Maintaining Records in Context? Disrupting the Theory and Practice of Archival Classification and Arrangement

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ABSTRACT

The role and the associated practices of the archivist are attuned to notions of facilitation. Archivists facilitate people's engagement with the historical record by providing access to records in context: a context instantiated through archival classification, arrangement, and description. In the second of a two-part article, the author draws from the archival literature to present a historical overview of the factors that contributed to evolving notions of archival classification and arrangement from the 1960s to today. A review of the literature of this time frame provides its own context for understanding how, why, and through whose influence competing understandings and implementations of core classification ideas persist. In the process, the author highlights classification as a historically situated interpretive act, drawing attention to the implications of various disciplinary influences and analytical perspectives on the present status and future conception of, and possibilities for, the American archival profession.

KEY WORDS

Archival history, Archival records, Digital records, Archival theory and principles, Classification, Arrangement, Processing, Provenance, Original order, Context

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Archivists manage the residue, not the entirety; the remains, not the totality.

—Laura Millar[1]

The architecture of classification is a way to model an archival theory of context, while physically arranging records allows archivists to implement control in practice. The first part of this two-part article examined how a distinct body of archival classification theory and practice emerged from the nineteenth century onward, and out of which the American archival profession was born. Synthesizing the state of knowledge on the topic brought to light the significant forces that shaped the emergence of an archival understanding about classification and arrangement, and the associated places in theory and in practice where agreement or discordance arose. As Peter Horsman observes, "members of rather closed professional groups, such as archivists, are inclined to debate and disagree about the fundamentals of their profession. This phenomenon probably has to do with the striving of a professional group for power and social prestige, particularly in relation to other related professional groups."[2] As the first article substantiates, a search for a professional identity characterized the history of the American archival profession from the early 1900s to the 1960s, both drawn from and independent of the theories and practices of European colleagues and from the antecedent professions of history and librarianship.

Indeed, Luke Gilliland-Swetland characterizes this early period as one of bifurcation: one in which a cohort of archivists identified with a broader community of historian-scholars, while others viewed themselves as distinct information management professionals. This notion of identity, and the ideologies from which it drew, influenced the development of archival principles and their practical instantiation in archival work. The "humanist historian-scholar" understood provenance (writ large) as a tool in service of scholars whose methodology was attuned to the analysis of primary sources, in context, for the purposes of writing history. This model of provenance became a part of the historical manuscripts tradition in the mid-twentieth century following a brief flirtation with library principles that privileged predetermined systems of knowledge for records access and use. Following in the footsteps of Hilary Jenkinson and Margaret Cross Norton, the "expert documentary manager" was *in situ* in various governmental archives. First and foremost an archivist, duty was to the record and protecting its integrity and authenticity. In this instance, provenance was associated not with the facilitation of historical research but with establishing and maintaining the archival (read "legal and administrative") value of records.[3]

Yet, as the first article demonstrates, Western notions of what constituted the principles of *respect des fonds* and original order, and the degree to which archivists adhered to them, were contested through the mid-twentieth century.

A variety of factors were in play, including national differences in government and administrative bureaucracy and culture. At the macro level, the notion of external provenance remained nebulous as archivists scoped out the boundaries of the very thing to be respected. In France in the nineteenth century, the opening of the archives to the citizenry and to historical research resulted in the *fonds* being tied to discreet (often defunct) entities whose records existed and were managed *post hoc* as closed archival groups. In the early twentieth century, German archivist Adolf Brenneke's notion of *Archivkörper* (the archive body) transformed the temporality and boundaries of provenance, dictating that it encapsulated the organic structure of an entity as evidenced via functions, programs, and activities. In doing so, Brenneke moved the rudimentary focus of the profession from the documentary trace to that of the workings of the creator.[4]

Early questions about adherence to the principle of original order were tied to beliefs about the authenticity of records and their ability to serve as evidence. On the one hand, archivists understood order as institutionally sanctioned: represented, for example, in the systematic rules and schemes in place in registry systems (as in Germanic countries). On the other hand, order was understood as inherently organic: a byproduct, as Hilary Jenkinson espoused, of the natural relatedness of records.[5] Others understood order as necessarily transgressive: as in the case of Brenneke, who believed that recordkeeping's final order could be altered given its inability to capture the fluid conditions and historical influences that shaped business and its processes.[6]

In the United States, the size of the bureaucratic apparatus of government, and the attendant volume of information it created, led the newly established National Archives to reject the legalistic parameters of the *fonds* and to create record groups scoped in size to facilitate the practical management of government records in custody. The later contribution of Oliver Wendell Holmes solidified a hierarchical model for the physical arrangement of materials and for reporting its results in writing. At the record group and subgroup levels, arrangement was seen as the practical instantiation of the principle of *respect des fonds*, while arrangement at the series level and below physically instantiated the principle of original order.[7] In turn, Holmes's classificatory model came to be embodied in broader archival descriptive practice, with the notion of multi-level control based on provenance forming a core part of the adoption of early data structure and data content standards.[8] As Steve Hansen notes, a dogma was thus created based on "the essentially hierarchical nature of archives from which, according to Holmes, proceeded distinct descriptive and arrangement requirements inherent in these levels."[9]

Yet, linking records (physically or descriptively) to one bounded creating entity (which in the US federal government usually equated to the bureau level) limited the potential for provenance to act as a connective tissue within

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bureaucratic structures. Moreover, delineating the boundaries of the *fonds* or the record group did not settle the question of who its instantiation was supposed to benefit. Thus, in the early history of the American archival profession, contentions arose as to whether provenance was critical to historical contextualization (acknowledging the need for archives to be responsive to the investigative methodologies of history), to documentary authentication (acknowledging the archival emphasis on protecting the evidentiary capacity of records through the physical and moral defense of the creator's archives in custody), or to information retrieval (acknowledging the centrality of record-users and their need for efficient and intuitive access strategies). The rationale for the internal ordering or reordering of documents was arguably more disputatious, vacillating over whose voice to center in the archive—that of the creator (through the context of the registry system or a more diffuse embodiment of the relationship between records, recordkeeping systems, events, and creators) or of subsequent users (liberating archives from their initial network of relationships so that the record-user can bring them together in contexts other than the original).

In the past sixty years (the time period covered in this article), these debates and discourses have been joined by global influences including those from the Southern Hemisphere, with Australian approaches (particularly the series systems and the records continuum) reshaping traditional notions of archival ideology and its embodiment in the theory and practice of classification and arrangement. Above all, the Australian perspective challenges the notion that provenance is associated with one creator or organizational unit and is instantiated in archival processes in a *post hoc* manner. In the Australian methodology, archivists are enmeshed in, and their record control processes supportive of, a dynamic and flexible system for the intellectual and physical control of records that are created and managed in and across time.

Today, geographical influences are, in turn, giving way to disciplinary ones, with harbingers of change coming increasingly from spheres of influence external to the profession. Today's call to renegotiate or reimagine archival classification and arrangement is made considering ongoing social, political, and technological transformations in North America, decades in the making. In tandem, changing interpretations brought by individual archivists to fundamental archival concepts and notions are influencing not only our understanding of bedrock archival thought but also the methods that can be applied in the study of archival work.

Such pluralities of perspective have also been filtered through ever-emerging graduate-level archival education programs, for it is in the academy that the transmission of archival work (as a "state of mind") takes place.[10] If the period from 1909 to 1977 in the United States is considered the era of "archival education as apprenticeship," the period from the 1970s to 2000 saw archival science

take hold as a program of study within the academy, with a second generation of archival educators at the helm.[11] The archival program of work, as defined by the likes of Theodore Schellenberg and H. G. Jones in the 1960s, coalesced around a triumvirate of theory, method, and practice, not all of which was homegrown. Indeed, the archival state of mind has been based on "a form of originary interdisciplinarity," with archival education framed by its "historical legacy as an adjunct to other disciplines," including history, library science, and records management.[12] The decades of the 1960s through the 1980s were notable for the growing interest that library and information science programs showed toward the education of the archivist.[13] This move was not without controversy. If archivists once pivoted toward the archivist-historian model in pursuit of a new rigor for the profession, George Bolotenko chastised the profession for throwing off this selfsame humanistic form in the process of seeking an amalgamation with library science, a discipline considered more relevant in an age increasingly digital in orientation.[14] Where Bolotenko misjudged, at least initially, was in the extent to which a humanities orientation was possible within the discipline of library and information science. In fact, LIS programs opened the archival profession, and scrutiny of its practices, to new areas of the humanities, with the discipline of English notable in this regard.[15]

Since 2000, the role of graduate archival education in shaping views on the practice and theory of archival work (including that of archival classification) has once again shifted as "the push to resolve human problems with recorded knowledge" expands "beyond the boundaries of librarianship."[16] Yet, the influence of information science has been developing over a long period. As I have noted, "from the 1950s onwards, an increased interest in automation, computing, and information technologies; the influence of information theory and information processing from the cognitive sciences; and a turn toward a user-centered approach in studying knowledge and knowledge systems cemented the . . . embrace of *information science* as the discipline."[17] As schools of information and computer science absorb library science programs, new synergies emerge.

The bifurcated growth of graduate archival education within the academy returned us to earlier debates about the proper relationship and distinction between archivists and allied disciplines, this time attuned to notions of how to situate archival studies as an academic field with a distinct theoretical and practical base. Gilliland-Swetland sums up the debate as one of competing ideals (of archivist as "humanist historian-scholar versus expert documentary manager") facing off "upon a stage called professionalization."[18] As this archival divide of the mid-1980s and early 1990s continued to fester, archival classification was held up for re-examination as archivists debated whether the historical, records management, or indeed archival mindset (or some

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combination thereof) could legitimately claim to be the protectorate of the long-held principle of provenance. Archivists worried over what provenance meant in a world where recorded information was increasingly digital and considered whether classification should be aligned with the evidentiary needs of administration or with information retrieval and the information needs of a broader user community. Archivists weighed whether methods of classification needed to be more attuned to historiography or the systemizing processes of library science, and they debated how to read and interpret the meaning of classificatory structures.[19]

All these facets are explored here as part of the process of examining the past sixty years in the development of theories and practices of archival classification and arrangement. In particular, I draw from the archival literature to present a historical account of the factors that contributed to evolving notions of archival classification from the 1960s to today. A review of the literature of this time frame provides its own context for understanding how, why, and through whose influence competing understandings and implementations of core classification ideas persist. In the process, I highlight classification as a historically situated interpretive act, drawing attention to the implications of various disciplinary influences and analytical perspectives on the present status and future conception of, and possibilities for, the American archival profession.

In writing about the archive, historian of science Lorraine Daston muses about the relationship between archives and time. Archival time is seen as distinct; a timeline that by necessity "stretches human time into the far past and the far future."[20] For the scientific community, the archive is trumpeted as the discipline's wager on its own durability, its archives described as "the physical expression of how present science creates a usable past for future science."[21] The word "physical" here encompasses not only the raw materials of history, but the archival models and processes that exist as its literal and constitutive entities. For Daston, the longevity of the archive is "no accident."[22] Its survival is said to depend on a continuity of practices that have "a chronology that is all their own."[23] Daston calls on those invested in the archive to pay attention to the "delicate" and "precarious" balancing act being played out in this age of archival anxiety brought on by the digital era. The balance sought is that between the "cautious conservatism" of archival practice and the "relentless progressiveness" of technology and of disciplinary theories.[24] This article takes on this intellectual challenge, choosing to both read into and to find creativity in the tensions and ruptures that have consumed the archival profession and its writings on archival classification and arrangement over the past sixty years.

Context and the Liberation of the *Fonds*

> *The long history of collecting, the library orientation, and the decades of neglect of government records in Europe and North America have turned archivists into salvagers and, sometimes, scavengers. They have had to rescue what they can and make sense of it after the fact. It has taken decades and more for archivists to intrude themselves sufficiently into the "recordkeeping" environment to participate more actively from the beginning and not perpetuate the records/archives divide.*
>
> —Adrian Cunningham, Laura Millar, and Barbara Reed[25]

From an international perspective, a radical new approach to archival control came from Australia, a country that, since the 1940s, had a nascent yet growing archival system and a theory "solidly grounded in registry practice."[26] In particular, the system reflected Australian government archivists' work at the nexus of archives and records management, "unencumbered by the baggage of archival systems past."[27] Although influenced by the principles and practices espoused in the Dutch manual and by the work of Hilary Jenkinson and Theodore Schellenberg (who visited Australia in 1954), the debates and discourses that played out in this country's archival literature helped to create a uniquely Australian approach to provenance and its application in an archival context.[28] In seeking solutions for the management of modern government records, archivists such as Ian Maclean helped to create a system for the Commonwealth Archives Office of Australia that was "broadly structured within concepts derived from Europe, but with significantly different principles more suited for records of the mid-twentieth century."[29] As Horsman pithily reminds us, "Neither Natalis de Wailly nor Muller, Feith and Fruin, nor even the Prussians, when formulating their instructions, had current archives in mind!"[30] Thus, while the tradition of archival classification handed down since the Dutch manual sought to gain control over a once-living organism (something tied, perhaps, to a defunct administration and a closed registry), the Australian system "included the strongly Jenkinsonian derived emphases of Maclean on managing the whole."[31]

The Australian attitude that archival control should be a contemporary and ongoing process and not simply a *post hoc* exercise undertaken in response to a "static heap" of backlogged records (a historical exigency that helped form the record group concept in America) transformed ideas about archival provenance.[32] A key development, promulgated internationally by archivist Peter Scott in the pages of *American Archivist* in 1966 and 1967, called for the abandonment of the record group as the primary category of classification (and description) in favor of the Commonwealth Records Series (CRS) system (aka, the "series system").[33] In doing so, Scott took issue with the long-standing model for classification, which, through its hierarchical structure, linked one recordkeeping system (internal provenance) to one creator (or external provenance). Instead,

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Scott's understanding of the workings of the Australian government impressed upon him the difficulties of instantiating the often fluid and dynamic nature of Australian government agencies within a fixed, one-dimensional hierarchy of provenance. Traditional archival thinking failed to take account of the often-substantial changes wrought in the function, structure, and mission of government departments over time. Indeed, Scott was able to establish the extent to which administrative change affects records, finding that over a quarter of the record series in the Australian Archives were created by more than one administration.[34]

The act of uncoupling the treatment of the record unit from that of its creating context retooled the role of archival arrangement and description. For Scott, external provenance was "more accurately revealed in finding aids than in any inherently imperfect grouping or juxtaposition of series on shelving."[35] Liberated from the desire to sync physical arrangement with storage, the record group was repositioned as the "virtual entity" that inventories and indexes materialized (or reported out).[36] Echoing ideas once promulgated by Brenneke, Scott suggested the need for a main grouping "no longer based on an organizational structure but on functions manifested through record-keeping systems."[37] Administrative links, however, could be made to any agencies that had a hand in creating the record series, with those agencies, in turn, being linked (hierarchically, chronologically, functionally, etc.) to the highest-level entity within a bureaucratic structure. In this scenario, description (in the form of authority files that formed part of "context control systems") took the primary role in representing the external and oft-changing aspects of external provenance, while arrangement was repositioned as a means of stable "record control." Physical arrangement was to be bound primarily to the internal recordkeeping system and, in particular, the last expression of that lower-level order. Series could then be related to as many external contexts as appropriate. Thus, the notion of the "whole" was now liberated from its physical ties with custody (location and storage management), and the flexibility of a virtual system for external provenance meant that notions of what constituted context could become broader and yet more nuanced.[38] From a temporal perspective, the series system and its focus on the ongoing management of all records created a perspective in which relationships between context and record unit could be understood in a synchronic (point-in-time) and a diachronic (over-time) manner.[39] The notion that intellectual control exists at any point in time, and not just as a *post hoc* arrangement, posited that the work and role of the archivist could (and should) exist as part of an integrated records continuum approach. Thus, the stage was set for a postcustodial mindset to influence the theory and practice of the archival profession, albeit on a gradual basis.

While the notion that archivists should abandon the record group in favor of the series system engendered debate in Australia, the series system initially garnered "very little controversy" in the United States and abroad.[40] Thanks to the forces of organizational inertia that worked to protect now-established archival practices, it was decades before American archival theory and practice felt its influence. Indeed, when the practical difficulties of applying the principle of provenance came under renewed scrutiny in the 1970s and early 1980s, the immediate reaction was not to turn toward the Australian series system for a solution but to revisit and rework long-standing archival ideas. Although somewhat dismissive of the arbitrarily drawn American "record group" concept, Michel Duchein was a particularly vocal advocate for the concept of the *fonds* and its role in creating a well-defined *post hoc* framework within which to understand records and their contexts. In rejecting criticisms of *respect des fonds* as a system of control, Duchein doubled down on the importance of the *fonds* and its associated principle as the "sure base" for the work of classification and description.[41]

Swatting aside the solution offered by the series system, Duchein declared that the inherent difficulties of applying the principle of *respect des fonds* could be overcome by adhering to a precise definition of what constituted the *fonds* and by using an augmented set of finding aids in which the complex history of the creating agency or agencies and their activities could be reconstituted.[42] Terry Cook, while also defending the notion of the *fonds*, saw much of value in the Australian series system.[43] Like Scott, the notion of the "*fonds*" harbored an inherent tension for Cook—that of understanding it both as a logical entity (the embodiment of creatorship, incarnated in functions, processes, and activities) and as a physical entity (the embodiment of the physical order, incarnated in arrangement). This tension, Cook thought, took on new urgency with the archival turn toward managing records in electronic form. In particular, the rise of complex organizations and the associated transition from filing systems to networked (database) systems (where data "may be inter-departmental or even intergovernmental") was muddying what had been understood as a one-to-one correspondence between the conceptual and the physical.[44] Cook stated the problem thus: "If the fonds is first and foremost a concept linked to the creator, then obscuring the act of multiple or complex creation by assigning records physically and intellectually to a single fonds during archival arrangement and subsequent description distorts provenance . . . to say nothing of the evidential character of archives."[45]

If Scott's model was one of dualities, with description to represent external context and arrangement to create a means of stable record control, Cook's model elevated the virtual over the physical. Cook believed that the notion of the *fonds* ceased to be problematic in this new environment if the *fonds* was understood not as a physical thing (something Cook saw as a relic of archivists'

custodial or curatorial mindset) but as an intellectual construct, in which the myriad of relationships between creators, functions, information systems, and records could be surfaced, as Scott imagined, primarily through the process of description. The *fonds* was reimagined as "the conceptual summary of descriptions of physical entities at the series level or lower, and descriptions of the administrative, historical and functional character of the records creator(s)—as well as descriptions of the records-creating processes (metadata)."[46]

In the United States, Scott's influence was seen in the growing call in the 1980s and beyond for archivists to abandon the record group concept, and the associated hierarchical model of classification, in favor of a model of authority control that was said to better embody the complexity inherent in the concept of provenance. As Hugh Taylor reminds us, this attempt to inject flexibility into the archival processes of arrangement, description, and retrieval emerged at "about the time that computers began to challenge the archivist," even though, as he says, there "may not have been a conscious connection."[47] Indeed, Scott's work at the Australian national archives had brought the development of the series system from concept to production by the late 1960s, with the CRS system being increasingly automated in the 1980s and 1990s. The series system provided the ability to decouple archival classification from its emphasis on representing physical data bound to one final provenancial entity through a linear and static hierarchical data model. In its stead, the series system foresaw the emerging era of digital recordkeeping with its emphasis on managing living data contextualized and connected to a network of evolving but persistent provenancial relationships (agents, functions, activities).

David Bearman and Richard Lytle were particularly critical of the traditional mono-hierarchical model of archival control. While traditional archival models were thought more suited to a nineteenth-century view of bureaucracies, Bearman and Lytle sought a model for provenance that could represent modern, living, bureaucracies in which structures, processes, and recordkeeping practices were increasingly complex and in which technologies contributed to a proliferation of information. To incorporate such an understanding within emerging archival information systems, the authors turned to library practice, calling for archivists to institute a system of separate, standards-based provenance authority records. Like Scott, the new archival model thus sought to separate (but link) information about creators (authority records) from information about records (archival control records). And, like Scott, Bearman and Lytle envisioned the integration of archival information systems with records management systems, with an associated bidirectional flow of data (as data moved from organization to archives and back).[48] This notion that a model based on authority (or context) control could provide an alternative to the monolithic and hierarchical record group concept was also taken up by Wisconsin's deputy state

archivist, Max Evans, who specifically acknowledged Scott's influence in creating a new framework in which "records and the record-creating agencies exist in a multi-dimensional conceptual space."[49] Given that archivists at the time had recently begun using local and national online library systems to share bibliographic data (including those based on the MARC Archives and Manuscripts Control format), Evans believed that a move to an authority based system would also expand opportunities for the archival profession, placing archivists within a "larger community of information professionals" where they could draw from existing authority files and "maximize the benefits of automation" by leveraging extant bibliographic systems and networks.[50]

All told, from the late 1960s onward, the notion of provenance had increasingly been seen as dynamic rather than static in nature and conceptual rather than logical in application. The notion of external provenance, with its immediate tie to a creator, had taken on a more expansive horizon, and the nomenclature of "context" had come to the fore to capture this new understanding of relationships and interrelationships. As Horsman explains, "context is not completely different from provenance, but it is potentially richer, and above all, does not focus on the fonds as a physical entity, but on understanding the meaning of records, how they were created, used, and maintained across space and time."[51] The rise of postmodernism, and the belated engagement of the archival profession with this literature in the 1990s, also had a profound impact in supporting the view that context is "virtually boundless," and here, too, the Australians had something to say.[52]

During the 1990s and 2000s, Australian archivist Chris Hurley inherited Peter Scott's mantle as "the chief exponent, intellectual developer and advocate of the [series] system."[53] In drawing from this Australian lineage, Hurley extended the viewpoint that privileges archival description over archival arrangement as a vehicle for capturing and documenting context, particularly as it plays out in the digital environment. In the Australian model, electronic records should have, from the outset, the descriptive metadata necessary to manage them throughout the continuum of their existence. This changes the perspective and the reality from one in which description is applied retroactively and hierarchically from the custodial viewpoint to one in which records and contexts are seen as separate entities whose relationships are being continuously described ("forged descriptively," as Hurley puts it) regardless of custody.[54] In his writings, Hurley extolled archivists to augment context control through a broader conceptualization of provenance, articulating the ways descriptive contextual entities can be combined for verifiable meaning making. These constellations of relationships are understood as existing in and over time, of which records are the outcome and description (in the guise of the finding aid) is the output. Critical of international descriptive standards that embrace practical mechanisms (e.g., authority

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control) rather than an ideological rationale for separating context control from
that of records control, Hurley argued that the work of the archivist must be
tied first and foremost to the need for contextualization and verifiable evidence
and not simply to the more library-oriented concerns for access and discovery.[55]
In such a system, evidential value is imparted to all records (public and private)
through their associated relationships and interrelationships; associations that
are captured and maintained through recordkeeping systems, no matter how
formal or informal.[56] Although description is the priority here, Hurley's world-
view offers important insights into the creator's process of ordering and how it
can be understood. In this worldview, the way records are ordered is not merely
evidence of how recordkeeping is instantiated in a system. It acknowledges those
entities that have the power to bring records into being and that have control
over their subsequent organization. It is evidence of how functions, activities,
and events are sequenced, and of which ordered records are the trace.[57]

In pursuit of an understanding of the complexity of external provenance,
Hurley presented the notion of "ambient" descriptive entities. In line with Tom
Nesmith's idea of "societal provenance," Hurley pushed the boundaries of prov-
enance beyond that of creation or generation to document broader relation-
ships that are provenance adjacent.[58] Crafted through functional relationships,
Hurley showed that ambient entities could exist, for example, as higher-level
entities that, while not directly responsible for creating records, are respon-
sible for the functions in which they are created. The notion that ambient enti-
ties can be used to disambiguate context is true in circumstances in which
provenance is seen as manifold (multi-provenance equates to multiple agents
operating within the same contextual framework but at different time peri-
ods), or simultaneously manifold (simultaneous multi-provenance equates to
multiple agents operating within the same contextual framework and in the
same time period). To Hurley, the notion of parallel provenance (the existence of
multiple agents operating within different contextual frameworks in the same
time period) simply represented a failure to broaden the concept of "ambience"
to accommodate such a reality.[59]

From the standpoint of internal provenance, Scott's understanding of the
virtuality of the *fonds* (its move from being "a stipulated type") is mirrored in
Hurley's understanding of the virtuality of the series and constituent parts.
Thus, series and items are now reimagined particularly when it comes to man-
aging digital records. Gone is the notion of an entity (document or series) exist-
ing because it meets a predefined notion of what it should be.[60] In its place,
the centrality of physical ordering and colocation are replaced by an under-
standing that documents manifest as items or a series as they are captured
through behaviors and relationships to other entities. "Capture" can be embod-
ied through the outcome of a search process and, from the archival perspective,

through descriptive data. As Hurley stated, in this worldview, "a series is not an object of description but the result of a description."[61] Such emphasis ties into a broader argument about the future of electronic records management systems in which "descriptive" and "continuous" classification, and an ensuing multiplicity of recordkeeping orders, are preferred to the classification rule of "one record one file code."[62]

In a further clarification of the ideas of Cook and Hurley, English archivist Geoffrey Yeo also sought to uncover the complexities of provenance and to reimagine the *fonds* by releasing it from "the constraints of materiality."[63] In setting up this scenario, Yeo revisited the definitions of what constitutes a "collection" and a "*fonds*." Yeo is critical of the notion that artificial assembly delineates a collection. Instead, he sees purpose and agency behind all assemblages of records as they evolve in space and time. As an alternative, the dichotomy between a collection and a *fonds* is recast as the difference between representations—that of a selected fragment and an imperfect imagined totality.[64] Whether analog or digital, Yeo defined a collection by its physical or material nature, acknowledging the reality of what archivists must manage at hand. Its very boundedness makes it amenable to being administered and maintained. Conversely, the *fonds* represented for Yeo the conceptual or boundary-less grouping that cannot be physically expressed but only formally described. Here the notion of the *fonds* embodies the realization that a collection is merely a trace or a sliver of relationships to other creators, other activities, other assemblages of records, and so on. The two realities (the physical and the conceptual entity) coexist even if, as Yeo noted, "in an era of multiple overlapping fonds, coincidence between fonds and collection is increasingly rare."[65]

From the perspective of arrangement, the distinction between these representations led Yeo to conclude that "acts of ordering (and the troublesome notion of "original order") cannot be applied directly to a *fonds* and must necessarily relate to a collection." This acknowledges the fact that a collection is likely to see many orderings during its lifetime.[66] But more than that, Yeo argued that relational systems of documentation play a key role in capturing the complexity of provenance and in ensuring that people can make judgments about whether records are authentic and trustworthy. As a corollary, notions of physical ordering are seen as less important in this regard. This conclusion led Yeo to treat item-level records as the heart of the collection to be contextualized and to seek to create archival descriptive systems and standards to handle the multiplicity of representations (*fonds* and collection) and interrelationships within this orientation.

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Technological Transformations of Context

The Digital Revolution has affected how information is embodied and what is used to organize it.

—Geoffrey Yeo[67]

A world of relational databases, of complex software linkages, of electronic accountability trails in office systems, of hypermedia documents, of multi-layered geographical information systems, is, in short, a world of relationships, of interconnections, of context.

—Terry Cook[68]

The notion that technology has brought fundamental changes to the theory and practice of archival work has already been established. As archivists such as Jane Zhang reveal, paper-based record traditions have "adjusted to the reality of electronic records," with organizational structures of digital records now tied to file directories, classification schemes, and metadata schemas.[69] Meanwhile, the notions of *respect des fonds* and original order endure, albeit within an expanded notion of context now inherent to each principle. Before delving further into the consequences that arise for archival processing when computing technology meets archival science, some historical background is necessary, including taking account of how the digital revolution is now enmeshed in the infrastructure of society and in human (including archival) activities.

The introduction of computers in the second half of the twentieth century was one more cog in the development of efficient bureaucratic systems, one that solidified the rise of economies centered on the creation, distribution, and control of knowledge. The symbiosis between work and computing technology heralded innovation in work patterns and processes. Methods of work became decentralized and sped up, connecting people and resources in time and across distances. From an information management perspective, computerization allowed public and private sector organizations to enlarge their capacity to create (input) and store highly detailed data in logical relationships in machine-readable form; to standardize, manipulate, rearrange, and reuse this information as needed; and to facilitate access to information in aggregate or disaggregate form within and across organizational boundaries.[70] The attendant increase in the quantity of data being collected and analyzed created a demand for new and updatable models, structures, and systems for information representation, storage, and organization, the systems themselves being comprised of hardware, system and application software, peopleware (documentation for people running the system), and data files.[71]

The shift from recordkeeping to information and electronic data processing technologies led to a long period of introspection, as archivists struggled to come to terms with whether this change heralded an expansion or an

abrogation of the notion of the record and its key quality as a form of documentary evidence. In the late 1940s and early 1950s, electronic mainframe computers provided US federal agencies with a tool that eluded the traditional fixation on administrative recordkeeping. In place of solely manual efforts, mainframes were put to work for policy matters, processing statistical information for active use in planning and evaluation, with media such as punch cards used to store and analyze the data. With machine-readable data of interest to the burgeoning social history movement, the 1960s were a decade in which the National Archives was at the center of conversations about which government agency should oversee the management and preservation of machine-readable data files.[72] In 1969, building on the advocacy work of National Archives and Record Service (NARS) staff member Meyer Fishbein, the staff of the National Archives stepped into the role of appraising "machine-readable records."[73] With a new breed of archival information (consisting primarily of sequential statistical and numerical data files stored on magnetic tape) came a new breed of researcher ("quantitatively oriented, computer using, academic social scientists and private sector analysts") and new descriptive practices that were increasingly standardized and created and output via mainframe-oriented tools.[74]

With the establishment of a Data Archives Staff (renamed the Machine-Readable Archives Division in 1974 and lead by quantitative historian Charles Dollar), the National Archives developed policies for appraisal and preservation of data tapes.[75] While the records management and archival principles traditionally used to manage paper records were considered valid for such machine-readable records, the nature of the technology and the medium to which the record was affixed meant that they would be applied in a different manner.[76] At a time when "a coterie of technicians and programmers" administered computing technology, the early generation emphasized the specialized nature, item-level orientation, and granularity of this new archival work.[77]

Valuing data as records, machine-readable data files were viewed as analogous to discrete paper files or record series, albeit with the additional complexity of having been processed through a computer and subsequently converted to archival flat files where they could be reconstructed and run through statistical software programs for verification and access.[78] Critical of the reliance of these pioneering archivists on the tools and methods of data librarians and social science data archivists, Cook claims that data files of the era were treated not truly as archival records but as publications, with "their contextual relationship to creators, inventories, fonds, series and related system information, being either secondary or non-existent compared to highlighting their informational content as discrete bibliographic units."[79] Yet, it can be argued that while electronic records were atomized along certain dimensions, contextualization was instantiated as part of the associated system documentation. According

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to Dollar, "technical documentation may be seen as a 'finding aid' at the item
level."[80] Documentation chronicled the transformation that occurred between
an event, its capture (whether from a sensor instrument or transcribed from
extant documents or forms), its encoding in machine-readable form, and its
representation on a storage medium. File specification documentation included
information about the source of the file and its functional characteristics, a defi-
nition of each record in the file (including its relative position and length, and
type of each data element in a field), and an explanation of the coding scheme.[81]

Undoubtedly, certain core understandings emerged in the era of machine-
readable records regarding how computing technology, and its associated soft-
ware, influenced the physical and representational architecture into which
records could be placed. At the most basic level, archivists were confronted with
new technologies and methods of presenting and ordering information from
the file on up to the system level. This entailed an understanding, at the mate-
rial level, of how data are organized, starting with the logical arrangement of
the data file whereby "characters are grouped into fields, fields into records, and
records into a file." It meant understanding that an associated file structure con-
trols how data are organized in a file (flat, hierarchical, etc.), including whether
one or more records is linked to one or more units of analysis, and understand-
ing that "original order" is partially tied to the sort sequence of the file, the
sequence in which data are ordered before processing.[82] In addition, archivists
learned that as part of the technical appraisal of machine-readable data files,
varying types of technical documentation had to be used that indicate how data
could be read and understood, including in terms of their organization. Indeed,
as data files were accessioned and processed into an archival master data file,
the archivist had to draw from knowledge of how the data were initially created
to document any data checking, correction, or compaction carried out before
the data files were made available to researchers.

Yet, changes in technology caught up with the "first generation" of machine-
readable archivists who had likely not foreseen that archives would "some day
be acquiring more than just flat data files."[83] Indeed, the National Archives was
soon challenged by an environment in which newer technologies eclipsed the
mainframe, magnetic tape, and the machine-readable flat file database. By the
1980s, computer hardware and software were proliferating throughout the
government as well as the business and educational sectors, with hierarchical,
networked, and relational databases being applied to research, planning, and
evaluation and to the more traditional concerns of administration and record-
keeping. Database technologies tied notions of ordering to new ways of think-
ing about the operations that can be performed on data and to what end. Data
models that archivists like Yeo would come to embrace joined nineteenth- and
twentieth-century notions of functional, predetermined, hierarchical, static, and

spatially located ordering, storage, and access. These data models emphasize flexible and integrative structures, granularity in the management of objects and relationships, and fluidity in links and connections. In effect, computing presaged a shift in worldview from the primacy of the archive as a physical, tactile, aggregation of records (that marked or fixed a particular provenance and taxonomic arrangement) to an archive that could also be understood as a virtual and sometimes randomly accessible record or repository of data points.

With the creation of a Documentation Standards unit in 1983, the National Archives worked to identify the impact of automated technologies on the national documentary record, to develop standards for the documentation of important agency functions, and to provide guidance to agency staff on these matters.[84] Yet, the impact that managing electronic records would have on archival theory and practice remained ambiguous at the time. From a processing perspective, Gerald Ham questioned how arrangement would function in a digital environment increasingly populated by centralized and interorganizational information systems in which transaction processing was the norm, with data elements that were current rather than historical in state, where data was highly structured yet decoupled from functions and processes, where systems created software-dependent files, and the physical arrangement of data was no longer confined to discrete record series nor controlled by the sequential and serial storage of tape files: "How does the traditional concept of provenance apply to a data base management system where information is stored without regard to administrative or functional context? Is not the notion of original order irrelevant to records stored in a random access file?"[85] Richard Kesner was similarly concerned about the impact of developments in data processing on the nature of what he termed "archival craft," including in terms of establishing the provenance of records.[86] As part of the response to the challenge of the new information environment, Kesner echoed the Australian model by calling for archivists to broaden their knowledge and engagement with new telecommunications and electronic data-processing technologies, and to involve themselves with the records that emanated from technologies across their full life cycle.

By the mid-1980s, the increased use of microcomputers and associated applications (including database management systems, word processing, spreadsheet, and electronic mail systems) across the business, educational, and artistic sectors continued to challenge traditional ideas about the nature of records and the principles said to give them context. From an organizational recordkeeping perspective, the office typing pools, centralized file systems, and secretarial support staff commonplace in offices since the 1920s diminished in importance as computing increasingly pushed record creation and recordkeeping to the individual and to the desktop. In the personal sphere, this era heralded what Margaret Hedstrom calls the "gradual infusion of machine-readable records into

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collections of personal 'papers' and literary 'manuscripts.'"[87] As recordkeeping
was pushed to the users' desktop, the clearly delineated states or processes of
record creation, the organization of filing systems, and the locus of records
management and retention continued to break down.

Despite, or perhaps because of, the nature of these challenges, the 1990s
marked a temporary break from the orientation and understandings of the early
pioneers. In its stead arose a decade of studies and research projects that pur-
sued standards, policies, and frameworks in which to understand and situate the
cultural phenomenon that was digital computing. This was a pivot from a focus
on system outputs and retrospective description of the provenance, dependen-
cies, and relationships of records, to a focus on understanding the system as an
ongoing concern and one capable of fulfilling an evidential purpose.[88] Projects,
including those run by research teams at the University of British Columbia and
the University of Pittsburgh, took place in tandem with outside expertise from
institutional and professional actors similarly invested in the long-term preser-
vation of digital information.

At its heart, this research addressed the technical, design, and policy rami-
fications of dealing with systems that the researchers understood as no longer
inherently record-centric. Part of the research entailed grappling with the legacy
of bureaucracies and technologies of the past as a way to frame the emergence
and ramifications of new information systems. Certainly, over the centuries,
bureaucratic systems had facilitated the creation of distinct procedures to guide
human action, in turn determining their documentary residue and its structure.
Within this context, formats had evolved to materialize and provide evidence
of an act (a reason for creation), while also containing the elements necessary
for the record to achieve its purpose. Computing technologies were thought to
destabilize this system of understanding, yet a strengthening and a broadening
of fundamental archival discernments emerged from the research.

Finding antecedents in the recordkeeping practices and processes of early
chanceries and drawing from scholarship in archival science, the reimagined
principles of seventeenth-century diplomatics, and the emerging science of
digital forensics, the InterPARES project posited that digital records could con-
tinue to provide evidence of action, albeit existing as a concept and as a real-
ity more complex than its analog form. Indeed, the notion of provenance and
context promulgated by the InterPARES project expanded from the traditional
intellectual emphasis of understanding the juridical, administrative, proce-
dural, and documentary landscape in which the records resided to also taking
in their distinct technological context.[89] As the project detailed, to produce or
reproduce a digital record involves the ability to identify and assemble stored
data. This includes linking digital components comprised of data to be pro-
cessed to create the manifested record (including content and form data) with

any associated rules or instructions to allow the processing to take place (composition data).[90] Rising above such technical realities, the digital record was presented as a series of elements and relationships—comprising persons, content, and intrinsic and extrinsic elements of form, with the traditional characteristics of fixed form and stable content remaining to the fore. Comparable to analog records, Giorgio Cencetti's notion of the archival bond was understood as a key component of the identity and integrity (and thus the authenticity) of digital records, with unambiguous links to other digital records needed within or outside of a digital system.[91] Classification schemes, the InterPARES research claimed, needed to remain in force to ensure that digital records retained their evidentiary link to procedure and activity. Such links had to be explicitly represented in the form of classification codes and tied together with registration and with record profile metadata.

In the last ten years, emphasis on the need to study the material nature of digital and computational media has grown. In an effort to move beyond what new media studies and digital humanities calls "screen essentialism," the "centuries-old science" of diplomatics has now been joined by the "decades-old practice" of forensics as the investigative tools of choice.[92] As Luciana Duranti notes, while diplomatics "merged its body of theory with archival science and used the support of philological and historical sciences, forensics has relied on the support of the disciplines that best studied the material under investigation, such as medicine, mathematics, engineering, and computer science."[93] With the adoption of digital forensics tools and techniques has come increased scrutiny of the representational architecture used for archival classification, the idea of how records should or could be embodied within such a scheme, and the principles that archivists follow in doing so.

At a broad conceptual level, one can argue that an element of similarity between analog and digital technologies helps settle a record in place and highlight its associations and relationships. A hard drive can be understood as a storage device similar to a physical file cabinet; a computer's file system corresponds to rules for filing that are embodied in the drawers of the file cabinet; the computer's file directory corresponds to the physical files (with attendant metadata) within the file drawer; and the computer file corresponds to a physical document within the file.[94] Yet, as the InterPARES project highlighted, at the forensic level, digital technologies with different physical and logical realities and that support different methods of handling information mediate the inscription and storage of digital files. This includes the fact that information is not directly written to but inscribed on digital media; that inscribed information is represented computationally, with binary digits forming its essential building blocks; and that data must be processed (action taken on it) to be used and assembled and presented to the user. As Trevor Owens indicates, the

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better analogy for the computer's treatment of a hard drive is that of a closet, where the goal is to order and store data in a container in the most efficient way possible.[95]

In this framework, traditional notions of original order are problematized on several levels. As Cal Lee has demonstrated, the traditional representational architecture for classification (including levels for series and files) has been joined by a new form of technological naturalness in which digital components exist and can be encountered through platform layers at granular levels of representation: as a bitstream on a physical medium, as a bitstream as encountered through input/output equipment, as a subfile data structure, as a file existing as a raw bitstream, as a file as encountered through a file system, as a file encountered through an application, as a digital object or package, and as an aggregation of objects.[96] Given the nature of their instantiation at bit level on a storage device (in clusters of a fixed length, with extra space in a cluster available for other data), digital objects are liberated from the traditional inert material order of a record, being "non-sequential in their material physical arrangement."[97] Thus, the dictates of the underlying storage mechanism negate a simple one-to-one correspondence between a document and its inscription on a storage disk. The notion of an inert material order, one state or place in which a file naturally resides, is also challenged by the fact that a digital file's physical storage location changes with the opening or modification of a file. That which the creator seeks to delete and expunge from the file system also follows a technological rather than a human-centered protocol. When the file is deleted, the rupture is to the file's entry in the storage disk's master index: its physical presence persisting until the data are overwritten. Arguably, the authorial intent embodied in the recordkeeping system is destabilized when storage devices are replete with places in which full and partial versions of data and files proliferate unbeknownst to the creator.[98]

Yet, now that, as Matthew Kirschenbaum said, we can "follow the bits all the way down to the metal," these selfsame faults can be reimagined as providing profound levels of engagement with the notion and meaning of ordering.[99] Owens reminded us that the way that humans typically engage with digital information is through the interface and a database.[100] The layperson's view of a file system is one of abstraction: accessed through a hierarchical directory system and manipulated through commands such as "copy" and "rename." In the digital environment, presentation often rests on the use of a query or a sort on metadata to surface relationships. Fully embracing database logic, the virtual representations are endless, with users empowered to create views of files as needed. This freedom from one canonical view aligns with work that problematizes the notion of original order in personal papers. Here, processes of arrangement and rearrangement (ordering and reordering) are seen to feature

prominently over the life of a creator, the outcomes of which speak to a myriad of habits and concerns vis-a-vis recordkeeping.[101]

At the same time, the fact that tiers of platforms (including file formats, operating systems, application software, etc.) mediate interactions with digital files provides a window through which the different levels of abstraction can be experienced and interrogated.[102] As Kirschenbaum notes, the user's representational view of the file system is partial at best given that the bitstream image carries with it all the "ambient" data that represents the system-level working of the files.[103] Imaging a hard drive, however, allows for a thorough investigation of what is rendered as an inert technical environment. A hex editor allows the archivist to take on the role of reader of computational rationalities: provided with a static view of file level and below, including a "record of every byte on the disk, whether program or data, preserved according to its actual storage geometry."[104] The framework that digital forensics provides is thus one in which both the conceptual architecture(s) intended by the record creator and the mechanical architecture intended by the computer engineer, among others, co-exist. As Owens states, "At every level, the platforms that enable, constrain, and construct our interactions with digital information are handmade by individuals, companies, and international committees. Just about every aspect of that information can tell us things about the people who saved the files, the folks who created the software, and the communities and societies they are a part of."[105] The ability to create a bitstream image of a file system for forensic examination, and to view and understand the fundamental binary data, show that the boundary between human and machine reading is never "absolute or inflexible."[106] If archivists throughout history are used to dealing with remnants or partial fossils (of filing systems and the remains of records within), digital forensics (ethics aside) gives access to something closer to the original and to the totality. In effect, there now exists "the potential to preserve both a mechanical version of 'order' as well as provenancial and contextual information that formerly were provided through description."[107]

While the database nature and fluid boundaries of digital objects burnish their inherent complexity, some archivists are using that understanding to push for a less interventionist approach to arrangement in the digital realm. Owens argues that the affordances of digital objects means that archivists can "enable end users to take on much more agency in filtering and sorting content in ways that are useful for them at a given moment." In effect, Owens calls for the adoption in the digital realm of Mark Greene and Dennis Meissner's "More Product, Less Process" (MPLP) approach, where the emphasis is "less on the individual objects and more about creating useful aggregations." [108] Owens does not dismiss the importance of individual digital objects here. Rather, he acknowledges that lower-level aspects of arrangement are generally taken care of by embedded

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metadata and "the forms of order and structure that come with all kinds of digital objects to begin with."[109] The challenge, as Owens notes, comes in determining what those higher-level aggregations should be and in understanding the implications of the choices inherent in a process of deciding what is inside and outside the boundary of an aggregation. This is seen as particularly critical in an era when third-party web, mobile, and social media platforms mediate the generation of digital records or data traces. Using Twitter as an example, Owens asks us to imagine the differences in how people are able to interact with data if an archivist establishes the boundary of a collection based on a selected time period versus an individual user account. As Owens notes, "in either case, someone who is using the data is free to do a chronological sort, filter by key word, or use any other number of means, but the decisions about how to chunk the information will significantly impact what someone can do with it easily."[110]

As a working proposition, archival educator Patricia Galloway has called for the archiving of a digital "order as received," with such a state supporting any set of derivative orderings later required by a user. In this scenario, the circumstances of the use and of the transfer of digital files to the archives are interrogated to uncover individual truths about ordering. The degree of human and mechanical control over the ordering process is studied. So too are questions asked about the organic or curated nature of ordering (ordering as ongoing, incremental, or represented in stasis). The completeness of the record and its associated filing system are also scrutinized in situations where digital files represent legacy materials, materials backed up in the course of normal and ongoing business activities, or materials selected for archiving by the creator or another party. In the case of computers donated to the archives, the archivist assumes that the files exist largely intact with clear evidence of both material and human forms of ordering. In the case where digital files resided with third parties (likely cloud providers), the archivist assumes ordering has been predetermined, shaped by external requirements and contingencies rather than by the specific needs of the creator.[111]

In drawing from the tools and methods of digital forensics, archivists have plumbed the depths of small data and in the process have come to understand how notions of ordering are instantiated in material and in behavioral form. This approach to finding meaning in analog and digital archival materials tracks the close reading method that is a hallmark of literary studies. However, the attention of archivists has also been increasingly directed to archives that can be understood as big data and to the distant reading and associated computational methods used in the digital humanities that can be used to engage with such materials at scale. As Jenny Bunn points out, an interest in the computational notion of abstraction is present in both scenarios.[112] Yet, the former

tackles granularity and boundedness at the lowest levels of abstraction, while the latter embraces the notion of abstraction higher up at the platform and infrastructural level.

Some research seeks alignment between close processing and distance processing methods with the goal of reinvigorating traditional archival processes at scale. This is a hallmark of a research group affiliated with the Texas Advanced Computing Center. In one study, the researchers developed an interactive visual analytics application for archivists that facilitates an in-depth investigation of salient characteristics of large-scale heterogeneous digital collections including those that speak to long-standing notions of provenance and original order. Aligning with a hierarchical or area-based approach to information representation, the application automatically extracts structural and technical metadata from a collection and presents it in the form of a treemap. A visualization of extant information layers is rendered documenting a collection's size, hierarchical structure, contents, technical characteristics, context, and provenance.[113] In a second study, the researchers used entity resolution as a framework to uncover relationships between data in a poorly organized collaborative file sharing system consisting of thousands of nested directories. A combination of natural language processing (NLP) and data analysis techniques identified data related by provenance, function, and theme, which in turn allowed for the provenance of files to be reestablished in cases where they had been copied into another directory as part of normal work processes.[114]

Big data approaches to dealing with digital records have also built on Scott's insights about the multirelational nature of context and the virtuality of its instantiation through the mechanism of the *fonds*. Taking a decidedly theoretical bent, Kenneth Thibodeau advocates for the use of constructs and methods from systemic functional linguistics and mathematics to tap into insights about the creation and use of documents in the world and how provenance and the myriad of relationships unearthed in the process can be analyzed and understood.[115] As a theoretical approach, systemic functional linguistics studies how language (oral and written) is used in social contexts to help people achieve certain goals. In studying how texts are produced, systemic functional linguistics provides a way to analyze the role played by textual records, the action with which they deal, the relationships between the actors involved, and how records are used in the process. In tandem, Thibodeau argues that graph theory (a branch of mathematics) can be used to capture and distinguish those aspects of provenance surfaced by systemic functional linguistics. As a data structure, a graph formally models a set of nodes (things such as activities, parties, and records) connected by arcs (the relationships between things). Thus, graph theory also liberates classification from the long-held rigid hierarchical schema that, as Giovanni Michetti says, only serves to "circumscribe and limit

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the space of possibilities to create and represent the system of relationships."[116] Indeed, Thibodeau reveals graph data as a source for sophisticated quantitative analysis and display, allowing for techniques that surface patterns and trends in texts over time, that locate and extract predefined key words in documents (such as names of persons and organizations, geographic locations, and expressions of time), and that cluster documents based on measures of similarity.[117]

Victoria Lemieux's work to create a prototype "third order" archival interface is another example of higher-level thinking about archival ordering in a computational environment. Critiquing prior logical models for provenance, Lemieux is part of an archival contingent searching for more "expressive ways to abstract and represent archival records."[118] In this instance, Lemieux champions ontology theory as a mechanism and theoretical basis in which complex notions of societal provenance can be represented and visualized. In doing so, she responds to a proposal from Yeo that seeks a postmodern understanding of ordering in which a sense of its social construction and fluidity replaces the notion of ordering as a natural activity.[119]

Eschewing the notion that preservation of original order is fully possible or always desirable, Yeo has placed a clear emphasis on reimagining arrangement for born-digital and digitized materials from the perspective of user requirements and the affordances offered by technology.[120] Settling on the example of the academic user, Yeo argues that scholars' interest in original order is at least matched by their desire to re-order archival materials in a way that facilitates subsequent data analysis and write-up.[121] Thus, once again, the digital realm is seen not only as the place where creators can impose various orders simultaneously, but as the place from which creators and subsequent record-users can and will continue a process of re-ordering at will. Drawing from computing concepts germane to the management of structured and networked data, Yeo argues that alternatives to archival classification schemes (including visualizations, ontologies, and linked data approaches) should be pursued as more effective and powerful methods of representing archival context. Yeo imagines contexts as free floating and almost limitless relationships expressed at the item level and instantiated through item-level relational models.

The Resurgence of the Social

> Re-creating the original web of contexts for records is clearly difficult because many ties, firmly rooted in practice but not in text, are first hidden and then lost as time passes. While records may be the only tangible evidence that remains of an organization's past, these survivors have lost their human dimensions—those working practices that connected them to continuing business and daily realities as tangible communications and as sources for practical memory.
>
> —Barbara L. Craig[122]

    In any protracted discussion of the nature of archival work, the acknowledgment of the role of the documentary past in human society must come to the fore. Interventions by the archivist and by others serve to construct a physical and intellectual space in which the concept of "the archive" exists as a reality to be investigated and understood.[123] Cook, drawing from the work of David Lowenthal, notes that the perceived universality of humanity, and thus the pervasive sense of the similarity between past and present, came undone through a culmination of political developments (the legacy of the French Revolution, post-Napoleonic nationalism, and growing imperial consciousness in Europe, etc.) that solidified in the early nineteenth century. In its place arose a complicated relationship with a past identified as neither fixed nor stable. In turn came a more multifaceted understanding of the communal artifacts shaped and secured as emblems of the past and of their democratized preserver, the archives.[124]

    Changing notions of the past first shaped the archival profession (and the history field from which it sprang) with the rise of scientific history in the nineteenth century. As outlined in the first part of this article, this new form of historiography cemented archivists' view of their role as intermediaries in the scholarly research process. Scientific historiography's insistence on the objectivity of the historical record ensured that notions of neutrality were ascribed to archival work and work practice.[125] Yet, this perspective has now lost its potency, replaced or at least existing in parallel to perspectives that form a "collective shift from a juridical-administrative justification for archives grounded in concepts of the state, to a socio-cultural justification for archives grounded in wider public policy and public use."[126] As Richard Cox describes, this changing vista has brought with it "a scholarly context" for understanding the nature of archives and archival work. Cox singles out "the emergence of scholarly interest in public or collective memory, mixed with new cultural and literary studies and postmodernist textual criticism" as the most potent theoretical positions in this regard.[127]

    The 1960s were a harbinger of such inflection, with social history ushering in a new approach to the writing of history and a proliferation of specialized fields in which historians moved beyond the concerns of intellectual, political, military, and diplomatic history to investigate the structures and processes that impacted the lives and conditions of the populace. This was history attuned to uncovering the "patterns, norms, and typical features of past societies," with a focus on "comparative studies of classes, groups, and regions."[128] At the disposal of historians was an arsenal of theoretical and methodological insights from the social sciences, an extended and nontraditional range of documentary and new machine-readable data sources (including vital statistics and census data), and the computing power to analyze them at scale.[129] Yet, the degree to which

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the archive would be shaped by this new form of historiography was uncertain given the archival profession's prolonged alignment with models of history ruled by an objectivist and scientific ethos.

Diagnosed with an ongoing preoccupation with "administration and technical problems," archivist Fredric Miller chastised the profession in the 1980s as having "fallen short of the social historian's ideal of re-creating the lives of ordinary citizens and the structure of human interaction."[130] While the need to broaden collection and acquisition policies beyond the elite was an obvious concern for Miller (and contemporaries such as Dale Mayer), it was accompanied by a critique of core tenets of archival classification and a call for them to be decoupled from what were considered outdated forms and foci of historiography. In some instances, traditional conceptions of provenance and original order were rejected on the grounds that they shackle researchers to an intellectual model in which records are understood and accessed solely through their relationships to individual bureaucratic and administrative structures and their associated recordkeeping practices and filing systems. From a practical standpoint, and echoing contemporary Australian concerns about context, the belief that provenance is ineffectual as a method to circumscribe complex modern institutions was a methodological strike against it. In counterpoint, an argument was made that archivists should facilitate access to information how and when the researcher needs it, without the constructs (or what Miller considered the "techniques") of provenance and original order mediating the information retrieval experience. Accordingly, Miller repositioned archival classification as a user-oriented endeavor responsive to the needs of interdisciplinary subject-oriented research and researchers. With the call to physically and/or logically rearrange materials into subject file series came the denudation of the archival principle of original order in favor of the reanimation of the pertinence-based paradigm once borrowed from librarianship.[131]

In the 1980s, Lawrence McCrank wondered if the public history movement could be the potential "healing influence" for the original disciplinary rift that had occurred with historians.[132] Certainly, forty years after the birth of the American archival profession, circumstances encouraged the two professions into greater alignment. The public history movement of the 1970s and 1980s was the history profession's response to a set of volatile economic conditions (the shrinking academic job market for PhDs and the associated decline in graduate students) and potent ongoing social forces (the call to engage with and respond to the broad social movements of the time including Vietnam, civil rights, and equal employment). As part of this move toward an applied history, public historians embraced (or in Cox's words "co-opted") the field of archives and records administration.[133] The interest in public and collective memory and the idea of applying history to real-world issues with methodologies that

embraced public engagement, collaboration, and community-based work reso-
nated within the archival profession. A dominant postmodern sensibility that
flourished in the 1980s also helped solidify the archival profession's move from
a stance birthed during the period of modernity (with its associated notions
of rationality and progress) to one of high-modernity or postmodernity, where
the conditions of life are seen to be influenced by the declining power of the
nation-state, the growth of globalization and postindustrial service economies,
new forms of rapid and networked communication, and the impact of such
technologies on public and private life, including social interactions unfettered
by temporal and spatial constraints.

Postmodernism solidified a post-Rankean understanding of the recon-
struction of the past. Turning away from the Enlightenment's legacy of reason
and progress, postmodernism rejected the notion of a universal human narra-
tive and problematized the status and truth of historical knowledge. As Brien
Brothman notes, postmodern sensibility opened historians and archivists to
"alternative ways of reading" that disturbed "conventional understandings of
individual texts, institutions and social practices, and particular events and cir-
cumstances."[134] The postmodern slant questioned the notion that history seeks
to pursue an objective truth, instead seeking to interrogate and interpret docu-
ments in the manner of texts and discourses. The postmodern slant also sought
to replace an ideological alignment formerly entrenched with the political and
economic status quo with "the voices of the marginalized—those whose values,
experiences, and worldviews give lie to the metanarrative."[135] This theoreti-
cal stance saw scholars situating the "archives"—"as institution, as activity, as
records, as recording media, as collective memory, as social phenomenon"—at
the center of scholarly debate and critique.[136]

In the professional realm, writers such as Brien Brothman, Terry Cook,
and Verne Harris coaxed archivists into dialogue with postmodern thought,
with all highlighting the impact of the French philosopher Jacques Derrida on
the discourse surrounding the nature and meaning of the record, as a form
of communicative effort.[137] In the postmodern perspective, the historian and
the archivist shift their focus from reconstruction to deconstruction, moving
from understanding records as "documentary evidence of past transactions" to
interpreting texts as "semiotic signs of hidden meanings."[138] As Prescott notes,
"text is always biased, always limited and always deceptive. . . . Even if the cre-
ator of the text were capable of transcending such aspects of his or her own
humanity as gender, social status, religion and education to produce a wholly
objective account of reality, each reader draws on a completely different set of
experiences in interacting with the text."[139] In the postmodern world, the text
is deconstructed for its "bourgeois nature" as well as for the layers of additional
meanings and readings that language allows.[140] From this standpoint, text is

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understood as infused with "memories and references" to other texts and thus linkable to them both in the mind of the creator and of the reader.[141]

From a Derridean perspective, writing of any kind is understood as a form of textuality that seeks to "impose—to capture and fix once for all time—permanent structures of being and meaning."[142] In this mindset, the traditional role of the archivist can be understood as the keeper or protector of the author's intent, above all others, a goal supported by the imposition of a single context or provenance on the record and associated forms of ordering. Yet, from a postmodern perspective, the deeply expressive power of language serves to push against this stabilizing goal, functioning "as much to obscure and defer meaning as to fix it permanently."[143] In this model, the notion of a determinist author or creator of a text is displaced as the center of meaning, with meaning ascribed to the language and its subsequent reading and interpretation. In such a world, systems or architectures of classification and their associated archival texts or traces ("artifacts, records, writings, bits, their various sources") "never succeed in controlling or 'capturing,' meaning and being exhaustively," despite the prevailing intent to fix it so.[144] As Brothman notes, such deconstructions "vitiate" the notion of "author," "origins," and "uniqueness," complicating the belief that "records possess a single definable provenance."[145]

Following Derridean proposals, literary, linguistic, and critical theories and methods (and their influences from Marxist, feminist, postmodern, and postcolonial perspectives) continue to shape archivists' understanding of the nature, production, and consumption of text (audience and reader), particularly as it applies to personal papers.[146] In common with more positivist archival traditions of classification, "authorial" or "intentionalist" traditions of textual criticism side with the notion of authorial intent and notions of authenticity.[147] Methods including close reading of the text and of its contextual surroundings suggest that the record should be interpreted: scrutinized in terms of the history and evolution of its form, the formal elements of its structure, and the consequence of its linguistic elements. In the case of arrangement, the belief is that the creator's *fonds* and final recordkeeping order can and should be instantiated or restored through the act of processing. Yet, in more recent forms of textual criticism, the idea of a knowable and stable authorial intent is viewed with something approaching suspicion. Instead, the interpretation of the text moves beyond the immediate and the material to the postmodern—looking at how meaning is continually constructed over the long arc of its production and reception. Textual criticism thus draws attention to a form of context and meaning-making long neglected by the archival community—the relationship between text and reader including an acknowledgment of the reader's role in re-actualizing or re-animating the record. Notions of construction are also seen as embodied in the many acts of the custodians of the record. As Heather MacNeil

explains, the archivist is understood as just one of the "authorities" responsible for how records are "resituated and recontextualized" as records pass through custody during their lifetime.[148] On a more macro-level, the archive is interpreted not only as a textual product of creators, custodians, and readers but of society and culture writ large. The effect is to continually situate the archive as "a proper object of historical and cultural analysis."[149]

The attendant impacts of these theories and methods on archival classification are manifold. In some contexts, the importance of ordering (and its association with a classification mechanism) is undermined by a preference for the study of form and textual materiality—of the document, its production, and the information expressed within its form. As Frank Boles expounds, "Creators first create documents. It is into this activity that they pour most of their labor. It is in the completed documents that they express their deepest thoughts and profoundest emotions. Documents are filed when this process is finished. Filing is a secondary activity, constrained by a finite number of logical organizational schemes."[150] Indeed, in this worldview, it is considered a fallacy that "the surviving remains of the past" can stand in as a full "personification" of a records creator.[151] As the record crosses the threshold of the archive, the notion of complexity may be hidden but is not resolved. As Brothman eloquently describes, "Archival order does not emerge as a result of some inexorable constraint placed upon us which we are powerless to repudiate. The Edenic order within archives is one that is shaped through the practice of grouping. These record groupings are creations; they are, to borrow a term recently coined in the sociology of science, microworlds that are demarcated by boundaries of our choosing—individuals, institutional structures, etc.—and which disguise as they conquer a profuse complexity that is also increasing in government and in the world at large."[152] Understanding ordering as an ongoing social production highlights the fact that it cannot be captured adequately in archival processes (physical or intellectual) that seek its sedimentation at a set point in time. Thus, in line with Australian protestations, ordering is seen as reductive, unequal to the challenge of representing a constellation of possible relationships.

If an interest in language and textuality characterizes Derrida's postmodern stance, other contemporary theoretical perspectives place archivists more squarely within their home turf of "evidence" and "recordness." Dubbed part of the Australian "record-keeping paradigm," the records continuum is "informed by the dissolving of thresholds between 'archives' and 'records', a defining of 'the record' in terms of functional (or work process) requirements, a privileging of the evidential attributes of records, and an emphasis on accountability."[153] First articulated by Frank Upward in the 1990s, the records continuum model emerged as a theoretical manifestation of the Australian lineage of ideas that reject custodial and *post hoc* notions of archival custody and control. If, as Cook

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says, "paper minds are modern; electronic virtuality is post-modern," then this worldview is one of archivists grappling with the theoretical and practical challenges posed by the proliferation of computing and computing technologies, including changes to the structure, organization, and process of work; the atrophying of traditional forms of centralized and bounded recordkeeping systems; the loss of an obvious materiality in the information that results from these activities; and the destabilizing of the traditional archival mindset in which physical custody is reified as part of the structure of archival work.[154] Integral to Upward's work is a sense that this loss of control (over the record, the system, the archive) must be met head on.

In looking to reorient archivists to the realities of the postmodern world, Upward presented theory as a tool to understand and navigate its complexities. In doing so, he drew from activity theory and, in particular, from sociologist Anthony Gidden's structuration theory.[155] Structuration theory posits that society is constructed via social interaction and that this happens in a dynamic relationship between human agency and social structures (embedded rules and resources—such as traditions and codes of practice—from which people draw), with human agents working to reproduce, maintain, or change societal structures through individual acts. In particular, structuration theory provides a framework within which to examine the construction of social systems across space and time in the interplay between agents (individual actors and groups), social practices (comprised of rules and resources), and peoples' "memory traces" that are an embedded part of social practices and make activities possible.[156] With the continuum theory, Upward provided an archival slant to the study of how social practices are ordered across space and time.

To complicate matters, the degree to which those writing within the recordkeeping and continuum frames fully engage with postmodern discourse is a matter of contention. On the one hand, Verne Harris believes that the "inherent authority" of the continuum model is largely antithetical to a Derridean approach in which there would be no model, only readings thereof. Yet, in looking at other seminal recordkeeping literature, Harris sees a synthesis or at least an alignment between recordkeeping and postmodernism in what he dubs the "recordmaking paradigm." Here, an openness to postmodern sensibilities is evident in the articulation of the open and networked reality of documents; the push against the notion of single, totalizing historical narratives; and the acknowledgment of the power inherent in those that shape the discourse and ideas that people use to understand the world.[157] In the continuum, classification and arrangement is clearly an ongoing action of ordering that takes place over the life of the record. When what is left of a record aggregation is pluralized, crossing the personal or organizational boundary and entering the archive, the archivist becomes the gatekeeper in the process. The archival act

of classification begins again the process of layering contexts and infusing new meanings into the documentary trace. As Eric Ketelaar describes, "every interaction, intervention, interrogation, and interpretation by creator, user, and archivist is an activation of the record. The archive is an infinite activation of the record. Each activation leaves fingerprints which are attributes to the archive's infinite meaning."[158]

Across all the models here, it is possible to see, as Nesmith does, that archivists' intervention to keep archival records indefinitely not only embraces the idea of meaning-making as a process, but "radically extends the meaning-making process to the maximum." By this, Nesmith means that archivists, knowingly or not, are responsible for the fact that records will be "re-created in many ways" across time and space.[159] During the life of the record, archivists establish contexts of meaning for records under their care. As Nesmith shows, archivists' way of reading records includes a determination of what its provenance should be. While the notion of provenance has typically employed a narrow frame, this is clearly being replaced by a multifaceted view expressed in the Australian series system, in Hurley's maximalist reimagining of context control, and in recordkeeping and textual theories of the continuum and of postmodernism by which records are understood as contextualized by a wide variety of factors and behaviors across their lifetimes.

Other postmodern writings that follow Hurley's rejection of the traditional notion of contextual singularity echo shifting notions of provenance and creatorship. In this vein, Nesmith raises the specter of "societal provenance"; an acknowledgment of the social dimensions or conditions in which the writing and reading of the archive occurs.[160] The provenance of a body of records is recast as constitutive of "the social and technical processes of the records' inscription, transmission, contextualization, and interpretation which account for its existence, characteristics, and continuing history."[161] Nesmith is not alone in recasting the nature of provenance. Jeannette Bastian views her work, and that relating to societal provenance, as returning provenance to an understanding that existed before the Dutch manual in which the idea of the community as the creator of the archive is very much to the fore.[162]

Using the archival materials of the MacDowell Colony (an artists' retreat in New Hampshire) as a case study, Bastian argues for an understanding of provenance created by and centered on human experiences. In arguing that its records are not simply the products of individual artists, but the products of the colony writ large, Bastian establishes that it is the colony itself, both as a physical space and a place of collective remembering, that serves as its contextualizing force. To Bastian, the centrality of place to contextualizing records suggests that they should be arranged and described in ways that communicate these manifold relationships. In a similar vein, Joel Wurl introduced the idea

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of understanding cultural groupings as a manifestation of provenance. This is a stance that also transforms provenance from its traditionally narrow conception ("bounded by the walls of a government agency, a set of business bylaws, or a household"), and one represented in an archival act of reconstruction, to one in which notions of provenance tap into the "rich reservoir of information originating deep within community infrastructures."[163] Drilling into the connection of creatorship with physical location, Richard Lehane argues that a multiplicity of contexts can be found and read at sites of creation, including the work environment, the floor plan, the physical location of records within a space, and the forms of technology and equipment used *in situ* to create or manage records. In arguing for documenting sites of creation as a form of provenance, he acknowledges that traces of organizational arrangement reflect, but are also incomplete records of, people's characters, self-image, and work patterns. Indeed, it is reasoned that the physical location and environment, in conjunction with the way records are ordered and housed, best speak to the function, importance, meaning, and emotional significance of documents in the lives of their creators. Yet, as Lehane notes, these understandings are typically disrupted when materials are relocated, accessioned, and tidied into the archive.[164]

The notion of provenance being instantiated in the form of co-creators has emerged as an idea with particular resonance in the archives and human rights literature, and the ethical frameworks that surround it. As Jarrett Drake so powerfully reminds us, "provenance emerged as a concept in the West at a time when most people were structurally if not legally excluded from ownership; ownership of their own bodies, minds, labor, property, and records."[165] Nathan Sowry's case study of American civil rights collections at the Wisconsin Historical Society demonstrates how people formally designated as subjects of the record can be remade as co-creators. Here, multiple creatorship, or the notion of "pluralist provenance," is tied to continuum theory and postmodern thought and their call to center and respect voices previously silenced, ignored, or marginalized.[166] This recentering from subject (third parties to the record) to co-creators of the record is also part of Livia Iacovino's "participant relationship model" of provenance. In a broad sense, Iacovino's work belongs to a new participatory model of community archiving that emerged in the mid-2000s that sets aside processes and practices from anglophone archival theory to center systems of knowledge from historically marginalized communities.[167] In doing so, Iacovino brought a distinctive rights-based framework to the fore.

Fighting for Indigenous communities in Australia to control the disclosure, access, and use of knowledge kept in archival records controlled by non-Indigenous (including government) entities, Iacovino set out a model that places the agency of Indigenous people and communities at its heart. Here, co-creatorship (what she equates to Hurley's "parallel provenance") acknowledges that

Indigenous people are actors and participants (whether voluntary or not) in the process of record creation and thus an integral part of its provenance. It also acknowledges that the effect of records on these communities is a powerful and necessary contextual element, as well as a moral exigency for which the archival profession must account.[168] With a similar mindset, albeit using a model based on feminist ethics of care, Michelle Caswell argues that "survivor status" must be understood as a form of provenance in records that document human rights abuses. Here, too, record subjects (victims of human rights abuses) and their kin (if victims are deceased and/or community-centered systems of knowledge exist) are repositioned as record co-creators with the attendant responsibility and moral obligation on the part of the archival profession to be community-centered in its archival processes and efforts.[169]

The notion of agency in the postmodern worldview inevitably cycles back to that of the archivist. Although archival scholarship has sought to establish how information workers create the epistemological ground upon which societies understand the present and the past, less has been done to investigate the lived experience of such workers. When it comes to writing about the practice of archival classification and arrangement, the emphasis has mainly fixated on managerial and bureaucratic aspects, particularly the study of processing procedures as a means to increase efficiency and to reduce the backlog that haunts many archival institutions. The study of arrangement in this instance takes place within a worldview in which arrangement is understood as "an inherently conservative but potentially time-consuming activity."[170]

To date, the best-known study of American arrangement (and description) practices is Greene and Meissner's 2005 work ubiquitously known as "More Product, Less Process," or MPLP. The study sought to acknowledge and address massive archival processing backlogs and the associated "failure of archivists to agree in any broad way on the important components of records processing and the labor inputs necessary to achieve them."[171] Data assembled by Greene and Meissner confirmed a tradition among processing archivists of handling, ordering, and weeding paper-based materials down to the item level. From this baseline, the authors called for a set of new benchmark practices attuned firmly to user needs. As both a follower and a harbinger of developments in the digital realm, the benchmark requirements embraced less literal and more virtual arrangement across all archival holdings, with arrangement practices to be pegged selectively to the series level and above. In doing so, Greene and Meissner echoed the belief that subgroups and series, as the major physical and intellectual groups of any collection, play the key role in establishing core contexts and relationships. In their worldview, item-level arrangement has little to reveal to the researcher, instead being seen as a symptom of archivists' "professional fastidiousness" and tendency toward "overzealous housekeeping, writ

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large."[172] Declaring that it is a "sign of professional maturity" that archivists own up to the resource limitations under which they work, the authors opted for a system that advocates not for an increase in staffing to tackle the backlog but one that requires a change in the quality and efficiency of archival practices to triple the speed at which archivists normally process collections.[173]

Utilizing a subset of data from the Greene and Meissner survey, Christopher Prom later teased out additional and sometimes contrary insights about processing practices in college and university environments. Prom's 2010 analysis indicates that "the size of a repository's collection, staff, or budget do not determine its processing rates, but smaller archives, where a few staff share many duties, are more likely to have slower processing rates and larger backlog."[174] Although the Greene and Meissner data did not allow Prom to determine what factors other than collection characteristics affect processing speed, he did examine whether certain manifestations of practice could explain differing processing rates. Despite the implicit assumption of Greene and Meissner's work, no correlation was found between backlogs of paper-based collections and the use of intensive processing techniques. According to Prom, this finding indicates that "we must examine the whole range of archival activities, management techniques, and outside factors if we wish to improve productivity and collection access."[175]

More in keeping with a postmodern sensibility, others within the profession have understood that deconstructing the archive and archival practice includes critically examining how archivists have internalized their own sense of the profession and their role in sedimenting the historical record in place.[176] Deconstructed here is the looming specter of labor in the classification and arrangement process, although there is much work to do in this regard. In the digital realm, the claim is that the backlog may be staved off if arrangement follows big data practices and "becomes largely automated, algorithmic, and batch processed."[177] Yet, it is unclear whether or to what extent archivists are adjusting to the reality that their work is becoming increasingly computerized. Missing is research that sheds light on how archivists come to accept, adapt, or resist new technologies and their integration into long-established work practices. Meanwhile, in the analog realm, some portray the process of physical arrangement as "a fading feature of archival work."[178] However, the reality of the backlog makes the erasure of this archival process unlikely, at least for some time. What is known about archival labor suggests that engaging with documents and the contexts from which they are drawn is emotion-laden work, even if archivists downplay such aspects during the arrangement process.[179] Yet, an examination of the human labor of ordering can reveal how archivists actually structure the world around them: work that plays out within economic and political systems that shape and influence its outcomes.

My own work tackles the trope of the archivist as technician acknowledging the role that the archive plays as an information and knowledge infrastructure and the work of archivists as sustainers of communities and as maintainers of the bodies of information under their care. Being situated within the landscape of infrastructural studies allows a closer examination of the technical, social, and political aspects of the archive, with the archive understood as a type of pervasive sociotechnical resource that needs to be developed and maintained to remain usable and useful. In reality, the archival infrastructure is often poorly maintained, a breakdown manifested in the ever-present processing backlog described in the archival literature. If, in 2005, Greene and Meissner called for archival systems to be re-engineered for greater maintainability, linking the backlog to a failure on the part of archivists (the maintainers), infrastructural and maintenance studies draw attention to the implicit neoliberal agenda, and associated power structures, that privilege efficiency and novelty to the detriment of those who labor within these systems. The focus on studies of maintenance work provides a backdrop against which to understand processing as a hidden tool of repair. The repair in this instance is an attempt to heal the rift in space and time between the materials as created and the materials as archived, an attempt to restore the materials to a place in time and to a condition where they were most meaningful.[180]

Taking a different tack, my research has also probed the underlying ideologies and understandings that archivists bring to the act of arrangement and that turn out to be often at variance with the assorted archival doctrines that this article examines. This insight into archival practice delves into what Geoffrey Bowker and Susan Star describe as "the landscape of work as experienced by those within it."[181] As part of a larger experimental and comparative study of analog versus digital processing practices (processing via the Augmented Processing Table—a digital tabletop interface and digitized images), my work with Luis Francisco-Revilla studied the implications of a "digitize first, process second" approach to combating the archival backlog. In the process, the study examined how principles and practices of arrangement play out in the mind and actions of the archivist. As part of the comparative process, we determined various phases and styles of arrangement, as well as the topologies (structure) of the resulting arrangement schemes. The findings reveal aspects of the work of archival arrangement (analog and digital) largely ignored in the literature to date, including the propensity for human errors during the arrangement process, the lack of replicability of arrangement typologies (archivists producing dissimilar arrangements given the same archival materials), and differences in the overall quality of arrangement. Perhaps more critically, the study draws attention to a propensity to bypass original order, and a focus on evidence, in the actual work of arrangement. In its stead, an arrangement model is created

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based on a preference for simplicity and certainty both on the part of the archivist and on behalf of the assumed user. The fact that intellectual form or material format is easy to understand and instantiate means that it becomes the de facto rationale for ordering, obviating or overpowering any engagement with the ongoing and complex discussions that have been surfaced in this article around preferred forms and means of contextualizing the record.[182]

Conclusion

> *I am arguing against the binary opposition and the either/or. It is in the both/and, the holding of these apparent opposites in creative tension, that there is liberation.*
>
> —Verne Harris[183]

Archival classification functions as a powerful frame for organizing knowledge, privileging certain ways of understanding over others. The need to classify and to arrange is a part of a deep-seated human desire to impose order on the world and, in doing so, to render sense and meaning from it. In existence for over a hundred years, the American archival profession has built an infrastructure in which the archive serves as the conduit between information creators and information users. Knowing that some records will make their way into the archival pipeline, archivists seek their control, retrospectively and increasingly contemporaneously and prospectively. For archival materials to be accessed and understood, archivists marshal a body of principles and methods that strive to present records in context. Context is the background, the environment, the framework, the setting, the situation, and the surroundings in which records partake throughout their existence and that weave together to tell their story.

The parameters or frameworks surrounding our classification theories and practices lead us to react and to attend to certain situations and phenomena to the neglect of others. Following the accumulation and fermentation of a body of knowledge and associated theoretical influences from the past sixty years, archivists can now critically reflect on the choices inherent in materializing different concepts and processes of classification and arrangement, and the tensions inherent in the decision-making process. As an intellectual endeavor, we have a choice to both read into and to find creativity within the kinds of tensions and ruptures that have consumed the archival profession over the course of its modern history.

Taken as a whole, it is evident that complications with the notion and principles of classification adhere at the conceptual and at the practical levels. An understanding of the contestations over the boundaries or scoping of that part of the world that is to be brought under control is a good place to start. At the most basic level, a tension resides in our understanding of the nature of

the record. In the analog world, objects live firmly in place. The archival bond is evidential. Sedimented in the filing process, records are connected to each other and to their origins. In the digital realm, archivists have tried to slough off this material reality, particularly as it relates to the archival *fonds*. However, the tools and methodologies of digital forensics draw archivists back to the physicality of the digital object at hand. Digital forensics allows archivists to uncover the inscription of the record, its places and manner of storage, and its interrelationships in ways that are both profound and elemental. Yet, new data models can also push past these notions of sedimentation to reveal multitudes of orderings at will. Here, the significance lies not in understanding and unpacking the digital object and its immediate material context but in uncovering and enabling surrounding contextual relationships. Indeed, the archival literature of the last sixty years reveals that the totality that is or could be the archival *fonds* is complex, difficult to pin down. At heart, the tension lies between understanding that which is knowable and controllable (the closed archive, the archival fragment or residue, the reconstructed archive in physical custody) and that which is not (the pristine entirety, the evolving archive, the virtual imagined archive).

Concurrently, the meaning of a body of records (physical or virtual) is understood as revealed through connections to relationships that are both broadly originary and constantly evolving. Provenance retains its association with relationships that are externally and internally realized. Yet, we now view external manifestations of provenance as less parsimonious and infinitely more complex. Provenance is no longer solely bound to a one-to-one relationship between a creating entity and its residual archive. Provenance is now enmeshed with living and ever-fluid frameworks of organizations, communities, individuals, functions, custodians, archivists, and readers, as "activators" of the archive.[184] The nature and boundaries of original order, and thus the confines of internal organization, are now understood as similarly elastic. The notion of the physicality of order has been joined by viewpoints that highlight its representational nature, created through the iteration of relationships, behaviors, and/or the descriptive process.

This multitude of understandings has come about because archivists operate within broader structures that frame and influence the practice of archival work and work processes. Information technology development, advances in communication technologies, the provision of access to and management of societal resources (including information), and the fragmentation of the academy along disciplinary lines all play a role in creating a world to which the archive and archivist must respond in and across time. Thus, the work of framing the profession, and its associated principles and concepts, has filtered not only through our own theories and methodologies but those of associated disciplines that provide sometimes competing ways of understanding the past, the

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role of its documentary traces in society, what can be reconstructed from such texts, and the archivist's role in stewarding such stories.

In one respect, the past sixty years of archival work is entwined with the unprecedented speed of technological change and the affects it has wrought in society. This world is dominated by information-centric and computer-dependent businesses and bureaucracies staffed by information workers; by the widespread adoption of stand-alone and networked digital technologies; and by the associated increase in the creation, access, and use of digital information in professional and in personal spheres. The emergence of an information society from the 1950s onward is associated with the rise of industrialism, the growth of capitalism, the legacy of the Cold War, and the increasing centrality of information as a feature of American life and culture. As society moved from information rich (1960s–1970s), to information based (1980s–1990s), to information dominated (1990s–2000s), so too emerged the need for professionals who are experts in information's control, organization, and dissemination.[185]

That archivists have struggled to keep up with the information deluge is clear in the ever-present backlogs that haunt the archival imaginary. Indeed, who can forget the clarion call from Mark Greene and Dennis Meissner in the mid-2000s for archivists to produce "more product and less process" to clear this information logjam.[186] The pragmatics of managing, preserving, and providing access to digital information at scale has thus ushered in new forms of cross-disciplinary collaboration and technical innovation. In the process, archivists have been drawn to models for archival classification that move from documenting relationships via fixed hierarchy to the network, acknowledging the possibilities of technology and the complexity of today's information systems. As in the analog world, ordering as a form of remixing in the archive and elsewhere is clearly a possibility here, with only a person's imagination and creativity bounding variants and transformations of context.

As an aesthetical force, these new classification models are cross-cutting, taking on the characteristics of nonlinearity, interconnectedness, and interdependence. The notion of the boundary of external provenance thus shifts from a frame of clear demarcation (e.g., a creating or receiving entity); to one with more dimension, having temporality, movement, and a sense of what is inside and outside; to one that is ever-expansive, networked, and interconnected. The structure of original order, and the notion of the part and its whole (in analog terms, the record group, series, file, and item), are correspondingly interrupted and stretched. The size of digital collections and the nature of the technology underlying their structure mean that "the overarching collection and the item survive, but the intervening layers (those we traditionally identified as physical series and files) become destabilized in digital space."[187] At scale, the item becomes the natural unit in the digital realm.

In a sign of a future, perhaps to come, the dialogue between archival science and information and computer science has resulted in the emergence of a new transdiscipline in the academy, computational archival science (CAS). CAS defines itself as a "field concerned with the application of computational methods and resources to large-scale records/archives processing, analysis, storage, long-term preservation, and access, with the aim of improving efficiency, productivity and precision in support of appraisal, arrangement and description, preservation, and access decisions."[188] This is the world of artificial intelligence and machine and deep learning. This is the world in which the product of archival classification can be reimagined through the auspices of computational methods of parsing (content recognition, natural language processing, and data summarization), modeling (graph theory and graph analytics), visualizing (information visualization and visual analytics), and discovery (faceted interfaces).

In this partnership, archivists are said to highlight their historical and ongoing expertise as preservers of "enduring and trustworthy memory and evidence," while ceding to computational science the advanced theories, tools, and methods that make possible an understanding of "the formation, processing and storage of digital records."[189] This reformulation of traditional concerns for records and their lineage provides an opportunity for archivists to also engage with a broader computer-science–driven "data provenance" movement and, if a decision is made to do so, to formally specify how archival provenance data can be modeled, exchanged, accessed, and merged.[190] That artificial intelligence systems are being created that can automatically extract provenance and associated contextual data from systems and objects, retrospectively and in real time, speaks to the viability of such an approach.

Overall, this worldview reaffirms the traditional evidentiary approach to classification, in which formerly scattered groups of records can be virtually and descriptively repatriated to their provenancial source or groups of records connected in a multi-provenancial environment. Yet, in "an archives-as-data paradigm," it is also possible that the traditional archival focus on evidence could lessen or dissipate in a world of disintermediation.[191] In tandem or in its stead, a disintermediated worldview will privilege user-directed acts of classification that herald new but nonoriginal interpretive frames. It augurs an approach that is both context-demolishing and context-creating that hews to the intent of the reader rather than to the intent of the creator. In thinking about the consequences of the datafication of digital archives as a precursor to computational manipulation, Devon Mordell raises the specter of the profession's return to a disciplinary influence in which notions of objectivity and neutrality in archival objects and in archival work come once more to the fore. Like the rise of scientific history in the nineteenth century, the rise of computational tools in the twenty-first may revisit an ideology in which data can be seen as raw and

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natural in nature and computational algorithms as objective and unbiased tools for its analysis. Indeed, the concern that Mordell raises is that "the efforts of the archival profession over the past three decades to pluralize the archival endeavour and to introduce a social justice orientation—incorporating critical race theory, feminist theory, queer theory, and other overtly politicized modes of inquiry—into archivy may be stifled or even undone."[192]

Sidestepping the focus on technology for the moment, clearly the past sixty years have been rife with social and political upheaval as people (represented, for example, by the women's rights, civil rights, and antiwar movements) have come together to fight for specific freedoms and equalities. Cycles of historiography since the twentieth century attuned themselves to these narratives: progressive historiography (1910s–1940s) focused on long-term social history, social class, and class conflict, while the work of the new left and of social historians (1950s–1970s) focused on issues of class, race, and gender. More recently, the cultural turn of the 1980s and 1990s ushered in gender, memory, and the cultural legacy of colonialism and imperialism as central categories of analysis.

From an archival perspective, this broader intellectual discourse aligns with the rise of professional activism and the ascent of individual and community-based archiving efforts infused with new forms of digital documentation created, organized, used, and shared within physical and virtual spaces in a way that democratizes and extends the archival paradigm. Thus, today's understanding of archival classification and arrangement practices also exists within a realm that seeks to move analog theory and practice into a more pluralistic, digital recordkeeping realm, a shift that creates synergies with fields such as digital humanities and gender studies, alongside the aforementioned information and computer science.

From such perspectives, today's archival landscape is characterized by a growing awareness of the politics and power inherent in archival work, a revelation that has led to new ways of understanding and interpreting records and their aggregations, along with the archival labor and ethos by which they are maintained. As Bowker and Star remind us, "no one classification organizes reality for everyone," with decisions routinely made about who and what should be visible or invisible in a classification scheme. Thus, the call for "multivocality" now permeates all aspects of the archival profession and challenges how we engage with the principles and practices of classification and arrangement.[193]

The result has been a decoupling of the archive and archival practice from notions of objectivity and neutrality and the expansion of context to acknowledge the forces that have the power to structure people's realities. In some cases, traditional models of provenance and original order are seen as legacies of bureaucratic systems and structures that archivists no longer seek to reify. Fixed and limited notions of provenance are also dismissed as a method of

understanding and documenting the complexity of human life and the associations and relationships that give it meaning. Looking at the record as a communicative act has opened the field to a dialogue with what is acknowledged as a myriad of creators and of readers of the record. Authorial intent is now juxtaposed with the reader's response, once more bringing notions of evidence and discovery into a dance of conflict and concordance. In all contexts, ordering is an ongoing and social process that seeks to infuse and communicate meaning, if only recognized and investigated as such.

Notes

1 Laura Millar, "The Death of the Fonds and the Resurrection of Provenance: Archival Context in Space and Time," *Archivaria* 53 (Spring 2002): 6, https://archivaria.ca/index.php/archivaria/article/view/12833.

2 Peter Horsman, "Taming the Elephant: An Orthodox Approach to the Principle of Provenance," in *The Principle of Provenance: Report from the First Stockholm Conference on Archival Theory and the Principle of Provenance,* ed. Kerstin Abukhanfusa and Jan Sydbeck (Stockholm: Swedish National Archives, 1994), 51–63.

3 Luke J. Gilliland-Swetland, "The Provenance of a Profession: The Permanence of the Public Archives and Historical Manuscripts Traditions in American Archival History," *American Archivist* 54, no. 2 (1991):160–75, https://doi.org/10.17723/aarc.54.2.w42580v137053675.

4 For more on Brenneke's work, see Angelika Menne-Haritz, "Appraisal or Documentation: Can We Appraise Archives by Selecting Content?," *American Archivist* 57, no. 3 (1994): 528–42, https://doi.org/10.17723/aarc.57.3.g114464381p11324; Peter Horsman, "The Last Dance of the Phoenix or the De-discovery of the Archival Fonds," *Archivaria* 54 (Fall 2002): 1–23, https://archivaria.ca/index.php/archivaria/article/view/12853; and Giovanni Michetti, "Archival Method," in *Encyclopedia of Archival Science*, ed. Luciana Duranti and Patricia C. Franks (Lanham, MD: Rowman & Littlefield Publishing Group, 2015): 67–70.

5 The notion of natural and mandated orders is outlined in Linda M. Janzen, "Series: History, Theory and Practice" (MAS thesis, University of British Columbia, 1994).

6 Ciaran B. Trace, "Maintaining Records in Context: A Historical Exploration of the Theory and Practice of Archival Classification and Arrangement," *American Archivist* 83, no. 1 (2020): 91–127, https://doi.org/10.17723/0360-9081-83.1.91.

7 Oliver W. Holmes, "Archival Arrangement—Five Different Operations at Five Different Levels," *American Archivist* 27, no. 1 (1964): 21–42, https://doi.org/10.17723/aarc.27.1.l721857l17617w15.

8 Terry Abraham, "Oliver W. Holmes Revisited: Levels of Arrangement and Description in Practice," *American Archivist* 54, no. 3 (1991): 370–77, https://doi.org/10.17723/aarc.54.3.2urn146354t3704r.

9 Steven L. Hensen, "'NISTF II' and EAD: The Evolution of Archival Description," *American Archivist* 60, no. 3 (1997): 287, https://doi.org/10.17723/aarc.60.3.y833n78003316620.

10 H. G. Jones, "Archival Training in American Universities, 1938–68," *American Archivist* 31, no. 2 (1968): 151, https://doi.org/10.17723/aarc.31.2.0g14n817068gv665.

11 In that period, thirty new archival faculty joined library and information science programs, and fifteen found a home in history departments. Richard J. Cox, "Graduate Archival Education in the United States; A Personal Reflection about Its Past and Future," *Journal of Contemporary Archival Studies* 2 (2015): 1–9, https://elischolar.library.yale.edu/jcas/vol2/iss1/3.

12 Alison Langmead, "The History of Archival Education in America: What's Next?," in *Archival Research and Education: Selected Papers from the 2014 AERI Conference* (Sacramento, CA: Litwin Books, 2015), 273–314; Joseph M. Turrini, "From History to Library and Information Science: A Case Study of Archival Education at Wayne State University," *Information & Culture* 47, no. 3 (2012): 373, https://doi.org/10.7560/IC47305. By the third generation, as Trace and Ovalle note, "the teaching of core archival knowledge and interdisciplinary knowledge has become either so interwoven or

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at least so juxtaposed that attempts to isolate that which is purely archival from the curriculum is becoming increasingly difficult, and perhaps no longer as meaningful." Ciaran B. Trace and Carlos J. Ovalle, "Archival Reference and Access: Syllabi and a Snapshot of the Archival Canon," *The Reference Librarian* 53, no. 1 (2012): 91, https://doi.org/10.1080/02763877.2011.596364.

[13] A trend, that, as Cox notes, was aided by the increased number of university archivists who could serve as adjuncts for these programs. Richard J. Cox, "Forming the Records Professional's Knowledge: North American Archival Publishing in the 20th Century," *Records & Information Management Report* 20, no. 3 (2004): 4.

[14] George Bolotenko, "Archivists and Historians: Keepers of the Well," *Archivaria* 16 (Summer 1983): 5–25, https://archivaria.ca/index.php/archivaria/article/view/12642.

[15] In his study of the graduates of New York State Library School, Williamson notes the preponderance of students entering the program with a history or an English degree in the mid-1930s— "close to eight in ten undergraduate degrees were in the social sciences and humanities, and English and history together continued to be the subject background of more than half of all students" (p. 439). By the 1980s, the distribution of undergraduate English and history degrees for incoming students remained largely unchanged, at over 40 percent. William Landram Williamson, "A Century of Students," *Library Trends* 34, no. 3 (1986): 433–49.

[16] Ciaran B. Trace, "Phenomenology, Experience, and the Essence of Documents as Objects," *Information Research* 22, no. 1 (2017), http://www.informationr.net/ir/22-1/colis/colis1630.html.

[17] Trace, "Phenomenology, Experience, and the Essence of Documents as Objects."

[18] Gilliland-Swetland, "The Provenance of a Profession," 171.

[19] For more on the history wars see, for example, Bolotenko, "Archivists and Historians: Keepers of the Well" and Felix Hull, "The Archivist Should Not Be an Historian," *Journal of the Society of Archivists* 6, no. 5 (1980): 253–59, https://doi.org/10.1080/00379818009514151.

[20] Lorriane Daston, "The Time of the Archive," in *Science in the Archives: Pasts, Presents, Futures*, ed. Lorraine Daston (Chicago: The University of Chicago Press, 2017), 332.

[21] Daston, "The Time of the Archive," 329.

[22] Daston, "The Time of the Archive," 330.

[23] Daston, "The Time of the Archive," 331.

[24] Daston, "The Time of the Archive," 332.

[25] Adrian Cunningham, Laura Millar, and Barbara Reed, "Peter J. Scott and the Australian 'Series' System: Its Origins, Features, Rationale, Impact and Continuing Relevance," *Comma* 2013, no. 1 (2013): 134–35.

[26] Robert C. Sharman, Introduction, in *Debates and Discourses: Selected Australian Writings on Archival Theory, 1951–1990*, ed. Peter Biskup et al. (Canberra, AUS: Australian Society of Archivists, 1995), 2.

[27] Sue McKemmish, "Are Records Ever Actual?," in *The Records Continuum: Ian Maclean and Australian Archives First Fifty Years*, ed. Sue McKemmish and Michael Piggott (Clayton, AUS: Ancora Press, 1994), 189.

[28] Samuel Muller, J. A. Feith, and R. Fruin, *Handleiding Voor Het Ordenen en Beschrijven van Archieven* (Groningen: Erven B. van der Kamp, 1898).

[29] Frank Upward, "In Search of the Continuum: Ian Mclean's 'Australian Experience' Essays on Recordkeeping," in *The Records Continuum*, 110.

[30] Horsman, "The Last Dance of the Phoenix or the De-discovery of the Archival Fonds," 13.

[31] Barbara Reed, "The Australian Context Relationship (CRS or Series) System: An Appreciation," in *The Arrangement and Description of Archives Amid Administrative and Technological Change: Essays and Reflections by and about Peter J. Scott,* ed. Adrian Cunningham (Brisbane, AUS: Australian Society of Archivists, 2010), 347.

[32] Peter J. Scott, letter to the editor, *American Archivist* 30, no. 3 (1967): 542.

[33] Peter J. Scott, "The Record Group Concept: A Case for Abandonment," *American Archivist* 29, no. 4 (1966): 493–504, https://doi.org/10.17723/aarc.29.4.y886054240174401; and Scott, letter to the editor, 541–42.

[34] Peter J. Scott, "Facing the Reality of Administrative Change," in *Debates and Discourses*, 123–31. For a Canadian take on the complexities of government bureaucracies and their implications for

the notion of the record group, see Carl Vincent, "The Record Group: A Concept in Evolution," *Archivaria* 3, no. 1 (1976–1977): 3–16, https://archivaria.ca/index.php/archivaria/article/view/10464.

35 Scott, "Facing the Reality of Administrative Change," in *Debates and Discourses*, 128.

36 Peter J. Scott, Introduction, in *The Arrangement and Description of Archives Amid Administrative and Technological Change*, 46.

37 Horsman, "The Last Dance of the Phoenix or the De-discovery of the Archival Fonds," 15.

38 Terry Cook, "Archives in the Post-custodial World: Interaction of Archival Theory and Practices since the Publication of the Dutch Manual in 1898" (paper delivered to the 13th International Congress on Archives, Beijing, 1996).

39 Scott imported the terms from linguistics, a discipline he studied at university. See Scott, Introduction, in *The Arrangement and Description of Archives Amid Administrative and Technological Change*, 8–95.

40 Mark Wagland and Russell Kelly, "The Series System—A Revolution in Archival Control," in *The Records Continuum*, 131–49. Although following the publication of Scott's article, a defense was mounted of NARA's use of the record group concept. See G. L. Fischer, "Letting the Archival Dust Settle: Some Remarks on the Record Group Concept," in *Debates and Discourses*, 117; and Meyer H. Fishbein, "The Record Group Concept," letter to the editor, *American Archivist* 30, no. 1 (1967): 239–40.

41 Michel Duchein, "Theoretical Principles and Practical Problems of Respect des Fonds in Archival Science," *Archivaria* 16 (Summer 1983): 68, https://archivaria.ca/index.php/archivaria/article/view /12648. For another description of Duchein's view, see Peter Horsman, "The Last Dance of the Phoenix or the De-discovery of the Archival Fonds."

42 Duchein, "Theoretical Principles and Practical Problems of Respect des Fonds in Archival Science," 64–82.

43 Terry Cook, "The Concept of the Archival Fonds in the Post-Custodial Era: Theory, Problems and Solutions," *Archivaria* 35 (Spring 1993): 24–37, https://archivaria.ca/index.php/archivaria/article /view/11882.

44 Cook, "The Concept of the Archival Fonds in the Post-Custodial Era," 28, 30.

45 Cook, "The Concept of the Archival Fonds in the Post-Custodial Era," 31.

46 Cook, "The Concept of the Archival Fonds in the Post-Custodial Era," 33.

47 Hugh A. Taylor, "Transformation in the Archives: Technological Adjustment or Paradigm Shift?," *Archivaria* 25 (Winter 1987–1988): 20, https://archivaria.ca/index.php/archivaria/article/view/11451.

48 David A. Bearman and Richard H. Lytle, "The Power of the Principle of Provenance," *Archivaria* 21 (Winter 1985–1986): 14–27, https://archivaria.ca/index.php/archivaria/article/view/11231.

49 Max J. Evans, "Authority Control: An Alternative to the Record Group Concept," *American Archivist* 49, no. 3 (1986): 255, https://doi.org/10.17723/aarc.49.3.0862585240520721.

50 Evans, "Authority Control: An Alternative to the Record Group Concept," 260, 261.

51 Peter Horsman, "Wrapping Records in Narratives: Representing Context through Archival Description" (paper presented at the Usability of the Archives of the International Tracing Service Workshop at the ITS, October 10–11, 2011).

52 The contribution of postmodern ideas to expanded notions of context is raised in Tom Nesmith, "Reopening Archives: Bringing New Contextualities into Archival Theory and Practice," *Archviaria* 60 (Fall 2005): 259–74, https://archivaria.ca/index.php/archivaria/article/view/12523.

53 Reed, "The Australian Context Relationship (CRS or Series) System," 349.

54 Chris Hurley, "In Pursuit of Provenance: When Societal Met Parallel with a View to Relationships" (paper presented at Australian Society of Archivists, Adelaide, June 21, 2013), https://www .descriptionguy.com/images/WEBSITE/What-is-PP.pdf, captured at https://perma.cc/97TE-5XSV.

55 Chris Hurley, "Parallel Provenance Part 1: What, If Anything, Is Archival Description?," *Archives and Manuscripts* 33, no. 1 (2005): 110–45, https://publications.archivists.org.au/index.php/asa/article /view/9765; and Chris Hurley, "Parallel Provenance Part 2: When Something Is Not Related to Everything Else," *Archives and Manuscripts* 33, no. 2 (2005): 52–91, https://publications.archivists.org .au/index.php/asa/article/view/9799.

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56 Chris Hurley, "Personal Papers and the Treatment of Archival Principles," in *Debates and Discourses* 143–58.

57 Hurley, "Parallel Provenance Part 1"; Hurley, "Parallel Provenance Part 2"; Hurley, "In Pursuit of Provenance."

58 Tom Nesmith, "The Concept of Societal Provenance and Records of Nineteenth-Century Aboriginal-European Relations in Western Canada: Implications for Archival Theory and Practice," *Archival Science* 6, nos. 3–4 (2006): 351–60, https://doi.org/10.1007/s10502-007-9043-9.

59 For more on ambient entities, see Chris Hurley, "Ambient Functions—Abandoned Children to Zoos," *Archivaria* 40 (Fall 1995): 21–39, https://archivaria.ca/index.php/archivaria/article/view /12095; and Chris Hurley, "In Pursuit of Provenance." The notion of a more expansive view of provenance (and one that disentangles provenance from its focus on the *fonds*) has also been taken up by Canadian archivist Laura Millar who, in drawing from models in archaeology and museology, envisions provenance as encompassing creator history, the history of recordkeeping, and custodial history. Millar, "The Death of the Fonds and the Resurrection of Provenance," 1–15.

60 A notion that has stretched, for example, from defining a series as a "physical 'filing accumulation' in the office of origin" created with retrieval in mind; as a *post hoc* "archival unit defined by intellectual characteristics of the documents themselves," or (the American viewpoint) as a "descriptive unit" that exists "within a classification system designed to assist researchers." Janzen, "Series: History, Theory and Practice," 44, 66.

61 Hurley, "In Pursuit of Provenance." In a similar vein, Yeo describes a series as an "aggregate record that has the potential to be manifested as a physical unity, even if it is not always manifested thus in practice." Geoffrey Yeo, "Bringing Things Together: Aggregate Records in a Digital Age," *Archivaria* 74 (Fall 2012): 51, https://archivaria.ca/index.php/archivaria/article/view/13407.

62 See Greg Bak, "Continuous Classification: Capturing Dynamic Relationships among Information Resources," *Archival Science* 12, no. 3 (2012): 287–318, https://doi.org/10.1007/s10502-012-9171-8.

63 Geoffrey Yeo, "The Conceptual Fonds and the Physical Collection," *Archivaria* 73 (Spring 2012): 68, https://archivaria.ca/index.php/archivaria/article/view/13384.

64 On a similar note, Horsman argues that "almost all fonds in the custody of archivists are just record groups or groupings of records . . . the term 'record group' actually expresses better the nature of the archivists' construct." Horsman, "The Last Dance of the Phoenix or the De-discovery of the Archival Fonds," 21.

65 Yeo, "The Conceptual Fonds and the Physical Collection," 79.

66 Yeo, "The Conceptual Fonds and the Physical Collection," 61.

67 Elaine Svenonius, *The Intellectual Foundation of Information Organization* (Cambridge, MA: The MIT Press, 2000), x.

68 Terry Cook, "Easy to Byte, Harder to Chew: The Second Generation of Electronic Records Archives," *Archivaria* 33 (Winter 1991–1992): 206, https://archivaria.ca/index.php/archivaria/article /view/11812.

69 Jane Zhang, "Original Order in Digital Archives," *Archivaria* 74 (Fall 2012): 191, https://archivaria.ca /index.php/archivaria/article/view/13410.

70 *Archivists and Machine-Readable Records: Proceedings of the Conference on Archival Management of Machine-Readable Records, February 7–10, 1979* (Chicago: Society of American Archivists, 1980).

71 National Archives and Records Service, "Proposed General Records Schedule 20: Describing Proposed Disposition for Machine-readable Records, Related Documentation Required for Their Servicing, and Files Related to the Automatic Data Processing (ADP) Procurement, Operations, and Management Function" (1972).

72 Allan G. Bogue, "The Historian and Social Science Data Archives in the United States," *American Behavioral Scientist*, 19, no. 4 (1976): 419–42, https://doi.org/10.1177/000276427601900404. Bogue notes that the Social Science Research Council promoted the idea that this work should be handled by a federal data center.

73 Charles M. Dollar, "Appraising Machine-Readable Records," *American Archivist* 41, no. 4 (1978): 423–30, https://doi.org/10.17723/aarc.41.4.g333h26662621363; Margaret L. Hedstrom, *Archives and Manuscripts: Machine-Readable Records* (Chicago: Society of American Archivist, 1984); and Patricia Aronsson and Thomas Elton Brown, "Government Archivists and Government Automation: The

Odd Couple," *Government Publications Review* 13, no. 5 (1986): 561–70, https://doi.org/10.1016/0277 -9390(86)90048-8.

74 Margaret O'Neill Adams, "Three Decades of Description and Reference Services for Electronic Records," in *Thirty Years of Electronic Records*, ed. Bruce I. Ambacher (Lanham, MD: Scarecrow Press, 2003), 70. This was the era of SPINDEX and MARC-MRDF (the Machine-Readable Cataloging– Machine Readable Data Files format).

75 The tapes comprised economic, social, natural resources, environmental, emergency operations, political, judicial, and national security data.

76 Robert M. Warner and Francis X. Blouin, "Some Implications of Records in Machine-Readable Form for Traditional Archival Practice," in *Archivists and Machine-Readable Records,* ed. Carolyn L. Geda, Erik W. Austin, and Francis X. Blouin (Chicago: Society of American Archivists, 1980), 242–48.

77 Greg Bak, "How Soon Is Now? Writings on Digital Archiving in Canada from the 1980s to 2011," *American Archivist* 79, no. 2 (2016): 310, https://doi.org/10.17723/0360-9081-79.2.283.

78 In fact, archivists were often dealing with different kinds of records or files, which not only included master files (representing an output to the system and the definitive state of a data file in a system at any one time), but also processing files (including work files, input files, and trans- action files employed to create or update the master file) and the documentation that related to the objectives and plans for the system and that was needed to service the files. The archive file itself could contain a data file, a human-readable user guide to the data, and a machine-readable dictionary file that described the data in machine-readable form. Information about the work of the early electronic records archivists is outlined in Hedstrom, *Archives and Manuscripts: Machine- Readable Records*; Katherine Gavrel, *Conceptual Problems Posed by Electronic Records: A RAMP Study* (Paris: UNESCO, International Council on Archives, 1990); Bruce Ambacher, "The Evolution of Processing Procedures for Electronic Records," in *Thirty Years of Electronic Records,* 43–62; and Cook, "Easy to Byte, Harder to Chew," 202–16.

79 Cook, "Easy to Byte, Harder to Chew," 204.

80 Dollar, "Appraising Machine-Readable Records," 424.

81 National Archives and Records Service, "Proposed General Records Schedule 20."

82 Hedstrom, *Archives and Manuscripts: Machine-Readable Records*, 23.

83 Candace Loewen, "The Control of Electronic Records Having Archival Value," *Archivaria* 36 (Fall 1993): 66, https://archivaria.ca/index.php/archivaria/article/view/11935.

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86 Richard M. Kesner, "Whither Archivy?: Some Personal Observations Addressed to Those Who Would Fiddle While Rome Burns," *Archivaria* 20 (Summer 1985): 142–48, https://archivaria.ca/index .php/archivaria/article/view/11184.

87 Hedstrom, *Archives and Manuscripts: Machine-Readable Records*, 63. Bak similarly describes the 1990s as the era in which "electronic records started to swallow all other record types, starting with financial records, correspondence, and office documents and moving on to photographs, video, and so on." Bak, "How Soon Is Now?," 286.

88 David Bearman, "Record-Keeping Systems," *Archivaria* 36 (Autumn 1993): 16–36, https://archivaria.ca /index.php/archivaria/article/view/11932.

89 Luciana Duranti, "The Impact of Digital Technology on Archival Science," *Archival Science* 1, no. 1 (2001): 39–55, https://doi.org/10.1007/BF02435638; and Luciana Duranti, "From Digital Diplomatics to Digital Records Forensics," *Archivaria* 68 (Fall 2009): 39–66, https://archivaria.ca/index.php /archivaria/article/view/13229.

90 Luciana Duranti, *The Long-term Preservation of Authentic Electronic Records: The Findings of the InterPARES Project* (San Miniato, IT: Archilab, 2005); and Luciana Duranti and Kenneth Thibodeau,

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"The Concept of Record in Interactive, Experiential and Dynamic Environments: The View of InterPARES," *Archival Science* 6, no. 1 (2006): 13–68, https://doi.org/10.1007/s10502-006-9021-7.

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92 Duranti, "From Digital Diplomatics to Digital Records Forensics," 64.

93 Duranti, "From Digital Diplomatics to Digital Records Forensics," 64.

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95 Trevor Owens, *The Theory and Craft of Digital Preservation* (Baltimore: Johns Hopkins University Press, 2018).

96 Christopher A. Lee, "Digital Curation as Communication Mediation," in *Handbook of Technical Communication*, ed. Alexander Mehler and Laurent Romary (Berlin: De Gruyte Mouton, 2012), 507–30.

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98 Bailey, "Disrespect Des Fonds"; and Matthew G. Kirschenbaum, *Mechanisms: New Media and the Forensic Imagination* (Cambridge, MA: The MIT Press, 2008).

99 Kirschenbaum, *Mechanisms*, xiv.

100 Owens, *The Theory and Craft of Digital Preservation*.

101 In interviewing archivists and librarians about writers' archives, Jennifer Douglas uncovered a multitude of understandings centered on the notion of order: including the creator's order, the packed-up and shipped order, the custodial order (order placed on materials following the death of the writer), the presumed original order, and that of the original disorder. Jennifer Douglas, "What We Talk About When We Talk About Original Order in Writers' Archives," *Archivaria* 76 (Fall 2013): 7–25, https://archivaria.ca/index.php/archivaria/article/view/13456.

102 Owens, *The Theory and Craft of Digital Preservation*.

103 Kirschenbaum, *Mechanisms*, 53.

104 Kirschenbaum, *Mechanisms*, 116.

105 Owens, *The Theory and Craft of Digital Preservation*, 53.

106 Kirschenbaum, *Mechanisms*, 30.

107 Bailey, "Disrespect Des Fonds."

108 Owens, *The Theory and Craft of Digital Preservation*, 157.

109 Owens, *The Theory and Craft of Digital Preservation*, 158.

110 Owens, *The Theory and Craft of Digital Preservation*, 148.

111 Patricia Galloway, "Order as Received: A Foundational Virtual Order for Digital Records" (unpublished manuscript), https://www.ischool.utexas.edu/~galloway/spring2015/INF392K/OARArchivaria2012v4.doc.

112 Jenny Bunn, "Mind the Explanatory Gap: Quality from Quantity," in *IEEE International Conference on Big Data* (IEEE, 2016), 3240–244, https://doi.org/10.1109/BigData.2016.7840980.

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114 Weijia Xu, Maria Esteva, Jessica Trelogan, and Todd Swinson, "A Case Study on Entity Resolution for Distant Processing of Big Humanities Data," in *IEEE International Conference on Big Data* (IEEE, 2013), 113–20, https://doi.org/10.1109/BigData.2013.6691678.

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