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## **A Type of Preservation: Modern Recreations of Typeface at Genesee Country Village & Museum and the Cary Graphics Art Collection**

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A Type of Preservation: Modern Recreations of Typeface at Genesee Country Village &  
Museum and the Cary Graphics Art Collection

A THESIS SUBMITTED  
IN PARTIAL FULFILLMENT OF THE  
BACHELOR OF SCIENCE DEGREE  
IN MUSEUM STUDIES

MUSEUM STUDIES PROGRAM

BY  
Koda Drake

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The members of the Committee approve the thesis of Koda Drake submitted on May 7, 2021.

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Juilee Decker, Ph.D.  
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## **Abstract**

Historical objects that serve educational and interpretive purposes face frequent use and can easily be damaged, particularly when those objects are designed to be disposed of following high usage. Conserving these artifacts through both digital and physical reproductions enables museum staff, scholars, and the general public to tell a more complete history of the objects and of material culture. To demonstrate the necessity of preserving functional artifacts, this thesis examined historic wooden typefaces used for document printing to answer the following question: do digital and physical reproductions of wood type fonts allow for preservation of the original fonts while maintaining an authentic, participatory experience for visitors? By working with the collection of typefaces at Genesee Country Village & Museum in Mumford, New York and the Cary Graphic Art Collection at Rochester Institute of Technology, I recreated damaged types with methods tested by scholars of printing history to demonstrate the value of physical and digital reproductions. I also showed how such efforts enable museums and other collecting institutions to view type as both an art form and a means of production. This research contributes to the ongoing discussion on the use of facsimiles in the museum space for exhibition and educational purposes and the conversations surrounding authenticity in museums.

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## Introduction

The modern consumer is no stranger to the presence of fake items for sale within the market. Knock-off handbags and sunglasses have almost become socially accepted and expected. What happens when objects, not original ones, become apparent in spaces other than consumer shopping?

Museums involve a form of consumership that may not be inherently visible. Visitors to museums are paying admission to view the artifacts on display and have the experience that has been curated by the museum, for the visitor or, more pointedly, the modern consumer. There is an expectation by the visitors that they will be viewing original and authentic artifacts while within the museum. Think about it: there would be an outcry if it was revealed a famous van Gogh painting on display was, in actuality, a modern recreation. Does the expectation of legitimate objects extend beyond what is traditionally viewed as valuable? If items used for education and interpretation are recreations of the original, do those artifacts elicit the same reaction from the visitor?

The nature of certain artifacts, notably those made after the Industrial Revolution and the introduction of assembly-line production, have a short life span. They were designed to be used until they broke, and then they were made to be replaced and reordered from manufacturers. These material objects with a limited use value, now years removed from their years of prominence, are no longer easily replaceable. Museums, the safekeepers of these artifacts, are left with an interesting dilemma. How does one preserve an artifact that was designed to break after extended periods of use?

There is not a single answer to that question. Museums can work with a conservator to reduce damage to the artifact. Museums can remove the artifact in question from use in its

educational or interpretive collection and place it in safekeeping in collections storage. Museums can alter the conditions with which that artifact is used so as to preserve it in its existing state for longer. Museums can photograph and digitally document the artifact so that future generations may be able to view the artifact long after it has deteriorated. Museums can deaccession the artifact once they are no longer capable of caring for it properly. Museums can digitally recreate the artifact and preserve it through 3D renderings. Museums can recreate the artifact and use the facsimile for educational and interpretive purposes in place of the original, while the original is moved to storage. The options for preservation and the continued existence of an artifact have increased as technology develops.

For this thesis project, I addressed possibilities for functional objects to be preserved and recreated for further use through a case study involving wooden typefaces used with a nineteenth century printing press at Genesee Country Village & Museum, a living history village and museum situated in Mumford, New York. My project focused on the process of recreating typeface and their use as interpretive tools in a living history museum. Through the creation of wooden typeface facsimiles, I was able to understand the further applications and use of facsimiles in museums for display and interpretation.



## Literature Review

In this thesis, I explored the use of facsimiles in museums to answer the question: do digital and physical reproductions of wood type fonts allow for preservation of the original fonts while maintaining an authentic, participatory experience for historical interpreters and visitors? I worked with the Genesee Country Village & Museum to render digitally and physically recreate a selection of their wooden type fonts that are used in the printer's shop onsite. By creating these facsimiles with the intent of printing, I demonstrated the capabilities of modern technology and the benefits of its use so as to decrease damage from loss and misuse.

Genesee Country Village & Museum houses several hundred historic typefaces made entirely of wood, dating to the 18th and 19th centuries. Their collection of typeface is composed of numerous fonts with varying degrees of completion. Through age and use, the collection has deteriorated over time. The incomplete nature of some of these sets of fonts leads to a need for letters to be recreated so that the fonts may be used to their fullest extent as interpretive tools. An evaluation of the condition of specific letters and fonts at the museum reveals the need to access a complete set of fonts. Utilizing the sets of typeface at the Cary Graphic Arts Collection at Rochester Institute of Technology as a control group, it was possible to recreate accurately the damaged and missing typeface at Genesee Country Village & Museum. It was possible to scan both the typeface and the printed impression of the typeface, and in turn, to create vector-based image files. These files were translated into other media, such as wood, by engraving and routing through technical means thereby creating reproductions or recreations of typefaces that are missing or damaged by age and printing. Such a process can allow for the creation of a complete type family, including all weights and styles, even without extant elements. In other words, the

possibilities for creation and completion of wood type fonts through mechanical means, as well as expansion, are endless.

### ***Introduction***

The use of facsimiles in museums is well documented with replications being made regularly in museums both to display artwork that is prone to deterioration as well as to replace pieces in an installation that are subject to damage with time and use.<sup>1</sup> Much of the literature available on the use of physical facsimiles and digital reproductions in collecting institutions focuses on the use of these items as an aspect of an exhibition. These reproductions are often used in place of artifacts that have an exchange value within human-artifact relations, an object with notable worth that can be assigned a monetary value, rather than artifacts that have a use value, objects that are valuable for the ability of that object to fulfill a human need or desire.<sup>2</sup> The literature review discusses the evaluation and categorization of artifacts, the use of reproductions in museums and collecting institutions, and the issues of authenticity when dealing with reproductions.

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<sup>1</sup> On replications in museums, see Alison Norton, "Migrating Facsimiles: When Copies Disappear from Conservation Control," *Studies in Conservation* 61 (2016): 160, <https://doi.org/10.1080/00393630.2016.1181926>; Sarah E. Altman, "Replicating a Revolutionary War Knapsack: The Challenges and Ethics of Creating a Museum Reproduction" (master's thesis, Fashion Institute of Technology, 2020), 8; Elmer Veldkamp, "Keeping It Real: The Exhibition of Artifact Replicas in National Museums of Korea," *Acta Koreana* 17, no. 2 (December 2014): 557-581, <https://DOI.org/10.18399/acta.2014.17.2.002>. <https://ezproxy.rit.edu/login?url=https://www-proquest-com.ezproxy.rit.edu/docview/2397798120?accountid=108>.

<sup>2</sup> On human-artifact relations, see Ann Smart Martin, "Material Things and Cultural Meanings: Notes on the Study of Early American Material Culture," *The William and Mary Quarterly* 53, no. 1 (January 1996): 11-12, <https://doi.org/10.2307/2946821>; Manjari Chakrabarty, "A Philosophical Study of Human-artefact Interaction," *AI and Society* 32, no. 2 (November 11, 2015): 267-274, <https://doi.org/10.1007/s00146-015-0618-3>.

### *Evaluation and Categorization of Artifacts*

Opinions vary as to how to best categorize an artifact. In a discussion of artifacts in regards to the study of American material culture in her article “Material Things and Cultural Meanings: Notes on the Study of Early American Material Culture,” historian Ann Smart Martin asserts that objects of material culture are given their meaning by how the objects were made, how the objects were used, and how the objects fit into the broader topics of society and culture. She argues that the above categories that assign meaning can be used to simplify objects of material culture into two categories: artifacts with exchange value and artifacts with use value. Artifacts with exchange value are defined by Martin as having a monetary value and worth assigned to them. Artifacts with use value are defined by their ability to fulfill humans wants.<sup>3</sup> The worth of objects that have exchange value as explained by Martin is further supported by the work of sociologists Gerbert Kraaykamp and Koen van Eijck who build off of the work of fellow sociologist Pierre Bourdieu.<sup>4</sup> Kraaykamp and van Eijck explain the intricacies of cultural values associated with the objectified state of cultural value. The authors then explain that the cultural and material value of an artifact is determined from the skills used to make the item as well as the way the object can be appreciated. Importantly, Kraaykamp and van Eijck note that few studies are done on the cultural value associated with the objectified state.<sup>5</sup> From a philosophical perspective, Michael Losonsky defines artifacts and the conditions that make them unique from natural objects in his article “The Nature of Artifacts.” Losonsky argues against any definition of

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<sup>3</sup> Martin, "Material Things," 5-12.

<sup>4</sup> For works by Bourdieu on cultural materials and heritage, see Pierre Bourdieu, "Cultural Reproduction and Social Reproduction," in *Critical Concepts in Sociology*, ed. Chris Jenks (London: Routledge, 2003); Pierre Bourdieu, "The Forms of Capital," in *Readings in Economic Sociology*, ed. Nicole Woolsey Biggart (Hoboken: John Wiley & Sons, 2008), <https://ebookcentral.proquest.com/lib/rit/detail.action?docID=351396>; Pierre Bourdieu and Jean-Claude Passeron, *Reproduction in Education, Society and Culture*. Revised Edition (London: Sage Publications, 1990).

<sup>5</sup> Gerbert Kraaykamp and Koen van Eijck, "The Intergenerational Reproduction of Cultural Capital: A Threefold Perspective," *Social Forces* 89, no. 1 (September 2010): 209-211, <https://www.jstor.org/stable/40927560>.

an artifact, guided by the work of Aristotle, and states that artifacts have varying natures that lead to the changes they undergo throughout time and use. He argues that the decay cycle is not exclusive to natural objects. The very purpose of use thus leads to the disintegration of the artifact. The disintegration of and the subsequent renewed demand for artifacts are important stages in the life cycle of an artifact. He concludes his argument declaring artifacts are, by nature, designed to decay and be recreated in another form.<sup>6</sup> The evaluation and categorization of artifacts by both Martin and Losonsky allow for a developed argument against preservation through safekeeping in collecting institutions and instead lend themselves to the concept of preservation through use. The concept of preservation through use inherently comes with the implications of allowing the artifact to live through its life cycle to its eventual disintegration. Shifting from preservation of an artifact and its cultural capital to object reproduction, the following section will address reproductions in museum settings.

### ***Reproductions in the Museum Setting and the Broader Sphere of Collecting Institutions***

Facsimiles are not uncommon in the exhibition setting. Art historian Alison Norton briefly discusses the use of facsimiles as a means of displaying fragile works of art in an exhibit space while simultaneously discussing at length, the use of facsimiles in an exhibition involving letters in her article “Migrating Facsimiles: When Copies Disappear from Conservation Control.”<sup>7</sup> Norton describes the practice of using reproductions in museums without necessarily fully revealing to the visitor in the museum space that the object on display is not the original. In other instances, attention is paid to revealing the use of facsimiles. As art historian Jasmine

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<sup>6</sup> Michael Losonsky, "The Nature of Artifacts," *Philosophy* 65, no. 251 (January 1990): 81-88, <https://www.jstor.com/stable/3751245>.

<sup>7</sup> Norton, "Migrating Facsimiles," 160-166.

Elizabeth Burns recounts in her article “Digital Facsimiles and the Modern Viewer: Medieval Manuscripts and Archival Practice in the Age of New Media,” facsimiles are communicated through exhibition. Burns describes an exhibition at the Vatican that showcased several manuscripts from their library. Several of these artifacts were described as facsimiles, and visitors were allowed to interact with these manuscripts at will. The last room in the exhibition space was designed to give the appearance of offering proper presentation conditions for fragile manuscripts. Burns reveals that these manuscripts on display were also facsimiles.<sup>8</sup> The authors reveal through their respective case studies that visitors are willing and do interact with facsimiles on display in museums.

With complete transparency as to the use of facsimiles to develop a more substantial visitor experience, the British Museum incorporated CT scans and 3D prints derived from those scans in their exhibit about the Jericho Skull, as described by Cara Hirst in her exhibit review, “British Museum Exhibit Review: The Jericho Skull, Creating an Ancestor.”<sup>9</sup> Full reproductions of artifacts are on display and easily accessible as well through Google’s *Arts and Culture* program. Oliver Franklin-Wallis details the extent of which Google has offered digital reproductions of artwork through partnering with cultural institutions in many countries. These reproductions range from still images to virtual reality (VR) which allow visitors to step inside a work of art.<sup>10</sup>

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<sup>8</sup> Jasmine Elizabeth Burns, "Digital Facsimiles and the Modern Viewer: Medieval Manuscripts and Archival Practice in the Age of New Media," *Art Documentation: Journal of the Art Libraries Society of North America* 33, no. 2 (September 2014): 155-157, <https://doi.org/10.1086/678515>.

<sup>9</sup> Cara Hirst, "British Museum Exhibition Review: The Jericho Skull, Creating an Ancestor," Papers from the Institute of Archaeology, accessed October 8, 2020, <https://pia-journal.co.uk/articles/10.5334/pia-521/>. The British Museum used Computed Tomography (CT scans also known as CAT scans) in the process of creating reproductions of the Jericho Skull as it allowed for the archaeologists on the project to identify the shape of the skull and its various distinct aspects hidden beneath the plaster covering the entire skull.

<sup>10</sup> Oliver Franklin-Wallis, "History Is Being Locked Away. Google's Museum Is Changing That," *Wired*, July/August 2016, accessed October 8, 2020, <https://www.wired.co.uk/article/google-cultural-institute-art-museums>. The use and presentation of collections outside of the museum, in a context that is digital, reveals the willingness of

Historians Neumüller, Reichinger, Rist, and Kern discuss several examples through which facsimiles have been used for both the visitor experience in museums as well as for preservation. The authors utilize the replications of cuneiform tablets at Cornell University to explain the potential for preservation and recreation of damaged artifacts, thereby demonstrating the possibility for recreating textual artifacts. However, since cuneiform tablets were created by hand and intermediary tools such as typefaces were not used for creation, there is room for research and scholarship surrounding the replication and preservation of typefaces and similar materials.<sup>11</sup>

While the aforementioned examples discuss the use of facsimiles and digital reproductions within an exhibition setting, no attention has been paid to the use of facsimiles of objects from American material culture with a use value in functional settings in museums. Moreover, while it is not unusual for replications of typeface to be created, there is little evidence of its use in museums. Typographers Richard Kegler and Amelia Hugill-Fontanel discuss a study they performed that evaluated the accuracy and clarity of a print made with a typeface constructed in different methods in their 2020 lecture “The Seven Lives of a Typeface” at the University of Porto (Portugal).<sup>12</sup> Kegler and Hugill-Fontanel recreated typeface through magnesium photoengraving, laser engraving, stereolithography, fused deposition modeling, and photopolymer plates. They found modern methods to be comparable in quality of print to the original typeface.

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institutions and the public to accept digital renderings of collection items. Google Arts and Culture is an example of one of the most mainstream means that digital reproductions have been accepted broadly by museums and the public, and the website showcases the potential of digital reproductions as an educational tool.

<sup>11</sup> Moritz Neumüller et al., "3D Printing for Cultural Heritage: Preservation, Accessibility, Research, and Education," in *3D Research Challenges in Cultural Heritage: A Roadmap in Digital Heritage Preservation*, ed. Marinos Ioannides and Ewald Quak (Berlin, Heidelberg: Springer Berlin / Heidelberg, 2015), 131-132, PDF.

<sup>12</sup> Richard Kegler and Amelia Hugill-Fontanel, "The Seven Lives of a Typeface," lecture presented at Post-Digital Letterpress Printing, University of Porto, Porto, Portugal, January 2020, video, posted September 21, 2020, <https://www.youtube.com/watch?v=gxclK7Wh2Hc>.

### *The Complexities of Authenticity*

Discussions surrounding reproduction and facsimiles bring to bear questions about veracity as well as perception. To address such questions, academics have noted the difference in experience between having an interaction with a historic artifact and an interaction with a known replica of the artifact. Burns highlights the physicalities of an artifact that can help researchers better understand the history of an artifact through the visible signs of use. The dirt and wear from fingers turning the page of a manuscript, the marginalia hastily scribbled next to a notable passage, and even soup stains offer an intimate understanding of the artifact and its history of use. Digital facsimiles take away from the intimate experience of interacting with the physical artifact as the layers of detail that are visible to the human eye on a physical object are blurred into a single layer where many of these features lay indiscernible.<sup>13</sup> The issue of authenticity for Burns lies in the quality of research and interaction that is present within physical artifacts yet lacking in the digital reproductions.

Authenticity is at issue in Chad Elias's "Whose Digital Heritage?" which describes replications done by hackers to open access to artwork that is closely guarded by museums while also offers the depiction of replications that were created to replace artifacts damaged by a war on cultural heritage in the Middle East. For Elias, the issue of authenticity is in the accuracy of the replica to the original. He notes the differences that are visible on the Arch of Palmyra from the original as well as differences between the original statues of Uthal and the reproductions done by Morehshin Allahyari.<sup>14</sup> The concerns of both Elias and Burns are rooted in an artifact's

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<sup>13</sup> Burns, "Digital Facsimiles," 148-167.

<sup>14</sup> Chad Elias, "Whose Digital Heritage? Contemporary Art, 3D Printing and the Limits of Cultural Property," *Third Text* 33, no. 6 (2019): 687-707, <https://doi.org/10.1080/09528822.2019.1667629>.

exchange value. The items the two discuss are designed to be highly decorative with limited functional purpose.

The concerns in European and American culture over the issue of authenticity are filtered through discussions within the fields of philosophy, anthropology, and history. Anthropologist Gwyneira Isaac challenges the perception that a copy is worth less than the original in her article “Whose Idea Was This?” through a comparison of cultures outside of the Euro-American sphere of influence that place higher value on objects that are copies of an original.<sup>15</sup> Isaac comments on indigenous cultures that use copies of religious artifacts to replace those that have been damaged with time and use. While religious artifacts do serve a functional purpose, the discussion of authenticity within the realm of functional objects with a use value in museums is an entirely different one than is visible in the literature reviewed. Sociologist and museologist Gordon Fyfe establishes the long history of reproductions in art history and attributes the value of the original work and the copies to the rules and intricacies of the society in which they are beheld.<sup>16</sup>

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<sup>15</sup> Gwyneira Isaac, "Whose Idea Was This?: Museums, Replicas, and the Reproduction of Knowledge," *Current Anthropology* 52, no. 2 (April 2011): 211-215, <https://doi.org/10.1086/659141>.

<sup>16</sup> Gordon Fyfe, "Reproductions, Cultural Capital and Museums: Aspects of the Culture of Copies," *Museum and Society* 2, no. 1 (March 19, 2015): 47-67, <https://doi.org/10.29311/mas.v2i1.2783>.



## Defining Authenticity

Authenticity, however, is a difficult concept to define due to multiple factors that influence the perception of an object or experience being authentic. Visitors to a museum space view authenticity in an entirely different manner than the staff of a museum and other professionals in the field may view and understand it. Due to the many and highly subjective definitions of authenticity, it is best understood as a term and concept with a fluid and ever-changing definition. While writing this thesis, many of the early definitions of authenticity focus primarily on how I view authenticity. I, as an emerging museum professional, may have an incredibly different view of authenticity than someone who has been working in the space of museums since before the proliferation of digital technologies and burgeoning handling and engagement practices of the participatory museum.<sup>17</sup> I was too focused on the professional and academic aspects associated with authenticity to consider the visitors' view of authenticity.

Museum professionals define something as authentic when it is historically accurate and an original artifact, when possible. Authenticity for the museum professional is more centered around the ability to use historical artifacts in a meaningful way.

There is an unspoken expectation that a visitor to a museum will receive an authentic experience as contemporary visitors are participatory within the Experience Economy.<sup>18</sup> However, there are multiple factors that can affect the authenticity of an experience. Authenticity can be established through historically accurate research and presentations of the site, interpretation, and artifacts in use.<sup>19</sup> The overall experience of the visitor can also be a measure

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<sup>17</sup> Nina Simon, *Museum 2.0* (blog), <http://museumtwo.blogspot.com/>.

<sup>18</sup> B. Joseph Pine and James H. Gilmore, "Museums and Authenticity," *Museum*, May/June 2007, 76, PDF.

<sup>19</sup> Susie Wilkening and Erica Donnis, "Authenticity? It Means Everything," *History News* 63, no. 4 (Fall 2008): 19, <https://www.jstor.org/stable/42654185>.

of authenticity. Thus the primary lenses for understanding authenticity in this thesis center on object-based authenticity and experience-based authenticity, defined below.

### ***Object-based Authenticity***

An object is commonly viewed as authentic when it is an original artifact with historical origins. The display of original artifacts and of original works of arts defines a museum and the experience it offers as authentic. The visitor is paying admission to a museum such as The Metropolitan Museum of Art to see legitimate artwork with known provenance, by notable artists, that is displayed there. The authenticity of the artifact, in this instance, is what draws visitors to the museum or repository. The context through which an artifact, historical or reproduction, is displayed and presented also impacts the perception of authenticity. Presenting a facsimile within an exhibition space such as with the Jericho skull can aid in the visitor experience being authentic, despite the reproduced and reconstructed skull being depicted in the exhibition date.<sup>20</sup>

### ***Experience-based Authenticity***

Experiences within themselves are capable of being authentic in a variety of forms. An authentic experience can occur within a fabricated location. Visitors to the Lascaux II cave in Dordogne, France, are viewing modern replications of prehistoric artwork. The original cave has been deemed too fragile for high numbers of visitors and tourists to travel through. However, with complete transparency, visitors to the recreated cave are aware that the cave is a hastily made replica created with the sole purpose of allowing people to visit the cave. A third rendition

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<sup>20</sup> Hirst, "British Museum," Papers from the Institute of Archaeology.

of the cave, aptly named Lascaux III, is being created with more attention to detail than was given to Lascaux II. The visitors to Lascaux still view the experience as authentic, despite their inability to visit the original cave.<sup>21</sup> The absence of an original artifact does not affect the experience of authenticity in this instance and demonstrates the capabilities of visitors and tourists to feel as if their experience itself is authentic. Authentic experiences is a topic explored by Dean MacCannell in his response article, “ Why It Never Really Was about Authenticity” as he details tourists who are satisfied with staged experiences and staged authenticity and the differences between the forms of authenticity and experience.<sup>22</sup> MacCannell expands upon his concepts through detailing that staged experiences can still be authentic as they allow for the impossible to occur and to feel real.

As this thesis centers on the context of the living history museum, the work of anthropologist Richard Handler and sociologist William Saxton is particularly useful: they build upon the concept of authentic experiences in living history museums throughout their article “Dyssimulation: Reflexivity, Narrative, and the Quest for Authenticity in ‘Living History.’” Handler and Saxton explain the major challenges of creating an authentic experience within a living history museum and the context of interpretation while also incorporating the many and expansive definitions of authenticity.<sup>23</sup> Living history interpreters must deal with historical accuracy involving a historically accurate setting and props while seeking to maintain a continued historical-themed narrative. Both MacCannell and Handler and Saxton address the concept of authentic experiences while detailing the nuances of such a fluid topic. Authentic

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<sup>21</sup> Pine and Gilmore, "Museums and Authenticity," 80.

<sup>22</sup> Dean MacCannell, "Why It Never Really Was about Authenticity," *Journal of Sociology* 45 (2008): 334, <https://doi.org/10.1007/s12115-008-9110-8>.

<sup>23</sup> Richard Handler and William Saxton, "Dyssimulation: Reflexivity, Narrative, and the Quest for Authenticity in 'Living History,'" *Cultural Anthropology* 3, no. 3: <https://www.jstor.org/stable/656173>.

experiences occur, even when inauthentic or unoriginal aspects are at play, because authentic experiences are defined by the sensation of feeling real. It may not be possible for the experience to have occurred historically, but that does not invalidate the authenticity of the experience to the visitor or the historical interpreter.

Authenticity is subjective. Interpreters and visitors are likely to have different perceptions and interpretations of what is authentic and what factors into authenticity. Authenticity can extend beyond the direct application of an object or an experience. A determining factor in what is authentic can be its relativity to the institution's mission and how it presents itself.<sup>24</sup> If an institution, within its mission, portrays a willingness for historical accuracy, the museum can be authentic through both the artifacts displayed and the actions of the interpreters. The artifacts displayed nor the interpretation need to be original nor historically accurate for the museum to be authentic.

### ***Transparency and Authenticity***

The most defining characteristic of a museum in regards to its authenticity is its ability to be transparent with its visitors regarding replications and any potential historical inaccuracies. Blatant reproductions and fictionalization are not a comparable substitute for the original material, but when reproduced and used in a historically accurate manner with an honest explanation, visitors are more likely to be accepting of reproductions within the living history museum space. When museums have established transparency with visitors, the visitors to these spaces are more willing to tolerate tools of interpretation that may not be original artifacts than they would without a direct line of communication and honesty. Visitors have noted that, when

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<sup>24</sup> Pine and Gilmore, "Museums and Authenticity," 79.

originals are unavailable, reproductions that are truthful and historically accurate. This observation is supported through the practical application of displaying facsimiles in various institutions. As a museum professional, it can be difficult to separate the professional view of authenticity from how visitors perceive authenticity.

### *Authenticity and Typeface*

In regards to authenticity and typeface, it is necessary to emphasize the classification of typeface. A typeface is a functional object with a use value. It has a limited lifecycle. The practice of preservation through use guarantees that the typeface will not deteriorate from decay, but the time will come when the letter is incapable of being used in a printing press. The eventual decay of typeface and the deficit of modern manufactures of typeface leads to a need for replacing broken type if a museum is to continue interpretation within a print shop to a similar degree. Typeface were designed to have a limited lifespan, be disposed of once broken, and re-ordered through the varying manufactures. The disposable nature of these artifacts of American material culture leads to issues with authenticity itself. In the present, there is a plethora of typeface available. However, in the future, there may be significantly less typeface. The supply of the item in question affects the authenticity of the artifact as well as the practicality of using an original artifact with a disposable nature.

Though the definition of authenticity is incredibly fluid and can be subject to rapid change, this thesis is written and the project is performed with the interpretation of authenticity that visitors hold. The project considers authenticity through the viewing of artifacts by visitors as well as through the consideration of what defines experience as authentic. Attention is also given to how professionals and academics view authenticity in regards to experiences and

artifacts used to create experiences. As the project ages, it is important to evaluate the project and application in comparison to the contemporary definition or definitions of authenticity.

## Background

### *Printing History*

The invention of the printing press by Johannes Gutenberg in 1440 led to increased literacy and a high demand for materials among the now largely literate populations. The printing press itself had very few changes between its creation and the printing presses of the nineteenth century, the focus of this study. Hand presses were the standard method of printing until the invention of the double-cylinder, steam powered printing press in 1814.<sup>25</sup> Though there were many renditions of the hand press, the distinguishing factor between them was the mechanism through which the machine printed.<sup>26</sup> A printing press is classified by the means in which paper is pressed against the inked type. The Washington Press, the model used by Genesee Country Village & Museum, was invented in 1821 by Samuel Rust and continued to be manufactured until approximately 1910.<sup>27</sup> The Washington Press (fig. 1) was unique in comparison to other printing presses due to its figure four mechanism (fig. 2).<sup>28</sup> Many renditions of the Washington Press were made throughout the years, and the model in use at Genesee Country Village & Museum is a c. 1850 Hoe & Co. press (fig. 3).<sup>29</sup>

The characters used with a printing press, typeface, historically were made of metal or wood. Metal characters were generally smaller in size, measuring only a few points or pica. They were more commonly used for printing materials such as newspapers and books. Wood type generally was created as larger specimens, measuring several pica<sup>30</sup>, and were primarily used for

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<sup>25</sup> Stephen O. Saxe and John DePol, *American Iron Hand Presses* (New Castle, Del.: Oak Knoll Books, 1992), vii.

<sup>26</sup> Saxe and DePol, *American Iron*, ix.

<sup>27</sup> Saxe and DePol, *American Iron*, 43.

<sup>28</sup> Saxe and DePol, *American Iron*, ix.

<sup>29</sup> Amelia Hugill-Fontanel, interview by the author, Cary Graphics Art Collection, Rochester, NY, February 3, 2021.

<sup>30</sup> Pica is a form of typographic measurement. Each pica is approximately  $\frac{1}{6}$  of an inch. One pica is equivalent to twelve points.

headings or posters. They accounted for the vast majority of large fonts that were printed. Wooden type has been created through several means throughout the history of printing. Originally, wood type would be created through hand carving. A thin, paperboard template would be made and used for the creation of multiple copies of the same character. The template would then be used as a guide for the process of carving the type. Later on, the router was perfected by Darius Wells as a means to mass manufacture wood type. His design was improved upon with the pantographic process in 1834 and 1836 by George Levenworth and Edwin Allen, respectively.<sup>31</sup> The use of the router to create wood type has continued to the present day with notable American manufacturers of wood type using routers as their primary means of type creation.

Modern creators of typeface also are capable of creating their type through other means of printing such as hand carving, 3D printing, laser engraving and cutting, metal casts, photopolymer, and magnesium photo etching.<sup>32</sup> Each method has its own benefits and unique characteristics of printing.

### ***Explanation of Typeface and Typography Terminology***

A typeface is a letter, numeral, character, or illustration set to 0.9186 inches high that is used in combination with a printing press to create an inked impression of the character on a piece of paper. The anatomy of a character, particularly of a letter, can be divided, defined, and categorized to identify, distinguish, and classify various fonts. Though typeface are created from

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<sup>31</sup> Rob Roy Kelly, *American Wood Type, 1828-1900: Notes on the Evolution of Decorated and Large Types and Comments on Related Trades of the Period* (New York: Da Capo Press, 1977), 50-51.

<sup>32</sup> Richard Kegler and Amelia Hugill-Fontanel, "The Seven Lives of a Typeface," lecture presented at Post-Digital Letterpress Printing, University of Porto, Porto, Portugal, January 2020, video, posted September 21, 2020, <https://www.youtube.com/watch?v=gxclK7Wh2Hc>.



both metal and wooden material, the wooden typeface is the focus of this thesis due to the larger nature of the material and the abundance of wood that fits well within the scope of the project. Regardless of material, typeface can easily be categorized by the type of font depicted.

The anatomy of a letter is complicated (fig. 4). Select terms, those directly related to discussion within the thesis will be defined. A serif is a detail at the end of a stroke that is not necessary to the body of the letter. It can be viewed as ornamental and does not affect the typeface beyond being a means through which to classify the font type. Serif fonts have serifs, small strokes, at the end of stems that can act as an accent to the letter. Serif fonts are further subdivided by the size of the serif in comparison to the stem as well as the form the end of the serif, the point, takes. Sans serif fonts are the second primary category of fonts. These fonts lack a serif and end at stems, the lines of a letter. Script is the third primary category of fonts. Script fonts are designed to replicate human hand writing.

Returning now to the parts of a letter, the stem of a letter is a vertical stroke, visible within most upright characters such as T, L, and H. A stroke is a secondary stem and is viewable in letters such as y. A terminal is the end of a stroke that lacks a serif. Sans serif fonts will have terminals in place of serif fonts. Serif fonts are unlikely to have a terminal at the end of the stroke. An arm is a horizontal stroke that remains unconnected to the stem on one or more ends. T is a letter with an arm. A spine is the main curved line within the letter S.

Typography has a unique set of measurements that can translate to physical measurements and are able to be used within many computer software as well. The smallest unit of typographic measurement is a point. One point is equivalent to 0.0138 inches. Twelve points is equivalent to one line. A line is equivalent to a pica. Six lines or six pica is equivalent to one

inch.<sup>33</sup> The specific and detailed nature of measurements used with characters makes it incredibly easy to verify the correct size as well as to resize typefaces as needed.

### *Use of Typeface at Genesee Country Village & Museum*

As a living history museum with seasonal hours of operation, the print shop is open and operational during the visitor season from May to October and on other occasions throughout the off-season. The typeface housed within the print shop is used for interpretation. Interpreters trained in using the printing press onsite design, layout, and print documents and publications related to historical events and the museum itself (fig. 5).<sup>34</sup> The typeface is laid and printed with after planning, deliberation, and redesigning the layout of a piece. During those months, the typeface are preserved through frequent use that ends in the wood of the character being conditioned as it is cleaned. The print shop closes in October, and the printing press is made inoperable as a protective measure against the cold weather. From October through May, before being open to visitors, the type in the print shop are left alone. The lack of handling and seasonal exposure to the elements can cause the typeface to enter into brittle condition. Cracking due to changes in the weather is merely a consequence of the nature of living history museums. The dedication to historical accuracy shown by faithfully recreating the conditions is evident in the print shop at Genesee Country Village & Museum.

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<sup>33</sup> "Specs," Virgin Wood Type.

<sup>34</sup> Diaz, interview by the author.

## Thesis Project Design and Process

### *Bringing Together Research and Practice*

In the fall of 2019, I served as a collections intern at Genesee Country Village & Museum which gave me the opportunity to clean, identify, and catalogue the various wood typefaces housed within the print shop of the museum. I learned the basics of font identification along with a lesson in printing history and typefaces at Cary Graphics Art Collection, on the RIT campus, to inform my experiential learning. Around the same time, a museum studies course I was taking explored the use of facsimiles and digital technologies in the museum space. My research and practice coalesced around museum collections, technology, and visitor experiences.

As part of my internship, I worked with the typeface at the museum and wrote condition notes for each font set which allowed me to observe firsthand how disposable these objects were designed to be. While little can be done to salvage a typeface that has cracked from repeated exposure to the elements or has been crushed by the hundreds of pounds of pressure that a printing press exerts, a short-term fix might be to glue a typeface back together. However, the instance that letter is put through the press, it will break again. Historically, a broken letter would be discarded, and a replacement would be ordered from the manufacturer.<sup>35</sup> The inability to re-order easily from a manufacturer that no longer exists, coupled with the historic, authentic nature of these letters, as well as limited access to replacements from the period, a seemingly simple replacement process for damaged or lost type is no longer possible.

This gap in collections care, preservation, and access was illuminated by my course work where I was reading articles about facsimiles in the museum space as an educational tool, ones

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<sup>35</sup> Hugill-Fontanel, interview by the author.

that allow for accessibility, as well as facets of an exhibition.<sup>36</sup> In fusing together these two experiences, I wanted to know if it was possible to recreate typefaces and, should that prove to be possible, if those recreations could replace the broken letters and expand a font. To find out, I contacted the associate curator at Cary Graphics Art Collection, Amelia Hugill-Fontanel to discuss the possibilities of recreating typefaces.

### *Cary Graphics Art Collection*

I was incredibly delighted to learn that not only was recreating typefaces possible and there were multiple means of doing so, but that Amelia herself had recently given a lecture on the process of creating typeface replicas to determine which method yielded the most accurate print.<sup>37</sup> 3D printing and laser engraving were two of the possible methods that seemed most accessible to me as a student at a college with a focus on technology. Either method would require an accurate scan of the imprint the inked typeface leaves on paper.

Originally, I had hoped to print type specimens, an impression of each character in a font set done with a printing press, at Genesee Country Village & Museum. I wanted to focus specifically on the fonts that had broken or damaged characters as well as the fonts that were missing characters. From those type specimens, I could create vector files using a program such as Adobe Illustrator. The vector files created from the type specimens could be used to laser engrave a piece of wood to match the original letter. After creating the replica typeface, it would

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<sup>36</sup> On facsimiles and replications in museums, see Alison Norton, "Migrating Facsimiles: When Copies Disappear from Conservation Control," *Studies in Conservation* 61 (2016): 160, <https://doi.org/10.1080/00393630.2016.1181926>; Sarah E. Altman, "Replicating a Revolutionary War Knapsack: The Challenges and Ethics of Creating a Museum Reproduction" (master's thesis, Fashion Institute of Technology, 2020), 8; Elmer Veldkamp, "Keeping It Real: The Exhibition of Artifact Replicas in National Museums of Korea," *Acta Koreana* 17, no. 2 (December 2014): 557-581, <https://DOI.org/10.18399/acta.2014.17.2.002>. <https://ezproxy.rit.edu/login?url=https://www-proquest-com.ezproxy.rit.edu/docview/2397798120?accountid=108>.

<sup>37</sup> Kegler and Fontanel, "The Seven."

be possible to print with the letter and adjust the design as needed to create a facsimile that was capable of printing in a manner accurate to the original as well as creating a clear impression of the letter and any details it held. Adjustments to the design could be made through hand carving the typeface as well as adjusting the way the typeface was laser engraved. After all the adjustments had been made, the facsimiles would be introduced into the collection at Genesee Country Village & Museum and used as a tool for historical interpretation when the museum was open to the public. At least, that was what I had planned to happen.

The unique, seasonal nature of a living history museum and the limitations of my availability prevented me from creating type specimens, either complete or incomplete, using the museum's type. In particular, the print shop at Genesee Country Village & Museum closes along with their visitor season in October. At that point, the printing press within the shop is made inoperable and prepared for winter ahead.<sup>38</sup> It would have been possible for an inter-institutional loan to happen between Genesee Country Village & Museum and Cary Graphics Art Collection during any average year. However, construction affecting the building that Cary Graphics Art Collection is housed within has created a situation where they have to move their collections to an offsite storage facility. Introducing a set or two of typeface while the move was occurring would have brought a lot of risk. It is possible that a letter or two could get mixed up with the collection at Cary Graphics Art Collection and moved to the offsite storage facility. It was at this point that Amelia suggested a loan from Cary Graphics Art Collection to me. I could work with the typeface in their collection as my reference for creating facsimiles. As this project ultimately aims to benefit Genesee Country Village & Museum, I selected type specimens that were in both collections.

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<sup>38</sup> Peter Wisbey, interview by the author, Rochester, NY, January 26, 2021.

### *The Museum Collection and Selection of Font*

Genesee Country Village & Museum has approximately forty sets of wooden type that are complete or very near complete. I needed to compare those forty to the dozens of fonts located at Cary Graphics Art Collection and find fonts that were similar. In order for the facsimiles to be able to be used with the other typeface at Genesee Country Village & Museum, every aspect of the font had to be the same, excluding the size. It was less important for the letters to be the same size because it is possible to scale a six line font to a larger size font or a sixteen line font to a smaller font.<sup>39</sup>

I decided to work on a much smaller scale than I had originally planned. Recreating an entire font, with anywhere from 60 to 140 characters, would require time and resources that were unavailable to me. In place of working with each letter of the alphabet in one singular font set, I selected a single letter in multiple fonts. All of the fonts at Genesee Country Village & Museum had capital letters, but very few had lowercase letters. Even fewer still had a complete collection of lowercase letters. With so few sets of typeface having lowercase letters, I chose to focus on the capital letters. In an interview with Melanie Diaz, a printer at the museum, I discussed the needs of the print shop as well as what letters she found herself using most often or running out of most often. She had mentioned the letters E, R, and S were among those that she frequently found she did not have enough of.<sup>40</sup> The shape of the three letters and the process of creating a facsimile are what led me to my decision of which letter to focus on. It was important to me to keep the creation as simple as possible as I was going to be working with machines that I had

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<sup>39</sup> Hugill-Fontanel, interview by the author. On type measurements and conversions see, "Specs," Virgin Wood Type, <https://www.virginwoodtype.com/specs/>.

<sup>40</sup> Melanie Diaz, interview by the author, Rochester, NY, February 2, 2021.

little knowledge of and no experience with. The process needed to be simple so if someone wanted to recreate the process for themselves, they would be able to. S, I concluded, had too many curves. If I chose any serif fonts to work with, creating the brackets on the letter would require more detail work. R had a similar issue. The curvature in the letter R would be difficult for learning the process of recreating typefaces. The empty space in the letter was also an issue. I was unsure of how simple it would be to create a letter that requires a conscious use of positive and negative space. The brackets in any serif font would also be a challenge. Having thought through the shape of each letter and the logistics of the project, E seemed to be the best choice. With the letter E, there was still the issue of brackets for serif fonts, but I thought it would be much simpler to create end brackets on a straight line than on a curve or while dealing with a concentrated negative space such as would be the case with S or R.

In regards to planning, all that remained was choosing the fonts. Fonts used in a nineteenth century print shop, like the one at Genesee Country Village & Museum, were most likely to be serif, sans serif, or script fonts. I wanted to represent each class of type within my recreation. Ideally, I would be able to recreate two serif fonts, two sans serif fonts, and one script font. The process of choosing the fonts began with taking a close look at the fonts in the collection of Genesee Country Village & Museum. Much like I had eliminated letters for their curvature or complexity, I eliminated fonts in a similar manner. A font such as the Roman Fat Face Condensed with hand carved ornamentation in the letter face would be too difficult to recreate. The amount of detail in a font such as that would require countless iterations of creating the font and numerous rounds of testing to ensure an accurate and clean print of the facsimile. While selecting fonts, I paid close attention to the amount of wood that would need to be cut to create the replica as well as the form of the letter (particularly the curves) and the shape and style

of the brackets on serif fonts. I narrowed my selection to four total fonts. I was going to be working with a Tuscan Extra Condensed font with flared serifs (fig 6.), a Gothic Tuscan font with straight stems and sharp ends (fig. 7), points, extending from the ends of the stems, a Gothic Extra Condensed font with square stems (fig. 8), and a Gothic Tuscan font with flared stems (fig. 9).<sup>41</sup> There were no similar scripts available at both Genesee Country Village & Museum and Cary Graphics Art Collection. I had chosen my fonts, two serif fonts and two sans serif fonts, and was ready to begin the process of creating the facsimiles.

### ***Process and Material Selection***

The process of creating facsimiles had significantly changed from my original plan, as well. I had intended to use Adobe Illustrator to create vector files, but limited access to software led me to find that route to originally be beyond the scope of reasonable outcomes for this project. Still determined to create the vector files for font recreation, I spoke with Mike Buffalin, manager of The Construct, a maker space on the campus of RIT. Mike informed me of two other options that I could utilize to create references for facsimiles. It was possible to scan the face of the letter with a flat scanner and then use the scan as a reference. I could also scan the letters and create digital references using a 3D scanner. To me, scanning the letters with a 3D scanner seemed like a more accurate means of creating a reference. 3D scanning would allow me to note the depth of the surfaces on the typeface whereas I would have to manually measure the different plains of the typeface and its dimensions if I were to scan the face of the letter using a flat scanner.

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<sup>41</sup> In typography, a stroke is the main body of a letter and may be curved or straight. A stem is the main stroke in a letter. A serif is a stroke on the open end of letters. A foot is the bottom of a stem. An arm is a horizontal stroke, attached to the stem on only one end.



It was still really important to get accurate measurements, even with the aid of a 3D scanner. Printing presses are calibrated for what is referred to as type-high wood. Type-high wood is, at its highest, 0.9186 inches tall. Anything at that height will leave an impression on paper after being inked and ran through the printing press. Exceeding that height could cause issues and could lead to the recalibration of the printing press, a process I would rather avoid. Having wood smaller than 0.9186 inches would be fine since it is possible to build up the height of type by adhering paper to the bottom of the letter.<sup>42</sup> Ensuring the correct height of typeface would not be an issue. There are multiple tools within the industry that can be used to verify that a character or illustration does sit at 0.9186 inches.

Another major change to the plan I had originally formulated was the type of wood to be used. Traditionally, typeface was created with the end grain of a hardwood such as cherry, apple, dogwood, pine, or maple.<sup>43</sup> Maple was the preferred wood for type due to the nature of its rings and the way the tree itself grows. It grows in very fine rings that allow for large amounts of pressure to be applied to the wood.<sup>44</sup> However, end grain maple is incredibly expensive due to the process and time involved in getting a suitable cut of wood. Modern print enthusiasts and scholars have successfully used other woods such as a plank of pine and even sheets of plywood adhered together.<sup>45</sup> This project used pine that had been previously cut to the correct height for typeface.

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<sup>42</sup> Hugill-Fontanel, interview by the author.

<sup>43</sup> Kelly, *American Wood*, 50.

<sup>44</sup> Hugill-Fontanel, interview by the author.

<sup>45</sup> On modern recreations of type see Nick Sherman, "Bethany Heck and End Grain," *Woodtyper* (blog), <http://woodtyper.com/791> and "Making Wood Type," *Inky Lips Press*, <https://www.inkylipspress.com/letterpress-wood-type/>.

### *3D Scanning of Typefaces*

With four specimens selected, the process of 3D scanning and creating digital renders of the four letters began. Mike Buffalin, Amelia Hugill-Fontanel, and I met at Cary Graphics Art Collection to discuss the possibilities of creating digital renders, what forms of recreation renders would be most useful in making, and what other records of typeface might be needed to create a facsimile through other means. After setting up a small tabletop scanner and a computer to capture the data, Mike and I began the process of scanning the typeface. Any letter that has been printed with is stained from ink. Letters that have been printed with numerous times are so dark that it can be difficult at times for the human eye to detect depth. Correctly exposing the cameras on the 3D scanner became somewhat of an issue. Capturing an image of a dark object on an equally dark background was a difficult task. Normally when 3D scanning an object, test scans for a dark, medium, and light exposure would be done to determine the best setting for capturing data. With such a dark subject and background, it was decided the dark exposure would most likely be the best choice.

Prior to starting the scan, Mike and I positioned the typeface and ensured that the cameras were six and a half inches from the letter. With the computer, Mike selected the area of the image containing the typeface to be scanned, and the machine started its work. It takes about three minutes for a scan to be completed 100%. After another thirty seconds to a minute, the scan has fully rendered in the software. The first scan (fig. 10) of the typeface, 9-line Gothic Tuscan, was a head-on scan that captured the majority of details present and had minimal photographic grain in the final capture. We then began to rotate the typeface to capture different angles. Capturing different angles of the typeface would allow for a complete render later on, after we had cleaned up the edges of the scans. The first letter was declared fully scanned after five scans

taken from a direct look, the left, the right, above, and below. A new file was started for the second typeface, the 10-line Gothic. The process for scanning remained the same as we captured images of the type from three angles showing the bottom of the letter and one angle showing the top of the letter.

The third letter to be scanned was the 15-line Antique Tuscan Condensed (fig. 11). The first scan, a direct image, developed fine and had relatively little gaps in the data captured. The second scan, capturing the right side of the type, captured the vast majority of the letterface in high detail but failed to capture the side of the letter. Another scan at that angle resulted in even worse image quality with more data missing than before. After a quick discussion about why the letterface was not being captured, the two of us changed the exposure from the dark setting to the medium setting and set about recapturing the right side of the letter. The scan captured more detail than the second scan did, but it was incredibly noisy due to the more light sensitive exposure. We returned the exposure to its previous setting and decided upon a more drastic angle for the fourth overall scan. The majority of the typeface had been accurately rendered, but a large portion of the middle of the letterface was not captured correctly and was represented through a blank portion of the image on the computer. As the sides seemed to be causing large amounts of difficulties, the typeface was then scanned from the bottom. After a decent scan, the two of us merged the images together, aligned the points, and created a render that fully showed the typeface from the one angle. From there, the top of the letterface and the final side were captured.

The fourth typeface was the most difficult to scan (fig. 12). A direct scan resulted in large portions of data being missing near the edges of the letter. A more extreme angle was used for the second scan with similar results and inexplicable missing data points. Troubleshooting led to

Mike and myself moving the typeface closer to the camera than it had been. The scan was still missing large portions of data, too many to attempt to merge the images together. We were unable to gather enough scans to create a complete render of the fourth typeface. It is likely that the glossy nature of the fourth typeface in comparison to the others made it incredibly difficult to capture an accurate image. As 3D scanners rely on lasers to capture data about an image, the lasers were unable to capture any data at glossy portions of the object. The combination of high gloss and the dark subject on a dark background is what most likely led to our difficulties in creating an accurate scan and therefore an accurate render. Seemingly a large problem, the inability to create an accurate render of the fourth typeface was ultimately not a project-breaking issue. Without the render, it is not possible to create a facsimile through 3D printing. The letterface is able to be scanned through a flat scanner. After being converted to a vector file, that scan can be used to create a CNC routed facsimile or a laser engraved facsimile.

While waiting for scans to finish, Mike and I discussed the multiple means through which a typeface could be recreated. 3D Printing, laser engraving, and CNC routing were among the most immediate and simplest ways to recreate a typeface. Mike had actually brought a quick sample he had created through using a file on the internet. The two of us determined that he would finish the mesh of the scans while I would work on creating a vector file of the letters we had scanned.

### *Creation of the Facsimiles*

Through the aid of a friend with expertise in Adobe Illustrator and the creation of vector files, the necessary files to create facsimiles with a CNC router were digitally made. While working on the vector files, Mike Buffalin created the 3D printed facsimiles from the scans we

gathered. Of the four typefaces that were scanned, three facsimiles were created (fig. 13). The troubles we had with the fourth typeface resulted in incomplete scans that prevented a complete, water-tight render from being made via 3D printed means.

Vector files in hand, I visited the Construct to create wooden replicas. Mike, again proved essential to the creation of the typeface facsimiles, as he guided me through the process of using the CNC router and VCarve, the software used at the Construct to run the router. Before any creation or layout could happen, the wood needed to be measured to create a digital canvas. The digital canvas we inserted into the software would inform the router of where to remove material.

Upon inserting the vector files onto the digital canvas, we found they were immediately too large. The files were scaled to larger than one hundred inches in height, whereas the plank of wood that we were using was no longer than twelve inches. Without the exact measurements of the original typeface, Mike and I measured the 3D printed facsimiles. The measurements from those facsimiles were taken directly by the 3D scanner from the original typeface. We then scaled the digital files as closely as possible to the heights of the typeface. After adjusting the heights of three of the vector files, Mike adjusted the depth at which the router would remove material (fig. 14). For the purpose of printing, we decided upon a shallow and even depth throughout the kerning, the empty space around the letter face.

With a finalized digital version, the wood was taken to the router to be cut (fig. 15). Several small steps were taken before the router was turned on, however. Mike secured the wood to the surface of the router using an archival tape so that the board would not move while the machine was on. He measured and adjusted the x and y axis, the physical location of the wood on the cutting surface, so that the digital version would translate well to the physical cuts that we

were going to make. Before turning on the router, Mike adjusted the z axis of the machine and ensured that the tip of the bit was touching the surface of the wood. To accurately determine the z axis, he placed a piece of paper on top of the wooden plank and lowered the drill bit until he was no longer able to move the paper. After manually adjusting for the depth of the paper, he ripped the paper from underneath the bit. The CNC router was turned on, and the machine began to carve out the letterfaces of the facsimiles. Within ten minutes, all three facsimiles had been carved and were ready to be detached from the wood plank (fig. 16). Several quick cuts led to three individual typefaces that were ready to be tested with a printing press.

### *Printing Facsimiles at Cary*

There is more work that goes into ensuring a typeface is ready for printing than simply placing it in a printing press and testing with it. Amelia Hugill-Fontanel assisted me with the preparation of my facsimiles as well as educated me on the nuances involved in printing. Together we measured the height of the six facsimiles to ensure they were typehigh. One of the typefaces measured slightly higher than 0.9186 inches. The rest of the facsimiles had to be adjusted to be the same height as the tallest typeface of the group. Using a gauge, Amelia and I took note of the height of each letter and worked on building the height of those that were shorter than the tallest typeface. Through adding layers of tape and paper while referencing the height of the facsimiles with a type gauge, we were able to achieve a consistent height between the six facsimiles.

From there, Daeya Shealy, a printing assistant at the Cary, and I began to arrange the facsimiles and secure them within a frame (fig. 17). Daeya measured the spaces between the letters while I found spacers that fit the gaps and would prevent the letters from moving while

being printed with. Once the facsimiles were secure with wooden and metal spacers, we used magnets to prevent them from moving further.

Using an alcohol ink prepared by Daeya and a roller, I inked the typeface for the first set of test prints. As my personal experience with printing is through linoleum tiles and with water-based ink, both the medium of the printing material and the consistency of the ink for this test print were unfamiliar to me. The first test print (fig. 18) was over-inked. It was also determined that the 3D printed Antique Tuscan would benefit from additional shimming, that is the addition of thin, tapered pieces of paper, to increase the typeface's overall height.

With another layer of tape added to the problematic typeface, a second test print was performed without re-inking (fig. 19). The 3D printed Antique Tuscan was still only partially printing. A third test was performed, again without inking, as an impression test to determine what may be causing the lack of an even imprint on the paper (fig. 20).

Another piece of tape was added to the typeface in attempts to create a full imprint of the letterface. This set of print was inked again (fig. 21). Still without a clear imprint, a second piece of paper was added to provide additional stiffness and support. We hoped this would solve the issue of the incomplete imprint (fig. 22). After evaluating the print (fig. 23), Amelia determined that the letter must have been bowed and deformed during its creation. A final test print was performed with two sheets of paper to provide support and to use additional ink on the typeface (fig. 24). In all, six prints were done.

## Discussion

The project can be considered successful with regard to the ability of the recreated typeface to be printed. There are, however, several immediate issues to be noted with the process and materials used that lend to critiques of the processes and timeline used for the project.

Nearly all letters were capable of being printed with. The 3D printed, 15-line Antique Tuscan, was slightly bowed in its form. Multiple test prints were performed with slight adjustments between prints in efforts to see a full imprint of the letter. In future reproductions, it is advisable to allow for enough time to create multiple renditions of the typeface to account for potential deformations in the facsimiles that are 3D printed. Alternate methods of 3D printing may prove to lend themselves better towards the recreation of typeface. Different materials used may provide clearer prints with less visible lines.

CNC routing is too industrial of a process for highly detailed woodwork that is required by typefaces. While creating the facsimiles, I found the pine wood was too soft, and one of the letterfaces had been damaged while still being carved within the router. The process also left large amounts of wood shavings that needed to be cleaned from the surface. However, the typeface created was too small to finish without specialized tools. Any replications of typeface that are printed with original artifacts need to be free of wood shavings as loose pieces of wood can scar the surface of original typefaces, permanently altering the way they print. This may be avoided by using a more detail-oriented and gentler process, such as laser engraving, or using a more traditional wood such as end-grain maple.

The project itself would benefit from a longer timeline for creation and testing. Having time for the refinement of processes and the perfection of facsimiles would allow for results that are tweaked throughout the multiple phases of production and would, in turn, yield ideal results.



The typeface could easily be integrated into an interpretive collection without introducing potential dangers to the original collection materials after thorough testing and refinement.

## Application

Though the case study within this thesis is directly applicable to the recreation of typeface used for interpretive purposes in living history museums, the application and implementation of facsimiles into the museum space is a process that can be applied from the broader aspects of this thesis. Facsimiles have a place within museums that allow for more interactive and thorough interpretation and education.

Facsimiles and reproductions can be used to recreate damaged artifacts or artifacts that were found in an incomplete state. Reproductions of a similar or same material as the original artifact can be safely adhered to the artifact to show what it may look like in its completed form, or a completed form may be displayed next to the original artifact to demonstrate potential interpretations of the true form of the artifact.<sup>46</sup>

Facsimiles are able to offer an expanded form of visitor interpretation and meaning-making. Visitors are capable of directly interacting with facsimiles on display and engaging with educational materials in a way that may have been previously inaccessible to them.<sup>47</sup>

Within the sphere of living history museums, and potentially other categories of museums as well, 3D scanning and the resulting facsimiles can be used to replace parts of machinery or other artifacts that may no longer be whole. The reproduction of these parts can allow an object to once again function or to be included as a usable piece within a permanent, educational, or research collection. The recreation of missing or broken parts can act as a supplement where original parts are no longer available through deterioration, absence of skilled preservationists, or lack of modern equivalent parts.

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<sup>46</sup> Hirst, "British Museum," Papers from the Institute of Archaeology.

<sup>47</sup> Burns, "Digital Facsimiles."

## **Conclusion**

Facsimiles are capable of being implemented in multiple means within the space of museums and collecting institutions in ways that are capable of enhancing visitor experience, visitor engagement, and preservation. Through a case study involving the recreation of typeface, I was able to explore the potential of facsimiles, technology, and engagement within a museum space.

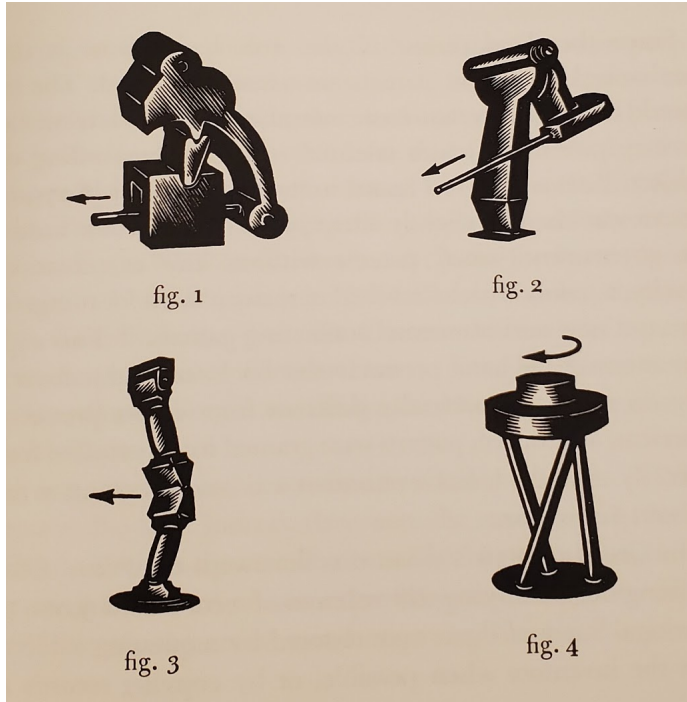
Without typefaces, in regards to the physical letters I worked with throughout my thesis as well as the invention of typefaces and the introduction of printing and increased literacy, I would not have been able to engage so critically with facets of the museum studies field that I find myself drawn to. Nevertheless I am critical of the work I performed and am aware of the flaws within the thesis that have limited its full potential. I am grateful for the opportunity I have been given to work intimately with artifacts that are so integral to American culture though they are often forgotten. Working on this thesis has allowed me to expand my knowledge of fields such as American material culture, printing history, and typography, all of which contribute to my overall academic interests and future aspirations of researching and working at the intersection of material culture, digital technologies and preservation, and cultural heritage institutions.

## Appendix



**Figure 1: A Washington Printing Press.** This is one of many models of the Washington Printing Press that utilizes the figure four toggle as its printing mechanism. Press, Briar. "Washington." Letterpress Commons.

<https://letterpresscommons.com/press/washington/>.



**Figure 2: Figure four mechanism of the Washington press.** This mechanism, denoted as figure 2 in the image, is how the printing press imprints the inked type against the paper. The mechanism distinguishes the Washington press from other types of printing presses. Other mechanisms are illustrated in the image.

Saxe, Stephen O., and John DePol. *American Iron Hand Presses*. New Castle, Del.: Oak Knoll Books, 1992.



**Figure 3: The printing press housed at Genesee Country Village & Museum.** The Washington press at use in the historical print shop within the museum is a Roe & Co. press from c. 1850. Image courtesy of the author.



**Figure 4: The anatomy of a letter.** The various parts of a letter and the ornamentations one may have are detailed in the image above.

Lupton, Ellen. "Anatomy." *Thinking with Type*. Last modified 2009.

<http://thinkingwithtype.com/letter/>.



**Figure 5: The print shop in the historical village of Genesee Country Village & Museum.**

The image shows the print shop in the historic village as visible from the entrance of the building. Image courtesy of the author.



A B C D E F G H I J K L M N O P R S T U  
 V W X Y Z & Æ Æ  
 a b c d e f g h i j k l m n o p q r s t u v w  
 x y z æ œ ff fi ffi fff  
 \$ 1 2 3 4 5 6 7 8 9 0

4.06.02.03

15 line [Tuscan Extra Condensed] cf. Page: Antique Tuscan No. 9

Manufacturer and date unknown

**Figure 6: 15 line Tuscan Extra Condensed font.** This image shows the first of four fonts that was recreated in this study. The image depicts a print of the original font. Scan courtesy of the author.

Wall, David P. A Specimen Portfolio of Wood Type in the Cary Collection. Rochester, NY: RIT

Cary Graphic Arts Press, 2010.

**A B C D E F G H I J K L M N O P Q R S T U V**  
**W X Y & Z**  
**a b c d e f g h i j k l m n o p q r s t u v w x y z**  
**# # # # #**

4.07.05.01  
 6 line Gothic Tuscan No. 3  
 William H. Page & Co., 1857-1859

**Figure 7: 6 line Gothic Tuscan font.** This image shows the second of four fonts that were recreated in this study. The image depicts a print of the original font. Scan courtesy of the author.

Wall, David P. A Specimen Portfolio of Wood Type in the Cary Collection. Rochester, NY: RIT Cary Graphic Arts Press, 2010.

**BDEFGHIJKLMNOPQSU  
VW  
XY&Z \$!234567890**

5-01.01.24  
10 line [Gothic Extra Condensed] cf. Hamilton: No. 4006  
Manufacturer and date unknown

**Figure 8: 10 line Gothic Extra Condensed font.** This image shows the third of four fonts that were recreated in this study. The image depicts a print of the original font. Scan courtesy of the author.

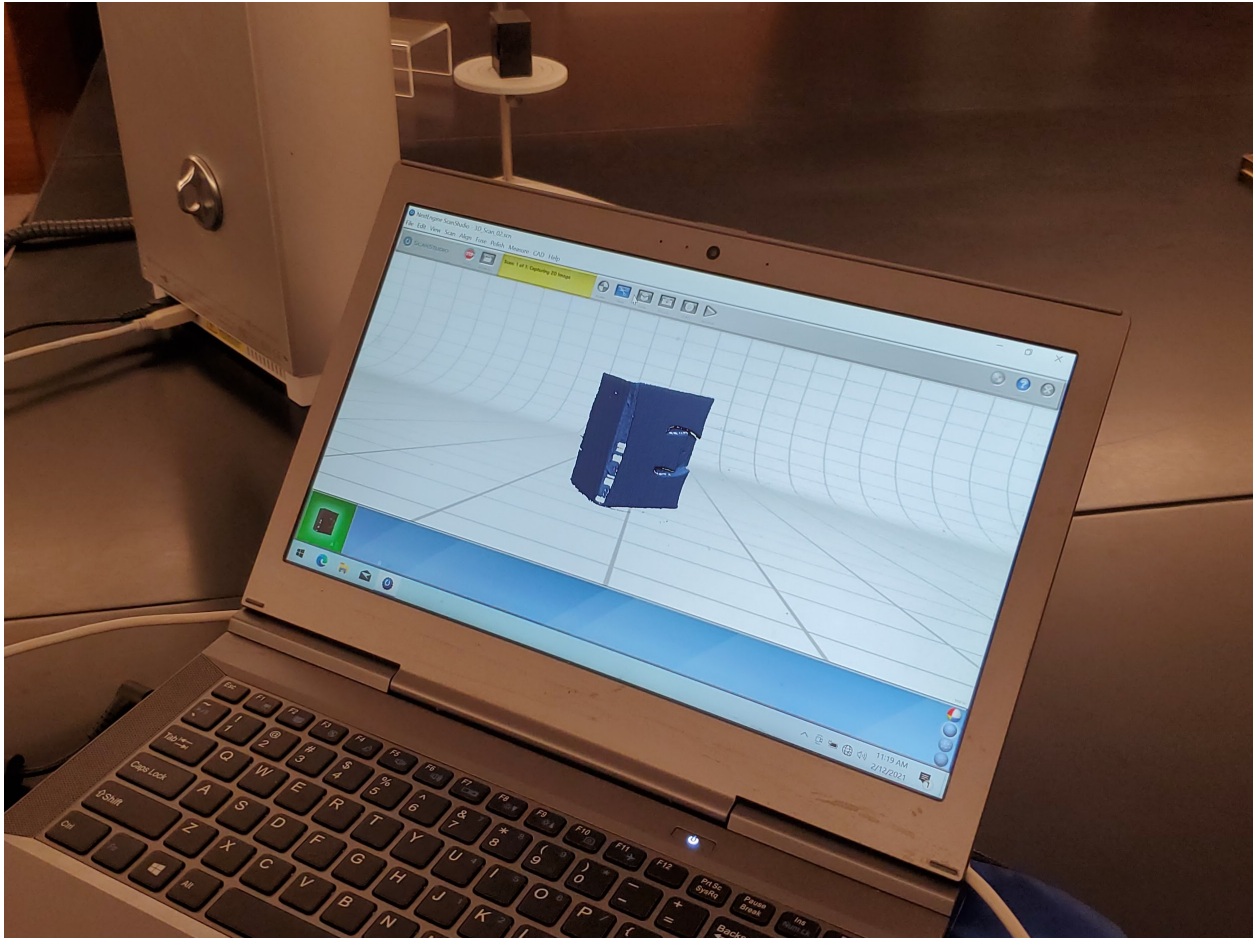
Wall, David P. A Specimen Portfolio of Wood Type in the Cary Collection. Rochester, NY: RIT Cary Graphic Arts Press, 2010.



5-03-02.02  
9 line Gothic Tuscan  
William H. Page & Co., 1857-1859

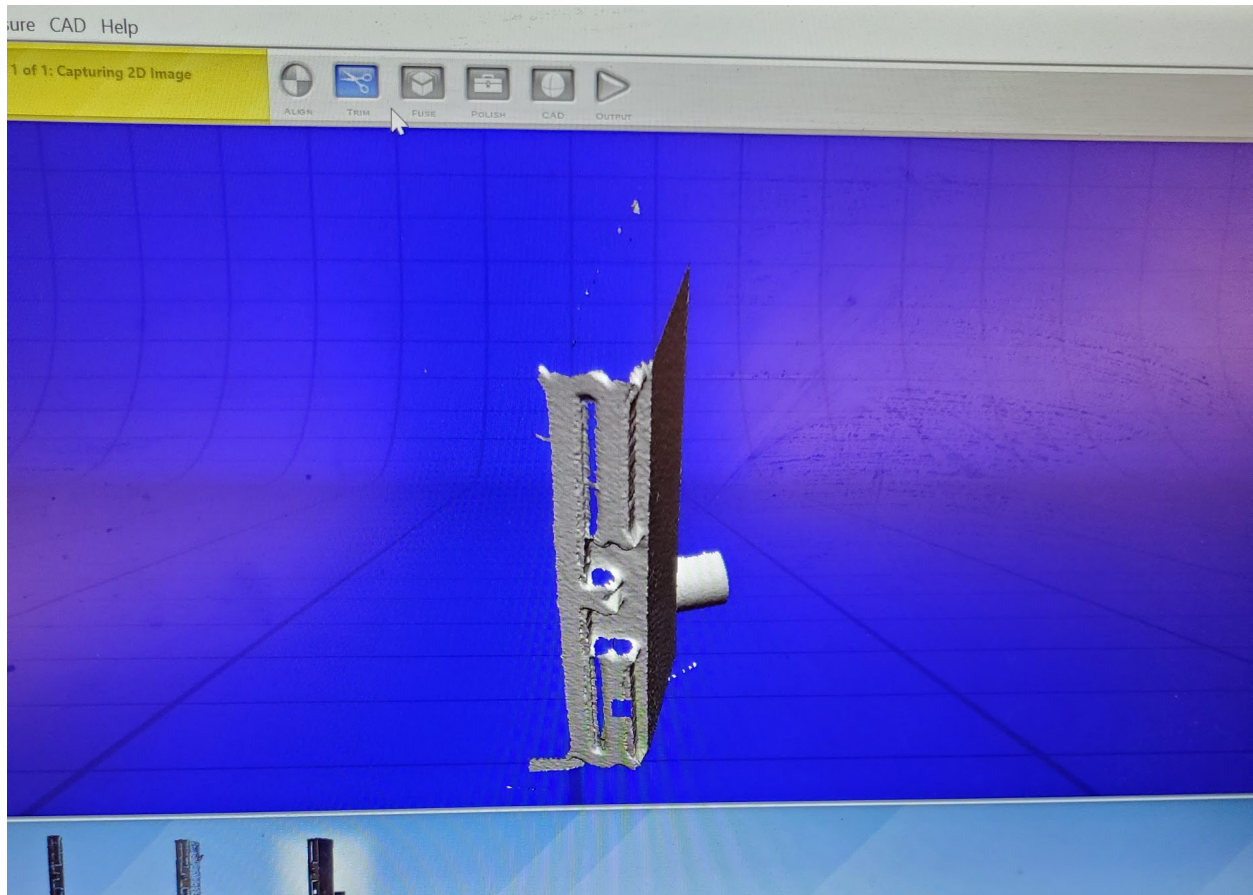
**Figure 9: 9 line Gothic Tuscan font.** This image shows the final of four fonts that were recreated in this study. The image depicts a print of the original font. Scan courtesy of the author.

Wall, David P. A Specimen Portfolio of Wood Type in the Cary Collection. Rochester, NY: RIT Cary Graphic Arts Press, 2010.

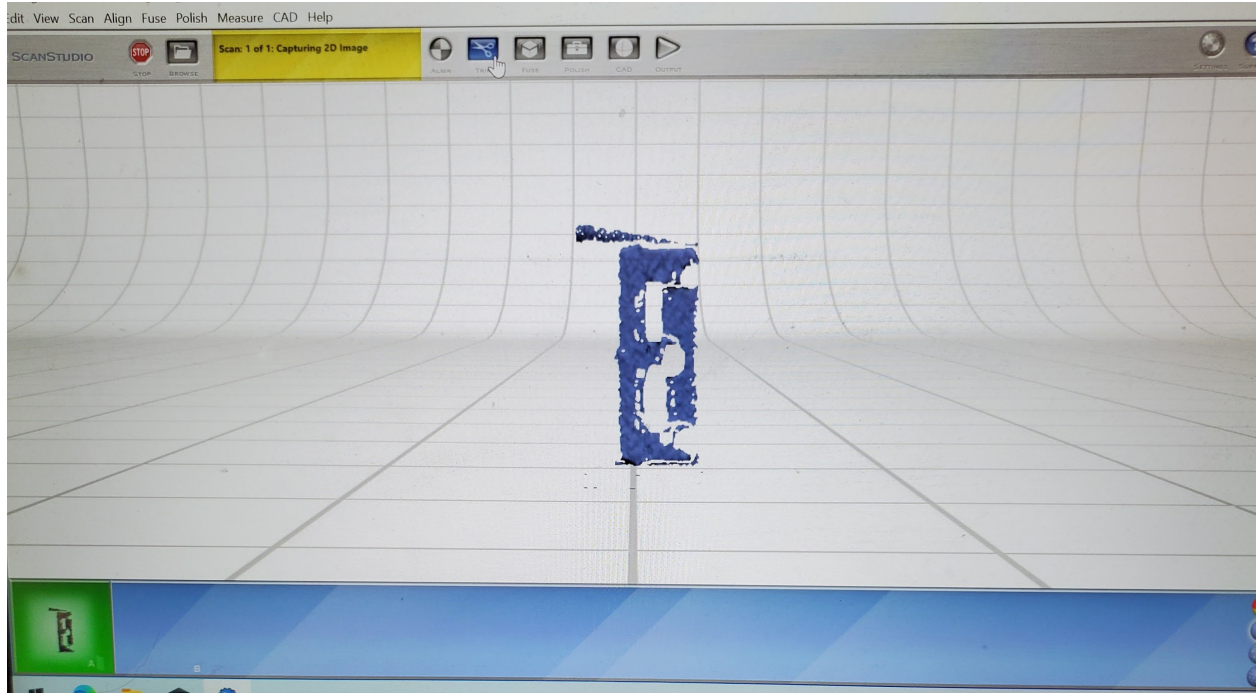


**Figure 10: 3D scan of 9 line Gothic Tuscan font.** The image depicts a 3D scan of the 9 line Gothic Tuscan font at an angle as visible in the computer software used for rendering. Image courtesy of the author.





**Figure 11: 3D scan of 15 line Antique Tuscan Condensed font.** The image depicts a 3D scan of the 15 line Antique Tuscan Condensed font as depicted in the computer software. The image shows the gaps in the image where the laser was incapable of recording data. Image courtesy of author.



**Figure 12: Partial 3D scan of 6 line Gothic Tuscan font.** The image shows the fourth font that was unable to be fully rendered through 3D scanning. The absence of data is attributed to the gloss of the original typeface and the lighting used while scanning. Image courtesy of the author.



**Figure 13: 3D printed facsimiles of three fonts.** The image shows the results of 3D printing the scanned typefaces. The 9 line Gothic Tuscan, 10 line Gothic Extra Condensed, and the 15 line Antique Tuscan fonts are represented. Image courtesy of Juilee Decker.





**Figure 14: Mike Buffalin adjusting the vector files in VCarve.** The image shows Mike Buffalin, RIT Construct, adjusting the size of the vector files of three fonts and the depth that the router would carve at. Image courtesy of the author.

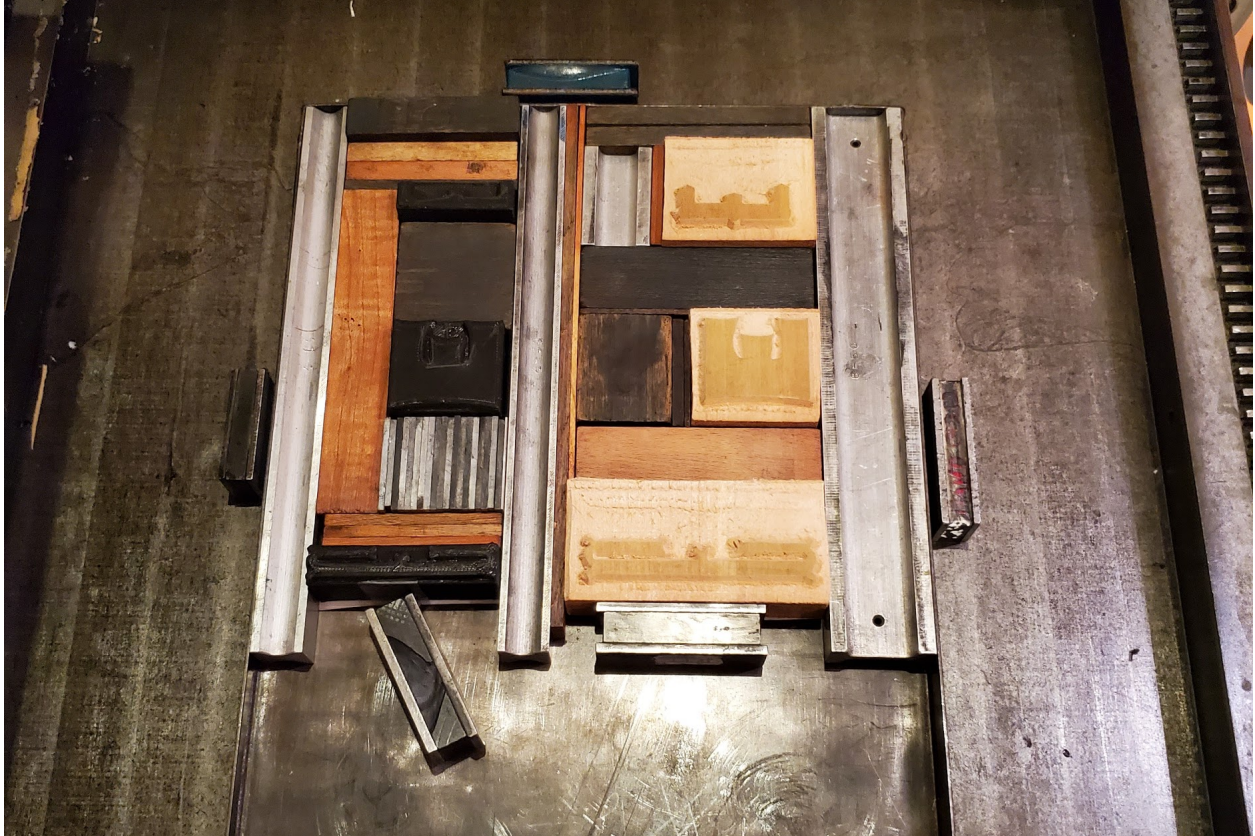


**Figure 15: CNC router.** The image is of the CNC router at RIT's Construct that was used to create the wooden facsimiles in this project. Image courtesy of Juilee Decker.





**Figure 16: Carved facsimiles.** The image shows the facsimiles still a part of the larger wooden board they were carved from. The three typefaces are visible within the board. Image courtesy of the author.



**Figure 17: Facsimiles secured for printing.** The image shows the six facsimiles secured for printing after being measured at Cary Graphics Art Collection at RIT. Image courtesy of the author.



**Figure 18: First test print of facsimiles.** The first test print of the facsimiles was overinked. It was determined that the 3D printed Antique Tuscan (bottom left) needed more shimming to help achieve a better imprint. Scan courtesy of the author.



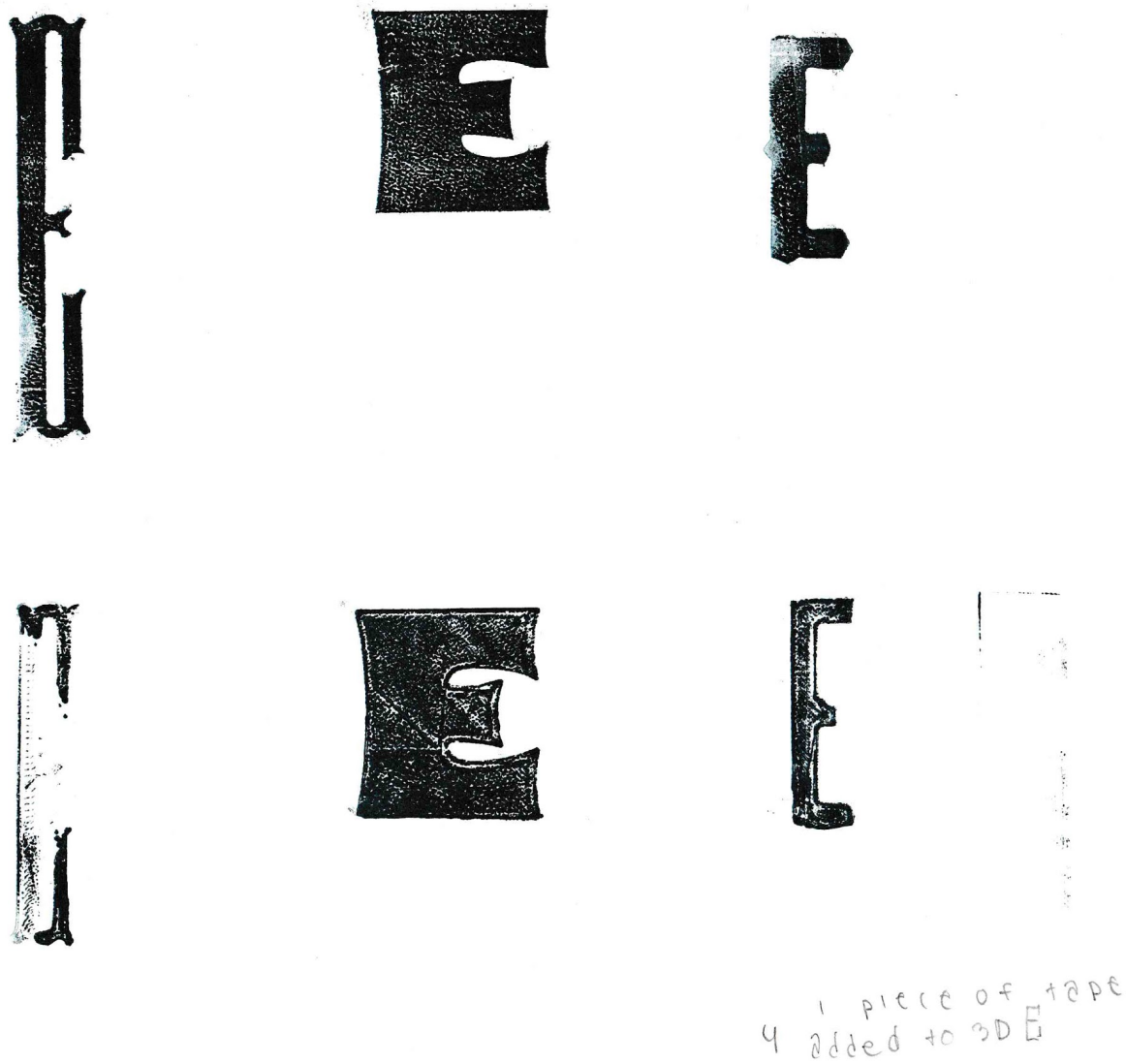


**Figure 19: Second test print of facsimiles.** The image shows the second test print which was performed to remove excess ink from the typeface before adding additional shimming to the facsimile in the bottom left. Scan courtesy of author.



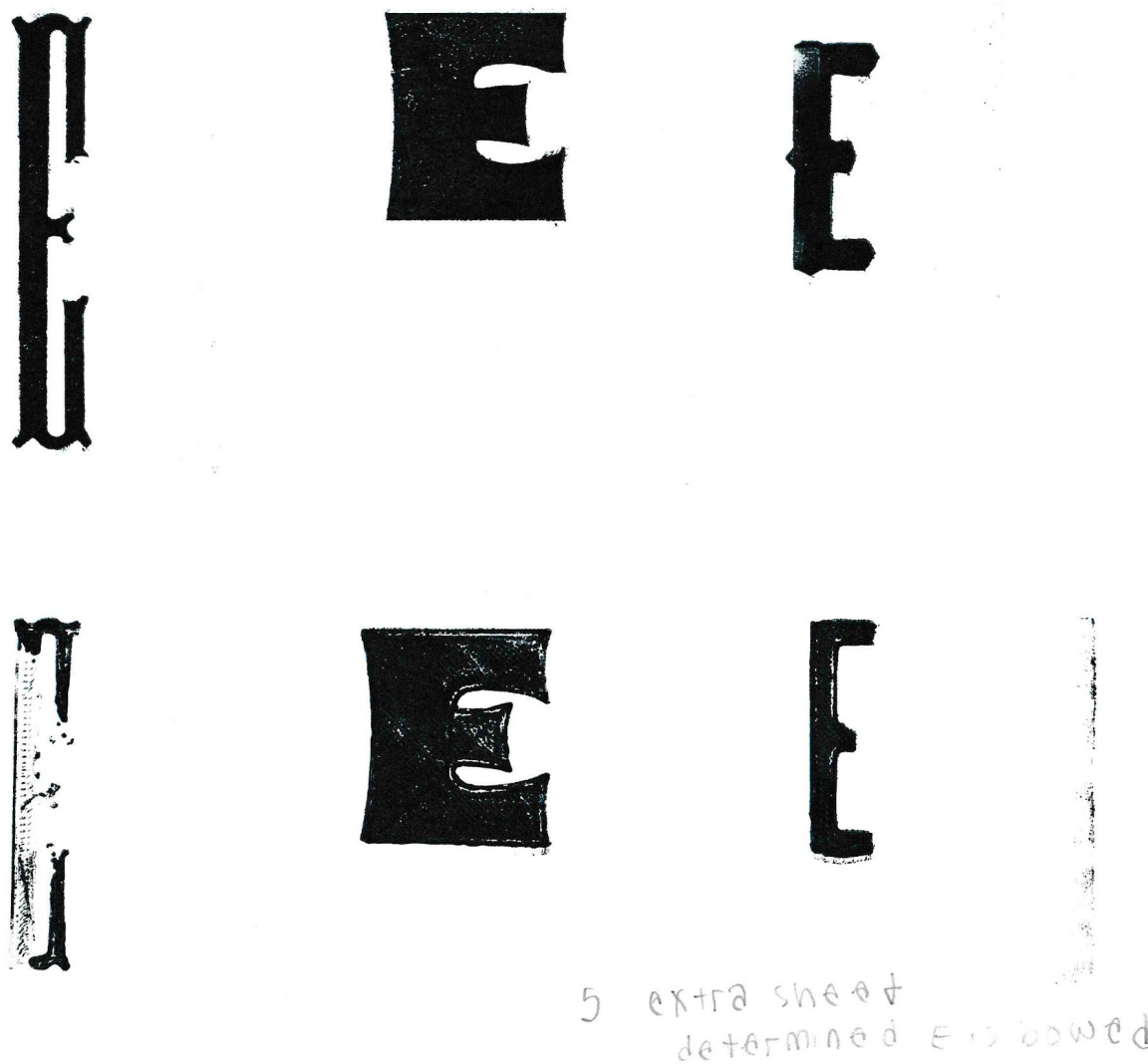
3 no ink  
impression test

**Figure 20: Third test print of facsimiles.** The image shows the impression test of the typeface performed by the author. Without inking the typeface, a piece of paper was pressed against the typeface without a printing press. Scan courtesy of the author.



**Figure 21: Fourth test print of facsimiles.** The image shows the fourth test print of the facsimiles after additional shimming was added. Scan courtesy of the author.

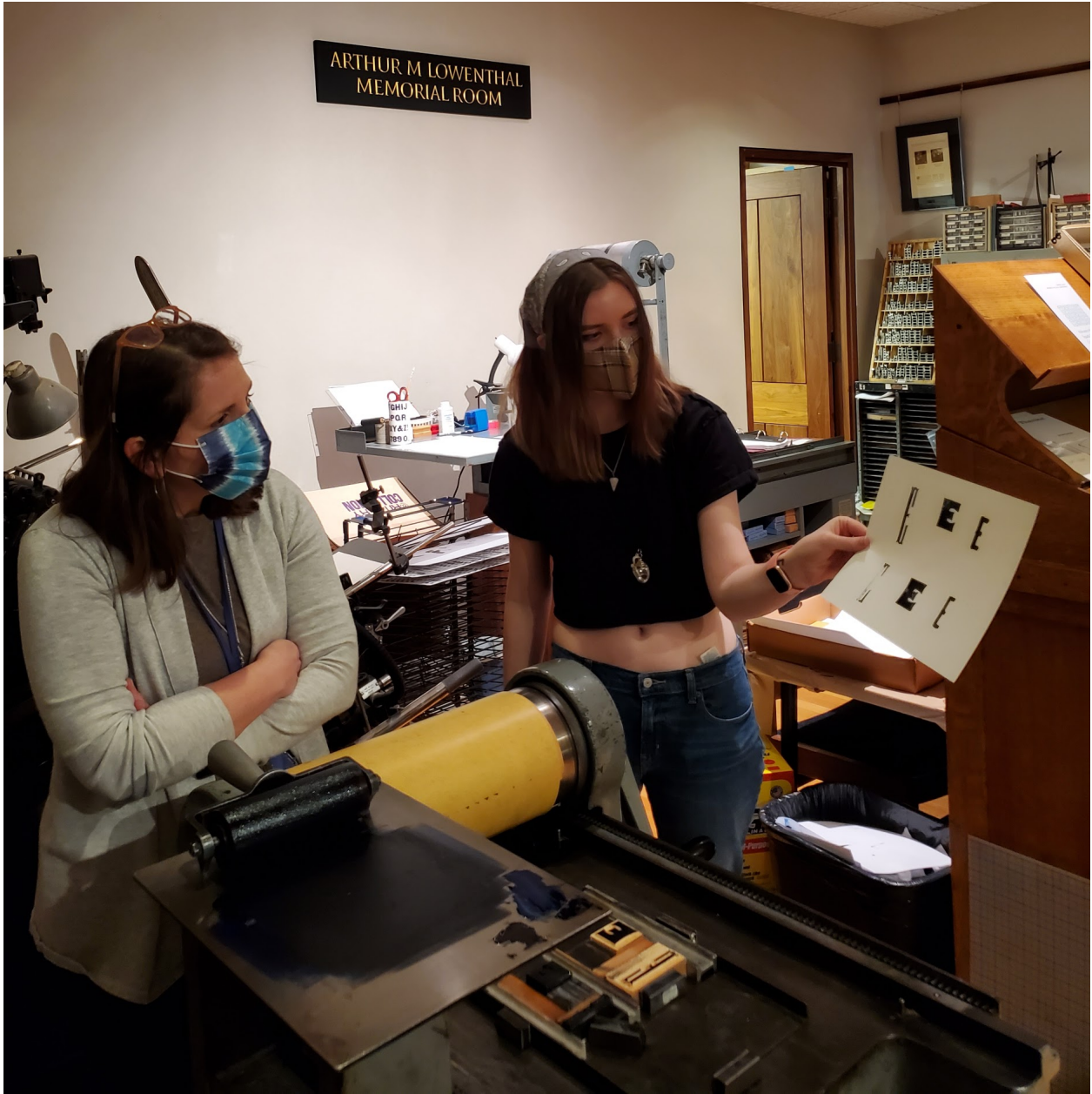




**Figure 22: Fifth test print of facsimiles.** The image shows the fifth test print of the facsimiles.

A second sheet of paper was added while printing to gain more of an imprint. This print revealed the 3D printed Antique Tuscan font was bowed and not a level surface. This print was overinked.

Scan courtesy of the author.



**Figure 23: Evaluation of test prints by Amelia Hugill-Fontanel and author.** This image shows the author (right) and Amelia Hugill-Fontanel (left) evaluating the results of a test print.

Image courtesy of Daeya Shealy.



**Figure 24: Sixth test print of facsimiles.** This image shows the sixth test print which was performed to remove excess ink from the typefaces. Scan courtesy of the author.

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