



Archival infrastructure and the information backlog

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Abstract

Embedded in the notion of the archive as knowledge infrastructure is the idea of a steady flow of information that resides within and moves through socio-technical systems. While there is exponential growth in the information transferred between the creator and the archive, the information flow between the archive and the user is often leaky—discontinuous and disrupted. There is a considerable interval between the time archival material are accessioned, processed, and made accessible for research. It is in this space that what archivists euphemistically call ‘the backlog’ comes into existence. What the backlog interrupts is the distribution and consumption end of the research process. As a concept and a reality, the backlog is a critical point of failure, carrying with it an ongoing and prevailing sense that ‘deferred maintenance’ has become the norm in the archive. In this article, focus is placed on framing and understanding the backlog as an infrastructural problem and on highlighting the conflict inherent in various forms of discourse seeking solutions to it.

Keywords Infrastructure · Maintenance · Maintenance work · Archival processing · Backlog · Archival labor · Humanities scholarship

Introduction

We are the distance runners. We are the keepers of the catalogues, the archivists, the librarians. We are the marathoners of the museum. Ours is not the race quickly won. Our work is measured by accumulation, in thousands of records, numbers of books, linear shelf feet, and sometimes even the size of the backlog. Ours is to collect and catalogue, to compile and classify, to man-

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age and preserve. We measure not in miles but in years, and decades, and generations. The finish line remains on an ever-distant horizon (Allen 1996, p 76).

Knowledge infrastructures exist as “robust networks of people, artifacts, and institutions that generate, share, and maintain specific knowledge about the human and natural worlds” (Edwards 2010, p 17). Archives form part of the knowledge infrastructure of the humanities, helping to gather, maintain, and circulate the recorded experiences that comprise human life and existence (Trace and Karadkar 2017). Created by a network of discrete organizations, archives exist as institutional arrangements, represented by physical and organizational structures and facilities. As an infrastructure populated with information artifacts, archives exist as networked and secure information systems—conduits from the creator of the source to the subsequent user of the source, with collections existing in permanent escrow with and within the archive. As an infrastructure maintained by a professional community, archives demonstrate a sense of commonality through professional standards and collaboration, and membership in professional bodies. Loosely coupled, what draws this infrastructure together are the shared norms, techniques, practices, and technical systems that workers use to support and sustain the archive. In all these notions of ‘the archive as infrastructure’ temporal dimensions loom large. The archive (in its various manifestations) has set itself up to be the preserver of the historical record—‘forever,’ ‘in perpetuity,’ or in the case of the United States National Archives, ‘for the life of the republic’—take your pick.

According to Sheila Anderson, archives become research infrastructures when “their practices are in relationship to the practices of scholarship” (2013, p 11). She ties the success of this infrastructure to the degree to which “it fills gaps in existing provision, or it is a solution to identified problems and perceived difficulties.” Infrastructure will be taken up, she says if “it is seen to be integral to the achievement of research goals” (Anderson 2013, p 10). As knowledge, information, and research infrastructures, Anderson declares that archives are sites that are not only “deeply material” but clearly visible to the humanists that engage with them (2013, p 10). Anderson (2013) describes the humanities scholar as consciously engaged with the archive as place and as material reality; understanding what archives are and experiencing how they operate. While in agreement with Anderson on all the archival infrastructure makes possible, this article disabuses the notion that archival infrastructure is always obvious to users and other stakeholders. Instead, this paper centers on tensions between notions of visibility and invisibility as it plays out in archival infrastructure and maintenance work in and over time. Here, I refer specifically to the fact that infrastructure and maintenance work is typically hidden from view until a breakdown occurs. It is failure that reveals the human and non-human actors that form and enable the archive and the conditions and obligations under which this research infrastructure truly functions.

The concepts of punctualization and depunctualization drawn from actor-network theory are relevant here (Latour 1999). Punctualization refers to the idea that complex parts of systems are often abstracted or concealed, and their interactions hidden from view. Black-boxed to all intents and purposes, depunctualization occurs with a breakdown or malfunction in the system that reveals parts that are related to or

affected by the failure. In the archival world, this breakdown, this failure to maintain, is manifested in the ever-present ‘backlog’ that haunts most archival institutions and that is made visible in certain circumstances and settings. The ‘backlog’ in this scenario is the buildup of work waiting to be completed to move historical records through the pipeline from creator to consumer. A manifestation of a malfunctioning infrastructure or at least an infrastructure operating under a general culture of objective scarcity, the backlog distorts the research process or at best leaves the research process tolerably intact.

In the USA, the backlog is as ubiquitous as it is extensive. In the mid-2000s, the National Archives and Records Administration (NARA) estimated its backlog at over 1 million cubic feet of records. An analysis of its holdings revealed that “74% of textual records in Washington were not processed sufficiently to enable researchers to easily identify records of interest.” NARA estimated that it would take at least 4000 employees to “adequately” process the records; a feat given that its staff in Washington D.C. dedicated to reference and processing of textual records was fewer than 140 at the time (Bucciferro 2008). By the end of fiscal year 2012 NARA, renewing its effort to tackle the problem with team-based and user-driven processing, had made headway with the backlog sitting at 40%. In the same year, however, over 95% of electronic records held by NARA presidential libraries were believed to remain unprocessed (NARA Office of Inspector General 2013). Continuing its initiative with analog records, NARA sets a goal in its 2018–2022 strategic plan of having 82% of its holdings processed by fiscal year 2021 (Fig. 1).

In the case of the archival backlog, it was the archival profession itself that first revealed key inadequacies to internal and external constituents. In the USA, a 2005 article by Mark Greene and Dennis Meissner was a particular inflection point,



Fig. 1 Federal Record Center staff member Willie Campos moves incoming accessions with a forklift, Laguna Niguel, California, 10/26/1989, ARC Identifier 29,011,096

with the clarion call that emerged from their work—‘more product less process’ (MPLP)—a direct response to and an attempt to correct this mulish problem. The backlog is a concrete instantiation of *slippage*, a gap between a system’s current and desired state (Henke and Sims 2020). The backlog occurs because the rate of flow between the creator and the archive (the pipeline that feeds the archival infrastructure) is growing exponentially (Greene and Meissner 2005). Moreover, the information flow between the archive and the user is not just mediated but leaky—discontinuous and disrupted. There is often a considerable interval between the time archival material is acquired and subsequently made accessible to designated communities. The delay encompasses the time elapsed from the accessioning of a collection to the completion of its arrangement and description, including an often-substantial amount of time a collection sits on the shelf before its processing commences (Abraham et al. 1985). It is in this space that what archivists euphemistically call ‘the backlog’ comes into existence.

In the professional literature, the backlog is defined as “materials received by a repository, but not yet processed... Anything delayed while pending some action” (SAA Glossary). The backlog reflects an interruption of the information flow leading to an associated disruption to the consumption end of the research process. It indicates that a material limit has been met and signals that access to historical data are always contingent on other processes that are developed around it. The backlog interrupts the process of archival communication; the arrangement and description work that archivists do to contextualize and portray the content of archival materials to contemporary and future generations (MacDermaid 1992; Trace 2020a, b). This deferred maintenance is a case of archival intermediation on steroids; a reality which may prevent the researcher from gaining access to archival records under any condition, even if they had managed to create a joint understanding with the archivist about the nature and import of their research (Trace 2006). As a concept and a reality, therefore, the backlog exists as a critical point of failure in archival infrastructure. It carries with it an ongoing and prevailing sense that deferred maintenance has become too often the norm in the archive, with the processing of archival materials and the associated restorative labor of the archivist sidelined and delayed as a result (Trace 2019).

In the archival profession, the attitude toward this deferred maintenance is diffuse. The notion of deferring maintenance on archival materials has long been normalized, if only internally. The term ‘backlog’ forms part of the lexicon in archival glossaries and manuals and has more recently been reified in the architecture of digital preservation systems. Externally, the frequent absence of descriptions of unprocessed collections from cataloging and finding aid systems generally detaches the archivist from likely public censure. Yet, the breadth and size of archival collections since the 1950s mean that the “huge backlogs” that have accumulated in archival repositories are increasingly difficult for archivists and archival stakeholders to ignore (Greene and Meissner 2005, p 211). The results of an Association of Research Libraries survey in the late 1990s provide a concrete indication of the extent of the arrearage, finding an average backlog of manuscripts, video, and audio material in member repositories running to twenty-seven, thirty-five, and thirty-seven percentage, respectively (Panitch 2001).

Framing the backlog

Research literature introduces different framings by which the backlog can be understood, and the framing here focuses on how it can be understood as part of the functioning or non-functioning of the infrastructure of the humanities. In infrastructural terms, the archival backlog falls under what Jackson et al. (2007) refer to as *infrastructural dynamics*. In particular, the backlog can be understood as an outcome of a specific type of infrastructural dynamic—the *reverse salient*. A military term in origin, a reverse salient emerges in expanding systems when “a component of the system does not march harmoniously with other components.” In effect, as a system advances toward a goal, components tend to “fall behind or out of line” thus thwarting or hampering its functioning (Hughes 1983, p 79). In the case of the archive, processing has been established as the component that encumbers the smooth operation of this infrastructure, with the backlog emerging as its trace.

Historian Thomas Hughes, who incorporated the concept of the reverse salient in his analysis of the early development of electrical power in the USA and Western Europe, prefers the term to that of bottleneck or disequilibrium in that it captures “an extremely complex situation in which individuals, groups, material forces, historical influences, and other factors have idiosyncratic, causal roles, and in which accidents as well as trends play a part” (Hughes 1983, p 79). As entities, reverse salients are characterized as “particularly intractable challenges, limits, or sticking points” of a technical, organizational, social, or legal nature, and on which “broad-scale system development grounds and stalls” (Jackson et al. 2007). According to Jackson et al., reverse salients shape infrastructural dynamics in two significant ways: they help explain changes in the pace of development of infrastructures (linked to the “friction” or “stickiness” of the ebbs and flows of reverse salients), and they can also alter or deflect the course of an infrastructure depending on how they are resolved (2007). Yet all is not bad news in a world of reverse salients, with “innovations” and “technological developments” said to result from efforts to correct reverse salients and bring systems back into line (Hughes 1983, p 80).

Keeping with the infrastructural angle, and digging deeper into the territory of analogy, is the notion of the backlog itself as a system ‘glitch’; an occasion where the conditions of the system are not fulfilled. As Lauren Berlant notes, “a glitch is... the revelation of an infrastructural failure” (Berlant 2016, p 393). Glitches can occur in ordinary times and are also linked to and are a feature of times of transition, including forms of economic crises (Berlant 2016). For Berlant, an infrastructure is not a system or solid structure so much as the “movement or patterning of social form” and thus the “living mediation of what organizes life” (2016, p 393). While institutions are solidified and settled in place, infrastructures are defined by “patterns, habits, norms, and scenes of assemblage and use” (Berlant 2016, p 403). Glitches disrupt those assemblages, with the matter of getting beyond them differing depending on whether the glitch is ignored, or a solution constructed as short term and impermanent or whether a solution seeks to situate, collectivize, and counteract the problem that caused the glitch in the first instance (Berlant 2016).

In practical terms, to paraphrase Scott Gabriel Knowles (2016), backlogs can also be understood as part of a long process of degradation and deferred maintenance on systems (analog and technological) built to support knowledge infrastructures. If, as in most work environments, the goal of the archivist is simply to get the job done, the backlog represents an impediment to the presumption of how labor should function and what it should achieve. Echoing Evdorides et al. (2012), the information backlog can be specifically understood as the unresolved or outstanding work required to remedy the unprocessed condition of archival materials and to restore the archival infrastructure to a predefined condition where steady-state maintenance is possible.

Clearing the backlog

Identifying and making visible the depunctualizations, the parts that are related to or affected by the failure that is the archival backlog, would seem to be a prerequisite to solving this slippage or glitch in the system. Indeed, the disparate narratives of who or what is responsible for the backlog, and the implications thereof, are contained within the stories that the archival profession tells about and to itself, including the practical and political relational work that is deemed necessary to keep archival infrastructures functioning. By drawing from ethnomethodology's notion of accounts, we can see how sense has been made of this archival breakdown, the dependencies which these accounts invoke in the process, and the publics around which solutions to infrastructural glitches are said to emerge. Accounts refer to the ways that people draw upon descriptions and explanations to rationalize behaviors to themselves and others, instilling a sense of coherence and accountability in what they do (Trace 2016). In the archival context, three forms of discourse or story lines around the backlog and its repair are apparent: an external account focused on advocacy and funding, an internal account attuned to notions of efficiency and effectiveness, and a communal account focused on an archival reimagining. These discourses are attached to competing ideas about how to situate the intractable problem of the eroding of archival infrastructure, the actors that are drawn together into common spaces in the process, and the nature and reality of its repair.

External: advocacy and funding

In framing the backlog as a glitch rendered by a series of economic crises, one form of discourse looks to make the situation visible to constituents thought to have some political or economic sway. Isto Huvila points us to the critical claim that the “future role of the ALM [archive, library, museum] institutions in the society is influenced by how different stakeholder groups conceptualise it” (2014, p 46). Given that many archival institutions are publicly funded, it makes sense that the archival profession would look to the public as an essential constituent in the effort to acquire the resources necessary for infrastructural upkeep. It is a reminder that as Henke and Sims state “technical problem solving alone is rarely sufficient to enact a successful

repair” (2020, p. 82). The idea that public pressure can change or at least refocus government priorities is a necessary belief in a functioning democracy even if the headwinds against which archives struggle are substantial. Yet making the problem of the backlog, and the preferred solutions for it, visible to the public is contingent on people interacting with archival infrastructure in meaningful localized ways.

A recent national survey completed by the Humanities Indicators project of the American Academy of Arts and Sciences (2020) provides insight into American’s level of engagement (or lack thereof) in humanistic activities as part of their personal and work lives (including “later-in-life engagement with the humanities through books, the Internet, television, and cultural institutions”), as well as their perspective on the societal, economic, and personal benefits of the humanities. Survey results highlight the problem of advocating for the maintenance and repair of an infrastructure that is both connected with a discipline with a receding claim on the public imagination and that people feel is dissociated from their regular activities, experiences, and concerns. Prior research from the United Kingdom (Usherwood et al. 2005) examining how people perceive, trust, and use cultural heritage institutions as repositories of public knowledge had already signaled the public’s decoupling of notions of value and of use in archival contexts. It encapsulates a perception that while there is an inherent educational and informational good to cultural heritage institutions, it is divorced from the immediate need or likelihood of utilizing that resource. Indeed, in comparison with libraries and museums, the public show a lack of understanding about the particulars of the archive service and how it functions to add value in contemporary society (Usherwood et al. 2005).

Advocating for the value of archives at the federal and state level has also proven less than satisfactory in securing additional funds to tackle backlogs at US federal and state archival institutions, backlogs that involve not only the processing of holdings but of freedom of information requests. At the national level, calls to Congress for additional appropriations or to earmark a portion of library endowment and trust funds to tackle the processing backlogs at NARA’s presidential libraries have long gone unheeded (Craig 2006; Gallina 2010). At the state level, the example of the Texas State Archives is a salutary lesson in the perils of revealing a backlog to adversarial political constituents. As a result of undergoing sunset review during the 86th legislature (2019), the state’s Sunset Advisory Commission charged the Texas State Library and Archives Commission with adopting a more strategic posture to reduce its backlog of unprocessed archives. In lieu of increasing what were acknowledged as limited staff numbers and resources, and against a backdrop of significant budget reductions since 2012, the agency was tasked with addressing the problem through supplementary work, including reconfiguring existing resources and seeking outside partnerships (Sunset Advisory Commission 2019).

Demonstrating the vulnerability of the archive as a public asset and the associated issue of deferred maintenance has been more successful when explicitly made visible to certain constituents in the cultural heritage sector; a strategy in which advocacy is turned outward in a bid for professional and institutional legitimacy and robustness. While humanities scholars have long divorced themselves from the reality of the archival labor that mediates their research process (Speck and Links 2013), those tasked broadly with sustaining and promoting humanities research have

proven better allies. The archival strategy here is to declare the problem of the backlog as sizeable and complex, tapping into part of the financial flow that is directly associated with and that underpins and supports the humanities. Archivists have sought their way into the consciousness of these funding entities by shifting notions of repair from the localized to the systemic, and from the embodied to the networked level. In pursuit of the economic resources to rectify the issue, archivists have drawn attention to the so called ‘archival silences’—the silences that ensue within the historical record when archival materials are unprocessed and thus unavailable to researchers. When these appeals are successful, the resulting funding from granting agencies is cyclical and contingent, leading to the creation of special, although usually temporary, positions to help redress the issue.

A prominent example, described below, is instructive in showing how infrastructural breakage is framed as worthy of fiscal support. Funded to the tune of twenty-seven million dollars by the Andrew Mellon Foundation and run by the Council on Library and Information Resources (CLIR), the *Cataloging Hidden Special Collections and Archives* program operated through seven cycles (2008–2014) with the goal of processing materials held in US archives, libraries, historical societies, and museums. The program promoted a sense of shared responsibility and a profession-wide collaborative response to the issue of the backlog, funding the creation of a multi-institutional, distributed online catalog for these materials (Friedlander 2007). In the grant process, priority was given to the perceived research merit of collections and to those institutions whose cataloging and descriptive practices emphasized sustainable, efficient, and innovative practice tailored to enhanced discovery and access. Emphasis was also placed on the idea that creating online catalog records for local collections would be another step toward the development of a networked infrastructure; one in which researchers could browse or search across the broader archival ecosystem, allowing materials to be connected, reused, and repurposed as appropriate (Friedlander 2007).

Such direct appeals for funding are to a certain constellation of actors who can invest in and impact research infrastructures that are deeply embedded in government and in academic settings. The complexity of the ask is related to the push and pull of a network in which archivists and humanities scholars are enmeshed within their own political battles for disciplinary recognition and the funding that comes along with it. It speaks to the notion that the repair needed here is not just of the material but of the social and ideological kind. Archives are thus seeking to leverage their close connection to the humanities sphere and are yet made vulnerable by it. Graham and Thrift state that “attention to the need for repair and maintenance of infrastructures tends only to occur after catastrophic, rather than prosaic failures” (Graham and Thrift 2007, p 9). One could argue that the archival backlog is, in this understanding, that ignored and prosaic failure that has played out gradually and cumulatively across time. In this respect, the failure is a result of a ‘slow disaster’ (Knowles 2016) that has manifested itself through the combined effects of budget constraints and the relative dearth of funding coupled with an overall lack of investment and care in the cultural heritage sector. That the infrastructure is being undermined from without should come as no surprise. After all, as Edwards et al. remind us, information and knowledge infrastructures are “embedded in and overlaid across

cultures, organizations, governments, and other social forms,” forms that have the power to not only interpret infrastructures but to alter and erode them (Edwards et al. 2011, p 1409).

Internal – efficiency and effectiveness

“Cataloguing is a function which is not working.” There are but two options for making it work. One is to increase the resources devoted to it. Given all we know about current processing practices, current acquisition levels, and current backlogs, it would require roughly a tripling of the number of processing archivists to fix the problem in this way. Is there anyone willing to suggest with a straight face that this is possible? The other option is to change the way we process so that we can, with our existing resources, roughly triple the speed with which we process (Greene and Meissner 2005, p 254).

Accounts centered on archival efficiency place the reverse salient that is archival processing and its aftermath, the backlog, within a framework of least production. It is an assertion that the archival system has failed to be fail-safe and that improved process and not stimulus should be pursued as the most viable option to rectify measures. Here, the backlog is used as an opportunity to leverage insights about the breakdown and to lean into opportunities for reductions in practice. Practical solutions pursued in the name of efficiency in archival processing and the dismantling of the backlog have centered on reconfiguring labor practices, including creating inverted, flexible, and/or team-based archival workflows (see, for example, Hite and Link 1990).

At the heart of notions of efficiency is the need to make visible the financial and temporal costs of archival processing. From an economic perspective, an internal methodology to reduce a backlog rests in balancing several critical factors including the budget available, the targeted condition after intervention, the timeframe in which to clear the backlog, the presence of alternative remedies, and the nature of the intervention based on the standards adopted for improvement (Evdorides et al. 2012). Archivists have long felt the need to advocate for a serious accounting of the costs of archival processing. This is promulgated as part of modern management and planning techniques, and as a key component of measuring and setting standards for institutional performance and for advocating for or justifying budgetary allocations (Wilsted 1989; Shein et al. 2020). Yet, whether from an anxiety that the figures uncovered will be unpalatable to administrators, or a concern for the difficulty in measuring unique entities with variable inputs, or a sense that the variance in processing practices stymie efforts of comparison, or a reluctance to tie processing rates to an individual’s productivity, it is rare for archival repositories to publish studies that fully quantify the laborious nature of archival work (Maher 1978; Wilsted 1989; Erickson and Shuster 1995; Shein et al. 2020). In undertaking such research at the Billy Graham Center Archives in the early 1990s, archivists Erickson and Shuster (1995) sought transparency and better control of their operations by tracking information that allowed for the full financial cost of archival work to be uncovered, including the outlay for labor, materials, storage, conservation, and administration.

As the authors note, “if archivists are afraid that they will be shocked by what they will find through cost studies, they are probably right” (Erickson and Shuster 1995, p. 40). For the authors, the shock came from discovering that the average cost of processing a cubic foot of records at the repository at that time was just shy of \$375 (Erickson and Shuster 1995).

The 2005 publication *More Product, Less Process* by Mark Greene and Dennis Meissner used the crisis of deferred maintenance as a catalyst for wide scale change in archival processing, in particular seeking to engineer efficiency to remedy backlogs and in the process transform the targeted condition of collections after this intervention. Their call for efficiency is couched in terms of understanding that “professional maturity” means owning up to the limitations under which archivists work, acknowledging that “good enough” (rather than perfection) is all that can realistically be accomplished (Greene and Meissner 2005, p 255). The authors encapsulate a worldview in which prior processing practices are declared non-normative and obsolete, relics of standards first instituted when the archival pipeline looked different from today. For the authors, and the repositories who adopted their suggested practices, MPLP is part of a long overdue effort to redefine the parameters of and to gain control over “a crucial and extremely expensive component” of archival work (2005, p 226).

In the quest for control, it is understood that metrics for archival processing need to be firmly understood, quantified both retrospectively (analyzing processing rates in the past) and prospectively (standardizing processing rates for the future). In institutionalizing this control (the MPLP sense of slippage), the solution of retrofitting the model of archival processing and centering archival metrics has been embraced as a key method for funding agencies to evaluate processing projects and to hold archivists accountable. In using these metrics, outside funding entities take on the role of what Latour (1987) calls “centers of calculation,” drawing together and analyzing processing data to produce usable performance standards for archival workers and supervisors. At a granular level, this involves the MPLP archivist processing most archival materials at the series rather than the file or item level, a process that brings efficiencies to the contextualization process that is archival arrangement and description. Any deviation from this minimum is said to be sanctioned only for “clearly demonstrable business reasons” (Greene and Meissner 2005, p 240). As a result, new normative benchmarks are assigned to processing, an intervention that includes opening all unprocessed collections to researchers and assigning a rate to the processing of large twentieth-century archival materials that sees “competent” archivists arranging and describing at an average rate of 4 h per cubic foot, or 400 feet per year. As Greene and Meissner note, “by increasing general processing productivity by a factor of 4 or 5, we can... envision a realistic road to reducing backlogs, providing much better access to users, and producing a sounder administrative model for our resource allocators” (2005, pp 253–254).

With their call to fundamentally reengineer archival systems for greater maintainability, Greene and Meissner link the backlog not to the systemic failure or constraints of social and political systems but to a failure on the part of the maintainers—a failure the authors believe is manifested in archivists’ “professional fastidiousness,” “excessive pride in craft,” “reluctance to be perceived as sloppy or

uncaring by users,” “obsession with cleanliness and order,” and mere concern with “housekeeping issues” (Greene and Meissner 2005, pp 233–234, 241). As a counterpoint, the authors extoll the profession to maximize “user needs” over “housekeeping compulsions” (2005, p 237). It is an assertion that archival craft lies not in the physical skills of working with archival materials but clearly and solely with the intellectual skills of “analysis and decision making” (Dundon et al. 2020, p 9).

Yet whether an approach like MPLP produces the most growth or future-oriented results has been called into question. Revisiting the rationale for and the value of archival processing has become a central concern in dealing with born digital and digitized archival materials whose volume and complexity have added to the backlog in the past decades. In this scenario, the push for effectiveness has replaced efficiency as the central tenet, with archival skills and expert knowledge recentered and rebalanced, instantiated through the use of technologies that aid in or automate human thinking and doing (Rolan et al. 2019). Since the turn of the twenty-first century, methods and tools from digital forensics (software, programs, and scripts) have been used in tandem with human analysis to complete select digital processing tasks: extracting metadata, creating file catalogs and access copies, as well as the deduplication and bulk ingesting of files into digital repositories at scale (Kim et al. 2006). Interactive technologies, including the multitouch tabletop computer, have also been used in tandem with human analysis to prototype a digitize first, process second approach to improve the effectiveness of archival processing (Crow et al. 2012; Francisco-Revilla and Trace 2014; Trace and Francisco-Revilla 2015). In addition, the increasing size of digital collections and the scale of processing tasks have brought AI techniques from computer science and computational linguistics to the fore with machine learning, natural language processing, and data mining forming the new archival toolkit. In this scenario, the cognitive tasks of “reading, counting, sorting, assessing, searching, and grouping records” move into the computational space, drawing and building upon human knowledge in the process (Esteva et al. 2013). The emerging computational workflow takes the form of automatic document classification, redaction, metadata extraction, and topic modeling which unearth rich contextual information for the purposes of archival arrangement and description (Cain 2016; Payne and Baron 2017; Hutchinson 2020).

In Hughes’ words, what needs to be asked when seeking to ameliorate a backlog is what “concentrated action (invention and development)” is necessary to move the system forward? (Hughes 1983, p 79). For today’s efficiency seekers, this concentrated action involves making archival processes more economical—expediting the flow of information into the hands of the user facilitated by adequate arrangement inputs, sufficient descriptive outputs, and the minimal number of steps needed to preserve archival materials. For the emergent effectiveness seekers, this concentrated action is tied to make archival processes more robust, pairing human know how with novel technology adoption and tapping into analytical computational forces working at the item level and at scale. Another question that needs to be asked when seeking to ameliorate a backlog is what repair (“the beyond of glitch”) looks like both generally and during the time of crisis (Berlant 2016, p 393). In one telling, the failure is a result of a lack of capacity to optimize solutions to a problem at scale, a scenario that can now be rectified computationally even if the fiscal ramifications, including

technology costs and how to pay for an upskilled labor force, have yet to be fully thought through. In the other telling, the argument is that the failure is a result of a lack of acuity on the part of the maintainers. The working hypothesis is of an infrastructure being undermined from within—that “processing projects squander scarce resources because archivists spend too much time on tasks that do not need doing, or at least don’t need doing all the time” (Greene and Meissner 2005, p 209). For Greene and Meissner, repairing the slippage in processing, so to speak, necessitates overcoming generations of poor administrative control coupled with insufficient productivity on the part of maintainers (2005, p. 212). The failure in this scenario is revealed not just as a failure to maintain, but a failure on the part of archivists to be flexible when faced with an influx of large twentieth-century collections.

Greene and Meissner’s dictates to stem the slippage entail “hard-nosed” and “pragmatic” efforts to tackle localized repair of the backlog in tandem with more systemic cross-cutting efforts (2005, p 227). Self-care in this scenario involves prioritizing funders and users of the archive and doing so with no increase in resources but with a calculated and tailored change to the nature and speed of maintenance work. Yet that this call for efficient self-healing constitutes an implicit embrace of a neo-liberal agenda for information labor and maintenance work, an agenda that portends a deskilled and contingent labor force and a deprivation of fiscal resources that has already served to hasten the infrastructure into disrepair, has not gone unnoticed or unchallenged (Cifor and Lee 2017). Indeed, the conflict in the story of the backlog highlights the fact that the archive is a contested space, a space where competing narratives emerge of what it means to invest in and maintain infrastructure.

Redirected: reimagined

The final thread of scholarly and practical accounts houses a discourse around the archival infrastructure and its repair in a way that fundamentally redirects or reimagines the constituents and the labor at play in creating, reifying, and providing solutions to the archival backlog. These accounts contain within them a recognition that power exists in and alongside the archival infrastructure and that it must be revealed, if not outright interrogated, for transformation to occur. According to Henke and Sims (2020), there are two distinct approaches to repair as it relates to issues of power—repair that preserves the structures of the status quo and repair that corrects or realigns its structures. In the transformative framework, people “often have very different perspectives and beliefs about whether any slippage has occurred at all, whether it warrants repair, and what a possible repair might look like” (Henke and Sims 2020, p 72).

Schofield et al. (2015, 2017) offer one approach; an approach in which interactions with the archive are placed within a design frame that seeks to center and reveal the material infrastructure of the archive as it exists within an ecology of archival material, technical infrastructures, work processes, and physical spaces. The work of Schofield and his colleagues explores the design of archival interfaces attuned to the spatial and the temporal rhythms of the archival infrastructure and its workflow and to opportunities to highlight the intimacy and immediacy of the

archival space and its associated processes for the benefit of the performer (archivist) and of the audience (researcher). Leading with Schofield et al.'s (2015) idea of “archival liveness,” and their foregrounding of the “incompleteness and long time scales of archiving as features of interest,” we can imagine a scenario in which a repository’s interface serves to reveal the archival backlog in the intimate, localized manner that engages and mobilizes the general public to action. In such a scenario, the backlog is revealed as a clog in the archival infrastructure, a process in waiting; a collection sedimented in a particular time and place that can be liberated via a user-oriented design intervention.

Another approach, as adopted by archivists such as Shilton and Srinivasan (2007) and Stanford and Meyer (2011), retrofits and interprets processing in new ways, disrupting the traditional notion of the role of archival infrastructure and of archivists as sole intermediary and mediator. With caring seen as “both a practical matter and an ethical relation” (Houston and Jackson 2016, p 3), this viewpoint asserts a deep moral imperative for the invisible yet essential work of maintenance and repair and the notion of repair as a form of social empowerment. In one instance, empowerment comes in the form of inserting new intermediaries and knowledge systems into the archival infrastructure, in particular the reintegration of creators back into the archival space in the form of equitable community, participatory, or crowd-sourced archival initiatives. Mukurtu is an example of a digital platform that integrates this more expansive worldview, aligning the work of arranging and describing collections to the indigenous creators from which the archival material emerged and within whose context most meaning emerges. The backlog in this scenario becomes a distilled and shared concern and one in which sustainable solutions emerge from participatory- and community-based approaches.

In another instance, empowerment comes in the form of asserting greater social agency for the archival infrastructure in tandem with technological methods to realign the temporality of the archival workflow. In introducing the “Data-driven and Circulating Archival Processing (DCAP) method,” Fan et al. (2020) merge a concern for effective and enhanced archival processes with a social justice orientation. Adopting the computational approach, the authors harness machine learning and data analytics to surface and provide rapid and recursive access to latent knowledge from large digital collections that are deemed useful for “crisis response, in controversial situations, or for public policy development, as well as for subsequent historical analysis.” As new content is added to these archived collections, description is reimagined as a process that can be automated and iterated to “recontextualize and generate increasingly granular descriptions of the collection, making them continuously responsive to societal change” (Fan et al. 2020). The backlog in this scenario is a barrier to digital archival collections being used in ways that are sensitive to evolving societal issues, and one in which solutions to it emerge from social justice oriented and rapid, automated, and computational processing approaches.

In another scenario, the call for greater archival efficiency has been redirected from MPLP’s call to do more with less to one in which expectations of the archivist are more firmly aligned to the current resources provided by the status quo for the maintenance and repair of archival infrastructure. Carl Van Ness calls out MPLP for “fighting the wrong fight,” arguing that archivists have little ability to effect change

and extract efficiencies when labor practices involve little elasticity, assigning processing primarily to contingent, paraprofessional workers (Van Ness 2010, p 131). Van Ness also reasons that archivists show little appetite for privileging processing at the expense of time devoted to reference and access services and outreach activities. In its stead Van Ness calls for an archival approach in which the backlog is framed not as a processing problem but of one of acquisition and appraisal. In stating that “the best solution to the backlog problem is not creating one in the first place,” he admonishes the profession to right the balance between the capacity of the archive and the ambition and mandate of its collecting policy. Thus, the revolution that Van Ness offers to the archival profession is to “restrict their acquisitions to levels they can adequately manage” (Van Ness 2010, p 145).

Tied to Van Ness’ idea and embedded in work to decolonize the archive and its methods are calls for the adoption of radically different temporal and spatial frames—a *slow archives*. According to Kimberly Christen and Jane Anderson, “slowing down creates a necessary space for emphasizing how knowledge is produced, circulated, contextualized, and exchanged through a series of relationships” (Christin and Anderson 2019, p 90). While the emphasis in Christen and Anderson’s article is on indigenous systems and knowledge structures and slow archives attuned to “indigenous communities’ values, goals, relationships, needs, and protocols” (2019, p 91), the metaphor also plays out in terms of the relationship between archival infrastructures and sustainability.

Bethany Nowviskie (2015) draws our attention to the fact that tying maintenance to the notion of resilience can feed into neo-liberal tropes in which societal stresses and shocks are normalized, put to work in service of ever more growth and transformation. Indeed, as O’Brien (2012) argues, the ability to work through disruption and to constantly change and adapt to it is not the only option for those working within the humanities. An alternative path to resilience is to accept, embrace, or at least recognize a reality in which the archive and the work within its borders are in decline; to imagine a loss instantiated in the notion of a ‘graceful degradation’ (Stuchel 2020). Graceful degradation is a design philosophy and principle that allows for systems to sustain, albeit operating at a reduced level of performance, even when a part of the system has been degraded. It is a way to imagine a scaled back presence, a reflective turn from the constant striving to do more and bring in more to dwell with less.

The notion has taken on greater depth and meaning as writers in the last two decades have acknowledged what it means to exist within the time and place of the Anthropocene; a period in which humans and human activities are acknowledged for their outside effect on climate and on the environment (Pendergrass et al. 2019). Examining these concepts as they play out in our engagement with material things, Stuchel (2020) reminds us that graceful degradation “minds the limits and lifespans of matter, and advocates for a better understanding of ephemerality...Not all records must, or should, or were intended to, last forever—and none can.” Stuchel situates this understanding alongside the work of Jacques Derrida whose fundamental insight is of the archive as intrinsically linked to and generated from loss—“if we could remember forever without fault or failure, the archives would be unnecessary.” It is a call to pay attention to and come to terms with loss in the here and now,

alongside the losses that will mount in and over time. In the case of the backlog, this means that repair work is not about directly fixing the issue but imagining how to live with it in a more sustainable way.

Conclusion

If the populace were asked to describe what constitutes a backlog today, what would come to mind? In the context of the USA, this exercise is likely to conjure scenarios of delays in processing immigrant's visa applications, veteran's disability claims, survivor's sexual assault evidence kits, and the public's COVID-19 viral and antibody tests. Mention of the word backlog is also likely to summon images of deferred maintenance to physical infrastructure including national park facilities and to networks of bridges, roads, and highways. Although less in the public consciousness, the information backlog that haunts the archival imaginary is no less salient for the knowledge infrastructure that it serves.

A multitude of stakeholders have a role to play in the knowledge infrastructure that is the archive: creators and creating entities, universities and other scholarly institutions and organizations, communities, academic and non-academic researchers and users, individual archives and their employees, and funding agencies, to name a few. Taking a broader approach, we can say that the archive resides within complex assemblages: “amalgams of systems of thought, forms of knowledge, finance, political economies, governmentalities and legalities, materialities and infrastructures, practices, organizations and institutions, subjectivities and communities, places, and marketplaces” (Kitchen 2014, p 20). Thus, even though most infrastructural breakdowns are blamed on technological or human errors, they are better explained in terms of the “complex relationships among operators, systems, natural conditions, and social expectations” (Edwards 2003, p 190). As Star reminds us, infrastructure is “both relational and ecological” (1999, p 337) and in the archival backlog, and the accounts thereof, we see the legacy of the tensions that have played out as the “identity and status of relevant stakeholders, the distribution of benefits and losses, and the general rules of the game are all being worked out simultaneously” (Jackson et al. 2007). Indeed, drawing from accounts in the archival literature and from analysis from other sectors that labor under similar conditions, the multifaceted reasons (the external and internal infrastructural hazards) why backlogs, in this case archival ones, occur can be parsed (e.g., Evdorides et al. 2012).

- Changing government priorities, which in the case of the archive heralds a lack of public funding, investment, and interest in the infrastructure of the humanities (in essence, a favoring of economic, scientific, and military infrastructures over cultural and social ones).
- The absence of data on the national level and the lack of tools for economic analysis to assist in measurement, setting priorities, and monitoring performance in efforts to reduce the infrastructural backlog.
- The complex nature of planning for the ongoing management and maintenance of archival materials that accumulate and must be distributed at scale.

- Lack of organizational knowledge of controlling and understanding the effects of backlogs within public sector institutions charged with processing archival materials.
- Human resource and technology constraints of those self-same public sector institutions.

On a practical note, we can scrutinize the accounts of the backlog, as they impact archives and other societal infrastructures, as a way of imagining or charting a way forward, both in the short and long term (e.g., Evdorides et al. 2012). In the short-term, data on the backlog, alongside performance measures and outcomes, can be created and used in a way that all parties (archivists and external stakeholders) are aware of the impact on archival workers, products, and processes. Archivists could also seek additive sources of financial support through an adoption of charges for processing from creators and users with the willingness and capacity to do so. Furthermore, the adoption of technology could be pursued as a force multiplier, both in terms of making processing more effective and in helping the profession combat negative stereotypes vis-à-vis its attitude toward reinvention and innovation.

In the longer term, efforts can be made to support infrastructural convergence so that the broad and largely dissociative archival network of actors becomes a more tightly coupled if heterogeneous one. In this scenario, a convergence of interests involves creating alignment and coordination between creators (producers), archivists (maintainers), funders, and users (consumers) such that planning for the processing of archival materials moves from an independent endeavor to a focused, coordinated, and cooperative process capable of mobilizing toward a singular goal. Such an approach is accomplished through greater transparency of the intellectual and practical nature of archival work with the goal of creating a climate of confidence and trust between the archive and its stakeholders. Another option involves repositioning the nature of the problem of the backlog by taking an approach that is inherently more attuned to or confrontational of political, economic, and technological stresses. This approach also involves multi-stakeholder engagement but in this case to examine the consequences of the failure to maintain services and to determine the tradeoffs (economical, societal, ethical, environmental, etc.) in deciding what to prioritize or how to move forward with an infrastructure that, at best, is capable of some sort of self-healing and, at worst, is not and indeed may never function at capacity. In this scenario, the consequences of disruption, and the solutions that are adopted (if any) for repair are managed and transparent to all.

In the literature, accounts can be found that view faults and failures in the archival infrastructure as externalized and internalized in nature. Concomitantly, addressing the backlog involves different forms, scales, and mechanisms of repair, from local fixes to broad systematic efforts and from embracing or reimagining human labor to privileging technology deployment. One can argue that the plurality of these perspectives is both an asset and a liability. The question that archivists should now ask is whether we can productively mix these understandings to deliver an orthodox set of infrastructural solutions or whether the lack of compatibility between the ideas inherent in this divergence call for parallel and partial rather than integrative approaches to repair. As Star (1999) reminds us, infrastructural change does not

happen overnight. Therefore, we can expect that any solution will involve a process of negotiation among interested parties coupled with ongoing recalibration of the archival infrastructure and to other parts of the knowledge system in which the archive lives and operates.

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