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Read by Touch: Stewarding the Reading and Writing Collection at the Perkins School for the Blind

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Abstract: This article traces the history of books, and reading and writing technology, for the blind through an analysis of collections held in the Perkins School for the Blind Archives in Watertown, Massachusetts. These collections include books using embossed text and braille as well as raised figures and other writing systems. The confusion created by competing systems in the United States, especially with regard to Helen Keller's education, is also considered. The authors establish that if we are to preserve such special collections, we must have an understanding and appreciation of their history and use. The goal of this article is to share information on the challenges of and solutions for preserving and digitizing embossed materials for other archivists and librarians who may have stewardship over similar collections, and to educate readers on how these materials might be used to study the history of reading and writing technology, especially those created for use by the blind.

Keywords: Archives, Preservation, Braille, Blind, Digitization

1 Introduction

“What kind of book is printed without ink” sounds like a riddle. While modern readers might think first of ebooks, the phrase was originally used to describe books for the blind. Made for reading with the fingertips, these embossed books are experienced entirely by touch. The embossing, whether it is braille or raised Roman letters, creates a luxurious topography that is enchanting to a sighted audience.

Embossed books have a long and fascinating history beginning in France in 1786 when Valentine Haüy published the first embossed book (Harris, p. 7). In the digital age, when the blind can navigate phones, books, and web pages with the use of screen readers or text-to-speech software,

these historic tomes acquire a new cachet as artifacts. In this article we will look at the fascinating history of reading and writing materials for the blind through the lens of collections held by the Perkins School for the Blind Archives. We will focus on systems used before the universal adoption of braille and the confusion created by competing systems in the United States, especially with regards to Helen Keller's education. We will consider information about the history of the Perkins School for the Blind, the Archives Program and collection care, milestones in books for the blind, the specific preservation needs of embossed books, and efforts to digitize collections.

2 About the Perkins School for the Blind and the Archives Program

Today, the Perkins School for the Blind is easy to spot. It is in Watertown, Massachusetts, on the outskirts of Boston; its collegiate gothic bell tower soars 180 feet over the banks of the Charles River and is visible from the Massachusetts Turnpike, the major east-west highway in Massachusetts. Incorporated in 1829, Perkins was the first chartered school for the blind in the United States. It later established the first kindergarten for the blind in the world (French, p. 23). Perkins continues to be a leader in the blindness field: in addition to residential and campus-based programs, Perkins conducts significant international work and is heavily invested in teacher training in the United States and around the world (Perkins School for the Blind, “About”).

Historically, Perkins is widely known for its many milestones in the instruction of people who are deafblind. The first person who was deafblind to learn language and receive a formal education was Laura Bridgman beginning in 1837 (Freeberg, p. 1). The methods developed for her education by Founding Director Samuel Gridley Howe laid the foundation for the instruction of Helen Keller 50 years later by Perkins graduate Anne Sullivan (Gitter, p. 279).

The Perkins campus is home to the Perkins Library, a lending library that services all of New England, as well as the Samuel P. Hayes Research Library and Archives.

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The Hayes Library contains one of the largest collections anywhere on the non-medical aspects of blindness (Perkins School for the Blind, “Research”). The archives collect materials related to institutional history and the larger history of blindness and deafblindness. Among our unique and prized collection is our library of more than a thousand early embossed books. The most popular collections are those related to Helen Keller and Anne Sullivan. Perkins houses many of the earliest letters, photographs, and materials related to Keller’s initial education, in addition to a large correspondence collection donated by Nella Braddy Henney, Sullivan’s biographer and a close friend of Keller and Sullivan.

Long stewarded by single research librarians, the collection at Perkins spans 185 years of institutional history and roughly 500 years of the history of blindness and deafblindness. In summer 2011, a particular focus on preserving the unique materials in the Perkins Archives led to a digitization project that quickly blossomed in 2012 to a three-year National Endowment for the Humanities grant to describe our 19th-century collections.

3 What Was There Before Braille?

Most people have a basic understanding of braille as the code used by people who are blind, but few know much about the long history of reading and writing methods for the blind that came before braille, or how many systems were invented and discarded in the century between the invention of braille and its formal adoption in the United States. The story begins at the Institute for Blind Youth in Paris, about 25 years before Louis Braille (1809–1852) was born.

In 1785, Valentin Haüy founded the National Institute of Blind Youth, the first school for the blind in Europe (Wood, p. 253). To teach reading, Haüy created an embossed Roman alphabet in 1786 to replace a previously devised method that relied on embossed tiles, which Haüy found inadequate (Lorimer, p. 14). This system started appearing in printed books for the blind that same year (American Printing House for the Blind [APH], “First”). Almost 50 years later, in 1833, Jacob Snider produced the first raised-print book in the United States for use by the Pennsylvania Institute for the Instruction of the Blind (Best, p. 400).

In Boston, Samuel Gridley Howe became the first director of Perkins in 1831. After visiting schools for the blind in Europe, Howe found the books and writing systems inefficient, for those reading them and those

producing them (Waterhouse, p. 6). Beginning in 1835 and with the help of printer Stephen Preston Ruggles, Perkins began printing books in a new system called Boston Line Type (McGinnity et al., “Reading”). Designed without the decorative flourishes prevalent in previous raised Roman alphabets, Boston Line Type strove to be a more compact system that was easier to read and more cost efficient to produce (Waterhouse, p. 6.) See Figure 1. The first book printed in this type is *Acts of the Apostles*, published in 1835 (Waterhouse, p. 6).

The history of books and materials for the blind also encompasses a great deal of tinkering and invention, including an abundance of varied and experimental materials and systems. Solid-dot braille is a great example of a discontinued system. The dots were made from applied material that was easy to pick off. According to Perkins legend, sneaky students would pick dots off choir booklets to form vulgar words and sentences.

Some books in the early 1800s were printed on paper so thick the pages hardly bend and do not open flat for easy reading. These books would be nearly impossible for a small child to read. Reading either braille or embossed type is a two-handed process: one hand reads across while the other moves down the left lines so that the readers will know where to begin on a new line when they lifted off the page on the right (National Library Service for the Blind and Physically Handicapped [NLS], “Reading by Touch”). For these early, unwieldy volumes, one would need third and fourth hands to hold the books open or to support the weight of the volume.

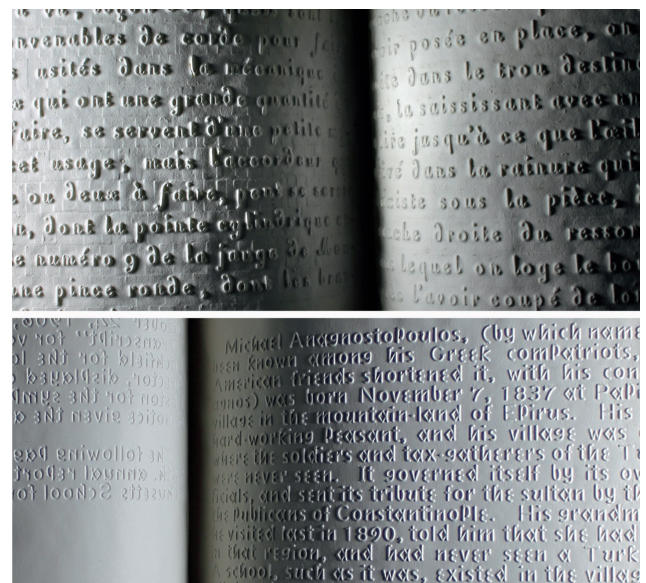


Figure 1: Sample Raised Roman Types for the Blind: (top) Royal Institute for Blind Youth, Paris, 1839, (bottom) Perkins Institution, Boston Line Type, 1907, Perkins School for the Blind Archive.

4 Earliest Writing Systems for the Blind and Educational Tools

Apart from books, early writing systems included resin-coated string alphabet boards, wire letters and numbers, and letter boards made with movable type, known as “sorts,” which included carved wood and metals such as lead. Gridded boards or frames were especially useful for teaching composition and forming mathematical equations. Many of these frames came with a well at the bottom to hold sorts, or had sliding lids that covered segmented storage underneath. The nineteenth century saw many new inventions and experiments—the Perkins collection even has what is likely the world’s first 3-D pen. The reservoir pen for embossing, made around 1840, consisted of a syringe-like instrument with a glass well to hold ink or resin, a thin nozzle at the tip, and a plunger at the top. After writing or drawing, the resulting work would be dusted with sand to produce a hard, thick line. See Figure 2.

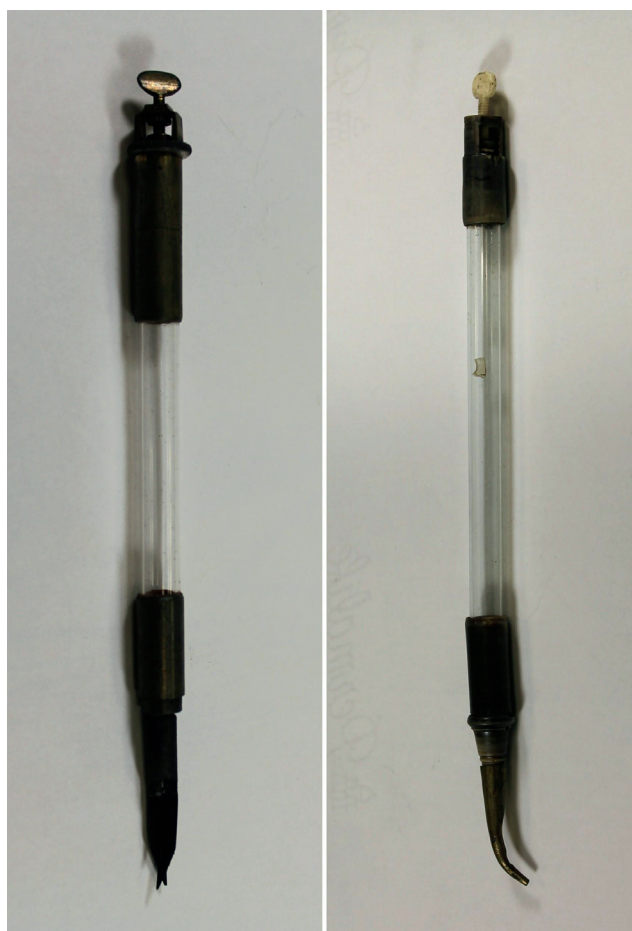


Figure 2: Reservoir Pens for Embossing (3-D) circa 1840, Perkins School for the Blind Archive.

5 The Origins and Need for Braille

After attending a presentation by Charles Barbier, Louis Braille developed his code after a system called “night writing” that was invented for warfare (American Foundation for the Blind [AFB], “Books”). Braille refined his system (reducing it from six dots by two to the current three-by-two system) and published the initial version in 1829 (NLS, “Louis Braille”). By 1835, he had added methods for transcribing music and mathematics (AFB, “Books”).

During this time, in the United States, there was a wide range of experiments and many systems in use, including embossed Roman alphabets, (Boston Line Type,) dot systems including English Braille, American Braille, and New York Point, and a system that used abstracted Roman letterforms called Moon Type.

While the dot systems are all similar in basic implementation, there were many experiments throughout the 19th century to find the easiest one to use. New York Point was two dots high, with characters one to four dots wide, and American (or Modified) Braille was developed so that the most commonly used letters used the fewest dots (Wood, p. 265–66; Irwin, “War”). American Braille was invented by Joel W. Smith, a blind music teacher at Perkins around 1878 (Irwin, “War”). Of course, there were also variations for other languages, and implementations for music and mathematics.

In addition, several forms of braille used contractions, where individual characters or combinations of dots stood for words or parts of words, requiring the user to know and interpret several hundred characters. It can be quite challenging today to figure out which system of braille was used for a particular text.

Moon Type is a particularly interesting alternative. William Moon published the system in 1845. He had lost his sight as an adult, and the Moon Type symbols are based in part on the shape of written letters in the Roman alphabet. It has long been considered easier to learn for those who lose their vision as adults, or who have a less acute sense of touch, and it is still used today by those who find braille too difficult to learn (Irwin, Royal National Institute of Blind People [RNIB].) See Figure 3.

While students and teachers who were blind from birth or an early age were quick to want braille materials and instruction, many schools continued to teach using embossed texts into the 20th century (Seymour-Ford, “Writing”). This period is often referred to as the “War of the Dots,” with many people having extremely strong opinions about or attachments to a particular form (Irwin). It was not until 1932 that a unified system (Standard English Braille) was adopted by most English-speaking countries (Harris, p. 20).



Figure 3: Alphabet Card for the Moon System, 1840, Perkins School for the Blind Archive.

Boston Line Type and other embossed Roman alphabets had an inherent flaw. While they were relatively easy to read, they could not be written. Braille and other dot systems were immediately superior because anyone could write with them using inexpensive slates as a guide, and a stylus to raise dots from the reverse side of the page (Wood, p. 269). Using a raised Roman alphabet to write a letter home, a grocery list, or even a simple label to distinguish salt from sugar would be impossible.

While embossed text was popular with sighted teachers and family members (and it allowed a parent and child or siblings to read together from the same book with the sighted person not needing to learn a new method of reading), the inability to write text was frustrating and limiting for those who were blind (Seymour-Ford, “Writing”). The advent of braille typewriters further advanced writing options (Irwin, “War”). The Perkins Brailier, perfected in 1951, is still the most popular and widely used of these devices (Perkins School for the Blind, “History”).

6 A Collection of Firsts: Milestones in Books for the Blind

The collection at Perkins contains three copies of the 1786 volume of the first book embossed for the blind, *Essai Sur L'Education des Aveugles* by Valentin Haüy (APH,

“First”). Unfortunately this book was useful only for raising awareness about the problem of printing books for the blind rather than as a functional reading system for the blind. The text relief is about as high as a nicely embossed wedding invitation and would have been extremely difficult to read by someone who is blind. In a letter of around 1921 from Alexander von Mell, director of the Imperial School for the Blind in Vienna, to Edward E. Allen, director of Perkins, Mell suggests the book was significantly damaged during the binding process where pressure collapsed some of the relief text (Alexander von Mell). By 1817 this problem was resolved. Rather than building up the ink, a wet process was used to raise or press the letters out from the back of the page.

The collection at Perkins also has the first braille book, Louis Braille’s *Procedure for Writing Words, Music, and Plainsong in Dots*, published in 1829, in which he first proposes the braille code (AFB, “Books”). However, because he is introducing the idea of using braille, most of the book is still printed in the raised type typically produced at the Institute for Blind Youth in Paris, which had been steadily improved since the first book in 1786. The first book printed entirely in braille is *History of France* (1837), also produced in Paris (AFB, “Books”). Michael Hudson, the museum director at the American Printing House for the Blind (APH, “First”), in an in-person conversation with Molly Stothert-Maurer on November 13, 2014, lovingly referred to these three books “The Holy Trinity.”

7 Writing Systems and Helen Keller's Education

Helen Keller was educated when many competing systems for reading and writing for the blind were being used, invented, reinvented, and eventually standardized. She was born in 1880 and it wasn't until 1918 that Standard Braille was adopted as the official system in the United States. During that time, Keller became the first person who was deafblind to earn a Bachelor's degree, and she had to read fluently in all of these systems for her studies.

The difficulty created by these competing systems cannot be overstated. In a 1901 letter to William Wade, Keller remarks: "There is nothing more absurd, I think, than to have five or six different prints for the blind ..." (Keller). The seminal work on the history of reading systems for the blind in the United States, tellingly titled *The War of the Dots*, introduces the subject with the following statement from Dr. Olin H. Burritt, Principal, Overbrook School for the Blind: "The conflict was acrimonious in the extreme. The bitterness can hardly be imagined" (Irwin).

The Perkins Archives created a digital exhibit in 2014 titled *Reading and Writing Systems for the Blind Used by Helen Keller*, with examples of books in different systems including Boston Line Type, Moon Type, English Braille, American Braille, and New York Point. The exhibit is a virtual bookshelf of sample pages designed to be read with one's fingers. It is accompanied by one pamphlet titled "Opinions of Blind Teachers and Pupils in Regard to the Braille System," printed in 1866 at the Missouri School for the Blind, which supports Helen Keller's sentiments on the superiority of the braille system.

8 Preservation of Embossed Materials

Books for the blind have a number of unique preservation challenges. First is size; braille and embossed books are large. This makes them challenging to read and challenging to house and care for. See Figure 4. In a 1935 radio broadcast on WAAB of a Perkins Choir Christmas Concert, Perkins Director Gabriel Farrell explains that the students are performing the music from memory, because if they brought out their sheet music in braille, the stack of books would be taller than the students (Farrell).

Additionally, many embossed books have competing needs. Frequently the dilemma is between the text block,



Figure 4: Laura Bridgman Reading an Embossed Book circa 1860, Perkins School for the Blind Archive.

which should be kept vertical, and the binding and book boards, which need to lie flat. It is important for the text block to remain vertical so that the pages are not weighed down or flattened on the bottom. Embossed and braille books are printed on heavy card stock which needs to be thick enough to withstand the pressure of the embossing without perforating the page, and large so that contents do not take up more volumes than necessary. The thick paper and large size result in heavy text blocks that pull and sink over time, creating significant strain on the binding and damaging the pages that slump at the bottom where the book boards fail to hold them up.

Because the pages cannot be pressed flat or immobilized by the normal pressure of a closed print book, embossed book paper is vulnerable to warping caused by fluctuations in humidity over time (Ogden, "Temperature"). Further, pages of older print books have

yellowing, foxing, or discoloration around the edges of the pages, but not so noticeably at the center or close to the spine. In embossed books, possibly due to the increased exposure of the pages, the deterioration is usually more evenly distributed across the page, rather than confined to the edges. The embrittlement and discoloration of pages occur for acidic papers (Ogden, “Storage”). Perhaps because embossed books do not press out oxygen, they age and deteriorate more quickly than do books with unembossed leaves.

The loose pages also allow dirt and dust to get in. Unlike print books, embossed books cannot be easily cleaned with a low-suction vacuum. It is common to see dark moon shapes on pages where the dirt has settled along the curve of a warped page. Historic collections of embossed and braille books are therefore excellent candidates for boxing, and because 19th- and early 20th-century volumes are far from a standard size, custom phase boxes are needed. The boxes must be able to withstand the weight of the volumes.

Children’s books are at even greater risk because they frequently have 3-D objects glued or pasted in to illustrate the text. These objects also create added and uneven strain on the leaves and the bindings. *See Figure 5.* For example, Perkins has a children’s book about a lamb whose leg is trapped in a bucket. To illustrate this, a foam lamb is stitched in with a thimble over one leg. The thimble is thicker than anything else on the other pages, so the book is wedge shaped when it is closed. This type of illustration creates the kind of preservation challenges that archivists frequently encounter with scrapbooks, in which each book must be treated individually as foreign and unique materials, glues, and other adhesives pose their own problems. *See Figures 6 and 7.*

Embossed and braille books also have a variety of unique tactile graphics, such as math and science models and, more commonly, maps. These can be at great risk because the embossed areas are large and unstable, making them prone to damage, including sinking or cracking. Text and dots are relatively even-sized and stabilize the page.



Figure 5: Insects and Crustaceans, *Pictures for the Blind*, M. Kunz, 1902, Perkins School for the Blind Archive.



Figure 6: Boxed and Unboxed Embossed Books, 2015, Perkins School for the Blind Archive.



Figure 7: Embossed Book Showing the Weight of the Text Block Straining the Binding, 2015, Perkins School for the Blind Archive.

9 Digitizing Books Without Ink

Making these books widely accessible has been the driving force in Perkins's digitization efforts. Rather than focus on the content, we seek to provide digital examples of embossed writing systems, while highlighting important editions, people, and technology of historical significance. Our digitization priorities also consider providing context about the books, such as photographs of the books in use or correspondence about the first printed embossed books.

Our digital collections currently reside on Flickr, and include our *Writing Systems for the Blind Used by Helen Keller* exhibit. This is a virtual bookshelf with accompanying textual descriptions of the various systems. We photographed sample pages from a handful of books printed in each system. The collection is geared toward a sighted audience, but we do include textual descriptions to make the collection accessible to the visually impaired. As digitization progresses, we anticipate wider access to this content as it continues to be ingested into the Digital Commonwealth, as we are a contributing institution.

There are several considerations when it comes to digitally reformatting embossed books. Unique treatment

is required because of their texture, size, and bindings, and the weight of the paper. As mentioned above, the key to imaging embossed books is raking light, done so that individual letters, dots, or symbols cast a shadow and reveal their shape. Traditional overhead photography and flash lighting produces large areas that are bleached out with contrast that is insufficient to appreciate the details of the book. Raking light has been used in cultural heritage digitization projects, revealing texture and also revealing text that has been erased (Dogan & Sharsky, p. 223).

Creating good raking light doesn't require specialized equipment. Lamps or tripod lights can usually be laid on their side next to a book, or held by an assistant. See Figure 8. For best results one should use a dark room without windows and turn off overhead lights. The downside of this type of lighting is that it can be difficult to get even lighting across an entire page or pair of pages. Sometimes the shadow cast by the text block or book boards onto the backdrop can be distracting. It can also be difficult to get even lighting from page to page, especially when heavy text blocks and bindings shift greatly in their angles.

It is necessary to photograph many books in a cradle. Because these volumes are large, images that contain open pages of a book, or even one entire page, may be



Figure 8: Example of Lighting Setup to Bring out Surface Relief of Embossed Books. The lamp is placed on only one side (uneven) with light directly across the page at an oblique angle approaching 180 degrees (raking light), 2015, Perkins School for the Blind Archive.

too zoomed out to engage the viewer. Our experience has been that digital exhibits should contain cropped sections to reveal detail, or, even better, have zoom capabilities in the interface. Accommodations might also be needed to restrain the pages during imaging. Embossed books usually have thick, and sometimes rigid, pages that don't lend themselves to lying flat on their own.

Photographing embossed books, especially those with Roman Type, can successfully capture light and shadow. Giving form to letters, words, and paragraphs provides an aesthetic experience for the sighted, even the moderate bibliophile or book worm. Artist Abelardo Morell photographed pages of a book printed in Line Type, likely created at Perkins. His print "1841 Book of Proverbs for the Blind," 1995, shows the text undulating across the gutter of the binding with a shaft of bright light cutting through the middle and just grazing a strip of letters (Morell).

10 Conclusion

These early embossed books present preservation and digitization challenges to the archivists and librarians responsible for their care and use. With this article we seek to share the best practices we have developed at Perkins with others who may grapple with these issues. Books for the blind have a long history that reflects evolutions in alphabet or code design and printing technology and also changing attitudes towards people with disabilities. Issues such as access to education and production costs still affect book production today, in print and electronic form. Despite being widely held as a superior system by the blind community, braille took almost 100 years to become an accepted and standardized system.

The Perkins School for the Blind Archives likewise has played an important role in the history of reading and writing. Our collections shed light on the figures, ideas, and technology behind many of the competing systems that are largely unknown today. The large size and raised print that characterize these early books provide unique challenges that can be addressed with custom boxing. Online, this history comes to life through photographs that are evidence of the ingenuity that went into creating these systems, technologies, and pages, and the photographs show the beauty inherent in these volumes.

More information about the history of books for the blind and Perkins history can be found online at PerkinsArchives.org and Perkins.org/history. The digital collections, which include images of embossed books,

technologies, and important figures can be found on the Perkins Flickr page at <https://www.flickr.com/photos/perkinsarchive/collections>. This includes the digital exhibit *Writing Systems for the Blind Used by Helen Keller*. Perkins collections are also being ingested into the Digital Commonwealth, an online repository of contributing memory institutions in Massachusetts. The collections can be found at <https://www.digitalcommonwealth.org/institutions/commonwealth:6d570760d>.

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Bionotes

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Molly Stothert-Maurer is archivist at the Perkins School for the Blind in Watertown, Massachusetts. Her MA is in information resources and library and information science from the University of Arizona and her BFA in Studio Art is from Texas State University. She has worked extensively on digital projects and in 2015 became a member of the Board of Directors of the Digital Commonwealth, the statewide digital repository for Massachusetts, USA.

Jennifer Arnott

Jennifer Arnott (MLIS) has been the Research Librarian at the Perkins School for the Blind since May 2015. Her previous library positions (at a secondary school and a small public university) have given her a deep appreciation for the range of ways people find, use, and share information. She is particularly interested in how to connect people with information they want and need, in a way they can use, and in how technology changes the ways we find and share information.

Jennifer Hale

Jennifer Hale is currently pursuing a master's degree in library and information science at Simmons College. She began working at the Perkins School for the Blind as an intern in 2013 and is now assistant archivist and assistant librarian. Her past career in Web and graphic design informs her interests in the digitization and archival description of visual materials, in particular photographs.