BIBLE AS INTERFACE

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A Dissertation

Presented to

the Faculty of the University of Denver and
the Iliff School of Theology Joint PhD Program

University of Denver

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In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

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by

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November 2017

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Abstract

The book is undergoing a major technological transition as print wanes in its dominance and the internet and mobile devices transform our reading and writing technologies. With the entangled histories of bible and book, our emerging technological age and its transformation of the materiality of bible forces us to engage bible as something irreducible to a book. The connections between the major technological transition from roll to codex in antiquity and the contemporary move toward the internet and mobile technologies as reading platforms encourage us to consider *bible as an interface that affords high surface area, collaboration, and anarchy*. Building on a growing attention to materiality in the study of religion and iconic books like the bible, I suggest bible as interface here to signal that bible is more than a container of content. Rather, bible as interface is a relationship between a material platform and a user that cannot be reduced to simple consumption of content. Rooted in the material religion approaches of Brent Plate and James Watts and animated by the interface theory of Johanna Drucker extended through a Levinasian optics of proximity, I will explore the many contact points of high surface area, the interruptive processes of collaboration, and the irreducibility to a single original text or single proper use in anarchy through a close look at the materiality of bible from ancient roll to digital API.

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INTRODUCTION: TRANSLATING BOOK

In early summer of 2013, on the heels of a week-long seminar experimenting with new modes and media beyond print for training manuals with a group of bible[1] translators from all over the world with the Nida Institute, I had the privilege of visiting Ravenna, Italy. The coincidence of reading Lev Manovich's *The Language of New Media*, talking about the constitutive role of translation in the life of bible, and encountering the proliferation of books in the mosaics of Ravenna planted the seed for this project.[2] Several years before this, I had already become interested in the role of transforming book technologies on the cultural imagination of bible in antiquity. Yet, Ravenna put this curiosity into pictures in ways I had yet to imagine.

As many have experienced, Ravenna is full of fantastic and vivid early depictions of Christian scenes in mosaic form from the 5th and 6th centuries of the common era. What surprised me as I began my reluctant tour through the ancient tourist sites was the prevalence of books in these early art forms. In fact, there were books everywhere, from the rolls in the hands of the saints around the baptismal font to the famous gospel cabinet in the funerary room. In the context of this discussion about bible as interface and the emergence of codex as a new book technology, there is a depiction of a gospel writer in

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[1] I prefer to use the anarthrous lower case "bible" instead of "the Bible" to signal the vast cultural phenomena of bible beyond a single book and to honor the proliferation that has been a part of bible as interface for its long history.

[2] Lev Manovich, *The Language of New Media* (Cambridge, Mass.: MIT Press, 2002).

the cathedral of San Vitale that highlights the co-presence of roll and codex in the interface repertoire of ancient bible users.[3] This particular set of mosaics is dated to the 6th century and the wall depicts all four gospel writers with their typical animal signs. The mosaic of Matthew depicts him sitting near a writing desk with a codex in his lap and a basket of rolls near the foot of the desk. Even as late as the 6th century, when codex has become the dominant reading and writing interface for most users of the world, high Christian iconography is entirely comfortable depicting the use of both roll and codex in the composition of their sacred writings. Bible may be inextricably bound to book, but these images expanded my conception of both bible and book.

Bible as Interface

Much like the situation depicted in the mosaics of Ravenna, the book is again undergoing a major technological transition as print wanes in its dominance and the internet and mobile devices transform our reading and writing technologies. With the entangled histories of bible and book, our emerging technological age and its transformation of the materiality of bible forces us to engage bible as something

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[3] For our purposes here, the larger category of book denotes a technology that involves the fastening together of discrete pieces of material to gather and set boundaries for a writing or collection of writings, which is primarily governed by the structure of the page. This broad definition of book encompasses roll books, palm leaf books, codices, and Kindle books. A codex is one particular book technology that uniformly folds pieces of material, usually papyrus, parchment, or paper of some sort, and fastens these folded bundles together at one edge to form a spine. See Colin H. Roberts and T. C. Skeat, *The Birth of the Codex* (London: Oxford University Press, 1983), 1, for a discussion of this definition, where they add "usually protected by covers." Because of the codex's predominance as a book technology since as early as the fifth century C.E., in today's parlance, book and codex are used interchangeably.

irreducible to a book.[4] The connections between the major technological transition from roll to codex in antiquity and the contemporary move toward the internet and mobile technologies as reading platforms encourage us to consider *bible as an interface*. Building on a growing attention to materiality in the study of religion and iconic books like the bible, I suggest bible as interface here to signal that bible is more than a container of content. Rather, bible as interface is a relationship between a material platform and a user that cannot be reduced to simple consumption of content. Rooted in the material religion approaches of Brent Plate and James Watts and animated by the interface theory of Johanna Drucker extended through a Levinasian optics of proximity, I intend to demonstrate that bible expresses three characteristic when imagined as interface: the many contact points of *high surface area*, the interruptive *collaboration* enacted by the participation of users in the creation of interface, and the *anarchic* irreducibility of a text to any single original or single proper use. I will later refer to these characteristics as affordances and explain them more fully.

Locating Within the Conversation

Robert Kraft was an early pioneer in these questions about the relationship between our present technological transition from print to internet and the shift from scroll to codex in antiquity. Focused particularly on the notion of canon, Kraft articulated the possible impacts at work in these somewhat analogous transitions, worlds apart in terms of history and culture, saying "For many years now, I have wondered whether the

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[4] Here again, given the broader definition of book I put forth above, bible beyond book suggests something more than simply bible beyond codex, even though codex has come to dominate our cultural imagination of book.

technological change from the scroll format to the large-scale codex influenced, at least in some situations, perceptions about 'the bible,' and especially the extent to which the classical Christian concept of a closed or exclusive 'canon' of scripture depended on that development."[5] As early Christian writers worked to translate their literary craft from roll books to codex form, Kraft used his own experimentation with a barely emerging writing/reading technology, the internet, to explore how technological changes might have impacted a reader or writer's relationship to books and text. In the piece quoted above, we can see the attempts to translate print structures such as footnotes into the internet "page."[6]

Using simple notation such as "—" to separate between a paragraph and the related notes, "===" to separate between notes and the next paragraph, and "\#/" to designate a note, Kraft attempted to translate familiar print structures into the continuous scrolled "page" of the internet. Without discrete page divisions with footers at the bottom of each page, as we would find in a typical book (codex), Kraft invented a similar structure to keep the familiar construct of notes in his text. Though this notation was no longer demanded by the web writing platform chosen by Kraft, much like multiple vertical columns were unnecessary on a codex page, Kraft worked hard to translate

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[5] Robert Kraft, "The Codex and Canon Consciousness," http://ccat.sas.upenn.edu/gopher/other/journals/kraftpub/Christianity/Canon, accessed on April 24, 2017.

[6] Even the fact that we call web objects pages suggests the durable presence of the codex and print on our media sensibilities. Yet, as Walter Ong noted in his *Orality and Literacy: The Technologizing of the Word* (London: Methuen, 1982), 133, there is a secondary orality at work in the "scrolling" we use to navigate these "pages" of the internet. The language we use to talk about emerging technologies provides a strong reminder of the palimpsestuous nature of media translation.

structures familiar to print readers into this new environment of the web page. His performance of the difficulties and possibilities of this new medium provided an object lesson for the theoretical questions he posed about the relationship between book technologies and users of books.[7] It is the both/and of Kraft's approach that is most instructive for me both practically and theoretically.

All new media contain their predecessors, even if not reduced to simple imitation or remediation, so it is no surprise that print features such as pages and footnotes remain even in this web environment used by Kraft.[8] Kraft also explored new terrain in the process of academic publication by producing his writing in a new form without having to eradicate or cease to participate in more traditional print forms of scholarly production. I continue in the line of questioning pioneered by Kraft, still wondering how the evolving material interfaces of bible, the technologies of bible as book, might "[affect our] perceptions about 'texts,' 'books,' 'reading,' and the like…."[9]

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[7] This draft electronic writing eventually gets published in print as chapter 14 in Lee Martin McDonald and James A. Sanders, eds., *The Canon Debate* (Hendrickson Publishers, 2002).

[8] For an exemplary discussion of the complicated and layered relationship between new and old media, see Lev Manovich, "Alan Kay's Universal Media Machine," http://manovich.net/index.php/projects/alan-kay-s-universal-media-machine, accessed on September 23, 2017. Here, Manovich, p. 6-7, challenges the simplistic notion of new media as imitating or remediating it predecessors and focuses on the addition of new affordances.

[9] Robert Kraft, "The Codex and Canon Consciousness," http://ccat.sas.upenn.edu/gopher/other/journals/kraftpub/Christianity/Canon, accessed on April 24, 2017.

Digital Materiality

Following in the footsteps of Kraft, I was hoping to both describe and perform the thesis that throughout its rich media history, bible has been an interface that provokes probabilistic production through the affordances of high surface area, anarchy, and collaboration. Yet, due to the confines of the dissertation genre, I will limit my explorations to the telling of this thesis and the description of interfaces rather than the construction of interfaces that experimentally embody these material affordances in emerging media environments.[10] Beyond simply articulating a sustained argument in support of the thesis of bible as interface and handling several artifacts to demonstrate the operation of these affordances in the life of bible from antiquity to the present, this project will do some additional work through three specific aims.[11]

First, a sustained attention to the details of several bible artifacts, physical and digital, will highlight the materiality of bible and the participation of users in this materiality. I have introduced a few terms here that deserve further reflection, "materiality," and "digital." By materiality or material, I am signaling a focus on the moving parts and structures that make up the spaces of interaction among bibles and users, such as the size of a viewing area for a given bible manuscript or a bible on screen.

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[10] Early experiments in the construction of interfaces as a part of this project can be found at http://textpotential.github.io/aproximatebible. Though largely hidden to the reader, I am still taking Kraft's lead in small ways by composing my dissertation in a syntax developed for web writing called markdown (https://daringfireball.net/projects/markdown/syntax, accessed on June 10, 2017) and then converting markdown to Word document formatting using a command line document converter called pandoc (http://pandoc.org/, accessed on June 10, 2017).

[11] Thanks to Benjamin Peters for demonstrating this helpful structure of combining a single thesis with multiple aims.

I do not intend the term "material" to limit our discourse to the raw materials that make up a given interface, such as papyrus, parchment, silicon, and electricity, though these items do play a role. Instead, a focus on the materiality of bible here intends to highlight the characteristics and attributes of bible that are not reducible to the texts of and about bible or the predominant textual analysis typical of most biblical scholarship.[12] The texts of bible and their possibilities of meaning are not irrelevant to this study, but they are not center stage.

The materiality at work in this project fits best the first aspect of Brent Plate's expansive definition of material religion, "bodies meet objects," with a distinct focus on the properties and structures of bible as object that shapes the possibilities for user participation in interface with these objects.[13] Groups such as the Society for Comparative Research on Iconic and Performative Texts (SCRIPT) and the Institute for Signifying Scriptures paved the way in considering new methodologies in the materiality of the books that many religions call sacred, but little was done in those conversations to push this material analysis into the emerging materialities of computing and the

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[12] My approach to materiality as a challenge to the dominant textualism of both biblical scholarship and the study of religion has been formed by S. Brent Plate's development of methodologies in material religion in works such as "The Skin of Religion : Aesthetic Mediations of the Sacred," *Cross Currents* 62, no. 2 (June 2012): 162–80 and *A History of Religion in 5 1/2 Objects: Bringing the Spiritual to Its Senses* (Boston: Beacon Press, 2014) as well as Manuel Vasquez's explorations of the limits of textualism in *More Than Belief: A Materialist Theory of Religion* (Oxford: Oxford University Press, 2011).

[13] S. Brent Plate, ed., *Key Terms in Material Religion* (Bloomsbury Publishing, 2015), iv.

internet.[14] This study extends the discourse on the materiality of religious books, particularly the bible, into the emerging material landscapes of the digital.

With this approach to materiality, dethroning text as the primary focus of analysis and foregrounding the objects that constitute bible, it is easy then to see how we might develop a more thoughtful exploration of the materiality of the digital as Johanna Drucker has called for in her work on interface theory for the humanities.[15] The term digital has come to represent a massive discourse that begins with the basic distinction between continuous (analog) and discrete (binary) phenomenon, particularly in reference to the binary machine language that is the basis for most forms of computing today. Yet, regardless of any meaningful distinction between continuous and discrete, digital has come to represent all things related to computing, the internet, and in a sense, anything that has a screen as its primary interface.[16] With this broad concept of the digital in mind, when I speak of the materiality of the digital, I mean the attributes and structures of platforms, devices, programs, and other objects that shape the spaces of user activity in the world of computing. Careful attention to these digital materialities are as important for a critical study of bible as are the material structures of an ancient roll or a codex manuscript.

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[14] See http://script-site.net/ and http://iconicbooks.blogspot.com/, accessed on June 11, 2017 for more information on SCRIPT. The Institute for Signifying Scriptures can be found at http://www.signifyingscriptures.org/, accessed on June 11, 2017.

[15] Johanna Drucker, "Performative Materiality and Theoretical Approaches to Interface," *Digital Humanities Quarterly* 7, no. 1 (2013).

[16] See Gregory Grieve, "Digital" in, *Key Terms in Material Religion*, ed. S. Brent Plate (Bloomsbury Publishing, 2015), 58-60, for an example of the digital being more about computing than any sense of discreteness that would be perceivable by users.

Grounding Emerging Anxieties

A second aim of this study is to offer an alternative to the pervasive anxieties surrounding emerging technologies such as internet reading and bibles on screens. Jeffrey Siker's recent book *Liquid Scriptures* brings to bible in particular a growing anxiety about books on screens and a nostalgia for well ingrained modes of reading and knowing fostered by the likes of Nicholas Carr and Sherry Turkle.[17] Emerging technologies have often engendered anxiety around the possible negative impacts on users of new possibilities in technological interface. Sherry Turkle has become a prominent public voice in discussions of technology and its social effect, as evidenced in the impressive attention captured by her recent book, *Reclaiming Conversation: The Power of Talk in a Digital Age*.[18] I first encountered Turkle's work while engaging a Richard Cohen article, "Ethics and Cybernetics: Levinasian Reflections," in my struggle with face to face language in online education.[19] Using her work from 1995, *Life on the Screen*,[20] Cohen offers Turkle as an example of media scholars who champion the advantages of

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[17] Jeffrey S. Siker, *Liquid Scripture: The Bible in a Digital World* (Fortress Press, 2017). Nicholas Carr, *The Shallows: What the Internet Is Doing to Our Brains* (New York: W. W. Norton & Co. Inc., 2010). Sherry Turkle, *Reclaiming Conversation: The Power of Talk in a Digital Age* (New York, New York: Penguin Books, 2015).

[18] Sherry Turkle, *Reclaiming Conversation: The Power of Talk in a Digital Age* (New York: Penguin Books, 2015). For some samples of the attention this book has garnered, see https://storify.com/textpotential/turkle-face-to-face.

[19] Richard A Cohen, "Ethics and Cybernetics: Levinasian Reflections," *Ethics and Information Technology* 2, no. 1 (June 1, 2000): 27–35.

[20] Sherry Turkle, *Life on the Screen: Identity in the Age of the Internet* (New York: Simon & Schuster Paperbacks, 2014).

cybernetics and internet communication technologies for redefining subjectivities in the direction of post-modern notions of multiplicity and instability.[21]

Turkle's more recent work has shifted focus from this earlier celebration of the fragmented self to a serious anxiety about the effects of robotics and mobile devices on our social capacities as humans.[22] Two minutes into a 2015 NPR interview titled "Making the Case For Face to Face in an Era of Digital Conversation,"[23] Turkle suggests that "face to face conversation is the most human and humanizing thing that we do, it's where we learn to put ourselves in the place of the other." For many, this phrase, "face to face," as Turkle uses it has come to represent "real" human interaction as opposed to a what many see as a weak simulation or even cheap imitation that happens through internet media.[24] Stated another way, Turkle warns of the detrimental effects on personal relationship and intimacy brought about by the ever-expanding access to information and connection provided by mobile devices and internet technologies. She prioritizes a

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[21] Cohen, "Ethics and Cybernetics," 27 n. 2. The notions of multiplicity and instability in the subject in this early work of Turkle has some resonance with the high surface area and anarchy I offer as affordances of bible.

[22] Sherry Turkle, *Alone Together: Why We Expect More from Technology and Less from Each Other* (Cambridge, Mass.: Perseus Books, 2013) and *Reclaiming Conversation*.

[23] NPR, "Making the Case for Face to Face in an Era of Digital Conversation," September 16, 2015, http://www.npr.org/2015/09/26/443480452/making-the-case-for-face-to-face-in-an-era-of-digital-conversation, accessed on October 11, 2017.

[24] In a few of her writings about the concern for the face to face, Turkle explicitly uses Emmanuel Levinas's philosophy to add weight to the issue at hand. Yet, Turkle reduces the "face to face" to a physical and spatial nearness in her work that does not resonate well with the face being precisely that which is unseen in Levinas. See Emmanuel Levinas, *Ethics and Infinity*, trans. Richard A. Cohen (Pittsburgh: Duquesne University Press, 1985), 85-86.

physical closeness in space between two humans (her notion of "face to face") as the most meaningful possible interaction. Interfaces involving machines or technologies are reduced to simply distractions.

Turning more specifically to book interfaces and users, Nicholas Carr has been a consistent voice of concern over the increasing nearness of internet reading interfaces. In his more current work, *The Glass Cage* and *Utopia is Creepy*, Carr continues to provide a useful voice challenging assumptions that the growing ubiquity of internet and computer technologies have a necessarily positive impact on human lives.[25] Here, Carr speaks directly to the tempting technological exuberance Drucker warns us of. The book that put Carr on the map, though, was a book specifically about reading and the internet titled *The Shallows: What the Internet is Doing to Our Brains*.[26] In this book, Carr's argument is basically that the distractive hyperlinking affordances of internet reading interfaces is rewiring the human brain to think more shallowly. Carr's attention to the neuroplasticity of the human brain even in adults and the impact of interface use on the shaping of brain pathways provides an excellent example of the material entanglement that operates in interface. Human brains designed internet reading platforms and these interfaces are now participating in the design of the human brain. Yet, rather than simply pointing to the differences emerging in neural pathways that seem connected to reading on the internet,

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[25] Nicholas Carr, *The Glass Cage - Automation and Us* (New York: WW NORTON & CO, 2015) and *Utopia is Creepy: And Other Provocations* (New York: W W NORTON & CO, 2017).

[26] Nicholas Carr, *The Shallows: What the Internet Is Doing to Our Brains* (New York: W. W. Norton & Co. Inc., 2010).

Carr laments the waning of the codex interface and identifies these new dispositions and brain wirings as "shallow."[27]

Carr actually begins his entire analysis with a look back to Marshall McLuhan's most famous book, *Understanding Media*, and his most well know aphorism, "the medium is the message."[28] Although he clearly respects the prescience and value of McLuhan's work, even using McLuhan's own language as the subtitle for his prologue, Carr immediately betrays an underlying fear of change and nostalgic anxiety as he emphasizes McLuhan's polemic against the neutralists without any attention given to McLuhan's celebration of art and social reorganization in the retribalization made possible by the collapse of time and space brought on by electric technology.[29] While Carr gives no attention to this part of McLuhan's discussion of electric technology, I can't help but hear echoes of McLuhan's global village when I read Clay Shirky's assessment of the internet age in *Cognitive Surplus*, which offers a stark and compelling

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[27] Carr, *The Shallows*, Kindle Locations 1984-1986, writes, "when we go online, we enter an environment that promotes cursory reading, hurried and distracted thinking, and superficial learning. It's possible to think deeply while surfing the Net, just as it's possible to think shallowly while reading a book, but that's not the type of thinking the technology encourages and rewards." I had the privilege of working with a poet colleague at Case Western Reserve University, Sarah Gridly, who consistently and generatively pushed our digital humanities efforts to find ways to encourage a disposition toward attention to ambuiguity. Gridly is calling us to participate in interfaces that are irreducible to consumption through high surface area, collaboration, and anarchy, all of which feed the ambiguity of which she speaks.

[28] Marshall McLuhan, *Understanding Media: The Extensions of Man*, (New York: McGraw-Hill, 1964), 7.

[29] McLuhan's idea of the "global village," made popular in his earlier book, *The Gutenberg Galaxy* (Toronto: University of Toronto Press, 1962) encapsulates the retribalization process I mention here.

counterpoint to Carr's pessimism.[30] Carr leverages McLuhan's clever and incisive claims

about the power of technology in shaping human culture, but all the while operates with a

sense that the dangers of digital technology are inevitably fatal. Though McLuhan is

exceedingly clear on the risks of technological change and advancement, the tone of

Understanding Media strikes me as loaded with potential and possibility, whereas even

Carr's title spells doom. For Carr, the growing ubiquity of internet reading fosters

multiple foci, shorter durations, and a lack of depth that have a decidedly negative impact

on human learning and knowledge.[31]

    While Turkle and Carr are unequivocally negative, cautious, and pessimistic

about the possibilities for meaningful relationship, knowledge, and learning in the

emerging technological landscape, Jeffrey Siker's recent book, *Liquid Scripture: The

Bible in a Digital World*, suggests "a mixed blessing" when he asks similar questions

about the impact of the rise of the digital on the use of the bible.[32] Siker looks at the role

of digital bibles (i.e. bibles accessed on screens) in both religious practice and the

academic study of the bible. Though Siker points out the possible advantages for access

to research tools and some long form engagement in interpretive tasks through blogs and

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[30] Clay Shirky, *Cognitive Surplus: Creativity and Generosity in a Connected Age* (New York: Penguin Press, 2010).

[31] Carr, *The Shallows*, Kindle locations 2812-2814, writes, "What that ancient Roman craftsman wove together when he created the first codex is unstitched. The quiet that was 'part of the meaning' of the codex is sacrificed as well. Surrounding every page or snippet of text on Google Book Search is a welter of links, tools, tabs, and ads, each eagerly angling for a share of the reader's fragmented attention."

[32] Siker, *Liquid Scripture*, 36, writes, "I will also be arguing that this transition in technology is a mixed blessing when it comes to how we read and understand the Bible."

YouTube, the majority of his analysis of digital bibles seems to take on a tone of caution and loss. Using language similar to Carr's "shallows," Siker characterizes bibles on screens as better fit for surface reading and skimming than for "deep" reading and he laments the loss of covers as a threat to the bible's authority as well as the loss of shape, the loss of tangibility, and the the loss of stability of the biblical text.[33]

An additional signal of the governing anxiety and caution of Siker's book can be found in the title itself, *Liquid Scripture*. For Siker, the liquidity of scripture in a digital age is decisively negative. Digital technologies both "water down" the boundaries of the biblical text and make this text less stable through the proliferation of translations.[34] This same capacity for proliferation, yet in a different register, I will argue as a strength for bible as it emerges beyond the lost covers Siker laments. Siker's anxiety around the loss of stability and authority of the bible in a "liquid" digital environment continues to propagate the more generalized fears undergirding both Turkle and Carr's work. With Siker, I am exploring the significant changes in use of bible as it moves into a different technological era. Yet, my approach aligns much closer to that of Timothy Beal, who highlighted these changes in the mediation of bible nearly a decade earlier in his book *The Rise and Fall of the Bible*. Beal writes, "The icon of the Bible, The Book of books, is in the process of deconstruction. And that, I believe, is a good thing. It's the end of the

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[33] Siker, *Liquid Scripture*, 37-51. Siker's summary of his arguments in his introduction do not reflect much mixed or much of a blessing in the many expressions of bible in an increasingly digital landscape. With his clear commitments to the stability and authority of the biblical text, I wonder if a more apt subtitle for Siker's book might be, "The digital in a biblical world," instead of "The Bible in a Digital World?"

[34] Siker, *Liquid Scripture*, 38.

Word as we know it, and *I feel fine*."[35] Like Siker, Beal points toward the impacts of the "twilight of print" on the cultural uses and imaginations of bible.[36] Unlike Siker, Beal finds a resurgence of the antique liquidity at work in bible through polyvocality[37] and proliferation.[38] With Beal, as the bible emerges into a digital world, I feel just fine.

Most certainly, we need to attend to the social effects of any emerging technology, both positive and negative, and I applaud Siker, Carr and Turkle for challenging our culture's tendency to uncritically embrace emerging technologies. Yet, rather than simply lamenting the loss of a particular way of relating to books and bible, looking for enduring affordances that connect older familiar technologies to emerging platforms can help build capacities in users to participate in new interfaces in meaningful ways even as they may helpfully challenge the value of more traditional uses. I will use three related approaches to help offer an alternative perspective to the common resistance to so called "new" technologies.

<div align="center">Emergence</div>

First, whenever possible, I will refer to *emerging* technologies instead of *new* technologies or *new* media.[39] The language of new and old sets up a potentially

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[35] Timothy Beal, *The Rise and Fall of the Bible : The Unexpected History of an Accidental Book* (Boston: Houghton Mifflin Harcourt, 2011), Kindle location 296. Emphasis mine.

[36] Beal, *The Rise and Fall of the Bible*, Kindle location 1997.

[37] Beal, *The Rise and Fall of the Bible*, Kindle location 2334.

[38] Beal, *The Rise and Fall of the Bible*, Kindle location 1756.

[39] Media and new media are vastly expansive terms that can encompass things such as technologies, art, books, and even bodies. Understanding that it is a drastic reduction, I

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dichotomous relationship between technologies that can lend itself to overly simplistic hierarchical evaluations. Focusing on the ongoing *emergence*[40] of technologies signals both that each iteration of a technology is somehow connected to what came before it and that this process of technological evolution is never finished.

<center>Material Media Translation</center>

Second, to support this focus on emergence, I propose a palimpsestuous notion of "material media translation" to describe the relationship between technologies as they emerge over time. In *Understanding Media*, Marshall McLuhan points us toward the cracks in the reign of print, that illustrious descendant of the codex, in the face of an emerging electronic age. McLuhan reminds us that technologies (media) are extensions of ourselves and that the message of every medium is its effect on our social relations.[41]

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will use media and technology interchangably in this study. For excellent examples of considering the connection of emerging technologies to the technologies that gave rise to them, see Lev Manovich, *The Language of New Media* (Cambridge, Mass.: MIT Press, 2002) and Marshall McLuhan, *Understanding Media: The Extensions of Man* (New York: McGraw-Hill, 1964).

[40] The shift from talking about "new" technologies or media to "emerging" already signals my value on anarchic methodologies or sensibilities. Articulating a "new" technology suggests a kind of origin at that moment, backgrounding the embeddedness of this new thing in what preceded it. Emerging technologies have no stark origin, but are built from and always entangled with preceding technologies.

[41] McLuhan, *Understanding Media*, 7-8, writes, "In a culture like ours, long accustomed to splitting and dividing all things as a means of control, it is sometimes a bit of a shock to be reminded that, in operational and practical fact, the medium is the message. This is merely to say that the personal and social consequences of any medium-that is, of any extension of ourselves-result from the new scale that is introduced into our affairs by each extension of ourselves, or by any new technology." McLuhan has many critics and I am aware of the possibility for a technological or media determinism in ideas such as "the medium is the message." For a semiotic critique of McLuhan's notion of medium, see "Cogito Interruptus" in Umberto Eco, *Travels in Hyper Reality: Essays*, trans. William Weaver (San Diego: Harcourt Brace Jovanovich, 1986). For an explicit critique

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Instead of focusing on the content delivered and consumed by any new technology, McLuhan emphasizes the impact of technologies on human relationship with the world and one another through a "change of scale." He writes,

> What we are considering here, however, are the psychic and social consequences of the designs or patterns as they amplify or accelerate existing processes. For the "message" of any medium or technology is the change of scale or pace or pattern that it introduces into human affairs[42]

Here, McLuhan challenges our binary tendencies between new and old and suggests that emerging technologies build upon existing technologies and bring a change in speed, size, or pattern, etc., which connects existing technologies with those that are emerging. For example, it is precisely this change in existing processes we find in the amplification of non-linear access from the emergence of the codex to the ubiquity of internet search. Just as the codex performed the multiple columns per page of a scroll, so internet search performs and amplifies the print index. I refer to this phenomenon of technologies building upon and containing its predecessors as *material media translation*. The language of translation is helpful here because it signals that all media transformations involve a negotiation between new and old with inevitable loss and gain. I use the phrase "material media" to qualify this translation to differentiate this process from the common process of "media" translation of texts into other forms of media such as sound and film.

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of the tendency toward technological determinism in McLuhan, see "The Technology and the Society" in Raymond Williams, *Television: Technology and Cultural Form* (New York: Routledge, 2003), 1-25.

[42] McLuhan, *Understanding Media*, 8.

In material media translation, it is the materiality of the technological interface that is

translated, not simply its "content," whatever that might entail.[43]

<p style="text-align:center">Affordances</p>

Third, to highlight the palimpsestuous nature of material media translation of

bible from various book technologies to platforms that push beyond book, I will focus on

a particular technology's affordances. Affordances as a concept were first introduced in

1977 by James J. Gibson, a perceptual psychologist, to describe the possible interactions

with an agent made possible by a particular environment.[44] An important aspect of

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[43] In our book technology tradition itself, we have a material metaphor for this process of material media translation, the palimpsest. A palimpsest is a manuscript that has been written on, erased, and then written on again. In normal use, a palimpsest may seem like a new manuscript, showing few or no hints of its previous life and use. Yet, upon closer examination, the erasure of the previous writing is never complete and continues to shape the space of the manuscript, even if unnoticed by the typical user. *Codex Ephraemi Rescriptus*, a fifth century manuscript of biblical texts in Greek, washed and written over in the 12th century with Greek translations of the fourth century Syriac writings of Ephrem the Syrian is one famous example of a material biblical palimpsest. To see a digital image of a page of this manuscript, visit BnF Gallica, "Codex Ephraemi Syri rescriptus 1v view 15," http://gallica.bnf.fr/ark:/12148/btv1b8470433r/f15.item, accessed September 25, 2017. This material enactment of palimpsest, two column miniscule Greek translations of Syriac over single column uncial Greek biblical texts, illustrates the process of emerging technology building upon existing structures to make something new without completely erasing what preceded it. The instructive part of palimpsest for material media translation is that no technology begins on a blank page and even if a new technology may seem to stand on its own, the echoes of its predecessors always lurk. In our analysis of emerging technologies related to bible, each "new" technology writes over an existing technology (or many technologies) with only partial erasure. Thus, material media translation enacts a kind of palimpsest. For example, though the codex erases the linear scrolling access of the roll, it retains the multiple vertical columnar structure even though not demanded by the structure of the codex page.

[44] James J. Gibson, "The Theory of Affordances," in *Perceiving, Acting and Knowing: Toward an Ecological Psychology*, ed. Robert Shaw and John D Bransford (Hillsdale, N.J.: Lawrence Erlbaum ass., 1977) and later expanded in James J. Gibson, *The Ecological Approach to Visual Perception* (New York, N.Y.: Psychology Press, 2015).

Gibson's invention of affordances is their relational nature. An affordance is a possible relationship between the physical properties of a "surface" and an organism encountering that surface.[45] Take for example, a reader using a codex as a surface or environment, as Gibson calls it. The physical properties of a codex include flexible pages bound together on one long side with a cover on the front and back. These pages have writing on them. On one level, this codex *affords* reading for the reader. More specifically, the codex affords non-linear access to text for a reader because of the physical properties of binding on one side and flexible pages instead of being rolled up in one long sheet from one end to the other as in a roll.

Donald Norman brought Gibson's notion of affordances into the world of human-computer interface design and focused the concept on those actions "perceived" as possible or likely by a user of an interface by combining the operations of affordances, signifiers, and constraints.[46] Rather than exploring any action made possible by the relationship between the physical properties of an environment and the capacities of a user, Norman focused more on the possible uses that would make sense to a user when

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[45] Gibson, *The Ecological Approach to Visual Perception*, 125, writes, "The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill. The verb to afford is found in the dictionary, but the noun affordance is not. I have made it up. I mean by it something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment." A critical piece of Gibson's theory is the relational nature of affordances and the way affordances problematize any binary between subject and object. An affordance is not simply a property of an object or of a subject, it is a possible relationship of encounter between participants in the encounter. We will see that this notion of affordance has affinity with the operations of interface.

[46] Donald A Norman, *The Design of Everyday Things* (New York: Basic Books, 2013), 145.

encountering an interface.[47] Norman is focused on intuitive and useful interface design, with primarily the designer in mind and wanting to facilitate affordances that are readily apparent to a user. One of the reasons I will stay closer to the more generic notion of affordances offered by Gibson as we discuss bible as interface is to distance our discussion from the singular intent of the "appropriate" or "proper" use of a technology as determined by the designer.[48] The concept of affordances will allow us to discuss the possible relationships between bible and user across several different technological environments.[49] Focusing my analysis of bible interfaces on affordances and their explicit entanglement of user and platform will guard against any reductionist tendency toward technological determinism.

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[47] In the first chapter of the revised and expanded edition of *The Design of Everyday Things*, 12, Norman tells the story of his relationship with Gibson and their fundamental disagreements about the interpretive role of the brain in the relationship between agents and objects. Norman is clear about his indebtedness to Gibson and the important contribution Gibson made to helping designers pay more attention to the information offered by the physical world.

[48] In Norman's definition of signifier, *The Design of Everyday Things*, 14, we can see this emphasis on the proper at work. He says, "For me, the term *signifier* refers to any mark or sound, any perceivable indicator that communicates appropriate behavior to a user." This signifier as indicator of "appropriate behavior" is different than an affordance, which is a possible relationship between a surface and an agent, a platform and a user. Norman does allow for accidental or unintentional signifiers, yet, his emphasis on understandability as connected to the communication of "appropriate behavior" could lead toward design governed by determining mechanistic consumption rather than provoking probabilistic production.

[49] My approach of tracing the affordances across many bible interfaces throughout history is informed by N. Katherine Hayles's "Media Specific Analysis" methodology demonstrated in "Print Is Flat, Code Is Deep: The Importance of Media-Specific Analysis," *Poetics Today* 25, no. 1 (March 20, 2004): 67–90.

Suggesting New Capacities

A third aim operative in this exploration of bible as interface is to demonstrate new capacities and new literacies demanded of biblical scholars to critically study bible as our technological landscape shifts. Here I am inspired by the work of John Miles Foley's Pathways Project,[50] the Academic Book of the Future Project,[51] and the ongoing work of the Experimental Humanities @ Iliff working group.[52] As bible interfaces proliferate in a technological landscape that prioritizes the production of more interfaces though APIs and other programming frameworks, my close handling of emerging bible interfaces beyond the book points toward new languages, new tools, and new mechanisms of close reading that will need to become a part of training biblical scholars of tomorrow. Learning basic skills in emerging technologies such as Python, XML, JavaScript, and APIs will give scholars powerful tools to further analyze and ask new questions of the antique data set with which they have worked for centuries. Without these literacies, the careful critical edge of biblical scholarship will decline as bible exceeds the boundaries of book as we know it. In this study, I only begin to signal the kinds of capacities we will need to continue to explore the rich life of bible and its use. More than articulating a specific set of tools necessary for an emerging generation of

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[50] John Miles Foley, "Pathways Project," http://www.pathwaysproject.org/, accessed on June 12, 2017 and John Miles Foley, *Oral Tradition and the Internet: Pathways of the Mind* (Urbana: University of Illinois Press, 2012).

[51] "Academic Book of the Future," https://academicbookfuture.org/, accessed on June 12, 2017 and Rebecca E. Lyons and Samantha J. Rayner, eds., *The Academic Book of the Future* (London: Palgrave Macmillan, 2016).

[52] "ExperimentalHumanities@Iliff," http://library.iliff.edu/humanities/, accessed on June 12, 2017.

biblical scholars, I hope to practice a process of inquiry that can be expanded and adapted as quickly as the technologies with which we work.

Defining Bible

One last definition is in order before I provide a basic roadmap for where we are headed in the rest of the project and that definition is of bible. At its basic etymological and translational roots, bible means book. When referring to sacred writings, the neuter plural of βιβλιον was most often used, τα βιβλια, which slowly transitioned to a feminine singular in Latin, which is where we get the singular "bible" referring to the collection of Christian sacred writings.[53] From its roots, bible is a material artifact even at the linguistic level, being related to the papyrus material from which roll books were made in antiquity. Before we ever get bible as collection of sacred writings or as generic authoritative work, we have bible as book technology.

Though etymology does not determine the meaning of words, this historical entanglement of form and content in the construction of the word "bible" already anticipates the work we are doing here regarding bible as more than the content it might contain.[54] With a nod to this technological etymology, when I use the term bible in this

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[53] LSJ, s.v. "βιβλιον" and Michael D. Coogan, *The Oxford Encyclopedia of the Books of the Bible* (Oxford: Oxford University Press, 2011), 75.

[54] See Colin H. Roberts and T. C. Skeat, *The Birth of the Codex* (London: Oxford University Press, 1983) for more details on the role of bible in the rise of the codex, Harry Y. Gamble, *Books and Readers in the Early Church: A History of Early Christian Texts* (New Haven: Yale University Press, 1997) for the role of the codex in the emergence of Christian reading practices, and Timothy Beal, *The Rise and Fall of the Bible : The Unexpected History of an Accidental Book* (Boston: Houghton Mifflin Harcourt, 2011) for the role of emerging media transitions in our cultural imagination of bible.

project, I am referring to the technologies that afford the use of Judeo-Christian sacred writings. I refer to "use" of sacred writings to signal that there are many uses of bible beyond simply reading, but my analysis here will be primarily focused on readerly type uses, even if some of the emerging bible interfaces we consider might challenge our conceptions and boundaries of reading. Though the important distinctions between conceptions and use of bible in the different Judaisms and Christianities that emerge from antiquity are absolutely worth considering, I will save that work for future explorations and will make no claims about the content boundaries of these sacred collections.

Making a Path

Though some terms remain to be more fully explicated in the coming portions of the study, such as interface, we have enough of a background now to articulate the plan for what follows. I will begin with a look at interface as a way of interrupting the reduction of bible to the content it contains and direct our attention to interface as a relationship of user and platform that cannot be reduced to consumption through the affordances of high surface area, collaboration, and anarchy. Having a working notion of bible as interface, I will lay out and develop the entangled affordances of high surface area, collaboration, and anarchy through three examples of bible as book interface, namely, roll bible, codex bible, and Kindle bible. Then, through a close look at these affordances in a web interface built around the digitization of one famous codex bible, Codex Sinaiticus, I will examine the beginnings of imagining bible beyond book. Finally, I will demonstrate the affordances of high surface area, collaboration, and anarchy in two bible interfaces that have moved decidedly beyond the covers and even the pages of bible

as book. All along the way, we will see the material media translation at work in these emerging interfaces, which will foreground the materiality of each of the interfaces and the capacities necessary to critically engage them.

CHAPTER 1: INTERFACE

In this study I am not focused on the questions of exegesis and interpretation that typically inform the study of the bible, and of religion more generally. Rather, my focus is on the material practices that constitute the rich history of bible. Looking at bible in terms of interfaces and users instead of simply books and readers offers us four primary advantages. First, thinking of bible as interface rather than book can unsettle the unquestioned binding of bible and codex, which coincides with the dominant cultural reduction of book to codex. By looking back at the bible roll as an interface and forward to kindle reader as an interface for bible, we can imagine better what constitutes bible for users beyond our current limited conception of book. Second, a focus on bible as interface highlights the material affordances operative in different user relationships with bible that extend beyond typical modes of reading, such as annotation and illumination in margins, organizational schemes, and use of bible as artifact. Third, exploring bible as interface can challenge us to conceptualize bible through its use rather than reducing definitions of bible to the content it contains. Fourth, tracing moments in the history of bible as interface allows us to see the continuities and discontinuities involved in media transitions/translations brought on by emerging technologies. Bible has always been interface and one of the key things to remember as we explore the many interfaces of bible throughout history is that these interfaces all borrow from each other and technological transitions are never total transformations.

Why Interface?

As I mentioned in my introduction, one of the aims of this project is to focus our attention on the materiality of bible. This bent toward materiality stems from two main convictions that I bring to this work. First, I begin with the assumption that the material characteristics of the technologies we use shape our relationship with texts and with one another. Second, I affirm that the digital is decidedly material. A shift to talking about bible as interface foregrounds a user's interaction with the particular material technologies of bible and connects the pre-digital materialities of bible, such as roll and codex, to a participatory construct and language that is ubiquitous in digital environments today.

Brent Plate has helped promote the importance of materiality in the study and practice of religion. More specifically, Plate calls those who study religion to attend to the role of the senses in religion.[55] In his work with religion and the senses in *A History of religion in 5 1/2 objects*, Plate foregrounds the role and importance of material objects such as stones, drums, and bread by suggesting that "Religious people are not *believers* so much as *technologists*."[56] Rather than articulating a notion of religion absent of belief,

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[55] At several points in his book, *A History of Religion in 5 1/2 Objects*, Plate cleverly articulates his aim with the turn of phrase, "bringing the spiritual to its senses." See p. 19-22 for some examples.

[56] Plate, *5 1/2 Objects*, 22. In a personal conversation with Jeffrey Mahan, he mentioned that in teaching Plate's methodologies, some students assume Plate is articulating a notion of religion that is absent of God or belief. I can see how this quote could be taken in such a binary or exclusionary fashion, even if not necessarily Plate's intention. For our purposes here, I will use language of religion as technology, which is *irreducible* to belief, in order to dethrone the role of belief in the study and practice of religion without a need to eradicate it as a part of religious phenomena.

Plate is simply suggesting that the *craft* of practicing religion entangled with material objects–what Plate calls "know-how" derived from the ancient Greek word *techne*–carries at least as much weight as what a religious person "knows/believes" about what they are practicing.[57] Plate hints toward the role of interface and users in religion when he defines technology as "human connections to and uses of natural and human-made materials… ."[58] Though Plate is using an ancient and broad definition of technology to highlight the importance of material objects and their use without pointing toward specific examples of interfaces that we might call technological today, he is setting the stage within the material religion discourse for a more particular technological analysis of bible. Just as Plate argues for religion as technology irreducible to belief, I am arguing for bible as interface irreducible to text.[59]

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[57] Plate, *5 1/2 Objects*, 22.

[58] Plate, *5 1/2 Objects*, 22. As Hutchings notes in "Augmented Graves and Virtual Bibles," in *Materiality and the Study of Religion: The Stuff of the Sacred*, ed. Tim Hutchings and Joanne McKenzie (Taylor & Francis, 2016), 88, Plate's approach is closely connected to the physicality of the human senses and often doesn't explicitly deal with the materialities of the digital. With Hutchings, I am taking a more technical (pun intended) approach to technology than Plate by focusing on what we more readily imagine as technological platforms for accessing Judeo-Christian sacred texts through books, websites, mobile devices, and APIs. Yet, Plate signals his attention to the religious ramifications of the extended materialities of emerging technologies in his treatment of media in the skinscape of religion and his articulation of the soul as technology. In *5 1/2 Objects*, 23, Plate writes, "Religion in a high-tech, media-saturated, global-economic age is as reliant on objects as it is in smaller scale societies." For more on skinscape and the skin of religion, see Plate, "The Skin of Religion: Aesthetic Mediations of the Sacred," *Cross Currents* 62, no. 2 (June 2012): 162–80. For more on soul as technology, see Plate, *5 1/2 Objects*, 184-192.

[59] Both belief and text are complicated and rich categories that are not always reducible to content. For example, see David Morgan's treatment of belief in "The Matter of Belief" in *Religion and Material Culture: The Matter of Belief*, David Morgan, ed. (London; New York: Routledge, 2010), 1-18. In this study, conceptualizing the text of

Bible as Irreducible to Text

James Watts was one of the founding members of the Iconic Books Project, which gathered together scholars from several disciplines to explore the role of books in history, society, culture, and religion beyond simply the interpretation of their texts within. This project continues presently as "The Society for Comparative Research on Iconic and Performative Texts" (SCRIPT), incidentally, with Brent Plate as their current president.[60] If the semantic dimension of books relates primarily to the interpretations of the texts contained in books, then as the society name indicates, SCRIPT is decidedly focused on the non-textual dimensions of books. Iconic Books and SCRIPT have taken up Plate's challenge to take materiality seriously in the history of books and their users. Through his work with the Iconic Books Project, Watts has articulated three dimensions of scripture, the semantic, the performative, and the iconic.[61] The semantic dimension of scriptures focuses on the interpretation of, commentary on, and other appeals to the *content* of

bible as content simply points out the typical propensity toward focus on exegetical and interpretive practices without close attention to the material relationship between bible and user.

[60] For more information on the Iconic Books Project and SCRIPT, see "Iconic Books Project," http://jameswwatts.net/iconicbooks/, accessed on October 11, 2017 and "SCRIPT," http://script-site.net/, accessed on October 11, 2017, respectively. James Watts happens to host the Iconic Books Project website under his own web domain, he is the main contributor to the Iconic Books Project Blog, and he is the current treasurer of SCRIPT.

[61] James W. Watts, "The Three Dimensions of Scriptures," pre-print version for archival repository, http://surface.syr.edu/cgi/viewcontent.cgi?article=1082&context=rel, accessed on October 11, 2017, 6. First published in *Postscripts: The Journal of Sacred Texts and Contemporary Worlds* 2/2-3 (2006/2008): 135-159. Reprinted in *Iconic Books and Texts* (ed. J. W. Watts; London: Equinox, 2013), 9-32. Watts finds these three dimensions in all books, not just scriptures. Scripture emerges from the degree to which a community ritualizes these dimensions.

religious texts.[62] Watts takes the time to note that both religious practitioners and scholars of religion have historically focused almost exclusively on this semantic dimension of scriptures.[63] The performative dimension of scriptures pertains to the use of writings through practices of recitation, monumental inscriptions, music, and artistic expression.[64] The iconic dimension of scriptures refers to the material forms and uses of these writings along with artistic renderings of these material expressions, such as the mosaics in Ravenna depicting the gospel writers with their scriptures.[65]

With these three dimensions, Watts takes a similar approach to that of Plate, suggesting that scripture cannot be reduced to the interpretation of texts just as religion cannot be reduced to belief. Also like Plate, Watts turns to the materiality of books particularly in the iconic dimension to help interrupt these reductive trends. The concept of bible I have articulated for this project, the technologies that afford the use of Judeo-Christian sacred writings, is one example of the scripture produced through the ritualization of these dimensions outlined by Watts. Focusing on the readerly uses of

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[62] Watts, "Three Dimensions of Scriptures," 6-7.

[63] In *More Than Belief: A Materialist Theory of Religion* (Oxford: Oxford University Press, 2011), Manuel Vasquez provides a practice based approach to challenge the textualism, the focus on the interpretation of texts, that has dominated the study of religion and biblical studies at the expense of a careful attention to the role of the senses in relationship to the material objects of the world as constituting the theory and practice of religion.

[64] Watts, "Three Dimensions of Scriptures," 7.

[65] Watts, "Three Dimensions of Scriptures," 7-8. As a reminder, Watts's thesis has to do with the ritualization of these three dimensions as the production of scripture and he finds these dimensions in all books. The meaning of the words, the performance of reading, and the materiality of the book always matter.

bible as interface brings together the performative aspects of using these texts and the

material aspects of the iconic dimension and continues to argue that bible is irreducible to

the texts it contains and the interpretive practices of the semantic dimension. Framing

bible in an interface theory that values both the performative and iconic aspects of books,

while pushing our notions of materiality toward the digital and beyond book will provide

a fruitful methodology for carrying the important emphasis on materiality championed by

Plate and Watts into the emerging technological landscape in which bible finds itself.

Now for a closer look at interface.

Interface as Irreducible to Consumption

At its most basic, interface denotes some kind of relationship of interaction

between entities.[66] With this generic definition, we can imagine countless examples in

everyday life, such as the relationship of interaction between my son and his dog, or the

relationship between neurotransmitters and receptors in a chemical synapse in your brain,

or the relationship between my fingers and the beautifully designed butterfly keyboard I

am using right now to type this sentence. Though I find a great deal of usefulness in the

ubiquitous relationality this broad imagination of interface offers, we need a narrower

definition of interface as we consider the relationship between bible and user. Even a

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[66] "Interface," https://en.oxforddictionaries.com/definition/interface, accessed on
September 29, 2017. The noun definition of "interface" is "A point where two systems,
subjects, organizations, etc. meet and interact." Even though we often see the word
"between" used with "interface," such as "the interface between religion and science,"
the simple noun definition of interface I have quoted above highlights that interface is a
"point" or space or surface of meeting. This space of meeting is mutually constructed by
the contact of the differing systems. Interface, in this sense, is not necessarily a space
"between" two systems, but the space created by the entangled "interaction" of two
systems. Since our definition states that systems must meet *and* interact, contact alone is
not sufficient for interface, there must be some interaction among the systems.

quick glance at a dictionary entry for "interface" will highlight its relationality and its importance in the realm of technology.

The Oxford English Dictionary (OED) has entries for "interface" as both a noun and a verb. Interestingly, both noun and verb entries in the OED figure Marshall McLuhan, of "medium is the message" fame, prominently as the first quotation in the non-scientific definitions of the term. In fact, the OED credits McLuhan as the first user of "interface" in the verbal form in a 1967 collaborative effort with Quentin Fiore.[67] Although I will not use any of the OED definitions as a basis for my own elaboration of interface, the OED provides a historical backdrop for the term and the categories of the term's use. In both parts of speech, noun and verb, the google define algorithm and the freely available Oxford Dictionaries online include a specific definition for interface related to computing, which signals that the term "interface" has taken on special significance in the area of technology.[68]

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[67] Marshall McLuhan and Quentin Fiore, *The Medium is the Massage* (New York: Bantam Books, 1967).

[68] If I were working with a medium other than print here, I would embed the results from my google search for "define 'interface.'" The google search algorithm for definitions draws on many sources to provide a quick look at the main definitions of a term, its etymology, its frequency over time, and gives you the ability to translate the term into other languages. Due to the demands and customs of the print genre and related citation tendencies, I have chosen to reference a combination of OED and other useful definitions, particularly because the OED entries for this term are vastly outdated. Given my experience with this particular word, "interface," I can't help but question the subtitle of the OED online, which is "The definitive record of the English language." The google define algorithm results for "interface" can be found by running a google search on "define interface" and the Oxford Dictionaries Online free version entry can be found at "Interface," https://en.oxforddictionaries.com/definition/interface, accessed on October 11, 2017.

The first definition of interface in the OED is a scientific definition, which denotes the boundary between two portions or phases of matter.[69] Though this earliest use of the term is not our primary focus here, it is worth noting that even this scientific definition foregrounds the irreducibility to consolidation operative in interface. Whether the interface identifies a boundary surface (the OED actually uses the term "face" here) within the same substance or between substances, the interface signals the interaction of two entities without either being eradicated. Even in these early technical uses of the idea of interface in the late nineteenth century, we hear the relationality of interaction and the resistance to reduction into one entity or the other at work in interface.

These processes of interaction that sustain relationality without the collapse of one entity into another are maintained in the computing focused definition of interface, which is "A device or program enabling a user to communicate with a computer"[70] or "a device or program for connecting two items of hardware or software so that they can be operated jointly or communicate with each other."[71] Here we see that interface has become a technical term in the technological realm to describe the piece of technology that is needed to allow two systems to meet and interact. Because of the difference between the modes of communication of a human user and a machine, an "interface" as a translation layer is needed to allow the entangled interaction of "interface." Here in the

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[69] "interface, n.". OED Online. December 2016. Oxford University Press. http://www.oed.com.du.idm.oclc.org/view/Entry/97747?isAdvanced=false&result=1&rskey=QjGVLf& (accessed December 21, 2016).

[70] OED, "Interface," https://en.oxforddictionaries.com/definition/interface, accessed on December 21, 2016.

[71] google "define interface."

computing definition of interface, we find the noun and verb operations of interface

coming together to suggest a multilayered notion of interface that includes both the

material bridge that affords interaction and the interaction itself.[72] The operation of

interface in this connection or communication between user and machine allows for a

relationship between these entities without reducing one participant into the other.

Interface as Event

Johanna Drucker's work draws our attention to the verbal character of interface.

She argues that texts are events not entities and that interface is a zone of encounter not a

window through which we access content.[73] It was Drucker's essay, "Humanities

Approaches to Interface Theory," that first led me to consider the notion of bible as

interface.[74] Drucker helpfully intertwines digital media studies explorations of interface

design with humanities questions of subjectivity to provide a theoretical foundation for

interface as a zone of encounter, not simply a piece of technology that connects two

things. In an exemplary fashion, Drucker demonstrates a reflexive practice by stating her

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[72] The verbal definitions of interface are simply "to interact with" or "to connect with." Link to the Oxford Online Dictionaries. The simplicity of these verbal forms and my brevity in addressing them are not indicative of the importance I place on the verbal aspect of interface. Yet, our difficult task here is to explore bible as interface without reducing interface to any one of these definitions at the expense of the other.

[73] Johanna Drucker, "Humanities Approaches to Interface Theory," *Culture Machine* 12, no. 0 (February 18, 2011), and "Entity to Event: From Literal, Mechanistic Materiality to Probabilistic Materiality," *Parallax* 15, no. 4 (November 1, 2009): 7–17.

[74] It was actually a combination of Drucker's essay and my conversations with Timothy Beal about "bible as media" at the 2014 Nida School of Translation Studies, where Beal was Nida Professor, that gave rise to my initial curiosities about bible as interface.

desire to explore the theory undergirding her own scholarly working environments at the

cusp of a transition from print to other dominant media/interfaces. She writes,

> The motivation here is simple. The authoring and reading environments for
> interpretative scholarly work are only just beginning to be designed in such a way
> that the linear, finite conventions of print media can be changed for the
> constellationary, distributed, multi-faceted modes of digital media…As this
> process develops, a challenge for humanists is to reflect on and articulate the
> theory of interface that underlies the design of our working environments.[75]

Drucker shows her awareness of the shifts at work in the emerging digital media

age and asks humanists to become a part of the process of constructing a theory to

support the design of our reading and writing spaces as a counter balance to the often

mechanistic principles at work in the software industry. The mechanistic approaches to

design and to the user in the software world are a progression of the development of the

field of Human Computer Interaction (HCI) and the growing economic importance of

Graphical User Interface (GUI). These mechanistic approaches tend to over determine the

relationship between machine and user such that the ambiguity of interaction is ignored.[76]

Drucker challenges the consumer market tendency toward functional determinism in

software design by connecting her idea of text as event with interface as a zone of

encounter. Pointing back toward her work on texts as event, Drucker suggests that

"attention to the specific relations between properties and affordances of electronic

environments within a system of codependent relations of production [with subjects] will

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[75] Drucker, "Interface Theory," 2.

[76] Drucker, "Interface Theory," 1.

be the starting point for assumptions about interface as a space that supports interpretative events and acts of meaning production."[77]

Critiquing the "window" metaphor that is so prevalent in our understanding of interface, Drucker pushes us to imagine interface as an event, both a thing *and* a process, both noun and verb as we saw in our exploration of definitions above. Drucker's binary rhetoric of entity to event might suggest that she devalues the materiality or thingness or noun character of interface in order to highlight the productive process at work in event. Yet, if we look closely at her concept of event, we get a more material sense of what she is doing with interface as "not a thing."[78] Drucker writes, "Probabilistic materiality conceives of a text as an event, rather than an entity. The event is the entire system of reader, aesthetic object and interpretation."[79] Much like we saw in Plate's suggestion of religion as technology irreducible to belief,[80] here, Drucker's interface as event entails entity without being reducible to it. Interface as event accounts for both the material conditions of the participants and the process of their interaction. The "entire system" of Drucker's interface as event, which includes "reader, aesthetic object, and interpretation," maps nicely onto Watts's three dimensions of scripture, performative, iconic, and semantic, respectively.[81] Like Plate and Watts, Drucker resists a reductive approach that

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[77] Drucker, "Interface Theory," 3.

[78] Drucker, "Interface Theory," 7-9.

[79] Drucker, "Entity to Event," 8.

[80] Plate, *5 1/2 Objects*, 22.

[81] Watts, "Three Dimensions of Scriptures," 6.

might conceptualize interface as simply a window to content and user as a mechanistic consumer.

Interface as event always exceeds content and consumption. If we think of consumption as the absorption or consolidation of one entity into another, then the earliest definitions of interface already suggested the irreducibility to consumption of interface. Interface is the moment and space of interaction of two *distinct* entities. If one participant in the event of interface absorbs the other or if the distinct entities consolidate into one entity, there is no longer any interface. Thus, the very notion of interface is predicated on resistance to consumption. Some interfaces are more durable in their resistance to consumption, while others are designed to quickly resolve into consumption by one participant or another. In this project, I am interested in bible interfaces that ongoingly resist consumption–bible interfaces that consistently promote interface, the sustained engagement that happens in the moment and space when *different* entities interact and simply cannot consume one another.[82]

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[82] This notion of consumption as homogeneity, consolidation, and absorption and my resistance to it in articulating a rich notion of interface comes from a combination of the dominant view of media as homogenizing in the Frankfurt School and Emmanuel Levinas's notion of proximity as that which infinitely resists homogenization. For an example of the Frankfurt School view of the role of technologies in consumption, see the discussion of the telephone and radio in Max Horkheimer and Theodor W. Adorno's essay, "The Culture Industry: Enlightenment as Mass Deception," in *Dialectic of Enlightenment* (New York: Herder and Herder, 1972), 94-96. As will become clear throughout this project, I do not hold the same pessimism about technologies that pervaded the Frankfurt School's critiques. For an example of Levinasian proximity as resisting consumption, see the note on "obsession," a synonym for proximity, in Emmanuel Levinas, *Otherwise than Being, Or, Beyond Essence*, trans. Alphonso Lingis (Pittsburgh, Pa.: Duquesne University Press, 1998), 191, n. 10.

Provoking Probabilistic Production

Near the end of her exhortation to humanities scholars to take seriously the task of building a theory of interface, Drucker reminds us that book has always been an interface.

> Clearly those with rich experience of book culture perceive the dynamic properties usually attributed to new media already active and present within the older forms, and rightly so. The book is no more self-identical, static, or fixed, than any other artifact that provokes a constitutive reading or response. Strict binarisms and technophilic exuberance lend themselves to exaggerated inaccuracies and hyperbolic rhetorical claims-charming in their own way, but perhaps not so useful for actual design. Many points of continuity exist between print and digitally networked artifacts and these don't have to depend on the seductive, special-effects, images of frictionless manipulation in holographic information spaces that will supposedly enable our lives in some fantasmatic future. Books, after all, are structured environments that provoke a reading that is probabilistic, not mechanistic, and the text or work is produced as an event, not an entity.[83]

I quote Drucker here at length for two reasons. First, I have at times been prone to and accused of the charming "strict binarisms and technophilic exuberance" Drucker cautions of here. Though I have found hyperbolic rhetoric useful at times to unsettle our unquestioned assumptions about media, I want to be exceedingly clear that, with Drucker, I am not interested in propagating some old/new hierarchical dichotomy between well established book technologies such as the codex and emerging interfaces that push us as users beyond our current imagination of books. This is why I introduced material media translation at the outset of this project as a way to focus our analysis on the continuities and discontinuities of the material interfaces of bible throughout history. Each emerging technology is a translation of what came before it, carrying forward some characteristics of its predecessors, while providing some new affordances.

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[83] Drucker, "Interface Theory," 18.

Second, this passage from Drucker begins and ends with a reminder that book has always been an interface. As the materiality of this interface shifts, we will undoubtedly learn from previous forms as we explore the affordances of emerging technologies. The last full sentence of this passage captures nicely the importance of understanding book as interface. To paraphrase in alliterative fashion, Drucker suggests that a book is an interface that *provokes probabilistic production* through the reading event.[84] Let's look closely at each of these p-words in reverse order, production, probabilistic, and provokes.

Production

Reading is production. It is important to remember that in any medium, a book is not simply a container of information to be ingested by a reader. The materialities and cultural contexts of both book and user entangle to produce the possibility for meaning in a reading act. Each encounter between book and user has the potential to offer something different, because reading is a production of meaning contingent upon the particularities of the encounter and its participants. If I read Emmanuel Levinas's *Otherwise than Being* in a hard bound print monograph as an undergraduate student in the early 2000's while sitting in the library at a small liberal arts college in Colorado, this will produce something different than my reading of the same text on a computer screen in a continuous scroll text editor as a late stage doctoral student in my house at the dawn of a Trump presidency. Though the "content" or the words of the text may remain identical in both of these cases, the readings simply cannot remain the same. These two reading events are moments in the ongoing making that is my reading of *Otherwise Than Being*.

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[84] Drucker, "Interface Theory," 18.

In this sense, perhaps it would be more useful to talk about reading *with* a book rather than the reading *of* a book to help unsettle our typical notions of reading as consumption. Reading *with* a book points toward book as interface, where user and platform are entangled in an emergent relationality that cannot be reduced to consumption.

Drucker emphasizes her constructivist approach to both subject and text by reiterating that a text or work is *produced* in the encounter facilitated by the book. This is another way of stating that book is not simply a window or a container through which we access and consume a text. Rather, book is a space that begs an encounter between user and the structured environment of the technologies and more. Drucker's foregrounding of reading as production rather than reduced to consumption of a text resonates with the creative tension between production and consumption in Michel de Certeau's work, *The Practice of Everyday Life*.[85]

De Certeau's explorations of "the practice of everyday life" respect the deep concerns about commodification so well articulated by many materialist critiques of culture. Yet, De Certeau refuses to take on the low view of mass culture and the consumer that often accompanies these historical materialist critiques. De Certeau restores some poetic dignity to the masses by reframing consumption as *production*, giving each person in each moment an agency in the meaning making endeavor.

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[85] Michel de Certeau, *The Practice of Everyday Life*, trans. Steven Rendall (Berkeley: University of California Press, 1984). Some have used the language of "prosumer" or "prosumption" to indicate this blurring of production and consumption. Introduced by Alvin Toffler in *The Third Wave* (New York: Bantam Books, 1996), the use of prosumption language has resurfaced in relation to web technologies in the work of George Ritzer and Nathan Jurgenson, "Production, Consumption, Prosumption," *Journal of Consumer Culture* 10, no. 1 (2010): 13–36.

> As unrecognized producers, poets of their own acts, silent discoverers of their own paths in the jungle of functionalist rationality, consumers produce through their signifying practices.[86]

I am not explicitly taking up the power dynamics de Certeau explores in this work. Yet, his consistent challenge of the production/consumption binary without erasing the role of the structures or the participation of the "consumer" reinforces our approach here of book as interface that provokes production. De Certeau also helpfully highlights that book as interface does not necessarily erase the operations of book as container. The container attributes of book remain as a part of the material structures that constitute the potential productive space of the interface. A theory of interface can resist the reduction of book to container and user to simple viewer without the need to eradicate the container aspects of book or the viewer aspects of user.

De Certeau uses reading as one of his examples of "everyday practices that produce without capitalizing." He notes the assumed writing-reading binary as a specific example of the production-consumption binary, but articulates a notion of reading that cannot be reduced to this dichotomy. Reading is a "silent production," "an 'art' which is anything but passive."[87] Reading as everyday practice is a poiesis, a making, within structured constraints that resists the production-consumption binary and thus offers a notion of reading as interface.

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[86] de Certeau, *Practice*, xviii.

[87] de Certeau, *Practice*, xx-xxii.

Probabilistic

In her essay titled "Entity to Event: From Literal, Mechanistic Materiality to Probabilistic Materiality," Drucker expounds in much more detail her use of the term probabilistic as it relates to reading interfaces.

> Probabilistic materiality conceives of a text as an event, rather than an entity. The event is the entire system of reader, aesthetic object and interpretation – but in that set of relations, the text is constituted anew each time. Like weather produced in a system around a landmass, the shape of the reading has a codependent relation to the structure from which it arises. Probability is not free play. It is constrained play, with outcomes calculable in accord with the complexity of the system and range of variable factors, and their combinatoric and transformative relations over time. A text is a highly complex system, containing a host of thermal sinks and basics of attraction.[88]

We can tell even in her interface theory that probabilistic is an alternative to mechanistic for Drucker in her analysis of the shortcomings of interface design as driven by the software development world.[89] Here, in this passage from "Entity to Event," with its strange alignment (I will include an image of the passage or try to format similarly in Word to demonstrate her play with alignment), we can see her ability to both show and tell the role of materiality in the reading event. The basic distinction between the mechanistic and the probabilistic for Drucker is that the former attempts to present a user with an entity to consume, while the latter presents the user with a set of possibilities that condition a reading event that will inevitably be new every time. This set of constrained possibilities in the probabilistic production of interface sounds a great deal like the emergent properties of affordance I mentioned in the introduction. Affordances are the

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[88] Johanna Drucker, "Entity to Event: From Literal, Mechanistic Materiality to Probabilistic Materiality," *Parallax* 15, no. 4 (2009): 8.

[89] Drucker, "Interface Theory," 10.

set of real or perceived use possibilities offered by the material design of an interface *in relationship to a particular user and context*. As McGrenere and Ho demonstrate, there is a lot of debate and extension around this definition.[90] For our purposes in this section on interfaces, the importance of pointing toward affordances is to remind us that there are material properties of an interface that present a set of possible uses to a user.

> With such concepts in mind, we see the page, book, print, or screen space of text and image quite differently from the usual static presentation of thing, and see it instead as an active, dynamic field of forces and energies in dynamic suspension, acting on each other and within a frame of constraint, to produce the conditions a reader is provoked by in the constitutive act of reading that makes the text. Again I come back to the central premise that a text, work of art, aesthetic expression is an event not an entity. The material existence serves as a provocation, set of clues and cues for a performance of the text.[91]

Rather than simply presenting a user with an entity to consume, a probabilistic materiality of interface *provokes* production of both text and user in the practice of reading. Let's look more closely at the provocation of interface, which Drucker suggests is related to the cues and clues an interface offers for the performance of a text.

Provoke

With Watts and De Certeau, I begin with the assumption that reading is a material act of production, no matter what the medium. Whether with an ancient papyrus roll, a medieval illuminated manuscript, a print codex, a computer screen, or a mobile phone,

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[90] See Joanna McGrenere and Wayne Ho, "Affordances: Clarifying an Evolving Concept," *Graphics Interface* 2000 (May 15, 2000): 1, for a brief history of the use of the term.

[91] Drucker, "Entity to Event," 14. Again we see similarities with Watt's three dimensions of scripture as the interpretive act is about making semantic meaning in the performance of reading as constrained by the materiality of the space of the event of encounter between user and book.

reading is an act shaped by both the materialities of the medium and the user.[92] Yet, I want to push us to consider the materialities of the so called "virtual" – digital technologies, computers, the internet, social media, mobile devices, the cloud, artificial intelligence, etc..[93] These technologies also have materialities that shape the encounters they afford and the idea of interface can help us stay attentive to the materiality of reading as use in the age of the internet.

Drucker celebrates the material provocation of reading interfaces. A codex doesn't simply lay passive on the shelf waiting to be opened and penetrated by the reader. The materiality of the book as interface participates in and provokes a reading event. A page from a book in Kindle reader on my iPhone, which gives me as user all kinds of power over the page, provokes a possible set of reading tactics, even if not entirely determinative. A print codex, with its bound spine, uniform page size, covers, and large open margins begging for participation offers a user a different set of possible encounters. Neither of these interfaces, codex or Kindle reader on an iPhone are simply containers of information. Book as container just waits to be consumed, book as interface provokes

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[92] I am aware of the limitations of talking about medium and user as distinct entities and the ease with which we might slip into simple subject/object binaries here. One of the difficult tasks of this project is to challenge these dichotomies in so far as they encourage a subject consuming object model of reading. Perhaps the emerging discussions of object oriented ontology could provide an interesting conversation partner with interface theory. Imagining both medium and user as objects that have properties and methods they bring to an encounter could help emphasize the entangled production of reading as process model I am advocating for here.

[93] Drucker, "Entity to Event," 7, also challenges the material movement to consider more thoughtfully the materiality of the virtual, pointing back to the Abrahamic traditions of mapping matter to flesh.

encounter. This provocation reminds us that platform is an active participant as structured environment in the relationality that is interface.

Proximity as Optics

One of the strategies Drucker offers for pursuing a theory of interface as relationality irreducible to consumption is to foreground the role of the subject in interface.[94] Drucker works with a constructivist notion of subject, where the subject is constructed through participation in interface with its environment.[95] Another structure of subjectivity that provides a useful optics for our consideration of bible as interface is the notion of proximity in Emmanuel Levinas. Though the term proximity is often used as a simple synonym for physical closeness in human relationship, Levinas articulates a notion of proximity that problematizes the reduction of relationality to nearness in space and provides an optics for human relationship that is not reducible to consumption.

In drawing on Levinasian notions of subjectivity to inform my analysis of bible as interface, I am not attempting to articulate an alternative to the constructivist subject that animates Drucker's idea of interface. Nor am I interested in suggesting that bible interfaces participate in the proximity that structures human subjectivity in a Levinasian phenomenology. Instead, the operations of proximity in the face to face encounter of

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[94] For an introduction to the role of different philosophical notions of subjectivity and the role of ethics in interface, see Lucas Introna, "Phenomenological Approaches to Ethics and Information Technology", *The Stanford Encyclopedia of Philosophy* (Summer 2011 Edition), Edward N. Zalta (ed.), URL = https://plato.stanford.edu/archives/sum2011/entries/ethics-it-phenomenology/.

[95] Drucker, "Interface Theory," 3, writes, "The constructivist subject of the digital platform emerges in a codependent relation with its affordances. This is the 'subject of interface' when interface is conceived as a dynamic space of relations, rather than as a 'thing'."

Levinasian ethics offer us an optics or an apparatus for seeing interface as a relationality irreducible to consumption.[96] Rather than asking whether emerging technologies are ethical, I will use proximity as an optics for exploring the affordances of bible in its many lives as interface. Levinas himself speaks and writes very little about technology explicitly,[97] but his negotiations of relationality that cannot be reduced to spatial nearness or to consumption through his idea of proximity have a great deal to offer our discussions of interface.

In the last of Levinas's major philosophical works, *Otherwise Than Being*, proximity blossoms as a problematization of the distance/nearness spatial binary. He

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[96] The term optics appears four times in Emmanuel Levinas, *Totality and Infinity: An Essay on Exteriority*, trans. Alphonso Lingis (Pittsburgh: Duquesne University Press, 1969) on p. 23, 29, 78, and 174. The most often noted articulation of this idea in Levinas is his phrase, "ethics is an optics." An optic is an apparatus for seeing or a necessary precursor for the ability to see. For Levinas, the ethical encounter of the face, otherwise stated as one's infinite responsibility for the other, is not governed by vision or knowledge or intentionality of the typical sort. Instead, this ethical encounter provides the apparatus for the very possibility of seeing, knowing, and willing. This is how I mean proximity as an optics, as an apparatus for the possibility of interface as relationality irreducible to consumption.

[97] As Richard Cohen, "Ethics and Cybernetics," 28, notes, the most pivotal chapter of Levinas's *Otherwise than Being, Or, Beyond Essence*, trans. Alphonso Lingis (Pittsburgh, Pa.: Duquesne University Press, 1998), which is titled "Substitution," offers a fitting mention of proximity in relationship to terminology we often find in discussions of technology, such as "circulation of information" and "resolved into 'images.'" After introducing the shortcomings associated with placing consciousness qua knowledge at the foundation of humanness, Levinas, *Otherwise Than Being*, 100, articulates an alternative, writing, "In starting with sensibility interpreted not as a knowing but as proximity, in seeking in language contact and sensibility, behind the circulation of information it becomes, we have endeavored to describe subjectivity as irreducible to consciousness and thematization. Proximity appears as the relationship with the other, who cannot be resolved into 'images' or be exposed in a theme. It is the relationship with what is not disproportionate to the arche in thematization, but incommensurable with it, with what does not derive its identity from the kerygmatic logos, and blocks all schematism."

writes, "for proximity is not a simply asymptotic approach of its 'term.' Its term is not an

end. The more I answer the more I am responsible; the more I approach the neighbor with

which I am encharged the further away I am."[98] Levinas uses the mathematical concept

of asymptote, a line that gets infinitely closer to a curve without ever contacting it, to

emphasize that his notion of proximity cannot be reduced simply to increasing closeness

in human encounter. In this resistance to the asymptote as a metaphor for proximity,

Levinas indicates concepts of relationality or even interface as face to face that are not

derived simply from spatial contiguity or its lack. First and foremost, proximity is a

sociality, a "relationship with," not simply a physical closeness in space and time.[99] This

"relationship with" is the core of interface as I have defined it, so we can already imagine

proximity as a kind of interface. Proximity, which cannot be reduced to physical or

cognitive closeness,[100] is conceptualized with many other terms by Levinas, such as

approach, contact, and responsibility. All of these terms connote a kind of engagement

that is a process of being approached by a neighbor or a stranger that demands a response

more than an intentionally willed choice to approach another and engage. This proximity

demands participation before there is a choice.

Typically, the kind of encounter or relationality described here would involve a

demand for an intimate knowledge of the other person to make the "relationship with" of

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[98] Levinas, *Otherwise Than Being*, 93.

[99] Levinas, *Otherwise Than Being*, 16, writes, "It figures as what is near in a proximity that counts as sociality, which 'excites' by its pure and simple proximity."

[100] Levinas, *Otherwise Than Being*, 47, writes, "An analysis that starts with proximity, irreducible to consciousness of…, and describable, if possible, as an inversion of its intentionality, will recognize this responsibility to be a substitution."

proximity compelling. Yet, Levinas is exploring a relationality that is not dependent on

such a knowledge, where approach as response precedes knowing. Here is where, in what

might initially seem odd, distance plays a role in proximity. There are two distances at

work in the discussion of proximity in *Otherwise than Being.* The first distance is the

distance of sight or knowledge or the incomplete objective genitive construction,

"consciousness of…," characteristic of phenomenological traditions of intentionality to

which Levinas is responding.[101] This distance is simply the distance required for a subject

to comprehend an object or for the eye to see an object. Levinasian proximity squeezes

this distance by enacting a contact that precedes comprehension, an encounter that is

blurry. While proximity in a Levinasian sense resists this distance of comprehension

through an asymmetrical entanglement of sociality not reducible to understanding,

another kind of distance emerges.[102] This second distance is another way of articulating

the difference always at work in this encounter that is proximity.

Levinas calls this distance "a diachrony without a common present," which

suggests that proximity does not actually bring the two terms of this relationship or

encounter or interface "together" in any reciprocal way in a shared appearance.[103] This

distance as diachrony or difference is not somehow an interruption of an original

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[101] Levinas, *Otherwise Than Being*, 89.

[102] Levinas, *Otherwise Than Being*, 89, writes, "Proximity, suppression of the distance that consciousness of… involves, opens the distance of a diachrony without a common present, where difference is the past that cannot be caught up with, an unimaginable future, the non-representable status of the neighbor behind which I am late and obsessed by the neighbor. This difference is my non-indifference to the other. Proximity is a disturbance of the rememberable time."

[103] Levinas, *Otherwise Than Being*, 89.

synchrony or sameness, to which a system is hoping to return. Rather, this distance in proximity is the ever expanding and insatiable demand by the other, which consistently troubles any attempts to consume the other. Levinas writes, "The subject is the more responsible the more it answers for, as though the distance between it and the other increased in the measure that proximity was increased."[104] This sounds a great deal like Levinas's reflections on the asymptote metaphor we saw above, where he writes, "The more I answer the more I am responsible; the more I approach the neighbor with which I am encharged the further away I am."[105] Here, the "further away" that indicates distance refers to the inexhaustibility of the responsibility operative in proximity. At no point, can one draw near enough through the approach of responsibility to master the needs of the other. Instead, as proximity enlarges through the relationality of response to the demand of the other in encounter, so does the inability to fulfill this demand and thus master or consume the other.

Levinas offers at least two hints in the direction of proximity as an optics for interface. First, as Sean Hand highlights so wonderfully in his analysis of Levinas's evolving relationship with art, Levinas saw in Paul Celan's poetry "a language of and for proximity."[106] Hand writes, "Levinas's appreciation of Celan, in contrast [with Heidegger

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[104] Levinas, *Otherwise Than Being*, 139-40. I would argue that Levinas unhelpfully uses proximity as a synonym for nearness in this passage, since proximity is the dual operation of increasing distance and nearness.

[105] Levinas, *Otherwise Than Being*, 93.

[106] Emmanuel Levinas, "Being and the Other: On Paul Celan," trans. Stephen Melville, *Chicago Review* 29, no. 3 (1978): 17, writes, "A language of and for proximity–more ancient than that of the 'truth of Being' (which it probably bears and supports), the first

on Hölderlin], emphasizes the poverty, inadequacy and non-radiance of a language, a language that therefore signifies proximity rather than mastery, and a being for the other rather than a world in being."[107] Without delving into all of the details of a Levinasian philosophy of art or the ways in which poetry operates in language, we can see here in Hand's comment and in Levinas's own reflections on poetry that proximity can offer an optics for poetry that resists simple consumption and provokes probabilistic production in the interface between reader and poem. Thus, if proximity can provide an optics for poetry, proximity as optics can also inform the use and design of bible interfaces.[108]

More specifically related to our questions of bible as interface, Levinas describes his own relationship with bible as book using language that sounds a great deal like his discussions of proximity. In a set of interviews conducted in 1981 on French radio with Philippe Nemo, transcribed in *Ethics and Infinity*, Levinas describes his relationship with bible and philosophical writings.[109] It was these very interviews that first stimulated my interest in the possibility of proximity as an optics for bible as interface. In the early discussions of the first interview, which is titled "Bible and Philosophy," Levinas

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of languages–response preceding question, responsibility to the neighbor–, making possible through its 'for the other' the whole miracle of giving."

[107] Seán Hand, *Emmanuel Levinas* (Abingdon, Oxon, UK: Routledge, 2009), 77.

[108] Levinas, *Otherwise Than Being*, 191 n. 10, makes another explicit claim for the relationship between poetry and proximity in his discussion of obsession, writing, "But is not the poetry of the world prior to the truth of things, and inseparable from what is proximity par excellence, that of a neighbor, or of the proximity of the neighbor par excellence."

[109] Emmanuel Levinas, *Ethics and Infinity*, trans. Richard A. Cohen (Pittsburgh: Duquesne University Press, 1985).

describes his view of bible as the "book of books," saying, "It is that extraordinary presence of its characters, that ethical plenitude and its mysterious possibilities of exegesis which originally signified transcendence for me. And no less."[110] The extraordinary presence of the biblical "characters" is not a celebration of the cast of characters in the biblical stories. Rather, these *characters* are the very letters of the text before they are assembled into words and phrases. These characters are *present* in ways that are beyond the ordinary, irreducible to the semiotic performance of their combinatorial effects.[111] The bible demands a response from its users, a participation that opens to "mysterious possibilities of exegesis." Ethical plenitude refers not to an abundantly recurring theme of ethics in the content of the biblical writings, but to the inexhaustible resistance to simple consumption enacted in encounter with this book. As we saw in the structure of proximity, even as a user approaches in response, bible can never be contained and thus will always overflow any possible fixed and stable readings, demanding ever more response.

Proximity emerges for Levinas as a reflection on human subjectivity and a particular interface of two humans. Through his reflections on poetry as language and

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[110] Levinas, *Ethics and Infinity*, 23.

[111] In his reflections on revelation in the Jewish tradition, Emmanuel Levinas, *Beyond the Verse: Talmudic Readings and Lectures*, trans. Gary D. Mole (Bloomington: Indiana University Press, 1994), 132, suggests, "It is by going back to the Hebrew text from the translations, vulnerable as they may be, that the strange or mysterious ambiguity or polysemy authorized by the Hebrew syntax is revealed: words coexist rather than immediately being co-ordinated or subordinated with and to one another, contrary to what is predominant in the languages that are said to be developed or functional." This coexistence of words before and irreducible to their coordination is the extraordinary presence of the characters of the bible.

bible as book, we see the operations of proximity at work in a different kind of interface, that between reader and text. Without any attempt or desire to suggest an equivalence between the mechanisms or gravity of human-human interface and user-bible interface for Levinas, this proximity which structures a relationality irreducible to consumption can provide an optics for bible as interface. Proximity as an optics also provides an apparatus for articulating interface that cannot be reduced to simply the interaction and entanglement of user and technological platform. Proximity begs for us to push further to consider the human relational possibilities afforded by these bible interfaces for the larger community of users.

Tracing Affordances

With proximity as an optics, I will explore the possibility of bible as interface through the affordances of high surface area, collaboration, and anarchy. As discussed in the introduction, an affordance is a possible relationship between a user and a platform in interface. Taking Drucker's lead in remembering that books have always been interfaces, tracing affordances through several examples of bible as interface will help my analysis stay focused on the relationality made possible by the materialities at work in interface and can help highlight the continuities and discontinuities among the historical and emerging technologies involved. At its best, bible as interface exhibits affordances of high surface area, collaboration, and anarchy.

Interfaces that afford high surface area have many possible points of contact between user and platform. The illustration I often use for high surface area is grinding coffee beans. The finer a coffee beans is ground, the more surface area that gets created

for the water to contact and thus the water can draw more flavor from the bean. Interfaces affording high surface area provide expansive points of contact for the relationality of interface. The excessive possibilities for contact make it difficult for an interface to become overly deterministic because of the vast interactive possibilities. In a high surface area interface, a user would find it difficult to exhaust all possible encounters, thus the relationship of the interface always exceeds a users ability to master an interface in its entirety. For example, watching a full length feature film straight through on YouTube is a fairly low surface area interface, since the user engages a continuous linear narrative that is taken in as a whole. On the other hand, searching YouTube for clips related to a recent election scandal can offer a high surface area interface through the many ways into the event offered by the search results.

Interfaces that afford collaboration provide possibilities for both participation in constructing the space of interface and chances for user interaction. Kindle reader on the iphone for example, affords several opportunities for the reader to participate in constructing the interface, such as choosing a font size or a background color for the page. Additionally, Kindle reader allows users to annotate and highlight as they use a book, which can create an entirely new navigation scheme through the material. We find a similar collaborative affordance in the marginalia so popular in medieval manuscripts.

Kindle annotations highlight another aspect of the collaborative capacities of interfaces, the communal process of use. Kindle reader allows users to share their annotations with others and users can enable a feature that will show popular highlights while reading through the book. This popular highlights feature is similar to checking out

a book from the library and seeing the markings and highlights left by previous users.

The Kindle reader example demonstrates the two layers of collaboration afforded by

interfaces that provoke probabilistic production through a relationality irreducible to

consumption. First, there is a relationality of participation in constructing the material

aspects of the interface rather than simply consuming the content. Second, there is a

relationality of community, using and making together not entirely on a user's own

terms.[112]

The third affordance of interfaces that we will look for is anarchy. Levinas

himself speaks of proximity as anarchic, saying, "Proximity is thus anarchically a

relationship with a singularity without the mediation of any principle, any ideality."[113] It

is the anarchy of proximity that first drew me to Levinas and it is the anarchy of

proximity that offers bible an afterlife in our emerging media age with its proliferation of

interfaces. Anarchy in the sense I use it here is something beyond disorder as another

order and something significantly more complicated than the simple absence of a

beginning or origin. Exploiting the *koine* semantic range of αρχη, which can mean

beginning and reign, I hear the anarchic as that which is *without the reign of an*

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[112] Wikipedia offers another good example of collaborative capacities, where a user can
participate in crafting an entry with a team of people from around the globe without any
previous "knowledge" or who these partners are. Now, Wikipedia does not necessarily
demand participation in the same way that the encounter with the other does in
Levinasian subjectivity, because a user can simply take in the content of the page. Yet,
again, the possibility of collaboration both in building the entry with strangers and
sharing bits of it with others, as an affordance, has the potential to shape a disposition
toward response-ability in human-human interface.

[113] Levinas, *Otherwise Than Being*, 100.

original.[114] Just as proximity resists any mastery or consumption of the other, anarchy in

interface resists the closure or consolidation of use to any mechanistic determinism

governed by original author, original version, or final form. Anarchy in interface

constantly exceeds attempts by users to grasp and order the whole in a stable manner. The

Talmudic page provides a beautiful example of anarchy in interface, in the medium of

print. The structure of the Talmudic page is very consistent, with Mishnah and Gemara

down the center column and additional commentary around the page from there. Yet, the

design of the page does not promote an over-determined reconstruction of any original

meaning of the biblical text, the mishnah, or its commentary, nor does it promote the

reign of a single author or principle. Rather, the Talmudic page anarchically invites users

to participate in the ongoing process of exploration and conversation.[115] Articulating this

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[114] Despite the semantic negation built into the word an-archy, I am uninterested in arguing for the absence of original. In my early attempts to articulate this anarchy in the realm of translation studies through a talk titled "From Murder to Anarchy" at the Nida School of Translation Studies 2014, I fear I had fallen into the trap of archaizing the anarchic by arguing for the eradication of the notion of original in the process of translation. The conversations with translators who have spent their lives caring for and working with both biblical and literary texts taught me that we needn't eschew the presence, value, and operation of an original or source text in the process of translation in order to question said original's governance over the validity or even methodology of a translation. We can always construct an original given a particular data set and time frame. Instead of eradicating any notion of original, I am asking us to consider a kind of reading, a mode of making, that operates *without the reign of an original*. In this vein, anarchy becomes one mechanism for the probabilistic production offered by interfaces that we discussed in chapter 1.

[115] Emmanuel Levinas, *Nine Talmudic Readings*, trans. Annette Aronowicz (Bloomington, IN: Indiana Univ. Pr., 2003), 5, points toward this anarchic sensibility of the Talmudic page, writing, "The pages of the Talmud, mischevious, laconic in their ironic or dry formulations, but in love with the possible, register an oral tradition and a teaching which came to be written down accidentally. It is important to bring them back to their life of dialog or polemic in which multiple, though not arbitrary, meanings arise

anarchic sensibility of the Talmud, Jacob Neusner writes, "Every Talmudic tractate–there are thirty-seven of them in the Babylonian Talmud–begins on page 2; there are no page 1s because there is no beginning. Wherever you start your study, you will feel you have joined a conversation which began long before you came along."[116] Of course, every tractate does have a beginning, even if on page 2, and every user does start somewhere. The anarchy of the Talmudic page need not eradicate beginnings, or endings. In interface, the affordance of anarchy facilitates a relationality between user and platform as well as among a community of users that is irreducible to the reign of these originary impulses

With these three affordances of interface in mind, high surface area, collaboration, and anarchy, we can now move toward looking at particular examples of bible as interface throughout its many manifestations in history.[117] These three affordances are not unique to bible nor are they the only affordances at work in bible interfaces. What makes these three affordances particularly important for this study is that they make bible interfaces more durable as interface, sustaining a relationship between user and platform

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and buzz in each saying. These Talmudic pages seek contradiction and expect of a reader freedom, invention and boldness."

[116] Jacob Neusner, *Invitation to the Talmud: A Teaching Book* (Eugene: Wipf and Stock, 2003), 170. Joel Lurie Grishaver, *Talmud with Training Wheels: An Absolute Beginner's Guide to Talmud* (Los Angeles, CA: Torah Aura Productions, 2003), 13, points out that though Nuesner touches on a truth of Talmudic interface, tractates begin on page 2 also because page 1 was reserved materially for the title page.

[117] In her Media Specific Analysis methodology, N. Katherine Hayles uses the helpful language of "instantiation" to refer to the particular manifestation of a set of affordances in a given material media context. This language of instantiation continues to highlight the continuities at work in material media translation. For Hayles's Media Specific Analysis of hypertext, see N. Katherine Hayles, "Print Is Flat, Code Is Deep: The Importance of Media-Specific Analysis," *Poetics Today* 25, no. 1 (March 20, 2004): 67–90.

that resists reduction to consumption. Implicit in my argument for bible as interface that affords high surface area, collaboration, and anarchy is my conviction that bible, at its best, refuses reduction to consumption and we can see this durability of interface throughout the life of bible.

I will first trace these affordances of bible as book interface through a roll bible, an ancient codex manuscript, and a kindle bible. Once we have seen the operations of these affordances in bible as book, I will explore the possible translations of high surface area, collaboration and anarchy into bible as interface in one attempt to move beyond the book through manuscript digitization, XML encoding, and web design. Finally, we will trace these affordances into interfaces that have pushed decidedly beyond the book, such as an XML digital bible library, a mobile bible app, and a bible application programming interfaces (APIs). Amidst the common fears and anxieties emerging as new technologies threaten the dominance of the book, attending to the affordances of bible as interface can help use of bible flourish beyond the book, while remaining deeply connected to the material history of bible

CHAPTER 2: INTERFACING BIBLE AS BOOK

Even though interface is a relatively new term in the articulation of the relationship between user and bible, the operations of interface as relationality irreducible to consumption have been present in bible since antiquity. Since book is so central to the emergence of bible in history, I will begin by exploring three examples of bible as book – a roll bible, a codex bible and a Kindle bible. All three of these examples fall in the category of bible as book interface, which has been the dominant interface type for bible throughout most of its existence.[^0] Carefully attending to these book interfaces of bible, we will look for the affordances of high surface area, collaboration, and anarchy. Seeing these affordances at work in these book interfaces of bible will prepare us for looking at bible beyond the book and how these critical affordances might carry bible into our emerging technological landscape without losing connection to the rich tradition of bible as interface throughout history.[118]

Bible on a Roll

Before bible became Bible, it was book. Our concept of book has become so deeply entangled with the dominant book technology of nearly the last two millennia, the codex, that we forget book has not always been codex. Based on the definition of book I

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[118] It is worth noting here that I have no interest in suggesting that high surface area, collaboration, and anarchy as detailed in the previous chapter are only afforded in bible interfaces exclusively. Many different interfaces have these affordances, such as other literary and textual traditions, poetry (as Levinas suggested), audience interface in oral performance, communication technologies like email and SMS, etc.

began with in the introduction, "a technology that involves the fastening together of discrete pieces of material to gather and set boundaries for a writing or collection of writings, which is primarily governed by the structure of the page," we could imagine book going all the way back to stone tablets. I won't take us all the way down that road here to avoid the detours it might provide, but in the life of bible as book, it is at least important to consider the codex's immediate technological ancestor, the roll.[119] We find roll books mentioned by authors in the ancient world and in the bible itself. βιβλιον is the Greek word often translated "book" in the Septuagint and the New Testament. Yet, this word for book that becomes the signifier for the cultural phenomenon of Christian scripture, and so much more, always refers to something otherwise than a codex in these ancient Greek texts, because the codex did not yet exist. Here are a few examples:[120]

> **LXX Exodus 24.17** - "And taking *the book* (το βιβλιον) of the covenant, he read it into the ears of the people and they said, 'All things, which the Lord said, we will do and we will hear.'"

> **LXX Nehemiah 8.8** - "And they read in the *book* (βιβλίω) of the law of God, and Ezra taught and ordered [them] in knowledge of the Lord, and the people understood when he read."

> **2 Timothy 4.13** - "When you come, bring the cloak, which I left in Troas with Carpus, and *the books* (τα βιβλια), especially the parchments."

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[119] As a future project, I would like to come back to this point and explore the relationship between the two tablets of exodus and the evolution of bible as cultural icon as Timothy Beal describes in *The Rise and Fall of the Bible*. I would start with William Blake's plates depicting Moses with the tablets looking just like a codex.

[120] Translations my own.

In English translation, with our deep assumption of book as codex, it is easy to read these passages and picture these ancient readers holding a giant leather bound codex. Yet, such a thing did not even exist at the time of these writings.

Rolls were regularly used in early gatherings for worship in communities that came to be known as Jewish. As an example, the book mentioned in the gospel of Luke, from which Jesus read, was a roll. In his book *The Rise and Fall of the Bible*, Timothy Beal offers a detailed look at this scene in the Gospel of Luke and the way Jesus would have used the roll as an interface for reading.[121] In an accident of history, the most complete biblical manuscript found in the caves of Qumran happens to be a roll book containing the biblical writing of Isaiah, which is the text from which Jesus reads in Luke 4. I will use this passage from the Gospel of Luke as a entry into exploring this ancient bible interface found at Qumran, 1QIsa[a], otherwise known as the Great Isaiah Scroll. I will start with a close look at the description of the user involvement in this interface provided in Luke 4 followed by an evaluation of the possibility of affording high surface area, collaboration, and anarchy in 1QIsa[a].

The pertinent portions of Luke 4 for our purposes are as follows:

And he went to Nazareth, where he was reared, and he went to synagogue on the day of Sabbath according to his custom, and he stood to read. And the roll (βιβλίον) of the prophet Isaiah was given to him and having unrolled the roll (τὸ βιβλίον), he found the place where it was written…and after closing the roll (τὸ βιβλίον) and giving it to the attendant, he sat down (Luke 4:16-17,20).[122]

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[121] Beal, *Rise and Fall*, Kindle location 1245-1378.

[122] My translation from the *Society of Biblical Literature Greek New Testament* (SBLGNT). There is an interesting textual variant in 4:17 with several important early witnesses (Alexandrinus, Vaticanus, Washingtonianus) using ἀνοίξας instead of ἀναπτύξας for "opening" the roll. The 27th edition of the Nestle Aland critical edition

The Great Isaiah Roll

Though many translations read βιβλίον as "book" in this passage as elsewhere in the bible, I have chosen to translate βιβλίον as roll to interrupt our contemporary tendency to imagine Jesus reading from a codex. In this episode, Jesus is not handed a leather bound King James bible, but a roll that likely operated much like the Isaiah roll found in cave one at Qumran. The Great Isaiah Scroll (1QIsaᵃ) was one of the first seven manuscripts found at Qumran and is the largest and one of the most well preserved of the entire collection. This bible interface is such a treasure that it is on display at the Shrine of the Book at the Israel Museum in Jerusalem.[123] 1QIsaᵃ is approximately 24.5 feet long and was made from 17 sheets of parchment like material sewn together with linen thread. Stretched out, this scroll would be just shy of the width of the singles lines on a tennis court, so you can imagine how substantial this book interface might feel in a user's

marks this variant as a change from the choice made in the 25th edition, meaning the committee elected to include ἀνοίξας in the constructed text in the 25th edition and switched to ἀναπτύξας in the 27th edition. This decision was unchanged in the 28th edition of NA. The difference between these variants is not significant in terms of the overall reading of the passage, since the more generic ἀνοίξας when used in reference to a roll clearly indicates an "unrolling," which is the meaning of the more specific ἀναπτύξας. Yet, in terms of interface, the more specific ἀναπτύξας is more helpful in indicating the particularities of the interface at work in this use of bible. So, I have translated with the constructed text, taking ἀναπτύξας as "having unrolled." This translational choice is similar to that made in the NRSV, which reads, "He unrolled the scroll…."

[123] Thanks to the work of the Dead Sea Scrolls Digital Project, 1QIsaᵃ is also available for viewing online in a digitized interface at http://dss.collections.imj.org.il/isaiah, accessed on October 11, 2017. This digital 1QISaᵃ interface interestingly has been designed to emulate the rolling of the scroll from right to left as a user moves through the interface, with the size of the rolls that would be in each hand changing to approximate a user's position in the roll. For example, as you near the end of the text of Isaiah in this digital interface of 1QIsaᵃ, the roll that would be in a user's right hand is much larger than the roll in the left hand.

hands.[124] On these sutured together skins, the text is written in Hebrew in fifty four columns that encompass the entire text of the biblical writing of Isaiah.

In general, as an interface, the roll offers a two handed user experience when reading that combines the analog, a continuity, and the digital, discrete bits. The typical roll book consists of several sheets of papyrus or parchment, glued or stitched together from edge to edge, written on one side in columnar fashion and rolled up for easy storage and protection. To read, a user would use one hand to unroll in the direction of reading, right to left in Hebrew, left to right in Greek, and the other hand to reroll the used portions of the text. A more contemporary, but already out of date, technology that emulates the mechanics of a roll is a cassette tape or a reel to reel film. If you can imagine rolling the two spools of a cassette tape by hand and reading for text on the tape, that is similar to how users interfaced with the roll. In fact, some rolls had handles that functioned like spools to enable the user to more easily move back and forth through the book. Imagine the inefficiency and frustration in this interface. Once you get to the end of a roll book, a user has to unroll (or is it reroll?) all the way back to the beginning to read again. I can imagine an ancient library staffing a circulation station with aspiring student scribes or scholars, where their only task was to roll back books from end to beginning after they had been used by a patron. Perhaps one of the reasons we find author attribution and colophon at the end of ancient roll manuscripts is because users often did not rewind.

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[124] For a detailed description of the physical characteristics of 1QIsaᵃ, see John C. Trevor's introduction to the Isaiah Scroll in Millar Burrows, *The Dead Sea Scrolls of St. Mark's Monastery*, vol. 1 (New Haven: The American Schools of Oriental Research, 1950), xiii-xviii.

The columns of writing in a roll book effectively delineated what we would call pages today as a user would roll with both hands in concert until a single column or maybe a few columns of text were visible, they would read that column, and then would roll again when ready to move on. In this sense, roll as interface offered the user both a linear analog[125] experience of rolling through the trajectory of a book along with a kind of digital processing of the discrete bits of text encountered column by column. Unlike an automated cassette tape, but much like the page turn of the codex, rolling to expose one or a few columns of text at a time breaks up the experience of a text, even if only for a second. This horizontal roll was not the only interface available for reading and writing used in antiquity, it was simply the preferred interface for longer texts and became the dominant roll book form for Israelite scriptures. Shorter decrees, contracts, and letters could be found in a vertical arrangement with the rolling mechanism the same as the horizontal roll, but in a different orientation and the writing was continuous along the roll, rather than being written in discrete columns. With the absence of the columnar interruptions, the vertical roll provided a more continuous reading experience for the user than the horizontal roll.[126] Yet, if a user allowed for multiple columns to be in view at once when reading from a horizontal roll, it would be possible to time rolling over a first column while reading a second column to reveal a third column, and so on.

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[125] I would rather find other words to describe this difference other than analog/digital. The important point to make in all interface analysis is that rarely do we have a binary situation, because interfaces as relationships afford more than one type of use.

[126] This vertical roll interface is akin to our contemporary relationship with reading on a web page and the act of moving around in these web pages is called "scrolling."

If we turn back to the scene portrayed in Luke 4, with a roll similar to 1QIsa[a] in mind as the interface in which Jesus is participating when he reads this passage from Isaiah, what kind of affordances do we see at work? Though we know very little about the practice of reading in ancient synagogues,[127] it is unlikley that Jesus had to unroll this large scroll from the beginning to reach the passage he reads from chapter 61 of Isaiah, which in 1QIsa[a] is in column 49 of 54 on the third to last piece of parchment. Given the common cycle of readings, the typical use of readings from the prophets, and the presence of an attendant in synagogue practice, it seems more likely that Jesus was handed the roll already positioned toward the text of interest. So, we can imagine the attendant handing Jesus the roll with a large amount of material in the right hand and just the last few sheets rolled up in the left hand.[128] Holding the bulk in his right hand, Jesus unrolls the roll a small amount to expose the column having the passage of interest, he reads a small portion, rolls the two ends back together, and hands the roll back to the attendant.[129]

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[127] For an excellent summary and useful bibliography regarding the public reading of scripture in first century synagogues, see Tim Hegg, "The Public Reading of Scriptures in the 1st Century Synagogue," *TorahResource* (2007), https://www.torahresource.com/EnglishArticles/TriennialCycle.pdf, accessed on August 11, 2017. Hegg deals explicitly with this passage from Luke on pp. 3-5.

[128] Based on some archaeological evidence from later synagogues, Lee Levine, *The Ancient Synagogue: The First Thousand Years* (New Haven: Yale University Press, 2005), 93-95, suggests that it may have been common to have a table in the center of the meeting space upon which these rolls were placed for reading. So, in our passage of interest here, after Jesus is handed the roll, he may have placed it on the reading table and then unrolled it as needed and read.

[129] If 1QIsa[a] is an indicator of the type of roll depicted in this scene in Luke 4, then the additional spacing left between the end of verse 60 and the beginning of verse 61 might

Surface Area: One Column at a Time

I suggested in the last chapter that the affordance of high surface area in an interface indicates many points of contact, which encourages participation through many potential points of participation and resists a user's ability to master or control the whole interface. In a sense, the columnar organization of this roll interface, particularly when used to find and read a small bit as a part of a larger ritual gathering, provides high surface area. The demanding access technology of a roll, requiring two hands to negotiate the location of any one column of text requires a level of user participation that is unfamiliar to us, given both the nonlinear access afforded by the codex and even more so the one handed thumb swipe enabled by Kindle reader on an iPhone. Each column, when in focus, offers one point of contact with the interface and the small bit of text read by the user in this example of Luke 4 also offers simply one of many points of contact with this interface. Though the reader and the community gathered may have a sense of the whole text of Isaiah and even the whole of Hebrew scriptures, this interface event offers one small surface of contact from a large possibility set of surfaces of contact such as other passages, other columns, even other prophetic writings. In terms of the material interface of the roll, the discrete engagement of the user with one column (or even a few) at a time could actually resist the capacity to master the whole. In the episode of Luke 4, there is no attempt to contextualize the passage read aloud by reading the rest of the column or by explaining the location of this particular pericope in relation to the whole of Isaiah, it is simply offered as a bit, or even a sound byte. This offers us an important reminder about

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have helped the user locate their position in the text in the absence of chapter and verse markings, with which we have become so familiar today.

interface and the role of both platform and user in performing or producing interface. In its simple material form, requiring linear access to any piece of text by proceeding through the entire whole of the text, a roll book might seem to offer very low surface area. Yet, in use, attending to one column, even one line at a time, this interface becomes rather high surface area, demanding participation in framing the column and resisting the mastery of the whole by distancing the user from the parts of the text which are not visible or even easily accessible.

Communal Use: Affording Collaboration

There are two ways in which this roll interface demonstrates collaborative affordances. First, the details of the episode in Luke 4 suggest that it was common to have this roll interface passed around to different people to read. So, even though 1QIsaᵃ may have been rather large and cumbersome and may have only allowed for one user at a time, the involvement of multiple readers engaging the roll in this communal synagogue setting over the course of many customary gathering on the Sabbath suggests that the roll interface was used as a collaborative interface. The preparation of the roll by the attendant, the handing back and forth of the roll between the reader and the attendant, and the reading aloud for others to hear, all signal a collaborative endeavor facilitated in part by this bible interface.[130] In his description of the physical appearance and wear of

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[130] In the manuscript itself, there are some unusual markings in the margins that could have been used to help facilitate this kind of collaborative reading process described in Luke 4. For example, in the right hand margin of line five of column forty nine of 1QIsaᵃ, which is the column from which Jesus would have read in Luke 4 if using 1QIsaᵃ, we find a heavy horizontal line with a rounded triangle on top. This marking appears 5 other times in the manuscript. Line five contains the last bit of what we now call chapter 59 of Isaiah and the line contains blank space at the end to mark the transition in textual unit, as

1QIsaᵃ, Trever hints at the collaborative affordance of this roll interface, saying, "Clear evidence of the long use of the Isaiah scroll in ancient times can be seen on the back of it both in these repairs and in the much darkened area at the center where the hands of many readers held it."[131]

In addition to this collaborative reading practice, the roll interface exemplified by 1QIsaᵃ signals a second collaborative affordance in the shared task of editing the text. As Trever notes, many of the emendations evidenced in 1QIsaᵃ look to be from the same hand as the scribe that wrote the body of the text.[132] Yet, there is also evidence of other people participating in the emendation of the text by adding words or larger sections that were omitted by the initial scribe.[133] In fact, on line twenty six of column forty nine of 1QIsaᵃ, which contains the first verse of Isaiah 61 we hear read in the episode described in Luke 4, there is an example of this collaborative participation in the production of the text. In the spacing between lines, a different user has added a word just above the line

is customary throughout this manuscript. Even though Trever, "The Isaiah Scroll," xvi, suggests that these markings were later additions to the text to mark passages for finding and reading, it seems equally as likely that these markings were used as guides for the writing of the text of this roll. From the user perspective in the synagogue example of roll interface, the passage transition is already marked by the space left blank at the end of the line, so it is unclear as to why an additional marking would be necessary to signal the reader. Emanuel Tov, "Scribal Markings in the Texts from the Judean Dessert," in *Current Research and Technological Developments on the Dead Sea Scrolls*, eds. Donald W. Parry and Stephen D. Ricks (Leiden: E.J. Brill, 1996), 46-48, identifies this marking as a *paragraphos* sign, marking the division of the text into paragraphs, yet not distinguishing between original scribes, later scribes or readers.

[131] Trever, "The Isaiah Scroll," xv.

[132] Trever, "The Isaiah Scroll," xv.

[133] As Trever, "The Isaiah Scroll," xv, notes, to explore more about the identification of these collaborative partners in production of the

where it seems a word was omitted. By the time 1QIsaᵃ was in use, in the last few

centuries BCE, the text of Isaiah was rather well established. So, as users participated in

this roll interface, they would easily have identified a missing word or phrase as

compared to the established tradition of the text of Isaiah. In this particular case of

column forty nine of 1QIsaᵃ, the initial scribe left out *sh'lächaniy*, so another user simply

added this word above the line right at the spot in the text where it would have been

expected. The marginal spaces and the spacing between lines in this roll interface

undoubtedly afforded both ease of reading and some protection of the text from weak

points in the material of the manuscript that might develop around the stitching of the

sheets. Yet, as we see evidenced all throughout the roll, these spaces become a vehicle for

affording collaborative participation in the ongoing construction of the interface that is

1QIsaᵃ.[134]

We can easily imagine the similarities between this collaborative affordance of

1QIsaᵃ and the notes we as teachers leave in the margins of our students' papers, either

with pencil on paper or with annotation bubbles and pointers on a PDF. More advanced

interfaces for collaborative construction of a text have emerged in word processing

technologies and cloud based document sharing and cooperative editing platforms like

google docs. These emerging interfaces allow for a new scale of collaboration by

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[134] For a discussion of and bibliography for the text of and scribal practices at work in
1QIsaᵃ, see Emanuel Tov, "The Text of Isaiah at Qumran" in *Hebrew Bible, Greek Bible
and Qumran: Collected Essays* (Tübingen: Mohr Siebeck, 2008). For a more
comprehensive look at scribal practices evidenced in texts from Qumran, see Emanuel
Tov, *Scribal Practices and Approaches Reflected in the Texts Found in the Judean
Desert* (Leiden: Brill, 2009). For a useful summary of these practices drawing heavily on
Tov's work, see David Stern, *The Jewish Bible: A Material History* (Seattle: University
of Washington Press, 2017), 11-62.

working with a material canvas that allows both erasure and addition without leaving a noticeable trace of the collaboration at work and the ongoing process of making the book.[135] One of the beauties of the constraints of interfaces like 1QISaᵃ is that the collaborative efforts to make the roll user friendly cannot be hidden away in a differential file that only appears if a user is curious. Instead, these changes to the text in the spaces between the lines and marginal notations in the gutters are in plain view for every user of the interface to see, signaling that this book continues to morph and emerge through use.

Hinting at Anarchy

In the previous chapter, I suggested that the third affordance of bible as interfaces is anarchy. Anarchy in interface "resists the closure or consolidation of use to any mechanistic determinism governed by original author, original version, or final form."[136] In one sense, the visible markings of users continuing to work on the text of 1QISaᵃ resists closure of this interface to a pristine and fixed text. Yet, as was customary in the manuscript copying process of antiquity, many of the changes we see in this interface by the initial scribe and later users are attempts to "correct" the text to more closely resemble its exemplar or the accepted version or tradition of the text of Isaiah.[137] Thus, in

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[135] Google Docs does track all history of changes made to a document, including identifying the contributor, if known, instead of relying on handwriting differences or ink changes. Yet, in a Google Doc, this history of participation in the construction of the interface is tucked away neatly in a different screen so as not to clutter up the finished product of the document itself.

[136] See chapter 1 for a fuller discussion of anarchy in interface.

[137] David Stern, *The Jewish Bible*, 26-27, calls these markings interventions, of which most are corrections. Many later users would not have access to actual textual exemplars, so by correction, I do not mean to limit this activity to simply alignment with an earlier

another sense, these collaborative markings exhibit archic tendencies, aligning the interface with some original source manuscript or an established proper form of the text it contains. Though 1QIsa^a may not exhibit many material properties signaling the affordance of anarchy, the fact that users participated in this interface as a form of communal reading without explicit determinative guides in the interface itself to control or contain or close "the mysterious possibilities of exegesis"[138] offered by reading a few lines from one column near the end of the book suggests the possibility of anarchy in use. The simple fact of inviting participants to read a small bit of text and allowing the listeners to make sense of that short reading as they found fit is a performance of anarchy.

The high surface area of the discrete columns, the collaboration of both communal reading and textual emendation, and the anarchy of expounding on a small excerpt read in the process of a customary ritual gathering suggest that 1QIsa^a has the potential to be an interface begging for participation and resisting reduction to consumption of content. It is important to note here, that for this roll bible interface, the communal reading use plays a major role in both demanding participation and resisting mastery, closure and determinism by involving many voices. We will see this combination of small bits and many voices remain as an important indicator of bible as interface.

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written manuscript. Instead, "correction" can encompass scribal adjustments to fit the tradition of Isaiah they had received from their community.

[138] This is one of the phrases Levinas, *Ethics and Infinity*, 23 uses to describe bible as the book of books. These mysterious possibilities of exegesis are an example of Drucker's articulation of interface as probabilistic production.

Binding the Book: Codex Bible

The roll interface illustrated by 1QIsaᵃ was the dominant bible interface until near

the turn of the first century of the common era, when a different technology for book

begins to emerge, the codex. Codex is the antique technical term for book as we know it

today. The definition offered by Roberts and Skeat in *The Birth of the Codex*, states that a

codex is "a collection of sheets of any material, folded double and fastened together at the

back or spine, and usually protected by covers."[139] This is a helpful and precise

definition, which highlights the material mashup that codex represents. The fastening of

multiple writing surfaces together at one end so that the writing surfaces fold together,

face to face, comes from the wooden tablets commonly used by the Romans in antiquity.

This collection of wood frames filled with wax is where codex gets its name, with *codae*

being Latin for wood.[140] In order to be of practical use for longer writings such as

literature, poetry, or scripture, a shift was made to the same type of writing and reading

surface as the roll, typically papyrus or parchment. So, the codex becomes a mashup of

two writing and reading technologies at the time, the wax tablet and the roll. The main

structural difference between roll and codex arises from the way in which sheets are

attached together. Rather than gluing or stitching sheets together at an edge in sequence

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[139] Colin H. Roberts and T. C. Skeat, *The Birth of the Codex* (London: Oxford University Press, 1983), 1. It is instructive to compare the Wikipedia definition of book, https://en.m.wikipedia.org/wiki/Book, accessed on October 11, 2017 and the google definition of book (search for "define book" in google) with this codex definition from Roberts and Skeat. It is clear that in contemporary parlance, book and codex mean the same thing. This is more evidence that codex has come to dominate the contemporary imagination of book.

[140] Roberts and Skeat, *The Birth of the Codex*, 11-12.

to make a long continuous roll, a codex is made by folding sheets into bundles called

quires and then fastening one or more quires at one long edge. The bare minimum

material needed to constitute a codex is more than one sheet of material and some kind of

binding at the spine. This new interface, though carrying forward continuities with

existing technologies, afforded new user relationships.[141]

Derived from its ancestors, the wax tablet, the leaf tablet[142] and the notebook, the

codex provided a number of potential technological advantages as compared to the roll.

Numerous examples have been suggested, such as portability, capacity, and flexibility.[143]

For example, Martial's late first century promotion of the new codex technology as a

fitting format for a traveler's collection of his poems or other literary classics confirms

the accepted value of portability attributed to the codex in antiquity.[144] Allowing for

writing on both sides of the writing surface, the codex could hold more text per unit of

material and thus smaller, more portable books could be produced. On the other hand,

since the codex could theoretically bind an unlimited number of pages and both sides of

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[141] The ancient helpdesk parody video that has circulated on YouTube provides a helpful, though hyperbolic, depiction of the assumptions we make about codex as a technology since we are so familiar with it. NRK, "Medieval Helpdesk with English Subtitles," https://youtu.be/pQHX-SjgQvQ, accessed on October 11, 2017.

[142] See Graham Stanton, *Jesus and Gospel* (Cambridge, UK: Cambridge University Press, 2004), 174, for a discussion of the leaf tablets found at Vindolanda.

[143] James Joseph O'Donnell, *Avatars of the Word: From Papyrus to Cyberspace* (Cambridge, Mass: Harvard University Press, 1998), 54.

[144] Roberts and Skeat, *The Birth of the Codex*, 24-25. Even with this affordance of portability offered by the codex, this may not have been an important technological advance for bible in early antiquity, since the scriptures used by early Christians were largely still interfaced in roll.

these pages were used for writing, the codex could hold an increasing amount of text within one book. This tremendous capacity also allowed for increased collection of writings together in one volume. Yet, as we saw with the roll, the pragmatics of user interaction with interface placed some limit on the practical capacity of a single codex. The flexibility of the codex is confined mostly to the multiquire format, where the binding could be removed to facilitate rearrangement, addition, and subtraction of sections.

I agree with James O'Donnell, who suggests that the most valuable technological advantage provided by the codex is non-linear access to text.[145] Non-linear access captures one of the fundamental technical differences between a roll and a codex book interface. The text of a roll has to be accessed in a linear fashion, from beginning to end, even if not all of the text is read. With a codex, access to a text can begin at any point without regard for what precedes or follows, and need not proceed in any sort of linear fashion. I prefer the language of non-linear access to describe this technological innovation over phrases such as "ease of reference" or "random access." The phrase "ease of reference" does not adequately describe the fundamental transition in the user interface for text processing that accompanied the shift in technology from roll to codex and traditional reference aids did not become common, even in codices, until the fourth century C.E.[146] Though random access was certainly possible with a codex, this seems

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[145] O'Donnell, *Avatars of the Word*, 54, says, "The history of medieval manuscripts is the history of the exploitation of the possibilities of the codex page."

[146] Harry Y. Gamble, *Books and Readers in the Early Church: A History of Early Christian Texts* (New Haven: Yale University Press, 1997), 55-56, 63.

like extreme language to describe the phenomenon. Reading and writing processes rarely involve or necessitate truly random access to a text.[147] "Non-linear" terminology maintains the idea of user participation in interface and clearly describes one technological affordance brought about by the codex.

Thanks to the collaborative work of the British Library, Leipzig University Library, St. Catherine's Monastery, and the National Library of Russia, we have the amazing ability to explore one particular example of bible as codex in Codex Sinaiticus.[148] Understanding the irony in this project of using a digitized interface to discuss the parchment codex interface, I will focus here on the affordances of the ancient codex, not on the ways the website affords our interaction with it.[149]

One of the great early bible codices, alongside Alexandrinus and Vaticanus, Codex Sinaiticus is thought to be produced in the middle 300's and contains a majority of

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[147] More recent machine reading techniques such as those used in Natural Language Processing tasks such as topic modeling can involve access to text that approaches randomness.

[148] I have a particular affinity for this codex both because I have spent some time exploring the manuscript itself but also because of its name. It gets its name from the Mount Sinai monastery where the first portion of the remains were found. Though the relationship between the tablets at Mount Sinai in the biblical story of Moses bringing the commandments to the people and the codex that bears this mountain's name is entirely accidental, I find great resonance between the cultural impact of these ancient stone tablets and the codex that is said to give us a window to the "original" text of the New Testament.

[149] The enactment of the Codex Sinaiticus project itself raises all kinds of interesting questions regarding bible as interface by combining digitization techniques, xml encoding, and web design to provide a collection of online interfaces to offer contact with this ancient codex interface. In the next chapter, I will take a closer look at the Codex Sinaiticus Project as a bible interface beyond book.

what is today considered the Christian bible, with a few particularities and omissions.[150]

Sinaiticus is a parchment codex of substantial size with 400 leaves remaining of the

estimated 730 that were in the full manuscript, totaling something near 1440 pages. The

pages are large, measuring 15 by 13.5 inches and the writing is in four columns per page

of uncial Greek in *scripta continua*.[151] It is interesting to note the continuation of

columnar writing that is carried over from the roll interface. The material interface of

codex does nothing to suggest the need to write in multiple columns on a single page,

which was a waste of expensive material. Writing all the way across the page would save

space, allowing a codex to store more and cost less. Yet, the presence of the roll remains

in the columns of the codex as an echo of the interface that preceded it.

Non-Linear Access and Collectability

Combining the new affordance of non-linear access with increased collective

capacities, a codex like Sinaiticus introduces a new scale of surface area into book

interfaces. In the roll interface, the mechanics of linear horizontal access with discrete

vertical columns exposed one at a time created one kind of high surface area, such that a

user might engage one column without having easy access to or awareness of another

distant portion of the text. In a simplistic sense, chopping a long text into columns on a

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[150] See "Content" in the Codex Sinaiticus Project, http://www.codexsinaiticus.org/en/codex/content.aspx, accessed on August 20, 2017, for a detailed description of the contents of the codex.

[151] For a description of the physical characteristics of Codex Sinaiticus and its relationship to other early Christian codices, along with a robust bibliography for other conversation partners regarding the materiality of Codex Sinaiticus, see Harry Gamble, "Codex Sinaiticus in Its Fourth Century Setting," in Amy Myshrall et al., eds., *Codex Sinaiticus: New Perspectives on the Ancient Biblical Manuscript* (London: The British Library Publishing Division, 2015), 3-5.

roll is akin to grinding up a coffee bean into coffee grounds, thus increasing the discrete

surfaces of contact with the entity. Codex Sinaiticus, with four columns per page, thus 8

columns across when open, and an easy page turn away from any distant portion of text

suggests a decreased surface area (more text in view at once, so less discrete, perhaps

even less digital) as compared to 1QIsa[a] from the perspective of a single open "page."

Yet, the ability to move back and forth across vast portions of text in a codex with a

simple page turn, without the analog-like process of having to move through each portion

of text to get there, provides an entirely different kind of discreteness that increases the

possible points of entry and contact for the user and at a much faster pace. Even before

the prevalence of reference aids in codex interfaces, if we combine the speed and

disjunction of non-linear access with the collective capacities of a codex like Sinaiticus,

we can see this high surface area at work, both demanding participation and interrupting

a user's ability to grasp the whole of the interface.

If a user was reading Luke 4 in Codex Sinaiticus and came across the passage we

explored earlier, which details Jesus's reading of Isaiah 61:1-2 in synagogue, the user

could flip from folio 230 to folio 66 to see more of the context of Isaiah passage. It is the

affordance of non-linear access that suggests a practical possibility of collecting these

two writings together in one book interface. Even if the theoretical capacity of a roll book

could hold enough text to contain both Isaiah and the Gospel of Luke, the linear access of

the roll makes it entirely impractical to read from two distant places in a roll in a short

period of time. A more common example of the high surface area afforded by the non-

linear access and collectability of the codex interface would be a user comparing

passages that describe similar events in more than one Gospel text. The presence of

marginal markings in Codex Sinaiticus indicating discrete related pericopes in different

gospel texts demonstrates the usefulness and evolution of this high surface area capacity

as reference aids emerged in the margin to support the practice.[152] On their own, the non-

linear access and collective capacities of the codex might have facilitated lower surface

area by privileging the access to the whole of a text. Yet, the interruptive process of non-

linear access and the multiple voices made available in such a large collection lead to

many potential contact points and many modes of access, which afford a high surface

area that supports bible as interface irreducible to consumption.

Scripta Continua as Surface Area

Another characteristic of Codex Sinaiticus that contributes to high surface area in

interface is the use of *scripta continua*. *Scripta continua* is writing that includes no spaces

and no punctuation to identify word breaks or phrase endings. In Codex Sinaiticus, the

scripta continua even continues across line breaks.[153] The regular patterns of the Greek

language allow for fairly predictable and consistent parsing of this uninterrupted string of

characters, but there are inevitably places where the algorithms do not produce only one

possible reading. As Gamble suggests, the absence of spaces and punctuation demands a

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[152] See D. C. Parker, *An Introduction to the New Testament Manuscripts and Their Texts* (Cambridge: Cambridge University Press, 2010), 315-16 and Dirk Jongkind, *Scribal Habits of Codex Sinaiticus* (Piscataway, NJ: Gorgias Press, 2013), 109-120 for more information on the Eusebian apparatus in Codex Sinaiticus in particular.

[153] This continuation of *scripta continua* across line breaks is one reason Gamble, "Codex Sinaiticus in Its Fourth Century Setting," 11, suggests that Codex Sinaiticus was unlikely used as a cathedral bible for public reading in services.

participation from the reader that is unfamiliar even to an ancient book like 1QISa[a].[154] It

might seem more appropriate to consider *scripta continua* as lower surface area since the

text all runs together without spaces or punctuation to break the text into discrete bits.

Yet, if we consider the use of an interface with *scripta continua*, it actually demands that

the user engage each character as a discrete unit to determine where the word breaks and

sense breaks need to be to read. So, the absence of spaces demands the reader to

participate more actively in constructing the text as it is read. The ambiguity possible in

this process of parsing word breaks, though far less frequent than a contemporary reader

might imagine, resists a deterministic reading of the text. Thus, *scripta continua* enhances

the high surface area of Codex Sinaiticus.

Collaborative Annotations

As stated by the curators of the Codex Sinaiticus project, one of the most

interesting aspects of this ancient manuscript is the rich annotative life it betrays. Klaus

Wachtel counts 23,000 places where the manuscript has been adjusted, amounting to an

average of 30 annotations per page.[155] Like we saw on a much smaller scale in 1QIsa[a], in

these markings at the margins, we find a material performance of the affordance of

collaboration in interface. Whether deemed as corrections, additions, theological guides,

or reading indicators, these annotations demonstrate a participatory reading process that

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[154] Gamble, *Books and Readers*, 203.

[155] Klaus Wachtel, "The Corrected New Testament Text of Codex Sinaiticus," in Amy Myshrall et al., eds., *Codex Sinaiticus: New Perspectives on the Ancient Biblical Manuscript* (London: The British Library Publishing Division, 2015), 97. Wachtel provides a detailed analysis and bibliography for exploring the corrective strands in Sinaiticus. The outer page margins are massive, which may have contributed to the rich annotative life of the manuscript.

affords collaboration of users and the ongoing use and development of the interface over

many centuries.[156] With the roll interface, we found a significant collaborative affordance

in the communal reading use. It has been tempting, given the close timing of

Constantine's request for "fifty copies of the divine Scriptures" in 330 and the likely

production of Codex Sinaiticus in the fourth century, to imagine Codex Sinaiticus as one

of the fifty bibles requested by Constantine to be used in the churches for instruction.[157]

Yet, as Gamble points out, the less than portable size of Sinaiticus, the lack of reading

aids, and the multi-columnar *scripta continua* suggest that Codex Sinaiticus might not

have been well suited for public reading and may have been commissioned for personal

use.[158]

Even if this magnificent manuscript was initially intended for private use, we see

the affordance of collaboration of the interface at work in the unparalleled volume and

diversity of annotations present in the book. Milne and Skeat as well as Jongkind provide

detailed accounts of the layers of collaboration in making this interface what it has

become.[159] The Codex Sinaiticus Project website provides a nice summary of the kinds of

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[156] Wachtel, "The Corrected New Testament Text," 98, suggests three layers of corrections in the New Testament portion spanning from the forth to the twelfth centuries.

[157] Gamble, "Codex Sinaiticus in Its Fourth Century Setting," 7-12, summarizes the main arguments for this connection, primarily based on Skeat's many articulations of the possibility.

[158] Gamble, "Codex Sinaiticus," 11.

[159] For extensive studies of the scribal activity in Codex Sinaiticus, see the classic work by Herbert J Milne and Theodore Cressy Skeat, *Scribes and Correctors of the Codex Sinaiticus: With Plates and Figures* (London: British Museum, 1938) and more recently, Jongkind, *Scribal Habits*.

activity present in the interface, which includes no fewer than three initial scribes, as many as nine revisors, three medieval marginal annotators, and arabic glosses.[160] This amount of ongoing participation in the construction of Codex Sinaiticus from the forth century until the twelfth demonstrates the collaborative affordances of the interface and the ongoing emergence of the text. The layout of the pages of the manuscript afforded a great deal of space on all margins that could well be used for annotations. Yet, the vast majority of the markings of participation show up in the small spaces between letters and lines in the body of the text. As I noted in the 1QIsaᵃ interface, here again in Codex Sinaiticus, we have a persistent reminder of the evolving and participatory nature of this interface because the editorial marks remain in place together with the earlier versions of the text. The ongoing presence of earlier and later participations in the interface mimics the palimpsestuous relationship between the roll and codex we see in the persistence of multiple columns on a single page in Codex Sinaiticus. Having access to this antique form of revision control in Codex Sinaiticus, where we see the history of suggested changes offered in the margins by users of the codex illuminates the dynamic collaborative life of the book. This revision history is an ancient precursor to functionality provided by contemporary interfaces such as the show all markup option of the Track Changes functionality in Microsoft Word. Even the spatiality of these distant analogies of revision history share commonality as words are struck through in exchange

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[160] For more details on this summary, see http://codexsinaiticus.org/en/project/transcription_detailed.aspx, accessed on August 20, 2017.

for others, characters are marked as deleted on the line, and comments float in the margins.

Opening the Binding: Anarchy in Codex

The character of the revisions found in Codex Sinaiticus and the fact that most of the changes to the text do not fully erase earlier versions of the text also contribute to the anarchic affordance of this bible interface, resisting in a way the consolidating tendencies of the material makeup of the book. As a material construction, Codex Siniaticus is an archic container, embodying the dominance of a singular entity. This massive book is a crowning example of the exploitation of the collective and consolidating affordances of the codex technology. Bringing such a large collection of texts together in one volume, twenty nine early Christian writings and the whole of the Septuagint,[161] was entirely impractical for everyday use, but was a strong signal of the unity and totality of the Christian scriptures. It is hard not to imagine some cultural and cognitive correlation between the growing debates about what writings ought to be included in the authorized collection of Christian scriptures and this exquisite exemplar of codex as container. Though I find Robert Kraft's suggestions of a relationship between growing Christian canon consciousness and the emergence of codex technology entirely compelling, I appreciate the wisdom of Gamble's caution to avoid postulating any direct causal relationship between these two phenomena.[162] Regardless of the precise relationship

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[161] Gamble, "Codex Sinaiticus," 4.

[162] Kraft, "The Codex and Canon Consciousness," http://ccat.sas.upenn.edu/gopher/other/journals/kraftpub/Christianity/Canon, accessed on August 20, 2017, and Gamble, "Codex Sinaiticus," 5, for a brief caution and reference to many works exploring the relationship in detail.

between canon and codex, the ability to collect a large number of related writings in one volume, bound together at the spine, and protected by covers most definitely signals an *arche* of containment and consolidation into a unity as a material artifact.

Perhaps it isn't a coincidence that once a user *opens* Codex Sinaiticus, this icon of unity that hints at comprehensiveness and homogeneity affords anarchy through the irreducible polyvocality of the collection and the revision layers. A collection of writings as large as that included in Codex Sinaiticus that come from vastly different time periods and regions inevitably resists any consolidation into a single voice. Challenging the "impoverished" tendencies encouraged by the simplistic cultural iconicity of bible as the unified and comprehensive container of all meaningful knowledge, Timothy Beal points out that "The Bible is anything but univocal about anything. It is a cacophony of voices and perspectives, often in conflict with one another.[163] Beal, well aware of the social effects of media in general and the specific effect of print codices on the use of bible as interface, points to the disjunction between the all encompassing closure and unity suggested by the physical form of the codex and the several layers of difference enacted between the covers. A simple example of the anarchy of the collection is the inclusion of four gospel accounts that constantly offer differences to negotiate among themselves, resisting reduction to any singular account of the life, ministry, and death of Jesus.

Beyond the texts collected together in Codex Sinaiticus, the revision process also indicates an anarchy in this book interface.[164] In his close attention to the character and

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[163] Beal, *Rise and Fall*, Kindle location 2088-2089.

[164] Jeffrey Mahan helpfully points out that this Codex Sinaiticus bible interface demonstrates the affordance of anarchy in several different kinds of uses, such as the

quantity of textual emendations in Codex Sinaiticus, Klaus Wachtel points out that though there is a tendency to emend the text toward the Byzantine text family, a user is able to discern at least three texts at work at the same time in Sinaiticus, the work of the initial scribes, the systematic emendations of Corrector[a] (C[a]) and the even later text of Corrector[b2] (C[b2]), which works with both the initial text and the text of C[a].[165] Again, because the process of revision in Codex Sinaiticus involved dots over letters or strikethroughs as deletions, rather than hard erasure or total replacement, much of the time, a user can still see the layers of evolution of the text and the direction of the changes does not always suggest a linear progression toward a stable text form.[166] A great example of this ongoing conflict of multiple voices in the revision layers resisting the closure of the interface to a single voice is what Wachtel refers to as the "bloody sweat" episode of Luke 22:43-44. This passage is one of three additions to the text of the New Testament often indicative of the more stable form of the text developed later in medieval times and known as the Byzantine text.[167] Looking at the last 10 rows of column 3 and the first line of column 4 on folio 244b of Codex Sinaiticus, we can see that the initial scribe included the bloody sweat passage and that an early corrector, identified as C[a],

ongoing production of the manuscript and the use of the manuscript for religious of liturgical reasons.

[165] Wachtel, "The Corrected," 101.

[166] Wachtel, "The Corrected," 104, says, "The development towards the stable medieval mainstream text form was neither homogeneous nor consistent."

[167] The other two additions include the longer ending to the Gospel of Mark (Mark 16:9-20) and the story of the story of the woman taken in adultery (John 7:53-8:11). See Wachtel, "The Corrected," 102-103 for further discussion of these variants in the early manuscript tradition.

used dots above the letters of the first line and then a more efficient dot marking at the

beginning and end of each line, to signal the deletion of this passage from the text. In a

palimpsestuous object lesson, these erasure dots then get erased by C^{b2}, but not entirely,

leaving a user of this codex with an explicit look at the anarchy of this interface in the

ambiguity and polyvocality inscribed on its surfaces.[168]

Before the stable consolidations of the medieval process of transliteration in the

ninth century and the emergence of print in the fifteenth century, Codex Sinaiticus

provides an example of codex bible that exhibits the affordances of high surface area,

collaboration, and anarchy. Though the material characteristics of the bound volume

afford instincts toward comprehensiveness, consolidation, and closure, the 800 years of

participation in evolving the text betray bible as interface, a relationality that is

irreducible to consumption.

Bible on Screen: Kindle Bible

Of all the possible platforms I could select to explore bible as book in the digital

age, I focus on Kindle because it is a familiar and ubiquitous platform that continues to

try to perform as book in significant ways. Though Kindle and other ebook platforms

offer a distinct change in a user's relationship to a text, even the nomenclature of "ebook"

and "Kindle book" demonstrate that these interfaces continue to imagine themselves in

the category of book. Based on the definition of book I began with in the introduction, "a

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[168] Wachtel, "The Corrected," 99-100, helpfully points out that multiple layers of corrections like these and the myriad others that are even less cut and dry would make it very difficult for a public reader to make decisions during the process of reading the text aloud. Instead, Wachtel suggests that Codex Sinaiticus was more likely used as an important exemplar for further copying, not as a reading bible.

technology that involves the fastening together of discrete pieces of material to gather and set boundaries for a writing or collection of writings, which is primarily governed by the structure of the page," Kindle is a book interface. Further, Kindle signals its ancestral relationship with the codex book in its predominant structuring of text in columns on discrete pages that are turned. So, as we have seen with other emerging technologies, Kindle books continue to enact the structures of its predecessors, while extending new affordances in interface.

The number of bibles available on Kindle is unstable. Depending on the day, your location, your search habits, and your demographics, a web search for "Kindle bible" will return a different set of options. Already, in this kind of search, we are performing the probabilistic production of interface, because each search has the potential to produce something new based on different user variables and on the constantly emerging options for bible on the Kindle platform. From my particular location in the USA as a bible scholar who does a fair bit of web searching related to bible, one of the top search results when I pass a simple query of "Kindle bible" is a Kindle Book titled "The Bible - The Holy Bible Formatted for Your eReader."[169] This title alone deserves some comment. First of all, the main title of the book is simply "The Bible" without any qualifications or further limitations or identifications. The subtitle offers a small amount more to distinguish this bible interface from the others available on Kindle.[170] This bible is a bible

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[169] "The Bible - The Holy Bible Formatted for Your eReader," http://a.co/grXmqZy, accessed on August 18, 2017.

[170] I am at a loss for why the word "Holy" is added to the subtitle of this book. This could be a reinforcement of Timothy Beal's suggestion in *The Rise and Fall of the Bible*, Kindle location 61, that bible has become a cultural artifact that extends far beyond any

"Formatted for Your eReader." Even in the title, this book is taking seriously the role of interface in the construction of this bible. In this title, there is no mention of version or author or date or language or oder of the text within. What is foregrounded is interface.

If you are willing to spend the $1.99 to purchase this bible interface and you read the "about this book" information, it becomes even more evident that this bible builds its unique identity on the expansion of non-linear access offered by the digital affordances of indexing, anchors, and search. Touch screen navigation, hyperlinked table of contents and chapter/verse markings, and a simplified search mechanism are all the ways this particular bible interface is advertised as unique. The only mention of the particularities of the content of the text inside is a simple statement that this Kindle bible "contains the complete old and new testaments…ASV Version."[171] Here we find the only language focused specifically on contents in the entire description and framing of this Kindle bible. Otherwise, this bible is defined by its interface affordances exclusively. The only mention of author or source of this Kindle bible is the grammatically redundant "ASV Version" fragment in the description, with American Standard listed as the author of the book. Following the author link for American Standard provided by Amazon leads to a blank profile with only this one bible in the list of related items. The American Standard

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sense of content to a cultural sensibility of "authoritative, univocal, practical, accessible, comprehensive, and exclusive." Perhaps, including "The Holy Bible" in the subtitle of this particular Kindle book differentiates it in terms of content from other bibles, such as the Python Bible or the Golf Bible. Could this mean that "Holy" has become a synonym for Christian in common parlance? "Holy" could also indicate that his particular bible interface is intended for pious use more than for academic study or other uses.

[171] See "The Bible - The Holy Bible Formatted for Your eReader," http://a.co/grXmqZy, accessed on February 17, 2017.

Version is a public domain text of the bible published initially in 1901. There is a vast and interesting history to this English translation of the bible, but this Kindle bible pays no attention to this either in the advertising of the bible or in the bible's introduction. We can see here a bible that is entirely focused on the use of it in interface, not on the content it contains.

Lest we imagine that the codex has been replaced entirely by this new interface, this Kindle bible uses the title page from a print codex bible as its "cover" art. Here we find a material representation of the palimpsestuous process of media translation, with an image of a print codex page representing the interface of a Kindle book designed to extend the non-linear access affordances introduced by the codex into new realms made possible by internet technologies.[172] This Kindle bible takes seriously the possibilities of its use and does not assume user familiarity with affordances available in this digital interface, so with the most emphasized line in the description, this bible offers links to YouTube videos on how to use the bible.[173] This may seem like a silly item to highlight in a bible, but it makes a fascinating point about the assumptions we have about users and

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[172] This use of a print codex page to signify the bible, rather than the titles of the writings in the bible, a list of characters and stories, or even some depiction of Christianity or God, shows how deeply embedded the identity of bible is in the print codex.

[173] Rather than using the affordance of linkability offered by the Kindle platform to deliver or embed these training videos in the book itself, for some reason the producers of this bible elected to provide a link to click to be emailed links to videos. From a user perspective, this seems like a failure of leveraging the possibilities of the platform. Yet, because Kindle books continue to perform the stability and fixicity of codex, meaning they do not allow updates like other interfaces might, this approach could afford providing better videos as they develop them or adding additional videos as issues arise with the interface. A more fitting strategy may have been to provide a link to a YouTube channel that could then be a dynamic library of support videos but with a durable link and landing space that could be provided in a stable interface such as a Kindle book.

codices that are no longer operable in these emerging book interfaces. If content is just

one part of interface, then these changes in modes of access will inevitably change the

relationship between user and platform, thus will require new skills and new intuitions.

Proliferation of Interfaces

One of the most interesting developments in the media translation of bible from

codex to Kindle is the ability to use this Kindle bible on an actual Kindle device, a laptop,

an iPhone, an iPad, android devices, and the list gets larger every day. In a sense, what I

have purchased from Amazon in this Kindle bible is permission to participate in a

plethora of interfaces, increasing the surface area of this bible by providing multiple

points of contact even at the platform level. This is one of the distinct differences

between newer media interfaces of bible and the manuscript interfaces we have looked at

previously. To own a manuscript is to have a singular material object with which a user

relates. Certainly, there were variabilities in the encounter between user and platform in

roll or codex interfaces based on historical period, social location, and cultural dynamics

at any given time. Yet, in roll and codex interfaces, the material affordances were

constant for a given book. A user could own more than one bible, but each bible was a

distinct entity and did not require any other technology of access in order to interface

with it.[174]

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[174] Of course, we could speak of language as a technology required to access a roll or codex, but for our purposes here, we can assume language competence in the textual language in all of these interface examples. This assumption is not transferable to the media literacies necessary for bible interface beyond book, which points again to the significance of this Kindle bible including YouTube instructional videos on how to use this bible.

So, in order to participate in the interface that is this Kindle bible, I have to purchase the bible and I have to have access to Kindle Reader software, either in a web browser or as a downloaded application on my laptop or mobile device. As a user of this bible on an iPhone, I actually have at minimum three interfaces at play when I use this Kindle bible-the interface with the phone, the interface with the reader application, and the interface with the particular bible I am using. The overlapping interface possibilities available in my use of this Kindle bible on a computer or on my iPhone provides expansive points of contact with the book that can resist a user from settling into the monotony of mastering one consistent approach to the interface. Using this Kindle bible on my computer at work allows me to write this sentence on one screen with the bible open in another screen. The screen size of the computer device layer of interface allows me to see more text on one screen and in multiple columns. This larger space and more text at once can help a user see connections and contours in the text that may be harder to notice on a smaller screen interface. If I leave work and decide to use this Kindle bible from my iPhone 7 on the train ride downtown, I'm working with less text at a time on the screen and using the search and linkability of the interface more often to make connections between parts of the text, which can surface new textual relationships that might not emerge on more standard linear navigation through the text. Unlike on the computer, the Kindle application interface combined with the iPhone device interface make it simple to share a passage I select with a friend via text or instant message, which could facilitate a more collaborative use of the bible interface through dialog.

Collaboration and the Page

The ability of a user to choose which device to use to participate in the Kindle bible interface and to use different devices as part of the bible interface is just the beginning of the expanded role of the user in shaping the material aspects of the interface. Though users certainly had an impact on the material surfaces of the roll and codex interfaces through adaptations of the text and use in communal settings, the Kindle bible affords an entirely new scale of user participation in shaping the physical space of the interface. Users of roll and codex interfaces were confined by the physical dimensions and limits of the pages, finding space in the margins and between lines or even over text to collaboratively construct the interface. In this Kindle bible interface, the flexibility of the digital screen affords the user the ability to participate in things such as page dimensions, font size, color of background, and number of columns per page. This user participation in shaping the material character of the page enacts one of the collaborative affordances of the Kindle bible interface.

Though the notion of page is not intrinsically operative in the roll interface, we can easily imagine many limits of the page in a roll, such as a each columns as a page, each sheet of material as a page, or even the user's wingspan as the boundaries of the roll page. In a codex interface, the page is clearly defined as one unit of material, be it papyrus, parchment or paper, demarcated by the fold and binding of sheets of material together. So, in Codex Sinaiticus, one sheet of parchment, folded at the middle and written on both sides, provides four pages with four columns of writing per page. In the Kindle interface, the operation of the page is a site of significant change in terms of user

participation. Though not demanded by the technologies involved in providing a digital platform for the use of books, the Kindle interface has kept the codex page as its primary navigational structure. Much like turning the page of a codex, in the Kindle bible, a user is presented with one unit of text at a time and there are navigational aids to move forward or backward in a book, which corresponds to left and right horizontal movement respectively in English language books.

Though entirely unnecessary technologically, Kindle books pay homage to the codex page by maintaining the horizontal navigation through discrete units of text, which mimics the pages of paper or papyrus bound at a spine. This carrying on of the codex page in a technological framework that does not demand it resembles the continued use of a roll's multiple columns of text on a single codex page, even though not the most efficient use of the emerging technology of the codex. In the browser Kindle interface, a user can use arrow keys on the keyboard or click the arrows provided in the pages to move either direction.[175] On an iPhone or other touchscreen device, this navigation is enacted by a touch on the edge of the current page in the direction you want to move and a swipe. This swipe action is the closest physical motion to the familiar page turn of the codex. Some digital reading platforms such as iBooks actually programmed the swipe to visually emulate the turning of the codex page to carry this characteristic experience into these new media environments.

Kindle pages also have a header and footer that are consistent throughout. The page header keeps the title of the book present throughout the book and the footer

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[175] Further bothering the spatiality of navigation, both the up and the left arrow go backward in the book, while down and right move forward in the book.

provides a location indicator, which functions as a media translation of page numbers in a late codex interface. When Kindle first released its platform, all Kindle books used this location numbering as the means of locating a user within the space of the book sequentially. Due to market demands to have better crossover reference capabilities with print versions of the same book, Kindle introduced page numbers into their platform in 2011.[176] Page numbers are not provided in our particular Kindle bible, because this particular Kindle bible has no interest in staying in sync with a print interface and because bible already has such regular internal reference markings provided by chapter and verse. Keeping the location number in the footer of the page throughout the book enables the user to have a sense of where they are located within the larger structure of the book. Better yet, the Kindle layer of the interface provides a location slider and percentage along with the raw location number to provide better visualization of a user's position within a book. This slider visualization enacts a material media translation of the experience of holding a codex and feeling or seeing the different thicknesses of pages in the right hand and the left. In 2016 Kindle expanded this media translation of locating a user within the larger book with the introduction of a feature called Page Flip.[177] With Page Flip, the user gets a slider and thumbnails of pages nearby to afford easy

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[176] See Charlie Sorrel, "Amazon Adds Real Page Numbers to Kindle," https://www.wired.com/2011/02/amazon-adds-real-page-numbers-to-Kindle/, accessed on October 11, 2017, for an example of the kinds of pressures driving this demand for page numbers.

[177] See Todd Bishop, "Amazon's New 'Page Flip' Feature for Kindle is Like a Virtual Thumb in an E-book," http://www.geekwire.com/2016/amazon-new-page-flip-navigation-tool-Kindle/, accessed on October 11, 2017, for an image, description, and video demonstrating this Page Flip feature. This article demonstrates the continued influence of the codex on the design of the Kindle user interface.

visualization of the macro location in the book and easy navigation elsewhere or back to the page from which the exploration began.

The use of location instead of page numbers as the primary indicator of position within a book highlights one of the important interface changes brought by the Kindle platform. In a print or manuscript codex, page size, font size, font type, margin size, page coloring are determined by the book producer and remain unchanged by the user. In this situation, where the materiality of the book determines the page dimensions and boundaries in a fixed and stable manner, regardless of use, it makes sense for page number to be a primary navigational reference aid. A Kindle book allows the user to participate much more in the material construction of the page. In a browser, with one menu click, the Kindle platform allows the user to select from five font sizes, five margin widths, and three text and background color combinations. Mobile Kindle interfaces allow the user to select font type and instead of margin size selection, mobile users can select spacing between lines. It is well established that things like color, font size, and spacing between lines has an impact on user interface and readability.[178] Yet, for our purposes here, the important impact of this increased user participation in defining the materiality of the interface is that user defines the page instead of the material limits of the book.

When using a Kindle bible on an iPhone, if a user turns the phone from portrait (phone held vertically) to landscape (phone held horizontally), the amount and

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[178] Tommy Walker, "The Effect of Typography on User Experience & Conversions," https://conversionxl.com/the-effects-of-typography-on-user-experience-conversions/, accessed on October 11, 2017, is a good starting place to begin exploring the impact of typography on reading in digital interfaces.

organization of the content on the page changes. For example, if I am at the beginning of Ezra chapter 8 in the Kindle bible on my iPhone 7, in portrait mode, the current page holds the first 11 verses, but only 8 in landscape mode. If I were to change the font size or the spacing between lines, the page definition would change yet again. These options for screen orientation and font size mean that each user may have a different material encounter with this Kindle bible, unlike the stable and uniform material encounter afforded by a parchment codex. For example, having less text on a page in landscape mode on an iPhone could provide a user an encounter with a particular passage unencumbered by what comes before and after it, leading to innovative interpretations of that passage.[179]

Though the page possibilities are not unlimited, the book is still bound in a sense, there is no doubt that users play a far greater role in constructing the material aspects of the page than previous book interfaces. This variability in the material aspects of the page is a major technological innovation and renders page numbers unnecessary, even nonsensical, in a Kindle book except for the need to have conversation about locations across interfaces. Yet, the page as a discrete unit of interface remains and has become a site of collaboration in the Kindle bible interface as users are invited to participate in constructing the dimensions of the page.

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[179] We can take this example of interface even further given the portability of a device like an iPhone, such that a user might engage a small passage from this Kindle bible in various settings throughout their day, such as on the bus to work or at a coffee shop. Each different setting could impact the possible interpretive uses of this particular passage engaged through interface with this Kindle bible.

Annotation as Collaboration

The collaborative affordances of the Kindle bible interface do not stop at the user's ability to shape the contours of the page. Whereas only trained scribes or authorized users of a roll or codex interface of bible in antiquity would have had the ability to annotate the text, every user of *The Bible - The Holy Bible Formatted for Your eReader* has the ability to participate in marking the interface. The Kindle bible provides two primary forms of annotation for any user participating in the interface, highlighting and notes. Any portion of the text can be highlighted, thus marked as important or interesting, and user notes can be added at any location in the text, as long as attached to some portion of the text of the bible. Users can also bookmark a location in the Kindle book, which functions like a dogeared page in a codex or a marginal notation in a roll that signals the special importance of a particular location in the text.[180] These notes, highlights and bookmarks signal a significant capacity for encouraging active participation in the reading process. In 1QIsa[a] and Codex Sinaiticus, this kind of annotative activity was visible for all users to see, providing material indicators of the ongoing evolution of the interface. The presence of these interruptive marks from others contributed to the collaborative affordances of the roll and codex as well as to the anarchy of these interfaces, resisting the reduction to a singular and deterministic use. The default settings in the Kindle bible interface make annotations private for the

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[180] Sharing is another affordance offered in the Kindle interface that provides opportunities for collaborative engagement between the interface user and others in their community who may or may not have access to the interface itself.

individual user, which does not demand the same curious interruptive possibilities offered by the marginal activity in our ancient interface examples.

Despite the default tendencies of the Kindle interface toward a private and isolated annotative experience for each user, the Kindle bible interface does provide two collaborative annotative capacities that can contributed to a more anarchic interface by inviting other voices into the interface. First, the Kindle bible interface offers an option to turn on a feature called "Popular Highlights." If enabled, this popular highlights feature will show a user passages in the book that have been marked as important or interesting by other users. A highlight is deemed popular if three or more distinct users mark the same passage and the interface will show the number of highlighters but not their identities nor any notes associated with the highlights. Though perhaps less informative than the persistent markings left on an ancient manuscript, with the popular highlights feature turned on, users of the Kindle interface are reminded that they are part of a community of users that may find different parts of the book important. As with many other parts of the Kindle bible interface, this contact with other voices is optional and can be turned off at any time, which can decrease the interruption possible in the Kindle interface.

A second collaborative annotative capacity afforded only when participating in the Kindle bible using one of Amazon's Kindle Reader devices is the possibility of public notes. If a user chooses, they can change a setting in the Kindle bible interface to make all of their notes public instead of private. With public notes enabled, any other user following this user who has enabled these public notes in the Kindle bible will then see

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all of their notes and annotations made in the interface. Multiple users, from different

parts of the world, can participate in this bible interface together, collaborating to

construct the interface by marking its pages and anarchically resisting reduction of the

interface to a static space with a singular voice. Unlike in the roll and codex, this

collaborative affordance in the Kindle interface is elective and selective, making it less

anarchic than the annotative lives of our older manuscript interfaces. Users of Codex

Sinaiticus simply had to deal with the different voices and layers present in the interface,

because these markings became a part of the singular material surface of the book that

would confront every user. The Kindle bible interface operates as many material copies

with the annotative markings as a separate layer of data, integrated into the interface for a

seamless user experience, but not materially bound to the rest of the book in the same

was as ink on parchment. The data surrounding these distinct copies of the Kindle bible

can be connected through popular highlights and public notes, if a user so chooses,

opening the interface up to the dynamic ambiguity of different voices. Yet, this resistance

to consolidating the interface into a closed and deterministic system is not demanded to

the same degree in the Kindle bible as it is in 1QIsaᵃ or Codex Sinaiticus.

On the other hand, the distinct layers of the text and user annotations in this

Kindle bible offer a different kind of anarchic tendency in interface. As a user

participates in the Kindle bible interface through highlights, notes, and bookmarks, these

annotations are indexed in such a way that creates an entirely new and constantly

emerging mechanism for navigating through the interface. Instead of being limited to the

navigational structures built into the interface itself, such as book, chapter, and verse

markings or location identifiers, the Kindle bible tracks the position of a user's highlights and indexes each word in every note, which allows the user to move through the interface based on the traces of their participation. Our Kindle bible interface, *The Bible - The Holy Bible Formatted for Your eReader*, is impeccably structured to map the precise relationships between each part of the book, from the beginning of Genesis to the end of Revelation. Yet, in the Notebook view of the Kindle Reader app, the annotative participations of a user provide a way of aggregating bits of the book based on user contact points, thus breaking up the structured flow of the text and introducing new possible relationships as two highlights from different places in the book bump up against a user note asking a question about something in between them. This new and evolving structure offered in Notebook view reveals a collaborative affordance that interrupts the ability of the default Kindle book structures to determine the possible relationships available in this interface.

<p align="center">**Exponentially Expanding Non-Linear Access**</p>

The indexing of user notes in this annotative affordance of the Kindle bible highlights one of the most important attributes of this particular interface, the search function. Much like we saw with Codex Sinaiticus, the combination of collectability and non-linear access provided an increase in surface area in the interface by affording fast access to many points of the interface while resisting the limitation to one way of interacting with the interface. Perhaps the most significant innovation offered by the Kindle book is the exponential expansion of this non-linear access through the search functionalities. As the introduction to *The Bible: The Holy Bible Formatted for Your*

eReader highlights, one of the advantages of this bible interface is the ability to search for any word or passage in the text and find all mentions of it in the entire book. Many bible interfaces provide indexes of various types to help users find passages or portions of text that address a shared theme, person, time period or geographical location. The Kindle bible builds an index of all the words in the bible and allows users to search for any term and it will present a list of all occurrences of that term in the book. Adding to the complexity of this search capacity, as I mentioned above, this indexing of words in the bible *includes* the words of a user's notes. So, the indexing process that builds the search capacity actually incorporates the markings of the user into the interface in ways that resemble the material markings of the scribes in 1QIsa[a] or Codex Sinaiticus.

This giant leap in scale of non-linear access creates a radically high surface area interface where a user can engage with any single point of the book with a simple query. Using search as a navigational tool and organizing method in the Kindle bible also provides a vast number of possible arrangements of the bits of the text, resisting the ability to over determine the interface. No single user could exhaust all of the possible approaches to the interface, because the interface keeps expanding as the user participates. More significantly, search as a means of user participation in the interface demonstrates the anarchic affordances of this interface by allowing the text to be reorganized based on the search terms passed by the user, putting passages into contact in the search results display that may never have come into contact in a more traditional mode of access. These searches are creating new possibilities for encounter both between parts of the text and between user and book interface. Folding user annotations into the

search results along with passages from the text of the book also challenges any dominance the "intended" book interface might have had over the user's experience. The extraordinary advances in and integration of user participation and non-linear access provided by *The Bible - The Holy Bible Formatted for Your eReader* demonstrate an interface that is constantly evolving and emerging, though still mostly contained within the covers of a digitized codex.

Bible as Book

Looking backward and forward at bible as book, it is clear that the affordances of high surface area, collaboration, and anarchy are present in a roll bible used for communal reading from the 2nd century BCE, a codex bible used as an exemplar for copying from the 4th century CE, and a Kindle bible designed for use by contemporary readers on mobile devices, even if not for the same reasons and to the same degree. Bible as interface is not new and not an invention of our contemporary emerging technological landscape. In light of the anxieties often present during times of emerging technologies, it is important to note that these affordances are not limited to one kind of interface and not guaranteed in any particular interface. In any bible interface, users are part of producing the possibilities for high surface area, collaboration, and anarchy in use and for shaping the design of interface in these directions. Now that we have seen these affordances at work in book interfaces, we will look toward interfaces that are pushing bible beyond the book.[181]

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[181] This intimate relationship between bible and book is highlighted many places. In our reading of Levinas, *Ethics and Infinity*, 22-23, in the previous chapter, we heard him call bible, the book of books and book par excellence. Roberts and Skeat, *The Birth of the*

Codex, explore the relationship between the rise of the codex to prominence and the emergence of bible as book in Christianity. More recently, the title to Christopher De Hamel's book, *The Book: A History of the Bible* (London: Phaidon Press, 2005), signals the intimate and important historical and cultural relationship between bible and book.

CHAPTER 3: INTERFACING BIBLE--MOVING BEYOND THE BOOK

In the previous chapter, we looked at the many contact points of high surface area, the interruptive processes of collaboration, and the irreducibility to a single original text or single proper use of anarchy in book interfaces of bible. I define book as a reading and writing technology that involves combining pages of material together in a sequence to create a discrete interface for a specific text or collection of texts.[182] In this chapter I address the question of whether emerging technologies, such as manuscript digitization, extensible markup language (XML), and the internet, push bible as interface beyond the book. Though these emerging interfaces are changing user relationships with bible through new affordances and expansions of scale in familiar affordances, deploying digital technologies does not automatically transform the book into a radically new interface, in which the affordances of high surface area, collaboration, and anarchy are realized in ways never before imagined. In this chapter, I look closely at one bible interface that begins to extend beyond the book but does not supplant it.

Consolidating a Legacy: The Codex Sinaiticus Project

The Codex Sinaiticus Project was a collaborative project to digitize, transcribe, and make available on the internet, the entire remains of the fourth century codex

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[182] Even if these book interfaces have dominated the cultural imagination of bible throughout most of its history, bible has always exceeded the book through aural/oral interfaces such as storytelling and preaching as well as artistic interfaces like music and art.

manuscript of bible known as Codex Sinaiticus. Launched on July 6, 2009, The Codex

Sinaiticus Project website provides a direct material media translation of the codex

interface explored in the previous chapter into a web interface, one of the earliest and

most comprehensive attempts to bring an ancient bible interface into a new scale of user

relationships through digitization and the internet.[183] The collaborative nature of this

project is evident immediately when you encounter the website. The rare four columns

per page of the Sinaiticus manuscript are matched by the four institutional partners and

the corresponding four interface languages available on the site.[184] This kind of

international collaboration was necessary given the goal of the project to restitch together

the extant pieces of Codex Sinaiticus scattered among different libraries so as to recreate

it as a single interface. Over the years, the remains of the codex spread across the British

Library, the library of the University of Leipzig, the National Library of Russia in Saint

Petersburg, and Saint Catherine's Monastery.[185] Even without a detailed analysis of the

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[183] To learn more about the project and to participate in the interface, see "Codex Sinaiticus Project," http://www.codexsinaiticus.org, accessed on October 11, 2017. To read more about this manuscript and the process undertaken to make this digitization project possible, see the chapter on "The Virtual Codex Sinaiticus" in David Parker's popular level book on the history of this manuscript, *Codex Sinaiticus: The Story of the World's Oldest Bible* (London: The British Library, 2010), 167-184. As I will explore in detail later, Parker includes a discussion of the use of XML to construct the transcription portion of the interface. For a more detailed account of the project as a whole, see the collection of essays in Amy Myshrall et al., eds., *Codex Sinaiticus: New Perspectives on the Ancient Biblical Manuscript* (London: The British Library Publishing Division, 2015).

[184] The interface languages available on the site reflect the four main partners, including English (British Library), German (Leipzig University Library), Greek (St. Catherine's Monastery), and Russian (National Library of Russia).

[185] One of the principles of the project as agreed to by all parties was to reconstruct a modern history of the manuscript upon which all partners could agree and to publish this

emerging technologies that enable the new interfaces of the Codex Sinaiticus Project, one can see here an expansion of the codex's capacity for collectability at work in the gathering together of these disparate parts of the manuscript into a single interface through digitization and web delivery. In its time, Sinaiticus itself was a marvel in its capacity for collecting together texts into one interface. Before the fourth century, biblical codices appeared either as individual texts or as smaller collections, such as Gospel books or Pauline letter collections.[186] The Codex Sinaiticus Project revitalizes the manuscript's affordance of collectability in new media forms by working to transcend political and spatial limits and bring four collections at four different institutions together into one bible interface.

The Codex Sinaiticus Project imagined itself as a multifaceted project from the beginning, with the driving values of conservation and dissemination of this historical manuscript.[187] The conservation efforts of the project included the preparation and care of

history along with access to the documents themselves. See "History of Codex Sinaiticus," http://www.codexsinaiticus.org/en/codex/history.aspx, accessed on October 11, 2017 and section four in Amy Myshrall et al., *Codex Sinaiticus*.

[186] Codex Sinaiticus demonstrates an expansion in scale of collectability for the codex, bringing together both texts from the Septuagint and the New Testament into one volume. For early examples of smaller collections, see P45 (a 3rd century collection of Gospels and Acts) and P46 (a 2nd/3rd century collection of letters attributed to the Apostle Paul). For a discussion of the limits of early codex construction and these two manuscripts in particular, see Harry Gamble, *Books and Readers in the Early Church* (New Haven: Yale University Press, 1997), 66-67.

[187] See Amy Myshrall et al., *Codex Sinaiticus*, xvii-xviii, for an account of the multiple facets or products of the project. See "About The Project," http://www.codexsinaiticus.org/en/project/, accessed August 26, 2017, for an outline of the main aims of the project and "Participants," http://www.codexsinaiticus.org/en/project/participants.aspx, accessed on August 26, 2017, for a full list of the participating institutions, scholars and funders.

the manuscript leaves in each location as well as the digitization of each page of the manuscript for use in the multiple aspects of study and dissemination at work in the project. I admire the project team's openness to both traditional and emerging technologies as means of providing access to the manuscript. Along with the web interface, which we will explore closely, the project has produced a traditional print facsimile of the manuscript,[188] a major international conference,[189] a popular level book discussing the history of the manuscript and the project itself,[190] and an academic collection of essays from the conference[191] analyzing interesting findings made available by the new interfaces of the project and detailing the technical procedures operative in developing the interfaces. This proliferation of interfaces for the project participates in some of the high surface area and collaborative capacities we found in the ancient codex itself.

The project has done cutting edge work to make Codex Sinaiticus accessible to a public audience without necessitating travel to four different locations around the world. Yet, the web interface of Codex Sinaiticus is not a simple reproduction of the parchment codex in digital form. The web interface of Codex Sinaiticus is a *different* bible interface

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[188] *Codex Sinaiticus: A Facsimile*, (London: British Library, 2010).

[189] For details about the conference, see "Codex Sinaiticus Conference," http://www.codexsinaiticus.org/en/project/conference.aspx, accessed on August 26, 2017. There was a second conference held at the National Library of Russia, St Petersburg, in November of 2009.

[190] David C. Parker, *Codex Sinaiticus: The Story of the World's Oldest Bible* (London: The British Library, 2010).

[191] Amy Myshrall et al., *Codex Sinaiticus: New Perspectives on the Ancient Biblical Manuscript* (London: The British Library Publishing Division, 2015).

built upon the data of the manuscript, which has involved media translations at several levels. Though the web interface provided by the Codex Sinaiticus Project definitely increases the opportunity for people to "connect with this famous manuscript," this interface has created new affordances that go beyond the turning of parchment pages of the codex in the rare book reading room at the British Library. Just like the physical materialities of the giant book provide possibilities and limits for how a user might relate to this bible, so too the digital materialities of the Codex Sinaiticus Project web interface create a particular set of possible relationships of user with bible. One quick example of these material differences: If one were to participate as a user in the codex interface of Codex Sinaiticus at Saint Catherine's Monastery Library, they would experience the binding of the codex as one of the material characteristics shaping the space of that interface. After all, the binding at one edge of the quires of the codex is one of the crowning aspects of book as we know it. In the web interface of Codex Sinaiticus, the images of the leaves show the marks of binding, but there is no user experience of the boundedness of the quires, except for the small glimpses of the folded pages seen in the margins of the photographs. Thus, in this web interface, we experience a kind of rebinding of the codex by bringing all of the leaves of Sinaiticus together in one interface again, yet the user contact with binding is minimized in the interface.

These material differences impact user relationship with bible. The binding of the codex manuscript allows it to lay open to offer two pages of the manuscript at a time to a user and the amount of parchment beneath each open half of the manuscript tells the user something about where they are within the whole of the book. Each page turn is a subtle

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material reminder that these pages are bound together into a singular volume, because it is the binding that affords this turning of the page. It would be hard for a user to imagine the Codex Sinaiticus parchment codex as anything but a collection of texts that shared a voice and had an intended relational arrangement. In the web Sinaiticus interface, the user is presented with one page at a time, not two. The fold of the binding of the codex page is visible in most of the digital images. Yet, there is little material connection to this binding for the web user, because the binding is no longer what affords user navigation through the manuscript. When a user uses the arrows or the menus of the web interface to move through the isolated pages of the manuscript, there are fewer material reminders that these pages are bound together in a fixed order. Though these may be subtle and often unnoticed material differences, these differences can have a significant impact on the use of bible.

As an example of bible interface beginning to move beyond book, I will look closely at the web interface created by the Codex Sinaiticus Project to see if and how high surface area, collaboration, and anarchy are afforded.[192] At its simplest, the web interface of the Codex Sinaiticus Project is basically a material media translation and expansion of a print facsimile edition of an ancient manuscript into the medium of the web. Like a facsimile, this web interface affords broader access to the manuscript without increasing the numbers of hands touching the fragile ancient material. Often, in print facsimiles, the photography constrains what can be seen of the characteristics of the

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[192] I am deeply indebted to the Codex Sinaiticus Project for providing access to a treasure that has shaped my own scholarly work in significant ways and I cherish the opportunity to reflect on the challenges and possibilities of the materialities of this particular digital bible interface.

artifact, so physical descriptions and transcriptions accompany the photographs to help

users have more data to work with in the interface. The Codex Sinaiticus Project expands

on the affordances of a print facsimile by providing multiple images of each manuscript

page and providing detailed in-line linkage between transcription, description, and

location on the page.

The web Sinaiticus interface consists of four main parts, the digital images of the

manuscript, a physical description of each page, a transcription, and a translation where

available. Using the advantages of internet technologies, the web Sinaiticus interface has

linked the images to the transcription in a detailed fashion, so a user can choose a discrete

location either in the transcription or the image of the page and the interface will

highlight that same location in the other. These connected layers are one of the distinct

advantages of the web technologies used by the Codex Sinaiticus Project. After some

initial analysis of the important material processes of digitization that undergird the

Codex Sinaiticus Project as a whole and the general navigational aspects of the interface,

I will focus our attention on the image and transcription portions of the web Sinaiticus

interface to examine the possibility of high surface area, collaboration, and anarchy as

affordances.[193]

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[193] Though I will not focus on them in my analysis of affordances in the web Sinaiticus
interface, the translation and physical description blocks deserve a brief mention. The
physical description portion of the interface deserves significant attention in its own right.
The constraints of this project do not allow for a fuller exploration of the impact of the
physical description data on the use of this bible interface. The extensive and careful
cataloging of the characteristics of the parchment page along with the technical aspect of
linking these features to specific locations on the digital image are an extraordinary data
source of their own. Depending on the features of the page, the physical description may
include information on things like parchment thickness, scribal markings such as ruling

Barely Beyond Book

The Codex Sinaiticus Project is barely beyond book as an interface. First of all,

the project outcomes include two print books as interfaces with this ancient bible, *Codex*

Sinaiticus: The Story of the World's Oldest Bible and *Codex Sinaiticus: New Perspectives*

on the Ancient Biblical Manuscript.[194] In so many ways, the project uses a web platform

lines, binding marks, damage to the parchment, and any repair attempts. In order to easily locate the physical features on the image of the codex page, each page was divided into text and marginal sections and labeled. These labels, such as "c5" referring to line five of column three on the page, can be referenced in the physical description and linked using hypertext to highlight that section on the image for the user. This chunking of the page into sections and allowing the user to focus on a particular feature of the page based on the data provided in the physical description offers another avenue for increasing the surface are of this bible interface. For an incredibly detailed and informative explanation of the sections and abbreviations used in the physical description block, see http://www.codexsinaiticus.org/en/project/conservation_physDesc.aspx. For an example of the process and value of recording the physical characteristics of Codex Sinaiticus, see Gavin Moorhead, Sara Mazzarino, Flavio Marzo, and Barry Night, "A Physical Perspective of Codex Sinaiticus: An Overview from British Library Folios," in Amy Myshrall et al., ed., *Codex Sinaiticus*, 221-238. The translation portion of the website seems to have garnered the least investment. There is not a single entry on translation in the collection of essays derived from the conference generated by the Codex Sinaiticus Project and the page of the project site devoted to translation, http://www.codexsinaiticus.org/en/project/translation.aspx, accessed on October 11, 2017, minimizes the role of translation in the project, saying, "The Codex Sinaiticus Project was primarily a conservation, digitisation, transcription and publication project. It did not aim to undertake a new English translation of the writings preserved in the manuscript." Though the translation block offers the user an ability to select one of four languages for the translation, representing the four languages of the institutions involved in the project, there are no modern Greek or Russian translation available, and only Esther is available in German translation. This translation area of the interface has received such little attention that selecting the Greek translation option offers a message within the block in English that says "No english translation available." English translations are available for the entire New Testament, Esther, and the first thirty five Psalms.

[194] David C. Parker, *Codex Sinaiticus: The Story of the World's Oldest Bible* (London: The British Library, 2010) and Amy Myshrall et al., eds., *Codex Sinaiticus: New Perspectives on the Ancient Biblical Manuscript* (London: The British Library Publishing Division, 2015).

to perform codex. It is still primarily oriented around the codex page, with linear and

non-linear navigation affordances much like the Kindle bible interface.[195] The bringing

together of the extant leaves of the codex does not provide a new affordance but actually

enhances the affordance of collectability. Even the different layers of the web interface,

the image, the transcription, and the translation, are bound together in this interface by

the synchronous focus when a user clicks on any one of the layers. When a user clicks on

one part of the interface, such as the transcription, both the transcription and the image

section of the interface respond since they are linked (or "bound") together through

meticulous use of backend internet encodings.

Yet, despite these codex-like attributes, the web Codex Sinaiticus interface begins

to push beyond the book as it seeks to afford a relationship with the ancient manuscript

that is beyond manually handling its pages, while still providing users access to the

materiality of the parchment codex manuscript in some ways. More specifically, the

ability to navigate and zoom the digital images in two different lightings, standard and

raking,[196] pushes beyond affordances we would typically find in a book. Because the web

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[195] Parker, *Codex Sinaiticus*, 167, refers to the web interface of the project as "The Virtual Codex" and in the title of his essay, "The Making of the Codex Sinaiticus Electronic Book," in the collection that came out of the Codex Sinaiticus Project conference, Peter Robinson indicates that the project team also thought of this web interface as a book. Though the language of "Virtual Codex" makes good sense for a popular level work like Parker's, I am uncomfortable with the typical hierarchical valuation of the so called real over the virtual. I prefer to think of the parchment codex and the website as two different interfaces, each with their own "real" materiality that make possible a different set of affordances.

[196] For a detailed description of the different lighting techniques used in the project to provide two different images for each manuscript page, see "Digitisation," http://www.codexsinaiticus.org/en/project/digitisation.aspx, accessed on August 26, 2017. For a discussion of different illumination techniques, including raking light, in the

interface is not a static product, changes could continue to be made to the transcriptions

and translations or to the design of the interface without necessitating a new edition of the

interface.[197] This flexibility of the design and content of the interface extends even

beyond what we saw possible in the Kindle bible interface, which offered a static

platform upon which the user could add dynamism in participation in the interface.

Digitization as Translation

Though the Codex Sinaiticus Project pushes us slightly beyond the book, the

interface remains largely oriented around the pages of the manuscript. At the core of both

the conservation[198] and access aims of the project was the digitization of the pages of this

massive codex. We might be tempted to imagine the digitization process as a copying or

reproduction of the manuscript page. At the level of content, words on a page, perhaps

this notion of digitization as reproduction can hold, since the same words appear on the

parchment page as do in the digital image. Yet, as I laid out in the introduction, with our

attention here to the affordances of different material interfaces of bible, it is more useful

digitization of ancient materials, see Lindsay MacDonald, *Digital Heritage: Applying Digital Imaging to Cultural Heritage* (Amsterdam: Elsevier, 2006), 44-45.

[197] Changes in the transcription are recorded in the XML of the transcription in the change elements of the revision description block (revisionDesc tag). When I downloaded the XML of the full transcription on April 17, 2017, there were 7 change elements describing modifications from the initial release of the transcription on July 6, 2010 to a few encoding corrections on March 25, 2014.

[198] For details of the physical preservation techniques at one of the locations of Codex Sinaiticus, see Hieromonk Justin of Sinai and Nikolas Sarris, "The Conservation and Photography of Codex Sinaiticus at Saint Catherine's Monastery: Not Quite Finished," in *Codex Sinaiticus*, Amy Myshrall et al., *Codex Sinaiticus*, 239-251. For a detailed report from the conservation team of the project, see "Conservation," http://www.codexsinaiticus.org/en/project/conservation_report.aspx, accessed on October 11, 2017.

to conceptualize digitization as a kind of material media *translation*. This particular kind of translation is not concerned with the languages of the text on the page, but with the material aspects of the interface. Much like we saw with the media translation of book from roll to codex, the process involves continuities and discontinuities between the two interfaces. Digitization is translation because it is the creation of a new interface from an old one involving similarity, difference, and mediation. The process of making discrete digital image artifacts from a page of the codex manuscript does not reproduce the codex, but instead it creates a new material artifact that offers a new interface with the codex. This new digital image interface will carry on some of the affordances of the parchment codex, will also erase others, and will introduce new possibilities in interface. In this process of translation, digitization affords many things including storage, access, disassembly, recombination, and new perspectives.

<div align="center">Storage and Access</div>

Remaining largely intact for well over 1500 years, Codex Sinaiticus has benefited from rather successful preservation and storage techniques throughout its lifetime. Yet, parchment decays with use. Capturing and storing high definition digital images of Codex Sinaiticus on redundant hard disk media that are not subject to the same long term environmental effects as parchment provides a diversified preservation plan to promote opportunities for engaging this codex even as the parchment and ink become more fragile with time. This storage on disk preserves access to one particular interface with Codex Sinaiticus, the digital image. There is careful work being done in all four locations that house portions of the parchment codex interface to provide appropriate storage facilities

<div align="center">111</div>

and practices to minimize the environmental impact of light, skin oils, and humidity on the ancient book. Similarly, the storage of the digital artifacts produced by the imaging process have to take into consideration the environmental conditions that might compromise the long term integrity of this particular interface of Codex Sinaiticus. With the emergence of distributed storage solutions, redundant copies of the digital image files can be stored in several locations all around the world to protect from any accidental damage or loss due to unplanned environmental events in one location, such as a fire, an earthquake, or a tsunami.[199] Digital storage solutions also have to take into consideration the environmental conditions of the storage facilities, such as temperature and humidity, so that the electronics holding the digital files are not damaged. Digital image files themselves can also degrade over time, so whatever storage solutions are used for digital artifacts such as the high resolution images of Codex Sinaiticus must involve checking and repairing degradations in the digital files.[200] The continuities in the storage and

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[199] Since 1844, the parchment interface of Codex Sinaiticus already began a kind of distributed storage approach as visitors to St. Catherine's Monastery, such as biblical scholar Constantine Tischendorf and Russian Archimandrite Porfirij Uspenskij, took portions of the codex to Germany and Russia, respectively. For a detailed reconstruction of the history of the codex, see "History of Codex Sinaiticus," http://www.codexsinaiticus.org/en/codex/history.aspx, accessed August 26, 2017. Though this kind of distributed storage of the codex among different physical locations does provide some protection from catastrophic loss of the whole manuscript, it still risks complete loss of each portion. The digital distributed storage solutions provide redundant copies of all of the images in multiple locations.

[200] The Codex Sinaiticus Project has not publicized any details regarding their digital preservation techniques. A great example of this kind of material preservation at the digital scale can be found in the preservation process used by the USC Shoah Foundation to monitor and maintain the integrity of its massive collection of digitized testimonies of Holocaust survivors. For details on the technologies involved in this digital preservation, see the Foundation's video about preservation at http://sfi.usc.edu/vha/preservation, accessed on October 11, 2017. For another detailed account of the factors considered in a

preservation demands for both the parchment interface and the digital image interface reinforce that digitization is a material media translation, not a virtual copy of a material original. Both interfaces have important materialities that shape their preservation and their use.

One of the main differences between the materiality of physical storage and digital storage is the means of access. In the case of the physical parchment manuscript, access simply demands being spatially collocated with the manuscript, having the appropriate permissions to handle the manuscript, and the sensory capacities to see, touch, smell, or hear this particular bible interface. Facility with ancient Greek language and *scripta continua* would be necessary in order to read the text of Codex Sinaiticus, but it is not necessary for other uses of this interface. So, in the case of the parchment codex, the only technologies of access needed would be transportation to the location of the manuscript and the necessary protective gear to preserve the manuscript when handling. Technically, all a user needs is hands to open this codex interface. This is not the case with the digitized interface of these codex pages. The digital image files are composed of a series of binary strings that can be read by a computer processor, translated into a series of pixels with RGB (Red, Green, Blue) color values and displayed on the screen as a bitmap, a rectangular grid of these pixels. An additional layer of access software is required for a user to open these digital images of the pages of Codex Sinaiticus to view them, having access to the files themselves is not enough. With the rapid rate of change

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digitization project, see Diane Bockrath et al., "Parchment to Pixel: The Walters Islamic Manuscript Digital Project," *Art Documentation: Bulletin of the Art Libraries Society of North America* 29, no. 2 (Fall 2010): 14–20.

of file storage formats and software to interpret them in our contemporary technological landscape, this demand for an additional layer of software to access digital artifacts has become a major concern for archivists.[201] While digitization affords an expansion in potential access by making the digital images of the codex pages available to a larger audience using internet technologies, this expansion in access also adds some complexity to the ongoing preservation task by demanding continued attention to changes in file storage and image rendering standards.

<div align="center">Disassembly and Recombination</div>

Capturing digital images of the leaves in all four locations of the manuscript also performed a double move, a move toward higher surface area by capturing each page as a separate and distinct object in its own digital image file and a move toward the possibility of lower surface area with the ability to bring all of these images together into one single interface again. The digitization process itself is a kind of fragmentation, taking small bits of this parchment codex and translating that bit into a different material medium, a digital image file. Though these digital image files can be related to one another through their content or the metadata supporting them, each digital image is an artifact of its own emerging from a particular use of this codex bible interface. A user could certainly engage just a single page of Codex Sinaiticus in the reading room of the British Library, but the majority of these pages are still bound together at the spine of the book, framing each page as a part of a larger artifact. The digital images taken in the Codex Sinaiticus

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[201] See Laura Carroll et al., "A Comprehensive Approach to Born-Digital Archives," *Archivaria* 72 (2011): 61–92, for the emerging challenges and practices related to archiving and accessing digital artifacts.

Project effectively unwind the binding of the ancient codex and created a discrete and independent interface for each page of the codex.[202] Theoretically, each of these digital artifacts could be handled as an independent bible interface. Yet, the Codex Sinaiticus Project team worked hard to provide metadata for these digital artifacts to afford easy collection and recombination of these discrete pages. As mentioned earlier, one of the main aims of the project was to reassemble the codex into one single interface from the four different locations, to allow users to encounter the manuscript (in its digital translation) in its entirety. Though digitization of the pages of Codex Sinaiticus performed a disassembling of the book, the use of these digital artifacts by the Codex Sinaiticus Project to construct a singular online interface with the entire manuscript has enacted a kind of rebinding that exceeds the material limits of the parchment codex spread across four physical locations.

Navigating a Web Bible Interface

One major component of the online interface of Codex Sinaiticus as designed and delivered by the Codex Sinaiticus Project in 2009 is public access to high resolution images of each extant fragment of this ancient bible without need for any additional permission and needing only a web browser. Making these images available to a much larger audience through the capacities of the internet is a radical expansion of an affordance offered by a print facsimile edition, namely access. This fantastic accomplishment must be acknowledged, even if I will have some critiques of the

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[202] The physical characteristics visible in the images often still signal each page's participation in a larger interface, such as the page junction often visible at one edge of the image and the faintly visible outline of writing from the opposite page.

interface itself. Codex Sinaiticus is one of our most important extant bible manuscripts and the collaborative effort put in by all of the project teams to make this web interface has afforded many the opportunity to study and engage the tradition of this manuscript and the history of bible in heightened ways. This increased exposure to these interfaces has the potential to invite new and different voices into the discussion of antique book making and bible as interface. The Codex Sinaiticus Project web interface is designed predominantly for scholarly users, given the demand for facility with Greek, the use of technical language to describe the manuscript (e.g. recto/verso), and the lack of investment in the translation aspects of the interface. Yet, the number of visitors to the site suggest that a broader interest in the materiality of manuscripts and the history of transmission of this particular ancient book brought many others to participate in the interface.

The web interface of Codex Sinaiticus contains four main components–image, transcription, translation, and physical description– with robust navigation of the bible interface and global project site navigation.[203] To provide a general picture of the shape and structure of the web Sinaiticus interface, I will begin with a close look at the materialities of navigation available in the site. The reason I mention both the global project site navigation and the bible interface navigation is to highlight that I am focusing on only one part of the larger Codex Sinaiticus Project web site. The global site navigation offers access to more information about the history of Codex Sinaiticus and the project itself, along with a quick link to any biblical book in the bible interface. The

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[203] The interface also has a footer section that lists the funders of the project.

structure of the web bible interface is consistent throughout, with a few user options

along the way. The page is basically broken into two columns, with a header section that

spans both columns and holds most of the navigational elements and user options. The

header of the interface holds two primary forms of navigation and a set of user options to

control what shows in the left hand column of the page. Users can navigate the bible

interface by biblical book, chapter, and verse, or by page identifier, which is combination

of quire number, folio number, and recto or verso.[204]

As I mentioned above, this navigation by page identifier continues to perform the

materiality of codex and it remains the primary organizational scheme for the entire web

bible interface. For example, navigating the interface by book, chapter, and verse takes a

user to the image of the page that contains the verse selected in the navigation, but does

not indicate where the verse is on the page or focus the viewable area on the verse. Both

of these header navigation options are simply ways of selecting an image of a page based

on its order in the codex. This navigational section of the interface has no affordance for

search, only selection of a page and arrows for navigating linearly through the text, page

by page or first and last page.

The last item in the header of the interface is a "display options" selector, which

allows the user to select what content is displayed in the columns below. The selector

does not affect positioning on the page, but operates as a set of on/off switches that show

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[204] A quire is the basic unit of a codex, a bundle of pages bound at the spine. A large codex like Codex Sinaiticus is a multi-quire codex, with many quires bound together to make up the codex. Folio number refers to the one page of the book defined from binding to edge. Recto and Verso are latin designations referring to the front and back of the page, respectively.

or hide the manuscript image, the detailed physical description, the transcription, and the translation. The image, the translation, and the transcription can each be displayed alone on the page or in any combination, giving the user an ability to focus on just one aspect of the interface at a time or in concert. If only one of these items are selected, that block fills the entire width of the page, effectively making the page a singular column. When the image is displayed with one of the other blocks, it fills the left column of the page, which is approximately 25% larger than the right column. Again, the size and position of the image block suggests the priority and prominence of the digital image. The transcription and translation blocks fill the right column of the page when enabled, with the transcription above the translation. The transcription block is approximately twice the height of the one containing the translation, which can be an indicator of the heightened value of the transcription with respect to the translation in this bible interface. The user has no control of the size or position of these blocks when enabled together.

The physical description of the manuscript can only be displayed in the right column alongside the image of the manuscript page and if turned on, the transcription and translation blocks are hidden automatically and disabled. Given the two column design of the web interface and the rich amount of data provided in the physical description block, these limits make sense. As the small info box, indicated by a small lowercase "i" in the top left corner of each of the content blocks available on the page, suggests, the physical description has many items that are linked to specific locations on the image of the manuscript page. When a user clicks on a linked location item in the physical description, that region of the manuscript image is highlighted with a red box. This linkability makes

it useful to require the image to display alongside the physical description, even though both blocks can still be engaged on their own.

This kind of user driven selection differentiates this web interface from its ancestor, the print facsimile of the codex.[205] Like the facsimile, this web interface has a fixed structure oriented around the image of the page of the manuscript. Yet, similar to the Kindle bible interface, the user selections of displayed items in the web Sinaiticus interface afford collaboration in this web bible interface, explicitly involving the user in the making of the space of the interface. Recall that the affordance of collaboration has at least two expressions in our notion of interface, the potential participation of users with other users and the user participation with the platform in constructing the space of interface that we see here in the web Sinaiticus interface. The key difference between the Kindle interface and the web Sinaiticus interface is that the user of the latter does not define the boundaries of the bible page as they do with the former. In the Kindle interface, a user can select the font size, color, orientation, and columnar structure of the page, effectively deciding the boundaries and physical characteristics of the reading environment, defining the size and structure of the page. Here in the web Sinaiticus interface, the structure of the bible *page* is stable even as the content of the web *page* shifts based on user selections. A close look at image and transcription areas of the interface and the way in which they are connected will highlight the degree to which this

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[205] See the facsimile editions of Constantin von Tischendorf and Petrograd. *Publichnaia biblioteka, Bibliorum codex sinaiticus petropolitanus* (Petropoli: sn, 1862) and British Library et al., *Codex Sinaiticus*, (Peabody, Mass.; London: Hendrickson Publishers Marketing; British Library, 2010).

Codex Sinaiticus web interface exhibits the affordances of high surface area, collaboration, and anarchy.

Image of/on the Page

Once a user uses the navigation options to locate a page of the manuscript, the interface loads the digital image of that page in the largest block on the screen. Above the image, a basic description of the page is provided that includes the beginning and ending passages on the page, the library holding this particular physical fragment, the folio indication from the page itself, and the scribe(s) thought to have composed this particular page. The single image selected by the user is loaded with its top left corner aligned with the top left corner of the image block at the lowest zoom level. Depending on the size of the user's screen, the image block will show a certain portion of the manuscript page at once, rather than zooming in or out to make sure the whole page is visible initially. If the user selects to display only the image and none of the other blocks, then much more of the image will be visible at once. The design of this image block heightens the surface area of this bible interface with respect to the parchment codex by showing smaller bits at a time and by offering two different images of each page. Each page of the parchment codex is typically viewed with the book open at the spine, which puts two pages open at once. This web interface of the images of Codex Sinaiticus breaks up the viewable field of the bible into smaller bits by showing only one page at a time and requiring click or drag navigation to see the entirety of that one page.[206] The image block does include a small pop-out window in the bottom right of the block that shows the whole image and

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[206] On a 13 inch laptop screen, even with the display options set to only show the image, I can still only see about three quarters of the whole parchment page.

allows the user to click a spot to reposition the image in the larger viewable area to focus

on the spot clicked. There are zoom and navigation tools in the image block that allow

the user to move around in the image and to get a closer look at certain features of the

page, such as small marginal notes, blemishes in the parchment, differences in scribal

hand, and even faint erasure marks within the text.

The image of the codex page is loaded as a grid of four by four sections of the

single image, each as separate image objects on the web page. Not only has the giant

codex been broken up into discrete images of each page, the web interface breaks these

pages up into a grid of discrete objects to afford easier navigation and focus on small bits

of the page.[207] This ability to focus on bits of the page as discrete objects is an indication

of the high surface area afforded by the interface.

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[207] The HTML that renders the singular image of the codex page is actually a collection
of calls to an asp (active server page) script that cuts the image of the page into 200x200
pixel squares organized by coordinates. For example, one square of the image can be
found at this URL (Uniform Resource Locator) -
http://www.codexsinaiticus.org/handler/manuscriptImage.ashx?image=Q82_7v_B562_p.
jpg&x=0&y=0&z=0. The way this URL is constructed is a typical mechanism for passing
parameters to a script or program stored on a server. In this instance, the script is the part
of the URL that ends in .ashx. An ASHX file is a generic web handler file used with the
ASP.NET framework, which is the primary framework used in the Codex Sinaiticus web
interface. After the question mark, the URL has named variables that are passed to the
"manuscriptImage.ashx" script. The first named variable is the file name of the digital
image for the page requested by the user. The following three variables, named "x," "y,"
and "z," are the coordinates for the particular square of the image that needs to be
captured and loaded. A value of zero in all three coordinates designates the square that is
the top left corner of the actual image, not including dark space. The image presented to
the user as a single graphic is actually a collection of twenty 200 x 200 pixel clips of the
full image.

Adding to the high surface are of this web Sinaiticus interface, a user can select

two different images of the codex page, one in standard light and one in raking light.[208]

Both images show the identical page of the manuscript, but with different lighting used

during the digitization process.[209] Raking light is a common approach in manuscript and

art digitization that photographs artifacts with a low angle of light glancing off the

surface of the artifact, which helps highlight physical features. The choice of lighting

provides the user another locus of participation in constructing the interface. In one sense,

providing two different lighting perspectives provides a higher surface area than only

having a single image to work with. Any limited and static number of snapshots of the

codex page affords a lower surface area interface than the many different perspectives

and lighting options available when handling the parchment manuscript in the dynamics

of a lighted room. When handling the parchment manuscript, a user could pick up the

manuscript and get different angles of light or carry the manuscript to another room with

higher or lower light, so perspectives are not limited by the fixed snapshot in time

provided by photography.

Although holding a codex in the room theoretically affords unlimited lighting

options, most users of books simply choose one spot to read with one particular angle of

lighting. The intentionality of the angular exposure of raking light affords different points

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[208] Checking the different filename passed to the ASHX file in the HTML of the page when selecting the raking light image confirms that the two images are distinct files.

[209] See the description of the digitization apparatus and process at "Digitisation," http://www.codexsinaiticus.org/en/project/digitisation.aspx, accessed on October 11, 2017, and note the simple description of the lighting options in the info bubble associated with the image block.

of contact between the user and the image of the manuscript in this web interface, particularly related to the "surface" of the page. Raking light can reveal to the user markings from the binding process, blemishes in the skin of the animals used to make the parchment, and erasure marks. This makes the Sinaiticus web interface higher surface area than the typical use of a codex interface a typical print facsimile, which only provides a single view of each page with fixed lighting and size.

The navigational design of the web Sinaiticus interface encourages a close attention to one image of one page of Codex Sinaiticus at a time, highlighting the discrete nature of the digital image artifacts made from the parchment codex.[210] The discreteness and high surface area of this fragmented approach can be seen in contrast with the web interface for the digital images of the Great Isaiah Scroll 1QIsaᵃ I discussed in a previous chapter.[211] The Isaiah Scroll web interface foregrounds the continuity of the roll and the relationship of each image to the roll as a whole. As a user navigates through the roll or zooms in on a piece of the manuscript, the location within the whole of the roll is never

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[210] Some, like Nicholas Carr and Jeffrey Siker, have argued that the proliferation of data available in web or mobile interfaces erode the potential for concentrated or "deep" engagement with a text. In a video interview with VOA News in August of 2010, https://youtu.be/tXDGh8v-OhA, accessed on October 11, 2017, Carr discusses his book *The Shallows* and how the internet as a "distraction machine" is rotting human brains. Perhaps partly by continuing to over perform the interface characteristics of a codex, this web Sinaiticus interface provides an example of the possibility for connective layers of data in the ecosystem of the internet to offer an increasingly close and deep encounter with a textual tradition such as bible. Though critical of bibles on screens in church settings, Siker, *Liquid Scriptures*, 16, does point out that some internet spaces afford more depth of engagement than others, such that blogs and YouTube may be less governed by shallowness and distraction than Twitter and Facebook.

[211] See "The Great Isaiah Scroll," http://dss.collections.imj.org.il/isaiah, accessed on October 11, 2017, to participate in this interface of the Great Isaiah Scroll.

lost.[212] In the web interface of Codex Sinaiticus, the focus is on close analysis of one

page at a time. There is very little in the way of contextualizing each page in the whole

codex and there is no attempt to emulate or material-media translate the turning of pages

in the codex, as many other electronic book platforms attempt.[213] As can be seen in the

critical comments offered by Peter Robinson, a member of the Codex Sinaiticus

Scholarly Edition Working Party, in his reflections on the production of this important

interface, the project team had a decidedly scholarly focus, hoping to facilitate close

engagement with this historic bible.[214] The high surface area approaches of digitization

and interface design focused on small bits of the manuscript afford this kind of close

engagement with the digital artifacts that comprise this web bible interface. This high

surface area approach to affording close study of Codex Sinaiticus outweighs the

decrease in surface area brought about by the digital reassembly of the codex in one

interface.

Transcription

In the info bubble connected to the transcription block of the Codex Sinaiticus

web interface, the text reads, "The transcription is a letter-by-letter electronic version of

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[212] The technologies used to render these images of 1QIsaᵃ actually do not even require reloading of the page when the user moves around in the roll, reinforcing the experience of a continuous roll. On the contrary, every change of page in the Codex Sinaiticus web interface requires a full page reload.

[213] See the iBook pagination visualization as an example.

[214] Peter Robinson, "The Making of the Codex Sinaiticus Electronic Book," in Amy Myshrall et al., eds., *Codex Sinaiticus: New Perspectives on the Ancient Biblical Manuscript* (London: The British Library Publishing Division, 2015), 271.

the text in the Codex Sinaiticus."[215] Peter Robinson suggests that the production of this

electronic transcription of Codex Sinaiticus could be considered "as remarkable an

achievement as Gutenberg's Bible."[216] Though this electronic transcription has not

attained the historical importance or impact of Gutenberg's Bible, it is nonetheless a

critical part of this bible interface. As I have said from the beginning of this analysis, the

digital images of the codex pages remain the central organizing principle of this bible

interface and the transcription process is no exception. The transcription block provides

three main features for the user, a translation of the *scripta continua* into discrete words

with spaces, the ability to navigate the digital images by clicking on any word in the

transcription or vice versa, and hyperlinked pop-up boxes indicating any scribal activity

on the page, such as marginal notes, deletions, and emendations. The electronic

transcription presented to the user in the web interface is derived from a detailed dataset

encoded to locate each word of the transcription in its appropriate spot on the

reconstructed columnar page and to map each word to the corresponding position of the

word or feature on the digital image.

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[215] Click on the small "i" icon in the top left corner of the transcription block on any page of the manuscript at http://www.codexsinaiticus.org/en/manuscript.aspx, accessed on October 11, 2017.

[216] Robinson, "The Making of the Codex Sinaiticus Electronic Book," 270-271. Despite Robinson's hyperbolic assessment of this production, his detailed account of the technologies involved in the process of making the transcription and, most importantly, his encouragement toward more open and fluid developments of online scholarly editions are invaluable as guides toward the next generation of bible as interface. Here, Robinson treads very closely to the concerns raised by Johanna Drucker in her plea for humanities scholars to get more involved in developing the future of online scholarly editions through a more robust theorization of interface. See Drucker, "Interface Theory," for her encouragement toward online scholarly interfaces that afford high surface area, collaboration, anarchy (my language not hers).

Extensible Markup Language (XML) was used for the encoding of this positional

and image alignment data.[217] XML is a markup language that uses tags to signal the

hierarchy and attributes of elements in a data set. For example, in the XML of the Codex

Sinaiticus transcription, we find tags for page, column, line, and word, among others.

Here is a sample of the final XML used for a small portion of a page of the manuscript.

```
<pb id="S-80-1r" corres="E-80-1r" n="80-1r" scribeid="A" archive="BL" localfol="247" >
<margin type="topmargin"><margin type="marginright"><note type="quireSig" n="79" >οθ </note>
<note type="folionum"> 247</note></margin>
</margin>
</pb>
<cb id="S-80-1r-1" corres="E-80-1r-1" n="1" ><margin type="coltopmargin">
<margin type="center"><note type="booktitle" scribe="S1" comment="Book title added by corrector S1">
<w n="1">κατα</w> <w n="2">ϊωαννην</w></note></margin></margin></cb>
<lb id="S-80-1r-1-1" corres="E-80-1r-1-1" n="1" rend="hang" vnumber="1:1">
<margin><note type="ECN" Ammonian="1" Canon="3"><hi rend="red"><hi rend="ol2">α</hi></hi>
<lb /><hi rend="red">γ</hi></note></margin></lb></ab></div>
<div id="K-B36K1V1-36-JOHN" n="1" type="chapter"><ab id="V-B36K1V1-36-JOHN" n="1">
<w n="1">εν</w> <w n="2">αρχη</w> <w n="3">ην</w> <w n="4">ο</w> <w n="5">λογος</w>
<lb id="E-80-1r-1-1" corres="S-80-1r-1-1" />
```

This is the XML for the page where the Gospel of John begins in the Codex Sinaiticus

manuscript. For those of us who are accustomed to focusing on the content of bible

interfaces, in line eight of the XML, you will find the title of John's Gospel, *κατα*

ϊωαννην, and on the second to last line, you will find the first five words of the gospel in

Greek, *εν αρχη ην ο λογος*. The rest of this seemingly complicated, yet incredibly regular

bit of code provides data related to the various features of this bit of the manuscript and

its relationship to other parts. For example, the <pb> tag in line one indicates the

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[217] The transcription team followed the basic standards set by the Text Encoding
Initiative (TEI) but modified as necessary. The editorial declaration section of the
transcription XML itself reads, "The XML is based on the TEI P5 guidelines, although
there are some innovations in order to represent the physical layout of each page. In
particular, pb cb and lb elements are divided into corresponding opening and closing
elements, with an additional margin element inside these elements containing marginal
material." The decision to use TEI standards where possible makes the XML for this
transcription more useful for comparative work done with other manuscripts encoded
using a similar standard. For more information on TEI standards, see http://www.tei-
c.org/index.xml.

beginning of a page, the <cb> tag in line six indicates the beginning of a column, and the <lb> tag in line nine indicates the beginning of a line.[218] The "n" values in each of these tags provides an index or count to help orient a user to their position in the manuscript and on the page. Reading these n values together, we can tell that this sample page is the recto side of the first folio of quire number 80 (<pb n="80-1r">) and we are looking at line one (<lb n="1">) of column one (<cb n="1">). <Margin> and <note> XML elements are used to define and locate items on the page that are outside the columnar structure of the manuscript page, such as the folio number marking at the top right of the page and the book title added by scribe 1 at the top of column one. We see chapter and verse identification in this encoding with the <div> and <ab> tags, and then finally, at the end of this block of code, we find the Greek words of the first line of column one of this page, divided and numbered by <w> tags.

This encoded data drives the user's interaction with the transcription block of this bible interface in important ways. First, the data of the transcription remains deeply embedded in and connected to the structures of the manuscript page, particularly with the presence of page (pb), column (cb) and margin (margin) tags. All of the markings on the page are linked to positions on the page as captured by the digital image. Second, the page itself is broken into smaller operational units; in this case the smallest operational unit permitted by the XML data is the word. Allowing the user to select any single word object on the digital image by clicking either in the transcription or on the image provides a large increase in the contact points a user may engage and continues the progression

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[218] For a more detailed introduction to XML on a much simpler encoding set, see my discussion of the Digital Bible Library in the next chapter.

toward higher surface area from the single image of the page to the sections of the page referenced in the physical description block, now to the word level in the transcription block. This increase in surface area is analogous to the difference between an image based PDF produced when scanning a library book, where each word is not selectable for highlighting, and a text based PDF generated by the "save as" function in a word processing program, which allows the user to select an individual word for highlighting and annotation.

Yet, at the same time, the XML encoded transcription divides the text by word units, not character units, thereby reducing the demand on the reader as compared to the *scripta continua* of the parchment codex. Reading continuous script requires the user to process each character and its potential relationship to the one preceding and following it. Transcription makes those decisions for the user; word breaks have been decided and the nature of scribal activity on a particular word has been codified and labeled. These encoding choices by the team creating the web Sinaiticus interface are largely invisible to the typical user of the web interface, yet they have a significant impact on the limits of a user's participation in constructing the interface. The added richness and layers of data provided by the XML encoding of the digital transcription make the text of Codex Sinaiticus vastly more accessible for many users, yet they lower the demand for participation by the user, thus diminishing the surface area of the interface. The danger in affording lower surface area could be to foster an interface that becomes more about the simple consumption of content by users instead of encouraging dynamic participation in interface. As I will show below, this decrease in surface area through the layering of

word breaks over the *scripta continua* of Sinaiticus is offset by other means of expanding

the affordance of high surface area in this web Sinaiticus interface.

Expanding Surface Area

Now that we have taken a close look at the major components of the Codex

Sinaiticus web bible interface, we can assess the ways in which this interface might

afford high surface area, collaboration, and anarchy. We have seen tensions at work in

the surface area of this interface from the beginning with the digitization breaking the

manuscript into discrete page images and then pulling them all back together in a singular

web interface. The physical description and transcription blocks of the interface helped

break these singular page images into even more points of contact, while at the same time

the word breaks of the transcription diminish the surface area of the continuous script of

the manuscript page. Even with these tensions, the sheer complexity and multiple facets

of this web bible interface enact the affordance of high surface area. A user can

participate in this interface from several different angles, beginning with a particular

image of a page or a scribal note in the transcription or blemish on the parchment

cataloged in the physical description. With all of the linkability and vast amount of data

provided in this interface, users can create paths through this bible that would be difficult

to replicate a second time, meaning user participation in the interface is not highly

standardized. Though one of the aims of the Codex Sinaiticus Project was to provide a

comprehensive and complete interface with this bible, the high surface area of the

interface in the volume of data, the many means of approach, and the single page at a

time navigation provides a resistance to a user's ability to master the whole thing.

Hints Toward Collaborative Capacities

Sadly, the collaborative nature of the Codex Sinaiticus Project itself, with four institutions and several teams of people involved at every level, does not carry over into the mechanics of the web interface. There are a small number of design elements that allow for collaborative construction of the space of the interface, but the interface lacks any explicit means of participation in extending or amending the markings on the page of the codex or even the digital images of those pages. Even the transcription and translation blocks, the more textual areas of the web interface, allow for no collaborative commenting, questioning, editing, or suggesting alternatives. In a way, this web bible interface is open to less participation than we see with the layers of scribal and editorial tradition in the parchment codex.[219] Though the physicality and content of this web bible interface may demonstrate fewer collaborative affordances than its parchment codex counterpart, the simple fact that this interface is public and accessible with only a web browser exponentially expands the collaborative possibilities provided by this interface.

For example, there is a group of students, staff and faculty at my institution who read Greek weekly together. This reading group has recently decided to work their way through some portions of Codex Sinaiticus. The group could all have purchased a facsimile edition of the manuscript or shared the library's copy, but this web interface makes it infinitely easier for them to engage this bible together and allows them to

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[219] Those few with privileged access to the source code for the site, perhaps much like the limited number of scribes who could touch the manuscript, could alter or add to the site. Yet, unless there are revision control systems in place to monitor and track a history of all changes made to the site, any additional "hands" in this interface could entirely erase the work of those that preceded them.

include others that may not be physically located in the same place through web conferencing and screen sharing tools. With the creative use of additional technologies such as the web annotation tool hypothes.is, the public and web based access of this bible interface affords users the ability to collaboratively mark, annotate, and discuss the pages of this bible within the browser.[220] So, even if the technologies of the Codex Sinaiticus web interface do not provide the capacity for collaborative annotation natively, the choice to make these digital images, the transcriptions, and the physical description data available publicly on the web affords the possibility for collaborative engagement through access, dialog and emerging web annotation technologies.

Anarchic Possibilities Unrealized

Any interface that is available to the public and involves the bizarre collection of writings gathered together in Jewish and Christian bibles is bound to provide some possibility of anarchy. It is hard to control or determine what a user might do with the artifacts and assets provided in a public web interface and it is difficult to consolidate the multiple disparate voices of these collected texts into one singular harmony. Yet, the Codex Sinaiticus web bible interface demonstrates far more archic affordances than anarchic. If anarchy suggests the irreducibility of an interface to the governance or reign of a singular origin or principle, it is hard to see such affordances operative in the Codex Sinaiticus web bible interface. The reconstitution of an original book and the reconstruction of that book's original text seem to be the driving force of the entire interface, both archic impulses. Let me say it again, I do not intend to disrespect the

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[220] "Hypothes.is," https://hypothes.is/, accessed on October 11, 2017.

incredibly valuable work done to produce this magnificent interface for engaging this treasure of a bible, from which my own scholarship has benefited. I merely mean to suggest that the design of this bible interface directs use toward the consolidation of the legacy of a singular material manuscript, instead of toward the ongoing making of this bible as we saw in the scribal participation on the parchment page.

The electronic transcriptions of this web bible interface do an exquisite job of representing this anarchic scribal participation on the parchment page in an electronic translation, yet where does a user expand or enhance or contribute to the tradition of this manuscript in the web interface? The digital images provided in this interface offer close examination of both the materiality and the textuality of the pages of this codex, yet how does a user of this web interface leave a mark on the page that stays with the page as other users interface with it? Perhaps this is why many, including David Parker, one of the principle scholars involved in the Codex Sinaiticus Project, continue to use the language of real and virtual when discussing the difference between the parchment codex and the web interface that constitute Codex Sinaiticus. I prefer not to deal in the binary of real and virtual, because both of these interfaces have a materiality. Users can participate in both if they have the means, even if one interface is easier to access than the other.

The decision not to allow web users to leave their mark in this bible was an intentional choice, not a technological necessary. Peter Robinson articulates this archic tendency well when he says, "Indeed, the data on the site is frozen: it can be used only on the site; it can be used only in the ways the site allows, using the tools the site's makers

thought to make available."[221] Robinson, a scholar deeply invested and involved in this particular interface design and construction, offers an alternative model for the making of a scholarly edition like that which we have in the Codex Sinaiticus web interface. His vision for an alternative model involves open access to data, distributed community involvement, and a potential proliferation of interfaces, which can easily be mapped onto the affordances of high surface area, collaboration, and anarchy, respectively.[222]

      The Codex Sinaiticus Project as a web bible interface affords high surface area but lacks in the areas of collaboration and anarchy. Robinson's suggestions of more community involvement and more open data access would radically challenge the tendency of scholarly editions toward closure and would open a potential engagement across disciplinary boundaries. Yet, at present, the energy or the money to maintain or expand the existing Codex Sinaiticus interface is not there. The interface was released in 2009 and the design has largely remained stagnant since, reinforcing Robinson's suggestion that the interface is dying and taking the data with it.[223] The design of the interface pushes bible users ever so slightly beyond the book, with the layers of linkable data related to the images of the page and the potential dynamics of these data. Despite the sophisticated internet technologies used to facilitate a "beyond the book" user experience, the codex becomes almost more codified in this particular web interface because of the user's inability to mark the page at all. It will take the work of a new

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[221] Robinson, "The Making of the Codex Sinaiticus Electronic Book," 273.

[222] Robinson, "The Making of the Codex Sinaiticus Electronic Book," 274-275.

[223] Robinson, "The Making of the Codex Sinaiticus Electronic Book," 273.

generation of users to imagine the affordances still dormant in this interface with

experiments toward user annotation, community sourced translations, and data in an open

standard that will all encourage further interfaces that can emerge from this one.

CHAPTER 4: PROLIFERATION OF INTERFACES

To differing degrees and through different materialities, we have seen the affordances of high surface area, collaboration, and anarchy at work in bible as interface in books and in an early attempt to extend beyond the book in the web Sinaiticus interface. In this chapter, I look toward bible interfaces that move decidedly beyond book, meaning these interfaces are no longer governed by the binding together of pages in a singular volume. As we have seen in other technological shifts in interface, such as the move from roll to codex, these emerging bible interfaces do not entirely erase or leave behind the structures of the page. The interfaces discussed in this chapter deploy the advantages afforded by digital, web-based technologies to a much greater degree than the digital interfaces we have seen thus far. As a result, there is potential for users to engage with the affordances of high surface area, collaboration, and anarchy in ways that exceed the book interfaces of the past.

Extending the analysis of bible interface into the realm of emerging digital technologies[224] involves two important shifts that will demand some new imagination on our part. First, as bible distances itself from the materiality of the page, it is important to understand the continued materialities of emerging digital technologies. Approaching

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[224] By digital, I simply mean technologies pertaining to computing, including things like software, hardware, mobile devices and the internet. I use the language of emerging instead of new to remind us of the ongoing palimpsestuous process of material media translation that gives rise to so called "new" technologies without starting from scratch and never fully leaving previous technologies behind.

these digital technologies as interface and attending to their affordances reinforces the materiality of the digital, since affordances describe the possible relationships between a user and the material characteristics of an environment or platform. In no way are we leaving the material realm of books and entering some immaterial virtual world of computers and the internet.

As I mentioned in the introduction, digital technologies have multiple layers of materiality. Computers and mobile devices are made of material components like capacitors, wires, precious metals, etc., and the internet is dependent on vast amounts of electricity to power connected devices but also to power the cooling systems that keep the equipment in good shape. While these materialities are necessary to keep our machines running, this is not the materiality I am interested in here.

I am interested in the layers of structure that produce digital technologies and that inevitably impact both the possible and the more probable relationships with a user. This is a digital materiality. In the previous chapter, the digital materiality of the web Sinaiticus interface was visible to the user through the four structured sections of the web page and the limited navigation options. On a different level, typically not visible to most users, the HTML of the page and the XML of the transcription also play a role in the materiality of the interface, structuring the possible uses available in interface.[225]

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[225] For a thorough outline of the scholarship on digital materiality in the last decade, see Sydney J. Shep, "Digital Materiality," in Susan Schreibman, Raymond George Siemens, and John Unsworth, eds., *A New Companion to Digital Humanities* (Malden, MA, USA: John Wiley & Sons, Ltd, 2016), 386-396. There are four main categories of digital materiality that emerge from the current scholarship. Matthew Kirschenbaum offers the terms forensic and formal materiality, the former addressing the "evidence" of physical traces left by a digital artifact in processes such as storage and the latter describing the

Awareness of and facility with these often hidden materialities of digital interfaces and their relationship to the other layers of materiality involved in the production and use of digital interfaces is quickly becoming a necessary set of skills demanded of biblical scholars who wish to study bible in the emerging technological landscape. To explore the kinds of capacities that might be needed to work closely with the materialities of bible interfaces at the programming and database level, I will analyze two digital bible interfaces, the Digital Bible Library and the BibleSearch Application Programming Interface (API), the latter of which is built upon the former.

The second shift involved in a move toward exploring digital bible interfaces is a growing attention to the proliferation of interfaces. By proliferation, I simply mean the

material aspects of a digital artifact that allow for its symbolic transmission, such as the HTML code underlying a web page. In his best attempt to summarize the relationship between these two materialities, Matthew G. Kirschenbaum, *Mechanisms: New Media and the Forensic Imagination* (Cambridge, Mass.; London: MIT Press, 2012), 15, writes, "Forensic and formal materiality are perhaps better brought to rest on the twin textual and technological bases of inscription (storage) and transmission (or multiplication)." Building on Kirschenbaum's two pronged materiality and Jean-François Blanchette's notion of distributed materiality, Johanna Drucker, "Performative Materiality and Theoretical Approaches to Interface," *Digital Humanities Quarterly* 7, no. 1 (2013), section 8, suggests a performative materiality for digital artifacts. Much like her work with interface, here Drucker is shifting the focus of materiality from physical properties of a particular artifact to the process of producing materialities in the event that is interface. Drucker's performative materiality is also close to Hayles's redefinition of an emergent materiality as "the interplay between a text's physical characteristics and its signifying strategies" in "Print Is Flat, Code Is Deep: The Importance of Media-Specific Analysis," *Poetics Today* 25, no. 1 (March 20, 2004): 72. Both Drucker and Hayles articulate a concept of materiality that seems rather close to the notion of affordance at work in our analysis here, which further reinforces the usefulness of affordance as a reminder of the materiality of digital interfaces. I have elected not to use any of the technical categories of digital materiality, because I am worried they will distract from the simpler point that digital interfaces have structures that shape possibilities and limits for use, just as pre-digital interfaces did. Attention to these material structures and the affordances they bring in interface remains a critical part of our work as bible scholars.

continual building of interface upon interface, which in turn could give rise to another interface, and so on. Emerging digital technologies highlight the proliferation of interfaces that bible can become. In one sense, proliferation of interfaces is not a new phenomenon for bible. Wachtel's suggestion that Codex Sinaiticus may have become an exemplar for scribes to use to produce additional copies of the manuscript illustrates one kind of proliferation of interface.[226] Given the broad definition of interface as relationality irreducible to consumption articulated in chapter one, we could also imagine a proliferation of interfaces from the study of a codex bible by a preacher (interface 1) that gives rise to a sermon that preacher gives on a bible passage that is pondered by a parishioner (interface 2), who takes that bible verse and writes it on a protest sign in a march against immigration (interface 3). The sign with the verse gets photographed, tweeted, and discussed on the internet for days (interface 4).

One of the characteristics of the interfaces dealt with in this chapter is that they participate in an ecosystem that is designed to facilitate the ongoing proliferation of bible interfaces as much as to facilitate particular user encounters with bible. This value on enabling the ongoing construction of interfaces also points out that emerging digital bible interfaces may have both human users and machine users at different layers of the interface. For example, the XML of the web Sinaiticus interface was designed for both human users (programmers had to be able to produce, read, and understand the XML) and machine users (their site generator software had to read the XML to produce HTML for the web page). In this chapter we will see an example of a bible interface

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[226] Wachtel, "The Corrected," 99-100. See my earlier discussion of Codex Sinaiticus and Wachtel's work in chapter 2.

(BibleSearch API) built upon another bible interface (Digital Bible Library) explicitly to

enable the design of additional bible interfaces by users around the world.

The Bible of Bibles

One bible interface that decidedly moves into a digital materiality is a recently

emerging project called the Digital Bible Library (DBL). At its simplest, the DBL

operates as a giant storage container that can hold any item related to bible.[227] At the time

of their public April 2017 Content Update, DBL contained 1508 text entries in 1145

unique languages and 444 audio entries in 374 unique languages.[228] The governing

impulse behind this bible repository is to make the content of the bible, "Scripture

translation content," available in "every language spoken on earth."[229] For all of the

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[227] In its aim to become the definitive, comprehensive, and authoritative source for all things bible, DBL performs the cultural iconicity of bible as defined by Timothy Beal, *Rise and Fall of the Bible*, Kindle location 66-74. Beal, *Rise and Fall of the Bible*, Kindle location 2006, also helpfully reminds us that bible has always been a kind of library, gathering a cacophony of voices and writings together from different times and places, such that DBL could even be viewed as a bible of bibles.

[228] Digital Bible Library, "April 2017 Content Update," https://thedigitalbiblelibrary.org/2017/04/01/april-2017-content-update/, accessed on April 25, 2017. The tracking of the number of unique languages involved in this content highlights the mission and vision of DBL and points toward one of the critical founding partners. The mission and vision of DBL deserves full mention here, "The vision for The Digital Bible Library™ is to contain digital Scripture, in every language spoken on earth by the year 2033. Its mission is to gather, validate, and safeguard Scripture translation content in a standardized digital format, and to empower partners to reach people from every tribe, in every nation, with the power of God's Word in their heart language by providing authorized and licensed access to the library content." Digital Bible Library, "About," https://thedigitalbiblelibrary.org/about/ access on April 25, 2017.

[229] The mention of every language here signals the deep involvement in DBL of the alliance of bible translation agencies known as "Every Tribe Every Nation" (ETEN). DBL is the primary project funded and managed by ETEN and a quick glance at the homepage of their website, http://www.everytribeeverynation.org/, accessed on April 25, 2017, shows how ETEN locates DBL in the trajectory of technological innovation begun

language of validation, safeguarding, and authorizing in the DBL mission and vision statement, there is little awareness of the impact of interface on the relationship between users and content.[230]

Recall from chapter one that an interface is a process of interaction among two entities that is irreducible to simple consumption of one entity by another. Bible interfaces in particular involve the interaction of users with technological platforms to participate in the texts and traditions of Judeo-Christian sacred writings. As a technological platform affording participation in several versions of these texts and traditions, DBL fits easily within our concept of bible interface, even if not used in the typical readerly fashions we have seen in previous interfaces. There are two reasons why I have chosen to look closely at DBL as a bible interface. First, DBL provides the backend data interface for one of the most widely used bible interfaces in the world, YouVersion's Bible App. As a database that provides structured bible translations for the Bible App, DBL is a part of the materiality of this ubiquitous bible interface that goes largely unnoticed or even considered by users or scholars of bible. Second, DBL provides a platform for proliferation, allowing others to create any number of bible interfaces

by Gutenberg. The fact that DBL is funded and managed primarily by an aggregation of bible translation agencies helps explain why the content of this library is primarily focused on bible translations, which seems to come with a bias toward bible as reducible to linguistic content.

[230] See the previous note for the mission and vision statement. Here we have an example of promotion of an interface that falls into Drucker's critique of mechanistic determinism, taking no account of the participation of the user in constructing the interfaces that are a part of DBL. While DBL provides a mechanism for validation and authorization of the linguistic *content* of a bible, it shows very little interest in controlling the interfaces built around this content except through policing which institutions can hold a DBL Library Card.

using the artifacts and data available in the library. In fact, DBL itself is a proliferation of interfaces.[231]

While the licensing and distribution aspects of DBL still operate in a paradigm primarily governed by the ideologies of book production, the interfaces enabled by DBL are pushing bible beyond its long history oriented around the page. After an introduction to the technological and cultural situatedness of DBL, I will look closely at another interface that interfaces with DBL, the American Bible Society's BibleSearch interface. In different ways, these two bible interfaces provide a definitive move beyond the book for bible, while continuing to afford high surface area, collaboration, and anarchy through their use of emerging technologies.

Bible in XML

On a closer look at the material structure of DBL, it is a collection of XML files that becomes the primary bible interface of DBL.[232] A sample from a DBL bible interface looks like this,

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[231] DBL consists of a web interface for participants to manage their licenses, an interface with ParaText, the primary bible translation management software used by translators around the world, to assess and ingest translations into DBL, and an application programming interface that allows users to download translations for use in building other interfaces.

[232] For a helpful look at the overall workflow of DBL and where it is located in the process of bible production and dissemination, see the diagram at "DBL Complete Workflow," http://app.thedigitalbiblelibrary.org/static/docs/about.html#complete-workflow, accessed on April 25, 2017. The technical aspects of DBL are managed by the Institute for Computer Assisted Publishing (ICAP). ICAP is a part of the United Bible Societies, an alliance of National Bible Societies all over the world that manage and produce bible translation projects. ICAP was instrumental in developing ParaTEext, http://paratext.org/, access on April 25, 2017, the software used by bible translation projects globally. Since it is so heavily involved in the translation production process already, ParaTExt has naturally become the primary mechanism for getting items into

```
<para style="p"> ...
Large crowds followed him from Galilee and the Ten Towns, from Jerusalem, Judea,
and the land on the other side of the Jordan.</para>
<chapter number="5" style="c" />
<para style="s">The Sermon on the Mount</para>
<para style="p">
<verse number="1" style="v" />Jesus saw the crowds and went up a hill, where he sat down.
His disciples gathered around him, <verse number="2" style="v" />and he began to teach them:</para>
```

Like we saw with the transcription data of the Codex Sinaiticus web bible interface, this

release bundle data in DBL is encoded in XML (Extensible Markup Language). The

materiality of this XML code becomes a part of the material limits and possibilities of the

bible interfaces built from the DBL. The users of this XML are both human

programmers, who need to be able to read this code in order to build interfaces from it,

and other machine interfaces that will process this XML code to construct the bible

interface used by more typical bible users looking to read the contents.

The syntax of XML resembles that of HyperText Markup Language (HTML), the

more familiar standard that web browsers read to present web pages to a user. But there

are two important differences: 1) HTML is used to display data, while XML is used to

describe data and 2) HTML tags are fixed and standard, while XML tags are flexible and

defined by users. HTML is a set of highly standardized encoding tags to tell web

browsers how to display and format data on the screen. XML is a flexible set of encoding

tags to structure and describe a data set, with little to no regard for how data should be

displayed. There are, however, advantages to using a standard encoding practice to allow

for predictable processing across multiple documents, and thus many communities of

DBL. In this sense, ParaTExt is one of the many interfaces that participate in DBL.
Technically, DBL is considered one part of a larger digital scripture development
ecosystem that includes ParaTExt and other tools. See
https://thedigitalbiblelibrary.org/about/ visited on April 25, 2017, for more details on this
ecosystem approach.

XML users have devised such standards. The XML used by DBL is a specialized

encoding standard designed specifically for digitizing biblical texts called Unified

Scripture XML (USX).[233] This particular USX standard holds together the versification

needs of bible data and continues to contain encoding for structural and style definitions

that might be useful for producing print versions of the digitized text. This is another

example of how new interfaces reproduce features of their predecessors.[234]

The way the XML of a DBL bible works is through a hierarchical structure of

tagged entities with attributes and content. In the example above, the tags are designated

by the brackets "<>," which define "paragraph," "chapter," and "verse" tags in this

particular selection.[235] As I mentioned above, XML allows for developers to create any

tag they need, so the naming and structuring of tags can tell us something about the

assumptions and values of an interface. Given the typical difference between XML and

HTML, where HTML deals with displaying data and XML with describing data, the

presence of paragraph(<para>) tags in this DBL XML is surprising. Chapter and verse

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[233] For detailed description and documentation of the USX 2.5 standard, see "USX," http://app.thedigitalbiblelibrary.org/static/docs/usx/index.html, accessed on April 25, 2017.

[234] The Codex Sinaiticus Project transcription XML had to include a great deal of positional data in the encoding to support the linking between the image and the transcription and the special formatting of the transcription in columnar form on the page.

[235] All tags in XML have some form of opening and closing. The simplest form of this open/close syntax is demonstrated by the <para> tags in this sample. You will notice that each <para> tag in the code is followed somewhere later in the code by a </para> tag, these mark the opening and the closing of a paragraph, respectively, with the forward slash indicating a closure. Everything contained between these tags is a part of that paragraph element, which can include text as well as other tags, specifically tags to indicate verses. This open and close syntax is identical to HTML.

tags make sense, since these would be describing and labeling the kind of data in the interface. A paragraph tag has more to do with display than with type of data.[236] Yet, in the DBL bible interface, paragraph operates as a data descriptor at the same level in the hierarchy as book and chapter elements. The prominence of the paragraph element in the XML of the DBL bible interface suggests that though this interface has made a move away from the dominance of the page as the primary unit of encounter for a user, the structural and stylistic demands of organizing text on a page remain a part of the dataset that constitutes bible.

If we look at the style attribute values of the paragraph element in this USX standard used by DBL, we can see the demands of print production of bibles at work.[237] In XML, attributes are additional data that indicate specific details about a given element defined by a tag to offer additional data to describe this element. In the example above, each <para> element has a style attribute indicated by the keyword "style" inside the brackets that define the tag followed by an equals sign and a value, such as <para style="p">. A given tag can have multiple attributes that offer different kinds of additional information about the element. For example, the verse and chapter tags in our sample have both a number attribute and a style attribute. The style attribute in the paragraph elements of DBL XML functions much like the style definitions in a word

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[236] One of the core tags used in most HTML standards is a paragraph tag, <p> instead of <para>. So, paragraph is most definitely a part of the encoding for data display.

[237] For a detailed description of all of the available style attributes in the <para> element, see Digital Bible Library, "<para> @style Types," https://app.thedigitalbiblelibrary.org/static/docs/usx/parastyles.html, accessed on October 11, 2017.

processor like Microsoft Word. In Word, a user can select a style of "Heading 1" or "Quote" or "Footnote" for a particular selection of text in the document and Word will apply a predefined set of formatting rules to that unit of text, such as font size, emphasis, and distance from the margins, to name a few. The predefined set of possible values for the style attribute of the paragraph element in the XML of DBL provide a mechanism of uniform formating for like elements within a bible, much like the heading and quote styles found in Microsoft Word. A <para> style attribute value of "p" indicates a normal paragraph, which signals that no additional formatting is needed for the content of that paragraph element. In our sample XML, we have one paragraph element with style="s", indicating a section heading, which can then be treated differently than a normal paragraph when displayed.[238]

The ubiquity of this style attribute in the DBL bible interface indicates a continued investment in the control and standardization of the display of text on a page. The DBL release bundle that comprises the XML contains a styles.xml file that contains explicit definitions for each of the possible values of the style attribute. Users of the interface can elect to adjust these style definitions, choosing a particular font to render normal paragraphs or a different color to emphasize section headings. Yet, the structure of these elements, that is to say, the definition of headings and the beginning and ending of paragraphs, is already cooked into the bible interface through these <para> elements and their style attributes. Due to the involvement of DBL in the production of other bible

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[238] For examples of the use of the section heading style attribute, see Digital Bible Library, "<para> @style Types," https://app.thedigitalbiblelibrary.org/static/docs/usx/parastyles.html#usx-parastyle-s, accessed on October 11, 2017.

interfaces in both print and digital forms, the XML encoding of DBL does the work of

what is typically divided between XML and HTML, both describing the data of these

bibles (XML) and establishing the appropriate parameters for displaying this data

(HTML). Including such explicit encoding for display and presentation in the XML of

DBL bibles seems to continue to pay homage, perhaps anachronistically or unnecessarily,

to the role of the book in defining bible as interface.[239]

Remnants of the Page

In terms of data description elements, the smallest unit in USX, the DBL XML

standard, is the verse. (By elements I mean features that are identified by XML tags.)

There are a few smaller elements in the USX hierarchy, such as the character element

(<char>), the table cell element (<cell>), and the optional break element (<optbreak>),

but as I noted with the paragraph (<para>) tag, these elements are focused on the display

of data, not on its description.[240] Since a verse element is always contained within a

paragraph element in the USX hierarchy, the words of verses function as the content of a

paragraph, with the verse tag simply indicating where a verse number should be inserted

in the paragraph element.[241] Though a subtle point, again we see the the page providing

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[239] This detailed attention to stylistic and structural elements in the XML of DBL also
reinforces that bible as interface continues to exceed simply the content a bible contains.

[240] The character element allows for stylistic formatting at smaller textual intervals than a
while paragraph element. The cell element describes the content and attributes of a single
cell in a tabular structure. The optbreak element simply indicates the position of an
optional line break in section of text.

[241] Unlike the paragraph element, which includes explicit open and close tags, the verse
element marks only the opening of a verse, not its end. Technically, a verse element can
be a child of the <para>, <row>, or <cell> elements, but row and cell elements are only
used for tabular display of verses. Instead of including a </verse> tag at the end of each

the structure for the USX governing architecture; the text is broken up by paragraphs, and

the paragraphs contain numbered verses.[242] With the verse as the smallest unit of data

description in the XML of DBL and with the content of verses essentially functioning as

content of paragraphs due to the hierarchical structure of the elements in USX, the DBL

bible interface affords less surface area than it could have if USX had encoded at smaller

intervals, such as the word or the character.

We saw a similar reduction in surface area in the XML-encoded transcription of

the Codex Sinaiticus web interface. Because Codex Sinaiticus itself was written in

scripta continua, its fourth century interface required the reader to process the text

character by character. The Codex Sinaiticus web interface, on the other hand, encoded

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verse, the verse element opens and closes in the same tag, such that technically, the words
of the verse are not the content of the verse element, the verse element is empty. The way
a verse element indicates open and close in a single tag is to include the forward slash
character at the end of the open tag, just before the close bracket. So, instead of
<verse>…</verse>, we have <verse … />. In the strictest terms, the verse element has no
content, since there is no data in between an open and close tag. A verse element simply
has attributes such as number, style, and alternative verse numberings. Each verse tag
includes at least a style and a number attribute, with "v" for verse as the only acceptable
value for the style attribute and number having a value that indicates the sequential
number of the verse within the chapter of which it is a part. Since there is only one
acceptable value for the style attribute of the verse element, this attribute is entirely
redundant and unnecessary, since the tag name already identifies the element uniquely as
a verse. The style attribute is also redundant in the chapter element, which has exactly the
same structure as the verse element, but indicates the beginning of a chapter, not a verse,
and the chapter element is not a child of the paragraph element.

[242] When processing these XML files with a language such as python, the text of a given
verse is more precisely identified as a "tail" of the verse element. In the Element class of
the etree module of the xml python library, a tail in XML is content that follows a close
tag. Since each verse tag in USX closes in the open tag and is then followed by the words
of the verse, these words are part of the tail of the verse element. Because the verse
element is a child of the paragraph element, even its tails belong to the paragraph
element, which is why I have articulated the words of verses here as content of
paragraphs.

the transcription so that the smallest unit was the word, not the character, thereby reducing the surface area. The XML encoding of the DBL has reduced the surface area even further by structuring the text in verse units.

The lower surface area of the XML provides for more efficient processing on the user end. If DBL XML encoded in a higher surface area manner, at the word or character level, then users of the interface (other interfaces such as a mobile bible study application in this case) would have to build in mechanisms for handling these additional surfaces, which could slow down or impede the ability of a user to work through this XML to render the text in an interface. These design decisions toward lower surface area may increase the efficiency of use, but they can also over determine the contours of an interface, which results in less demand on the user to participate in the production of the interface.

Interfacing Interfaces

DBL is designed with interface proliferation in mind, meaning DBL is an interface for other interfaces. The release bundle XML interface I have just described is intended produce another bible interface such as a print edition, a kindle bible, or a web interface that affords access to several translations at once. Even though the print paradigm encoding governed by the paragraph is present in the DBL interface, a particular user designing a different interface could choose to manipulate the material structures of the XML to resist or alter the conventions embedded in this DBL bible interface. There are explicit suggestions and demands for how a DBL bible is to be used in the construction of a new interface, through the structure of the XML, the style

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definitions, and the licensing requirements contained in the release bundle. Yet, the

attempted persuasive language of "should" used by the documentation for the elements of

the DBL XML standard highlights the collaborative and anarchic affordances of this

DBL bible interface.[243] Because the XML of DBL does not contain explicit HTML code

or complete print layout definitions, the DBL bible interface demands a user to

participate in the construction of the bible. This complicated relationship between users

and an interface that seeds the development of new interfaces also points to the inability

of the DBL XML to control entirely how users will participate in constructing the next

layer of interface, an anarchic affordance.

One example of a bible interface built upon and shaped by the digital materiality

of the DBL bible interface is the popular mobile bible interface produced by Life.Church

called YouVersion.[244] Its utter dominance in the mobile bible market has allowed the

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[243] For an example of this persuasive language, see the additional notes alongside the samples provided for the verse element at Digital Bible Library, "Elements," https://app.thedigitalbiblelibrary.org/static/docs/usx/elements.html#samples, accessed on October 11, 2017.

[244] Tim Hutchings has done some detailed description and careful sociological analysis of the religious use of YouVersion's Bible App in "Now the Bible Is an App: Digital Media and Changing Patters of Religious Authority," in *Religion, Media, and Social Change*, Kennet Granholm, Marcus Moberg, and Sofia Sjö, eds. (New York: Routledge, 2014), 143–61. In his recent volume, *Liquid Scripture: The Bible in a Digital World* (New York: Fortress, 2017), Jeffrey Siker also considers YouVersion's Bible app as one example of bible on screen. The Bible App has a counter on their site's home page that tracks the number of unique devices that have installed the "completely free, with no advertising and no in-app purchases" mobile app. Of course, this number is always expanding, but at the time of writing this sentence, the number of devices having downloaded the Bible App was 270,763,095.

YouVersion app to take on the more generic name of simply "the Bible App."[245] At the time of this writing, the Bible App offers a user just over 1500 bible versions in over 1000 different languages and some of these versions include both audio and text. Shaped by the digital materiality of the Digital Bible *Library*, the Bible App also functions as a library of bibles in a consolidated interface.[246] As we saw above, the XML of the DBL interface has verse as its smallest structural unit. Unsurprisingly then, the smallest unit of text a user can select in the reader area of the Bible App is a verse. A user can select multiple verse objects on the screen, but cannot select a single word or phrase within a verse. Here again is an example of the digital materiality of the DBL shaping the material affordances of bible interfaces built upon it.

Leveraging the anarchic affordances of the DBL, the Bible App goes beyond the XML DBL interface and adds high surface area and collaborative affordances through the "Related" feature of the reading area of the app. Once a user has selected a verse, a menu appears with several options for the user to participate in the interface with this particular verse. The "Related" option connects the verse contained in the version file loaded from DBL to other objects in the interface that have been marked as related to the selected verse. Through the Bible App, a user can add a note to a verse and mark this note private,

[245] I will refer to YouVersion's app as the "Bible App" from now on to indicate the dominance this particular bible interface has garnered in the mobile application space.

[246] These version statistics are presented to the user of the Bible App at the top of the Versions view in the mobile app. These versions come from the DBL interface I discussed above. Comparing the May 2017 statistics from DBL to the number of versions available in the Bible App, we find that DBL holds 1535 text entries in 1154 languages, slightly higher numbers than included in the Bible App. See Digital Bible Library, "May 2017 Content Update," http://thedigitalbiblelibrary.org/2017/05/01/may-2017-content-update/#more-917 for the report, accessed on May 8, 2017.

for friends only, or public. If a note is marked public, then any other user can select the same verse and choose the "Related" menu item and see this note. On an iPhone 7, this list of related notes loads in a new screen so the text of the selected verse is not visible anymore. Instead, the user is presented with a reverse chronological--most recent first--list of notes added to this particular verse by users all over the world. This list of notes on a given verse gives a user a point of contact with the larger community of users engaging in the interface, and extends the interface beyond the material limits of the XML of the DBL interface.

As we have seen with a close look at the XML of the DBL, DBL cannot be reduced to simply a data or content source for bible interfaces, it is an interface of its own that enacts a digital materiality that shapes the possibilities for interface proliferation. Yet, the vast collaborative capacities afforded by the myriad ways to translate DBL XML into different media interfaces, working with the structural elements of the DBL interface, resists the ability of DBL to dictate or determine use of this bible interface. One of the ways in which DBL attempts to mitigate these anarchic affordances of its bible interface is to closely control who can be a library card holder. The DBL bible interface is decidedly not public. A user, which in this case is an institution such as American Bible Society or YouVersion, has to be a DBL "library card holder" (LCH), which DBL also refers to as a publisher. The LCH must abide by the licensing requirements of a given bible in order to have the ability to download and use a release bundle from DBL. The criteria for becoming a LCH includes

Reputable Standing – Only reputable organizations will be considered for participation in the DBL. A reputable organization is one that follows the historic tenets of Christianity

Cooperation – While we don't expect all partners to hold to similar confessional practices or standards, we do expect them all to be able to operate cordially and constructively with all ETEN members, including the inter-confessional ones. Applying organizations should not have any outstanding conflicts with any current ETEN partners or other Library Card Holders.[247]

Unlike the Codex Sinaiticus web bible interface, which was released to any user that has access to the internet, the DBL interface is only available to those approved by the Partnership Credentials Committee. The need for such a process of approval partly has to do with the sensitive copyright information being negotiated in the DBL, but at the same time, it functions as a means of limiting the anarchic affordances built into the interface itself. The four terms listed under the tag line for the DBL on the main page of their website are, in order, "Security," "Uniformity," "Availability," and "Accountability."[248] The positioning of these terms is important. Availability, the value that connects most closely to the anarchy of the DBL interface, is bracketed by security and accountability. Only in the context of these kinds of controls does the DBL interface

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[247] For a full list of the criteria for being an LCH in DBL, see the LCH criteria accordion menu of the Library Card Holder tab on the "Get Involved" page of the DBL website, http://thedigitalbiblelibrary.org/get-involved/, accessed on May 7, 2017. There are other criteria, but these two illustrate the non technical attempts to control who participates in this interface. The mention of ETEN in the Cooperation criteria refers to the alliance of ministries and bible translation agencies known as Every Tribe Every Nation. This alliance is the primary governing body and funding vehicle for the DBL. For more information on ETEN, see http://www.everytribeeverynation.org/, accessed on October 11, 2017.

[248] "The Digital Bible Library," https://thedigitalbiblelibrary.org/, accessed on May 7, 2017.

champion availability and the close attention to criteria for attaining a library card in DBL supports this kind of minimization of anarchy.

Technologically, DBL affords a reasonably high surface area interface--though lower than some others we have seen--that has expansive affordances for collaboration and anarchy. The collaborative affordances of DBL are most evident in the fact that Library Card Holders (DBL users) themselves determine what is available to other users through the DBL interface. By ingesting their bible translations into DBL and specifying licensing options, DBL users have a high impact on what is possible in the DBL interface. DBL affords anarchy through its capacities for proliferation. Providing a platform upon which users can develop new bible interfaces, the materialities of the DBL interface influence these new interfaces without entirely dictating their limits and possibilities. In practice, there are logistical processes in place that could limit the affordances of collaboration and anarchy in the DBL interface. To see how this negotiation plays out in practice, we will look at one of the early and significant users of the DBL bible interface, American Bible Society's Bible Search API[249].

Bible API

American Bible Society (ABS) is a Library Card Holder in the DBL and one of the founding partners. As a Library Card Holder, ABS has built a bible interface called BibleSearch at bibles.org using bibles from DBL to provide a public web search engine

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[249] American Bible Society, "Bible Search API," http://webtools.bible/api.html, accessed on September 10, 2017.

for bible and an application programming interface (API).[250] The web search engine of BibleSearch is clean and simple and offers a great deal of functionality for reading and interacting with the textual content of bible.

The more interesting interface offered by BibleSearch is their BibleSearch Application Programming Interface (API), which allows developers to build new bible interfaces using the data BibleSearch has remediated from the DBL interface. Much like a graphical user interface makes it easier for a user to navigate a software application through interaction with graphical representations of objects and functions, rather than resorting to the obtuse syntax of a command line prompt, an API makes it easier for one software application to interface with another. APIs are zones of contact where two software systems interact and negotiate a relationship based on rules and processes defined by the API. Hence the word *interface* in the name. In a growing landscape of application interoperability, APIs are becoming ubiquitous. Google has several APIs, Twitter and Facebook have APIs, Amazon has APIs, and the list goes on.[251] These APIs are what allow programmers to more easily build apps for a mobile device that enables users to check email and post to twitter from their phone. APIs highlight the proliferation possible in emerging digital technologies. With the BibleSearch API, we see a user

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[250] BibleSearch also has a widget tool that embeds a search engine in another site and a highlighter tool that will read a site for bible references and link to BibleSearch content from the reference. For more details on any of these tools, see American Bible Society, "Tools," http://webtools.bible, accessed on October 11, 2017. Incidentally, ABS was also the driver behind developing the .bible registry for domain names ending in .bible instead of .com or .org, etc.

[251] For a searchable exploration of available APIs, see ProgrammableWeb, "API Directory," https://www.programmableweb.com/apis/directory, accessed on October 11, 2017, which cataloged over 17,000 APIs at the time of this writing.

(American Bible Society) building a bible interface from the bible interface of DBL in order to facilitate the construction of other bible interfaces.[252]

The BibleSearch API offers programmatic access to a select set of DBL bible content for any registered BibleSearch user, which anyone can become. The BibleSearch API is taking secured and authorized DBL bibles and making them available to a much larger public than has access to DBL. Given the copyright and licensing constraints on public access to bibles in DBL, it is no surprise that the number of bible versions available in the BibleSearch API is much smaller than those existing in DBL. The BibleSearch team at ABS is working hard to offer more access in the API, but currently there are 302 versions available in 276 languages, a fifth of the versions made available to the public through the Bible App.[253]

BibleSearch Interface

So, what does this bible API look like? The best way to see the operations of this interface is by using it, but through the documentation provided by BibleSearch, much can be learned about the API.[254] The introduction to the documentation makes it clear that the API is designed for developers and is not intended for commercial use. The

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[252] DBL has an API that we did not discuss earlier, which allows Intellectual Property Contributors and Library Card Holders easy read only access to metadata (attributes describing the data in a translation) and file downloads for DBL content for which they have a license. For details about the available functions in the DBL API, see Digital Bible Library, "API," https://www.thedigitalbiblelibrary.org/dbl/static/docs/api/index.html#, accessed on May 9, 2017.

[253] For up to date statistics on available versions in the API, see American Bible Society, "Versions," http://bibles.org/versions_api, accessed on May 9, 2017.

[254] American Bible Society, "Developer Tools: API," http://bibles.org/pages/api, accessed on May 9, 2017.

language of the documentation suggests that the API is a means of including "Scripture content and text" in as site or application. Though the data available in the BibleSearch API is oriented around biblical text, the interface cannot be reduced to the content available within, it is a framework upon which new bible interfaces can be built. To use this bible API, a user need not meet the complicated criteria for becoming a Library Card Holder in the DBL. All a user needs to do is register an account to identify themselves within BibleSearch and provide a brief description of the interface/application being built to use the BibleSearch API. These barriers to use are far lower than for DBL, allowing exponentially more users to participate in the interface. Like DBL, the BibleSearch API administrators do provide some stated guidelines for use to help mitigate the potential anarchy of the openness of the interface. The second in their list of frequently asked questions, titled "How can I use the data?," says,

> You cannot use the Scripture content retrieved from the API for any commercial purposes, nor in any application that is illegal, offensive, obscene, violent, immoral, or derogatory towards others or the Scriptures itself. Basically, play nice. Don't alter or change the meaning of the Scripture, or how it could be interpreted.[255]

The focus on bible as content here is pronounced, but there is also a distinct awareness of the vast possibilities for use of this bible interface. Again, a caution about use of bible is not a new phenomenon in our emerging technological landscape. It doesn't take much effort to recall violent and derogatory uses of earlier bible interfaces throughout history, such as war, slavery, and oppression of difference. Yet, that a developer could use this API to build a new bible interface that enacts or propagates these

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[255] American Bible Society, "Developer Tools: API," http://bibles.org/pages/api, accessed on May 9, 2017.

harmful adjectives to an uncontrollably large internet audience does perhaps introduce a heightened scale into the caution here. The final clause of these brief guidelines for use betrays an utter lack of any concept of the importance of interface in the construction and use of bible. Even if bible were reducible to content alone, this articulation of the already established and static meaning and possibilities for interpretation of bible devalues the role of readers as users.

The BibleSearch API is a read-only API that provides either XML or JSON (JavaScript Object Notation) results through HTTPS (Secure HyperText Transfer Protocol) GET requests. Let us look more closely at each of these technical aspects of the API, in reverse order. HTTPS GET requests are what we run when we enter a web address into a browser address bar or click on a link, asking (GET) for a server somewhere to return to us a page and its data in a web browser.[256] Like we saw in the DBL bible interface, the BibleSearch API provides users access to bible via XML or an alternative data encoding language called JSON. Like XML, JSON is self-describing hierarchical data description notation, meaning the elements in a JSON data set and their hierarchy are defined by the data itself, not by some external standard. Instead of the open and close tag notation syntax of XML, JSON is structured by a hierarchy of objects that contain key/value pairs.[257] We will see more specific examples of JSON below when

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[256] The "S" in HTTPS states that the communication between the browser and the server is secured through some form of encryption. HTTP, the non-secure form of these GET requests and HTTPS are supported by the BiblesSearch API, but HTTPS is recommended. The BibleSearch web interface uses their own API to deliver content to a browser based on a user request over HTTP.

[257] For a brief introduction to the syntax and structure of JSON, see http://www.json.org/, accessed on May 10, 2017.

we look more closely at the API in use. Finally, the BibleSearch API is read-only, which

indicates that this API allows users only to view data; it does not allow them to modify,

add, or delete any data in the interface.[258] The fact that the BibleSearch API uses familiar

HTTP methods and common data encoding standards for the results of these methods

makes this bible interface more accessible to a larger population of users. Limiting the

interface to read-only decreases the collaborative affordances of the interface, since users

cannot make any marks on the interface itself to participate in constructing the space of

the interface. On the other hand, the myriad uses that this interface can afford beyond a

simple "reading" of the JSON results does allow users to construct interfaces with greater

collaborative affordances.

Requesting Bible

To begin participating in this bible interface, I had to register an account with

BibleSearch and then register an application that will be using the API. This registration

process provides an authentication token that must be used every time I as a user

participate in the interface through the API. Though this registration and authentication

provides an efficient and comprehensive means for BibleSearch to monitor a user's

behavior in the interface, the barriers to attaining this access in the first place are very

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[258] The read-only nature of the API effectively limits users to the GET HTTP method and excludes other possible methods such as PUT (edit), POST (add), and DELETE. BibleSearch also suggests that this API is a RESTful API, which means that this is a web service that adheres to the architectural constraints of Representational State Transfer (REST). The REST architecture was introduced in 2000 by Roy Fielding in his doctoral dissertation at University of California, Irvine, titled, *Architectural Styles and the Design of Network-based Software Architectures*, http://www.ics.uci.edu/~fielding/pubs/dissertation/rest_arch_style.htm, accessed on May 10, 2017.

low, particularly compared to the criteria required to become a Library Card Holder in

DBL. So, in one sense, the BibleSearch API is providing a public interface for a limited

subset of the DBL interface, which is more tightly controlled.

The simplest way to describe the structure of this API interface is that it consists

of endpoints that take requests and return responses. An endpoint in this case, such as the

verses endpoint, is a URL that provides instructions for a user to request a particular

response from the API. For example, to request a specific verse from a particular version

with a JSON response I would use syntax modeled by

```
GET /verses/{version_id}:{book_id}.{chapter_number}.{verse_number}.js?include_marginalia=true
```

In this schematic, we see the explicit GET method I referenced earlier and then

we have "/verses/," which stipulates the verse endpoint of the API. The rest of the items

in this URL are parameters or instructions a user passes to the endpoint to ask for a

specific verse. The version_id is a unique code identifying the specific version from

which the verse will be requested.[259] Book_id is an abbreviation for the biblical book in

which the verse is located and these abbreviations are based on the Open Scripture

Information Standard (OSIS) definitions for biblical books.[260] Chapter_number and

verse_number are numerical values that identify the specific verse requested. The ".js" in

the URL tells the API that a user wants the results in JSON rather than XML. Finally,

"include_marginalia=true" is an optional flag that can be passed in the API request to

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[259] For samples of version_ids and more details on the versions endpoint, see American Bible Society, "Versions," http://bibles.org/pages/api/documentation/versions, accessed on May 10, 2017.

[260] For more information on OSIS, see The Crosswire Bible Society, "OSIS," https://www.crosswire.org/osis/, accessed on May 10, 2017.

include footnotes and cross references in the response along with the indicators for these notes within the text itself. So, if a user[261] wanted to request a JSON response for the sixth verse of the third chapter of 2 Corinthians in the English Standard Version, including footnotes and cross references, the API request would look like:[262]

```
GET https://bibles.org/v2/verses/eng-ESV:2Cor.3.6.js?include_marginalia=true
```

This API based verse request interface is essentially the same as a verse picker browse function in a web browser, where a user would select a version, book, chapter and verse from a list and select the option to display footnotes. The BibleSearch web interface does just this, taking the user input from the version and chapter selections at the top of the page and constructing an API request much like we have seen above.[263] Here we see BibleSearch itself building layers of interface upon the interface of DBL. The BibleSearch web bible interface is a user of the BiblSearch API, which is a user of DBL bible interface. Bible interfaces in this emerging technological landscape continue to

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[261] I have two possible users in mind here. First, we could imagine a programmer designing a bible interface using the BibleSearch API as our user. Second, we could imagine the machine or the code running the newly developed interface as the user of the API. In fact, API is common language to describe interfaces between two pieces of software. So, here we see another sense in which these emerging bible interfaces are moving beyond our typical notions of bible as book, by involving users that are machines.

[262] The https://bibles.org/v2 is the trunk of all API endpoints including an explicit API version number "v2." If a request leaves out the explicit version, the request will use the default API version, which is currently "v1." Versions codes in the API contain both a language indicator and the version abbreviation, such as "eng-ESV" for English language - English Standard Version.

[263] See American Bible Society, "BibleSearch," http://bibles.org, accessed on October 11, 2017 to try the web interface for this API. The main difference in the web interface is that it uses primarily the chapter endpoint to return all verses for a selected chapter of a selected version and it formats the results for viewing and interacting with in a browser.

challenge any stark boundaries between user and interface as interfaces become users and users construct new interfaces on the fly.

Bible as Data Objects

The response from the sample API request we constructed above contains several pieces of data related to the request, including copyright information, next and previous verse identifiers to provide context for this verse and easy machine navigation, the parent object of this verse (2 Corinthians book object), and the verse information including verse number, verse text, and footnotes and cross references. One advantage of an API type interface is that bible is not reduced simply to the textual content of a verse. When a user requests a verse from this API bible interface, such as 2 Cor. 3.6, the interface returns a structured set of data that relates to the verse, such as verse identifiers, the HTML encoded text of the verse, and related footnotes. The verse content itself is only one contact point with this interface, highlighting the digital materiality of this interface and reinforcing the irreducibility of bible to the content of its verses. In the small selection below, I show both the list of keys that make up the JSON response from this verse request and the value of the text key.

```
verse object keys = ['footnotes', 'reference', 'label', 'auditid',
                     'prev_osis_id', 'copyright', 'verse', 'id',
                     'previous', 'lastverse', 'parent', 'crossreferences',
                     'text', 'next', 'next_osis_id', 'osis_end']

'text':  <p class="p"><sup id="2Cor.3.6" class="v">6</sup>who has made us
         sufficient to be <a href="#2Cor.3.6!x.1" id="link_2Cor.3.6!x.1"
         class="notelink x-link"><span>+</span></a> ministers of <a
         href="#2Cor.3.6!x.2" id="link_2Cor.3.6!x.2" class="notelink
         x-link"><span>+</span></a> a new covenant, not of <a
         href="#2Cor.3.6!x.3" id="link_2Cor.3.6!x.3" class="notelink
         x-link"><span>+</span></a> the letter but of the Spirit.
         For the
         letter kills, but <a href="#2Cor.3.6!x.4" id="link_2Cor.3.6!x.4"
         class="notelink x-link"><span>+</span></a> the Spirit gives
         life.</p>
```

The "text" of the verse object is indicated by the 'text' key followed by a colon and then the long string following the colon is the text value of the verse object. The ESV text of this verse, 2 Corinthians 3:6 is very short, "who has made us sufficient to be ministers of a new covenant, not of the letter but of the Spirit. For the letter kills, but the Spirit gives life." All of the encoding in the text of the verse is an HTML translation of the XML provided by the DBL interface for this verse. You will recall the <para> and <verse> elements from the DBL XML had style values of "p" and "v" respectively. In the HTML of the text of this verse object from the API, <p class="p"> is a translation of the DBL <para style="p"> ; and ⁶ is a translation of the DBL <verse number="6" style="v"/>. The <a> and <span> elements in the HTML construct cross references in the text. The href attribute of the <a> element maps to the "id" attribute of one item in an ordered list of cross reference objects returned by the API in this verse request.

Including cross references like this in the API contributes to the surface area of the interface by providing more points of contact within the verse that interrupt a user's

ability to contain the verse by pointing toward other places in the biblical text. Interestingly, these cross reference objects are not formatted in such a way to make it easy for an application or a user to link from the verse in view to the verses mentioned in the references. Providing linkability by formatting the references using syntax that could easily be passed back to the API would increase the surface area and collaborative affordances of this interface even further by providing avenues for the user to construct different pathways through the text. Cross reference objects are just one example of the many points of contact provided by this API bible interface.

As we saw with DBL, the verse is the smallest unit in the API bible interface, yet the JSON results contain many distinct access points for the verse beyond just the content of the text of the verse, as demonstrated by the keys list in the sample above. The JSON structure of a verse object makes it clear that a verse has many more properties than simply the words it contains. Although each verse object contains data contextualizing it within the larger textual framework, such as next, previous and parent attributes, the sheer fact of constructing verses as objects that a user can engage and use individually foregrounds the typical role of bible as an aggregation of distinct objects rather than a homogeneous whole.

The read-only nature of the BibleSearch API definitely limits the collaborative affordances available in this interface. If a user could write back to the API notes or amendments or other assets that might relate to a verse, such as images, videos, links, etc., this bible interface would provide more opportunities for users to participate in the

construction of the space.[264] Yet, the fact that a user has to learn how to construct an API

request using some form of application language, such as perl, python, php, etc. demands

a level of participation that we may not find in some of the other interfaces considered

here. Of course, any bible interface carries with it some kind of linguistic or semiotic

demands to engage the text for more than its aesthetic material value. In these emerging

digital interfaces of bible that are built primarily as platforms upon which users will build

new interfaces, the demands for participation are quite high because a user has to have

the literacies and capacities to both interpret the responses from the interface and to

construct something meaningful from them. Much like the roll interface shaped some of

the possibilities and limits of the codex, so each of these interface layers, such as DBL

and BibleSearch API will impact the affordances of the interfaces built upon them. We as

scholars will need to continue to develop literacies at each layer of these interfaces in

order to critically examine the assumptions at work. It is my hope that this project is an

initial experiment in that direction.

Expanding the Anarchic

As I mentioned earlier, a bible interface that is expressly designed to encourage

users to build other interfaces can afford anarchy at a growing scale. Using the

BibleSearch API, I could build an interface that constructs an entirely new bible version

from a randomized selection of passages from different versions in multiple languages

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[264] The BibleSearch web interface does allow users to tag verses with keywords and add
notes to verses. Currently, the API allows read access to the tags associated with a verse
but not the notes and there is no way via the API to add or modify tags. For more detail
on the tags endpoint, see American Bible Society, "Tags,"
http://bibles.org/pages/api/documentation/tags, accessed on May 11, 2017.

and present this to users in a web browser that allows them to move verses around to construct an entirely different narrative than was presented to them. This kind of use most certainly challenges the reign of an original intention or singular principle governing the interface. This API interface offers great potential for anarchy, even if American Bible Society has offered suggested guidelines for use that are less anarchic and has the ability to terminate a user's access at any time. Within the structure of the API, there are also some anarchic affordances at work. Several endpoints in the API offer a query parameter or search function that can open up new combinations of verses and interrupt the dominance of the typical order of the text. The API also provides a basic search endpoint that allows for passage or keyword requests. A query based request to the API simply means a user is constructing a question to ask the API, rather than just providing explicit values for parameters to return a specific response. The most interesting of the query based requests is offered in the verses endpoint, where a user can ask any keyword(s) question of the API and get a response that aggregates all verses that meet the criteria provided in the query.[265] For example, if I want to find all mentions of "book" in the bible, I can make a request that looks like[266]

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[265] For a detailed look at all of the possible search criteria that can be passed to this verse search endpoint, see the Searching section of American Bible Society, "Verses," http://bibles.org/pages/api/documentation/verses, accessed on May 11, 2017.

[266] The python code I use to run this API request is included here:

```
GET https://bibles.org/v2/verses.js?keyword=book
```

The API response provides a very helpful summary object for this query request that tells me there are eight versions that have 318 occurrences of the keyword "book" across the Old and New testaments.[267] In this single API request, I have constructed a collection of over three hundred verses that cross eight versions and two testaments based on my interests as a user in a single keyword. In four additional lines of code, I can construct a single continuous text of 87,528 characters from a simple concatenation of these 318 verses.[268] Here we see the anarchic affordances of the API bible interface on display as I construct an entirely different text from the results of a keyword search.

```python
import requests
from pprint import pprint

api_token = [my_personal_API_token]
pass_fake = 'X'

verse_endpoint = 'https://bibles.org/v2/verses.js?keyword=book'
verse_resp = requests.get(verse_endpoint, auth=(api_token, pass_fake))
verses = verse_resp.json()

pprint(verses)
```

[267] The summary object looks like this:

```
'summary': {'query':      'book',
            'rpp':        '15',
            'sort':       'relevance',
            'start':      1,
            'testaments': ['OT', 'NT'],
            'total':      318,
            'versions':   ['eng-NASB', 'eng-ESV', 'eng-MSG',
                           'eng-KJVA', 'eng-CEVD', 'eng-AMP',
                           'eng-GNTD', 'eng-CEV']
           }
```

[268] The additional lines of code with comments are

Demanding New Literacies

In all of the layers of interface from the DBL to the interfaces constructed by users of DBL, such as the BibleSearch API, we find the affordances of high surface area, collaboration, and anarchy. As bible evolves beyond the technological and cultural categories of book, there is undoubtedly a progression toward higher surface area in bible as interface, even though there is a tendency toward the verse as the smallest unit of the bible instead of the word or character as we found in some earlier book interfaces. The collaborative affordances of book bible interfaces were embedded in the ability of a user to mark the surfaces of the interface through a scribal note or a public user highlight. As bible emerges into a technological landscape that pushes beyond book, its collaborative affordances move toward the ability for users to participate in constructing the interface and make more layers of interfaces, which both DBL and the BibleSearch API demonstrate exquisitely.

The technologies of these emerging interface ecosystems will continue to expand the anarchic affordances of bible by allowing users to build new interfaces that challenge the rule of any original text or intention. At the same time, with the increasing abilities to track usage in internet interfaces, the institutions running the platform bible interfaces like DBL and BibleSearch API will have the ability to police and curtail the extent of

```python
# get just the list of verse objects from the API response
search_verses = verses['response']['search']['result']['verses']
book_bible = [] # define an empty list

for verse in search_verses: # look through all 318 verses returned
    book_bible.append(verse['text']) # add the text of each verse to the list

print(' '.join(book_bible)) # print all items of the list joined by a space
```

experimentation and shape the nature of collaboration based on their perceptions of proper use. Just as biblical scholars have invested in the layers of linguistic interface involved in bible, as bible moves beyond book into emerging technological interfaces, biblical scholars will need to develop the skills to analyze and critique the myriad layers of interface at work in each surface of encounter that is bible. Instead of lamenting the difference and discomfort of bible on the screen, let us take up the challenge to learn new languages to carefully read and build new interfaces for bible as the book relinquishes its reign on knowledge and the bible.

CONCLUSIONS

As Timothy Beal so aptly puts it in his analysis of the cultural iconicity of bible in the twilight of print culture, "It's the end of the Word as we know it, and I feel fine."[269] I couldn't agree with Beal more and I am excited to see what bible can and will become as interface in the continually emerging technological landscape of machine learning and artificial intelligence. Bible as interface, irreducible to its contents alone, has provided us a way to see how bible continues to enact bible amidst substantial technological change such as the rise of the codex and the emergence of internet technologies. Bible at its best is an interface that enables relationships with users that cannot be reduced to simple consumption of its contents. The affordances of high surface area, collaboration, and anarchy facilitate this kind of interface and we have seen these affordances at work in the ancient technologies of the roll and codex manuscript as well as in the digital technologies of XML and APIs. The continuity of these affordances, though expressed differently in each interface, provides a way for users to see the connection of emerging bible interfaces to the long history of bible use, even as bible begins to extend beyond the book. In a sense, our analysis here has demonstrated that bible as interface is irreducible to the book.

Early on, I articulated three aims at work in this project related to the argument of bible as interface: 1) focusing attention on the materiality of bible even into the digital

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[269] Beal, *The Rise and Fall of the Bible*, Kindle location 309.

realm; 2) finding an alternative to the anxiety around the impact of emerging technologies on the use of bible; and 3) beginning to build new capacities for biblical scholars to study and engage bible in our emerging technological landscape. The process of *material media translation*–the translation of affordances from one interface to another–provides an anchor for all three of these aims. The translation of the affordance of anarchy from the scribal emendations of Codex Sinaiticus to the search endpoints of the BibleSearch API demonstrates the radically different materialities at work in these bible interfaces and the impact on use. Ongoing scribal participation in an ancient manuscript through the margins and the space between lines and letters resisted the closure or fixity of a text. The search endpoints of the BibleSearch API allow a user to bring together typically disparate texts in ways that can surface new possible meanings and relationships in the text.

At its best, bible has and always will afford this kind of anarchy through the constraints and possibilities of its materiality in interface. Even if this anarchy looks more troubling and threatening to those who value the stability of the texts of bible, the continuity throughout history of this affordance of anarchy in the acts of material media translation can offer us a way to engage emerging bible interfaces from a place of familiarity and value, not anxiety. The ability to attend to these continuities and distinctives in the process of material media translation of bible as interface will demand an ever expanding development of new capacities as well as holding onto the value of those capacities already well developed in the discipline of biblical scholarship. It is our responsibility as students of this material cultural phenomenon of bible to develop the

capacities to engage bible on its terms as its materialities continue to expand in each

emerging technological landscape in which we find ourselves. The scale of this

expansion, and hence, the demand for our ongoing learning, is only beginning to make

itself known. This demand for learning, for building new capacities, and for doing this

together in collaborative community excites me. So, it is indeed the end of the Word as

we know it, and I feel more than fine.

Face of the Deep

One of the ways I propose for biblical scholars to begin learning the capacities

needed to study bible as interface is to go beyond the critical analysis of existing bible

interfaces and to participate in the designing and building of emerging bible interfaces.

With the help of The Experimental Humanities Lab at Iliff School of Theology[270] and the

Baker-Nord Center for the Humanities at Case Western Reserve University,[271] I have had

the privilege of participating in this process of collaborative design and construction of an

emerging bible interface. For the 2014-2015 academic year, through the generous support

of the Baker-Nord Center, I had the privilege of working with an inspiring and inquisitive

team[272] to collaboratively explore ways in which emerging digital technologies might

unsettle our notions of sacred text translation. For a little over a year, our team worked

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[270] "ExperimentalHumanities@iliff," http://library.iliff.edu/humanities, accessed on October 11, 2017.

[271] Case Western Reserve University, "Baker-Nord Center for the Humanities," http://humanities.case.edu/, accessed on October 11, 2017.

[272] Timothy Beal, Sarah Gridley, Eric Pellish, William Deal, and Michael Hemenway.

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remotely and co-located to imagine a web interface that would encourage attention to ambiguity in the translation processes of Genesis 1.1.

Working with this team through Baker-Nord provided the seed for a bible interface project that we have taken up in the Experimental Humanities Lab at Iliff, my home institution, which we have called *Face of the Deep*.[273] I was initially hoping that the *Face of the Deep* bible interface would be a part of this dissertation, so our team spent significant time together developing a proof of concept in the Fall of 2016. Due to the lack of evaluative and logistical infrastructure in our doctoral program for digital dissertations, work on the interface has been put on pause. Yet, below I outline some early experiments in the theory and practice of design for *Face of the Deep*. The design of this interface is deeply formed by the affordances of high surface area, collaboration, and anarchy that we have seen in bible as interface.

Two Lobes of Infinity

Face of the Deep provides users an encounter with the relational networks of artifacts that constitute bible. We have taken a broad notion of artifact in this project, including translations, versions, manuscripts, images, art, film, music, etc. I think of the interface design of *Face of the Deep* as the constant interplay of the two lobes of the infinity sign. *Lobe 1* is an ongoing and iterative machine learning process gathering artifacts and data from sources and from user interaction. This machine learning engine would use this data to create correlative metadata that provides possible links among

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[273] We did all of our initial development of the *Face of the Deep* project in a public repository on GitHub, which you can find at "Face of the Deep," https://github.com/textpotential/faceofthedeep, accessed on October 10, 2017.

artifacts in this bible interface by connecting words to conceptual domains through grammatical and semantic abstraction. Optical Character Recognition (OCR), image recognition tools, and video processors will engage media for potential terms or attributes that can be passed into the conceptual algorithm map for metadata processing. We will use an object oriented database to store and access artifacts in a manner that problematizes any strict database/interface dichotomy and foregrounds interface's irreducibility to content consumption. Natural language processing will provide the algorithms to take streams of data and find correlations between artifacts and create the corresponding metadata by moving back and forth between semantic and conceptual realms using tools such as WordNet.[274] Lobe 1 affords high surface area because it is constantly new artifacts as contact points for users, it affords collaboration by incorporating user participation into the discovery of artifacts and the construction of relationships between artifacts, and it affords anarchy by bothering any simple reduction to a governing data set that dictates all possible uses.

Enacting the proliferation characteristic of emerging digital interfaces, *Face of the Deep* will use partner interfaces to provide artifacts for the ongoing training of the machine learning engine and for user engagement. Some of these partner interfaces would include bible interfaces we considered in this dissertation, such as the Digital Bible Library and the BibleSearch API for textual translations and audio artifacts. Our team would also be interested in helping develop an API for the digital images and transcriptions of the Codex Sinaiticus Project to make it easier to incorporate these

[274] For more information see Princeton University, "WordNet," https://wordnet.princeton.edu, accessed on October 10, 2017.

artifacts in the interface. In gathering partner interfaces, we will privilege open access

artifacts and will provide pointers to each artifact when possible, rather than copying and

ingesting full objects into our interface. Pointing users to other interfaces provides

another affordance of anarchy by resisting attempts to keep users within one interface,

but promoting the interconnection of interfaces as much as possible.

Lobe 2 of *Face of the Deep* leverages the algorithms of lobe 1 to render a web

interface that allows user interaction with and participation in constellations of artifacts

that make up the tradition surrounding a biblical text. Users arrive at the *Face of the Deep*

interface and are presented with a textual translation of bible based on the default

language settings in their system of access. A touch or click on a portion of text zooms to

that portion of text as shimmering artifacts making up letters, almost as if letters are

buzzing, and then these objects release from formation in letters into a slowly swirling
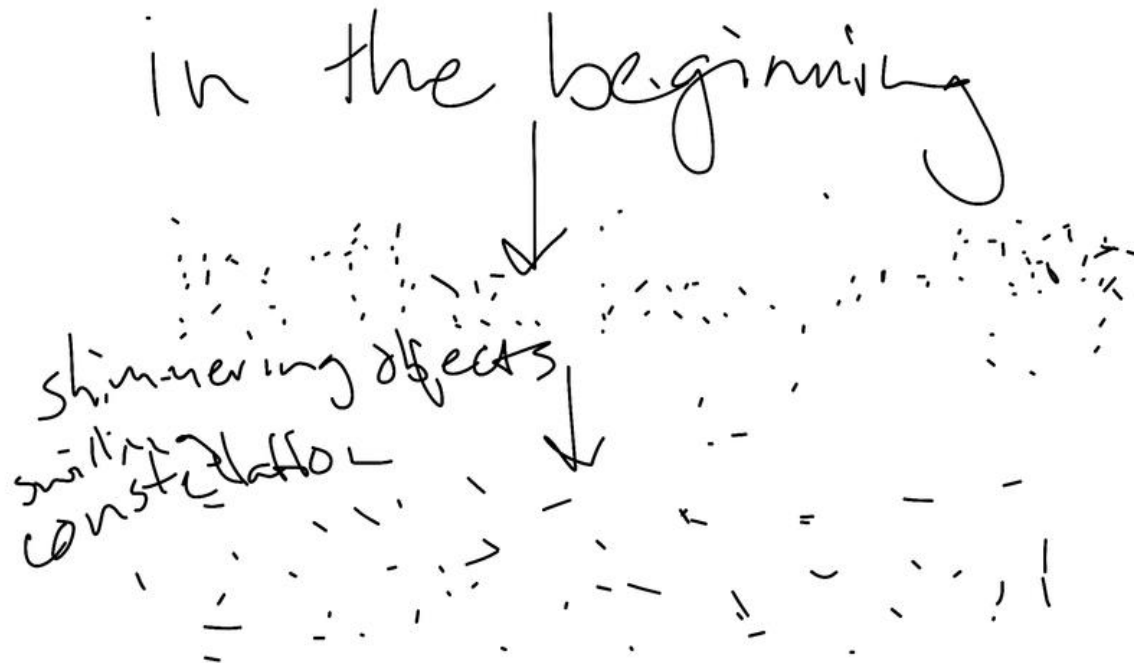
constellation of objects.

Figure 1. Opening animations of the *Face of the Deep* interface.

To the left of the swirling constellation will be a clickable cloud of object type toggles to allow filtering of artifacts in the constellation by particular object types, such as text, image, video, etc. All types will be displayed by default. Clicking on a type marker one time will remove that object type from the constellation and clicking again will bring these objects back into the swirl. To the right of the constellation will be a clickable cloud of concept toggles for filtering in a similar fashion.[275]

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[275] We could have countless clouds or cascading clouds that allowed filtering by different attributes (language, time period, genre, etc.)
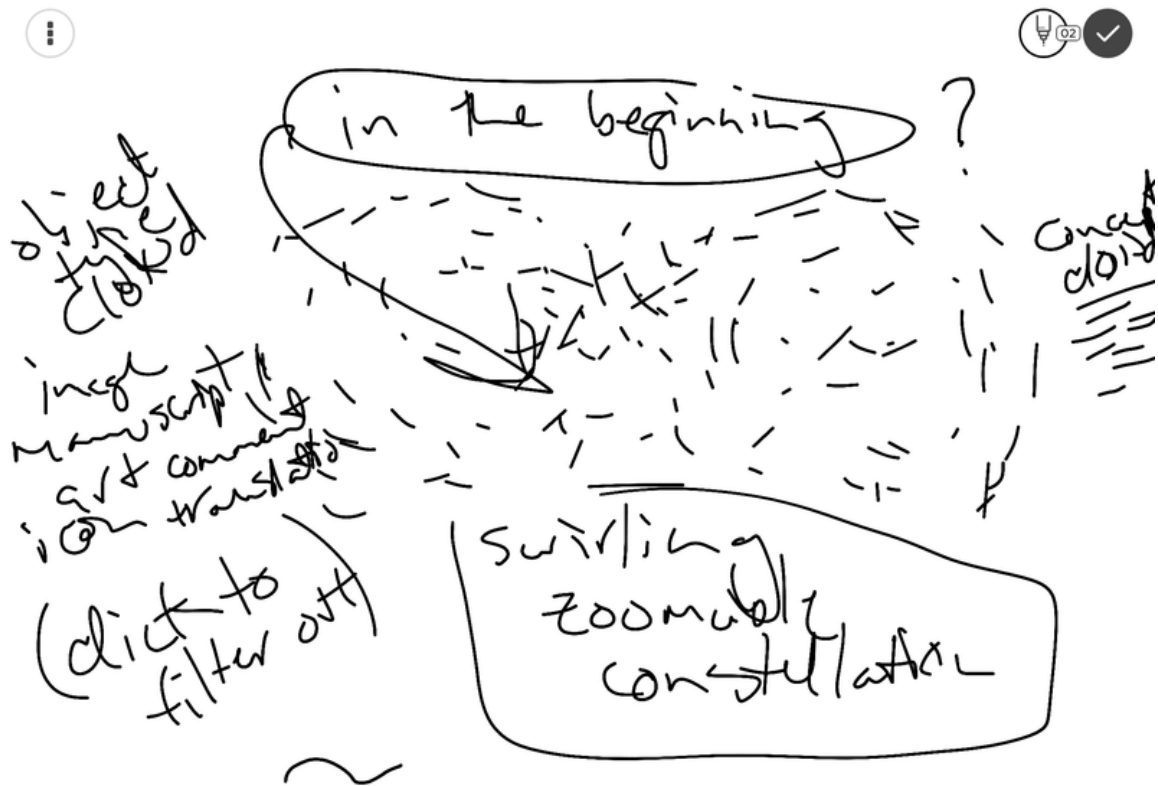
Figure 2. Constellation view of the *Face of the Deep* interface

Our team has discussed having ways to organize the swirling artifacts

(e.g. versions) by time or other attribute for pedagogical aims (e.g. show historical

trajectory of translations for comparison and genealogy). These facet or filter clouds

illustrate a collaborative affordance, allowing the user to participate in the shape and

content of the interface. The progression from translated text to swirling constellation of

artifacts affords both high surface area and anarchy. The few simple words of the biblical

text explode into an ever expanding collection of artifacts that have shaped and been

shaped by the particular text selected by a user. This constellational approach to engaging

the tradition entangled around a biblical text dramatically expands the possible contact

points for a user with this particular text. The machine learning engine supporting the web interface will continue to find relevant artifacts to add to the constellations and create relationships among them, which resists any attempts at closure or consolidation to a complete or governing tradition of bible.

When a user interacts with this constellation, a touch or click on any object will bring it into focus and show annotations, sharing options, and perhaps even a way to suggest correlation with another object in the constellation. The annotation feature will allow general comments and spatially located point specific annotations on the objects composing the constellation. All annotations will allow text, image, html embeds, audio, or video.[276] Here, the user has the ability to collaboratively mark the interface in several ways as well as to impact the metadata algorithms of lobe 1 by suggesting correlations and simply by engaging the artifacts.[277]

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[276] We discussed annotation moderation of some sort and requiring account registration to participate in the interface in these ways.

[277] Our machine learning lobe could internalize analytics based on user patterns in their participation in the interface to foreground certain artifacts or correlations.
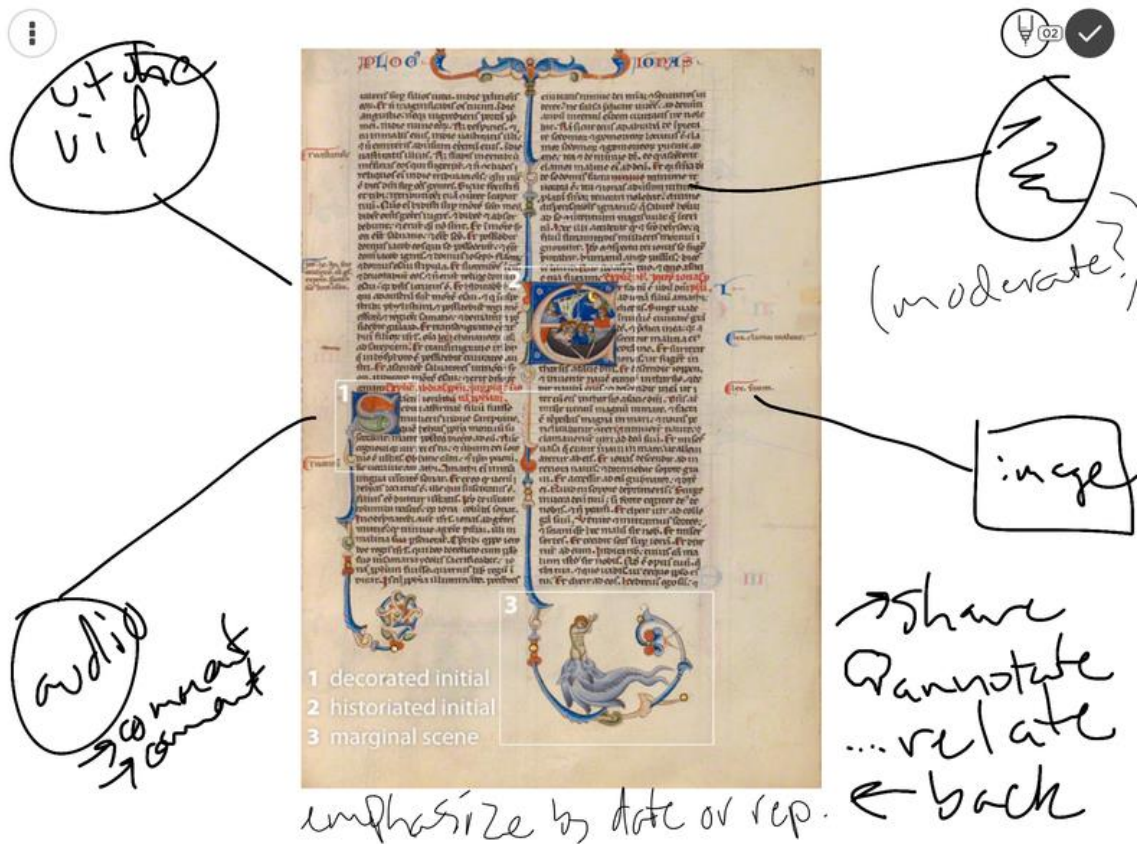
Figure 3. Item view of the *Face of the Deep* interface

Similar to the larger constellation view, item view will also offer clickable clouds of related concepts and object types. Yet, in item view, a click on a cloud item will take the user to a new constellation based on their selection. This will allow users to move from a single artifact to alternative constellations based on the attributes of a given artifact.

Given the layers of this *Face of the Deep* interface, a user can simply read a biblical text through without delving into these constellational spaces. But, shimmering and swirling beneath the surface of these words and letters awaits ever expanding and anarchic possibilities for encountering the traditions and the users that have participated in the ongoing production of bible. This constant entanglement of surface and depth,

embodied in the *Face of the Deep* interface, affords collaboration, high surface area, and anarchy, inviting users to dive further in as participants in the many contact points of bible, while resisting any attempts at gaining a comprehensive grasp of the whole. I am eager to see what our team and others will continue to imagine for bible as interface and I look forward to developing the capacities to participate.

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