aware of a range of computer applications, including those, like databases and multimedia records, that required dynamic access to preserve their meaning. Moreover, Naugler argued that even static outputs such as word-processed files should be preserved in digital form so as to represent "the operations of the institution from an administrative and historical perspective."[83] Even the first director of the PAC MRA unit, Michael Carroll, who was determined to minimize differences between analog and digital

79 Intriguingly, this is also true of later records on portable magnetic media, such as floppy disks, and on CDs and DVDs. These media are interfiled with printed textual records and represent an undescribed but, in many cases, adequately preserved record of computing during the 1980s and 1990s.

80 This is the focus of a new research project I am starting. In this project, I am looking at the history of computing in Manitoba, and at the totality of records of computing in Manitoba saved in Manitoban and other archives. My goal is to produce both a history of computing in Manitoba as well as an account of the preservation of digital culture in Manitoba from the 1950s to the present.

81 Michael S. Mahoney, "What Makes the History of Software Hard," *IEEE Annals of the History of Computing* 30, no. 3 (2008): 8–18.

82 The point can be illustrated by thinking about different eras in word-processing software. The differences between WordStar in the late 1980s, WordPerfect in the late 1990s, and Microsoft Word today are vast. Having a functional understanding *only* of MS Word could almost be considered an impediment to imagining what it was like to work in WordStar.

83 Naugler, *Archival Appraisal of Machine-Readable Records*, 54.

records, had to concede that researcher access to digital records *had* to be different, as rendering the records required computer systems that simply were not available in the PAC reading room.

Three of my four "messengers" passionately argued that it was a huge mistake to minimize differences between paper and digital records.[84] My selection of these three was somewhat arbitrary, in the sense that similar messages can be found elsewhere in *The Canadian Archivist* and *Archivaria*, but not entirely so. Hugh Taylor, Jay Atherton, and Richard Kesner were important and controversial voices at this time and on this issue. Taylor was perhaps the first in the Canadian archival literature to argue persistently for the importance of electronic media *as electronic media*. Atherton is primarily associated with his efforts to computerize archival processes through his finding-aid projects in the 1960s, but his work during the 1980s, and especially "From Life Cycle to Continuum" in *Archivaria* 21 (1985), emphasized the importance of preserving the native interactivity of digital data. It was Richard Kesner, however, whose article on "the electronic office" anchored this argument in a practical understanding of how desktop computing was changing contemporary office work and recordkeeping.

By the mid-1980s, Canadian archivists had been exposed to multiple voices arguing for the use of computer technologies by archivists as well as for the acquisition of digital records by archives. These arguments were largely ignored or actively rejected by the Canadian archival mainstream. This correlates with a lack of direct experience among Canadian archivists with computers. Since the computers of the 1960s and 1970s were expensive and required dedicated staff to operate, it is not surprising that archivists, like most Canadians, lacked exposure to them.

Ten years later, the technology was changing. In 1979, the release of VisiCalc, a cheap and user-friendly spreadsheet application, had transformed the Apple II from a hobbyist's toy to an increasingly common business tool.[85] It was the first "killer app," harbinger to a wave of progressively more user-friendly software applications that would run on increasingly cheap yet ever more powerful desktop computers. Aldus PageMaker would bring similar ease of use to desktop publishing in 1985, while Adobe Photoshop would be launched in 1989, both initially designed for the Apple Macintosh, itself launched in 1984. By the late 1980s, IBM had joined the game, flooding the business market with so-called personal computers, or PCs, that ran MS-DOS

84 This was not an issue for the Vancouver Island Project team, my fourth "messenger." This project explored the use of computers in managing archival records and was not concerned with acquisition of digital records by archives.

85 Melissa Rodriguez Zynda, "The First Killer App: A History of Spreadsheets," *Interactions* 20, no. 5 (2013): 68–72; Burton Grad, "The Creation and the Demise of VisiCalc," *IEEE Annals of the History of Computing* 3 (2007): 20–31.

along with a range of application software with similar functionalities. By the early 1990s, desktop computers had become common in many office settings, including archives, and featured libraries of ready-to-use applications such as email clients, word processors, spreadsheets, relational databases and, eventually, web browsers. Archivists, like other bureaucrats, became computer users, fundamentally changing their outlook on computers and their uses.

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