

SLOUCHING TOWARDS ALEXANDRIA: A CRITICAL ANALYSIS OF THE
SCHOLARLY COMMUNICATION SYSTEM

A Dissertation

by

ROBIN ADRIENNE BEDENBAUGH

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Chair of Committee,	Patrick Burkart
Committee Members,	Jennifer Mercieca
	James Kevin Barge
	Harland Prechel
Head of Department,	James Kevin Barge

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ABSTRACT

This dissertation provides an historical analysis of libraries and discusses the broader system of scholarly communication and publishing using mixed methods from critical media studies, library studies, organizational communication, systems sociology, and rhetorical studies. It argues that practices of scholarly publishing in the US university environment are grounded in myths and ideological systems of gatekeeping which may prevent participants from recognizing dangers and opportunities associated with digital librarianship. Three such myths operate to support the status quo system of scholarly communication: the myth of authority, the myth of influence, and the myth of permanence. These myths portend and reflect structural changes in relationships governing the intertwining of library and university organizations, including emergent organizational forms, intellectual property challenges by commercial scholarly publishers, and new library-centered forms of publication enabled by new technologies.

DEDICATION

For Holly

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CHAPTER I

INTRODUCTION: MODELING THE SYSTEM OF SCHOLARLY

COMMUNICATION

Introduction

Scholarly communication exists in the relationship amid four factors: research and the methods by which it is evaluated, publication of that research, libraries that preserve and disseminate the research, and the regime of intellectual property (Lyman & Chodorow, 1998). The Association of College and Research Libraries (ACRL) defines the system like this:

Scholarly communication is the system through which research and other scholarly writings are created, evaluated for quality, disseminated to the scholarly community, and preserved for future use. The system includes both formal means of communication, such as publication in peer-reviewed journals, and informal channels, such as electronic listservs (ACRL, 2006).

A key characteristic of scholarly research is that it is typically created as a public good, with substantial public support through direct and indirect federal and state funding, and generally with little expectation on the part of scholars for financial rewards (ACRL, 2006). As technology has advanced, libraries have changed dramatically in the services they offer and in their organizational structures, reflecting the co-development of libraries and information processing systems and networks as a socio-technical system. The higher education environment for libraries has also changed, both organizationally and normatively, with renewed questions about the social value of university research

production. Peter Thiel, an entrepreneur associated with Silicon Valley political libertarianism, encourages some of the brightest minds in the country to forgo higher education by providing \$100,000 over the course of two years to start a new company and quit school. According to Thiel “it’s fundamentally wrong for a society to pin people’s best hope for a better life on something that is by definition exclusionary” (Lacy, 2011), while others suggest that Thiel’s beliefs reflect the interests of an economic elite deliberately attempting to undermine a sector contributing to social mobility and middle class growth (Deresiewicz, 2011). Anti-university sentiment is nothing new in U.S. history; after Eisenhower won the 1952 election, *Time* magazine reported that his victory disclosed “an alarming fact long suspended: there is a wide and unhealthy gap between the American intellectuals and the people” (Hofstadter, 1963, p. 4). As Thiel paints professional scholarly life at universities as frivolous at best, scholars potentially obscure their own agency and self-representations by occluding the ideas with which they wrestle on a daily basis. They could do otherwise, partly by publishing their work in venues that are more accessible to readerships outside the academy.

This dissertation explores the constitutive power of myths in scholarly discourses about libraries and their evolving purpose in a scholarly communication system which is organizationally and economically strained to a breaking point. In highlighting the mythological and ideological in discourse, it will also reimagine the position of the library in the academic and broader culture. It also asks of the most appropriate model by which to find historical referents for the modern university library: is it more like the famed Library of Alexandria, with a collection that drew scholars from around the world

to sit in its reading rooms? Is it more like the fictional library of Babel, infinite in nature, containing all truth, decipherable only to one godlike librarian (Borges, 2007)? Is it like the Memex—a hypertext system that provides ultimate interconnectivity as outlined by Bush (1945)? Is it something of a commons, as library literature increasingly suggests (Bolorizadeh & Smith, 2010)? Is it an amalgamation of all of these, or something else entirely? Addressing these questions also calls into question the role played by the academic library in academy. This dissertation argues that the digital transition in librarianship has illuminated many of the myths attending the subsystems contributing to scholarly publishing and librarianship. Discursively speaking, these myths have been constructed at organizational boundaries that are becoming increasingly unnecessary or redundant in the shift from print to digital collections. The argument advanced here is that libraries can, should, and in many cases, already do play a central role in creating a reliable system of scholarly communication that provides a prerequisite for the twenty-first century research university. Paradoxically, inter-institutional dependencies in higher education are articulated in many of the core activities of libraries, even as these dependencies threaten to undermine libraries' key functions.

Statement of the problem and research questions

A second enclosure is on the horizon. This “enclosure movement” is growing out of new restrictions on intellectual property. The first enclosure, in which land ownership was transferred to aristocrats, was redistributed later to bourgeois classes, producing a powerful “logic of enclosure” (Boyle, 2010, p.45). Intellectual property rights are being extended to cover even the simplest recounting of facts (Boyle, 2010). Commercial

publishers in the system of scholarly communication show increasing consolidation, meaning that the scholarly record is owned by fewer and fewer companies, while libraries are forced to make increasingly difficult decisions regarding their collections. All of these pressures come together to create a critical problem. If libraries cannot afford to continue collecting the research output of scholars because of price increases from commercial scholarly publishers, researchers at their institutions will not have access to the materials required to do new research. Scholarship is a cumulative process, and the system rests on the ability of researchers to gain access to the scholarly output of the past. This dissertation argues that academic publishing practices are rooted in traditions that have taken on mythic properties that blind participants in the system both to dangers and opportunities inherent in the system of scholarly communication. To make this argument, the following chapters address three questions: first, how is legitimacy constructed in the scholarly communication process, and does the digital shift do anything to change that? Second, how has the shift to the digital environment affected the organizational structures of the scholarly communication system? Third, how have traditional processes in the creation of scholarship taken on mythic properties that influence usage of the digital environment and access to research materials?

Delineation of the research field and scope of the project

This analysis rests at the intersection of several conversations about the relative merits of openness and the free flow of digital collections. Critical scholarship from law and policy studies of intellectual property (Boyle, 2010; Hyde, 2010) warns of a second enclosure of culture by private owners of the largest digital collections, and attendant

tragedies of the commons. Many who relied on the commons as a cultural resource are now left at the mercy of the new property owners, which are typically corporate gatekeepers. In addition to restricting access to library catalogs by licensing them under exclusive terms, rights holders have also called into question the long-standing doctrine of fair use, creating a further expansion of gatekeeper power (Gillespie, 2007; Aufderheide and Jaszi, 2015; Lessig, 2004). Fair use is a doctrine under US copyright law that allows for use of excerpts of copyrighted material under certain circumstances, which include parody, criticism, teaching, and reporting (Aufderheide and Jaszi, 2015). Elsevier and other rights holders are sending cease and desist letters to scholars who post their work online (Peterson, 2013), and Cambridge, Oxford, and Sage have sued librarians for creating online systems for course reserves (Smith, 2011). Edwin Mellen Press sued librarian Dale Askey for libel for suggesting in a blog post that the publisher is a vanity press (Flaherty, 2013). Much like the music and movie industries, scholarly publishers are exerting controls that were unavailable to them in the all-print world (Lessig, 2015). Vaidhyanathan (2005) claims that the mere existence of libraries threatens content industries and their plans to create a delivery system for content designed as pay-per-view, since libraries can lend print books an indefinite number of times while paying for the book only once (under the “first sale” doctrine in the U.S.). Therefore, the publisher can only make money once. Once made digital, books are simply data to be distributed and their use can be tracked more efficiently than they could have ever been in print form.

From the library and information sciences literature, the push for reform has been built almost entirely around Open Access (OA), which ostensibly provides not only greater impact for research, but also potential cost savings for libraries and means by which to bypass commercial scholarly publishers (Suber, 2012). In an attempt to avoid an “openness fetish” (Morozov, 2013, p. 86) the dissertation will reorient the discussion to provide a different framework through which to analyze the overall system and the players involved. Authors remain beholden to commercial publishers to publish in their discipline-defined tenure-worthy journals. By focusing on how certain academic norms and ideals related to scholarly publishing and libraries have taken on mythic qualities, the dissertation also aims to shift the scholarly conversation to the overall sustainability of the scholarly communication system. The critical problem in the current system is that as commercial publishers consolidate control of the market for scholarly content, libraries are increasingly unable to afford this content, meaning that scholars lose access to existing research on which they rely to do new research.

Borgman (2007) groups scholarly communication functions into three categories: “legitimization; dissemination; and access, preservation, and curation” (p. 66). The latter two functions tend to fall under the purview of libraries. In an increasingly digital world, librarians are making more content accessible widely through print to digital conversion. Libraries have long experimented with technologies and have been working in some cases to build broad-based infrastructures to make rare and unique research materials available online (Phillips, 2010). Libraries have more recently transformed into cultural centers. Many academic libraries now have information commons or learning commons,

which are physical spaces within libraries that provide access to information, technologies, and programming to engage students (Bolorizadeh & Smith, 2010).

Commercialization of information create threats to both culture and democracy, and libraries are a bedrock of both. Public libraries are “functional expressions of enlightenment principles,” and “where the public domain lives, the place where we gain access to the information commons” (Vaidhyathan, 2005, p. 124). Digital information creates bends in ethical traditions as well. Libraries have long been vocal proponents of free speech, privacy, and equal access. To protect privacy, for instance, user data in libraries were regularly saved only in aggregate, in order to prevent tracking of individual user reading, searching and other activities. Digital libraries do not always address such ethical traditions of libraries in their infrastructure. The USA Patriot Act jeopardized these traditions of patron privacy by making it easier for law enforcement agencies to acquire data about patrons, but librarians have fought against this from the moment the Act was presented in Congress (Taylor & Black, 2004). Systems in use at academic and public libraries, however, are constructed such that these threats to privacy are minimized. Systems are typically set up such that the link between patron records and items loaned are maintained in the system only while items are on active loan. (Breeding, 2016b). As new systems are built, it is crucial that these traditional values be taken into account, though dangers exist where infrastructure is built by people outside of the library community (Besser, 2002). Choices made today about how to construct these systems can limit how the systems will be built on and used in the future.

Individuals can create and operate in their spaces on the Internet and host their own personal publication platforms. Such opportunities for mass distribution had remained the exclusive domain for large institutions until the era of the web page and the blog, by which time information was no longer affixed to physical space. Laws like the Digital Millennium Copyright Act (DMCA) and systems of digital rights management (DRM) are increasingly used to restrict information, potentially commodifying more of our cultural interactions than in the past (Gillespie, 2007). Information policies supportive of DRM and anti-piracy initiatives have been adapted to provide for enclosure of the online commons, as market-friendly attitudes influenced lawmaking which followed the maxim that social resources which are not productive assets owned by individuals are being wasted (Boyle, 2010). Hyde (2010) connects the growth of the cultural enclosure can to what he calls “cultural aphasia” (p. 241), pointing in particular to scholarship on James Joyce. Severe restrictions on the use of Joyce’s papers restricted the use of some of his material, leading to some errors of omission by Joyce scholars and scathing critiques from reviewers (Hyde, 2010).

The sociology of knowledge provides a claim by Castells (2010) that the information age yields organizations characteristic of the “network society” (p. 21), defined as a new kind of social structure and manner of social organization that is global in nature and constructed on networks. Digital technologies afford the opportunity for greater ease of managing complex networks on a global scale, redefining identity and social structures (Castells, 2010; Hardt & Negri, 2009). In an adaptation of these concepts for library and information studies, Pierce (1992) points to the lack of a

foundational theory or a set of “dead Germans” in the field of library and information science (LIS)—and offers John Stuart Mill (while dead, not German) as a potential foundational thinker (owing to Mills’ essay *On Liberty* as a starting point for considerations of intellectual freedom). Discursive shifts toward a focus on “commons” in library and information science suggests that his criticism is still being evaluated. The rich idea of the commons for scholarly communication and publishing would benefit from a reorientation of analysis from the technical resources of communication to the organizations and individuals using them. At a fundamental level, the academic enterprise operates more like what Kelty (2008) refers to as a recursive public. Conceiving of the system of scholarly communication as a recursive public allows for a clearer illustration of boundaries within the system and provides a solid foundation on which to redraw those boundaries. He defines it as:

A recursive public is a public that is vitally concerned with the material and practical maintenance and modification of the technical, legal, practical, and conceptual means of its own existence as a public; it is a collective independent of other forms of constituted power and is capable of speaking to existing forms of power through the production of actually existing alternatives (Kelty, 2008, p. 3).

As it stands, and traditionally, academic organizational structures allow for the construction of “intimate publics,” or the collective context on which people come to rely for preserving their identities, which are then obscured by metrics required to define their worth. While many scholars resist the corporatization of academia in their work,

the metrics and assessment that attempts to measure scholarly productivity create something of a contradiction, as measurements are subsumed into critique of their discourse (Eisenhower & Smith, 2009, p. 8). These attempts to measure productivity mean that scholars are increasingly beholden to metrics that are defined almost entirely by commercial entities, which can then exert undue influence on the academy (Lyotard, 1984). Scholars continue to publish in the same venues and give away their copyright to those same entities. Considering scholarly communication as a recursive public allows for the illumination of myths by clearly outlining the boundaries at which those myths operate, and allows for a different view of scholarly work, providing a framework to rebut arguments that scholars and their productivity can be easily measured using a system of metrics. By conducting a historical analysis of changes in the system of scholarly communication, three overarching myths can be seen to operate in the system: the myth of authority (conferred through publication, selection, peer review and other means of certification), the myth of influence (gained through citation, and defined by metrics in the current system), and the myth of permanence (granted through collection and preservation practices).

Myths

Fundamentally, myths are stories that provide substantial support for ideas that cannot be supported using rationality (Rowland, 1990, p. 103). Rather than representing the past, they represent narrative justification of the past to support what is in the present. Socially, they function to justify maintenance of existing structures by outlining “not merely why we do the things we do, but why we *ought to go on doing them*” (Frye,

1967, p. 28). They can be viewed simply as a “captivating fiction, a promise unfulfilled and perhaps unfulfillable” (Mosco, 2004, p. 22), and they become stories “you can’t get out of” (Hyde, 2010, p. 178). Human beings are storytellers who use not reason, but “good reasons” and our rationality is based on our relationship to narratives (Fisher, 1987). Social myths express values that are dominant in society and are considered true even if they are empirically untrue, inconsistent within themselves, and incompatible with other socially accepted myths (Conrad, 2011).

Myths reveal and conceal truths in understanding the role of computer communication systems that make up the Internet, the World Wide Web, and the broader global computer network. Mythology surrounding technology often leads to “end of” myths. Often lost in mythic talk of technologies is that seemingly revolutionary transformations are often built almost entirely on what has come before them. The myth of the internet today tells us that it will lead “us to a new sense of community, to democratic communication, and to a rebirth of education online” (Mosco, 2004, p. 28). Technologies, particularly those geared toward communication, “reinforce, amplify, revise, and extend their ideologies,” (Vaidhyathan, 2005, pp. 20–21) and using technology creates change in the environment. Communicating through technologies can alter assumptions about the world, much like having a television in a room changes both the structure and the function of the room (Vaidhyathan, 2005). Lincoln (2000) develops a notion of myth as “ideology in narrative form” (p. xi), and noted that scholarship that “is interested, perspectival, and partial and that its ideological dimensions must be acknowledged, ferreted out where necessary, and critically cross-

examined” (Lincoln, 2000, p. 208). Myths are inherently political and instill ideology, a system of ideas and ideals, into human values by adapting the narrative of the political and raising “it to the level of a near impregnable fortress unassailable by ordinary mortals” (Mosco, p. 30). Vaidhyathan (2005) describes ideologies as “malleable examples of ‘cultural software’” (p. 20) and notes it is possible to examine specific technologies and how they influence broader systems of ideology.

I’m fascinated by how widespread use of distributive communicative technology generates, to employ John Dewey’s psychological tenet, “habits of thought.” These “habits” among individuals build into “cultural habits,” or ideologies, through discussion, deliberation, and distribution (p. 20).

While new technologies tend to drive the elaboration of utopian visions that take on mythic functions (Mosco, 2004), myths can also be built up in social or organizational systems, creating barriers to change. Within organizations, myths work not only to communicate values but they also “help to constitute the organizational consciousness of social actors by articulating and embodying a particular reality and subordinating or devaluing other modes of ‘organizational rationality’” (Mumby, 1987, p. 125). Human beings are not rational, but *rationalizing* (Weick, 1981). Individuals in organizations or institutions seek to understand their purpose as part of the process of creating an institution. Selznick (2011) points to the “elaboration of socially integrating myths” (p. 151) as one technique by which they do so. Through idealistic language, members of an institution attempt to distinguish the goals of the institution and determine their overall sense of mission (Selznick, 2011). Rationalized institutionalized rules grow around

work activity such that organizations incorporate those rules as part of their formal structures. These structures are based not on the work organizations set out to accomplish, but on “myths in their institutional environments” (Meyer & Rowan, p. 539). There are two crucial elements to these myths: they prescribe technical objectives based on social objectives and impose rules by which those purposes can be pursued. Once institutionalized, individuals may lack the discretion to make any changes to the rules, which are treated as legitimate regardless of their usefulness, and legitimacy is a key building block for both organizational structures and managerial styles (Meyer & Rowan, 1981). Rationalized myths are important not because they are true and can be empirically verified, but because people believe them, and they are taken for granted, whether or not they conform to reality. A myth, to be successful, must construct an ideal to which members of the organization wish to aspire, and thus must involve all manner of policies and procedures in an organization, not simply restricted to special occasions (Selznick, 2011).

These myths lead to isomorphism, in which organizations attempt to imitate others around them, leading to various kinds of conformities across industries (Meyer & Rowan, 1981). Categorical conformities are similarities of language—organizations in a particular field begin to describe ideas in the same way. Structural conformities evolve from the building blocks that are considered proper, necessary and legitimate. Procedural conformities center around processes used to get things done (Meyer & Rowan, 1981). Organizations who do not use procedures that are deemed appropriate within an industry can be vulnerable if they are not seen as rational, affecting both

customer and industry perception. Personal conformities are tied to the type of actors that are seen to be required in particular positions in an organization—some industries began to see MBAs from Ivy League schools as a necessity for managers, for instance (Meyer & Rowan, 1981). At the level of an organizational field, which includes peer groups, peer aspirant groups, customers, and suppliers, isomorphism can be either coercive or mimetic. Coercive isomorphism forces organizations into certain behaviors based on environmental pressures, while the latter is merely about doing what others in a field are doing, something that is typical in times of uncertainty (Meyer & Rowan, 1981). Critically, they are legitimating stories and serve as integrating aids to help with day-to-day activities. Myths work to both maintain control and harmony inside an organization and to mollify external stakeholders, serve as “institution builders,” that “create an integrated social organism” (Selznick, 2011). More critically, organizations pursue isomorphism to gain legitimacy in their institutional environments, incorporating rationalized elements considered legitimate to ensure survival (Meyer & Rowan, 1981). When goals start to lose a clear definition, these stories begin to lose their power to persuade. It is at these points that bureaucracy takes over, and people begin to look out for their interests before those of the organization—it is then that these organizations and their members “lose the plot” (Gare, 2007, p. 111). The scholarly communication system rests uncomfortably in between institutionalized myths of academia, and myths of the promise of new technology that are increasingly brought to bear on the system.

Next, I will explore how the changing environment in higher education is illustrated by a history of post-industrial production and work, followed by an outline of

trends in technology and library and information science, and begin the process of recasting the system of scholarly communication as a recursive public.

Shifts in the higher education system

Harvard College was founded in 1636 and was the first institution of higher education in the New World. By 1861, the number of institutions in the US had grown to 182 (Carrigan, 1990). From 2009 through 2010, there were 4,495 degree-granting institutions in the US (Institute of Education Sciences, 2012). There have long been varied and changing ideas of the purpose of higher education. What began as a system to prepare the economic elite grew into a system to prepare the masses (Hofstadter, 1963, p. 357). In 1918, the commission on the reorganization of secondary education proposed that post-secondary institutions follow the example of secondary schools and shift their attention to “become mass institutions and to arrange their offerings accordingly” to better serve the interest of democracy by not limiting higher education to an elite few (Hofstadter, 1963, pp. 335–36). Schement and Curtis (1995) outlined what they referred to as a “shadow” education system that began to develop in the twentieth century, in which corporations would have their own internal system of education designed to educate workers on how to do specific jobs within those organizations. Community colleges grew out of this and have served similar purposes—the shift here that Schement and Curtis (1995) note is that education became far more vocationally focused with little thought for how universities typically operate. Research universities were not immune to the capitalist shift, as capitalists funded many of these across the US (e.g., Stanford, University of Chicago), many have relationships with corporations, and many are now

expected to create patentable research and bring in significant amounts of external funding. The shift toward mass institutions creates an environment in which vocational education partly supersedes academic study (Hofstader, 1963; Schiller, 2000), with a notion that the university exists to train students to do particular jobs. Arguing for a middle ground, Nussbaum (2010) contends that proponents of vocational education in the for-profit environment “have adopted an impoverished conception of what is required to meet their own goal” (pp. 10–11). A hyper-focus on measurement and vocation creates a system in which the perceived value of an academic subject is tied to whether it can be applied directly to a waged labor.

However, Fish (2008) argues that critical evaluation is the key component to education. Interests, beliefs, and identities should be evaluated *first* and *respected second*, because, as he noted, “interests can be base, beliefs can be wrong, and identities are often irrelevant to an inquiry” (pp. 10-11). The legitimate role of teachers in colleges and universities, then, is to share existing knowledge and traditional methods of inquiry to which students have not yet been exposed, to endow students with the ability to critically engage with those traditions, and to ensure that they can do this independently when they leave (Fish, 2008). While Nussbaum (2010) agrees that the education system is not doing its job if it benefits only the elites, she argued that the focus on vocational education and teaching to life skills will bring us to produce “generations of useful machines, rather than complete citizens who can think for themselves, criticize tradition, and understand the significance of another person’s sufferings and achievements” (Nussbaum, 2010, p. 2). Hofstader (1963) outlines another tension:

Intellectuals in the twentieth century have thus found themselves engaged in incompatible efforts: they have tried to be good and believing citizens of a democratic society and at the same time to resist the vulgarization of culture which that society constantly produces. It is rare for an American intellectual to confront candidly the unresolvable conflict between the elite character of his own class and his democratic aspirations (pp. 407-408).

Suber (2012) suggests that funding for research, whether the funding is from private or public organizations, is effectively a form of charity, as organizations make choices to fund research that is they define as necessary or valuable. Universities, whether private or public, are depending on both public and private funds, and are beholden to states and donors to prove that the research created at their institutions is valuable. At the center of this struggle is the author that strives for acclaim while railing against the indignities of class separation. A firmly democratic intellectual class will regularly face disappointments and these may be concealed while democratic ideals are thriving, as during the New Deal, but the disappointments are eventually revealed (Hofstadter, 1963). As Nussbaum (2010) asserts, if business wants “technically trained obedient workers to carry out the plans of elites” (p. 21), then the idea that they might be trained toward freedom of thought seems incredibly dangerous for the educational system.

Library and information science, technology trends

Libraries have a long and rich history, punctuated by wars, destruction and times of both incredible prosperity and poverty. Ray Bradbury suggested that they are a place where “you can get a complete education for no money” and noted that he had no money for college, so he “went to the library three days a week for ten years” (Marelisa, 2012). Libraries are, according to Neil Gaiman, “about the most important things there are, and he deems librarians the “thin red line between civilization and barbarism” (IndyPL, 2010). Gaiman goes on to assert that “Google can bring you back 100,000 answers. A librarian can bring you back the right one” (IndyPL, 2010). As many people as there are who love libraries fiercely, and who view them as paragons of virtue, there are as many who would suggest that society “burn the useless things to the ground” (Travisano, 2011). This opposite view holds the Internet up as a replacement for libraries. “The library is dead; the Internet is alive” (Travisano, 2011). OCLC issued a report in 2010 indicating that the association of libraries with books grew stronger over the five-year period since they last studied the phenomenon in 2005 (OCLC, 2010). Several scholars have attempted to outline some key characteristics of the ideal library for the twenty-first century and beyond. Vaidhyanathan (2005) perceives the ideal library as a “communication medium,” and describes them as “leaks in the information economy” (p. 123). These leaks are precisely the kind that many commercial entities would like to plug; as Gillespie (2007) notes, academic culture seems to be in transition from a culture of fair use to a culture of “fared use” (p. 62). The ideal library, according to Fitzpatrick (2011), would be a partner with the university press, creating a center of scholarly

publishing that would be “another pivot point between the institution and the broader scholarly community.” The library could be the partner that “brings the world to the university,” and the press brings “the university to the world” (p. 180). University presses should, as Fitzpatrick (2011) describes, be considered an integral part of the scholarly publishing process, and not a business operated tangentially to the university. Many schools deploy institutional repositories (IRs) to ensure access to scholarly work, but because these are usually developed through the libraries, the focus tends to be purely on access. Including university presses in these projects would allow repositories to more closely mirror the complete publishing process (Fitzpatrick, 2011, p. 182). The romantic view of the Internet often ignores the centrality of technology in the twenty-first century library. In fact, conversations about technology often tend toward either extreme optimism or extreme skepticism.

Mattelat (2005) finds views on the shift to digital to be too optimistic and short-sighted and suggests that they lead to “techno-mercantile determinism” (p. 160). This determinism paints those who suggest that there are potential negative societal effects of an overreliance on technology as opponents of both technology and modernity. Others see the potential for technology to bring us together in a global network (Benkler, 2006; Castells, 2010; Hardt & Negri, 2009). The shift to digital allows more control over information (Gillespie, 2007) with new opportunities, but with potentially deleterious consequences for our culture (Boyle, 2010; Lessig, 2004). The overflow of information, for instance, is not a new phenomenon; libraries have long lamented that there is too much information. While information proliferates, the systems through which it moves

become increasingly complex. The ability to link large amounts of data over a network affords a more comprehensive view of broader patterns (Snickars, 2015). A more centralized infrastructure in cloud computing, with Google at the front edge, creates a global machine for processing and disseminating information (Snickars, 2009), this shift, as Vaidhyanathan (2011) argues, brings both opportunity and cause for worry.

Knowledge sharing through publication is the method for gaining social capital in academia. While formal and informal structures exist, fixed points such as peer review provide a bright line beyond which something is considered published and legitimate (Borgman, 2007). In the case of peer review, Fitzpatrick (2011) proposes following the model of various social systems online by “separating the question of credentialing from the publishing process, by allowing everything through the gate, and by designing a post-publication peer-review process that focuses on how a scholarly text should be received rather than whether it should be out there in the first place” (p. 32). A commons is a particular type of intellectual property where multiple people have rights contribute, edit and publish. The commons includes not just the property, but the individuals and their rights to operate there (Hyde, 2010). The new medium is more fluid than previous systems of print distribution and has brought with it new commons and new enclosures. This second enclosure, through a variety of intellectual property, patent, and technology legislation, is leading toward “the enclosure of the intangible commons of the mind” (Boyle, 2010 p. 45) and the redistribution of its value.

Fitzpatrick (2011) places the start of a crisis in scholarly publishing as near 1990, noting that the financial situation began to get increasingly worse for presses in 2000,

following the burst of the dot-com bubble. The crisis does not just affect librarians; it has significant implications for faculty in academic department and the broader academic community, including the university press. Thatcher (2013) instead points to a period in the early 1970s when financial problems in the system appeared to a different set of players in the system of scholarly communication: the directors of university presses. During the period between 1969 and 1973, the ratio of book expenditures to journal expenditures began to drop with a worsening trend over time. Directors at the time pointed to the danger that although presses had managed to adjust costs and expenditures to manage financial difficulties, the presses would be forced to make editorial decisions based less on scholarly merit and more on salability. This tension was expressed in the relationship between the Association of American University Presses and the Association of Research Libraries (ARL), pitted against each other when Thatcher & Rosenthal (1973) testified before Congress that fair use principles as practiced by libraries were a potential threat to their business models. University presses do not get all their costs paid up front and as a result the presses have to rely on book sales for revenue (Thatcher, 2013). In the shift to creating a new system of digital libraries, the focus on technology and collections often ignores ethical traditions of librarianship, which include fierce loyalty to reader privacy, equal access, diversity, and serving underserved populations. Libraries have often relied too much on third parties that do not adhere to those values to build new systems (Besser, 2002). As scholars and librarians reconsider their publishing behavior, it will be important to treat technology as a tool and not as an end in itself. Mythological thinking has been attached to all manner of technologies, and

that thinking influences laws and policies surrounding technologies and intellectual property with far-reaching implications.

Information law and policy, critical media studies

Mythology surrounding technologies drives us to “end of” myths because if presented with something that seems entirely new, people tend to forget all that has come before (Mosco, 2004). The telegraph, electricity, and the telephone have all led to the end of history, politics, and even geography. Often lost in discussions of these transformative technologies is how they are built almost entirely on what has come before them.

Indeed, the history of technology suggests that this would be far from the first time that we have laid claim to the end of history, the end of geography, and the end of politics. Practically every substantial technological change has been accompanied by similar claims. The chant goes on: this changes everything.

Nothing will ever be the same again. History is over, again and again and again (Mosco, 2004, p. 119).

Technologies can often ease these transitions by mimicking those that preceded them. For example, incunables, books that were published in the 50-year period following the invention of moveable type, conformed quite closely to the manuscript tradition, with type that resembled handwriting and illustrations done in color and by hand (N. Howard, 2009), just as technology for reading books in digital form regularly attempts to mimic the reading of print books. Socrates viewed writing as an invention that would “produce forgetfulness in the souls of those who have learned it, through lack of practice at using

their memory” and “an elixir not of memory but of reminding” paints writing itself as a disruptive innovation (Plato, 1986, p. 123). Rather than something entirely new, technologies tend to be built out of parts of previous ones, and in remarkably similar ways, regardless of the opportunity to do something truly innovative. As Striphas (2011) suggests, cultures become invested in particular technologies and bestow “disproportionate amounts of credibility, prestige, and influence on the classes of people with whom it’s most closely associated” (p. 159).

Advances in technology, legislation, and media conglomeration can be dangers to culture. Technology and conglomeration make it much easier for corporations to attempt to exert control over content and distribution, while legislation focuses on protecting intellectual property, typically in the form of copyright. In its initial inception in the US, copyright lasted for 14 years, with an option to extend that protection for an additional 14 years. In 1976, the terms of copyright were extended to life of the author plus 50 years (or longer for corporate creations) and extended yet again in 1998 under the Copyright Term Extension Act (Lessig, 2004). The Recording Industry Association of America (RIAA) and the Motion Picture Association of America (MPAA) are only two of the institutions that are seeking for more restrictive legislation (Lessig, 2004). Both organizations have pushed for legislation to make it more difficult for individuals to make copies of copyrighted materials, and The Digital Millennium Copyright Act (DMCA) grew out of their concerns. Of particular concern is the erosion of fair use. Fair use typically allows for someone to use a certain percentage of work for other creative purposes, parody or educational uses. Under DMCA, fair use is not as easy to discern.

Moreover, as long as corporations like Sony and others are lobbying Congress and driving legislation in this regard, it is not certain that even the protection of the fair use doctrine will last (Lessig, 2004). This legislation as outlined in DMCA is particularly insidious because, in addition to making copying illegal, it makes it illegal to circumvent technologies that prevent copying, or what Boyle (2010) calls “the digital equivalent of barbed wire” (p. 86). This legislation makes it illegal for anyone to create digital wire cutters—perhaps no great concern for users with no intentions of creating copies of creative works that they have purchased, but potentially of grave concern to researchers. For example, scholars doing research on the various kinds of encryption used to lock down digital items are left open to lawsuits if they *publish the results*. According to this corporate logic, researchers are effectively providing wire cutters to the masses (Boyle, 2010). According to Lessig (2004), legislation around copyright and intellectual property will have a chilling effect on creativity and culture. Because so much of our culture is built on what has come before it, making it more expensive and sometimes illegal for creators to borrow and comment on each other, we cannot then proceed in the same way we have in the past. As Boyle (2010) notes, the world of research would be similarly affected.

Recursive public

Kelty (2008) forms his argument about recursive publics around geeks. Geek is not used in the traditional sense to refer to a particular kind of person—it refers to the way in which particular people act as a group to mediate the technical infrastructure they use to act as a group. Geeks develop an affinity through the collective practice of

developing, in this particular case, free software. Rather than focus on the kind of people involved in this practice, he focused on the practices that brought them together to serve the purpose of creating free software. This collective practice is what constitutes a recursive public (Kelty, 2008). Collective practices as exercised by scientists are critical, given that scholarship is “almost always cumulative and collaborative” (Hyde, p. 179) and that the work of science flourishes when barriers to collective practice are removed. Stories are also central to the movement of free software, aligning participants toward particular problems, defending the movement from naysayers, and drafting new members. The Free Software movement comprises five components: shared source code, a concept of openness, copyleft licenses, forms of coordination, and a movement or ideology, and suggests that reframing the practices of the movement is important to “conceptualize them as a kind of collective technical experimental system” (Kelty, 2008, p.15). In considering the concept of a recursive public, the internet is best understood as a series of layers that support each other, allowing for both openness and a lack of central control, which provides opportunities for creative restructuring of its own social and technical infrastructure (Kelty, 2008). There are two distinct qualities of recursive publics:

...the ability to include the practice of creating the infrastructure as part of the activity of being public or contesting control, and the ability to ‘recurse’ through the layers of the infrastructure, maintaining its publicness at each level without making it into an unchanging, static, unmodifiable thing (Kelty, 2008, p. 62).

Information products are built from parts of other information products—output from one person is input from another. As raw materials to create information products come under increased protection, the cost of creating information products increases. Reduced access creates the potential for certain dangers—in particular that if rights are drawn too broadly, scientific progress, criticism, and speech itself would be discouraged. Restricted access would dampen innovation that follows from existing ideas, concentration of industries would create monopolies and oligopolies, and the effects of strong networks would lead to markets choosing inefficient technologies (Boyle, 2010). In order to create a workable public sphere that calls the members “into collective being as a ‘people’” (Hyde, 2010, p. 153) readers and writers have to put aside differences in order to act as civic persons, and that the rules for publication provide cultural norms for such a public. When the rules are followed, the citizens appear, and when the rules are not followed, they disappear; writers cannot, as civic actors, take such pride in their voices that they prevent others from appropriating it without doing a disservice to the public sphere (Hyde, 2010). The advent of blogs helped rekindle the coffee-house model of circulating text, but that they were more like the newspaper and pamphlet equivalent, not quite making room for the longer form of the monograph, which had been under the purview of libraries. A system that could account for all of these forms would center the library not just as a repository, but as “fully part of a communications circuit that facilitates discourse rather than enforcing silence” (Fitzpatrick, p. 180). Barge, Lewis, & Simpson (2017) point to the recursive nature of engaged scholarship, indicating that it “reflects

recursive and reflexive processes between scholars and stakeholders enacted to enrich both theoretical and practical knowledge” (p. 808).

Research methods & outline of chapters

To make my argument, a historical analysis of changes in the system of scholarly communication is offered with an analysis of long-term trends in librarianship, with a focus on how publishers are consolidating and using new technologies to create more efficient means for them to control the scholarly record. Myths of authority, permanence, and influence legitimize the process of scholarly communication. The research questions propelling this analysis are as follows: first, how is authority constructed in the traditional scholarly communication process, and does the digital transition do anything to change that? Second, how has the shift to the digital environment affected the organizational structures of the scholarly communication system? Third, how have traditional processes in the creation of scholarship taken on mythic properties that influence usage of the digital environment and access to research materials?

Outline of chapters

Chapter II: what the market will bear

Chapter II outlines the changing nature of the market for scholarly publication, demonstrating consolidation of the industry under a few commercial scholarly publishers. It further outlines legislation in the 1990s that permitted media distributors such as publishers to exert increased legal control over their content in a much more targeted way, and a view of some of the ways in which individuals and organizations are pushing back against this legislative control through both legal and illegal means.

Chapter III: lies, damn lies & impact factors: the myth of authority

Chapter III explores how authority is constructed in the system of scholarly communication. I will argue that the myth of authority is built around certain prestige markers in the system of scholarly communication, which are increasingly reliant on a system of metrics. I will show that along with an ever-increasing number of publications and publication venues, scholarly publishers have more and more control of the content of scholarly research through industry consolidation, placing a financial strain on libraries and the overall system of scholarly communication. In addition, I will explore the increased focus on metrics and how scholarly journals have taken on the mantle of brands, constraining changes to faculty publishing behavior, which is the key to extracting libraries and universities from the commercial scholarly publishing regime. I will outline how a rise in predatory publishing creates increased complexity and confusion in an already tenuous system. To provide an alternative template for changing that behavior, I will first argue that universities have outsourced the imprimaturs that bestow prestige in the system of scholarly communication (like peer review and tenure) to algorithms, metrics and commercial publishers, and that the value commercial publishers once added to scholarly publications has been drastically reduced.

Chapter IV: discipline & publish: the myth of influence

Chapter IV examines how influence is constructed in the system of scholarly communication. I will argue that citation behavior is a key element to the myth of influence and that the foundation of this myth is bound up and concentrated in the social infrastructure of scholarly disciplines. I will draw from resource dependence theory to

illustrate how power is distributed in systems, from Meyer & Rowan (1981) to explore how myths operate in institutions, and from Mosco (2004) and Castells (2010) to demonstrate how myths get built up around the social valuation of technologies. I will argue that influence is fundamentally about infrastructures through which information is exchanged and demonstrate that not just the content of scholarly communication, but its underlying infrastructure is coming under increased control by commercial scholarly publishers.

Chapter V: the widening gyre: the myth of permanence

Chapter V provides an overview of the history of collection development in libraries and how it is changing, arguing that a myth of permanence is embedded in the combination of infrastructure and content: context. In addition to an exploration of changes in library and university organizational structures, this chapter will provide an overview of changes in the scholarly communication system, including emergent organizational forms, lawsuits by commercial scholarly publishers, and new library-centered forms of publication driven by new technologies. I will also explore changing technological environments and how they have an effect not just on needs for expertise in library organizations, but also how algorithms and personalized searches are driving an epistemic shift in the way that content is constructed and consumed, driving a shift the context of the information environment. Additionally, I will explore how new pressures in a digital environment threaten longstanding library practices.

Chapter VI: nolite te bastardes carborundorum

In Chapter VI, I will reflect on the research questions and discuss how this analysis relates to debates in library science regarding open access and the technologies driving the system of scholarly communication. I will outline some future possibilities for the scholarly communication system and the role of libraries in shaping that process, together with many challenges. I will argue that scholarship is fundamentally a deliberative process, and that process need not and should not change whether it is disseminated electronically or in print. The gestalt of the scholarly communication system lies in its publicness. Conversations that focus only on access allow for publishers to continue to exert undue pressure on the system. I will develop a framework based largely on Kelty's (2008) concept of recursive public and use it to reframe the notion of the system of scholarly communication, drawing from Björk's (2007) *A model of scientific communication as a global distributed information system*. Points in the process help describe key boundaries. His model outlines the whole communication value chain, "from initial research to the assimilation of research results to improve every-day life," and focuses on both communications in formal and informal form. The communications include data with a particular focus on the traditional methods of publishing and indexing peer-reviewed articles. New models of publishing allowed by new technologies, including OA, are more responsive to how readers find and access online work once it is published (Björk, 2007). I will suggest that if an exhortation is to be made to "burn the useless things to the ground," let it be directed at commercial scholarly publishers, not libraries.

CHAPTER II

WHAT THE MARKET WILL BEAR

In this chapter, I will analyze the changing nature of the market for academic publishing, including how the concentration of publishers has grown smaller since 1973, while expectations for faculty publication have increased along the same timeframe. I will then explore the changing legal environment in which the system operates, focusing on key legislation in the 1990s that provide distributors of digital content increased control over that content. I will briefly explore two cases in particular, that of Aaron Swartz, and the recent emergence of Sci-Hub as an illegal distributor of copyrighted academic publications.

The changing landscape of scholarly publishing

Through commercial scholarly publishers, the content and the rights to it are both being commodified in ways that were not originally envisioned in the creation of the system of scientific communication, and the pace at which the catalogs of publishers have expanded has increased dramatically since their business needs became more reliant on scholarly content. Expectations for faculty publishing to achieve tenure increased in colleges and universities, compelling faculty to increase their publication output. Publishers, both commercial and non-commercial, began to expand their product lines for books and journals, and libraries saw an increased demand for research materials (Greco, 2015). Approximately 28,100 scholarly peer-reviewed Science, Technical and Medical journals existed in August 2012, accounting for about 1.7 to 1.8 million articles published per year. The number of journals has grown at a rate of 3.5%, and the number

of articles at a rate of 3% (Ware & Mabe, 2012). The increase in expectations for publication output and the increase in actual output for publications can be tracked to the 1970s (Donoghue, 2008), which coincides with both Castells' (2010) starting point of the rise of the network society, and Thatcher's (2013) suggestion that scholarly publishing had reached a crisis point. The discipline of communication, which Stephen (2014) traces back to its origins in English departments around 1914, launched a new journal about once every two years between 1915 and 1970. Since 1970, the rate has been about three per year, which is an increase of 600% between 1970 and 2010 (Stephen, 2014).

As universities continue to find new metrics through which they can measure faculty productivity, faculty have demonstrated changes in publishing behavior. While thirty percent of faculty in 1970 did not publish even one article, surveys indicate that expectations changed dramatically in the following decades. In a 1969 survey, 21% of faculty at colleges, 44% of faculty at research universities, and 6 percent of faculty at comprehensive universities "strongly agreed" that publishing was required to get tenure. Those numbers rose respectively to 42%, 83% and 43% in a similar survey in 1989 (Donoghue, 2008, p. 52). The expectations did, in fact, increase. A significant number of colleges and universities increased their expectations for tenure and promotion. In book-driven disciplines like history and philosophy, the expectation for tenure after World War II was generally one published book, excellent teaching, and service. As universities sought recognition and status, expectations grew to two published books, even three at some of the more prestigious schools. In journal-driven fields, expectations

were at two published scholarly articles, which eventually increased to four to six articles, and even ten in some places (Greco, 2015).

According to estimates, the number of peer-reviewed scholarly journal articles surpassed 50 million in 2009. At that rate, the number of articles produced in the overall system doubles at just less than 24 years (Jinha, 2010). Tenure-track jobs are scarcer, while the number of part-time faculty has increased by 305.3% (Hoeller, 2014). So, there are fewer full-time tenure-track professors creating increasing numbers of articles in increasing numbers of journals that libraries need to buy with often decreasing budgets. Subscription costs from publishers continue to increase at the same time. Over the last 40 years, subscription costs for journals have increased at approximately two times the rate of healthcare costs (Suber, 2012). Publishers are sometimes divided into three tiers from the library perspective. The first tier includes the top 5, the second includes society and university presses, and tier three is composed of all the other small publishers, difficult to quantify, who are most at risk of being acquired by larger publishers, and are often ignored by academic librarians, who are most at risk of having their titles cancelled by libraries. Since publishers in the top two tiers own the titles that faculty most want available, that is where libraries focus their spending (Ivins, 2005). Before World War II, scholarly societies accounted for most publication of scholarly journals. By the mid-1990s, commercial publishers were responsible for 40% of journals, societies were responsible for 25%, and educational publishers 16% (Larivière et. al., 2015). Publisher catalogs tend to contain a large percentage of journals published on behalf of scholarly societies, with proportions ranging from twenty to forty-five percent of all their

published journals. Half of Elsevier's catalog in the mid-2000's represented titles published for societies, and Blackwell's catalog was entirely society-based journals (Ivins, 2005).

A shift to digital publication has not had an effect on access or format as much as it has on the economics of academic publishing and the market for scholarly journals. In the social sciences, the top five commercial publishers accounted for between 15% and 22% of the market in 1995. These publishers accounted for 54% to 71% of the market by 2013. The humanities, which tend toward a lower publication density, published more with smaller volume publishers, and the top five commercial publishers account for 10% of papers in the arts and 25% of those in humanities. The digital distribution of scholarly publications has been much slower to build in these fields, which have relied more on monographs and local journals, and do not tend to have a need for rapid publication as seen in some scientific fields (Larivière et al., 2015). The specialized nature of academic journals keeps rivalry among the top publishers low because there is no real direct competition, since academic journals are targeted to specific academic disciplines, giving each journal its own target audience (McGuigan & Russell, 2008).

The general belief has been that digitization of the publication infrastructure has led to a higher concentration of scholarly literature under a small number of publishers, but Larivière et. al. (2015), provide the first broad analysis of the evolution of this change in market structure, based on journals indexed in Web of Science between 1973-2013. The authors analyzed data from a relational database they created with data extracted from Thomson Reuters' Web of Science (WoS), which includes data for

44,483,425 documents. The authors use this approach since scholarly publishing is a particular kind of publishing and is not a market or industry in the strictest sense.

Around 1973, commercial scholarly publishers began increasing their share of scholarly publications, with another marked increase starting in the mid-1990s. Reed-Elsevier, Wiley-Blackwell, Springer, Taylor & Francis and Sage all increased their share of ownership of the scholarly record. More than 50% of all papers published in 2013 came from the top five publishers—social sciences with the highest level of concentration, followed by natural and medical sciences (bolstered by the strength of their scholarly societies), and the humanities, which were still operating fairly independently and were focused on monographs (Larivière et al., 2015). This concentration is illustrated in figure 1 on page 36.

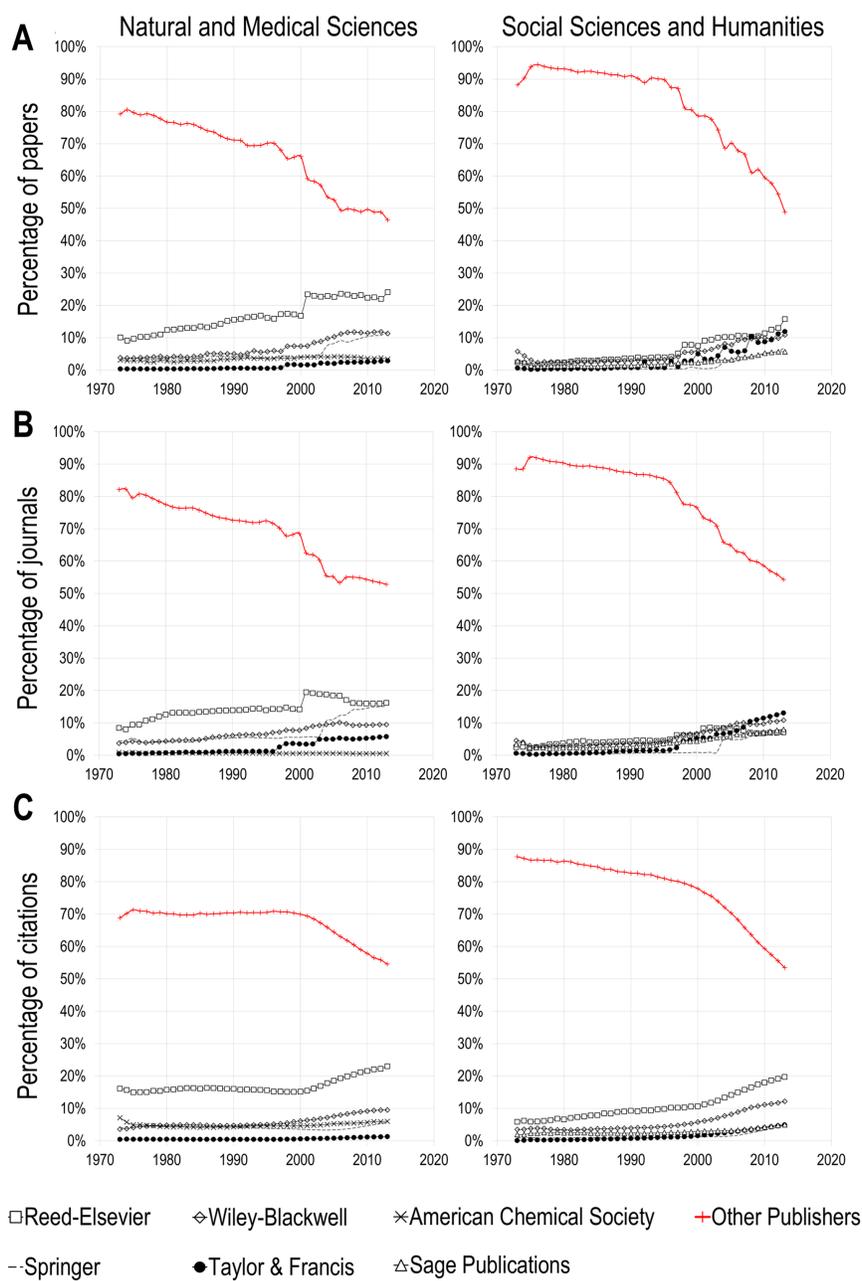


Figure 1 illustrates the percentage of papers published by the top 5 publishers from 1972-2013, with Natural and Medical Sciences represented on the left and Social Sciences and Humanities on the right. Reprinted from Larivière et al. 2015.

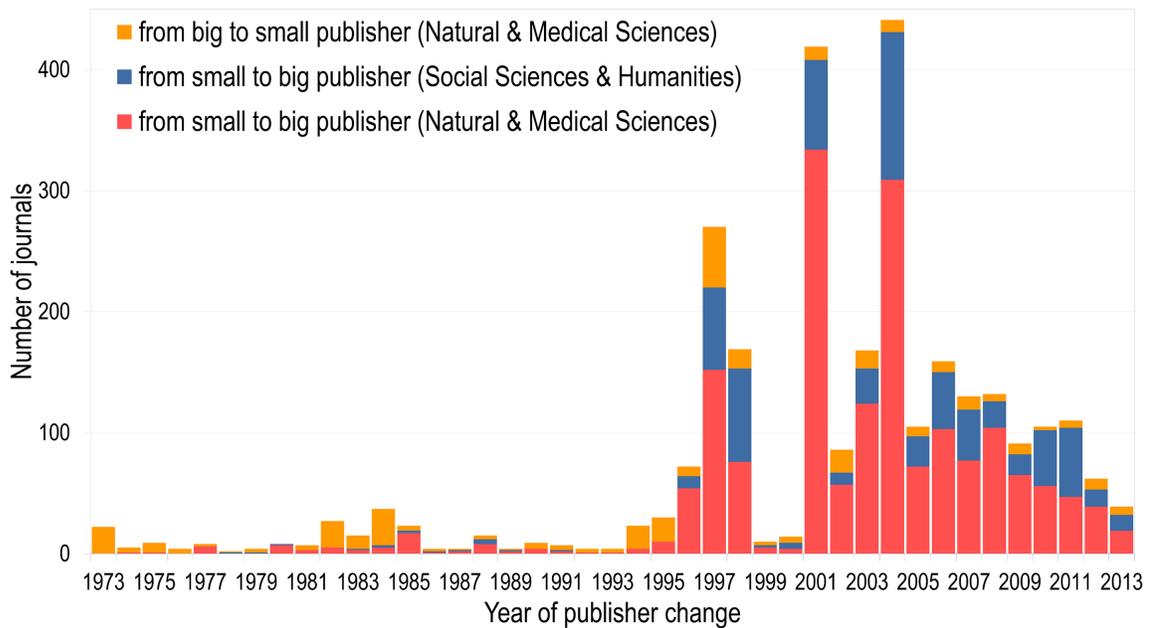


Figure 2 illustrates the shifting of journals from small to large publishers and from big to small publishers per year of change in the Natural and Medical Sciences and Social Sciences & Humanities. Reprinted from Larivière et al. 2015.

Concentration of ownership in the top five publishers in 1973 was between 10% and 20%, increasing by 2013 to 42% and 57%, with a marked increase in the mid-1990s (Larivière et al., 2015). During the 2007-2008 recession, college endowments also began to see steep declines, with additional adverse effects due to changes in the Consumer Price Index. The confluence of all these trends proved troubling for academic libraries, where they reduced budgets due to lower revenue from endowments and other state sources (Greco, 2015). This concentration of ownership is one potential explanation for the large publisher profits. No publisher outside of the top five accounts for more than a 3% share of the journal market, and the top publishers control the most prestigious titles (McGuigan & Russell, 2008). Resource Dependence Theory points to the true problem. The organization that controls the resources required by another organization has power

over the organization requiring those resources (Pfeffer & Salancik, 2003). With a greater concentration of scholarly content under fewer publishers, which is required by researchers in order to create more scholarly content, those publishers have the ability to exert power in the system of scholarly communication. Figures 3 through 5 show the percentage of papers published in three broadly defined disciplinary areas.

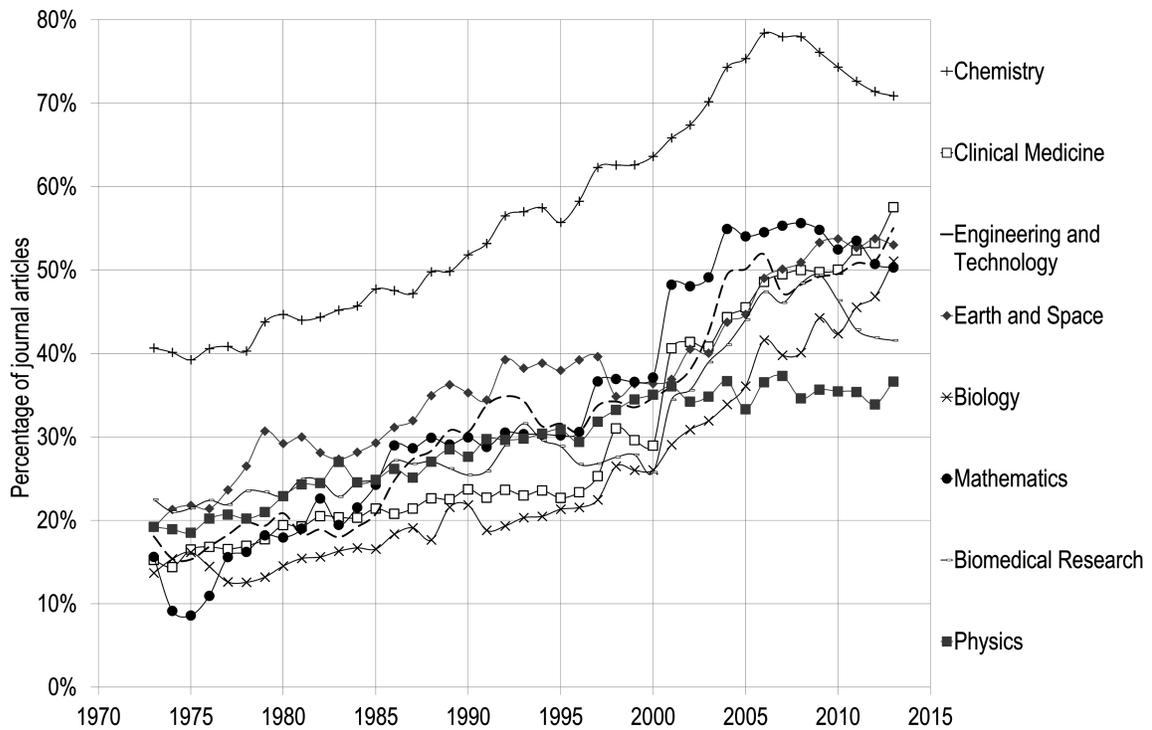


Figure 3 illustrates the percentage of papers published by the five major publishers, by discipline in the Natural and Medical Sciences, 1973–2013. Reprinted from Larivière et al. 2015.

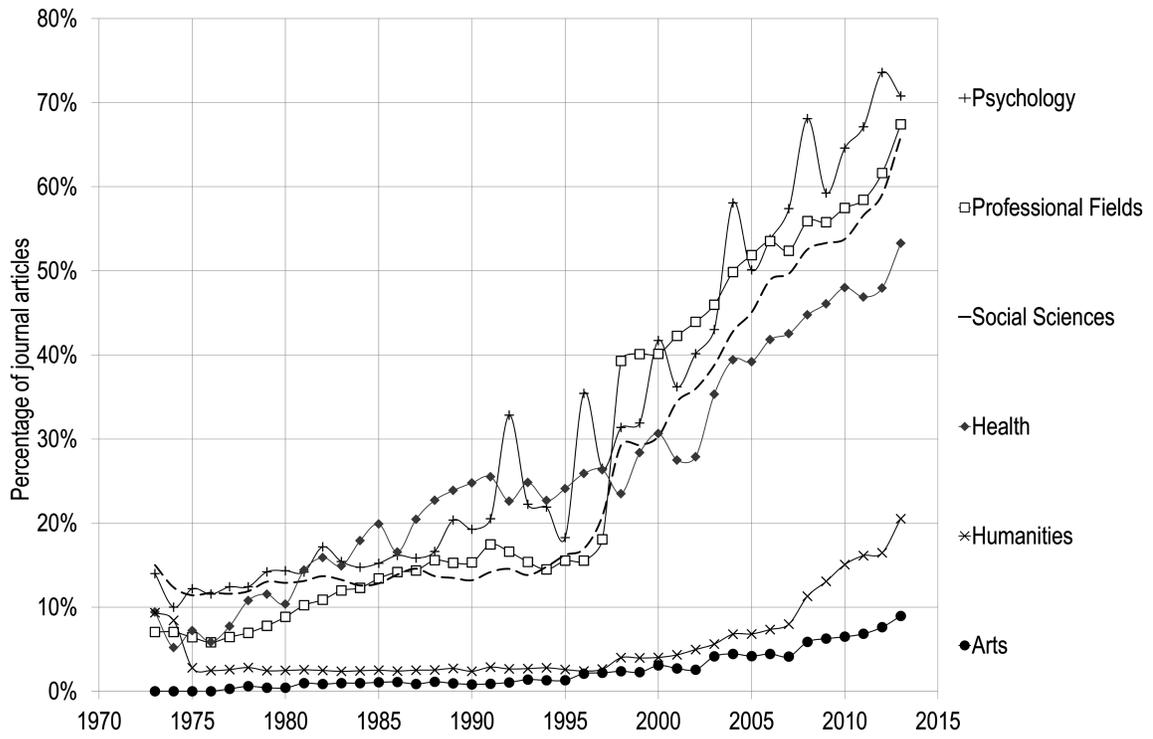


Figure 4 illustrates the percentage of papers published by the five major publishers in the Social Sciences and Humanities, 1973–2013. Reprinted from Larivière et al. 2015.

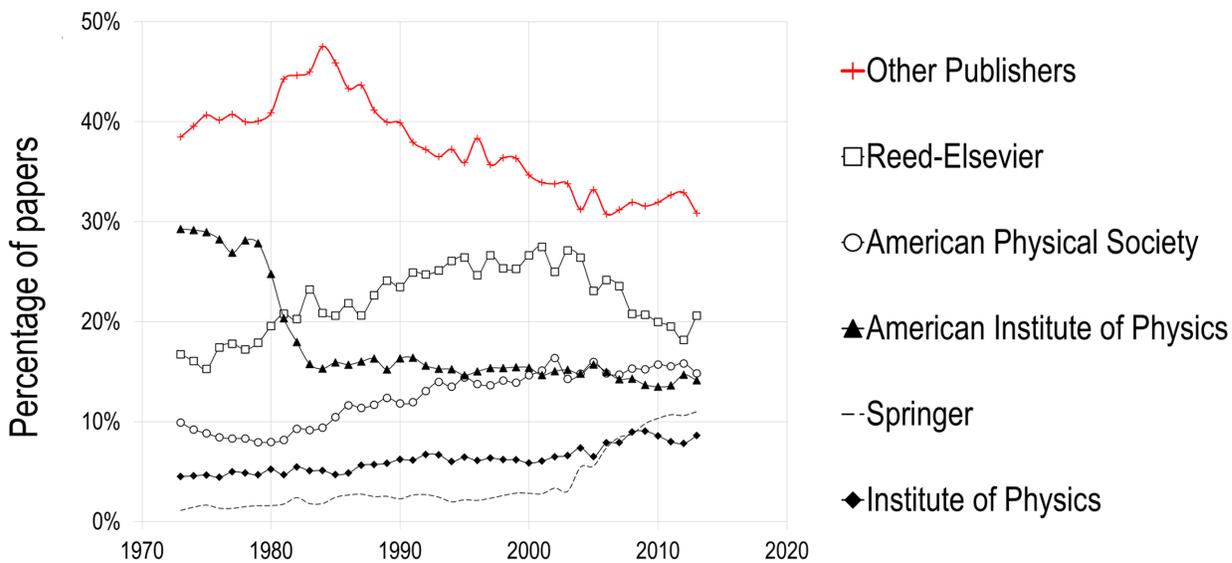


Figure 5 illustrates the percentage of papers published by the five major publishers in Physics, 1973–2013. Reprinted from Larivière et al. 2015.

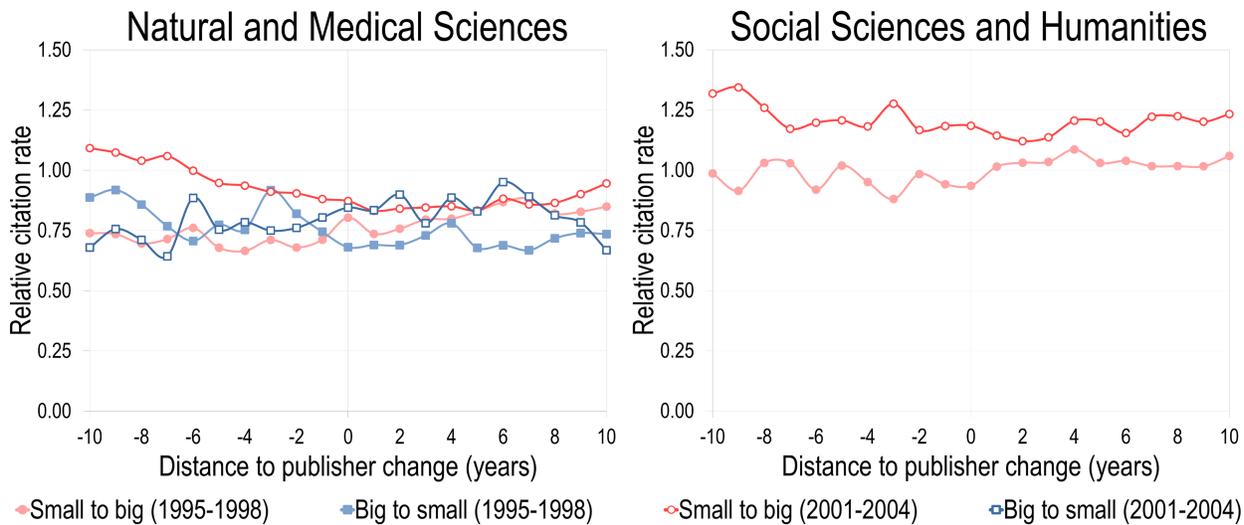


Figure 6 illustrates the evolution of the mean relative citation impact of papers, by distance to publisher change, 1995–1998 and 2001–2004. Reprinted from Larivière et al. 2015.

An interesting finding in the study is that there is no significant change in impact when shifting from a small publisher to large, with the mean impact of papers (in terms of citations) staying below the world average. Production of high impact papers seems not to be correlated with changing to larger publishers (Larivière et al., 2015).

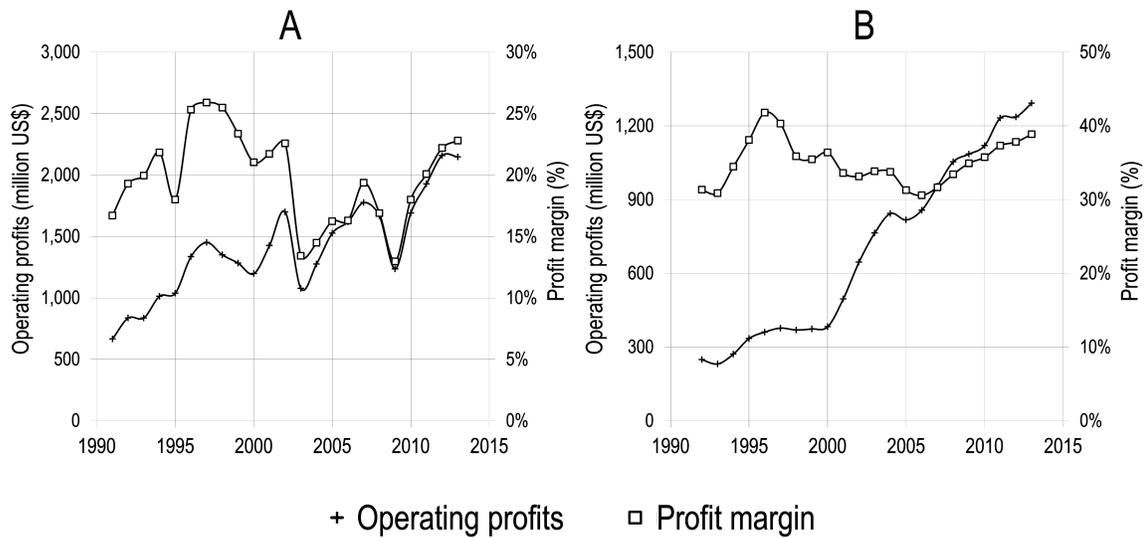


Figure 7 illustrates the operating profits and profit margin of Reed-Elsevier as a whole (A) and of its Scientific, Technical & Medical division (B), 1991–2013. Reprinted from Larivière et al. 2015.

The high profit margins of publishers are combined with the fact that two of the key inputs to journal production are given to them free of charge—the articles that make up the journals, and the editorial review. That faculty need previously published research to do new research leaves libraries in a bind and creates an inelastic demand for academic journals. As a result, publishers can continue to increase prices. The publisher’s role as intermediary gives them power to charge whatever the market will abide (McGuigan & Russell, 2008). Publishers tend to justify the profit margins by pointing to the value they add to the process in pre-vetting submitted papers, support provided for peer review,

printing and distribution, but, of Elsevier, a Deutsche Bank analyst pointed out that if their processes were as complex as they suggest, profit margins that high would not be available to them (McGuigan & Russell, 2008).

Changes to the legal environment & copyright law

The US Constitution requires Congress to create law at a federal level that creates incentives for the creation and distribution of new works. This law, copyright law, bestows exclusive right to copy, sell, and perform original authored works that are in a fixed tangible medium. This exclusive right, which grants the owner a monopoly for a limited time, was designed to balance the interest of readers, publishers and authors, but also to allow for good faith use by journalists, students, scholars, and others.

Changes to copyright law throughout the years have created a matrix of legal protections that are now referred to as intellectual property rights (Vaidhyanathan, 2001). The first change was a comprehensive copyright law passed by Congress in 1976. Then, in 1978, Congress extended the length of copyright for authors to the life of the author plus fifty years, and for corporate authorship to seventy-five years. Additionally, renewal terms were forty-seven years, which is a total of seventy-five years. They also broadened the nature of works protected by copyright and clarified fair use and infringements (Greco 2018). One of two significant revisions to copyright law passed by Congress in 1998 were the Copyright Term Extension Act, which included two key provisions. The act extended term of copyright from fifty years after the death of the author to seventy and extended corporate copyright from seventy-five years to one-hundred and twenty years after creation of a work, or ninety-five years post-publication. It also extended the

copyright for all works published before January 1, 1998 from seventy-five years post-publication to ninety-five years (Greco, 2018). Copyright is not just a single right, but a bundle of rights which includes first, an exclusive right to make copies, but also a right to allow others to make copies, derivative work, sell or perform the work in public, and a right to petition a court if others infringe on those rights. Control of these rights can be transferred or licensed to third parties (Vaidhyathan, 2001), as scholars do when they transfer copyright to publishers.

The Digital Millennium Copyright Act (DMCA), a second significant shift in copyright law, passed in October 1998, and was intended to enforce two treaties of the World Intellectual Property Organization (WIPO), which were the WIPO Copyright treaty and the WIPO Performance and Phonograms Treaty. Among other things, the DMCA made producing or distributing any device designed to specifically reduce or minimize digital rights management (DRM) systems that control access to works under copyright (Greco, 2018). In its original form, copyright was created to regulate copying published works, not the reading or sharing of the works. This legislation effectively collapsed the distinctions between accessing, using and copying (Vaidhyathan, 2001). On one hand there exists a system of technology that allows for incredible freedom of reuse and creativity, but a system of laws that renders that reuse and creativity illegal. This level of regulation “fails every important standard of efficiency and justice (Lessig, 2015, p. 266). Focus on the “copy,” Lessig (2015) argues, is part of the problem. Laws should focus less on protecting copies and reproductions and instead on uses. Fair use, for example, allows for people can quote or reuse work under copyright without

payment or permission (Aufderheide & Jaszi, 2015), but there is a failure in this objective under the current system of copyright. Given that companies are suing individuals for fair use violations, the advancing of the fair use doctrine is problematic. The doctrine was developed with the idea that it would be administered by lawyers at a corporate level, but it becomes inadequate when Sony is suing teenagers for infringement of copyright (Lessig, 2015). The intellectual property regime now operates at a much lower level, and “is implicated in routine creative, communicative, and just plain consumptive acts that each of us performs every day (Boyle, 2010 p. 51-52). A more useful system of copyright would be built around what specific uses are beyond its scope, allowing for flexibility, so that organizations that can afford lawyers can work to make sense of the law, leaving a simpler and cleaner system to regulate use by everyone else (Lessig, 2015). Fair use is critical to a thriving cultural environment, as it is one of the alternatives to strong copyright protection. Another alternative is copyleft licenses.

Copyleft licenses started in the Free Software movement when Richard Stallman grew frustrated with increasingly proprietary software and university administrators unwilling to push back against corporations who would not allow him to customize installations of software. In protest, he left MIT to found the Free Software Foundation. In an effort to ensure that free software could not be bought and then made proprietary, he created copyleft licenses. These licenses require that anyone who makes changes to free software make their changes and improvements publicly available so that others can continue to make changes and improvements. They must also retain the license, meaning

that the license perpetuates itself (Vaidhyathan, 2001). Creative Commons is a non-profit that works similarly to layer reasonable copyright protections to make it easier to build on other people's work by allowing the original author to make clear at the outset what kind of use the work can be put to without having to involve lawyers. Creative Commons licenses apply to other forms of work outside of free software. The content is marked with the CC mark, and attached to a license, of which there are a range. Original authors, for example, can choose licenses that allow for any use as long as attribution is provided, any noncommercial use, any use as long as the same freedoms are attached to the new work (share and share alike) (Lessig, 2015). *PLoS ONE*, the journal produced by the Public Library of Science, requires that all work deposited in their journal be published under a Creative Commons Attribution (CC BY) license, meaning that authors who publish in the journal agree that their work can be used, in whole or in part, for any purpose, even commercial, thereby facilitating freedom of reuse (Lessig, 2004). The final way around a strong system of copyright is piracy. Two stories in particular are illustrative of piracy of academic resources. The first is the story of Aaron Swartz. The second is the rise of Sci-Hub.

The story of Aaron Swartz

Aaron Swartz was a political activist and computer programmer. In 2010, MIT received word from JSTOR that someone was downloading articles from their servers by the hundreds of thousands, and that they could trace the intruder to the MIT campus. Swartz, it turned out, was the intruder (Bombardieri, 2014). Swartz was charged in federal court under the Computer Fraud and Abuse Act, legislation passed in 1984 to

ease the government's ability to prosecute hackers who stole information or destroyed computer functionality. The government interprets this law as allowing them to prosecute based on activities like violating the terms of service for a website or violating a company's computer use policy (Kravetz, 2012). By the time he was caught, Swartz had downloaded 4.8 million articles, which constituted 80% of JSTOR's archive. MIT risked losing access to the resource, since their contract with JSTOR promised that MIT would protect against misuse of JSTOR resources (Bombardieri, 2014). Swartz surrendered to authorities in 2011 and faced dozens of years in prison and a \$1 million fine if convicted (Kravetz, 2012). The charges under the Computer Fraud and abuse act centered on the notion that Swartz's access to both MIT and JSTOR networks was unauthorized, and while his behavior might have been inappropriate, the fact that he was logged on to MIT's network as a guest suggests that his access could be considered authorized. Ultimately, facing federal prosecution, massive fines, and a long jail term, Swartz committed suicide in 2013 (Bombardieri, 2014).

The rise of Sci-Hub

Sci-Hub was created in 2011 by a researcher in Kazakhstan, Alexandra Elbakvan. She created this database in response to a lack of access to research output by researchers around the world, due to the fact that their libraries are unable to afford the content, suggesting that the lack of access is a violation of the United Nations' Universal Declaration of Human Rights. The website provides access to more than 48 million scholarly research articles for free. Many of these articles are still under copyright and are therefore usually kept behind paywalls (Banks, 2016), making it possibly the largest

case of copyright infringement on record. Elsevier sued Sci-Hub in a US District Court in New York, winning the case, and an award of \$15 million in damages. Given that the founder lives abroad and outside the jurisdiction of the court, it is entirely possible that Elsevier will never get that money (Greco, 2018). Sci-Hub did not comply with a court order to take down the site, instead continuing operation under a new domain. Elsevier has filed a new legal complaint, but legal sanctions will likely be difficult to enforce (Banks, 2016).

In this chapter, I traced the consolidation of scholarly publishing under a small number of publishers beginning in the 1970s and reviewed legislation passed in the 1990s that gives distributors of content increased control over their content. I reviewed ways in which content creators have been pushing back against the system through both legal and illegal means. In the next chapter, I will explore how prestige symbols in the system of scholarly communication operate under the myth of authority.

CHAPTER III

LIES, DAMN LIES AND IMPACT FACTORS

Introduction

In this chapter, I will outline a response to the research question “How is legitimacy constructed in the scholarly communication process, and does a shift to a digital environment do anything to change that?” I will do so by articulating the first of three overarching myths that operate in the system of scholarly communication: “the myth of authority.” I will argue that this myth manifests itself primarily through prestige markers in the system: peer review, publication, and tenure. Prestige symbols are signs and symbols that are considered markers of success in social systems, gathered through the process of reaching goals or having traits desired by a group (Wilson, 1995). As new models of publishing emerge, these traditional processes create barriers to change. I will argue that resistance to change in the system of scholarly communication is bound up in this myth of authority which operates as a screen to prevent participants in the system from seeing that the foundation of traditional processes are first and foremost the social infrastructures, not the technical and procedural infrastructures, that underlie the system. Scholarly communication tends to be an inwardly focused system of experts talking to each other. To be considered an expert, and therefore an authoritative voice in a scholarly conversation, scholars must pass peer review to be published in the right journals as designated by their discipline—a process that, for tenure-track faculty, is usually required for earning tenure (Greco, 2015). As the system of scholarly communication is increasingly driven by technology and new tools are being developed

to manage the processes underlying the system, critically examining the myths surrounding the digital transition for scholarly print publishing and its various tools foregrounds social and cultural processes contributing to changing relationships between academic publishing, librarianship, and readerships, rather than relying on technological determinism to explain any particular phase.

In contrast with Fitzpatrick (2011), who places the scholarly communication crisis beginning in the early 1990s, which is when libraries began to feel a significant strain on their budgets, I rely on Thatcher's (2013) argument that the beginning of a crisis in the system of scholarly communication began in the early 1970s, around the time Sanford Thatcher and Arthur J. Rosenthal testified before the Senate Subcommittee on Patents, Trademarks and Copyrights on behalf of the Association of American University Presses. Although librarians recognized an apparent crisis when journal subscription price increases outpaced their library budgets, university press directors had begun to see problems many years before (Thatcher, 2013). The subcommittee sought to establish of a National Commission on New Technological Uses of Copyrighted Works, and Thatcher & Rosenthal (1973), testified that the copying that libraries were allowed to do under a provision of copyright law negatively affected the proprietary works of University Presses (Thatcher & Rosenthal, 1973). I will trace the development of the system of scholarly communication up to the 1970s, and how it has changed after that time. As Mosco (2004) suggested, by considering a myth as something that occurs early in the development of a system, it may be possible to uncover the grounding of the myth in politics and ideology. The myth of authority, I will argue, is tied up in traditional

scholarly practice but increasingly buttressed by an overreliance on metrics—or, to use a more scientific term, data.

Defining authority

Legitimacy is constructed through prestige symbols in the system of scholarly communication, lending authority to both individuals participating in the system and is abstracted at an epistemic level in the fixed forms of content they produce within that system. Weber (2015) outlines three kinds of legitimate authority. Legal authority is based on rationality and a system of normative rules, with reverence given to an established order. Those with formal legal authority are given obedience by virtue of their office and scope of their position. Traditional authority resides more directly with a particular person who is bound by a particular tradition and carries out established beliefs within that system—the loyalty to tradition is bound to a prescribed system of obligations. Charismatic authority rests on affection for a particular person considered to be of exceptional character or other admirable qualities, who engenders loyalty through trust in his charisma alone. Legitimacy is what distinguishes between the general notion of power, exerted through violence or some other form of force. When power is legitimate, or socially endorsed, it can be considered authority (Weber, 2015). Authority manifests itself on a higher plane than the strictly descriptive. Although claims from science and religion do sometimes overlap, where they agree, it tends to be at a descriptive level (Blackwell, 1998). There is a distinct difference between the two when it comes to authority. Science derives its epistemic authority from evidence and rationality, while religion derives its epistemic authority from scripture and tradition.

Neither science nor religion are truly rational and each is subject to human fallibility.

Falsification is based on the idea that the rules of science are not fully rational.

Regardless of the fact that rules of science are not fully logical, that is, not fully rational in the sense that scientific hypotheses cannot prove hypotheses are true, but, only that they are false, scientists continue to use these rules (Blackwell, 1998, p. 43). Narrative rationality, which proposes that human beings rely on stories in all manner of discourse, similarly points to the fallibility of discursive work.

...but all discourse is presented by a fallible human being and is an interpretation of some aspect of the world occurring in time and shaped by history, culture, and character. Discourse rarely, if ever, presents an uncontested or uncontestable truth (Fisher, 1994, p. 23).

Narrative rationality requires coherence and fidelity. Coherence requires structural (or argumentative) coherence, material coherence (how a story compares with other relevant discourse), and characterological coherence, which is tied to the integrity and values of the author. “In each of these features of coherence, values are manifest: consistency, completeness, and character” (Fisher, 1994, p. 24). Fidelity requires two assessments, “weighing the elements of a message usually regarded as its reasons and weighing the values it explicitly or implicitly conveys” (Fisher, 1994, p. 24).

Scientists know now that Copernicus was correct in his description that the earth revolves around the sun, which was later supported scientifically by Galileo. Scientists today would agree with Galileo’s scientific approach, though they would, given new information, take issue with his claim that the sun is the center of the universe. Religious

leaders took issue with Copernicus and Galileo because their findings contested a view of the universe outlined in Genesis, which they considered to be a higher authority than science (Blackwell, 1998). Similarly, two hundred years ago, even the brightest minds might have had difficulty with the idea that Earth was 4.5 billion years old, and the universe significantly older. Primate of Ireland Bishop Usher established through research on the Old Testament and mathematical calculations that the birthdate of the world was 4004 B.C. His conclusions were derived in a systematic manner, and his conclusions “fit nicely into the common view of history as a sacred narrative, progressing purposefully from an intentional beginning toward a promised consummation—in short, a teleology” (Rumsey, 2016, p. 88). Fisher (1994) distinguishes between science and rhetoric, noting that there is a clear difference between “doing rhetoric” and “doing science” (p. 22). The practice of scientific discourse is rhetorical—scientists adapt to their audience, use persuasive symbols and build arguments. Trying to convince an audience of a position is a rhetorical practice, but science is a specific manner of solving problems (Fisher, 1994). At the level of epistemic authority, science adopts certain procedures and verification commitments that have, through trial and error, been deemed by scientists to have been successful in the past, with hopes that these successes will continue. When these choices are challenged by other kinds of authority, as in the case of Galileo, the scientific community will respond predictably in protest to those challenges (Blackwell, 1998). As the church looks to scripture and tradition for its epistemic authority, scholars look to the traditions of their disciplines and their canons. Institutional authority is directly tied to epistemic

authority, and anything that threatens the institutional authority is also considered a threat to epistemic authority (Blackwell, 1998). Scholarly journals themselves stand not just as public records of scholarship, but as their brands, publication in which brings a particular kind of recognition (Guédon, 2001, p.16). Brands, in the realm of corporations, stand as “the core meaning of the modern corporation” (Klein, 2002, p.5), and are a function of marketing, with advertisements as one way that meaning is communicated. Commercial publishers brought their marketing infrastructure to bear on the scholarly communication system, adopting strategies like market segmentation, to target faculty members and librarians in a variety of sectors of academia. Marketing defines brand image, brand equity and brand personality in order to position a book or journal in a market. When these segmentation strategies work, they make it difficult for competitors to break into an area and take revenues from leaders in the market. Brand marketing is a continual process of maintaining the reputation of the brand (Green 2015).

The system of scholarly communication, broadly speaking, is governed at various points in its processes by all three types of legitimate authority as outlined by Weber. There are prescribed rules that must be followed to publish, including making the right choices of publication venue; the broader academy and individual disciplines have long-standing traditions about how they do their work, and it is generally important to make sure the right people are cited, or, best, be the person scholars might be expected to cite. Better than that, even, Merton (1974) points to eponymy as one of the grander forms of recognition in science, through which a particular scientist can leave historical

marks by having all or some part of his or her discoveries named after them, “as with the Copernican system, Hooke’s law, Planck’s constant, or Halley’s Comet” (Merton, 1974, p. 298). As Mosco (2004) argues, the true test of a myth is not whether it is accurate, but whether the myth is embraced by sanctioned power structures that, “in doing so, keep them alive” (Mosco, 2004, p. 39). What constitutes knowledge is influenced by power structures and those who hold authority within those structures. In politics and science, an authority figure is required to determine what information is acceptable for discourse, what information constitutes knowledge, which is key for a stable society (Lyotard, 1984). Authority in the system of scholarly communication is theoretically built into the science and not the medium through which it is communicated, though the various media have taken on their mantles of authority, made legitimate by social actors (scholars) operating in the system. Authority is the system by which content is commodified at the epistemic level. Authority in the current system is abstracted through brands and metrics; due to concerns about fallibility, human judgment is offloaded into data. As a first step at examining how authority is accumulated around content and communication technology, I will explore its role in one area in particular: the fixed nature of the print form.

The myth of fixity

Rather than considering books and the information on their printed pages as natural facts, Rumsey (2016) considers them better viewed as “memory machines with lives of their own” (p. 177). Once thoughts are documented in hard copy form, they begin “circulating and pursuing their destinies.” Just as scholars have figured out how to

share ideas in hard copy form and distribute the ideas contained therein both in the present and through time so that ideas live on, it is necessary and possible to ensure this occurs as culture transitions its memory machines to digital form. The trust built in books and other forms of print is based in part on their fixed form. Inflexibility in form, in fact, is precisely what can make the transition from one technology to another difficult, because “fixity and indelibility may form the basis upon which our trust in printed books is built, but these attributes can just as easily endow these objects with an air of integrity they may not fully deserve” (Striphas, 2011, p. 12). Striphas (2011) continues:

... specific goods take on an identity or life of their own seemingly independent of human involvement, which then becomes an abstract index of their value. Instead of favoring either of these definitions of commodity, I wish to locate books in the tension between them. What interests me are those moments in which they’re treated either as generic stuff or as hallowed objects, as well as the labor it takes to transform books from the one into the other. This is nothing other than the work of culture (p. 28).

Print culture constructs boundaries in various forms and myths build up around those boundaries. These boundaries tend to be procedural at their basic level. The basic notion of publication itself serves as a boundary. Books have chapters, journals have volumes and individual issues, and distinguish themselves from other journals by providing particular types of content. Rumsey (2016) notes: “the mere fact of print carried with it an implicit imprimatur of authority” (p. 60).

Although the authority of books and other printed materials seems baked into their very essence, the idea of fixity obscures the fact that the ideas contained therein were not born fully formed into the world. This fixity reverberates throughout the culture of the printed word. Even the Declaration of Independence, one of the founding documents of the United States underwent revision on their way to their final draft. The text, so central to the values of an entire country, were heavily edited on the way to the final form seen today. One of the document's most famous phrases: "we hold these truths to be self-evident, that all men are created equal." These were not the words of Thomas Jefferson, but an edit suggested by Benjamin Franklin. Jefferson's phrasing painted these truths as "sacred and undeniable." As Rumsey (2016) notes:

The jarring yet oddly familiar sight of the Declaration of Independence in full Track Changes mode makes self-evident the disagreements among the Founders and the compromises they agreed on. The original document renders the past strangely new—the events dramatic, the motives of the actors complicated, the conclusion unpredictable (p. 5).

Knowledge derives its authority from its assumed objectivity. In the quest for knowledge, the values of the participants are clear. Social and natural science are in a constant state of confirming and disconfirming lines of inquiry, but the rhetorical transactions around inquiries only cease when the inquiry is confirmed (Fisher, 1994, p. 29). Once something is "proven," it is considered fixed—at least until someone comes along to disprove it. However, fixity and indelibility are precisely the factors that have

allowed egregious errors to be counted as fact, because they are in purportedly authoritative texts (Striphas, 2011).

Even before the deluge of information presented by digital distribution, books broke down barriers to information sharing, creating what Rumsey (2016) refers to as a “disturbed landscape of memory” (p. 60). As printed works began to circulate, ideas traveled even further than the bounds of the covers in which they were printed, passing from person to person, and becoming compelling agents of influencing opinion. Once in print circulation, factually incorrect information is difficult to fight, for the simple reason that once something was on the printed page, it became imbued with “an implicit imprimatur of authority” (Rumsey, 2016, p. 60). Fixity as an inherent quality of print underscores this imprimatur of authority. By viewing fixity as a transitive rather than an inherent quality, it is possible to see that fixity only exists when recognized by individuals, that factors besides the availability of the texts themselves influence readers, and that the cultural space in which the text exists shapes its reception—thereby focusing attention more appropriately on social and cultural interactions (Johns, 1998). The invention of writing itself happened more than once through multiple cultures. As Rumsey (2016) notes, “Egyptians, Chinese, and Mesoamericans each developed writing systems of astounding complexity and ingenuity quite independently of each other” (p. 25). These systems, once encountered by others, spread to other cultures, “extending the reach and longevity of knowledge became a distinct competitive advantage not only over animals but also over rival *Homo sapiens*” (Rumsey, 2016, p. 25).

A brief history of scholarly journals

As Thatcher and Rosenthal (1973) outline in their congressional testimony, a typical scholarly book is built using information from articles that were originally published in scholarly journals. The system by which authors publish in scholarly journals was built purposely on the foundation of scholarly authority. In 1665, Henry Oldenburg, then a member of the Royal Society of London, to advance a more dignified public image for natural philosophers, created *The Philosophical Transactions of the Royal Society of London*. His aim was not just to create a “public record of original contributions to knowledge,” but to establish a process that would bring clarity and transparency to work done by these philosophers and certify the originality of their work—in essence operating as something of a “patent office for scientific ideas” (Guédon, 2001, p. 5). This public registry, Oldenburg hoped, would also guide behavior within the community. He designed this system explicitly to establish authority in and for the scientific community.

Johns Hopkins University, founded in 1876, built itself largely around German traditions in higher education, and was the first university in the US through which a scholarly journal was published. According to then president Daniel Coit Gilman, a true university considered the practice of research as the essence of its being. Walter Dill Scott, president of Northwestern University, echoed this research-focused view in 1921 when he told the faculty that their publication record was considered the official record of the university’s members. Similarly, Harvard President Derek Bok suggested that, because peers cannot easily evaluate teaching in one’s institution, nor by those at other

universities, a faculty's published research is, therefore, the common currency that can be evaluated across boundaries (Carrigan, 1990). Within this system, the only "university recognized marker of distinction" is publication (Donoghue, 2008, p. 39). Ira Remson, a chemistry professor, who joined the faculty at Johns Hopkins University in 1876, requested permission to publish preliminary reports on his research, not as a way to disseminate knowledge, but as a way to bolster their image with working chemists and to establish a reputation for their faculty among peers. In 1878, he started *Notes from the Chemical Laboratory*, the first publication of its kind in the US, which would later become the *American Chemical Journal* (Carrigan, 1991, p. 133). The evolution of the scholarly journal has been centered almost entirely around creating a legitimacy structure for scholarly work. Regardless of the communication technologies in use, capitalist tendencies and hierarchical structures as developed during the Industrial Revolution continue to influence the structure of higher education.

Commercial impulses encourage more and more digitization because it allows for "amplification of communication as a commodity form" (Mosco, 2004, p. 156), transferring its use value to exchange or market value. Through a "mutual constitution of digitization and commodification" (Mosco, 2014 p. 156), commercial forces increase their ability to measure and repackage content, which coincides with increasing desire to measure results of scholarly output more effectively and efficiently. Although the internet and mobile technologies do much to impart freedom and liberation from controls, gatekeepers exert centralization of control through centripetal force applied by large companies like Apple, Amazon, and Google (Striphas, 2011). There is an ever-

increasing collection of metrics currently in use that attempts to define the productivity of faculty and the universities for which they work. While teaching and service have not been jettisoned completely, the metrics focus most closely on one thing: publication (Donoghue, 2008). As scholars focus more intently on ensuring they meet these publication standards, they hand over rights of use and distribution of their work to commercial scholarly publishers. Use rights are key to the identity of those operating in a commons, and it is important to the preservation of those identities that those rights not be commodified (Hyde, 2010, p. 43), but they already have been.

As paid subscriptions and sheer volume of publications increase, libraries have to make increasingly difficult decisions regarding their collection practices. Donoghue (2008) notes that the focus on productivity—in the case of faculty research, the number of articles produced—and perceived status of journals and presses, produces a system that rewards scholars who are active but not necessarily influential, effectively breaking the prestige model on which the entire system rests (Donoghue, 2008, p. 39). Different social situations have different prestige symbols, and prestige is not a constant. Prestige is derived from signs and symbols that are considered markers of success. These markers accumulate through the process of attaining goals or possessing traits that are coveted by the group (Wilson, 1995). Scholarly communication, then, is a complex sociotechnical system driven by a commodification of texts selected by a prestige hierarchy, and the increasing volume of publications indicates that publication is not only the foundation of the system of scholarly communication, but an increasingly crowded space in which to operate.

Measuring productivity in some industries is simple. A company that produces standardized products need only calculate the ratio of outputs to inputs. Such calculations are difficult in education, where standards vary both within and across institutions. As Bowen (2013) states, “this formulation conceals at least as much as it reveals” (Bowen, 2013, p. 6). The difficulty with calculating productivity and efficiency does not stop administrators and legislators from trying to make such calculations or from relying on the results. Educators still find it necessary to prove their economic and social worth with an ever-increasing suite of statistics, in an attempt to defend against an oppressive “corporate vocabulary of efficiency, productivity, and usefulness” (Donoghue, 2008, p. xv). Research faculty with or without tenure in this environment must improve their metrics or risk being fired for productivity lapses. Entire fields of research now revolve around assessing these measures. In determining the rankings of schools, previous methods would have asked relevant experts in the field for their opinion. Current methods focus on “how many pages each faculty member in the law school publishes over a five-year period” (Diodato, 1994, p. vii). A cottage industry, in fact, has grown up around the idea of measuring the effectiveness of individual scholars. Impact factors measure the influence of journals (Kolowich, 2010). Journal impact factors are published by the Institute for Scientific Information (ISI), and are typically used to evaluate both quality of the overall journal, and the quality of the papers published in the journals (Sombatsompop & Markpin, 2005). The h-index estimates how important a single scholar’s cumulative contributions to research are and attempts to measure the impact and broad significance of that work (Hirsch, 2005). The g-index

purportedly provides all the benefits of the h-index but provides additional information that allows for a clearer distinction between scientists and for a more accurate ordering of scientists (Egghe, 2006). These are just a few examples. Each of these measures captures some small part of what a faculty member does. Added together, they still provide no explanation or substantive critique of the scholar's work. The numbers can provide an easy shorthand, and even tell a compelling story, but not necessarily the *right* one. A notable attempt to use scientific measurement for scholarly production came with Alan Pritchard's "bibliometrics" in 1969, "the application of mathematics and statistical methods to books and other media of communication" (Pritchard, 1969). He proposed this term as an improvement upon "statistical bibliography," a term first used by E. Wyndham Hume in 1922. Due to the shift toward scientific measurement of productivity, professionals and knowledge workers are now subject to similar anxieties about the possibility of losing their jobs due to lack of productivity that was brought to blue-collar jobs through a restructuring that the 1980s (Abbott, 2008b, p. 161). A 2012 report released by the National Academy of Sciences that outlines that productivity in this environment is not one-dimensional and that there are myriad risks in the use of overly simplified measures (Bowen, 2013).

Because of the way the h-index is calculated, it tends to favor scientists. A scholar in the humanities will unlikely have an h-index as high as a scholar in physics because the humanities tend toward long-form writing, which means fewer publications. By relying solely on the h-index, humanities scholars can potentially fall victim to a reification fallacy, by which an abstraction is treated as if it were some concrete event or

physical item. When pitted against scientists in virtually any of these numbers games, humanities scholars, regardless of reputation or influence in their discipline, simply do not seem to measure up according to just the numbers. In a digital environment, it is possible to extract data that show not only the number of citations, but the number of downloads for a particular article, and it is even possible to see browsing patterns of researchers navigating literature (Kolowich, 2010). In reaction to the increasing demands from university administrations for metrics, Priem, Taraborelli, Groth, & Neylon (2010) published a manifesto declaring a vision for a diverse array of metrics designed to “measure impact in a diverse scholarly ecosystem,” which they called altmetrics. This system of metrics promises to “create real-time recommendation and collaborative filtering systems” that can ease the process through which scholars find new material in their field by providing a real time feed of new publications in an area and measure a broader range of scholarly work. Their system goes beyond previous systems of measurement in that it measures citations for articles more quickly and finds references to scholarly work outside of the traditional system of citation counting. Again, in this case, there is an addition of even more metrics. The creators of altmetrics boast of the semantic nature of the data and, in addition to helping scholars filter information, and helping administrators calculate, this data system promises to help detect fraudulent activity (Priem et al., 2010).

Donoghue (2008) directs attention to how this kind of measurement tends to lead to competition and argued that competition is now as fundamental in academic culture as it is in corporate culture. Publication at intensive research institutions for faculty on the

tenure track is no longer optional; it is a requirement. Moreover, to make comparisons between institutions, the projects must be somewhat comparable, leading to conformity, or as Meyer & Rowan (1981) would call it, isomorphism—in the very environment (particularly for research universities) where it is hoped innovation will occur. As Donoghue (2008) suggests, “in an ironic turn, professors, who like to think of themselves as autonomous intellectuals, find that their work tends, because it is constantly evaluated and managed, toward narrow conformity and standardization” (p. 176). Conformity in tenure requirements begins to spread across the country, publication expectations for assistant professors inflate, research missions creep into schools where they never existed before, and the education enterprise begins to measure itself against the expectations of elite institutions (Donoghue, 2008).

Standards and processes developed for a physical environment are being mapped onto a digital infrastructure that need not be constructed in the same way. Ramsay (2010), as part of a *Hacking the Academy* blog series, questions the struggle to shift toward ways of looking at digital content produced outside of the traditional publishing process:

For years, I wondered why people are so resistant to electronic publication and digital projects generally. The answer just didn't make sense: “We don't know how to evaluate that kind of work?” “Really?” I thought. “Here's an idea: How about you look at it and decide whether it's good or not.” But *that's* precisely the responsibility that no wants to have (without cover of darkness). This is the root of every bit of sanctimonious nonsense you've ever heard about “peer review.”

Translation: We don't have a certifying authority to whom we can offload this. That's why I believe that creating these certifying authorities for digital work may end up capitulating to an already broken system (Ramsay, 2010).

Although it seems that new technologies are being fully embraced in academic circles, much of the work published in digital space outside of the traditional publishing process is still not considered worthy of the academic enterprise. In fact, in January of 2014, The International Studies Association (ISA) proposed barring members of the editorial board of journals published under its imprimatur from blogging. The president of ISA noted that the policy suggestion was not directed specifically at blogs but put forth as a guard against people confusing work done by ISA authors as part of their journal work and the work they do in a more personal space (Straumsheim, 2014).

Lessig (2004) warns that the initial design of technical systems can make it difficult to make changes to that system in the future, restricting available options. Borgman (2007) applies this notion to a scholarly context, noting that decisions made now are going to affect both producers and consumers of scholarly content who have not yet been born (Borgman, 2007). Lyotard (1984) similarly warns that technology's focus on efficiency could be detrimental to a system purportedly focused on seeking truth, noting that the focus on scientific language creates an "equation between wealth, efficiency, and truth," and that decision-makers resort to attempting to describe the whole through "input/output matrices" and legitimize power based on measures of efficiency (Lyotard, 1984, p. xxiv).

Gare (2007) argues that increased bureaucracy has potentially deleterious effects on institutions, because when “careerists” become involved in them, goals are often set aside to make room for power struggles for personal advancement, and the original mission of the institution—its reason for being—gets left behind. As for the system of scholarly publishing, it is important to remember that “the bottom line is that scholarly publishing isn’t financially feasible as a business model—never was, never was intended to be, and should not be. If scholarship paid, we wouldn’t need university presses” (Davidson, 2014). The university press has long been a central component of scholarly publishing, and they were originally intended to publish work from their faculties (Fitzpatrick, 2011). While their imprimatur remains crucial, new methods of publication are possible in a digitized publication system. The imprimatur of authority bestowed by the press carries far more weight in the academy than those of non-academic publishers—and scholarly journals provide similar cachet. Productivity and impact measures are tied together in a system to bestow legitimacy on participants and the work they produce. University public relations departments around the country scramble each year to either trumpet success at moving up in the *U.S. News & World Report* college rankings each year, or to explain away any movement downward on the list. The importance of these measures is perhaps best evidenced by the fact that scholarly publishers are now creating tools to aggregate and provide data (at a cost) to the universities that provide their work product. The myth of authority lies in the imprimatur of authority conferred by publication.

Scholarly communication is best understood as a complex sociotechnical system (Borgman, 2007). The system has shifted from a gift economy to a reputation economy (Fitzpatrick, 2011). Lanham (2007) argues that there has been a shift from an “information economy” to an “economics of attention” (p. xi), in which not scarcity but an excess of information is the problem, so that *attention* to information is what now drives the system. Mosco (2004) explains political economy as “the study of the social relations, particularly the power relations, that mutually constitute the production, distribution, and exchange of resources, such as communication” (p. 6). It is particularly important that scholarly communication be considered as a system, as it “implies a degree of interrelatedness-of integration, coordination, and logic among the constituent elements” (Carrigan, 1990, p. 335). From the system level, it becomes clear how the environment imposes structure on the system, and how all of the assorted parts function individually and in coordination with one another. Three main systems exert influence on higher education in the United States. The first are state systems that control many institutions of higher education and form a system with extensive impact even outside of publicly-funded institutions. The second is the academic oligarchy, where senior professors exert their influence, and, finally, the wider commercial market economy, reflecting choices made by and exchanges between individual elements in the overall system (Clark, 1983). Scholarship tends to be an inwardly focused system of experts talking to each other. To be considered expert and therefore an authoritative voice in a scholarly conversation, scholars must pass peer review to be published in the right journals as designated by their discipline. Librarians have a vested interest in ensuring

their collections contain authoritative research—and, increasingly the corresponding sets of data—that supports the research process—libraries do not collect everything, but they do work closely with faculty in various disciplines to ensure that collections are sufficiently authoritative. Intense pressure to publish often and in the *right* venues confers a brand upon journals with high impact factors.

The notion of a brand may be a shortcut used to assess quality that is a function of marketing and not of academic quality. Brembs Button & Munafò (2013) suggest that institutionalizing journal rank and the pressure to publish has had negative consequences for science, because with the focus on the journal itself, focus on the quality of work goes down, leading to an increase in retractions. It is suggested in some areas that the whole concept of the journal be done away with entirely (Brembs et al., 2013). In a system driven by print, the “journal container” was the most efficient method for delivering scholarly content prior to the digital shift. In a digital environment, the focus can shift more to individual articles, with pay-per-view access as a possible alternative to paying for entire journals (Bosch & Henderson, 2014). The value of the results of scientific inquiry comes after they are made public, and the system was designed as a way of “claiming and proving property titles” (Guédon, 2001, p. 7). Guédon (2001) continues:

The lesson to be drawn from all this is obvious: research scientists treat articles and published journals exactly as Oldenburg had anticipated, i.e., as registers of intellectual property whose functions are close to that of a land registry. In effect, journals record the ownership titles (articles) and they define limits and

boundaries. Ultimately, scientists are more interested in articles than journal titles, exactly as anyone would be more interested in locating a particular land title than a title office. Yet, knowing where the title office lies is obviously very important as well (Guédon, 2001, p. 16).

Peer review provides “an intimate relationship between reputation and authority in the intellectual sphere” (Fitzpatrick, p. 35), and together with other measures of assessment help to determine reputation. A digital environment provides a variety of new possibilities for “reputation-determining metrics” (p. 35). EBay and Slashdot are just two examples of online entities that have evaluations systems based on customer feedback and ratings, and Fitzpatrick (2011) argues that these frameworks and others point to a potential change in how scholarship is produced and consumed, which can lead to “a vibrant intellectual commons that will genuinely promote the Progress of Science and useful Arts” (Fitzpatrick, 2011, p. 83). Cohen (2010) points to this drive for publication as problematic because while the system is creating a great deal of scholarly content, there is, as yet, no clear picture of how much actual demand exists for that content. He goes on to suggest that the social contract rests on engaged reading, and proper attribution and that both the supply of content and the demand for content need to be appropriately aligned (Cohen, 2010). Within such a system, the library plays two roles: as a place to store materials, and as the key customer in the market for an increasingly large and increasingly more expensive collection of published scholarly output (Carrigan, 1990). The strain on library budgets makes it difficult for libraries to maintain the collections necessary to sustain the scholarly communication system. As

expectations for faculty production continue to increase, commercial publishers make record profits—in fact, as outlined in Chapter II, increases in commodification, increases in reliance on metrics, increases in competitiveness, and increases in publications and publication venues have all coincided with increases in publisher profits, particularly since commercial publishers began to take over scholarly publishing. It is in the interest of their business that these increases continue. The rise of digital publication and the increased commercialization of scholarly content is creating new opportunities and new tensions in the culture of publishing.

Factors contributing to change in the publishing culture

The shift toward peer production in digital environments is creating a culture change throughout various avenues of publication and information exchange. These shifts are less a cause of destabilization and more of an acknowledgment of a problem—and the problem is “a reorientation of knowledge and power that includes questions of enlightenment and rationality, democracy and self-governance, liberal values and problems of the authority and validation of knowledge” (Kelty, 2008, p.279). In the system of scholarly communication, researchers are particular in their choices of information to use in supporting their research. Guédon (2001) notes, concerning scholarly sorting behaviors on publications, that:

As a rule, preprints will simply not do; not all journals will do, either: scientists want the best citations from the most authoritative sources possible and this shows that scientific publishing actually rests on the perception of a pecking order among journals. Finally, scientists also monitor five to ten “essential” titles

they deem fundamental for their specialty. In this manner, they check the progress of colleagues and potential competitors (Guédon, 2001, p. 15)

Benkler (2006) points to content as one place where there is an increasing amount of legal control exerted through more restrictive copyright, patent, and trademark legislation, but also notes that social forces are pulling in the opposite direction—toward content sharing and a strong drive to participate in communities to create content and allow for its repackaging and reuse (Benkler, 2006). Changes in culture can lead to crises of authority. When existing power structures are called into question, and the information load is overbearing, “the question of *what* to believe becomes, almost imperceptibly, a question of *who* to believe” (Rumsey, 2016, p. 61). Hyde (2010) points to a key element of the community of scholarship in the system of higher education in the US, which is that, in order to advance professionally, scholars must demonstrate quality in scholarship, teaching, and service—the quality being determined by the community.

The quality of work in each of these spheres, moreover, is judged by the community[...] Only at the end of that process—after all the letters have been written by colleagues and students, after the tenure and promotion committee has met, after the dean of faculty has read the file, and so forth—only then can professional advancement, both in rank and in salary, come. As in Franklin’s model, if merit belongs to the work, the community assigns it, not the scholar. (Hyde, 2010, p. 159)

This is the critical contradiction of the myth of authority. Authority is assigned by the community, but it is currently tied too closely to journal brands. To emphasize this, I will now explore changes to the information economy, and follow with an outline of new possibilities for publishing scholarly work.

The information economy reached its current networked status when capital costs lowered enough to grant access to a broader population. Investments became more broadly distributed; information could be produced and processed through the efforts of people who were not geographically collocated. Thus, the increase in peer production is no different rationally speaking than that of the assembly line at the beginning of the twentieth century (Benkler, 2006). Three key areas make the current information environment toxic, as specifically related to copyright law: changes in legal rules, the advance of technologies, and seismic shifts in the area of media ownership (Lessig, 2004). These issues have affected scholarship as much as they affected other forms of media production, but a key difference is that peer production is something scholars were doing long before the internet came along. Björk (2007), in an attempt to document the entire value chain of the process of scientific communication, outlined the process using a series of workflow diagrams. The following is the top-level diagram that provides an overview of the entire process:

- A-0 Context diagram
 - A0 Do research, communicate and apply the results
 - A1 Fund R&D
 - A11 Evaluate prior research of applicants
 - A12 Evaluate research proposals
 - A13 Make funding decisions
 - A2 Perform the research
 - A21 Study existing scientific knowledge
 - A22 Collect data from existing repositories
 - A23 Do experiments and make observations
 - A24 Analyse and draw conclusions
 - A3 Communicate the results
 - A31 Communicate the results informally
 - A32 Communicate the results through publications
 - A321 Publish the results
 - A3211 Write manuscript
 - A3212 Choose where to submit or negotiate publishing
 - A3213 Produce publication
 - A32131 Publish as monograph
 - A32132 Publish as conference paper
 - A32133 Publish as scholarly journal article
 - A321331 Do publisher's general activities
 - A321332 Do journal specific activities
 - A321333 Process article
 - A3213331 Do peer review
 - A3213332 Negotiate copyright
 - A3213333 Pay article charges
 - A3213334 Do technical phases of publishing
 - A322 Facilitate dissemination and retrieval
 - A3221 Facilitate retrieval globally
 - A32211 Bundle publications from different sources into electronic services
 - A32212 Make manuscript or copy of publication openly available on the Web
 - A32213 Integrate meta data into search service
 - A3222 Facilitate retrieval locally
 - A32221 Negotiate subscriptions and licenses
 - A32222 Make paper publication available inside organization
 - A32223 Make electronic version available inside organization
 - A3223 Preserve publication
 - A323 Study the publication
 - A3231 Find out about the publication
 - A3232 Consider buying access to publication
 - A3233 Retrieve publication
 - A32331 Retrieve paper publication
 - A32332 Retrieve electronic publication
 - A3234 Read and process publication
 - A324 Publish secondary account of the results
 - A33 Share the data
- A4 Apply the knowledge
 - A41 Educate professionals
 - A42 Regulate industry and society
 - A43 Do industrial development
 - A44 Apply in practice

Figure 8: Top level diagram of Björk's model of scientific communication as a global distributed information system. Reprinted from Björk, 2007

Section A3, “Communicate the results,” is the most substantial section of the model. The outcome of this part of the model is the distribution of scientific knowledge to its expected readership, without which the results would generally be considered useless.

Mosco (2004) explains that commodification occurs when use value is transferred to exchange or market value. The commodity form of scholarly publication, which is the form that communication takes on when the production of that communication is organized primarily through the process of exchange, is expanded through digitization, because it affords commercial forces increased opportunities to be more flexible in the way that they control, monitor and measure content.

Wikipedia is possibly the most famous example of a system built around the notion of peer production. Designed by the Wikimedia Foundation, it is both an online encyclopedia and a community, evidenced by their statement of commitment: “Imagine a world in which every single human being can share freely in the sum of all knowledge. That’s our commitment.” (Reagle & Lessig, 2012, p. 20). While scholars like Vaidhyathan (2005) and Benkler (2006), who promote peer production for the cultural commons, have explored shifting notions of authority with regard to the production, distribution, and consumption of media and the democratization of those processes, scholars have ignored how intellectual authority might also be changing (Fitzpatrick, 2001). For example, some academics and librarians have banned the citation of Wikipedia. This kind of ban may be due to a misunderstanding of the inherent value of the stored knowledge in Wikipedia—its soul lies not in the entries themselves, but in the fact that users can see the history of the entries, “where the controversies inherent in the production of any encyclopedia entry are enacted in public, rather than smoothed over into an untroubled conventional wisdom” (Fitzpatrick, 2011, p. 16). Fitzpatrick (2011) continues:

More centralized projects, such as Citizendium, that seek to add traditional, hierarchical modes of review to a project like Wikipedia overlook the facts that the wiki is in its very architecture a mode of ongoing peer review, and that not only the results of that review but the records of its process are available for critical scrutiny (Fitzpatrick, 2011, p. 17).

Myths provide balm for the uncertainty that is inherent in what Mosco (2004) refers to as a “liminal state.” Not only do myths help us get through uncertainty at the moment, they allow us to consider the “power and possibility that comes with the release from custom and the loosening of traditional ties” (p. 32). Additionally, Mosco (2004) observes that it is important not to elide social structures, human agency, and “the real world of politics. According to myth, the Information Age transcends politics because it makes power available to everyone and in great abundance” (Mosco, 2004). Technology has, in fact, provided some additional room for freedom in the production of scholarship, particularly in the area of Open Access publishing, but it has also created space for predatory publishers. I will next provide an overview of OA and predatory publishing, followed by an explanation of other publishing options currently available that exist outside of the world of commercial scholarly publishers.

Open access and predatory publishing

In an attempt to address many of the issues in the system of scholarly communication, and most directly the issue of struggling library budgets, the Open Access movement began in the early 1990s. The movement gained momentum and took

on a more global character beginning with the Budapest Open Access Initiative (BOAI) in 2002. The statement of principles outlined at that initiative define OA as follows:

By "open access" to this literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited (“Budapest Open Access Initiative Statement of Principles,” 2002).

Supporters of OA have received pushback from commercial publishers as well as faculty at their institutions. The movement recognized that a scholar is a particular kind of author:

Imagine a tribe of authors who write serious and useful work, and who follow a centuries-old custom of giving it away without charge. I don't mean a group of rich authors who don't need money. I mean a group of authors defined by their topics, genres, purposes, incentives, and institutional circumstances, not by their wealth. In fact, very few are wealthy. For now, it doesn't matter who these authors are, how rare they are, what they write, or why they follow this particular custom. It's enough to know that their employers pay them salaries, freeing them to give away their work, that they write for impact rather than money, and that

they score career points when they make the kind of impact they hoped to make (Suber, 2012, p. 2).

The goal of the movement has been to disrupt traditional forms of scholarly publishing that are subscription-based, making scholarly output more freely available online to a much broader audience, and to break free of the oligopoly of commercial scholarly publishing, a system in which the top five publishers controlled over fifty percent of scholarly content in 2013, a marked increase which began in the mid-1990s. These publishers were Elsevier, Taylor & Francis, Wiley, Springer, and Sage (Larivière et. al., 2015). Policies and guidelines have been created to guide the distribution of scholarly work by initiatives like the Budapest Open Access Initiative and the Bethesda Statement on Open Access publishing (Nelson & Huffman, 2015). There are different models for OA. When access is provided directly by journals, it is called gold OA. When access is provided through repositories, typically through deposit of an author final draft, it is called green OA. Any work that is available only for a fee is referred to toll access (TA) (Suber, 2012).

The concerns of scholars who have resisted OA initiatives included worries that OA undermines traditional process of peer review and academic freedom. Open Access is in fact, compatible with peer review, copyright, and virtually every other process involved in scholarly publishing. However, as Suber (2012) stated, “cultural inertia slowed the adoption of OA by leading many people to mistake it for a more radical idea than it actually is” (p. 168). Adoption of OA has been uneven, partly because of concerns about peer review and research quality, but partly due to the established

reputation of traditional journals, which are critical to the tenure path. When considering whether to publish in OA journals, tenured scientists are more interested in visibility than non-tenured scientists, while non-tenured scientists were more interested in potential career benefits (Park, 2007). For those who have yet to receive tenure, it is still critical to ensure that they are published in the right journals.

The OA movement is beset with problems familiar to traditional scholarly publishing as well. Concerns about predatory journals began to crop up in the early 2000s, and it was the OA movement that created the circumstances that allowed their rise (Nelson & Huffman, 2015). Predatory journals serve a similar function as vanity presses for monographs and edited volumes. These predatory journals charge article processing charges (APCs) to authors, but often do not implement a rigorous peer review. To test this purported process, an author sent a purposefully flawed article to one of these predatory journals and received an acceptance letter and the instructions on how to pay the APC on the following day (Shen & Björk, 2015). A heavy focus on publication counting drives some of this behavior, leading to problems even in the traditional system of publishing. Impact factors create particular problems, with some editors rejecting articles not because they are bad scholarship, but because they do not cite enough articles in the editors' journals. A particularly egregious example is an article published in *Medical Science Monitor*. Four hundred forty-five of the 490 articles cited by the authors of the article appeared in *one* other journal, *Cell Transportation*. This pattern of citations drove up the impact factor of the journal *Cell Transportation* by

21% over the next year. Three of the four authors of this particular article in the *Medical Science Monitor* were editors for *Cell Transportation* (Morozov, 2013, p. 251).

In an attempt to raise awareness of the problem of predatory publishers, Jeffrey Beall founded Beall's list in 2008, later coining the phrase predatory publisher in 2010 (Pyne, 2017). Publishers and journals identified as predatory under his standard are seen as being devoid of a real peer review process, generally of low quality, and profit-driven (Nelson & Huffman, 2015). Beall has been considered a hero to some—the OA movement, in particular, has been critical of his list, suggesting he is overly hostile to the model (Straumsheim, 2017). Beall's list recently, without warning, disappeared from the web. Questions arose as to whether it was in response to legal action. Cabell's, a company that helps researchers and librarians find scholarly journals, has been working with Beall since 2015 on a new blacklist of journals, but they deny having anything to do with the removal of the list (Straumsheim, 2017). Neylon (2017) suggested that the death of Beall's list is a positive move and points instead to the availability of multiple whitelists as an already existing solution to the problem. PubMed, Web of Science, Scopus, Directory of Open Access Journals (DOAJ) all provide the information to help determine whether a journal is worthy of scholarly work. Olivarez, Bales, Sare, & Van Duinkerken (2018), questioned the quality of Beall's list, analyzing whether established journals with a good reputation would pass the criteria Beall outlined. They examined 81 journals, and found that 45 failed on at least one criteria, while 18 failed more than one.

The term predatory creates a frame around publishers that are operating outside the traditional, commercial scholarly publishers who wish to continue their hold on

scholarly output. In considering whether these journals are in fact predatory, it should be clear precisely what predatory behavior they currently exhibit. If incentive structures in the academy are constructed such that they focus on counting number of publications, a publisher is not necessarily predatory, but fulfilling the needs of scholars who need venues in which to publish (Basken, 2017). On whom, then, is the process said to be predatory? The author pays system is not inherently broken but does include a fundamental conflict of interest in that publishers' profits are tied directly to the number of articles they accept, which is effectively an invitation for abuse (Stratford, 2012). The problem lies not so much in the hands of any particular publisher, but on a system that focuses on publication above all else. Criticism of the author pays model also ignores that commercial publishers like Elsevier, Taylor & Francis, Sage, Springer and Wiley all provide the opportunity for authors to pay additional money to ensure their publication is OA. While Thompson Reuters has been working to index more regional journals, regional publishers, who often fall into the predatory category, have worked diligently to get their journals indexed in Web of Science, which is the mechanism through which their journals can establish an impact factor. The Serbian government, for instance, requires that authors publish in journals with an Institute for Scientific Information (ISI) impact factor to gain both academic appointments and PhDs, and this requirement is set up as a safeguard of legitimacy (Shen & Björk, 2015).

Concerns of scholars and librarians with predatory publishing are growing, but there are also concerns about the traditional system, including around the prevalence of publication bias. Publication bias is the withholding of null studies, defined as those

studies in which the result proposed is not the result achieved, therefore the conclusions do not support the outlined hypothesis. These studies are typically not considered exciting enough for publication, though they would often contribute to an overall body of knowledge, and in fact, left unpublished, can create a slant across an entire field. Researchers found that of the null studies done by social scientists, only 20% were published, and 65% were never written up because the authors assumed that journals would not accept them (Franco, Malhotra, & Simonovits, 2014). This behavior extends to how results are published more broadly. Newspapers do not cover initial studies when there are null results and tend to cover initial findings of studies, but rarely follow up when those results are disconfirmed (Dumas-Mallet, Smith, Boraud, & Gonon, 2017).

Faculty have a well-established loyalty to journals owned by traditional commercial publishers, but the stories of two library journals point to the fact that there are limits to this loyalty. In 2013, the entire editorial board of *The Journal of Library Administration* resigned in protest of Taylor & Francis Group's author agreements, which they deemed too restrictive of author rights, in that Taylor & Francis either expected to retain copyright of their work or charge a significant amount of money in order to allow the authors to retain copyright (New, 2013). In 1998, in response to increasing subscription prices, the entire editorial board of *The Journal of Academic Librarianship* resigned, then moving on to create *Portal: Libraries and the Academy*, published by Johns Hopkins University Press (Schwartz, 2013). In fact, many journal editorial boards have declared their independence, with the first documented case being in 1989 (Journal declarations of independence, n.d.). Journals manage to keep their

monopolies on content through a rule in academic journal publishing that is largely obsolete because of electronic publishing but still enforced largely through copyright agreements. The Ingelfinger rule, established in 1969 by the publisher of the *New England Journal of Medicine*, prevented authors from submitting to more than one journal at a time (Larivière et al., 2015). So, each scholarly journal is “a natural mini-monopoly in the sense that no other journal publishes the same articles” (Suber, 2012, p. 38). These methods, which constrain an author’s flexibility to contribute to an existing body of knowledge in favor of arbitrary restriction, are a function of intellectual property rights, providing a temporary monopoly for the holder of those rights. The status of journals as brands is particularly problematic, playing into the metrics-driven nature of the academy today:

In academia, journal brand is everything. I have sat in many committees, read many CVs, and participated in many discussions where candidates for a postdoctoral position, a fellowship, or other roles at various rungs of the academic career ladder have been compared. And very often, the committee members will say something along the lines of “Well, Candidate X has got much better publications than Candidate Y”...without ever having read the papers of either candidate. The judgment of quality is lazily “outsourced” to the brand-name of the journal. If it’s in a Nature journal, it’s obviously of higher quality than something published in one of those, ahem, “lesser” journals (Moriarty, 2016).

Authority structures in the academy have been converted to shorthand judgements of quality based on journal brands and data-driven structures that own and disseminate content created by and paid for by the academy. The commercial impulse then encourages more and more digitization because it allows for amplification of communication as a commodity (Mosco, 2004, p. 156). Digital environments broaden the commodification of content because there are so many ways in which content can be measured, tracked and repackaged. Scholarship which has traditionally been done in print journals, meanwhile, is caught up in a commercial scholarly publishing system that increasingly adds little true value beyond the brand names of the journals published, which help to abstract authority through a system of metrics. Lyotard (1984) warned of validating science through such a process:

This is how legitimation by power takes shape. Power is not only good performativity, but also effective verification and good verdicts. It legitimates science and the law on the basis of their efficiency and legitimates this efficiency on the basis of science and law. It is self-legitimizing, in the same way a system organized around performance maximization seems to be. Now it is precisely this kind of context control that a generalized computerization of society may bring. The performativity of an utterance, be it denotative or prescriptive, increases proportionally to the amount of information about its referent one has at one's disposal. Thus, the growth of power, and its self-legitimation, are now taking the route of data storage and accessibility, and the operativity of information (p. 47).

Publishers have a vested financial interest in this system continuing to pivot around their existence. Peer review is potentially the largest roadblock to progress towards more innovative methods of scholarship. The epistemic authority of scholarship is inextricably tied to peer review (Fitzpatrick, 2011). As Blackwell (1998) noted of the Church, “the institutional authority of the Church is grounded in the epistemic authority of Scripture and tradition, then whatever threatens, or is perceived to threaten, the former is also seen as a threat to the latter” (p. 50). Open Access and other non-commercial methods are not inherently a threat to peer review, although they are often perceived as such by scholars. Peer review, however, has always first and foremost been part of the social infrastructure of the scholarly communication system. The tools by which the contents of research output are made public is of no real consequence to the quality of scholarship as long as those social structures remain in place. Fisher (1994) suggests that it is important in any narrative to consider values and whether they are “appropriate to the nature of the decision or beliefs that the story concerns,” and what the effects of following those values have “in regard to one's concept of self, to one's behavior, to one's relationship with others and in society” (Fisher, 1994, p. 24). Scholars value their methods, their disciplines, their impact, and the latter points to one critical symbolic function of publishers. As the creators of the content on which the entire system is based, they are the allocators of academic capital (Larivière et al., 2015). That faculty do not want to give up on practices manifest in traditional journals is not particularly problematic, given that practices like peer review are critical junctures in the scholarly communication value chain. Scholarly practices and their legacies are crucial to a well-functioning

system of scholarly communication and should be preserved in a discernible form. Peer review is a critical part of the scholarly communication system, and publication is critical to the dissemination of ideas. The measure of the merit of scholarship, however, has become too closely tied to the shorthand of the journal container through which it is disseminated, and to a system of metrics that offload human judgement to statistics. Human judgment cannot be completely removed from the process of evaluating scholarship. Cultural and social interactions are key drivers of the process. As Rumsey (2016) notes: “the realm of emotional intelligence, empathy, and imagination—all necessary for judgment in the context of incomplete information or conflicting aims—is beyond the reach of our machines” (p.172).

Going “public” through Connexions

New technologies that allow for creation of content and mirror the processes inherent in the system of scholarly communication have been in production for some time. Kelty (2008) explored one system in particular that is tied directly to scholarly content production. Connexions is an open repository of educational materials through which authors publish content that would traditionally have gone into textbooks. One of the critical issues facing the creators of Connexions is how to ensure that the process of creating and publishing textbooks online satisfies traditional notions of authoritative textbook knowledge. Since online books look nothing like traditional books, the concepts of authorship, ownership, and other components of the system of knowledge creation are sometimes called into question. While printed books exist as a single enclosed container, publications in Connexions are modular, allowing authors and

publishers more flexibility in their reuse and modification (Kelty, 2008). Deetz (2008) noted that the research community has often considered itself as apart from the world, aspiring to universal knowledge and eschewing ideology. While also understanding that this disinterested detachment has always been elusive—allowing for the avoidance of certain kinds of subjectivity, but not provide to enough durable objectivity. The free software movement, informing the ideology of Connexions, substitutes bookish objectivity for what Kelty calls a “recursive public,” which is a public that is maintained by the practice of people who participate in it. A recursive public also forms a social imaginary, which is a narrative supporting the technical and moral norms and practices, and a set of rationales for to deciding what is included and excluded as part of those norms and practices. Its stories illuminate the “shared moral and technical imaginations that make up Free Software as a recursive public” (Kelty, 2008).

Kelty (2008) uses the idea of a recursive public to support Johns’ (1998) challenge to the idea of fixity in relation to the culture of print. Johns (1998) questions the notion that fixity is an inherent quality of print, noting that it is transitive and only subsists when people make this distinction. Various organizations have grown up in the scholarly communication arena to provide new methods for creating and disseminating scholarship in opposition to the commercial enterprise and built more closely on the model used by Wikipedia such as MediaCommons, the Center for Open Science, and Openstax (formerly Connexions). The Texas Digital Library is one of many consortia that provides opportunities for the creation of new journals. Technologies like CommentPress, a tool similar to Connexions, and made available through

MediaCommons, could potentially bring the codex out of seclusion, and allow readers and reviewers to talk to each other and the author. These suggestions could make the notion of books as conversations across time more real with the conversation happening in the book itself, similar to asynchronous forms of communication found on blogs and message boards, but with the functions of peer review built in (Fitzpatrick, 2011).

Connexions operates similarly, as it makes the textbooks available to many potential readers at once, with publication taking on a more abstract meaning—authoritative knowledge is part of a process rather than a fixed point in that process. Establishing published works as a source of authoritative knowledge was a struggle in the days of the printing press, and it continues today with the Internet. At a more practical level, open textbook initiatives are a reaction to the rising costs of textbooks. The cost of textbooks is often higher than the cost of tuition, and many students report not buying textbooks because they cannot afford them (Martin, Belikov, Hilton III, Wiley, & Fischer, 2017).

University presses and libraries both serve key functions in the dissemination of the scholarly record. Publication being a central concern of scholarship, the university library provides one important mechanism by which those publications are disseminated by providing discovery and access systems. Without a scholarly record to disseminate, libraries are incapable of doing work that is central to the academic enterprise. Although commercial presses are one way for this record to be created, the university press is more closely aligned with the mission of universities, because for the most part, the presses are not geared toward making a profit (Courant & Jones, 2015). Fitzpatrick (2011) notes that originally the university presses were only in the business of publishing

work of faculty at their institutions. A university press that is treated as if it is a central part of the process of creating scholarship, and that is focused on producing scholarship of merit without worrying about whether the work will provide profit, would bring universities closer to an ideal of a system in which commercial publishers did not control content and infrastructure. Such a system would likely save no money, but scholarly publishing already costs universities significant amounts of money—the focus here would shift toward to whom this money should go. Universities can give the money to profit-seeking institutions outside the borders of the academy or invest in their institutions through their libraries and university presses by investing in technologies that allow for disruption of the commercial scholarly publishing enterprise.

Creation of textbooks in Connexions follows much the same process as any traditional publication. The first stage of creating content in the system is what happens before the system is involved—the composition of the text. The system marks up the text after it is submitted, creating the structure by which the text is presented, modularized and potentially transformed. It is the potential transformation after the fact that is powerful, as it disrupts the notion of fixity—a published document can be transformed in multiple ways by multiple people and can change regularly depending on the number of people contributing to the process (Kelty, 2008). During the process of Fitzpatrick's (2011) book being on display through CommentPress, a system similar to Connexions, forty-four commenters left 295 comments, providing a broader range of critique than any traditional peer review process. Post-launch, it received over 31,000 page loads, with over 12,000 unique visitors, 3,300 of whom returned multiple times (Fitzpatrick, 2011).

These numbers combined with the fact that a review of the project was published months before the print edition was available is coupled with the fact that scholarly monographs in the humanities typically sell around 400 copies, suggesting that the work was more widely read in this environment (Fitzpatrick, 2011). The practice of creating scholarship, even in a digital environment, need not change any existing social structures of ensuring authority. What technology has helped to do is illuminate the material practice of the scholarly communication system. As Kelty (2008) suggested, the processes of writing and publication have become so naturalized that the cultural norms involved have become imperceptible, even to its practitioners (Kelty, 2008).

When researching faculty publishing behavior at a Canadian university, Pyne (2017) found that at one university founded in 2000, researchers in the business school are increasingly publishing in predatory journals because they have no incentive not to do so, given the fact that their promotion and tenure are tied directly to how much they publish. Publishing even in reputable journals, particularly when reputation is defined by journal rank based on impact factor is no assurance of research quality. Journal rank does not predict importance and in some cases, predicts unreliability. The design of impact factors violates basic scientific standards even as it influences appraisal of journal quality (Brembs et al., 2013). If anything is to create a more reliable scholarly communication process, metrics are not the answer. The myth of authority demonstrates that authoritative knowledge, generally considered to be wrapped up in fixed containers, whether they are monograph or journal, is not so easily discernible. The compatibility of OA with institutional functions of university libraries, scholarly journals, and university

presses would be more obvious, were it not for the operation of myth to occlude and disfigure the potential benefits of the system to tenure track professors, university libraries, and university publishers. It does certainly help to maintain high profit margins for the top five commercial scholarly publishers.

In this chapter, I explored how commercial scholarly publishers and predatory publishers are gaining control of the content of the scholarly communication system. Problems with publication in the system are not merely a result of the spread of the Internet, but a problem with changing social, legal and technical conditions similar to issues in different print cultures that challenged the book, and its attendant issues surrounding the nature of what can be considered authoritative. The myth that authority is derived from content in fixed form has been an impediment to change in the system of scholarly communication. Kelty (2008) sees the challenge faced in creating and sustaining a system like Connexions as twofold: first, figuring out what different legal, technical and social issues need to be addressed today, and second, how to create and subsequently modify a system such that it assures knowledge that is properly authoritative. In Chapter IV, I will explore some of the legal, technical and social aspects of the scholarly communication system and introduce the Myth of Influence, which I will argue is bound up not in the content of scholarship, but in the infrastructures through which it is distributed.

CHAPTER IV

DISCIPLINE AND PUBLISH – THE MYTH OF INFLUENCE

Introduction

In this chapter, I will outline a response to the question, “How has the shift to a digital environment affected organizational structures of the scholarly communication system?” I will do so by articulating the second of three overarching myths, namely, the myth of influence. I will argue that this myth manifests and sustains itself largely through citation and peer review as status markers in academic publishing, which provide a representation of validity, merit, and status. Although peer review is central to the myth of authority, I argue that authority also operates through systems of influence. As a precondition for influencing scholarly communication systems, authority fundamentally pertains to recognizing and validating the social and technical infrastructures through which information is exchanged and is centered in academic disciplines. Scholarly societies and university presses were the original disseminators of research in the system of scholarly communication. Faculty produced the work, publishers (not for profit) did the labor of distributing the work, and libraries bought the work at higher prices to subsidize scholarly societies. The RDT perspective suggests that things changed when these resources came under commercial control.

Resource dependence theory

At an organizational level of communication analysis, resource dependence theory (RDT) is a network theory that deals with ties between social actors, which can be represented by individuals, groups or organizations. Networks, or the relationships

between and among organizations and individuals in an institutional environment, are a key component of the theory (Pfeffer & Salancik, 2003). Networks have structure, and the patterns of ties and the behavior of social actors within the network are key—relationships and structural constraints matter. This theory assumes that organizations are dependent on resources from other organizations, which implies that organizations have some measure of control over what another particular organization can and cannot do. To survive, an organization must be actively engaged with its environment by forging relationships to ensure access to resources the organization needs to survive. This theory also allows us to think about the internal dynamics of the organization, because choices internally can be based on power struggles among units, and units with more resources often have more success in implementing their strategies. Boundary spanning is a key concept here, as organizations (and units within organizations) need and want to extend their influence beyond their borders. Organizations require resources to function, and these resources are typically found in the environment in which the organization is embedded. That environment also contains other organizations, who often control the resources, which are the basis of power in the network, meaning that independent organizations depend on each other for survival. The power of one organization over another is only as much as the need for resources. Power, in this case, is dependent on relationships and is often mutual (Pfeffer & Salancik, 2003). I distinguish between power as defined by RDT, and authority as outlined in the previous chapter, since power pertains to the control of resources, while authority pertains instead to the legitimization of ideas. Power constitutes control over content which is selected

through mechanisms of authority, from production, to ownership and distribution rights coded into intellectual property law. While closely intertwined, authority operates at an epistemic level, and power at a political level. RDT treats the environment as its independent variable and examines how perceived or actual constraints in the environment can affect the conscious behavior of people in leadership to adapt to changes in that environment.

Boundaries as infrastructure

Computer-mediated communication (CMC) studies how people communicate, create relationships, form identities and create community using the computer technologies—in particular—the internet. Participants in interactions create social realities by using available resources to construct messages. Most of these resources come from outside sources, including “temporal structure, external contexts, system infrastructure, group purposes, and participant and group characteristics” (Baym, 1995, p. 161). Science, operating in a similar manner, is at its most creative when it works collectively, collaboratively, and cumulatively, flourishing when “barriers to collectivity are reduced” (Hyde, 2010, p. 179). The traditional commons consisted of “not so much the land in question as the land plus the social relations and the traditional institutions that organize its use” (Hyde, 2010, p.29), and thus it was a social system. Boundaries in social systems are often difficult to define because the organizations tend to be structured around behavior, not around people (Pfeffer & Salancik, 2003). As Pfeffer & Salancik (2003) argue, the focus on physical units rather than behaviors makes drawing boundaries difficult. This difficulty in defining boundaries may be because individuals

are only partly included in any set of organized behaviors, Individuals can be part of an organization and part of its environment at the same time. A faculty member in a department of communication, for instance, is part of a department, a university, a discipline and potentially multiple professional associations. Discursive boundaries are organizational “lines of demarcation and differentiation” and “shared social, organizational, and discursive spaces” (Wilson & Herndl, 2007, p. 131). By looking at how behavior is coordinated, the line between an organization and its environment becomes clear—the boundary exists “where the discretion of the organization to control an activity is less than the discretion of another organization or individual to control that activity” (Pfeffer & Salancik, 2003, p. 32). Work done at these boundaries is a discursive endeavor, aimed at differentiating one group from another through a “demarcation exigence” (Wilson & Herndl, 2007, p.129). Boundary objects can also serve as a rhetorical construct to create an “integrative exigence” that allows for a “temporary trading zone characterized by rhetorical relations of symmetry and mutual understanding” (p. 129). An example of boundary objects are knowledge maps used to create mutual understanding across separate teams at the Los Alamos National Laboratory. The effort exerted at boundaries then, can both divide and join. The processes through which these exigencies are managed are not always evident and can often not be seen by outsiders to those processes (Wilson & Herndl, 2007).

Boundary objects work in two ways. First, they provide meaning and coordinate practices for a broad range of actors. Second, they express themselves differently depending on specific contexts (Wilson & Herndl, 2007). They can be either abstract or

concrete; they are flexible enough to adapt to individual situations; they are strong enough not to lose identity when crossing boundaries, and they serve an integral role in creating a sense of continuity at the crossroads of social systems (Star & Griesemer, 1989, p. 393). Standards and protocols are boundary objects that allow for the exchange of data and other information across groups. Libraries are classic boundary objects, which hold contents that can be used by multiple groups in multiple ways. A dataset, for example, can be interpreted differently from the perspective of different disciplines, even if they are drawing from the same data (Borgman, 2007). The process of peer review can be considered as boundary work, considering that a referee is a “status judge who evaluates the quality of role performance in a social system” (G. Howard, 2012, p. 324).

Alan Sokal, a physicist, submitted a hoax article to the journal *Social Text* in an effort to test their peer review process. The content of the article was a conglomeration of copied and pasted postmodern quotations with ideas made up to form connections between the quotations. The article was accepted by *Social Text*, and Sokal revealed the hoax several weeks later (G. Howard, 2012). Hoax articles and other tests of the system of publishing abound. Springer Publishing and the Institute of Electrical and Electronic Engineers (IEEE) recently removed over 120 papers from their services after determining they were generated by a computer (Noorden, 2014). The *Social Text* case in particular highlighted the importance of peer review as part of the academic social system. The incident was dismissed as unimportant because *Social Text* was not a refereed journal and Sokal had picked a “soft target,” (G. Howard, 2012, p. 331).

Further, his hoax did not reveal any problems with the legitimate peer review system because, as Howard (2012) states:

Clearly, the fact that Social Text has an “editorial collective” of forty academics should give the journal more authority than it would have without such referees but less than if manuscripts were sent to scholars completely independent of the journal who were chosen solely for their expertise in the topic of the manuscript (p. 331).

Peer review and its importance to the creation of scholarship has been one of the several obstacles to reform in the scholarly communication system. Faculty often reject OA based on a misunderstanding that OA provides a bypass for peer review. However, OA is simply a mechanism through which content is prevented from being locked behind a pay wall (Suber, 2012). Peer review is not a naturally occurring process, but a process that is “mediated through a complex network of social relationships and interactions, such that the outcome is, at least partly, the result of social negotiation” (G. Howard, 2012, p. 328). Movements like Free Software and OA force us to ask questions about the nature of both publishers and scholarly societies, as both “have become large, bureaucratic organizations sedimented in their modes of doing things, sometimes for good reasons (stability, reliability), sometimes for bad (tradition, fear, self-interest)” (Fitzpatrick, 2011, p. 184). These movements serve to remind us of the reasons these organizations were created and the purposes they serve and can point to their responsibility to the creation and dissemination of scholarship (Fitzpatrick, 2011). Considering how boundaries are constructed around disciplines both inside and outside

the academy illuminates how the social and epistemic boundaries of scholarly disciplines support the overall academic infrastructure. Arguments for and against OA often conflate the social and technological infrastructures that make up the system of scholarly communication. Evidence supports the idea that the social infrastructure is where the arguments should rest.

Disciplines/social infrastructure

Departmental structures in American universities were created between 1890 and 1910 and have changed very little since their outset, even as “cultural structures - the pattern of knowledge itself - has greatly shifted” (Abbott, 2001, p. 122). This department-based structure was unique to American universities, though it eventually spread to Europe and beyond. As Abbott (2001) notes, “academic disciplines in the American sense—groups of professors with exchangeable credentials collected in strong associations-did not really appear outside the United States until well into the postwar period” (p.123). The focus on disciplinary departments has a tremendous influence on faculty careers, faculty hiring, and the teaching of undergraduates (Abbott, 2001). Trowler, Saunders, & Bamber (2012) provided a definition that includes both structural and social components as comprising a discipline:

A discipline comprises a set of different but clear narratives about a field of knowledge; its boundaries, procedures and purposes. These incorporate relative consensuses about a disciplinary saga concerning key figures, conflicts and achievements. Disciplines take organizational form, have

internal hierarchies and confer power differentially, to the advantage of a minority (p. 9).

Considering faculty as social actors acknowledges that they have some agency to exert influence on the systems in which they participate at the discipline level, while also recognizing that organizational structures of the disciplines themselves can make those changes difficult. There has been, over the course of many years, “a continual ebb and flow of power and dialogue between the institution, individual, and stakeholder groups” (Trowler et al., 2012, p. 258), leading to changes in various disciplines, including communication, psychology, sociology and the sciences. What has not changed is the structure of universities along disciplinary lines. American universities borrowed somewhat from the hierarchical structures of German and French universities and incorporated the Ph.D. degree from the German system, which was later “specialized into a Ph.D. ‘in something’” (Abbott, 2001, p. 125). This created both a “medium of exchange between particular subunits of different universities” and a “subsystem of structures and exchanges organizing universities internally while providing for extensive but structured career mobility” (Abbott, 2001, p. 125). Isomorphism crept into the system, as organizational structures across different universities began to look similar, and these disciplinary structures began to create more keenly structured career paths based almost entirely on disciplines.

At around the time that universities became departmentalized, national disciplinary societies formed, often by those outside of academia—although academics eventually drew the boundaries around these societies to exclude those outside of the

academy (Abbott, 2001). Rumsey (2016) suggests that culture is memory formed collectively, through which people “create a shared view of the past that unites us into communities and allows large-scale cooperation among perfect strangers” (p.15), and further describes it as the “collective wit by which we live” (Rumsey, 2016, p. 18). Abbott (2001) proposes that the reason academic disciplines have persisted in spite of shifts over the years lies in what he calls a “dual institutionalization” (p. 126). Disciplines “constitute the macrostructure of the labor market for faculty” (Abbott, 2001, p. 126) by supplying candidates for jobs and exchanging those jobs at national meetings. Academic careers are generally tied much more closely to disciplines than they are to universities. Disciplines are also microstructures at the university level with faculties across the country sharing a fairly common departmental structure. All arts and sciences faculties contain more or less the same list of departments. Deviating from this disciplinary system can severely curtail employment prospects for Ph.D. graduates if they do not clearly fit into a well-defined “disciplinary market” (Abbott, 2001, p. 126). Pfeffer & Salancik (2003) propose considering boundary issues not from an individual perspective, but as a set of “interlocked or coordinated behaviors” (p.32), whereby the boundary between organization and environment becomes clearer—“the boundary is where the discretion of the organization to control an activity is less than the discretion of another organization or individual to control that activity” (Pfeffer & Salancik, 2003, p. 32).

In addition to the impact on employment prospects, even the process of being published in particular journals is discipline-centered, considering that the process of

peer review is centered not at the university level, but at the discipline level, generally through scholarly societies. This process not only places an imprimatur on the work itself but invites the author into a “restricted intellectual space” (Guédon, 2001, p. 17) that indicates belonging to a social system. Guédon (2001) described the system of scholarly communication as:

A dense web of institutional and individual hierarchic relationships thus structures the scientific system and in order to appear in the best publication spot, it is important to avoid “wrong” steps. Wrong here does not so much mean “false” as tactical or strategic bad judgment: for example, throwing a challenging gauntlet without ensuring a sufficient stock of symbolic and institutional resources. In other words, simple caution dictates that brilliance—assuming it is present—must be exercised within well-established boundaries rather than outside! (p. 17)

The royal academies, which predated scholarly societies, were the first to use peer review as part of a state infrastructure to monitor which ideas were worthy or safe to be released publicly. The advent of scholarly societies shifted this process away from state-sanctioned forms of censorship into a self-monitored system “creating, in the Foucauldian sense, a disciplinary technology, one that produces the conditions of possibility for the academic disciplines that it authorizes” (Fitzpatrick, 2011, p. 21). Peer review is the foundation of disciplinarity, and a mode that constricts, produces, and constitutes “academic ways of knowing” (Fitzpatrick, 2011, p. 21). As Fitzpatrick (2011) says of peer review:

...its roots in early modern book censorship are revealed by its continued appeal to the imprimatur it grants. Peer review thus long pre-dates the invention of the scholarly journal, originating with the formation of the royal academies themselves. Membership in these societies required scientists to demonstrate their bona fides in the form of publication, experimentation, or invention in order to be eligible for election—arguably subjecting their work to a form of peer review. Further, early scientists circulated letters among their peers or read papers in society meetings, reporting the results of their investigations with the explicit intention of eliciting response. The application of peer-review processes to scientific journal publishing thus becomes a further extension of society business (p.22).

Rumsey (2016) illustrates the impact of publication technology on doctrinal authority and censure with the Catholic Church's publication of indulgences and offering of an opportunity for Martin Luther to publish an anti-indulgence message. The printing press made it difficult for any single organization or individual to monopolize communication distribution channels. Literate people figured out how to use presses to their personal advantage in controlling messages.

University presses have a specific set of issues deriving from their relationships with their institutions. Although presses are associated with institutions, presses operate apart from them, running mostly independently as a not-for-profit, though they are expected to act as revenue centers and recover costs through sales. When presses are subsidized, the money they receive from their institution makes up a meager percentage

of the overall budget. The underlying assumption of the university press production model is that their function should be driven by the market—leaving the press in a conflicted situation. If the selectivity in publishing is based on profitability rather than scholarly merit, it could mean that a press might be less focused on fulfilling its scholarly mission if the press aims to turn a profit. If publication prices are increased, then their customer base, which is almost entirely research and university libraries, stands to shrink (Fitzpatrick, 2011).

The technological shift

Mosco (2004) proposes that if myths “evacuate politics” (p.31) from social problems needing attention and reflection, then the critique of myth is the way to demonstrate the occluded or disguised influence of politics in problem areas.

If the telling and retelling of the mythic story shields cyberspace from the messiness of down-to-earth politics, then the critique of the myth, told many times over in many different ways, gives new life to the view that cyberspace is indeed a deeply political place. This happens when we expand the assessment of myths to include not only whether they conform to and agreed-upon reality. (Will the information highway expand education?) It also involves assessing what myths mean to the people who produce and believe in them, and what they reveal about the society that sustains them. It is here, on the intellectual border, where cultural and political economic understandings meet, that the analysis of myth becomes particularly productive.

Scholarly publishing and librarianship serves as one of these boundary zones where mythological thinking predominates decision-making about technological changes or stasis. It is instructive to review the network environments of these organizations. Baym (1995) notes that the technical infrastructures of computing networks can shape interaction in three ways. The physical configuration of a network determines the number of computers, the speed and geographical boundaries of the system. Adaptability determines how flexible the system is, and user friendliness includes flexibility, ability to multi-task, and generally how easy a system is to learn. Modifying any of these can significantly change the potential communicative strategies for the users of a system. In these systems, the fundamental element is the users. Any network that includes the participation of people is not just a technological, but a social infrastructure (Baym, 2010). Castells (2010) identifies the 1970s as the period when information technologies became sufficiently diffused to create what he calls an “information society.” Modes of development became more centered on information, and in these information-centered modes, patterns of change do not progress in a linear fashion, but appear more interspersed and spontaneous change, mimicking an evolutionary process. Castells (2010) argues that out of this shift, a new capitalist form came about at the end of the twentieth century that is global, flexible and provides a tension between global networks. These global networks have arisen with individual identity, and with what he called the “bipolar opposition of the Net and the Self” (p. 3). The Net refers to organizational forms derived from extensive use of media, and the Self is tied to how identities are formed in a time of constant structural change. These identities then lead

to new forms of social organization, and also to social fragmentation. Identities may be drawn with ever-stricter boundaries, and it becomes more difficult for individuals to find shared experiences.

In this condition of structural schizophrenia between function and meaning, patterns of social communication become increasingly under stress. And when communication breaks down, when it does not exist any longer, even in the form of conflictual communication (as would be the case in social struggles or political opposition), social groups and individuals become alienated from each other, and see the other as a stranger, eventually as a threat...The informational society, in its global manifestation, is also the world of Aum Shinrikyo, of the American militia, of Islamic/Christian theocratic ambitions, and of Hutu/Tutsi reciprocal genocide (Castells, 2010, p. 3).

Research on the higher education environment suggest that technological changes to communication can also put organizations in stressful states, and that identity politics is not necessarily new to a digital age. For example, Becher & Trowler's *Academic Tribes and Territories* outlines how cultures within the academy (i.e., tribes) and knowledge within disciplines (territories) are formed and reformed and always centered around disciplinary identities, whether in content or methodology (Becher & Trowler, 2001).

And yet, because higher education contributes to the skill sets of symbolic workers, its strategic importance in the economy and society grows. Shifts in occupation over the years have led to an increase in professional and technical workers and fewer

skilled laborers. Status in society was traditionally achieved through inheritance and entrepreneurship and was largely property-focused. However, there has been an increasing shift toward education as a marker of status—driven partly by the greater numbers of jobs requiring higher education. The percentage of people completing high school grew from 41% in 1960 to 81% in 1996, and the number of college graduates grew from 7.7% to 24% over the same period (Bell, 1999, p. xvi). The technologies driving development today “form a complex adaptive system that is the foundation of the electronically mediated global economy” (Bell, 1999, p. xvii). Industrial societies operate on a labor theory of value by which industries exchange capital for labor, while in a post-industrial society, knowledge-based innovation, becomes the basis for increasing exchange values on information-based commodities (Bell, 1999). Productivity and innovation, and the increased expectations for these, accelerated rapidly around 1970; Castells (2010) attributes the acceleration to what he calls “virtuous circles,” which are systems that evolve parts of their own networks.

Computers create more powerful computers, and as Castells (2010) argues, efficiency in management systems during the 1980s worked by feeding back information systems into managerial systems. This process has implications on the system of knowledge creation and dissemination because in a post-industrial society, “technical skill becomes the base of and education the mode of access to power; those (or the elite of the group) who come to the fore in this fashion are the scientists” (Bell, 1999, p.358). Similarly, Castells (2010) places higher education as integral to what he called “milieu of innovation.” With federal research funding encouraging more specialization and the

ensuing commercialization of publishing, multinational conglomerates now control a significant percentage of scholarly literature (Lyman & Chodorow, 1998).

Baym (2010) notes that there is a tendency to consider technologies in a deterministic manner, frequently assuming that they can potentially damage relationships, language, and communities, and replaces them with “shallow substitutions” (p.150). A cheerier view, but just as technologically deterministic, suggests that technology can avert harms or improve conditions—for example, with larger networks, closer family connections, and a more engaged public. Baym (2010) articulates a case for the social shaping of technology:

Yet people are adaptive, innovative, and influential in determining what technology is and will become. We use technology to suit our own aims and developers redesign and innovate to provide people with better ways to do the things they didn't expect us to do. Nowhere is this more obvious than when looking at social and emotional expression. Rather than be stymied by the lack of social cues inherent in text-only interaction, people innovated, making use of punctuation, capitalization, verbalization, and other tools to convey the social attitudes and feelings they wanted to impart. The internet was never envisioned as an interpersonal medium. Based on sheer features, at first blush it seemed poorly positioned to become one. But people took advantage of the affordances it did offer to make it into a social resource. Our drive to be social and find means of connecting with one another has

been a guiding force in the internet's transformation from military and scientific network to staple of everyday life (pp. 150–151).

These social relationships are integral to the concept of interconnectedness, as outlined by Schement and Curtis (1995). Interconnectedness can be viewed in three dimensions. At the micro level, it relates to changes in social relationships—while the number of relationships increases, their depth decreases. Businesses and other organizations at the meso level build new forms of communication to address environmental uncertainties and create technologies to process information and improve decision-making. At the macro level, new technologies and institutions appear to meet demand for connection on a global scale. This “interconnectedness grows because social organization demands it and technology allows it” (Schement & Curtis, 1995, p. 65). As Mosco (2004) argues, it is important to be cognizant of the fact that most of the seductive power of technologies is often intentionally constructed by the same companies that will benefit from its sale (p. 41).

Scholars have indicated various reasons for the choices they make in deciding who and what to cite in their work. Deciding factors include quality of the content itself, familiarity with people or institutions, recognized journals, and the context of the content—whether its published in a journal, presented at a conference, or posted on a blog. Study of the content is important, but trust in a referring social connection reduces the need to examine content closely. Also important is whether peers will consider sources properly authoritative. When a source is not peer-reviewed, scholars are more likely to spend time tracking its citations to ensure that it has been considered as worthy

scholarly research, and thus, reducing the likelihood of using misleading information (Thornley et al., 2015). Fitzpatrick (2011) recommends exploring the nature of social systems and the “structure of online texts” (p.107) as a worthwhile exercise not because it will solve the problems of scholarly publishing, but because understanding the ways that texts circulate within and give rise to communities will be a necessary component of any successful electronic publishing venture” (p.107). Questioning whether publication and credentialing should be as inextricably intertwined as they currently are, Fitzpatrick (2011) notes that peer review might have a lot to learn from social systems like Slashdot and Digg to become more “peer-to-peer review” (p. 32). Indications are that scholars have been on this track for some time.

arXiv

In 1991, Paul Ginsparg launched arXiv in an effort to ease sharing of unpublished manuscripts (preprints) between researchers. Originally designed to alleviate the burden of printing, reproducing and sending preprints, often to a small number of friends and colleagues, Ginsparg’s system allowed researchers and graduate students from around the world to both post and read full-text preprints (Ginsparg, 2011). Preprints are not typically considered authoritative sources (Guédon, 2001), and many argue that a lack of peer review can potentially lead to bad science spreading throughout the system of scholarly communication (“The shackles of scientific journals,” 2017). The National Institutes of Health (NIH) is currently considering whether preprints should be considered as part of grant applications, with the central concern that rigor and reproducibility would suffer—preprints only reflect initial

findings and have not been through the process of peer review (Krisch, 2017). The resistance to preprints is one element keeping science chained to journal publication, which also keeps academic research inaccessible to the public. The fact that arXiv has operated for over 25 years and is still embraced by the scientific community indicates that reliance on preprints can work to some degree (“The shackles of scientific journals,” 2017). In only two years the service became a primary resource for scientists globally, and once researchers realized the service could be used to make claims of intellectual precedence, the service has had sustained growth (Ginsparg, 2011). However, arXiv serves only a few quantitative fields, including some in physics, mathematics, computer science, quantitative biology, and quantitative finance (Davis, 2009). The system does have methods to ensure the qualifications of its participants. Participants are required to have endorsements to submit content, and, while some endorsements are granted based on academic credentials and affiliations with research facilities or academic institutions, many authors are required to get endorsed by authors who are already participants. To endorse someone, endorsers must have themselves submitted a certain number of articles within a subject area to the system. Although this does not constitute peer review, it does serve as some measure of certification (“arXiv.org help - The arXiv endorsement system,” n.d.). Work posted in the system can also bring recognition even when not published elsewhere. Mathematician Grigori Perelman published a mathematical proof only on arXiv and garnered both a Fields Medal and Millennium Prize (Krisch, 2017).

Social science research network

Started in 1994, Social Science Research Network (SSRN) was also designed as a distribution system for social sciences research, including law, economics, accounting, information systems and marketing. Like arXiv, SSRN is not a comprehensive repository of scholarly literature in its subject areas, and does not subject submissions to peer review, meaning that most of the literature consists of preprints and working papers (O’Leary, 2006). Although it does not provide peer review, SSRN does use a gatekeeping function—site administrators can make decisions about whether articles are searchable through its search engine, arguably anathema to its representation as an open access system (Kruger, 2013). SSRN’s quality control is based on its system of usage tracking—they use the number of downloads to determine whether an article is of importance to other researchers (O’Leary, 2006).

Mendeley

Mendeley is an online tool designed for citation management, but also as a social network for scholars. Based on the model of Last.fm, which is a social network for music enthusiasts, Mendeley allows researchers to manage work they are reading, to manage work they are writing, and to find other researchers with similar interests. Mendeley was created first to serve as a social network and a citation management application, rather than as subject matter repository. Though it can be used to share content between researchers with similar interests, connecting with other researchers is more algorithm driven (Zaugg, West, Tateishi, & Randall, 2011). Like SSRN,

Mendeley's quality control is based on readership and download counts (Fairclough & Thelwall, 2015).

Institutional repositories

The first institutional repository (IR) in the US was created at The Massachusetts Institute of Technology (MIT) in partnership with the Hewlett Packard Corporation in 2002. The DSpace IR system has served as a model and has been replicated across a variety of other institutions since its inception (Lynch, 2003). Sometimes referred to as digital repositories, IRs are databases that contain scholarly work and data produced by faculty, students and staff at their associated institution (Dawson & Yang, 2016). Tools exist to allow for redistribution of metadata, which is data that describes content, from IRs to disciplinary repositories, such as arXiv and SSRN, making IRs a potential infrastructure on which a broader network can be built (C. Lynch, 2003). IRs are open access as a way to broadly disseminate and showcase their faculty's scholarly work; although IRs open contents are subject to challenges of copyright and ownership. At many institutions, librarians do much of the work to ensure that copyright and ownership issues are properly addressed, going so far as to create institutional-level agreements faculty can use to negotiate with publishers, and waivers to be used when publishers are not receptive (Dawson & Yang, 2016). Providing access to scholarship and data produced by faculty is one way for more privileged institutions to improve visibility for their scholarship, and it also allows for partnerships with less well-resourced colleagues to gain access (Heller & Gaede, 2016). These new infrastructures, including the use of open source software like Open Journal Systems (OJS), provide new opportunities in

scholarly publishing, though the economics are not yet mature. Streams of revenue are limited due to the obedience to an open publishing model—these repositories do not have subscriptions, which would help forecast income (B. Lynch, 2017). Yet, they continue to grow. In December of 2016, OJS reached a new milestone of 10,000 active journals around the world operating on their platform (Public Knowledge Project, 2016).

Commodifying the infrastructure

Leaving technical capabilities of the disciplinary systems aside, a key claim that arXiv can make is that SSRN and Mendeley cannot is that it has not been bought by Elsevier. The purchase of Mendeley puts Elsevier in a position to create a “vertically integrated tool” (K. Anderson, 2013), and Elsevier noted in a press release that it “will become Elsevier’s central workflow, collaboration, and networking platform, while we continue on our mission of making science more open and collaborative” (Bonasio, 2013). Purchase of the system afforded Elsevier access to data on how researchers collaborate and what they read and share (Lunden, 2013). The purchase of SSRN, which Elsevier plans to merge with Mendeley, suggested that Elsevier understands that copyright ownership of scholarly content may not shield them in a potentially open access driven future. The CEO of SSRN, Gregory Jordan, noted that citation data from Scopus in addition to Elsevier's broader collection of metrics and data analytics were some of the key benefits of the deal, creating an end-to-end system through which content can be published, disseminated and closely analyzed. An additional bonus for Elsevier was that it will be much easier for users of the SSRN to find Elsevier content (“Simba Information: Elsevier Doubles Down on Mendeley Strategy with SSRN

Acquisition,” 2016). In addition to buying these pre-existing networks, Elsevier sought and was granted a patent for an online peer review system (Blumenstyk, 2016). As noted by Harmon & Nazer (2016), Elsevier seemed to have realized that because they may not be able to control content anymore, they will assert control over as many of the infrastructures that support scholarly publishing as they can. This continues, as Elsevier also acquired bepress, a company that provides IR software for universities, noting that this will allow bepress to expand their product offering while “helping Elsevier drive further adoption of its research management tools” (Elsevier, 2017). The parent company of Elsevier has shown increased acquisition in mergers and acquisitions in each decade since 1970, with a particularly prolific increase starting in 2000. Figure 9 provides a list of these.

2000	Acquires: eLogic Corp.
2000	Acquires: CMD Group (construction publisher)
2000	Acquires: Business Information Product of the <i>Financial Times</i> .
2000	Reed Elsevier acquires Miller Freeman Europe (business publishing)
2000	Sells: K. G. Saur to Thomson for an estimated \$50 million.
2000	Combines: Lexis Nexis and Butterworth Tolley to form Lexis Nexis Butterworth Tolley.
2000	Acquires Endeavor Information Systems, integrated library systems.
2000	Acquires Schnell Publishing (chemical industry information).
2001	Acquires Harcourt General
2001	Sells Harcourt's higher education publishing units and professional services to Thomson
2001	Sells Bowker to Cambridge Scientific Abstracts
2001	Disposes of Cahners Travel Group and OAG (Official Airline Guides).
2002	Acquires Qucklaw, MBO Verland and FactLANE, all legal publications.
2002	Acquires STM business of Holtzbrinck.
2003	Acquires Applied Discovery and Dolan Media Company, both legal publishers.
2003	Acquires CIMA Publishing, a publisher of learning products.
2005	Acquires MediMedia, a professional medical publishing business.
2006	Acquires: Gold Standard developer of drug information databases, software and clinical information solutions.
2008	Acquires: MEDai Inc., a predictive analytics company that analyzes healthcare claims and improves the delivery of healthcare
2009	Acquires: William Andrew, Inc. - independent publisher of technical and scientific materials in the United States.
2009	Acquires: Professional Development Software publisher of nursing student education.
2010	Acquires: NurseSquared provider of nursing education software.
2010	Acquires: Collexis Holdings, Inc. develops software that search and mine large sets of information.
2011	Acquires: Shanghai Datong Medical Information Technology - drug decision support software for Chinese hospitals.
2011	Acquires: Fisterra.com - consulting website for medical professionals
2011	Acquires: Ariadne Genomics, Inc. - pathway analysis tools and semantic technologies for pharmaceutical and life science researchers.
2012	Acquires: QUOSA provides software solutions that support scientific literature management workflows – for full-text articles.
2012	Acquires: Aтира provides software and tools for academic institutions and researchers to manage their research outcomes.
2012	Acquires: ExitCare provides print, video, and interactive patient education and engagement solutions to hospitals and health systems.
2013	Acquires: Knovel - integrates technical information with analytical and search tools.
2013	Acquires: Aureus Sciences provides databases and information tools for pharmaceutical and biotech companies.
2013	Acquires: Mendeley is an academic social network
2013	Acquires: Woodhead Publishing is a publisher of print and eBooks in food science, technology and nutrition, engineering.
2014	Acquires: Amirsys is provides healthcare solutions in radiology and pathology for diagnostic decision support
2015	Acquires: newsflo :Media monitoring to keep track of coverage at all levels of your institution.
2016	Acquires: Social Science Research Network SSRN is a multi-disciplinary online repository
2016	Acquires: Hivebench is a digital laboratory notebook that helps researchers to manage protocols, experiments.
2017	Acquires: Plum Analytics is a company that helps research projects and enterprises interpret and understand their data.
2017	Acquires: Bepress is a hosted institutional repository service used by universities, colleges, law schools, & research institutes.

Figure 9 lists acquisition activity of RELX group from 2000 to 2017. Data from Thomson Reuters (2017).

Elsevier has acquired companies that publish legal, scientific, educational, business and medical information; companies that provided collaborative opportunities, companies that provide analytics and data storage solutions; companies that allow for management of research data; and a variety of companies that provide information management in medicine-related fields, from diagnostics, drug information, nursing education and predictive analytics to analyze health care claims. They have even acquired a company that provides integrated library systems. Their expansion into the

medical arena suggests that their interest in controlling the flow of information obviously extends beyond the academic enterprise into other professional domains. Taylor & Francis, Sage, and Wiley-Blackwell have demonstrated similar acquisition and merger trajectories, with an increase in such behavior since 2000. Elsevier is the most prolific (Thomson Reuters, 2017a, 2017b, 2017c, 2017d). Libraries and researchers see the ease of sharing content online as a solution to a problem while commercial scholarly publishers consider it a problem (Fitzpatrick, 2011), unless they can profit from it. In 2002, the library staff at The California Institute of Technology (Caltech) worked to publish the proceedings of an international conference online. Costs of this initial effort (there was no pre-existing infrastructure) were estimated to be around \$100 per article. At the time, journal publishers estimated that a peer-reviewed paper cost around \$1500 to produce (Douglas, 2002). Actual costs to libraries or faculty for open access journal publication tend to range from \$500 to over \$3,000 (Watkinson, 2015).

The open question is how arXiv has managed not to be consumed by a commercial scholarly publisher. The digital era has shown a striking increase in the share of scholarly literature published by the top publishers and a much larger dependence on those publishers by the scholarly community. The natural and medical sciences have significantly larger scholarly societies, in part because their disciplines are relatively larger as compared to the social sciences and humanities (SSH). The American Physical Society (APS) and the American Chemical Society (ACS) were able to publish print journals and manage transitions to digital publishing without significant intervention from commercial publishers. The social sciences and humanities tend to be

more fragmented, with no umbrella organization to manage the myriad societies or publish their respective journals. With a large number of subdisciplines further divided into specialties, these disciplines lacked the means to adapt, and instead entered into agreements with commercial entities, thus subverting the traditional scholarly communication process (Larivière et al., 2015).

The influence of Connexions

The Connexions system is explicitly designed around social and communal advantages of multiple people working together on creating textbooks. An added benefit deliberately built into its infrastructure is the modularity of content. The creators of Connexions had a desire to help students see connections across disciplinary boundaries—connections between, for example, statistics and genetics, and intellectual property law and engineering (Kelty, 2008). In the late twentieth century, pressure grew within academia for faculty to work collaboratively across disciplinary boundaries as a drive toward unity and synthesis. The blurring of genres and restructuring of knowledge in its many forms is referred to as interdisciplinarity (Klein, 1990). Abbott (2001) suggests that a particular kind of universal knowledge grows emerges as disciplines struggle with defining their boundaries:

When there are many different epistemological routes to one place, people who have taken them will "see" a different thing when they arrive. What is universal about social science knowledge is the project of getting there and of mutually decoding our routes. (p. 32)

Disciplines evolve through contrast and assimilation, splitting into subdivisions that often grow into separate disciplines in the process. Specialization, while often denigrated for creating fragmentation, is often a precursor to interdisciplinarity as a researcher in one discipline approaches the boundary of another and opens relationships at the intersections of the disciplines (Klein, 1990). Referring to the Free Software and Open Source movements, Kelty (2008) indicates that they are not unlike social movements in that their practices become the most important part of their organizing process, rather than an ideology. This is the fundamental element that makes them a recursive public—the concern with the material and practical means by which they organize their activities.

In scholarship, ideologies change over time, as does the focus of research. Disciplines appear, disappear, and fragment. Even concepts addressed by disciplines evolve. Terms, concepts, and methodologies in the discipline of communication have seen significant changes over the course of its history (Gehrke & Keith, 2015). Abbott (2001) explores changes in the discipline of sociology, noting that the discipline has seen significant changes over its history in how culture is defined. Björk's (2007) model of the system of scientific communication points to something particularly interesting. The very process of scientific communication was never really designed but has evolved; the model addressed the process using a series of intricate flow diagrams that map the activities of researchers, funders, publishers, libraries, bibliographic services, readers, and practitioners, as a way to understand how the process of scientific communication works (Figure 11).

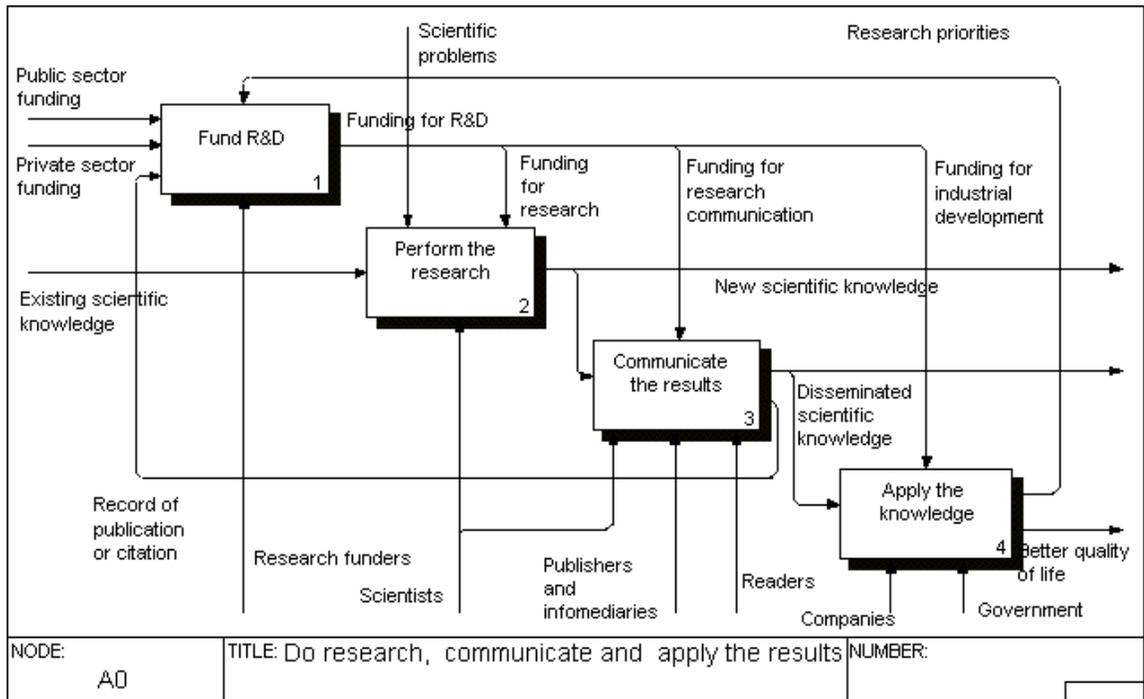


Figure 10: Do research, communicate and apply the results diagram from Björk's model of scientific communication. Reprinted from Björk, 2007.

The emphasis is on traditional peer-reviewed journal articles, but it points to how these processes have been affected little by shifts in technology. Another compelling aspect is that even in its intricate detailing of the finer points of the system of scholarly communication, it is a general model and discipline agnostic. Peer reviewing, seeking research funding, writing, publishing, and other functions exist across the disciplines. It is within the disciplines themselves that the boundaries of what qualifies as authoritative knowledge is constituted. The foundation of the system is in its social infrastructures.

Fitzpatrick (2011) describes an experience using MediaCommons and CommentPress as a personal experiment in publishing, explaining that publishing texts online helped to facilitate discussions among motivated individuals, and to create a

different kind of social interconnectedness. Connexions is run by people who are devoted to open systems and standards, and who are not interested in becoming a profitable textbook publisher. Their concerns like in ensuring they create a useful publishing infrastructure—the openness allows even for competitors to use the system (Kelty, 2008). Scholarly societies and libraries are beginning to use avenues for publication that lie outside of the commercial scholarly publishing enterprise and that are designed to complement it with tools that are designed around norms of academic practice. The Scholarly Publishing and Academic Resources Coalition (SPARC) maintains a list of scholarly societies publishing open access journals. As of May 2017, the list encompasses over a thousand journals (SPARC, 2017). BioOne is a SPARC partner collaborating among scholarly societies. The BioOne initiative aggregates journals from dozens of small bioscience-focused societies to make peer-reviewed research accessible and allow the scientific societies to have a more cost-effective model of publishing that will help them remain viable (Johnson, 2000).

Deetz (2008) points to the notion that engagement with outside communities allows for organizing work around social needs rather than literatures and topics of study. This type of engagement makes scholarship more like a conversation, but it may put traditional conceptions of knowledge at risk because there is more opportunity for the conversation to go in unexpected directions (Deetz, 2008). Systems like Connexions may not drive collaboration and cooperation, but they are built on an expectation that collaborative activity is already happening (Kelty, 2008). These new infrastructures can provide opportunities to take advantage of both Open Source models of collaboration

and open access to content while avoiding current publishing infrastructures that drive the commodification of academic work. As noted previously, it is increasingly common for scholars to work across disciplinary boundaries. With a different infrastructure or platform, these connections can be made more visible. Castells (2010) draws an elaborate picture of a network society. Scholarship has long been a series of interconnected networks. The people involved in the system, not the technology, created these networks. The technologies are merely an affordance that allows for making more and faster connections. Castells (2010) notes that virtual communities and physical communities need not be set in opposition to one another but allow for a new context in which to consider human identity—with the Internet being well-designed for establishing weak ties. Developing a broad infrastructure for scholarly publishing could prove to be a powerful connector. Commercial publishers understand the power of these connections and are making inroads to control not just the content of the system of scholarly communication, but control over the entire value chain.

Development of new technologies for scholarly publishing that provide competition for commercial scholarly publishers, along with the increasingly acquisitive behavior of the top five publishers, raises the question of how power is really distributed in the system. Resource Dependence theory suggests that power accrues to people and groups within organizations who best reduce uncertainties and address contingencies that affect control of resources—these are the people who accrue the power to make decisions on strategic endeavors. Distribution of power within the organization provides the political context within which interdependence develops. Borgman (2000)

understands infrastructures as transparent parts of larger structures, technologies and social orders. They are learned as part of belonging to a particular group, and they embody the standards of that group, such that other tools can properly interconnect, building on a base from which it inherits both strengths and weaknesses. This is most evident, she notes, when they fail, as in when the power grid fails or a bridge collapses.

Reconsidering the boundaries of the scholarly communication system allows for a different view of where the discretion to control activities in the system lies, and points to the contradiction of the myth of influence. Commercial publishers have power over universities and libraries because they own the content necessary for the operation of the system of scholarly communication in which universities and libraries are embedded. They own this content because scholars give this to them free of charge. The power they do have exists because scholarly societies in many cases have given them control over the journals in which scholars need to publish. Those journal titles only have any authoritative power at the epistemic level—that is, they only retain their imprimatur of authority insofar as the scholars that publish in them allow them to do so. It is in these social connections that the myth of influence resides. A powerful expression of this is reflected in a study by Klein, Broadwell, Farb, & Grappone (2018), which compared papers published in pre-print repositories to the final published counterparts. Their study revealed that there was generally no appreciable difference between the two. With a variety of new options available for publication, a shift is only necessary in the imagination—a view of the system of scholarly communication as recursive public allows for a broader conception of the system as a series of influencers working together

to create a record of scholarship, and it is less encumbered by ties to particular titles or technologies. As Rossignoli & Ricciardi (2015) state, “no power relationship is forever, especially if the stronger partner goes too far in abusing the weaker one” (p.33).

In this chapter, I explored how commercial scholarly publishers are increasingly exerting control over scholarly publishing infrastructures and therefore, the social infrastructures of the system of scholarly communication. I outlined a series of emergent technologies that are currently operating in the system and suggest that influence in the system is centered in social relationships at the discipline level. In Chapter IV, I will explore the myth of permanence, which I will argue, is invoked silently or subtly to tie collection and preservation practice to libraries. The myth of permanence pertains not only to the content and infrastructure of the system of scholarly communication, but also to the context of the information in that system.

CHAPTER V

THE WIDENING GYRE – THE MYTH OF PERMANENCE

In this chapter, I will outline a response to the question, “how have traditional processes in the creation of scholarship taken on mythic properties that influence usage of the digital environment and access to research materials?” I will articulate the third of three overarching myths with which I began, the myth of permanence. Stated simply, this myth operates to oversimplify tensions inherent in the practice of collection, dissemination and preservation of scholarly work. I will argue that this myth manifests itself largely in how libraries collect, disseminate and preserve content in the digital age and how commercial scholarly publishers and other commercial entities place pressures on libraries. Technology has created an epistemic shift in the way that information is categorized and disseminated, and arguments for and against technological change within academic circles are embedded in this myth of permanence, which is based not just on content and infrastructure, but on the marriage of the two: context. According to Mosco (2004), myths prove powerful because they provide meaning for our lives, gratifying conclusions, and templates through which reality may be interpreted. Myths concerning the internet, in particular, tend to be powerful because they fulfill these characteristics. The stories suggest that communication technologies will become better, less expensive, and faster. Furthermore, the myths imply that technology will help realize democratic dreams by providing empowering tools equally to everyone. As Mosco (2004) phrased it, it is possible to realize “the perennial dream of philosophers and librarians: to make possible instant access to the world's store of information without

requiring the time, energy and money to physically go where the information is stored” (p.30).

In response to a 1997 plan by the British Library to discard what remained of their collection of foreign newspapers, Nicholson Baker founded the American Newspaper Repository to save the newspapers from destruction. In 2001, Baker’s *Double Fold: Libraries and the Assault on Paper* was published, and its publication set off a response from librarians that would nearly singlehandedly create a brand-new subset of the library literature. Although Baker comprehensively researches the book, he concedes that it is an activist treatise, and criticizes traditional library preservation practices. For example, the activist sentiment is evident in chapter titles like “Destroying to Preserve,” “Slash and Burn,” “The Road to Avernus,” and “Thugs and Pansies” (Baker, 2001). Baker (2004) and his critics agree that preserving the cultural and intellectual record is an integral part of the library mission but disagreed on how to do so and the general scope of that responsibility. The reality of collection and preservation policies is complicated (Plutchak, 2014). The environment in which libraries operate today is populated with material and immaterial catalogs, sourced from university publishers, commercial publishers, OA publishers, predatory publishers, a wide variety of technology vendors, emerging dissemination and publishing technologies, a variety of consortia, and various other digital intermediaries. Considering how to reframe the work of libraries in an increasingly digital world is particularly challenging, because the word library means different things to different people. It is a word and an institution tangled up in stereotypes and the deeply ingrained notion that

libraries are warehouses for books. As such, library is something of a “self-referential metaphor” (Stoddart, 2013). A variety of metaphors are used from within libraries in attempts to communicate their value, including words like digital, place, conversation, storehouses, partners, and various body parts including heart, feet, muscle, and circulation system (Giesecke, 2010). Giesecke (2010) notes that library as ecosystem is a set of metaphors that is useful in framing the work of today’s research libraries, emphasizing the various species that make up the system and the importance of relationships in the system—framing the library essentially as that system of relationships. Libraries have historically served as cultural intermediaries, regardless of the form of their contents. The idea of permanence of a cultural or scholarly record looms large over library practice and the public imagination now as it has throughout the history of libraries.

History of libraries/collection practices

Collections in early libraries were not constructed in the same manner as collections today. They typically grew out of the needs of a particular regime and ceased to exist when that regime collapsed or fell out of favor. Greece and Rome would later bring libraries that broadened their collection principles, but early libraries in the Near East were some of the first to use procedures that are still fundamental to library practice today (Casson, 2001). Perhaps the most famously mythological of the ancient libraries is the Library of Alexandria, founded in approximately 300 BCE. Alexandria, while ancient, was meant as a universal library, although it was preceded by others. Clay tablets found at an archaeological site in Syria point to the existence of a library in

the royal palace of ancient Elba around 2300 BCE. The first library catalog may have been discovered at Nippur and was dated at approximately 2000 BCE. Tiglath-Pileser I, ruler of Assyria in twelfth century BCE, is the first documented founder of a library (Casson, 2001). Assyria also lays claim to the next founder, King Ashurbanipal, whose library was larger than any before it, and any other that would follow for about three centuries. King Ashurbanipal held the Assyrian throne from 668 to 627 BCE and was an avid collector. In his palace ruins, archaeologists found texts including the Epic of Gilgamesh, the Epic of Creation and variety of other Near Eastern literature that are available today (Casson, 2001). These collections not only provided a degree of power for their owners, but they also contributed to the myth of permanence by sustaining records of history, literature and scholarship.

The Ptolemies founded the ancient Library of Alexandria with the intention to bring together far more comprehensive collections than in other earlier libraries. This is not to suggest the Ptolemies were not striving for similar ends—something of a monopoly on knowledge. They invited scholars to live and work at this famed institution, copying and often confiscating and confiscated books from visitors—even going so far as to ban the export of papyrus in a strategic competitive move to maintain supremacy over the libraries at Rhodes and Pergamum. Ironically, this drove the creation of parchment by the Pergamenes, which, for more than a thousand years after, was the writing medium of choice throughout Europe (Battles, 2003). While Ashurbanipal, Aristotle, and others were known for their extensive libraries and collected for personal ends, Alexandria was the first library to aim for a comprehensive

collection of knowledge. Generous funding provided to scholars by the Ptolemies, drew intellectuals from around the world (Battles, 2003). This rapacious approach to collections at Alexandria placed a high value on knowledge as an asset of the empire. The goal was to hold everything “from the authoritative manuscripts of the *Iliad* and Hesiod’s *Works and Days* to the most obscure lists of secondary and fallacious commentaries on Homer, the works pointing out their misattribution, and the works refuting those works” (O’Donnell, 1998, p. 30). This quest to accumulate and centralize all published knowledge created the risk of its total loss. As O’Donnell (1998) noted, “great libraries are problematic in times of war, disaster, or decay, for their fate becomes the fate of the literatures they contain” (p. 31). Much of what survived through antiquity did so because small, private libraries were not subject to the same level of decimation during times of war and civil unrest. “Above all, it is this last point—the needs and tastes of private readers and collectors—that determines what survives.” (O’Donnell, 1998, p. 31). The idea that the Ptolemies saw the library as “a universal repository devoted to the preservation of liberal learning” may serve as salve in times when the reputation of libraries is on the wane, but history demonstrates that “libraries are as much about losing the truth—satisfying the inner barbarians of princes, presidents and pretenders—as about discovering it.” (O’Donnell, 1998, p. 31).

Cooperation in collecting, sharing, and disseminating library materials is a thoroughly modern construction. As libraries throughout history have created collections based on the whims of kings and the desire to control knowledge, among private collectors, there has often been a performativity to creating libraries (Battles,

2003). Two developments are potential keys to values that modern librarians esteem. First, books became commercially available, allowing for the creation of large private collections, which are considered a precursor to the public library at Alexandria. Second, the Athenian government passed a decree that there should be some central repository of trustworthy copies of books (Casson, 2001). Throughout much of history, even with major disruptions along the way, the producers of texts continued to be patricians and members of the clergy. The idealized version of the library as a bastion of all-inclusive knowledge has persevered, though any single collection will fall short of perfection in this regard. While the dream evades reality, it is powerful, and this dream of a “virtual library” continues (O’Donnell, 1998, p. 39). Before the existence of the Internet, mass distribution and production of texts were the dominion of institutions—this power is now available to the individual (Gillespie, 2007).

Before the 1920s, universities tended to have decentralized departmental libraries. These departmental libraries began to disappear due to a new drive towards efficiency. The libraries built between the World Wars were more centralized, and as a result, faculty were further removed from their role in collection development and were forced to change their research behavior. Specialized reference works and departmental libraries may be limited in scope, but they are “highly ordered and highly particular,” (A. Abbott, 2008a, p. 18), and although librarians pushed for more generalized indexes, “research scholars always want partial indexes, indexes slanted their way, organized by their way of seeing the world, not by a generic view from nowhere” (A. Abbott, 2008a,

p. 18). Systems of classification allow particular areas of practice to remember only what they need to know. These systems are not, however, simple to create:

All classification systems, however, face a bootstrapping problem. In a world of imperfect knowledge, any classificatory principle might be good, valid, useful; you will not know what makes a difference until you have built up a body of knowledge that relies, for its units of data, on the classification scheme that you have not yet developed. (Bowker & Star, 2000, p. 276).

Classifications simplify. They tell you “what to forget and how to forget it” (Bowker & Star, 2000, p. 278). The sciences, for example, do not deal much with their social history. Those stories are left to historians in a “form of erasure” (Bowker & Star, 2000, p. 278). They create hierarchies of knowledge, such that certain disciplines in the sciences need only focus on a particular set of information, like geography or particle physics. They also allow for hierarchies distributed across temporal planes:

It also operates a distribution in time, saying that all scientific problems can be progressively unfolded so that at one point along the path in treating a problem you will need to draw on biology, then chemistry, then physics, then mathematics. Each type of memory that has been distributed in space will also be sequenced in time. (Bowker & Star, 2000).

In this way, they also allow for some things to be left behind once they are no longer useful to current inquiry.

Abbott (2008a) proposes that problems of information overload were in place long before the Internet, and he points to the growth of the academic population since

the 1920s, and to another key suspect: librarians. Librarians in his view focus too much on indexes to guide research and too much on making “the library a universal identification, location, and access machine” (p. 25). The digital world of information is simply an extension of issues scholars in the humanities and social sciences have long railed against about libraries. An investigation of humanities and social science graduate students and faculty in the 1950s pointed to the fact that they did not tend to use the indexes and various sophisticated tools built for them by librarians. They mostly simply browsed the stacks, reading one book after another, selecting those they deemed useful along the way. Faculty and graduate students created bibliographies based on what others told them to read and on the reference lists of others, which were more selective than general bibliographic indexes (Abbott, 2008a). Librarians may have in fact been creating similar problems that arise from algorithmic indexing through their own indexing practice before the Internet came along. Google’s ambition is to make information accessible universally, but through customizing algorithms Google contributes to “reinforce the fragmentary state of knowledge that has marked global consciousness for centuries” (Vaidhyanathan, 2011, p. 138). Accessibility may be a noble goal, and central to the value system of librarians as well, but when users potentially miss critical information based on their past searches, personal interests, or even geography, the algorithmically derived list of results “fractures a sense of common knowledge or common priorities rather than enhances it” (Vaidhyanathan, 2011, p. 139). When scholars do research online, citation behavior changes and they are “more likely to echo a prevailing consensus and to narrow the intellectual foundation on which their

research lies” (Vaidhyanathan, 2011, p. 193). For the broader audience, the implications of this “filter bubble,” as it is named by Pariser (2011) are expansive; for example, algorithms in Google can track behavior, make assumptions about what users do and do not like, and present them with information that keeps them in a loop of similar information. They do not encourage exploration of new ideas, and they do not give us any idea of what users might be missing. Vaidhyanathan (2011) points out that the problem here is not necessarily with Google; people are the bigger problem for relying on it too much, without any real knowledge of how the system works.

Borges (2014) imagines a godlike librarian who holds the key to the mysteries held within the walls of his fictional library of Babel. Historically, the real-life keys have been paper indexes that outlined a canon or the list of things that ought to be read for a discipline or an area within a discipline. The shift to algorithms has changed this dramatically. Rather than starting with a core group of readings, or canon, from which one can branch out, the digital brings forth a deluge of information, leaving it to the searcher to sort out. Moreover, there are no mechanisms built in to point to that canon. Librarians’ training today includes far less experience with the paper indexes, which are seen as obsolete. Beyond even the database, libraries are tending toward aggregating systems that bring information from databases all together in one set of search results, much like Google—the only difference is that these systems are not attempting to learn from your past behavior. Tracking user behavior is in direct violation of standard library ethics (Gorman, 2000). The volume of information in an information society creates a problem in itself. Bell (1999) argued that, in the information society, the volume of

information that individuals must consume and attend to leads to a different kind of scarcity. Previous theory indicated that individuals had a complete set of information with which to make decisions. As Bell (1999) argues, “*more* information is not complete information; if anything, it makes information more and more incomplete” (p. 467). In a digital environment, the index is no longer defined or outlined by scholars in a discipline or by librarians, but by algorithms. Filters are a natural part of both library collections and algorithms. The fictional Library of Babel may contain all the knowledge in the world, but it is incomprehensible without someone to provide context. There is one thing that numbers and computers cannot do, but people can “recognize implied context” (Gradmann, 2012, p. 17). Through indexing and categorization, librarians contextualize the research process. Through collection and preservation, they provide one of the foundations for the research process. Rapidly changing technology in a digital environment has profound effects on practices of preservation and dissemination. Preservation is a means by which to ensure that documented information will remain for others to use, but without proper context, information can get lost. As the information landscape has become increasingly digitized, the environment in which libraries operate has become significantly more complex, requiring libraries to change longstanding practice, enter into partnerships with new kinds of organizations, and generally reconsider the role of their organizations.

Changing organizational environments

At the university level, attempts at creating efficiency have included the convergence of information technology (IT) departments and libraries. These mergers were first considered in the 1970s. In the 1990s, administrators took the reins and moved forward with mergers of libraries and IT departments to increase efficiency. These mergers seemed an obvious solution, since libraries are often the innovators of technology use on university campuses because they implement discovery and access technology (Quinlan & McHarg, 2012). In many cases, library directors were chosen to lead the consolidated organizations, which required additional staff to fill gaps in knowledge and skill. Those who continue to argue for these mergers suggest that they not only offer cost-savings, but also serve to explore new ways of spending time and energy delivering services (Joint, 2011). Detractors of merger practices point to the disparate missions of the organizations; for example, libraries deliver information and IT departments support systems and the infrastructure that libraries use to deliver that information (Massis, 2011). Some models have gone so far as to merge additional groups such as academic computing services—departments that provide technological support to faculty research—under an umbrella organization that reports to a chief information officer (Massis, 2011). Although all of these groups depend heavily on technology, libraries tend to see technology as a means to an end, and it is not uncommon for computer specialists to see the development of technology as “the means and the end” (Quinlan & McHarg, 2012, p. 148). In many institutions, particularly those that included academic computing services, researchers who were increasingly

experimenting with technology looked to these combined organizations for support and found that their needs were prioritized alongside projects that were essential to the functions of the university (Quinlan & McHarg, 2012). Some universities later decoupled the organizations and returned the departments to their independent status. Those that remained consolidated have determined how to use the individual strengths of each department without unintentionally erasing what makes them distinct (Massis, 2011). Even within independent libraries, organizational structures have shifted from collections operations to more process focused operations that are structured around departments. These department-centered structures are more geared to innovation, as libraries attempt to lead in practices of research, teaching, and learning as they also look to support strategic initiatives at the university level (Schonfeld, 2016).

The American Library Association pioneered collaboration among libraries. The collaboration efforts began in 1876 with the creation of the committee on cooperation in indexing; this was followed in 1913 by cataloguing college libraries and the shared acquisition of collections, and, in 1917, with interlibrary loan (ILL). National and regional catalogs were common by World War II, and library consortia reached their pinnacle in the 1970s (Horton, 2015). Consortia vary in both geographic makeup, size, and service offerings. A 2012 survey indicated that there were more than 200 operating consortia in the United States, the membership of which included over 18,000 libraries with an average budget of \$2.9 million, and an aggregate budget of over \$170 million. The main services provided by these consortia are resource sharing and ILL, communication, professional development, and continuing education, consulting and

technical assistance, and cooperative purchasing of databases. Additional services provided by consortia include shared catalogs, technical support, advocacy, courier services, and digitization (Horton, 2015). Examples of large consortia include OCLC, The Digital Public Library of America (DPLA) and LYRASIS. OCLC is an international consortium with a membership that includes 23,000 libraries, archives, and museums across 170 countries, and was initially started in 1967 to provide new technology to help libraries with cost-savings improved services through shared cataloging. The OCLC network connects libraries across the world to help in sharing resources and ensuring access to knowledge. The DPLA was founded in 2013 as a step toward building America's premier digital library. Initially created with grant funding and participation by member libraries, it has also provided funding to other consortia and institutions to expand access to digital content. LYRASIS is broad geographically and is the host organization for The International Coalition of Library Consortia. LYRASIS works across a variety of consortia, typically working through state agencies as their agent for licensing, and, in some cases, working to create inter-consortia licensing. LYRASIS is also an agent for the OA movement, working on projects like the Sponsoring Consortium for Open Access Publishing in Particle Physics (SCOAP3). SCOAP3 is geared toward moving journals in the field of high-energy physics to an OA model (Pronevitz, 2015). So far, I have explored changing collection and preservation practice, changes in information finding behavior and a variety of consortia and other emerging forms of organization that are creating new challenges for libraries. Next, I

will explore trends in economics that create strain on library budgets and examine two lawsuits brought by publishers that call library practice into question.

Changing economics

The promise of widespread digitization was that information would be cheaper in a digital environment, but for libraries, the converse has been true. For example, the print version of the *ACCRA Cost of Living Index* cost \$165 per year. The print version was discontinued in October of 2014, and the electronic-only version, which does provide access to previous years' content, costs \$12,700 per year. *AGROW World Crop Protection News* cost \$3,300 for the print version, which was also discontinued in October of 2014. The electronic-only version costs \$20,000 per year (M. Royle, personal communication, November 7, 2014). To fight rising costs of electronic-only versions, libraries have sought ways to achieve economies of scale. These economies of scale are a central reason for cooperation among libraries. DPLA would not exist without the collaboration of library consortia, and Big Deal packages allow for consortia to negotiate significant savings on scholarly journals, thus, allowing broader access (Horton, 2015). Frazier (2005) describes Big Deals thusly:

A Big Deal is a comprehensive licensing agreement in which a library or library consortium agrees to buy electronic access to all or a large portion of a publisher's journals for a cost based on expenditures for journals already subscribed to by the institution(s) plus an access fee. Multi-year Big Deal agreements typically limit the ability of the library to eliminate subscriptions or reduce expenditures to the publisher while specifying an annual price increase

that is less than the price increases that would apply if the library continued to purchase the individual journals. (p. 50)

A Big Deal is not a database that includes journal articles, but a collection of serials much like ScienceDirect from Elsevier or Preferred License from Wiley. As Frazier (2005) notes, the difference is critical because serial holdings are supplemented by databases, but a big deal changes the meaning of ownership of journals altogether (Frazier, 2005). One of the changes that technology has brought to libraries is a shift from ownership to licensing of content. LYRASIS, the Center for Research Libraries, and other consortia work to help consortia with issues of licensing. The assistance is needed because there is significant expertise required to manage the process. The necessary expertise is not just for negotiating prices and managing the licenses, but also in understanding legal terminology in the agreements, and ensuring compatibility with the technologies used by libraries for access and use terms as outlined in the agreements. Some terms make it difficult for libraries to take advantage of their paid-for content, sometimes restricting access to walk-in users, preventing users from saving personal copies of PDFs, and restrictions on the libraries' participation in ILL (Anderson, 2016). Libraries are creating new methods to make the licensing process less burdensome because the process of ensuring that contracts complied with fiscal policies and state and federal laws was creating delays in the process of renewing electronic resources. The use of master agreements at the University of Tennessee are one example of these new methods. That libraries are required to coordinate with a contracts office and general counsel to ensure that lending practices do not run afoul of publisher agreements is an

added operational burden (Halaychik, 2015). Restrictions on use of content can pose challenges for longstanding library practices, and publishers have demonstrated they are willing to go to court over these issues.

A fair use case brought by three publishers demonstrates that library practice in a print environment does not translate well to a digital environment, from a legal standpoint. In April 2008, Oxford University Press, in concert with Cambridge University Press and SAGE Publications, filed a lawsuit against four individuals at Georgia State University. In the lawsuit, the publishers alleged that more than 6,700 works were made available through online systems (e-reserves) without permission, as part of "systematic, widespread, and unauthorized copying and distribution of a vast amount of copyrighted works" (Albanese, 2010). Two novelties of the suit were that the lead defendants in the case are not large commercial publishers but university presses, which purportedly have a mission to serve higher education much like libraries. Furthermore, the suit skirted the state sovereign immunity doctrine that prevents states from prosecution in federal court by naming individuals at Georgia State. Rather than suing the state university system, the suit named President Carl Patton, Provost Ron Henry and Librarian Charlene Hurt as defendants (Albanese, 2010). For many years these university presses were shielded from market forces due to their relationships with universities; however, university presses are now in commercial relationships with the universities that they must rely on (K. L. Smith et al., 2011). In the initial ruling, Judge Evans determined based on a four-point test that the use of the materials was fair use, but only on two of the points. Whether the work was for educational use and subject to

copyright favored the university; however, the effect on the value of the works and the volume used favored the publishers. In the final analysis, the judge outlined a 10% rule for the volume of work that could be used, therefore ruling in favor of Georgia State (Fister, 2016). The publishers asked for an injunction that would allow professors to distribute only 1,000 words per document without asking for permission or providing payment, which would greatly restrict longstanding academic practice and render fair use irrelevant (K. L. Smith et al., 2011).

With a transition to electronic systems, faculty are more often providing students with readings directly rather than putting them on reserve in the library, where librarians are generally aware of the four-point rule as outlined in the Copyright Act, which provides a way to determine whether something is fair use. These four factors are the character of the use (what is being done with the material?), the nature of the work (is it creative or factual?), the amount taken, and the effect on the market value of the original work (Aufderheide & Jaszi, 2015). As Fister (2016) notes,

I also suspect that faculty are for the most part less well-informed about applying the four-factor test to determine whether a specific use is legal or not. They may also give less of a damn. When you think the purpose of publishing scholarship is to share knowledge, and when in your experience money from sales doesn't play much of a motivating role in their contribution to the progress of science and the useful arts, copyright can seem like arcane red tape that doesn't, somehow, apply when you want to share an article or a few pages of a book with students. (Fister, 2016).

The publishers appealed the 2012 decision, and the Eleventh Circuit Court of Appeals vacated the initial decision, sending the case back with notes on how to adjust the analysis of fair use. The Court of Appeals, like Judge Evans, rejected arguments by the publishers on broader principles. Applying the new fair use analysis, Judge Evans again ruled against the publishers (K. Smith, 2016). The status quo of the scholarly communication system, which is currently intertwined with commercial publishers, relies on these flaws being invisible to faculty either through ignorance or apathy (K. L. Smith et al., 2011). Of critical importance is that Judge Evans' analysis has demonstrated that "licensing income for the publishers narrows the scope for fair use by libraries." (Smith, 2016). Fair use is a bedrock principle of much of the work that libraries do, and continued assault on this notion brings much of the enterprise into question, particularly since content is much simpler to share in digital form.

Less important than the increasing costs of journal subscriptions is the fact that many of the journals bundled into Big Deal purchases are of questionable value. Big Deal may save money relative to the cost of buying individual journal subscriptions, but there is no fundamental difference between commercial journals and not-for-profit journals that justifies the significantly higher cost of commercial journals. The only explanation for the high costs is that librarians have been willing to pay them (Frazier, 2005). Odlyzko (2015) argues that decreasing library budgets relative to overall university budgets indicate that the importance of libraries to universities is in decline, while scholarly publishers have maintained their importance by maintaining control of the resources. There is a notable difference in cost between commercial journals and

not-for-profit journals produced by scholarly societies. The cost of commercial journals on a cost-per-page basis can be 100 times higher than that of the least expensive journals, and cost-per-use is comparably striking. For example, journals from the American Chemical Society are five to ten times cheaper on a cost-per-use basis than some produced by commercial scholarly publishers (Frazier, 2005). Odlyzko (2015) estimates that Elsevier's revenues per article are around \$5,000, which is similar to revenue generated by scholarly societies, such as the American Mathematical Society, which he determined can bring in about \$5,400 per article.

There are costs associated with running a preprint server like arXiv; however, most of the work is done by unpaid volunteers contributing user generated content, and the average costs of running the server are about \$10 per article submitted (Odlyzko, 2015). Around 5,000 journals are accounted for in all of the Big Deals, but they tend to be the higher cost journals. The other scholarly literature not included in the Big Deal should also be collected, organized and preserved, but Big Deal purchases take up a disproportionate amount of financial resources. At the University of Wisconsin-Madison, Elsevier journals make up less than 1% of serial holdings, but Elsevier accounts for 15% of serial expenditures (Frazier, 2005). Consortia models, Odlyzko (2015) argues, should be used to broker national deals for electronic content, which is a prospect supporting publishers to marginalize libraries in favor of publishers' proprietary delivery systems (Odlyzko, 2015). Consortia deals create their own set of issues, however, since money directed at those deals means less money for localized collection development (Ivins, 2005). Books and journals are in some cases being shifted to off-

site warehouses, users are relying on electronic resources, and libraries are seen by some as less efficient at providing access to content than publishers are (Odlyzko, 2015). This leads to suggestions that shutting down libraries is a desirable solution to a myriad of problems including access to content for researchers and strained budgets for libraries.

In 2017, Louisiana State University (LSU) sued Elsevier for breach of contract after Elsevier cut off access to content for its School of Veterinary Medicine Library. After determining that the approximately 600 faculty and student users would fall under the 35,000-user limit imposed by the agreement signed by the main university library, the school decided to let the separate contract through the School of Veterinary Medicine Library expire. Elsevier subsequently blocked access to content for users at that library. In ongoing discussions, Elsevier has, citing Louisiana's long-arm statute, refused to accept service of the suit, instead suggesting a commercial solution, in which LSU would pay approximately \$200,000 for additional subscriptions for 2017 (Albanese, 2017). This case highlights a key point in the changing nature of the scholarly publishing environment. Since libraries do not purchase, but only license content from publishers, users of the library do not get content *from* libraries as much as they get content *through* libraries. This change in the nature of ownership is what opens space for arguments that libraries are unnecessary in the age of the internet—the library no longer serves the same gatekeeping function.

Digital intermediaries

The technological environment in which libraries work continues to get more convoluted. Libraries use integrated library systems (ILS) to manage their catalogs, link

resolvers to ensure searches take users to the full text of content from a variety of databases, LibGuides designed by librarians for specific subject areas or types of content, and even resource management systems for electronic resources. It is no easy task to ensure that all of these systems work together. Technical access often requires working closely with publishers to ensure access to content (Anderson, 2016).

Collections are increasingly geared toward electronic content, and many libraries are migrating away from ILS products that are print-focused and toward platforms that can manage both electronic and print. Additionally, there is a shift toward hosted services, which provide libraries relief from expenses incurred with the management of local software and hardware, and vendors of such services new forms of revenue (Breeding, 2015). Discovery services are beginning to replace more traditional catalogs. These services, while not yet comprehensive, are designed to uncover resources from various systems like IRs, databases, and other sources through a single interface by creating a unified index, allowing users to limit results with faceted navigation (Burke & Tumbleson, 2016). Competitive distinctions among discovery services concern the quality of the indexes. The two most common services are Summon and Primo, with Summon widely considered among libraries as having a superior index. Primo, until recently, had touted its content-neutral stance because Ex Libris, the company that owns this service, is focused entirely on library technology (Tay, 2017). Transitions throughout 2015 consolidated power in a smaller number of large companies. In 2015, Ex Libris was acquired by ProQuest, a company that had been less competitive in the technology arena but offered a wide range of content and workflow products. The

majority of the company is owned by Cambridge Information Group, while Goldman Sachs holds minority equity (Breeding, 2016). Longstanding library practices are being called into question, costs to acquire (or license) materials is increasing, and technology trends indicate a move away from traditional information categorization and dissemination. Libraries are also developing technologies on their own.

Libraries continue to develop open-source systems for repositories (DSpace, Fedora, and Hydra are examples), and for discovery interfaces (VuFind and Blacklight), but the implementation of these systems requires that the systems are aligned with the needs of and resources available to libraries considering their adoption. With an increasingly consolidated technology sector, libraries have fewer options available to them (Breeding, 2016). New technology is one factor that makes libraries increasingly difficult to manage as organizations but increasing use of technology also has implications for finding information. Google, Microsoft, and others provide search engines for free, and, thanks to the desire for convenient access to information, many researchers turn to these engines when doing research, and libraries can no longer count on students and faculty using tools provided by the library (Burke & Tumbleson, 2016). While these search engines seem easier to use, their complexity lies beneath the surface in personalized algorithms, and people are increasingly relying on these personalized tools, including Facebook and other social media, for getting their news (Pariser, 2011). Researchers often consider discovery channels offered by libraries limiting, with faculty as well as students turning toward free search engines. Additionally, publishers are providing metadata to companies like Google so that scholarly information can be

discovered through their service, Google Scholar. Biases built into search tools were found as part of the Discovery Tools Project which heavily influenced the kinds of information that students chose (Burke & Tumbleson, 2016). Additional results indicate that students tend to rely on nonacademic resources through the Internet and Google for most of their research and are happy to find information that is “good enough,” (p. 199) because there is a gap in understanding what are considered valid resources for academic research (Badke, 2015). Badke (2015) notes:

The main problem here is that students, lacking deep content knowledge, are unlikely to choose well even if they know the best criteria to use and are well motivated. Sadly, for the majority of students, neither knowledge of criteria nor motivation to spend time evaluating is a prominent factor in their research. (p. 205)

Because they lack the in-depth content knowledge of faculty, students rely more often on relevancy rankings and do not look past the first page of search results. Students also tend to use the sources themselves with not much care, as studies indicate that, regardless of source length, three-fourths of their citations point to the first three pages of the source material (Burke & Tumbleson, 2016). Pariser (2011) remarks that computers are progressively becoming more like a “one-way mirror, reflecting your interests while algorithmic observers watch what you click” (p.3). Libraries, too, are beginning to analyze user behavior to provide suggestions based on catalog holdings (Pennell & Sexton, 2010), and are replacing federated search with discovery systems that provide a Google-like single point of departure for identifying library holdings,

based on a user desire to search everything at once through an intuitive interface (Burk & Tumbleson, 2016). Librarians have long taken on the position of guarding the right of individuals to information. These values need to be carried with us into the digital realm, particularly as libraries work to ensure that information is seen within its proper context, and that the divide between "haves" and "have-nots" is as small as possible. Far more than buildings containing collections of books, libraries have both service and ethical traditions that are crucial to their functions. Any digital environment that is constructed may not be sustainable until these traditions are incorporated into its essence (Besser, 2002).

Private partners outside of academia

Libraries have been working to digitize collections and have struck partnerships with commercial entities like Microsoft and Google beginning in the mid-2000s. With a combination of private funding and commercial technology, libraries were able to create larger collections of digitized books than had previously seemed possible. The challenge in orchestrating these deals is partly that there are myriad models emerging, and librarians have little knowledge of the commercial side of the equation; business deals are not typically part of library culture (Kaufman & Ubois, 2007). The technologies with which information is distributed, through and outside libraries, is increasingly under control by large corporations. Google Books is likely the best-known example of such a partnership. A controversial mass digitization project, Google Books, was developed in partnership with university and public libraries, including the New York Public Library and university libraries at the University of Michigan, Harvard, Stanford, and Oxford.

Books were scanned and converted to text using optical character recognition to help make the books searchable. Users can search for books, see basic information, and if the book is no longer subject to copyright, they can read and download the entire book. Although the collection brings millions of new books to new audiences, legal battles have plagued the Google Books project, starting with a class action suit by the Authors Guild, the Association of American Publishers and a few others over copyright issues. The basis of the arguments has been that Google's dominance would undermine library values of privacy, access, and cost (Peltier-Davis, 2011). In addition, Commercial partners often ask institutions to sign confidentiality agreements in order to keep the terms of these partnerships secret, in addition to asking for exclusivity of distribution to digital files, which is in direct conflict with the reasons that libraries enter these partnerships—to provide the broadest possible access (Kaufman & Ubois, 2007). Due to budgetary pressures, libraries themselves are realizing a transition to new models like patron-driven acquisitions (PDA) and demand-driven acquisitions that allow for users to find information whether the library owns it or not, with the purchase of content based on use thresholds. While technically more difficult to maintain, for libraries, these models ensure that their purchases are more closely aligned with the content their users want (Anderson, 2016).

Google Books is a mass digitization project aiming to provide broad access to collections of books. The HathiTrust Digital Library is a partnership of research organizations and libraries from both the United States and Europe, making available millions of volumes. Started as a collaborative effort to allow for a small group of

universities to share their digital collections, HathiTrust now allows access to public domain and copyrighted content to anyone with access to the internet. Partners in the project includes state university systems like The University of California System and the University of Georgia System, but also individual institutions like Texas A&M University, the University of Tennessee, Harvard University and Yale University. Partner institutions have access to a broader set of features, including the ability to download full PDFs of public domain content and the ability to create their collections. Partner institutions often deposit digitized content from HathiTrust into Google Books (Peltier-Davis, 2011). The name of the organization is a clue to the values of the organization:

Hathi (pronounced hah-tee) is the Hindi word for elephant, an animal highly regarded for its memory, wisdom, and strength. Trust is a core value of research libraries and one of their greatest assets. In combination, the words convey the key benefits researchers can expect from a first-of-its-kind shared digital repository. (Peltier-Davis, 2011, p. 142)

Traditional ethical standards of libraries, including equal access and diversification of information, are important to defend in a transition to a digital environment, but that increasingly commodified content and infrastructures are concentrating into fewer hands, meaning that fewer and fewer works enter the public domain (Besser, 2002). It is therefore critically important that collections strategies go beyond ensuring that popular content is available and ensure that a diversity of information is available, eschewing the impulse toward opportunistic collection development. Tools and business strategies

developed through elite political and commercial institutions have limited the distributed nature of the internet and scientific communities, which are “supposed to be open, extensible” (Vaidhyathan, 2005, p. 18). Commercial forces are powerful in this regard, per Mosco (2004):

Digitization takes place in the context of powerful commercial forces and also serves to advance the overall process of commodification worldwide. In other words, commercial forces deepen and extend the process of digitization because it enables them to expand the commodity form in communication. From a cultural or mythic perspective, cyberspace may be seen as the end of history, geography, and politics. But from a political economic perspective, cyberspace results from the mutual constitution of digitization and commodification. (p. 156)

The commodification of content expands with expanding abilities to “measure and monitor, package and repackage” information (Mosco, 2004, p. 156). This commodification is extending even to the most precious collections inside of libraries and other institutions built on the idea of preserving cultural heritage. If these collections are commodified and absorbed into the content offerings of commercial publishers, then libraries have little on which to rest their existence beyond their ability to index information.

Digitizing special collections

Beginning in the mid-1990s, libraries and other cultural institutions started digitizing their special collections. Special collections have always been less accessible to users outside of these institutions, but, most importantly, institutions are far more likely to hold the intellectual property rights to these collections, therefore do not need to ask permission for conversion into digital formats. While digitization provide access to a significantly larger audience, challenges have included the cost of digitizing materials, cost of building and maintaining the infrastructure, integration into the broader collections, and figuring out the needs of a suddenly much larger set of users (Maron, Pickle, & Marcum, 2013). Institutions' dedication to cultural heritage are challenged by a range of choices as they figure out ways to use new technology to make their collections more publicly accessible, and many of these choices direct them to commercial entities. Deals for mass digitization projects tend to be unique in that there are varying requirements for collections, and varying business criteria for commercial entities, making it difficult to balance between institutional missions and business strategies (Kaufman & Ubois, 2007).

A key point to consider with regard to these collections is that special collections in libraries tend to be handled not by librarians, but by archivists. Archivists are focused not on broad collections, but on “primary sources that document the activities of institutions, communities, and individuals” (Society of American Archivists, 2016). Legal, administrative, and historical evidence are only some of the uses for these

materials, and they are a critically important part of the cultural heritage of institutions and the broader society. From the Society of American Archivists:

Since ancient times, archives have afforded a fundamental power to those who control them. In a democratic society such power should benefit all members of the community. The values shared and embraced by archivists enable them to meet these obligations and to provide vital services on behalf of all groups and individuals in society. (Society of American Archivists, 2016)

The distinction between librarians and archivists is illuminating, as archival practice points to possible solutions to some tensions in a shift to a digital environment for the dissemination. Archivists, like librarians, focus on collections, but archivists are keenly focused on preserving very specific content in its original context—a central tenet to the idea of permanence. Absolutely critical to archival practice is the principle of provenance, also known by the French as *respect des fonds*. Provenance relates to the history of an object, which traces who created it and who owns or has owned it. In practice, what this means is that records of differing provenance remain separate to preserve context, and, importantly, determine authenticity, described by Theimer (2012) as:

“. . . typically inferred from internal and external evidence, including its physical characteristics, structure, content, and context.” Physical characteristics, structure, and content are all internal evidence; the external evidence of authenticity is supplied through context, and so the archival drive to preserve context is in part motivated by the need to preserve the evidence needed to assess

the authenticity of the material. For archivists, preserving context is also about preserving the conditions that make documents more meaningful to users.”

Because context is critical to archival practice, archivists use finding aids instead of traditional bibliographic indexes. Finding aids in archives are organized differently than library catalogs, which is not to suggest that context is not important to librarians. The context in broader collections tends to derive from the users of those collections. The deep content knowledge that faculty have and students lack are a form of context.

Although libraries have worked to ensure that the interfaces they provide to users are simple to use, they have not made the interfaces simpler but have simply masked their complexity. Norman (2011) suggests that design of objects and systems should be appropriately complex. For example, an airplane cockpit might seem frighteningly complicated to the average person, but to pilots, the controls are all organized into meaningful groups and therefore easy to use. Search engines like Google might seem simple on the surface, but the complexity is simply built into algorithms that are invisible to the user. Personalized searches might provide a personalized context, but they do not and cannot provide an appropriately epistemological context, even narrowed down to a particular discipline. The cultural record is increasingly commodified and corporate-owned, and its preservation requires theoretically informed, if critical, practices of librarianship and archiving. The myth of permanence rests most solidly here, in this tension between what collections should survive and to whom their existence should be entrusted. The problem of permanence of digital information is becoming

more critical, as more and more content is born that way, however, obstacles grow to its realization, because of the velocity at which technological change occurs.

The problem of permanence for digital information

Fitzpatrick (2011) points to a key problem with content in digital formats, noting that Michael Joyce's *Afternoon* is an early hypertext rendered nearly unusable since the hardware and software required to read them have become out of date. Digitization is not a substitute for preservation. Digital resources are distinctive for creating ease of access to information but are poor for preservation, which has traditionally been the province of libraries and archives (A. Smith, 2007). Information that is recorded in any medium will last only as long as the medium, meaning that the durability of the medium is tied directly to the durability of the information. Cuneiforms may not have been the first forms of inscription, but if anything preceded them, those media were so fragile that there is no trace remaining (Rumsey, 2016). If books were as permanent as assumed, then they would not require the sophisticated infrastructure developed over centuries to ensure their protection. A parallel process for the preservation of digital content could be developed over a much shorter period (Fitzpatrick, 2011). Concerns about potential global catastrophe are currently informing plans to build libraries to facilitate a restart of civilization, as needed, together with a proliferation of thought experiments about what to save and what can be left behind (Rumsey, 2016). Digital content, whether born-digital publications or digitized special collections material, is the fundamental component of digital libraries, much like print content has historically been the fundamental component of brick and mortar libraries. Digital content is the fastest

growing part of most library collections, but digital content is potentially transient. Until recently, most digital collections had a backup in paper originals from which the digital versions had been scanned. There is a growing set of cultural content with no print equivalent to serve as a backup copy (Worthey, 2013). The permanence of this part of the cultural record, then, is rendered questionable.

In exploring the transition to digital first formats, Rumsey (2016) posits that the idea of preserving knowledge forever is long past; consumers replace books and other forms of physical media with computer code that is easily overwritten, easily rendered obsolete, and dependent on machines to render its contents readable. Some systems have been developed in an attempt to address these issues. Lots of Copies Keep Stuff Safe (LOCKSS) and Controlled LOCKSS (CLOCKSS) are joint ventures of libraries and publishers to help ensure preservation of digital content. Libraries that use LOCKSS have a LOCKSS box, which is simply a computer that preserves local copies of digital content from publishers. Member libraries are not just leasing digital content anymore with the permission from the publisher. Through systems like LOCKSS, libraries can take custody of the material, and the LOCKSS box at a given library will provide the content to users if the copy from the publisher is no longer available (Ferguson, 2007). The LOCKSS system preserves content in its original form, and also includes a mechanism through which content can be migrated to new formats on the fly when the content is requested by a user (Heinrich, 2012). The CLOCKSS systems go a step further in that libraries can preserve content from member publishers whether or not they subscribe to it. CLOCKSS is a dark archive through which content is only made

available after defined events are triggered, such as when the material is no longer available from a publisher. The distinction between the two initiatives is that LOCKSS is community-driven and focused on local library collections, and CLOCKSS is a more globally focused attempt to preserve collections in the event of business disruptions (Ferguson, 2007). One of the first journals to be preserved in the LOCKSS system was *The Absinthe Literary Review*. The announcement of the journal's participation in the LOCKSS program coincided with a severe server crash at the publisher website and the expiration of the domain registration, which was capitalized on by cyber-squatters who took over their domain name. The content of *The Absinthe Literary Review* was preserved in LOCKSS (Worthey, 2013). Although criticism of Nicholson Baker was largely valid, he did have one point. The transition of content from analog to digital can radically transform information and do so in the same way information is lost when making copies of analog items. For example, microfilm loses around 10% of its information each time a copy is made. However, born digital content does not have the same problems. Virtually no information is lost through generations of digital copies when properly preserved (A. Smith, 2007).

As Anderson (2013) notes, libraries have treated shifts in the scholarly communication from a print-based system to a digital network as a shift in format, but it is fundamentally a question of the function of the library in the 21st century. Preservation of print products is still a contemporary goal. Cooperative efforts are underway to ensure that libraries preserve print copies of journals and other documents that they remove from their collections in shared off-site facilities so that a "last copy" is available in non-

digital format somewhere. The Western Regional Storage Trust works with institutions to ensure that complete journal runs were preserved, and Ohio has developed a statewide network of shared facilities that includes both public and private universities (Schonfeld, 2015). Preservation in the realm of special collections tends to have a different focus. Artifacts and collections are not preserved because of their curricular relevance or any instrumental value, but because they have some inherent cultural value, whether that value is global or local (Anderson, 2013). Most regional preservation efforts center on the declining necessity for access to content in print form. JSTOR is an example of a different approach, linking preservation of print to the provider of digital preservation and access. All things being equal, print access will likely become less important, and over time, access to digital should continue to grow; therefore, ensuring the preservation of digital content and the ability to re-digitize when necessary will be critical (Schonfeld, 2015). Anderson (2013) argues that the academic library should shift focus toward non-commodity documents, that is, those in localized collections which are found in special collections. A localized and specialized collection focus would bypass some of the controversy over whether OA or toll access is a preferred model for scholarly communication. This line of thinking, given that OA has been driven largely from libraries, suggests that libraries have not been partners with researchers in the system of scholarly communication, but have effectively been attempting to undermine it. Libraries are not constraining authors' publication options but offering new opportunities for researchers to publish outside the commercial publishing enterprise. In fact, across the US, libraries and university presses are merging operations to create a

new enterprise for disseminating scholarship. While the business models are strikingly different, these mergers point to possible solutions to the publishing problem (Clement, 2011).

An experiment by the libraries at the University of Tennessee points to additional opportunities for new forms of publication. As part of The Big Read, the Knox County Public Library chose August Wilson's *A Lesson Before Dying* for the book that the Knoxville community would come together to read. In partnership with the Knox County Public Library, the Clarence Brown Theatre put on a production of the play based on the novel. The community participated in book discussions, panel discussions and a variety of other activities for this event. The University of Tennessee Libraries entered the partnership with a call for essays and other reflections from the university and broader community. Essays and artwork were gathered from a variety of disciplinary perspectives and a variety of community members, including artwork from students at a local high school. The essays were published in a book through NewFound Press, which is the digital imprint of the University of Tennessee Libraries. The project was so successful that a call for papers for the current Big Read novel, *Station 11*, is now available (University of Tennessee Libraries, 2018).

Preservation of text has existed throughout history with all manner of constraints existing with regard to publication options, and commercial scholarly publishers have exacted many of them. There is a growing tension not just with regard to preserving the contents of libraries, but whether the institution itself should remain permanently. The suggestion that libraries are undermining the system of scholarly communication misses

a crucial point. Libraries are a part of and not apart from the system of scholarly communication. Setting researchers and libraries in competition with one another leaves commercial publishers in a position to continue to exert ever greater influence. Anderson (2013), reflecting on where libraries should focus their attention in this new environment, places special collections as be the centerpiece of library collection activity; however, this ignores the fact that commercial publishers are also working to digitize special collections, and sometimes the publishers are arguing for exclusive distribution rights. Thus, special collections are not immune to the commercial influences in the system (Maron et al., 2013). Regardless of the focus of library collection behavior, they should not be ignored as a central part of the system of scholarly communication. As Rumsey (2016) puts it,

What survives war can die from inattention and neglect. The library at Alexandria ultimately collapsed not directly from wars. It died because people stopped valuing its contents (Rumsey, 2016, p. 45).

Libraries still serve critical functions in the system of scholarly communication, but their practices have changed considerably over the last few decades as the shift to digital content has evolved. They will only continue to serve these critical functions in the future if people outside the walls of the library fully understand their place in the system.

In this chapter, I have explored how changing organizational environments are putting pressure on libraries to change longstanding practice and organizational structures. I outlined changing economic and technology environments, and some ways in which the digital environment changes the way people consume information. I also

have outlined how an idealized but impoverished view of libraries prevents many outside their walls from seeing the expanding inventory of services they provide, and the increasing pressure from a variety of technical and economic forces. I also explored how a shift to a digital environment creates an epistemic shift in how people consume information and the implications on library practice, and how preservation of the cultural record and the library as an institution are in danger. The commercial influence of publishers has begun to extend into the most localized content in libraries in their special collections- bringing about the commodification of that content as well. In Chapter VI, I will make a more fully formed argument for considering the system of scholarly communication as a recursive public, as defined by Kelty (2008), as a way to challenge the myths of authority, influence, and permanence.

CHAPTER VI

CONCLUSIONS: NOLITE TE BASTARDES CARBORUNDORUM

Chapter I outlined how the myth of authority operates in the system of scholarly communication with a history of the development of scholarly journals, how authority came to be seen in the form of books, and how the imprimatur of print became the paradigm on which authority is based. It noted the shift to digital formats and how digital publishing, as a commodity, is met with increased expectations for publication on the part of faculty, and an increased reliance on abstractions of the value of scholarly work with the use of metrics. Chapter II paints a picture of the market for scholarly communication, demonstrating that ownership of the scholarly record is increasingly under fewer and fewer publishers, and details changes to intellectual property law and the effects of those laws on a digital information environment. Chapter III explored the myth of influence, specifically how there is a divergence between the social infrastructures of scholarship associated with disciplines, and the technical infrastructures, which are increasingly under control of commercial interests. Chapter IV explored the myth of permanence by exploring shifts in the organizational and technical environments around digital publishing and the changes libraries are making in response. It also addressed the libraries' participation in a basic shift in epistemic authority—that is, in how and why people find and consume information in library settings. This final chapter reflects on the information in the preceding chapters and constructs an outline of the scholarly communication practices which form a recursive public, as informed by

mobilization of resources model of organizational communication, and by Kelty's (2008) history of the open software moment.

To extricate organizations from rationalized myths, Meyer & Rowan (1981) offer four solutions. First, an organization can resist ceremonial obligations, which leaves the organization unable to document efficiencies, since they cannot be easily identified absent the measures provided by the ceremonial obligations. Ceremonial obligations, like the prestige markers in academia, also provide resources and stability. Resisting those prestige markers would, based on Blackwell's (1998) argument, be a threat to the epistemic authority of the institution. Meyer & Rowan's (1981) second solution is to conform rigidly to institutionalized formulas by isolating the organization from external relations. The cutting of external ties introduces problems when constituents are unable to perform boundary-spanning activities, but most importantly, organizations that are institutionalized cannot just conform to myths, they must also preserve the image that they work. A third option is to accept cynically the irreconcilability between institutional structure and work requirements, which delegitimizes the institutionalized myths, and ultimately, the organization. The fourth option is to promise reform, which risks defining the organization's current structures as illegitimate, since this strategy indicates a valid structure as lying in the future. A promise for reform in the system of scholarly communication can avoid the risks they outline if a focus is maintained on the fact that it should be a shift not in obligations, but a shift in thinking about to whom producers of scholarly work are obligated. To demonstrate this, I will recast the system of scholarly communication as a recursive public. First, I will revisit Kelty's (2008) definition of a

recursive public, then I will outline the five components of a recursive public and relate each component to scholarly practice. I will then revisit the myths of authority, influence and permanence. Finally, I will make some recommendations for how to begin to change the system through what the definition of a recursive public promises: “actually existing alternatives” (Kelty, 2008, p.3).

The definition of a recursive public is as follows:

A recursive public is a public that is vitally concerned with the material and practical maintenance and modification of the technical, legal, practical, and conceptual means of its own existence as a public; it is a collective independent of other forms of constituted power and is capable of speaking to existing forms of power through the production of actually existing alternatives (Kelty, 2008, p. 3).

Component one: support by a movement or ideology

The first component necessary to a recursive public is that it be supported by a movement or ideology. The only component that the Connexions system does not modulate, Kelty (2008) argues, is that of the movement, though he refers to OA as a second cousin of what might be a movement for free textbooks. This movement actually does exist under a different name. Open Educational Resources is an approach to publishing that has seen some early successes and is broadly focused on all material for use in education, including textbooks, course readings, syllabi, and assessment tools (Mallon, 2015). Some of the successes of the OA movement, in addition to the expansion of Open Educational Resources—of which a system like Connexions would

be considered a part—demonstrate that there are existing alternatives to commercial scholarly publishers. MediaCommons, arXiv, Connexions, the Open Science Framework offered by the Center for Open Science, institutional repositories, and Open Journals Systems are among a host of systems that perform in the same way or provide some of the same functions as traditional scholarly publishing but are using different tools—the only difference being that they do not often result in a printed volume.

Component two: sharing of source code

These tools, by design, retain critical aspects of scholarly practice including peer review; it is these practices that can be related to the second component of a recursive public: the sharing source code. A key aspect of the sharing of source code is the portability of software. Björk's (2007) model of the system of scholarly communication and its discipline agnostic structure suggest that across disciplines scholars share basic structures that underscore practice. Abbott (2001) traces the history of the field of sociology and how changes to the field have differentiated objects of study or methodology, and how these have changed over time in reproductions of fractal cycles. The discipline of communication has undergone similar changes, first emerging from the English Department as a separate discipline, and over time splintering into a variety of sub-disciplines (Gehrke & Keith, 2015). A constant has been the manner in which research is conducted, as demonstrated by Björk's (2007) model. The model serves as something like what Rawls (1999) referred to as “veil of ignorance,” a simple series of workflow diagrams that force scholars to take a step back from ideologies specific to individual disciplines. By thinking of the scholarly publishing system as a recursive

public, the conversation can shift from one centered on access and begin to focus on the inner workings of our social processes and how the system exploits free labor to support a multibillion-dollar industry.

Component three: openness and how it is conceptualized and operationalized

This third component concerns both the technical and ethical aspects of openness, including what protocols should be used and what market infrastructures should be involved. From the time Oldenburg produced the first edition of *The Philosophical Transactions of the Royal Society of London*, openness has been a driving philosophy of the system of scholarly communication. It was only when scholarly societies began to hand off their publications to commercial scholarly publishers that access to research became more problematic. As argued in Chapter Two, Open Access publishing, in its basic form, is not incompatible with traditional scholarly practice. Predatory publishers exist in this arena, but it is critical to understand that predatory publisher versus commercial publisher is a false choice. Editorial boards of both library and philosophy journals have successfully jumped to the OA model with the reputation, if not the name, of the journal intact. Business as usual, under the oligopoly market structure of the Big Four commercial publishers, is likely to lead to an increasingly commodified content system with an increasingly large portion of the infrastructure for creation, analysis, publication, and dissemination under their purview as well. Broader commercialization in combination with a proliferation of new titles has been a source of conflicts and some consternation for libraries, which were once the sole subsidizers of scholarly publications. Commercial publishers have stoked this problem in part by

massive catalog acquisitions of copyrighted scholarly work. Here it is critical to revisit RDT, with its keen focus on control of resources. Publishers can only continue to control the resources of scholarly output insofar as faculty continue to give them away. Their marketing infrastructures have segmented faculty into target audiences that further reinforce brands of journals, abstracting the authority into the brand – authority presumed by the target audience. Critical to the notion of authority at the epistemic level is that it is assigned by the community. The actual power to change this system lies with the individuals creating the content in the first place.

Component four: application of copyright (and copyleft) licenses

The fourth component of a recursive public rests in the application of copyright (and copyleft) licenses. Open Access enthusiasts regularly use and promote Creative Commons licenses, and librarians regularly help authors negotiate agreements even with commercial publishers to help them retain at least some of the protections of copyright (Suber, 2012). An elaborate system is in place to ensure that the rights of authors can be protected.

Component five: forms of coordination

This is perhaps the most complex part of refiguring the system. In Connexions, authors changed the way they coordinated and collaborated in creating academic textbooks. Scholars have been fluid in their forms of coordination and collaboration over the history of the academy as disciplines have shifted and they have worked to cross disciplinary boundaries. It is plausible, if not likely, that enough infrastructure is in place to consider whether the commercial influence of publishing is worth keeping in whole,

in part, or not at all. As an example, the Association of Research Libraries, along with regional and national repository networks, recently endorsed an international accord to more closely align repository networks across the globe to improve cooperation and identify common principles under which they will all operate—an accord created by the Confederation of Open Access Repositories (Shearer, 2017).

Rethinking authority in the age of e-books

If scholarly publishing supports the prestige hierarchy underpinning the U.S. system of higher education (Fitzpatrick, 2011; Borgman, 2007), and if its historical continuity depends on the ongoing operation of mythological thinking about the traditional authoritativeness of peer reviewed publications appearing in print university journals and books, then it is likely that these myths will destabilize further. The economic instability of the publishing system is increasingly seen to be matched by an employment system which may be fundamentally at odds with non-economic values, as well. Alvarez (2017) summarizes some of the main problems.

Our scholarly imaginations are forcefully limited by a system that concentrates prestige, cultural capital, financial rewards, and knowledge-defining power at "the top," a system that makes professional life at "the bottom" not only invisible but economically unbearable. This is to say that academe's inequality problem is not just epistemic. It is interwoven with socioeconomic inequalities in admissions and hiring that are deeply racialized, gendered, etc., and that supplement epistemic dominance within universities by diverting more teaching duties to a growing underclass whose members can barely make ends meet, let alone

produce scholarship that senior faculty take seriously. It is not just cold careerists at Princeton or Chicago holding everyone down by happily hoarding all the prestige; we are all complicit, more or less, and many of us are complicit out of necessity, which isn't an accident. This is a system functioning "as it should."

Professional librarians have intervened into the debate about the weaknesses of the current relationship between academic publishing and librarianship with proposals of their own. Beatty's (2014) critique of the Association of College and Research Libraries' (ACRL) *Framework for Information Literacy in Higher Education* outlines how a new framework proposed in 2012 by ACRL, while offering improvements on the previous document, still reinforces a market-oriented worldview, and does nothing to challenge existing forms of power, for example, with commons-based or peer production models. The framework distinguishes between novice and expert researchers, suggesting that novices rely on superficial authority markers like author credentials, while experts with authority recognize schools of thought and disciplinary paradigms. As a differentiator of quality of scholarship, the distinction is problematic.

To equate expertise with 'recognizing schools of thought or discipline-specific paradigms' is just to make it a slightly more sophisticated form of credentialism. To be sure, it's a step towards expertise. Real academic expertise is born from immersion in a subject to the point that the meanings of these labels break down. What this threshold concept offers is not expertise, but the credentialism of first-year graduate students establishing their internal pecking order over a pitcher of beer (Beatty, 2014).

It is through the various prestige markers of peer review, publication, and tenure that the myth of authority is manifested. The imprimatur of authority sits most firmly in peer review and publication, as these are the mechanisms through which scholars allocate academic capital. An increasingly small number of commercial publishers own these scholarly journals. The relationship of scholars to particular journal brands creates tension in the system, though technologies exist that allow for a move away from the journal container as it has been traditionally viewed—in fact, it is entirely possible that at that point the journal container is not just no longer useful, but detrimental to the entire system. As Guédon (2001), suggests, journals might offer a public record of scholarship, but they are private brands in their own right.

These tensions in the system, emphasized by the Thatcher testimony, underscore social conflicts which have been masked for many years by mythological thinking about authority, influence, and permanence. Librarians, university faculty and university presses, rather than working in concert, are in many cases effectively working at odds with one another. For examples, Fitzpatrick (2011) considers the history of the University of California Press, which was established in 1893. At its inception, the press did not publish books, but mostly monograph pamphlets, and there was no real systemization of the methods they used or the products they created. The products they did publish were all written by the faculty of the University of California. It wasn't until 1929 that their editorial board authorized publication of books written by scholars outside the University of California. In 1933, they formally reorganized as a trade publisher, and the director requested that all revenues generated by the press be retained

by the press. Publishing had been entirely noncommercial prior to this, and all revenues were returned to the university. This shift toward book publishing, and toward the press as a business, coincides with the “distancing of the press from the work of its own faculty” (Fitzpatrick, 2011, p. 178). Fitzpatrick describes the distancing as being detrimental to the missions of all organizations involved.

...what the university gains in the press’s financial autonomy, it loses in the press’s service to the university community. Reconnecting university publishing with the broader university community will require undoing some of the twentieth century’s business-oriented transformations and returning to the fundamentals: if the dissemination of scholarship is a valuable part of the university’s mission, the university must take responsibility for that process and transform the press into a publishing center whose function is intimately tied to the work of its own institution (p.178).

Mergers of libraries with university presses have shown some successes. For example, at Utah State University, the merger of the library and press organizations allowed the press to continue operations, and subsequently begin a digital imprint called USU Digital Monographs, which is seen as the final step in fully integrating the two organizations (Clement, 2011). With libraries finding new methods of publishing journals through consortia and institutional repositories, the possibilities for a self-contained academic publishing enterprise exist. Fitzpatrick (2011) notes a fear among university faculty that in setting up the university press as a publisher for the work of its own university faculty, the press would collapse into a species of vanity publishing, and thus be required to

publish anything submitted by faculty. Even in the early days of the University of California Press, however, it engaged with subject experts to ensure the quality of its content. The people in the system of scholarly communication are the ones who bestow authority on scholarly content, not the publication venues or the publishers.

Rethinking influence in the Google era

An interesting thing to note in thinking of the workings of influence in the system of scholarly communication is that the university itself is effectively decentered in the system. While it is true that university administrations and boards of trustees make decisions on tenure cases, in most cases (except those not respecting academic freedom and shared governance) a university does not decide whether a scholar's work is worthy of publication or granting of tenure until the peers in their discipline do so. The center of power for making effective changes in the system of scholarly communication lies not with the university, or with the libraries that sustain them, but in the scholarly societies which organize disciplines and faculties. Scholarly societies are the social infrastructure that maintain the feedback loop of influence in scholarly conversations. Fitzpatrick (2011) notes that both university presses and scholarly societies should be held more accountable to their memberships for making scholarship available and visible inside and outside the academy.

Commercial scholarly publishers have taken over increased control of scholarly content, and they are making inroads to take over vital technical infrastructures as well. In so doing, they hope to corner the markets for intellectual property rights over the largest corpia of publications available and also the technologies used to publish them.

Elsevier alone has taken over companies in a variety of areas vital to scholarly work, including data collection, data management, data analysis, integrated library systems and institutional repositories. Continuing down this path, a future is foreseeable in which a researcher would have to rely on Elsevier to get data, analyze data, publish the results and retrieve the article upon publication.

Pfeffer & Salancik (2003) note that boundaries in environments are where one organization has more discretion to control an activity than another. Faculty do have discretion in where they publish. Commercial publishers only have the power over the system that they have because they have been given the content for free or even charged others for providing it to them, through article processing charges. The bind for faculty is that the publication venues they require for tenure are typically tied up in a commercial system, thereby putting their own institutions, through their libraries, in a budgetary bind and propping up a commercial system that makes billions of dollars on their free labor. This problem will only ever get solved if members of scholarly societies can come together and make a change to their publishing and credential-granting practice. The social infrastructure of the system is its foundation, and its only hope for fixing the problems that currently exist in scholarly communication. The most critical part of any nationwide or global system to create, review and evaluate scholarship is already in place—the people who do the work of creating scholarship.

Rethinking permanence in enterprise information systems

New technologies have not only affected the organizational structures of academic libraries but has brought about an epistemic shift in the handling, organization, and dissemination of electronic publications, including their metadata. This shift toward networked technology has also affected library practices of collection, dissemination and preservation. Technology has created an epistemic shift in the way that information is categorized and disseminated. Algorithms control how content is discovered in search engines, and libraries are instituting new systems through which content from a variety of databases can be discovered through a single interface. Abbott (2008) notes that this practice is not far from what librarians have always done, perhaps without realizing it, through creating indexes to information; I have strengthened this argument by pointing to the cybernetic commodification of publication metrics and other markers of scholarly influence.

The long-term promise of new technology has been to offer cheaper access to information, not necessarily better or higher quality information. While cheaper delivery may have been accomplished in some industries and sectors, it is not always the case for libraries serving higher education, as a shift to licensing has increased costs for many titles and collections. Easy access is not cheap, particularly when an organization requires new kinds of staff to manage new expectations. Libraries face increasing pressure to consider their collection practices and determine whether offers like “Big Deal” packages make sensible planning decisions. Librarians also face the task of

working more closely with faculty in academic departments to determine the best ways for the whole system of collections to be rethought and made more sustainable.

Despite these challenges, libraries and librarians are probably up for these tasks, having always exhibited selectivity in their collecting behaviors. Libraries have focused on the methods of digital resourcing, but the organizational challenge now is to reframe the role of libraries in the scholarly system of production, publication, and collection of knowledge, while preserving the values of the profession. Wolf (2015) offers the useful notion of librarians as serving as social “middleware:”

It often strikes me that the librarian’s place in the scholarly communications space is that of the middleware linking together the other stakeholders. I feel as if librarians are perhaps the only stakeholders with a better than average understanding of the perspective, practices and policies of the majority of the other players in research publication. For instance, as librarians, we are often called on to explain publisher policies and funder policies to researchers, to explain publisher practices and policies to research administrators, to explain to publishers the levels of awareness of, say, open access (OA) amongst our researchers, and so on. Our role is to understand, and in some cases influence, the perspectives of the other links in the chain, while ensuring our own services help the smooth flow of information through it. In other words, it could be said that librarians are maybe at the centre of information flow (both ‘produced’ information such as articles, books, etc., and ‘workflow’ information such as

publisher policies, funder mandates, etc.), but not necessarily central to those information flows (Wolf, 2015, p.78).

Memory and recordings of history are fragile, and professionals worry that libraries might inadvertently abandon their critical traditional role as cultural and historical protectors.

On the one hand, computers are seen as the ultimate memory tool capable of providing access to everything ever written. On the other hand, the digital record is liable to manipulation, distortion or erasure. In such an environment, we cling to our libraries and our artifacts even as we dream of ever more encompassing virtual collections. How do libraries enmeshed in this mythology of computer as both threat and savior chart a rational course for the future? (Manoff, 2001, p. 379).

Charting the course requires thinking about the inherited system in a different way. In the Open Software movement, geeks, defined as affinity groups working together to maintain the social and technical infrastructures through which they work, employ technical and moral elements to operating in a recursive public—operating systems and social systems work in concert, since the infrastructure through which geeks do their work is as important as, and inextricably tied to how they discuss their activity in the system (Kelty, 2008). As scholars map new tools onto existing infrastructures, university libraries are in conflicted roles, owing in large part to their being a subsystem of the university. Universities participate in economic, political, technical, and cultural

subsystems of society and myths can mask conflicts between subsystems. As state legislatures and university administrators urge more accountability through metrics, commercial scholarly publishers are increasingly creating systems to create and measure even more metrics and selling those to universities in addition to their traditional content. I will argue that rather than looking to the library as a place of information transactions, faculty should consider the library as central to, and librarians as partners in the academic enterprise.

Although the intentions of the OA movement have been admirable, the focus on openness has prevented the movement from pulling far enough from existing commercial structures for publishing scholarly work. Commercial publishers simply adopted the language of the movement and instituted measures like article processing charges, supplementing the income they receive from subscriptions by charging authors to make content open access without then discounting subscriptions paid by libraries. Sweeney (2014) has suggested that librarians should work together with publishers to solve these problems. Another approach, however, might be to stop inviting publishers to self-regulate, because their profits margins rely on the system continuing as it currently stands. A crucial point to remember about myths is that they “sustain themselves when they are embraced by power, as when legitimate figures such as the vice-president tell them and, in doing so, keep them alive” (Mosco, 2004, p. 39). Rather than keep the myths of authority, influence and permanence alive, I will, based on the perspective outlined in the previous chapters, my experience as a librarian, and work

already being done in the OA movement, offer some recommendations for killing them off.

Recommendations

Recommendation one: The Association of Research Libraries (ARL), the Association of American Universities (AAU), the Association of Public and Land-grant Universities (APLU), and the Association of University Presses (AUP) should hold a joint meeting of their leadership to begin a conversation about how and through whom scholarly work should be published, and what changes can be made to address the various problems outlined here, keeping in mind that Oxford and Cambridge are members of AUP, and have been instrumental in lawsuits targeting libraries.

Recommendation two: Scholarly societies should take up these issues in earnest at their legislative assemblies to come to some conclusions about how work is certified within those societies and associated disciplines in order to provide discipline-specific frameworks for testing new publication and certification venues.

Recommendation three: Declare independence. Where possible, faculty on editorial boards of journals owned by commercial publishers should follow the lead of the editorial boards of library journals and others listed in the journal declarations of independence (n.d.) here and quit to reform under new journals.

Recommendation five: At the university level, faculty should bring up the problems of scholarly publishing at faculty senate meetings. At universities where librarians do not enjoy faculty status, and therefore do not have a seat at these meetings, librarians should

be invited. Full professors in particular should bring the full weight of their job security and status within the academy to help guide reform.

Recommendation six: At the university level and at department level in universities, reconsider the way in which scholarly productivity is measured. If arguments that do not rest on publication counting for the granting of tenure have not been convincing, then better arguments need to be made. If professors were evaluated based on only the 3-5 most influential or high-quality publications (or other work product), how might their publishing behavior change? If home institutions committed some amount of money to every tenure-track humanist to use for publication subventions at university presses, how might that change the system?

Recommendation seven: Rethink the relationship of universities and their libraries and presses. Many institutions are far down this road already. Most crucially, universities need to reconsider how the presses are funded. Rather than considering them as a separate unit that should be able to recover costs or even make a profit, their operation should be considered a part of doing university business.

Conclusion

What, then, is the proper place for the academic library in the 21st century research university? In a practical reframing, the library is a key partner in the overall academic enterprise and a potentially new fulcrum around which publication can pivot. A broader conversation about reforming the system of scholarly communication should include scholarly societies, university administrations, scholars, university presses, librarians, and exclude commercial players with no incentive to change business models.

Commercial publishers, with increased control over scholarly journals, are now exerting control over the infrastructures through which those journals are published and finding new methods to enhance profits through mechanisms like article processing charges. Scholarly societies once depended on libraries to subsidize their publication activity. Given that libraries now demonstrate the ability to publish journals and books, and that university presses are in many cases merging with library operations, it seems clear that scholarly societies are now well-positioned to refocus their attention back toward libraries and away from commercial publishers, which are currently taking content from scholars so they can sell it back to the universities where the scholars work, only to then sell the universities systems for measuring scholarly productivity.

Obstacles to changing this system are essentially about recognition of agency at both organizational and individual levels. Scholarly societies, having once been dependent on libraries to subsidize publication activity, have the agency to rethink their relationship with commercial publishers. Scholars have the agency to make different decisions about where they publish. When the editorial board of *The Journal of Academic Librarianship* resigned, going on to create *Portal: Libraries and the Academy* (Schwartz, 2013), they demonstrated that it is the coordination of people doing scholarly labor which has the greatest impact on creating the scholarship, and not the work of publishers. The same level of quality research people grew to expect from *The Journal of Academic Librarianship* can be found now in *Portal: Libraries and the Academy*. The research itself, its write-up, editorial production, and review of the work are all tasks which are already being performed by scholars. Principally, the mechanism for

distribution is at issue. Much like the movie, music and TV industries, the scholarly publishing industry is threatened by the new ways of distributing content. The question of new expenditures on catalog access and infrastructure hangs in the balance: either universities can continue to spend with commercial entities outside the academy or possibly reinvest in their own institutions. The latter possibility is not unthinkable, since libraries have long subsidized publication in scholarly societies, and are now providing tools for societies and universities to self-publish once again. The social parts of the process and the construction of authority, influence, and permanence exist apart from the technical processes of producing scholarship. Coordination will be critical to ensure reformed system works for all involved, because as Fitzpatrick (2011) has noted, one of the reasons that institutional repositories do not broadly have full publication abilities is that librarians never coordinated with university presses as part of their development.

Libraries are already demonstrating that they can play central role in creating a reliable system of scholarly communication that is prerequisite for a functioning twenty-first century research university, even as the current system, through coordinated efforts of commercial entities, serves to undermine their centrality. Scholarship is by nature a recursive process. In rethinking the way scholarship is created and disseminated, it is critical to understand that scholars, like geeks in the open software movement, are the central element to creating and maintaining the systems through which and by which their work happens. The social infrastructures of the academy cannot be outsourced. Advocates of OA have long been on the right track in terms of their goal to free the scholarly record from commercial forces, but the focus on *open* has not gone far enough

as a force of structural resistance in that it potentially limits discussion to *access* to content, and not the overall social and technical infrastructures through which scholarly research is created. Refocusing efforts toward the agency of researchers and librarians to enact change affords new opportunities for change, which are necessary to ensure that libraries and the universities they support have the tools they need to do their work. If we are slouching towards Alexandria, let us arrive there at its inception, not its destruction.

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