

205
/ RESTORATION AND PRESERVATION TECHNIQUES--AND
CONCERNS OF HISTORIC WALLPAPERS,

by

SARA ELIZABETH GANS
B.F.A., University of Kansas, 1978

A MASTER'S REPORT

submitted in partial fulfillment of the
requirements for the degree

MASTER OF SCIENCE

Department of Clothing, Textiles,
and Interior Design

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1983

Approved by:

Ludwig Villan
Major Professor

LD
2668
R4
1983
G-36
c.2

CONTENTS

	Page
LIST OF FIGURES	iv
Chapter	
1. INTRODUCTION	1
Statement of the Problem	3
Limitations	5
Methodology	5
2. INFLUENCES ON AMERICAN WALLPAPER	7
English Wallpapers	7
French Wallpapers	12
Oriental Wallpapers	14
American Wallpapers	16
Architecture Wallpapers	19
Plain Papers, Borders, Friezes, and Dados	20
French Scenic Wallpapers	21
Drapery Wallpapers	22
Satin Wallpapers	23
Distinctive Pattern Type Wallpapers	23
Textile Imitations and Rainbow Wallpapers	25
Rococo Revival Patterned Wallpapers	27
Gothic Revival Patterned Wallpapers	27
Gilded and Embossed Patterned Wallpapers	27
Late Nineteenth-Century Taste Changes	28

**THIS BOOK
CONTAINS
NUMEROUS PAGES
WITH PICTURES
THAT ARE CROOKED
COMPARED TO THE
REST OF THE
INFORMATION ON
THE PAGE.**

**THIS IS AS RECEIVED
FROM CUSTOMER.**

ILLEGIBLE DOCUMENT

**THE FOLLOWING
DOCUMENT(S) IS OF
POOR LEGIBILITY IN
THE ORIGINAL**

**THIS IS THE BEST
COPY AVAILABLE**

Chapter	Page
3. HISTORIC WALLPAPER TECHNOLOGY	32
Handmade Paper	32
Machine-Made Papers	35
Painted Papers	36
Stenciling	37
Block Printing	37
Machine Printing	39
Flocking	42
Silk Screening	42
4. PRESERVATION AND RESTORATION TECHNIQUES	44
Planning	44
Research	45
Uncovering and Removing Samples	48
Identification of Samples	49
Alternatives for Wallpaper Restoration	50
Preservation of a paper as found	50
Removal and rehanging of large areas of wallpaper	53
Custom-made reproduction of original wallpapers	59
Purchase of appropriate wallpaper patterns	62
CONCLUSION	64
BIBLIOGRAPHY	66
APPENDIXES	70
A. ILLUSTRATIONS OF WALLPAPER	71
B. INSTRUCTIONS FOR POLYESTER FILM ENCAPSULATION	99
C. REPRODUCTION WALLPAPER FIRMS	104

FIGURES

Figure	Page
1. English Bible Box	72
2. Early Eighteenth-Century Flocked Wallpaper	73
3. A Flocked English Flowering Vine with Diaper Pattern	74
4. Landscape Wallpaper	75
5. Print Room Wallpaper	76
6. Gothic Pattern	77
7. Pillar and Arch Pattern	78
8. Wallpaper Pattern from Réveillon's Factory	79
9. Marbled Paper	80
10. Eighteenth-Century Chinese Wallpaper	81
11. Chinoiserie Motifs and Indian Florals	82
12. Pannell Papers	83
13. Plain Papers	84
14. Festoon or Swag Border	85
15. Fresco Papers	86
16. Frieze, Fill, and Dado Placement	87
17. French Scenic Wallpaper	88
18. Drapery Papers	89
19. American Imitation of Drapery Papers	90
20. Satin Paper	91
21. A Distinctive Pattern Type	92
22. Irisé or Rainbow Paper	93

Figure	Page
23. Gothic Wallpaper	94
24. Gilded and Embossed Wallpapers	95
25. Late Nineteenth-Century French Block Print	96
26. William Morris Wallpaper Pattern	97
27. Early Machine Printed Pattern	98

Chapter 1

INTRODUCTION

Wallpaper is an important feature of interior architecture, sometimes dominating a furnishings scheme, but more often forming the background against which other decorative arts were shown to their best advantage according to the current fashion. It is a feature too often neglected or replaced by inappropriate patterns in museum "period rooms" and in restored historic houses.

Wallpaper should be considered an integral part of the interior decoration of a historic building. Used in combination with paint, molded woodwork and plaster moldings, wallpapers are hung to give a room's wall and ceiling surfaces color, texture and a decorative pattern. Most often, historic wallpapers are applied directly to a room's plaster walls and ceilings. This direct application establishes the relationship of the wallpaper to the other architectural elements in the room--woodwork and plaster moldings. It also creates a physical bond between the wallpaper and the plaster wall surfaces, so that structural deterioration or environmental factors that result in damage to the substrate also cause damage to the historic wallpaper. Recognition of the interdependency of the wallpaper and the structure in which it hangs is crucial for successful wallpaper preservation and restoration (13).

As during the past, wallpaper today is also imitative and closely linked with textile designs. It was greatly influenced in both design and technology by existing modes of wallcovering. Wallpaper acquired an imitative, eclectic character from which it has never quite freed itself. Starting with animal skins, cave paintings and woven grasses, wall decoration evolved through periods of elaborate stonework, richly embroidered draperies of wool and linen, carved and painted wood-panelling, tapestries, silks, and serges. These materials, and to an even greater degree printed textiles and embossed and gilded leather, are largely responsible for the way both ancient and contemporary wallpapers appear today.

The large number of period designs copied and adapted from old papers and textiles provide designers with one more contemporary artistic tool to design with. Other contemporary tastes are seen in designs which, though basically traditional, are characteristic of our day in color, scale, and in the elimination of detail.

The increasing number of restorations of historic structures and contemporary interpretations of historic wallpaper in the United States has created a demand for accurate reproductions of documented wallpapers, and their original technology.

Through preservation, the past comes to serve the present and contributes to the development of the modern design. In the destruction, and inaccurate renovation of old

buildings, the contribution of the past is lost without an active emphasis towards preservation and restoration (39).

Statement of the Problem

From the very beginning, wallpaper has been regarded mostly, though not always, as a poor substitute for more luxurious and expensive mural decorations and, therefore, has not been preserved with any great care.

Rarely is wallpaper given adequate consideration in the restoration and/or preservation of interiors. However, it should be remembered that eighteenth- and nineteenth-century homeowners, architects and builders may have visualized certain spatial effects of light, warmth, mood and proportion dependent on the use of wallpaper. Therefore, attempts to create rooms in restored houses require careful consideration of the appropriate interior wall finish. The likelihood that wallpaper may have been used should be recognized and investigated.

In many American cities, old buildings of high architectural standards are designated by law as historic landmarks. The interiors in most cases do not receive the local legislation that protects them from imprudent alterations or even complete gutting. One particular component of the interiors that could be valued aesthetically and historically is the wallpaper. Without this consideration many wallpapers that once enhanced interiors are lost (6, 32).

Striving for an accurate restoration, a high level of objectivity must be maintained and the evidence carefully

considered. There are some things to avoid in choosing the paper. Not just any paper will achieve the proper historical ambience, and finding the proper documented paper is not always easy. Many expensively restored late nineteenth-century rooms have been unwittingly papered with reproductions of distinctly eighteenth-century patterns which were readily available. The personal tastes of the board of directors, local decorators, influential donors or volunteer committees can pose great problems. Often, after professional research reveals the actual paper that was used in the room, the results are ignored by members of an influential committee who consider the paper ugly and, therefore, "inappropriate." The impulse to decorate in conformity with twentieth-century taste is commonly allowed to prevail, but should be suppressed. If paper is to be hung, patterns should be consistent with any evidence found on site, whether a documented reproduction or an adaptation of the original be used (5).

Wallpapers designed and made by past generations often represent the best design, craftsmanship and artistic endeavors. This legacy of wallpaper design deserves preservation equal to that of the exterior.

The purpose of this report is two-fold. First, to show that successful designs are not without roots. It is for this reason we need to protect the wallpaper of historic sites so not to lose our links with our artistic heritage. Secondly, this paper serves to educate people of the importance of the preservation and restoration of period papers. A decision

must be made in the initial stages of the project as to the fate of any discovered wallpapers on site. This decision must take one of two directions, (1) preservation and/or restoration of the discovered papers or (2) hanging of reproductions, accurate in pattern, color, and historical period.

This report focuses on the techniques of preservation and restoration of discovered period papers, giving the project decision-makers, restorationists, and preservationists a background of the necessary procedures and techniques to follow.

Limitations

1. Many of the companies that were contacted for information were out of business or chose not to reply.

2. I was not able to travel to any distant area to examine the necessary documents or relics.

3. I was not able to obtain many of the rare books through interlibrary loan.

4. Many of the companies suggested one or two identical books for information and research, that were not as current as some I found.

Methodology

The research design was of historical nature. The process involves investigation, recording, analyzing and interpreting the events of the past for the purpose of discovering generalizations that are helpful in understanding

the past, understanding the present and, to a limited extent, in anticipating the future.

In researching the topic, various sources were consulted. These included bibliographies, card catalogs, The Art Index, Avery Index, The Architectural Index, the Historical Abstracts, a Computer Search, Subject Guide to Books in Print 1983, the Reader's Guide to Periodical Literature, the Science Citations, the America: History and Life Abstracts and the Interlibrary Loan. Additionally, letters and telephone calls were made to agencies and museums within the United States and Europe, inquiring for literature, samples and slides.

Chapter 2

INFLUENCES ON AMERICAN WALLPAPER

English Wallpapers

Traditionally, wallpapers imitate more expensive materials, such as architectural details, painted wall decorations, wood grains, marble, and, most often, textiles. General stylistic trends paralleling those of other furnishings and decorative arts can be traced in wallpapers.

Prior to the Revolution, English papers dominated the American market. The English colonizers on the East Coast of America drew upon the architectural and decorative styles of their homeland for the forms and ornamental details of nearly all their buildings and furnishings (8).

Although a great deal is known about the colonists' chairs, tables, and chests, there is less evidence about what they used to finish interior walls. Paper and cloth wall coverings were perishable commodities that have not survived in quantities equaling those of antique tables and chairs. Records of their presence in houses are also much rarer because wall finishes, once applied or installed, lost their value as "moveables" that could later be sold. They were therefore not listed on inventories of estates--documents that have provided historians with a great deal of information about other objects commonly found in colonial households. However,

scattered bits of evidence in colonial trading records and advertisements, as well as in eighteenth-century correspondence and journals, support the conclusion that the colonists closely imitated English styles in wall coverings, as they did in everything else.

In England during the seventeenth century, walls were finished with plaster, paint, or wooden paneling, called wainscoting. Exposed stone was also an accepted interior finish for a wall. All of these materials could provide highly decorative surfaces, and even when not elaborately ornamented, they were considered adequate for most rooms. In fact, decorating interior walls with "hangings," a term used to describe textiles, leather, or paper tacked, glued, or otherwise secured to cover a wall, was the exception during this era (16, 21).

The most luxurious way to decorate seventeenth-century walls was to hang them with woven tapestries of the kind that had been favored since the Middle Ages for the halls of the British nobility. Some paper hangings evolved as inexpensive imitations of tapestries and of other materials--including woolens, damask, velvet-woven silks, leather, and canvas--that were also occasionally hung on English walls during the seventeenth century (4, 11, 16).

In England as well as in Europe, those of the lesser ranks sometimes pasted sheets of paper decorated with pictures on their walls. These poor men's substitutes for the framed paintings of the rich were printed by the same

craftsmen who made book illustrations. The patterned sheets made by these printers were also used as endpapers for their volumes and as lining papers for boxes and trunks, where they survive more often than they do on walls (Figure 1, page 72). When they began to decorate the single sheets with patterning that formed a complete motif, or repeat only when juxtaposed with other sheets, they set in motion one of the processes from which modern wallpapers evolved. These papers were amongst the very earliest patterns available for decorating American walls.

A quite different group of English craftsmen, more accustomed to decorating textiles than to working with printing presses, designed another kind of wall covering that was used during the seventeenth century. This group had learned how to imitate cut velvets by applying flocking to canvas and paper (Figure 2, page 73). By the seventeenth century the fame of London-made flocked wall coverings had reached America, and patterns of branching stems putting forth flowers and leaves over background of diaper patterning (patterning based on a diamond grid) were executed in flocking, as well as distemper (water base) paint (Figure 3, page 74).

Floral patterns. The floral motifs were derived from textile prototypes, and formed the largest category of repeating patterns in this first relatively large group of wallpapers known to have been used in America (10, 14).

Other English floral patterns included some that featured flowing ribbons among the flowers, and floral

stripes. In these, sprigs of flowers or vines were interspersed among vertical bandings that imitated the bandings woven in textiles. The vertical stripes formed by horizontal ribbing sometimes looks like grosgrain ribbon or ribbons of lace (16, 37).

Although both printed and flocked papers had been introduced in England during the early sixteenth century, their use was still limited throughout the seventeenth century. Wallpaper was not to achieve real popularity until the middle of the eighteenth century (16, 24, 37).

Landscape papers. In addition to floral patterns, hand-painted, rather than printed, landscape papers were English wallpapers with large-scale nonrepeating views depicting ruined architecture. They are known to have been used in at least three important American mansions of the 1760s: the Philip van Schuyler and Stephen van Rensselaer Houses in Albany, New York, and the Jeremiah Lee House in Marblehead, Massachusetts. The elegant views were surrounded by wallpaper or papier-mâché "frames" (imitating plaster work), which were stylish among those who built mansions in America during the 1760s (Figure 4, page 75) (16).

Print rooms. During the middle of the eighteenth century the idea of decorating with wallpaper imitations of framed pictures was popular. The English during this period pasted engraved prints directly on the walls, and framed them with wallpaper borders. These rooms were referred to as

"print rooms," Print rooms offer the opportunity for exercising ingenuity, originality, and personal taste in the combining of prints of any description with wallpaper decorations and hanging them to best advantage on one's own walls (Figure 5, page 76) (1, 25).

Gothic patterns. The repeating pattern used with the hunting prints in the Moffatt-Ladd house exemplifies an eighteenth-century interpretation of Gothic motifs by Batty Langley (1696-1751) (Figures 5 and 6, pages 76, 77). Langley was the popularizer of architectural features. His career climaxed in 1742 with a pattern book in which Gothic architecture was "improved" by being classified into "orders" like those of classical architecture. Patterns as in Figures 5 and 6 illustrate the eighteenth-century Gothic's bizarre mixture of floral naturalism, scrolls and swirls borrowed from rococo style, and elements from classical architectural ornament like the beading along one edge (35).

Pillar and arch patterns. Another distinctive English pattern type was made of "pillar and arch patterns" (Figure 7, page 78). These were recommended especially for use in entry and hallways. By the eighteenth century, these patterns featured a round-headed arch carried on two columns or pillars. These architectural elements framed a central motif, usually a single figure, a group of figures, an urn, or a vase holding flowers. One or two motifs were repeated one over another, side by side, or were drop repeated. These and many other

eighteenth-century English wallpapers were generally monochromatic and subdued in palate compared to the French papers of the same and later periods (29).

French Wallpapers

America's independence from England ended British colonial trading restrictions and cleared the way for a dramatic increase in the importation of French wallpapers by Americans. Yet it was not until the 1790s that American advertisements began to feature the French paper hangings. The post-revolutionary popularity of French papiers prints (the French term for wallpaper, be it printed or painted; also known as "painted paper" in the eighteenth century) was not simply the result of removal of British restrictions on non-British goods, the price drop on French papers when export duties were abolished, or a by-product of American gratitude for French assistance during the Revolution. These factors were doubtless important, but the quality of the French papers themselves was probably their most important selling point in America during the late eighteenth century. By the 1790s, the beauty of French wallpapers had captivated American tastemakers, and they were gaining popularity among wider circles of consumers.

Most distinctive of the French styles were the Arabesque patterns first popularized in Paris by Jean Reveillon (Figure 8, page 79). He based his papers not only on adaptations from textile patterns, but also on more ambitious, large-scaled designs by important artists. Reveillon was

particularly admired in this country by Thomas Jefferson and his contemporaries during the 1780s and 1790s. Through the use of many individual blocks to print the large number of colors within a single pattern, Reveillon was able to develop a clarity of color and a subtle combination of brilliant and pastel shades that distinguished his wallpapers from those of his successors (28, 37).

Through the first half of the eighteenth century, French workmen had made advances that transformed the craft of the dominotiers; makers of marble paper (Figure 9, page 80) who also used inks to print sheets of patterning that were often colored by hand, into the art of creating large repeating patterns and panels in colors printed from wood blocks (37).

Jean Papillon (1661-1723) and his son Jean-Baptiste-Michel Papillon (1698-1776) made major refinements in the craft. They produced patterns that repeated beyond the confines of a single sheet of paper, and they improved printing techniques. Papillon Sr. is regarded by many as the true father of wallpaper. In 1688 Jean Michel took over his father's printing house for wallpapers, using very large wood-blocks and drawing directly onto them, to produce the first allover repeating and continuous designs. He worked on all aspects of wallpaper production and hanging and contributed notes on the subject to the French writer Denis Diderot for his encyclopedia. Unfortunately, Papillon's notes and his excellent illustrations were dropped, as Diderot, it seems,

finally considered wallpaper too insignificant a topic to merit more than a brief summary (37).

Oriental Wallpapers

Both the English and French styles were influenced by hand-painted nonrepeating papers exported from China to the West from the seventeenth century onward (Figure 10, page 81). The expensive Chinese papers can be generally grouped into three basic types: flowering trees bedecked with birds and insects, landscapes, and processionalists (24, 25, 26).

The delicate hand-painted designs on mulberry paper soon, however, attracted interest in their own right. Because the paintings did not follow the conventions of western perspective, nor did they use effects of light and shadow, they distributed space in a quite novel way. They could be comfortably looked at from a variety of angles. The same qualities meant that their motifs could be used in repetitive patterns (26, 37).

Because each Chinese paper was a unique painted work, not a print made in multiple, it was expensive. Their intimacy, originality and quiet gaiety appealed strongly to the emerging merchant class, as well as to the more aristocratic. The Chinese set high standards for design and craftsmanship (26, 37).

The Chinese designs were usually made in sets of twenty or twenty-five nonrepeating panels each four feet wide, twelve feet long. The panels were made up of joined sheets of mulberry paper. Chinese papermakers could produce

larger individual sheets of paper than did the mills in the West. The average size sheets used were twenty-four by sixty inches (37).

Chinese papers were only hung in the houses of the richest Americans, but this trend filtered down; the incorporation of chinoiserie motifs in wallpaper manufacturing countries was common during the eighteenth century. In addition, phrases like "India figures," "mock India pictures," "Chinese pieces," and "Chinese papering" could also have referred to patterns that would be described today as "Chinoiserie." Chinoiserie designs, Western interpretations of Chinese motifs, were derived from goods and illustrations brought from China, including painted wallpapers (Figure 11, page 82) (18).

One point that should be mentioned is the confusion between Chinese and Indian wallpapers: the terms were interchangeable. Although trading was certainly carried out between these countries, and though Indian woven and printed materials were imported, there are no wallpapers which are known to be specifically Indian (16, 29).

Although few of the actual papers have survived in America, it is possible to document the constancy of the appeal of Chinese papers, and imitations of them, through the eighteenth and nineteenth centuries (37).

American Wallpapers

Before the 1760s, the history of wallpaper styles in America is a history of imports. Most papers came from England, some were imported from the Orient, and a few from Europe, especially from France. Not until 1760s did manufacturers begin to make wallpaper in America (11, 16, 20).

To have pieces of wallpaper that can be dated from before 1750 and hung in an American house is extremely rare. For this early period, therefore, it is exceedingly difficult to create a clear scheme tracing coherent stylistic development in the kinds of papers Americans were importing. The problem of pinning down dates for specific styles in wallpaper patterning, either prior to 1750 or at a later time, is complicated by factors common to studies of style in almost any category of decorative objects in almost any period (29).

The first problem, unlike many works of sculpture or painting, is that furnishings were rarely signed and dated. Secondly, economic factors complicate research: wallpapers that appear to be particularly early because of a simple, even crude, pattern and quality of finish may in fact have been made at surprisingly late date. There is a temptation to look for progress from the simple and crude toward the complex and highly finished. But, in some cases, wallpaper patterns were simplified so they could be made cheaply, even though more sophisticated styles and techniques for printing were current. Or again, crudeness, simplicity, or old-fashioned patterning may reflect nothing more perplexing than the fact that a skill

of a craftsman was limited, along with his knowledge of and concern for contemporary fashion. The taste of the customer can also add difficulties to the researcher's attempt to use style as a tool in establishing the date of a wallpaper (2, 33).

Even though these problems pose difficulties, the life spans of wallpaper styles can still be roughly delimited. It is possible to find enough examples to make a few generalized statements about the earliest pattern types that would have been available for importation and were probably used in America (2, 33).

English styles, as mentioned earlier, dominated the pre-revolutionary wallpaper market in America, a domination well protected by the Acts of Trade and Navigation. But even without this protective colonial policy, English papers would probably have been favored, since they were far better made than those produced elsewhere in Europe. Well into the eighteenth century, English papers enjoyed a reputation as the best available. They were particularly popular in France, even in court circles. Not until late in the eighteenth century, with heavy borrowing of techniques from the English, were the French to produce papers of equal quality (16).

The earliest documentation known for the printing of wallpaper in America appeared in the 1756 advertisement of a dyer and scourer "lately from Dublin," one John Hickey, who announced in the New York Mercury on December 13, 1756, that he "stamps or prints paper in the English manner and hangs it so as to harbour no worms" (25, p. 19).

In 1765 another New Yorker, John Rugar, is regarded as having begun a wallpaper manufactory, and in 1769 Plunkett Fleeson, a Philadelphia upholsterer who had been in business at least since 1739, first announced that he had for sale "American Paper Hangings manufactured in Philadelphia . . . not inferior to those generally imported" (25, p. 26).

The American paper stainers based their patterns on imports, but despite their claims to excellence, they seem to have been held in low esteem by most consumers. The advertisement of one paper hanger published in 1785 is revealing: he offered to hang "any paper, from the most elegant imported from the East Indies or Europe, to the most indifferent manufactured in this country" (35, p. 16).

Some of the first American manufacturers started their factories to supply businesses that began as import and retail shops. William Poyntell of Philadelphia, proprietor of a book and stationery store during the 1780s, seems to have become a wallpaper manufacturer early in the 1790s. By this time a substantial businessman, he acted as entrepreneur, leaving to others the craftsman's job of actually staining paper.

Prior to the Revolution, booksellers, stationers, and upholsterers sold most of the products of the earliest American paper stainers alongside imported wallpapers. Cabinet makers, house painters, and merchants or importers of almost any description also dealt in paper hangings. Wallpapers were occasionally included in the auction listings of imported and

domestic goods that so frequently appeared in eighteenth-century newspapers (16).

Architecture Papers

"Architecture Papers" were becoming very popular in the eighteenth century in America. They depicted large architectural objects such as columns and arches, reduced to small scale. In contrast, imitation at full scale was exploited to fool the eye with cheap substitutes for elements of interior architectural finish, such as moldings, plaster work, and various other ornaments. Among this second, and much larger, group of "architecture papers," "Pannel Papers" were particularly popular (Figure 12, page 83). The "Pannel Papers" were used to imitate wainscoting. Wainscoting was largely confined to the dado level, the lower area of the wall, between the chair rail and the baseboard (20).

The most common wallpapers depicting architectural ornaments were imitations of carved and plaster-work cornices and of simpler moldings designed to run along the tops of walls marking the juncture with the ceiling. As wallpaper borders, they perhaps carried the "look" of high-style architectural detailing to the broadest group of consumers. Advertisers of the 1780s and 1790s described their architectural moldings as "moldings," "carved work," "oakleaf," "dental" (dentil--small square blocks used in a series), and "dental work" borders (16, 40).

Plain Papers, Borders, Friezes, and Dados

A late eighteenth-century style that lasted far into the nineteenth century featured the use of a plain solid shade of coloring applied to wallpaper, usually in green or blue but available in a wide range of other colors, such as French gray, pink, salmon, and yellow as well as black and white. These papers were called "plain papers" and were advertised with "rich" or "elaborate" borders (Figure 13, page 84). Walls painted in a solid color were also embellished with wallpaper borders; the "plain papers" had one advantage over paint, they hid the cracks (12, 29).

Borders were an integral part of wallpapering schemes especially when using plain papers. Its purpose was to imitate architectural moldings. Most often, it was intended that the borders match the colors of papers, plain or figured, with which they were to be used, as well as the pattern (Figure 14, page 85) (29).

Borders were also commonly used to simplify the paperhanger's job by concealing and fastening the cut ends of pieces of wallpaper. They could also serve to hide any tacks used, or to fill gaps if a paper were trimmed too skimpily (26).

In the late eighteenth century, narrow two-inch borders were often used to outline interruptions in walls, windows, doors, fireplaces, cabinets, and pilasters. Borders slightly wider, four to five inches, were used in combination with the narrower ones, usually on the horizontal at the cornice and

chair rail level. This practice was continued past the turn of the century.

In the early nineteenth century, the French produced in abundance, fifteen to thirty-inch wide friezes and dados. Friezes were applied to the top of walls and dados below the chair rail in combination with narrow and wide borders along the vertical edges of walls (3).

The use of borders diminished slightly by the mid-nineteenth century. They were narrower and, for the most part, confined to the tops of walls. In the 1850s and 1860s a French fashion for dividing the wall into vertical panels, formed by border papers again focused fashionable attention on wallpaper borders. These panel decorations, many of which included elaborate dados imitating architectural panelling and carving, were known as "fresco decorations," and required clever hanging to be fitted on a wall (Figure 15, page 86) (35).

With the English patterns of the 1870s and 1880s came the preference for dividing the wall into three clearly differential horizontal sections: frieze at the top, fill below that, and dado below the chair rail. These areas of different patterning were marked off by border patterns (Figure 16, page 87).

French Scenic Wallpapers

French styles dominated the American wallpaper trade during the first seventy years of the nineteenth century. One of the early nineteenth-century wallpapers was the "French Scenic." To Americans of the nineteenth century they were

"landscape papers," "landscape views," "long-strip landscapes," "scenery papers," or simply "view" (28, 37).

The scenic papers were designed to cover the walls of large rooms from the chair rail to ceiling, with continuous, nonrepeating panoramic view. Each length in a scenic "set" or "collection" was about twenty inches wide and between eight and ten feet long. Each length was in turn made up of joined sheets of handmade paper. These were finer and stronger than machine-made continuous papers, which became available around 1820, so manufacturers continued to prefer the handmade as the base on which to print their scenes (Figure 17, page 88) (16).

Drapery Wallpapers

Among repeating patterns, some of the most extravagant French paper hangings of the early nineteenth century that were imported and then copied were designed to look like curtains and elaborately draped textiles hangings. Draping a room with textiles arranged in imitation of the walls of an elaborate tent was in fashion during the First Empire. These drapings were inspired by the campaign tents of Napoleon and his generals (1, 31, 37).

In the wallpapers, sometimes a full length of cloth was represented extending from the top of a wall to the bottom. Such wallpapers were called "drapery panels." In other "drapery panels," the lengths of cloth took the form of curtains, hanging realistically shaded folds that fell unbroken down the length of the panel, or were shown with supplementary

vertical lengths that were caught halfway down in wreaths or ornamental devices around which they were elaborately knotted (Figure 18, page 89) (24, 31).

The American paper stainers did not copy the large scale drapery panels; instead, imitations were made in a smaller scale. The smaller scale draped patterns that were made up of vertically repeating elements were easier to produce for the American craftsmen (Figure 19, page 90) (16, 24).

Satin Wallpapers

"Satin" was a word that frequently appeared in advertisements for drapery papers. Within the context of the early nineteenth-century wallpaper trade, that meant "having a shiny, polished finish" (Figure 20, page 91) (11).

Every kind of pattern seems to have been printed on satin grounds. There were plain, figured, striped, and plaid satin papers. Hardly a wallpaper advertisement of the 1820s and 1830s omitted the word "satin" (11, 31).

Distinctive Pattern Type Wallpapers

While French drapery patterns inspired American imitation, a much larger group of French patterns were arriving in the early part of the nineteenth century that inspired large numbers of copies and adaptations. Many of the patterns within this group can be classified as Empire or neoclassical, but many of them have none of the distinctive characteristics of those styles. Because this group of patterns incorporated motifs from several decorative styles, it is more helpful to

distinguish them by categorizing them as a pattern type made up of elements positioned in conformity to a set formula (Figure 21, page 92) (24, 28).

Complete versions of this pattern type include three elements that were always placed in a set relationship within the width and length of a roll of wallpaper. These included: (1) a dominant motif (or motifs), often a bouquet, figure, or self-contained little scene placed in the center of a width of wallpaper; (2) a spotted background made up of a subordinate motif, usually very small and simple and not much darker or far removed in hue from the ground color (dots, florets, leaves, stars, for example); and (3) vertical stripes along the edge or edges of the paper's width. The stripes were usually formed of small-scale geometric shapes--dots, dashes, ovals, circles--printed in stronger colors than the motifs of the background spotting and stacked in close spaced vertical lines so that they formed definite stripes. The stripes often incorporated leaves, simple flowers, and other motifs (24).

Often, the dominant motif was matched by an alternate motif of equal importance, or a close variation on a given theme, and these two were alternated vertically right down the center of the paper's width. In many other examples, a larger dominant motif was alternated with one slightly smaller, with a subordinate element spacing the repeats of the more important motif. Occasionally, in more expensive papers, a variety of these dominant motifs were introduced, perhaps six or eight.

The vertical spacing between the most important motifs in these papers varied from example to example (16, 24).

When the large central elements were eliminated, such papers became stripes with spotted backgrounds. But, when the spotting was dropped from the scheme, the effect, though simplified, was quite similar to that achieved when all three elements were used (16, 24).

Textile Imitations and Rainbow Wallpapers

Many of the patterns of the 1820s and 1830s were printed as eye-fooling imitations of textiles. This applied not only to the drapery papers, but also to patterns that made a wall look as if a flat piece of cloth had been stretched across it. It was also true of simulations of woven fabric, where tiny lines represented thread patterns, such as twills, satin weaves, and brocades (1, 37).

During the 1820s the Zuber factory in Alsace, France, developed a printing technique that became a style in itself, and was widely imitated by European and American factories well into the 1840s. The technique was one for printing subtle, blended color effects, called "irisé" by the French, and advertised as "rainbow papers" in this country (11).

Though the popularity of rainbow, or irisé, papers had peaked nearly a quarter century earlier, as late as 1853 they were still admired by the important English critic Matthew Digby Wyatt, who mentioned them in Industrial Arts of the Nineteenth Century, a book published in 1853. Wyatt described "rainbowing" as "the production of shaded or

blended ground, consisting of graduated tints of a particular color," and called rainbowing "one of the most effective processes" in the production of paper hangings. These color blending techniques were used for the ground coloring of repeating patterns made by many manufacturers (42).

An Englishman, Andrew Ure, in his book, Dictionary of Arts, Manufactures and Mines, first published in 1839, described the production of what he called the "fendu or rainbow style of paper hangings." Ure seems to have known Zuber's technique, or closely similar techniques. He described "rainbowing" as:

produced by an assortment of oblong narrow tin pans, fixed in a frame, close side to side, each being about one inch wide, two inches deep, and eight inches long; the colors of the prismatic spectrum, red, orange, yellow, green, &c. are put in a liquid state, successively in these pans; so that when the oblong brush . . . is dipped into them across the whole of the parallel row at once, it comes out impressed with the different colors at successive points . . . of its length, and [the brush] is then drawn by the paper stainer over the face of the woolen drum head, or sieve of the swimming tub, upon which it leaves a corresponding series of stripes in colors, graduating into one another like those of the prismatic spectrum. By applying his block to the . . . [surface of the swimming tub] . . . the workman takes up the color in rainbow hues and transfers these to the paper (p. 27).

Most frequently Zuber used iris  or rainbow paper effects in stylized floral and foliate patterns derived from textile prototypes (Figure 22, page 93). In many of these papers, the colorful effects dominate the patterning, and the increasing and diminishing strength of the colors created wave-like rhythms that were the most intriguing features of the paper when they were hung on large expanses of walls (21).

Rococo Revival Patterned Wallpapers

From the mid-nineteenth century, elaborate Rococo Revival styles were very characteristic among the thousands of patterns annually offered by hundreds of manufacturers as seen in Figure 20 (page 91).

The wallpapers were richly embellished with scrollwork, curving foliate and floral forms. The "C" and "S" curves, the asymmetrical cartouches (a form used as an ornament, often enclosed with wreaths, garlands, or scroll-like forms), and the fantastic acanthus leaves of late-seventeenth- and eighteenth-century baroque and rococo ornament were revived during the 1830s for wallpaper patterns (37).

Gothic Revival Patterned Wallpapers

The Gothic Revival found its way into numerous domestic interiors during the 1840s and 1850s. Gothic patterns introduced American paperhangers to the pointed arches, crockets (ornament used on the sides of pinnacles usually leaf or bud shaped), trefoils (a three-lobed ornament resembling a clover), and rose windows (Figure 23, page 94) (16, 37).

During this period, combinations of vivid green with gray, strong harsh red with brown, or a brilliant shade of blue paired with brown were particularly popular (37).

Gilded and Embossed Patterned Wallpapers

During the 1850s and 1860s, in apparent reaction against the strong colors and dense ornamentation of wallpapers, many Americans began to hang sparsely ornamented

patterns on which light touches of gold were spotted across delicately tinted ground colors, such as grays, beiges, eggshell shades, and white (16).

Most of these patterns featured small embossed gold motifs on satin grounds. The gold was real gold leaf that had been subjected to the pressure of intricately detailed metal dies on heavy machines that stamped their imprint into the paper while bonding the gold leaf to it.

The stamping technique was a specialty of two German factories--that of Karl F. L. Herting at Einbeck and of Englehard at Mannheim. The Englehard papers were distributed in France by Desfossé, and probably came here through American distributors for that French firm (34).

Americans also made such papers. The patterns that were the most popular vehicle for this technique were variations on the types illustrated in Figure 24 (page 95). Other motifs used were delicate sprigs, tiny birds, leaves, fleur-de-lis, cartouches, and rosettes (37).

Late Nineteenth-Century Taste Changes

During the late nineteenth century, the American wallpaper industry boomed, and was able to effect steady decreases in the cost of its product. Wallpaper printing machines stamped many papers with a look that can be readily distinguished from earlier block printed papers. At the same time, aspiration to the elaboration achieved in the most expensive French designs (while these were still being printed by hand)

had an equally marked effect on the look of wallpapers used in America (37).

In contrast to the early machine prints, which were limited in colors, many of the expensive hand printed French imports incorporated dozens of thick-bodied, chalky distemper colors that were applied by hundreds of intricately carved wood blocks. Although some mechanical devices were introduced to speed the block printing and to reduce costs, French masters of the art of hand printing worked more for refinements in painterly effects. They delicately shaded their patterns and produced elaborate, large scale, nonrepeating designs that no machine could have made (Figure 25, page 96) (24, 37).

Expensive French papers were designed to proclaim at first glance their distinctiveness from cheaply made products of the big factories.

During the 1870s, Americans continued to cover their walls with ever-increasing quantities of paper. However, their taste in wallpaper was changing from the elaborate and realistic painterly effects of French papers to the abstract and stylized flower patterns introduced by the English (7, 37).

English critics and designers had been trying since the 1840s to change popular tastes in wallpaper from French to English. This was part of a much larger and more significant movement to improve the design of all manufactured furnishings and decorative objects, as well as the whole system that was required to design and make the objects for everyday use (7).

One of the first and most influential persons of this Arts and Crafts Movement was William Morris. He thought English interiors either were "costly and hideous, or cheap and hideous" and the main road to salvation was to be a return to the honest work of the medieval craftsman (14).

Morris was influenced by the Middle Ages a model for changing society and fighting against the ugliness of the modern world. He dreamed of an era when the craftsmen could create in contentment objects for all to use, when art would not be monopolized by the elite, but the common pleasure of everyday life (7, 14).

Morris went directly to nature to find inspirations for most of his designs. Almost all of his wallpapers used motifs of flowers, fruit and foliage, either in continuous graceful patterns or organized in loose bunches on a background of grass or foliage. His patterns were relatively abstracted, two-dimensional, with no suggestion of relief or perspective (Figure 26, page 97).

Morris' wallpapers changed the look of wallpapers produced in Europe as well as America. In 1876 Scribner's Monthly stated, "The interest excited by the beautiful designs and novel colors of the so called 'Morris Papers,' for interior decoration, has inspired European manufacturers to the highest achievements in the field of household art" (37, p. 216).

Morris' influence spread by what he wrote as well as by what he produced. His interest in private housing involved

architects and designers in domestic planning, which was very valuable for the wallpaper business.

Morris' patterns from 1876 onwards showed that this historic knowledge brought increased formality and conventionalization, and was thus potentially at war with his naturalism. Yet, in his most characteristic designs, he manages to reconcile them. Within a Gothic-derived net of incredible complexity, he combines from two to five different plants without destroying the natural system of growth peculiar to each. These patterns create a "bower" or "garden tangle" effect which was what he meant by representing nature and not merely flowers. It is a synthesis which only Morris, with his sympathy for nature and his degree of identity with medieval art, could have achieved.

As wallpaper patterns become more and more complex, so did the methodology of creating the finished product. The following information describes the evolution of the manufacturing of wallpaper from handmade wallpaper to state-of-the-art machine-made paper.

Chapter 3

HISTORIC WALLPAPER TECHNOLOGY

Style can be greatly affected by technology, by setting limits as well as opening new possibilities, so it is important to understand how wallpaper was made.

A man who produced wallpaper in the eighteenth century was known as a "paper stainer." In most cases, he did not make the paper stock on which the patterns were printed. Instead, it was his job to transform the special class of "hanging paper" that was received from the mill or warehouse in its undecorated state into the finished "paper hangings." In the eighteenth- and nineteenth-century sources, the order in which the words "hanging" and "paper" was used determined the stage of the paper's development (6).

Handmade Paper

The paper maker started with rags of cotton, linen, and other fibers and reduced them to a pulp, achieved by soaking, beating, and processing rags with chemicals in vats filled with water. Then he took a rectangular mold made up of a wooden frame, or "deckle," and a bottom of wire cloth, and plunged it into the vat. With this frame, he scooped up a small quantity of pulp, manipulating the deckle to spread the mushy mixture over the wire surface. This surface often incorporated a decorative element or lettering that left a

faint impression of a "water mark," in the paper itself that served as the maker's signature or trademark. When the water drained through the porous bottom, a thin layer of pulp remained, to be further dried, pressed, flattened, and smoothed. The deckle for making paper could be no larger than an individual paper maker could handle, and the size of a deckle determined the size of a sheet of paper (6, 21).

The durability of the paper, the cost, and much of the final aesthetic value of a wallpaper depended on the paper stock on which it was printed. Hanging paper was of an inferior quality by eighteenth-century standards, since it was made of unbleached rags, giving it a murky gray, tan, or blue shading. This discoloring was of little consequence because it would be covered over with the paper stainer's colors. In comparison with modern wallpaper stock, it was strong, high-quality paper. It is for this reason that so many papers of the eighteenth and early nineteenth centuries have still remained in such good condition (26).

Wood pulp papers which are the rule in the industry today were developed around the nineteenth century, although until the 1890s most papers were printed on an inferior rag paper made from repulped waste rag paper. Wood fibers, when treated for paper making, are much less sound than rag fibers, and therefore our later papers are much less durable. Wood pulp papers also have the disadvantage of discoloring rapidly under sunlight (26).

The individual sheets that made up a piece or a roll of wallpaper were not uniform in size, but usually were smaller than twenty-two by thirty-two inches. Early in the eighteenth century, most paper stainers printed sheets which were then pasted individually to a wall. By mid-eighteenth century, the sheets were usually pasted together to form rolls before any coloring was applied. The standard length of a piece of joined wallpaper, formed from the individual sheets, was established by English excise officials at twelve yards and most were twenty-three inches wide (25, 26).

Horizontal seams spaced at regularly recurring intervals usually indicate that the wallpaper was made before machine-made paper was generally adopted by wallpaper manufacturers. Such seams are the first item to look for, and this can be done by shining a strong beam of light, held close to the wall, horizontally across the surface. Under this raking light almost any irregularity on the wall should become apparent in the resulting shadows. Indications of seams between the sheets and between the lengths of wallpaper could appear, even under a coat of paint. However, if subsequent layers of paper have been applied over a handmade paper, evidence of seams could be hidden by the smoother surfaces (3, 23).

If an edge of the paper can be uncovered, evidence of the handmade process might be indicated by the slightly ruffled or "deckle edge" caused by the uneven drainage of the water from the top half of the mold (called the deckle). If

only small fragments of paper are found, examination under magnification will distinguish between the multidirectional patterns of the fibers characteristic of the handmade process, or the regular vertical alignment of machine-made paper (23).

Machine-Made Papers

In the early nineteenth century, machines for producing "endless" paper was an important innovation that made the industrialization of wallpaper-making possible.

Developments in England included the Fourdrinier machine of 1799 that used a cylinder to form paper. In 1817, the first machine-made paper was produced in America by Thomas Gilpin in Delaware. Though wallpaper manufacturers would have been the logical early users of the new endless paper, they do not seem to have adopted it in France until 1820, in England until 1830, and in this country not generally until 1835 (37).

The widths of the machine-made paper varied from country to country. By the 1850s the standard width of French paper was eighteen inches, of English paper twenty-one inches (twenty inches when hung), and of American paper twenty inches. Despite standardization, papers from all these countries have been found in widths varying from eighteen to forty inches (6, 37).

Early handmade papers were composed of textile fibers and were generally heavier and more durable than later machine-made papers. The introduction of wood pulp for making paper was first commercially successful in England in the

1850s, and was introduced to America in 1855. By the 1880s, the bulk of commercial hanging paper stock had been greatly cheapened by the introduction of wood pulp, straw, and other less expensive ingredients. Such paper is now characteristically brittle, and browned from the acids present in the wood pulp (9, 21).

Superficial examination usually serves to distinguish cheap, machine-made papers from the handmade paper. Machine-made paper will tear in a neat line and the browning and brittleness are often all too apparent. Further microscopic examination may be required to determine if a fragment of higher quality paper with a high rag content is machine-made or handmade (13, 21).

Painted Papers

Generally, the more expensive wallpapers, including the Chinese papers, have been hand painted through all wallpaper history. Painting as a wallpaper-decorating technique had been brought to the greatest perfection by Chinese craftsmen who produced designs especially for export to the West (16, 25).

The brush strokes were executed in waterbase colors. By varying the pressure and angle of their strokes, the liquidity and quantity of pigment carried on their brushes, and other skillful manipulations, they produced variations of hues and shading. Color once applied to the absorbent mulberry paper used in Chinese paper hangings could not be reworked (16, 25).

Stenciling

Paper stainers sometimes used stencils made of leather, oilcloth, or pasteboard to decorate the wallpapers. The craftsmen used large brushes to spread their distemper or varnish colors over the cutout figures of the stencils (14, 22).

In France the early eighteenth-century wallpaper makers produced pattern outlines from woodblocks using black ink. The black ink was thin-bodied, unlike the thick distemper colors of most eighteenth- and nineteenth-century wallpapers. In early examples, the black printed outlines were filled in freehand, or with the aid of stencils, in thin, transparent water colors. This stenciling can be recognized by the presence of multidirectional brush strokes, ending abruptly at the edges of solid-colored pattern shapes, where outlines of color often collected and streaked. Stenciling appears in cheaper wallpaper of the mid- to late eighteenth and early nineteenth century, but was not a common feature of wallpapers of the best quality (24, 37).

Block Printing

The use of woodblocks with the printing surfaces carved in relief has been a standard in making fine wallpapers. A separate block is required for printing each color (16, 37).

The printing blocks vary in size according to the unit of design to be printed. They range from about 18 × 20 to 20 × 37 inches in size. The boards were stacked so that the grains of their woods were successively at cross angles to

prevent warping. The bottom board on which the pattern elements were carved was most often pear wood (6, 35).

After the individual sheets of paper had been pasted together to form a roll of hanging paper, a coating of coloring or of white pigment was applied with wide brushes. This ground color concealed both the joints and any discoloration in the paper stock itself. Multidirectional brush strokes applied by hand are often apparent in the grounds of early papers. Brushing on a layer of color, called the "ground," was the first step in decorating "hanging paper" and transforming it to "paper hangings" (6, 24, 35).

Distemper colors were normally used for color printing from woodblocks. To make distemper colors, pigments were mixed with water and glue size to produce the thick-bodied, opaque, chalky colors still favored in fine wallpapers. Occasionally, oil-based mediums were used to produce glossy accent colors, but sometimes they were also used for ground colors (6, 24, 35).

Spreading the pigment evenly on the printing surface was called "charging." Just as in inking a rubber stamp, the block was charged from a pad of cloth soaked with color. The pad was contained in a shallow box, with a pliable cloth bottom, painted to make it watertight. This box floated loosely in another box upon a "slush" of water and paper pulp. The "slush" served to press the cloth pad firmly against the printing block. Paper stainers also called this process "dipping" the block (6).

In order to keep all the areas of color in a design in correct relation to each other, the printer must have register marks along the edge of the block. The register marks are dots printed by the heads of brass pins driven into the side of the block and bent at a right angle. As each color is superimposed, the register marks of the new color block must fall directly over the dots registered by the previous block.

For printing, the paper slides over a flat surface, generally of stone covered with cloth. The printer holds the block firmly with a strap attached to its back and fitting snugly over his hand. The block is first lowered on the pad of color and gently brought over the paper until it is in register. When the block is in place, pressure is applied to complete the contact (6, 26, 29).

A whole length or roll, if it is a repeat design, or even a whole order, is printed in a single tone before the entire process is repeated with another block and another tone. It is customary to print the lightest shade first and finish with the deepest, except for the highlights, which are printed last. Hand printing gives cleaner and more distinct divisions in the pattern printed, as each area of color is dry before the next is superimposed or laid beside it (6, 26, 29).

Machine Printing

In the 1820s, as textile printing was being mechanized using engraved copper cylinders, experiments were made for incorporating this technology in the printing of wallpaper. The Zuber Factory in Alsace, France, produced papers in this

manner using thin-bodied, glossy coloring. The resulting patterns were composed of thin lines, similar in character to engravings, and the venture was of limited commercial significance. There has not been any evidence found of its use in the United States (16, 24).

In the 1840s a significant commercial impact of machines on wallpaper printing occurred. Steam-powered machines were developed with efficient systems for feeding color to cylinders that printed from raised, rather than engraved, surfaces employing the conventional principle of the woodblock. The standard cylinder had a wooden core with the raised printing surfaces, formed by strips of brass which were tapped into the wood core and had raised outlines of shapes. Inside the strips of metal, felt was tightly stuffed to carry the colors for the solid areas of patterning (37).

Detailing such as lines and dots were printed by appropriately shaped brass pieces. The cylinders were placed on a machine that had at its core a large revolving drum, or giant cylinder, upon which the blank paper rode. Against the lower half of the drum the rollers were placed, each with a section of the pattern in relief. Each roller must have a continuous and even coat of color on its printing surface. In order to achieve this, the roller is accompanied by a pan of color. The color is lifted above the surface of the pan by a smooth roller which passes the color on to a still higher "sieve cloth," a woolen blanket moving as a continuous belt. Just before the blanket belt comes in contact with the surface

of the printing roller, it passes a scraper, called a "doctor blade," which removes any surplus color. There may be anywhere from one to twelve printing rollers to a drum, each with its pan of color, smooth roller, sieve cloth and doctor blade. The great drum, with the paper taut on its surface, rotates downward, pressing the paper against the rollers (6, 18, 37).

To dry the printed paper, the sheet of paper was slid onto a roller, and was then picked up by flat rods. These rods lifted the paper onto a horizontal network of ropes hung near the ceiling the entire length of the workshop where steam-heated pipes were laid on the floor. The paper was hung in festoons (strip hanging in a curve). The movement of the ropes pulled the rods along and the paper moved slowly forward as it dried. The finished wallpaper was reeled at once onto the rolls which the consumer purchased, or it was inspected and made up into rolls more or less by hand. This depended on the standards of the craftsmanship of a particular factory, and the price at which the wallpaper was to be sold (6, 18, 37).

Old papers that bear the impression of these raised-surface cylinders of machine printing cannot safely be dated before 1841. The intricate metal outlines filled with felt left a distinct impression--an outline of a thicker coloring around the edges of each shape, combined with traces in colored areas of the unidirectional streaking caused by the constantly rotating cylinders (Figure 27, page 98). The colors used on the machines were thin-bodied for quick drying. These

characteristics of machine printing are particularly easy to recognize in cheaper papers (6, 18, 37).

Flocking

From the seventeenth century, attempts were made to give wallpaper some resemblance to velvet. This was called "Flock wallpaper." Flock paper was made by printing or stenciling a pattern of glue or varnish on colored paper. Chopped colored shavings of silk or wool, either cut up by hand or in a mill, were scattered on the pattern. When dry, the excess was removed, leaving a paper which looked like velvet (1, 24, 37).

Silk Screening

Silk screens are very much like a stencil, carried on very finely woven silk textile screens, stretched over wooden frames. The pattern was produced by blocking out with varnish or lacquer the area on the screen that was not part of the design. This allowed the color to pass through only the areas needed. Patterns produced from these screens can often be recognized with the aid of magnification. This crisscrossing of the woven threads of the textile leave their mark, especially along curves and diagonals. The fact that the coloring material has passed through a woven fabric is indicated by minute "stair steps" that form the edges of shapes (37).

The technique has various names: screen printing, serigraphy, frame printing, or in the United States, hand printing. Silk screened wallpapers became particularly

popular for the more fashionable and expensive patterns first appearing in the United States around 1930 (37).

Wallpaper technology has progressed parallel with other sciences. In modern manufacturing techniques the machine plays an important role, both in designing new patterns and the reproduction of classics. As the public's desire for restoring and preserving classical designs of the past increases, the true importance of old wallpapers comes to light. Not only are the styles and motifs of old papers an important building block for today's wallpapers, they also are a very important segment of our history, social evolution and our heritage.

For these reasons it is of great consequence that examples of eighteenth- and nineteenth-century wallpaper be preserved and restored.

Chapter 4

PRESERVATION AND RESTORATION TECHNIQUES

Planning

The initial stages of a renovation project should begin with extensive planning and research on wall finishes. This planning and research should decide whether the walls are to be papered or painted and with what types, colors and patterns. These decisions can only be made after a detailed examination of the project has been made and the results of this examination have been fully researched (29).

Consulting specialists may be required to identify and date any wallpapers found during the restoration of the project. There are many museums with wallpaper reference collections that may be of great value to identifying samples. The accepted method of using museum collections is to furnish a duplicate sample and accompany them with good clear slides of the room interior and the wallpaper. Usually the museum will return a brief and generalized statement of opinion about the date of the wallpaper. This service may be free of charge, although many museums may charge a nominal fee. The largest collection of identified samples is housed at the Cooper-Hewitt Museum, Smithsonian Institution. A more detailed analysis may be obtained, but at a much greater cost. In this type of analyzation, on-site examination is often necessary by a

consultant. The initial fees and expenses may seem high, but the consultant's expertise is invaluable in planning the preservation of valuable wallpapers and can prevent costly and irreversible errors (29).

Research

The restoration project requires many types of expertise in researching the historical and physical properties of the building. Ideally, the preliminary research is conducted by personnel experienced in restoration/preservation work. This preliminary research should concentrate on both the physical structure and related documents. The results of this research sets the scope of the entire project (29).

Documents play a very important role in determining the appropriateness of wallpaper. Records of the business, institution or family connected with the project should be studied for references to wallpaper or other interior finishes. Diaries, business journals, bills of sale, public documents and construction contracts should be studied with great care. The backgrounds of old photographs and portraits should be examined for wallpaper applied to the room's walls. In the event that photographs of a specific room reveal wallpaper, a thorough search should be made of the room's walls to detect any obscured remnants (29, 30).

An additional area that can provide clues to early papers is on the walls of added closets and behind cabinets, mirrors, paintings and trim. Any structure or object that

looks like it may have been an addition to the original building may be hiding a sample of original and previous wallpapers.

Prior to any restoration or demolition, all of the walls should be subjected to a raking light which greatly aids in deciding if there is a possibility of early papers covered by layers of paint. One should be aware to the clues of faint horizontal seams of early handmade papers or the vertical seams of later papers. If a room has been stripped to bare plaster walls, an illumination with a blacklight may reveal chemicals that have leached through the wallpaper paste and left a discernable pattern on the wall (21, 29, 30).

Many times the only clues as to the type of wallpaper applied in a building or home may come from leftover pieces of the wallpaper. If the preservationist is able to access original furnishings and owner's possessions, a direction of styles can be found. Often remnant pieces were used as underlinings of furniture and cabinets or as linings in hatboxes, trunks and old boxes. The researcher should always check under the topmost layer for any previous layers of wallpaper linings. Attics and storage areas may provide ends of rolls or old wallpaper sample books.

The researcher should not be concerned with only identifying the type of paper used on one part of the wall, but should also strive to identify any paper friezes, fills, and/or dados. Additionally, ceilings should be checked for patterns, borders and center medallions.

Once a wallpaper is discovered, precise drawings should be initiated. These should include measured elevations, exact coded location on the wall and scale of measurement. In addition, each location should be photographed using black and white prints and color transparencies. Both types of photographs should include a scale and the coded position identical to the method used on the drawings (29, 30).

Perhaps the most preferred method of conservation is to preserve the original papers found in the structure. Unfortunately, the preservationist is seldom presented with this situation. Often the old paper, or supporting walls, are in such poor condition that, in the interest of preserving and using a room, the paper must be removed. Before removal begins, the papered room should be thoroughly documented with a set of photographs and drawings as described above. Samples including full widths and repeat lengths should be numerically coded in pencil to correspond with any drawing and photographs, and, only then, should removal begin. It is of utmost importance, despite any ensuing research, that a copy of each type of sample be retained by the preservation project (23, 29).

If either lack of time or funds prevents a preservable room of wallpaper from restoration, the paper should be covered with plasterboard. This will enable the project to continue with redecoration and used for whatever purpose until funding and time for proper restoration is available (30).

Uncovering and Removing Samples

In the event that a usable early paper is discovered, or if a large expanse of old paper appears to be salvageable, an expert paper conservator is to investigate the possibility of preserving it. An experienced specialist in paper preservation should be used in the uncovering, removal and remounting of a quantity of paper that has been covered by later layers of paper or paint.

If wallpaper is found to be covered by paint layers, removal of paint from this layer may prove to be quite difficult. By testing on a few small areas, a solvent may be found that will remove the paint without disturbing the paper, and thereby exposing a representative area of the pattern. Many times the desired period of paper lies beneath the painted layer. Lifting the later layer by steaming and loosening the water-soluble wallpaper paste is usually a simpler process than removing paint (30).

In many older homes, many layers of paper are frequently encountered. The simplest procedure for studying successive layers of paper is to find an inconspicuous area where the entire "sandwiched" layers have separated from the wall and to remove it carefully by working a spatula between the combined paper layers and the wall. The layers are then placed on a horizontal work surface and steamed apart using a hand steamer. To separate the layers, the jet of steam should be directed at the paste on the underside of each successive layer until the paste is softened, separating two layers which

can be pried apart with a spatula. When the paper becomes moist and weakens, it should be supported with screening or with blotters (29, 30).

If steaming proves difficult, and quantities of duplicate paper are available to back up a loss, the entire "sandwich" of layers may be submerged in lukewarm water. When the paste begins to soften (which usually happens before the water-soluble colors begin to run), a spatula may be inserted under the topmost layer, and as the paper loosens, a piece of screening can be inserted under it for support and removal from the water. After most of the excess water is removed, the individual layers can be transferred to glass or waxed paper to complete the drying. Under no circumstances should the samples be allowed to dry on newspaper, toweling or other porous surfaces which would adhere to the paste. Although successive layers may be removed by this method with much greater ease than by steaming, there will be a greater amount of color loss. Another advantage to submersion over steaming is that a sample of each layer is obtainable from one "sandwich" layer, barring any unfortunate accidents; whereas in the steaming process, successive layers are destroyed in order to reach the desired layer (10, 13).

Identification of Samples

In determining the time frame of recovered samples, a good stepping stone is the physical examination of each sample. The process of how the paper was manufactured and colored is of major importance, but also has some limitations. To aid

in the dating, the stylistic evidence must be researched (23).

Many museums have reference collections of early wallpaper. A majority of their samples have been photographed and dated to provide the preservationist with a groundwork to begin the search. If a sample can be aged to a certain time period, some museums may be of help in providing color slides of their collection from that period. The Cooper-Hewitt Collection of the Smithsonian Institution provides this service. While far from being an all-inclusive collection, they do have thousands of slides and prints which are identified and dated.

Once the general period of a wallpaper is determined, the researcher may be able to find the actual manufacturer and designer. Maker's marks may be stamped on the backs of early papers, but are more frequently printed on the front margins of later papers. A collection of maker's names and dates are being assembled at the Cooper-Hewitt (37).

Alternatives for Wallpaper Restoration

The following are suggestions for assessing the alternatives for wallpaper treatment: preservation of paper as found, restoration of the original paper, custom-made reproduction of the original, or the purchase of wallpaper patterns appropriate for a given date and available on the market (29).

Preservation of a paper as found. Very rarely does the preservationist find a room with the wallpaper from the

acceptable date of restoration in place and in good condition. Once the identity and date of the paper have been verified, preservation in place is the most ideal, and possibly the least expensive alternative. Superficial cleaning of the paper by vacuuming, while protecting it with fine nylon screening, may be all that is needed. Cleaning horizontal surfaces is most effective with a draftsman's vinyl cleaning pad and may be also tried on vertical ones. It is very important that these only be used on smooth surfaces of wallpaper in good condition and that all residue be thoroughly cleaned off by careful brushing with a very soft camel hair brush (13, 29).

As previously mentioned, walls of many homes that are to be restored, a multi-layer of earlier papers may be found. If a decision has been made to preserve or restore one of these earlier papers, several factors must be considered. Careful consideration must be given to the period that the total restoration project will take. If a nineteenth-century paper is found in an eighteenth-century structure, careful evaluation must be given to the validity of removing a historically significant layer of decoration in favor of returning the room to an earlier date (29, 30).

In the event that a decision is made to remove later layers of wallpaper several key items should be checked (1) check that even earlier layers that should be preserved do not lie under the desired finish layer, and (2) arrange in advance for the preservation of papers that have to be removed.

In making advance arrangements the person responsible for the project should contact local preservation interest groups and advise them of the availability of the unwanted papers or advertise in one of a number of publications circulated among preservation projects. A project in need of your extra paper could finance its removal and restoration (29).

Preservation of wallpaper in place involves not only superficial cleaning and minor restoration, but also a careful check of the condition of the walls behind it. A special emphasis should be placed on finding evidence of areas where moisture has been or is a problem. If the project calls for any structural changes, whether interior or exterior, particular care should be taken to prevent accidents from taking place. Special care should always be taken to prevent natural or man-made damage from affecting the paper during alterations. If there is any chance that such alterations would expose the paper to the outside weather or any other peril, special protection should be constructed. Drastic changes of temperature and humidity could prove disastrous to wallpaper that has been well protected from the elements. Because pigments used to color wallpapers are light-sensitive and subject to fading, ultraviolet filtering Plexiglas should cover windows, and artificial lighting should be kept to a level of fifteen-foot candles using incandescent lights. Installation of shades or blinds may prove necessary if a papered room has too much direct sunlight. A further safeguard is constant temperature

and humidity control, which will help preserve the life of the papers, pigments, and adhesives (30).

Some basic practices to avoid, include not using scotch tape, Duco cement, or rubber cement to repair tears. Instead, use only chemically pure wallpaper paste to readhere torn paper to the walls. Under no circumstances use varnish or shellac to adhere the paper, as these compounds tend to darken and discolor the paper as well as add an uncharacteristic sheen. If protection is needed for old papers, especially near doorways where visitors will be tempted to touch them, cover the papers with sheets of Plexiglas, mounted on blocks that hold it about one-fourth inch from the wall, allowing circulation of air and preventing condensation under the plastic (29).

Removal and rehangng of large areas of wallpaper.

Skill and experience are required to successfully remove and rehang a whole wall of paper. An experienced paper conservator should be consulted and any subsequent work carefully supervised. The techniques for removal may be as complicated as facing the paper with a strong tissue on which it can be held together while it is lifted from the wall and carried, or as simple as carefully scraping the paste away from the underneath already-loosened paper to coax it from the wall. Once the wallpaper is removed, the paper should be cleaned, backed with acid-free lining paper, and mounted on chemically pure muslin before it is rehung. One source for this lining material is Charles Garcie, at 979 Third Avenue, New York.

If it must be stored before hanging, every effort should be made to avoid rolling the paper. For long periods of storage, it should be laid flat on blotters or on good acid-free paper with masonite or plywood boards underneath to keep it flat. When papers are rolled, the thick pigments on the surface can easily be dislodged and flake off (13).

In rehanging, only very pure water-soluble paste should be used. An alternative would be to simply tack the already carefully backed wallpaper to the wall so that it can be easily removed for cleaning or rehanging later. In some cases, papers pasted directly on unfinished boards resist removal even by the most skilled paper conservator. If the patterning is to be preserved at all, then the board itself must be removed and stored, ideally in a dark, temperature and humidity controlled storage area. One sample of a full repeat might be left on display in the room to be restored (13, 15).

Consideration for the aesthetic appearance and for the teaching possibilities of leaving worn paper exposed next to the new reproduction should be assessed in deciding whether or not to leave samples of the paper on display. Sample areas can be preserved in place under ultraviolet filtering Plexiglas covers and will not detract from the general appearance of the room, if they are placed in inconspicuous locations. However, the sample can probably be preserved with the least amount of color fading and future deterioration if it is removed from the wall and stored as described below. Unless there is great

difficulty in removal, this probably is the preferred procedure (23).

When paper is removed from the wall, samples including a full repeat of any patterning should be preserved, layers separated, cleaned, and then encapsulated in polyester film following the procedures developed by Peter Waters at the Library of Congress. A very similar method used by George Cunha at the New England Documentation Center, North Andover, Massachusetts, is described below.

Encapsulation is a simple reinforcement technique designed to give added support to wallpaper or any paper document and to protect them from physical wear and tear. Wallpapers are enclosed between two sheets of clear polyester film, the edges of which are sealed with double-coated pressure sensitive tape. The process is easily reversed by carefully cutting the polyester envelope along the edges in the space between the tape and the object. The condition of the object is not altered in any way by encapsulation. The polyester envelope primarily reinforces and protects the sample. An encapsulated sample can be safely handled by the general public, and may even withstand rough handling. Since the sample is sealed in a near vacuum, it is also protected in other ways--from pollutants, from acid migration from adjacent materials, and to some extent, from changes in temperature and relative humidity. Appendix B includes the instructions for Polyester Film Encapsulation method (27).

Polyester film is strong, flexible and chemically inert. If free of plasticizers, ultraviolet light inhibitors, colored dyes, and surface coatings, it will not damage the paper it protects. Although many brands of polyester film have proven suitable for conservation use, one which is readily available is Mylar Type D, which can be used in three, four, or five mil thicknesses. The tape that should be used for joining the edges of the envelope is 3M Scotch Brand double-coated tape #415. This is the only such tape proven stable during testing at the Library of Congress. Polyester film and double-coated tape are available from conservation suppliers and many office supply outlets (27).

Encapsulated documents are held in place between the polyester sheets by static electrical attraction. Static may help hold fragile encapsulated samples together, reducing the need to repair small tears before encapsulation. However, static in polyester film can also lift loosely bound media and pigments from the paper (27, 29).

If a document can be so treated, washing or deacidification by one qualified to do so is recommended prior to encapsulation which does not halt the chemical deterioration of acidic paper. However, documents may be encapsulated without deacidification; they will benefit from the physical protection which the method offers. Documents which are not deacidified prior to encapsulation should be so labeled for the information of future custodians. A label typed on acid-free buffered paper, such as Permalife, and inserted inside

the polyester envelope with the document is more secure than one attached to the outside of the envelope (27).

Great care should be exercised in repairing damaged papers. Crucial to this is the selection of a competent worker chosen on the advice of a reputable paper conservator and who would work within clearly established guidelines which dictate choice of materials and procedure. Repairs to valuable papers important to a historic restoration should be undertaken only by an experienced paper conservator.

The most common problems are (1) adhesive breakdown, that is, wallpaper falling off the wall, (2) flaking colors, (3) lost colors and areas of pattern, and (4) waterstaining. The following suggestions apply to restoration as well as to subsequent maintenance procedures (27, 30).

Frequently, old wallpaper paste will lose its adhesive strength due to either excessive dryness or moisture. Moisture may indicate that the wall behind the paper is wet, in which case mechanical and structural causes should be investigated and corrected. Before readhering paper which has been separated from the wall, the surface of the wall should be carefully cleaned, and all old paste should be removed from the wall and the wallpaper. This can usually be done by delicately scraping with a small knife that has a curved blade. Paper in good condition, only partially loosened from the wall, can be readhered with first quality water-soluble wallpaper paste. Paper in weakened condition, worn and frayed

should probably be removed, mounted on lining paper and rehung with first quality paste (29).

Fine quality wallpapers printed in distemper colors over a ground coat of thick distemper color are subject to flaking, due to an inherent weakness in the bonding capabilities of the color to paper. Do not employ the ruinous nineteenth-century varnishing method for remedying this problem and do not simply attempt to spray with a fixative. Not only will an undesirable shiny finish be created by either of these methods, but neither will serve to properly readhere the pigments to the surface of the paper. To readhere flaking colors, cautiously brush and/or flow a synthetic adhesive over the affected area, gently forcing the liquid behind the flakes. As they become moistened and relaxed, cover a small area with glassine and mechanically stroke the loose pieces, pressing them back against the paper. This is painstaking, meticulous work which must almost be done flake by flake by a careful, patient, and skillful hand (37).

The correct synthetic adhesives to use will vary according to the color, thickness and surface appearance of each area of flaking paint. They may include polyvinyl alcohol of varying viscosities, one or two percent methyl cellulose dissolved in water, polyvinyl acetates of varying viscosities in toluene or Acryloid B-72 in xylene (27).

Where colors and pattern elements have been lost, in-painting may be undertaken using Windsor and Newton water-colors and gouaches. Samples of the colors should be allowed

to dry so that they may be compared with the areas to be in-painted before they are used. Particular attention should be given to the gloss of paints used. When in-painting, every effort should be made to reproduce the block printed effect of the buildup of layers of flat opaque colors in shapes that have strong edges. Solid areas of coloring in block printed wallpapers have none of the brushstroked qualities of shaded easel painting. Of course, by the same logic, if in fact the paper is hand painted, brushstrokes are in order, and an attempt to reproduce the look of machine printing should be made when machine printed papers are being painted (29, 37).

There are a number of methods available to an experienced and skilled conservator for removing water stains from paper, when working on a horizontal surface. One of the simplest is to place a blotter or a little Fuller's earth under the paper, then to work with water, tamping or rolling this bleach solution with a cotton swab so that the solution passes through the paper. It is then followed by pure water, which is tamped through the paper in a similar manner to wash out the bleach. A more difficult method involves using an etherial solution of hydrogen peroxide (equal volumes of hydrogen peroxide and ether), and again tamping with a cotton swab. But this method is physically dangerous, and it is suggested for use only by the very experienced (29, 30).

Custom-made reproduction of original wallpapers. When physical or documentary evidence indicates the need for a wallpaper pattern that is not currently available commercially,

custom reproductions can be silk screen printed. Unless there is a particular interest in reproducing the early processes of block printing or paper making, such expensive refinements as the carving of printing blocks and the handmaking of small sheets of paper to be glued together to form rolls for hanging can be bypassed in good conscience. Most restorationists agree that it is not necessary to repeat the original printing process as long as the finished appearance of the reproduction matches as closely as possible that of the historic paper. Also, in the long run, there would be no confusion as to the paper being a reproduction.

If a decision is made to use the silk screening process, the restoration supervisor should review the artwork carefully and critically and insist on having proofs of the printed product to compare side-by-side with a sample of the original. Do not settle for fuzzy generalizations of pattern elements that are distinct and crisp in the original. If working from worn discolored fragments, or from photographs, colors may be checked against pristine samples in museum collections that date from the same period as the paper being reproduced. Most colors should be chalky and matte, but in some early papers, highlights were printed in shiny, oil-based colors, and this quality should be reproduced. Mica, "spangles," flocking, and other textural additives on patterns of the eighteenth and nineteenth centuries should be reproduced if they were incorporated in the original models, as well as any embossed elements. When the screen printer is not

prepared to emboss, firms can be located that are able to do such unusual and specialized work (29).

Because wallpaper firms normally deal in large volumes, time-consuming customwork means little profit and the charges for producing a special design will be high. In some cases, the cost can be reduced by selling the firm the exclusive rights to the pattern, and allowing the use of the restoration project's name in their advertising. Any wallpaper manufacturing firm equipped to do screen printing, and willing to undertake the scrupulous task of duplicating an antique pattern, should be able to reproduce old wallpaper. Essential to this operation are exacting specifications and a competent artist, either from the staff or the manufacturer of the restoration, to execute the renderings and oversee the work.

Another source for reproducing wallpaper may be a local artist skilled in the art of screen printing. With some time and ingenuity, a pattern can be printed on a one-time basis in a studio, often at a reduced price. If custom reproductions are made, it is advisable to order slightly more than double what is actually needed. The duplicate rolls should be carefully preserved for repairs and for future renewal when necessary.

Many antique dealers occasionally handle room-lots of wallpapers, and the house restorer may happen upon an important old paper in an unusual shop. But several dealers regularly stock antique papers and should be visited if an antique paper is desired. If fragments of a specific scenic

paper are discovered in a house but are beyond restoration, or if documentation indicated a particular scenic paper that has long since disappeared, there is a good chance of replacing it with an original antique duplication since these elaborated showpieces of the block printer's art were produced in quantities (29). Nationally known dealers in antique papers are:

A.L. Diament and Co.
2415 South Street
Philadelphia, PA 19146

Charles W. Gracie and Sons
979 Third Avenue
New York, NY 10022

Purchase of appropriate wallpaper patterns. A careful study of the published information of the wallpapers used at a given date should precede any selection of commercially advertised "period papers" for a restoration. If possible, the photographic files of the Cooper-Hewitt Museum should be consulted first hand. Otherwise, copies of color slides showing patterns of appropriate dates can be ordered through the mail.

A number of wallpaper companies include in their commercial lines adaptations of early wallpaper patterns based on samples of old papers. The old samples are known in the wallpaper trade as "documents." Frequently in making the reproductions, the scale of the original pattern is altered, colors are eliminated to cut printing costs, and modern color schemes are used, though often the "document color" is offered as one alternative among several choices.

If you want to use a pattern which is a straightforward reproduction of an early wallpaper, ask for the "document color," and compare the reproduction with the original sample, which should be retained by the manufacturer

or in the collections of the historic house or museum for which it was produced. Check for variations in scale and color adaptations.

There are many late eighteenth-century and early nineteenth-century patterns reproduced and commercially available, but there are very few from the early twentieth century. Wallpaper company's statements about the dates of their papers must be checked for accuracy. Many adaptations of nineteenth-century patterns are sold as "colonial." If you find a commercial paper that purports to be of a given date, confirm the validity of the claim through the publications and museum collections, or through the expert advice of a qualified person who has made a special study of wallpaper. Appendix C includes a list of firms that have done successful screen printed custom reproduction work.

CONCLUSION

As the preservation movement comes to include more of the eighteenth- and nineteenth-century houses, there is evidence of the widespread use of wallpaper. It becomes more than ever a pressing practical necessity to provide restorationists, preservationists, architects, engineers, historians, interior designers, and curators with precise information about this important architectural accessory which did so much to provide a foundation for the other decorative arts.

As people continue to restore and preserve old wallpapers found in eighteenth- and nineteenth-century structures, hopefully there will be more and more persons interested enough to ferret out these old examples of wallpaper and see that they ultimately reach a place which will assure their preservation as historical specimens. The samples will also be used as sources of fine reproductions of wallpaper which may be enjoyed by the countless persons who appreciate the great artistry and craftsmanship of days gone by.

This report has not been all inclusive, but it does provide a framework from which the homeowner, preservationist, and restorationist may work. It is impossible to adequately illustrate all patterns of wallpaper and all situations encountered by the preservationist/restorationist. At the minimum it should provide a keener sensitivity towards the

importance of preserving discovered samples and/or the restoration of papers in renovated structures.

Throughout the review of literature it was found that there was a need for a questionnaire and/or a system to record and document historic wallpapers. This need for such questionnaire would provide a worthwhile project for future research.

BIBLIOGRAPHY

1. Ackerman, P., Ph.D. Wallpaper: Its History, Design and Use. New York: Frederick A. Stokes Company, 1923.
2. Anon. "Antique Wallpaper Preservation." The Old-House Journal, Vol. 1, No. 3 (December 1973): 2.
3. Anon. "Authentic Victorian Wallpaper." The Old-House Journal, Vol. 5, No. 6 (June 1977): 72.
4. Anon. The Cooper-Hewitt Wallpaper Collection. New York: Brunschwig and Fils, Inc., 1982.
5. Anon. "Historic Wallpaper in Restored Houses." The Old-House Journal, Vol. 4, No. 7 (July 1976): 3-5.
6. The Buffalo Fine Arts Academy. Exhibition of Wallpaper Historical and Contemporary. Buffalo, New York, 1938.
7. Clark, F. William Morris Wallpapers and Chintzes. New York: St. Martin's Press, Inc., 1973.
8. Entwisle, E. A. A Literary History of Wallpaper. London: B. T. Batsford LTD, 1960.
9. Flaherty, C. "The Late Victorian Art Movement." The Old-House Journal, Vol. 3, No. 4 (April 1975): 9-11.
10. Flaherty, C. "Wallpaper in Old Houses." The Old-House Journal, Vol. 2, No. 2 (February 1974): 3-6.
11. Frangiamore, C. L. "Wallpapers Used in Nineteenth-Century America." Antiques, December 1972, pp. 1042-1051.
12. Gerhardt, T. H. "Decorating with Wallpaper." The Old-House Journal, Vol. 4, No. 12 (December 1976): 9-11.
13. Gilmore, A. M. "Wallpaper and Its Conservation--An Architectural Conservator's Perspective." Journal by the American Institute for Conservation of Historic Artistic Works, Vol. 20, No. 2 (Spring 1981): 74-81.
14. Gloag, J. Victorian Taste. U.S.A.: Harper & Row Publishers, Inc., 1973.
15. Green, A. S. "Select the Adhesive That's Right for Your Wallcoverings." The Old-House Journal, Vol. 3, No. 9 (September 1975): 9-10.
16. Greysmith, B. Wallpaper. New York: Macmillan Pub. Co., Inc., 1976.

17. Halbert, G. Promotional Literature for George Halbert's Design and Import Paper Hanging Business, Brooklyn, New York, ca. 1800.
18. How, S. Indoors. New York: Warren, Fuller and Co., 1894.
19. Kallop, E. L., Jr. "Wallpaper Conservation--Puzzling Priorities." Journal by the American Institute for Conservation of Historic and Artistic Works, Vol. 20, No. 2 (Spring 1981): 53-57.
20. Katzenbach, L., and W. Katzenbach. The Practical Book of American Wallpaper. Philadelphia and New York: J. B. Lippincott Company, 1951.
21. Levine, C. "Historical Wallpaper: Past Is Present." The New York Times, 5 Aug. 1982, Sec. C1, C6.
22. Lichten, F. Decorative Art of Victorias Era. New York: Charles Scribner's Sons, 1950.
23. Lynn, C. "Colors and Other Materials of Historic Wallpaper." Journal by the American Institute for Conservation of Historic and Artistic Works, Vol. 20, No. 2 (Spring 1981): 58-65.
24. Lynn, C. Wallpaper in America. New York: W. W. Norton and Company, Inc., 1980.
25. McClelland, N. Historic Wallpapers. Philadelphia: J. B. Lippincott Company, 1924.
26. The National Trust for Historic Preservation in the United States. Documented Reproduction of Fabric and Wallpapers. Washington, D.C.: The National Trust for Historic Preservation in the United States, 1972.
27. Northeast Document Conservation Center. "Polyester Film Encapsulation." Andover, Maine: n.n., n.d. (Mimeographed).
28. Nouvell, O. Wallpapers of France 1800-1850. New York: Rizzoli International Publications, Inc., 1981.
29. Office of Archeology and Historic Preservation; National Park Service; U.S. Department of the Interior. Wallpapers in Historic Preservation [by Catherine Lynn Frangiamore]. Washington, D.C.: n.n., 1977.

30. Phillips, M. "Wallpaper on Walls: Problems of Climate and Substrate," Journal by the American Institute for Conservation of Historic and Artistic Works, Vol. 20, No. 2 (Spring 1981): 83-90.
31. Plumb, J., Sir. "Patterns, Panoramas, High Adventure." House and Garden, August 1983, 28-31.
32. Prycer, D. G. Preserving a Fragile Art. n.p.; n.n., n.d.
33. Quimby, I. N. G., ed. Winterthur Portfolio 10. Charlottesville: Univ. Press of Virginia, 1975.
34. Ramsey, N. A., ed. The Decoration Digest. Rutland, Vermont: Charles E. Tuttle Co., 1965.
35. Sanborn, K. Old Time Wallpapers. New York: E. P. Dutton and Company, 1908.
36. Shoppell, R. W. How to Build, Furnish and Decorate. New York: The Cooperative Building Plan Associates, 1883.
37. Teynac, F., N. Pierre, and J. D. Vivien. Wallpaper: A History. Great Britain, 1982.
38. Ure, A. Dictionary of Arts, Manufactures and Mines. New York: D. Appleton, 1863.
39. Weinberg, N. Preservation in American Towns and Cities. Boulder, Colorado: Westview Press, Inc., 1979.
40. Whiton, S. Interior Design and Decoration Fourth Edition. Philadelphia, New York, Toronto: J. B. Lippincott Company, 1974.
41. Wood, C. "A Queen Anne Revival in Little Rock." The Old-House Journal, Vol. 2, No. 6 (June 1974): 2-4.
42. Wyatt, M. D. Industrial Arts of the Nineteenth Century. London: Day and Son, 1853.

APPENDIXES

APPENDIX A
ILLUSTRATIONS OF WALLPAPER

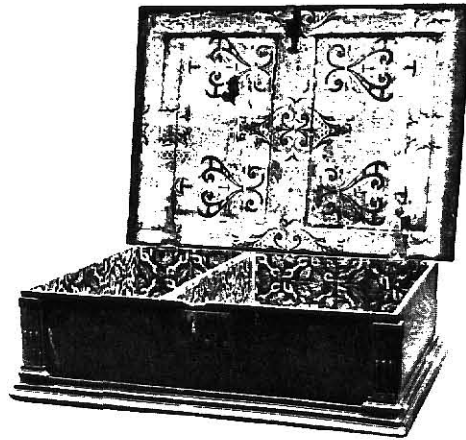


Figure 1. The two patterns lining an English Bible box were printed in ordinary black inks of the kind used for printing books. The patterns, incorporating heraldic, allegorical, and grotesque devices with strap- and scrollwork represents types that were probably available in America before 1700. Sheets of patterning used to line such boxes were also pasted on walls.

Source: Wallpaper in America, C. Lynn, p. 23.

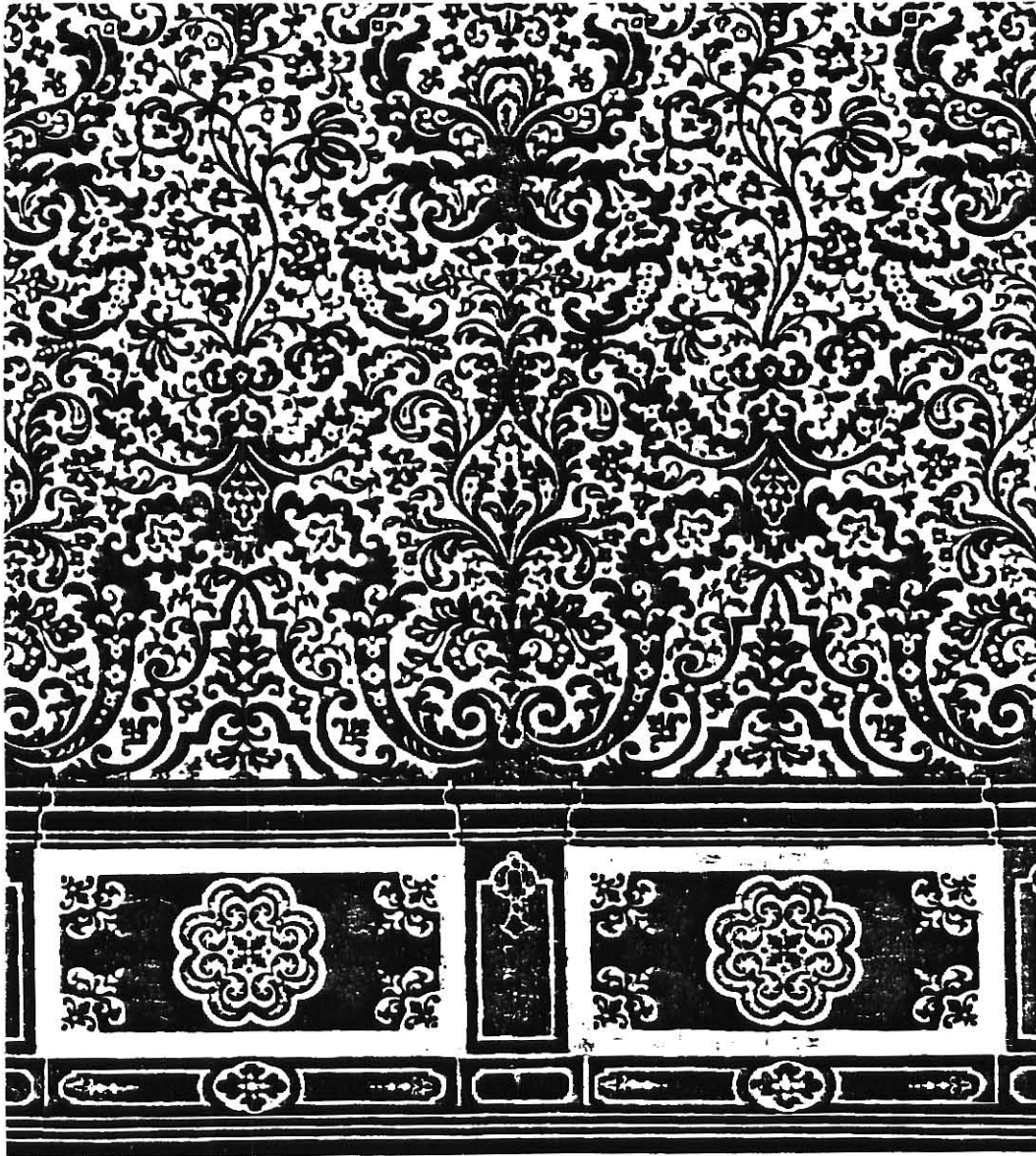


Figure 2. An elaborate early-eighteenth-century flocked canvas hanging combines imitations of velvet hangings and a panel of wainscoting. It was probably made in England and represents some of the early wall coverings available to wealthy Americans around the turn of the eighteenth century. The horizontal line that marks off the bottom third of the illustration imitates a chair rail. On the wall, it occurs at a height of 26½ inches. The dado (covering of the lower part of the wall) follows a standard configuration found in fielded wooden panels.

Source: Wallpaper in America, C. Lynn, p. 21.



Figure 3. A red flocked version of an English flowering vine with diaper pattern survives from its 1781 installation in the Webb House built in 1752 in Wethersfield, Connecticut. The enormous size of the repeat, $72\frac{1}{2}$ inches long $38\frac{1}{2}$ inches wide, contrasts with the narrow border, just under 2 inches wide. Many of the horizontal as well as vertical seams between individual sheets of handmade paper, each about 21 inches wide and 24 inches long, are apparent in this photograph.

Source: Wallpapers in Historic Preservation, U.S. Department of the Interior, p. 18.

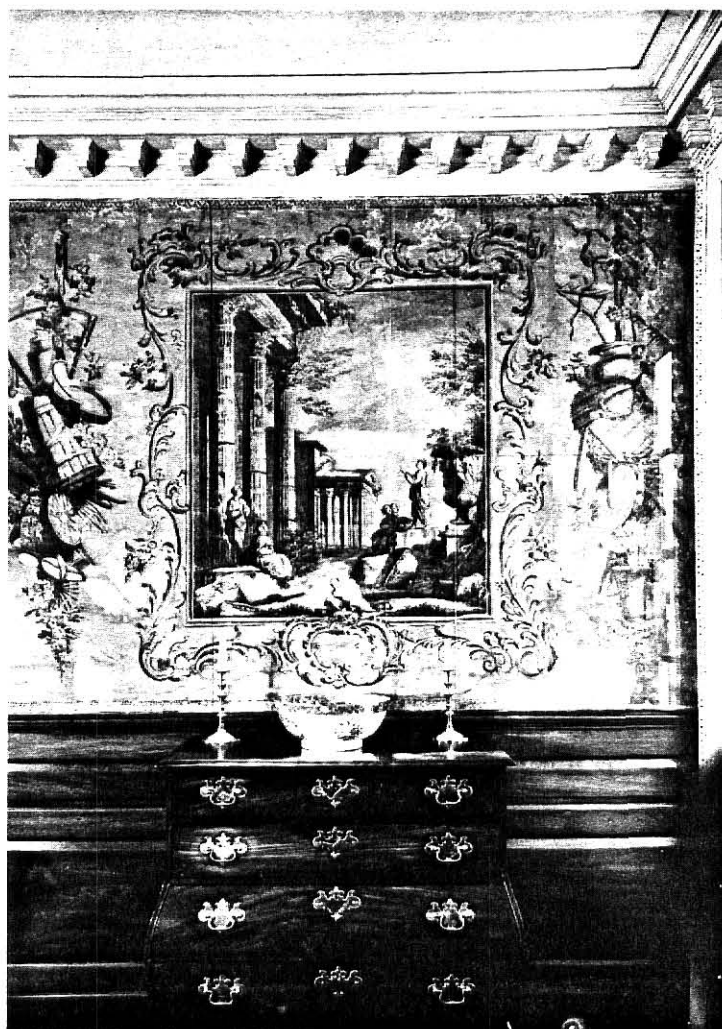


Figure 4. Elaborate wallpapers are the original decorations in place where they were installed during the eighteenth century on the second-floor landing of the stair hall in the Jeremiah Lee Mansion, built between 1767 and 1769 in Marblehead, Massachusetts. Rendered in shades of gray within painted wallpaper "frames," the ruins of Rome, based on engravings after Pannini, are painted in tempera. Narrow printed border papers were used around the doorway, above the chair rail, and under the wooden dentiled cornice appearing in this illustration.

Source: Wallpaper in America, C. Lynn, p. 77.



Figure 5. This engraving, "In Full Chace," is one of a series of four hunting scenes thought to have been incorporated in a frieze around the tops of the walls in an American "print room" of about 1763. They survived in the "yellow chamber" of the Moffatt-Ladd house in Portsmouth, New Hampshire. The engraving shown here is after the work of an English artist, James Seymour (1702-52). It is 18 inches wide and 11½ inches high, printed on paper bearing English excise marks.

Source: Wallpaper in America, C. Lynn, p. 70.



Figure 6. A sample of wallpaper from the Moffatt-Ladd house which imitates stucco work in an eighteenth-century reordering and "improvement" of Gothic motifs. The pattern above includes quatrefoils formed of curves derived from Gothic arches, but filled with leafy ornaments and bordered by beddings and bandings derived from classical sources. The pattern was engraved on plain paper. It was used in combination with prints, including the one shown in Figure 5. The piece is 23 inches wide and 26 inches high.

Source: Wallpaper: A History, F. Teynoc, P. Nolot, and J. Vivien, p. 64.

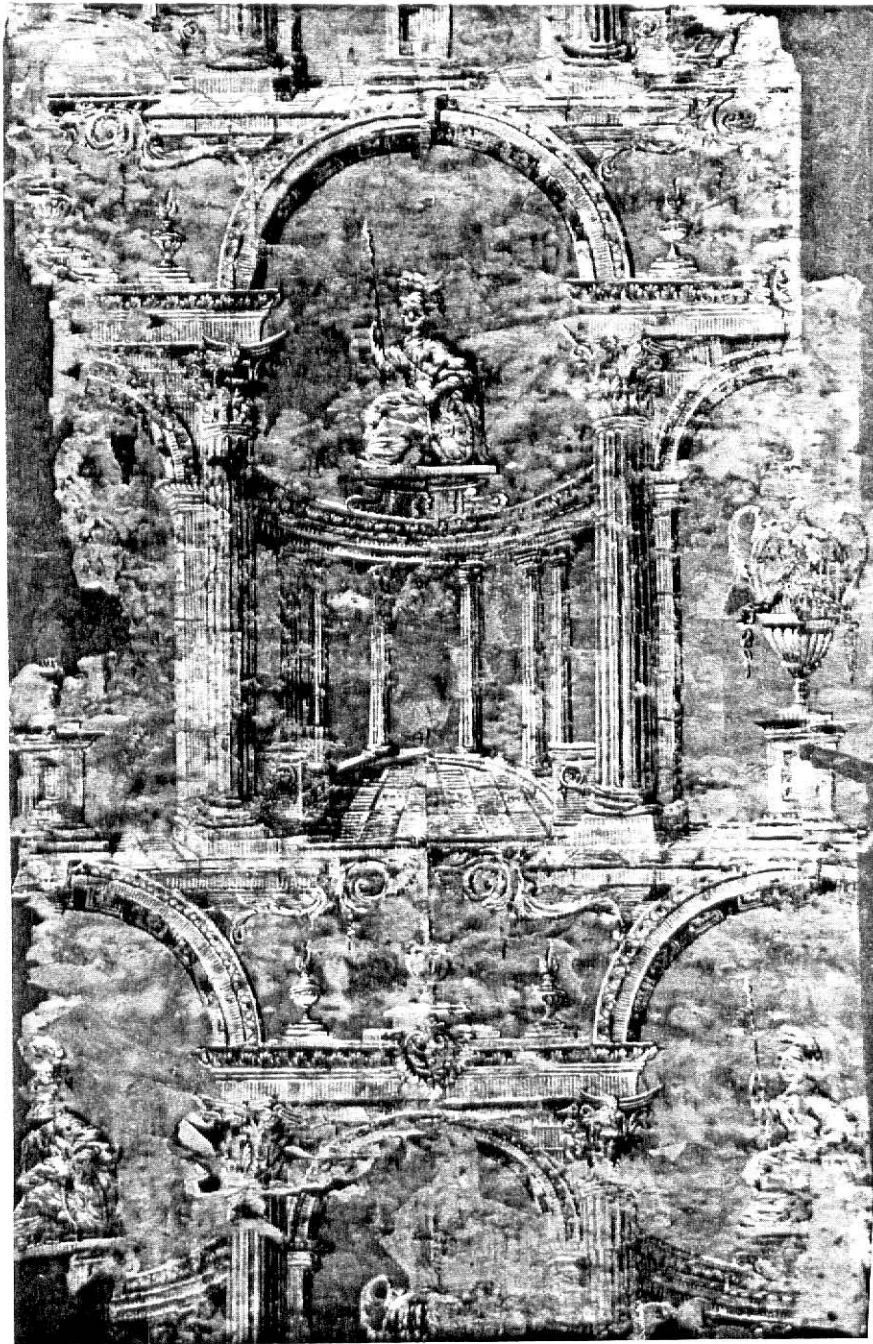


Figure 7. Block printed in black and white on a gray ground, this English paper was probably the original wallcovering used in the Samuel Buckingham House, built in 1768 in Old Saybrook, Connecticut. The remnant illustrated is about 24 inches wide. Such relatively large scaled neo-classical "Pillar and Arch Figures" were advertised.

Source: Wallpapers in Historic Preservation, U.S. Department of the Interior, p. 20.



Figure 8. In the stair hall of the wing added in 1795 to the Phelps-Hatheway house in Suffield, Connecticut, the principle pattern was made in the Réveillon factory, probably under the direction of Réveillon's successors Pierre Jacquemart and Eugène Bénard. The incorporation of architectural elements and its large scale (each vertical repeat is 46 $\frac{3}{4}$ inches) make this pattern comparable to English pillar and arch designs, also popular for American halls.

Source: Wallpapers in Historic Preservation, U.S. Department of the Interior, p. 23.

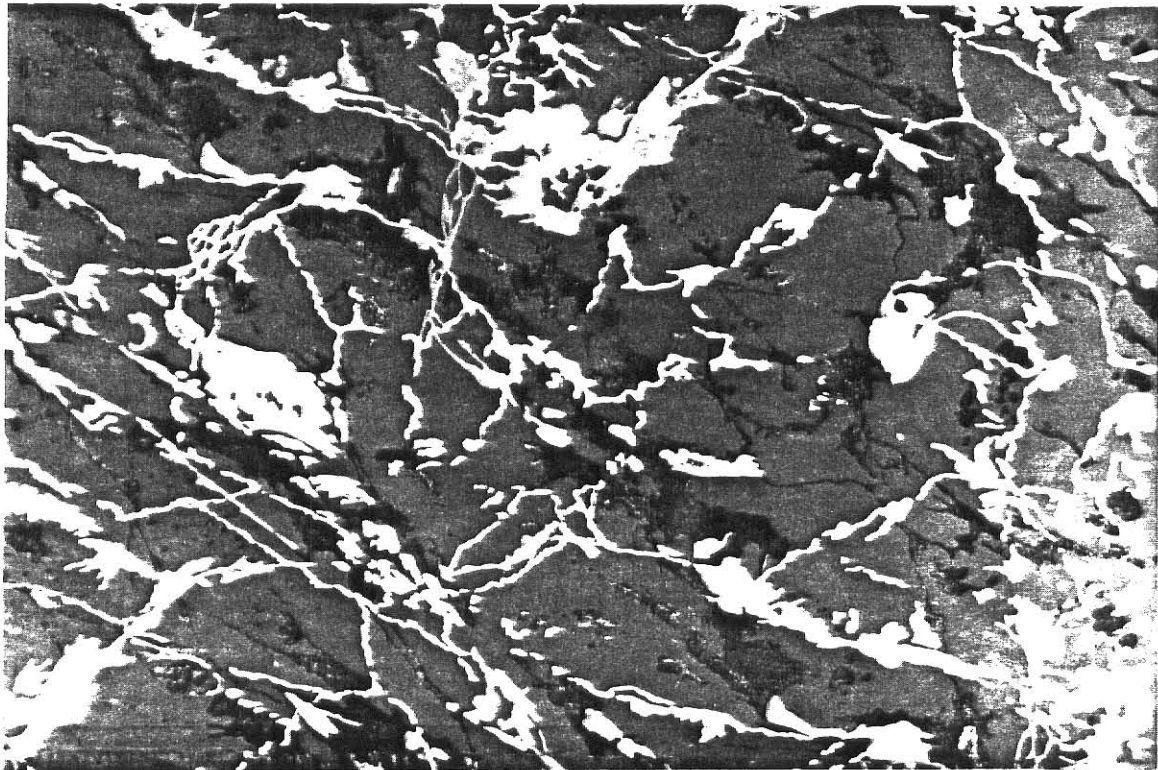


Figure 9. Printed wallpapers imitating marble are less familiar to collectors of antiques than are the "marbled papers" produced by floating oil-based colors on water. With its dark ground good camouflage for scuffs, it is often used on dados and in entries and halls. In the late-eighteenth-century French wallpaper shown here, white, gray, and black veining has been block-printed on a green ground. The sample is 23 inches wide.

Source: Wallpaper: A History, F. Teynac, P. Nolot, and J. Vivien, p. 217.



Figure 10. Anonymous eighteenth century Chinese wallpaper in tempera.

Source: Wallpaper, B. Greysmith, p. 71.



Figure 11. Jean Baptiste Pillement's publications of the 1760s and 1770s provided pattern makers with models for Chinoiserie motifs and Indian florals. This engraving was published in 1773.

Source: Wallpaper in America, C. Lynn, p. 65.

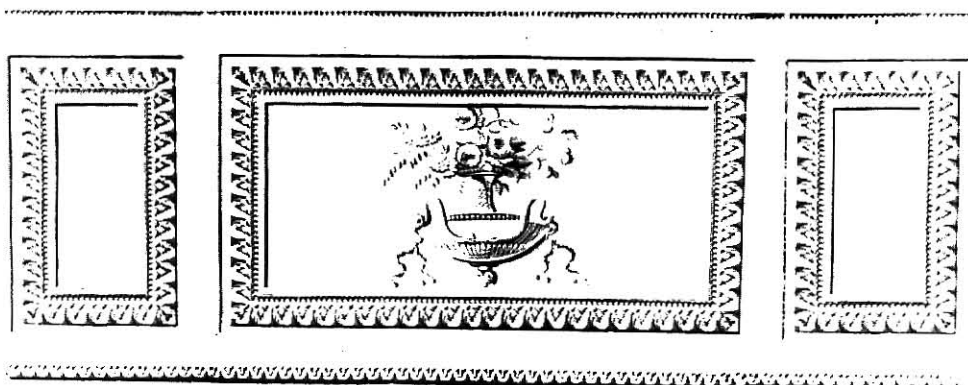


Figure 12. An American advertiser of the late eighteenth century might have described the block-printed paper hanging as a "handsome wainscot or dado pattern." It is a late-eighteenth-century French example. The "moldings" on it are printed in shades of gray-brown on a robin's egg blue ground. The panel would have stood 26 inches high (the paper's width) on a wall.

Source: Wallpaper in America, C. Lynn, p. 358.

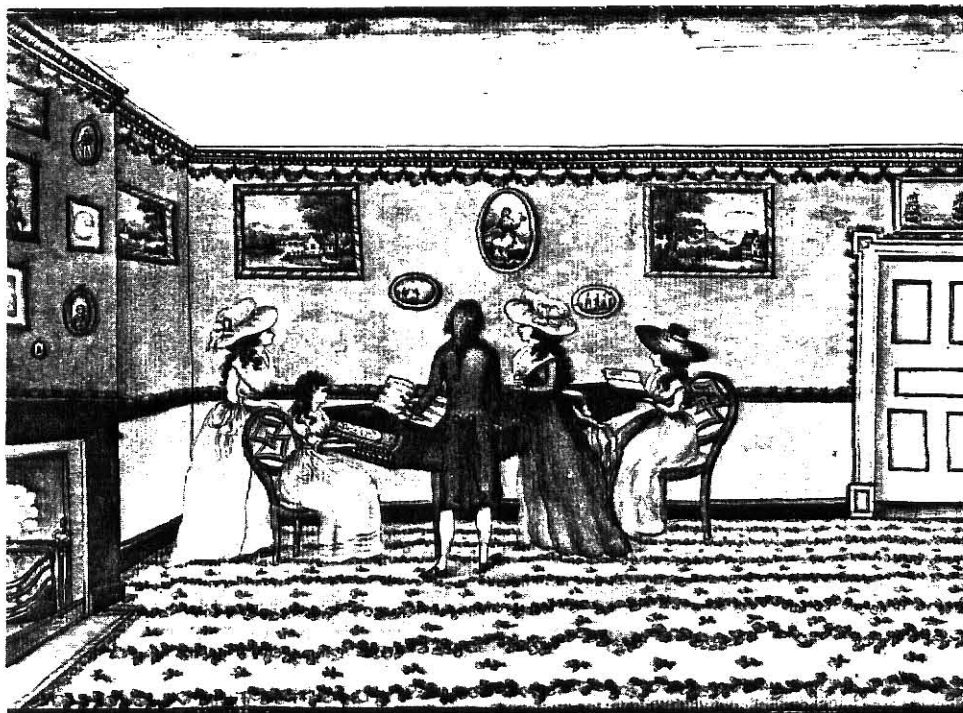


Figure 13. The watercolor Piano Recital at Count Rumfords, Concord, New Hampshire was painted about 1800 by Benjamin Thompson (Count Rumford). The plain green walls embellished with wide festoon borders at cornice level, and narrow edgings at chair rail level and around the door, were probably papered. They certainly illustrate the late eighteenth century taste for the plain colored wall with contrasting borderings, a fashion that lasted well into the nineteenth century.

Source: Wallpapers in Historic Preservation, U.S. Department of the Interior, p. 25.

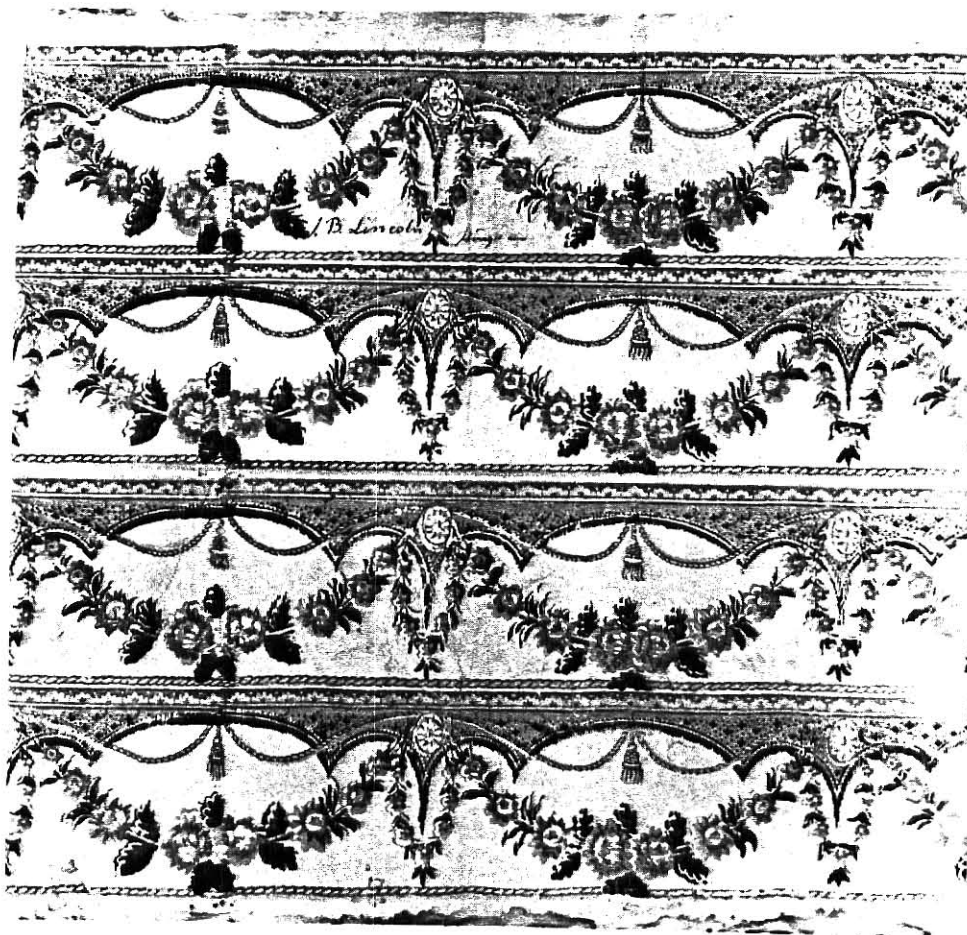


Figure 14. Four lengths of a festoon or swag border survive uncut, side by side, as the stainer block-printed them late in the eighteenth century. After a paper hanger had separated such strips, he most probably would have placed them at cornice level, like the festoon border illustrated in Figure 13. Printed in orange, white, green, and pink on a gray ground, each border is $5\frac{1}{4}$ inches wide.

Source: Wallpapers in Historic Preservation, U.S. Department of the Interior, p. 25.

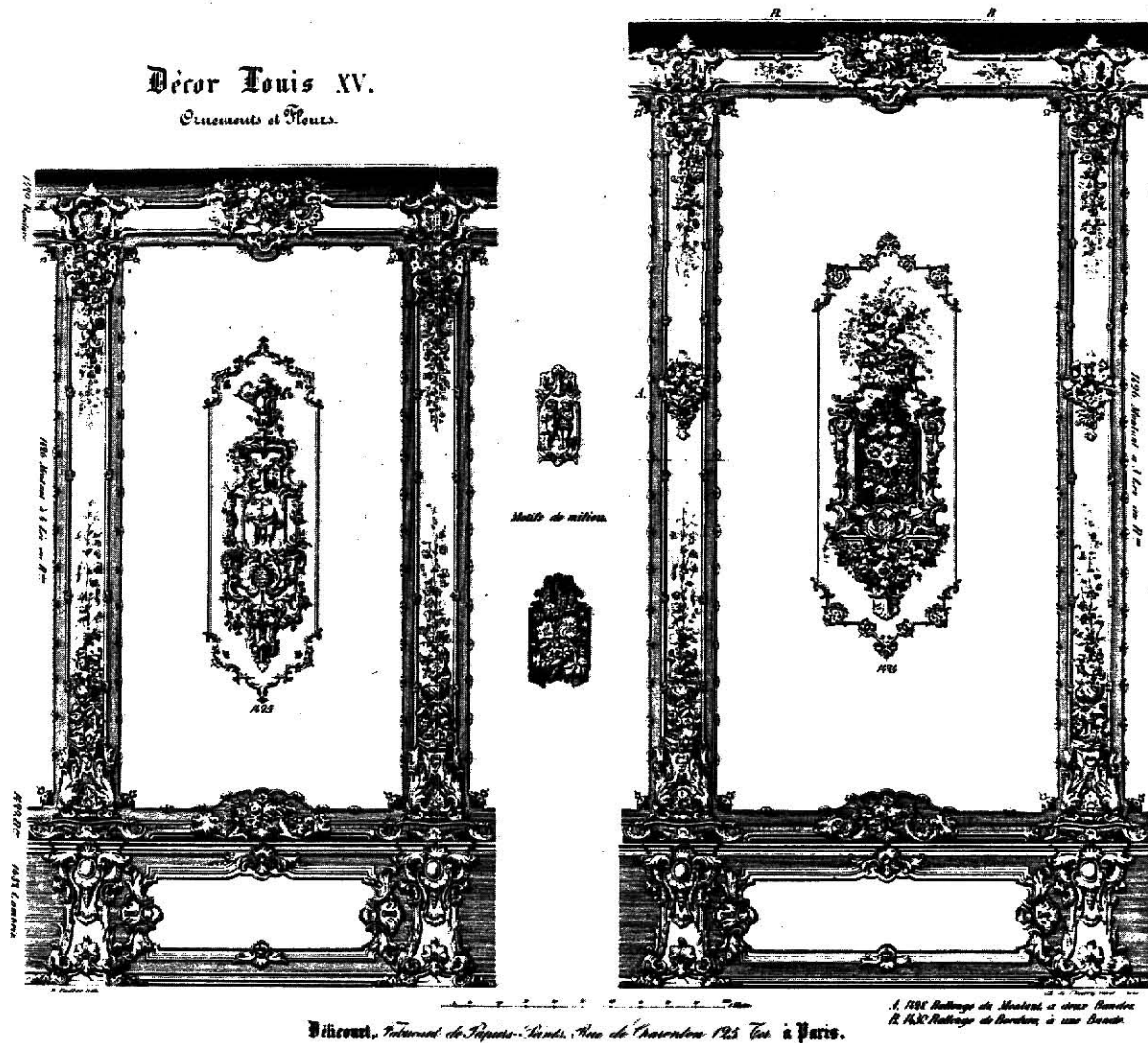


Figure 15. Panel set like the one shown here divided the walls of a room into vertical segments. They became fashionable in the mid-nineteenth century. Panel sets were called "fresco papers" in the advertisements.

Source: Wallpaper in America, C. Lynn, p. 354.

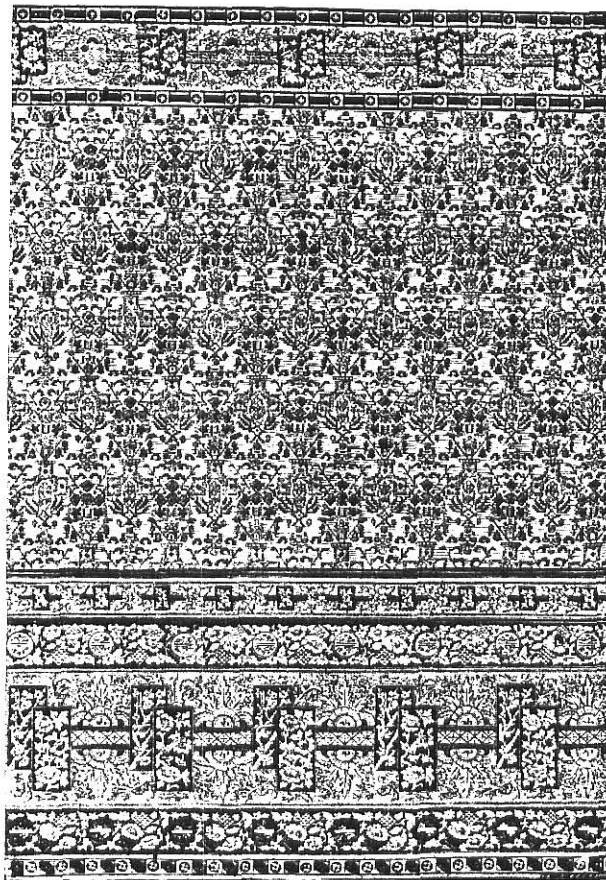


Figure 16. Favorite scheme of the eighteenth-century for dividing the walls into three horizontal sections: frieze at top, fill below, and dado below the chair rail, all marked off by borders.

Source: Wallpaper: A History, F. Teynoc, P. Nolot, and J. Vivien, p. 146.

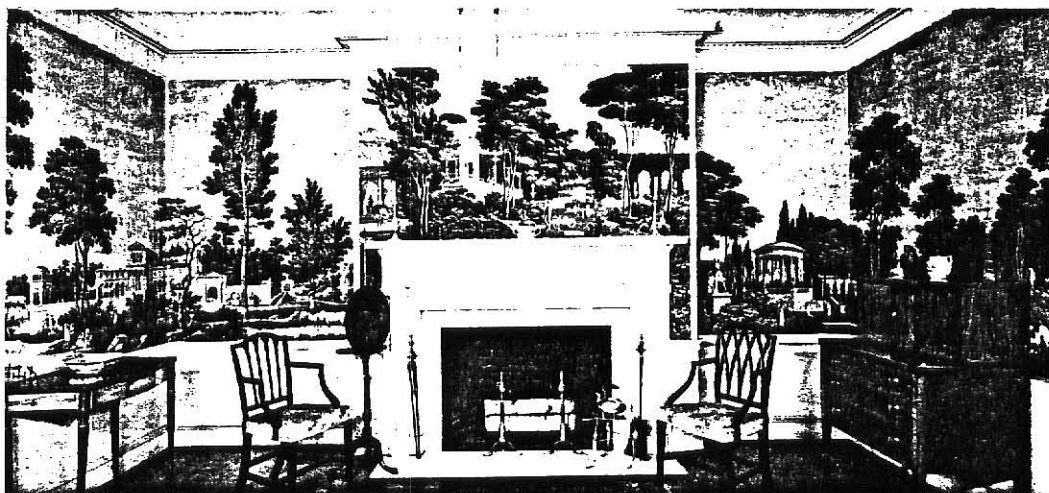


Figure 17. Between 1800 and 1805 scenic paper, the parlor of the George Shepard house in Bath, Maine.

Source: Wallpaper in America, C. Lynn, p. 186.

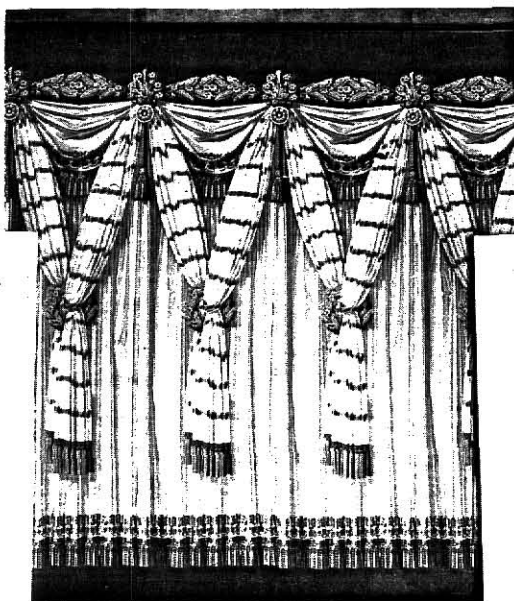


Figure 18. This wallpaper drapery, imitating panels of heavy green-striped white silk fabric with gold fringes and ornamentation, was block-printed in France about 1815. The paper was originally hung in the Ruel Williams house in Augusta, Maine, and is now displayed, as shown here, in the Stebbins house at Historic Deerfield, Massachusetts.

Source: Wallpaper in America, C. Lynn, p. 359.



Figure 19. Creating the illusion that the drawing room walls were draped in endless swags and tassels, this wallpaper and its narrow border were hung at Adena, in Chillicothe, Ohio, shortly after their purchase in October of 1808 from a firm of Baltimore paper stainers. They probably were printed by Thomas and Caldeleugh, whose bill to Thomas Worthington for these papers survives in the Adena State Memorial. They imitate elaborate French drapery patterns. The photograph was made about 1900, before the papers were removed.

Source: Historic Wallpapers, N. McClelland, p. 197.



Figure 20. On a mid-nineteenth-century stripe, realistic flowers were printed in bright blue, pink, and orange, shaded with maroon over scrollwork in gray, blue, and gold, all on a polished white satin ground. Typical of French imports of the period, this 22 inch wide paper was used in the Early House in Lynchburg, Virginia.

Source: Wallpaper, B. Greysmith, p. 128.

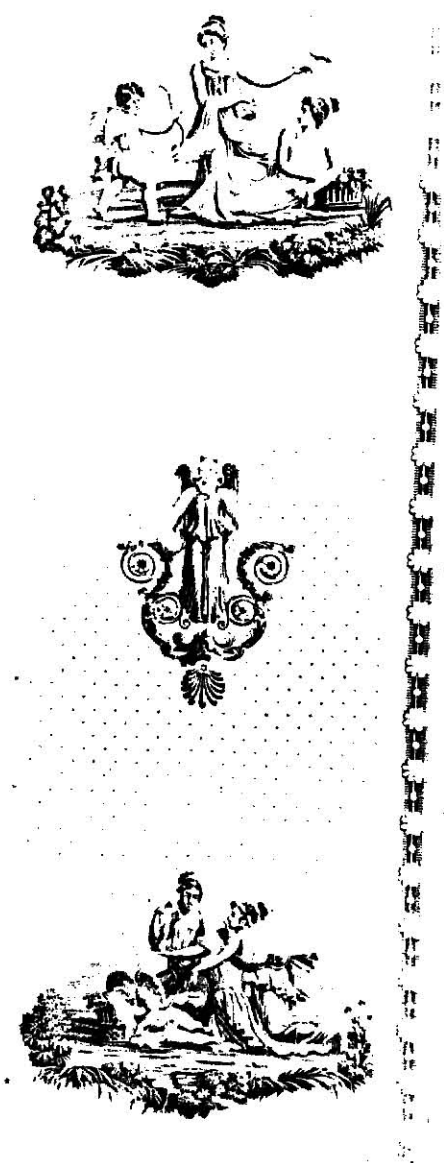


Figure 21. French wallpaper of 1810 to 1815, here, all the striping has been printed along the right edge of the paper width--with three principal motifs alternating between stripes, over a ground spotted with small figures. The sample is 20 inches wide.

Source: Wallpaper in America, C. Lynn, p. 278.

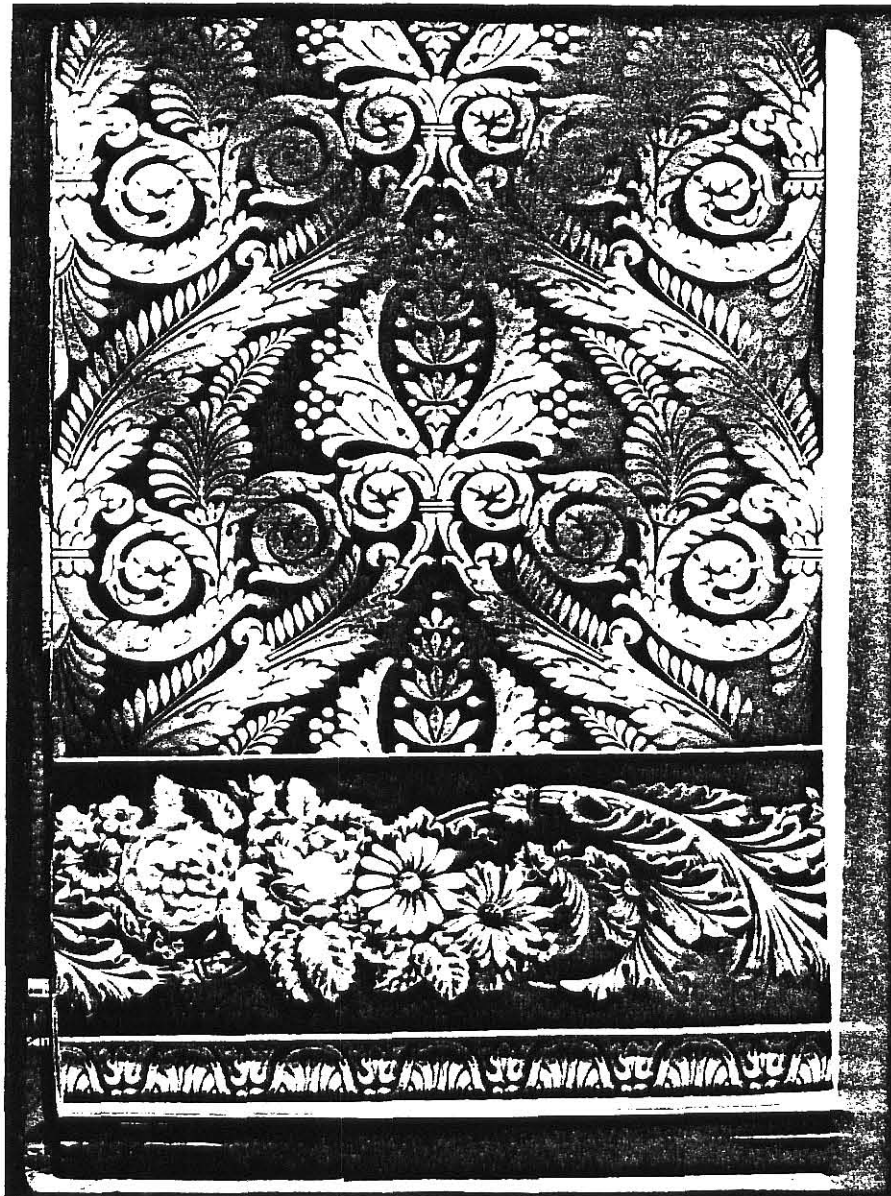


Figure 22. The vocabulary of neoclassical ornament was embellished with color-blending (irisé or rainbow) in this pattern, which is shown with a flocked floral border just as it was bound in a volume of designs produced in 1828-9 by the Zuber Company in Alsace.

Source: Wallpaper: A History, F. Teynoc, P. Nolot, and J. Vivien, p. 265.



Figure 23. Anonymous English Gothic wallpaper, c. 1840-50.

Source: Wallpaper, B. Greysmith, p. 118.

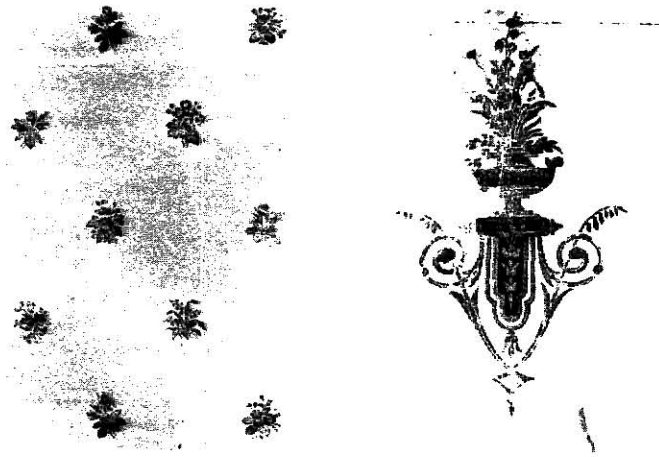


Figure 24. The scale and spacing in the placement of the motifs are typical of a great many gilded and embossed wallpapers of the 1850s and 1860s.

Source: Wallpaper in America, C. Lynn, p. 358.



Figure 25. Block Printing--To make this French paper of the late eighteenth or early nineteenth century, a series of woodblocks was used to print opaque layers of thick, chalky distemper colors in pastel shades over a brown ground color on a sheet $23\frac{1}{2}$ inches wide. The impressions made by stamping with carved woodblocks.

Source: Wallpapers in Historic Preservation, U.S. Department of the Interior, p. 10.



Figure 26. The Englishman William Morris (1834-1896) designed this "Willow" pattern in 1874. It was one of the most successful of the stylized flat patterns--as contrasted to the naturalistic three-dimensional patterns--that won a generation of taste conscious Americans away from French designs. Morris papers inspired "artistic" imitations by American wallpaper manufacturers. Morris himself designed a total of 41 wallpaper patterns between 1861 and his death in 1896, and five patterns for ceilings. Because each was registered by name and number with accompanying sample at the English Board of Trade, and because these records are preserved in the British archives, the dating and identification of the designs of Morris, and of many other well-known British designers, can be quite precise.

Source: Wallpaper: A History, F. Teynoc, P. Holot, and J. Vivien, p. 146.

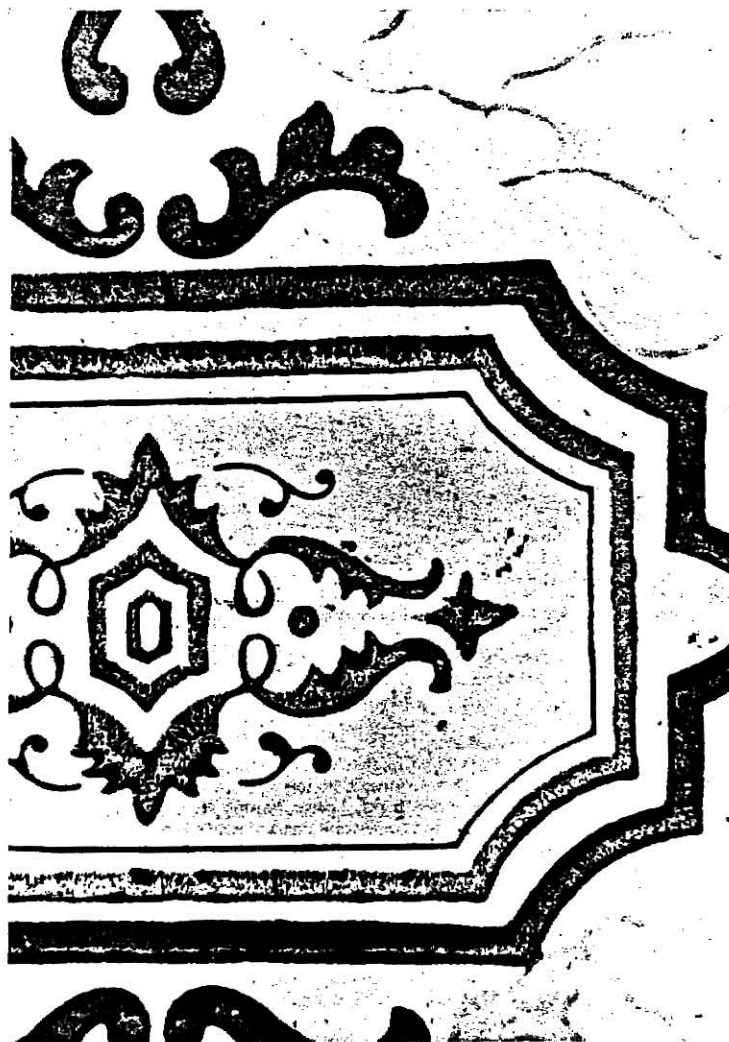


Figure 27. This shows the imprint of the metal outlines used to form printing surfaces on rollers for machine printing. The thinbodied pigments are characteristically transparent, giving texture in which all the streaking runs in a vertical direction, in which the printing rollers were turning.

Source: Wallpapers in Historic Preservation, U.S. Department of the Interior, p. 15.

APPENDIX B

INSTRUCTIONS FOR POLYESTER FILM ENCAPSULATION

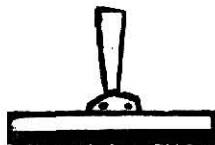
INSTRUCTIONS FOR
POLYESTER FILM ENCAPSULATION

Materials Needed:

Scalpel, knife or small scissors
Lint-free cloth (cheesecloth)
1 Weight with clean felt bottom
1 Hard rubber brayer



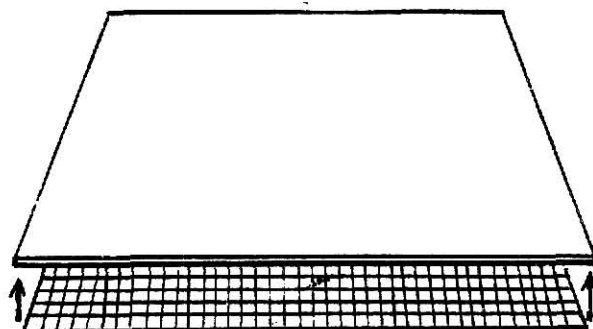
1 Window-cleaning squeegee



Polyester film, pre-cut or in rolls: Mylar Type S or equivalent; 3 or 4 mil for small and medium size documents; 5 mil for large documents. Available from most conservation suppliers.

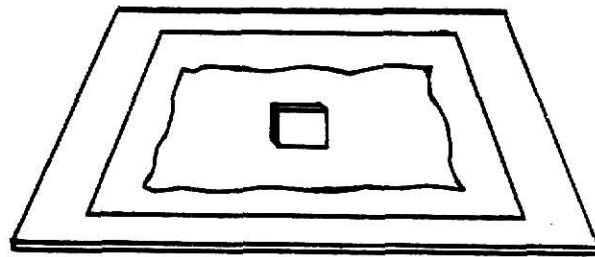
Scotch brand double coated tape #415, 1/4" or 3/8" wide.
Available from most conservation suppliers.

A gridded work surface can be prepared by taping 1/4" graph paper to the underside of plexiglass or glass.

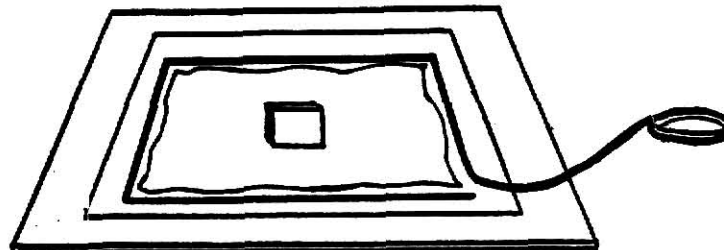


Instructions:

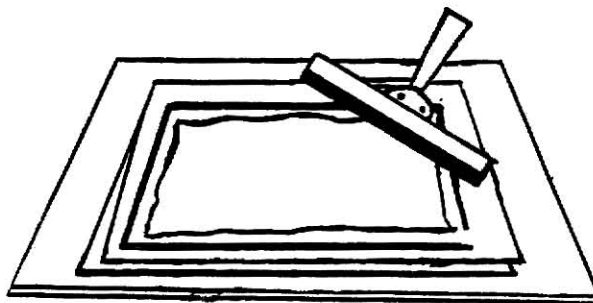
1. Cut two sheets of polyester film at least one inch larger than the document on all four sides.
2. Place one sheet of the polyester film on a flat hard work surface. Wipe the surface of the film with a lint-free cloth to remove dust and create a static charge, which will adhere the film to the work surface.
3. Center the document on the polyester film, leaving an adequate border for the double-coated tape.
4. Place a weight on the center of the document to keep it in position.



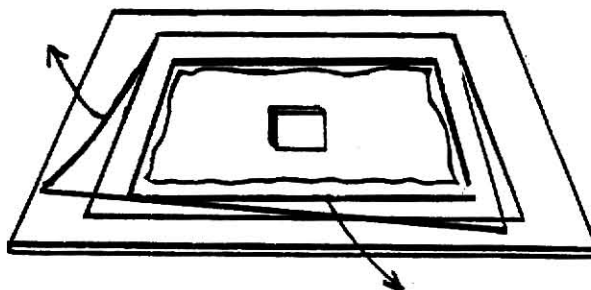
5. Apply the double-coated tape to the polyester film, leaving a 1/8" margin on each side of the document. A graph paper grid placed beneath a glass work surface, will help to position the tape squarely. The ends of the tape should be cut square and butted on three corners with no overlap. A gap of at least 1/16" should be left at the fourth corner for air escape. Leave the brown protective paper on the tape.



6. Wipe the second sheet of polyester film with cloth.
7. Remove the weight from the document and place the second polyester sheet cleaned side down on the document.
8. While holding the partially completed capsule down with one hand, use a squeegee to remove as much air as possible from between the sheets of film. Work from the center out to the edges.

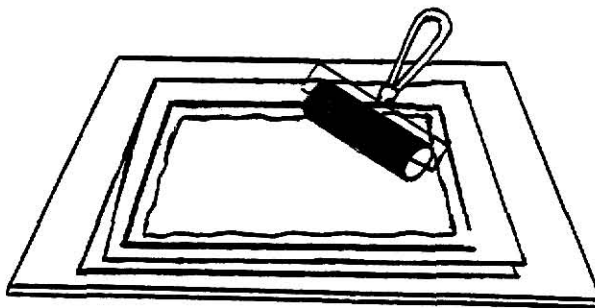


9. Replace the weight on the center of the pack.
10. Lift one corner of the top sheet of polyester film. Carefully peel the brown protective paper from the tape on two sides of the document.

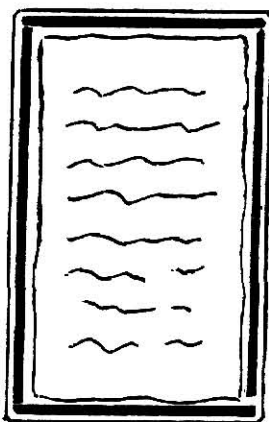


11. Repeat step ten on the diagonally opposed corner.
12. Use the squeegee to seal the tape and remove air from the envelope. Work towards the air gap left in one corner of the tape border.

13. Roll the brayer over the tape to bond it firmly to the polyester.



14. Trim the capsule, leaving a slight margin outside the tape on all four sides. Rounding the four corners will help prevent scratching or cutting during handling.



Source: "Polyester Film Encapsulation" (Mimeographed),
Northeast Document Conservation Center.

APPENDIX C
REPRODUCTION WALLPAPER FIRMS

Birge Wallcoverings, 2775 Broadway, P.O. Box 27, Buffalo, N.Y.
14240 (716-891-8334)

Bradbury & Bradbury, P.O. Box 155, Benicia, Calif. 94510
(707-746-1900)

Brunschwig & Fils, 979 Third Avenue, New York, N.Y. 10022
(212-838-7878)

A. L. Diamant & Company, 309 Commerce Drive, Exton, Pa. 19341
(215-363-5660)

Greeff Fabrics Inc., 155 East 56th Street, New York, N.Y. 10022
(212-751-0200)

S. M. Hexter Company, 2800 Superior Avenue, Cleveland, Ohio
44114 (216-696-0146)

The Hinson Collections, 251 Park Avenue South, New York, N.Y.
10010 (212-475-4100)

Katzenbach & Warren, 950 Third Avenue, New York, N.Y. 10022
(212-759-5410)

Milbrook Inc., A Division of Collins & Aikman, 23645
Mercantile Road, Cleveland, Ohio 44122 (216-464-3700)

Scalamandré Inc., 950 Third Avenue, New York, N.Y. 10022
(212-361-8500)

F. Schumacher & Company, 939 Third Avenue, New York, N.Y.
10022 (212-644-5900)

Richard E. Thibaut Inc., 315 Fifth Avenue, New York, N.Y.
10016 (212-481-0880)

Albert Van Luit Inc., 4000 Chevy Chase Drive, Los Angeles,
Calif. 90039 (213-247-8840)

Waverly Fabrics, A Division of F. Schumacher & Company,
58 West 405h Street, New York, N.Y. 10018 (212-644-5900)

RESTORATION AND PRESERVATION TECHNIQUES--AND
CONCERNS OF HISTORIC WALLPAPERS

by

SARA ELIZABETH GANS

B.F.A., University of Kansas, 1978

AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Clothing, Textiles,
and Interior Design

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1983

ABSTRACT

In many American cities, old buildings of high architectural standards are designated by law as historic landmarks. The interiors in most cases do not receive the local legislation that protects them from imprudent alterations or even complete gutting. Rarely is wallpaper given adequate consideration in the restoration and/or preservation of interiors. However, it should be remembered that the papered and boarded wall was an important feature of American interiors during the eighteenth and nineteenth centuries, and should be preserved, restored, or reproduced whenever possible. The purpose of this report is to compile the historical background, influences, and technology of the eighteenth- and nineteenth-century wallpapers in the United States along with current preservation and restoration techniques.

In addition to the discussion on the history of wallpaper and preservation/restoration techniques, the report compiled the technology of historic wallpaper. Wallpaper technology has progressed parallel with other sciences. In modern manufacturing techniques, the machine plays an important role, both in designing new patterns and the reproduction of classics. As the public's desire for restoring, preserving, and reproducing classical designs of the past increases, the true importance of old wallpapers comes to light. Not only are the styles and motifs of old papers an

important building block for today's wallpapers, they also are a very important segment of our history, social evolution and our heritage.

The report cites the museum that can be contacted to provide identification of samples, antique dealers that can provide authentic period papers, and companies that manufacture reproduction papers.

Additionally, step-by-step instructions are provided for the preservation method of polyester film encapsulation procedure.