

Treatment of an Oversize Rare Book: Research and Decisions on Rebinding

ABSTRACT

The Architecture of Leon Batista Alberti, In Ten Books. of Painting. In Three Books. And of Statuary. In One Book by Cosimo Bartoli, translated from Italian by James Leoni, was first published in Italian and English parallel texts by G. Bickham and J. Wren in London in 1726. A second edition in English was printed in 1739, and a third edition appeared in 1755. A supplemental section entitled *Some Designs for Buildings both Public and Private* by James Leoni-Architect, appeared in some of the editions. The book was 276 pages of text with 75 engraved illustrations. The Leoni supplement contained eight pages of text and 27 engraved illustrations. The tome provided a major model from the Renaissance examples of Alberti (1404–1472) for late eighteenth century Georgian architecture design and proportion in both England and America.

A volume of the third edition with a partial supplement belongs to the Historic Odessa Foundation (HOF) in Odessa, Delaware, a non-profit historic house museum owning five main buildings and six outbuildings open to the public for educational programs and tours. The Corbit-Sharp House, built in 1772–1774, is one of the finest existing Georgian homes in Delaware and on the national register of historic houses. A signed inscription on the title page of the book shows that in 1773 this book was purchased and owned by Robert May, the architect of the Corbit-Sharp House, thus its relevance to the site and collection is important.

The volume measures 17 5/8 x 11 3/8 x 1 7/8". Its late nineteenth century rebinding used millboard with printed decorative paper spliced to a leather spine. The text block of Dutch watermarked Jean Villedary laid paper was tightly sewn on three recessed cords. There are 36 illustrations missing from the main body of this text. The condition was moderately worn and stained overall, with the cover delaminating, text block distorted from the tight binding, and with tears and small losses on head, tail and fore edges of the text

block. The title page and adjacent frontispiece had received severe overexposure to light and ambient environment while on display for several decades.

During an eight week summer internship at Historic Odessa Foundation, Evelyn Mayberger and HOF conservator Betty Fiske undertook the complete treatment of this book. The HOF volume was compared to six other versions of the third edition from the following institutions: Fisher Library at University of Pennsylvania, Watkinson Library at Trinity College, Beinecke Library at Yale University, Main Library at University of Iowa, Linda Hall Library of Science, Engineering & Technology in Kansas City, and the Boston Athenaeum. First editions of the book from the Olin Library of Wesleyan University and Beinecke Library of Yale University and a second edition at the Library of Virginia in Richmond were also examined. The treatment and rebinding was planned in consultation with two book and paper conservators, Michaelle Biddle of Olin Library at Wesleyan University, and Abigail Quandt of the Walters Art Museum, Baltimore. This paper will focus on the rationale for decisions made on treatment and the style and materials for rebinding in an appropriate manner representative of the eighteenth century.

BACKGROUND

The town Odessa was settled during the 17th century and become a center for wheat, canning, and tanning production. The community's location on the banks of the Appoquinimink Creek allowed it to prosper as an important shipping port to Philadelphia. William Corbit was a leading citizen when he hired architect Robert May to build him a handsome Philadelphia-style Georgian house in 1772–1774. A signed inscription on the title page of the Alberti book shows that in 1773 this book was purchased and owned by Robert May which connects it to the site (fig. 1). Architectural elements described in the Alberti book can be physically observed in the Corbit-Sharp house. The house remained in the Corbit family until 1938, when H. Rodney Sharp acquired it. Sharp was responsible for restoring the

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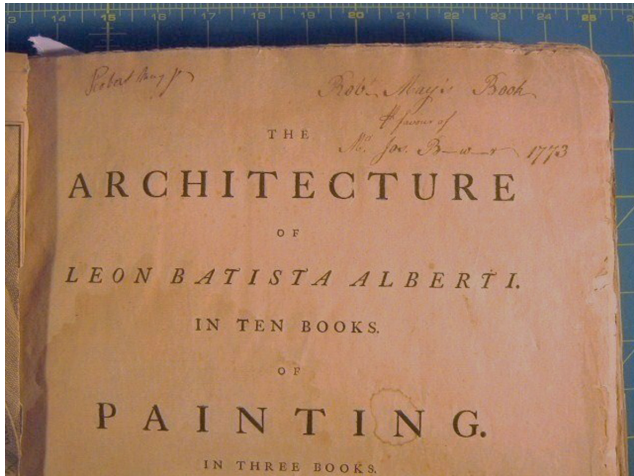


Fig. 1. Detail of the title page with the architect Robert May's signature; Courtesy of Historic Odessa Foundation

house as well as several other historically significant buildings in the town. The Corbit-Sharp house was declared a National Historic Landmark in 1967. The Sharp family opened the Historic Odessa Foundation (HOF) in 2005.

The HOF identified the Alberti book for conservation treatment because of its historical importance to the site and its fairly poor condition. In addition to stabilizing the book, the foundation was interested in learning more about the historical significance, codicology, and evolution of the text. The research focused on the four following questions:

- Differences between the organization of the three editions
- Insight on the original binding structure
- Placement and orientation of the 75 engraved plates
- Relationship to the supplemental section

To best address these questions, a literature review was undertaken, several consultations with experts were conducted, and additional Alberti books were examined.

The Architecture of Leon Batista Alberti, In Ten Books. of Painting. In Three Books. And of Statuary. In One Book by Cosimo Bartoli, translated from Italian by James Leoni was based on the work of Renaissance humanist Leon Batista Alberti (1404–1472). The text was divided into three general categories: architecture (in ten books), painting (in three books), and statuary (in one book). Originally, Alberti's works were published separately: *De re aedificatoria* (1485), *De picture* (1436), *De statua* (n.d.). Alberti modeled his work upon that of the ancient Roman architect Vitruvius, who also presented his treatise in ten parts. Alberti's work was divided into ten books: lineaments, materials, construction, public works, works of individuals, ornament, ornament to sacred buildings, ornament to public secular buildings, ornament to private buildings, and restoration of buildings. His work

was revolutionary in its melding of geometrical and physical principles with architecture, affecting both the strength of buildings and their proportions, thus providing the fundamental basis for beauty and harmony in architecture (Acidini and Morolli).

The principles of Alberti's architecture were translated into English for the first time in this publication. The first edition appeared in 1726 and had the English and Italian text appearing in parallel columns. Although the title page was dated at 1726, there are several plates that are dated from 1727 or 1729. B. Picart was responsible for the allegorical frontispiece and most of the plates. The book was reprinted in 1739 and again in 1755. The Historic Odessa Foundation owns a copy of the 1755 edition (Works of the Master Architects).

The HOF copy opens with a preface and a table of contents that only covers the chapters from the architecture books. Farther back in the text is the beginning of the sections that cover painting and statuary. Pages 1–240 are devoted to text and plates addressing architecture. Painting is touched on between pages 241–268 and statuary discussed in the last pages (269–276) of the manuscript. The book has a total of 75 engraved plates that appear interspersed throughout the codex. In addition to these 276 pages of text by Cosimo Bartoli, there is a supplemental section by the architect James Leoni. The segment is entitled *Some Designs for Buildings both Public and Private* by James Leoni—Architect, London: printed for the proprietor in the year MDCCLVIII (1758). This section must not have been originally bound with the 1755 material. The HOF supplement consists of eight pages of text, seven big fold-out engravings, and nine single sheet impressions. A complete supplement would have 27 engraved plates. The supplemental part is printed with a Roman font that is slightly different from the typeface used in the rest of the book. There are 19 copies of the 1755 edition currently reported on WorldCat.

In England, the bookbinding industry was transformed in the 15th century with the invention of the printing press, the introduction of movable type, and the widespread use of paper. Domestic printing came from the continent with Caxton in 1474, although it took several decades before it was an established industry (Middleton 1996, 285). Initially, manuscripts would be printed on the continent and brought to Britain to receive an English-style binding (Pearson 2005, X). The bindings done in the 16th, 17th, and 18th centuries were “stronger and more durable than but not as functional as the later bindings” (Middleton 1996, 290–291).

During the hand press era (1450–1800), the four main types of covering material in England were calfskin, sheepskin, goatskin, and vellum. Calfskin was most popular in Britain between the 15th and 19th century because of its durable yet aesthetically pleasing surface. The use of goatskin and vellum were not as widespread during this period, and sheepskin was commonly used for the lower end of the market. It was

not uncommon for the boards to be covered in paper and the more expensive leather used on the spine (Pearson 2005, 15–18). The choice of board material evolved from wood boards to pasteboards, pulpboards, and millboards to increase production speed and decrease costs (Middleton 1996, 285–288). During the 17th century, recessed cord sewing and fake headbands became popular as additional cost cutting measures. According to Middleton (1996, 289) larger books normally still had sewn headbands and had several raised cords to provide additional support to the oversize volume.

BEFORE TREATMENT RESEARCH

The literature review revealed that in Alberti 1755 books that retained their original bindings, the volumes were bound in sheepskin, in English tight back binding style. James Leoni was responsible for the drawings for the plates. He based the majority of the images on the woodcuts from the Alberti text published in 1550. Although the more involved plates were done by B. Picart, there were a few engravings that were done by J. Harris and J. Cole. The text and title pages are dated 1726, although some of the plates are dated 1727 and a few in the supplement 1729 (*Works of the Master Architects*). Some of the engravings were so popular that they were reproduced on a smaller scale for later editions such as the 1884 Italian publication of the *Architecture* books.

Before the treatment was started, Abigail Quandt, senior book conservator at the Walter Art Museum, was able to examine the HOF book and provide her insights. Regarding the current placement and orientation of the plates, Ms. Quandt felt that there was probably some underlying organization originally but it could have been lost during later rebinding. She was not opposed to the proposal to place all the plates in the recto direction. For the re-sewing of the textblock Ms. Quandt recommended packing the thread on the raised cords as a way to provide additional support across the spine. Michaëlle Biddle, senior book and paper conservator at Wesleyan University, was consulted on technical matters during the course of the project and undertook some initial research on the watermarks encountered in the HOF book.

Another volume of the 1755 edition was examined at the University of Pennsylvania Fischer Fine Arts Library for comparison with the HOF copy. The Fischer text had been drastically trimmed and bound in a typical 20th century library binding, resulting in the loss of physical evidence of the original binding. Despite these invasive restorations, the book still contained 74 of the original engravings. Unlike the HOF copy, the Fischer volume did not have a supplemental section. From comparing the two volumes, it was determined that the HOF copy only had 39 of the original engravings. Both books had similar but not identical plate placements and images appearing in both the recto and verso directions. Treatment decisions on the HOF book were based in part

on the information gathered from the observations of the Fischer copy.

MATERIALS AND CONDITION

The HOF Alberti 1755 edition was rebound in a 19th century English binding (fig. 2). The millboard boards were covered with a decorative paper. The leather from the spine was wrapped over the boards about one inch to create a durable joint. The decorative paper was overlaid on the leather about $\frac{1}{2}$ inch for visual continuity. The spine was prevented from gapping by headbands at the head and tail. The book was sewn on three recessed cords. The modern laid endsheets were most likely added during a post 19th century partial restoration of the book. The flyleaf also was made of laid paper of a later date than the rest of the book. The pastedowns were carelessly adhered and there are several areas of cockling on the inside of both covers. Laid paper (0.12mm) was used for the textblock with four different watermarks and countermarks visible (See Watermark section). The HOF book has 39 out of the 75 engraved plates that are printed on heavier laid paper (0.19mm). While most of the plates were inserted with the image on the recto of the page there are a few that were inserted with the image on the verso. Most of the

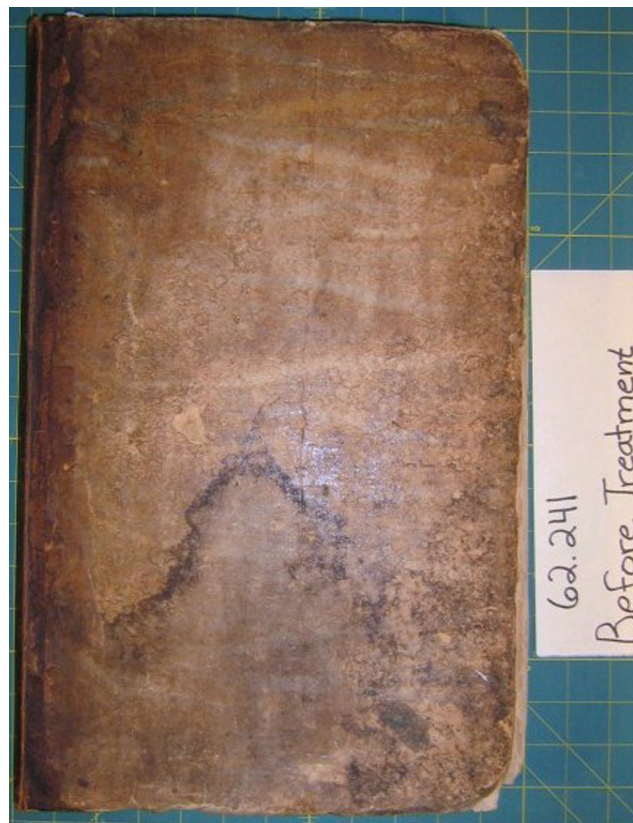


Fig. 2. HOF front cover before treatment; Courtesy of Historic Odessa Foundation

images depict architectural elements and plans or scenes of nature. Two plates have evidence of hand-coloring in watercolor and gouache, probably added later. There are 4 large foldouts throughout the main section of the book. There is a supplemental section at the end of the book with text and engraved plates (fig. 3).

The overall condition of the HOF book before treatment was fair. The 19th century binding was secure but it did not adequately provide enough space for the folios to function properly. When the book was opened, cockling appeared along the gutter, which made turning the pages difficult and potentially damaging to the codex. Some damage was already apparent on the first few folios that had cracked along the inner joint. The spine was mostly intact with some isolated tears around the head and tail. The decorative paper that covered the boards was stained, heavily abraded, with worn corners, and contained some losses concentrated in areas around the leather-paper overlap. Both boards appeared to

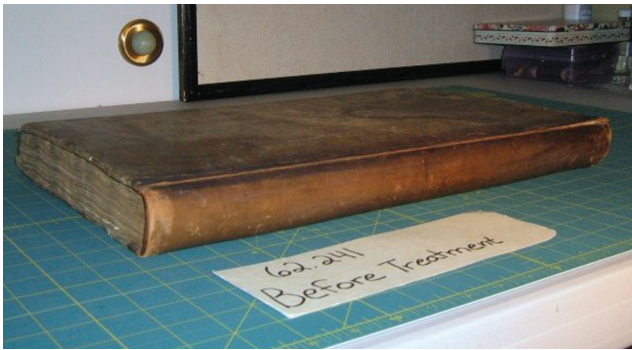


Fig. 3. HOF spine before treatment; Courtesy of Historic Odessa Foundation

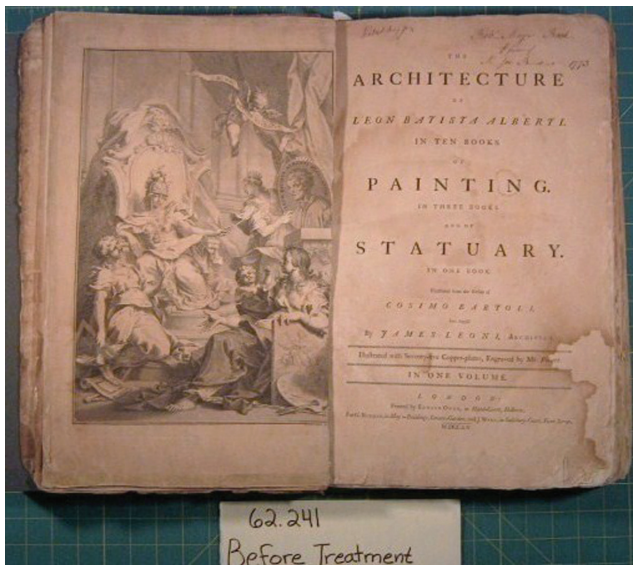


Fig. 4. HOF frontispiece and title page before treatment; Courtesy of Historic Odessa Foundation

be securely attached to the codex. The sewing structure was intact but was too tight and was damaging to the textblock. The paper had some staining and water damage that was particularly prevalent towards the front of the book. There were creases and folded corners throughout the text. Several pages showed the evidence of previous infills. Overall, the fore-edges were quite dirty and the paper exhibited moderate foxing. Many of the engravings had tears and losses and had evidence of previous restoration with the use of gummed glassine tape and mending tissues. The engraved frontispiece was cracked along the shoulder and the large foldouts were particularly damaged from handling (fig. 4).

TREATMENT

Based on the before treatment research, consultations, and current conservation guidelines, a treatment proposal was agreed upon and approved by the HOF. The treatment that was undertaken involved the following steps: disbinding the book, washing the paper, mending tears/infilling losses, re-sewing textblock, and rebinding the codex. The treatment was performed by Betty Fiske, HOF senior paper conservator, and summer intern Evelyn Mayberger. The outside consultants, Michaelle Biddle and Abigail Quandt, were kept apprised of the treatment throughout the process. The entire treatment was completed in 462 hours.

After an initial surface cleaning with a soft hair brush, the textblock was removed from the boards by cutting along the internal hinge. This revealed the back of the spine with multiple thick layers of adhesive and spine linings. The headbands proved to be fake offering no structural support and were removed. To separate the backing materials, a thick layer of methylcellulose poultice was applied with a spatula to the back of the spine, covered with a clear plastic wrap, and allowed to set for twenty minutes. The poultice was removed with a spatula and left the spine softened. The poultice was repeated an additional three times each with twenty minute set times before the spine lining, mesh backing, and old adhesive were completely removed. Once cleaned, the recessed cords with the ends folded over the back of the spine were revealed. A clear separation of gatherings was also apparent. The textblock was carefully pulled and the gatherings separated. The gatherings were consistently comprised of four bifolio sheets and totaled 25 gatherings plus one extra bifolio. Each bifolio was created from two individual pages guarded together with a mending tissue. The mending tissue was not always applied carefully or trimmed and had begun to detach in many places. In the 19th century rebinding, the original gatherings were cut apart and the plates were incorporated into the bifolio gatherings often of text pages and plates regardless the different weights of paper. The old gathering markers using letters at the start of a signature were ignored in favor of consistency.

A maquette of the gatherings with page order and plate location was made and will be kept in the object file.

The textblock and plates needed to be washed to remove old guarding tape, minimize cockling, reduce staining, and rejuvenate fibers. Before any washing took place, the various printing inks and watercolors were tested for solubility. The iron gull ink inscription and red watercolor were found to be slightly soluble and alternative washing methods had to be determined. Preliminary tests also showed that the guarding tape would float off with the application of water. In addition to the removal of the tapes, the paper lining of the frontispiece also floated off during the washing. To prepare the bifolios for washing, each page was sprayed with water from an atomizer sprayer. Dampened bifolios were stacked into gatherings and was put in between two sheets of polyester film and inserted into a bath of distilled water for 1–1 ¼ hours. At that point the tapes were easily removed mechanically with slight pressure using a bamboo spatula (fig. 5). To reduce the staining even further, each gathering was submerged into a second bath of water with three drops of ammonia to create a pH 8 bath. The gatherings were allowed to sit for ½–¾ of an hour. At this point the gatherings were removed from the bath and laid out to dry as individual sheets on polyester film sheets and allowed to air dry overnight.

The frontispiece and several of the pages of the table of contents were seriously discolored and had prominent tide lines that needed more treatment. These pages were sun bleached, placed between polyester films and immersed in water and put outside for several hours in direct sunlight, with a few drops of a 3% hydrogen peroxide added to the bath as a catalyst. This reduced the staining and brought the pages closer to the color of the rest of the textblock. The frontispiece needed to put in the sun for three afternoons (ca. 16 hours) before the desired stain reduction was obtained. The two engravings with hand-colored watercolor could not be submersed in a bath because of the soluble colors, thus controlled blotter washing was conducted. Masks of Hollytex were cut out in the shape of the soluble color areas and the paper was put on top of these masks as a barrier on top of damp blotters and covered with Hollytex and polyester film. This system uses capillary action to remove staining but minimizes the horizontal movement of water which could move the soluble inks (fig. 6). The title page with the inscription in iron gull ink also received a different type of washing. The page was put in a shallow bath on an incline with the iron gull ink section resting on a strip of blotter just above the water line. The water could be pulled throughout the sheet thereby decreasing the likelihood of tide lines forming, but reduced the motion around the iron gull ink section because of the presence of the blotter and being on the higher part of the incline. While these alternatives did not reduce the staining as much as full submersion washing, it did remove a considerable amount of overall discoloration.

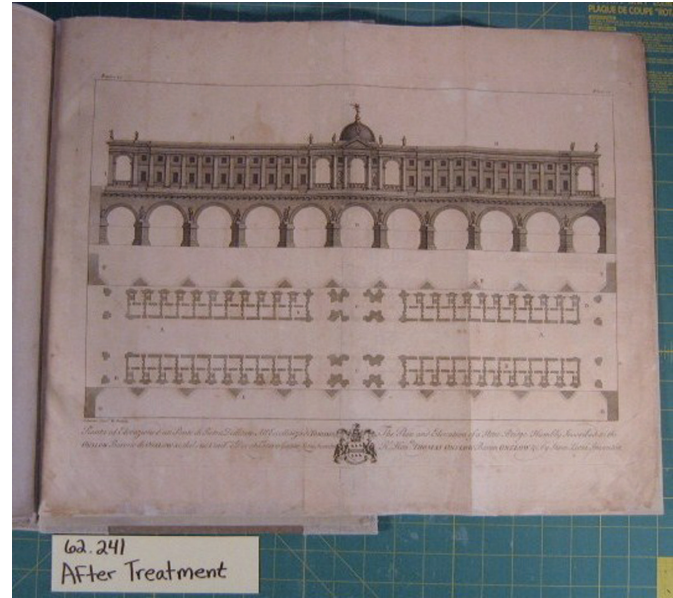
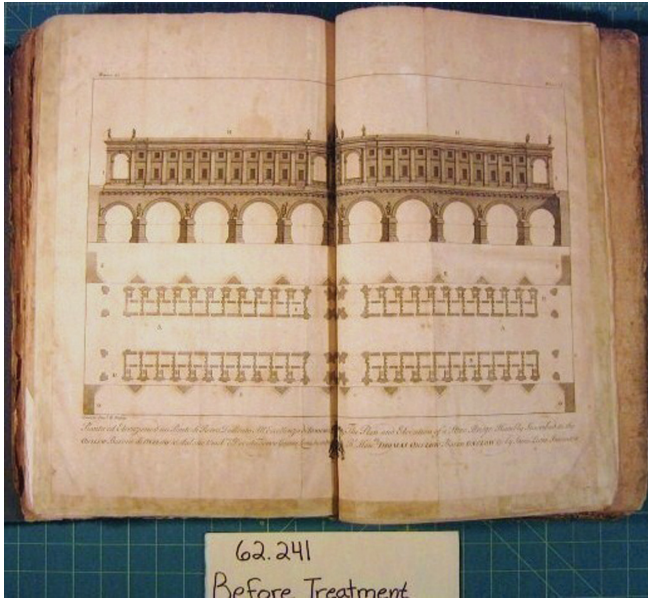


Fig. 5. HOF removing guarding tissue during treatment; Courtesy of Historic Odessa Foundation



Fig. 6. HOF engraved plate with soluble watercolors on the figure and the Hollytex mask; Courtesy of Historic Odessa Foundation

After the pages were dried overnight, they were spray remoistened and put into a blotter press under boards and weights to make the paper flat. Once flat, numerous page mends were done using kozo mending strips. Gampi silk tissue was used to mend tears that went through graphic



Figs. 7–8. HOF oversized plate #27 before treatment (left), after treatment (right); Courtesy of Historic Odessa Foundation

media. The infills were done using three laid papers from Griffin Mill: Lynx, Griffin, and Genet. All the tissues and papers were adhered using wheat starch paste. Several of the oversize plates had been sewn through the center thus obscuring part of the image. Those plates were re-configured back to their original foldout format (figs. 7–8). Previously the plates appeared to be located within the correct chapter but not necessarily in their original location. It was determined that the pages should be kept in the same order and gathering configuration since the original gathering organization could not be determined. It was decided that plates that had been inserted with the engraving on the verso would be re-orientated so that image appeared on the recto. The last two gatherings were reconfigured into three gatherings to give more space for the large foldouts. A guard strip of Ruscombe Queen Anne thin laid paper was pasted with $\frac{1}{2}$ – $\frac{5}{8}$ inch strips to join the matching pages of each bifolio. It was then dried under Hollytex, blotter, and weights. Endsheets were made using Genet laid paper (115 grams).

The textblock was sewn with waxed linen thread 35/3 on seven raised cords; the cords were packed during sewing to increase their stiffness and provide more support across the spine (fig. 9). Several times more thread had to be added on with a basic weaver's knot. When done, the sewn 26 gatherings of the textblock and 2 gatherings of endsheets measured $1 \frac{7}{8}$ inches thick. The textblock was then allowed to rest under weights overnight to reduce swelling. Structural headbands were then sewn on single cord cores using alternating red and natural hemp thread. The ends of the cords were left long to later be laced into the boards.

The textblock was then put into an English binding. The spine was lined with wide strips of Sekishu tissue between



Fig. 9. HOF book on the sewing frame during treatment; Courtesy of Historic Odessa Foundation

the raised cords. There was a $\frac{1}{4}$ inch overhang to provide additional support. After it was boned down and allowed to dry, another layer of Sekishu tissue was added with a $1 \frac{1}{2}$ inch overhang that was not adhered at this point. After the spine section was adhered, a one-on-two-off hollow tube was added using 10 Point cardstock. New boards were cut using 3 mm Eterno buffered lignin-free board. The boards were cut slightly bigger than what the book was previously bound at $17 \frac{3}{4} \times 11 \frac{3}{8}$ inches. The holes for the cords were cut with a chisel. The two holes for the headband cords were located at a 45° angle. The boards were covered with Saint Armand Handmade text weight dark linen colored 85 gram 100% linen paper adhered with wheat starch paste. The cords were

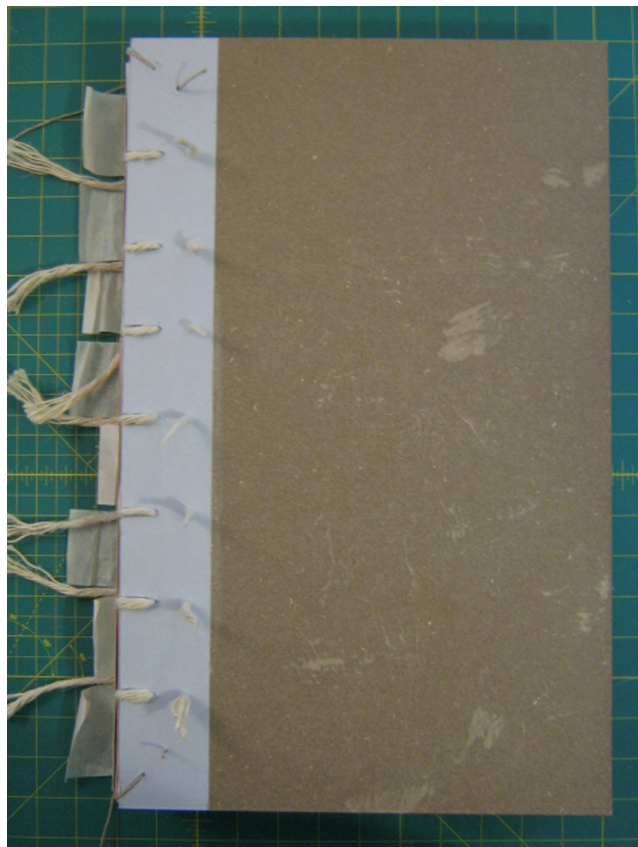


Fig. 10. HOF book cords laced through paper covered boards; Courtesy of Historic Odessa Foundation

laced through the boards and were then secured into place using wheat starch paste and allowed to dry under weights (fig. 10). The cloth spine was made off the textblock using 20 point cardstock, natural bookbinding linen, and a polyvinyl acetate emulsion adhesive. It was then adhered to the back of the spine and extend 2 ½ inch onto the covers. The corners of the boards were covered with natural linen to help prevent wear. The pastedowns were adhered using wheat starch paste. The book was allowed to sit in a press until it was completely dry.

The old covers, leather spine, headbands, old end papers and samples of other components removed were saved for the object records. Although monetary constraints prevented the book from being bound in leather, it still remains an option for the future (fig. 11).

AFTER TREATMENT RESEARCH

In an attempt to better answer the four major research questions listed earlier and to look at preservation options undertaken at other institutions, additional copies of all three editions were examined after the HOF treatment was completed.



Fig. 11. HOF book after treatment; Courtesy of Historic Odessa Foundation

First editions (1726) were examined from:

- Olin Library of Wesleyan University (Middletown, CT)
- Beinecke Library of Yale University (New Haven, CT)

A second edition (1739) was also examined at:

- Library of Virginia (Richmond, VA)

Six additional versions of the third edition (1755) from the following institutions were analyzed:

- Fisher Library at the University of Pennsylvania (Philadelphia, PA)
- Watkinson Library of Trinity University (Hartford, CT)
- Beinecke Library of Yale University (New Haven, CT)
- University of Iowa (Iowa City, IA)
- Linda Hall Library (Kansas City, MO)
- Boston Athenaeum (Boston, MA)

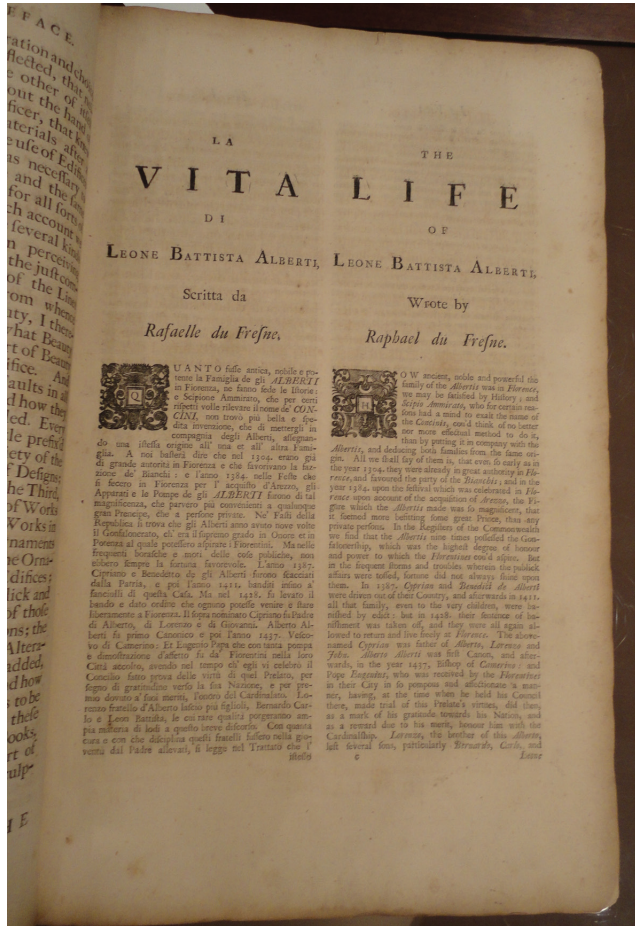


Fig. 12. Library of Virginia 1739 book with parallel Italian and English text; Courtesy of Library of Virginia

The following information and graphs were compiled based on observations of these books.

Differences between the Organizations of the Three Editions

The original text was written by Leon Battista Alberti in Italian during the 15th century. The three editions that appeared during the 18th century were significant because it was the first time manuscript was published in English. In the 1726 edition and 1739 edition, the book appeared in parallel Italian and English text (fig. 12). The 1755 third edition completely abandoned the parallel text format in favor of a mono-language English text. One might speculate that this decision could have been the result of an effort to reduce the production costs of the book.

Insight on the Original Binding Structure

None of the books examined still retained their original 18th century bindings. There was a wide spectrum of binding styles observed that reflects the individual history of each book. The range included books bound in full leather with



Fig. 13. Wesleyan 1726 book with paper imitating Spanish embossed leather; Courtesy of Wesleyan University

gold tooling to books bound in with typical cloth library bindings. The Wesleyan University 1st edition had the most unusual binding with the covers made of gilt textured paper that imitated Spanish embossed leather and a cloth spine (fig. 13). The overall condition of the examined books was as varied as the binding styles encountered.

The three recessed cords on which the HOF book was sewn failed to provide any information about the number of sewing stations that originally would have been used for the textblock. The three library bound books did not preserve the physical evidence of the original binding structure. Of the six remaining books, three were sewn on 6 raised cords and three were sewn on 7 raised cords. Either 6 or 7 sewing stations would have been appropriate for a book of this size. The engraved plates were not sewn on the raised cords but instead were whipped stitched onto the textblock indicated by the holes on the gutter edge of plates that have not been trimmed. The large number of plates would have provided significant stress on most binding structures.

All the books examined showed evidence of being cut down. The original dimensions of the paper were probably the size of an 18 x 24 inches paper mold such as Demy (17 x 20"), Medium (19 x 24") or Royal (19 x 24"). The HOF book had the largest dimensions at 17 $\frac{5}{8}$ x 11 $\frac{3}{8}$ inches with deckles at bottom and fore edges. The University of Iowa had the smallest book at 16 $\frac{1}{4}$ x 10 $\frac{3}{8}$ inches (figs. 14–15). Some books retained the deckled edge appearance while others had a smooth fore-edge. Cutting down the edges of books was a popular and efficient way to address fraying edges of worn manuscripts and damaged gutter edges. The folds of the gatherings were cut off for other reasons—mostly to avoid dealing with glue removal. Another method that appeared on two of the examined books to address damaged pages was to laminate the entire page. Although this method prevents further paper loss, it can cause additional stiffness and cockling.

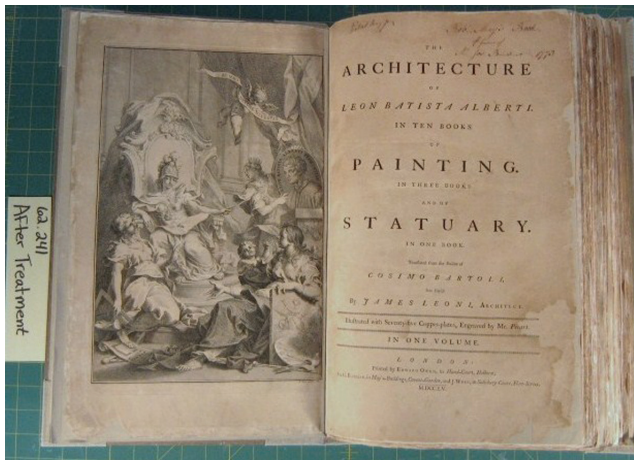


Fig. 14. HOF book frontispiece and title page after treatment; Courtesy of Historic Odessa Foundation

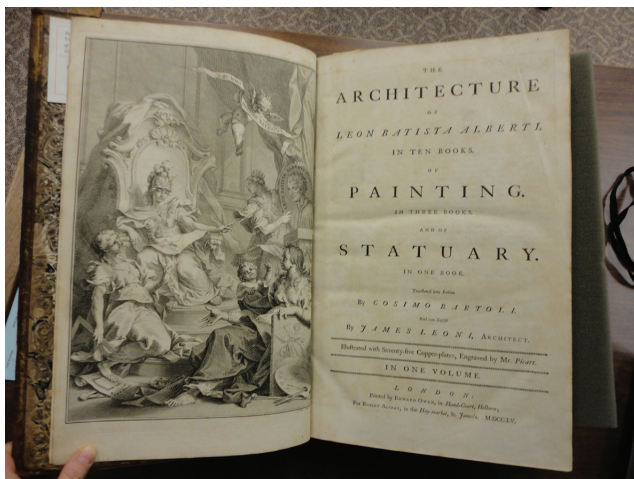


Fig. 15. University of Iowa book frontispiece and title page with margins drastically cut down; Courtesy of University of Iowa

Placement and Orientation of the 75 Engraved Plates

During the treatment of the HOF book, the “correct” placement and orientation of the engraved plates was unclear. Each plate had a page number on their upper corner which was presumed to correspond with their placement in the text. However, in the HOF book, the plates failed to appear next to their corresponding text page number. While most of the plates were oriented in the recto direction, there were six plates that faced the verso direction. Examining additional copies of all three editions provided insight on the organization of the plates.

The same engraved plates that originally were made for the first 1726 edition were used and reprinted for the subsequent two editions. The plates with their page location listed corresponded to their placement in the first edition that had the parallel Italian and English text and therefore were congruous with the 1739 edition. With the Italian text omitted in the 1755 third edition, the plate page numbers no longer correctly corresponded with their placement. The first edition text folios only contained one number on the recto side instead of each side having its own page number. The text page number sequence started over again with the beginning of the section on *Painting* and for a third time at the *Statuary* portion of the book. The two 1726 books examined had all of the engraved plates oriented in the verso direction with the engraved image facing the recto text page with the corresponding number.

The 1739 second edition examined also only had one page number on the recto side for each text folio and the page numbering sequence restarted with each of the three parts: *Architecture*, *Painting*, and *Statuary*. Because the Italian text was retained, the plates mostly were placed next to their corresponding text page number. Six of the 75 plates fail to follow this convention and appeared near but not next to their corresponding text page number. A major difference from the 1726 first edition was that the 1739 second edition was that all the plates were oriented in the recto position facing the verso of the corresponding text page number.

All of the 1755 third edition books observed were organized differently from their earlier predecessors. The Italian text was completely omitted and the text folios were numbered on both sides of the pages. The same text numbering continues throughout the book. Although the majority of the plates were oriented in the recto direction, an average of ten plates in each copy were facing in the verso direction. There appeared to be some continuity across the third editions for the placement and orientation of each plate.

To try and quantify this continuity, the plate placement and orientation of all seven 1755 editions were recorded. In terms of plate placement, there was a 100% agreement on location for 63 out of the 75 plates (If the book was missing the plate, its absence was noted but not included in the statistics.) For the 12 plates that were placed in various locations, the mode (number that appears most frequent in a series) placement was

Plate Number	Mode Plate Placement	Percent Agreement (%)
Pag. 16 Lib. I	18	67
Pag. 32 Lib. II	34	67
Pag. 48 Lib. III	52	86
Pag. 19 N. 4 Lib. IV	130	83
Pag. 20 Lib. IV	130	83
Pag. 62 Lib. VIII	174	83
Pag. 89 Lib. IX	198	83
Pag. 105 Lib. X	216	86
Pag. 111N. J (sic.) Lib. X	224	86
Pag. 2 Lib. I	242	83
Pag. 4 N. I Lib. I	244	83
Pag. 32	272	86

Fig. 16. Table showing the placement of plates where there is not 100% agreement across all 3rd editions

Plate Number	Mode Plate Orientation	Percent Agreement (%)
Pag. 52 Lib. III	Verso	57
Pag. 20 Lib. IV	Recto	83
Pag. 71 Lib. VIII	Verso	67
Pag. 89 Lib. IX	Verso	67
Pag. 105 Lib. X	Recto	86
Pag. 3 Lib. I	Verso	83
Pag. 9 Lib. I	Verso	86

Fig. 17. Table showing the orientation of plates where there is not 100% agreement across all 3rd editions

determined. The percent agreement or confidence factor was calculated for each placement and is listed (fig 16). The same method was used for plate orientation. There were only seven plates that did not have 100% agreement on their orientation. The mode orientation and percent agreement/confidence factor for the inconsistent plates is recorded (fig. 17).

After the mode for each inconsistent term was determined, “correct” sequences for plate placement and orientation were established. Each 3rd edition book including HOF (before treatment) and HOF* (after treatment) were compared separately against the “correct” sequences to determine each book’s percent accuracy for both plate placement and orientation (fig. 18). The number that appears under each listed institution on the x-axis is the total number of plates found in each book. A complete book has the engraved frontispiece

plus 75 plates that appear through the main text. Because statistically the HOF book only had 39 of the plates, every plate that was inconsistent with the “correct” sequences would have a larger impact on overall sequence accuracy than books that were more complete. The average of the two percent accuracy for both plate placement and orientation to determined overall plate accuracy is recorded (fig. 19).

All the books examined have been rebound so any attempt to quantify accuracy in plate organization is problematic. The HOF * percent accuracy for orientation was lowered because of the treatment decision to orient all the plates in the recto direction although this later research indicated that ten plates (of which HOF* has 7) should be oriented in the verso direction. Because of this decision, the overall accuracy of HOF was 98.5% while HOF* was 91%. The ten plates according to the “correct” sequence that should be oriented in the verso direction and how they were oriented in HOF and HOF* is listed (fig. 20). **On reflection and after examining additional copies of the 3rd edition, the HOF* book is an exception to the orientation norms observed. However, the 2nd edition copy observed supported the HOF* orientation treatment decisions.**

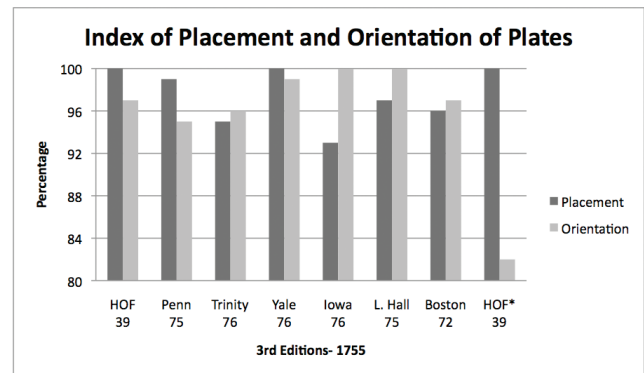


Fig. 18. Graph showing the percent agreement of plate placement and orientation of each volume against the “correct sequence”

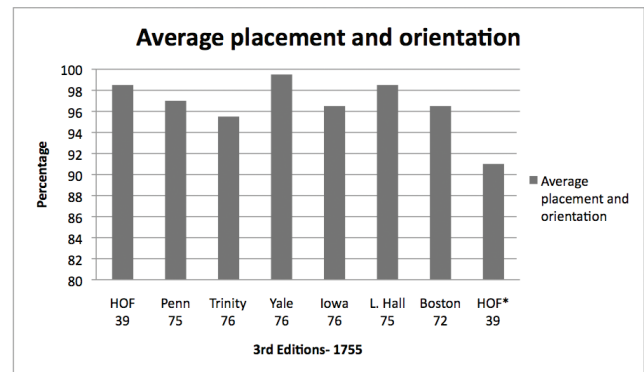


Fig. 19. Graph showing the overall plate accuracy for each examined volume

Relationship to the Supplemental Section

In addition to the standard text and plates, the HOF book also had an incomplete supplemental section by James Leoni. Given the later date on the title page (1758), the supplement must have been incorporated at a later date. Examination of the 1726 first editions revealed that they included the same James Leoni supplement but had an earlier title page that was dated 1726 (figs. 21–22). Of all the 3rd editions observed, only HOF and Yale had the supplemental section.

WATERMARKS

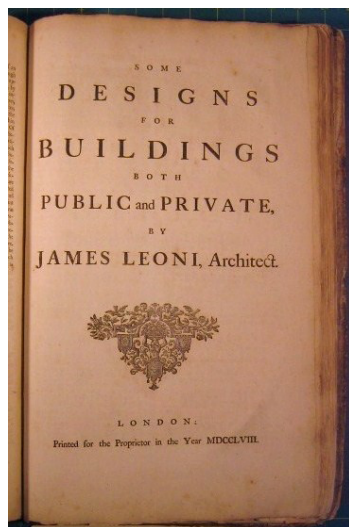
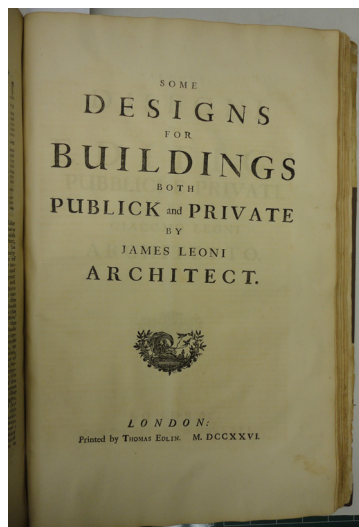
Although a quick identification of the LVG watermark was established during examination of the book, detailed identification and recording of the watermarks that appeared in the HOF volume was undertaken after the treatment. The main Strasburg Lily/Fleur-de-lis was determined from beta

radiography (0.19mm, 6hrs) as Heawood #1829 and is dated 1743 (fig. 23). Beta radiography was also done for the countermark (0.12mm, 2 hrs) and the initials “IV” (0.12mm, 2 hrs) (figs. 24–25). The shield with bars watermark that occasionally appeared in the HOF book was identified as Churchill #434. It establishes it as an 18th century paper that appears with Gerrevink and Villedary watermarks (fig. 26). The dating from the watermarks determined that the 1755 edition used different papers than the earlier editions. An example from the Wesleyan University 1726 volume of the shield with bars shows a different shield with bars (fig. 27).

The Gerrevink family made paper in Holland before the 18th century but it was not until after 1700 that their paper began appearing with the LVG monogram. The initials stood for Lubertus van Gerrevinck, who worked the Phoenix mill at Egmond aan den Hoef, near Alkemaar, Holland (Heawood, 478). The LVG mark was appropriated by many makers in

Verso Plate Numbers	Percent Agreement (%)	HOF Before Treatment	HOF* After Treatment
Pag. 52 Lib. III	57	Recto	Recto
Pag. 30 Lib. VII	100	Verso	Recto
Pag. 33 N. 1 Lib. VII	100	Verso	Recto
Pag. 33 N. 2 Lib. VII	100	Verso	Recto
Pag. 71 Lib. VIII	67	Missing	Missing
Pag. 89 Lib. IX	67	Missing	Missing
Pag. 3 Lib. 1	83	Missing	Missing
Pag. 9 Lib. I	86	Verso	Recto
Pag. 15 Lib. II	100	Verso	Recto
Pag. 32	100	Verso	Recto

Fig. 20. Table showing plates according to modal average that should be in the verso orientation and the relationships with HOF and HOF*



LEFT TO RIGHT

Fig. 21. Wesleyan 1726 book title page to the supplement section; Courtesy of Wesleyan University

Fig. 22. HOF book title page to the supplement section; Courtesy of Historic Odessa Foundation

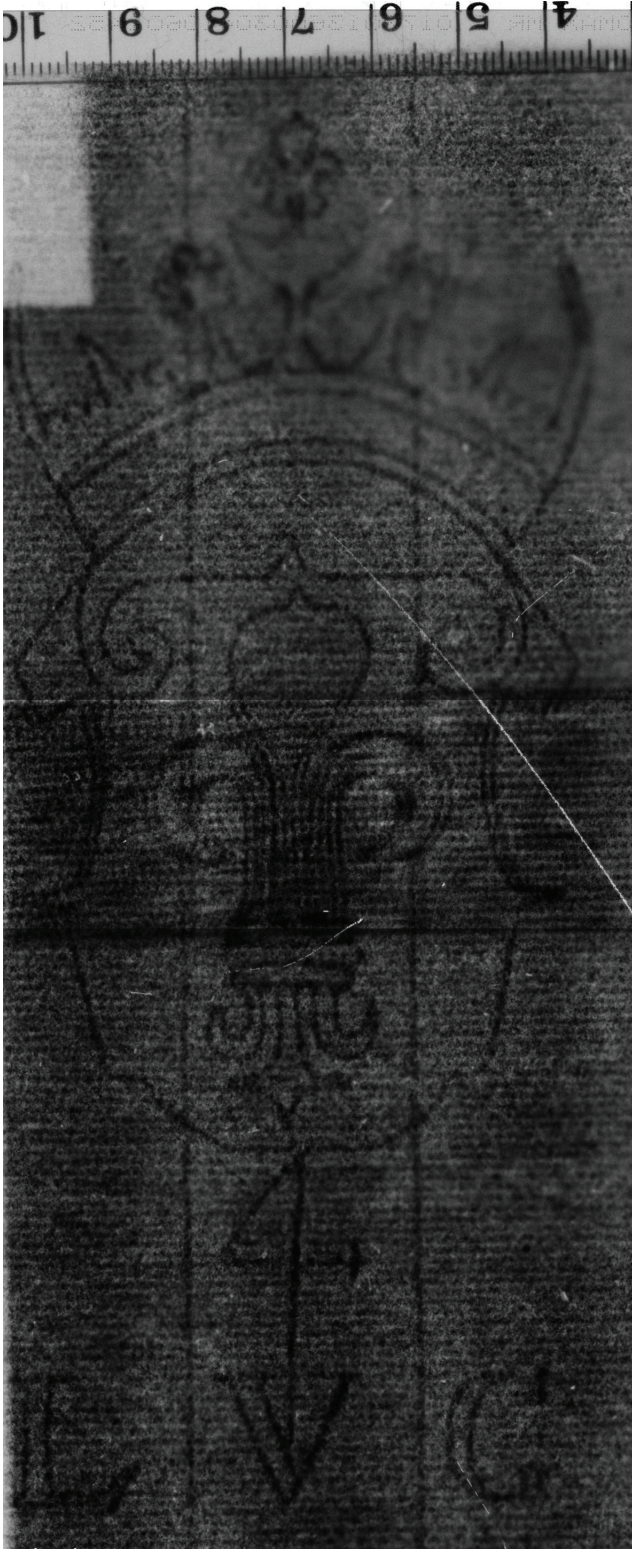
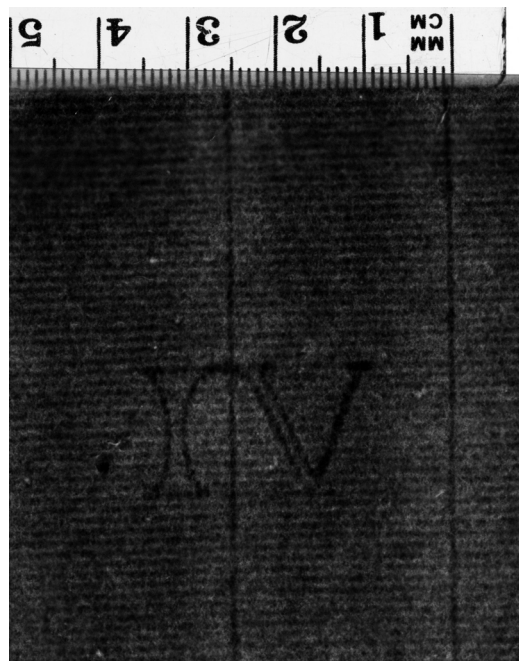
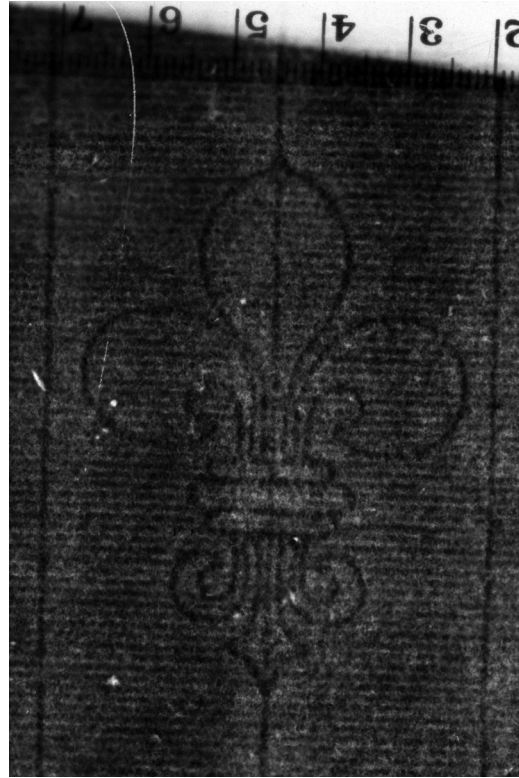


Fig. 23. HOF beta radiograph (0.19mm, 6hrs) of Strasburg Lily watermark; Courtesy of Historic Odessa Foundation and the Philadelphia Art Museum conservation laboratory



TOP TO BOTTOM

Fig. 24. HOF beta radiograph (0.12mm, 2hrs) of the fleur-de-lis; Courtesy of Historic Odessa Foundation and the Philadelphia Art Museum conservation laboratory

Fig. 25. HOF beta radiograph (0.12mm, 2hrs) of initials "IV"; Courtesy of Historic Odessa Foundation and the Philadelphia Art Museum conservation laboratory



Fig. 26. HOF book with transmitted light digital photograph of shield with bars watermark; Courtesy of Historic Odessa Foundation

Western Europe, including James Whatman, Henry Portal and others in England, as a mark of quality. The Gerrevinks are closely associated with the name or initials of Jean Villedary ("IV"), with whom they may have had agreement with to make papers for the Dutch and English markets. There were several generations of papermakers called Jean Villedary who operated in Vraichamp, Beauvais and La Couronne mills in the Angoumois (Angouleme) from 1668 to 1758. The Villedary family moved to Hattem in Guelderland, Holland, in 1758, where they continued to make paper (Churchill 2006, 21). The paper was popular because of its quality and large size (Heawood, 478).

CONCLUSIONS

In conclusion, the rebinding of *The Architecture of Leon Batista Alberti, In Ten Books. of Painting. In Three Books. And of*



Fig. 27. Wesleyan 1726 book with transmitted light digital photograph of a different shield with bars watermark, Courtesy of Wesleyan University

Statuary. In One Book by Cosimo Bartoli (1755) was carried out at the HOF with limited time, resources, and facilities. The treatment needed to be completed within the eight weeks of the summer internship because of previous time commitments of people involved in the project. Monetary constraints did not allow for the volume to be rebound in leather which would have been historically appropriate, but it remains an option for the future. Although the HOF did not have a conservation laboratory, creative treatment solutions were devised in the afforded space. While the before treatment research and consultations provided great insight for the treatment, it failed to provide the quantitative information gathered from the books examined after treatment. Based on the quantitative results, the conserved HOF book plate orientation is an exception to the observed trend in third editions, although it is consistent with the orientation decisions seen in the 1739 edition. The watermark comparisons and identifications proved that the 1755 copies used different paper than the earlier editions. Overall, the research and treatment provided the HOF book with context of the past, comparison with other volumes in the present, and stabilization for the future.

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MATERIALS USED

Conservation Resources International LLC
5532 Port Royal Road
Springfield, Virginia 22151
Phone: (800) 634-6932
Email: sales@conservationresources.com
Supplies: Cardstock 10-Point

Griffen Mill
Killinagher, Ballyhaunis
Co. Mayo, Eire.UK
Phone: 00353 (0) 949640744
Email: griffenmill@eircom.net
Supplies: Lynx laid paper, Griffin laid paper, Genet laid paper

Hiromi Paper, Inc.
2525 Michigan Ave
Bergamot Station Unit G-9
Santa Monica, CA 90404
Phone: (310) 998-0098
Email: hiromi@hiromipaper.com
Supplies: HP-73 kozo mending strips, HP-74 kozo mending strips, HP-12 gampi silk tissue, Sekishu

New York Central Art Supplies
62 Third Avenue
New York, NY 10003
Phone: (212) 473-7705
Supplies: Saint Armand Handmade linen paper

Talas
330 Morgan Ave
Brooklyn, NY 11211
Phone: (212) 219-0770
Supplies: Ruscombe Queen Anne thin laid paper, Eterno buffered lignin-free board 3mm

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WorldCat. Accessed July 7, 2010

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