

## Paper, Pins, and Preservation: The Evolution of Wallpaper Conservation in a “Ruin” Environment

### INTRODUCTION

As a design element subject to changes in taste and style, and fairly easy to remove and replace, wallpapers are one of the most vulnerable elements of a building and surviving examples of historic papers can be rare.

Search the term “Wallpaper Conservation” and most of the results will discuss the preservation of opulent, high-end papers found in the homes of the wealthy. This bias is also seen in numerous books on the history of wallpaper, the technical brief issued by the National Park Service, and multiple articles published by conservators. But as preservation expands to include more vernacular structures, conservators are increasingly being asked to preserve interiors finished in inexpensive, mass-produced wallpapers often overlooked by the conservation community. These materials bring with them a new set of conservation issues not seen in higher-end wallpapers.

The goal of most conservation efforts in historic house museums is to make it appear the occupants have just stepped out of the room for a minute; but what if that goal instead is to try and retain the sense that the visitor has just walked into a space that has been left abandoned for the last 50 years? This is the preservation challenge present at the Lower East Side Tenement Museum.

### THE LOWER EAST SIDE TENEMENT MUSEUM

The Lower East Side Tenement Museum, a National Historic Site, is the nation’s first history museum specifically devoted to the urban immigrant experience. It is located in a five-story, brick tenement building in New York City’s Lower East Side, considered by many to be the most famous immigrant neighborhood in the United States. Constructed in 1863 in the Italianate style, the building initially contained 22 apartments and a commercial saloon in the basement. Originally intended for middle-class families, the three-room apartments were arranged four per floor—two in the front and two

in the rear—accessed by an unlighted staircase which ran up the center of the building. The apartments contain a parlor, a kitchen, and a small bedroom and were approximately 325 square feet in size with no indoor toilets or running water. Light was supplied by oil lamps and heat from coal stoves. Despite the apartments’ small size, it was not unusual for each household to contain seven or more tenants. In the 72 years the apartments were occupied, nearly 7,000 people from over 20 countries lived in the tiny apartments of 97 Orchard Street.

Like many tenement buildings, modifications were made to 97 Orchard to comply with the city’s developing housing laws. Passage of the First Tenement House Act in 1867 saw the installation of fire escapes for every unit. The Second Tenement House Act in 1879 required each room of each apartment to have windows to increase air and light, which necessitated cutting new openings into interior walls to admit air and light into the kitchens and bedrooms. The Tenement House Act of 1901 led to major changes, including the introduction of indoor toilets (two per floor), gas lighting, and increased ventilation through the addition of a full-height air-shaft. The toilets and air-shaft were added to the southern half of the building, which reduced the size of the already small bedrooms for half of the apartments.

Even with these upgrades, the middle-class families continued to move out to newer homes with more modern amenities and were replaced by poor families and recent immigrants. The passage of restrictive immigrant laws in the 1920s also greatly reduced the number of new immigrants moving to the Lower East Side neighborhood, with the population declining 40% between 1920 and 1930.

The difficulty of filling these apartments, combined with the passage of a 1934 law which would have required the replacement of the central staircase at great expense, led the landlord to evict the tenants and seal off the upper floors, leaving only the storefront units open and generating rental income.

These upper floors remained unoccupied until 1988 when the museum purchased the building and discovered over 2,000 objects in the apartments which had been left by the

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last inhabitants. As a result, these apartments had become a time capsule of immigrant life in America.

#### WALLPAPER AT THE LOWER EAST SIDE TENEMENT MUSEUM

The Tenement Museum currently has 19 apartments, 15 of which are open to the public. The museum is unique in its restoration and interpretation of the building and its occupants, and its treatment of some of the apartments in a state of “arrested decay.”

The museum classifies their apartments into two different categories, “restored” and “preserved.” Restored apartments are those which have been restored or reconstructed to a specific time period in the building’s history and are used as interpretive spaces. These apartments tell the story of actual residents of 97 Orchard Street using information gathered through historic research and family histories. Restoration treatments included new plasterwork and sheet rock, skim coats of plaster over historic finishes, painted finishes, and new wallpaper (fig. 1).

Of the six restored apartments, the parlors of the Gumpertz, the Rogarshevsky, and the Levine family apartments have wallpapers that are re-creations of original historic papers that were found within 97 Orchard Street. In 1994 paper conservator Reba Fishman Snyder conducted an “archaeological dig” of the wallpapers at the museum and catalogued the papers found within the various rooms. She carefully removed small sections of the wallpaper for analysis, gently separating the layers using a microspatula. In one apartment she found upwards of 22 layers of wallpaper.

Ms. Snyder and the museum worked with wallpaper company Scalamandre, who provided their services pro-bono, to recreate some of the papers found during the analysis. The floral paper used in the Gumpertz parlor is a reproduction of the earliest wallpaper discovered in the museum. The red wallpaper used in the Rogarshevsky parlor is the 14th layer found in Apartment 11 (fig. 2). Based upon the wallpaper’s location within the stratigraphy of the layers, and the color and style of the wallpaper pattern, museum curators determined that this paper most likely dated to circa 1910, when the Rogarshevsky family would have been living in the building.

Scalamandre are manufacturers of high-end textiles and wallpapers who tout their use of the finest materials. While their replicated papers are beautiful, the quality of these wallpapers is very different than the wood pulp papers used by the original inhabitants of 97 Orchard.

#### HISTORIC WALLPAPER FOUND AT THE LOWER EAST SIDE TENEMENT MUSEUM

Wallpaper, originally made of cotton rag, was too expensive for the majority of Americans to afford until the mid-19th century. However, with the introduction of machinery to



Fig. 1. Parlor of the “restored” Rogarshevsky apartment.



Fig. 2. Historic wallpaper on the left was recreated for the Rogarshevsky parlor (right).

make and print continuous rolls of paper, prices began to fall in the 1840s. It was the introduction of wood pulp to the paper making process which drove prices down far enough to become popular even among the poorest Americans. With prices starting at 4.5 cents per roll in 1898, an entire apartment could be papered for less than \$1.00.

Inexpensive wallpapers were printed in the most popular styles and patterns. An 1884 edition of *Carpentry and Building Magazine* stated, “It is quite remarkable how quickly the supply for cheap and truly artistic papers has responded to the demand.”

Wallpaper was a popular interior finish for the working poor as can be seen in the majority of the apartments at the Tenement Museum where there is a wide array of patterns including Asian-inspired designs, abstracts, florals, brocades, and stripes (fig. 3). Borders, running around the perimeter of rooms, are found in both floral and geometric patterns.

The wallpapers in these apartments are not relegated to just the walls; they are also located on the plaster ceilings in the parlors and kitchens of many of the apartments. These papers may have been applied as decoration, or to hide cracks in the ceilings as the building aged.



Fig. 3. Examples of wallpapers found within the LESTM apartments.

The Tenement Museum also has examples of sanitary papers. The late 19th century saw a great rise in sanitary concerns and wallpapers were frowned upon as decoration because they could not be cleaned. Wallpapers accumulated dirt, soot, and grease, and were thought by some to harbor insects and disease. Sanitary papers were seen as the answer to this problem, having a coating of varnish which allowed them to be washable. An 1887 article in the *Journal of Decorative Arts* entitled “The Homes of the Lower Classes; How to Make Them Sweet, Clean, and Beautiful,” stressed the use of this “economical and hard wearing” paper for “poorer households.” The walls of the kitchen in Apartment 11 were finished with at least two layers of sanitary paper. The design on this paper is one that was popular for many sanitary papers, which is in imitation of another material known for its sanitary properties—ceramic tiles (fig. 4).

Based upon historic research at the museum, wallpaper began to replace paint on the front room (parlor) walls of the apartments in the mid-to-late 1880s. The museum believes that the landlord arranged for the walls to be papered every time new tenants moved into an apartment. While some tenants added their own layer of wallpaper to beautify their apartment, landlords may have opted to use wallpaper instead of paint because, with its busy patterns, it better hid imperfections in the walls and general soiling. Also, compared to oil paints, which could take up to a week to dry, wallpaper could be applied in one day. Unlike higher-end wallpapers,



Fig. 4. Washable “sanitary” paper found in the kitchen of Apartment 11.

which were generally applied over a liner, the wallpapers at the Tenement Museum were first applied either directly over multiple layers of paint, or over plaster or wallboard repairs. Where liners are found, it is often an old newspaper. But more often than not, the wallpapers were applied one layer over the other.

In 1885 a law was passed in New York mandating that “no wall paper [*sic*] shall be placed upon a wall or ceiling of any tenement or lodging-house, unless all paper shall be



Fig. 5. “Preserved” kitchen of Apartment 11.

first removed therefrom and said wall and ceiling thoroughly cleaned.” While considered by many to be “a very slovenly and unhealthy practice,” luckily for historians and conservators, many landlords skirted the law on this issue. The amount of retained paper varies greatly from apartment to apartment, with some rooms retaining only a few scraps of paper while others had upwards of 20 layers. As was customary at the time, none of the bedrooms were papered on either the walls or the ceilings.

These historic wallpapers are all found at the Tenement Museum, in what they call a “preserved” apartment. The preserved apartments are those spaces which have been stabilized in their as-found condition and presented as “ruins” (fig. 5). These apartments endured over fifty years of water infiltration, uncontrolled fluctuations in temperature and humidity, and general neglect. Many of the papers in these apartments are in poor condition. They are stained, torn, and sagging. Additionally, these apartments also exhibit substrate conditions which greatly affect the historic paper, including exposed lath, peeling paint, and cracked, bulging, and detached plaster.

Analysis of the historic wallpapers found them to be pigmented Kraft-based papers with starch and glue paste adhesives. So, in addition to the damages caused by fluctuations in temperature and relative humidity, exposure to ultraviolet light, and failures of the substrate, these papers are also affected by the oxidation of the acidic wood pulp paper which caused the paper to darken, become brittle, and lose strength over time.

While the papers in these apartments are in poor condition, exhibiting extensive levels of deterioration, they are an *integral* part of the museum. In addition to helping define the authenticity of the apartments, the original wallpapers tell the story of the building’s occupants including financial situations, sanitary concerns, and changes in aesthetic tastes over time.

#### WALLPAPER CONSERVATION AT THE LOWER EAST SIDE TENEMENT MUSEUM

Jablonski Building Conservation Inc., (JBC) began working with the Tenement Museum on interior finishes in 2002 when, with funding from the Getty, the preserved apartments were surveyed and a conservation plan was created. Conservation treatments were tested to determine the most successful means and methods of stabilizing the wallpapers. The conservation plan included recommendations to address soiling, minor wallpaper delamination (where just the edges had lifted), and major delamination (where more than 50% of the paper had fallen away from the plaster substrate). As the water-staining was so extensive and as it is primarily an aesthetic issue, tests for stain removal were not performed. Multiple campaigns of in-situ wallpaper and plaster conservation have been performed since 2008. Due to limited pre-existing studies on the conservation of vernacular wallpapers, many of the treatments were experimental, though performed with the philosophy of doing the least harm. Conservation treatments have included the following:

##### CLEANING

One of the easiest and least expensive treatments for the papers of the Tenement Museum was simple cleaning. Many of the papers were torn and folded over, or had become detached and were rippled on the surface of the wall. Each ledge of the paper was completely coated in a thick layer of dust. The paper is extremely brittle and breaks easily; therefore any cleaning had to be undertaken with great care.

Two methods were used to clean the papers depending upon their condition and location. Paper that remained fairly well attached to the wall, but was rippled, was gently vacuumed using a HEPA vacuum with a soft brush attachment. Paper that had become detached was supported from behind by hand and the soil gently dusted away with a soft, natural-bristle brush.

One of the more challenging items to clean was the large amount of debris that had accumulated behind the detached paper. This debris consisted of the detached finish plaster and paint fragments which had fallen behind the loose wallpaper and gathered at the base of the void. Where possible, tweezers and micro vacuum tools were used to remove the debris so the wallpaper could lie flat. In some locations the presence of shelving additions had trapped the fragments and the tools could not reach the debris. While cutting the paper below the level of the shelf was an option to create an opening to remove the fragments, it was decided against further damaging the wallpaper. Instead the debris was left behind the paper and the upper loose portions of wallpaper stabilized.

## SYNTHETIC ADHESIVE

As part of the 2002 conservation plan, multiple types of adhesives were tested on the wallpaper. A 20% solution of Paraloid B-72 in acetone, and Jade R, a reversible, acid-free, archival adhesive proved to be the most successful at reattaching the paper to the substrate. Due to the brittleness of the papers, they were often first softened with a light spray of steam and the adhesive applied to the substrate and the back of the paper. The paper was then gently pressed back into place using a piece of silicone release paper as a barrier. The wallpapers were held in place by hand until the adhesive dried.

Unfortunately, due to the dry, porous nature of these wood pulp papers, they were very absorbent and were easily stained. While this was not as much of a concern on the earlier heavier weight wallpapers, it was most noticeable on the thin Kraft-based wallpapers. These papers are often the most recently applied, especially on the ceilings. The application of Jade R to these papers always seeped through to stain the surface. While our initial testing found that a 20% solution of B-72 in acetone did not stain the wallpapers, additional tests using 15%, 25%, and 50% solutions found that a 50% solution of B-72 in acetone was required to re-attach the paper without staining. Unfortunately, the adhesive above a 25% solution was thick and gummy, creating thin tendrils of adhesive that would stretch between the container and the brush, which made it difficult to keep adhesive off the surface of the paper. Any B-72 solution which was accidentally deposited on the paper surface made it dark and shiny.

## PINS

In an effort to avoid the creation of additional stains caused by the adhesives on some wallpapers, buttons or pins were also used to re-attach the loose paper to the plaster walls. The pins are clear acrylic, 1/16-inch thick, in a variety of shapes and sizes with edges sanded smooth. They were installed with small stainless steel brads inserted through a pre-drilled hole in the button and gently hammered into the plaster (fig. 6). Rectangular pins were generally used for securing long tears; large disks for joining multiple tears; and small disks for small adhesion areas.

If the pins were carefully placed at the edge or along a tear, it was possible to re-adhere the wallpaper without puncturing it. Once installed, the clear pins do not block the pattern of the wallpaper and are often difficult to discern when viewed from a short distance from the wall.

The pinning treatment, however, also had its drawbacks. While an effort was made to place the pins at an edge of the paper in order to not perforate it, this was only successful if all of the paper edges are aligned. Due to the manner in which the wallpapers have torn, the edge of the top paper is often stepped back from the layers below.

The stainless steel brads also required a stable substrate in which to be inserted. Several examples can be found in the



Fig. 6. A pin placed along a tear to prevent puncturing the wallpaper.

museum where multiple pin holes have been punctured into the paper, but no pin remains. These pins kept falling out due to the numerous layers of wallpaper which have nothing behind them into which the brad can secure. In other locations, the pins remain in place, but have become loose causing the rectangular pins, which were initially installed vertically, to rotate on the brad to a horizontal position. Additionally, much of the plaster in the museum is precarious and even gentle hammering can cause it to become detached.

Even with these drawbacks, pinning is an inexpensive, low-tech repair, and JBC has been able to instruct the museum staff how to install the pins when they find new detachments. This prevents the paper from continuing to tear from its own weight until JBC can return to the museum to perform treatment.

## STABILIZATION OF THE SUBSTRATE

As the loss of the substrate, either paint or plaster, has an effect on the paper finishes, these elements have also had to be addressed. In several apartments, multiple layers of wallpaper have been applied directly over oil-based finishes which themselves have been painted over water-soluble distemper paints. High humidity and water infiltration had caused the distemper paints to fail. As the loss of paint leads to additional loss of paper, stabilizing the paint had to be part of the wallpaper stabilization.

Flaking paint was stabilized using a 10% solution of Aquazol 200 in water applied with a natural bristle brush. Working in small sections, three applications of the Aquazol 200 solution were applied and then using a sheet of silicone paper against the surface of the paint, slight pressure was applied to the area. Larger paint chips that were completely loose from the plaster but which remained in place were re-adhered with an application of Jade R adhesive to the back of the sample and reset using tweezers. Once a smooth, stable



Fig. 7. Stabilization of the plaster substrate to prevent additional wallpaper loss.

surface was achieved, the wallpaper was re-secured to the substrate using pins and Jade R adhesive where applicable.

Much of the plaster in the museum has become detached from the lath and is in danger of being lost and taking the wallpaper finishes with it. The south wall in Apartment 11 exhibited a large area of exposed lath and the plaster at the western end of the wall was severely bulging. As the plaster was extremely soft, and the bulging area filled with debris and broken keys, there was a concern that any attempt to stabilize the wall by getting the plaster flush with the lath would result in the complete loss of both plaster and wallpapers. As the wall did not appear to be continuing to move, the conservation treatment was to remove as much debris as possible and then simply fill the void with Ethafoam to create resistance behind the wall should anyone press against it. The open face was spackled over and painted to mimic the color of the exposed plaster brown coat (fig. 7). Additional treatments included the tinted spackle application without the Ethafoam, and consolidation of plaster using Rhoplex and Methyl Alcohol.

#### NATURAL ADHESIVES

One of the most recent materials being used for wallpaper conservation at the museum is funori or TRI-Funori™. Funori is a polysaccharide mucilage (similar to carrageenan) made from seaweed harvested from natural populations in Japan. It is available in dry form from conservation suppliers such as Talas, which must be cooked and strained. Tri-Funori is a pre-mixed version available from Historic Plaster Conservation Services.

Funori has been used in Japan for over 300 years as a consolidant, an adhesive, and a cleaning agent. Although primarily used by book and paper conservators, the product is just becoming known to architectural conservators. Testing of this product has found that it does not leave tide-lines, dries to a matte finish, and is non-toxic. As funori is a mild adhesive, a 4% solution of sturgeon glue was added to increase the strength of the adhesion for this project.

Prior to conserving the wallpaper, the backs of all of the detached papers were cleaned using a soft natural bristle brush. Three coats of funori were then spray-applied to the exposed distemper paints on the plaster. Over time these water soluble paints had become powdery and friable.



Fig. 8. Process of wallpaper stabilization using Tri-funori includes cleaning, consolidating, re-adhering, saturating, flattening, and cleaning.

After the distemper paints had been consolidated, pieces of hanging paper were re-attached. Using natural bristle brushes, the funori/sturgeon glue mixture was applied to the exposed plaster and the back of the wallpaper which was then gently pushed back flat against the plaster. If the papers were extremely brittle, the surface was gently misted to soften it enough so that it would not break when returned to its original position. A second coat of the funori mixture was applied to the face of the wallpaper over a small square of Japanese tissue paper. For larger sections of detached wallpaper, an additional application of the mixture was injected behind the wallpaper to saturate it. Once the entire piece of failed wallpaper was re-adhered to the substrate, a wallpaper seam roller was rolled across the surface to remove any air pockets or creases. After the wallpaper was secured, the tissue was removed, taking care not to disrupt the bond between the wallpaper and substrate.

A side benefit of the re-adhesion process was that the funori and tissue application also cleaned the wallpapers, many of which were heavily stained from water damage (fig. 8).

Brittle, curled edges of the wallpaper which could not be flattened were consolidated and strengthened using an airbrush application of the funori/sturgeon glue mixture. Some detached pieces were left in the hanging position with a strip of Japanese tissue secured to the back with the funori/sturgeon glue mixture to provide additional support. This retained the “ruined” look of the wallpaper by leaving strips hanging from the ceiling or puckered from the wall.

Like most of the previous treatments, there were unexpected draw-backs to the funori/glue mixture. Although touted as

not leaving tidemarks on paper as it dries, unacceptable staining occurred in areas where the funori was applied on the Kraft wallpaper. In an effort to determine if the paper was being over-saturated by the application methods, testing was performed applying the funori with an air sprayer. The spray application method also discolored the paper and reduced the sheen of the silver-colored printing ink on the paper. In an effort to determine if it was the conservation treatment, or the material being conserved that was causing the staining, the funori/sturgeon glue mixture was tested on an old newspaper dating to 1935. The funori left no tide marks or staining on the newspaper, indicating there was some element either in the historic wallpaper, glue, or printing ink which was reacting negatively with the funori.

The wallpaper conservation on the ceilings was the first step in the stabilization of the plaster ceilings. Much of the ceiling plaster had become detached from the lath and posed a safety hazard to visitors. Part of the plaster conservation involved removing the floors from the rooms above and consolidating the plaster from above using an aqueous acrylic emulsion. Due to cracks in the ceiling, which could not be sealed because of the ceiling papers, the consolidant seeped through the cracks and also stained the papers.

The tidelines and the darker staining of the consolidant required a discussion between JBC and the Museum regarding an acceptable final appearance. Together it was determined that it was more important to retain the historic plaster and papers, which were already heavily stained from water infiltration, than risk the loss of these elements.

## CONCLUSIONS

The preservation and conservation of these historic wall and ceiling papers at the Lower East Side Tenement Museum is an important part of the interpretation of these spaces. The torn, sagging, and stained papers help evoke a sense of place and the passage of time in these apartments; their stabilization remains critical. However, due to the extensive nature of the project, with layer after layer of historic paper over what is often an unstable substrate, decisions on means and methods of wallpaper conservation must take into account multiple factors including: financial constraints, visitor's experience, and different or evolving ideas about historic preservation and conservation.

While not always ideal, each of the treatments presented in this paper will continue to be tested, built-upon, and used at the Museum. What works best for one paper may not be the best treatment for the paper in an adjoining room. As always, however, the goal remains to retain as much historic fabric as possible to ensure the unique authenticity experienced at the Lower East Side Tenement Museum is preserved.

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