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and Claus Rittenhouse. Printed on Twinrocker handmade paper.

Articles and reports by members and non-members are welcome for consideration.
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In retrospect, the experiences gained when attempting any endeavor can become more important than the endeavor itself. For 7 years (1968–1974) research for a fine press publication about William Rittenhouse was undertaken that involved known and emerging American hand papermakers, printers, and book artists. Although that publication was discontinued, the acquaintances made and the experiences gathered from this endeavor after 23 years are examined in this article.

William Rittenhouse, the papermaker, was born in 1644 at Broich near Mülheim an der Ruhr, Germany,\textsuperscript{1} at a time when the achievements and lives of Caravaggio, artist; Callot, engraver; Donne, poet; Galileo, astronomer; Ruetté, binder; Shakespeare, author; and Spilman, papermaker had ended, when Europe was entering an age of enlightenment, and when paper for writing and printing would soon be in demand. William and his brother Heinrich properly learned the craft of hand papermaking at the Adolf Vorster Mill in Broich about the time Rembrandt van Ryan (1606–1669) completed his 1658 etching "The Writing Master," the subject of which approvingly holds a sheet of the ever-improving papermakers' craft.\textsuperscript{2}

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{Figure1.png}
\caption{A 1658 Rembrandt etching of L.W. van Coppenol}
\end{figure}
By 1665, William Rittenhouse resided in Holland where he became a Dutch citizen, married, and fathered several children. When in Holland he very likely knew about the development of the Hollander Beater that would eventually succeed the use of stampers for pulping. When William and his family immigrated by 1689 to Germantown, near Philadelphia, Pennsylvania, he must have been aware that he would be establishing the first paper mill in the British Colonies and that certain trades established there in the 17th century, i.e., Stephen Day/Cambridge Press, William Bradford/Philadelphia Printer, and John Sanders/Boston Bookbinder were dependent on the variations of imported papers. The paper mill was completed by William and his son Nicholas (Claus) in 1690 on Monoshone Creek, also known as Paper Mill Run, a branch of the Wissahichkon Creek.

Although achievements by individuals in the sciences, arts, and humanities have mostly been documented for some 2000 years, the contributions of papermakers have remained almost completely anonymous. Although 1990 marked the 300th anniversary of papermaking in America, a complete history of the Rittenhouse papermakers, the founders of the American papermaking industry, remains unfinished. Studies about these founders are many and research by Milton Rubincam, Walter Leiter, Henk Voorn, James Green, and others have added immensely to this history.

This account begins in 1968 when Helena Wright and myself joined the Museum of American Textile History staff and became interested in the history and craft of American and European papermaking. These studies coincided with the notable re-emergence of bookbinding, decorative papermaking, fine printing, hand papermaking, printmaking, and paper conservation in America. The more we attempted to document these activities, the more interested we became in producing a publication about the history of William Rittenhouse and developing a technical paper workshop that would serve the diverse needs of those working with paper.

As the history of papermaking and graphic arts was researched for the publication and paper workshop, we found that with industrialization, hand papermaking had barely survived, as evidenced by the closing of the Ivy Mill of Pennsylvania in 1866, which brought an end to the continuous practice of hand papermaking in America since its founding. After the Civil War, the study and practice of hand papermaking was revived several times through the efforts of individuals and companies like Harrison Elliott (1879–1954) of the Japan Paper Company, the making of handmades by the L.L. Brown Company of Massachusetts (1881–1907), Dard Hunter’s Marlborough-on-Hudson of New York (1913–1919), and Lime Rock of Connecticut (1928–1931) mills. Hand papermaking continued to survive in America through the efforts of a few, including Douglass Howell, the best known perpetuator of the craft by the 1950s.

In 1969, a fine press publication about William Rittenhouse took precedence after reading a notice about hand papermaking in The American Archivist. The notice mentions a 1966 article about Howell, which states, “...handmade-paper, a skill which
he (Howell) believes is slowly dying” (“Hand-made Paper Still Flourishes” Publisher’s Weekly, Sept. 5, 1966). This dire situation had begun to be corrected in 1962 when Lawrence Barker, head of the printmaking department of Cranbrook Academy attended a 2-week papermaking seminar by Howell in his studio at Westbury, New York. That year, Barker wrote a paper about his seminar experience and about making paper from different qualities of hydrated linen rags.

As a printmaker my experience with papers was pragmatic: I knew one paper under certain conditions behaved thus and another so. My mind then, only a little ruffled with cursory readings, was a tabula rasa with regard to this arcane craft.

Four months after the seminar, Barker further articulated his attitudes about paper; To create a paper, a piece of white paper, tailored to the requirements of a medium, a supporting vehicle of unostentatious beauty that enhances the esthetic quality of a work of art, a paper of great strength and durability, seems to be the classic preoccupation of the papermaker and one I think noble and worthy of emulation (Barker, Lawrence. “A Seminar in Handmade Papermaking for the Fine Arts” Cranbrook Academy of Art, Oct. 26, 1962, pps. 1-21).

In 1963, Barker founded at Cranbrook Academy what is considered to be the first university fine arts papermaking program in the United States.

It seemed that after reading Barker’s accounts of papermaking, a publication about William Rittenhouse would be incomplete without the addition of a facsimile watermarked paper being made at Cranbrook. In 1969, we were familiar with only nine watermarks used by Rittenhouse papemakers from 1692 to 1719. We also only knew of three American papermakers who might be capable of making the watermarked papers: Lawrence Barker, Douglass Howell, and Henry Morris of Bird & Bull Press. When writing to Barker about making the watermarked sheets, he replied that the paper could be made by students and that only a waterleaf paper was possible, as his samples of five “hard papers” (new cloth) and six “softer papers” (worn rag) demonstrated. Barker also explained that Cranbrook owned five different sizes of hand moulds, two laid and three wove, and watermarks would be formed from brass wire. According to Barker, the making of watermarks hadn’t previously been attempted at Cranbrook, “Curiously enough, perhaps, we do not employ a watermark ourselves due to the fact that we are making paper of different thicknesses. What would be suitable wire diameter for thin paper would make for an illegible mark on thick paper and conversely, too heavy a wire would ruin thin sheets” (Barker, Nov. 4, 1969). Howell, after being asked about the project, said, “My advice to you would be to raise your sights on something more important…” (Howell, Nov. 16, 1969). Morris, when asked about the project, advised,
The watermark would have to be handmade, and the only place where I can still get this done is in England. There are no professional makers of paper moulds or hand watermarks in this country any more [sic] (Morris, Dec. 30, 1969).

The Rittenhouse watermarks selected for the facsimile sheet were an arrangement of three elements considered to be in use by 1696: the “cloverleaf” seal of Germantown, the word “Pensilvania” [sic], and the initials “WR” for William Rittenhouse. It was decided that Barker and students should make the watermarked sheets because they were willing to undertake the forming of the wire creating the watermarks and because they considered the project to be an educational exercise. In 1970, an order for 250 10"x13" watermarked sheets was made with 335 sheets delivered that summer from student John Boyd. When later writing Morris, I enclosed one of these papers to which he replied, “The facsimile watermark is really first rate—whoever made it did a fine job . . .” (Morris, May 8, 1972).

Wanting to learn more details about the making of the watermarked papers, I recently located Lawrence Barker of the Barcelona Paper Workshop at Barcelona, Spain, and John Boyd, now a professor of printmaking and papermaking at the State University of Wichita, Wichita, Kansas. I learned from Barker that he left Cranbrook by July 1970 and asked Boyd, then a department student, if he would undertake the project. It was Boyd who had the watermarks made and formed the papers during July and August 1970, “I was the only person involved in making the paper . . .” (Boyd, Oct. 12, 1989).

Figure 2A, 2B, 2C A 1970 watermarked sheet by John Boyd, Cranbrook Academy
Boyd comments that he made the paper (one pound dry fiber per load) by mixing “…three beater loads of cotton sheets, three beater loads of linen, and about five beater loads of reconstituted paper (originally made from cotton diapers)” (Boyd, Aug. 10, 1970).

The paper was formed on one of the laid moulds measuring 17-3/4" x 23" with 1-3/16" chain and 20 laid lines to the inch using masking tape to block the screen for making the 10" x 13" watermarked papers. The watermarks were made with the assistance of Cranbrook metalsmith Professor Richard Thomas. The cloverleaf emblem was made with brass wire and all letters were formed with one piece of wire using a thinner gauge of a copper/brass wire. The watermarks were lead soldered to the laid screen and then, upon completion of the project, the watermarks were removed from the mould. The Cranbrook papermaking program had performed only two private projects: the Busyhaus watermarked papers and an earlier paper made by students John Boyd and John Koller for an edition of Roy Lichtenstein prints published by Gemini of Los Angeles, California.

In 1970, two 3" x 3" boxwood engravings were made for the intended publication by Michael McCurdy of Penmaen Press. One engraving depicted William Rittenhouse in front of his 1690 mill and is a composite of the extant 1707 to 1713 Rittenhouse residence on Paper Mill Run. The second engraving depicted William and Claus Rittenhouse at work in the 1690 mill. Plans then were to have the engravings printed on handmade papers from the Wookey Hole Mill of Somerset, England. A 1971 trip to Europe provided the opportunity to visit hand papermaking mills, printing workshops, and conservation laboratories. Among these facilities were the Amies Mould Company and the Hayle/Barcam Green Paper Mill of England. A new demonstration hand-laid mould was ordered from Amies including the purchase of two antique laid moulds for the workshop program. Because William Rittenhouse had resided in Holland, visits were made to two historical sites that represented Dutch papermaking; the 1692 De Schoolmeester Mill (School Master) of Westzann, the last of over a thousand wind-driven mills, and the reconstructed 17th century Marten Orges-Veluwe Paper Mill at the Arnhem Open-Air Museum. The experiences, technical information, and equipment gained from this trip enabled the first Busyhaus Paper Workshop to be conducted on October 19, 1974 at the Harcourt Bindery of Boston.

After visiting paper sites in Europe and learning more about papermaking practices, it was decided that the two McCurdy 3" x 3" wood engravings could be improved on and plans for eight other 4" x 4" engravings were made. McCurdy did drawings for the eight engravings and executed only one of them (not illustrated), which depicted William and Claus Rittenhouse making paper in their 1690 mill. During development of the Busyhaus Workshop and Rittenhouse research was also when the Twinrocker Paper Mill of California was founded in 1971 and moved to Brookston, Indiana, in 1972. That same year, Michael McCurdy and Arnold Grummer, the Curator of the
Dard Hunter Paper Museum, informed us about Kathryn and Howard Clark of the Twinrocker Paper Mill. The opportunity to then consider having the engravings printed on Twinrocker handmades resulted in the decision to use the two smaller 3"×3" 1970 engravings (completing the eight 1971 larger engravings and making handmades for them proved too expensive). In 1972, we considered the use of a handmade paper by Twinrocker in keeping with the tradition started by William Rittenhouse 282 years ago (now 301 years).

In 1973, Twinrocker was asked if they would make three reams of handmade paper for the two engravings. Kathryn and Howard replied that they were still preparing the mill, "The beater and vats are now in the mill, and the water purification system was delivered recently although Howard hasn’t connected it yet" (Kathryn Clark, Jan. 11, 1973). That year it was possible for Helena and I to visit Twinrocker and discuss making the handmades for the engravings. While at Twinrocker, it was decided to modify a wove mould with deckle strips to allow two sheets to be formed at one time. With instruction from the Clark’s, we formed in one afternoon about 500 (5-½"×4-¾") waterleaf papers and completed pressing and posting them for drying. After exam-

Figure 3 A 1970 wood engraving by Michael McCurdy of papermakers William and Claus Rittenhouse. Printed on Twinrocker handmade paper.
Figure 4 A 1970 wood engraving by Michael McCurdy of William Rittenhouse at his mill/residence.

Figure 5 The author at Twinrocker Mill in 1973, pressing handmade papers made for printing wood engraving.
Figure 6 A 1692 De Schoolmeester Paper Mill, Westzaan, Holland.

Figure 7 Seventeenth century reconstructed Marten Ogres-Veluwe Paper Mill, Arnhem, Holland.
ining the finished papers, it was decided to only print the 3"×3" engraved mill interior view of William and Claus Rittenhouse making paper. This engraving was printed on the Twinrocker handmades by McCurdy using a Vandercook proof press. After printing, the final number of prints produced was less than 500 and today 480 exist as the property of Busyhaus.

Ironically, by 1974 the increased interest and successes in hand papermaking, the book arts, and conservation contributed to the publication never being completed. Because of these commitments, the Busyhaus Paper Workshop and our museum professions took priority over the publication. It has been 23 years since Lawrence Barker, John Boyd, Kathryn and Howard Clark, Michael McCurdy, Helena Wright and others provided their knowledge and skills toward a Rittenhouse publication. Although the publication was never finished, it may suffice to say, “I (we) have pursued this topic steadily, the drawbacks being the unending flow of historical and technical information which, while indispensable, has caused its postponement” (Hauser/Wright, Morris, May 3, 1972).
NOTES


I recently wrote Henk Voom about his research and about the location of the Vorster Paper Mill in Mülheim-Broich where William and his brother worked. Voom comments (Aug. 14, 1989) “Papermaking was practiced at Mülheim-Broich till 1906, when the production was brought to Dorsten. At the old site is now the administration office of RWW.” Voom also suggested that I contact Walter Leiter who lives in Mülheim an der Ruhr (the city of Mülheim an der Ruhr and bordering town of Broich shouldn’t be confused with Mülheim am Rhein and Mühlheim of Frankfort am Main) who published in 1982, “Heimat und Name von Wilhelm Rettinghaus, Dem Ersten Papiermacher in Dem USA Seit 1690.” (Native Country and Name of Wilhelm Rettinghaus, Primary Paper Manufacturer in the U.S. Since 1690.” IPH Yearbook, Basle Edition, Vol. 3, 1982.)

Mr. Leiter (Sept. 1, 1989) identified RWW as the Mülheim Water Works (Rheinisch Westfälische Wasserwerksges), which is on the Ruhr River next to Castle Bridge and near the Broich Castle. In 1989, I visited Germany with my father who had emigrated from Oberhausen to America with his parents in 1927. By coincidence, Oberhausen borders Mülheim-Broich, making it possible for me to visit my father’s boyhood home and the site of the Vorster Paper Mill-Broich Castle with Mr. Leiter as our kind host and guide.


In 1643 (William Rittenhouse born 1644), the Dutch East India Company had shipped to Holland 3,000 sheets of paper from Japan. This shipment and others may be the source that influenced Rembrandt to experiment with non-European papers. (From Salamon, F. History of Prints & Printmaking from Durer-Picasso, American Heritage Press, Boston, McGraw Hill, New York, 1972, p. 41.)

While it has been suggested by some authorities that most of the papers Rembrandt used were of French origin, H. Voorn, in study limited to paper mills of North Holland ("De papiermolens in de provincie Noord-Holland," 1960), maintains that before 1650 most papers used there were imported from Germany and Switzerland, and that it was only after the mid-century that French papers became those most commonly available. (Rembrandt: Experimental Etcher. Reed, Sue. "Types of Papers used by Rembrandt," New York Graphic Society, Greenwich, CT [and Hacker Books, New York], 1969, pps. 178–183.)

Could the paper held by Coppenol have been made in Germany and by William Rittenhouse at the Vorster Mill? (Complete documentation of the papers or watermarks used by this mill are unknown to me.)

3. It is interesting to consider that the reason for William Rittenhouse's move to Holland could have been the pulping developments that led to the "Hollander Beater" (The Paper Maker, Voorn, Henk. "On the Invention of the Hollander Beater." Vol. 25, No. 2, 1956, pps. 1–9). We can only speculate that Rittenhouse was familiar with this advancement and might have wanted to employ it in America. We know at Twinrocker the development of a new stainless steel and fiberglass corrosion resistant beater was a high priority and one, alas, that Rittenhouse would have been envious of. "... This beater is light enough to be easily moved from one place to another" (The Howard Clark Hollander Beater/Twinrocker Equipment, 1978).

The recognition by hand papermakers in the 1970s that using new technology would improve the craft should be considered one of the factors that allowed the craft to prosper. Typically, the Twinrocker Mill was interested in hydraulic presses, water purification systems, environmentally controlled drying, sound-proof beater rooms, and dye research. This dual approach of craft and technology is stated by Twinrocker in a 1973 history and goals document "... We decided to try to revive the craft of hand papermaking on a professional level in a custom way, and to adapt it to contemporary uses." This merger is expressed again in a 1975 mailer: "As the paper dries, the fibres come closer and closer together until the distance between cellulose molecules is small enough to permit hydrogen bonding." A predictable direction considering the developments being made in paper chemistry, conservation, and permanence matters.

4. The Friends of Historic Rittenhouse Town are celebrating the 300th anniversary of papermaking in America by holding activities that include lectures, demonstrations of hand papermaking, and plans for a history museum and archaeological studies of the
1690 and 1701 Rittenhouse paper mill sites. Rittenhouse Town is the site of seven structures once owned by the Rittenhouse family and includes the 1690 residence of William Rittenhouse. Anyone interested in membership and making a donation should contact: Friends of Historic Rittenhouse Town, 3612 Earlam Street, Philadelphia, PA 19129, (215) 441-8789. Historical research about Rittenhouse descendants can be found in the Rittenhouse/Family Newsletter, published by Mark Haacke, 2312 Glendon Road, University Heights, OH 44118-3810.

5. During 1968–1975, while researching William Rittenhouse, the Historical Society of Pennsylvania sent a copy of a letter from F.J. Clifford (Advertising Department, Dill & Collins, Inc. Paper Makers, 816 Public Ledger Building, Philadelphia, PA) to a Mr. George Allen (3345 Woodland Ave., Philadelphia, PA) dated December 12, 1940. The letter comments on the 250th anniversary of papermaking in America and allegedly traces the connection between the original Rittenhouse mill and Dill & Collins.

Sometime prior to 1860, the Rittenhouse mill was acquired by Mr. Charles Magarge, who had some years previously, it is believed about the year 1825, with his brother Edward, built two paper mills. These mills were approximately two miles above the site of the first Rittenhouse mill and within a few hundred feet of what is now the Valley Green Motel. One was known as the Handwell mill and the other as the Wissahickon mill. A few years later the Magarge brothers divided their business and Charles Magarge took the Wissahickon mill.

In 1879, he sold his paper mill business to Alexander Balfour, who operated the Wissahickon mill until 1882. He then built the Delaware Paper mill, which is now the Dill & Collins mill, located on the Delaware River near Richmond & Tioga Streets, Philadelphia. It was acquired from Balfour by Dill & Collins in 1895 and has been operated by them ever since. Dill & Collins is now a subsidiary of The Mead Corporation.

6. Helena Wright is presently the Curator of the Division of Graphic Arts at the National Museum of American History, Smithsonian Institution, Washington, D.C. Recent contributions by Ms. Wright to American papermaking history have been the exhibition and catalogue, 300 Years of American Papermaking, National Museum of American history, Smithsonian Institution (December 1990–November 1991), and the presentation: “Handmade Paper in the Machine Era: The Story of L. L. Brown, 1881–1907” at the University of Iowa Center for the Book Symposium, “From Rittenhouse to Twinrocker,” March 23, 1991. Ms. Wright has kindly assisted with this article by researching and editing materials, and by having Walter Leiter’s 1982 article “Heimat und Name von Wilhelm Rettinghaus, Dem Ersten Papiermacher in Dem USA Seit 1690” (“Native Country and Name of Wilhelm Rettinghaus, Primary Paper Manufac-
turer in the U.S. Since 1690") transcribed into English. Ms. Wright was associated with Busyhaus during the period 1968–1982 and research by her on William Rittenhouse and American papermaking contributed to this article.

7. From 1968 to 1969 business activities were conducted using the name Diving Gull and after this date, the name Busyhaus was used. Busyhaus can be defined as a “Busy House” with Bauhaus persuasions in design and education. The Busyhaus windmill logo was adapted from the family’s heraldic design. The Busyhaus logo was registered (no. 1039885) with the U.S. Trademark & Patent Office on May 18, 1976. A broadside was designed and mailed on December 4, 1973, offering the Busyhaus paper workshop. The first workshop resulting from this mailing was held at the University of Dallas, TX, on February 21, 1975. The first paper workshop was held on October 19, 1974 at the Harcourt Bindery (9-11 Harcourt Street, Boston, MA) using a broadside designed by Sam Ellenport of Harcourt Bindery (see Turner, S. & Sköld, B. Hand Papermaking Today, Frederic Beil, NY, 1983, pp. 114–115). To my knowledge this was the first educational paper workshop offered in Massachusetts, discounting any that may have been held at L. L. Brown Company during the period 1881 to 1907 or by Dard Hunter when his Paper Museum was at Massachusetts Institute of Technology during the period 1938 to 1954. This also included exhibits at the Boston Institute of Contemporary Art and Boston Visual Artist Union in 1977 which included a visit/lecture by Simon B. Green of the Hayle Mill, planned by Andrews/Nelson/Whitehead & Busyhaus. A Japanese papermaking workshop with Timothy Barrett was planned by Busyhaus for conservators and held at The Carriage House Paper Studio in 1978.

Busyhaus paper workshops/lectures were mostly held during 1974–1981 at over one hundred art schools, universities, and museums (e.g., Harvard Carpenter Center, Cleveland Art Institute, Philadelphia Print Club, University of Buffalo). Workshops/lecture programs were sponsored by Rising and Monadnock paper mills and instruction at Centro Venezolano Americano, Caracas, Venezuela (1979) and NEA funded programs at six New England State Art and Humanities Councils (1980).


9. It was in the Library of Congress 1968 publication Papermaking: Art & Craft that I first learned about the papermaker Henry Morris. Morris kindly provided information about having laid moulds and watermarks made by the Amies Company of Maidstone, Kent, England. The Amies Company was asked in 1970 about making
a 6"×10" laid mould with Rittenhouse watermarks and replied that a laid mould with watermarks would cost seventy-five pounds ($180.00 dollars) and could be dispatched in about 4 weeks. At this time, papermaking at Cranbrook was near closing, making it impossible to have the Amies moulds for making the watermarked papers. In 1972, an 8"×12" laid mould with a Busyhaus logo watermark was made by Amies for the papermaking workshop. Morris also provided in 1973 information about the work of Hassam Ragab of the Papyrus Institute, Egypt. Ragab supplied papyrus reeds and photographs of papyrus making that were used in the Busyhaus papermaking workshops. To my knowledge this was the first time papyrus making in America had been demonstrated in a workshop situation.

10. Barker wrote (Nov. 4, 1969) that he had one laid mould and later (April 28, 1970) said he had two English laid moulds that could be used for making the Rittenhouse watermarked sheets. The earlier laid mould appears to have been one of the two English moulds. Barker comments (Hand Papermaking Vol. 3, No. 1, Summer, 1988, pps. 3 & 5) that he had use of moulds from Henry Booth, whose father, George Booth, had founded the Cranbrook Press. Booth had “Cranbrook” watermarked paper made on these moulds by the L. L. Brown & Company of Adams, Massachusetts. According to Barker (Dec. 20, 1989) these are likely the same moulds (one of them) that were used to make the Rittenhouse watermarked papers. According to Boyd (Oct. 12, 1989), Cranbrook owned two laid moulds and only one of them may have had a Cranbrook watermark. The other mould is likely to be the one used to make the Rittenhouse watermarked papers. Proof of how many moulds were used at Cranbrook, their origins, and whereabouts cannot be fully documented at this time.

11. Physical evidence of these watermarks in documents at the Philadelphia Historical Society and Library Company were studied and typically showed 1" chain and 27 laid lines per inch. This was the chain and laid line measurements found on a dozen or more documents. In hindsight, some of the watermarks found in these documents and duplicated to make the facsimile may not be Rittenhouse watermarks, as explained by Dard Hunter in Papermaking in Pioneer America, Garland Publishing, New York, NY, 1981, pps. 26–27.

It is questionable if all of the watermarks attributed to this mill were produced by William and Klaus Rittenhouse in the early Pennsylvania establishment. It is not unusual for historians to be confused by Dutch and English paper that was made during the 1690–1720 period in which appeared watermarks bearing the same emblems and the identical initials that were used by the Rittenhouse mill. The shield watermark so often attributed to the first papermaking establishment in America was abundantly used by the makers of paper in both England and the Low Countries. Historians are still further confused by the watermarked letters, “WR,” as these initials are extremely common in papers made in England and Holland during the seventeenth and eighteenth centuries.
In the original publication *Papermaking in Pioneer America*, Mountain House Press, Chillicothe, OH, 1950, pps. 22–23 (Boston Public Library/Rare Books Q115.3/No. 142), 27 facsimile watermarks of American mills are represented with four Rittenhouse watermarks duplicated from documents printed during 1692–1720. Because the documents contain watermarked initials KR (with clover-leaf) and NR (with shield) for Klaus and Nicholas Rittenhouse, they are considered to be authentic. Hunter states in his *Papermaking in Pioneer America* prospectus:

The many specimens of old line watermarks appearing as illustrations in each book have been made in the actual paper with the exact number of laid and chain lines, duplicating faithfully the original American watermarks in private and public collections.

My examination of Hunter’s 1950 publication containing Rittenhouse watermarks shows that he used moulds with 1” chain and some with 26 and 25 laid lines to the inch, making them very similar to the original documents studied at the Philadelphia Historical Society and Library Company.

If we consider Hunter’s four Rittenhouse watermarks and the thirteen illustrated in Milton Rubincam’s 1959 book, we have seventeen Rittenhouse watermarks that are often similar in design. The three watermarks duplicated for Busyhaus are from those illustrated in Milton Rubincam’s 1959 book and not from those studied in documents at the Philadelphia Historical Society and Library Company. Those selected for the Busyhaus facsimile sheet were considered to be Rittenhouse watermarks on the basis of WR (meaning William Rittenhouse), the shield and cloverleaf (being the seal of Germantown), and Pensilvania [sic] (being the location of the Rittenhouse Mills). I now realize that these three watermarks cannot be absolutely attributed to the Rittenhouse papermakers.

Other watermarks with a WR monogram have proved misleading. Some English paper of the period is marked WR for King William, the R standing for the Latin “rex.” Also the celebrated Basel papermaker Wendelin Riehel used a WR monogram under a shield bearing a fleur-de-lis which has often been mistaken for a Rittenhouse mark. (See Green, James “Rittenhouse Mill and the Beginnings of Papermaking in America. Library Company of Philadelphia & Friends of Historic Rittenhouse Town, 1990, p. 19.)

America were the reasons for publishing this article.

13. John Boyd (located through the Cranbrook Alumni Office) is a professor of printmaking and papermaking at the State University of Wichita School of Art & Design, Kansas. The original order was for 500 watermarked sheets with 250 decided on in a letter (Jan. 7, 1970) to Lawrence Barker. Boyd, when he finished the project, actually mailed Busyhaus 335 sheets on August 12, 1970. Boyd recounts that some 500 sheets were made to allow selection of the better sheets. Boyd states that the reason for making so many sheets had to do with the thin wire used for watermark letters. “The smaller diameter of these letters may have been the reason for their lesser clarity in the finished paper.” The 335 sheets sent to Busyhaus were considered to be the best of the some 500 sheets formed at Cranbrook. In addition to the 335, Boyd gave ten sheets to friends and repulped the other sheets. Of the 335 belonging to Busyhaus, only 325 will be available as keepsakes. Of the remaining ten sheets, one each was given to Henk Voorn, Lawrence Barker, and Michael Durgin. One is missing and six have become damaged and will remain part of the archival records. In total, 345 sheets were extant in 1970 and 344 extant in 1991 (minus missing sheet?) with 331 the property of Busyhaus (or 330 with one sold in 1991).

14. The two 1970 wood engravings were mostly designed from resources in Milton Rubincam’s *William Rittenhouse (and Moses Dissinger. Two Eminent Pennsylvania Germans)*, the eighteenth century Diderot encyclopedia, and Dard Hunter’s *Papermaking, The History and Technique of an Ancient Craft*. Eight 1971 wood engravings were designed from additional references and research at paper mills in Europe. The engravings envisioned were (1) William and Heinrich (brother) Rittenhouse as young men working at Vorster Mill; (2) William in Holland with windmills; (3) William in Colonial America at his 1690 mill; (4) Interior of mill with watermarks being applied on papermaking moulds; (5) William and Claus (son) making paper at the mill vat; (6) William delivering papers to Philadelphia printer William Bradford; (7) Destruction of the mill in a 1700–1701 flood; and (8) William in front of his 1707 residence. McCurdy did drawings for the eight engravings (extant drawings 2, 3, 5, 6, 7, 8) and completed a wood engraving for drawing 5. Drawing 5 is extant only as a photocopy. Michael McCurdy, Penmaen Press (1968), 66 Lake Buel Road, Great Barrington, MA 01230.

15. The 1971 trip to Europe was made possible with the award of a traveling fellowship in 1969 from the Boston Museum School and Museum of Fine Arts. A second trip was made in 1975 that included attendance at a conservation seminar held by the British Museum and the University of London. Sites visited during these trips included the Amies Company, Marten Orges-Veluwe Mill, Barcham Green/Hayle Mill, Basel Papiermule, Biblioteca Nazionale Centrale, Cartiera Ditta Filippo Milano Amalfi, Cartiera Miliani Fabriano, Douglas Cockerell Bindery, De Schoolmeester Mill, Gutenberg Museum, Instituito Patologia del Libro, Plantin-Moretus Printing...
Museum, Sheepstor Paper Mill, White Rose Paper Mill, and the Wookey Hole Paper Mill. I am indebted to Vera Freeman (Andrews/Nelson/Whitehead) and Leonard Schlosser (Lindenmyer Papers) for the many introductions they gave me, and to Henk Voorn, who spent several days guiding my visits to Dutch paper sites.

16. In September 1971, an 8" × 12" (sheet size) laid hand mould was ordered from Amies & Son and completed by April 1972. This demonstration mould contained the Busyhaus logo watermark and had 1" chain with 20 laid lines per inch and E. AMIES & SON 6739 stamped on brass. This mould was obtained for the paper workshop being planned (see Handmade Paper Today, 1983, pps. 114–115). During the period 1973–1975, it became possible to purchase from Amies & Son a working pair (two moulds and one deckle) of antique 19-3/8" × 24-3/4" (sheet size) laid moulds that had been used at the Green/Hayle Mill. These moulds had 1-3/8" chain with 23 laid lines per inch and E. AMIES & SON stamped on the brass of both moulds. Before I owned them, the moulds had what appeared to be the watermarks "TEDMONDS 1940" and a fleur de lis-type design. Timothy Barrett, in 1976, when studying papermaking in Japan, assisted Busyhaus with having a custom 12-3/4" × 16-3/4" (sheet size) transfer screen (su/sugeta) mould made for the paper workshops in America.

17. After first writing Twinrocker (Jan. 3, 1973), they replied that they did not own any laid moulds, although they had used them and asked about sources for obtaining them. By April 1973, Twinrocker had succeeded in purchasing laid moulds from Remy Green made by Amies and used by the Barcham Green/Hayle Mill.

18. The 1973 trip to Twinrocker, with Helena Wright, became possible with an award of a fellowship from the National Endowment of the Arts to research papers used by American paper/book conservators. This research was later published, Restoration Papers: A Survey of Papers used by American Print and Book Conservators, NEA/Busyhaus, 1977.

19. Although some 500 sheets were made at Twinrocker in 1973, less than that number were made into wood engraving prints with an unknown number given as keepsakes or disposed of during printing. Of these, 480 prints are the property of Busyhaus. The use of 325 watermarked sheets and wood engraving prints as keepsakes means 155 prints remain.

20. In 1970, Helena Wright wrote a 2000-word manuscript, "Paper Mill Run/The Rittenhouse Paper Mill," which was to serve as the text for the publication about William Rittenhouse. In 1970, the manuscript and other copy was sent to Roderick Stinehour (Stinehour Press, Lunenburg, Vermont) for typesetting and printing specifications. The project was also reviewed by Ivan Ruzicka, a hand bookbinder at Impressions Workshop, Boston. It was Ruzicka who suggested using printing papers made by Zerkall Renker & Söhne of Germany or Czechoslovakian papers from the Velke Losiny Mill (1516–1976). Ruzicka said that they could make 200,000 sheets per year.
DEDICATION AND ACKNOWLEDGEMENTS

“Gewidmet dem Kunstler und Einwanderer Henry Carl Hauser.” Dedicated to Henry Carl Hauser, artist and immigrant, and Grace and Albert Hauser who have always been supportive.

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Leiter, Walter. “Heimat und Name von Vilhelm Rettinghaus, Dem Ersten Papiermacher


*Available for Purchase*: The watermarked sheet and the wood engraving, sold as a pair (325 pairs being offered), are available for purchase at $35.00 per pair. Please write to Busyhaus Associates, Box 1072, Mattapoisett, MA 02739 (checks only to Robert Hauser). A pair includes the 10"x13" watermarked sheet (illustration no. 2) made by John Boyd at Lawrence Barker’s papermaking program, Cranbrook Academy, 1971, and the 3"x3" wood engraving (illustration no. 3) of papermakers William and Klaus Rittenhouse by Michael McCurdy in 1970, and printed by him on 5-½"x4-¾" handmade paper made in 1973 at the Twinrocker Paper Mill.
ARCHITECTS BOOKS:
AN INVESTIGATION IN BINDING AND BUILDING
Elizabeth Williams

As an instructor of undergraduate architectural students at the University of Michigan College of Architecture and Urban Planning, I am always searching for unique ways to begin an architectural design project. While searching for an appropriate project, I began to appreciate the relationship between books and buildings, and more importantly, making books and making architecture. I was particularly inspired by Ulises Carrion’s *The New Art of Making Books*.

In this four-week architectural project, students were asked to design the studio and dwelling spaces for a hand bookbinder on an urban site in Ann Arbor, Michigan. After touring the Bessenburg Bindery, students were given the program statement in the form of small unbound sheets of paper. They were then asked to assemble the pages in a way that explored or challenged the concept of binding. After presenting the projects, a discussion about the relative design issues of binding and architecture followed. Students then proceeded with the design of the building. For some, the ideas explored on this introductory project became the generator for the building development. For others, the binding project served as a point of departure for the architectural project.

I found that this introductory project had an enormous impact on the success of the students’ projects. By starting with an abstract yet related project of making, the students were encouraged to think about conceptual issues that could inform their architecture. Students were also introduced to the relationship of craft and idea, while developing a respect and understanding for the work of their proposed client.

BINDINGS AND BUILDINGS

*The Program*

At the beginning of the project, students were given a handout or program which described the requirements of the problem to be solved, as well as any additional information they might need. The program was copied on to 4-1/4 x 5-1/2 inch sheets of paper and wrapped in brown craft paper. Attached was a note that asked the students to assemble the sheets (Figures 1 and 2).

*Ken Nye*

Ken appreciated the distinct relationship between the pages and the cover of a book, and drew an analogy to the interior and skin of a building. Both the binding and the architectural model articulate the relationship between a fragile interior protected or bound by a solid enclosure. The box is made of walnut. The pages are held between wood strips that are joined with a wood pin detail (Figures 3 and 4).
Rebecca Goozner

Rebecca was interested in the relationship of chapters to the whole book, and saw parallels in the various programmatic components of her building. She divided the program into three distinct chapters and stitched them each to a separate yet connected cardboard spine. The architectural project explored the idea of programmatic zones, and divided them distinctly in both the horizontal and vertical dimension (Figures 5 and 6).

Laura Giezentanner

Laura interpreted reading books as a ritual that involved a series of steps. She bound her pages in a way that exaggerated this notion. Her pages were sewn onto a cloth cover that had been attached to a copper rod. The rod was held in place within a wood box that had several leather hinges and clasps. The building project explored the ritual and sequential nature of binding and living (Figures 7 and 8).

Craig Hoernschemeyer

Craig was interested in the relationship of spine to book and spine to building. He was also interested in the tastes of Roger Payne (as noted in Bibliopegia, by John Hannett). Craig’s wood zig-zag spine was drilled and hand sewn to the cover. The olive cover and the purple end pages were as Roger Payne would have specified. The building relies on the circulation spine as an organizational element, which is visible from the exterior (Figures 9 and 10).
**Eric Andreasen**

Eric’s pages were bound vice like, between two wood boards tightened with brass screws. The boards were drilled and the pages were sewn through the boards. In essence, the book and the process became one. Eric approached his architectural project in an analogous way, where his process drawings and his final project were one in the same. In addition, the spine became the most important organizing component of Eric’s building, serving as both circulation and structural support (Figures 11 and 12).

**Ellen Martin**

Ellen’s initial interest was in the way that paper was folded in the making of books, and the fact that a book could be considered as a series of folds. She was also interested in challenging the way books are held, opened, and read through. Her architectural project explored the relationship of folding and interlocking spaces as well as the way the building is read (Figures 13 and 14).

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*Figure 11*
Theresa Choa

Theresa was fascinated by the mystery, the craft, and the materials of bookbinding. The binding is an assemblage of special papers and found materials, carefully hand sewn. Her architectural project, in particular the facade, explored similar issues (Figure 15).

Bob Fenderson

Bob’s book describes his idea that bookbinding remains constant and that text changes through time. His book cover is of sheet metal, and the pages can be removed as a result of a clasp detail. His architectural project explored a similar idea with the exterior as the cover or binding, and the internal framework as the text that changes from occupant to occupant through time (Figure 16).

Alan Orb

Alan glued his pages end to end, and rolled them around a wood dowel. The scroll was then wrapped with needlepoint fabric and tied with string (Figure 17).
Elizabeth Williams is an Adjunct Assistant Professor at the University of Michigan College of Architecture and Urban Planning, Ann Arbor, Michigan.
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