On a Mission to Scan: Visibility, Value(s), and Labor in Large-Scale Digitization

by

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Finally, I would like to respectfully and enthusiastically submit this dissertation for consideration of membership to the Society of People Interested in Boring Things (Star 2002), should such an entity come to exist again.

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BYU	Brigham Young University
CSM	Church-service Missionary
FHC	Family History Centers (LDS)
FHL	Family History Library (Salt Lake City, UT)
FS	FamilySearch organization; family history wing of the LDS Church
FSB	FamilySearch Books
FTM	Full-time Senior Missionary
GBS	Google Book Search
GSU	Genealogical Society of Utah
IA	Internet Archive
LDS	Latter-day Saints; “LDS Church” is the Church of Jesus Christ of Latter-day Saints
OCR	Optical Character Recognition
OLIB	FamilySearch library catalog

Abstract

As an often overlooked piece of internet infrastructure, print media digitization at scale is pervasive yet elusive; its output is widely accessible but its transformative processes are largely invisible. Easy access to scanned media objects thus obscures important questions about the work required for their creation.

Through two qualitative research projects on large-scale book digitization efforts—Google Books and FamilySearch Books—this dissertation investigates the labor of digitization. Using an interdisciplinary theoretical framework from science and technology studies and infrastructure studies, the research draws on the concepts of information labor and a feminist ethics of care to center and reframe digitization work. This approach animates the institutional and cultural values, labor, and information systems through which physical materials, digital conversion processes, and human workers cohere to produce large-scale digitization.

The first project reconstructs the confluence of technical and cultural values and priorities that shaped the Google Books project through an analysis of project documentation and public statements. A new term, algorithmic digitization, describes Google's commitment not only to scale and speed but to standardization, automation, and iterative improvement of scanned images. The relative inaccessibility of Google Books— a closed system with limited available documentation—serves as both context and jumping off point for the second project, which comprises the bulk of this dissertation research.

The second project is an ethnography of FamilySearch Books, a book digitization project undertaken by the genealogy organization FamilySearch (the family history wing of the Church of Jesus Christ of Latter-day Saints) and public library partners. The research layers three project perspectives: institutional participants, social and technical divisions of labor in digitization roles and tasks, and the ways that digitization workers make sense of their work. FamilySearch Books constructs scanning as "meaningful" work that "anyone"

can do; in practice, this means that the particulars of how "anyone" has been constructed shape what tasks are visible as "work." The visibility of religious service often obscures skilled work undertaken by professional librarians, even as this work is also service-oriented. This includes coordination and support work, maintenance and repair work, work to connect users to digitized output, work to manage the evolving relationship between print and digital resources, and work to care for resources, patrons, and colleagues.

The findings suggest that different configurations of work in large-scale digitization shape ideas about building, maintaining, or devaluing infrastructure. Lofty rhetoric about the democratizing power of digital access to print content overshadows the contingency, fragility, or often the proprietary characteristics of the infrastructure required to create and/or maintain this access. The dissertation foregrounds the latter so as to consider implications for long-term access provision and digital knowledge infrastructure development. By illuminating the mediating role played by workers who transform information from one medium to another, this work contributes to an emerging research literature on data, digital, or Internet labor. By expanding the definition of digitization work to include more actors and integrating an ethics of care, this research informs ongoing debates over the future of both public libraries and public librarianship.

Chapter 1 Introduction

1.1 Out of sight, out of mind

Invisible to library patrons, and even perhaps to other library staff, digitization often remains both physically and institutionally out of sight. In contrast to the maker spaces found in increasing numbers of public libraries across the country—which tend to be ground-level, window-lined, and encourage public observation of patrons using new and old technologies—digitization labs are typically hidden away within locked library corridors, in basements, windowless rooms, or what one of my interlocutors described as "anywhere with a maximum amount of exposed pipes or concrete."

There are logical reasons for this physical positioning: when digitization involves unique or valuable resources, the ability to ensure that materials will be kept safe is important. Digitization must take place in controlled lighting conditions, and overhead lights are often turned off while a scanner is in use. Scanners take up space (as do the carts of materials to be digitized), are not particularly quiet, and enter into institutions already struggling to find physical space for their collections.

One scanning technician reflects fondly on the set up in a previous position, a public library in a different part of the country. While tucked away in a corner of the library, the site offers that rare commodity in scanning environments: a window with a view. She wistfully describes the position of a window from which she and her coworkers could view a hawk's nest in a nearby tree, relating how everyone anxiously monitors the tree for the hawk's return each year. By contrast, the windowless basement scanning lab in which we sit talking—located within a "staff only" part of the library—provides no visual clues of either outside environmental conditions or the activities of patrons inside the library.

At a different public library scanning site, digitization takes place in a converted storage closet. Four scanners, several computer terminals, and the library's entire

conservation and preservation workspace have been crammed into the tiny space. Up to eight scanning workers work quietly together in there at a time. With the door to the main library floor closed, the digitization lab feels thoroughly isolated from both the main library activities and direct communication with the librarians charged with supporting the missionaries.

A part-time security guard makes daily visits to chat with scanning technicians. Similar in age (they are all senior citizens), the group have an easy banter, with the security guard providing updates as to the library goings-on and the scanning workers providing commentary. One afternoon, the security guard stops by and pronounces himself exhausted. He describes a dramatic standoff that had just taken place in the preceding hour between a woman in need of mental health medical attention and the police; an initial altercation between the woman and her mother had escalated, first to police involvement and eventually to the entire library being evacuated. Patrons had been led down side stairs, where they encountered a wall of police cars and other emergency vehicles blocking traffic on the street.

Given the security guard's casual demeanor, it was initially difficult to figure out if his story was real or imagined in order to entertain his audience. Faced with a wall of concerned and puzzled expressions, however, the security guard's demeanor changed abruptly, and his expression grew serious. He sheepishly admitted that he had forgotten about all of us in the evacuation plan. A trip out to the main floor confirmed that we had in fact entirely missed both the dramatic scene and the subsequent library evacuation while cocooned in our scanning closet.

In contrast to the scene of hidden digitization work and workers described above, the *output* of these digitization projects is visible on every corner of the Web. I routinely access digitized copies of paper checks, or copies of old health records. Family members have digitized old family photographs, which they distribute to geographically dispersed relatives. Digitization has been used by cultural heritage organizations to enable web access to work of art, newspapers, and books. The Library of Congress and the National Archives have made millions of photographs, government records, and other artifacts available on the Web through digitization. In many areas of networked American culture, this world of digitized information is as ubiquitous as the microprocessors and broadband Internet connections that enable its production, circulation, and storage.

Sandvig (2013) observes that for most users, the Internet's infrastructural invisibility is both practical—as its major material manifestations (e.g. signals, wires, or servers) are not visible to the human eye, buried, or locked away in unmarked buildings—and metaphorical. "The idea of the Internet," he argues, "is also invisible, with Web pages arriving as if by magic, relying on processes that are totally unknown and unquestioned by most Internet users."

As part of this infrastructure, digitization is similarly pervasive yet elusive; its output is widely accessible but its transformative processes largely invisible. While most digitization work is not quite as literally hidden as the scene above—which actually took place during fieldwork for this dissertation—easy access to scanned media objects obscures important questions about the processes and work required for their creation: cognitive, technical, and social. Buried deeply in this experience are the terms by which digitization projects render *some* print content visible as networked digital data. If, as Gitelman (2006) observes, digital images reflect a growing entanglement between humans and machines in the production of "the data of culture," we must better understand the nature of this relationship. This includes the values and priorities institutions bring into digitization partnerships, the ways that these values are translated into executable workflows, and the systems and labors through which digitized images are produced, circulated, and stored.

1.2 Problem statement

This dissertation research, then, emerges from the following motivating question: *what would digitization look like we centered the perspective of work?* Outlining a general approach to understanding the complexities of information circulation and infrastructures, Downey (2014) urges us to ask "who does what kind of information work, when and where and why?" In considering membership, marginality, and standardization in sociotechnical networks, Star (1990) asks, 'cui bono?' In other words, who benefits? This is a question of for whom inclusion is a benefit, but also of why and how caring for this question might facilitate thinking "otherwise."

For this dissertation, thinking otherwise involves not only opening the converted storage closet and remembering to evacuate digitization workers with the rest of library

patrons but also fundamentally reframing and expanding our understanding of digitization by starting from the perspective of work. In doing so digitization is rendered visible not as product but as a set of interconnected work processes involving many actors.

1.2.1 Surfacing digitization labor

Labor has long been noted as a major digitization expense, often straining the budgets of already under-resourced organizations. However, details of this labor and the extent to which it has the capacity to shape digitization are inadequately accounted for in digitization budgets, project plans, workflows, or write ups. Beyond its behind-the-scenes status, there are several other reasons digitization labor remains largely invisible.

Technological change is often accompanied by shifts in how, where, and by whom work gets done. Digitization technologies and processes have matured rapidly over the past 30 years, redefining the possibilities for digitization goals, outputs, and labor. For both human and non-human actors, roles and tasks change with different models of digitization; this is particularly true as the growth of the web served as a catalyst for access-driven mass digitization (Terras 2008; 2011). Large-scale digitization relies on human labor to plan, coordinate, and fill in the gaps of increasingly automated and technology-driven processes, but the *roles* that humans occupy in these systems vary widely across digitization providers.

Digitization workers may be paid contract workers or unpaid interns, full-time employees or part-time retiree volunteers, professionals with graduate level training or job training program participants. Digitization workers have widely varying skill sets and divergent understandings of the contextual or material properties of content. Their work may be characterized in job descriptions or promotional materials as skilled technical work, unskilled work, or not even work at all: for volunteers (motivated for an equally wide range of reasons), the physical, repetitive, and detail-oriented work of digitization is often characterized as a "labor of love."

All media conversion projects involve material and immaterial labors that do not easily map to specific roles or discrete tasks in a workflow. This work includes managing, coordinating, and supporting the many disparate—and connected—pieces of digitization workflows and infrastructures. Despite often being distributed across multiple people and

taking place without discussion or acknowledgement, these types of work are critical for moving digitization projects forward—particularly projects that are large scale, long term, and geographically distributed.

To locate the work of digitization, we must surface and connect multiple layers of largely invisible work and workers. For the purpose of this research, analogues to digitization labor comprise a complex mix of low-, middle-, and high-status workers. Digitization workers undertake media (re)production tasks (e.g. scribes and monks, Bartleby the scrivener, data entry clerks, typists, photocopy people, Amazon warehouse workers); repetitive, technology-mediated tasks that cannot quite be automated (e.g. human computation, social media content reviewers); interest-driven immaterial labor (e.g. crowdsourcing volunteers, non-innovative knowledge workers, consumer or game labor); maintenance labor (e.g. technicians, "data janitors," etc.); system design and improvement work (e.g. engineers, system administrators); coordination, support, and care labor (librarians, secretaries, other service-oriented roles).

In aggregate, wide variation of intertwined *roles*, *tasks*, and *types* of work involved in digitization work point our attention to the diverse cultural, geographic, institutional, and economic contexts in which digitization work takes place and gains value.

1.2.2 Goals

Focusing on two open-ended, large-scale book digitization efforts—Google Books and FamilySearch Books—this qualitative research investigates how digitization happens, under what conditions, and through what divisions of entangled machine and human labor. This approach animates the values, labor, and information systems through which physical materials, digital conversion processes, and human workers come together to produce digitization-at-scale.

I have two primary goals for this research. First, I aim to *expand what is recognized as digitization work*. I account for the work of digitization across two separate projects and from multiple perspectives. I surface the roles, tasks, and types of work present in the daily work of long-term digitization. Moving beyond simply describing previously invisible labor, I consider how various valences of visibility and value shape and affect groups of workers and types of work. As a strategy to expand and reframe definitions of what counts as

digitization work—and to highlight the lived experience of this work—I integrate care work into the frame.

Second, I consider infrastructural implications of different digitization models or strategies. A close examination of these two large-scale digitization projects reveals how they are shaped simultaneously by institutional interests and resources, human and non-human work, platforms, and multiple systems mediating access to books in multiple formats (from print intellectual property regimes to platforms and software systems). Lofty rhetoric about the democratizing power of digital access to print content overshadows the contingency, fragility, or often the proprietary characteristics of the infrastructure required to create and/or maintain this access. By constructing digitization from the perspective of work, I foreground the latter concern in order to ask questions about implications for long-term access provision and infrastructure development.

1.3 Research Questions

With the motivating questions outlined, the specific research questions encompassing the two projects described in this dissertation are as follows.

1) How do institutional motivations and priorities, labor structures, resource constraints (technical, financial, human), and information systems shape the work of digitization?
2) How is digitization work structured, organized, and coordinated over space and time? What social and technical divisions of labor are evident in digitization work?
3) How do digitization workers make sense of, and meaning in, digitization work (in paid and unpaid contexts)?

1.4 Dissertation Structure and Rationale

This dissertation is made up of two distinct research projects, each focused on understanding different aspects of a large-scale digitization project. Part 1 (Chapter 2) details Google's algorithmic approach to digitization in its Google Books project, highlighting the work delegated to computation and software. Part 2 (Chapters 3-6) is an ethnography of a different large-scale digitization project, FamilySearch Books. Chapter 3 outlines the research design and literature grounding the field research, while Chapters 4, 5, and 6 construct a multi-faceted view of digitization work in FamilySearch Books by focusing on the institutional perspective (Chapter 4), social and technical divisions of labor

in digitization roles and tasks (Chapter 5), and the ways that digitization workers make sense of different types of digitization work (Chapter 6). Layered together in the final synthesis chapter (Chapter 7), these views and contexts provide insight into several infrastructural issues surrounding book digitization and digitization work.

1.4.1 Part 1: Google Books

With its digitization of more than 20 million books, Google—supported by the web's search-centric definition of functionality—emerged as a major driver and transformer of print media digitization. Despite or even alongside its notable limitations and failure to attain its exhaustive aspirations of scanning "the world's books," Google Book Search (GBS) proved that what Rieger (2008) calls "mass access scanning" was not only technically feasible but actually executable. In its book scanning project, Google created a kind of standard object–but not by following established cultural heritage digitization standards or creating new standards. Rather, Google scanned books at such a massive scale it established a de facto standard by sheer force of volume and by leveraging the power of cutting-edge image science to develop semi-automated processes for high-speed *text* scanning. Deegan & Sutherland (2009) observe that "[f]or better or worse, Google is setting the pace and the standards, taking a broad and shallow approach to data: huge quantities of text presented with minimal added value other than searchability and some simple metadata."

Questions of viewpoint and perspective, particularly those of institutional or media-specific values, often get buried in the scale of mass digitization projects. In this research I set out to uncover the confluence of technical and cultural values and priorities that shaped Google's approach to digitization, and the ways that these factors were translated into executable workflows. The research proposes a new term, algorithmic digitization, to describe Google's commitment not only to scale and speed but to standardization, automation, and iterative improvement of scanned page images. Algorithmic digitization raises broader questions about the computational and cultural work delegated to algorithms in digitization, evident in Google's book scanning but also in other efforts to bring physical objects under the purview of the web's logic.

1.4.2 Part 2: FamilySearch Books

An ethnography of infrastructure-in-formation (Star, 1999), Part 2 focuses on a long-term, geographically-distributed book digitization project undertaken by the genealogy organization FamilySearch and its multiple partners. FamilySearch is a non-profit family history organization "dedicated to connecting families across generations;" its digitization activities are inseparable from the centrality of genealogy in its parent organization, the Church of Jesus Christ of Latter-day Saints (FamilySearch 2018). FamilySearch has been microfilming genealogy records since 1938 and began digitization activities in 1998; it reports having partnered with more than 10,000 archives worldwide to collect, preserve, and share genealogical records using a range of technologies and processes. FamilySearch has pursued its genealogy goals across many media formats, and FamilySearch Books (FSB) comprises one small piece of this project. (The size of FSB is therefore tiny compared to GBS.)

In continuity with the research described in Part 1, in Part 2 I animate—and layer—the many moving parts involved in digitization in order to underscore how institutional values and priorities, resource constraints (financial, human, material, or media-related), and labor structures mutually shape the planning and execution of digitization.

1.5 Google Books and FamilySearch: Similarities & Differences

There are several salient points of connection or overlap between GBS and FSB. Both projects are ambitious in their scope, executed in part by setting themselves up as low or no-cost digitization services. Both projects grapple with ways that existing information systems that mediate access to print books—from catalogs to copyright—shape the form that digitization takes. Somewhat separate from the goals or proclamations about access that project leaders espouse, these issues have a substantial impact on the type of access to digitized books is actually produced through the projects. Both are shaped by web-based expectations of functionality and access, namely the ability to search the full text of imaged pages through the use of OCR software. Both projects must address questions regarding long-term stewardship, ownership, and technical infrastructure for digitized objects.

In other ways, however, the two projects are very different. At a fundamental level, they deploy different strategies to build economies of scale and structure labor. The

digitizing institution in each of the projects, Google and FamilySearch, pursued and approached partnerships with book-holding institutions very differently. These two organizations maintain contrasting orientations toward content stewardship: while Google deliberately avoided calling itself a library and evaded questions of long-term content ownership, FamilySearch embraces both of these things. Finally, the two organizations understood the concept of "everything," of exhaustive digitization, in very different ways, which in turn shaped the parameters around which each organization optimized its digitization workflows.

Parts 1 and 2 are not meant to be comparative studies; beyond the differences noted above, the research methods and goals for each are also quite different. The Google Books project provides a provocative case study that raises issues of importance to the broader landscape of cultural heritage digitization, but it proved to be problematic from the viewpoint of research access. The opacity of Google's processes—its proprietary protection of details of both the work and workers involved in its project—limits what can be known about how Google Books was planned and executed. Further, in its algorithmic approach to digitization Google delegated much of the heavy-lifting work-wise to software and computation processes, leaving human labor at the margins of the project. This combined set of limitations and constraints created the impetus for the project described in Part 2.

1.6 Theoretical Framework

I have constructed an interdisciplinary theoretical framework that draws from science and technology studies (STS) and infrastructure studies. With this foundation, this research takes a layered understanding of how sociotechnical systems develop over time. Emphasizing situated configurations and interactions rather than isolated actors, this research bridges multiple scales of analysis to rematerialize the technologies, bodies, and systems that produce and circulate digitized information (Edwards 2003). For this project, that involves attending to workers' experiences at the micro-level as well as the connections their daily experiences have with larger aggregations such as workflows, projects, institutions, and infrastructure.

Infrastructures shape and distribute knowledge, values, and objects; they materialize ideas and bodies, and make mundane and taken-for-granted actions possible.

Edwards et al. (2007) point out that "the long now" of cyberinfrastructure reaches back 200 years, to the slow development of an information infrastructure to support changes in the organization of knowledge.

Infrastructures are not neutral: they are designed to include some people or groups—for whom an infrastructure may operate seamlessly and largely invisibly until it breaks downand exclude others (Star and Ruhleder 1996). At every stage of development infrastructure is a contested and unevenly distributed process, with interwoven social and technical components (Edwards et al. 2007). Organizational arrangements—including professional practices, the development of standards, and institutional bodies—can variously make possible, impede, facilitate, and be impacted by the development of technology.

Infrastructure studies is used in this dissertation as an analytical lens as well as a research method (Star and Ruhleder 1996; Star 1999; Bowker 1994; Star and Bowker 2010; Sandvig 2013). Bowker's (1994) concept of "infrastructural inversion"—in figure/ground reversal in which infrastructure itself becomes the object of study—is useful here, as is Star's (1999) call for ethnography as a strategy by which "to understand this imbrication of infrastructure and human organization" in infrastructure. Emphasizing the contingent, relational quality of infrastructure allows us to examine the values, design, negotiation, collaboration, labor, and accidents of infrastructure formation from multiple perspectives (Star and Ruhleder 1996; Star 1999; Star and Bowker 1999; Mattern 2014).

The relationality of infrastructure is an important concept for infrastructure studies. To surface how this relationality works, Star (2002) argues that more attention should be paid to what is happening in infrastructural moments of controversy, formalization, or group formation. These are work practices where boundaries are often drawn, places to attend to presences and absences or to voices being heard or silenced. In this research, this relationality appears in several different ways. Different institutional actors position digitization to solve different problems or serve different ends. At times, these digitization goals align, while at others they are at odds. Decisions made about how to translate these goals into workflows have consequences for digitization participants—and future users. A similar situation occurs with how labor is structured in digitization projects. In Part 2 of this dissertation, I describe how FamilySearch has constructed book digitization as a job

"anyone" can do in order to leverage available volunteer labor. This decision has short-term consequences for what work is visible (to project participants as well as the public at large), as well as long-term consequences for building and maintain infrastructure to support digital access to books. Using a relational approach enables us to examine what relationships stabilize, strengthen, and reproduce themselves over time—and which ones do not.

Finally, my approach here also responds to Haraway's call for a "materialist informatics" that disrupts neat divisions between production and consumption in favor of viewpoints generated from coordinating mechanisms such as infrastructure, standards, or gendered and raced divisions of labor (Nakamura 2003). Haraway argues that, in a given situation, the following questions must be asked:

> what kind of relationality is going on here and for whom? What sort of humanity is being made here in this relationship with artifacts, with each other, with animals, with institutions? How do you move out of the universalist category to the situatedness of the actors, both the human and nonhuman actors? So neither human nor machine should be theorized in these universalist ways; but rather, which kinds of humanness and machineness are produced out of those sorts of material-semiotic relationships? In thinking about information worlds, or cyborg worlds, insofar as the cyborg world is a figure for information worlds, I want to know what are the specific material circumstances for the designers, the makers, the users, the marketers, the dreamers, the performers, the musicians, the public culture, the occupational health people. Who is where in these worlds, and where are the human and nonhuman actors, and what does their relationship say about world building?

By constructing a notion of the cyborg as worker (complementing Poster's (2002) "Workers as Cyborgs"), Haraway insists on bringing together a wide range of people, work processes, and governance structures that make a given system possible. This ranges from programmers and web surfers to chip factory and computational microworkers–and, importantly, the nonhuman agents with which they do their jobs.

1.7 Significance and Contribution

Given the recursive relationship between media content and the processes used to convert media from one form to another, conditions of production may—or *should*—shape the use of digitized surrogates. In establishing digitization as an important site of both digital labor *and* digitized cultural production, this research contributes to a growing, interdisciplinary body of critical research which explores how the technical and cultural logics of digitization—crystallized within workflows, formats, platforms, and interfaces—shape digitized media and culture more generally.

This dissertation research also contributes to historical and contemporary understandings of information labor through its elaboration of a largely invisible piece of labor relevant to understanding the work that produces and sustains content production, distribution, and use on the web. By expanding the definition of digitization work to include more actors and integrating an ethics of care into this definition, this research can contribute to future studies on data, digital, or Internet labor. This expanded, enhanced definition of digitization is of particular use for illuminating the mediating role played by workers responsible for moving—and transforming—information from one medium to another. Supplementing current understandings of cultural heritage digitization—which are often project- or output-focused examinations—this dissertation project provides a nuanced understanding of the multiple human and non-human actors shaping collaborative digitization efforts.

As more cultural heritage institutions choose partnership, third-party, or crowdsourced strategies to produce or add value to their digital collections, the expansive accounting of digitization labor provided in this dissertation research may provide helpful insight into expectations of resource expenditures (human or technical).

1.8 Limitations

This research shares the limitations that attend all qualitative, interpretivist social science research. By design, this research does not aspire to provide a comprehensive or even high-level view of the phenomenon under study, and it does not collect or analyze the types of data that would allow its findings to be generalizable (Miles and Huberman 1994).

In the ethnographic portion of this work (Part 2), the subjectivity and positionality of the researcher has been recognized and accounted for in the research itself. While this thorough accounting may be considered a particular strength of ethnographic methods, it is mentioned here because these features also underscore the method's lack of generalizability. The research is instead concerned with developing a situated understanding of the work of digitization from the perspectives of those actually executing it. As a study of a long-term, distributed digitization project, it is limited institutionally to the perspectives of a single service provider and several relatively homogenous collecting institutions.

By design, neither of the two research projects within this dissertation aspires to a totalizing picture of digitization; each animates some actors and elements and leaves out others. Content and users/patrons are two major perspectives that appear throughout both projects but are not a focus in either one. In Part 2 patrons are an important but invisible group, as their expectations, interests, and skills co-construct today's genealogy domain alongside libraries and commercial vendors. As caretakers of family memories, genealogists undertake work relevant to any nuanced understanding of digitization. Nonetheless, this was not a study of users and they are not present in the narrative to speak for themselves.

In choosing an infrastructural lens for this research, I have aligned it with science and technology studies and studies of invisible and information labor. In doing so I have necessarily left out other views of digitization that could inform the landscape of book digitization. These include concepts and framings salient within media studies, communications studies, or from the libraries and archives/cultural heritage digitization research community.

Chapter 2 Producing "One Vast Index": Google Book Search as an Algorithmic System

2.1 Introduction

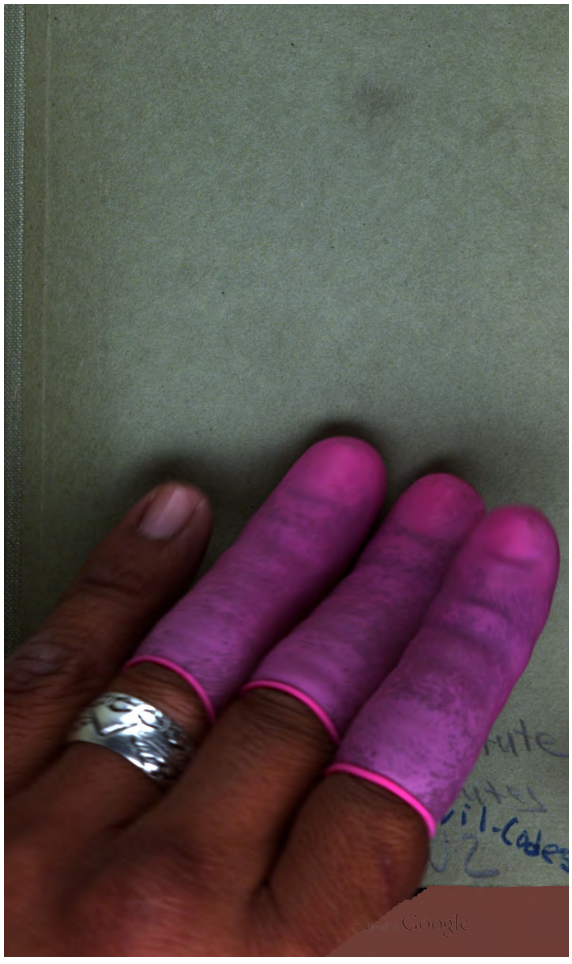

Figure 2-1 Hands scanned by Google (New York, 1862)

Reading a public domain book on the Google Books website is a mundane encounter with text on a screen. In the midst of this experience, the appearance of a hand presents an unsettling disruption (Figure 2-1). Positioned within the front matter of the Code of

Procedure of the State of New York *(1862)*, *bright pink rubbers cover three fingers. The hand bears a thick silver ring and matching pink nail polish. The thumb has been partially erased, appearing as a brown, pixelated stripe. The words "Digitized by Google" have been digitally tattooed on the hand's skin.*

Momentarily pulling back the curtain on Google's digitization processes, the hand's presence draws attention both to the book's print origins and to the human and machine labor required to transport (and transform) it from library shelf to laptop screen. This hand belongs to a contract worker hired by Google to turn the pages of more than 20 million books digitally imaged through the Google Book Search Project since 2004. These fingers, skin, nails, and rings appear as visible traces of ongoing processes designed to obviate—and subsequently to erase—human intervention. The dream of automation persists, even as the materials resist.

The hand's ghostly presence also highlights the opacity surrounding Google's undertaking, a disjuncture between the company's techno-utopian public rhetoric and the paucity of public access it provided to the technical specifics of digital conversion. Envisioning a far-reaching public impact, Google CEO Eric Schmidt (2005) described the project's goals: "Imagine the cultural impact of putting tens of millions of previously inaccessible volumes into one vast index, every word of which is searchable by anyone, rich and poor, urban and rural, First World and Third, *en toute langue* -- and all, of course, entirely for free." Yet the actual digitization proceeded under a cloud of secrecy, leaving analysts such as ourselves to glean traces of the project's values and processes from public statements, contracts, project webpages, blog posts, presentations, and patent applications — and sometimes from the margins of the page images themselves.

Existing research has investigated many aspects of Google Book Search (hereafter GBS), including its goals, its outputs, and its intellectual property frameworks (Samuelson 2009). Scholars have considered GBS in the context of the corporate monopolization of cultural heritage (Vaidhyanathan 2012), the history and future of the book as a physical medium (Darnton 2009), and the place of digitized books in knowledge infrastructures such as libraries (Jones 2014; Murrell 2010). Leetaru (2008) provides a rare analysis of GBS analog-digital conversion processes, while Google employees Vincent (2007) and

Langley and Bloomberg (2007) have presented elements of Google's technical workflows to specialized technical research communities.

Here we take a new tack, arguing that Google's approach to digitization was shaped by a confluence of technical and cultural factors that must be understood together. These include Google's corporate commitment to the scalable logic of web search; partner selection parameters; the lingering influence of print intellectual property regimes; and the requirements of Google's highly standardized "mass digitization" processes (Coyle 2006). This article proposes an alternative descriptor, *algorithmic digitization*, intended to highlight how the algorithms Google uses to scale and automate digitization intertwine with the production logic that governs GBS planning and execution.

Understanding GBS as an algorithmic system foregrounds Google's commitment to scale, standardized processes, automation, and iterative improvement (Gillespie 2016). These features must also be understood as negotiated translations of varied project, partner, and corporate goals into executable workflows. We first examine how algorithms shape and structure the work of digitization in GBS, and consider the effects of algorithmic processing on digitized books accessible to users. We then explore the implications of Google's embrace of an algorithmic solution to the multiple technical, material, and legal challenges posed by GBS. Beyond simply scaling up existing book digitization, Google's algorithmic digitization effort has had the effect of *reimagining* what the intended outcome of such a project should be – with important implications for mediating digital access to print books.

2.2 Books as data: digital hammer seeks digital nails

Google's corporate mission, "to organize the world's information and make it universally accessible and useful," has remained effectively unchanged since its first appearance on the company's website in late 1999 (Google, Inc. 1999). At the time, it referred chiefly to web search, Google's core business. In December 2004, Google announced an extension to that mission: a massive book digitization project in partnership with five elite research libraries. The original five libraries were Harvard, Stanford, the University of Michigan, New York Public Library, and the Bodleian Library at Oxford University. Since then Google has worked with over 40 library partners to scan over 20

million books, producing billions of pages of searchable text. In 2012, without any formal announcement, Google quietly began to scale back the project, falling short of its aspirations to scan "everything" (Howard 2012). While it seems unlikely that Google will stop digitizing books completely or jettison its digitized corpus anytime soon, the project's future is currently unknown.

To Google, converting print books into electronically searchable data was GBS's entire *raison d'être*. Therefore, Google constructed digitization as a step parallel to the web crawling that enabled web search. In contracts with library partners, Google defined digitization as "to convert content from a tangible, analog form into a digital representation of that content" (University of Michigan and Google, Inc. 2005). In practice, this conversion produced a digital surrogate in which multiple representations of a print book exist simultaneously. Each digitized book is comprised of a series of page images, a file containing the book's text, and associated metadata. Layered to produce multiple types of human and machine access—page images, full-text search, and pointers to physical copies held by libraries—each of these elements was produced by separate, yet related, processes.

2.2.1 Integrating human values—and labor—into algorithmic systems

As with many Google endeavors, the company re-engineered familiar processes at new levels of technological sophistication. From that perspective, Google's primary innovation on libraries' hand-crafted "boutique" digitization models (which pair careful content selection with preservation-quality scanning) was to approach book digitization as it would any other large-scale data management project: as a challenge of scale, rather than kind. Susan Wojcicki, a product manager for the project, contextualized Google's approach bluntly: "At Google we're good at doing things at scale" (Roush 2005). In other words, Google turned book digitization into an algorithmic process. Scaled-up scanning required a work process centered in and around algorithms.

Algorithms are complex sequences of instructions expressed in computer code, flowcharts, decision trees, or other structured representations. From Facebook to Google and Amazon, algorithms increasingly shape how we seek information, what information we find, and how we use it. Because algorithms are typically designed to operate with little oversight or intervention, the substantial human labor involved in their creation and

deployment remain obscured. Algorithmic invisibility easily slides into a presumed neutrality, and they remain outside users' direct control as they undergo iterative improvement and refinement. Finally, the vast complexity of many algorithms—especially interacting systems of algorithms—can render their behavior impossible for even their designers to predict or understand.

Embedded in systems, algorithms have the power to reconfigure work, life, and even physical spaces (Gillespie 2016; Golumbia 2009; Striphas 2015). Seaver (2013) calls for reframing the questions we ask about algorithmic systems, moving away from conceiving of algorithms as technical objects with cultural consequences and toward the question of "how algorithmic systems define and produce distinctions and relations between technology and culture" in specific settings. Studying algorithmic systems empirically may thus bring together several elements: the technical details of algorithm function; the imbrication of humans (designers, production assistants, users) and human values in algorithmic systems; and the multiple contexts in which algorithms are developed and deployed.

Like many contemporary digital systems, GBS integrated humans as light industrial labor, necessary if inefficient elements of an incompletely automated process. Human labor in GBS was almost entirely physical, heavily routinized, and kept largely out of sight; human expertise resides outside rather than inside Google's system. Partner library employees pulled books from shelves onto carts destined for a Google-managed off-site scanning facility (Palmer 2005). There, contract workers turned pages positioned under cameras, feeding high-speed image processing workflows around the clock (University of Michigan and Google, Inc. 2005). Directly supervised by the machines they were hired to operate, scanning workers were required to sign non-disclosure agreements but afforded none of the perks of being a Google employee beyond the walls of a private scanning facility (Norman Wilson 2009). For the time being, at least, human labor in book digitization remains necessary largely because of the material fragility, inconsistency, and variety of print books.

2.2.2 Preparing to digitize: Partnerships, goal alignment, selection

Mass digitization initiatives are often characterized as operating without a selection principle: "everything" must be digitized (Coyle 2006). In practice, however, partnerships, scaling requirements, intellectual property regimes designed for print, and the particulars of books' material characteristics all challenged Google's universal scanning aspirations.

At the turn of the 21st century, Lynch (2002) observed that cultural heritage institutions mostly understood the *hows* of digitization, even at moderately large scale. The main challenge, he argued, was to optimize processes. Lesk (2003) described the challenges of scale and efficiency more succinctly: "we need the Henry Ford of digitization," i.e., an institution willing to invest vast resources in "digitization on an industrial scale" (Milne 2008). Google stepped forward to assume this role. While not the first, GBS was the biggest and most controversial of several large cultural heritage digitization projects undertaken by entities such as Yahoo, Microsoft, Google, and the Internet Archive in the early 2000s (St. Clair 2008).

Google courted partners to provide content by incurring nearly all costs of scanning, while carefully avoiding the repository-oriented responsibilities of a library. Each partner library brought its own goals and motivations into the project. The New York Public Library (2004) observed that "without Google's assistance, the cost of digitizing our books — in both time and dollars — would be prohibitive." Other partners spoke of leveraging Google's technical expertise and innovation to inform future institutional digitization efforts (Carr 2005; Palmer 2005). Libraries employed different selection criteria, from committing to digitize all holdings (e.g. University of Michigan) to selecting only public domain holdings (e.g. Oxford, NYPL) or special collections (later partners). Most digitization contracts remained private, adding to the secrecy surrounding Google's efforts.

Full-text search quickly emerged as a kind of lowest-common-denominator primary functionality for the project. Using the Internet Archive's Wayback Machine, we can see how Google incrementally modified language relating to the project's goals and mechanisms throughout its first year (Google, Inc. 2004a). The answer to the question "What is the Library Project" evolved from an effort to transport media online (December 2004) to a pledge to make "offline information searchable" (May 2005) to a more ambiguous plan to "include [libraries'] collections… and, *like a card catalog,* show users

information about the book plus a few snippets – a few sentences of their search term in context" (November 2005, emphasis added).

The purpose behind these changes became clear in Fall 2005, as the Authors Guild and the Association of American Publishers filed lawsuits alleging copyright infringement (Band 2009). The Association of American Publishers lawsuit was settled privately in 2011, while in 2015 the Second Circuit Court of Appeals upheld a 2013 lower court judgment rejecting the Authors Guild's copyright infringement claims and affirming Google's scanning as transformative and therefore "fair use." Google argued that by creating a "comprehensive, searchable, virtual card catalog of all books in all languages," it provided *pointers* to book content rather than *access* to copyright-protected books. The company maintained that scanning-enabled indexing constituted "fair use" under the U.S. Copyright Act (E. Schmidt 2005; US Copyright Office 2016). In November 2005, the project's name changed from Google Print to Google Book Search, reorienting users' frame of reference from the world of paper to the world of the electronic web (Grant 2005). The change attempted to correct any misperceptions that Google intended to enable access to *user-printed copies* of books, and to de-emphasize the idea that the project was in the business of copying or of content ownership.

Since December 2004, GBS has provided full access for public domain books. Google consistently downplayed this capability, maintaining that like a bookstore "with a Google twist," readers would use it mainly to *discover* books rather than to actually read them (Google, Inc. 2004b) . Yet partners scanning public domain books often referenced online reading as a benefit. This ambiguity perhaps contributed to copyright-related concerns—and misunderstandings—during GBS's early days (Carr 2005; New York Public Library 2004).

2.2.3 A means to an end: Image capture

Once it took custody of partner library books, Google deployed its own selection criteria. In a (rare) concession to the library partners tasked with storing and preserving paper materials, Google used a non-destructive scanning technique. In patents filed in 2003 and 2004, Google provided descriptions of several high-resolution image capture systems designed around the logistical challenges posed by bound documents. While patents

provide only generic system descriptions, they provide sufficient detail for high-level reverse engineering of Google's processes. Journalists' accounts and output-oriented research provide anecdotal verification (Clements 2009; Shankland 2009). The thicker the binding, for example, the less likely a book is to lie flat. In flatbed or overhead scanners, page curvature creates skewed or distorted scanned images. Book cradles or glass platens can flatten page surfaces, but these labor-intensive tools slow down scanning and can damage book spines. Google addressed this page curvature problem computationally, through a combination of 3D imaging and downstream image processing algorithms. That decision shaped and complicated Google's workflow.

In the patent schematic shown in Figure 2-2, two cameras (305, 310) are positioned to capture two-dimensional images of opposing pages of a bound book (301). Simultaneously, an infrared (IR) projector (325) superimposes a pattern on the book's surface, enabling an IR stereoscopic camera (315) to generate a three-dimensional map of each page (Lefevere and Saric 2009). Using a dewarping algorithm, Google can subsequently detect page curvature in these 3D page maps and correct by straightening and stretching text (Lefevere and Saric 2008).

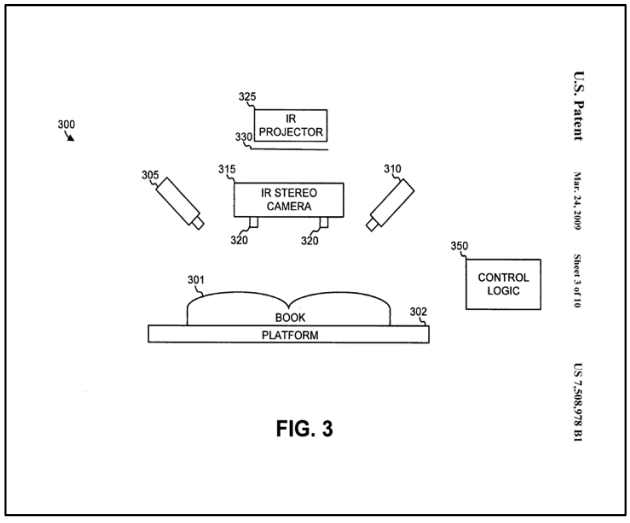

Figure 2-2 System for optically scanning documents (Lefevre and Saric, 2009)

Scanning produces bitmapped images that represent the pages of a print book as a grid of pixels for online viewing. Unlike text, this imaged content cannot be searched and

remains "opaque to the algorithmic eyes of the machine" (Kirschenbaum 2003). As a next step after scanning, Google might have adopted existing library-based preservation best practices for imaged content. Or it could have created new standards around 3D book imaging (Langley and Bloomberg 2007; Leetaru 2008). Instead, Google chose to transform the raw 3D page maps described above—rich in information, but unwieldy for end users due to file size and format—into "clean and small images for efficient web serving" (Vincent 2007).

2.2.4 Producing a machine-readable index: Image processing

For GBS, then, imaging ultimately represented a key yet preliminary step toward text-searchable books on the web. The project's image processing workflows thus acquired a dual imperative. It had to produce both (a) two-dimensional page images for web delivery, and (b) machine-readable—and therefore searchable—text. "[O]ur general approach here has been to just get the books scanned, because until they are digitized and OCR is done, you aren't even in the game," Google Books engineering director James Crawford observed in 2010 (Madrigal 2010). The "game" here, of course, is search. In a web search engine, crawled page content and metadata are parsed and stored in an index, a list of words accompanied by their locations. Indexing quickly became the key mechanism (and metaphor) through which Google sought to unlock the content of books for web search.

To produce its full-text index, Google converted page images to text using optical character recognition (OCR). OCR software uses pattern recognition to identify alphanumeric characters on scanned page images and encode them as machine-readable characters. Originally used to automate processing of highly standardized business documents such as bank checks, over the past 60 years OCR has become integral to organizing and accessing digital information previously stored in analog form (Holihan 2006; Schantz 1982). Through OCR, imaged documents gain new functionality, as text may be searched, aggregated, mined for patterns, or converted to audio formats for visually impaired users.

Tanner et al. (2009) argue that by providing search functionality for large digitized corpora at low cost, automated OCR systems have been a key driver of large-scale text digitization. GBS leveraged decades of computing research related to OCR. Through the

1990s, boutique library digitization efforts had addressed the question of quality mainly by establishing *image-centric* digitization standards (e.g. scanner specifications and calibration, test targets, resolution) (Baird 2003). Rooted in libraries' traditions of ensuring long-term *visual* access to materials through re-formatting (e.g. copying, microfilming), these practices relied on labor-intensive visual inspection for quality control. By contrast, pattern recognition research developed systems for algorithmically assessing quality, measured by accurate recognition of printed characters and document structure (Le Bourgeois et al. 2004; Lin 2006).

Google adopted this framing of digitization as a text extraction challenge, optimizing its processes to produce the clean, high-contrast page images necessary for accurate OCR. The GBS processing pipeline relied heavily on OCR to automate not only image processing and quality control, but also volume-level metadata extraction. Google's Vincent (2007) described the digitized corpus as algorithmic "document understanding and analysis on a massive scale."

2.3 Books bite back: Bookness as bug, not feature

In their commitment to scale and standardized procedure, algorithmic systems often prioritize system requirements over the needs of individual inputs (e.g. books) or users. Google's search engine, for example, has come under criticism for failing to prioritize authoritative or accurate search results. In December 2016, the *Guardian* reported that a Google query on "Did the Holocaust happen?" returned a Holocaust denial website as the first result. A Google spokesperson maintained that "[w]hile it might seem tempting to fix the results of an individual query by hand, that approach does not scale to the many different variants of that query and the queries that we have not yet seen. So we prefer to take a *scalable algorithmic approach* to fix problems, rather than removing these one by one" (Cadwalladr 2016). Google's acknowledgement here of the tradeoffs it faces between scale and granularity highlights questions of algorithmic accountability (Pasquale 2015).

Google's system also exposes tensions between the standardization required to scale digitization processes and the flexibility needed to accommodate the diverse output of print publication history. It is perhaps no surprise that books, unlike business

documents created to meet OCR requirements, persistently resisted the structure imposed on them by Google's homogenizing processes.

Bound books evolved over centuries from earlier writing formats such as scrolls and codices. But in Google's conversion system, the hard-won features of bound books — the very things that made them convenient, efficient, and durable media for so long — were treated as bugs rather than features. Google routinely excluded materials from scanning due to size or condition. These included very large or small books as well as books with tight bindings, tipped-in photographs and illustrations, fold-out maps, or un-cataloged material (Coyle 2006). Very old, brittle, or otherwise fragile books were also excluded (Ceynowa 2009; Milne 2008). Many of the rejected books remain un-digitized, while others have joined lengthy queues within libraries' ongoing internal digitization programs.

As a sampling process in which some, but not all, features of an analog signal are chosen for digital capture and representation, digitization is always accompanied by both information loss and information gain (Terras 2008). In GBS, lost information includes the physical size, weight, or structure of a volume; the texture and color of its pages; and the sensory experience of navigating its contents. Non-textual book features such as illustrations, as well as marginalia and other evidence of print books' physical histories of use, are often distorted or auto-cropped out of Google's screen-based representations. As for information gain, image capture and processing embed traces of the digitization process into digitized objects.

The quality of Google's digitization output has been systematically evaluated through empirical research, and widely critiqued in informal venues such as blogs. While useful in characterizing quality concerns in the digitized corpus, this work generally does not consider how and why digitization processes shape outputs. The following examples illustrate commonly identified problems, but they also extend existing analyses by emphasizing the role of algorithms in concretizing relationships among system inputs, conversion processes, and outputs. These types of problems remain endemic in the GBS corpus not because they are unsolvable, but rather because they have been accepted as tradeoffs. Their solutions do not fit easily into Google's priorities and workflows, even as their persistence challenges efforts to automate quality assurance processes.

2.3.1 Visual content

Output-based evaluations of large-scale book digitization have found that except when catastrophic (rare), most text-oriented page scanning or image processing errors result in thin, thick, blurry, or skewed text that may frustrate or annoy readers but does not render them entirely unreadable (Conway 2013; James 2010) . Objects such as fingers or clamps also appear commonly in scans, but often do not obstruct text significantly.

In Figure 2-3, the very tiny book *Mother Goose's Melody* has been housed in a binder to prevent it from being lost on a library shelf. While the library-created *cover* fits Google's selection criteria and has provided a frame size for image capture, several material elements usually cropped out of Google-digitized page images have crept into the frame due to the size mismatch between the cover and the actual book. These include a call slip and university label, metal book-securing clamps, and the page-turner's hands. When extra-textual features are detected and removed algorithmically – without the help of a human eye – they often leave new artifacts behind. We see some of these less familiar traces here: the stretched appearance of book pages caused by the dewarping algorithm, and the finger incompletely removed by another algorithm. Further, the system has evidently misrecognized some aging yellow tape as a color illustration, causing most of the page images throughout the right side of the book to be rendered in color. While this book is an example of a relatively rare "bad book" (Conway 2013), it aggregates many of the visual quality issues that pervade Google's digitized corpus.

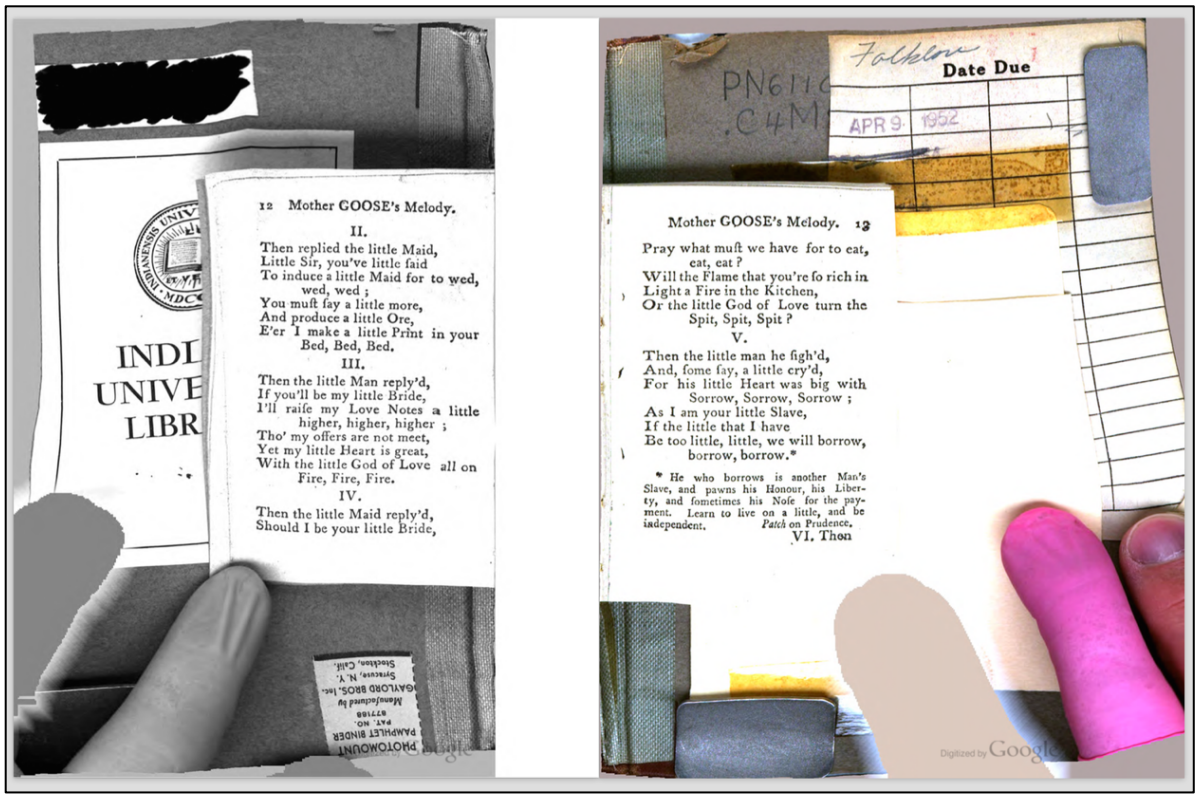

Figure 2-3 Imaging a tiny book (Thomas & Shakespeare, 1945)

Other material characteristics challenge image processing. These include ornate, unusual, or old fonts; non-Roman characters/scripts; and rice paper, glossy paper, glassine, and tissue paper (Conway 2013; Weiss and James 2015). Non-textual content such as illustrations (e.g. woodcuts, engravings, etchings, photographic reproductions, and halftones) also often fare poorly. Halftone reproductions, for example, have been widely used since the 1880s to cheaply reproduce graphic content for print. Placing a screen over an image and dividing it into squares, variably sized and regularly spaced ink dots are used to create the image; the human eye fills in the gaps created by sampling and perceives the image as a continuous tone. Computerized scanning similarly creates a digital image by sampling the dots at regular intervals, but from a different angle; as the two grids meet, this misalignment leaves visual artifacts on the digitized image.

In Figure 2-4, the grid misalignment has created a psychedelic blue and orange sky, which appears to fascinate the astronomer Hipparchus (Giberne 1908). These moiré patterns appear throughout the image, along with color aliasing, from wavy striations in the sky and floor to geometric patterns on building columns. Color aliasing occurs when the

spatial frequency of the original image is sampled at a rate inadequate to capture all its details. Like moiré, it is a common phenomenon among Google-digitized books that contain engravings or etchings.

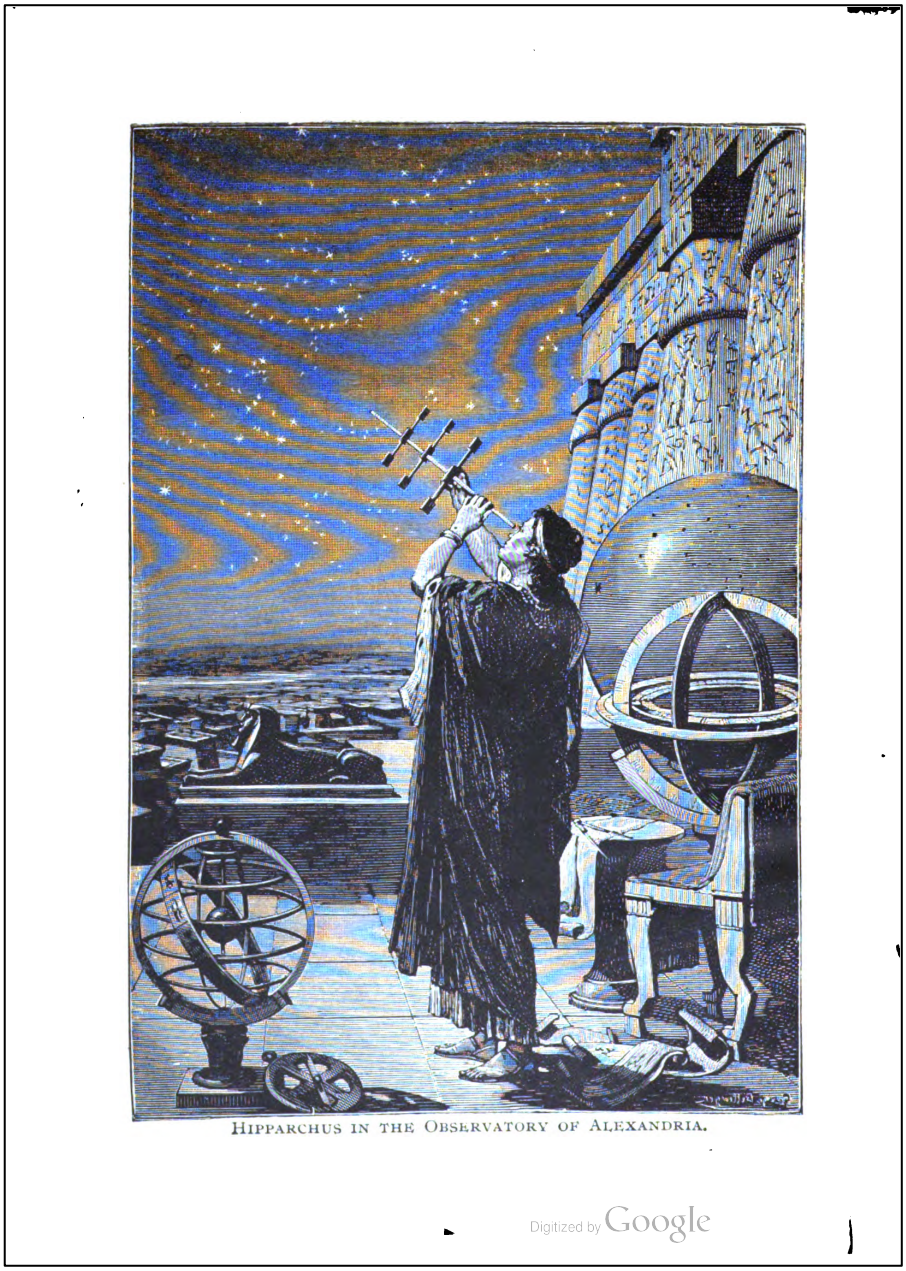

Figure 2-4 Moire and color aliasing (Giberne, 1908)

While the problem of digitization and moiré has been discussed since at least the 1970s, and corrective measures have been identified (Huang 1974), no fully automated solution appears to have emerged. In 1996, the Library of Congress acknowledged that moiré mitigation strategies remained unsuitable for production-scale environments

(Fleischhauer, 1996). This type of error is predictable, yet intractable, in large-scale book digitization. It is ironic that halftone screening — a technique that facilitated the mass reproduction of photographs for print books and newspapers — became a significant challenge to mass print digitization.

Google's automated image processing also often misrecognized features of print books. Initially captured in full color, raw bitmapped images were then processed down to bitonal images for textual content or 8-bit grayscale for illustrated content (University of Michigan Library 2005). Figure 2-5 shows a page of text rendered as a grayscale illustration. The thinness of the original rice-paper volume allowed content from adjoining pages to bleed through during scanning. This, combined with the nuanced shading of Chinese characters, caused the system to miscategorize the page (Zhang and Kangxi Emperor of China 1882).

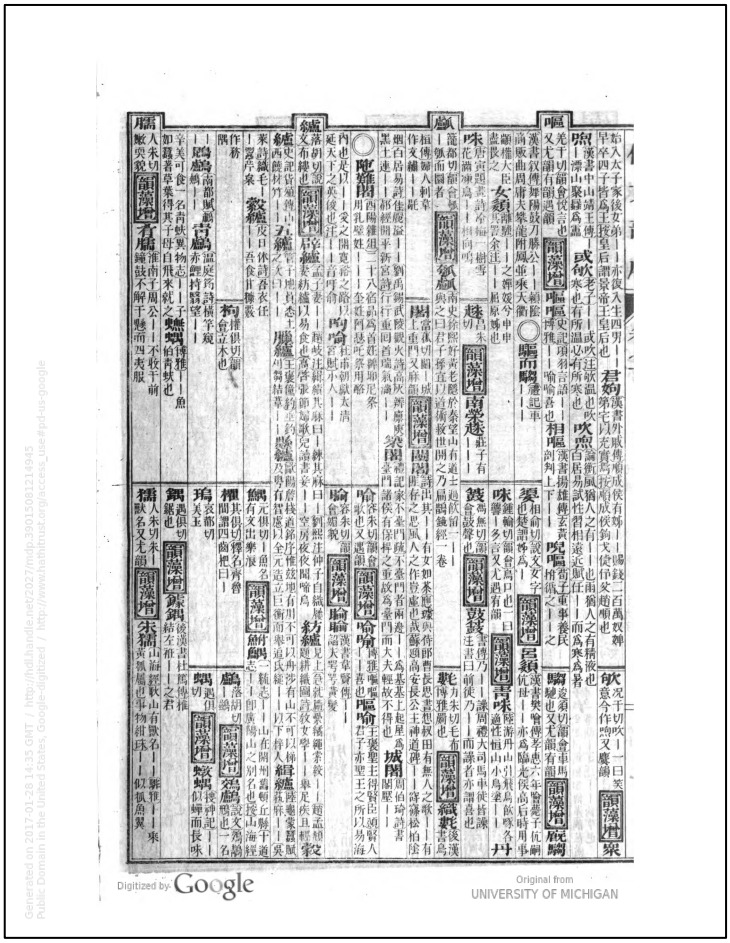

Figure 2-5 Grayscale rendering, Chinese text on rice paper (Zhang & Kangxi, 1882)

On the other hand, the same Chinese text often fared poorly when rendered as a bitonal image within the GBS digitization model. Binarization converts a raw color digital image into a bitonal image by using an automatically determined threshold to differentiate foreground and background. This technique reduces the amount of data contained in full-color scans, thereby speeding up OCR processing and downstream image distribution (Holley 2009; Vincent 2007). However, Google's threshold settings often have the effect of darkening, lightening, or erasing nuance from rendered characters. Figure 2-6, from the same book as the preceding example, illustrates the consequences of automated binarization for calligraphy pen detail.

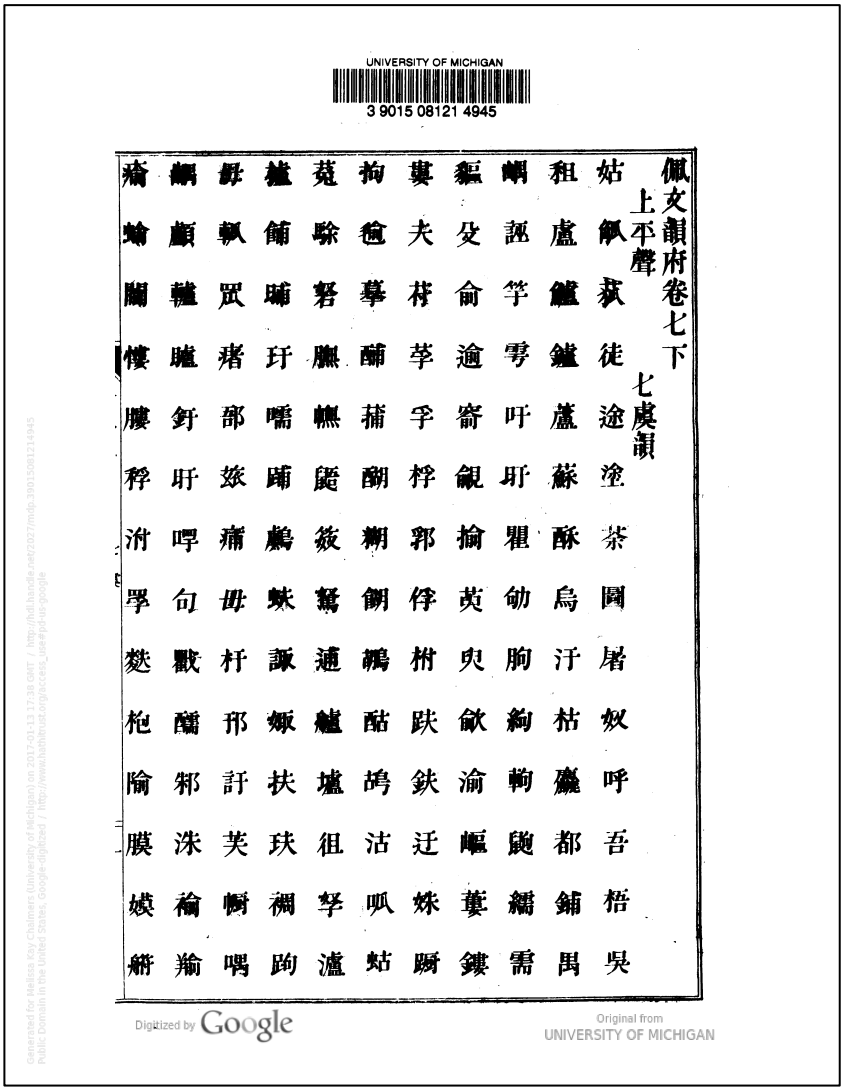

Figure 2-6 Bitonal rendering of Chinese text on rice paper (Zhang & Kangxi, 1882)

This problem is avoided by interleaving blank pages to block adjoining page noise, but to do so routinely would slow the scanning process considerably. Further, without specialized language skills, the original book in hand, or time for careful examination, it can be very difficult to recognize the nature or extent of information loss in a digitized page image. In a related example, Google's standard protocol — scanning books front-to-back and left-to-right — often caused books with vertical or right-to-left writing formats to be delivered backwards or upside down (Weiss and James 2015).

2.3.2 Textual content

Optimizing workflows for OCR does not in itself assure high quality character recognition. Consistent with Google's brute-force approach, corpus indexing (and keyword search) were built upon software-generated, uncorrected OCR. Research evaluating OCR in large-scale text digitization reveals widespread accuracy and reliability problems; as with imaging, OCR accuracy is challenged by print material features such as age and condition, printing flaws, rare fonts, textual annotations, and non-text symbols (Holley 2009; Tanner, Muñoz, and Ros 2009). OCR also suffers in the presence of imaging quality issues such as page skew, low resolution, bleed through, and insufficient contrast.

Recall the page images of *Mother Goose's Melody* in Figure 2-3 above. Surrounded by visual artifacts of the digitization process, the text—a maxim about the value (and challenge) of independence—appears generally readable. However, the OCR provided for the page (Figure 2-7), reveals numerous problems, from missing words to problems caused by the long s's in the original text.

Page 13

Mother GOOSE's Melody. Pray what mull we have for to eat, eat, eat? Will the Flame that you're fo rich in. Light a Fire in the Kitchen, Or the little God of Love turn the Spit, Spit, Spit? V. Then the little man he figh'd, And, fome fay, a little cry'd, For his little Heart was big with Sorrow, Sorrow, Sorrow; As I am your little Slave, If the little that I have Be too little, little, we will borrow, borrow, borrow.* * He who borrows is another Slave, and pawns his Honour, his Man's Liber- ty, and fometimes his Nofe for the pay- ment. Learn to Uve on a little, and be independent. Patch on Prudence. VI. Then

Figure 2-7 OCR produced from page images of Mother Goose's Melody (Thomas & Shakespeare, 1945)

Human OCR correction, traditionally completed by professionals double-keying texts, is considered the accuracy gold standard but is cost-prohibitive at scale (Tanner, Muñoz, and Ros 2009). In 2009, Google acquired reCAPTCHA, owner of the web security technology CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart) (von Ahn and Cathcart 2009). This technology, in widespread use since 2006, asks users to examine digitized images of words OCR cannot interpret. Harnessing the free labor of web users a few seconds at a time, but aggregating to millions of hours, reCAPTCHA has improved the usability of the GBS corpus (for certain languages) while also being fed back into the training sets of machine-learning algorithms. GBS thus fills gaps in its automated quality control system with "human computation," defined by CAPTCHA creator von Ahn (2005) as treating "human brains as processors in a distributed system" to solve problems that cannot (yet) be undertaken by computers alone.

2.3.3 Metadata

Scholarly users of Google Books quickly identified problems with its metadata, e.g. item descriptors such as author, publication date, and subject classification contained in traditional library catalogs (Duguid 2007; Nunberg 2009; Townsend 2007). Using his knowledge of canonical texts as a point of departure, Nunberg (2009) conducted searches in the Google books corpus that revealed extensive errors in volume-level metadata. These included a disproportionate number of books listing 1899 as their publication date; anachronistic dates for terms such as "internet"; mixups of author, editor, and/or translator; subject misclassification (e.g. using publishing industry classifications designed to allocate books to shelf space in stores, rather than Library of Congress subject headings); and mis-linking (e.g. mismatch between volume information and page images). James & Weiss's (2012) quantitative assessment supports Nunberg's anecdotal findings. In response, Google acknowledged that it had constructed book metadata records by parsing more than 100 sources of data (Orwant 2009). These included library catalogs, publishing industry data, third party metadata providers, and likely data extracted from OCR. If each source contained errors, Google's Jon Orwant acknowledged, the GBS corpus aggregated millions of metadata errors across trillions of individual data fields. (That the most explicit

official statement of Google's approach to metadata takes the form of a 3000+ word blog post comment is at once extraordinary and unsurprising.)

Google's metadata mess was quickly–and publicly–cast as a confrontation between old and new information systems for accessing books, evidence of Google's techno-utopian investment in machine intelligence and the power of full-text search to triumph over the centralized library cataloging systems constructed painstakingly by librarians (Nunberg 2009). At a minimum, the pervasiveness of metadata errors drew attention to the irony of Google's public construction of GBS as an "enhanced card catalog." In practice, the need to circumvent license restrictions on bibliographic data significantly shaped Google's approach to metadata. Coyle (2009) and Jones (2014) assert that although Google obtained catalog records from library partners, libraries' contracts with OCLC — a company that produces the union catalog WorldCat — probably prohibited Google from displaying that metadata directly. (For efficiency and consistency, libraries often download catalog records from WorldCat, rather than create their own — but OCLC restricts their use.)

Google's metadata problems exposed imperfections in existing book cataloging systems, from the challenges of algorithmically interpreting MARC records to the temporal and geographic limitations of ISBNs to errors in human-catalogued bibliographic data. The incompatibility of legacy catalog systems further challenged Google's attempts to aggregate metadata from multiple sources. Over time, incremental modifications to Google's machine processing substantially improved, identifying and ameliorating systemic metadata problems. Nonetheless, GBS metadata continues to be far from accurate.

2.3.4 Integrating books into the web

Unlike print books, the web is not tied to a single physical device for content delivery. In 2009 Google introduced "mobile editions" of the corpus. The development team explained:

> Imperfect OCR is only the first challenge in the ultimate goal of moving from collections of page images to extracted-text-based books… The technical challenges are daunting, but we'll continue to make enhancements to our OCR and book structure extraction technologies. With this launch, we believe that we've taken an important step toward more universal access to books (Ratnakar et al. 2009).

By defining books as structured information carriers from which content may be extracted and delivered seamlessly via widely varying devices, Google's focus on mobile technology further distanced digitized books from their print origins.

Approaching books as one among many objects to integrate into web search, Google also projected web-based *expectations of change* onto print books. Search engines crawl the web constantly, capturing changes, additions, and deletions to a massive set of networked pages. A well-justified expectation of constant flux drives this crawling, a scale of change only manageable through constant wholesale capture. By contrast, the pace of change for print media on library shelves is normally much slower. Pages may turn brittle. Users may mark up books, or more rarely, steal them. While Google tried to deploy a "scan once" strategy for initial imaging, when it comes to image *processing* it has treated its book corpus with a disregard for stability borne out of its experience with web pages. Embracing the iterative logic of algorithmic systems, Google routinely updates and replaces scanned content after running it through improved error detection and image quality algorithms (University of Michigan and Google, Inc. 2005). Even if changes to the corpus tend to be small and incremental — algorithms erase a finger in the margins of a scan, restore a missing page, or deliver a once-buried quote in search results — the constant and accumulating changes generate a sense of instability. Google has not consistently provided users with documentation related to this updating (Conway 2015); the automated work of maintenance and repair remains invisible. It's a tangled, even paradoxical relationship, as the fundamental revisability of algorithms supersedes the print book's material stability and persistence. But while algorithmic logic suggests that the latest version of a page will always be the most accurate, critical traditions rooted in print culture may lead us to ask how GBS defines accuracy and what other characteristics may be altered by real-time updating.

This section has demonstrated that because GBS page images and machine-searchable text are in effect co-produced, an action at one stage of the process can set in motion a cascade of consequences that shape both visual and machine readability in the corpus. At scale, optimizing workflows around textual properties of books ran the risk not only of distorting some books' visual properties, but also of defining normative book characteristics. In Google's one-size-fits-most scanning system, decisions about image

processing may have a disproportionate effect on certain aspects of the digitized corpus; the Chinese-language volume described above was one of a set of 50, all digitized by Google at a single location and all subject to the same processing problems.

Objects that are excluded from scanning, or distorted and transformed beyond the point at which they may be used as surrogates for their print originals, become "non-charismatic objects" (Bowker 2000): by failing to be "collected" through digitization, they are rendered invisible to future digitally-based scholarship or use. Further, Google's opportunistic rather than systematic approach to digitization may amplify existing selection biases in physical print collections; over-represent certain types of publications (Pechenick, Danforth, and Dodds 2015); or perpetuate Anglo-American cultural dominance in digital cultural heritage (Jeanneney 2008).

2.4 Mediating access: Indexing the world, one piece of text at a time

By constructing books as data, Google Book Search inserts them into a networked world where algorithms increasingly mediate human access to information. In the project's wake, the dream of digitizing "everything" has taken hold, re-calibrating the sense of what is possible and what is expected for both individual web users and cultural heritage institutions.

This article is the first piece of a larger, ongoing study of several large-scale cultural heritage digitization projects, including the Internet Archive and genealogy organization FamilySearch. This project seeks to join an existing critique oriented toward material culture and labor process with an emerging critique of algorithmic culture. "Algorithmic digitization" thus serves us as a sensitizing concept; emphasizing relationships between inputs, materials, labor, processes, outputs, use, and users, we use it here to consider opportunities and limitations in Google's approach to providing universal access to information.

Understanding GBS as an algorithmic system renders visible multiple tensions in the project: between Google's universalizing public rhetoric about the project and the technical processes that must translate these ambiguous visions into workflows; between the

competing goals of stakeholders such as Google, publishers, authors, and libraries; between aspirations of scale and the specialized needs of individual end users or books; between the materiality of the print book and that of the computer; and between the invisible, iterative authority of algorithms and that of human visual experience or expertise.

As we have seen, notable limitations stem from Google's choices in resolving these tensions. Imperfection is unavoidable in large-scale book digitization. Yet the vocabulary of error is often too static to be useful, since error is always relative to a particular user and/or purpose. Gooding (2013) argues that large-scale cultural heritage digitization sacrifices quality to serve scale. We have shown that while intuitively appealing, this argument is too simplistic. It tends to align "quality" with the needs and values of traditional readers, thus privileging visual access. In doing so it ignores the extent to which quantity and quality are mutually constitutive in building a digitization economy of scale, and misses the careful calibration of tradeoffs between multiple forms of access to books afforded by digitization. It misunderstands the measures by which the project itself has defined and evaluated quality. Finally, it over-states Google's concern with end users more generally.

We must, then, attend carefully to how Google's algorithmic system supports some users' requirements while simultaneously rendering others difficult or impossible to meet. For example, "visible page texture"—from marginalia to other signs of aging or use inscribed on the printed page—may be useful information or a mark of authenticity for some users, yet it is defined as noise for automated image processing. A situated understanding of these details exposes limitations to GBS's suitability as a flexible, general-use collection that can meet the needs of a range of stakeholders, such as readers (Duguid 2007; Nunberg 2009), researchers conducting quantitative analyses of cultural trends (Michel et al. 2011), or cultural heritage institutions.

Further, the opacity of Google's processes has contributed to widespread critique of libraries and other memory institutions "outsourcing the risk and responsibility" for digitization to a private company (Vaidhyanathan 2012). Google's "black box outsourcing model" (Leetaru 2008) frames agreements with content providers as partnerships rather than customer-client relationships. These partners give up some control over project parameters, tacitly agree to participate in the digitizer's larger projects or agendas, and

remain dependent on the digitizer's continued interest and investment in digitization. As smaller institutions and collections gain access to digitization through this privatized model, the risks grow. Google's digitization model conceals the resource-intensive nature of digitization, from the invisible labor of professional librarians, contract workers, and end users filling in the gaps created by incomplete automation to unanswered questions of long-term maintenance or preservation of digital assets. It may thus discourage cultural heritage institutions from budgeting sufficiently for their own digitization infrastructures. This will doubtless leave some institutions unprepared to maintain their traditional stewardship roles with respect to digital content.

Just as users (individuals or institutions) benefit or suffer from Google's reliance on algorithmic processing differently, so too are print books unevenly affected. Google's highly proceduralized scanning workflows (perhaps inadvertently) imposed a normative idea of the form and content of the English language book on the digitization process. With its construction of digitization as a text extraction and indexing challenge, Google further distanced itself from library-based understanding of the value of scanned page images as surrogates for print originals. Instead, the above analysis has revealed several ways in which Google aligned GBS with other iterative, algorithmic systems—from Google Streetview to 23 & Me—created to bring physical objects, information systems, and even human bodies within the visual and computational logics of the web.

Today, books maintain an uneasy parallel existence, caught between the world of the web and the world of Gutenberg. GBS highlights the uneven rates of change and competing logics of these two worlds, the technological and legal frameworks that may produce, organize, and mediate access to print and digital information differently but that digitization forces together. Google shaped the processes and outputs of GBS to respect the constraints of copyright law, for example. Yet it simultaneously sought to circumvent print-based permissions management by emphasizing functionality that resonated with its web- and scale-centric mission, but had no direct parallel with print.

GBS has provided searchable text access to millions of books. The weight of this remarkable achievement must not be denied or underestimated. Yet by equating digital access with full-text search, the GBS corpus has created a future for books in which they are defined principally by their textual content. Google's workflows have elided other

(historical, artifactual, material) properties of books that, when absent, threaten to disrupt or reframe the relationship between a digitized surrogate and its print original. As print libraries fade into the deep background of our brave new digital world, much has been lost that cannot be regained.

Chapter 3 FamilySearch Books Research Design

3.1 Introduction

Part 2 of this dissertation is an ethnography of FamilySearch Books, a long-term and large-scale book digitization undertaken by FamilySearch (formally part of the Church of Jesus Christ of Latter-day Saints) in collaboration with public genealogy libraries and other memory institutions.

This chapter details the research design for the study described in the next three chapters. The first half includes a discussion of methodology, data collection, data analysis, and a description of the analytical chapters. The second half of the chapter contains a literature review of concepts relevant to the current study of digitization work: invisible labor, information labor, and an ethics of care.

3.2 Methodology: Ethnography

No longer the exclusive domain of anthropology, ethnography has been taken up in a range of different fields to study knowledge, information, and technical work. In industrial anthropology and sociology, studies of the organization of work began to be undertaken in the 1920s as a strategy for focusing on the human, subjective dimension of work, an alternative to Taylorist scientific management characterizations of men and women as machines (Burawoy 1979).

Ethnography can be a useful strategy for surfacing invisible work (Suchman 1995). Ethnographic laboratory studies have long been used in science to obtain a bench level view of scientific knowledge production and the laboratory cultures of science (Knorr-Cetina 1999; Latour and Woolgar 1979). Beyond the study of knowledge production, ethnography has been used at length by the anthropology of work, industrial anthropology, computer-supported cooperative work, and organizational studies to investigate a wide

range of types of information and technical work in situ (Barley and Orr 1997; Orr 1996; Burawoy 1979; Suchman 2006).

Ethnographers engage in participant observation, unobtrusive observation, and interviews to understand how a given worker's understanding of a problem, situation, or task is worked out in practice, and use narrative to represent these situated practices as sense-making activities (Geertz 1973). With its focus on capturing the perspectives of research participants—or interlocutors—ethnography is equipped to accommodate multiple, even contradictory, meanings attributed to things. Through participant observation ethnographers endeavor not only to describe experiences or ideas as interlocutors see them, but also to account for why they are as they are.

Ethnographies of work provide descriptive data on who does work, how they do it, and how they interface with the structures (institutional, economic, technological) and changes that shape their work (V. Smith 2007). Ethnographic field studies approach work as situated practice, where context is part of what is being studied; for ethnographies of technical and information work, this context includes the ways in which workers use–and are shaped by the use of–information technologies in their work (Orr 1996; Suchman 2006; Fish and Srinivasan 2012). By focusing on work practice, ethnographic research may be "aimed at recovering the projects, identities, and interests that inform those practices" (Suchman et al. 1999).

Ethnographic study can surface subtle or unexpected consequences of technological change that affect the visibility of work and workers. Sampson and Wu (2003) use ethnographic research to explore the effects that containerization and the use of increasingly complex communication technologies have on shipping as an industry as well on the lives and work of the crew. Extensive technological advancements have led to changes in the organization of work and work crews, job duties, and required skills. As a participant observer, Sampson's close physical proximity and sustained engagement with the field site led them to observe other, more subtle changes to working life aboard the ship. For example, they note that new technology-supported processes—which compress time and decrease in-terminal turnaround times for ships—also increase perceived distance between crew aboard the ship and crew in the terminal. Sampson and Wu argue that the new organization of work in containerized shipping neither requires nor

encourages the two groups of employees to interact, in stark contrast to the lively interaction taking place in non-containerized shipping terminals: "The workforce at Tetra is thus rendered invisible to the majority of seafarers, just as seafarers are rendered invisible to Tetra employees. The distance between them is relatively short and yet the yard itself acts as a chasm dividing them."

Ethnography has been open to criticism about the subjectivity of both its methods and outputs; the field of anthropology itself has engaged in extensive internal self-critique of its methodologies, a conversation that has been generative for the field as a whole. Work in reflexive, feminist, or critical ethnography has usefully problematized the question of representation and voice in ethnography, for example addressing what it means to speak *with*, and possibly *for*, participants in your research, and insists on the inseparability of the observing subject from the observed (Clifford and Marcus 1986; L. T. Smith 1999; Stoler 2006; Visweswaran 1994).

3.2.1 Value of ethnography for this study

As a phenomenon with many moving parts and behind-the-scenes labor, large-scale digitization is well-suited to being analyzed via the nuanced and rich data ethnographic methods provide. Field-based research facilitates an understanding of the daily experience of digitization work, through which it is possible to gain perspective on the many factors that shape project planning and execution.

This includes the sensorial experience of scanning—the darkened rooms, equipment emitting beeps and flashes of light; the hours without talking; the varied motivations and pacing strategies of scanning technicians; methods for monitoring performance (or just marking the passage of time). Time is a key element of digitization that becomes conspicuously visible through ethnographic research. This is perhaps not surprising, as the temporal register of digitization cannot be represented in project reports or in web-based access to its output. Everything takes time, and considerably more of it than is typically anticipated.

Further, the ground-level perspective of ethnography makes it possible to understand relationships between and across digitization roles, tasks, and types of work.

This is particularly critical given that the visibility of some aspects of digitization work often renders other work invisible.

3.2.2 Constructing the field site

Field work is a core component of ethnography. For this reason, constructing the field site is a critically important preliminary step of ethnographic research. The expansion of the range of phenomena studied ethnographically has prompted researchers to contest the notion of the field as a fixed or bounded locality (Gupta and Ferguson 1997; Marcus 1995). Particularly with the pervasiveness of networked communication, a phenomenon may not take place entirely within a single, physical space. The object of research interest may take place in many physical spaces, simultaneously or sequentially. In their review of 25 years of ethnographic research in the field of computer-supported cooperative work, Blomberg and Karasti (2013) observe that far from being fixed and well-bounded, the field site "has become a multifaceted and intricate constellation of people, technologies, activities, entities, and relations; and the boundaries of the field site are less clear, even unbounded, involving extended spatial and temporal scope." Amit (2003) argues that "in a world of infinite interconnections and overlapping contexts" the field site "has to be laboriously constructed, prised apart from all the other possibilities for contextualization to which its constituent relationships and connections could also be referred. This process of construction is inescapably shaped by the conceptual, professional, financial and relational opportunities and resources accessible to the ethnographer."

A field site for ethnographic research must thus be understood as enacted—not merely revealed—through the research design. The field site is a constellation informed by the researcher's own knowledge, experience, and interests as well as by time- or access-related constraints. This framing acknowledges and even embraces the fundamental constructedness, and contingency, of the research environment; there is never a view from nowhere, a single way to define a field site. It requires researcher reflexivity in accounting for her own positioning within the research design and execution, particularly for the ways that the field site remains "continuously constructed" for the duration of the project (Blomberg and Karasti 2013).

I have used multi-site ethnography (Marcus 1995) to guide my field site construction. Marcus describes multi-sited ethnography as an exercise in "mapping terrain," following an object of interest's circulations, paths, or translations across different localities. The goal is not to reach a holistic or totalizing understanding of a cultural formation but rather to construct understanding through juxtapositions, translations, and shifts in scale. Such an approach conceives of ethnography as "a study of parts rather than wholes" (Burrell 2009; Marcus 1998).

Each of the sites can be used to make connections with other sites, but also must be considered independently in regard to its role in producing the phenomenon of interest. Ethnographically, the multi-sited field is constituted as the research progresses by tracking how the phenomenon under study is understood and acted on by participants (mediated by the ethnographer's presence and interpretation, of course).

3.2.3 Relevant experience and preliminary research

This research was informed by several hands-on experiences with large-scale digitization, through which I gained an understanding of different models of digitization, workflows, and divisions of labor. I have described them below because in addition to providing relevant context they directly informed the design of this dissertation research, assisted me in entering and positioning myself within the field sites, and provided general insights into the organizational arrangements and social relations that shape digitization work across settings (V. Smith 2007).

In 2015, I spent approximately 100 hours working as an intern at the Digital Conversion Unit (DCU), the in-house digitization lab for the University of Michigan Library. The DCU provided a vantage point from which to observe shifting relationships—and longstanding tensions—between technical and content-oriented interests in the University Library organizational (and budgetary) structure, and how digitization processes were defined and coordinated in the service of larger institutional goals.

Much of the DCU's work fell within the scope of the Michigan Digitization Project (MDP), UM's 2004 Google book scanning partnership. UM was the first library to commit its entire collection to the Google Books Library Project. As part of MDP, the DCU digitized content that did not fit into the parameters of the Google Books project (e.g. book size,

material fragility, etc.); it also completed re-scans of content captured poorly by Google's standardized processes. Through circumstance and timing, then, my experience at the DCU also provided ground-level insights into both the limitations of largely automated scanning systems and, nearly a decade after Google packed up and left town, the considerable residual labor required to carry out the Google Books project at one site.

During my summer at the DCU I went through the standard training process for interns or work-study students, both of whom are at least a semi-regular source of low-cost labor. This included generating picklists for digitization, pulling books from storage facilities, transporting books to the scanning facility, creating records for books in a database, performing low-level repairs to physical materials prior to scanning, and finally scanning, image processing, and quality control. I conducted semi-structured interviews with DCU staff about their jobs, hiring practices, internal DCU workflows, and how the DCU fits into the institutional structure of the University Library. I also collected and reviewed documentation related to training, workflow, and the database used for project management.

In 2017, I spent a semester digitizing plant specimens for the University of Michigan Herbarium; most of my 20 hours each week were spent imaging individual historical plant specimens carefully affixed to cardstock. At the herbarium, plant digitization tasks were atomized similar to other large-scale digitization efforts (including those described in future chapters), and at each step creating digital collections was shaped by the structure and limitations of print originals. For example, metadata written on plant specimen cards is neither consistent nor always accurate, collected by a wide range of researchers at different times. Transcribing and representing this historical print documentation into a new digital content management system proved labor-intensive and challenging.

The Herbarium also acts as a contract digitizer for specimen collections housed elsewhere. I managed the completion and hand-off for one such year-long digitization project. In order to identify lessons learned to inform future projects, I talked to project staff individually. Project staff identified multiple points of disconnect between the deliverables agreed to by leadership and the labor or expertise required to achieve these outputs. While challenges such as missing or inaccurate metadata and catalog records were readily apparent to domain staff upon examination of the print collections, project

leadership did not identify such obstacles in advance and therefore the resources required to mitigate them were not accounted for in the project budget. This is a pattern familiar to digitization, and we will return to it in the chapters on FamilySearch Books.

Finally, as preliminary research for the study described in the following chapters I did participant observation at two Internet Archive book scanning sites, and conducted interviews with site managers, scanning technicians, and one senior official at the Internet Archive.

My digitization experiences directly informed the research design for this dissertation. Methodologically, it provided an opportunity to reflect on ethnography as an approach and explore how my presence shaped both the research site itself, and the data collected. I initially projected some well-worn definitions of performance and productivity from my own experience onto the DCU scanning environment in particular. Through these internal and external observations of work, I was able to reflect on my own positionality as a researcher as I planned this dissertation research. I identified open-ended strategies for talking to individual scan workers in ways that engaged them and captured their experience from their own viewpoints.

As I started this dissertation research, my familiarity with digitization terms and processes aided my conversations with senior project staff and partner librarians. It even assisted my acclimation into dissertation field sites, making it easier to build rapport with the senior missionaries tasked with imaging books (with whom I had little else in common). This familiarity then could be balanced by the much less familiar technical and social divisions of labor present in FamilySearch scanning sites.

3.3 Data collection

This research was guided by a systematic yet flexible research design and data collection strategy. It was systematic in that I collected the same types of data across multiple physical settings, and I attended to the configurations of a common set of elements across settings. It was flexible in that it used individual physical settings as points of departure from which to explore connections or deepen understanding of one piece of the phenomenon under study (Burrell 2009).

This ethnographic dissertation research is built upon a range of participant observation, interview, and document data collected over nineteen months (2016-2018). I directly observed approximately two hundred hours of work distributed across four FSB scanning sites spread geographically across Eastern, Midwest, and Western states across the U.S., FamilySearch headquarters in Salt Lake City, and several community-oriented scanning events in Utah.

The data collected are described in detail in Table 3-1; further detail is provided as relevant in each of the next three chapters.

Table 3-1 Data collection

Data source	Quantity/time interval	Details
Participant observation	200+ hours in aggregate at field sites July 2016-February 2018 - Four scanning locations: two FamilySearch sites, two public library partners - FamilySearch headquarters (Salt Lake City) - Family History Library (Salt Lake City) - Rootstech Genealogy Conference (2017) - Annual book scanning partners meeting (2017) - Two public book scanning events run by FamilySearch Books at genealogy community events	Observations of: - Digitization process: materials preparation and handling, cataloging, image capture (scanner operation), image processing, and quality control processes - Training processes - Daily digitization lab functions: routine work, staff interactions, problem-solving, other coordination or decision-making work - Daily librarian responsibilities - Meetings - Public-facing scanning and genealogy events
Interviews	- Digitization workers (missionaries and volunteers): 26 - Site management personnel: 9 - FamilySearch Books employees: 5 - Others: Family History Library staff (2); FamilySearch staff: training staff (2), cataloger (1), quality control staff (1), shipping and receiving personnel (1), volunteers at Rootstech (8-10)	Interviews took place primarily at workplaces, or at genealogy conferences; conducted preliminary phone interviews with key FamilySearch personnel at project outset; other interviews took place in transit or at LDS Church facilities in the Greater Salt Lake City area.
Documents	Collected throughout the research process	- Organizational charts - Job descriptions - Training materials - Hardware, software use manuals, documentation - Mission statements - Public-facing materials: project marketing and PR, missionary recruitment information, public presentations (electronic) - Digitization workflows: high level digitization pipeline and data management, but also for each piece of process (e.g. content selection, materials handling, image capture, processing, and quality control, etc.) Documents created to track objects through the digitization process: database, spreadsheet, paper
Photographs		Digitization facilities, equipment, workers, and materials to be digitized

Smith (2007) observes that access and time are frequently major constraints for ethnographic research. Amit (2003) acknowledges that as the parameters of possible field sites expand, the ethnographer—in part attributable to other personal or professional identities that overlap and come into tension with the demands of ethnography—often engages with her field site in an intermittent, disrupted or non-continuous way (also see (Fetterman 2010)). My research design has been shaped by both of these considerations.

In order to collect data with both depth and breadth, I spent shorter amounts of time in a number of different settings rather than one lengthy stay in a single physical location. I made these choices in response to the nature of the phenomenon under study, which is distributed across a number of physical scanning locations and other organizational settings.

Gaining access to a research site is shaped by a mix of strategy, negotiation, serendipity, and logistical constraints. Throughout fieldwork, my access to staff, volunteers, and missionaries involved with scanning at both FamilySearch and its partner libraries was without restriction. FamilySearch staff emphasized this openness to an occasionally conspicuous degree at times, and I became aware that there is a line between open access and what one FSB employee described as "rolling out the red carpet." Given the LDS Church's general enthusiasm for outreach I occasionally felt as though I was being put through a public relations demonstration, particularly in the Salt Lake City-based field work. (It is important to note, however, that every member of the LDS Church I talked to spoke as individuals and not as formal representatives of the LDS Church.)

The work environments in which this fieldwork took place varied. For much of the time I sat next to missionaries while they scanned books; I scanned books of my own at every site. I spent time with partner librarians at their desks and on shift at the reference desk, and attended meetings with FSB project staff. I toured scanning facilities, and spent time in labyrinthian basements and backstage areas of libraries. I visited the Family History department of the LDS Church, located in the Church Office Building in Salt Lake City, where I talked to many people involved in FamilySearch's broader genealogy data collection and processing activities, from shipping and receiving to cataloging to quality control. I went to meetings of community-based genealogical societies and participated in the genealogy conference Rootstech. On-site at Rootstech and a Family History day in

small-town Utah, I helped staff the FamilySearch on-site digitization tent. I greeted patrons with books they brought in to scan and answered a range of questions about content selection, copyright permissions, process, and use. I interviewed returned book-scanning senior missionaries in an empty room of an LDS meeting house. I accompanied book-scanning partner representatives to what was purported to be Utah's best Chinese food restaurant to continue discussions begun at Rootstech.

At each site I undertook participant observation, gathering data through observational field notes, photographs, documents, and audio capture of extended conversations with individuals and groups. I wrote. field notes as I toured facilities, talked to people, and acquired documents. While on site and immediately afterward, I created site-level memos that abstracted high level takeaways and included broader analytical insights or reflections on the data I had collected. Along with participant observation, I also conducted semi-structured interviews with missionaries, librarians, and FamilySearch staff members (inside and outside the book scanning project), which were recorded and transcribed.

3.4 Data Analysis

I analyzed data collected inductively and iteratively, with analytical activities occurring contemporaneously with ongoing data collection. Away from the field sites, I transcribed much, but not all, of the audio I recorded in my research. With a few exceptions, all quotations in the chapters that follow are taken from transcribed audio; as a result, the quotations may over-represent several individual missionaries and field sites. By engaging in constant comparative analysis of field sites, I was strategic in my choices to transcribe audio from several of the later sites as I began to reach theoretical saturation and hear a similar set of perspectives on various topics. As a result I have noted throughout the text when quotations or perspectives appear to be outliers or when they are more commonly held sentiments.

I immersed myself in this qualitative data in several ways. For each site I listened to all audio recordings and reconciled what I heard with corresponding field notes, supplementing or elaborating the written documentation whenever useful. After this, I typed written field notes. I used the qualitative analysis software MaxQDA to aggregate,

organize, and thematically code observational, interview, and documentary data as well as memos. I periodically refined and re-organized codes as I created the structure for the chapters that follow. In this process, I created a second type of analytical memo for emerging themes.

3.5 FamilySearch Books chapters structure (Chapters 4 – 6)

The resulting output, detailed in the three chapters following this one, is a thick description in the tradition of Geertz (1973); while richly detailed and systematically produced, these descriptions must be recognized as representations that remain situated and positioned vis-à-vis the researcher responsible for constructing them.

It is the nature of ethnographic inquiry to generate data through which many stories can be told. Paying close attention to representing the viewpoints of my thoughtful interlocutors, I have chosen to animate the work of FSB digitization through three perspectives: institutional perspective (Chapter 4), digitization tasks and roles (Chapter 5), and meaning constructed in and through digitization work (Chapter 6). In each chapter, I have tried to capture both action and positionality, as digitization takes place with many actors (both human and non-human) in motion at once; while I have attended closely to what is being done and said, I have also endeavored to make sense of the context in which this all takes place. These perspectives are then layered together, with some integration of the analysis in the Google Books chapter (Chapter 2), in a final synthesis chapter (Chapter 7) which suggests some broader implications or applications this research presents.

Before jumping into the data, the second half of this chapter contains a brief literature review on several relevant topics.

3.6 Literature Review: Digitization as invisible work

Spanning multiple disciplines and many different kinds of work, the research literature on invisible work provides a good place in which to situate this research on digitization work. Many different types of work may be invisible; service work, domestic work, infrastructure work, immaterial labor, and information labor are all relevant comparisons—if only partially, for most—to the work explored in this research. In the brief literature review that follows, I identify some salient findings from existing research on

invisible labor, discuss their limitations, and then offer two conceptual tools that seem promising for studying work ethnographically: information labor and a feminist ethics of care.

3.6.1 How does work become invisible?

Researchers have attributed the invisibility of work to many different factors. The list that follows highlights some of the ways in which information work in particular is often perceived as invisible. It is not exhaustive, and neither are the categories mutually exclusive. A given job or type of work might fit into multiple categories, as it is certainly possible to be multiply invisible across different contexts of work.

3.6.1.1 It is not recognized as work.

The question of invisible work is in some cases a question of what counts as work in a given context. Feminist scholarship on domestic labor and on gendered divisions/valuations of labor from the 1970s onward remains relevant to understanding how definitions of work—paid and unpaid—change over time. Daniels (1987) discusses ways in which what she calls longstanding "common sense" notions of work—based on perceptions that it is paid, takes place in the public sphere, and is separate from leisure—obscure a range of other practices that might otherwise be understood as work. Daniels links the erasure of these other types of work—highlighting women's domestic work as an example—to the place of work as a status indicator for social life, and argues toward an expanded view of work. Jarrett (2014) carries this analysis of feminized, immaterial work into the digital realm with a focus on how "nonproductive work" serves a social reproductive function.

In much of the subsequent research citing or inspired by Daniels across a number of fields, invisibility is equated with devalued or marginalized work. In her review of this research, Hatton (2017) includes in her definition that invisibility is specifically economically devalued: "this article defines 'invisible work' as labour that is economically devalued through three intersecting sociological mechanisms—here identified as cultural, legal and spatial mechanism of invisibility—which operate in different ways and to different degrees."

Particularly in its digital form, information work sometimes suffers from this failure to be recognized as work. Studying invisible labor can serve as a correction to the perceived immateriality of digital labor. Beyond functioning as a strategy by which to animate the workings of systems and infrastructures, at a basic level studies of behind-the-scenes technology and Web-based labor underscore the important point that our hardware, software, platforms, and content are not produced magically or by robots. They require resources—and, in almost all cases, human labor—to function and to be maintained long term.

Terranova's (2000; 2015) critique of free Internet labor as exploitation, through which a user's labor is extracted and commodified without permission or compensation (though enjoyable, sometimes), is one such example. Her critique serves as a counterpoint to other more celebratory formulations of free content provision online, in which activities that might in other contexts be compensated in some way have been cast not as work but as rewarding leisure time investments. These include Benkler and Nissenbaum's (2006)"commons-based peer production," Shirky's (2010)"cognitive surplus" citizen science, and even the emergence of crowdsourcing as a model for business—and knowledge production (Howe 2006). This literature touts the ability of distributed groups to coordinate action and generate knowledge outside of traditional parameters of organizations or institutions, or the often-invisible service workers connecting individuals to information.

These conflicting constructions of invisible work point to the ways in which privilege intersects with questions of visibility and value in work. In the examples above, a subject's ability to choose how to spend time that is not compensated economically may likely shape interpretation of the visibility of that work.

3.6.1.2 The work itself is invisible because it produces no material goods, takes place within and between occupational classifications, or is infrastructural in nature.

Orr (1996) argues that as occupations have lost their status as a central organizing principle for understanding work and workers have shifted to immaterial modes of work, work has been rendered as an abstraction—a largely invisible "generalized input into a production function"—on a cultural as well as scholarly level. Information work happens

within and between the structures established by organizational hierarchies, formal training programs, and job descriptions. Information work involves "soft" critical contextual skills and situated action. It often includes improvisation, and requires workers to deal with an amount of contingency and ambiguity. Like other service or infrastructure-related work, information workers often do not produce material goods (Star and Strauss 1999). Because information work is often coordinating, boundary work, its workers often go unrecognized and therefore unaccounted for as workers. And when they are recognized, their labor is often misrecognized or undervalued. Immaterial labor, which refers to the production of information or cultural content, is particularly difficult to surface for this reason (Brophy and de Peuter 2008; Gill and Pratt 2008; Whalley and Barley 1997; Jarrett 2014).

Sometimes work disappears into the background—whether through routine, by its service orientation, or because it is infrastructural—and ceases to be noticed. Star and Strauss draw on examples of nursing, office administrative, and other support- or care-oriented work. Collaborative work may fit here as well, particularly in cultures of attribution (or where individual productivity is emphasized).

In other situations, the worker is invisible while the work is not. Star & Strauss (1999) observe conditions where work visibly takes place, the work is acknowledged by both employer and employee, but the employee remains an invisible "non-person." Star and Strauss mention domestic and service workers as an example; workers in crowdsourced or microwork platforms are a contemporary example (Irani 2015; Gillespie 2018), along with other work that has been detached geographically from the sites in which it has traditionally taken place (e.g. business process outsourcing, telecommuting).

3.6.1.3 Invisibility results from tensions and gaps between formal task descriptions and informal, behind-the-scenes work.

This comes up in frequently in computer supported cooperative work, where accounting for work at a granular level is critical for understanding how to support decision-making and collaboration (K. Schmidt and Bannon 1992). Articulation work in particular has been observed to be invisible to rationalized models of work (Star 1991;

Berg 1997; Suchman 1995), and the work of coordination and support is similarly positioned.

3.6.1.4 Labor is not itself invisible but rather obscured by cultural or social ideologies, culturally constructed expectations of work, or the politics of skill

Groups of workers and types of work often get erased when this work takes place in already gendered and/or raced spaces. This includes work that may be required of a group of workers who may or may not be compensated. It includes what Hatton (2017) calls "hidden bodily labour" such as emotional or identity management work. Hochschild (1983) originally created the concept of "emotional labor" to explain labor in which employees are required to "feel the right feeling" as part of their jobs. Flight attendants, for example expected to perform emotions such as kindness and calmness; this involves having the capacity to manage and perform emotions in a way that has the desired effect on the other party to the exchange. While the work itself may be invisible, and possibly undervalued by those benefiting from it, in this original case this work was recognized as part of employment relationship and compensated. While Hochschild (2013) argues that emotional work is assumed to be devalued only in what she calls "a broken care system," other researchers have found that workers routinely experience tensions between personal and occupational identities in which they are expected to perform specific constructions of race, class, or gender (Hatton 2017; W. R. Poster 2007). Service or teaching oriented work often involves emotional labor; librarian work would be included here.

Hatton (2017) identifies the naturalization of gendered, classed, or racialized expectations of skill as a common sociocultural mechanism of invisible work. Skill (or lack of skill) is attributed to a groups of workers as a biological or cultural characteristic rather than something acquired through experience or training; this can justify labor arrangements that disadvantage the worker. Nakamura (2014) draws attention to the longstanding dependence of technology manufacturers on the flexible labor of women of color in order to continue to manufacture computers cheaply. While 21st century American consumers remain (willingly or unwillingly) unaware of the labor through which their technologies are made, Nakamura points to a long, and domestic, history of this same

phenomenon with the hidden history of the semiconductor manufacturer Fairchild's employment of Navajo women in the 1960s. The company rebranded skills desirable for employment (e.g. dexterity, ability to visualize complicated patterns, and "flexibility"—meaning they could be hired cheaply and let go quickly) as natural, and cultural in origin. Drawing parallels between integrated circuit manufacture and Navajo cultural skills such as weaving or silversmithing, the company positioned Navajo women as uniquely qualified for the low paid positions they were looking to fill.

Work is a cultural construct, full of values and assumptions that are subject to change. Wajcman (1991) explores how definitions of skills are established, within and across occupations, in order to consider the gendered politics of skill determination and ways in which the construction of skill is simultaneously ideological and material. Wajcman notes that feminists have long approached skill as an ideological category imposed on types of work. The consignment of women, or minorities, or workers in other countries, to low status jobs is often attributed to their "natural skills" (which show remarkable flexibility in being exported across time and space). Wajcman's arguments about the politics of skill suggest that occupational categories may be usefully understood as performative: they construct, and subsequently embed and reproduce, value hierarchies as much or more than they meaningfully reflect the realities of work practice. Once implemented, such classification systems are embedded in sociotechnical systems and operate largely invisibly, over time becoming naturalized and giving the appearance of reflecting some kind of natural order in the world (Bowker & Star 2000).

3.6.2 Moving beyond the visibility/invisibility binary

Moving beyond the visible/invisible binary, what does studying invisible work show us? Studying work is not just a matter of rendering visible the invisible. Star and Strauss (1999) observe that "no work is inherently either visible or invisible." Instead, visibility seems context dependent, and more often than not connected to perceptions of value attributed to the work—or worker. In this section, I examine several insights from the invisible labor research literature related to bringing visibility, value, and work together in research.

3.6.2.1 Invisibility can be a strategically powerful position (often within a larger context of marginality).

While invisibility is often associated with devaluing work or marginalizing workers (Daniels 1987; Hatton 2017), there are certainly counter-examples where invisibility is a privileged position. Some invisibility in work, in fact, is positive: far from being entirely trapped within institutional structures or even machine-driven workflows, workers in many industries have shown remarkable adeptness at problem-solving and developing workarounds for problems that may not be priorities for management to address (or, in many cases, may not be thought of as problems at all). Whether executed to facilitate more efficient work or to avoid some aspect of work, exposing these invisible work practices may expose them to being rationalized, managed, or taken away (Orr 1996).

3.6.2.2 Sometimes, visibility facilitates greater control by others or inhibits productivity.

It is tempting–and often worthwhile–to render invisible work visible for advocacy reasons. Doing so makes it possible to advocate for its recognition as work, to draw attention to hierarchical valuations of work that perpetuate unequal divisions of labor, or to restore missing voices to a historical narrative. However, this strategy must be pursued thoughtfully, as there may be trade-offs and dangers involved (Suchman 1995).

Nursing provides an instructive example. Within the hierarchical healthcare professional community, nurses occupy a marginalized position; their work is often neither acknowledged nor appreciated, and they are left out of decision making. It would seem to be a positive to give the nuanced details of their work more visibility through research. However, as Bowker and Star (1999) and Suchman (1996) point out, this increased visibility may lead directly to increased supervision and tighter control over their work, making them a "target for hospital cost accounting" rather than securing them some kind of higher rank in the hospital hierarchy.

3.6.2.3 (In)visibility in work is relational, and can shift in a single setting.

The naturalization of skill—or rather the construction of skill as naturalized, and associated with a particular group—can have consequences in how work is or is not acknowledged in specific settings. Jain (2006) traces the history of 19th century repetitive stress injuries from "scriveners' palsy" to "telegraphists' cramp" to modern keyboard-

related injuries accompanying data entry and typewriter labor. Jain uncovers the fact that telegraphers' cramp was very similar in nature to another injury called "twisters' cramp. One was covered by workers' compensation laws, while the other was not. The difference? "Twisters' cramp affected a relatively small group of older women lace makers while telegraphers' camp afflicted a well-organized group of white-collar men who were able to garner media attention and initiate public discussion about compensation." The men were recognized legally as workers, while as far as the law was concerned the women were not undertaking work at all. By tracing the labor of this marginalized group, Jain was able to gain insight into the operations of power (in the form of gender and class) at work in the legal system.

Information workers are particularly susceptible to shifting entanglements of skill valuation and attribution, given their in-between status. Zabusky (1997) observes that technicians are variably expected to be "servants as well as experts" depending on the situation or the interaction. Also see Barley and Bechky (1994) on the "status inconsistencies" of technicians, or Timmermans (2003) similarly on "status dilemmas." Plantin (2019) extends these analyses in his observations that data processors experience visibility and invisibility simultaneously, their work visible internally through extensive documentation but invisible to the end user. Plantin attributes this construction to the embeddedness of specific values at the data archive level; labor, then, serves as a strategy by which to explore these values at work.

3.6.3 Useful concepts for thinking about visibility, value, and work

The following two concepts—information labor and care work—prove useful for putting questions of work and worker visibility in conversation with questions of value in work settings with respect to groups of differently positioned workers working within the same space.

3.6.3.1 Looking infrastructurally at labor

Infrastructures are designed to remain invisible for normative users unless they break down; it is perhaps no surprise, then, that the significant amount of labor that produces this seamlessness–that builds, operates, maintains, and undertakes repairs for these systems–remains largely invisible. So too, argues Downey (2014), does the

infrastructural labor involved in moving information (whether in the form of data, content, or knowledge) into, out of, and through material networks. Downey argues that this "basic insight, and basic contradiction, sits at the heart of any historical work on information labor: look for such labor precisely where system builders, promoters, and proponents assert it isn't to be found, where it isn't supposed to matter, where it isn't supposed to count as part of the 'new media' that they are selling (Hughes 1989; Chandler and Cortada 2000)." Downey (2003) notes that information labor is also particularly susceptible to a kind of technological determinism that renders work invisible through an assumption that technology overdetermines work; at best, work appears as an effect of the technology. This invisibility likely grows deeper in an age of flexible, contingent contract labor, particularly in the high-tech sector.

The concept of information labor focuses on a particular kind of human work that is informational in nature, enables and constrains the circulation of information across contexts and media forms, and has been shaped–and often radically changed–by changes in technology (Downey, 2001, 2008, 2014). Downey (2014) argues that attending to information labor is a critical strategy for understanding how information flows within and across infrastructures; is transported across temporal, organizational, or cultural contexts; and is translated from one form to another. These often-invisible workers are also responsible for transporting and transforming information across media formats, space, and time. Rather than freezing and measuring labor, Downey's approach surfaces and follows the labor over time and space to make sense of the histories of labor, technologies, and technical systems together. Such an approach considers labor within the system in which it takes place—in relation to the changing technologies necessary to define and execute the work, and as one among many intersecting actors necessary to produce and maintain the system.

Using "information labor" as a unit of analysis provides a tool with which to look at both the (in)visibility of work and the social relations in which it is embedded—which create value for the work. While Downey's approach is historical and Star's is ethnographic, Downey and Star share an emphasis on using a situated understanding of labor to make sense of the values, politics, and possibilities of the systems in which the labor takes place.

Star (1999) identifies surfacing invisible work as a tactic for the ethnography of infrastructure. This is less about the visibility/invisibility binary than it is a way in on understanding the complexities of how systems of work function in action. Many systems contain a mix of formally recognized work and work that goes unremarked; sometimes the presence of unaccounted for workers in a system prevent it from working, but at other times their efforts facilitate its smooth running. A thorough accounting for this work supports the ethnographer of infrastructure to understand both the values and priorities built into the infrastructure but also anticipate the longer terms trade-offs or infrastructural implications these labor structures may present.

Through ethnography, Star (1999) says, it becomes possible to investigate, "what values and ethical principles do we inscribe in the inner depths of the built information environment?" For large-scale digitization, this is a question that must be considered from multiple angles: from resource-constrained institutional actors participating in collaborative digitization projects, to the labor structures through which projects are executed, to the information systems through which genealogical information is captured and accessed. Star (1999) reminds us to attend to the winners, losers, and orphans of infrastructure; she argues that through ethnography we can subvert the homogenizing, generic force that the concept of infrastructure carries in order to uncover what—or who—has been rendered invisible by its apparent seamlessness.

3.6.3.2 Care work

A feminist ethics of care dates to the 1980s, with the work of Gilligan (1982), Tronto (1993), and Held (2005). Fisher and Tronto (1990) describe an ethics of care as "a species of activity that includes everything we do to maintain, contain, and repair our 'world' so that we can live in it as well as possible. That world includes our bodies, ourselves, and our environment, all of which we seek to interweave in a complex, life sustaining web."

In sharp contrast to values such as autonomy, objectivity, or independence, a care ethics foregrounds connectedness and interdependence. It posits that humans are relational, responsive beings. Care work is relational in nature, and involves creating and managing relationships. Tronto (1993) defines care as a practice that contains four sub-elements, or goals: attentiveness, responsibility, competence, and responsiveness. These

elements emphasize the ability and willingness to identify and respond to the needs of others, and to provide care that considers the positions of others.

As a point of intersection with the review of invisible work above, there seems to be a consensus that care work is rarely accounted for—or valued—fully in many jobs, particularly in roles that are occupied by women or have been constructed as feminized work spaces. An ethics of care has been used in many different contexts to re-imagine politics, foreground an alternative set of values that allows for care work to be visible and valued.

Over the last several decades, the concept of care or a care ethics has been critiqued from several angles. Valorizing care as a self-evidently good value obscures the ways that care can be leveraged destructively (or even the ways that care work remains devalued in many situations). Care can be colonizing, and paternalistic, care imposed by one party onto an un-receptive but powerless second party. Murphy (2015) critiques the way that care is often the domain of the privileged subject, "conditioned by white privilege [and] capitalism," and that the politics of care has been complicit in many "non-innocent histories." Care, then, can be contradictory: it can be both privileged and marginalized, depending on the context.

Feminist STS scholars have recently taken up the ethics of care, along with its critique and its messy politics (Puig de la Bellacasa 2011; 2012; 2015; Martin, Myers, and Viseu 2015; Murphy 2015; Mol, Moser, and Pols 2015). Moving beyond situating care as something that takes place between humans, feminist STS scholars expand the frame of care to include the objects and technologies with which we inhabit lives and work. Martin et al. (2015) point out that feminist science studies scholarship has a long genealogy of care, one that "draws attention to how researchers in STS come to care about the lives they study and the worlds in which they intervene." Puig de la Bellacasa asks "how can an ethico-political concern such as caring affect the way we observe and present technoscientific agencies, things and notions?"

Martin et al. propose a "critical practice of care." They argue, "care is a selective mode of attention: it circumscribes and cherishes some things, lives, or phenomena as its objects. In the process, it excludes others. Practices of care are always shot through with asymmetrical power relations: who has the power to care? Who has the power to define

what counts as care and how it should be administered?" Explicitly invoking Star's (1990) work on the inclusions and exclusions of standardization practices, a critical practice of care explicitly includes understanding how care fits into arrangements of power and privilege and imagining "how these arrangements of care and power might be otherwise" (Martin et al 2015). This practice of care, then, makes room attend to the ways that care is constructed in a space, and make room for care in our accountings of things in research, but also prioritizes accounting for how care is positioned, by whom, and to what end.

Of relevance to this dissertation research, this framing of care has been integrated in in recent years by the growing community of scholars studying infrastructural maintenance and repair (Information Maintainers 2019; Denis and Pontille 2015; Mattern 2018) as well as critical studies of librarianship (Dohe 2019; Ettarh 2018; Harris 1992; Hoffmann and Bloom 2016), and digital humanities (Nowviskie 2016).

Chapter 4 FamilySearch Books: Institutional Perspective(s)

4.1 Introduction

As a large-scale, long-term, geographically distributed digitization project, FamilySearch Books (FSB) is a collaborative effort with many stakeholders. This chapter examines FSB from the perspectives of the participating institutions, while future chapters will take up the perspective of workers and work. Through this exploration, I seek to surface places in infrastructure where what Star (1999) calls "the master narrative-in-the-making" becomes visible. These are narratives of inclusion and exclusion, values and assumptions about normative characteristics or practices embedded in artifacts, systems, and infrastructures; they may be found in a wide range of objects, from classification and transportation systems to mundane household objects to software platforms (Star and Bowker 1999; Lampland and Star 2009; Latour 1996; Akrich 1992; Gillespie 2010; Winner 1980). In an information system, these narratives can determine not only objects that are included and excluded but also things that are knowable and things that are not.

Master narratives may often be found explicitly in the goals and values cited by individuals or institutions as motivating projects or system design, although the presence of a master narrative requires neither intention nor design (Akrich 1992; Johnson 1988). In the first two thirds of this chapter, I address the following question: *what are the different motivations, goals, values, priorities, and resource constraints that institutional participants bring to FSB?* Section 4.2 provides an understanding of the organization and functional structure of FSB, while Section 4.3 surfaces multiple motivations, contexts, and constraints of participating institutions. Institutional participants in FSB include FamilySearch (inseparable from the Church of Jesus Christ of Latter-day Saints) and public library

partners. Section 4.4 brings these separate institutional contexts together to situate questions of motivations, goals, and resource constraints within a broader ongoing conversation about (public) library futures. Digitization is positioned to address different problems within each participating institution, and each envisions different futures (of use, but also of physical settings for the stewardship of print collections) for their collections. In aggregate these sections provide a high level institutional view of FSB planning and administration.

Often, however, master narratives are produced in practice at the intersection of many actors, human and non-human, an entanglement of active participants as systems are built and scaled. In the final third of the chapter, I address this by exploring the question: *as institutions negotiate mutual benefit and navigate constraints, what tensions, gaps, or power dynamics become visible in the transition from digitization plans to execution?* These are places in projects when embedded values and priorities may be undermined, circumvented, or defied, moments of displacement or disruption that can shape of the system. In FSB, there are many such moments, as institutional actors, humans, print materials, and information systems are brought together through digitization. In Section 4.5 I explore how FSB begins to take shape in practice through an examination of one early coordinated effort among participants concerned quite explicitly with matters of inclusion and exclusion: content selection. Significant constraints emerging in practice include labor as well as existing systems for mediating access to print and digital content.

The data for this chapter were collected from multiple sources. These include interviews and observations of each of FSB's five full-time book scanning employees, two manager level staff members at the LDS Church's main Family History Library in Salt Lake City, six public library partner employees with responsibilities related to negotiating and managing digitization partnerships with FSB. It also contains data gathered through extensive onsite observations of daily scanning operations at four book scanning sites (two public library partners, two Family History Center scanning sites), the FSB weekly book scanning team meeting in Salt Lake City, the annual FSB partners meeting at the RootsTech conference in Salt Lake City, and two community scanning events.

4.2 FamilySearch Books: Organization and functional structure

4.2.1 FamilySearch Books history

In partnership with the library at Brigham Young University, in 2003 FamilySearch undertook a small pilot project to digitize compiled family history books. FamilySearch Books staff member FS-2 recounts, "We started digitizing some of ours, they did theirs, and they hosted them on their website. We did it for a year, and then we kind of pulled back and wanted to analyze it, see if it was really worthwhile. The statistics showed that the books were being used more than they had ever been used." The BYU-hosted collection soon outgrew the available IT infrastructure, taking up too much bandwidth and server space. Eventually, the Church made the decision to host the digitized books on FamilySearch.org and continue with the project by digitizing the book collection at its massive Family History Library (FHL) in Salt Lake City. That decision, FSB staff member FS-3 relates, is when the project really began to grow; eventually Family History Books (now FamilySearch Books) was formally established in 2005, with a small staff to support and execute it.

Book scanning, multiple FHL and FSB employees relate, "wasn't created as its own entity with its own budget or anything." It was a beta project, an opportunistic—possibly temporary—collaborative undertaking among multiple Church divisions. In the early days, FHL staff member FS-6 says,

> It was 'we're going to start scanning books and see how this goes, and we're going to get them up on the site.' It was just 'get us books.' There wasn't a needs assessment. There wasn't a plan. It was just 'this is our beta. Get this in. We're going to see how this grows and what it does.' I think we were completely floored by the consumption of it. It grew way faster.

Reflecting on the project's days of being located within the FHL building, FHL staff member FS-7 explains, "it was a matter of they would take it off the shelves and then just take it to the room downstairs. We didn't know that they were doing that. The catalog didn't indicate that 'hey the book's no longer on the shelf.'" FSB outgrew each of its scanning spaces and eventually landed in West Valley, a few miles west of downtown Salt Lake City.

Internally, FSB operates as a collaborative effort among several LDS Church divisions: the Records and Partnerships division (responsible for strategy and planning,

making content selection directives); the Family History Library/Patron Services division (responsible for fulfilling the Records team's content requests, but with genealogists on staff to provide input on prioritizing content); and the small FSB team, which executes the project. FS-7 explains:

> Records, they own the collection, but we [FHL] manage what's in house. Then we have scanning, so the three of them kind of work together... Scanning goes 'we need more books to scan,' and then records go 'okay, well just check the permissions.' Everything's there. Then we go, 'all right, now we got to pull our books off the shelves and then send them on.'

FSB has grown in three separate but related directions. First, it has continued FamilySearch's commitment to digitizing the entirety of the FHL collection. Second, it has supported and managed the digital conversion of print holdings at LDS Church-run Family History Centers (FHCs) throughout the country; these are described in more detail in Section 4.3.1 below). Because the FHL, FHCs, and FSB are part of the same larger organization—FamilySearch, which is itself part of the LDS Church—FSB formally defines these two strands of the project to be *internal undertakings* rather than *external partnerships*.

Third, it has pursued partnerships with non-LDS organizations in order to acquire unique or local family history materials collected by public libraries, historical societies, and one university library. In several of these locations, FSB also partners with the Internet Archive to share and distribute expenses (e.g. Internet Archive provides the equipment, FamilySearch provides the labor).

4.2.2 FamilySearch Books structure

Between July 2016 and February 2018, during which time I undertook the fieldwork for this research, FSB had fourteen digitization locations within the U.S. These scanning sites, which are listed in Table 4-1, undertake scanning related to the three strands of the project described above, and are located in a mix of LDS Church-owned properties (FHCs and standalone operations) and partner scanning sites.

Table 4-1 FamilySearch book scanning sites

LDS Church sites/Family History Centers *(Internal)*	Public Libraries *(External partnerships)*
Mesa, AZ	Allen County Public Library (Fort Wayne, IN)*
Ogden, UT	Historical Society of Pennsylvania (Philadelphia, PA)
Orange County, CA	Houston Public Library (Houston, TX)
Orem, UT	Mid-Continent Public Library (Independence, MO)
Pocatello, ID	Onandaga County Public Library (Syracuse, NY)
Las Vegas, NV	University of Florida (Gainesville, FL)*
Sacramento, CA	
West Valley City, UT	

** Sites with Internet Archive partnerships*

The LDS Church/FamilySearch employs a team of five professional staff to lead and coordinate the FSB team's efforts from Salt Lake City. Not included in the staff count is FamilySearch's professional cataloging team, who work with multiple FamilySearch divisions to create and maintain accurate catalog records, and work done by a logistics manager to manage transport of Church-owned books across libraries and scanning centers. This small team works with manager-level professional staff from partner organizations that house FSB scanning operations. (In the case of FHCs, leadership positions are occupied by volunteers nominated by LDS Church leaders.) Within scanning centers, imaging-related activities are almost exclusively undertaken by pairs of full-time senior missionaries, a mixture of married couples and "single sister" missionaries. (Senior here refers to age rather than status.) The labor of executing digitization will be the focus of subsequent chapters.

In the descriptions and analyses of FSB that follow, I differentiate among three separate institutional perspectives—FamilySearch, FHCs, and partner libraries—when relevant. Note that the FHC perspective often aligns with its parent organization, the LDS Church/FamilySearch, in high level project motivations and values; the FHC perspective gains relevance to be considered separately primarily in digitization execution.

4.2.3 Resource allocation

FSB functions as a contract digitizer, although no money changes hands among participating institutions. For all projects FSB staff negotiate scanning parameters in advance; this usually includes materials handling, copyright protocol, receipt of copies of

digitized output, FamilySearch support availability, and partner responsibilities. FSB staff prepare and sign a memorandum of understanding with all external partnership organizations, which can be a slow process due to Church and library bureaucracy.

The FHL and FHCs send books (using LDS transportation infrastructure) to FamilySearch-run regional scanning centers. For external partners with large collections, FSB will set up an onsite scanning operation. “If they have 2,000 unique books that we don't yet have scanned, then that justifies us being able to send volunteers and buy some expensive equipment and go set up in the corner of their library for more than a year,” FS-2 explains. For smaller external collections, FSB encourages prospective partners to send their materials to the closest regional scanning center, as it does with rural FHC collections.

For each scanning site, FSB provides the equipment, digitization workflow, and a supply of trained senior missionaries. FSB also hosts and maintains online access to digitized collection content. Partner organizations generally provide physical scanning space, electricity, on-site training and ongoing support for missionaries, professional librarian expertise and time, and as partner librarian FS-42 describes, “a collection that we’ve built over half a century, a willingness to collaborate.” FSB staff work with the existing (often minimal) IT infrastructure at partner libraries and modify digitization workflows where necessary.

4.3 Digitization motivations, contexts, and constraints

FSB takes place within multiple institutional contexts; each of these institutional participants has different things at stake in digitization, and may be differently affected by the shape digitization takes. Beyond individual motivations, each participant faces a different configuration of a familiar set of circumstances that shape its digitization efforts. These include institutional structures, available resources (human, material, technical), changing user needs and expectations, and information systems that mediate access to print and digital resources differently. All FSB participants do share several digitization goals and motivations, however. These include contributing to fulfilling broader institutional missions, and expanding access to content for a widening body of users. Collaboration within FSB emerges, then, as layered alignments of overlapping but often distinctly different institutional goals and priorities. This section sketches out institution-

specific values, priorities, and resource constraints that shape project participation. There are two primary perspectives here: FamilySearch and public library partners.

4.3.1 Religious roots: Genealogy—and digitization—in the Church of Jesus Christ of Latter-day Saints

FamilySearch's digitization motivations are inseparable from the centrality of genealogy in its parent organization, the Church of Jesus Christ of Latter-day Saints. Noting that little attention has been paid in non-LDS literature to the religious doctrine behind Mormons' genealogical activities, Otterstrom (2008) observes that genealogy and family history are at the core of LDS members' personal sense of identity as well as their professional public outreach.

The LDS Church places a strong emphasis on family, and understands family bonds as eternal. Living LDS participate in several different religious ordinances, acts which have formal spiritual significance within the Church, related to the redemption of the dead (specifically deceased family members). Ordinances performed by Church members by proxy on behalf of the dead within LDS temples (often referred to as "temple ordinances") include sealings, in which living and deceased family members are connected eternally, and baptisms to ensure individuals' salvation. Mormon doctrine maintains that a deceased person has agency to choose whether or not to accept the baptism or sealing (Ludlow 1992).

In 1894, LDS Church President Wilford Woodruff gave a speech in which he shared a revelation connecting the redemption of the dead to family history research. "We want the Latter-day Saints from this time to trace their genealogies as far as they can and to be sealed to their fathers and mothers. Have children sealed to their parents, and run this chain through as far as you can get it…This is the will of the Lord to his people" (Woodruff 1922). Following Woodruff's revelation, the LDS Church has strongly encouraged individual Church members to conduct genealogical research and trace their family histories to at least four generations specifically in support of these religious activities (Allen, Embry, and Mehr 1995).

Genealogical records, then, are critical for extracting names and documenting the identities of deceased individuals who may then become the recipients of sealings and/or

proxy baptisms; these two activities are the driving force behind all of FamilySearch's efforts described in the next several chapters. Accurate genealogical record-keeping is also necessary to help to avoid duplicate baptisms, an ongoing problem for the Church (Allen, Embry, and Mehr 1995).

4.3.2 Situating FSB within LDS genealogy infrastructure creation

Over the last century, the LDS Church has invested considerable administrative and financial resources into creating infrastructure for genealogical record collection, reformatting, preservation, and dissemination (Otterstrom 2008). The Genealogical Society of Utah (hereafter GSU) was founded in 1894 by Church members in response to Woodruff's speech. In 1944 the GSU officially became a Church corporation, and in 1961 disincorporated in favor of becoming a formal Church auxiliary (Allen, Embry, and Mehr 1995). Since 1999, with the launch of the FamilySearch website, the GSU has operated as FamilySearch International. It remains the family history wing of the LDS Church (Paulich 2014).

The GSU/FamilySearch has undertaken several separate but coordinated strategies to support Church members to identify, submit, and clear names for temple ordinances. Each provides relevant context to FSB, which comprises a tiny fraction of the LDS Church's aggregate genealogy efforts.

4.3.2.1 Gathering, organizing, reformatting genealogical resources

The GSU began microfilming genealogical records in 1938, and became a prominent early non-military user of microfilm technology as well as an enthusiastic partner in initiatives to improve it. By 1980, the Church had more than one million feet of microfilmed genealogy records from all over the world (Bean et al. 1980). The organization began digitizing records in 1998, focusing on the digital conversion—and—eventual indexing, of its massive microfilm archive (Otterstrom 2008).

In the 2000s FamilySearch moved on from microfilming to collect new genealogical records using digital imaging technologies at repositories worldwide (Laxman 2009). Today FamilySearch engages in image capture, digital conversion, physical preservation, and indexing for a broad range of genealogical records in partnerships with a wide range of

entities—public libraries, governments, historical societies, churches, cultural organizations, and for-profit genealogy corporations (FamilySearch 2018).

4.3.2.2 Building networked technical infrastructure for name extraction

Supplementing other efforts to centralize genealogy information and access, the GSU has invested in building networked technical infrastructure for genealogy data sharing, from file formats to the web-based software platforms. Over the past 60 years, the GSU developed several systems for automating the extraction, submission, and clearing of names from microfilmed genealogy records for temple ordinances. These include a mainframe system called Giant, the International Genealogical Index, the Personal Ancestral File, etc. (Allen, Embry, and Mehr 1995).

In May 1999, the Church of Jesus Christ of Latter-day Saints launched FamilySearch.org, which promised to provide free access to a wide range of online family history research resources (Lloyd 1999). This move was of particular interest to growing numbers of amateur genealogists active online, whose previous options were limited to the subscription-based for-profit model established by companies such as Ancestry.com (launched in 1997). *Wired*'s Erik Davis (1999) characterizes the online genealogy environment into which FamilySearch stepped as containing "old-school Internet values *and* the new Web economy," with family historians' commitment to collaboration and sharing challenged by commercial players such as Ancestry.com. With the concurrent growth of both the corporate Ancestry.com and the non-profit FamilySearch, Davis observes, "These commercial players are changing the ecology of Internet family history, generating a now familiar tug-of-war involving producers, consumers, and advocates for free and open information."

Twenty years after launch, FamilySearch's long-term commitment to family history makes a multifaceted and savvy use of the web. FamilySearch leverages the web to distribute genealogical content to family history researchers worldwide. This distribution system has been so successful that in 2017, after more than 50 years, FamilySearch discontinued loaning microfilm to branch or affiliate libraries in favor of online access and formally announced a shift to digital in its records preservation strategy (FamilySearch 2017b).

Using FamilySearch's web-based platform, many users then contribute genealogical content back to FamilySearch through their research. FamilySearch remains free to use by LDS Church members and non-members; however, access to many FamilySearch digitized records or books remains limited to computers located within Church-owned facilities or affiliate public libraries and memory organizations.

4.3.2.3 Building libraries: Family History Library and Family History Centers

The GSU supported the building of the Family History Library (FHL), near the LDS Church headquarters in Salt Lake City. It is the largest genealogy research library in the world. In 1961, the GSU also partly financed the opening of small branch libraries that could offer access to microfilmed genealogy records and a small number of reference books. Today there are more than 5000 of these Family History Centers (FHCs) worldwide (Church of Jesus Christ of Latter-day Saints 2019).

Located in Church-owned buildings but open to both LDS Church members and non-members, many FHCs are tiny and offer limited programming beyond computer access (Allen, Embry, and Mehr 1995). Local congregations are responsible for all FHC operations, with Church members called for service assignments to staff the centers. FHCs offer access to genealogical records via the online FamilySearch catalog, subscription genealogy websites, and microfilm collections. While FHCs were never intended to be formal book holding repositories, over decades of operation many of the larger centers have amassed collections that include both unique local genealogy resources and commonly used reference materials and have become libraries in practice if not in design.

FHC participation in FSB is directly motivated by the LDS Church's desire to "remodel" FHCs, where space is tight and books are not being used. One FSB staff member explains,

> They've been told that if they want to remodel, if they want more space, if they want more equipment they have to get rid of their books. We [FamilySearch, or the LDS Church more generally] haven't forced them to actually send them, but it's still kind of a heavy stick that if the status quo's okay you don't have to do anything, but if you want more equipment, more computers, you have to send us your books.

The majority of books digitized from these small FHCs are taken off the shelves permanently as part of the process: here the phrases "remodel," "downsize," and "process a collection" are all euphemisms for clearing print books from shelves and/or installing computers able to access all of FamilySearch's digitized content.

Through digitization, FHCs are actually returned to their original function as places where Church members (and later non-member) may gain networked access to genealogy resources; while referred to as "branch libraries," they were never intended as repositories. Many of the books in FHCs —from self-published family histories, family newsletters, or other resources linked to regional or local populations—have maintained a dual invisibility for decades, physically hidden away in the basements of rural FHCs but also un-cataloged in the FamilySearch library catalog or even WorldCat. Through FHC remodeling, these books are brought under the auspices of the Church first through cataloging and then, following digitization, are sent to the FHL's long-term storage facility.

In terms of motivations, then, the FSB project represents the extension of FamilySearch's religious goals into the world of books. FSB's religious underpinnings are in evidence at every level of the project, from the prayers that start FSB staff meetings and missionary work days to the fact that FSB partners regularly reference the religious motivation of FamilySearch's commitment to digitizing genealogical materials.

4.3.3 FamilySearch Books: Being the "red-headed stepchild" in a powerful family

When talking to FSB partner libraries, librarians often actively align the FSB project with the LDS Church's century-long commitment to collecting and offering access to genealogy resources—longer than any of the public genealogy library partners' collections have existed. In doing so they favorably compare FSB's perceived institutional stability with their own precarious library futures.

From an operational standpoint, however, FSB staff actually see their project quite differently. FSB is newer and smaller than other digitization efforts, but also has been situated institutionally in multiple places as it has moved from a beta project into a formal unit. Several people characterize the book scanning project as a kind of invisible, "red-headed stepchild" within the Church's Family History division. They explain that FSB flies

under the radar compared to the much greater institutional visibility of longstanding genealogy records capture efforts, in which pairs of missionaries are sent with cameras all over the world to scan genealogy records from locations such as archives or local government buildings.

In the early days, those involved in the FSB project found themselves needing to create scalable systems to manage and support growth that was already happening. FS-3 describes the ways that FSB has grown, its systems and workflows evolving in an ad hoc way with reference to many factors simultaneously:

> Not every group starts out with the perfect content management system backend that houses everything. They use the resources they have. They get what they can. They build what they have. It's just that the needs of people using it get crazier and huge, so then you have to evolve as your patrons' needs evolve. That's where we're at today is we're going through an old system, evaluating new systems, moving to that.

FSB staff observe that the project's rapid growth has required flexibility and an openness to change; often these needs are at odds with an institutional context in which Church bureaucracy, conservatism, and constant organizational re-structuring makes it frustratingly slow to change policies in response to evolving needs. Further, the challenges of managing growth have occurred with what FSB staff characterize as a minimal budget and small staff.

Today, FSB's marginality vis-à-vis the larger FamilySearch organization shapes—and challenges—the project at almost every level, from resource allocation to recruiting prospective missionaries for scanning missions to marketing the project's output to users. For example, on the FamilySearch website there are separate pipelines for processing and accessing digitized books and other genealogy content. FamilySearch book content is located on a different part of the website than record search, and is accessed differently; whereas record search uses fielded information which has been indexed by volunteers, books may be searched by downloading and searching within text that has been made searchable through OCR software. The "hints" that the FamilySearch platform provides to help a user locate other information relevant to a search does not cross between these different resource types.

Given these circumstances of relative institutional marginalization, things such as improving efficiency and minimizing expenses emerge as priorities for FSB in practice. FS-3 explains:

> That makes a lot of sense in a digitization workflow to figure out how to do two things, get out of the business of mass data transfer, and process everything in a centralized way, and then how to minimize the cost of pulling it out of storage to keep processing it. The transferring data got to be a nightmare because each book was ginormous, it was huge. Every page being anywhere from five to 20 to 40 megabytes a page… You times that by 600 and then you times that by several thousand and it just adds up. If we were imaging in color on our copy books at a full spread, that's like an 80 megabyte page at 300 pixels per inch. Some projects require 400 and 600 and we can do that, but very rarely do we do that. We can get anything we need to with our 300 pixels per inch images whether it's online or reprinting, it's great quality…. 400 pixels per inch, gee that's like 200 megabytes a page… That's just too much.

While perhaps secondary to the religious goals motivating the entire undertaking, these efficiency-oriented priorities shape FSB decisions at the pixel level with respect to image quality and at the technical infrastructure level with strategies for processing and storing imaged resources.

4.3.4 Public library partners: Autonomy, invisibility, and resource constraints

Located as units within larger public library systems, genealogy or family history centers contain a mix of commonly held reference resources (e.g. copies of birth, death, marriage, and military records, held in a mix of print, microfilm, and digital formats) that are national or international in scope, and—particularly when housed within or adjacent to local history collections—resources unique to the geographical region(s) of the library or to the demographics of its users (e.g. historical business directories, narrative family histories, some city/county/region histories, etc.).

Partner libraries say that digitization helps them to fulfill their service and patron-facing goals and demonstrate the contribution of family history departments to broader public library missions. One partner public library describes itself as a service institution for the whole county and beyond. Its mission statement has four big action statements: inform, educate, entertain, and culturally enrich. Family history fits in to all of these

categories, its manager observes, and says the library's partnership with FSB "sweetly and concisely" helps with all pieces of the mission and serves family historians of all kinds. A librarian working at another library partner, located in a large and diverse urban public library system, says that the FSB partnership helps the library to fulfill its mission to serve patrons with diverse roots; the "power of FamilySearch" gives them the ability to help a person who comes in who wants information about Zimbabwe, South America, or colonial American ancestors. A third partner librarian says, "there's no way we could do it [fulfill our mission] without them. We would still have the support of our administration and we could still get local volunteers, but we couldn't get the distribution of 300,000 books, that's what it boils down to."

Focused closely on providing patron services but also responsible for collection management that occasionally involves accepting donations and providing long term content stewardship, genealogy libraries often fit awkwardly within a public library's administrative or support structures. Multiple genealogy librarians characterize their centers as akin to special collections libraries. "We are the public genealogy library…" one librarian, FS-82, explains. "Being able to provide the 'public' part has been very important, but we're also kind of the 'special' part - special collections, specialized services…." This is unusual, librarian FS-83 explains, because "public libraries really aren't in the business of special collections. They're in the business of popular reading, and job creation, and services for the community that are basic everyday services."

As special collections libraries within larger public library structures, genealogy centers experience both autonomy and invisibility. One partner librarian reports getting less scrutiny than other two special collection libraries within a large multi-branch public library system: "Nobody knows anything about genealogy….I very rarely get a phone call. Yeah. It's interesting. I kind of live really autonomously five and a half miles away from the mothership." But, FS-83 quickly acknowledges, this autonomy is accompanied by a kind of outsiderness. Again using a family metaphor that comes up repeatedly across both FSB and public library staff to characterize their institutional positioning(s), FS-83 describes her large genealogy library as "sort of a step-child" within the public library system.

Like the public libraries that house them, genealogy and family history centers have a history of working with often extensive resource constraints. One public librarian relates

that her genealogy library is "1 of 31 branches. If you are one of 31 children, you have to share attention - and resources…." Another large genealogy library partner is one of 43 branches of a large urban public library system. Even if they are interested in digitizing their collections, public libraries often lack the money, equipment, or people to execute any large-scale efforts—or maintain access to digitized resources.

Because the majority of public library funding comes from property taxes, the recession and economic downturn of the late 2000s contributed to shrinking library budgets and resource scarcity issues. Partner library genealogy managers report varying levels of (financial and institutional) administration-level library support for their collections. One genealogy library manager, FS-83, reports a substantial resource shrinkage over the past several years—in both physical space (patron-facing and storage) and staff provision—as part of a broader library-level re-organization and consolidation.

Resource allocation can be complex, and contingent. Some libraries operate relying on a delicate balance of city and external funds. One partner librarian relates that her large genealogy library has had its collection development budget reduced tenfold over the last decade, but the library continues to receive funds for purchasing materials from a non-profit Friends of the Library group. The group also staffs one of the library's buildings on a volunteer basis. The librarian here points out that this reliance on city and external funds is a delicate one, as the availability of one funding stream may undermine another. In particular, she has a sense that the availability of external funds (or, potentially, no-cost partnerships such as FSB represents) probably negatively shapes the public library administration's willingness to provide ongoing funding. At the same time, she also gets support from the library administration because she brings positive press and visibility to the library by actively seeking out partnerships with prominent national entities like FamilySearch.

4.4 Digitization and (genealogy) libraries of the future

An ongoing debate over the continuing value of public libraries in the 21st century shapes FSB—and in particular, FamilySearch's pursuit of partnerships with public libraries—in multiple ways. Libraries, multiple researchers and critics observe, have often faced change and uncertain futures as systems of media production, distribution, and

storage evolve alongside broader cultural and technological change (Battles 2004; Janes 2013; Mattern 2014).

Genealogy collections and libraries represent a very small fraction of the public library landscape, and these libraries have a much more narrowly-defined user base than public libraries as a whole. Even so, situating FSB within discussions of library futures here sheds light on how digitization intervenes in ongoing debates over what constitutes a user and what constitutes use, the future of libraries as repositories for print resources, the changing role of librarians, the complexities of resource allocation, and the different ways institutional participants imagine the evolving relationship between print and digital resources in the library.

On the one hand, digitization appears to contribute toward the dream of universal access to information by bridging the divide between shelf and screen, enabling access by almost unlimited numbers of geographically dispersed users. But on the other, several partner librarians acknowledge it is an open question of whether—or to what extent—the availability of digital collections raises the profile of print collections or helps to render them obsolete, along with the brick and mortar buildings that house them or the librarians who help to provide access to them.

This debate over library futures is not just talk. Rather, it is tied to actual resource allocation, as shrinking library budgets distribute resources across a growing number of areas. These include familiar library expenses such as print collection development, programming, and human resources to newer developments such as public community spaces (e.g. maker spaces, cafes), digital collection development, or technical infrastructure provision and maintenance (Casey and Savastinuk 2007; Horrigan 2015; Schnapp and Battles 2014). These are the circumstances in which genealogy libraries find themselves in need of outsourcing things like technical infrastructure and digital collection development and management. Public library participants in FSB negotiate mutual benefit among many competing values, priorities, and structural constraints. The decisions that are made with respect to digitization will inevitably leave some people and practices behind as the future library takes shape.

By pursuing its ambitious genealogy goals in part through digitization partnerships with public libraries, FamilySearch has somewhat inadvertently intervened in an existing

debate about public library futures. While in conversation FamilySearch staff want to emphasize that there is a natural alignment with the ways that public libraries are thinking through ideas of community and collaboration (online and offline) and what FamilySearch is doing to support the creation of online family history communities, there are important differences between the two in the way they approach library content and services.

These differences are perhaps crystallized in two contrasting constructions of library futures recently put forward by David Weinberger (2012) and Shannon Mattern (2014). In "Library as Platform," Weinberger urges libraries to transform from portal to platform. He argues that the idea of the platform does not center the physical versus virtual information distinction; instead, a "platform first" strategy will think instead about data, tools and services, and where they are best provided. In continuity with libraries in their current form, he sees communities gathered around libraries as mostly geographical, with some interest-oriented manifestations. Libraries as platforms, Weinberger argues, will enable the development of "knowledge networks"—groups of people and data clustered together, which may or may not include librarians or other experts. The platform "focuses our attention away from the provisioning of resources to the foment those resources engender."

Approaching the new media era as part of library evolution rather than revolution, Mattern (2014) puts forward an alternative vision of "Libraries as Infrastructure." She argues that while contexts for library functions may shift "the library has always been a place where informational and social infrastructures intersect within a physical infrastructure that (ideally) supports that program." This definition underscores the layered, entangled character of the multiple networks and systems through which libraries operate, and foregrounds attention to the ways that ideas, values, and social responsibilities are scaffolded within libraries' material systems. Mattern advocates a future for libraries where they resist the urge to take up all of the functions of lagging social service agencies, but retain their importance as community spaces by remaining committed to supporting lifelong learning for both the disenfranchised and the enfranchised. Foregrounding library labor—and expertise, she advocates for the rebranding of librarians as "professional consultants in a complex information economy."

Mattern (2014) argues that Weinberger's vision leans too heavily on a Silicon Valley-inflected "entrepreneurial epistemology"; landing too fully on the side of new media, it overlooks the "generative capacities of low-tech, and even *non*-technical, library services." While Weinberger centers "messy rich networks of people and ideas" as the heart of the library project, Mattern critiques his lack of attention to the backstage material and human networks that support this activity. Indeed, the flat, smooth surface of Weinberger's platform metaphor evokes an immaterial neutrality that does not appear to require funding (for content creation or maintenance) or labor.

Because the contrasting visions of library futures constructed by Weinberger and Mattern map at least partially to those of FamilySearch and partner public libraries respectively, they provide helpful context for the rest of Section 4.4 and for understanding how the FSB project fits into multiple infrastructure—and infrastructural change—stories simultaneously. FamilySearch, like Weinberger, focuses primarily on the generative productivity of simply making data and tools available. Public library partners, on the other hand, might not disagree with Weinberger's vision in principle, but their experience of both maintaining a broad commitment to access and operating under severe resource constraints likely lead them to recognize that Weinberger's vision is as at best short-sighted or incomplete.

Following a vignette from one of the public library partners describing the layout and foot traffic of the library on what librarians term a "typical" afternoon (4.4.1), subsequent subsections (4.4.2-4.4.5) explore points of convergence or tension between FamilySearch and its library partners with respect to the question of library futures and digitization within the FSB project.

4.4.1 VIGNETTE: A view of the library from the Information desk

In 2016, as part of a multimillion dollar renovation, this public library's central branch consolidated its physical space substantially while revising its collection scope to prioritize the expansion of non-book "shared community resources" such as maker technologies, a tool library, etc. Adding street-level access to the library, the library gave up its use of the fourth and fifth floor of a mixed use (office, shopping, and defunct food court) building in the downtown of a mid-sized postindustrial city struggling to recover from the recent economic

recession.

The library renovation has affected the space, staffing, and composition of the Local History and Genealogy (hereafter LHG) department. In 2016 the department moved from its own dedicated space—where the majority of its collection was housed in open stacks—to the third floor, where it now shares space with the library's entire adult print collection. LHG books have moved to a closed stack format as well. Book shelves line the perimeter of the third floor, with plenty of space for tables, chairs, and couches. A large counter occupies the middle of the room, with a red sign announcing its purpose in capital letters: INFORMATION. The LHG collection adjoins the Information desk on one side; it is separated from rest of the third floor by a windowed half wall and a theft detection checkpoint, presumably to ensure the security of the collection's non-circulating materials. The renovated LHG space contains a long table with chairs and lamps for using collection materials, several legacy paper card catalog systems, and two big shelves of general reference materials. A row of computer terminals, printer, scanner, and microfilm reader line the back wall. Two staff members—one professional librarian, and one para-professional clerk—staff the Information desk. A uniformed security guard sits at a smaller, nearly identical counter labeled SECURITY approximately fifteen feet away.

LHG librarians FS-63 and FS-64 report working more reference shifts post-library reorganization, but because the Information desk now serves both the LHG collection and the general adult collection they field more general reference questions than when the collection had the fifth floor to itself. On shift at the Information desk, we have long stretches of no patron interactions during which we talk, or multitask by cataloging books for the FamilySearch missionaries to scan, or on one day make small talk with the elderly retired man who staffs the security counter.

"We used to have a beautiful space," FS-63 laments. "We had our own floor, a huge space. In the move we lost that, we lost windows, and security, and a certain buffer too." I get the sense from talking to both FS-63 and FS-64 that the loss of security they describe references two things simultaneously, with their discomfort in being physically consolidated and collocated with the rest of the print collection and its patrons exacerbated by a distrust for library administration's commitment to the long-term support and stewardship of the LHG collection. Tasked to carry out an administration-level vision that they perceive to devalue

both their department and their expertise, FS-63 and FS-64 remain committed to the both their collections and their service-oriented profession but many of our conversations are permeated by an air of resignation. There is no sense that this new reality is temporary; by contrast, many of their explanations differentiate quite deliberately between the past and present/future.

During these hours of observation from the Information desk, our conversations about the changing positioning of the genealogy/local history collection within the library, the changing emphasis of the library overall, and the changing—and multiple - nature of librarian work are animated in striking ways by the visibility of patron activity patterns. While staffing the reference desk LHG librarians become spokespeople for bathroom rules of use, and defensive guardians of office supplies and small tools (e.g. magnifying glasses, staplers) they report routinely go missing. The set of computers is in constant use. A woman with a stroller clearly containing most if not all of her possessions changes a baby's diaper on a nearby reading table. People nap next to phones charging in wall outlets. The security guard makes countless slow loops around the perimeter of the third floor, sometimes interrupting these activities and sometimes avoiding them. Patrons looking for the bathroom are directed to facilities where the main door has been propped open, with stalls lacking locks inside; by the second day I realized this set up was intentional rather than created out of neglect, a strategy to mitigate the improper use of bathrooms for drug use or other activities. The library provides books for patrons, sure, but also provides electricity, heat, and a roof under which patrons could pass the time insulated from the late fall wind and rain outside. Positioning itself as a 21st century community resource, this urban library has to grapple with changing definitions of both "community" and "resource."

4.4.2 Library as destination, as gathering place

On one level, the recursive relationship among the availability of media online, user expectations, and decreasing door counts suggests that the brick and mortar library's days as a book-centered institution are numbered; at least one librarian partner asserted this directly. On another level, however, the view of the library from the Information desk in the vignette below underscores the continuing—if increasingly economically devalued—critical role public libraries play as community spaces and resources.

Part of the 21st century redefinition of public library spaces is to position libraries as community resources rather than just buildings to store books, which requires a shift in focus toward "information" in many formats. Public libraries are going in many directions to remain relevant to today's users, and people use library buildings for different things. In addition to reading or researching, librarian FS-82 observes, "People use the public library as a babysitter, a place to drop family members off. Today's public library has to balance what the customer wants and what we can pay for." Whether print or digital, genealogy resources and services are increasingly squeezed between and by other library functions. On site at two partner public libraries, located within urban locations hard hit by the recent economic recession, there is a visible disjuncture between different types of users and use supported by the libraries.

FamilySearch does not operate a public library; while the FHL is the largest genealogy library in the world, its patrons are considerably more uniform in their intentions for visiting the enormous Salt Lake City building than those visiting FamilySearch's genealogy library partners. As a result, FamilySearch is able to be at once more narrowly focused and expansive in its future envisioning. De-centering the role of books through digitization, FamilySearch staff imagine the brick and mortar genealogy library of the future as a collaborative family history research space in which print books are one among many genealogy information media formats. They argue that a genealogy library's value in the future will likely be found through services and functions that are not always tied to an on-site print collection. FHL staff remain confident about the continued viability of the library as a destination, a literal gathering place—even as entire floors of its books and microfilm at the FHL have been slowly and permanently removed for scanning and off-site storage over the last few years. FHL librarian FS-6 details:

> What we have found, and I can only speak to the Family History Library, family history is still a collaborative event, it seems to be. People still gather. Us as the library, one of blessings is we, societies have members from all over the United States or all over the world, and they can hold, use our facilities for their gathering place. We have the computer labs for them. We have the scanners. We have the resources. We have the classrooms. That's one of the things I see in libraries is where there's a worldwide membership or collection of people who have similar likes, but nobody's living next to each other, libraries can be that gathering place, that collaboration space. There will be

> books that we can never digitize and put online. They're still going to be unique to that public library or our library that people still come here for that resource, just like they do archives or somewhere else.

FS-6's colleague FS-7 points out that patrons also value librarians' expertise: "You also get the expertise here. If you need help in your research, it doesn't matter if a book is online or on the shelves, if you need help, what's next step, what's this book telling me, you can also come in here and get that sort of a help."

FamilySearch has also begun to create "Discovery Centers," where individuals and families can interact with—and contribute—family and historical data using a variety of new technologies, unencumbered by libraries' shelves of books (Nauta 2015). These centers are constructed as sites of engagement for both new and seasoned family history enthusiasts, supplements rather than replacements for the traditional research library.

4.4.3 "It gets your face in the place, and the place is virtual": digitization as marketing

FSB seems to push the same argument to all public library collaborators, characterized here by partner librarian FS-63, that "by putting your collection online, you're making yourself more visible in general, and people will think, 'oh, well they have this set of records, so what else do they have?" FS-64 elaborates, "because people recognize that you are the holders of that information so they'll reach out to you via email or phone call if they can't physically get to our department. I think that's probably true. I think a really serious researcher will recognize that this is a place that I need to consider going to at some point." Every public library partner articulated this FamilySearch sales pitch in one way or another, and it emerged as an important piece of goal alignment among FSB and partner libraries.

For partner libraries, digitization can thus be used as a marketing tool to demonstrate the continuing value of their collections—online or on shelves. On digitization, genealogy librarian FS-41 articulates, "I think it's some of the best marketing you can do. It gets your face in the place, and the place is virtual." Successful digital projects, the argument goes, can be marketed externally *and* internally to justify investing institutional resources into additional projects or in managing existing collections.

The reality of this value proposition, however, is more complicated. If digitization

projects and partnerships serve as marketing tools for a library's collections, boosting the public profile of the holding library, the reach of this marketing is largely confined to internal stakeholders or digitally-savvy users (often in distant locations) who are already doing genealogy research online. Such users are neither the major nor necessarily even a valued user group for public libraries, which often continue to measure use formally through print-based metrics such as door counts. We will return to the question of metrics in the conclusion chapter (7), as it connects topics such as institutional values, labor, and access.

4.4.4 Expand the reach and use of content

All participants express a desire to increase the visibility of genealogy content through digitization. Across all types of libraries, all participants report that books digitized through FSB are being used at much higher rates than their print counterparts. Partner librarian FS-63 explains, "well, I would say that my first goal, and it's my approach to the collection in general, is giving people accessibility. Well, giving people the ability to discover what we have, and then to use what we have. It's been so obvious to me since I started here that there's so much in the collections that was hidden, and not cataloged, or held back from being cataloged."

FS-21, site manager for a large FHC scanning operation that serves as a hub in a multi-state region, observes from his extensive travels that many FHC print collections are even less visible to users. It would not be unusual, FS-21 observes, for a FHC manager to report having turned on the lights in its library "once in the past six months:"

> Oh yeah, it's not being used. Like, for example, the collection in [city name] … I was over there a couple weeks ago, and I was talking to their director, and in the last year he's had three people actually walk down into the basement where the books are at and… do anything with them at all. So— but we're finding too, that in some of these smaller locations the books aren't being used because they're usually locked in a closet. Or they're in a separate room other than where the main Family History Center is, so the patrons have no idea that the books are even in there. And so in those cases, a lot of them are like, 'we just want to free up this space. Here's all of our books -'

FHCs have become de facto repositories over time rather than planning, as resources were acquired or donated over years and decades. Given the volunteer nature of FHC staffing, many if not most of these resources lack cataloging as well, leading to the situation FS-21 describes where a year goes by with three total people attempting to access print books. Cataloging and digitization make these books available online in ways that they simply never have been while in the "library;" given the lack of active maintenance, it is not difficult for most FHCs to agree to give up their print collections in exchange for online access and more space for computers.

As genealogy moves online, FamilySearch does not face the same institutional existential crises that brick and mortar public libraries describe. While both FamilySearch and FSB partner institutions are concerned about the long-term access of digitized resources, the groups have significantly different orientations toward print collection management and stewardship. Partner libraries remain committed to maintaining access to print collections, and to the buildings that hold them; unless forced, partner libraries are not looking to take their books off shelves through digitization. By contrast, FamilySearch's investment in FHC remodeling or external partnerships is driven by its interest in content rather than physical space; FamilySearch would happily embrace an all-digital future, even if that is unlikely to happen for a variety of reasons explored in the following sections. This emerges as a point where values diverge, a potential site of tension in developing digitization partnerships.

4.4.5 Support evolving definitions of users and use—inside and outside the library

All institutional participants emphasize that networked electronic access to genealogy research materials enables librarians to serve a wider range of patrons interested in family history. Multiple librarians, from partner public libraries as well as the LDS Church-run FHL, describe the precarious balancing act their libraries face in supporting users whose needs often split along age, experience, and preferred media format lines. Even as digitization contributes to a long-term shift in genealogy user behavior toward an embrace of digital research methods, most librarians report continuing

to support multiple types of patrons. With respect to questions of users' technical literacy (and age), FHL librarian FS-6 explains:

> We are straddling two worlds because we have a lot of - the millennials are becoming interested in family history… They come in, and they know exactly what to do with digital, and they're totally fine with that. Our highest percentage are still between the ages of 65 and older... They still want to know where the card catalog is let alone where the digital copy of book is. It's a challenge because we're asking them to do things that they're not comfortable with in a format that they're not comfortable with.

Partner librarian FS-82 uses a similar metaphor to characterize her public library's efforts to serve users who are increasingly split between old and young, print and digital: "We're hanging right now. We're kind of just hanging on that edge. It's which way are we to head? Right now, we still have to balance it, that's how I see it."

For both FamilySearch and partner libraries, digitization represents a strategy to expand access to users beyond those who have the means and motivation to be physically present in a library. Long-time FamilySearch employee FS-5 enthusiastically relates, "In the 1980s, people lined up around the block before the Family History Library opened [in the morning], ready to run through the doors to race to a favorite microfilm reader, etc. Whenever I saw that, I thought 'there's got to be a better way.' And now we're here!"

Through digitization, FHL staff member FS-6 says, "we're just trying to break down the walls of the library" by offering access to millions of users around the world. Partner librarian FS-41 similarly explains, "We want more people engaged, and engaged for us doesn't mean you have to first, last, and in the middle be physically present in our facility, not at all. A number of downloads on the minority percentage of our collections that's online eclipses the entire library circulation."

FamilySearch and commercial content providers actively support the idea that genealogy research can and should done anywhere. Talking about the early days of the book scanning project at the FHL, FSB staff member FS-2 observes:

> We found that we were only serving 1/3 of our patrons in the Family History Library, and 2/3 of our patrons were being served in Family History Centers. Almost everything we're doing is 'how can we take the expertise of the library and make

> that available to people away from Utah so that they don't have to come to Salt Lake?' And almost everything on our website is that. The Wiki that we have, all of the digitization, the indexing we're doing, everything is here to make it easy for people to do genealogy from their home, and honestly that's what Ancestry and My Heritage and Find My Past are doing as well.

Both FSB and partner libraries point to a recursive relationship among libraries, users, and online genealogy companies (which include commercial vendors such as Ancestry or MyHeritage as well as the non-profit FS) in shaping user expectations. As more content becomes available, patrons increasingly expect that everything can and will be available online—and accessible anywhere. Public library partner FS-41 relates:

> I do pay a lot of attention to how the dot coms market themselves in the commercial space, 'cause I think there's a lot of wisdom in seeing who they're playing to because they set up our customers' expectations… So the My Heritage commercials, which ran around Christmas time, where there's this iPad on a stand in Central Park, and someone walks up to it and presses a few things and types in a surname. And I think one of the exclamations of one of the persons is, 'Wow! 10,000 ancestors.' So in a 45 second commercial, there's 10,000 ancestors. So knowing what our customers' expectations are and trying to insert some reality into those expectations is very helpful.

Compared to FamilySearch employees, public library partner librarians tend to be more circumspect in the impact digitization may have on their libraries' futures. The expansion of both content and users through digital collections may have different consequences for the FS-run institutions—which depend largely on volunteer labor for staffing—than for public libraries. The wide availability of digital genealogy sources often creates more work for the librarians, for example, who must not only actively market the digital collections but also teach patrons to use them. FS-83 describes that this has

> actually has made our job a little more difficult. Because there is that heavy education component. Because, okay, so we are going to buy $45,000 worth of books a year. But, we're gonna subscribe to Findmypast. So, you know, you can go out and talk about all these wonderful databases, and everybody thinks it's cool, but you also have to market and educate, which it's not a given that somebody's gonna come to the library anymore. So not only do we have to be customer service providers, we also have to be educators.

Even as public librarians appreciate the expanded user base facilitated by digitization and remain committed to serving all users, the resources with which public librarians are expected to do this work do not necessarily increase. Instead, the combination of digital resource availability and plummeting door counts often justify the employment of less professional librarians in the public library.

The question of library futures sits quietly in the background of these discussions of doing online genealogy research in a public or LDS library, at home, or in Central Park. In describing the evolution of library facilities and services and libraries' attempts to remain responsive to a wide range of 21st century patrons, both FSB staff and partner librarians say sometimes contradictory things. Sometimes the two groups are at odds with each other, and occasionally their contradictions are internal.

The dream of expansive web access—out of which online genealogy has grown, and which motivates digitization generally—also supports the idea of unmediated access to information, a neoliberal information factory without gatekeepers. One of the central tension points emerging between FamilySearch and libraries concerns the implications of this goal for libraries. By helping FamilySearch to "break down the walls of the library" or "take the expertise of the library" and move it online through digitization, are partner libraries and librarians happily manifesting their own obsolescence? Because we don't know yet what the long-term outcome of digitization will be, or exactly how much will remain of the physical structures and the books (digitized and un-digitized), there are no definitive answers to these questions.

4.5 Partnerships in practice

The genealogy centers within public libraries that partner with FSB sit at the nexus of multiple crossroads: between different types of users, who vary in age as well as skill level or location; between the past of print collection management and the future of digital access; between access systems built to manage print collections and those required for digital access; between the visible physical infrastructure of 20th century libraries and the invisibility of the technical infrastructure necessary to host and maintain digital collections; between shrinking budgets and expanding ideas of what a library should be. Right now, these genealogy libraries remain committed to serving a both/and world, supporting print

and digital collections, developing new programs and services, and welcoming users across all ages and interests. But for how long?

Public libraries are thus uniquely positioned to accept the terms of the "free" digitization services offered by FamilySearch through FSB participation, but they are also uniquely trapped, with no easy alternative. Such arrangements trade on the willingness of resource-strapped institutions to partner with an organization that may not share its core values or motivations. Partner librarian FS-42 acknowledges that in entering into low or no-cost digitization partnerships—whether with FamilySearch or other book digitizers such as Google or the Internet Archive—a public library remains largely beholden to the priorities and values of the entity providing most of the resources. Each digitizer, FS-42 observes, develops workflows that prioritize different things (e.g. metadata, image quality, volume, process standardization, etc.), which FS-42 describes as "a blessing and a curse" that shapes the execution of every project.

This is true to an even greater extent with FHC digitization. While FSB staff are quick to point out that FHCs are managed independently and make their own decisions, one FHC site manager points out that with respect to digitization "we have no budget at all here." Because the entire digitization budget is centrally controlled by FSB in Salt Lake City, FHCs remain dependent on FSB to determine the scope—and speed—of its scanning efforts.

For the remainder of Section 4.5 I use the process of content selection to explore how some of the institutional values, priorities, and constraints surfaced above are translated into executable processes, and how they are shaped by the tensions and constraints.

4.5.1 Content selection

Content selection is one place where multiple digitization actors animated within this dissertation—institutional values and priorities, labor, print materials, and systems created to mediate access to books—intersect to shape FSB project execution. Content selection can reveal uneven power dynamics among institutional project participants. It is also a site of extensive invisible labor in the project, undertaken by FamilySearch staff, partner librarians, and missionaries. Often unaccounted for in FamilySearch's offer of "free scanning" services, content selection comprises a substantial amount of the professional

labor involved in FSB. These activities include efforts to fit genealogical library resources into existing information systems mediating digital access to works created for print (e.g. library catalogs, copyright protections).

4.5.2 Defining "everything": Content selection as an idea

Mass digitization efforts such as Google Books focus on the wholesale conversion of libraries or other large corpora. Coyle (2006) differentiates mass digitization from other digitization efforts (some of which may be large in scale) in terms of digitizer motivation, process, and output. The goal of mass digitization projects, Coyle argues, is to facilitate search and indexing of digitized books through a combination of imaging each page and subjecting the output to optical character recognition (OCR) software. Human expertise or intervention is minimized through reliance on semi-automated mass production workflows. In mass digitization projects, content selection is therefore defined by default as a book's ability to fit into highly standardized digitization workflows; Google Book Search, described in the last chapter, exemplifies this approach.

FSB differentiates itself from mass digitization projects such as Google Books in part by pairing mass digitization conversion *processes* and *output* with boutique content selection parameters (*motivation*, in Coyle's terms). This pairing—and particularly the primacy of cataloging as a driving force for FamilySearch—creates tensions with respect to both content and labor, and has significantly shaped execution of FSB. If the LDS Church's aspirations to build a universal database of names circumscribes FSB as a whole, content selection is the place where the rubber hits the road. With content selection, FamilySearch's religious motivations encounter institutional, material, and legal constraints.

Within FamilySearch, book collection and scanning are organizationally distinct from genealogy vital records capture. Books include family histories, county and local histories, genealogy magazines and how-to books, gazetteers, city directories, yearbooks, individual family newsletters, and pedigrees. These print resources complement and support the information provided in vital records, and FamilySearch considers them to be valuable sources from which new names can be extracted. From missionaries to FSB staff, in the course of this research many people provided me with some version of the claim that

FamilySearch had done a statistical analysis to determine both the average number of names on a page and the number of those names that do not already appear in FamilySearch family trees. The numbers they came up with were more than ten names per page, with two-thirds or more of these names unique and not found in the existing names database.

FSB employs an expansive—and sometimes flexible, sometimes opportunistic—definition of a "book." One FSB staff member observed, "If it can be cataloged as a book, then we would scan it." Another pointed to the presence of a title page and author as important markers of "bookness." When there are questions, FSB refers to FamilySearch's materials acceptance policy (FamilySearch 2017a). This policy states that donated books must include a title, author, and publication date. They "must be readable, organized, and accessible to help researchers identify individuals and relationships by name, date, and place." They must be accompanied by a "permission to duplicate" form and must not violate copyright or privacy laws. FSB documentation lists the following content as currently acceptable: family histories, local and county histories, autobiographies and biographies containing genealogical material, and indexes to records in book format.

FSB explicitly excludes donations of materials for a variety of reasons; these include space concerns as well as considerations of future genealogical value beyond an individual or family memory level. Donations *not* accepted include: unorganized collections of genealogy research (e.g. an individual's research collection); objects that may be part of a family's history but serve limited genealogical purpose for others (e.g. souvenirs or memorabilia; correspondence, travelogues; family bibles; photo albums or scrapbooks; books of remembrance; family history research products for which there is no easy verification of accuracy (e.g. pedigrees, family group charts); journals without sufficient genealogical content or that mention living (or recently deceased) individuals) (FamilySearch 2017a).

FSB's definition of a book does not always easily translate beyond the project, particularly when combined with the relative invisibility of the project vis-à-vis FamilySearch's other genealogy resource collection efforts. Patrons often bring books to a library or a community scanning event that do not fit into book digitization parameters but fit elsewhere in the LDS Church's genealogical data collection and preservation efforts. The

Church History Library, for example, collects materials (some donated by individuals) relevant to the history of the church as an institution, whereas FSB mainly focuses on individual family histories. FamilySearch also encourages patrons to upload photographs and other family history artifacts that are not books to the "memories" section of the Family Tree website rather than including them in library collections. The added labor that the combined project invisibility and definitional confusion create for FSB staff and others will be explored further in future chapters.

FSB's particular definition of what is and is not included in "family history resources" is one of the most obvious moments where power dynamics come into play in the project. Beyond defining "bookness," FSB must also define genealogical value vis-à-vis the project. FSB partnerships manager FS-2 explains that with its public library partners, "the best collections have either a lot of family histories or local and county histories. Some libraries combine their genealogy collections with their history collections and other things, and while we're interested in some history books about a given area we're not interested in every type of history." Local history books can be valuable, but FSB content selectors are careful to screen history books for narrative detail focused on named individuals and to avoid duplication. FS-2 points out that after a decade of digitizing books in Utah, for example, it is unlikely to encounter a book about Utah state history that contains new content. For partner institutions that combine family history and local or regional history collections, the primacy of FSB's content selection parameters mean that only parts of their collections will ever be digitized.

4.5.3 FSB content selection process

Prior to the start of a new project or partnership, FSB staff work with the institution on a preliminary identification of what books in its collection fall within FamilySearch's content scope. Once a project is underway, a library is in theory free to scan collection items in any order it wants; however, librarians (or sometimes missionaries) are responsible for generating and submitting "pick lists" of individual items to FSB for approval prior to scanning. This often takes the form of physically going through shelves of books, and checking each book in both OLIB, the FamilySearch library catalog, and the holding library catalog for copyright information, digitization status, and catalog accuracy.

If the item has not been digitized elsewhere (by FamilySearch or other digitizers), it is put on a list submitted to FamilySearch for digitization approval.

If the item does not appear in OLIB, additional cataloging is necessary prior to digitization. Library staff check OCLC, using the OCLC number of the item (if one can be located) to create a metadata request to submit to FamilySearch catalogers in SLC. Once cataloging records have been created, the books may be approved for digitization. (Note that this cataloging is process is related but separate from the additional cataloging that is often required at the originating partner library end.)

Because it includes both bib checking and often additional cataloging, content selection is a slow and painstaking process. Working its way through the stacks, one library found that between what's already been digitized by FamilySearch and other factors they moved forward to digitize approximately 5% of their collection as part of the FSB partnership. Another reported identifying 12-15% of books to scan.

4.5.4 Challenges to content selection: cataloging and copyright

Library catalogs and copyright are both systems that mediate access to print and digital books. In FSB, they each represent a different kind of challenge to FamilySearch's exhaustive genealogy digitization aspirations.

4.5.4.1 Catalogs and cataloging

Cataloging is simultaneously a driver, a challenge, and a major output of FSB digitization. FSB relies on its library catalog, OLIB, to document the digitization status (digitized, un-digitized, or in process) of every catalog record in its system, from serials to individual volumes. FSB's ultimate goal is to digitize 100% of its catalog. Due to the nature of both genealogical collections and the resource-constrained institutions that house them, however, the "catalog" itself remains an evolving, growing object.

FamilySearch approaches book scanning explicitly as a strategy to expand and manage its massive genealogy library. By contrast, in its book scanning project Google created (and was roundly criticized for) volume-level metadata for its scanned objects by aggregating information from multiple sources (e.g. library catalogs, publishing industry data, third party metadata providers, and OCRed texts themselves) after the fact in order to facilitate user access (see Chapter 2 for details). The proliferation of multiple copies of

books in the corpus suggests that little or no attention was paid to limiting duplication of effort among 40+ library partners. Actively eschewing any assertion it aspired to be a library, Google instead described GBS as "the world's most comprehensive index of full-text books."

In order to be eligible for FSB digitization, content must be cataloged in a standard way in OLIB. From rural FHCs to public libraries, many genealogy collections have incomplete or idiosyncratic cataloging systems. Sometimes this is due to the nature of the content, such as with compiled family histories or local history publications created by individuals and self-published with varying levels of formality. Other collections, such as those found in many FHCs, are not managed or supported by librarians with professional cataloging expertise.

At both FHCs and public library partners, the content selection process therefore often leads to the discovery of previously un-cataloged local or unique resources. On FHC digitization efforts, FS-21 relates:

> …the team in Salt Lake are finding out that some of these centers have incredible collections that nobody's ever known about. Like the books from Los Angeles that FS-30 was cataloging this morning. We had to create brand new records for them. And they're doing that because Salt Lake didn't have them. Now it gives—people everywhere have access to that, those magazines, but people in Salt Lake also have access to it. So it's not only expanding access for the public but it's also expanding the collection that the full-time staff of the library in Salt Lake have access to.

FS-21's juxtaposition of end user access ("people everywhere") with Church access ("people in Salt Lake") underscores the role of cataloging at the heart of FSB. Church management of the records is on parallel with the value of expanding end user access.

This parallel value holds true for public library partners as well, if in a more limited way. Multiple partner librarians report that one positive, if unanticipated, outcome of the FSB digitization partnership has been an improvement in the quality and completeness of cataloging in their collection. This effort, however, often takes considerable labor and time; some of this labor will be the subject of the next chapter.

Centralized management of the library catalog facilitates FSB's geographically distributed digitization strategy. Library partner FS-41 explains:

> So FamilySearch is really interested in getting more than the low-lying fruit, because they can partner with all the large information aggregators to get the populations, get all the vital records, the military records, all that stuff. What they like to do is to create hubs around the country where they can deep mine for things that they don't have in their collection or—and this was a big 'or' for them—or a place that has a lot of things in their collection where we can help them with putting their entire Family History Library online because we have 80% of it here. So they can be working on it there, they can be working on it here. Plus, they get access to the unique 20% they don't have out there.

Here FS-41 outlines three separate areas of digitization interest for FamilySearch. First, many government and other vital records related to genealogy have at this point been digitized by FamilySearch or through cooperative agreements between commercial genealogy companies (e.g. Ancestry, Find My Past, or (non-profit) FamilySearch) and state and federal archives (Kriesberg, 2015). Second, FSB has committed to digitizing the entire FHL collection. Third, FHC remodeling and partnerships with public libraries offer the opportunity for FSB to capture what FS-41 calls the "high-hanging fruit" of genealogy collections. If FSB compares the FHL collection to a prospective partner's and the catalog reveals an 80% overlap of commonly held reference materials, then through partnerships FHL library digitization can progress in any number of locations.

4.5.4.2 Copyright

Copyright remains another major challenge to digitization: a combination of copyright, privacy, and publisher opt out restrictions significantly constrain online access to digitized resources.

The legal frameworks that govern access to works published in print have extended their reach into the digital realm, as digital access systems are required to mimic print book use (Samuelson 2009). In FSB, copyright-protected books may be scanned for digital access under a specific set of circumstances. First, the holding library must remove the print volume from the shelf and place it in dark storage. Then it must deploy digital access systems that ensure a digitized book may not be accessed simultaneously by more than the number of copies held in storage. The calculation of trade-offs here depends on the institution's priorities—and resources.

FamilySearch and its library partners may differ in the place they imagine for print collections in the libraries of the future. In the present, however, multiple librarians inside and outside of the LDS Church observe that brick and mortar libraries—and the print collections maintained on their shelves—will likely retain relevance in part because not everything will be digitized.

For FSB, scanning copyright-protected books is an easy decision, because it actually furthers FamilySearch's efforts to centralize genealogy information organization and access. With its size and infrastructure, FSB can accommodate copyright-related scanning requirements in in a way that small libraries cannot. FamilySearch maintains a long-term high-density storage facility outside of Salt Lake City where scanned copyright-protected books can be sent. Virtually all the books from remodeled FHCs end up here, as well as scanned volumes from the FHL. FamilySearch will store up to three print copies of an item in order to facilitate having three simultaneous digital users at one time. Copyright-protected texts digitized through the FSB project may only be viewed from computers in the FHL, FHCs, or affiliate libraries (such as partner libraries) (FamilySearch 2017a).

The dark storage requirements for in-copyright books shape FamilySearch's digitization workflows, and two separate tracks emerge. Copyright-protected books from the FHL and FHCs are often disbound and scanned through a sheet fed scanner; this destructive scanning process is much faster than the hands-on page turning required for non-destructive scanning. The scanned volume is then rubber banded together post-scanning and packed to be sent to long-term storage.

By contrast, public libraries participating in FSB have thus far resisted ceding permanent physical control of copyright materials to FamilySearch; they choose to scan only public domain books. Given the ongoing resource constraints that public libraries face, few if any are in the position to develop new systems to support access to digitized in-copyright portions of their collection. For partner libraries, which continue to value (and measure) patron foot traffic, the option of sending copyright-protected volumes to FamilySearch dark storage in favor of digital access represents an aggressive move toward one side of competing service models—and users—attached to different media formats. Small libraries or community-based organizations are also often risk-averse with respect to digitization content selection and copyright. They might aspire to digitize, and believe that

it's legal, but they may not take on the project from fear of having to use very limited resources to fight copyright disputes. This is an issue for scale and scaling, and will come up in a future chapter.

There are several other reasons that books may be excluded from FSB's workflows. Some publishing companies have specifically opted out of FSB scanning or, after the fact, have requested that their materials be taken down from the web. These are often commonly used reference resources, which remain monetizable in a way that other genealogy information sources are not. City directories produced by the R.L. Polk Company provide one example; one site scanned these directories for a while, but the volumes eventually had to be taken down at the publisher's request. FHL staff report that while they would love to digitize all reference volumes to create a kind of digital toolkit for users and missionaries who support them, many publishers explicitly disallow such behavior. Some FHCs, too, are unwilling to remove items from on-site collections—even if they remain un-cataloged and largely unused. In each case, copyrighted materials remain un-digitized, leading to holes in the digital library

While restrictive copyright laws limit the amount of online accessible content libraries can offer, in some ways copyright also preserves the positioning of the library as a physical space that has a role to play in offering access to—and longtime stewardship over—content originally published in print. Partner librarian FS-41 observes, "At least a third of our nearly half a million actual monographic volumes … 400,000-plus monographs, easily a third of those will be under copyright in my lifetime. So there will always be a reason for people to come, if the only reason is, we have a book they can't get access to somewhere else."

As more genealogy content moves online, print books that are either un-cataloged or protected by copyright will not be digitized. Many of the libraries with incomplete or inaccurate catalogs are unfortunately the ones least equipped with resources to take on this extra labor; these collections are in danger of remaining invisible to all users in the long term. These institutions are also among the most risk-averse with respect to taking their in-copyright collections out of circulation, and least likely to create local systems to mediate digital access to in-copyright books. This means that unless copyright law changes

substantially, a substantial portion of any public library collection with 20th century materials will remain offline to many users.

4.5.5 Feeding the machine: realities of content selection

Content selection is ongoing, not finite. Librarians undertake content selection (and cataloging) at the same time as other library management and patron support responsibilities, often concurrent with overseeing scanning operations.

The FHL, for example, has been digitizing its collection since before FSB was a formal undertaking; its long-term digitization plan will take decades to execute. FHL staff employ content selection parameters that balance the use behaviors and access expectations of current physically present users with the access expansion offered by putting the collection online. Library manager FS-6 describes a set of ordered priorities for determining the order of pulling and scanning the FHL print collection. "Our first is usability and value. What is the value to the guests? The second is what are the copyright laws or what is the ability to scan or not scan that book - our second biggest question is 'is this or is this not scannable?'" Next, FS-6 relates, library staff consider demand and interest, selecting content that generates a lot of reference requests. Content selection decisions may also be constrained by perceptions of digitization pipeline efficiency and online user experience issues. The FHL does not want to pull a high demand book from the shelf until it can guarantee it will only be unavailable for a short time *and* that accessing it online will be easy and satisfying for patrons with limited technical skills. FS-6 says that thus far digitization efforts have focused on "what has the most genealogical content," such as compiled family histories.

Over the course of the project, FHL librarians relate, managing project productivity and growth has sometimes meant taking an opportunistic rather than strategic approach to scanning. FHL staff FS-6 and FS-7 discussed content selection in FSB's early years with FS-3, who is part of the small FSB full-time staff. As the project scrambled to create systems to accommodate rapid growth with a minimal budget:

> FS-6: We kind of compared the scanning department to the 17-year-old boy that was always hungry. No matter how much you fed them, they wanted more and more and more and more.

FS-7: Now we have our process in place.
MKC: Were you struggling to feed the 17-year-old boy?
FS-6: Yes, because we had to go through and decide what could we pull in the meantime still trying to run the library and make sure they had it and get it documented and tracked.
FS-7: And make sure it was in the catalog.
FS-3: Now we have a much more regular diet.
FS-7: Yes, you do.
FS-6: We've just bought a bunch of Top Ramen. We identified the Top Ramen in the collection.
FS-3: It's not as nutritious, but it keeps us busy.

Public library partners describe similar experiences, in which content selection decisions are in practice shaped by equipment or labor availability. Given the limited technical understanding of many missionary scan technicians, for example, libraries often choose to dedicate a specific scanner to a particular kind of book rather than rely on missionaries to re-calibrate regularly. Occasionally missionaries get out in front of the list of books approved for digitization and must wait for the partner librarians or Salt Lake City catalogers to catch up. At other times, scanning equipment may need to be calibrated to accommodate specific materials (e.g. oversized, fragile, bound or dis-bound, etc.).

Sometimes FSB partners are able to leverage FamilySearch's very broadly defined topical interests for the digitization of unique materials that would never be identified in advance as priorities for digitization. FS-41 explains:

> So when we look at things to digitize - unless someone has done an immense amount of research, and really contexted a federal population schedule with all kinds of miscellaneous and ancillary data, there's no way, there's absolutely no way would we ever digitize that. It's been done. It's online. There is no need to do it again, to have it in our silo. Ancestry just penned an agreement 36 months ago with the state … that bore fruit within the last couple of months. Where huge numbers, tens of millions of [state] birth, marriage and death records are online now. No need to do that, it's already been done. But someone brings in a World War 2 service record that has newspaper clippings and a memorial card and DD24 form? Yeah, that's not collected by anybody and it's kinda hard to wrap your arms around 100 million of those or 10 million of those. So yeah, we go for some of the outlier things.

At the logical extreme of FamilySearch's long-term, exhaustive genealogy digitization commitment is the question of how the project can ever reject an eligible

document. How granular is too granular? The vignette that follows provides some perspective on this question.

4.5.6 VIGNETTE: Lake County books

The plain, tan, cloth cover of the book in front of me doesn't reveal very much about its contents, although its single marking—a number, 613—does suggest that there are others like it somewhere. No library cataloging info dresses its spine. While it is definitely bound, as a material object the oversized volume dispenses with other obvious trappings of "bookness:" the first page jumps into content without a title page, author, or publication information. It is a ledger of some kind. The content is difficult to recognize at first, as its 1000 pages are filled with carbon-copied documents printed on onion skin paper. A closer look reveals dated material from 1924. This helps to explain the physical condition of the book, as its fragile pages have been wrinkled, torn, taped, and written on over time. The text is clear on some pages and so faint as to be barely recognizable as text on others. On still others the print has bled through from adjoining pages, creating a set of horizontal—and unreadable—blue blobs running parallel down the page. The page degradation is particularly egregious in the beginning and ending 100 pages of the volume, massive portions of text condensed into tiny accordion folds.

Noticing my puzzled expression, a nearby scan technician leans over to explain that the volume is a title company's office copy of legal real estate documentation. Created in preparation for a parcel of land to change hands, abstracts of title trace a property's legal history of ownership through sale, inheritance, or divorce, or legal property disputes such as probate cases or liens, lawsuits. In its original form, it is itself an aggregate of copied documents.

Discarded by the title company, this set of abstracts of title changed hands several times before being acquired by the genealogy center of a large public library. While these volumes (termed the "Lake County books") have been partially cataloged for organizational purposes, they have never been visible within the library's electronic card catalog and have until recently been stored north of town in a library-owned warehouse.

Nearly a century after their creation, land records such as abstracts of title have found a second life as objects of documentation to genealogists and family historians. These records

provide insight into an ancestor or family's migration patterns over time and space. They can illuminate networks of people (often related, often men) that gather around properties. This includes biological relationships documented in records such as wills, but also descriptions of living arrangements, names of adjacent property owners, etc. In many places, land ownership has been reserved for specific segments of the population (e.g. white men). Women, for example, enter into the paper trail of Indiana land ownership at the margins, when things like inheritance, dower rights, or community property insert them into land ownership records (if often only as intermediate points between male owners). In this way land rights can be a gateway into learning about marriage and familial names or relationships, but this coverage is limited to certain populations.

Transported from the warehouse to the library's basement by the pallet, page by wrinkly page ledger #613 and the other 2199 Lake County books are slowly being digitized as part of FSB. You could make a strong case that with all the material in the world in need of digitization, and a scarcity of resources to execute this work, this enormous and unwieldy set of books is a strange candidate for priority digitization. But the Lake County books are also objects of opportunity, and of negotiation—by virtue of being in the right place at the right time, these books slipped into the FSB digitization queue perhaps decades before they might through careful content selection. Details on the agreement between FSB and the library are limited, but the story I heard multiple times is that the library's genealogy manager convinced a FamilySearch official on the project's value during a site visit to check out the scanning operations. The library completed some test scanning, and FSB staff determined that the aging volumes both contained a surprising number of unique names not in the FamilySearch system and provided a good test case for their book processing workflows. FSB agreed to digitize the complete set of books, a process which partner librarians surmise will take close to a decade to complete.

The Lake County ledgers have a rather tenuous "bookness," and appear to have been retroactively defined as books to fit into the project. A case can be made, of course, that books such as these ledgers (or similar bound volumes such as historical city directories or yearbooks) fit into the spirit of the FSB project. The LDS Church remains invested in both identifying new names to add to its databases, and motivating users to continue to engage in family history research. To accomplish the latter, resources such as these may be useful not

only in finding your ancestors' names, but also in learning something about what their lives were like.

At the same time, the Lake County books test the limits of granularity even for an institution as patient and committed to incremental and long-term digitization as FamilySearch. One FSB staff member acknowledged that it was hard to imagine another organization agreeing to digitize the 2200-volume set, given the resource intensity of the undertaking.

The Lake County books fit awkwardly within many FSB project parameters. I have estimated that this entire process, from library shelf to screen-based access, takes an average of seven human labor hours for each volume. To put the scale of this endeavor into perspective, that's more than 15,000 human labor hours allocated to digitize 50 years' worth of land records for one small county in one U.S. state. Further, their size and material condition break workflows (and, on occasion, spirits), technical infrastructure designed for much more normatively defined books, and any measures of efficiency or productivity.

4.5.7 Conclusion

The institutional view of digitization I have offered in this chapter lays the groundwork to raise questions about digital content infrastructure relevant to the wider public library landscape (or even that of cultural heritage institutions more broadly) in the concluding chapter of this dissertation (Chapter 7).

The inclusion of the Lake County books (and other "high-hanging fruit" of genealogy collections) in FSB illustrates both the scale of the endeavor and the precariousness—or, interpreted differently, the opportunism—of FamilySearch's definition of a book for this project. This consideration is more than simply definitional. These choices—in combination with challenges such as cataloging and copyright, detailed above—have a significant impact on determining what content ends up in the digital record. While emerging digital access infrastructures currently co-exist with print-based access mechanisms such as libraries, it is not clear how long this coexistence will last. If orphaned by the emerging digital access infrastructure (Star 2007; 1999; Star and Bowker 2007; Ribes and Finholt 2009), these resources will at a certain point cease to exist for most users (Conway 2010).

In pursuit of its content-driven goal, FSB has shown a willingness to modify its digitization workflows around individual objects (or collections) that a mass digitization effort such as Google Books might reject because they break standardized workflows and measures of productivity. The Lake County books are one extreme example. At a certain point, however, questions of resource allocation reassert themselves. The translation of digitization goals into executable processes, or even the implementation of contractually agreed upon elements (such as quality, selection for digitization, etc.), often run headlong into the particular configurations of other digitization actors present. These might include properties of content to be digitized (format, location, etc.), available equipment, or the skills of digitization workers.

As you walk through all the backstage areas of even small print repositories—basements full of file cabinets donated by patrons, books stacked floor-to-ceiling in corridors just beyond the open stacks, long-term storage warehouses packed tightly with pallets and bins of books—the scale of the endeavor at hand here quickly turns overwhelming. In a different way, standing for hours in front of a scanner slowly turning the pages of a nearly unreadable Lake County book provides another perspective on both scale and time in digitization. This human side of the work of digitization is the subject of the next two chapters.

Chapter 5 Labor (1): Constructing Digitization as Work Anyone Can Do

5.1 Introduction

It is through labor that the broader motivating objectives of digitization meet up with the means by which to execute them. This chapter surfaces the often-invisible labor—and laboring bodies—that transform print objects for networked digital access, and investigates how this work is structured, organized, or coordinated over space and time. The following questions frame the chapter: how does digitization become a job "anyone" can do? What is included in this definition, and what is excluded?

The particulars of how "anyone" has been constructed here—that is to say, the project's reliance on senior missionaries—shape what tasks are visible in the project as "work." There is significant additional labor, however, that cannot quite be atomized or automated, and therefore cannot be undertaken by the senior missionaries who are the face of the project. (Sometimes it is additional labor created as a result of the decision to atomize and automate digitization labor!) This is the work of coordination and support, the work of maintenance and repair, and the work of preparing to get rid of print gatekeepers (undertaken, ironically, by some of those gatekeepers). This labor—undertaken by partner librarians or FSB staff or other skilled workers—often remains unaccounted for, as the visibility of missionary service labor may often overshadow the professional labor that also goes into participating in the "free scanning" services offered by FSB.

After introducing the roles and tasks involved in FSB (Sections 5.2 and 5.3), I identify the strategies by which work has been constructed and allocated in FSB (Section 5.4). I then examine the imbrication of practical and social divisions of labor (and human and non-human actors) in daily life at multiple scanning sites, from missionary-led image

capture and quality control (Section 5.5) to the management and coordination work that connects missionaries with librarians and remote FSB staff (Section 5.6). In aggregate this exploration illuminates changing relationships between human workers and technology/machines as digitization scales.

It is important to note here that by relying heavily on missionary labor, FamilySearch has constructed digitization as *meaningful* work. While this chapter focuses on how "anyone" and "work" have been constructed within FSB, the next chapter addresses the "meaningful" piece.

5.2 Digitization tasks

The work of digitization in FSB involves many different tasks, executed by people and machines that are networked together but often geographically distant. They include:

- content selection;
- materials transport and handling;
- cataloging and metadata creation;
- copyright determination;
- imaging;
- quality control, called auditing;
- data file upload and transfer;
- OCR;
- online publishing;
- digital object management
- partnership and missionary management and support (onsite, remote);
- missionary recruitment
- marketing;
- technical infrastructure improvement and maintenance

5.3 Digitization roles in FamilySearch Books

5.3.1 Scanning technicians: FamilySearch (senior) missionaries

Within scanning sites, imaging-related activities are almost exclusively undertaken by senior Mormon missionaries. Missionaries pull books from shelves, scan, complete two rounds of quality control audits, process, and upload digitized books for final review and online publishing by FSB staff in Utah. In 2016, FSB had 24 full-time senior missionaries and approximately 300 church-service missionaries or other long-term volunteers working

on book scanning. Long-term volunteers are not missionaries and are not required to be LDS (although they almost always are).

Over the last several years the LDS Church has sought to grow its senior missionary program, where "senior" refers to age and not status. In 2015, 8% of 83,471 LDS missionaries serving around the world were seniors (The Church of Jesus Christ of Latter-Day Saints 2015). The senior missionary program takes a loose definition of "senior," as it encompasses any LDS Church member over 40 years old; the average age of senior missionaries, however, is much higher. There are two types of senior missionaries, full-time missionaries and church-service missionaries, who are described in more detail below.

For this research, I interviewed and observed the work of 26 current or returned senior missionaries, a mix of church-service missionaries and full-time missionaries. These interactions took place in several scanning environments: public libraries, FHCs, and public-facing scanning days held in LDS buildings or at Rootstech.

5.3.1.1 Senior full-time missionaries

Senior full-time missionaries (hereafter FTMs) are called to serve missions of 12, 18, or 24 months outside of their home church communities. Senior FTMs are responsible for 100% of their own living costs, although the Church pays for travel to and from the mission location for senior missionaries who serve domestic missions more than 18 months in duration. Senior full-time mission assignments are allocated to pairs of missionaries. Most are married couples, although uncoupled "single sister" missionaries may be paired up to serve together; single men do not serve these types of missions.

In 2011, in response to shrinking missionary participation overall, the LDS Church announced several changes to the senior missionary program to lower perceived time and cost barriers to participation. These changes included creating flexibility in the length of missions (allowing seniors to serve 6–23 months instead of the previous minimum of 18 months) and capping housing costs at $1400 a month (Hall 2011; The Church of Jesus Christ of Latter-Day Saints 2015).

Senior FTMs may indicate a preference regarding their job or location, but the Church cautions that this preference is only one among several factors that shape

missionary assignments. Senior missionaries may undertake missions requiring skills related to professional careers (e.g. data analysis, curriculum/instructional design, journalistic writing, public relations, project management), but many choose to serve on a support-oriented mission in an unrelated field.

5.3.1.2 Church-service missionaries

Church-service missionaries (hereafter CSMs) receive a calling to serve 6-30 month missions within their own communities, during which time they live at home and work 8-40 hours a week. At the completion of this time period, CSMs may be extended or released and called for a new mission; informally, book-scanning CSMs report being allowed to continue for as long as their health and willingness to scan permit them. CSMs serve in many different capacities. They staff distribution center retail stores, bishop's storehouses, canneries, and other Church welfare operations; provide information, communication, and technical support services for Church programs, offices, and media; undertake facilities management for LDS buildings and businesses; staff LDS social and health service programs; and provide family history support (The Church of Jesus Christ of Latter-Day Saints 2018; Walker 2011).

5.3.2 Professional staff: FamilySearch Books employees

The small Utah-based FSB team is comprised of a manager, FS-2, who reports to FamilySearch's Imaging Operations Manager (they manage multiple imaging operations, such as records capture). FS-3, the book scanning operations manager, and FS-1, the book scanning partnerships manager, report to FS-2. FS-1 is responsible for establishing and maintaining FSB's partnerships with public libraries, historical societies, and other non-LDS genealogy collections (including Internet Archive, a crucial and longstanding partner). This role vets content selection, and manages the distribution of missionary labor to staff partner scanning sites. FS-3 manages daily operations across FSB's 14 scanning sites. This includes troubleshooting and support (in person and remote), evaluating technology and new/modifications to existing workflow processes prior to purchase/roll out, and managing/supporting site productivity and resource distribution. Two additional FSB employees report to FS-3: the Digital Processing Center Supervisor, FS-4, and the person who manages the online publishing portion of the digitization pipeline (as well as Internet

Archive-related partnership operations), FS-5. FS-4 and FS-5 serve as a first tier for partner site technical support; if they are unable to solve a problem, they send it to FS-3.

For this research, I conducted face-to-face interviews with all five members of the FSB team, and observed the daily work of two (FS-3, FS-4). I attended the team's weekly staff meeting, and participated in the annual Rootstech book scanning partners meeting and scanning days. I also interviewed five FamilySearch staff members whose work overlaps with or supports FSB in various ways. This includes two employees who train senior missionaries for imaging missions, two employees with content selection and management responsibilities at the FHL, one FamilySearch cataloger, and an employee responsible for shipping and receiving genealogical materials for the Church's Family History Department.

5.3.3 Scanning site management: Librarians and volunteers

The FSB team works with manager-level professional staff from partner organizations that house FSB scanning operations. At partner scanning sites, this role is occupied by a librarian or library manager, while at FHC scanning sites this is a Church-designated volunteer/missionary role. This role coordinates and manages both print collections and humans in service of genealogy book scanning.

Tasks include content selection, cataloging, bridging metadata practices among different organizations, liaising with the FSB team, and onsite support and troubleshooting for missionary scanning technicians. This is a role that varies widely depending on who is filling it. At FHC sites, it is often a hands-on full-time role undertaken by a senior missionary couple or a long-time volunteer. Partner librarians must work FSB support into their existing full-time jobs; they report spending very different amounts of time supporting FSB and its missionary technicians, from two hours per week to two hours per day (5-20 % of weekly work time). Commonly, but not always, the amount of partner employee time allocated to the project diminishes over the length of the partnership.

For this research I interviewed six librarians or library managers who have worked with FSB as partners (FS-41, FS-42, FS-63, FS-64, FS-82, FS-83). I observed four of them working with senior missionaries in their libraries, and interviewed two at Rootstech. I

interviewed and observed three people who have taken on volunteer site management roles in Family History Center scanning sites as well (FS-21, FS-26, FS-27).

5.4 "Work" "anyone" can do: Constructing "anyone," constructing "work"

FSB recruits prospective senior missionaries by constructing senior missions as work where religious commitment and interest trump required skills. "From five minutes to full time," the 2016 LDS website on "service" encourages, "find opportunities to serve based on your availability, talents, and interests" (The Church of Jesus Christ of Latter-Day Saints 2016). Among the minimal skills listed in missionary recruitment materials for book scanning include soft skills such as basic computer literacy, interpersonal skills, and good eyesight. Hard skills such as genealogical experience, proficiency in multiple languages, and librarian skills are listed as helpful but not required. Other recruitment materials prioritize computer experience over family history research experience..

FSB employee FS-3 describes missionary recruitment and placement as a resource distribution challenge as much or more than as a challenge to match people with skill requirements. He explains,

> They'll say, 'Okay, what Church opportunities are in the area? Okay, there's an empty pasta mill here, or there's a meatpacking plant here, or there's a ranch over here, or there's a library over here that needs book scanning people… There's a pageant or a play that's going to happen, and these crew members or needed or whatever. They will look for opportunities in their area. As far as they're concerned, we're [book scanning] just another opportunity.'

FS-3's description is noteworthy in that it casts book scanning as a generic, unskilled job largely interchangeable with working in a Church-run pasta mill, a meatpacking plant, or backstage crew at a religious pageant. While this definition certainly expands the applicant pool, constructing missionaries' role in digitization as unskilled also functions to erase the cognitive and physical work the work entails.

5.4.1 Constructing "anyone": Automation and atomization

Automation has been critical for producing digitization economies of scale. In many large-scale digitization settings, efficiency and diversity—material, technological, organizational, or human—are now managed through standardized, semi-automated scanning and image-processing workflows. This strategy is exemplified in things like business process outsourcing, in which structured and fairly uniform paper documents such as insurance forms are digitized to enable electronic access. Beyond the maturation of scanning technologies, content management systems also increasingly promise end-to-end management of image capture, remediation, transport, storage, and access. Automation has helped to transform cultural heritage digitization from a small-scale, hands-on and labor-intensive experiment with new technology into a high-volume, factory-like process (Leetaru 2008; Conway 2010; Coyle 2006).

Automating technologies have changed requirements for digitization labor. In a boutique, or collection-based, approach to cultural heritage digitization, an individual worker might be required to complete multiple steps of the workflow at a time. For example, she might input metadata related to an object into a content management system, then image the object, then perform quality control. A fully rationalized, or what I am calling *atomized,* digitization system instead identifies bottlenecks and inefficient points in the existing system, then decomposes the workflow into discrete component parts. This approach, of course, is not new; it merely brings a scientific management approach to digitization (Taylor 1911; Gilbreth 1914). It groups tasks that are amenable to being automated or undertaken efficiently in batches, and separates skilled and unskilled tasks. Atomizing digitization work optimizes the use of both scanning equipment and human resources: if imaging can only be done at the scanner, there is no reason to do quality control at that workstation as well. Increasing consistency and eliminating time wasted switching between tasks, an atomized approach to digitization keeps that particular workstation and its human operator dedicated to scanning, while at a separate workstation another worker—with perhaps a different set of skills, or different training—focuses on quality control.

Google's one-size-fits all mass digitization system developed for the Google Books represents the logical extreme of the entanglement of automation and atomization in book

digitization. Explored in detail in Part 1 of this dissertation, you will recall that Google has minimized human participation in book scanning in pursuit of scale. While humans are tasked with the pieces of workflow that are not quite able to be automated (e.g. materials handling, page turning and imaging), Google leans on computational power to take care of—and iteratively improve—the remaining steps (e.g. batch processing hundreds and thousands of pages at a time to automatically identify and mitigate common imaging errors) (Conway 2015; Leetaru 2008).

In aggregate, automation and atomization have made it possible to substantially reduce labor costs by differentiating between skilled and unskilled labor. This turns much of digitization work into tasks that "anyone" could do. In FSB this "anyone" is senior citizen missionaries; in other large-scale scanning contexts these roles might be filled by hourly workers, job training program workers, graduate student interns, or prisoners.

5.4.2 Constructing "work": Missionary training

Given the lack of skill requirements for missionary service, FSB staff describe training as a necessary but resource-intensive. Training time factors into FamilySearch's calculation of both mission length and scanning site set up estimates, in particular the designation of a twelve-month minimum commitment for full-time missionaries as well as for setting up new scanning sites (FS-2). Senior FTMs undergo two weeks of training before embarking on their missions. In the first week, FTMs travel to the West Valley, Utah scanning location to receive book scanning training. The second week, held at the LDS Church's Missionary Training Center in Provo, Utah, is "more of a spiritual preparation. If we had opportunities to share the gospel, they taught us maybe ways how to do that" (FS-23). By contrast, CSMs do not travel for training; all training happens on-site and is facilitated by the site coordinator, long-term volunteers, or experienced CSMs.

FS-8, who trains senior image capture missionaries in Utah, observes that initial training focuses on both practical and psychological aspects of ensuring basic technical literacy among senior missionaries:

> I'm there for them, to help them overcome that first moment of, 'Oh my gosh, what am I gonna do? I don't want to wipe it all out. I don't want to mess up everything.' And so, if by the end of the week that we're training, I can have them so they look at

> the scanners and that kind of thing when they first show up and go, 'Ah. I've worked on this before, no fear.' You know, kind of thing. Then the people that they're working with can then implement the tools that we've taught them. That's what we're there for is to just give them the familiarity that they need in order to be able to move forward.

The balance between supporting and overwhelming new senior missionaries is a delicate one. "You can overload them and then you can just see it seeping out," FS-8 says, pointing to her ear. "You can see it 'pffff' going out this way because they're just overloaded with information. We've tried to overcome that a little bit with just providing them with what they need for the projects they'll be working on."

FS-8 observes a parallel—or at least a resonance—between the ways that FamilySearch supports missionary skill acquisition over time and the ways the LDS Church structures religious education. While taking care to clarify she is speaking personally and not for the Church, FS-8 describes how Church's religious education system rotates through its "standard works" every four years: a year on the Book of Mormon is followed by the New Testament, then the Old Testament, and the Doctrine & Covenants. A Church member (child or adult) can enter into the system at any time, and the Church maintains an emphasis on deepening understanding and research for each standard work each time it is encountered. FS-8 describes,

> It does help, I think, with new members of the Church a lot because they're so new to things that they come in and need to learn. The way in which we do that is everyone's learning the same things, but it may be at a different level depending upon where you are. So you'll glean different things as you're taught those same principles over and over again, but you'll glean different things because at the level which you're at…

Describing the training senior imaging missionaries receive, FS-8 later returns to this theme of skill building through repetition:

> We go through all of it in the week they're with me, but it depends upon, once again, that repetition. You'll glean different levels of information. Maybe the rocket scientist is gonna get more of the detailed pieces of it [missionary imaging training], and the administrative assistant is gonna get more of just, 'Okay. I've seen this before… And I know that if I push this button that turns it on. I know that I push

these buttons, and I know that the process is that I need to enter metadata, calibrate, and go through. Details of it I'm gonna get better at it as I go along.'

The formal value placed on repetition within the Church education system provides scaffolding for training senior missionaries here, as a reference point for both the rote memorization of the discrete steps involved in scanning work as well as the gradual development of understanding as to how these steps fit into a bigger (process or religion-oriented) picture.

Once in the field FTMs must adapt the general training they have received to the local context. Multiple partner librarians describe this as a major gap facing new FTMs. The skill scaffolding strategy described by FS-8 requires significant resources in practice, and the smooth running of any FSB scanning site is thus reliant on multiple types of laborers simultaneously: short-term and long-term, unskilled and skilled, task-oriented and management-oriented, onsite and offsite. Other types of LDS senior missions(including records image capture) have field supervisors positioned to support overseas FTMs. FS-31 served an international records image capture mission, and describes that when he arrived, "the Church had a full-time employee that oversaw the volunteers. His first comment was, 'now ignore everything they told you in Salt Lake. This is how we really do it here.' That helped [having a field supervisor], he was a great person to work with. Felt like I really came away with understanding how to do things." With FSB, the labor of tasks related to transition, adaptation, and ongoing training and support is distributed among several groups of long-term workers: FSB staff, partner librarians, site coordinators, and experienced volunteers (often returned missionaries). This is described in more detail in Section 5.6 below.

5.4.3 Learning to "think like a machine": Scanning as technical and cognitive labor

The technical—and physical—limitations of senior missionaries have been accounted for at multiple levels within FSB, including scanning equipment selection. FS-3 observes, "We evaluate different types of scanners that best fit our needs and that are easier to train on than others because the missionary volunteer workforce we have, they're all senior age. We need to be able to have equipment that's easy to use and easy to train on as much as it is to have great image quality."

FamilySearch engineers have developed a portable, camera-based scanning unit that can be transported and re-assembled easily. While not designed exclusively for book scanning, the unit is being developed with the technologically illiterate user in mind. As part of the development process, a user experience team has worked with engineers to develop a persona named "Betty" around whose capabilities and limitations the hardware and software is designed. Betty encapsulates FamilySearch's target market for the kits, which might be used by senior scanning missionaries or loaned out to low resource historical institutions that cannot transport their collections for digitization. Betty, FS-2 describes, is "not technologically savvy. She's an AOL user, flip phone, all of the things that our grandmas are. In our pilot mode, we have found that Betty does not do well with this software. She is panicky. She is flustered...For example, she has to understand what F-stop, adjusting the F-stop. I don't know many younger people that even know what F-stop means. How do we expect Betty to do it?"

CSMs and FTMs almost universally report a steep but relatively short-term learning curve. At one FHC scanning site, a CSM remarks, "well, the first week sucked. But then it got a lot better." Everyone laughs at her candor. When pressed for specifics on training challenges, missionaries point to being unfamiliar with both spreadsheets, and computer login processes.

Many senior missionaries describe the necessity of a mindset shift in order to acclimate to the job, which often involves trusting their own capabilities as well as the process. Asked to reflect on the most important quality required for this job, FS-46 answers first with an extended laugh, and then relates, "I think a willingness to learn the technology, an openness to the technology. I think people our age tend to block, and resist. [Laughs again.] Yes, you can do it!" CSM FS-30 describes "really kind of kicking my brain back into gear" after years of retirement as the most challenging aspect of training, while CSM FS-40 relates, "When I decided I could do it, everything started to click ….You get someone who knows what they are doing, and it can be hard to follow step by step-by-step. But if you ask enough questions you won't have a problem [laughs]".

FS-46, who describes herself as a person who doesn't understand or use technology in her non-missionary life, chuckles as she says that part of acclimating to missionary scanning work is learning to "think like a machine." Later, while explaining a batch image

editing feature, FS-46 further observes that "machines are taking over, as fast as they can design and market it." Her observations don't register as positive or negative; she is instead describing a reality in which submitting to the authority of the Church to send her on a scanning mission is at least metaphorically parallel to submitting to the authority of machines.

Senior missionaries who report low levels of technical literacy make it clear that they know they are working for computers and not vice versa. FS-47 describes herself as "not having a computer mind at all." Asked what she likes about auditing books, CSM FS-40 laughs several times as she says she enjoys "the repetition. I don't have to push so many buttons and the computer tells me what I'm supposed to do."

While computers may be directing the missionaries' activities, this characterization sells short the cognitive requirements of scanning. Scanning demands sustained attention and focus, but also a constant multitasking in which missionaries go through mental check lists to ensure consistency. While narrating her imaging process for a particular type of book, FTM FS-46 laughs as she remarks to me, "Since you've done scanning, you probably know that your mind is going through 400 steps here that you can't explain." Over the sound of crinkled pages being smoothed out FS-46 explains that she keeps track of page numbers by focusing on the spacing of the page cropping in the corner where the page number appears and tracking the consistency of the gap between image number and page number (e.g. because scanning a book includes front matter and other unnumbered pages, the image number does not match up with the actual page number). All of this takes place simultaneously and is largely invisible to the casual observer, who just sees someone standing in front of a glorified copy machine turning pages and pressing buttons.

5.4.4 "Come back when your doctors give you the OK": Scanning as physical labor

FSB's reliance on senior missionaries for digitization throws into relief the claim that through atomization and automation, digitization has been turned into a job that "anyone" can do. Digitization tasks delegated to missionaries include physically repetitive work, which can strain the necks, arms, and backs of the bodies that undertake them. Senior missionaries often have age-related health needs and limitations that shape scanning productivity—and workflows. While FTMs likely consider their health status

prior to committing to a full-time mission far away from their permanent homes, CSMs serving missions within their communities often find their scanning work interrupted by health concerns.

Several CSMs specifically identify health concerns as requiring them to stay close to home, preventing them from doing full-time missions. CSM FS-40 says, "I wouldn't leave my home, because I have a pacemaker, and I need to stay near home, so that's the reason I can't go away - … It's something I can do here, because sometimes your health says you can't do it." Asked how long she plans to continue scanning books, one long-term volunteer quickly answers, "probably as long as my health allows it." In multiple conversations site coordinator FS-21 points to examples in which a CSM's scanning mission has been postponed or interrupted due to health issues:

> I had one gentleman who wanted to - who did want to do it, and then was told by his doctor that he had to have both of his knees replaced. And so he's like, well I'm out until at least June next year. I say one year up and walking without a cane, and you call me. We'll still be here.
>
> I have one staff member who is, he's waiting to find out if he's got - if he qualifies for a liver transplant. And he comes in if his health allows him, and if it doesn't, he doesn't. As long as they let me know, then I don't have a problem…
>
> I've got one staff member whose diabetes has screwed up his eyesight. And his doctors won't clear him to work on a computer. So I just said 'come back when your doctors give you the OK.'

The physical nature of the tasks required may be inadequately accounted for in project planning. While appreciative of FamilySearch's scanning infrastructure, multiple partner librarians suggest that the project would benefit from investing additional resources into supporting the ergonomic needs of senior missionaries. They report that senior missionaries are sometimes given castoff library furniture to work with, including old office chairs that may not adjust to the required level for scanning or computer terminal-based work. Likewise, scanners may be positioned on tables that create uncomfortable angles for scanning or auditing.

At other times, gaps in vetting prospective missionaries have created a poor match between existing health limitations and the physical requirements of scanning. FS-64

describes a senior missionary who had trouble with the amount of sitting required for scanning, for example. Some FTMs serve missions operating Internet Archive-owned scanning equipment, which is quite different from the equipment on which they are trained in Salt Lake City. Internet Archive equipment is for the most part manually operated, and requires considerable physical strength. In one case, a senior FTM couple who had difficulty with the ergonomics of the Internet Archive equipment had to be transferred shortly after arrival to a different mission location 1000 miles away—in an entirely different climate!

5.4.5 VIGNETTE: Bookending a working life

"It's a tradition in our church that when you're retired if you have enough stamina, which I barely have, you go out to do some service." It is impossible to leave an interaction with full-time missionary FS-48 without a lasting impression of his advanced age; at 78, he is not exactly frail, but he moves deliberately—and slowly. He repeatedly references how his body and mind are not what they used to be. FS-48 relates that scanning work reminds him of his first job as a sixteen-year-old stacking lumber in his grandfather's saw mill. His grandfather would bluster in and pressure everyone to work at breakneck speed all day long. The problem, FS-48 observes more than sixty years later, was that his grandfather was only ever present for two days at a time. The rest of the work week he'd be out purchasing new equipment, or calling on customers. He didn't have to stack lumber all day long. He therefore had no way to understand that you couldn't keep that pace up all day every day, it just wasn't possible. Speaking softly, FS-48 remarks to me that it seems appropriate somehow that these two jobs—lumber stacking and book scanning—have bookended his working life, much of the rest of which has been taken up with teaching.

In contrast to stacking lumber, his compensation as a senior missionary is not tied to his productivity. Citing personal pride in quality and volume—as well as widening preservation and access for historical documents—as motivations, FS-48 appears to possess the patience required for the unending tedium of scanning. But, he relates, this patience has limits, and there are related limits to his willingness to sacrifice physical and mental wellbeing to do it. He describes scanning the Lake County books—in bad condition, with content that he couldn't read—as a kind of "psychological torture." Preferring to work in

solitude, he holds a similar antipathy toward the social expectations among missionaries at the scanning site; his own commitment to service does not extend to engaging socially with his fellow missionaries.

FS-48 expresses joking fear of and/or disdain for the site's efforts to monitor or regulate productivity. He says he could probably scan at the "required" speed if he needed to, but this awareness has no actual bearing on how he undertakes his scanning work. He sometimes times himself using the analog clock hanging on a nearby wall, but not regularly or with any sense of urgency. Instead he works steadily every day at his own pace, and takes both mental and physical breaks while scanning: he listens to audio books, pauses to read interesting content, and takes walks around the library between books to stretch his muscles and give his eyes a break from the little black scanning box. Beyond the quiet eloquence of his observations of a life at work, FS-48's experience as a senior scanning missionary provides an example of both the limits of speed as a group motivator, and the tensions that can emerge when standardized workflows encounter the health or motivations of individual volunteer workers.

After a week observing daily life at this scanning site, FS-48's connections between scanning and lumber stacking resonate clearly with me from an analytical point of view. Both are jobs with no beginning or end, physically repetitive work that makes invisible cognitive demands of patience and mental focus in order to persist through the hours and days and months. Both jobs seem amenable to rationalization and optimization from the outside, and both run up against finite human productivity limits of attention and physical speed in practice. Both position humans as necessary if inefficient elements of incompletely automated systems.

5.5 Structuring digitization work (1): Practical and social divisions of labor among missionaries

Within digitization projects, workflows and optimization parameters are shaped by a combination of institutional values and missions, more widely held cultural values, and resource constraints (financial, labor, technical, etc.). While the basic tasks of digitization remain consistent across sites, each FSB site structures work differently and has its own

distinct work atmosphere/culture. Daily digitization work at FSB sites is structured through a mixture of formal tools and informal social divisions of labor.

5.5.1 Workflow tools

An online workflow system tracks both a book's movement through the digitization pipeline and the individual touches on that book for various tasks. Missionaries log in to the system and record their names as each task is completed. Individual sites have developed supplementary workflow coordination mechanisms, often in the name of efficiency improvement. These include the use of paper-based tracking slips, or complex macro-filled spreadsheets on which individual activities are recorded, aggregated, and compared. The processes around creating and managing efficient workflows are described in the next chapter. Workflow modifications are occasionally undertaken at a project level, such as recent changes to reduce the number of uploads and downloads of digitized objects in order to cut data transmission costs. I found in the course of field work across multiple scanning sites that at a site level, efficiency-oriented workflow modification is primarily done in service of meaning making more than long-lasting system change; partner librarians such as FS-63, FS-64, and FS-42 report that workflow modifications made by missionaries frequently last only as long as the missionaries instituting them remain on site.

5.5.2 Task allocation—and collaboration

Missionaries exert considerable influence over the ways that FSB's standard workflows are implemented, adjusting and modifying workflows around individual missionaries' skills, interests, physical limitations, or the requirements of a given site's print collections. FS-42 says that the missionaries are free to adapt the workflows in any way that helps them distribute their resources better.

Some large scanning sites rely upon a tightly organized division of labor. At one FHC site, the site coordinator has divided the work of his 31 CSMs into teams, based on the skill sets and requirements for each: cataloging (further split between serials and books), scanning, and auditing. Within these teams, experienced CSMs take on leadership and training responsibilities to keep team members on the same page. At another public library partner site, FTMs thwart structuring expectations by rotating freely among tasks and

workstations. While one missionary may informally specialize in a particular task or machine, these preferences seem to balance and the missionaries move seamlessly among tasks and equipment with little negotiation.

At one site the scanning of the Lake County books has been going on for years, and is the source of much consternation and commiseration among missionaries. Circumventing the individual login system for both workstation and task tracking, in 2016 the missionaries devised a workaround to distribute the labor required for scanning them: they divide each 1000-page real estate ledger into 500-page increments, and one Copibook scanner remains perpetually occupied with these books. FS-44 observes:

> Even though a good pace is five or six pages per minute on these [books], you can fall asleep in the middle of doing it. And so being able to do it and stay awake … that part of it is tedious…. We'll scan for a while, we'll audit for a while, do other administrative tasks. And… the ability to kind of pace yourself and measure you know keep yourself awake but be productive for the whole day… is a challenge.

One single sister missionary, FS-47, occasionally stays at the scanning site after the other missionaries leave to scan additional pages of Lake County books as a gift to the missionary who will take his or her turn on the books the following morning. FS-42, a librarian tasked with supporting the missionaries' work on site, observes that this kind of collaborative workaround resonates with what he characterizes as the "cooperative nature of a shared religious institution."

5.5.3 Who's in charge (1): "You're always going to have an alpha couple"

When possible, FSB positions full-time missionary pairs as informal site leaders responsible for overseeing the church-service missionaries and supporting daily work. This couple monitors productivity and often makes efficiency-oriented improvements to workflows. The senior couple triages problem-solving, often with the more technically-savvy person taking the lead (almost always the male half of the couple, unless—through attrition, or circumstance, more than design—it is a pair of single sister missionaries). Given the typical skill sets of senior missionaries, it is very helpful for preserving the time and attention of both partner librarians and FSB staff to have an on-site point person for troubleshooting; at one site, the first response to a technical problem among the female

missionaries at one site is to look up and around and exclaim "FS-44!" However, this problem-solving leadership can also become a challenge when the pair in charge chooses to solve problems in inconsistent or non-standardized ways.

"You're going to have an alpha couple, always, and you're just going to have to make sure there are not two alpha couples," library partner administrator FS-82 explains. While not necessarily naming it as such, at least one person from every library partner mentioned this phenomenon among full-time missionaries. The descriptor "alpha couple" provides a vivid picture of the ways that the personalities and priorities of the senior couple shape both the technical systems that execute the daily workflow and the general atmosphere that structures work informally. (For this researcher, the alpha couple—or, at least, the alpha male—was easy to spot. At multiple scanning sites, one (male) missionary immediately stepped forward to greet me after the partner librarian's group introduction. Without pausing to hear my questions or plan, this self-designated leader became my primary guide to the scanning site—or at minimum my guide to a very detailed overview of his processes and improvements.)

The rough edges of this setup, in which CSMs (some of whom may have been scanning at a given site for years) report directly to a rotating set of FTM pairs, are smoothed over somewhat by the presence of the existing LDS community structure here. The LDS Church's reliance on volunteer infrastructural labor, calling Church members to time-limited leadership positions at the local and regional level, makes this leadership structure a familiar one. With its balance of short-term full-time oversight and long-term part-time scanning labor, this structure ensures continuity at the site level and effectively leverages the different levels of commitment for both FTMs and CSMs.

Particularly in sites with multiple pairs of FTMs, some senior missionaries report that the control alpha couples exert over digitization work and the workplace feels petty, or unnecessarily controlling. FS-23 explains,

> …the really, really tough part for me was when the two sisters came. They would turn to me and say, 'FS-23, how do you do this and that?' I would start to explain it to them, and either [names of couple] would beeline over there, interrupt me, okay, and just take over, or else FS-44 would just stand there. He would just … stand there

> as I was explaining it to them. I would look at him like, a couple times I gave him a dirty look, but I mean that was just, you know - that was really, really hard for me.

Several missionaries describe situations in which it feels like the alpha couple is making rules for the sake of rules, that the couple's version of consistency contradicts either the training provided by FSB or—in the absence of a widely shared policy—individual preferences/practices among other missionaries. Occasionally these disputes require intervention or other support from on-site partner librarians or FSB staff in SLC.

5.5.4 Who's in charge (2): Gendered divisions of labor

Gendered divisions of labor also shape scanning work. As in the genealogy research that book scanning supports, it is necessary to look for women's work in the margins. It often remains unrecorded and unremarked, obscured by men's work, in much the same way that historical documentation (such as records related to military service, voting, property ownership, wealth, etc.) used in family history research make it difficult to locate details of the lives of people who are neither men nor white.

Married couple missionaries are a package deal, with widely varying skill sets. This skill variation is almost always gendered: in this research it was common to find senior FTM couples in which both report being computer literate, but in cases where one has significant technical or process-oriented expertise (e.g. working professionally as an engineer, manager, or in quality control) and the other does not it was always the husband with the technical knowledge and the wife without. This leaves wives to find support rather than leadership roles within the workflow.

It is not unusual for the wife in a missionary couple to describe the mission as her first opportunity (or first in decades) to be part of a formal workplace environment. While many of the women missionaries interviewed for this research described careers working outside of the house (in varied fields that included administrative work, farming, education, and healthcare; several reported obtaining graduate degrees), many cited family care work across generations of large Mormon families as an immediate and/or long-term work precedent.

Gendered divisions of labor in FSB often do not seem to relate to the actual skills required for book scanning. "You're going to have fun with her," FS-44 remarks about FS-

45, who has been making fun of him in front of me. “Because she will give you the polar opposite. I’m the technical details and all that fun stuff, and how things work. And she’s … over here.” FS-44 laughs and gestures to a nearby computer workstation, where book processing and documentation-related activities take place. At another site FS-35, who has undertaken multiple full-time missions with his wife FS-34, casts the task division of a previous mission as one that takes existing interests and skills into account. “My wife likes doing the scanning because she doesn’t like computers particularly [laughs]. So I’d do all the computer work…I’d do the metadata, the sending, other things. So my day was broken up a lot more. If I got tired, I’d just go out to the stacks and start looking for books.” Here FS-35 characterizes his own efforts under the umbrella of “all the computer work” then goes on to explain how he broke up the tedium by taking walks to select books from shelves for scanning. His wife, on the other hand, is by his own description simultaneously scanning in order to avoid computers and operating a computer all day (because scanning involves engagement with image processing software, the database tracking system, etc.).

Multiple partner librarians remark upon how married couples support each other in daily digitization work, their skills complementing each other. Partner librarian FS-83 draws a parallel with gender dynamics related to marriage and the LDS Church in order to understand FSB scanning work. FS-83 says,

> … like with [FS-34 and FS-35]. FS-35 [husband] is very, very, very computer literate. FS-34 was happy to stand there and turn the pages… And I think because, interestingly, I think it has a lot to do, in a way ... and I don't really know how to say this, other than, the Mormon faith. You know, they are married for life, basically. I mean, some of them go through divorce, which is fine. But, especially the seniors, they've been married for years and years and years, you know? And a lot of the times, the woman is willing to follow the lead of the husband, and let the husband be ... the smarter one isn't the right word, but maybe the more proficient … that's what I've seen.

In the LDS community (or Church leadership) members talk of men and women being equal partners, but there is plenty of evidence—reflected most clearly in the Church’s gender hierarchy in which only men can hold most formal leadership roles—of clearly defined gender roles and formalized submission by women to male authority.

FS-8, a FamilySearch employee responsible for training senior missionaries for imaging missions, takes for granted longstanding gendered divisions of labor within work environments in which men are more likely to occupy positions of management while women undertake administrative and support-oriented labor. Contradicting other interlocutors' assertions of "naturally" gendered differences in skills or interests, however, FS-8 observes that these traditional administrative divisions of labor may actually position women to grasp the details relevant to scanning work more quickly than men:

> A lot of the women that we work with catch on fairly quickly, I would say. More so sometimes than the men as far as the computer goes, just because they've been more in the administrative work in the last few years, and so they do more work in offices where they've been on a computer more often. The men generally would have had an administrative assistant or something that would have done the computer work for them, and then they would have done more of the technical type of work. There is kind of an interesting balance.

The unspoken observation in FS-8's description is that many of the tasks taken on by missionaries in FSB involve computers but are often more administrative than technical in nature. In the hands of specific individuals at the scanning site, scanning may appear to be technical work; this often seems to be in service of making the job a meaningful one that the missionary is committed to, however, rather than any real reflection of the skills required to do the job. In the deskilled world of missionary-led book scanning, administrative computer work may be the "most" challenging and/or prestigious role, and therefore becomes "men's" work. We will return to this in the next chapter.

Beyond work that directly supports the scanning workflow, as one half of an alpha couple missionary wives undertake emotional work that also serves to support the perpetuation of a patriarchal work environment. This often adds an additional layer of hierarchy to daily scanning work, one which others occasionally identify as unnecessary and frustrating. One returned missionary, FS-23, described the gendered dynamics of working with a particularly domineering alpha couple: "She [the wife] would see things and she would go to him [the husband] instead of coming directly to me. She would go to him and say, 'Well, she needs to make this correction and this correction, and she needs to start doing the color on every single page and this and that.'" FS-23 interpreted the work of the

wife here as supporting a system in which only one person, or at best one couple, is empowered to possess or provide expertise.

Couples' work within FSB highlights the ongoing collaborative work that remains largely invisible within individual productivity metrics. However, the gendered divisions of labor in the couple-based structure often also function to further obscure the administrative, coordination, and care work undertaken most often by women missionaries (and, as the next section describes, non-missionary scanning workers). This provides an excellent introduction for the management and coordination work described in the rest of the chapter.

5.5.5 VIGNETTE: Problem solving, skill, collaboration, and divisions of labor

FS-46 and FS-47, two single sister missionaries, have convened about fifteen feet away to discuss something. "FS-46 asked if there's a way to darken, rather than lighten" a page image, FS-47 tells me. FS-45 offers to help FS-46 troubleshoot, while FS-47 looks on silently. Seated at a workstation with the others standing around her, FS-45 opens Irfanview (image processing software) and they all discuss options for action at the same time, although it's clear that only FS-45 actually understands the program in a meaningful way.

It takes about 30 seconds for FS-44 to make his way over to this gathering of women and ask his wife, FS-45, "so what are you looking for, love?"

FS-45: "we're just trying to see if there's a way to increase the - "

FS-47, talking over FS-45: "… You know, some of the pictures that are bled out, a little bit, see if there's a way we could darken some of it. You know, reverse the brightness."

FS-44: "Well, sometimes you can apply the color to it. The color, under image -"

FS-45, interrupting FS-44: "We're just - adventuring through all of it." [Laughs]

FS-44: "OK -"

FS-45, to the others: "Increase… decrease. Resize?"

FS-44: "If you want to do a color correction, this bring up the panel that allows you to enhance -"

FS-45 continues to click things, exploring options and generally ignoring FS-44's attempts to intervene: "So Control-G allows you to turn it to grayscale. Shift-G … I can't find..." FS-44 finally interjects, "Shift-G, that allows you to adjust - right there, open that one. You can do the

brightness -" FS-45 is kind of listening ("oh, I see," she says while simultaneously moving on to a different setting), but rather than absorbing any explanations from her husband she is making rapid, extreme adjustments to the image in order to try the settings out. "There we go, we made it black!" she exclaims, as the image on the screen has been turned into a large black square.

FS-46 leans over to point out additional red, green, and blue color options, and asks "What does saturation do?" Multiple people, including FS-44, point out where FS-45 should click. Without getting an answer about defining "saturation," FS-45 says, "That might be what she wants." Looking at the default settings, she says "I wonder why that one was all the way over there?"

FS-44's patience is at this point wearing a little thin. It's clear he doesn't appreciate this whimsical exploratory learning process as much as the others, and when he speaks his tone is resigned but a little exasperated. He says, "The neutral part is at one. And it doesn't let you go very far. Then the other one you've got up there is contrast."

FS-45, interrupting: "If we click OK, we have to save it. So we can still look at it and not save it, and we'd be ok? Play around?"

FS-44: "Yeah."

FS-45, playing with saturation: "Does anyone see any difference?"

FS-44: "yeah, it changed."

FS-45: "Yeah, it looked like you can actually see it more."

FS-46: "You can actually read it!"

FS-45 (overlapping): "You can see it!"

The women laugh.

FS-44: "OK, so just - so just go forward, and come back. Now do a Shift-U."

FS-45: "Huh?"

FS-44: "The Shift-U just combines automatically all those effects - "

FS-45: "With the other stuff we put this through, we want to just leave it like that right?"

FS-44: "Basically, what we're doing is - when we run this batch process at the end, we run each page and do a Shift-U and convert it back to grayscale and that's the process. … It's a batch set up, a batch -"

Clearly not paying any attention to FS-44's explanation, FS-46 laughs as she says, "Now that I've distracted everybody…" With as much enthusiasm as I've observed from her in days, FS-45 answers FS-46 with, "That's good, maybe it woke some of us up." Laughing, everyone returns to their respective workstations.

5.5.6 "Now do a Shift-U": Troubleshooting without context

Senior missionaries have proven adept at learning and following relatively narrow lists of instructions. Explanations of their efforts troubleshooting when problems arise, however, and observations and interviews with missionaries reveal both the challenges and limitations of atomizing digitization work in this way.

In the absence of technical skills or adequate context to situate their work within a larger digitization pipeline, scanning missionaries are often inefficient and inconsistent problem solvers. The vignette above highlights the range of ways that missionaries navigate both their own technical (il)literacy and problem solving. While FS-46 and FS-47 are afraid to touch anything, FS-45 jumps in. Part of that confidence might be shaped by the fact that she is half of the senior couple informally in charge of the site. At the same time, there are hints at other underlying gendered divisions of labor; while all problem solving is undertaken by women here, FS-44 immediately (if unsuccessfully) tries to take charge, offering help and explanation using terminology (real and made up) that none of the others understand. His wife, FS-45, acts as kind of a buffer to that takeover attempt, ignoring or undermining his attempts to solve the problem efficiently in favor of a less systematic path that gives multiple people the opportunity to explore how the image editing software works. This strategy is not particularly useful in standardizing the workflow, although in the long run it may prove helpful in providing them with a working understanding of the possibilities of image processing software—or at least embolden them to try it out.

In moments of uncertainty, missionaries often make up their own explanations of both problem and solution. Within the scanning sites, disagreement over how to handle something (e.g. when to use color imaging, copyright rules governing photographs in yearbooks, etc.) can disrupt the workflow, occasionally drive missionaries to the point of distraction trying to get everyone on the same page, challenge the production of consistent outputs, and create future work for non-missionary workers.

5.6 Structuring digitization work (2): Management and coordination work

FSB's project level decision to turn digitization into something that "anyone" can do therefore requires that a steady supply of senior volunteer labor be balanced by the parallel existence of a professional administrative structure capable of providing oversight and continuity over space and time. This includes the small FSB staff based in Salt Lake City as well as on-site partner librarians or FHC site coordinators. The work of this group, who function as local and/or domain experts at and between scanning sites, is the primary focus of the section that follows.

This section explores the significant amount of work that does not fit into the deskilled portrait of digitization work put forward in missionary recruitment literature, or in popular press accounts of FamilySearch's "free" genealogy records capture services around the world (Brooks 2015; Lloyd 1997). This work often takes place between or concurrent with the discrete imaging or auditing tasks undertaken by missionaries. It includes management and coordination work, such as resource allocation, content selection and cataloging, scheduling and daily coordination, project marketing, and missionary recruitment. It also includes work to support deskilled tasks delegated to missionaries, ongoing support and other care work such as technical support or even conflict management.

The visibility of religious service, and missionaries' enormous sacrifice of time and resources to undertake this unpaid work, often obscures the skilled work undertaken by professionals in producing and maintaining access to digitized resources. This work involves not only a range of less visible actors and tasks but also types of work—such as the work of coordination, collaboration, and support—that do not lend themselves easily to workflow diagrams (or sometimes even job descriptions).
This work is instead outsourced to feminized professions in which care, support, and other detail-oriented work is routinely expected but not always acknowledged.

It is through librarians' work in particular that some of the trade-offs of the "free scanning" services offered by FamilySearch becomes clearer. Public library partners repeatedly emphasize that no money changes hands in their digitization partnerships with

FSB. But by embracing FamilySearch's language of "free scanning," librarians often end up erasing their own contributions to the project.

5.6.1 Managing resource allocation

Resource allocation is a permanent challenge for FSB staff, who must match finite—and limited—available resources with specific project needs across fourteen scanning sites. "Pins on maps, guys," is one of book-scanning operations manager FS-3's favorite phrases. Given the project's limited budget, project staff are always trying to find ways to make workflows, data transmission, and resource use more efficient.

This is further challenged by the small size of the FSB staff, and FSB's institutional invisibility vis-à-vis FamilySearch's other genealogy data collection efforts which stretch back more than a century. FS-1, who manages external partnerships for FSB, observes, "we have over 150 missionaries. Our employees are spread really thin. Our missionaries are amazing, but they need to have support. They need to have training. They need to have all the things that a team of 150 people need. Even if they weren't missionaries, you would find it difficult to keep a team of 150 people going with just five employees." Part of the liaising that FSB staff do with the rest of the FamilySearch organization is to render the project more visible institutionally. FS-3 reports that he spends much of his days in a range of meetings, from budget, planning, and audit meetings to meetings about future workflow improvements to "meetings to help educate our department on who we are because sometimes our own department doesn't realize who the book scanning team is. Because they're so focused on all of these other missionaries taking portable camera systems to the basement of some county clerk's office or some archive in Madagascar or something."

To set annual incrementally increasing FSB project scanning goals (measured in pages scanned), FSB staff account for planned workflow and software improvements, and consider any reallocation of its limited (human, technical) resources among sites that might improve productivity. FSB staff also work with individual sites to create site-specific scanning goals that take into account human, material, and technical conditions on the ground. Generally FSB has exceeded its goals every year. In 2016, however, the annual goal took into account anticipated infrastructural improvements to the project that took longer than expected to materialize, resulting in a substantial annual increase in overall

productivity but which fell well short of the 2016 goal. “What does that mean?” FS-3 asks rhetorically. “Does that mean that I go to all these centers cracking the whip and start yelling and screaming? No. That's not what we do. We just try to gain a pulse and to find out if the equipment is being utilized. If it's just sitting there, then we need to move it around, or we need ... to find out why it's sitting there.”

For partner libraries, FSB determines equipment needs by a combination of the availability of missionary staffing and the content selected for scanning. At one public library site, missionaries scan several types of oversized content that only fit on one type of scanner; partner librarians and missionaries must create digitization pick lists that balance concurrent selection of these materials with smaller content that will fit on the site’s other scanners. Both human and technical resource allocations are further complicated by the open-endedness of some site partnerships: “what I do is I help make sure they have the right equipment to do the job in the timeframe that we're contracted to do it. The contract might be six months, it could be 30 years. We don't know. Some groups just let us stay there and kind of open-ended… Then I need to make sure that there's enough missionary volunteers to run it.”

With FHCs, FSB staff work to scope scanning projects around the existing LDS volunteer infrastructure; this includes the number, experience, and skill sets of volunteers. FS-3 explains:

> We just have to figure out, okay, how many people are there? What kind of tasks can we give them? Are they already trained to do cataloging, or do we have to freshly train them, or can they do it at all? Are they going to be a small library? We just have to go in and kind of qualify them…we just use their existing volunteer service. However they are set up is how we work with.

Partner librarians and FHC site coordinators, one FSB staff member related, are FSB’s “feet on the ground, and they know how many people are starting to come in or if so-and-so hurt their back or has to go to the hospital and they can't put in as many hours or whatever, or they'll say, ‘You know, we got more books and we only got one scanner, so if you send us another scanner, we can keep it super, super busy and we'll be able to do more.’”

5.6.2 VIGNETTE: Permanent multitasking

Partner librarians FS-63 and FS-64 support ongoing FSB digitization somewhat precariously. The same staffing and resource allocation constraints that threaten the local history and genealogy collection's long-term institutional viability (and, perhaps, its librarians' job security) also challenge the library's ability to fully leverage its participation in FSB. Back at the Information desk, the librarians squeeze FSB content selection, cataloging, and missionary support between and simultaneous with the librarian tasks to which their time has already been allocated.

Cataloging remains a major resource expenditure. To mitigate existing cataloging inadequacies, they have divided the print local history and genealogy collection among three librarians. Every day, FS-63 returns to the shelf where she left off and fills a new library cart with books for which to verify, update, or create new catalog records in preparation for digitization. The cart follows her throughout her day, rotating between time scheduled on the Information desk and indirect time in the cubicle-filled staff area.

Despite these efforts, the librarians have been unable to build a backlog of titles to be digitized. This is due in part to the fact that the librarians' time has been further stretched by a colleague's maternity leave and no staff provided to fill in for her (in all of her duties, not just those related to FSB. FS-63, and to a lesser extent FS-64, report feeling some low-level — but constant — stress about the project, always scrambling because the speed of their content selection process (and the related approval from FamilySearch catalogers in Orem, UT) is often outpaced by the missionaries' scanning speed. This creates bottlenecks in the digitization workflow that can leave missionaries idle or under-worked. Rather than taking a break, or even taking a day off, the missionaries tend to sit and wait for more books to be delivered to them if they run out. FS-64 describes one missionary who developed a somewhat stressful habit of lurking in the area of the reference desk when the supply of books to scan was getting low: "If we have books that we haven't processed yet for them, he knows that, and he'll come and ask us about it, and if we're busy, he will not relent, he'll ask us about it and ask us about it until we do it."

While the librarians frame their digitization partnership with FSB as a valuable opportunity to steward their fragile (institutionally, not physically) local history and genealogy collection into an uncertain future, the demands of keeping up with missionaries'

productivity levels can divert librarians from this motivating goal. "Sometimes," FS-64 admits a little sheepishly, "we just look for large projects to keep them busy."

By identifying and submitting non-unique—and therefore fully cataloged—genealogy reference books to FamilySearch for digitization approval, librarians "buy" time to get their own unique references cataloged. In the course of my observations, for example, I watched the missionaries at this site scanning a series of annual reports from a state geographically distant from the library scanning site.

5.6.3 Workflow management

Partner librarians and the small core FSB team spend a significant amount of time coordinating and balancing the geographically distributed pieces of the book scanning workflow, addressing both human and technical bottlenecks such as the cataloging challenges described above. Specific responsibilities fluctuate as partnerships develop. In the early planning, partner librarians must get up to speed on the details of the FSB workflow, cataloging processes, equipment, training materials, and documentation, and ongoing support and communication expectations.

As the preceding chapter makes clear, partner libraries lack the resources to undertake large-scale digitization on their own. Partner librarians thus must often squeeze or add FSB support and coordination work into job descriptions that have already been stretched thin due to consolidation efforts, budget cuts, or just longstanding resource constraints. Working in environments in which their graduate-level expertise is increasingly devalued institutionally, librarians are asked to do more with fewer resources – financial or human.

Partner librarians all hold manager-level librarian positions. Whether public- or administration-facing, they are connectors in their organization: they bridge gaps and coordinate the uninterrupted flow (and organization, and easy access) of information from shelf to screen, card catalog to online database. They manage people, collections, and information systems. They attend meetings, and sit on committees. They manage the details of bridging different content management systems and approaches to metadata. Librarian FS-42 describes acting as a point person for what he characterizes as a constant state of triage, which extends to collections management. The library regularly receives

unsolicited donations of collections of books and personal research, and it cannot process and/or digitize them all.

Detail management occupies much of partner librarians' or volunteer site coordinators' attentions. Details not mentioned elsewhere include but are not limited to managing materials handling, storage and transport; dis-binding books; dealing with collection donors, and donor requests for copies of scanned materials; creating tracking slips and other project documentation.

Librarians at one of the newer partner sites report at least initial surprise at the range of work required to prepare their library to participate in FSB. FS-63 says, "I had no clue going into it that it would be this much work…I should have thought that through a little. I just thought some magical thing would happen and everything would get scanned." Much of the work FS-63 refers to here work relates to content selection and cataloging, which represents most partner librarians' largest resource expenditure both before and during the project. Librarian partners point out that ultimately efforts to prepare content for scanning (e.g. cataloging) improve the overall value and accessibility (in both print and digital form) of their collections, and they seem skeptical they'd ever get extra resources to do it without the impetus of "free" scanning. At the same time, this work takes time—in some cases, a lot of it—and librarians must often create this time within schedules already stretched to capacity, as the librarians in the vignette above relate.

As missionaries travel to the shelves to work their way through digitization pick lists, partner librarians field questions about collections and content selection. FS-42 describes,

> …they might find material inside a book from the shelf… they may not be able to find a resource they want to digitize. They might have any number of copyright related questions. They might have binding questions. You can really get to the nitty gritty. Is the gutter too - is there room to lay the book flat? Can they—if it's an easily dis-bindable item, can we do that and then put it back together?

Even self-sufficient senior missionaries require detail management. When missionaries or volunteers (instead of librarians) are charged with pulling volumes from shelves to approve for digitization, they often pick books that appear easy to scan. FS-35

explains that a partner library manager tasked him with going back through a previously digitized collection to ensure that all the public domain genealogy books had been captured. He laughs as he details, "the thing we found, because I went back through the library, was that there had been a lot of cherry picking. And so a lot of the books we were doing the last three or four months there were the ones that were tightly bound, narrow margins, onion skin."

At one FHC scanning site in which CSMs undertake cataloging, the site coordinator frequently contacts FamilySearch's team of professional catalogers in SLC to manage high-level cataloging gaps or challenges (often related to serials with complicated relationships of parent/child cataloging details). FS-21 explains, "we might have a record in the catalog that shows it's unauthorized, but we have the book so - I call them to say that since we have the book from the center, what do we do with it? Or if it's a situation for a serial, like the one earlier this morning, if there's a problem in Worldcat and we can't import it, I'll call the cataloger in Salt Lake and see if she can find it for me. And if she can't find it for me, she'll create the record."

Scheduling can be time consuming at CSM-dominated scanning sites. In addition to health issues, CSMs have lives and responsibilities outside of scanning; the site coordinator's schedule management work therefore involves informally maintaining extensive knowledge about CSMs' lives. These details can have a large impact on the timeline and speed with which a digitization collection can be scanned. Accounting for them becomes critical as FSB contemplates future scaling strategies (as would be the case for any long-term digitization project with large-scale aspirations).

Some of the larger scanning sites contain decades of work. Standing next to the bins of disbound books stacked floor-to-ceiling awaiting transport to long-term dark storage or walking among the donated filing cabinets full of un-processed content gathering dust in the basement storage area of a public library partner, the critical stabilizing role played by partner librarians and site coordinators becomes clear. At each scanning site, there was always one person present who was able to point to a stack of books at any point and identify how and why they came to be there. (And, it must be observed, why they might reasonably sit there in anticipation of processing and/or scanning, for another decade.)

These individuals have been at their jobs long enough to have grasped the scale of the endeavor and remain committed in spite—or because—of it.

5.6.4 "They don't think like me": Managing unskilled volunteers

"You call it a missionary program; I call it a volunteer organization. Potato, potato." Characterizing LDS missionaries as "the largest volunteer organization in the world," partner librarian FS-41 frames the training and support challenges librarians face with missionaries as a more general one related to volunteer management. FS-41's colleague, FS-42, notes that managing voluntary workers often requires a different approach than managing other workers:

> And so, management there is very different than management here, where we're paying folks to—over here [with the missionaries], management is trying to keep people on the same page, accepting what they can do and allowing their personal sort of pride to move them forward. But it's a lot more carrot, and a lot less stick, when you're working with a volunteer group. And that's, I hope I do that here [on the paid employee side] too, but there's a leverage here that's not there [with the missionaries].

Part of volunteer management here is to get work out of the missionaries, but part of it is to support missionaries' positive experience and integrate the missionaries into the library's broader commitment to volunteers. FS-41 explains, "we believe that if a volunteer has a transformative experience it will reach out, ripple out into the world."

As volunteers, missionaries' narrow focus on a single activity, scanning books, means that they often fail to appreciate the broader scope of work (both tasks and skills) involved in FSB. Many missionaries do not understand how the imaging and auditing they do fit into a larger process with many interdependencies, and further that this larger process includes significant amounts of (often professional) work that cannot or at least is not routinely undertaken by missionaries.

Within partner library sites, tensions occasionally emerge in part due to missionaries' lack of understanding of librarianship more generally. Librarians take on the additional labor of supporting and mitigating the gaps created by the disparate skill sets of these two groups. Librarians report that occasionally missionaries seem to hold a mis-perception that the librarians spent their time exclusively supporting the missionaries. FS-

64 reports frequently working on other parts of her job during the day and "they'll walk by and I'll be looking at a book and they'll say, 'Oh, is that one for us?'"

Multiple partner librarians mention observing that senior missionaries have very different orientations toward print books than they do. While these tensions are mediated elsewhere (at the administrative partnerships level through content selection, for example) in the project, they occasionally manifest in practice during scanning. While senior FTMs receive general training on materials handling in Utah and onsite at partner libraries, FS-64 says she has winced while observing missionaries handling some of her collection's oldest and most fragile books. (Also, she admits, the way that missionaries occasionally seem to stop working momentarily, or freeze, as she enters the room makes her uneasy.) FS-64 says she realizes the missionaries' preparation is not the same as being trained as a librarian—"they don't think like me," she says—and that she must continue to reinforce and expand their training on materials handling. FS-64 also reports that the missionaries routinely request that books be disbound for scanning, belying an underlying lack of understanding of the library's commitment to the stewardship of its print collection. "We prefer to keep the book intact," FS-64 describes, with just a hint of un-articulated annoyance.

5.6.5 Supporting senior missionaries: Technical, social, and care work

Professional workers tasked with supporting FSB must understand the specific physical, cognitive, social, and health-related abilities, limitations, and needs of working seniors. These factors shape FSB workflows (from training to documentation) as well as the nature of the on-site or remote support provided to *senior* missionaries. FS-83 observes candidly that as a genealogy librarian, she has significant experience working with and supporting senior patrons (as these are a major demographic of family history researchers); this experience has proven useful in training and working alongside senior missionaries, who often have a lack of confidence and literacy around technology. Providing relevant management and support thus involves understanding the strengths and challenges of individual missionaries, from the sister missionary "afraid to make a move" to the alpha couple who disrupts existing social dynamics. Partner librarians and site coordinators acknowledge the simultaneous presence of multiple individual paths toward skill acquisition and/or proficiency.

At times there's a noticeable disjuncture between the nature of librarians'—and FSB staff members'—professional expertise and the nature of the support that the senior missionaries require. Partner librarians, FSB staff members, and other site coordinators often function as a kind of human "computers for dummies" resource for the senior missionaries. While FS-3 has a graduate degree in imaging science, for example, he spends much of his time cheerfully (re)walking seniors through the login and password screen of their computer workstations.

The technical support that senior missionaries require varies by the individual, and frequently involves a significant resource investment from a range of different people. Asked to identify important skills for completing her auditing tasks, FS-40 says, "Being able to sign in, being able to turn the computer on, being able to recognize a problem. Know when I have reached my limit so I can ask someone for help. That's one of the BIG things is to recognize … that there's a problem I don't know how to fix." FS-40 observed that she doesn't find it hard to ask for help. She details:

> Sometimes I find it difficult to understand the answer, but to ask it is not the problem… Those that are very skilled at computers find it hard to break it down enough for a person who is computer illiterate. And that's what I was. It's hard for someone in that situation to understand what is being said. Sometimes it takes two or three people explaining, because everyone explains it a little different. And then it works. And it takes a little bit [of time] for it to click.

While there is usually at least one senior missionary with some combination of technical skills and site experience to provide first level hardware and software troubleshooting, technical problems often require additional onsite assistance from partner librarians or the FSB team remotely. Two FSB staff members, FS-4 and FS-5, act as front line remote technical support for scanning sites; if they are unable to resolve issues, they push them on to FS-3. FSB staff are, for example, able to use remote login software to troubleshoot challenges large and small. Missionaries express frequent and effusive appreciation and admiration for the ongoing remote support provided by FSB staff. Laughing, FS-64 relates her experience on a previous scanning mission:

> Salt Lake was really supportive when I was, kind of through process of elimination, the senior person [in the partner scanning site]. FS-4 was very responsive, in any kind of pickle I could just call … It would either be something in the transmitting, and I you know, would do something wrong, or whoever had scanned it had put the wrong number, and it would be something that she would have to change at that end. Fortunately, the log-me-in program worked very well.

FSB has grown its team and expanded the remote support offered to missionaries—and partner librarians—in recent years. "It used to be just one person and FS-4 was just overwhelmed, I'm sure, in getting people out there and then getting them figured out and she had to know each of them in so many ways. I think that now we've got much more support than we did in the past" (FS-82). Partner librarians recognize and appreciate the FSB team's dedication and this increase in support, but still identify this as an area of continuing improvement for partnerships—particularly as it relates to ongoing missionary support and training.

Partner librarians also observe—and, in what partner librarian describes as "an exercise in diplomacy,"—manage many social challenges among senior missionaries. Of the personality conflicts in evidence, partner librarian FS-42 remarks, "there have been times when I have been sort of counselor in residence..." One missionary, FS-23, describes being touched by FS-42's efforts to let her know he saw and understood the challenges she faced in navigating some thorny social dynamics and hierarchies. At a different site, partner librarian FS-83 reports having to occasionally "run interference" to mitigate personality mismatches between an initially gruff long-time library employee and missionaries unsure of how to do their jobs.

As seniors, many of the missionaries have retired from professional careers and have left behind some of the (social, professional) expectations or norms of the workplace. Others have retired from positions of leadership where they may not be used to taking directions from others. Some women senior missionaries may not have ever entered waged workplaces in the first place, working in the home or other informal environments. Partner librarian FS-42 describes, "I work for 45 years, I retire, then I go do a mission. And I have to co-exist - … put eight 75 plus year old retirees together who are pretty set in their ways, in their understanding. And sometimes many of them have been the top dog in their field. It's

very, sometimes it can be very difficult to get along. That has nothing to do with the church, it's just the dynamic."

Multiple library partners (FS-41, FS-64) mentioned that many senior missionaries would benefit from additional training or orientation related to acculturation issues—what to expect from the work environment, both socially and practically, anticipating challenges in working in a team setting, and even navigating transitions and adjustments to a new city. Partner librarian FS-82 details,

> We have had those who come, and they're there for a year, and all they want is to go home. I think that that understanding of 'you're gone for a year' maybe not have been there. We had one person, she was not emotionally ready, her husband had passed away, and she dived right into this and she didn't make it two weeks. She wanted to go home to her family and to her ... I'm like, somebody should have recognized that. I just felt so bad for her, but it just did not work at all. I mean it wasn't even two weeks. I think that one wasn't well planned ahead.

FS-42 has a finely tuned sense of trade-offs with regard to working with senior missionaries. He points to the quality of their work (from imaging to cataloging, etc.) as higher than contract digitizers (who employ hourly workers) has worked with, and puts a high value on the strong shared sense of purpose and investment in the work's significance that the missionaries uniformly possess. On the other side, FS-42 relates, are a range of instabilities that accompany a reliance on missionary labor. This includes missionary recruitment challenges, the time-limited nature of missionary work, and that *senior* missionaries require a different kind (and amount) of support and care and supervision from librarians that contract digitizers—or even volunteers more generally—just do not. FS-42 is candid that when everything is working well (technically and socially) the project is a great thing to behold, but there are also times when the combination of technical difficulties, interpersonal conflict, and FamilySearch's institutional intransigence (e.g. the slow speed with which it can make high level changes related to things like content selection or infrastructure provision) make the scanning site an uncomfortable or even unpleasant place to be. Acknowledging that there had been "a couple folks who just, yeah - couldn't manage. And really really inflexible," FS-42 still concludes, "And so, they are still gifts, still contributors. Not every missionary is a fabulous worker… like I say, radically

different skill sets. The one common piece is that they're willing to work, willing to do this on a volunteer basis."

5.6.6 VIGNETTE: FS-21

The ongoing support and care work involved in book scanning is evident in partner libraries as well as in high-volume FHC scanning sites. Site coordinator FS-21's responsibilities include workflow management; staff recruitment, training, scheduling, and support; collections transport; communication with FSB staff. FS-21 is more than simply the site manager, however. He is the site's lifeblood; without him it's hard to imagine the site could exist at all. The high volume scanning site, which recently moved to its own freestanding building, is filled floor to ceiling with shelves, boxes, and piles of books. In my time onsite, I observed several conversations where missionaries were confused about the placement of books, from questions about the scanning status of an unlabeled box of books to where to put a full cart of books to when and where a different set of books had been sent to be dis-bound. When answering these questions, FS-21 never referred to any documentation; the answers all resided in his head and nowhere else.

FS-21 is member of the local LDS community and a long-term volunteer — a full-time, 40 hours a week volunteer. He juggles his scanning center site management with his full-time paying job doing software support, which he can do remotely. Aside from his phone and computer emitting a range of different beeps and alarms intermittently all day, FS-21 seems to combine his two jobs pretty seamlessly. He makes himself available for the unending stream of troubleshooting—material, technical, or personal—required by his staff of more than 30 senior CSMs and volunteers.

Considerably younger than the senior missionaries he supervises, FS-21 interacts with scanning staff using a combination of lighthearted banter and calm pragmatism; he is gentle with new and unsure missionaries, patient without engaging in hand-holding. This approachability is built into the scan center layout: there are no physical markers that FS-21 is in charge. He doesn't have an office, or even a desk to himself. When he's not driving his own vehicle all over three states picking up or delivering collections like a one-man Deseret Trucking Company, he and his work laptop are parked within the rows of computers and scanning equipment used by the CSMs and volunteers.

FS-21's technical skills and thorough understanding of FSB and its scanning workflows and policies allow his center to remain largely self-sufficient. FS-21 can field and solve problems better than any of the other FSB scan sites outside of the greater SLC area. Missionaries, too, are aware of FS-21's considerable expertise, and many rely on him in a way that makes them actually less *self-sufficient than missionaries at other scanning sites. I ask CSM FS-30, for example, many questions about the catalog, her spreadsheets, and the way that books are tracked through the early part of the scanning process. She can answer much of it, but more often than not her answers are statements along the lines of "FS-21 takes care of that."*

FS-21's outsized presence (and commitment) provides a stable mentorship and daily support structure at the scanning site that is both admirable and an anomaly. The need for this kind of work does not simply go away in the absence of an FS-21 to provide daily oversight and support, particularly in partner sites with higher turnover FTMs. Instead, the work gets shifted invisibly onto other people such as partner librarians or handled remotely by FSB staff.

5.6.7 Managing continuity and change on and across scanning sites

Beyond daily workflow management, FSB staff and its partner librarians have navigated the growing pains of the project as it scales and experiments with different hardware, software, and processes. Managing ongoing efforts to streamline the digitization workflow within a rotating, senior, and geographically distributed workplace can be a challenge for both FSB employees and partner librarians.

Multiple FamilySearch employees and volunteers who have been involved in the project since its early days observe that in the beginning, there were no systems in place so things changed every day. FS-36, a long-term CSM at a FHC, remarks that at the scanning site even today "change is chronic." 1600 miles away at a partner site, FS-42 echoes this sentiment. Digitization, he says, is "all about change. It's all about better resolution, better OCR, and so the Church is constantly changing their processes. There's new terminology, and new terminology is hard for those of us who are older." FSB staff and partner librarians provide the bridge between project-level policy or workflow changes decisions made

elsewhere and their execution by missionaries; as FS-42 alludes to, this kind of support work often has technical and social dimensions.

It is challenging to achieve a balance between the need for consistency and standardization in large-scale digitization and the realities of the widely varying conditions across sites. Each site is reliant to a different extent on a dedicated core of experts; in the case of FTM-managed sites, these "experts" are temporary and their expertise is tenuous. While FSB staff try to plan for training overlaps between new and departing missionary couples, partner librarians and other long-term workers such as CSMs or volunteers step in to fill any continuity gaps that emerge as a result. Many senior FTMs go on multiple missions, and repeat missionaries are a great resource for FSB. Even with the challenges of skill retention and retraining (e.g. two-time single sister missionary FS-46 reports going through training each time, observing "it's amazing what you forget when you're not using it every day"), repeat missionaries are still able to leap over at least some of the initial acclimation and skills acquisition process reported by the missionaries. Beyond becoming familiar with and invested in the missionary structure, these missionaries accumulate context through their experience that makes them more independent, skilled scanners able to help new missionaries. Some returned missionaries also keep their hard-gained experience fresh through volunteer work or CSM callings if FSB has a scan site near their permanent homes; these missionaries often use their significant hands-on experience to train and mentor new CSMs and volunteers at FHC scanning sites.

When each person is working with a slightly different view of the project, however, getting everyone involved with FSB on the same page is difficult if not impossible. The scanning missionaries are buried in site-level daily work details, and often do not have the ability to gain a coherent view of the bigger picture. FSB staff, on the other hand, cannot grasp all of the nuances/details of site workflow challenges. Sometimes the way that SLC-based FSB staff think something *should* happen seem out of touch with the way it does happen—or really, the very practical reasons that it happens a certain way on-site.

FSB employees engage in project-level team building work with both missionaries and partner librarians. FS-3 explains this effort:

> I'm trying to get everyone to feel like they're a part of the team… Basically some libraries didn't know they were team members or didn't receive reports regularly or whatever. I try to work really hard to make sure that everybody feels like they're part of one big team and that they're not just a book scanning team. What they're really doing is they're building the next-generation online family history library. Whatever books we add to that, whatever changes we make online to improve the user experience we're building the next generation library so that people don't have to come to Salt Lake to have an awesome family history experience. They could just go online. It's important for every single library, whether you're a FamilySearch library or a partner library, to get that you're part of a team.

FS-3 facilitates a regular conference call between the SLC-based staff and missionaries at all FSB scanning sites. While the focus of these meetings is on training related to establishing consistency among sites (e.g. quality control parameters, copyright issues, etc.), partner librarian FS-42 reports that "most of the time I participate, just to keep my connection with FS-3, and FS-4, for the FamilySearch corner. Those connections are really helpful when you have problems to solve." FS-3 indicates that his intention for these meetings encompasses both training and team building:

> I record those to use as training later, but in the beginning of every single one I always do a roll call. I'll say, 'Okay, do we have Sacramento online? Great. Okay, do we have Orange, California online? Okay, do we have Mesa? Do we have Las Vegas? Do we have Philadelphia?' Inevitably there's always at least one or two libraries that after the meeting that will call me up and say, 'I had no idea we were this big. I thought we were just a Midwest thing,' or, 'I thought it was just a couple of us in California. I didn't know we had all 15.' I'm trying to help each of them realize they're part of a big team… it's something so simple but yet it puts them in touch with other people who are missionaries doing exactly what they're doing, and they're not the only ones.

5.6.8 Marketing and recruiting

FSB's much-remarked institutional invisibility extends to the general population of family history researchers (inside and outside of genealogy centers or libraries). Whether it involves recruiting prospective users or missionaries, everyone involved with FSB has to spend at least part of their time doing public relations and/or marketing for the project. In pursuing partnerships with libraries, for example, FS-1 frequently has to do significant groundwork simply to introduce prospective partners to FSB. Relating the origins of her

library's partnership, one newer partner librarian described her good fortune at being seated next to FS-1 at a genealogy conference and getting the opportunity to hear about this valuable service and online resource she had been completely unaware of—and she is a longstanding professional in this space.

Exacerbated by FSB's low public profile, missionary scarcity remains a perpetual challenge to scaling FSB (or even to maintaining current scanning levels). To acquire missionaries, FSB must compete with other units within the LDS Church at large as well as the Family History department more specifically. To recruit senior missionaries, the LDS Church places static descriptions of full-time missionary opportunities within various categories of its website, and publishes a weekly newsletter listing current openings. These descriptions provide details on who is eligible to serve, time commitment, location, and required or suggested skills. Service and missionary-related LDS websites also make use of video testimonials from current or former missionaries to recruit prospective missionaries.

FSB staff must remain in active communication with multiple LDS Church departments with respect to ongoing staffing needs and locations. Each state, for example, has its own church mission coordinators who seek out volunteer opportunities at the local level. (The number and geographic distribution of mission coordinators depends on the density of Mormons in a given area—Alabama, for example, is quite different from Utah.) There are always more available mission opportunities than there are missionaries to fill them. To fill the missionary gap, the FBS team supplements general LDS Church recruiting efforts in multiple ways. FSB has created colorful cardstock brochures to describe its work and missionary opportunities within it; these promotional materials are distributed at scanning sites, but also at public outreach events such as family history scanning days or the scanning booth set up at the annual Rootstech genealogy and technology conference in Salt Lake City. FSB staff sometimes use Family History Area Support to recruit in local areas. In recent years they have begun to use targeted Facebook campaigns in a limited way to reach out to missionaries.

No one talks about it explicitly, but each of the partner libraries is in some way competing for the same limited labor pool. While in interviews they are circumspect and nuanced, at large gatherings such as the annual book scanning meeting in SLC, partner library managers trip over each other (and themselves) to compliment FSB and declare

their love for missionaries. Partner librarian FS-82 describes, "having an idle scanner is a hole in our world." Library partners also share some of the recruitment labor, from managing current and anticipated staffing levels to interfacing directly with the local LDS community to find volunteers (in tandem with missionaries). FS-82 describes, "we have our LDS channel where they become official missionaries or if I can't get that call made then we put them through our volunteer program. I find a way; I'm never turning anybody down."

In CSM-dominated scanning sites, word of mouth is often the best community-based recruiting tool. "He strong-arms them," a CSM pipes up from two rows over in answer to my question about how FS-21 recruits scanning staff. A chorus of laughter follows. FS-21 explains that he pursues several different strategies to recruit CSMs. "If I know them and think they'd work really well I just cold contact them and say 'hey come work for me.' Other cases we put out the word through the Church Service Missionary system that we need staff." Missionary recruitment often includes providing prospective missionaries with basic information they need to consider volunteering their time with FSB. Anticipating prospective missionaries' technical literacy challenges and acknowledging this invisibility, one scanning site has created a detailed set of instructions for navigating the LDS Church's online recommendation form to initiate the CSM approval process. This printout is distributed locally at the site, with a printout of the website description of book scanning missions attached. It is also made available at public recruiting opportunities such as at FSB's scanning boot at the RootsTech genealogy conference.

5.7 Conclusion: Senior missionaries as gatekeepers

Every morning I walk up to the LDS Church Administrative Building's visitor sign-in desk, where two smiling senior sister missionaries greet me. I explain who I am and my purpose for visiting, and more often than not I am actually accompanied by the person I am there to see (FS-3). His smiling physical presence does little to speed up this process, however. The pleasant woman—each day a different one—looks up my host's name in the computer's staff directory and fails to locate him, asks and re-asks his name, and does not appear to hear him spelling it out carefully. She takes my driver's license and then forgets she has it. We patiently chat as we tell her once, twice, three times about my itinerary for the day and eventually she types into the computer, one slow letter at a time, the required information

about my whereabouts on the third and fifth floors. A full five minutes later I leave the desk clutching my new visitor badge, which I flash at the security guard stationed at the elevator bank across the lobby.

From a work perspective this encounter—alternately reassuring and maddening in its consistency—encompasses the upsides and downsides of the LDS Church's heavy reliance on (senior) missionary labor in Salt Lake and elsewhere to support its infrastructure. On the one hand, everyone is so pleasant. On the other, senior missionaries are more often than not largely technologically illiterate. They forget details, and when a problem arises, they choose to start the entire transaction over rather than trying to figure out where the problem occurred.

In these interactions, it is often hard to reconcile the efficiency-minded Mormon work ethic with the fact that using senior missionaries for technology-dependent customer service means giving up entirely on aspirations of efficiency. Working alongside some senior book scanning missionaries is not unlike my experience of trying to get into the Church Administrative Building. The challenges that both sets of missionaries face in terms of technological literacy draw attention to the efficiency dilemma inherent in asking senior volunteers to fill these jobs, as the labor cost-savings of relying on volunteers is set against the productivity loss and oversight requirements. In both sites of work, however, it quickly becomes clear that such a dilemma fails to account for other factors that shape—and often drive—the work itself, from planning to execution.

In this chapter I explored the ways that FSB digitization work is distributed across tasks and roles, and examined how project workers are differently positioned within a construction of digitization work as something "anyone" can do. In Chapter 6, I shift to consider this missing piece alluded to in the preceding paragraph, how missionaries and other project participants make sense of and meaning in digitization work—collaboratively and individually—across different types of work.

Chapter 6 Labor (2): Constructing Digitization as Meaningful Work

6.1 Introduction

One view of digitization work starts and stops with a fairly typical division of labor in which digitization has been broken down into a finite set of tasks geographically distributed across differently motivated groups of workers. This view captures one way that that digitization can be scaled—and certainly deskilled—as more work is outsourced to computers and software algorithms.

On the other hand, a significant amount of work goes into digitization that is not circumscribed by this division of labor. In FamilySearch Books digitization work seems to defy practical divisions of labor at every turn. In Chapter 5, I illustrated this by examining the digitization tasks and roles for two groups, missionaries and professional or managerial staff, arguing that the visibility of the volunteer missionaries' imaging work often functions to obscure the tasks associated with other pieces of the workflow.

Questions of visibility and value in digitization work are not confined to *tasks* and *roles*, however; the unacknowledged presence of different *types* of work is also important. This includes the work of collaboration and of coordination, explored in Chapter 5. In Chapter 6 I add the work of providing context, the work of adapting work to personal skills and interests, and the work of creating and maintaining community. This is the work of motivating and supporting volunteer workers, often unaccounted for as it is undertaken invisibly by their paid counterparts. It is the work of supporting automation, and of serving patrons—or religious institutions. It is care work, and the work of making work meaningful.

All of this work is of particular relevance to understanding FSB, which has simultaneously set itself up as a "free" contract digitizer and constructed digitization as work "anyone" can do. Work does not have to be meaningful to be considered to have value (economic or otherwise). But in the absence of monetary compensation, some kind of meaning or value has to motivate work.

This chapter explores the ways that participants in FSB—missionaries as well as librarians and FSB staff—make sense of, and meaning in, digitization work. In FSB individual, site-specific, and collective meaning-making efforts structure and shape daily scanning activities described in Chapter 5. These efforts in turn intersect with, and occasionally depart from, the institution-level digitization values and goals that digitization is undertaken in the name of described in Chapter 4. In Section 6.2, I provide an overview of the different ways in which a service ethos manifests in both religious volunteers and professional librarians. The former are the focus of Section 6.3, as I consider how digitization work becomes meaningful as explicitly religious work. Librarians and LDS volunteers are brought back together in Sections 6.4 and 6.5 as I focus on how an ethics of care plays out in FSB with respect to patrons, content, and finally colleagues.

Individual missionaries articulate a range of religious—but also personal and community-oriented—motivations and sites of meaning-making for their work, often surfacing multiple forms of meaning in a single conversation. Further, missionaries within a single scanning site may be invested in different aspects of work. This application of external meaning is particularly important for missionaries, because much of the daily work undertaken by senior missionaries is routine, semi- or un-skilled work. The generic quality of many scanning-related tasks make these tasks malleable to being outsourced to a range of workers employed by other third party digitizers: LDS missionaries in this case, but also Google's scanning technicians, job training program participants, graduate student interns, or prisoners (who interestingly may undertake scanning work in both paid and volunteer contexts) (Kaplan 2014; Norman Wilson 2009; Bauer 2015; Lloyd 1997). Reframed as *meaningful* work, however, digitization tasks can also be integrated into work transition and job skills training programs, undertaken by graduate student librarians as unpaid internships, or be the focus of religious missions—all at low costs to the digitizer.

By contrast, digitization often becomes meaningful work for librarians in the context of their own changing jobs and roles. The partner librarians who were part of this research are all paid workers. However, they undertake a lot of largely invisible—and therefore unaccounted for—labor in order to participate in FSB's "free scanning" services. Digitization offers an opportunity for librarians to ensure the stewardship of their unique and local print collections in the face of institutional uncertainty, and helps them to better serve and engage with family history research patrons.

Ideas about work are presented discretely in this narrative, but in practice often appear in combination as digitization work is made less abstract through workers' constant encounters with multiple contexts for their work. The question of context has the capacity to shape worker motivation and, in turn, daily scanning activities. Are you pushing a button over and over, or are you making history available on the web? Are you helping patrons to discover their personal pasts, or are you helping to connect families (living and dead) eternally? The answer to this may depend in part on how the work is framed to the people tasked with executing it, and the context and training that are provided to them.

In studying FSB, I often found that one type of meaning/value (volunteer service, service ethos) is called on to take the place of another kind of value (compensation). Missionaries and librarians participating in FSB are all motivated to give away their labor for free, if for different reasons and to different extents. Bringing together the different roles and types of work present in digitization work, it becomes possible to consider shifting registers of visibility and value(s) in FSB. Different types of work involved in digitization overlap with—and, sometimes, obscure—each other, and there are tensions between different types of visibility and different types of value (personal, institutional, professional, monetary) attributed to work in a given setting.

When digitization work is constructed as meaningful work, it can be rationalized as work that it is not necessary to pay people for. When constructed as a "labor of love," or subsumed under the umbrella of a service ethos, this work may not appear to require substantial institutional investment from the constrained budgets of libraries that enter into partnerships with FamilySearch. Further, the availability/visibility of "free" scanning may support the idea that digitization is not a resource-intensive activity worthy of budget allocations or local infrastructure investment.

6.2 Service ethos

While motivated by different sets of values and commitments, librarians, missionaries, and FSB employees align significantly—if partially—in a shared service ethos.

6.2.1 LDS Church as a service culture

For most if not all senior missionaries, religious commitment precedes and is animated through family history missions. This is a major piece of meaning-making, simultaneously separate from and yet present in many of the statements from senior missionaries detailed below.

With both formal and informal elements, a service ethos permeates the daily lives of active LDS Church members. In a survey of Mormons, more than 90% of those surveyed reported volunteering within their ward within the past year, with an average of 332 hours per year by active LDS respondents not currently serving full-time missions. Evans et al. (2013) observe that high levels of volunteerism among practicing Mormons are likely shaped by two things. First, Mormons are more likely to have demographic characteristics that are correlated with higher volunteer rates (e.g. Mormons are more likely to be married, have more education, children, etc.). Second, the LDS Church structure prioritizes—and depends heavily on—voluntary service labor to staff and maintain its infrastructure.

LDS Church members are formally called to fill volunteer positions that cover the majority of the religious, educational, social, and organizational elements of local LDS life. The Church relies upon unpaid lay clergy at the local and regional level, and volunteers fulfill Church education-related teaching positions (Pitcher 1992). Volunteer labor supports and manages the LDS Church's social welfare infrastructure, which includes food production and distribution centers, addiction recovery and other social/health service programs, job acquisition support, and thrift stores (Mangum and Blumell 1993). Senior missionaries staff Church departments (e.g. member and leader support, church education system, temple department, family history, Church Administration Building in Salt Lake City, etc.) as well as historic sites and visitor centers.

The LDS Church connects proselytizing missionary work, convert retention, member re-activation, temple and family history work, and teaching the gospel as related pieces of "the work of salvation," and posits that all church members have a responsibility to be actively involved in this work (The Church of Jesus Christ of Latter-Day Saints 2010). Scanning-related senior missions are divided into records preservation (digital image records capture), book scanning, and records center operations. Other Family History missions include providing home-based customer support (phone, chat, or email) for FamilySearch website users, online community support, creating or editing Wiki content, and online content translations. Family History senior missions outside the home include being area missionaries (supporting overseas missionaries to integrate family history into their missions), working at the Family History headquarters, or providing patron assistance in FamilySearch Libraries (main SLC library or other regional libraries). Otterstrom (2008) notes that the "majority" of the staff at the Family History Library in Salt Lake City are volunteers or missionaries.

Beyond formal service opportunities such as callings or missions, Church members are encouraged to perform ongoing service and care work in their daily lives. This may include acts of charity such as preparing meals for a sick community member or helping a new Church member to move furniture (Cnaan, Evans, and Curtis 2012), but also encompasses daily acts of kindness such as a willingness to share talents or take interest in the activities of friends and family.

6.2.2 Librarians as service-oriented workers

Librarians' commitment to service is professional rather than religious. The American Library Association's professional Code of Ethics (2017), first adopted in 1939 and revised several times over the past 80 years, was created to explicitly identify the ethical principles that guide the work of librarians. These principles codify the service orientation of the library profession, with respect to patrons, resources, and librarian colleagues.

While none of the principles in the ALA Code of Ethics explicitly references care, through librarians' work we see an ethics of care applied to a professional setting. Librarians engage extensively in care work, from the general patron support described in

Chapter 4 to caring for objects through cataloging and future-proofing the collection to supporting the physical, intellectual, and emotional needs of working seniors in FSB.

In a striking but perhaps misleading parallel with missionaries, librarianship is often also characterized as a calling; constructing librarianship as vocation or calling facilitates assuming librarians work selflessly, not motivated (or adequately rewarded) by monetary compensation. Critics point out that this same characterization of librarianship as calling—"a care-centric vocation that is 'inherently good and sacred, and therefore beyond critique"—conditions librarians to accept low pay and low status while having their workloads increase (Mattern 2018; Ettarh 2018).

Genealogy librarians serve a high maintenance patron population that has not always been welcomed by librarians or archivists (Bidlack 1983; Freeman 1984; McKay 2002; Yakel 2004; Mills 2003). One partner librarian, FS-41, narrates how making family history researchers feel welcome and valued is a motivating core value for the founding of his library's genealogy department:

> They [genealogists] are an atypical class of patrons. Usually a patron comes in, in the mid-20th century, with a specific information need. And I think there's a lot of strings to today…it can be a hard question or an easy question, but they ask the question, the information professional provides the answer, and they do that blessed thing, they thank you and leave.
>
> Whereas genealogists tend to stay, ask lots of questions, and you answering a question successful only makes them want to stay longer and ask more questions. So certainly in mid-20th century when [genealogy department founder] started this department… he wanted a place where genealogists could come and get treated like regular public library customers. You get good service no matter how many questions you ask—we'll be excited, we'll be engaged, we'll provide you with the best answer, we'll try to collect some decent resources in which to context those answers. And that in the mid-20th century was like a match to dry wood; it just took off like crazy.

While several of the partner librarians have spent their careers in the genealogy or local history space, others started out more generally as public librarians. One, FS-82, describes being drawn to libraries over 20 years ago because of the public aspect, the commitment to providing access to information resources for everyone. At the annual FSB library partners meeting in 2017, librarian FS-82 remarked to the assembled group of librarians and FSB employees, "We work for a public library, we don't make a lot of money.

So everyone … who is working there, hired or volunteer, is there because they want to be there. We can understand their [missionaries'] work without remuneration because we aren't in it for the pay either." Librarians describe feeling an affinity for the missionaries and their dedication to scanning work; despite rarely sharing religious, geographical, or professional roots, both sets of workers demonstrate a commitment to service-oriented work that often remains invisible or under-valued.

6.3 A new kind of conversion narrative? Digitization as missionary work

The LDS Church's senior missionary program represents a means by which to extend the productive labor of retired seniors outside of the wage labor system. To varying degrees senior missionaries replace some of the validation acquired through paid compensation—in the form of hierarchical career advancement, financial security, identity management—with religious service, and missionary service provides many of the social benefits of work as well.

Senior missionary service offers a chance to perform work in at least a marginally public setting, to get credit for it in some way. This seems especially valuable for people who have retired from the workplace, but also allows some women to perform work and skills publicly for the first time as they never took part in the public workforce. (It must be noted that home-based entrepreneurial labor such as multilevel marketing and handcrafted goods sold on Etsy, most often undertaken by women, is quite prevalent within LDS communities. Christenson (2016) notes a connection between this contemporary labor and Depression-era ideas of economic self-sufficiency.)

This visibility, however, is tenuous at best, as social divisions of labor often make different types of work "count" unevenly.

6.3.1 Callings

LDS Church members often but not always receive formal "callings" to perform voluntary work for the Church (Pitcher 1992). After prayerful consideration, Church members are called by Church leadership for a specific job and duration, and then are released at the end of their calling; they often receive a new calling quickly. A study of

Mormons' prosocial behaviors found that more than 86% of Mormons surveyed reported currently serving a calling of some kind (Cnaan, Evans, and Curtis 2012).

Full-time missionary (hereafter FTM) FS-44 talks about being called to serve as a digital preservation missionary with a mix of pragmatism and religious deference. After looking at the recruitment and promotions materials on the LDS website, married couple FS-44 and FS-45 submitted an application to do a senior mission. They did not directly talk to anyone at FamilySearch. They indicated a few areas of interest, including digital records preservation. FS-44 laughs as he says, "we blithely and naively put that down, and we also put down that one of our choices was work in the Visitor's Center…. Not realizing that if you put down digital records preservation mission, you are doomed to that life…" They speculate that FS-44's engineering background and considerable technical skills probably caught the interest of the missionary recruitment staff. Several months into their full-time mission, they reflect that they have adapted to their calling—even if it does not exactly fit their expectations of a senior mission. FS-44 describes: "We wanted to do something like this. Make sure we were busy, for us it works better if …. we're given a well-defined scope where we need to… This was probably an ideal fit, as far as—not necessarily the exact thing we thought of doing, but it fits very well." He concludes, "in some ways, in a lot of ways, it's just the Lord knew where we needed to be and He just worked right and left until we got where we needed to be."

6.3.2 'One of the cogs in the wheel': Structure and meaning through religious belief

Senior missionaries draw on their religious belief to add structure and meaning to their individual paths or experiences, from mitigating concerns about technical literacy to providing motivation for remaining attentive to detail. LDS Church members do not believe in coincidence, or chance. Instead, they believe in actions being led divinely, whether by the guidance of an invisible hand (as in statements like "I know I am where Heavenly Father wants me to be") or experiences of "impressions" that lead them to take actions previously not considered consciously. At scanning sites, missionaries and long-term volunteers readily reference examples of this. FHC site manager FS-21 describes:

> The Church sent us a great number of Chinese books, and most of us here had no experience with Chinese. But, we had a volunteer who came in who could read

> Chinese. So he was able to go through and make sure we had them all done correctly. That was a great thing to happen. So he could find such things as duplicate pages, and the rest of us would have no clue it was a duplicate page. So… the right person at the right time just showed up.

Another long-term volunteer, FS-37, describes the circumstances in which she found *herself* to be the right person at the right time, literally the answer to someone else's prayers:

> I happened to go into the center and say I'd like to volunteer, and this is what I have in my background. And he said, 'can you come in this afternoon?' And I said yeah… Went down there, and he said, 'when can you start working?' and so I started working two days a week. And so I was taking care of the film that was coming in on the microfiche, and I was in the process of getting trained on the books, and the lady who had been in there doing the books passed away. And so I got more training, but I remember that the director came to me at the funeral and said to me, 'I had been praying because I knew something was wrong even though she hadn't told us.' And he says, 'here you are. You just walked in off the streets and said, 'hey I can do this.' "

Single sister missionary FS-46 describes being called to a digital preservation mission in spite of her lack of obvious matching skills or interest in scanning work. "No, I left it totally open to whatever somebody was inspired to send me, and willing to do things. I have limited technology or computer skills, which I indicated, and… [am] just willing to do anything. And when I was selected for [the mission], it was a pretty high learning curve [chuckles]. This is a scanner, and this is what you do." Despite their drastically different skill sets and relevant experience, FS-46 aligns with FS-44's experience above in integrating her missionary placement and experience scanning within a larger religious framework—and service ethos—into which she has placed faith that she will be led to serve where she is needed. Reflecting on her two scanning missions, FS-46 says, "I thoroughly enjoyed it and really felt like I was in a bigger flow, like there was something bigger going on. That I was just one of the cogs in the wheel." In the broader context of our conversation, it is clear that FS-46 is referring here to both the religious work motivation her service but also to the nature of her daily work experience in which she is happy to be a cog in the wheel of important work being done largely by computers, supported by humans.

6.3.3 VIGNETTE: Called to scan

Interested in serving a full-time senior mission in the unspecified future, FS-22 and FS-23 met with a missionary recruitment person at FamilySearch who detailed some potential opportunities. "She said, 'we don't know when these things are going to be available. Just think on these things;'" the open-endedness of her answer worked well for FS-23 because FS-22 was currently in the middle of serving a multiyear term as a bishop in his ward. FS-22 narrates,

> *We came back from that thinking, 'Gee, sometime this is going to be fun.' That was I think on a Wednesday. Sunday morning, the following Sunday morning, I went to a bishop's meeting where all the bishops in the state presidency met, and they had two missionaries, a missionary couple, report their senior mission. Okay, so while they are reporting their senior mission, I'm sitting there with my heart beating out of my chest. I think, 'What is going on here?' I wasn't even thinking at that time, 'Gee, maybe this is when we're going to go.' I wasn't thinking that at all…*

At some point in the meeting, FS-22 turned to a church leader sitting next to him. "I leaned over to him and I said, 'President [name], you made a big mistake today.' He looked at me and he says, 'I know. I was watching you the whole time.' He said, 'Why don't you come in Wednesday evening, you and FS-23 and talk to me.' We went in that Wednesday evening and he called us to accept a call to go on a mission."

Within seven weeks of their initial inquiry, FS-22 and FS-23 were in training for their full-time scanning mission. While both emphasize that their timeline to a mission was unusually short, they also stress that the path they followed is one familiar to LDS church members. FS-23 explains,

> *I think the thing that is important maybe to say up front, a little context, is that one of the things that we covenant to do or promise to do, which is part of our temple covenants, is to consecrate our lives to the upbuilding of the Kingdom of God. Whatever we feel that the Lord wants us to do at that particular time in our lives, we listen to that. We listen to the Spirit or those promptings in our head that we get and we follow through on those. That's a very moving power for us. As far as people going, even FS-42 [a partner librarian] says, "I don't know why you do this. I don't know why you spend this time away from your family and everything to do this." It's like if we're putting ourselves in tune with the Spirit, we will know what we need to do at certain points in our lives.*

6.3.4 Senior missions as second act: Opportunity for service, for adventure

Senior missionaries often characterize senior missionary life as a kind of second act, a chance to embrace life, have an adventure, and try new things—while doing religious service. "That's how you stay young," FS-32 answers when asked about her motivation for going on multiple senior missions. Senior missions also provide structure and justification for venturing beyond an individual's local LDS community. This is particularly true for single sister missionaries, or for church-service missionaries (hereafter CSMs). FS-46, a single sister missionary, laughs as she describes, "I lived in one place for 50 years, and then two or three years in Portland, a year in Eugene, in Montana, bounced around. Serving a mission also figures in to that kind of transient—I'm in a safe environment, I'm doing something that I love to do, among good people."

The senior missionary program differs in several ways from the traditional proselytizing missionary program that serves as a rite of passage for many young adult Mormons. For senior missions, the Church emphasizes its support for balancing a mission with family life and other responsibilities. This includes caring for family members, maintaining regular contact with grandchildren in particular, taking time off for vacations, and engaging in volunteer work. This contrasts sharply with the conformity and isolation embedded in the rigid traditional missionary program structure, in which young Mormons are required to leave behind their home lives entirely (e.g. their homes, their language, contact with their families) in order to devote all attention and energy to their proselytizing missions.

Instead, senior missionaries report balancing their missions with a range of volunteer activities—both religious and non-religious—that allow them to connect with and invest in the communities in which they are serving a religious mission. Senior missionaries, both CSMs and FTMs, report engaging in many volunteer activities outside of their scanning missions. CSMs often integrate part-time scanning missions into schedules already full of activities such as leading Boy Scout troops or serving callings elsewhere in their wards. FTMs engage in similar activities, which have the added benefit of establishing community ties in their new—if temporary—homes. One FTM relates, "Actually, they [someone in the local LDS church ward] asked us to teach a Sunday School class for the

adults. Here we are thinking, 'Oh goodness. Doing that plus what we're doing is going to be kind of time consuming,' but we loved it. We learned a lot."

Senior FTMs almost universally report extensively exploring the local areas in which they are completing their missions, viewing missions in part as opportunities for learning about local histories. FS-65 and FS-66, a married FTM couple, describe a recent trip to a local historical society one day after work. They spent some time at an exhibit related to the Underground Railroad's presence in the area, a display which FS-66 describes as a "kind of a kid's game where you lift up the lid and see in there who it was…. Well we looked at one and it said 'this is the home of Ellen [unclear], and we said, 'wait we just did her diary!'" They noticed that the documentation accompanying the exhibit states that the information came from her diary, which the couple had just scanned days prior. The content being scanned, often unique materials from local history or genealogy collections such as individual diaries or family history narratives, provides a connection to physical place and makes living in that place more meaningful. FS-65 and FS-66 report going to other historical societies in the area, on a daily basis observing that the scanning work they are doing is "bringing things to life."

Some senior FTMs choose to travel in the wider geographic region of their mission, both for fun and to further their own personal family history research. They report traveling to minor league baseball games, important Mormon religious sites, regional historical societies, chocolate manufacturing factories, autumn leaf tours, and famous race tracks.

Several senior FTMs report embracing every opportunity to engage with people. FS-23 says, "I think the thing that was absolutely incredible for me was just to meet all the people. I'm a friendly person. I'll talk to people on the corner. I'll talk to people on the elevator. To know that there are good people out there that we hear so much on the news about all the bad people out there, that really in general there's a lot of good people and we just totally enjoy getting to know them." Her husband, FS-22 adds, "I'm one that's probably a little slower to build friendships and so forth. Yet, there were individuals that I met that we just clicked with. 'Oh we just met but we've known each other forever,' kind of thing. I enjoyed that."

6.3.5 Creating and managing efficient workflows

For a small subset of senior missionaries, often the male half of the alpha couple described in the last chapter, digitization work becomes meaningful by creating and managing efficient systems that balance volume and quality. At each site at least one missionary (or long-term volunteer) describes a commitment to improving systems and overall productivity or efficiency, often alongside general workflow modifications rolled out by the centralized FSB project administration. In general, FamilySearch makes little formal effort to measure individual productivity, and understands speed as an inevitable trade-off for free labor. However, some senior missionaries find meaning and motivation in monitoring the numbers of pages scanned, audited, and transmitted. For some, this is an individual measure of efficiency, focus, or skill; for others, it provides metrics for site-level success.

Several FTMs attempt to run their scanning sites very tightly, like an efficiency-driven corporation; each monthly goal met is accompanied by a loftier goal for the next month and tweaks to the workflow to enable it. FS-22 describes, "I'm sitting there, and I was a production planner, so I would write manufacturing instructions and so forth, so my mind was always going, 'How can I make this better,' and so forth." They report satisfaction, and a sense of accomplishment, in see monthly productivity numbers, or in being able to document efficiency improvements over time.

Long-term CSMs are therefore frequently subject to systems improvement efforts originating not in SLC but rather on site with short-term FTM couples. These FTMs may have extensive relevant professional background experience, but they are new to the particularities of a given site's workflow and inputs. At one public library partner site, the arrival of a particularly intense and efficiency-driven male FTM upended the existing scanning workflow used by up to a dozen CSMs. In its place FS-65 created an elaborate, micro-managed system that involved extensive monitoring of individual productivity and accuracy and required CSMs to document all of their actions using a combination of spreadsheets and individually-assigned notebooks.

When CSMs push back on these efforts, and they often do not, it seems mostly in the form of raised eyebrows or half-joking comments interspersed throughout the workday. These dry remarks draw attention to the wide gap between the mundaneness of the task at

hand and the fierce urgency with which a particular FTM might seek correction or improvement. FS-65 mentions repeatedly that FS-69, a CSM, "likes to give me a hard time." After watching several of FS-65's more aggressive or indelicate interactions with FS-69—summoning him over to confront him on a quality control auditing error ("Yeah, come over here. Did you not notice that this is this way?" "Nope." "Well, it's wrong." "OK."), or standing behind FS-69 at the scanner providing unsolicited feedback—it was difficult to agree with FS-65's interpretation of this relationship. Instead FS-69, an 85-year-old retired farmer who squeezes scanning in between transporting his wife to cancer treatments, seems to at best silently tolerate FS-65.

Given the rotating cast of missionaries that cycle through scanning sites, site-specific workflow adaptations or improvements are often fleeting even when they do manage to get the buy-in of fellow missionaries. One FTM, who created an elaborate documentation system to better track a book's path through the workflow—as well as monitor the productivity of the people who touched it on its way through—indicates he understands the tenuousness of his improvement efforts. Of his efforts to document his changes, FS-44 laughs as he says, "One of the challenges that I have is putting in enough detail so that someone who has not got the Windows stuff burned into their frontal lobes can figure out what they're supposed to do."

Site-level workflow improvement efforts often instead reveal the particular values or meaning-making efforts of the missionary or long-term volunteer in charge, priorities which are not always shared by all of the missionaries within a site. The Lake County books provide a good example here. Given autonomy to distribute the resources required to scan these books, over time groups of missionaries have constructed the task in different ways. One, FS-22, describes scanning the books as a personal efficiency challenge, an almost meditative experience in which he listened to audio books and focused on establishing a streamlined rhythm to get through the 1000 page volumes increasingly faster: "Well, okay I'm sitting there dividing an hour up into 15 minute blocks. How many pages can I get done in 15 minutes? I would time by my watch, okay I've gotten this many, gotten this many. I got up to 300, 340 pages an hour." Another, FS-48, experienced this same strategy as an untenable kind of "psychological torture" in which the tedium of scanning remained uninterrupted by brief breaks to discover interesting content (because the content remains

almost unreadable to the human eye). A third, FS-44, later created a collaborative system for distributing the task into more digestible increments in which individual missionaries bypass the login system and take turns scanning 500 pages at a time.

While the value—and beauty—of an efficient system may be self-evident to some senior missionaries, many (perhaps most) senior missionaries express indifference at best toward efforts to improve the overall speed and efficiency of scanning. FTM FS-45 chuckles as she relates the story of her arrival, and the frustration of the missionary tasked with training her on the scanning site's workflow and equipment. She kept trying to get me to hurry up, FS-45 describes, but "I wouldn't hurry. I don't have any hurry left in me!"

6.3.6 Social aspects of work: Creating (LDS) community at the scanning site

Whether located in a basement or a re-purposed storage closet, all FSB scanning sites maintain a collegial atmosphere. Despite the perception (and, for some senior missionaries, appeal) of scanning as an unusually non-social mission due to its behind-the-scenes nature, the idea of "being social" involves not only interfacing with the public but also with co-workers. FS-40 observes that while her scanning mission does not necessarily involve a lot of social interaction, "you can't come down here and sit like you're a log. You have to say something once in a while, or people will think you're nasty." Whether you're a librarian, a security guard, a fellow missionary, or a researcher, it is difficult if not impossible to spend much time in a FSB scanning site and not gain some understanding of its senior missionaries' personalities, backstories, or current activities. These expectations—of sociability if not socializing—manifest differently at each site, and shape without entirely defining work culture and community building efforts at each site.

At one public library scanning site, all scanning work is done by senior FTMs, 12-23 month temporary transplants. Here the missionaries live in the same apartment building, engage in morning prayer together, and eat lunch as a group in the employee lunchroom; in many ways they appear to function as an extended Mormon family. With the sometimes heavy-handed help of the LDS church, they have created a strong sense of community within this small space. A single sister missionary reports that working alongside her fellow missionaries all day at this site provides her with comfort and support, and appreciates this environment as part of the "single-mindedness" or unity in purpose that

the full-time scanning mission offers. She describes, "we're all coming from the same place, we're all on the same team. A little more intense than what you find in the outside world." Asked to specify the quality that unites her with her fellow missionaries, FS-46 responds, "Well it's more the spiritual side, the church focus. That we sit down together and have a devotional in the morning, focus ourselves. That we're all engaged in our other time outside of here, in similar activities. You know, again, support, service… because we're all LDS, we're all kind of on the same page. So, that's a joy also."

Another FTM at this same site, however, experiences this same social atmosphere—which could be described as active, yet somewhat policed—as being full of stifling, petty displays of control. FS-48 frequently passes the time while scanning by listening to books and music on CD, and recalls at some point being informed by another FTM that he needed to limit his use of headphones to one ear in order to avoid inadvertently missing out on "important information." He chuckles as he relates this story, but also makes it clear he resents—and in several ways has actively resisted—this level of individual control over his non-scanning-related attention.

A different busy FHC scanning site, located in a small Western town and staffed entirely by CSMs and volunteers, has an atmosphere of constant social interaction; the workers' familiarity with each other is as evident in their conversation topics as in the frequency of laughter or group conversations punctuating the clicks and beeps of scanning. The missionaries frequently discuss work-related questions, but just as often the topics of conversation are personal: they talk about goings-on in their families (many have dozens of grandchildren) or in their church ward, provide updates on thorny family history research they conduct in their spare time, and trade funny anecdotes and quips. Multiple times I ask one person a question, only to hear the answer come from a different person in a different part of the room. FS-21, the site coordinator, is able to create a low-stress environment for seniors to engage in computer-based work in part through his use of humor; no one (including himself, including me) is immune from his good-natured teasing. Missionaries at this site in particular enjoy sharing and laughing at their "senior moments" of getting off course, forgetting technical details, or other small slips of memory.

FHC scanning sites tend to be much more tightly integrated with the local LDS community than the external partnerships based in public institutions. These sites rely on

previously established (community-based) relationships with each other in both recruiting CSMs and in providing ongoing support for existing CSMs. These relationships also shape the social environment at sites because many of the CSMs are familiar with both each other and the general set up of the FHC. At one FHC scanning site, FS-37 persuades FS-38 to share her story of how she came to be at the scan site. "I would go down to the Center to do genealogy work. And FS-21 tricked me as I was going out the door one day. He said, 'we need you here.' And I was just about to end work, I mean a real job that *paid*, and he looked at me and said, 'come in here!' FS-38, and upon retiring from paid work quickly found herself volunteering regularly in the FHC. FS-38's exaggerated emphasis on the word "paid" makes multiple people laugh.

The senior missionaries at all FSB scanning sites often use humor to turn the tedium of scanning into a communal and social experience. FS-36, a CSM, laughs as she says, "I love the people I am working with down here. Our pain is the same." Asked about skills necessary to succeed in missionary scanning work, another senior FTM answers with "patience"—for the work, but also "just for making it through the day." "I wouldn't make a career of it," he remarks with a short dry laugh. Describing a recent visit from the new (regional) mission president, FS-47 reports that he or his wife mentioned the word "tedious" numerous times in their conversation with the missionaries. When they left, he remarks, all the missionaries said, "finally someone gets what we do!"

6.3.7 VIGNETTE: Navigating the social as faith journey

FS-23 remarks multiple times that "I love to get to know people." She and her husband, FS-22, have gone on multiple missions, and she describes initiating many interactions with strangers that led to meaningful social relationships:

> *I tell you, whether it's the lady that's throwing the garbages away or whoever it was, I really tried to get to know them all and just became friends with them so that I could learn from them and they could learn from me. From these little ladies I would always go over there, 'Okay, where's the neat place to go? Where's a neat place to eat?' They were just so cute because they would say, 'Well you've got to try this place. You have to try this place. Have you tried this? Have you seen that place yet?' They were like my little tour guides. We built up this friendship that even now we're still corresponding.*

In relating stories of their missionary experiences, FS-22 and FS-23 repeatedly emphasize the interactive, reciprocal nature of their social relationships. FS-22 and FS-23 cast every social interaction as an opportunity for learning something new but also sharing—if only tacitly—their faith.

They describe a social navigation strategy that seems dually built around faith and an insistently earnest, indefatigable kindness. FS-23 smiles widely as she describes the gradual bond developed between herself and FS-22 and several city officials tasked with supervising the missionaries' work at one short-term scanning project, retrieving and physically tracking the books through the missionaries' digitization workflow:

> *FS-22: It started out as kind of a little bit of feeling of adversarial kind of ... Like they were watching us.... We knew that this was hard because when you scan you have to focus ... He [FS-22] would sit and turn the pages and lift up the glass and I would press it and then I would try to do a pre-audit, and we would talk with them. We built up a friendship with them just talking and get to know and learning about corn, growing corn and harvesting corn.*
> *FS-22: I had no idea what a combine was. Now I know.*
> *FS-23: The really, really neat thing is that we got to know the bailiff and the judge. Oh my gosh, such a fun guy... That was one of our thrills was just getting to know the people that supposedly might be kind of suspicious about us or 'they're Mormons' and ... But to just end up with a friendly feeling amongst us all.*

Eventually, FS-22 and FS-23 relate, they found that various city officials brought them snacks and entrusted them with scanning additional personal materials. While some of these activities extended their mission time by weeks and certainly extended the length of individual days (and nights) of scanning and auditing, FS-22 and FS-23 ultimately conclude that "it was just a good experience and I think, if anything, there might have been a breakdown somehow of these feelings towards the Mormons."

FS-23 characterizes her experience with particularly challenging social divisions of labor at a different book scanning site as a kind of opportunity for personal—or faith—growth: "The things that we'd learned… to love your enemy, all those little things that you throw out, we were really, really trying to do that because we wanted no contention on our part as LDS missionaries to come into a library and be contentious. We're supposed to be Christian people that love everybody… That was a big thing for me to learn." Through the

perspective of her religious faith, FS-23 was able to reframe her encounter with both a difficult personality and with entrenched gender-based hierarchies at the scanning site as a personal test.

> *I knew that there had been contention for the last eight years on and off in that setting. I knew that there were times when there were single sister missionaries that were companions that actually yelled and screamed at each other in the library, and I was never going to add to that contention. I just had to humble myself and just put up with it. I would say to him [a male FTM with a particularly domineering personality], 'I don't agree with you, but I'll do what you said, or do what you say.' I would… Oh, yeah. Yeah, I'm not one that just is kind of passive and sits back. You know what, I think that it was a growing experience for me that I could do that, because ordinarily I couldn't.*

6.4 Digitization as care for content, and users

In framing their work as helping others directly to find their ancestors, or to connect with their personal pasts, missionaries align their work (if partially) with genealogy librarians. Missionaries join FSB staff and partner librarians in emphasizing the impact of digitization on lowering the bar for participation in family history research. FS-21 summarizes, "I look at it this way, that what we're doing is giving people an opportunity that maybe can't afford it. To have access to collections that they might find their relative in. Because it's not cheap to be able to get to Salt Lake." In contrast to public library employees, missionaries and FSB employees are perhaps not surprisingly far more likely to mention the LDS Church's role in expanding access to genealogical records to users.

6.4.1 Librarians: Stewarding collections—and patrons—across an evolving information access landscape

Much of the attention to librarians in this research thus far has been to highlight the critical support and coordination labor they provide in order to convert resources from print to digital media. Partner librarians, however, are often additionally responsible for chaperoning patrons through a broader transition from paper-based genealogy to online family history research. This is a transition that, as has been described in Chapter 4, raises larger, often existential questions about library (and librarian) futures. Despite and probably also because of this broader context, digitization becomes meaningful work to

librarians as they contribute time and energy toward patron outreach and education around using digital collections.

All librarians involved in FSB express their commitment to meeting users where are, in terms of skills and interests, and facilitating individually-defined user success. While articulated in the vignette above by FS-63 and FS-64, this is a viewpoint shared by all of my librarian interlocutors. Multiple partner librarians reference helping patrons to "find their personal past." Partner librarian FS-42 observes, "each of the people who is interested in their own story also has their own definition of success. And honoring that in a real public library spirit is part of the mix as well." I will return to this in the synthesis chapter.

6.4.2 VIGNETTE: Patrons and the changing nature of librarian work

During afternoon reference shifts at their library's third floor Information desk, partner librarians FS-63 and FS-64 share carefully considered and nuanced opinions about the changes networked computing has brought to their library, to genealogy librarianship, and to users. Between their words and their tasks, they demonstrate how their role as genealogy librarians has been simultaneously deskilled, expanded, and increasingly specialized. Throughout these changes, the genealogy librarians remain committed to the wide range of patrons they serve—in ways that do not always map to their changing job descriptions.

At the library administration level, the librarians report the reduction of professional staff through retirement or decisions to not replace those who leave. At the same time, LHG librarians have been joined by para-professional staff—from clerks to security guards—who have also been tasked with supporting the changing needs of the library's general patron population. In practice they work together to triage patron questions, as a patron approaching the Information desk is hard pressed to differentiate between the local history/genealogy librarian and the para-professional clerk seated at adjoining computer workstations.

They share that librarianship, particularly when performed in a public library setting, increasingly involves dealing with patrons' technical illiteracy: with the Internet, with library-specific resources, or just with computers generally. At the Information desk, FS-63 and FS-64 spent much of their time providing general technology-related support or troubleshooting;

this includes operating the public use computers, copying, scanning, and using microfilm. One patron requests a list of memoirs about depression and mental illness, and is given a lesson in using the catalog. FS-63 assists a para-professional clerk to help a patron find nursing exam books. A few patrons request genealogy items that must be retrieved from closed stacks. Both FS-63 and FS-64 provide information about the time or library hours to many others.

Differentiating herself from her para-professional colleague, FS-64 reports that "we do a LOT of instructing with our patrons." With respect to use of the LHG collection, she says that patrons new to family history research often struggle to understand both the scope of resources available and how to find them. LHG staff prioritize guiding and educating patrons through the research process generally as much as proving specific answers to questions. I observe FS-64 conduct a single substantive reference conversation with a genealogy patron during a three-hour reference shift. While this elderly patron has real genealogy questions, he is actually able to answer them himself if he can just figure out how to get to the right websites. Simultaneously keeping her voice calm while nearly shouting so that he can hear her, FS-64 patiently walks the nearly computer-illiterate patron through the steps necessary to find the particular records he needs.

In terms of specialization, FS-63 says that genealogy librarians must become expert at multiple ways of doing family history research simultaneously. The growth of online genealogy (data and communities of researchers) has also supported seasoned family historians to rapidly expand and deepen their research—online and offline. Computer-savvy genealogists who have exhausted online resources must often seek out genealogy librarians for some combination of their professional research skills or their mediating role in identifying and providing access to un-digitized print resources. FS-63 observes:

> *what it has done is it used to be you would help somebody, and it was seven out of ten questions, it was well go look on the Census, and you can find this. Go look for the birth, and you can find this. The digitization and mass distribution of this has taken away all low hanging fruit, so you literally sit at the desk and you answer one brick wall after another brick wall after another brick wall.*

While FS-63 expressed enthusiasm for the challenges of helping advanced researchers, these types of patrons appear to be far from common on shift at the Information desk, at least in terms of foot traffic.

In order to improve access to FSB-scanned volumes, the library would like to embed URL links to the FS-hosted content in its own library catalog records. However, this has been tasked to a person whose cataloging responsibilities already more than fill his time. As a result, it has become a low priority task even as this "last mile" step serves as the primary mechanism through which the value of the project—and the library's local history collection—may be demonstrated to patrons and library administrators.

Instead, this work falls to the librarians. FS-64 observes that most digital collections promotion within the library is word of mouth: genealogy librarians teach patrons how to use the digital collections, but also more fundamentally educate them about the existence of these collections. Computer terminals have replaced a shelf of commonly used print reference texts on one wall and some signage related to digital collections hangs on another, but FS-64 reports that the majority of her users have great difficulty and "a lot of them depend on us to do it while sitting right next to them." Of the increased online accessibility of the library's genealogy collection through digitization, FS-64 observes, "It's almost like the patrons are glad we're doing it [FSB scanning] but they are not using it."

6.4.3 Missionaries: Moving a book from shelf to screen to user

The digitization tasks delegated to senior missionaries often involve generic and repetitive work, but missionaries often also describe it as communal and meaningful work in the context of the larger digitization project. FS-40 summarizes a common sentiment among missionaries about the combined satisfaction of task completion and of contributing toward moving a book along the path from shelf to screen:

> I like to see the books go from one place to another, I like to see the transition. Because you get something like this, and some of these books have been on the shelf over there for a year. And it just feels good to get them moving along. It feels good to be able to say, 'ok that book is ok as far as I can see.' Then the second auditor comes along and finds a bunch of problems [laughs]. But the problems I found are taken care of, and he can do the next ones.

Many missionaries express personal pride in some combination of quality and perseverance with respect to scanning work. Several missionaries describe valuing the opportunity to use existing skills in a new service context, helping not only people but also the objects themselves. FS-22 explains,

> I had been involved in manufacturing all my career. I guess one of the highlights to me of that was seeing something out in the marketplace that I had something to do with to put it there… Making something, seeing it used. To me, one of the highlights was to scan a book and to then see it go through the process, and then to be available for somebody to use. To me, that's useful. It's a tool—I'm doing something to help people. To me, that was a driving force.

Senior missionaries also readily share testimonies of content finding its way into the right hands through a combination of missionary care and spiritual guidance. FS-8, a FamilySearch employee who trains new senior missionaries for imaging missions, relates a story from the FamilySearch quality team. Located in the Church Office Building Salt Lake City, the quality team reviews images captured at scanning sites:

> So they fail images or they pass them, depending upon the quality standards. Just recently, we had one of our missionaries that ... He and his wife have been doing just fabulous, never getting a rework. They were doing great, and then he got some rework for 'out of focus,' I think it was, and he was like, 'Okay. Come on. I've been here for long enough that I shouldn't be having these problems.' But then when he went back to actually do the work he found that when he had flipped through the book, he had thought that the last portion of the book was all empty, he didn't see anything written in there.
>
> Then when he went back through that book again, he found like 100 pages that had writing on it and he says, 'I looked and looked to see about my focus.' He goes, 'But I have now come to the firm belief that it's not just quality that they're checking, that we actually may have instances happen in order for us to go back and find out what we might have missed.' Once again, it's people on the other side saying, 'Wait a second. We got some issues here… We got some issues. You missed us.' …Even to that level where quality [team] may be saying, 'Yeah, it's fine or it's not good.' Maybe it's for other purposes.

6.4.4 VIGNETTE: Scanning work as personal family history

Single sister FTM FS-47 initially got experience scanning as a healing process when her husband died two years earlier. She organized her family photos, scanned them, and then

moved on to doing family history research. This trajectory, from grief to scanning to family history research, seems to shape all aspects of her missionary experience.

In her spare time during her mission FS-47 works on family history research, often traveling with another sister missionary to the local FHC. It is there that a non-LDS family history researcher taught FS-47 how to upload photos to her family tree on the FamilySearch website. When FS-47 speaks, it is in a voice that contains a mix of wonder and naivete, with modulations that make everything sound a little more tentative than it is:

> *…he's taught me how to do it, and so NOW, now I go back five generations and all my relatives there's pictures! And my favorite thing is my dad. When my dad passed away and I was going through his pictures, one old old lady I thought, oh my gosh Dad's gone I'm never going to know who this is. … I go on FamilySearch and there she is! So I know who the ancestor is… Because her face, her face picture was up there among my ancestors, it was the EXACT same picture I had with no identity.*

FS-47 projects this personal experience directly onto her work as a senior FTM by focusing on photographic (rather than textual) detail when she scans and audits books, particularly with respect to yearbooks. She has a strong sense of the future users of the output she is helping to create through scanning, users like herself who might connect with previously unseen photos of their ancestors. Speaking in a hushed, but quietly emphatic tone, FS-47 describes: "So to be working for FamilySearch, and also be progressing my own ancestors' line has been like a double shot. So when I'm doing the work, I'm never bored because I think, 'these would be perfect pictures for FamilySearch for people to find their ancestors and put online.'"

FS-47 repeatedly describes the connections—emotional and personal, rather than organizational or related to tracing formal family lines—a user can make through a visual encounter with a photograph:

> *Every time I finish a book and send it …copy and paste it and send and think oh good, it's a couple steps closer to someone to open it and see and maybe find a relative and know what they look like and realize that their great grandfather did graduate from college and, by the way, he was on the rowing team and they didn't know that. Or his minor was such and such, or my great-grandmother was most popular flirt, or you know funny little things that they might not know about.*

FS-47's focus on the visual impact of imaged books directly contradicts both the FSB workflow (which uses text- rather than image-oriented scanning specifications, e.g. 300 dpi) and the site level guidance on image editing thresholds from the FTM couple in charge. However, it also helps FS-47, who describes herself as very unaccustomed to using computing technology in her daily life, to bridge the considerable technical gaps in her understanding of both digitization and how FSB works. This allows FS-47 to align her past and present experiences and make her scanning mission into meaningful work.

6.4.5 Contributing to family history research

Content, work, and religion are drawn together for missionaries through a commitment to contributing to family history research, both individually and generally. The importance of "sharing" is a big buzzword among those missionaries who are active in family history research themselves. This idea of sharing connects senior scanning missionaries to both the expanding reach of the Internet, which has transformed family history research, *and* the extensive history of the LDS Church's proselytizing efforts in which traditional missionaries share the gospel with potential converts.

While scanning, missionaries often keep an eye out for names within their own or friends' families. One afternoon while auditing, FS-46 gets up and walks across the room to the administrative desk. "A friend of mine asked me to keep an eye out for her name. It's not a common one," she says. She pulls out a small piece of paper, jots down the name, as well as the publication, city, and the year. After folding the paper back up and tucking it under some papers, she slowly walks back to her auditing station.

Several missionaries report benefiting personally from the digitization efforts of others, and bring this awareness into their own scanning work. At a previous full-time mission, one CSM reports,

> Colleagues were also doing registration cards for World War 1, so you just got a glimpse of some of the things and realize how important it is for people to be able to access that and see it, and understand more about their family. And then coming home, and doing more of my own family history work, I certainly appreciate some of the efforts that someone's gone into, digitizing the record and indexing the record so you can find it.

Other missionaries describe being drawn into their own family history research—often for the first time—as a result of their missions. FTM FS-46 relates, "I was not a genealogist and not particularly much interested in genealogy before now. And the process has affected me into 'wow, these are real people and real stories.' And that's, that's probably my biggest joy now, that I'm part of that."

In conversation with a group of volunteer catalogers, I ask about the most satisfying aspect of their family history mission. FS-38 speaks up first, and says, "I think it's knowing maybe someone out there will actually find someone they're looking for. I think about that a lot. Appreciate why we're doing this, it's just overwhelming. You know, getting it out there to share. You feel like you're doing something to help people." Someone chimes in with "a service," while a third person says "a worthwhile project of our time, that doesn't have an end."

Senior missionaries' ideas about future users and their needs shape their approach to their scanning-related tasks. FS-23 says,

> It was not just, 'Oh, this is a job.' It was 'How could I make it look the best possible in the moment of time that I have to scan it?' I'm trying to think ahead for other people. I guess that that was my intention. It brought on a little creativity, I guess, in how to make that presentable and nice. That was a piece that was not just, 'Oh, just one thing after the other.'

FS-38 makes an explicit connection between attention to detail in her cataloging work as a missionary and being able to connect users with information they are seeking:

> So what was so hard about it? Just that there's so many lines to fill in, and they have to be right so that other people will be able to find their information. So many different places to look and to verify the information. Making sure it's right… The whole idea is that someone going online is going to find it, so whatever we do is important for that.

The perceived genealogical value of content can provide motivation for missionaries to press on with scanning particularly cumbersome or tedious materials. FS-44 points to a page on the Lake County book he is scanning, faint blue text barely visible on the oversized and deteriorating page, and explains "this kind of thing, you establish a relationship, and

you establish a location for those individuals at a very specific point in time. Which both are really valuable genealogical data. So even though they're horribly tedious to do, and you find that some of them are really kind of a pain to work with—the data that's there is valuable to have."

6.4.6 "I gotta see where this story ends": Content as respite, and as social glue

One of the trade-offs of asking senior citizens with often limited technical skills to spend 40 hours a week digitizing books for free is that it is understood there will be short detours to take a closer look at content. FS-65, perhaps the most productivity-oriented FTM encountered in this research, even observes warmly of his coworkers:

> It's interesting because, when you're scanning you put your book on there, and you hear this click. Then you hear the rrrrrrrrrr, and then you hear it pop open. Then you hear it click, this click click click … and it's really funny. You get used to hearing that in the background and then all of a sudden you don't hear it. And then you think, 'what's going on?' And you turn around and then—they're reading it! It's grabbed them and they're like 'I gotta see where this story ends.'

Missionaries report engaging with content for a range of reasons. Others focus on content to provide amusement, engage general historical or regional interests, and to initiate short social breaks among groups of missionaries. At one public library partner site, FS-47 leans back from scanning to remark on a quote within a yearbook. "Here's a nice saying from a yearbook: 'if in heaven we don't meet, hand in hand we'll face the heat.'" Multiple people chuckle or acknowledge hearing in some way, even though she's speaking specifically to no one. At other times, yearbooks spark conversations about evolving hairstyles, dress standards, football uniforms, and politics or culture at different times and places. At some point everyone gets a giant kick out of looking at a yearbook page congratulating the winner of a college's annual Miss Horned Frog competition.

While yearbooks provide a particularly tempting visual distraction, missionaries also report on reading historical documents, family narratives, wills, and almost anything that crosses their scanning stations. CSM FS-32 describes her struggle to remain focused on work rather than content: "Right now we're doing all these periodicals trying to get them out of here. So many books, and I've been working mostly in Danish, German, and so forth.

One of the reasons I pick those is that I read the English books on history and so forth. [I think] 'Oh my, let me see,' and I read the books. No! I'm supposed to be auditing! But it's just fascinating— "

6.5 "Care dash full": Digitization work within a web of care

Partner librarian FS-42 has had experience working with several different contract digitizers. Asked to differentiate the FSB scanning operations from others, such as the Internet Archive book scanning, FS-42 offers the following characterization of FSB: "You have this faith-based, meticulous … not low-speed but, um, careful. And you know, care dash full—it's caring."

It is not just senior missionaries engaged in care work: care work suffuses the project across many tasks and all roles, including SFB staff and partner librarians or other site coordinators. Much of this work has been detailed throughout other sections of this and the preceding chapter. The family history research that FSB digitization supports is another example of adjacent care work that is pervasive and perhaps shapes the work of digitization but is not the focus of this dissertation research: genealogical research is itself care work, with individual memory keepers responsible for collecting and caring for the names and narratives of family histories.

This section describes examples of ways in which participants in FSB care for each other. Missionaries, library partners, site coordinators, and FSB staff are all enrolled into supporting a kind of care infrastructure enacted through the LDS senior missionary program.

6.5.1 Caring for missionaries

FSB staff and partner librarians acknowledge and make efforts to reciprocate the voluntary labor contributions made by missionaries; the magnitude of the missionaries' dedication and service ethos seems to compel others to take on care work that otherwise might fall outside of expected job parameters. FSB employee FS-3 describes deliberately remaining accessible to missionaries at all times for technology-related support: "I'm always on the phone talking with all of our sites… People can call me up any time of day. Usually it's nice if they wait until my Utah hours start, but I'll answer the phone at any time

because I know that they're sacrificing their time to be here, and so they're stuck somehow, and I just need to pick up the phone and help them."

While librarians might undertake care work initially in order to ensure continuity and stability for missionaries' experiences, this work often becomes personal over time. Partner librarians describe many examples of bonds developing between themselves and missionaries. Across multiple sites partner librarians reference varied knowledge of missionaries' lives, gained through daily interactions as well as through occasional socializing outside of the library. FS-64 relates, "sometimes I interact with them on a personal level. I bring them flowers from my garden. I don't know, just try to make it a little more cheerful and visit. Then when I'm doing my work in the lab, they're kind of chatty and talk a little bit. I've heard a bit about FS-66's children… and 34 grandchildren." Partner librarians invite missionaries over for dinner (FS-42, FS-64, FS-83), and FTMs regularly offer to help partner librarians outside of work hours (FS-63). At one site, missionaries recruited other members of the local LDS ward to help the collection move equipment and furniture to a new location as part of library remodeling. FS-64 is candid that some FTM couples become closer than others. Of a previous couple, FS-64 says, "we loved them. We were sad when they left. They become friends."

6.5.2 VIGNETTE: Support and continuity work as care work

In CSM-dominated scanning sites, long-term missionaries or volunteers provide continuing support and mentorship to new CSMs. At one of these sites FS-36, one of two lead catalogers, has been working with FS-21 since the earliest days of scanning at this site. She jokes about slowly gaining computer skills over time, but the speed of her typing alone gives away her decades of experience working with computers in administrative support roles. FS-36 is quick to laugh, and is a good conversationalist; I find out that she has 26 grandchildren within about two minutes of meeting her.

One morning FS-36 trains FS-39, a new volunteer prone to pre-emptive apologies. Thirty minutes into the workday, FS-39 approaches FS-36 with a workflow question. She reviews the preliminary cataloging steps she's gone through; terminology tumbles awkwardly from her mouth, and she makes it clear she doesn't understand what the words mean. FS-36 nods along and offers constant affirmative "mm-hmms." "Very good," FS-36 says when FS-39 finishes.

"Now the only thing you don't need to do is..." She laughs heartily at FS-39's unchanged expression, and offers another positive encouragement. She accompanies her gentle error correction with additional "why" and "how" context, explaining that the information that is confusing FS-39 is relevant for the scanners and not the catalogers and therefore belongs in a different location.

A sudden breakthrough in understanding flashes across FS-39's face. FS-36 smiles and says, "Good job, FS-39. You're doing super." FS-39 laughs and returns to her workstation a few feet away. A few minutes later FS-36 leans over and remarks to FS-39, "You know I've done some doozies in my past that have been horrendously difficult to fix. Ask FS-21, because he and I have had to wade through them." From all the way across the room FS-21 chuckles, and answers "yeah, there have been a few." Everyone laughs.

Throughout the day, FS-36 maintains an awareness of FS-39 even as she is occupied with her own work. I also watch her rotate among other catalogers, checking in with all of them periodically. She is the glue holding the small cataloging team together, quietly providing ongoing support but also momentum.

6.5.3 There's no place like home: Missionary service and family care work

The family, and the home its members create together, occupies a central position in Mormon cultural life over years, decades, and generations. When asked what they would be doing if they weren't serving on missions, many if not most of the women senior missionaries (FTM and CSM) immediately reference a range of family responsibilities and care work—babysitting grandchildren, taking care of ailing relatives and spouses, etc. Missionary service offers a break from ongoing domestic care work, if only a partial or temporary one. "It's nice to have a break from being at home all the time," CSM FS-38 observes.

Married senior FTMs often characterize their missions as a chance to strengthen their marriage relationships by working together on something outside of the house or family structure. FS-35, who has served multiple senior full-time missions with his wife, laughs as he says, "We like this because we can work together. Actually we prefer the partner libraries kind of because we're there alone." Interviewed together, FS-22 and FS-23 reflect on the impact of their senior mission on their relationship:

> FS-23: And, you know, our relationship became closer.
> FS-22: Oh yeah. It was good before, but it's better now.
> FS-23: Yeah, because we were a team. We were a team. Especially in [short-term scanning project site] I felt it the most because we were side by side. We were ... He did his part, I did my part and that teamwork, we were able to do something very quickly that might have taken us much longer but we would ... There's none of this, 'Oh, well you audit tonight. I'm so tired.' It's like we both were invested.

Missions offer an opportunity for couples to make time for themselves, even if this time is always already accounted for as service to others, and to foreground the couple relationship.

Senior FTMS describe leaving their extended families (especially the grandchildren), many of whom live within close proximity to their permanent homes, as a primary personal sacrifice of going on a mission. In contrast to traditional young missionaries, however, senior missionaries are encouraged to maintain regular contact with their families. Full-time missionary service thus offers senior missionaries the ability to remain connected but formally step away from being central players in their (frequently very large) families. It also reminds extended family, if only tacitly, that the matriarch and patriarch of the family are not a free source of unlimited daily support.

This experience of managing family relationships while serving a mission is very different for CSMs and FTMs. For senior FTMs, the family home is an asset they close up for a year in preparation to relocate for a mission. It also becomes a resource that may be used by one or more family members as they encounter periods of transition or change in their lives. By contrast, CSMs serve missions while remaining at home, often maintaining a range of family responsibilities concurrent with their mission work. The house often occupies a different position in CSMs' lives. For people with little means or ability to travel, or people with ailing spouses and relatives at home, the house emerges as a kind of confinement—a structure from which serving on a church-service mission offers periodic escape. Partner librarian FS-82 has worked with both CSMs and FTMs, and describes:

> And that's the difficulty between a couple who are a local missionary, they still have their family around their home responsibilities, they have all of that and if you have a couple or a missionary who comes in from [distant location], they don't have any

> house responsibilities, they're staying in an apartment that doesn't belong to them. They can do that, they can be that focused, so you know, I mean that's just a logistical difference.

While FS-82 presents this as a "logistical difference" between mission types that affects missionaries' ability to focus, on the flip side this acknowledgement of CSMs' ongoing home and family responsibilities helps to contextualize the very different ways in which missionary service work fits into the lives of CSMs and FTMs.

6.5.4 Senior missionary system as a kind of invisible care infrastructure

Listening to missionaries tell their mission origin stories, it is often unclear whether the "need" being met through the mission originates in the work requiring human labor or in the person asked to do it. As the preceding sections describe in detail, missionaries (both FTMs and CSMs) experience senior missions within a wide range of broader circumstances or contexts. For some, serving a mission fulfills long-standing plans. Others describe being called to serve while adrift, in mourning, or otherwise in need of some kind of support or structure.

Even as seniors provide volunteer service to the Church in the form of scanning labor, they are also often cared for in compelling ways. One long-time volunteer, FS-37, observes, "This is my home away from home. It keeps me sane." An elderly CSM at a public library partner site fits his book scanning mission around his wife's cancer treatments. His wife's health brings a certain amount of instability to his schedule, as he drives her to the hospital from out of town and then comes to scan for a few hours while she is in her appointments. The FTMs and librarian coordinator accommodate his needs quietly and gracefully, expressing empathy for his circumstances and gratitude for his continuing scanning contributions.

CSM FS-40, for example, exclusively works on doing the first of two quality control audits of scanned books. Some of these FS-40 is able to correct, such as adjusting the position of an image on a page. "Sometimes people will transpose numbers. I'm really good at that," she says. Many other times she needs significant help solving problems, such as when page images are stored in the wrong folder or directory, when page image file counts do not match up with what the tracking information file says they should be, or when she

understands that something is not right but does not possess the vocabulary required to get help to deal with it. When faced with this circumstance, FS-40 simply puts the work aside in a pile for the site coordinator to deal with. The parameters within which FS-40 is effective as an auditor are *very* limited, then, but still FSB—along with the site coordinator, her fellow missionaries, and the local LDS community, who form a small circle of support around FS-40—welcomes her efforts and encourages her continued service.

In some cases, church -service missions literally give some LDS Church members a reason to get up and out the door of a suddenly empty home, or provide justification for a break from family care work in others. By serving on missions, some CSMs also bring themselves into the line of sight for the Church. For these people church-service missions provide structure, social support, and someone counting on them—with a relatively low bar for accountability.

FS-30 tells the origin story of her church-service mission, in which she catalogs books for scanning at a FHC:

> FS-36 and I are good friends, and the thing about it is—my mother passed away in May of 2015. And so FS-36 just came to me about end of June, about a month after mom passed away, um and just said, 'I don't know if you'd be interested in volunteering, but we could sure use you.' And so she kind of talked to me about what we'd be doing. I said, 'oh, yeah—I think I could…' And about a week later I got a phone call that the stake president wanted to visit with me, and they extended me a call for a mission. And she didn't know they were going to do that! [Laughs] So it all fell into place. So—I was handpicked to come to work with her.

As FS-30 continues to narrate her acclimation to her mission, the importance of the support roles played by both FS-36 and the Church becomes clearer:

> I was the office manager at a place of business, and I did spreadsheets for all sorts of different customers we had. So I had worked on them, but I—I wouldn't say that I was really, extremely knowledgeable on it. So to be out of it, really out of it for about four years, and for a year being really focused on taking care of mom, my brain was mush. [Laughs heartily.] In fact, I told FS-36 when I had—after I got so I was doing pretty good, I said 'did you really wonder about me when I first started?' [Laughs again.] She said, 'no. I knew where you were, and I knew it would come.'

FS-36, one of the site's lead catalogers, and FS-30 had a previously established relationship. FS-36 was therefore familiar with not only FS-30's work history and skills, but other details about her personal life as well. FS-36 was able to leverage this contextual awareness—of FS-36's capabilities and limitations, updated in real time—to provide relevant and constructive support to FS-36 as she emerged from the physically and emotionally intense experience of caring for and losing her mother.

In practice, for FSB missionaries digitization work becomes meaningful through a mutually reinforcing confluence of individual experiences with religious commitment, investment in family history, and a social structure that, depending on the site or day, can provide support, camaraderie, religious community, and humor. FS-36 describes:

> FS-36: You know, I am sure for two things. Number one, I believe in what we're trying to do. Because I have been a recipient of digitized records. I just feel like what we're doing is very critical. And the other is connected to the Church. I am supposed to be here, I know that. And so I am committed to what the Lord has asked me to do. And that is the bottom line. And those are the two things that keep me coming back.
> FS-39: And me.
> FS-36: You have the same reasons?
> FS-39 [speaking to MKC]: No, I keep her coming back. Just Thursdays.
> [All laugh]

The reciprocity of the care relationship here might also be understood as the LDS Church engaged in boundary marking, or community reinforcement of some kind. Compulsory volunteerism may be part of the high cost of membership in the LDS Church, a strategy by which to screen out free riders but also increase participation-driven rewards. This is similar to the idea that for participants in the traditional proselytizing missionary program, it is possible that "going on a mission has more impact on Latter-day Saint commitment than it does on LDS conversion" (Stark 1998). Nonetheless, the social and care benefits that missionaries expressed receiving through serving missions was a very striking piece of fieldwork. Sometimes this care operated as invisibly to the caregivers as to the receivers, as in the vignette below that closes this section.

6.5.5 VIGNETTE: Computers, change, and care

FHC site coordinator FS-21 describes FS-40 as his most extreme example of technical illiteracy in an incoming CSM. "I've been dragged kicking and screaming into the computer age!" FS-40 admits. FS-40 reports being completely unable to operate a computer when she started, and declares that a year and a half later "I'm not much better now!" "That's not true!" a nearby CSM insists, to which FS-40 quips in reply, "well, I can turn it on now."

As we talk, FS-40 strongly emphasizes both her longstanding antipathy toward computers and her prolonged resistance to being called to this particular mission. She attributes both of these to a lifelong stubbornness more than to any specific technical skill requirements related to a scanning mission. Asked about the hardest part of training, FS-40 answers,

> *Making me want to come down here at all. I served a mission at the canning center, the bishop's storehouse, for three years. And they said, 'well you can't go on any longer. You've got to take a little time off.' So I took the time off, and my stake president decided I wasn't supposed to go back to the storehouse [laughs]. And he took four years to convince me to do what he wanted me to do and this is what I got.*

Our conversation is long and somewhat rambling, shifting back and forth between details of learning how to operate a computer and references to FS-40's life at home—both with her husband and as a widow. Alternately defensive and self-effacing, FS-40's communication style is blunt; "I've never been hollered at for holding my breath," she observes.

Of computers, FS-40 says, "It's one of those things that you can teach an old dog new tricks, but it's hard. It's hard for people to change, for your attitude to change when you've spent so many years hearing your husband say 'stupid computer.' FS-40 describes how her husband became a programmer back in the days of punch cards somewhat accidentally, acing an aptitude test given to workers at his company. She describes how at some point he duplicated a program that had frustrated and defeated a group of programmers at the home office for days. She says it took him 10 minutes. "He could make those machines do anything," she says. He wasn't concerned with getting credit, or bonuses, she notes. Over time his eyesight deteriorated, though—"he'd have to change his glasses every three or four months"—and he

could eventually no longer do the work. "He ended up unloading potato trucks," she says. "He didn't like computers," she finally concludes. Framed through this life experience, it's easy to see why she harbors some resentment for computing generally.

For the moment, anyway, FS-40 has reached a truce with both her mission and computers more generally. Of computers, FS-40 says,

> *I'm not scared of 'em any more. Not mad at 'em any more. It's interesting. Before, when I was first starting to learn, I was concentrating so hard on what I had to do that I didn't see what was in the books. And now, sometimes, you come across things like recipes in books. Take the time to write it down, try it out. It gets to the point where I can actually enjoy some of this.*

FS-40's growing comfort with computers is demonstrated by the fact that she can now, on occasion, allow her concentration to waver enough to engage with the content of the books she is auditing. While other missionaries described in this research might cite names of family members or interesting historical stories, the only content FS-40 points to is recipes tucked into family histories and newsletters.

FS-40's mission has already been extended once, and she represents herself as possessing a reluctant willingness to continue indefinitely:

> *Well, I was supposed to end in May [2016]. And they sent the papers to my stake president, and he extended me for another year. Without telling me! So I didn't know I was extended for another year. So it would be May, and by then maybe I'll be comfortable and might stay longer. So, that's kind of my situation… I'm alone, my husband died ten years ago. I really don't have a whole lot to do.*

FS-40's prickly exterior softens perceptibly, and she laughs as she concludes our discussion with, "yeah, I think it's probably something I would just keep doing if I'm not making enough mistakes that FS-21 wants to get rid of me."

FS-40's descriptions of her grudging acceptance of both her mission and her long, slow process of "getting comfortable with the machines" seem to take on a dual meaning as she narrates her experience. It is as if the mission becomes a stand-in for talking about change generally, the ways that change brings new sets of expectations, new routines—all challenges that grow more difficult with aging, and with the deaths of spouses and other loved ones. She

acknowledges that she pushes computers, and people, away. She describes her efforts to keep herself isolated at home in her favorite chair with her cat, even as she acknowledges benefiting from both the forced social interaction and the challenge of learning new skills.

6.6 Conclusion

Crowded together at a round table in the public library's employee break room, I talk and laugh with the missionaries. Having finished our home-packed lunches, we eat cherry loaf cake FS-45 has made for her husband FS-44's 70th birthday. The missionaries joke about sneaking into the off-site storage warehouse where the Lake County books are stored and setting fire to them after they've been digitized. After being gently rebuked by FS-45, FS-48's eyes light up and he remarks, "those are the last words of your dissertation! We've written the last words of your dissertation for you." And so, the missionaries all quickly agree, the closing summation of this inquiry into digitization work should be, "if we were silly enough to sign up for this, it's our own fault."

As the ensuing laughter dies down, I scan the surrounding tables to see if we are disturbing other library employees. Most tables are occupied with pairs of quietly chatting employees, or individuals accompanied by various digital devices. Two hourly scan technicians employed by another large-scale book digitization effort sit together at a neighboring table. After glancing at her watch, one announces to her coworker, "we've got two-and-a-half minutes left before we need to be back on." They quickly pack up their lunches and silently file out of the break room. They head in the direction of a darkened corner of the library's closed stacks, where scan technicians turn the pages of books under a camera silently, partitioned from each other through a combination of individually curtained workstations and earbuds tucked into their ears.

Chapter 7 Synthesis and Conclusion

7.1 Introduction

Nanna Bonde Thylstrup's (2019) recent work on mass digitization as a sociotechnical phenomenon provides a useful high level framing through which we might understand some of the ground level perspectives presented in this dissertation's preceding chapters. Exploring mass digitization relationally as an assemblage comprised of multiple human and non-human actors, Thylstrup's case studies of mass digitization projects (Google Books is one) explicitly integrate the logics of late-sovereign and late-capitalist accumulation into some of the same theories of infrastructure informing this dissertation. Thylstrup argues that mass digitization should be approaches as an "infrapolitical activity that retreats into, and emanates from, digital infrastructures and the network effects they produce." At the same time, Thystrup argues, "mass digitization projects are in direct correspondence with neoliberal values such as privatization, consumerism, globalization, and acceleration, and its technological features allow for a complete restructuring of the disciplinary spaces of libraries to form vaster and even global scales of integration and economic organization on a multinational stage."

Thylstrup locates the politics of mass digitization at the level of infrastructure, where stakeholder investments and priorities lurking behind public arguments in the name of access—in particular logics of accumulation, power, and control—are concretized and take material form. "The infrapolitics of mass digitization," she argues, "is the building and living of infrastructures, both as spaces of contestation and processes of naturalization." The assemblage construct used by Thylstrup provides a temporally and contextually situated view that is able to accommodate both stability and contingency. This approach resonates with this dissertation's layered approach to animating the multiple actors involved in mass digitization; my aim here, however, is somewhat narrower.

The fact that infrastructures are political, contingent, power-laden undertakings is instead the starting rather than ending point for this dissertation research on mass digitization. Infrastructures grow slowly and over time, as processes and systems are gradually intertwined and grow mutually dependent. In putting forward their relational approach to infrastructure, Star & Ruhleder (1996) construct infrastructure as a process rather than a concrete noun: "when is infrastructure?" they ask.

As a digitization project protected by proprietary practices such as non-disclosure agreements, Google Books is an inaccessible closed system. Indeed, Thylstrup's recent work confirms that researchers interested in Google Books are all engaging with the same finite set of sources, parsing public statements and cherrypicking patent diagrams. We can reconstruct GBS's origins and evolution through secondary sources, and can follow its output into the world to speculate about its infrastructural impacts, but in important ways GBS remains a black box.

By contrast, the value of ethnographic research in studying mass digitization is the way in which it affords a multi-faceted ground level perspective of infrastructures in flux and in formation, highlighting places where values and priorities are both concretized and contested. The infrastructural view of large-scale book digitization constructed through this dissertation research bridges multiple scales of analysis but thus intentionally remains partial and fragmented. By centering work, both conceptually and literally within this final chapter, I suggest alternate ways we might view, account for, or approach digitization and the digital knowledge infrastructures it continues to shape.

In previous chapters, I have surfaced multiple configurations of materials, labor, and stakeholders through which book digitization takes place. In this chapter I situate this layered understanding of digitization work (and of digitization through work) gained from both research projects—GBS (Chapter 2) and FSB (Chapters 3-6)—within several overarching themes and infrastructural issues surrounding book digitization and digitization work. These themes are: revisiting "access" as a motivating goal for digitization (Section 7.2); expanding definitions of work to explicitly accommodate an ethics of care (Section 7.4); viewing digitization relationally through questions of outsourcing, infrastructure, and library futures (Section 7.6).

In order to remain grounded in the ethnographic detail that is at the heart of this dissertation research, in Sections 7.3 and 7.5 I present two examples from my field research that crystallize how disparate values, resources, information systems, and labor are brought together in practice in FSB. The first focuses on challenges of measuring productivity, while the second focuses on scaling. These examples layer together the perspectives explored separately in Chapters 4, 5, and 6, shed light on issues of both infrastructure and labor, and offer points of departure for thinking about the wider landscape of book digitization and web-enabled access to digitized books.

7.2 Revisiting "access" as a motivating goal for digitization

Large-scale digitization projects are often undertaken in the name of access. Over the past decade and a half, a number of these access-oriented projects—including GBS and FSB—have produced massive corpora of digitized documents for the public, relying on the Web as a distribution platform. "This egalitarianism of information dispersal is precisely what the Web is best at," Google's Erik Schmidt (2005) enthused in an editorial about the Google Books project titled "Books of Revelation" that constructs access as an information extraction and processing challenge.

We encountered this view of as digitization as a solution to the problem of access in Google's public statements about GBS in Chapter 2 as well as by FSB participants in Chapter 4. Now we must consider how the exploration of digitization work in the intervening chapters has complicated this vision. The lofty rhetoric about the democratizing power of digital access to print content overshadows the contingency, fragility, and proprietary characteristics of the infrastructure—and labor—required to create and/or maintain this access.

Digitization and digital collection building can increase access to books by volume, but this expansion may be at the price of advancing the idea of online access to books as immaterial and devoid of human labor. On exclusively digitally-accessed libraries, Mattern (2014) questions:

> Do *patrons* wonder where, exactly, all those books and periodicals and cloud-based materials *live*? What's under, or floating above, the "platform"? Do they think about

> the algorithms that lead them to particular library materials, and the conduits and protocols through which they access them? Do they consider what it means to supplant bookstacks with server stacks—whose metal racks we can't kick, lights we can't adjust, knobs we can't fiddle with? Do they think about the librarians negotiating access licenses and adding metadata to 'digital assets,' or the engineers maintaining the servers? With the increasing recession of these technical infrastructures—and the human labor that supports them—further off-site, behind the interface, deeper inside the black box, how can we understand the ways in which those structures structure our intellect and sociality?

Mattern's final question here is important in part because it makes a connection between the decreasing visibility of human library labor to the continuing function—and evolution—of libraries as social, communication, and knowledge infrastructures. A question emerges from both GBS and FSB, if differently: to what extent does digitization contribute to a neoliberal concept of libraries—of unmediated access to content, cutting out the middleman where the middleman is the *librarian* rather than the library itself?

7.2.1 Last mile labor: Meaningful access (still) requires librarians

Hoffmann and Bloom (2016) argue that Google's technorationalist definition of access in GBS—the "idea that the presence of resources, made fundamentally discoverable through an uncomplicated search interface, constitutes access, full stop"—elides other types of information work and workers integral to facilitating meaningful access to information. This construction of access, which Star (1999) would refer to as a "master narrative" woven into the fabric of GBS infrastructure, resonates with Vaidnathan's (2012) positioning of GBS within the company's broader effort to push the idea that public institutions are outdated or unnecessary.

Hoffmann and Bloom contrast Google's idea of access with the library profession's construction of access. Engaging with the gendered history of librarianship and the idea of "women's work," they suggest that librarian values of education, service, community, and an "ethics of care" offer a valuable alternate vision of access—one currently in danger of being erased. As Hoffmann & Bloom observe, the work of librarians in particular is often absent from public visions of digitized access. This absence of librarian labor is perhaps not surprising in Google Books, given the ways in which humans were relegated to the margins of the project. By constructing books as searchable data, Google removed books from the

library shelves and re-housed them within the search-based logic of the web. As is the case with other behind-the-scenes labor required to prepare (or prevent) content for access by end users such as content moderation (Roberts 2016; Gillespie 2018), tech companies often prefer to obscure the fact that humans remain involved at all.

However, as the chapters on FSB demonstrate, human labor is quite present in the day-to-day realities of library digitization; this includes cataloging and support labor as well as librarians' efforts to connect users with digitized content. Far from realizing the neoliberal dream of unmediated access to information, librarians' work illustrates how many patrons require more rather than less attention from librarians in order to meaningfully access digital resources. This is what I am calling "last mile" labor, after the "last mile" problem identified by telecommunications and internet industries as the final leg of a network bringing communication services to an end user. The genealogy librarians appearing in this research routinely provide last mile labor in connecting patrons with information across multiple media.

FSB partner libraries must attract and engage patrons in order to remain viable as institutions—online or offline. To do this, libraries pair the illusion of ease that the Internet provides with the kind of individualized—and free—attention (and expertise, and education) that professional librarians provide. Genealogy librarians bring a combination of technical and domain expertise to their patron interactions, and they must also be able to offer excellent customer service on top of research support.

The specificity of librarians' knowledge and its location within the public library draws attention to the question of the role of local expertise in a digitized world. Even as services move online and the scale of data—along with the number of potential users—increases dramatically, genealogy librarians remain committed to serving individual patrons. Librarians educate users about the availability of digital resources in the hope that it lowers the bar for participating in genealogy sufficiently to inspire patrons to come back. Partner librarians emphasize the need to encourage rather than judge patrons with different skills, interests, and receptiveness to established best practices in family history research.

Public genealogy librarians remain aware of the genealogical needs and interests of local populations (some of which are more monolithic than others). In one partner library,

for example, the genealogy librarian must be able to speak for the specificity of access to New York-related resources, which librarians report is often unavailable through some combination of privacy laws and widespread antipathy toward genealogy patrons at the state level. Librarians become spokespeople not only for unique resources related to local history, but also for legal frameworks governing access to resources held elsewhere.

Multiple partner librarians also engage in significant labor to connect patrons with FSB scanning output. This frequently involves as much explaining that FSB exists as explaining how to leverage it. For various reasons, FSB digitized content is segregated from other genealogical resources on the FamilySearch website, and books are searched differently than vital records. FS-83 observes:

> You know, it's kind of interesting because the structure of the Family Search website, and the fact that the books are not searchable in the historical documents. A lot of people don't know about the books…So when you show people the books, you also have to go into the story about copyright. That, I think, opens up people's eyes to the fact that, wow, they do need to come back to the brick and mortar. The education, I think, is what sort of drives them back into the brick and mortar… I think it's a really big lesson for people that are digitally born, or that people have move into the digital world, either way, to realize that there's stuff that's just not out there.

With patron outreach and education we can see how librarians are expected—but that the work is not necessarily acknowledged—to deal simultaneously with technological change *and* continuity.

Downey's (2002) research on telegraph messenger boys may provide a useful historical example here. At the turn of the twentieth century, telegraph messenger boys physically transported messages, which had themselves been first written on paper, then encoded and sent as a telegraph, and then translated again before being delivered physically. Messenger boys crossed and connected multiple separate communication systems, owned by public and private institutions, performing critical coordination work and acting as physical representations of the "last mile" of the telegraph system. As child workers, they facilitated the smooth functioning of the telegraph system, yet Downey observes that they have been left out of its official histories.

Librarians are called upon to execute a similar type of information labor as the telegraph messenger boys, although rather than acting as a physical representation of the last mile librarians instead chaperone patrons back and forth across this territory between print and digital. With family history research resources siloed within different media, databases, copyright regimes, or legacy information systems that do not connect, librarians are called on to help patrons to navigate seamlessly between the worlds of print and electronic access to books and other information.

By taking on this "last mile" labor, librarians help to market and demonstrate the value of digital collections to users. At the same time, the continuing (in)visibility of content—vis-à-vis patrons, or the cataloging and copyright systems that mediate access to content—is often also shaped by institutional labor and resource issues outside of librarians' control. Librarians are often left to act as spokespeople for the limitations or restrictions of information systems they had no part in creating (Downey 2008).

7.3 Challenge: Measuring productivity

From lunch-time conversations at the scanning site to a Family History Fair in suburban Utah, FSB participants reference numbers of pages scanned (by individuals, sites, and the project as a whole) ubiquitously. As an aggregate measure of time and effort, these numbers provide a convenient shorthand for both the enormous scale of the project and the productivity of its executors. They are an institutional metric for incremental progress, and a target for efficiency-oriented workflow improvements over months and years. Some, if not most, individual missionaries also use these numbers to define success (at a personal or site level). Throughout the year FamilySearch compiles and distributes monthly reports on pages scanned at each site, and includes monthly numbers from the previous year as a point of comparison with incrementally increasing annual goals.

Volume-based productivity measurements may be of limited utility for assessing FSB's progress or success, however. They suggest a level of standardization that is not be present within the project's content, its labor, and even its partnerships. Further, these success metrics elide as much as they reveal about FSB's values, workflows, and workers.

Conversations about productivity are, of course, also strategies by which to surface relationships between visibility and value—what counts as "productive" work (Star and

Strauss 1999). The challenge of managing productivity connects the values and priorities of digitization projects with the labor through which projects are executed. This challenge serves as a point of departure for the second theme of this synthesis chapter related to expanding definitions of work.

7.3.1 Mass digitization values: One size, and speed, fits most

Increasing efficiency—and, in turn, managing productivity—becomes a critical challenge as the scale of the digitization project increases. Efforts to increase efficiency by imposing consistency are always challenged by the resistance of both materials and human labor to these standardizing impulses, however.

Mass digitization projects such as Google Books optimize workflows around values such as speed and consistency, which in turn consigns humans to unskilled labor that cannot be fully automated. Google's book scanning-related patents, for example, characterize humans as both inefficient and imprecise; humans' involvement is an obstacle to be remediated by technology or semi-automated workflows. Google holds patents, for example, for a system that uses music to increase the speed of page turners (O'Sullivan, Proudfoot, and Uhlik 2009), processes to automatically trigger a page re-scan command when hands are detected overlapping text on a given page (Lefevere, Poncin, and Khaliq 2011), and for processes to identify and remove fingers appearing in pages with text (Lefevere, Poncin, and Khaliq 2009).

Other large-scale book digitization projects have been shaped in practice by similar values, if not to the same extreme. For example, the Internet Archive's book scanning efforts have been based in part on setting itself up as a low-cost contract digitizer with libraries and other partners. Because the Internet Archive charges its partners by the page as well as a small per-book setup fee, it has an incentive to increase efficiency around these metrics; inevitably, the fee structure shapes both a partner institution's content selection policies and the Internet Archive's own expectations for hourly workers' productivity. For the latter, the Internet Archive uses a tool called the Scan-o-meter to monitor scan technician productivity; while not used punitively, the presence of the Scan-o-meter helps to define metrics for productivity and success at each site.

Digitization productivity, of course, is shaped dramatically by the material properties of books, such as age, size, and condition, or that require mixed grayscale and color imaging. In Google Books, books that were very large or small, in delicate condition, or contained foldouts or non-Western fonts were routinely excluded from or distorted by Google's book scanning system in service of its prioritization of speed and standardization (Conway 2013).

7.3.2 FamilySearch Books: Productivity in context

By contrast, as Chapter 4 described, FSB has built its vision of large-scale digitization around values such as content selection rather than speed or efficiency. Unlike GBS or even the IA, FSB is willing to modify or build workflows to accommodate individual books because inclusion is a more salient value in the project than speed. This decision, in turn, is in part due to FamilySearch being less concerned than GBS or IA about the monetizable productivity of its (majority unpaid, volunteer) workers. FSB's missionary-based labor model for digitization instead constructs scanning as meaningful, temporally-flexible work. By volunteering to scan books, missionaries experience comparative freedom from governance by the temporal control structures and anxieties deeply ingrained in capitalist work settings. They engage instead in collaborative and collective work, where productivity cannot be meaningfully tracked on an individual level.

While it is possible to scan books at a relatively high speed, it is difficult to sustain that pace over a long period of time. Every movement outside of the page-turning, glass-lifting and lowering, and image-capturing—whether it is focused on taking care of oneself or the object being imaged—subtracts from a volume-based productivity measurement. Every pause to take a note, or fix a problem, or drink water, or visit the bathroom, or check email feels like it is being timed. Further, that measurement inadequately accounts for whether the scan technician is a careful or sloppy worker, or whether he was distracted this morning waiting to hear the status of a relative having surgery, or whether she is 20 or 40 or 70 years old. This is of particular relevance in a work environment staffed in part by senior volunteers, who may have physical limitations or be indifferent to the speed-based metrics that motivate waged workers.

Productivity measurements cannot characterize the process factors and interdependencies that shape digitization speed in FSB. Missionary FS-44 observes that many of these are outside the direct control of missionaries; this includes infrastructure bottlenecks or gaps, such as transfer and processing backlogs, which extend the time between site-based page image-capture and online publication managed by FSB staff in Salt Lake City. While high-quality books lead to easy scanning, FS-44 says, books like the Lake County books throw the whole system off and, in FS-44's estimation, make the site appear unproductive. Destructive scanning, in which books are disbound and imaged by a sheet-fed scanner before being placed in FamilySearch's long-term dark storage, is exponentially faster than non-destructive scanning. However, this takes place almost entirely within FHC scanning sites, as partner libraries prefer to keep their print books on shelves. The skills of individual missionaries also come into play: a less-skilled first auditor is going to slow down the second auditor, just as a sloppy scanner is going to trip up the first auditor.

Content selection practices, as well as cataloging challenges, also intersect with labor to shape scanning rates. In libraries working their way through large collections, missionaries often work with a limited set of identifiable "types" of books for a block of time. By working through a set of yearbooks, for example, missionaries gain efficiency with a fairly predictable set of challenges or characteristics, from copyright considerations to decisions about color imaging. The efficiency gains created through this repetition, however, are balanced by the content of the books themselves; there are types of books that tend to engage the non-scanning attentions of missionaries (e.g. yearbooks), and others that they experience as the tedium of factory work (e.g. city directories, or the Lake County books).

7.3.3 Surfacing—and circumscribing—digitization labor

Volume-based productivity metrics perpetuate the notion—constructed through the combined atomization and deskilling of work and the virtuous visibility of volunteer service—that image capture can adequately stand in for the sum total of work contained in the journey of a book from shelf to screen to user. As the work by missionaries, FSB staff, and librarians detailed in the preceding chapters made clear, digitization labor includes more than page imaging. A focus on these numbers has the potential to further obscure

work critical for ongoing project execution that supports but does not directly translate to digitized pages. In combination with the project marketing itself as a "free scanning" service, productivity measurements downplay the considerable professional labor contributed by participant institutions. This includes the care, coordination, and other administrative and professional support work detailed in Chapters 5 and 6 on FSB labor.

An FTM couple relates a story of how a short-term scanning project they had been tasked with took much longer than anticipated, a fact they attribute to a miscalculation in accounting for both the speed *and* types of labor involved:

> FS-22: FS-3 put in the contract that he estimated that it would take two and a half weeks. FS-3 didn't estimate very well. He was estimating that we could do about 600 pages an hour… We averaged about 300 an hour. It took us a solid four weeks working 14-hour days.
> FS-23: Yeah, day and night.
> FS-22: With the auditing at our home at night so that we could come back and go on with the copying the next day.
> FS-23: The piece, I guess, that got forgotten was the administrative kind of stuff to be able to make tracking slips. It helped us to keep track of things all along, plus we would enter that into spreadsheets so we would know how many images we were doing a day and what was done. We wanted to make sure that we got everything. We actually took pictures…

Measuring productivity through pages scanned also downplays the important role—and labor—of collaboration in FSB. Freed from the productivity measures designed to structure and motivate individual workers in wage labor systems, missionaries create novel, collaborative workarounds to battle the boredom of scanning, and even the physical limitations of senior missionaries. At one site, missionaries often circumvent FSB's individual login system in order to improve site-level productivity through task sharing. While missionaries do log in individually to the workstations (e.g. for certain tasks such as auditing), it became clear through observation that the missionaries freely rotate among stations and scanning-related tasks. There is no emphasis on logging in as a productivity measurement or accountability task. It would not be surprising, in fact, if one person's login was in use for every machine simultaneously, or if none of the missionaries really understood how or why it worked.

Simultaneously, missionaries, site coordinators/partners, and FSB staff all actively engage in considerable amounts of emotional labor to facilitate and sustain collaborative efforts that carry the project across space and time. This is the work of coordinating and sometimes reconciling the perspectives of different stakeholders, who often have very different skills, perspectives, and priorities.

7.3.4 VIGNETTE: the invisible work of collaboration (and productivity)

In the course of this research, interlocutors at multiple locations highlight the remarkable productivity of FS-48, an FTM at a public library partner site where a number of the missionaries work on equipment provided by the Internet Archive (IA).

At lunch with the missionaries one day, conversation turns to the IA's publication of the previous month's scanning numbers. FS-44, an efficiency-minded FTM, complains that he never gets any credit for the folios he occasionally scans for the IA. He prompts FS-48 to talk about the many thousands of images he has produced for the IA and questions the accuracy of the page-credit attribution. FS-48 brushes FS-44's outrage aside and wryly remarks, "It doesn't matter. We can't buy anything with our credits anyway."

Beyond highlighting the varying emphasis individual missionaries place on productivity statistics, the exchange is also notable for the fact that throughout it the labor of FS-49—FS-48's wife, seated directly between FS-44 and FS-48 at the table—goes entirely unremarked. FS-44's feigned outrage at failing to get credit for his own work or for FS-48's perceived productivity shortchanging completely ignores the fact that FS-49 served the same hours side-by-side with FS-48. In fact, FS-48's remarkable scanning productivity is directly facilitated by FS-49 spending time taking care of all of the non-imaging workflow elements (e.g. creating pick lists, auditing, etc.).

In a subsequent conversation while sitting at the scanner, FS-48 indicates his own awareness and appreciation of this division of labor. FS-48 explains that FS-49 has fibromyalgia and cannot physically scan all day long, as IA scanning equipment has a heavy foot pedal which must be carefully controlled in both its downward and upward movements. FS-48 describes how he and FS-49 work to maximize their own individual strengths as well as navigate their physical limitations. Even as they dismiss the exercise of measuring productivity through numbers, FS-48 and FS-49 have calculated that when they are done with

their mission, they will probably have scanned and processed about 1.5 million pages together (two pages at a time).

7.4 Expanding definitions of "work"

Measuring productivity is, like the question of invisible work in Chapter 3, a question of what counts as work. In FSB, the question of measuring productivity exemplifies the ways that the project does and does not offer alternative ways to think about or account for work. It embodies the complicated, and sometimes contradictory, ways that work and workers are understood and valued—particularly with reference to evaluating success, or progress—and informs the discussion of defining work that follows.

In this section I explore the different ways that FSB and libraries measure success before turning to the broader question of defining digitization work.

7.4.1 Measuring success, with and without numbers

7.4.1.1 FamilySearch Books

Positioned simultaneously within a large-scale, collaborative digitization project and the family history wing of the LDS Church, FSB embraces multiple definitions (and/or measurements) of success for individual missionaries, scanning sites, and the project as a whole. When FSB employee FS-3 declares that "We are a quality first, numbers second type of shop," his definition of quality encompasses both imaging and missionary experience:

> Numbers are important, but the only person that evaluates the numbers is me, and people higher than me. If they're low, then I just have to explain why numbers are low, like they need more equipment or they need more missionaries or they're working on some really hard books like these books that are on onion skin, 1000 pages, really faded and they can't go as fast, but they're doing a good job. That's really what it boils down to is how do they feel about their mission and are they doing a good job, and are they keeping the machines running even if they're not running on full blast.

For individual missionaries, FS-3 ties success to a willingness to embrace missionary work as something more than—or at least other than—a "job."

> Some people just naturally look at missions like it's a sacrifice and they're willing to do whatever is asked of them, and people who go in with that kind of a heart are definitely going to have the most successful and the happiest missions. Some people just show up like it's a job, and those are the people that just go through the motions and they're naturally not going to be a good fit. Even if they are successful at what they do, they're not going to blend in well with the other happy missionaries on their team.

FS-3's observation is striking in part because it constructs a "regular" job as a thing without meaning. While FS-3 acknowledges that it is possible to "go through the motions" and even perform job functions adequately in the absence of the external meaning supplied through religious service, he is quite clear that success within FSB is often measured in ways altogether different from productivity metrics.

The simultaneity of many different (gendered, aged, raced, classed, and embodied) experiences and interpretations of digitization work further shape these definitions. FTMs and CSMs, for example, often construct not only success, but work in general, in different ways. FTMs—whose commitment to a year or more of service far from their permanent homes allows them to focus their time and energy on scanning as a full-time job—mention traditional success metrics such as numbers of pages scanned far more frequently than CSMs, who more actively juggle scanning work with many other daily responsibilities. In striking contrast to the style and approach to work in evidence at FTM-managed scanning sites, defining success at CSM-dominated sites may be much more limited, and individualized. Such sites are staffed by missionaries who bring with them not only diverse skill sets but also different motivations for undertaking the mostly part-time work.

Despite FS-3's assertion about meaningful work above, for some CSMs—such as FS-40, in the vignette above—the work may not actually feel personally meaningful on a daily basis. It may involve being dragged somewhat unwillingly into the unfamiliar world of computers and technology. For FS-40 (whose experience was detailed in a vignette in Chapter 6), success may involve leaving the house to show up for work when scheduled, being forced to interact with a few people, learn a few skills, and help in a limited way with auditing scanned books.

7.4.1.2 Library and librarian metrics for success

In order to justify budgetary allocations, public library partners are often required to demonstrate the value created by a project or area of service. Several genealogy librarians expressed frustration over their library's reliance on use metrics that do not reflect the genealogy's collection's values/value, the ways it is used by patrons, or evolving relationships between the use of digital and print resources. Library partners all talk about supporting individual user "success," and position digitization as an important piece of producing that success in 21st century genealogy. There seems to be a tension, however, between their uniform emphasis on individual, experience-based definitions of success and common use metrics such as door counts that continue to be relied upon by libraries.

Multiple librarians observe that their libraries encourage people to use online sources such as the library's website and databases, but do not value these users' patronage the same way as they do a person who walks through the door. Partner librarian FS-63 observes, "one of my biggest frustrations is that the county politicos and our board and our administration very often judge viability by how many people are sitting on the floor. That's been a long-term battle… If you're looking at a book on FamilySearch, I think it's the same as sitting in the department looking at it, but we're very much in an old-school way of gathering statistics and usage." Librarian FS-82 is blunt in her assessment: "My problem is that I don't care about the numbers," she says, even though she does engage with numbers in some meaningful way as part of her job managing a large genealogy library. She says that whether or not it can be captured through numbers or metrics, an individual patron's experience and definition of success is of far more value to her as a librarian than where the patron is physically located. FS-63 echoes this focus on individual patron experience, and further problematizes the challenge of measuring it:

> That goes back to the idea of, do you measure success by a quantity, as opposed to finding something that's very difficult to find that you might not have found any other way. Especially for this kind of thing. You know, you're talking about people who are looking for some sort of record or data that they haven't found in years or can't find. So to be able to home in on something. So it might be just one person finding one thing, but the value of that one result is weighted by its uniqueness.

It is possible to identify in the librarians' lamentations about door counts here a sharp tension between the librarians and the libraries that employ them related to the values and measurements that shape definitions of both work and success. Doing extensive outreach or education around digital collections is thus a double-edged sword for partner libraries. On the one hand, these efforts may lower the bar to participation in genealogy and may bring increased visibility to the library's collections. On the other, that labor is both largely invisible and in service of gaining new patrons that may be inadequately accounted for in the metrics a library uses to assess the volume and value of users and collections. If resources allocated to librarians to support doing their jobs are shaped by institutional definitions that equate door counts with use, then this may give library administration the idea that digitized collections require fewer resources—or none at all. The fact that the library may not value these remote patrons as users also de-values the efforts librarians make to provide individualized service to them, even as they squeeze these service efforts into time increasingly allocated elsewhere.

For librarians, the contradictions inherent between widely held library values and the metrics by which value or success are measured are further exposed through participation in FSB. As described above, FSB defines success in part through participants engaged in work that is meaningful to them. This seems to align well with librarians and the public service ethos that motivates their work. However, as Chapter 5 and 6 detailed, the project itself does not always do a good job of making librarians' digitization work contributions visible or validating them. Further, even as librarians are expected to continue to undertake care work with respect to patrons, content, *and* FSB missionaries, none of this effort may be captured within their own institutions through success metrics such as door counts.

To add a final layer, this situation is compounded almost heartbreakingly by returning to David Weinberger's (2012) vision of library as platform:

> Conceiving of the library as a platform not only opens a range of new services and provides for a continuous increase in the library's value. It also does something libraries urgently need to do: it changes the criteria of success. A library platform should be measured less on the circulation of its works than in the circulation of the ideas and passions these works spark – from how many works are checked out to

> the community's engagement with its own grappling with those works. This is not only a metric that libraries-as-platforms can excel at, it is in fact a measure of what has always been the truest value of libraries. In that sense, by becoming a platform the library can better fulfill the abiding mission it set itself: to be a civic institution essential to democracy.

If you remove references to "platforms," Weinberger's vision reads as a great summary of the ways that librarians have talked about their often undervalued work to engage patrons and support access to information over the last several chapters. Unfortunately, Weinberger's vision of library as platform doesn't include any of this very human effort, instead shifting responsibility onto "the community" to generatively engage with a software platform themselves.

7.4.2 Expanding the definition of digitization work

Part 2's exploration of work in FSB surfaced significant, previously hidden digitization labor. Its purpose, however, was more expansive. The workers involved in FSB experience shifting registers of visibility and value with respect to the way their work intersects with institutional goals, project workflows, and sometimes each other. By observing and talking to project participants, it became possible to construct a picture of what sense these digitization workers make of what they are doing and why they are doing it. The visibility of care in the daily efforts of all involved in FSB was one of the most striking aspects of that picture.

Yet all of this care receives very little attention in high level discussions of FSB (with senior staff, or in public facing documents). Explored in detail in Chapter 5, the way that "work" has been constructed in FSB paradoxically proves useful in lowering the bar for missionary recruitment and participation, but ultimately excludes other groups of workers such as librarians (or even the long suffering FSB staff supporting the project remotely from Salt Lake City) from being recognized as important project contributors. The visibility of missionaries' *unskilled* labor—simply by virtue of their presence as extraordinarily dedicated volunteer workers—also often erases the *skilled* labor of librarians. Allowing missionary labor to stand in for the project as a whole also does not provide an accurate description of the varied types of work I observed in digitization sites in which collaboration, support, and care work are routine—but important—elements of daily work.

Digitization work often involves many types of work and tasks performed simultaneously, sometimes by a single individual and sometimes distributed across groups of workers.

Care work is an important component FSB, and for missionary work and librarianship more generally. As part of what motivates people to give away their labor for free, care operates on several levels in FSB. In Chapter 6, project participants across all roles talked about caring for objects (books, in print and digital form), for people (coworkers, patrons, etc.), for communities, for the FSB project, and even care for upholding the missions of institutions (libraries, the LDS Church). It is part of a service ethos, a lifetime commitment to service. Library partners, FSB staff, and long-term volunteers suffuse care into the coordination and support work they undertake to ensure new missionaries feel comfortable quickly (or to diffuse conflicts when they occur). The social atmosphere of many sites is kept light, in part, through care (and wholesome humor). In the network of social relations that make up scanning sites or the project in general, most actors function at times as care-givers; some, mostly missionaries, are also care-receivers.

Attending to questions of positionality and power, however, it is important to recognize that missionaries and partner librarians may not be equally able to choose to participate fully in such a care-centric system (Martin, Myers, and Viseu 2015). Librarians have a perhaps more fraught relationship with care than the missionaries. Librarians work in environments where care work is expected in almost every task. Librarians care for patrons and for information resources, sometimes in combination; sometimes resource constraints reframe what might otherwise be paid tasks as a "labor of love," or care work, such when librarians invest extra effort into last mile labor to connect patrons with information that has supposedly been designed to obviate the necessity of that labor. They care for missionaries. While missionaries' care work is visible highly valued, librarians' care work has historically been devalued through the alignment with feminized, unskilled work (Harris 1992). This is particularly evident in the gendered divisions of labor (and leadership) in Library IT; in many cases, they are left with additional service work as a result of poor software interface design by workers less acquainted with users' skills or needs. (Dohe 2019). Mirza & Seale (2017) observe that librarians are already largely left out of the future-oriented labor of entrepreneurship and innovation in libraries, due in part

to the ways that librarianship has been constructed over time as feminized, and therefore "non-skilled" service labor.

Mol et al. (2015) observe that an ethics of care reframes our interpretations of practices: "Care practices move us away from rationalist versions of the human being. For rather than insisting on cognitive operations, they involve embodied practices. Rather than requiring impartial judgements and firm decisions, they demand attuned attentiveness and adaptive tinkering." Workers such as librarians, however, may find that their participation in this positive, generative care practice is contingent on their simultaneous agreement to continue to work within its opposite as well.

As FSB contemplates future growth and sustainability, it may be useful to lean into care, and consider what resources a care-centered framing of digitization work may require to be supported—for all project participants. The question, then, becomes how to position care as a critical but equitable value—and practice—in systems of work. Mattern (2018) suggests, "If we apply 'care' as a framework of analysis and imagination for the practitioners who design our material world, the policymakers who regulate it, and the citizens who participate in its democratic platforms, we might succeed in building more equitable and responsible systems." Care is something that virtually everyone at an FSB digitization site engages in and would agree is important. It is an important component of the ways in which the FSB labor structure provides a refreshing alternative to the efficiency-oriented world of waged labor. Care is part of both motivation and reward for project participants—both volunteers and paid employees (within FamilySearch or at libraries).

In this dissertation research my approach has been infrastructural, but it does not aggregate to a comprehensive view of a particular infrastructure. It focuses instead on work that is infrastructural in nature: work related to embedding institutional values, priorities, and constraints into processes; the work of collaboration, and negotiating resource allocation as well as mutual benefit; the work of negotiating tensions between systems designed to mediate access to print and digital objects; the work of caring for objects, and for people. This aggregates not to provide a holistic view of an infrastructure, but rather a series of layered observations of disparate actors and factors navigating an uneven terrain together. In one view, universalizing rhetoric about access bumps up

against copyright law *and* the invisible cataloging labor of librarians. In another, the labor of missionaries who describe the challenges of learning to log in to machines in great detail is both visible and valued, while the professional labor of librarians remains unremarked upon—and they work together happily. If this is possible, it is certainly a fractured and crowded space, and one in which you will have to accept the productive possibility of holding contradictory things together. Viewed from a critical care perspective, however, it then seems plausible for a project such as FSB to embrace care as a core value while acknowledging the simultaneous presence of many factors that shape FSB but do not traffic in care as a value.

7.5 Challenge: Scale and scaling, the hub-spoke model

In this section I detail FSB's scaling strategy, which it terms the "hub-and-spoke model." As a commitment to a specific vision of digitization, it contains implications for committing other institutions' resources in unaccounted for—or perhaps unanticipated—ways. It therefore functions as a point of departure for the third theme in this synthesis chapter on outsourcing, infrastructure, and planning library futures.

> FS-36: You know when we started this… we were really just trying to process our little library…And then halfway through that, they said, 'no we're going to do everything in the region' and things started coming in. I don't think I ever realized that there's just no end. There's no end in sight.

FS-36 chuckles as she relates her growing realization of the scale of FSB's scanning aspirations—and of the genealogy content in need of scanning. We sit together in a row of computers, overstuffed shelves of books framing her profile as she catalogs. It is at these moments, literally surrounded by books at various locations in the workflow, where the enormity of FamilySearch's commitment to genealogy scanning is most striking.

As FSB considered its second decade of book scanning, questions of how work is structured among sites—and who is doing it—became critical. FSB project execution involves a constant interplay among long-term, project-level goals and strategies, site-level conditions and (human, technical) resource availability, and infrastructure being created

on the fly to scale and maintain the project over time. The question of scaling brings these elements together.

While FSB has only recently begun to explore the feasibility of the hub-spoke model with its public library partners, it has employed a similar strategy for its efforts to digitize print content in LDS Church-owned FHCs. The idea behind hub-spoke is to leverage longstanding scanning partnerships by establishing them as regional "hubs" beyond the parameters of the original scanning agreements. Small "spoke" libraries (which include public libraries, historical societies, or FHCs) can send their unique materials for scanning. In between these "spoke" projects the host library continues to scan its own collection

One public library partner, for example, has focused on positioning its library as a regional scanning hub for materials from small libraries susceptible to the destructive force of hurricane-force winds and rain. By pursuing digitization agreements with small libraries—starting with the FHC located in what they refer to as "Hurricane Corridor" and then expanding outward to libraries and historical societies—the hub could remain open for scanning for the foreseeable future.

Without the overhead of having to expend resources to establish new scanning centers, FSB partnership development can focus on identifying and capturing new sources of unique materials. For their part, partner librarians' desire to retain missionaries and scanning capability may shape their willingness to take on additional—and significant—management tasks in support of the hub-spoke model.

The hub-spoke model also highlights many of the general challenges of long-term, partnership-based digitization. At the annual book scanning partners meeting in Salt Lake City in 2017, there seemed to be consensus among current public library partners that the hub-spoke scanning model is a great idea but has not been executed smoothly thus far, with several challenges having emerged.

7.5.1 Challenge: Managing spoke expectations

Hub libraries must manage spoke library expectations with respect to the speed of both digital conversion and access to digitized content. Because partnerships take time to develop, FSB and hub libraries have taken a long view on both resource allocation and workflow development. Spoke libraries, by contrast, often approach FSB's offer of "free

scanning" with a limited understanding of scanning specifications, of best practices, and of information system organization in general.

Because it is as if by magic that books appear online—and magic does not take time (or labor)—spoke libraries have no context for understanding why the turnaround time for collection processing may be slow. Spoke libraries' desire for quick turnaround times is often at odds with both hub resource availability and the spoke library's preparedness for scanning or long-term maintenance of digitized resources.

When scanning sites are located within Church-owned buildings (e.g. FHCs), the book scanning team can leverage existing LDS infrastructure. The LDS Church operates a trucking service, the Deseret Transportation Company, that among other things moves food and supplies to "bishop's storehouses" spread across the United States. These warehouses are a critical piece of the LDS Church's food security and emergency provisions infrastructure, as supplies housed within them can be distributed to LDS Church members in need. Boxes of books that need to be scanned travel alongside on Deseret Transportation trucks for transit among FHCs, scanning centers, and storage warehouses. Based on FSB's successful use of LDS transportation infrastructure, FSB and hub partners envision harnessing existing public library book transportation networks in support of digitization (e.g. inter-library loan systems).

However, the institutions and collections that would benefit most from being spokes are often simultaneously resource-scarce and risk averse. Transporting and taking custody of collections, even for a short period of time, requires a certain amount of trust. Trust relationships require time to develop. It is precisely the trust and efficiency accrued over the course of long-term collaborative relationships that supports the hub-spoke concept in the first place. Mitigating risk perception in these short-term hub-spoke relationships adds labor on all sides.

At one FHC scanning site, in operation for over ten years, the volunteer manager FS-21 has put hundreds of thousands of miles on his car traveling across three states to assess, pick up, and deliver print genealogy collections from rural FHCs and small historical societies for scanning. FS-21 recounts one particular experience with a rural FHC, in which books were locked in a closet, having never been cataloged or even used: "I snapped pictures of books that I took out of the library and sent the photos to the directors. They

had no idea what I was taking. They trusted me because they knew me already. I took them back to our facility, scanned them, and then took them back and went through the pictures to confirm they had all their books back." FS-21's longstanding presence makes him a trusted figure. FS-21 reports that other small institutions have put him into the library computer system as a patron, and check out books to be scanned to him.

FS-82, a hub partner librarian, describes a similar experience with prospective spoke libraries:

> this is still being figured out because it's again, it's one of those things that they're precious items. We do have a courier system in our state that will do this free of charge but they [small institutions] just hesitate to put things through a courier system. So that this point we are physically going down, identifying, picking up, and bringing back…We have delivery systems in the state, but the problem is you are talking about stuff that there's only one copy. People don't trust it to the courier.

While an individual's willingness to travel hundreds or thousands of miles—at not insignificant personal expense—to support spoke library partnerships provides one way address the trust problem, it does not scale well and is limited by travel budgets as well as the human resources required for relationship management. This challenge of managing spoke library expectations also exposes the paradox that small and under-resourced book-holding institutions may willingly let books sit un-cataloged and unused—literally locked up in basements or closets for years on end, in de facto if unintentional dark archives—rather than let them out of their walls.

7.5.2 Challenge: Managing resources and workflows

The frequency of the situations described by FS-82 and FS-21 is indicative of the significant hub-based labor involved in setting up and managing partnerships broadly. The resource expenditure and work involved in establishing trust relationships over time often remains unaccounted for in project narratives. It points to the limitations of FSB's offer of "free scanning" by raising the question of whose labor is being given away and under what circumstances.

Beyond relationship management, public library partners are also called on to manage additional resource requirements in their role as hub scanning sites. A small public

library expressed interest in FSB scanning; when asked for a list of volumes to be digitized, the library explained that its inventory management was lacking and requested that the hub library take on the work of cataloging and content selection. While the hub library manager agreed in this instance, she learned that some terms that are not feasible even if they fall within the realm of lowering the bar to facilitate spoke digitization participation.

The consensus among hub partners has become that spoke libraries need to have an inventory management system in place as a prerequisite to scanning. This request from hub libraries creates tensions with FSB, which has more to lose than hub libraries do by enforcing such a requirement. Acquiring these materials for digitization, after all, is often contingent on FSB agreeing to help with other information organization tasks.

How, then, should the labor for these extra steps be distributed? Hub public library partners are staffed with committed, but overtaxed, librarians. The senior missionaries who are responsible for executing scanning workflows generally lack the expertise to undertake cataloging and as short-term volunteers it may be impractical to invest resources into training them. Hub libraries face the challenge of remaining flexible, able to shift resources between projects while keeping them separate within the workflow. When the Arizona State Library shut down for renovation it made the decision to cull its print collection as part of the move to a new location. FS-2 negotiated with the Arizona State Library for FSB to store and scan their genealogy-relevant books. Books were shipped to FSB's West Valley location, which temporarily cut its production on scanning the main FHL collection by a third to accommodate Arizona's tight timeline.

Partner libraries must strike a balance between the availability of resources and the availability of content to scan. Librarian FS-83 points out a chicken-egg dilemma as her library establishes itself as a FSB hub scanning center: you cannot acquire missionaries unless you have content to scan, but it is difficult to secure content without knowing if there is missionary labor available to scan it. FamilySearch is a large and bureaucratic organization; getting separate divisions to move in tandem is often challenging.

Hub site manager FS-21 further points out connections among available labor and scanning speeds, space, and parts of the digitization workflow housed elsewhere:

> We don't have the capacity to go any faster than we're going because we're holding on to everything until it gets online. We could produce more, and we could probably go faster, and I would recruit even more staff, if and/or when we get to the point where we are getting these books online in a week. Because with them, with that capacity then we would be able to box and ship weekly. And so I'd be able to clear out what we're holding just as fast as what we're scanning.

Scanning speed, FS-21 observes pragmatically, is directly related to the efficiency of FSB's software platforms and systems related to transmitting, hosting, and serving digitized output online. These systems, in turn, are managed by FamilySearch staff geographically and organizationally distant from the groups of people working on other pieces of the workflow. The capacities and limitations of these systems then shape a given site's human labor requirements.

The extent to which hub-spoke benefits all parties evenly remains in question. The way that the hub-spoke model structures relationships potentially puts hub partners in an awkward position, caught in the middle between FSB and spoke libraries, even as partner libraries sometimes seem willing to take on extra work to keep FamilySearch scanning within their libraries.

7.6 Viewing digitization relationally: Outsourcing, infrastructure, and library futures

The challenges of scale and scaling present a situation in which institutional values and priorities come up against both labor considerations and the ways that information systems and material properties of books shape digitization. As Chapter 2 and the section above related to FSB demonstrate, individual digitization projects choose to construct economies of scale in different ways and with different implications for both long-term project execution and use of digitized output. In this section, I take these discussions of scale as a point of departure to consider long-term infrastructural implications of large-scale book digitization efforts. How are labor—and benefit—distributed across project participants? How does FSB fit into the emerging infrastructure to produce, manage, and distribute digitized books for the libraries of the future? Who or what is left out?

7.6.1 FamilySearch: Book digitization and/as infrastructure

FSB has evolved from a pilot project to a digitization service provider to an infrastructural actor (vis-à-vis libraries). FSB began as an exploration of a new strategy to add new names to the LDS genealogy database, and to add records to the LDS library catalog. Describing the early days of FSB, staff member FS-3 observes, "It started out as a need that we had, and it evolved into a service that we provide to partner libraries, and people walking in with stuff to digitize. It didn't start out that way clearly."

For the last century, the LDS Church has pursued its genealogical data agenda worldwide through collaborations with a range of organizations. Given that the LDS Church has formally invested in FSB and that differentiates it from these other one-off projects, it is useful to view FSB within the frame of this broader effort. As with FSB, for most of these collaborations the LDS Church provides some combination of labor and technical infrastructure while the partner institution provides access to content and project administrative costs. More than 12,000 volunteer LDS Church members, for example, spent more than eight years extracting names from microfilmed copies of 22 million Ellis Island passenger records to create the Ellis Island Foundation's online database, launched with great fanfare in 2001 (Sachs, 2001). "Typists marshaled in peaceful army," a headline from an official LDS Church news clipping describes a multi-year collaboration among the LDS Church, the National Park Service, and the Federation of Genealogical Societies to create a database of Civil War military service records for approximately 3.5 million soldiers (Lloyd, 1997). The LDS Church provided proprietary software and support, while the National Park Service covered the cost of project administration. The Federation of Genealogical Societies, with considerable support from the LDS Church, organized the volunteer data entry labor (which included both Mormon and non-Mormon volunteers). For its efforts, the LDS Church received a copy of the database.

With respect to book scanning, FamilySearch has used its experience with senior volunteers to construct flexible workflows that can support the trade-offs—the opportunities *and* limitations—inherent in working with seniors. FSB packages and markets the missionaries' efforts as "free scanning" services to public libraries and other content providers; in doing so, FSB is in effect also marketing FamilySearch's institutional stability and history.

However, FSB and FamilySearch are not the same entity. FSB comprises a new and very small fraction of FamilySearch's genealogy data conversion efforts, and one that has for proven challenging to scale. If FamilySearch is in the business of collecting and aggregating names, and names prove easier to extract from imaged records (thanks to crowdsourced indexing) than from books (through OCR), then FamilySearch may at some point choose to stop investing in the project.

7.6.2 Libraries: Outsourcing digitization—and infrastructure?

Given the tentative, exploratory development of FSB, it is perhaps surprising to all parties involved that FamilySearch has come to occupy an infrastructural role in public libraries' efforts to ensure long-term access to digitized genealogy books.

The libraries involved in FSB are more than willing participants; library managers uniformly reported being grateful for the opportunity FSB represents. One public library-based interlocutor remarks that her institution's arrangement with FSB was "almost a no-brainer," because it benefits the library directly and facilitates digitization that otherwise would not be possible. Librarians characterize their libraries' relationship with FamilySearch using warm and positive terms, at times speaking of FamilySearch more like a generous benefactor than as a service provider. Partner librarians express little concern about entering into partnerships with a church and say that their libraries are not concerned about ways in which the LDS Church's end use for the digitized materials may differ from their own institutional investments in the resources. Multiple librarians observe that libraries do not do a litmus test on prospective patrons to assess motivation, skill, or literacy. So why, they ask, would they worry about what the LDS Church wants to do with the records?

FamilySearch is a trusted player in the genealogy world. Several of the FSB library partners have longstanding relationships with FamilySearch that extend beyond FSB; one partner, FS-41, describes having evolved from a business arrangement to a cooperative effort into something that felt more like a true collaboration. For another librarian, FamilySearch is one of a small number of institutions his library trusts for long-term digital asset management when trying to ascertain if an item in his collection has previously been digitized. Beyond looking at FamilySearch, HathiTrust, or the Internet Archive for

persistent URLs, which FS-42 terms "the usual suspects," "we might go to a state archive, which we can fairly guarantee will stay stable. Although there have been a couple, including one pretty local, where that's not the case."

Rather than thinking of outsourcing digitization as a kind of calculated risk, then, some library partners actually see it as a risk *mitigation* strategy. They feel that the real long-term risks to these collections are defunding at home, or entrusting an external institution such as the state to follow through on preservation commitments. One partner librarian, FS-63, relates that "on a personal note, it's very gratifying to have FamilySearch recognize that our collection is important and valuable, because presently we're downsizing and they're minimizing our presence in the library, because I think there's not as much of an understanding of what a gem we have in this building." Lacking trust in her institution to continue to invest in their genealogy collection in the long term, FS-63 says of FSB: "I feel extremely confident in their ability to take care of the records."

With its institutional longevity, expertise, technical infrastructure, and steady labor supply, FamilySearch emerges as a more stable—and enthusiastic— infrastructure actor than Google with GBS. While Google was interested in partnering with prominent research libraries to digitize entire collections, its interest in content was limited to the books' utility as searchable data; Google had no intention to take on long-term digital content stewardship responsibilities, leaving that aspect of the work up to third-party digital preservation repositories such as HathiTrust (York 2010). FamilySearch's aspirations to collect and aggregate all genealogical information are no smaller than Google's in their ambition. But FamilySearch has chosen a different approach to scale, slower and distributed and involving many more actors. It happily partners with a wide range of institutions with similar interests, such as commercial genealogy companies like Ancestry.com, and forges partnerships with governmental and non-governmental memory institutions. Its project reaches across a century rather than decades.

7.6.3 Where do digitized books live? The problem of technical infrastructure

The provision of copies of digitized files is a standard point of negotiation in digitization partnership agreements. The Library of Congress, for example, requires that all third-party digitizers provide it with two copies, one for preservation and one for end-user

access, of every object imaged (Library of Congress 2019). This question of digital object provision, and by extension designation of long-term digital object stewardship, sheds light on the status of each institution's technical infrastructure. It casts doubt on the development and readiness of individual digital library infrastructures, and highlights the emergence of a smaller number of institutions capable of functioning as infrastructure providers.

FSB offers partner libraries and FHCs copies of digitized content, but these institutions often lack the technical infrastructure to take advantage of this offer. Instead, libraries outsource the job of hosting and maintaining permanent access to digital content to FamilySearch. One partner librarian, FS-41, observes that library IT staff are busy keeping workstations up and running and forced to work with cumbersome ILS systems and other technology that supports primary functions of the library. The library's "barebones" IT infrastructure, he says, has no capacity to store or maintain digitized content. In a different public library system a thousand miles away, partner librarian FS-64 details a similar story:

> It's been a little bit of a challenge even to get cloud storage space for things. We're very hierarchical here, and that purview is someone else's department. If they don't think we need it, we can't just go ahead and get it. That's been a little bit of an issue. When the FamilySearch opportunity came, I think how we really ... We all realized what an opportunity it was for us.

Even the well-supported genealogy libraries do not host or manage their own digital content long-term; if URLs are recorded in the catalog to facilitate online access, they are almost always to digital copies hosted by FamilySearch.

This situation is not unique to genealogy libraries or even public libraries; several of the original Google Books partners, all prominent research libraries, have encountered similar challenges. (It is important to note, however, that this was more than a decade ago; much has likely changed in the interim.) In its contracts with initial partners, Google promised to provide partners with a copy of all scanned books. However, several of the original partner libraries found themselves in the position of not having the capacity to store or host these files. In 2004, Oxford University's Bodleian Library included in its

digitization contract the understanding that Google would host and maintain the Bodleian's copies of digitized content while the Bodleian built the necessary technical infrastructure for future stewardship (Carr 2005; Milne 2008). For a company (Google) that was at that point only six years old, this promise assumes a high degree of corporate stability and endurance! On the other hand, the New York Public Library, never planned to offer access to locally-stored copies of its digitized content. Instead, catalog entries for Google-digitized books first included a link to the book on the Google Book Search website; in 2019 these links have been replaced with links to HathiTrust versions.

7.6.4 Planning library futures: Implications for ceding the territory of digitization—and infrastructure

The shifting valences of visibility and value with respect to different groups of workers, types of work, and institutional investment in FSB are similar to what Plantin (2019) observes in the practices of data-cleaning to prepare large datasets for re-use. Data processors' work has been designed to be invisible to consumers of the data but is visible within the data archive itself through detailed documentation. While the information labor of data processors is key to the data being able to travel across use contexts (Downey 2014), the archive's prioritization of presenting "pristine data"—"raw," and unmediated—to users inadvertently hides the labor of the data processors. This undermines the archive's public data accountability as well as an researchers' ability to understand the details of how data is prepared for secondary use.

Using this example, let us return to FSB: FamilySearch's construction of digitization partnerships as "free scanning" services is part of what allows resource-strapped libraries to enthusiastically join the project. This same construction obscures the significant amount of additional professional librarian labor that goes into digitization (particularly at small, rural, or low-resource libraries). In aggregate, the combination of the visibility of FSB's "free scanning" offer and the invisibility of librarian or professional staff digitization labors creates the idea that digitization is not a resource-intensive activity. This message may be heard by institution level decision makers—often unaware of program or service details—to mean that digitization or digital collections management is not worthy of budget allocations or infrastructure investment. Ultimately, erasing information labor

inadvertently supports that neoliberal dream of unmediated access to information via the Web.

This scenario feeds into a broader conversation about the de-professionalization of librarianship and the question of librarian futures. Recall the challenge of helping prospective spoke public libraries catalog their collections to facilitate FSB participation: Neither the spoke nor hub libraries are able to easily expend the resources required for this task. But what about FamilySearch's team of professional catalogers? One FamilySearch cataloger reports a reduction in Utah-based professional cataloging staff, even as cataloging needs continue to grow in the field. Instead, FamilySearch has explored "crowdsourcing" or outsourcing cataloging to experienced missionaries. This strategy remains precariously dependent on short-term and often scarce LDS senior volunteer labor pool and downplays the professional training this task has previously required.

At a certain point and at a certain volume, relying on low-cost outsourced digitization services bolsters the idea that digitization is not a professional service that institutions should pay for—whether it is undertaken by a corporation like Google or as a labor of love by a religious institution. At what point does something that *could* be done for free turn to expectations that it *should* be done for free?

7.6.5 Future-proofing: Considering risk, stewardship, and ownership

Given the infrastructural development described in both of the research projects contained in this dissertation, it is apparent that libraries and users are becoming reliant on privately built—and often fragmented—access infrastructures. As a privatized model of partnership-based digitization expands access to services for smaller institutions and collections, the risks grow. Without the promise of permanent stewardships from organizations like FamilySearch or access to membership-based institutions like HathiTrust, small organizations may enter into partnerships with third-party digitizers without a safety net, completely at the mercy of their partners to maintain access to their digitized collections. LDS Church-owned FHCs take this trust relationship perhaps the furthest, having conferred permanent stewardship of most or all of their print collections *and* digital surrogates to FamilySearch.

With the Google Books Project, the opacity of Google's proprietary digital conversion processes—and the fierceness with which it protected details of both its process and long-term use intentions—contributed to widespread critique of the wisdom of relying a single company for such a massive and important undertaking. Critics expressed a sense of concern for libraries, that by entering into formal agreements with Google they might trade short-term access for longer-term concerns over quality, preservation, and control. Vaidhyanathan (2005) argues that the original "five libraries in Google's project are outsourcing the risk and responsibility" for digitization to a private company. Publishers feared that by digitizing copyrighted works and storing them in a dark archive, Google complied with copyright in the short term but could emerge as a competitor in the long-term.

Digitizers and collecting institutions frequently do not have the same underlying motivations or commitments to digitizing collections. A corporation may have more resources and flexibility to pursue new projects, but that also allows them to jettison projects that do not fit corporate metrics of success. Microsoft was an early entrant into large-scale book and genealogy digitization; in 2008, however, it abruptly changed its priorities and withdrew from large-scale digitization, turning over its content and equipment to another digitization effort (the Internet Archive) which continues to maintain online access to its output (Helft 2008).

Google has become notorious for shutting down its projects or products, leaving users as well as developers and hardware manufacturers in the lurch (Amadeo 2019); sites like https://killedbygoogle.com track discontinued Google services, products, devices, and apps. In 2012, without any formal announcement, Google scaled back and perhaps even sunset the Google Books project, falling short of its universal scanning aspirations (Howard 2012). While it may seem unlikely Google will leave the digitization game entirely or jettison its digitized corpus any time soon, the project's future is unknown.

For its part, FamilySearch's wholesale embrace of the logic of digital replacement can be viewed in its centralized catalog management, its strategy for remodeling FHCs, and even in its willingness to provide long-term management of in-copyright print books through dark storage. This contrasts sharply with the ways that public libraries are navigating the evolving relationship between paper and digital access to books.

FamilySearch's interest in a digital future for genealogy is more ideal than it is practical, however, as copyright, platform issues, and user demographics, make this future unlikely in the short term.

It is easy to speculate the dangers of relying on private investment—monopolies by single providers in an environment hostile to regulation, the long-term viability of corporations or foundations, and the fragility of "public goods" in the context of potentially proprietary infrastructures; this has long been a prominent critique of GBS (Vaidhyanathan 2012). In the absence of a public alternative, however, the digitization landscape is increasingly likely to be fractured and populated by these private entities, and the traditional systems-consolidation step of infrastructure creation may not occur.

This isn't necessarily a bad thing; it may just be indicative of the way that large-scale digitization will continue to proceed, scale and infrastructure for digital access continuing to build fragmentedly across different interest-driven digitization projects. It may be beneficial, however, to think through how this emerging infrastructure may accommodate or exclude different types of memory organizations from participating.

The combination of this fractured landscape and the expanded view of digitization provided through this research—in which skilled and unskilled, professional and voluntary, invisible and invisible, valued and marginalized, mundane and care-full work often exist in a single messy, collaborative setting—underscore the importance of the simultaneous presence of both resources and motivation in digitization projects. Neither is sufficient on its own to sustain a digitization project in the long-term. This is true of both FSB and GBS. It is increasingly important observation given the likely digitization interests of small, under-resourced organizations such as community or DIY archives that rely on non-professional or care-driven work but are not lucky enough to have their interests align with that of a powerful, stable entity such as the LDS Church in the case of genealogy digitization.

Appendix Research participant codes

Code	Role
FS-41	Partner librarian
FS-42	Partner librarian
FS-83	Partner librarian
FS-82	Partner librarian
FS-63	Partner librarian
FS-64	Partner librarian
FS-21	FHC site manager
FS-26	FHC site manager
FS-27	FHC site manager
FS-1	FSB staff
FS-2	FSB staff
FS-3	FSB staff
FS-4	FSB staff
FS-5	FSB staff
FS-6	FHL staff
FS-7	FHL staff
FS-8	FS missionary training
FS-9	FS missionary training
FS-28	FS training
FS-28	FS quality control
FS-25	FS shipping and receiving
FS-22	FTM
FS-23	FTM
FS-44	FTM
FS-45	FTM
FS-46	FTM
FS-47	FTM
FS-48	FTM
FS-49	FTM
FS-61	FTM
FS-62	FTM
FS-65	FTM
FS-66	FTM
FS-68	CSM
FS-69	CSM
FS-30	CSM
FS-31	CSM
FS-32	CSM
FS-33	CSM
FS-34	CSM
FS-35	CSM
FS-29	CSM
FS-36	CSM
FS-37	CSM
FS-38	CSM
FS-39	CSM
FS-40	CSM

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