

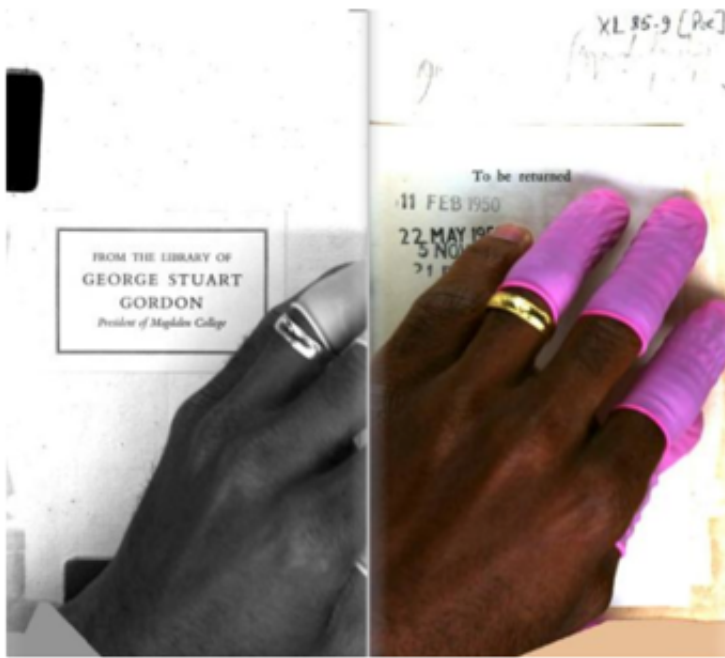
## Fingerprints of British Book History: A Feminist Labor History of EEBO

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### Abstract

In this essay, I give a labor history of the commonly used database Early English Books Online. EEBO began its life as a microfilm archive produced beginning in 1940: a massive book-copying project was undertaken during World War II to protect rare books from German bombs. These reproductions were made largely by unnamed woman archivists and led by a team of woman photographers, academics, and secretaries. In this essay, I draw on existing theories and histories of EEBO while highlighting these women's work, which manifests in the photographs through the shadows of the fingertips they used to pin down the fragile books. This archive of reproductive labor exemplifies the artificial divide between auteur and stenographer, artist and secretary, that animated many of the early twentieth century's avant-garde movements, including ones in which EEBO photographers were intimately involved. The fingers represent the custodial labor of women working across artistic and administrative modes during World War II and the decades that followed.

Upon its founding in 2002, Google Books promised its users the world [Hoffman and Bloom 2016]. “Imagine,” wrote then-CEO Eric Schmitt, “the cultural impact of putting tens of millions of previously inaccessible volumes into one vast index, every wor) of which is searchable by anyone, rich and poor, urban and rural, First World and Third, *en toute langue* — and all, of course, entirely for free” [Schmidt 2005]. Nearly twenty years later, the service has indeed become a ubiquitous online resource, one with a mixed reputation among digital humanists [Noble 2018], [Newman 2011], [Grimmelmann 2009]. Its errors — evidence of imperfect human mediation — are also commonplace. In 2011, artist and writer Krissy Wilson began collecting these errors on her blog *The Art of Google Books*. Wilson’s archive, which includes submissions from readers, catalogues the ephemeral flaws made before and during the copying process: a forgotten library slip with check-out dates spanning thirty years; a blurred page, photographed as it is turned; rips in the paper; ink stains. However, the most common and most eloquent error captured by *The Art of Google Books* concerns the trace of human labor in the archive’s production. Google’s scanning cameras often capture the fingers and hands of the low-wage workers who hold open each book. They often wear pink or blue finger rubbers, minimizing the wear and tear book-handling exerts on the skin. The images largely depict Black and brown hands, suggesting the demographics of this low-paid work (Figure 1). The bad scans capture the process of unspectacular labor as it occurs. In consequence, they are an artful and poignant visible record of the work that digital humanists have recently sought to recover [Klein 2020], [Nyhan 2020]



**Figure 1.** This worker's hand obscures the book plate and check-out slip for Edward Young's *The Complaint; or, Night-thoughts on Life, Death, and Immortality* (1750). The original is held by Oxford University and was digitized by an anonymous worker on August 2, 2007.

*The Art of Google Books* demonstrates the continuity between contemporary digitization practices and a longer history of archival touch. Scholars have examined the abuses of Google's digital practices and their implications for both archival labor and intellectual property [Noble 2018], [Hoffman and Bloom 2016], [Segev 2010]. In this essay, I extend this work to trace a cultural history of the photographed finger. I do so through a focus on the labor history embedded in one literary database: Early English Books Online (EEBO). Several critics have catalogued the palimpsestic nature of this digital archive, which reveals the circumstances in which the database was produced, beginning during the crucible of World War II, in an international scramble to photograph every extant early modern book as the threat of German occupation increased [Schmitt 2003], [Peiss, K. 2019], [Mak 2014], [Kichuk 2007]. Less known are the experiences of the photographers and librarians who created the archive. Teams of women in the backrooms of universities and museums made thousands of microfilm reels during the war and continuing afterward. The evidence of their labor is anything but invisible. The images they created include stunning and mundane traces of their work, cluttering the lower margins of manuscript pages, their fingertips a silent motif that persists into the Google Books era (Figure 2).

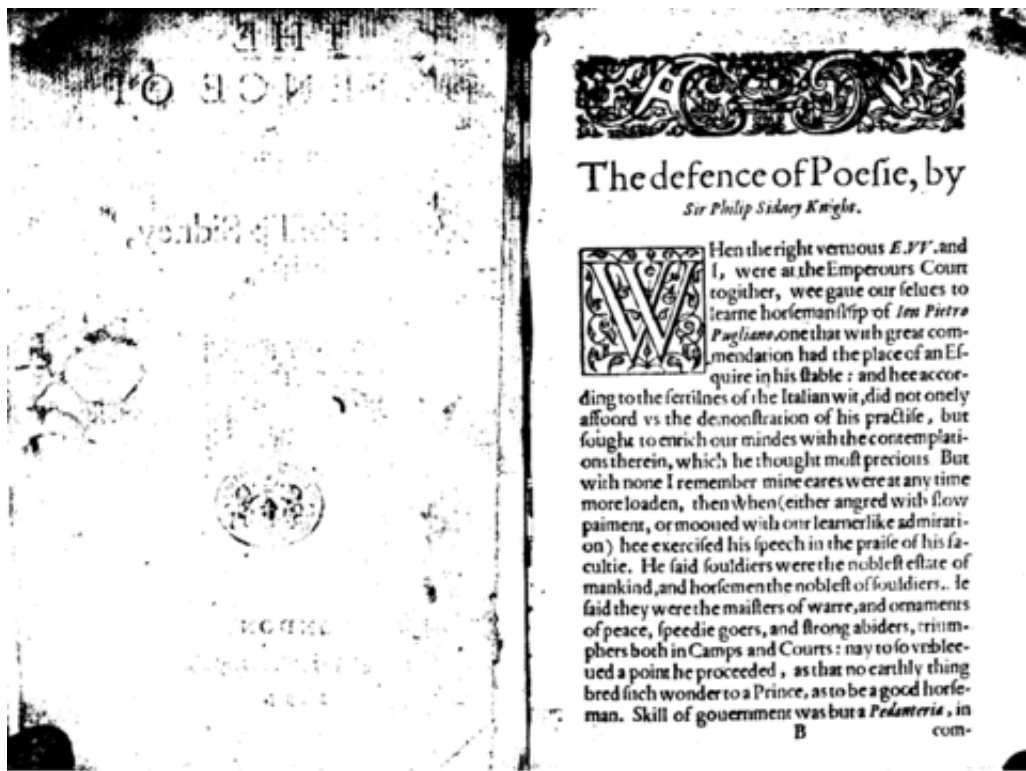


Figure 2. The first page of a 1595 copy of Sir Philip Sidney's *The Defence of Poesie* has been photographed with the fingers of the photographer visible in the lower corners of each page. © British Library Board. STC 2nd edition 22535 reel 904:16. Images published with permission of ProQuest. Further reproduction is prohibited without permission. Images produced by ProQuest as part of Early Modern Books. www.proquest.com.

This essay centers EEBO's photographed fingertips as interventions in the archive, analyzing not only their historical significance but also the conceptual import of their visual mark on images of the English literary canon. Reading EEBO's fingers focalizes the digital object as distinct from print, and acknowledges the feminized labor needed to produce it. This reading practice also activates a centuries-long material and conceptual history of interaction between hand and page, one that spans a series of technological evolutions. EEBO and its fingers mark the transition from analog to digital, through the intimate technology of the digit — the index finger. This archive of reproductive labor exemplifies the artificial divide between auteur and stenographer, artist and secretary, that animated many of the early twentieth century's avant-garde movements, including ones in which EEBO, then called Early English Books (EEB), photographers were intimately involved. In what follows, I chronicle the women who lived this divide, including secretary Margaret Harwick, librarian-spy Adele Kibre, and Bauhaus photographer Lucia Moholy, whose work in both microfilm and avant-garde photography theorized "the invisible hand of the artist-as-reproducer" [Troeller 2020, 86]. The largely untold stories of these artists throw into relief the self-hagiography of the archive's presumed architect, Eugene Power. Read in this context, the signature contribution of the EEB images is that they render reproductive labor literally visible, in the form of a fingernail imprinted at the edge of a textual artifact. The fingers represent the custodial labor of women working across artistic and administrative modes during World War II and the decades that followed. At the same time, they render visible the text's transition into a new form of commodity, repackaged for new sites of purchase and distribution, their specific visual arrangement testifying to the text's valuation and evaluation at a key moment in literary history.

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## A Note on Methodology: Piercing the Digital Veil

Studying the production history of EEBO places my work in conversation with a growing tradition of feminist digital humanists. Integrating feminist practices into the digital humanities has required its practitioners to, as Catherine D'Ignazio and Lauren Klein write, "show [their] work." Their book, *Data Feminism 2020*, argues that digital spaces depend on invisible labor forces. In fact, "invisible labor" has become a central formulation in digital studies. The

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predicament is a feminist one, Klein writes elsewhere, because women have traditionally been tasked with myriad forms of uncredited work, from cleaning and child-rearing to editing, typesetting, data entry, and archive maintenance [Klein 2020]. An important example of this shift is recent scholarship on digital humanities pioneers like Josephine Miles, who invented a form of quantitative reading while teaching at UC Berkeley in the 1950s [Heffernan and Sagner Buurma 2020], [Pasanek 2019]. Julianne Nyhan has illuminated the work of the 65 keypunch operators, many of them woman, who worked with Roberto Busa, the so-called father of the digital humanities [Nyhan 2020]. Still more scholars have traced extensive histories of digitized archives of newspapers [Fyfe 2016], [Beals and Bell 2020], [Bingham 2010], [Fafinski 2022], [Hauswedell et al 2020]. We can also draw inspiration from the emerging field of production studies, begun in film and media studies and now borrowed by many feminist digital humanists. Production studies attends to the quotidian and collective labor of making art. The field, Miranda Banks writes, is profoundly “anti-austerist,” deflating the cults of personality that often define filmmaking in favor of cataloguing the many tasks that bring a film to life. This is a feminist methodology in large part because it “highlights production at the margins” [Banks 2018, 157]. The microfilmed EEBO archive provides an apt opportunity for a production studies approach, its margins quite literally highlighted by the cluttered residue of its production.

Methodologically, production studies contends with the occlusions of reproductive labor. Jordan Troeller articulates the challenge this insight poses for studying artists such as Lucia Moholy, whose work in the *Bauhaus school* during the 1920s and 1930s was often overshadowed and outright stolen by her husband, the more famous László Moholy-Nagy. Troeller writes, “Coded as ‘reproductive,’ in distinction to the ‘productive’ work of her male colleagues, Moholy’s photography was not maliciously ignored so much as it was naturalized as a labor of love on the part of a devoted wife, whose status as an artist was never seriously considered” [Troeller 2020, 75]. Troeller describes a hierarchy of labor that separates the original from the reproduced, and, importantly, the artistic from the technical. While Moholy-Nagy shot the camera, it was most often his wife who actually produced his images in the darkroom. According to Moholy, her husband viewed technical knowledge as “derivative... in comparison to the more consequential work of the painter and architect” [Troeller 2020, 82]. This divide, which characterized the artistic philosophy of the Bauhaus more generally, mirrors the gendered hierarchies in literary modernism between authors and midwife-editors and in bibliographic societies between male museum and library directors and female secretaries, treasurers, and copyists, the so-called “handmaidens of history.” The first several decades of the twentieth century, which saw women gain access to the professions in growing numbers, not to mention the loss of thousands of men from the workforce due to two world wars, are prime territory for interrogating the ever-flimsier divide between artistic and reproductive labor, as research in art history and literary studies has demonstrated [Troeller 2020], [Richards 2020], [Delsandro 2020], [Otto and Rössler 2019], [Micir 2019], [Wagner 1998], [Marek 1996].

Putting production studies in conversation with existing histories of EEBO leads to new feminist insights into theories of digitized archives and book history. Bonnie Mak, Ryan Cordell, Ian Gadd, Stephen H. Gregg, and Diana Kichuk have argued for emphasizing the particularity, even materiality of each digital text, which becomes a new object rather than a failed reproduction of another one. As Gregg writes, “Transform the book into another medium (‘remediation’) and you change the meanings of the book” [Gregg 2020]. Cordell argues that “we must reckon with mass digitized historical texts as new and discrete bibliographic objects, which is to say as objects worthy of and available for source criticism” [Cordell 2017, 190]. This is a difficult task, as readers most often come to EEBO in search of early modern originals, albeit with an awareness of those originals’ mediations. The insistent virtuality of an online database — which can, for instance, block a viewer out of the archive if her browser window has remained inactive too long — makes it even more difficult to conceive of a digital object as discrete and unique. The crux of this challenge, Cordell argues, is that “of apprehending: of seeing the digital object as such, as an artifact with a distinct materiality and sociology” [Cordell 2017, 192]. Cordell articulates the need for a more granular and attentive digital history, an expectation of the medium that mirrors the enthusiasm many early modernists express for book history. And yet these forms of history often work at cross purposes. Kichuk, who gives an extensive history and theory of the “remediations” of EEBO, points out that most of the database’s users “[gaze] through [the] veil, seduced by the transformations wrought by remediation, [and suspend] disbelief in order to advance the study of the text” [Kichuk 2007, 299]. In response, feminist production studies insists upon the materiality of the veil.

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This method articulates how digitized texts preserve multiple moments of history in a palimpsestic form. This is especially important for EEBO, which purports to represent the relatively distant early modern past. Its digitization catalogues the intermediary forces that have stewarded that past. As Mak writes, “As a product of human labor, a digitization transmits clues in its very instantiation about the circumstances of its manufacture and dissemination” [Mak 2014, 1515]. Mak argues that the best way to glimpse the materiality of a digitization is to know its history: its legacies of labor and touch. In this way, she contradicts the first early modernist responses to the archive, like that of reviewer John P. Schmitt, who wrote that using EEBO was “a little like waking up in the British Library after closing time” [Schmitt 2003]. Informed by production studies, my reading of EEBO redirects attention from the simulated experience of the reader to those of the women who actually worked in the British Museum and Victoria and Albert Museum during the 1940s.

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In what follows, I begin by tracing the trajectory of EEBO’s construction, focusing on the women who gathered its holdings, managed correspondence and translation, and photographed each page. First, I sketch a history of the EEBO archive, including details of its creation, daily operations, and equipment; I also give a thick description of the fingered images themselves. Second, I describe the women who served as administrators and secretaries for the copying project, analyzing both their appearances in and absences from important historical records. I pay special attention to the writing and photography of Lucia Moholy, whose art photography provides artistic referents for a visual analysis of the microfilmed fingers. The presence of these digits in the margins reflects a set of interlocking historical developments: the dawn of [digit]ization, the role of reproductive labor in both avant-garde art and archive-keeping, and the increasing power of American corporations to maintain and control data. Contextualizing these developments leads to a new theorization of the finger as a shifting transhistorical signal of embodied reading, from the early modern manicure to the digital cursor. Finally, I argue that the fingers in these images point toward a labor tradition that has permeated late capitalism into the present: the human mediation — often labor performed by underpaid women in the Global South — required to prop up all forms of automated work that benefit mega-corporations.

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## The British Museum at War: Eugene B. Power’s Modern Renaissance Archive

The history of EEBO is a war history; it begins not with the Second World War but with the first. Archivists from the Bibliographical Society at the British Museum compiled a volume entitled *The Short Title Catalogue of Books Printed in English, Scotland, and Ireland and of English Books Printed Abroad (STC)* beginning in 1918 as a response to “the potential for air raids during World War I and [their] fear that future wars might jeopardize the collections within Britain” [Martin 2007, 160]. This volume attempted to list every extant book published between 1471 and 1640, found largely at the British Museum, the Bodleian Library, and the Huntington Library. Archivists A. W. Pollard and G. R. Redgrave published the STC in 1926. As anticipation of another war intensified, the curation of this body changed hands, and its preservation became an industry unto itself. The vast conservation mission undertaken to protect English books and manuscripts marks only part of a frenzy of collection at work in the years immediately preceding the war. Kathy Peiss’s *Information Hunters* 2019 catalogues this international scramble by “librarians, soldiers, and spies” to protect archives, often with cinematic flair. She argues that books came to represent the bastions of European culture and anti-Nazi principles that must be preserved during the German onslaught. “Even more important,” she writes, “wartime mobilization [of archive technologies] encouraged new aspirations among major libraries to achieve national leadership and international prominence through the development of foreign holdings” [Peiss, K. 2019, 8]. The most obvious of these aspirations originated in the United States, whose acquisition of myriad European archives mirrors its ascension to unqualified global superpower in the post-war years.

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According to Pamela Spence Richards, after attending the first World Congress of Documentation, organized by the League of Nations Institute of Intellectual Cooperation in Paris in March 1937, H.G. Wells called microfilm “a preserver of the brain of mankind, the race brain” [Richards 1988, 302]. At the same Congress, it became clear to many attendees that American microfilm technology was the most advanced in the world. By 1938, an American scholarly journal, *The Journal of Documentary Reproduction*, and corporation, University Microfilms International (UMI), had been created to sustain that reputation. In that year, UMI’s founder, entrepreneur Eugene B. Power, offered the services of his newly

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created company to make microfilm copies of every book listed in The Short Title Catalogue (Figure 3), a photography archive known as Early English Books (EEB). As preserved on EEBO today, this collection is known as STC I to distinguish it from the microfilm collection of works published 1641-1700 by bibliographer Donald Wing. A second edition with additions and corrections was published in three volumes in 1976, 1986, and 1991. The STC images included in this essay were part of Power's original collection, which we can discern by their early reel numbers and their canonical status in the Short Title Catalogue published in 1927.

Power consistently describes his work as an emergency preservation project. "The Nazis," he writes with signature mildness, "had the reputation of being book burners" [Power 1990, 117]. Considering libraries on the besieged continent a lost cause, Power focused his attention on England. As suggested by the title of his autobiography *Edition of One*, Power takes the vast majority of the credit for the preservation of EEB. In this account of himself as a singular innovator, Power resembles Roberto Busa, who has been depicted, Noëlle Schon claims, "as a lone scholar whose work marked a sharp break with the past" [Schon 2020]. We might think of Power as a Busa-like figure in the history of digitized early modern archives. However, Power goes beyond Busa by making brief reference to the staff of women working in numerous archives to make microfilm copies of rare books. Nearly 900,000 pages of EEB were photographed in 1940-41 alone. This work was performed largely by women, as Power alludes, because so many young and junior male workers, including bus drivers and drill press operators, were at war. Of his hastily trained staff Power writes, "Too much cannot be said in praise of those who have done so well despite the handicaps of unfamiliar equipment and a strange technique" [Power 1944, 28]. Ironically, given his performed deference, Power mentions their leaders only briefly, and the team members not at all, requiring us to examine the literal and metaphorical perimeters of the archive to discern their contributions.

The literal perimeters were shaped by the technology available to Power's teams. The imaging process begun in 1940 predates cradle technology, a more advanced copying method that protects old books' delicate spines while producing a complete photograph. The microfilm camera used during this period, the Kodak Recordak Microfile Model D, featured an adjustable camera that faced down on the document, which rested on a flat plate. As a result, the book had to be pinned flat against the plate in order to prevent page curvature and a black galley down the binding (Figure 3 and Figure 4).



Figure 3. Aemelia Lanyer's *Salve Dues Rex Iudæorum* (1611) features the shadows of steady features on every page. © British Library Board. STC 2nd 15227.5 reel 803:11. Images published with permission of ProQuest. Further reproduction is prohibited without permission. Images produced by ProQuest as part of Early Modern Books. [www.proquest.com](http://www.proquest.com).

Many of the books that feature these marks have them on every page, suggesting that the way a book is bound and the person who photographed a particular book play a role in the circumstances of its reproduction. In photographs made in later decades, during Donald Wing's tenure as chief bibliographer, the finger markings significantly decrease and photo quality increases. On the original microfilm reels, which in most cases feature between ten and twenty books, sometimes several consecutive books feature consistent finger markings, but just as often these are interrupted by unmarred images, suggesting that entire reels were not photographed successively or simultaneously. Despite the fact that a long roll of film gives the impression of linearity, each reel is a collage, patching together texts that do not share author, publication date, or even library of origin.

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At the start, Power planned for the reels to be produced and organized chronologically and alphabetically by author, and indeed the first 100 reels or so focus exclusively on late medieval manuscripts, including printings of Chaucer made in the late fifteenth century. But shortly afterward, access to different libraries and the urgency of the bombings made the organization of the reels grow more haphazard, with Shakespeare's plays included on reel 353, 675, 783, 904, 2403, and many more. The best explanation for this haphazardness is the decentered and overlapping groups doing preservation work during the war, especially given the varied locations of rare books, which were sometimes shipped to London or to the United States, and sometimes remained in place. According to Lucia Moholy, a committee under the direction of Dr. H. A. Kellar of the American Historical Association made inquiries and ultimate decisions about which books to document first. Copying projects under Kellar's authority were carried out in London, Oxford, Cambridge, and Wales [Moholy 1942, 9].

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These wartime efforts have had a long afterlife in both analog and digital archives, and thus remain relevant to contemporary users of online databases. Zachary Lesser has chronicled the 1950s and 60s initiative at the University of Pennsylvania to make Xerox reproductions of EEB microfilm texts, despite the fact that the university already owned the microfilm collection [Lesser 2010, 12]. According to Lesser, internal records show that Penn librarians viewed a Xerox archive of printed, codex books — unlike the technical struggle of microfilm — would establish the university's holdings as a major force in early modern archives. A few decades later, when archivists began Early English Books Online in 1998, Proquest staff digitized these microfilms rather than re-photographing the fragile books. These digitizations, like the Xeroxes, reverse the unending scroll of the microfilm reel in favor of mimicking the codex. However, these updated forms, which contribute their own original errors, depend on the microfilm as the original source of the material. As a result, the fingers of the photographers, alongside many other imperfections, remain preserved in the widely accessed online database. That database is fundamentally shaped by the wartime context of its creation — in effect, the first and last time all of these books would be together in order to be copied.

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These images, poignant on their own, are made even more striking by a knowledge of their production. But Power elides some of the most valuable information about this process in his autobiography, not least the central contributions of his staff and the wide array of bibliographic societies contributing to the photography effort. Although most of the photography was performed by unnamed laborers, several women working in administrative roles have left impressions on the microfilm's history.

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## **Secretaries, Photographers, and Spies: Microfilm's Women Architects**

Power originally hired his eventual right-hand woman and CFO Margaret Harwick, whose corporate headshot is printed in Power's book, as a secretary; she had recently lost her job at the Michigan Crippled Children's Society. "I will never forget the look on Margaret's face — she had been on the job all of one week — when I told her I was going to England on an important microfilming project and said, 'You will be in charge,'" he writes [Power 1990, 37]. Power represents her as guileless and femininely competent, a tool for his genius, writing, "If I were compiling a book of lessons for entrepreneurs based on my experience, a major point would be; Find someone like Margaret Harwick to be your right hand, and hire her as soon as you can" [Power 1990, 38]. He frames Harwick's capacity to run the entire corporation and oversee a great deal of microfilm photography when Power was abroad as a testament to his own sensibilities, but he also suggests the importance of her administrative labor in reproducing a vast intellectual archive.

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Another woman central to establishing UMI's international reach was the American scholar and photographer Adele

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Kibre. Before the war, she traveled across Europe and made a living photographing rare manuscripts for scholars at the University of Chicago, where she had earned her PhD in medieval studies in 1930 [Peiss, K. 2019, 121]. At the Vatican, she discovered microphotography and first met Eugene Power, who hired her to do freelance translation and photography work. Power described her as “a real Mata Hari type” [Power 1990, 138], referencing her expatriate lifestyle and proficiency in several languages. Her relationship with the American government is shadowy; Peiss reports that her personnel file at the National Archives comprises one page. Once the United States entered the war, Kibre became an agent for the American Interdepartmental Committee for the Acquisition of Foreign Publications (IDC). She made the clandestine trip to Stockholm under the cover of bad weather, and remained stationed in Sweden, a neutral nation that could receive German periodicals embargoed in Britain and the United States, until the end of the war [Peiss, K. 2019, 132]. While there, she collaborated with the British Ministry of Information to ship 192 reels of microfilm to London. Richards writes that Kibre, among other IDC agents, ordered subscriptions to the periodicals through cooperative or made-up Swedish citizen subscribers, and Peiss suggests that Kibre may have cultivated a friendship with Nazi party member Rolf Hoffman in order to receive his private mailings [Peiss, K. 2019, 133].

In appropriate Mata Hari style, few photos of Kibre exist. While she “was supposed to be terrific... at translating ancient inscriptions,” she was also, according to Power, “all thumbs mechanically. She simply could not operate the camera” [Power 1990, 139]. Power’s account of Kibre’s skill, which unwittingly parodies the thumbs in the images themselves, contradicts Peiss’s research; she documents many recipients praising Kibre’s skill, although perhaps it developed over time. Kibre was certainly famous for her scrupulous recordkeeping, which could verge on the fanatical. As many microfilming missions “scrambled,” according to Peiss, to film everything in sight with somewhat haphazard methods, Kibre kept detailed lists of everything she photographed, including relatively insignificant periodicals and newspapers [Peiss, K. 2019, 45]. In Power’s and Peiss’s renderings, Kibre is a marginal historical figure but nevertheless an ideal innovator for archive studies. As a librarian hero, her wartime bravery was outstripped only by her attention to detail.

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While Kibre made secret inroads in Stockholm, and Harwick managed daily operations in Ann Arbor, the book-photographing mission was conducted primarily in Britain, with Power making frequent visits. The urgency of photographing rare manuscripts and printed books increased as the war progressed, with Power acknowledging that the Blitz played a central part in the project’s decision to focus on the British Museum and other British holdings [Power 1944, 28]. At the outset, the British Museum did not warmly receive the intervention of this newly formed American corporation. According to Power, Sir John Forsdyke, the museum’s director, replied “frostily” to their offer: “Thank you very much, but the British Museum can take care of their own holdings” [Power 1990, 123]. Early in the war, documentation efforts were decentralized, with government entities like the United States Office of Special Services, the German Society of Documentation, the British Association of Special Libraries and Information Bureaux (styled Aslib or ASLIB), and individual interests like UMI, the British Museum, and many public and university libraries, all pursuing their own archival projects. As bombing continued and libraries lost hundreds of thousands of volumes, these efforts were centralized under Power’s and Aslib’s administration. A great number of women worked as administrators and secretaries for Aslib, including treasurer Irene Shrigley and archivist and writer Edith M. R. Ditmas. In addition, Eleanor Cavanaugh and Ruth S. Leonard, employees of the American Special Library Association, visited London to give talks at Aslib’s annual conference. These women’s names almost exclusively appear in the archived Report of Proceedings for Aslib’s Annual Conference, held at the British Library. The most prominent Aslib employee was the director of its microfilm division: Lucia Moholy. During her tenure, Moholy oversaw Aslib’s photography efforts in Britain, which included not only many early modern books but hundreds of thousands of German scientific publications and classified government information.

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Moholy had first moved to London in 1933, after many years spent as part of the Bauhaus school in Dessau, Germany. She was never formally a student or instructor at the school, but a frequent collaborator with her husband on photography and writing projects for which she was rarely credited [Schuldenfrei 2013, 185]. After her exile to England and divorce from Moholy-Nagy, Moholy published a book, *A Hundred Years of Photography, 1839-1939*, in 1939. Her contributions to the modernist and sachlich (objective) photography movements have been partially recovered in art historical scholarship on photography, including work by Rolfe Sassche, Mercedes Valdivieso, Ulrike Müller, Robin

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Schuldenfrei, and Jordan Troeller, but a great deal of this criticism, as well as Moholy's own writing, remains available only in German. Moholy's underappreciated contributions to the history of photography run in illustrative parallel to the development of the EEB microfilm.

In 1943, the Aslib Microfilm Service (AMS) moved from the Science Museum Library to the flat of the superintendent of the nearby Victoria and Albert Museum for more space [Richards 1989, 283]. Once there, Moholy oversaw a set of five Kodak Recordak Microfile Model D cameras manufactured in Rochester, New York, the highest quality available at the time. According to Moholy's report on Aslib's work during the war, published in the *Journal of Documentation* in 1946, the cameras were movable up and down their stands, and "fitted with voltmeter, exposure meter, film footage counter, exposure counter, framing light, focusing device, a release for operation by hand or by foot, and an indicator showing the reduction which can be varied from 8 to 30 diameters" [Moholy 1946a, 150]. The unit also made use of a Recordak Microfile Reader, Model C, and a Depue Printer, which transferred photo negatives to positives. Once a document was delivered to AMS headquarters, Moholy's team of camera operators, largely women, had 24 hours to photograph and develop them [Peiss, K. 2019, 46]. AMS's total output during the war amounted to 5.5 million pages, and they indexed microfilms from other centers to the extent of 7 million more. Because Moholy had an existing relationship with the American Council of Learned Societies, where she had photographed "valuable manuscripts and early printed books," AMS continued to oversee the photography of rare book material in addition to scientific publishing and classified government documents [Moholy 1946a, 158]. It is unclear how much of this photography overlapped or corresponded with the archive Power claimed as his own, although they had a lengthy collaboration. Neither in Moholy's own account of her activities, nor in scholarly retellings, are the camera operators enumerated or named.

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In her contributions to Aslib's Annual Conference and in published essays after the war, Moholy made clear that she considered evangelism about microfilm a large part of her role. Because Britain lagged behind the United States in manufacturing both cameras and readers, the technology had been less completely embraced, and her photography could be used by fewer customers. She was eager to expand this industry, which could respond to book shortages by serving "the intellectual needs of people in liberated countries", where micro-copies could supplement printed books that were not always available [Moholy 1946a, 159]. But Moholy was also invested in more innovative uses of the technology. In 1946, she introduced to Aslib the possibility of a microfilm reader designed for disabled people, especially wounded soldiers, using hospital beds. The mechanism would reflect the magnified image of the page onto the ceiling, so patients lying on their backs could read without moving in bed. Moholy mentioned that adaptations were in the works for patients who could not use their hands, or whose hands were in plaster casts [Moholy 1946b, 82]. This product was already under construction in the United States and not an invention of Moholy's, but her presentation at Aslib's annual conference demonstrates her holistic approach to the microfilm medium, which allowed for the preservation of enemy periodicals and rare English books, supplementing book shortages for hobby readers, and accommodation of disabled readers.

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In Power's account, Moholy's credentials are primarily technical. He writes that his project was "advanced considerably when I discovered Lucia Moholy in London.... She was well versed in the techniques of microfilming. I hired her, and she recruited a crew of women to help her. At that time, of course, one saw women doing all kinds of work in England, from driving buses to running drill presses" [Power 1990, 135–136]. Power describes Moholy as a capable technician, a shift leader who worked in the trenches of wartime preservation in the absence of more esteemed male colleagues. In this depiction, Power, perhaps unwittingly, reproduces the hierarchy of artistry that characterized the Bauhaus school. In a short statement entitled "Production-Reproduction," Moholy's husband Moholy-Nagy makes a strict division between creation and reproduction, writing, "reproduction (reiteration of already existing relations) can be regarded for the most part as mere virtuosity" [Moholy 1922, 289]. Power's praise of Moholy alights upon her "mere virtuosity" as the force that will make her a good employee. He had no need for a creative artist, although the ultimate result of her work was more layered than he expected.

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A productive continuity emerges between Moholy's art photography and her work with Aslib, considering Moholy's personal photography of disembodied hands (Figure 4). As Troeller writes, "Moholy fragmented the body, identifying it with its parts and then again with its various forms of domestic (i.e., reproductive) labor — labor that was, like her own act of taking the image, maligned as artistically unmeaningful, 'merely' reproductive" [Troeller 2020, 102]. Moholy's

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photography work takes on the character of the domestic work it depicts; both are unspectacular, “idle,” and repetitive. Moholy chooses the hands as the bodily fragment responsible for reproductive labor: precision tools that can depress the shutter release button on a camera as well as wring out wet laundry. The photography project she would oversee on an entirely different scale at the Victoria and Albert Museum also depicted hands at work. Like Moholy’s work in the darkroom for her husband, and like her own objective photography, the fingered EEB microfilms trouble the boundary between productive and reproductive, artistic and technical.



Figure 4. Lucia Moholy, *Hands Pinning Cloth*. 1930.

Despite working as an arm of Power’s corporation and the British government, the archive under Moholy’s supervision disrupts the legacy of early modern great masters that it claims to preserve. Its reproductive history is sutured to the “original” text. Considering the shared preoccupation with the hands and fingers between these two bodies, representing Moholy’s work during the 1920s and 1940s, it is possible to understand the EEB microfilm as an art historical archive, and her personal art photography as a digital humanist one. Both insist upon the importance of mundane human touch in the creation — and more importantly recreation — of art.

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## From Digit to Digitization: Tracking the Technology of the Index Finger

Parsing the visual significance of EEBO’s photographed fingers necessitates attention not only to art history but to its intersections with book history. Visual representations of fingers appeared in the margins of rare books long before they were being photographed. Beginning as early as the *Domesday Book* in 1086, authors, scribes, and readers included drawings of hands with pointing index fingers to emphasize specific passages [Houston 2013, 167]. Much later, these hands would recur in a digital remnant: the point and click mouse. At first glance EEBO’s fingers and the hands recorded in *The Art of Google Books* appear functionally opposed to these pointing images; after all, they appear randomly within the texts that they frame, rather than highlighting specific passages. However, like the manicure, they inflect the text with a new layer of meaning, marking its encounter with specific bodies, institutions, and readerships. The spatial arrangement of the fingers recorded on the page visually represents the precise nature of this encounter, its mediation through the hands of women workers and the emergent technology of the camera. While the photographer’s marks make meaning in a fashion distinct from the pointing finger, to read these images back into the visual tradition of

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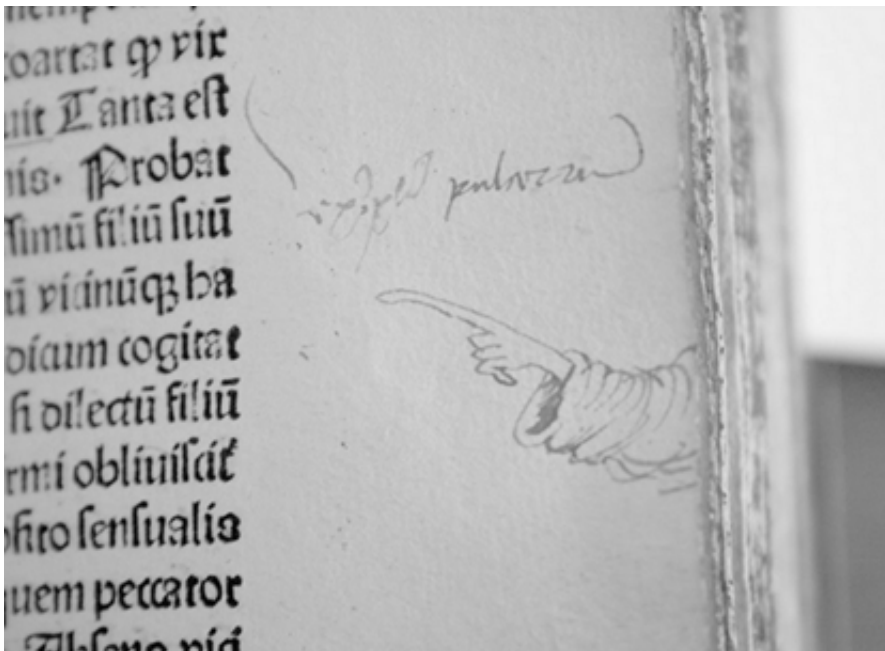
the manicule recognizes EEBO's anonymous photographers as co-producers of textual meaning and physical agents of a pivotal transition in literary history.

Until recently, no codified name for bibliographic finger markers existed, and book historian William Sherman turned up more than 10 alternate names, including pointer, digit, index, indicator, and fist [Sherman 2008, 25]. He follows manuscript experts in his choice of the currently used term, *manicule*, from the Latin *maniculum*, or *little hand*. Manicules were used both by printers and in handwritten manuscripts, meaning that they bridge the gap between the literal work of a text created *by hand* and that of emergent print technology. Manicule use peaked during the Renaissance, when readers continued to insert them into already printed books. Although they are most associated with this period, the image of the gesturing hand has continued to populate literary history. In the eighteenth century, printed versions joined the handwritten ones, and the device appeared in letter-writing manuals and printed novels by Samuel Richardson and Lawrence Sterne [Williams 2013]. In Richardson's *Clarissa* (1748), Christopher Flint writes, the appearance of the printed manicule demonstrates "the degree to which the fiction is enmeshed in its mode of production" [Flint 2011, 650]. A century later, Walt Whitman would use a pointing finger, topped with a butterfly, as his icon for the first printings of *Leaves of Grass* (1855) and use handwritten manicules in his manuscripts and notes.

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In the eighteenth and nineteenth centuries, the indexing finger also became associated with advertising. Readers of Whitman's work would have recognized the pointing hand, Eric Conrad writes, from its use in countless newspapers, periodicals, and hand-bills [Conrad 2019, 64], [McPharlin 1942, 61]. These fingers express contradictory implications; on one hand, they imply an embodied reading practice, intimate, focused, and particular. Sherman writes that manuscript manicules in particular are often "intentionally made to look as though they extend inwards from a now-invisible reader's body off the edge of the margin" [Sherman 2008, 32] (Figure 5). On the other hand, their mass production created ever-more distant facsimiles of readerly intimacy. Even when disseminated by the growing print industry in the eighteenth century, the presence of the hand or finger points to the suturing of mechanized and human technology. Their adoption by corporate advertising quite literally illustrates the ongoing analog labor required in capitalism-driven mass-printed archives, from the advertising flyer to the microfilm reel. The work of individual hands is required to mass produce print and digital ephemera.

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**Figure 5.** This manicule, which can be found in a book by fifteenth century Archbishop William Scheves, features an extended index finger and a sleeved arm disappearing off the edge of the page. Courtesy of the University of St Andrews Libraries and Museums.

The fingers captured at the margins of EEB, and now digitally preserved on EEBO, represent a pivotal moment in the history of the pointing finger. Like the manicule that advertises a product, EEB's fingers indicate the creation of a

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consumer good: the Early English Books Microfilm Collection, which Eugene Power's UMI would sell to university libraries across the United States. They represent the moment of intimate touch between embodied reading and mass production. These images capture the manicule's detachment from the content of individual passages and from its historical role as the record of a reading. Instead, EEBO's scans manifest a different mode of literary valuation, which selected a corpus of texts for reproduction according to twin standards of English national heritage and American literary taste. And this, too, by the happy coincidence of technological error: EEB records the custodial touch, neither authorial nor readerly but belonging to the worker, enlisted in a vast institutional project of reshaping the practice of reading. Like Richardson's manicules, EEB's digital afterlife is indeed "enmeshed in its mode of production," and richer for it [Flint 2011, 650].

The visual flaws left by the fingers evoke the immediacy and tactility of a very particular moment in a document's history — a single now of touch and collective readership that bears a durable poignancy. In so doing, these fingers also offer a preliminary method for the digital humanities' quest to articulate the materiality of distinct digital artifacts. This materiality, especially in the form of the finger, has gendered and even erotic implications. In her book *Time Binds: Queer Temporalities, Queer Histories*, Elizabeth Freeman draws attention to the cheeky finger metaphors present throughout Virginia Woolf's 1928 novel *Orlando*, including an allusion to a hole in a manuscript "big enough to put your finger through" [Woolf 1973, 119]. In a sense, Freeman suggests, Woolf invites us to "finger history," indicating that, "History is a hole to penetrate, but not with the usual instruments" [Freeman 2010, 109]. As read by Freeman, Woolf imagines a historiography that makes itself available to the playful, erotic prodding of a queer historian. The finger is "not the usual instrumen[t]" for penetrating history; it is not a phallic tool for domination. Instead, its investigation is gentle, sensual, and curious; it explores the "holes" in history that make the archive inscrutable. Freeman figures this exploration as both deconstructive and reparative. The queer finger, she writes, "pokes and caresses the holes in the archival text even as it sutures them" [Freeman 2010, 110]. *Orlando* instantiates a symbolics of the finger that is indebted to the indexical history of the manicule but adds a defiant emphasis on sex in all senses. The finger is the nonphallic amateur's tool for reaching toward the archive. Despite Power's corporate credentials, his archive is covered with the inappropriate touches of femininity — those made by Moholy, Kibre, and Harwick, as well as the staff they directed. As Moholy's art photography shows, modernist-era avant-gardes understood the intimate touch of the finger as the point where mechanized labor and high art intersected.

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## Exploitation in the Margins: Touching Texts in Late Capitalism

The women fingering EEBO's archive belong to a labor history of digitization that stretches forward to include contemporary projects such as Google Books. To recognize the agency of these women workers as participants in the creation of meaningful visual texts is not to negate their status as workers, operating on the lower rungs of a vast institutional collaboration. The labor of digitization still consistently falls to anonymous workers. *The Art of Google Books*, the blog of copying errors curated by Krissy Wilson, belongs to a growing body of work that illuminates hidden and undervalued labor in digital archive production, particularly Google Books. Artist Andrew Norman Wilson worked for a time on the Google campus and noted that the vast majority of the workers in the *ScanOps* division were people of color, working ten-hour days at low wages. He later made a work of video art entitled "Workers Leaving the Googleplex" [Goldsmith 2013]. The imperfect Google scans demonstrate how the totalizing information technology available to large corporations requires constant and underpaid labor that depends on intimacies of touch. Lilly Irani calls these workers "data janitors," a massive invisible labor force that props up corporate power while reaping none of the benefits. She writes, "These moderators and scan workers never showed up in the lavish, celebrated spaces where Googlers drank, ate, and brainstormed.... In fact, Google's abundantly productive, nonhierarchical, and playful workplace seemed to rely on hidden layers of human data work" [Irani 2015]. I take Krissy Wilson's blog as an especially eloquent instance of the hierarchal system Norman Wilson and Irani describe.

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This system is also at work in the ongoing corporate interests that govern EEBO. The EEBO Text Creation Partnership (TCP) has sponsored transcriptions of the EEBO images, making them searchable by keyword and thus useful for many early modern quantitative projects, albeit not infallibly. The digital era of the database reproduces the labor circumstances of its earliest instantiations. The transcription work was outsourced by Proquest to third-party vendors, Apex CoVantage and SPi Global, whose workers, anonymous coders in India, actually created the inscriptions [Gavin

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2017, 98n54]. Every technological era of EEBO is also an era of labor practices, as the University Microfilms International, later Proquest, corporation immerses itself in global capitalism. The anonymity of the Indian coders is even more complete than that of Power's women photographers; their presence, stripped back by the digital mode, is not represented by an errant finger; they are what Mary L. Gray and Siddarth Suri call "ghost workers," representatives of a developing global underclass that props up information and technology corporate wealth [Gray and Suri 2019]. Another example that underlines the contours of racial capitalism is Amazon's "Mechanical Turk" platform, which relies on human workers to produce "artificial artificial intelligence," using a racialized referent to an automation hoax that dates back to the 18th century. According to one study, only 4% of "Turkers" make above minimum wage, and their numbers disproportionately include those for whom disability or weak local economies make gainful employment difficult to access. Their underpaid labor perpetuates the hoax of artificial intelligence as a truly autonomous technological marvel [Stephens 2023].

Placing the EEB microfilm in historical continuity with corporations like Google, Amazon, and Proquest allows us to recognize the longer history of this exploitative labor and its entanglement with the American superpower that World War II fostered. Gavin points out that Eugene Power "in many ways...represents the ideal of twentieth-century masculine subjectivity," observing that even his name seems plucked from the work of Ayn Rand [Gavin 2017, 78]. Power made no apologies for his corporate interests and their calibration to make the United States the universal custodian of British and European rare books. He wrote in one memo, "The collections listed are not complete. Only those portions of particular interest to American scholars were microfilmed" [Power 1990, 385]. Power's intervention represents a watershed moment in the intersection of book history and capitalism. As war and new technologies converged to create great opportunity, he seized it in order to make an immense profit in the name of book preservation. I have argued that the images of EEBO bear the marks of this literary revolution, not in Power's own hand but through the hands of the women hired to conduct the physical labor of the project. The images they generated testify to his ambitions and those of the institutions with which he collaborated, but they also invoke contemporaneous women's photography, such as the work of Lucia Moholy, which celebrated the artistry of reproductive labor and challenged its dismissal as derivative, unskilled, or merely technical. Knowing the labor history of this capitalist archive, which makes itself insistently known through errorful fingers, should enjoin us to observe the increased custodianship of corporate interests in our archives. This custodianship is, and has always been, built on the work of women. As readers of these digital sources, we bear the responsibility to attend to the ghostly presence of anonymous workers and to study their work in continuity with the literary work they preserved.

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