

PART TWO

Historical Perspectives



Support and Polychromy of Altarpieces from Brussels, Mechlin, and Antwerp

Study, Comparison, and Restoration

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COMPOSITE ALTARPIECES, comprising painted and sculpted elements (really pieces of liturgical furniture) had already appeared in great number by the middle of the fourteenth century in different regions. They functioned at this time as tabernacles,¹ and cupboards for relics and for individual figures of saints and narrative scenes. Gilded architectural elements, baldachins,² and rhythmic colonnettes strictly compartmentalized the space. The painted wings served to close these “cases,” revealing the figures to the faithful only on feast days.

Altarpieces were popular throughout Europe in the fifteenth and sixteenth centuries. The regional workshops—for example, Germanic, Franco-Flemish, Spanish, and Italian—evolved differently, varying the dimensions, space, perspective, lighting, and polychromy of the altarpieces (Skubiszewski 1989).

Only altarpieces from the historic Brabant region³ are considered here—in particular, the sculpted parts of these Brabantine altarpieces. In the fifteenth century, Brabantine altarpieces evolved toward a more realistic expression and a more accentuated relief. Compositions were grouped in successive arrangement, presenting scenes of small characters, related as in a theatrical setting. Over time, the architecture changed, reducing in size, until eventually there was no more than a frame presenting scenes consecrated to the Virgin, to the lives of the saints, or to cycles of the infancy and Passion of Christ. This evolution progressed very slowly during the mid–sixteenth century, from late Gothic decoration to Renaissance motifs. From the second half of the fifteenth century, Brabantine altarpieces became so successful that, in order to satisfy the demand, a division of labor became necessary. The production of altarpieces was divided between the hutch maker,⁴ the sculptors of the architectural elements, the sculptors of the figures, the gilders, the polychromists, and the painters (Jacobs 1989).

The regulations of the guilds were very strict. It was mandatory that the works be marked as a way of guaranteeing their place of origin and their quality. This method of serial production reflected a systematization in the formal creation of the altarpieces and in the application of the polychromy in the principal Brabantine workshops.

The Brussels Workshops

The Brussels workshops produced altarpieces in oak and in walnut. Architectural elements and the hutch⁵ were in oak, and the paintings of the wings on oak supports. Walnut was used especially around the middle of the fifteenth century to create sculpted groups from a single block. Each compartment was composed of a block containing a composition of five to eight figures. The customary forms are rectangular with a raised central compartment. There are often three—or, occasionally, five—compartments for the large altarpieces (Fig. 1). Colonnettes and pinnacles separate the scenes and support the canopies. Pierced friezes decorate the bases of the altarpieces.

It is known from guild documents, notably those dating from 1453 to 1455, that quality control was regulated by marks (Nieuwdorp 1981, 1993). The hutch was marked with a compass and plane, the sculptures with a mallet, and the polychromy with a “BREUSEL” punch in the gilding (Fig. 2). Still other marks are occasionally found, such as a Gothic letter J or a flower, which are considered personal.⁶ In addition, marks or numerical notations denoting position can be found on the architectural elements.⁷

At the end of the fifteenth century, the sculptures and the composition of the altarpieces became complex. The fragments were systematically cut in quartersawn oak, and they were no longer carved in a single block, but rather in a series of blocks perfectly accommodating each other, either one behind the other or side by side. Marks from the rotatable vice can often be seen on the heads of the figures and marks from long knives on the underside of the base. The mounting of the hutch, the architectural elements, and the sculptures is remarkable. The assemblages are fashioned with dovetails (above the case), mortise and tenons, and pins. The wood of the hutches from Brussels shows signs of cleaving less often than that in hutches from Antwerp because even the wood at the back of the Brussels cases was often reworked (sawed, smoothed, planed); consequently, the marks of the woodcutter are less often found (Glatigny 1993).⁸

Figure 1

Brussels altarpiece from Saluzzo, ca. 1500. In the collection of the Maison du Roi, Brussels.

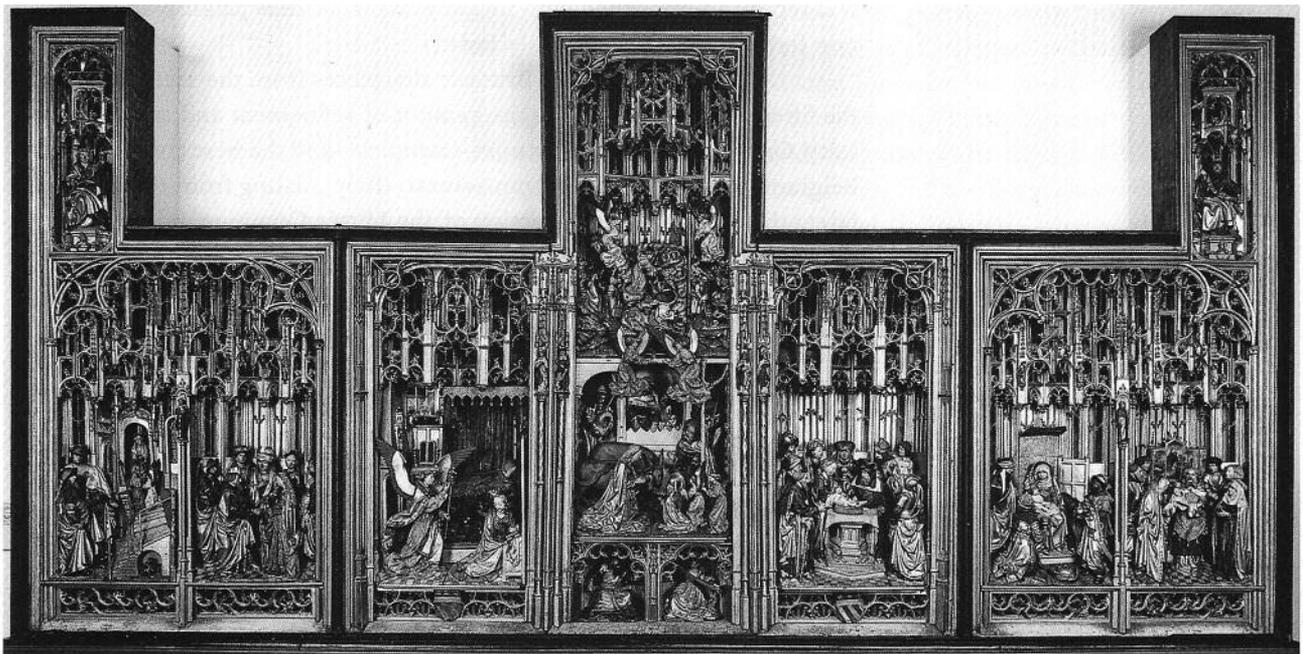


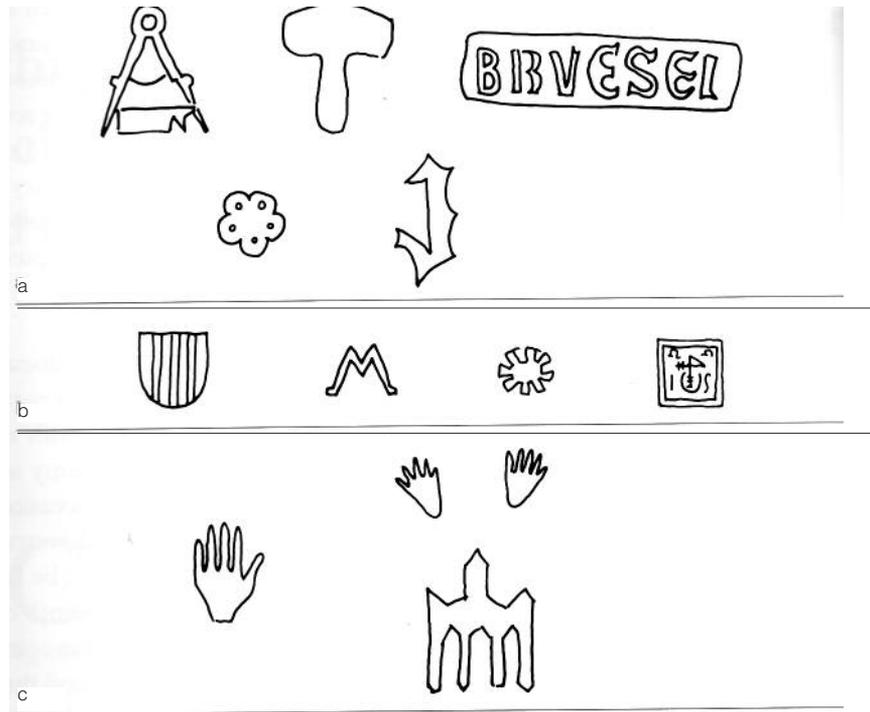
Figure 2a–c

Sketches of marks found on altarpieces.

(a) Brussels, top row: the compass and plane (hutch maker's mark); the mallet (sculptor's mark); the BRUESEL punch (polychromy mark struck into the gilding); second row: the flower, the letter J (examples of personal marks struck in the wood of the case).

(b) Mechlin: the shield (mark of hutch makers and sculptors); the letter M (polychromy mark struck into the gilding); the wheel (example of personal mark struck into the wood); the square (personal polychromy mark).

(c) Antwerp: the hand (sculptor's mark); the castle and hands (the final guild mark on the case and wings).

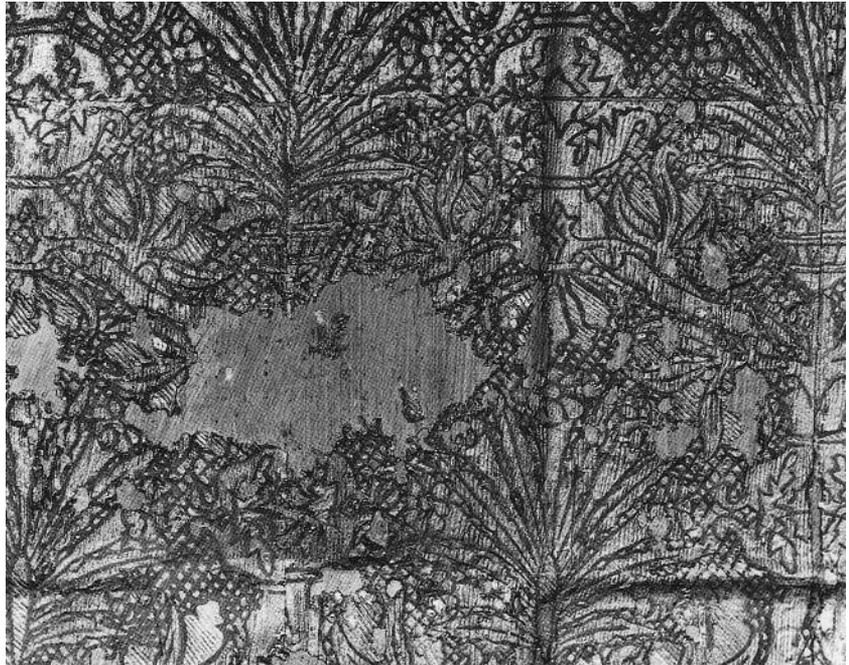


The architectural elements were dowelled and adhered with animal glue. They were then coated with a white ground⁹ composed of chalk and animal glue. Two layers of ground generally sufficed for the fine tracery of Gothic arcades destined to receive a matte oil gilding, with ochre added to the oil mixture. Broad areas and larger parts of the arcades were covered with more ground layers to prepare them for the burnishing of the gold, applied on a pink-orange bole. The sculptures were coated with the same ground, most often in similar thickness; hair, faces, hands, fine decoration, and landscape areas received only two or three thin layers, while the garments or those areas that were intended to receive gilding—in burnished gold or silver—were covered in five to ten layers. The ground was recut and smoothed with marsh grass (*Equisetum palustre*) in preparation for application of the polychromy.

The polychromy of Brussels altarpieces from the second half of the fifteenth century reaches the summit of refinement and artistic virtuosity. One of the most sumptuous examples—and the best conserved in Belgium—is the altarpiece from Saluzzo (Italy), dating from the end of the fifteenth century, in the collection of the Musée Communal de la Maison du Roi, located in the Grand Place in Brussels (Fig. 1) (Fichet 1965). The stages and the components of the polychromy are as follows: the pink-orange bole was applied very cursorily in the areas intended to receive gilding. In certain instances, a gray bole has been found under silver leaf—for example, under the silvering of a small domestic altarpiece of the Nativity from the same museum.

With the application of the ground and bole to the fragments completed, a kind of stage setting was created by placing the individual elements first in the background plane, then the middle plane, and finally in the foreground plane. The middle and foreground figures conceal the bases of those of the background. Incisions were made in the bole to define those areas intended to receive the gilding, so areas that would not be seen

Figure 3
Brussels altarpiece from Saluzzo. Detail of
applied brocade on the canopy.



would not be gilded. After application of the metal leaf by water gilding, and after burnishing, the next step was probably decoration by punching.

A typical decoration of Brussels altarpieces is the imitation of richly embroidered textiles, achieved by the technique of applied brocade¹⁰ (Ballestrem 1968; Serck-Dewaide 1990). Certain canopies and garments received complete brocades of the lean type, rectangular leaves in relief that were prepared in a mold. These decorations on Brussels altarpieces are extremely fine. Each mold was engraved with a textile motif, then covered by a leaf of tin (as a releasing agent). A small amount of liquid ground material was then poured, while lukewarm, into the mold. After drying and removal from the mold, the brocade leaves were glued onto the paintings or sculptures. They were gilded in place (matte oil gilding) and then embellished with fine blue or red painted decorations (Fig. 3).

Other parts received local brocades laid down on a colored glaze applied over silver. There are two examples in the scene of the Annunciation in the Saluzzo altarpiece: the decoration of the eagle in gilded relief on red glaze over silver on the bed cover, and the floral decorations on a green glaze laid over burnished silver on the decoration of the baldachin. In the latter, there is an added refinement: the green glaze is applied in one layer; then the gilded brocade is “glued” to the undried glaze. Once dry, a second layer of glaze is applied, using a fine brush to contour these motifs in relief and to form a decoration of darker tonalities in thick glaze. Finally, the same technique was used for the borders of glued brocades (or orphreys) on the mantle of the Angel Gabriel (Fig. 4).

Other decorations typical of Brussels altarpieces, but rarely preserved, are the metallic decorations in relief: small “cups” in copper (or alloy) pressed into the fresh pictorial layer of glaze or oil paints. Three altarpieces still in Belgium have these decorations.¹¹

Representations of stained glass windows are made with remarkable realism in Brussels altarpieces: burnished silver leaf on bole is covered

Figure 4
Brussels altarpiece from Saluzzo. Scene of the
Annunciation.



with a somewhat greenish glaze and finished by a network of fine black lines to represent the leads. The blues are deep azurite on light blue. The azurite may be crystalline, pure, matte and coarsely ground, applied on a black ground in an aqueous medium. It is found on most of the linings of the garments, simulating velvet.

A few blue dresses have decorations of small gold dots, seemingly achieved with shell gold (powdered gold bound in gum arabic). On certain garments, the blue azurite areas are strewn with small cut-and-gilded brocade motifs. The azurite may also be ground more finely, mixed with white lead, or on a yellow or reddish ground bound in a glue, an oil, or a mixed medium. These blues decorate hats and cloaks, and they are often outlined by red or blue piping. The flesh tones are also extremely refined. They are often smooth, like porcelain—rather white for the female figures and redder for the males. Fine, precise oil strokes finish off the details of the eyes, eyelids, eyebrows, circles around the eyes, mouth, fingernails, blood, and sometimes even tears.

The decoration of areas depicting the floor or ground varies according to whether an interior or exterior space is represented. The interiors are decorated by a tile pavement, with the lines in perspective, often engraved into the ground layer. The entire area is leaf-gilded with an ochre colored oil, and afterward each alternating tile is coated with green (copper resinate) or red glaze. The outdoors is suggested by a grassy earth, sometimes worked by a technique known as *tremolierungen*¹²—as observed in the altarpiece dedicated to the life of Saint George (signed and dated by

Jan Borman, 1498) and in the small domestic altarpiece of the Passion (both in the collection of the Musées Royaux d'Art et d'Histoire, Brussels), as well as in the Saluzzo altarpiece (Maison du Roi). To produce invisible joins, these areas were filled with a thick putty, or paste, composed of animal glue and wood powder. This material was occasionally also applied on the surfaces as an alternate method of representing grass. Matte gold was then applied to these areas, which were then partially covered with malachite green in an aqueous or mixed medium, and then covered with a green glaze of copper resinate.

These finishing touches of matte gold, color, and glazes were applied after the last mounting of the altarpiece. Finally, a very fine protective layer of animal glue was applied on the burnished gold (called "matting of the gold" in the seventeenth century) (Serck-Dewaide 1991).

It should be emphasized that all Brabantine altarpieces were originally polychromed. Because many altarpieces were stripped of their polychromy during the nineteenth century, certain art historians have written that some Brabantine altarpieces were meant to remain bare wood, locally tinted and colored, like those of Tilman Riemenschneider or other sculptors of the German Renaissance. These suggestions are erroneous; each time a "bare wood" altarpiece has been studied or restored, traces of polychromy have been found, or texts from the nineteenth century requesting the removal of the polychromy have been discovered.

The Mechlin Workshops

The Mechlin¹³ workshops produced works contemporaneous with those of the sumptuous period of the Brussels workshops (end of the fifteenth century) and with those of Antwerp's great production (first half of the sixteenth century). Like the Brussels and Antwerp workshops, the Mechlin workshops created a few altarpieces of historic scenes—such as those in Odeby, Sweden (Derveaux-Van Ussel 1973b); Aachen Museum, Germany (Nieuwdorp 1993:20–21); the church of Clerey, France (Derveaux-Van Ussel 1973a); and *Deutschordenskirche* (the Church of the Teutonic Knights) (Koller 1995:90–104) in Vienna, Austria (Van Doorslaer 1933:170). More often, however, they created small, domestic altarpieces that were rectangular in shape, had painted wings, and contained three statuettes commonly called Malines (Mechlin) dolls. The best known examples are the altarpieces conserved at the Musée Mayer van den Bergh in Antwerp (Coo 1969:202–3), such as the one shown in Figure 5, and the altarpiece from the Loze-Corswaremme collection. The single statuettes are ubiquitous, representing different male and female saints and also the Infant Jesus, nude and standing on a socle (Godenne 1972).¹⁴ The height of these statuettes is rather regular, the small format being 12.5 cm, the most common being 33–34 cm, and the largest 45 cm. The dolls are almost always in walnut, while the bases, the architectural elements, and the hutches are in oak.

The construction of the Mechlin hutches is very similar to that of the hutches of the Brussels school: pierced railings at the base, separating colonnettes, background fenestration. Only the decoration of the concave and convex brackets of the canopy¹⁵ (serving as parentheses) distinguishes them.

The marks on these altarpieces reveal the complexity of the work's organization, collaboration between the different centers, and the options of the clients. The marks of the Mechlin guild of hutch makers and sculptors,

whose stamp was a shield with three pales, can be seen on the cases or on the backs or bases of the Malines dolls; but the mark of Brussels (BRUESEL) may also be found on the polychromy of these dolls, or the mark of the compass on the case containing the dolls.¹⁶ Consequently, it is clear that the two workshops collaborated and that the client was able to order a Malines doll with either a Brussels polychromy (particularly for the applied brocades), or a Malines polychromy (marked by an M punched into the gilding, generally in the middle of the figure's gilded garment). From the beginning, the characteristics of Malines polychromy were painted decorations on burnished and punched gold: flowers, foliage, and strawberries on the borders of the garments and on the base. A little later, the polychromy was often decorated, as at Antwerp, with motifs in sgraffito¹⁷ on gold—and especially on burnished silver—and the sculptural quality began to diminish. Finally, personal marks of the Mechlin polychromists—monograms struck into the gilding of the base—have been found on several examples (Van Doorslaer 1933).

To further complicate the situation, an altarpiece very similar in construction to that of Odeby, which has a case with brackets, is consequently considered as Mechlin in origin, but it possesses an Antwerp mark on its case (Nieuwdorp 1993). Could it have been polychromed or finished in Antwerp?

The production, commerce, and exportation of the Malines dolls during the first quarter of the sixteenth century assumed a proportion difficult to imagine. In effect, they are found in all European countries: Portugal (Ferraio de Tavares e Tavora 1976), Spain (Eguia Lopez de Sabando 1983; Mirari 1989), abundantly in France and Germany, and as far as the Philippines, where one was given as a present to the queen of Mazzava from the Portuguese navigator Magellan (Didier 1973). The production of the Malines dolls cannot be counted by the dozen but rather by the hundreds.

The dolls were also acquired by the devout of the region's convents, who surrounded the figures with flower embroideries in the celebrated closed gardens of Mechlin (Vandenbroeck 1993:91–104). These gardens were appointed with relics, ex-votos, and Malines dolls until the beginning of the seventeenth century. At the end of the century, the azurite blue of the dolls was replaced by smalt. Occasionally, the nude Infant Jesus was dressed, but this became obligatory only after the Council of Trent (1545–63). The Infant Jesus from Lubeck is an extraordinary example (Hasse 1970:160–61). The high demand by collectors and dealers for these dolls has led to the production of numerous fakes.

The Antwerp Workshops

Antwerp produced altarpieces at the end of the fifteenth century, though the major part of its production occurred after 1500. (Marks became mandatory around 1471–72). It could be said that Antwerp surpassed Brussels at that point in terms of reputation and that Brussels artisans probably came to practice at the Antwerp guild. The works were constructed more rapidly, and the compartments were more numerous and tiered—most altarpieces having six compartments. The early, generally rectangular, forms took on arcing shapes, and the altarpieces were then placed on a painted or sculpted predella.

Antwerp altarpieces were the subject of special study and conservation for the 1993 exhibition at Antwerp Cathedral. Systematic dendrochronological analyses have confirmed that the oak used always came from the Baltic region and was imported to Antwerp by boat.¹⁸ The wood bears the marks of a type of scraper, a marking tool of the wood-cutter (Glatigny 1993; Serck-Dewaide 1993b).¹⁹ The guild required the use of aged, quartersawn oak, from which the sapwood was eliminated. Despite these strict rules, a few millimeters of sapwood is often found on at least one sculpted piece from each altarpiece, thus permitting a correct dating. The assemblages of the case were always made with dovetails and mortise and tenons. The planks at the back were left split and were nailed to the framing structure.

The architectural elements were constructed according to a typical scheme. The theater of historical scenes is presented on an incline plane, as if staged. Four or five figures are generally positioned in the foreground plane, occasionally with their backs to the spectator while observing the scene in the middle or background planes. The gilded concave architectural elements frame the space in the middle ground, which contains the principal scene. In the background plane, landscapes, architectural elements, or secondary scenes are fixed to the half hexagon-shaped canopy of the architecture.

During the numerous restorations, observation of the various marks has allowed a chronology of the work to be established. Altarpieces were mounted three times. The first mounting was in bare wood, when the preliminary adjustments were made; any possible imperfections—pieces too high or too low—were corrected by adding blocks to the bases or at the backs of the fragments.

The work of the sculptor was controlled; and, before application of the ground layer, numerous statuettes were marked by hot iron with the “hand” of Antwerp on the head or on the base. The elements were then given a ground layer according to the same method used in Brussels or Mechlin, except that the manner in which the pieces were secured during the application of the ground was different. Square nail holes, systematically placed at the middle of the back, hold no significance for the attachment of the altarpiece. This implies that a plank was nailed to the back, on which the individual pieces were posted for application of the ground layers. In this way, handling the fragments would not be necessary, yet the edges of the back of each piece could still be reached.

After the ground was recut and smoothed, one layer of orange-colored bole was applied, and the altarpiece was mounted a second time. The hidden parts of the pieces that were not intended to receive gilding were delineated by incisions. Adjustments that were made after the ground was applied (indicated by marks in the ground layer) can be seen at the back. Each element of the statuette then received the desired gold or silver gilding. After guilders burnished the water-gilded metallic leaves, produced decoration by punching, and matted the gold with a protective layer of glue, painters proceeded to apply the underpaint and the paint layers in tempera—for example, black or medium blue under the azurite, and pink in an aqueous medium for the flesh tones (Sanyova 1993).

Oil gilding was generally applied on an oil layer, to which ochre was added. Often, analyses and visual observation reveal a red layer of

minium under the oil layer. This can be interpreted as an isolating layer or a layer that would indicate to the gilder the positioning for the matte gold.

Oil colors, glazes, and decorations followed. The precise succession of operations, particularly for flesh tones, is discernible by examining how the layers correspond at the juncture of two colors. Thus, between the flesh tones and the oil-gilded hair, the preliminary application of a pink underlayer can be distinguished, followed by layers of matte gold (underlayer, oil layer, gold). Finally, the pink layer, made with an oil medium, was applied to color the cheeks; then the eyelashes, eyebrows, eyes, and mouth were painted when this layer was dry. The decorations were created through the use of different techniques; punching performed by the gilder has already been mentioned, although painted decorations of flowers, leaves, lettering, and geometric lines are found with equal frequency on the gilding.

Finally, the characteristic technique of the Antwerp school is sgraffito. This technique consists of applying a paint layer on a burnished gold or silver surface and, after a moment of drying, of engraving into the colored layer to allow the gold or silver to show through it. This rapid technique replaced the applied brocade technique used by the Brussels workshops. A very few local and other rare examples of brocades (perhaps done by Brussels artisans?) are found on Antwerp altarpieces from the beginning of the sixteenth century—for example, on the altarpiece from the church of 's Hertogenbosch in Holland (Smedt 1993:52–57).

The altarpiece was then mounted a third time. Certain adjustments can still be seen. Everything was fixed with the help of forged nails inserted into the prepared holes of the first schemes. At this stage, gilders and painters intervened again. They applied the final touches to the altarpieces in their vertical position. The heads of visible nails were oil gilded, and the decoration of the tile pavement was finished, as was the shading, with a green glaze, the drip marks of which are visible at the back. When the ensemble was completely finished, the mark of the castle and two hands was burned into the side of the case or, occasionally, on the frame of the paintings.

This veritable “art industry” led to a rather stereotypical production. The garments, the architectural decorations, and the stance of the figures evolved slowly toward Mannerism and the Renaissance. The palette and the mixture or the superimposition of pigments changed slowly, but the structure and organization of the work seems to have remained unchanged until around 1570, by which time altarpieces of this type were no longer ordered.

Material Evolution of the Altarpieces

Within the group of preserved altarpieces—including 180 from Antwerp, catalogued by Hans Nieuwdorp; approximately 70 from Brussels; and hundreds, or perhaps a thousand, Malines dolls (not counting the fragments from dismantled altarpieces)—it could be said that rarely have works survived in their original, pristine state. The works have been subjected to natural aging, iconoclasm, vandalism, theft, and church fires, as well as cleanings, overpaintings, retouchings, varnishings, replacement of elements, and other poor interventions. The state of conservation varies according to the regional school (Brussels, Mechlin, or Antwerp) and according to the country in which the works are preserved. Unfortunately,

as a result of successive restorations, a series of the most beautiful extant Brussels altarpieces in Belgium was stripped during the second half of the nineteenth century. These include the following altarpieces: the Virgin from the church of Lombeek-Notre-Dame in Brabant (De Borchgrave d'Altena 1938; Wauters 1971:170–88); Saint Crispin and Saint Crispinian, attributed to Jan and Pasquier Borman, from the church of Herenthals, Antwerp (Kuyt 1870; D'Hainaut-Zveny 1983); the altarpiece in the church of the Saints, Brabant; the altarpiece from the church of Hemelverdegem, western Flanders; the two from the parish church of Villers-la-Ville, Brabant; and finally, the altarpiece of Saint George in the *Musées Royaux d'Art et d'Histoire*.

By contrast, the thirty-three Brabantine altarpieces in Sweden survive in relatively good condition. None of them have been stripped; they have only been overpainted (a common practice), but the quality of the overpaints is quite acceptable.

It could also be said that half of the altarpieces produced at Mechlin have been stripped, or otherwise “mistreated” (the statuettes overpainted, poorly restored, scraped, altered, etc.).

Of the twenty altarpieces (or parts of altarpieces) that were chosen for exhibition in Antwerp in 1993 because of their “good state of preservation,” five have original polychromy. Those from Valladolid, Spain, and Thenay, France, have no recent intervention. After recent treatment for exhibition, those from Dijon, France; Elmpt, Germany; and Arlon in the province of Luxembourg, Belgium, now have original polychromy. Three more have original polychromy following removal of overpaints: those from Lanaken in the province of Limburg, Belgium; Bouvignes in Namur, Belgium; and 's Hertogenbosch, Holland. Finally, among the remaining twelve, the altarpiece from Netterden, Holland, has been stripped to the wood, and obvious repairs to the eleven others include overpaints and pervasive varnishing, which either partially or totally mask their original aspect, often altering it completely.

Of the twenty-one exposed fragments, nine are stripped to the wood, ten have original polychromy—either in good condition, damaged (dirty, with lifting polychromy), or poorly restored—and two have a very beautiful Spanish Baroque overpaint.

Statistically, the situation would appear to be consistent with what is generally found elsewhere.

Treatments

Treatments that should be performed by conservators obviously differ in each case and according to the state of preservation of the work. The minimal amount of intervention possible is the best approach for an altarpiece, provided that it is at least preserved in a stable environment and that it does not travel. To study and understand these works, it is necessary to examine those works that appear to be in the most pristine condition and to intervene as little as possible.

For this reason, the following altarpieces have been chosen for discussion: the Brussels altarpiece from Saluzzo; the Mechlin altarpiece with Brussels polychromy from the *Musée Mayer van den Bergh*; the Mechlin Virgin and Child with Malines polychromy from the *Musée d'Audenarde*; and the Oplinter altarpiece from the *Musées Royaux d'Art et d'Histoire*. These works are particularly intact; they display only a few early, localized

interventions, and the conservation treatments carried out during the last two decades have been minimal. For the altarpieces from Bouvignes, Namur, and Opitter, Limburg, detailed interdisciplinary studies have permitted an understanding of the numerous interventions and have influenced the approach to their complex treatments.

The Brussels altarpiece from Saluzzo

The Saluzzo altarpiece depicts the life of the Virgin and Saint Joseph (Fig. 1). It is dated around 1500 and is attributed to the workshop of Pasquier Borman, son of Jan. The painted wings are attributed to Valentin Van Orley (Coo 1979). The altarpiece was commissioned by the Roman family Pensa di Mondovi and installed in the north of Italy. It was bought by the city of Brussels in 1894 and exhibited in the Musée Communal de la Maison du Roi. The exceptionally well-preserved polychromy may be considered original; only a few of the faces seem to have been locally inpainted.

In 1988, at the time of alterations at the museum, the Institut Royal du Patrimoine Artistique (IRPA) was charged with a “renewed maintenance” before presentation of the work in a new exhibition case. Records indicate that identical maintenance was carried out in 1950 and 1973. It took eight days for a team of five conservators to carry out the treatment, which was undertaken in situ without dismantling the altarpiece. A few lifting areas of the polychromy were set down with a wax-resin mixture for the burnished gold and sturgeon glue for the matte colors and the brocades. Dust was removed with small sable brushes. For a few dirtier areas, white spirit and toluene were used. Respect for the original “matting” layer placed on the burnished gold was considered very important, and the encrusted patina on this layer was not removed. A few pinpoint retouchings along the edges of the losses were done with watercolor.

The Mechlin altarpiece from the Musée Mayer van den Bergh

This altarpiece, dated around 1500, has three figures: Saint Catherine, the Virgin and Child, and Saint Barbara (Fig. 5). The interior wings are decorated with images of Saint Madeleine and Saint Agnes. The closed wings present two small angels elevating ribbons and coats of arms on a marbled green-and-black background. The altarpiece had been overpainted, the exterior wings being entirely overpainted in black. A coat of arms above the two saints on the wings was painted on the sky, then hidden by an overpaint imitating the sky. The case, architectural elements, and bases were rather heavily regilded. The blue of the figures has been overpainted, and their faces have been overpainted twice. Two crowns are original; that of the Virgin is a later addition.

The oak case has a Malines mark on its left side, and the three walnut statuettes have the same mark on their bases. The polychromy is identical to that of the Saluzzo altarpiece and appears, therefore, to be of Brussels production. The BREUSEL mark, generally affixed on the socles, must have been lost at the time of the regilding. Moreover, it seems that the painting of the wings was also carried out by the Brussels workshops.

A complete treatment was carried out at IRPA in 1970. It consisted of setting down the lifting polychromy with wax resin for the gilding and with dilute poly(vinyl acetate) for the blue layers and decorations.

Figure 5

Mechlin altarpiece with a Brussels polychromy, ca. 1500. In the collection of the Musée Mayer van den Bergh, Antwerp.



Figure 6

Mechlin Virgin and Child with a Malines polychromy, ca. 1520–1530. Hotel de Ville, Audenarde (eastern Flanders).

The localized overpaints on the dolls had been removed, as well as the overpaint on the exterior wings. Campaigns of maintenance were executed in situ in 1978 and 1985.

Mechlin Virgin and Child from the Town Hall at Audenarde

This sculpture (Fig. 6) (Serck-Dewaide 1995) presents a typical Malines polychromy. The figure is in walnut and the base is in oak. It could be dated around 1520–30 and, interestingly, possesses four different marks. On the back of the figure is a mark of the Mechlin workshop—a shield with three pales; on the socle is a shield and wheel with eight spokes, an individual mark of the sculptor (the same mark as found on a Saint Peter in the Musées Royaux d'Art et d'Histoire, Brussels). On the gold of the garment in the front is an M—the mark of the polychrome workshop of Mechlin—and an individual mark on the base, a square punch with an anchor and two rather indecipherable letters (J and E, or I and S?).

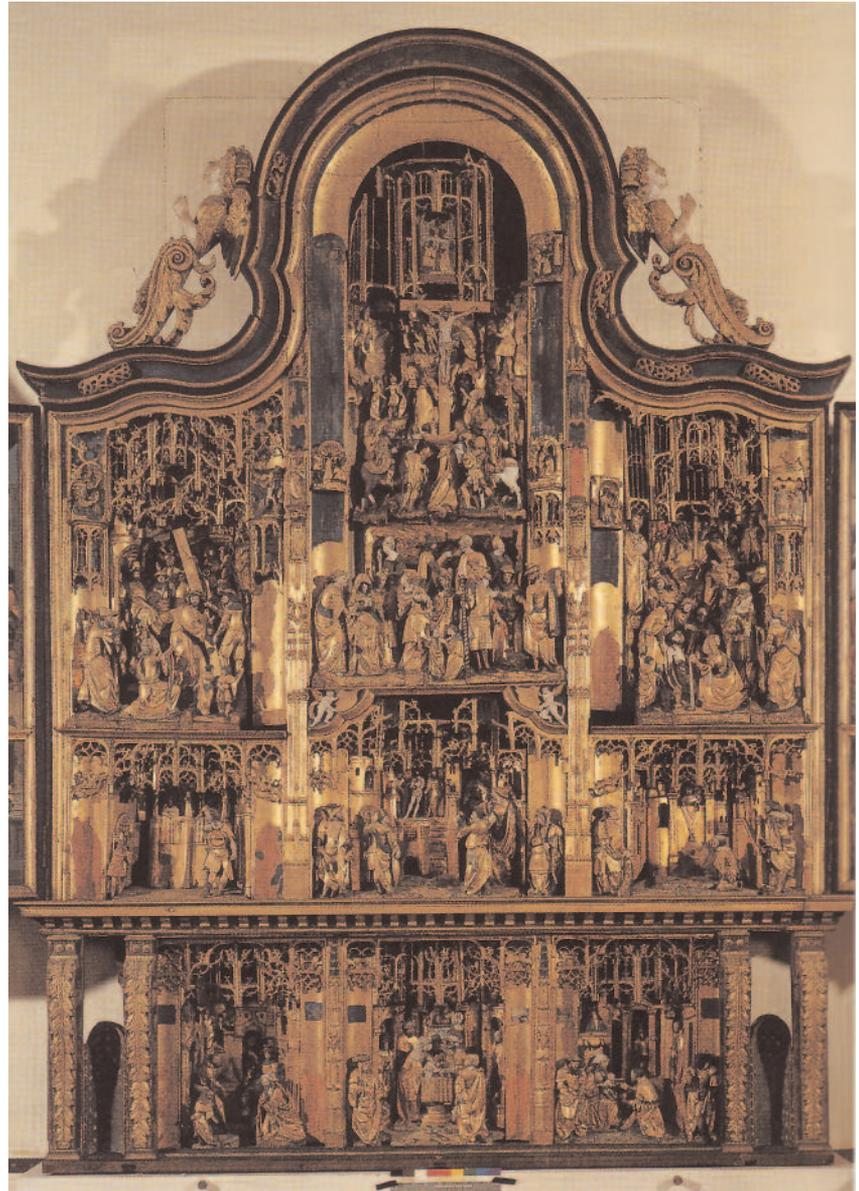
A treatment was carried out at IRPA in 1963, consisting of disinfection, a very localized consolidation of the worm-eaten wood, and setting down of the polychromy with wax and poly(vinyl acetate). In 1994, maintenance of the sculpture collection was requested by the Town Hall. Another setting down of the polychromy was necessary (using wax resin and sturgeon glue). New, small losses were apparent in the polychromy. A few retouchings were made using dry pigments and Acryloid B72 in ethanol to which a little diacetone alcohol was added.

The Antwerp altarpiece from Oplinter

The altarpiece of the Passion from Oplinter, circa 1530 (Figs. 7 and 8a, b), has been in the collection of the Musées Royaux d'Art et d'Histoire since 1894. Except for the addition of two angels positioned back to back at the

Figure 7

Antwerp altarpiece from Oplinter. In the collection of the *Musées Royaux d'Art et d'Histoire*, Brussels.



a



b

Figure 8a, b

Detail of the Magus, front and back, from the Antwerp altarpiece from Oplinter. Note the added block and nails, the scraper marks, the inscription, and the punch marks.

top of the hutch, four pilasters, two niches, a seventeenth-century cornice framing the predella, and the unfortunate theft of nineteen fragments, the altarpiece is remarkably intact. Almost all the surfaces remain untouched since its creation, although a resinous varnish, applied to the flesh tones, has strongly altered their legibility.

While certain fragments were dismantled during transport to the museum, the architectural elements and all of the third plan were never dismantled. The observations made at the time of the restoration performed at IRPA during 1972–74 were particularly fruitful and are noted in the Antwerp catalogue (Serck-Dewaide 1971–72).

Treatment consisted of setting down the polychromy before transport to IRPA, dismantling, another setting down of the polychromy, laboratory examination, balanced cleaning, removal of the varnish, inpainting,

remounting, and documentation. Recently, a survey of the archival material and a study of the iconography were undertaken (De Boodt 1993), and a complete, multidisciplinary publication is in preparation. Maintenance provided the opportunity to sample the various layers for analysis.

Selection of the works presented here has been guided by the state of conservation of their polychromy. It should be added that more extensive treatments also have been carried out. For example, overpaints were removed from the Antwerp Renaissance altarpiece of the Passion from the church of Bouvignes (province of Namur), which dates to around 1556, and a new hutch was added (Serck-Dewaide 1993a; Bauret and Serck-Dewaide 1993). Another altarpiece, one of the Passion from the church of Opitter (province of Limburg), had such a complex history of interventions that it took fifteen people one year to complete its examination and treatment. It is hoped that a comprehensive study on this subject will be published.

Conclusion

It should be pointed out again that the quality of the cut of the wood and the perfection brought to bear on the polychromy are guarantees of the excellent state of preservation of Brabantine altarpieces, provided that the works have not been subjected to vandalism, severe climatic fluctuations, or poor restorations.

Consequently, preventive conservation is essential, so as not to allow an altarpiece to become overly dirty, and a system of regular maintenance is advised. It is obvious that protection was better in the past, as the wings were almost always closed. Today, cases and alarms are necessary in the churches and museums that house the altarpieces.

The life of each of these altarpieces is very complex, and it is not easy for the uninformed spectator to recognize or differentiate between the specific and original features of polychromies from Brussels, Mechlin, and Antwerp. It is therefore necessary to publish, in color, the intact evidence, and to make art and conservation professionals aware of the history of these altarpieces and of polychromy techniques. This was an aim of the Colonial Williamsburg symposium, and it is the aim of this article.

Notes

- 1 A *tabernacle* is a small structure situated in the middle of an altar, containing the holy sacrament.
- 2 A *baldachin* is an architectural element in wood, marble, or metal that crowns an altar or a sculpted scene.
- 3 This area today is divided between Belgium (the provinces of Antwerp and Brabant) and the Netherlands (province of North Brabant). In the fifteenth century, the large Brabantine cities—Brussels, Louvain, Mechlin, and Antwerp—profited from the decline of the Flemish cities of Bruges and Ghent and became the centers of political, administrative, industrial, and artistic activity for the former Netherlands.
- 4 *Hutch maker* is a medieval term designating a cabinetmaker and maker of coffer, cupboards, and altarpiece cases.
- 5 *Hutch* generally refers to a coffer or furniture element in wood; it is also the term used for the case of an altarpiece.
- 6 The letter J was discovered on the oldest altarpiece (the Nativity) from the church of Villers-la-Ville, dated ca. 1460, during restoration at the Institut Royal du Patrimoine Artistique (file # 2L/31-81/2315). This letter, struck seven times on the back of the altarpiece, is also found on the case of a Brussels altarpiece in Berlin, a photograph of which was published

by Demmler (1930:344). Other personal marks include the one drawn by Nahuys Maurin (1879:17–24) and the flower visible on the case of the Nativity altarpiece from the Maison du Roi, a work very close to that in Berlin.

- 7 Such marks are found on the architectural elements of Brussels altarpieces. In the case of the Villers-la-Ville altarpiece, one can see marks of the curved chisel: “(, ((, (((, ((((”); the flat chisel: “/, //, ///, ////”); or the round punch: “., .., ...,, Y, Y,” with a notation system similar to Roman numerals. Each case or compartment has a code defined by a different tool. Despite the stripping of the polychromy and the dismantling to which these altarpieces have been subjected, these marks appear to be original. For the Vermeersh altarpiece in the collection of the Musées Royaux d’Art et d’Histoire (MRAH), the marks found under the colonnettes are “I, II, III,” and are original as indicated by the appearance of ground and gold under the edges. For the stripped altarpiece of Lombeek-Notre-Dame, the marks cannot, with certitude, be construed as original, but the same type of mark with Roman numerals appears. The same mark is found on the architectural elements of the altarpiece of Claude de Villa and Gentile Solaro (MRAH).
- 8 These woodcutter’s marks have been confused with the marks intended to denote position (see Verougstraete and van Schoute 1993).
- 9 A *ground* is the first layer applied to wood before painting. Gesso, which is always composed of calcium sulfate, is used as a ground in the southern countries: Italy, Spain, south of France. However, in the north—Northern France, Belgium, Holland, Germany, and the Baltic countries—calcium carbonate is used. Therefore, the term *gesso* is not used in this article. (The confusion between these terms continues in the English literature.)
- 10 *Applied brocade* is a polychrome technique imitating, in relief, a brocaded and gilded textile.
- 11 These “cups” are seen as part of the polychromy of the altarpiece of the “Vermeersch Bequest” Passion, and on the recently acquired altarpiece of the Passion, both in the collection of the Musées Royaux d’Art et d’Histoire, and on the altarpiece of Saint Dymphne from the church at Geel.
- 12 *Tremolierungen*, a German word with no precise English or French translation, refers to relief designs carved in wood with a curved gouge.
- 13 Throughout the literature, Mechlin (the English spelling used here) may be more often encountered in its French spelling, *Malines*, particularly in regard to this town’s artistic production. The French spelling is reserved here for references to the well-known Malines dolls and their polychromy.
- 14 Willy Godenne published a series of pieces on the Malines dolls in his *Handelingen van de Koninklijke Kring voor Oudheidkunde, Letteren en Kunst van Mechelen*. This series, titled “Préliminaires à l’inventaire général des statuettes d’origine malinoise présumées des XVème et XVIème siècles,” ran from 1957 to 1976 and appeared in the following volumes: 61:47–127; 62; 64; 67:68–156; 73:43–86; 76(2):3–80; 77(1):87–146; 78:93–104; 79:133–39; 80(1):71–105. The series was also published in French in *Bulletin du Cercle royal archéologique, littéraire et artistique de Malines* (Brussels).
- 15 A *canopy* may be defined as a small vault decorated with an ornamental arcade and pinnacles, screening the sculptures of a portal. (For altarpieces, the canopy and baldachin are used in an identical manner.)
- 16 As on the altarpiece with three dolls from the Loze-Corswaremme collection (see Derveaux-Van Ussel 1973b).
- 17 *Sgraffito* is a polychrome technique consisting of the application of a paint layer on top of burnished gold or silver, followed by the creation of motifs by selectively removing the paint layer.
- 18 See Vynckier 1993:189–91 for an explanatory note concerning the dendrochronological examination of several Antwerp altarpieces from the fifteenth and sixteenth centuries. It is likely that the Brussels workshops also used oak from the Baltic region, but a systematic dendrochronological analysis of Brussels altarpieces has not been carried out.
- 19 The French term for this tool is *rainette*.

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Painted Italian Picture Frames in the Samuel H. Kress Foundation Collection at the National Gallery of Art

Nancie C. Ravenel

IN THE LATE 1940s, as the Samuel H. Kress Foundation began to distribute works of art to museums all over the United States, it also continued to expand its collection. In addition to purchasing paintings and sculptures, the foundation acquired approximately eight hundred antique picture frames, many of which were restored at the foundation's conservation facility in Pennsylvania for use on Kress Collection works of art (Perry 1994). Other frames without paintings were given to museums to be used as they saw fit. Two hundred frames were donated to the National Gallery of Art in 1961. Each had been labeled by the foundation with a number, an attribution, and the dimensions of the frame's rabbet. The frames are identified as being of Italian, French, Flemish, and Spanish origin, dating from the fifteenth to eighteenth century, with the majority of the collection being Italian, from the sixteenth and seventeenth centuries. These are primarily *cassette* and reverse profile frames, but there are also a few *tabernacles* and *tondi*.¹

The Kress Foundation archive indicates that in the 1940s nearly five hundred frames were purchased from Alessandro Contini-Bonacossi, an Italian art dealer (Perry 1994:27), who stated in a letter to Rush Kress, the foundation's president at the time, "I have dedicated myself to buying up the few good frames that have turned up" (Bowron 1994:48). In fact, the collection that Contini-Bonacossi sold to the Kress Foundation is an amalgamation of smaller frame collections.² One smaller collection has been identified through markings on the reverse of the frames.

It is noteworthy that although most of these frames were acquired by the Kress Foundation without paintings, others were deemed of higher importance than the paintings they contained and were removed from those paintings by the foundation (Modestini 1994). Much of what is known about the provenance and history of picture frames is directly related to their contextual relationship with paintings, and without the provenance, dating and attribution of frames is conjectural. For some frames in the collection, the relationship between frame and painting has been reestablished through examination of 1930s photographs of Samuel Kress's New York City apartment, in which frames now at the National Gallery appear on paintings currently housed in other museums. The labels from previous collections have also helped in linking frame to painting.

Although most of the frames donated by the Kress Foundation are water gilded, approximately one-quarter are painted. They can be divided

into three types of decoration: Some are painted to imitate other materials, such as tortoiseshell or exotic woods, or to suggest a carved relief; others are painted a solid color and decorated with mordant gilding; the third group is decorated with sgraffito, a technique in which paint is applied to a water-gilded surface and then mechanically removed in a decorative pattern that reveals the gilding beneath.

The Technical Study

In conjunction with the preparation of an inventory and condition survey of the frames at the National Gallery of Art, the Frame Conservation Department has begun a study of the techniques and materials used on period frames. Traditionally, frame attributions are made through analysis of the combination of decorative motifs and the type of frame. Because style and decoration are copied from region to region and span several centuries, a technical study of materials used in the fabrication of the frame complements connoisseurship to provide a fuller picture of a frame's origin. While gilding techniques and materials have remained fairly consistent, painting materials and their manner of application have changed over the centuries. Therefore, this technical study has begun with the more complex, but perhaps easier to date, painted frames.

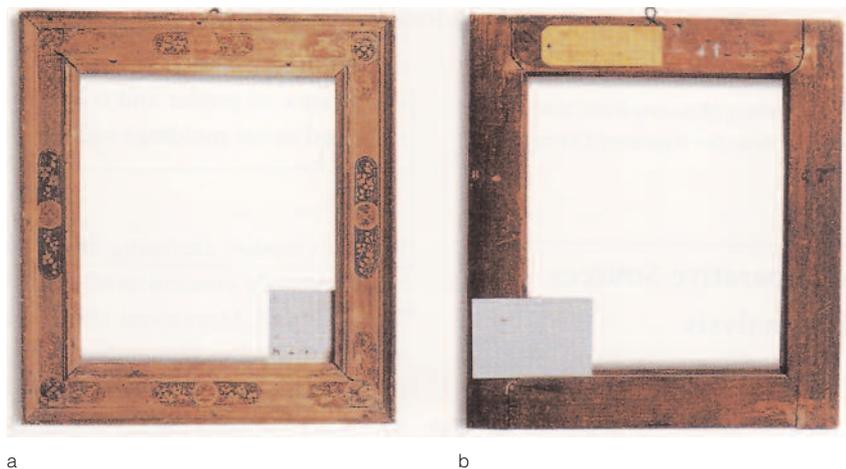
For the pilot project, four *cassette* with blue-painted sgraffito friezes attributed stylistically to sixteenth-century Venice were chosen. Selected for the study primarily because their surfaces appear to have incurred little or no intervention, they are not consistent in terms of quality, sophistication of construction, or decoration.

Frame Descriptions

Frame 0321 (Fig. 1) is constructed of a softwood. Its joinery, a mitered half dovetail lap, is unusual but has also been seen on several *cassette* decorated with molded *pastiglia*,³ also attributed to sixteenth-century Venice and on view at the National Gallery. Written in ink on the reverse of the frame are the initials "C. T.," which may relate to the frame's maker, to a prior owner of the frame, or to the identity of a painting it once housed. Typical of *cassette* and common to the four frames in this study, the sight and outer moldings are separate pieces of wood nailed to the back frame (Fig. 2). The frieze is punched in a lattice pattern and decorated with sgraffito. The painted areas appear to have been laid out in advance with incised lines

Figure 1a, b

Front (a) and back (b) of a *cassette* frame. Venice, sixteenth century. Polychromed and gilded wood. 53.3 × 48.3 cm. Samuel H. Kress Foundation Collection, National Gallery of Art, frame 0321.



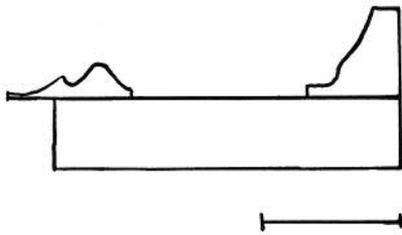


Figure 2
Profile drawing of *cassetta* frame 0321 (shown in Fig. 1). Scale bar represents 2.54 cm.

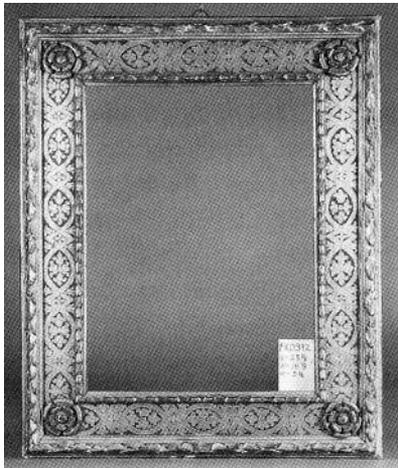


Figure 3
Cassetta frame. Venice, sixteenth century.
Polychromed and gilded wood. 93.0 × 75.9 cm.
Samuel H. Kress Foundation Collection,
National Gallery of Art, frame 0392.

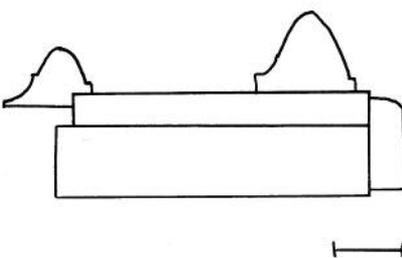


Figure 4
Profile drawing of *cassetta* frame 0392 (shown in Fig. 3). Scale bar represents 2.54 cm.

drawn first with a compass. These areas were filled in with a fine, transparent red paint, then a coarse, opaque blue-green paint, prior to having a scrolling foliate design scraped out of the paint. The frame does not appear to have undergone any restoration and is in very worn condition. There is a similar type of punched and painted decoration on the outer molding of a mirror frame dating from the early sixteenth century in the collection of the Palazzo van Axel in Venice (Morazzoni 1944:37) and on an early-sixteenth-century Venetian *cassetta* in the Robert Lehman Collection at the Metropolitan Museum of Art (Newbery and Kanter 1990:88).

Structurally, frame 0392 (Fig. 3) may be a pastiche, but it is constructed of hardwoods that all have the appearance of poplar (*Populus*). The sgraffito painted frieze is on mitered pieces of wood that are nailed to the half-lap jointed back frame (Fig. 4). This type of construction is unusual for painted *cassetta*. It appears that the sight and outer moldings were prepared for gilding separately from the frieze. The applied sight and outer moldings are carved with imbricated leaves, and there is a turned rosette glued and nailed in each corner of the fascia. The frieze is decorated with a floral and strapwork sgraffito design with a thinly painted, dark blue background. The edges of the design are punched with a dome-shaped tool. When viewing the frieze below the rosettes (Fig. 5), it appears that the sgraffito was executed without regard to the rosettes. In these areas, paint, gold leaf, and bole appear to have been removed, leaving remnants of gold in the bottoms of the punch marks. The frieze seems to have had no other alteration.

Frame 0393 (Fig. 6) is constructed of a hardwood that exhibits the characteristics of poplar, with bridle joints and mitered moldings nailed to the back frame (Fig. 7). The frieze is decorated in a wasp motif with intersecting ovals and foliate scrolls at the corners and centers in sgraffito.⁴ This decoration is virtually identical to a frame in the Pinacoteca Nazionale in Bologna dating from the early seventeenth century (Morazzoni 1953:22; Cammarota 1995).⁵ The blue paint on the frieze is extremely coarse and thickly applied. The sight and outer moldings have been overgilded, and the fascia has been overpainted at the edge of the outer molding, where the overgilding on the outer molding continued onto the fascia.

Of the four frames in this study, frame 0414 (Fig. 8) has undergone the most restoration. Although the areas decorated with the opaque blue sgraffito in a strapwork design appear to be intact, the red-painted central diamonds and corner rosettes have been extensively inpainted and regilded. The blue paint on this frame is very similar in texture to that on frame 0321 (Fig. 1); it is coarser than that of frame 0392 (Fig. 3) and finer than on frame 0393 (Fig. 6). Frame 0414 is made of a hardwood with the appearance of poplar and is joined with half dovetail laps with mitered sight and outer moldings nailed to the back frame (Fig. 9).

Comparative Sources for Analysis

Previous studies exploring design and production of Renaissance frames have primarily concentrated on fabrication of the wood substrate (Gilbert 1977; Morazzoni 1944:7–46; Bisacca and Kanter 1990; Matthew 1988:211–65), but they indicate that the decoration could have been undertaken by fine artists as well as artisans. Although there were artisans who specialized in painting three-dimensional wooden objects, such as chests and polychrome sculpture (Cole 1983:162), easel painters were also very involved in the design and production of frames (Gilbert 1977:13–16, 20;



Figure 5
Detail of *cassetta* frame 0392 (shown in Fig. 3): upper proper left corner with rosette removed.

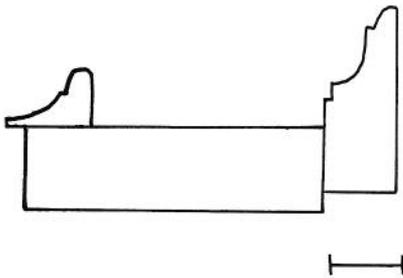


Figure 7
Profile drawing of *cassetta* frame 0393 (shown in Fig. 6). Scale bar represents 2.54 cm.

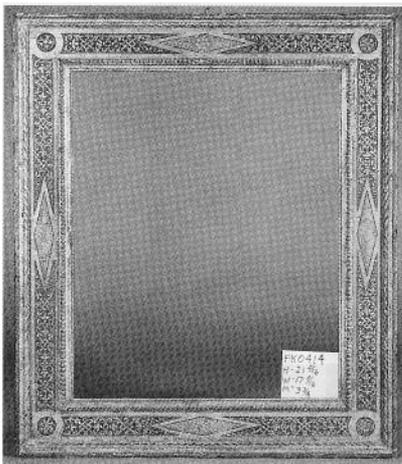


Figure 8
Cassetta frame. Venice, sixteenth century.
Polychromed and gilded wood. 72.1 × 62.9 cm.
Samuel H. Kress Foundation Collection,
National Gallery of Art, frame 0414.

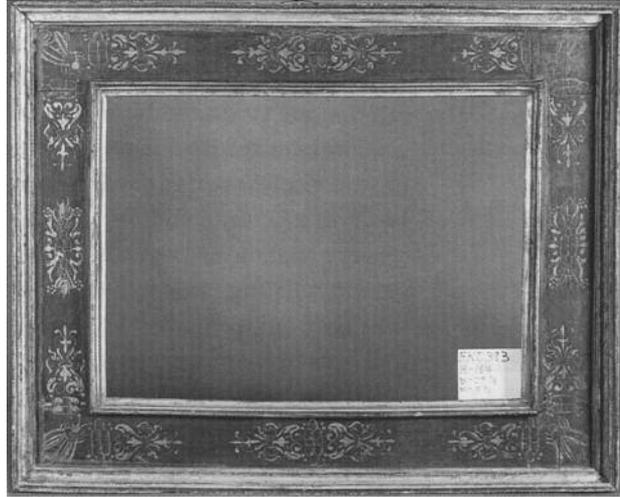


Figure 6
Cassetta frame. Venice, sixteenth century.
Polychromed and gilded wood. 77.2 × 94.3 cm.
Samuel H. Kress Foundation Collection,
National Gallery of Art, frame 0393.

Lydecker 1987:126). Early in the Renaissance, when panel paintings were produced in engaged frames, the individual who painted the image on the panel was also likely to have painted decorations on the attached frame. This trend may have continued into the early sixteenth century when frames were engaged onto paintings on canvas, whereby the painting's stretcher or strainer was used as a back frame, to which decorated moldings were nailed (Newbery and Kanter 1990). Two painted and gilded Venetian frames of this type, still bearing remnants of the paintings they once housed in their rabbets, are part of the Kress Collection of frames at the National Gallery.

The Venetian painter Lorenzo Lotto (ca. 1480–1556) often described in his account book whether the frames on the paintings he sold were gilded, black, or walnut (Lotto 1969:146, 150, 232). Although he painted frames for many of his smaller pictures and portraits (Matthew 1988:199), the account book indicates that gilders and painters were also subcontracted for their fabrication (Lotto 1969:167–68). Thus, the close tie between painters and frame makers would suggest that there would be similar sorts of materials used in their products.

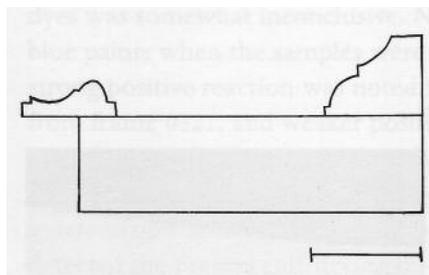


Figure 9
Profile drawing of *cassetta* frame 0414 (shown in Fig. 8). Scale bar represents 2.54 cm.

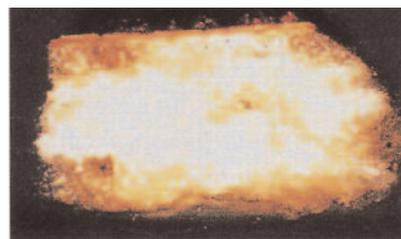
The blue pigment that seems to have been used most often on Italian polychrome sculpture is azurite (Pandolfo 1988:12). Studies of three sixteenth-century Northern Italian altarpieces reveal that natural ultramarine was simulated by laying azurite on a thick layer of red lake, and smalt was noted in one location (Galassi, Fumagalli, and Gritti 1991:200). In studies of Venetian easel paintings, smalt and indigo were found in addition to azurite and ultramarine on works produced in the sixteenth century (Lazzarini 1983:136), and smalt has very rarely been found on paintings dating prior to 1500 (Mühlethaler and Thissen 1993:114).

Binding media in paints used on Italian polychrome sculpture were generally proteinaceous, egg tempera, or glue (Galassi, Fumagalli, and Gritti 1991:199; Pandolfo 1988:11). Studies of sgraffito on fourteenth-century Italian paintings indicate that the exact type of medium was dependent on the pigment used (Halpine 1995:41–48). Cennino Cennini and Giorgio Vasari dictated the type of binding media to be used with various pigments—in particular, the use of glue with ultramarine and other blues (Vasari 1960:224; Cennini 1960:88–89). Cennini also recommended using red lake in oil medium in a glaze over vermilion in egg tempera to depict brocade cloths, which were often illustrated by using the sgraffito technique (Cennini 1960:88). This suggests that oil medium might also be observed on some sgraffito-decorated surfaces.

Analytical Methods

Samples of dispersed pigment were examined with a polarizing light microscope for pigment identification. Cross-sectional samples from the blue painted areas of friezes were embedded in polyester resin and examined microscopically in visible and ultraviolet light. For media characterization, the samples were stained with reactive dyes—fluorescein isothiocyanate (0.2% in acetone) for protein and dichlorofluorescein (0.2% in acetone) for

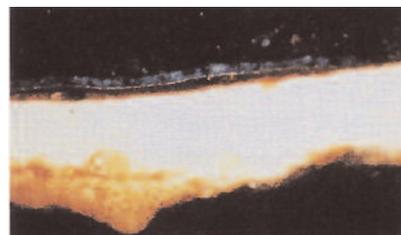
Figure 10a–d
Cross sections of paint layers from *cassetta* frames 0321 (a), 0392 (b), 0393 (c), and 0414 (d) in reflected light. Magnification $\times 123$.



a



b



c



d

oil—and were examined under a Leitz ultraviolet-light microscope with an I $\frac{2}{3}$ filter cube. The cross sections were also examined with the scanning electron microscope, and pigment identifications were confirmed with energy-dispersive X-ray analysis. Characterizations of binding media were supplemented using gas chromatography–mass spectroscopy and high-performance liquid chromatography.

Results of Analysis

The gilding preparation for the four frames in the study is extremely similar. In all cases, the gesso ground is applied in several layers and consists primarily of gypsum with some calcium sulfate anhydride. Rhombohedral inclusions of dolomite ($\text{CaCO}_3 \cdot \text{MgCO}_3$) are observed on the gesso layers of frames 0321 and 0414 on the scanning electron micrograph.

The bole layer observed in the cross sections is rather thin, measuring 10–18 μm in thickness. On all of the frames, the bole is finely ground and pale orange in color, with the exception of frame 0393, on which the bole is red brown.

All of the painted layers on all frames were simple mixtures of blue and white pigments (Fig. 10a–d). The blue painted areas on frame 0393 (Fig. 10c) and frame 0414 (Fig. 10d) are structurally identical. Each has a dark paint layer, with coarsely ground blue pigment particles topping a paint layer with finely ground white and blue pigment particles. Smalt and lead white were found on both frames, but the blue paints on frame 0414 also contain gypsum, cobalt blue, and azurite.

The cross sections from frame 0392 (Fig. 10b) show a single, dark blue paint layer above the gold leaf, the simplest structure in this group. The pigments are smalt, cobalt blue, and carbon black. Of the four frames discussed, the most complex system of paint application was on frame 0321 (Fig. 10a). A blue-green layer of paint containing coarsely ground heterogeneous, natural malachite, azurite, and dolomite was placed over a transparent red paint layer containing red lake and dolomite. The amount of malachite compared to azurite in the upper layer varies from area to area on the frame. Samples of the upper paint layer from the central lozenges are almost entirely azurite, whereas the samples from the corner circles are almost entirely malachite. This suggests that some areas were intended to appear more bluish green, while others were to appear greenish blue. There is also the possibility that the frame painter intended to imitate ultramarine by layering azurite over red lake, as noted by Galassi, Fumagalli, and Gritti (1991:200).

On the cross sections, the media characterization using reactive dyes was somewhat inconclusive. No reaction was observed in any of the blue paints when the samples were stained with dichlorofluorescein. A strong positive reaction was noted in the blue painted layers in samples from frame 0321, and weaker positive reactions were noted in the blue paints in samples from the other three frames using fluorescein isothiocyanate, indicating the presence of protein. Gas chromatographic–mass spectroscopic analysis of the blue paint samples on all of the frames detected the presence of drying oil—probably linseed oil, based on the ratios of methyl palmitate to methyl stearate (Lomax 1995). Small amounts of diterpenes, indicative of pine resin materials, were noted in the blue paint chromatograms for frames 0392 and 0393, and peaks relating to wax were noted in the chromatograph for frame 0321. As for amino

acid analysis with high-performance liquid chromatography, glue and egg yolk were detected in the blue paint on frame 0393 (Halpine 1994a). The high-performance liquid chromatographs for the samples taken from frames 0321, 0392, and 0414 bore no relationship to glue, egg white, egg yolk, or casein; and only trace amino acids were found (Halpine 1994b).

Conclusion

The simplicity of the paint application and of the pigment mixtures in the paints argues favorably for the antiquity of the painted decoration on these frames. The pigments found on all four frames have been in use since the sixteenth century and have been found on Venetian easel paintings (Lazzarini 1983:135–144) and Northern Italian polychrome sculpture of the period (Galassi, Fumagalli, and Gritti 1991:200). In fact, with the exception of dolomite, these pigments have had widespread use since 1500 throughout Europe. Dolomite, also found as a transparent extender in paints on works by Giovanni Bellini (Venetian, ca. 1430–1516), may be particular to Italian painting and frames, but the incidence of fillers of this type are not often reported in the literature (Gettens, FitzHugh, and Feller 1993:204, 210; Berrie 1994). The presence of dolomite in the paint and gesso on frame 0321 and in the gesso on 0414 enhances the credibility of the sixteenth-century Venice attribution.

The results of the media analysis were unexpected, since the media were presumed to be proteinaceous materials, based on the types of materials generally used in sgraffito decoration. However, the oil medium on these frames could provide another reason behind the painters' choice of smalt as a blue pigment on frames 0392, 0393, and 0414. Smalt's siccativ effects on oils had been noted early on (Mühlethaler and Thissen 1993:116). The oil medium for the blue and green paints on frame 0321 also elucidates why these two colors are now indistinguishable by simple visual examination. This phenomenon has been previously reported on three easel paintings at the National Gallery, London, where thick layers of azurite in oil have turned greenish in color (Gettens and FitzHugh 1993:27). The discoloration was tied to yellowing of the paint medium rather than to conversion of the azurite pigment particles into malachite.

Of interest is the relative sophistication in the manner in which the sgraffito was executed, which did not extend to the manner in which paint was applied. The pigments used in the paint layers, and the way they were applied to the unsophisticated frieze, on frame 0393 are very similar to those used on a frieze having a more intricate design seen on frame 0414. The difference in the handling of the materials could be ascribed to the relative thicknesses of the paint layers. The paint on frame 0393 is twice as thick as that on frame 0414, and it contains much larger smalt particles.

Since a larger body of technical information about painted Italian frames with known provenance has not been established thus far, the results of this study are simply observations about these particular frames. As indicated above, the pigment analysis revealed unexpected similarities between two frames that could not be detected from simple visual examination.

Broader conclusions relating to the production of frames in Venice cannot yet be drawn. Work also needs to continue in areas other than the technical aspects of frames. In the case of frame 0393, the scant body of art historical information currently available has provided as many

clues to the frame's origin as the technical analysis. The contribution of information from archives, depictions of interiors, and frames from other collections in exhibition catalogues and other publications has been vital. A continued investigation into the provenances of individual frames in the collection, as well as into the materials used in the creation of these frames, must ensue for the National Gallery's frame inventory database to be a truly useful research tool for curators, exhibition designers, and conservators (National Gallery of Art 1994:38). By increasing the volume of information available about each frame, these objects can be better understood as works of art and better utilized in that context in their display.

Acknowledgments

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Notes

- 1 The following definitions of frame types and related terms were adapted from Newbery 1990: *Cassette*: a rectangular frame with applied sight and outer moldings and a flat frieze (pl. *cassette*). *Reverse profile*: a frame with its highest molding on the sight edge. *Sight*: the edge or molding closest to the framed object. Also, the dimension of the framed object that is visible. *Tabernacle*: an architectural frame consisting of an entablature supported by columns or pilasters, with or without a crowning pediment or a supporting predella. *Tondo*: a circular frame with a circular opening (pl. *tondi*).
- 2 In a conversation in New York in 1994, Mario Modestini (formerly the conservator in charge of the Samuel H. Kress Foundation Collection) told the author that, before moving to the United States, he sold his collection of frames—housed in his studio in Rome—to Contini-Bonacossi.
- 3 *Pastiglia* ornamentation, used in Italy since medieval times for decorating furniture, is a mass containing gypsum and glue—or lead white and egg—that can be applied directly or molded, then stained with color, painted, or gilded.
- 4 Although a number of sources—including the nine-volume encyclopedia of Italian heraldry (Spreti et al. 1928–35)—were consulted, the meaning of the interlaced oval symbol has not been determined. Although the wasps could also be interpreted as bees, it is more common in Italian heraldry for bees to be depicted with their wings open.
- 5 The frame's current location is unknown, and there is no indication in the records of the Pinacoteca Nazionale regarding what painting the frame held.

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The Imitation of Natural Materials in Architectural Interiors

Ian C. Bristow

THE USE OF PAINTED WOOD to imitate more expensive natural materials—exotic woods, marquetry, stone, tortoiseshell—is well documented in historic British interiors.¹ The use of imitations was thoroughly established in England long before the discovery of America and the advent of European building methods and techniques. Marbling had been practiced in medieval Britain in both secular and domestic buildings, a notable example being the “marble colour” that Henry III ordered to be applied to the piers of his aisled hall at Ludgershall, Wiltshire, in 1246; the pillars and arches in the whitewashed King’s Hall at Guildford Castle, Surrey, were similarly treated in 1256 (Clapham 1937:32; Clapham and Storey 1959:289). Such embellishments remained popular during the sixteenth century; in 1597–98, for instance, the King’s Sergeant Painter, Leonard Fryer, was paid for painting the paneling in the Gallery at Oatlands, Surrey, “with soundry cullours curiously grayned wth a grayne called flotherwoode.” It is interesting to note that the panels were further embellished with “droughts . . . of markatree,” possibly a reference to the imitation of inlay.²

The First Half of the Seventeenth Century

When John Smythson visited the king’s house at Theobalds, Hertfordshire, in 1618, he made a sketch of the paneling in the Great Chamber, noting the panels decorated in figured “wallnuttree Culler,” surrounded by black with gold moldings (Richardson 1976:99, no. 28). Imitative techniques thus came readily to hand in the pursuit by Inigo Jones of his noble ideal of Italian architecture. Jones had been appointed Surveyor of the King’s Works in 1615, and the doorcase he designed in the late 1620s for his remodeling of the Queen’s New Cabinet Room at Somerset House, London, for example, was painted like white marble (probably with gray veins) and its enrichments were gilded³ (Harris 1972:15, no. 40). This treatment is paralleled by the doorcases in the staircase at Ham House, Surrey, which in 1638 were “Layde over twice wth waitlead in Nutt [walnut] Oyll and varnished and vayned as polished Marble.” The doors within them were painted “walnuttree cullo^r,” the general effect being seen clearly in the restoration effected by the Victoria and Albert Museum a few years ago.⁴ This tonality of dark doors within lighter openings seems, incidentally, to have been quite common, and was to be found at the Queen’s House, Greenwich, Kent, where the doors in Inigo Jones’s Hall, set within

Portland stone doorcases, were originally painted a dark brown, probably in the late 1630s (Bristow 1986:28–30).

The 1638 painter's account for Ham is also notable in showing the extent to which graining was used on paneling. The paneling then in the Hall, for example, which probably stood to three-quarters of the wall height, was grained in imitation of walnut, as was the joinery of the staircase balustrade. Cornices in several chambers, below which hangings would have been suspended, were also either grained or marbled.⁵

The Second Half of the Seventeenth Century

Following the interregnum and restoration of the English monarchy in 1660, Christopher Wren and his contemporaries employed graining and marbling on a large scale; the flowering of Baroque architecture in Britain, for which they were responsible, was particularly notable for its illusionistic effects. Paneling was commonly grained in imitation of oak, walnut, or cedar; and references also exist to the imitation of olive and princewood. Accounts of the period suggest that, most commonly, a single timber was imitated in any one room; the Earl of Danby's Dining Room at Whitehall, for example, was painted "walnut tree colour pencill grained" in the late 1670s.⁶ It is also clear that a single imitation might be used throughout an apartment—for example, the deal wainscots in the consecutive presence chambers (or antechambers), bedchambers, and closets in the apartments formed for the Duke and Duchess of York (later James II and his queen) at Hampton Court, Surrey, in the early 1670s, were all painted walnut tree color.⁷

More elaborate schemes were nevertheless adopted on occasion. Part of one example survives in Morton's Tower at Lambeth Palace, London, its date being given on the trompe l'oeil chimneypiece as 1691. A similar scheme was apparently executed the same year at Erdigg, Debigshire (now Clwyd), described as "painted very well the pannells are resembling Yew, the stiles [?] to prince wood, and the moulding a light color" (Cust 1914:41). Natural timber paneling of this richness also seems to have been made, since Celia Fiennes (in Morris 1947:153) described the Hall at Chippenham Park, near Newmarket, Cambridgeshire, as:

wanscoated with Wallnut tree the pannells and rims round with Mulbery tree that is a lemon coullour and the moldings beyond it round are of a sweete outlandish wood not much differing from Cedar but of a finer graine.

Comparable paneling in cedar and Virginian walnut survives in the early eighteenth-century Talman wing at Dyrham Park, Gloucestershire (now Avon).

An alternative taste was to paint paneling in imitation of marble. White marble with gray veins seems to have been the most common choice. Examples include the King's Supping Room at Whitehall, which was painted "white marble varnisht and veined in distemper" in 1662,⁸ while paint samples from the North Drawing Room at Ham show it has been marbled in oil since at least the 1670s, when the paneling was assembled in its present form (Bristow 1984).

As with graining, more elaborate schemes were also to be found. In 1680, all the "wainscott worke carveing & window shutters" in the Duchess of York's Privy Chapel at Saint James's Palace were painted to

resemble “lapis lazuli & Raince marbell [a reference to *rance*, a dull red marble mottled and veined with gray and white] & white & black marbell;⁹ and beneath the present graining in the Balcony Room at Dyrham lies the original splendid scheme of marbling applied to the paneling when it was erected in 1694. Paint samples have shown that imitations of porphyry and a large-figured, orange-pink marble were deployed (Bristow 1979)—a scheme of particular interest, since it was executed by a painter named Hauduroy (probably the Huguenot, Mark Anthony Hauduroy) and may be correlated with almost contemporary advice on marbling offered by the French architect Auguste Charles D’Aviler in 1691. Discussing the imitation of various materials in paint, he observed:

One should never imitate marble where it could not exist in reality, as on doors and window casements. It is necessary to vary the marbles between the different architectural elements, so that the architrave and cornice should be of one colour and the frieze of another. In panelling, the framing should be different from the panel mouldings, and the mouldings different from the panels. . . . In varying the marbles one should ensure that the colours do not destroy each other by having too great a contrast, and that moulded parts should be painted with soft colours [he probably means marbles without pronounced veining] so that their profiles can be well read.

The avoidance of strong contrasts seems to have been of particular concern to D’Aviler; and in the use of natural stones or marbles to differentiate architectural elements, a practice of which he warmly approved, he stressed particularly the need to eschew the placing of white against black. Instead, he preferred the use of white, gray, or reddish stones; and for the fields of panels, he particularly recommended as appropriate the employment of a breccia or a white marble with gray veins. The marbled paintwork of the Balcony Room is clearly consistent with the spirit of this advice, notably in the use of porphyry on the moldings, which would allow their profiles to be read without distortion, as D’Aviler had adumbrated (D’Aviler 1691:230, 339).

However, paint samples taken from the doors suggest that Hauduroy committed the solecism of marbling them, and marbled doors also feature in the upper room at Swangrove, a hunting lodge on the Badminton estate, Gloucestershire, in which japan (lacquer) motifs are imitated on the stiles and rails. Japanning was also a popular taste, which cannot be discussed here, but was to be found at Dyrham in a now-destroyed room, while other examples were to be found at Chatsworth, Derbyshire, and at Hampton Court Palace.

In addition to its use on paneling, marbling found a particular place on discrete architectural elements such as columns, chimneypieces, and detached sculpture. Certain busts on the now-destroyed staircase at Burley-on-the-Hill, Rutland (now Leicestershire), were painted in imitation of lapis lazuli by Gerard Lanscroom sometime before 1700, while its columns were painted in imitation of a red marble (Croft-Murray 1962:254). Earlier examples include the columns in Christopher Wren’s Sheldonian Theatre, Oxford, which were “don like Rance wth a high varnish” in 1669 (Bolton and Hendry 1924–43:19:99); and in the mid-1690s Celia Fiennes recorded that in the Hall at Broadlands, Hampshire, were “severall rows of Pillars of wood painted like marble for to walke between” (Morris 1947:55).

Prior to the advent of modern heating methods, the fireplace occupied an important, even symbolic, position in interiors. Special care was thus lavished on it, and its eminence was often emphasized by the use of expensive and exotic marbles. The expense of real marble could not always be afforded, however, and the material was often simulated in paint. Thus, Sir Balthazar Gerbier (1663:22) observed: "The Chimney-mantles ought to be all of Stone or Marble, but if (to spare charges) the upper frame, sides and top be made of timber it will be most seeming to have them painted as Marble."

Examples of marbling on such elements may even be found in royal buildings. The chimneypiece in the King's Guard Chamber at Whitehall, for example, was marbled in 1687;¹⁰ and there is an item in the Kensington Palace accounts for "veining a chimneypiece" in 1692.¹¹ D'Aviler's advice on marbling wainscot has already been mentioned, and, in commenting on his design for a grand chimneypiece, he noted, "The frames of a chimney as rich as this should be of marble, and the remainder of the same material or of joinery painted in marbles of diverse colours" (D'Aviler 1691:166).

Tortoiseshell also was commonly imitated. It was used notably on the columns and friezes of the new altarpiece designed by Wren for the Tudor Chapel at Whitehall in 1676; the remainder was painted cedar color.¹² In 1688, however, John Stalker and George Parker commented critically on the generally poor quality of the imitation as provided by house-painters (Stalker and Parker 1971:79). Indeed, there seems little doubt that the quality of seventeenth-century imitations could vary widely, and in a memorandum attached to the painter's estimate for decorating his Library at the Lincoln Cathedral, Wren noted, "Ranse Marble & indian woods extraordinarily well don soe as to deceive the Eye & be taken for naturall may be worth 4 shillings the Yarde or more," although he had suggested only 1s.4d. or 1s.6d. for ordinary imitations of walnut or "indian Woods" (Lincoln Cathedral Library).

Among the most ambitious illusionistic effects of the period must have been the king's canopy in the Tudor Chapel at Whitehall Palace, which the King's Sergeant Painter Robert Streater painted with fine lake in 1675 to represent crimson velvet, with gilding "flickered," as the account puts it, to imitate embroidery and the pile of the material.¹³ A comparable instance was to be found at Lichfield Cathedral when Fiennes visited in 1697; she noted there was "a painting over the Communion table of peach coullour satten like a cannopy with gold fringe, and its drawn so well that it lookes like a reall cannopy" (Morris 1947:111). Although neither of these examples survives, the still-extant carved and painted curtain above the family pew in the Chapel at Petworth House, Sussex, may originally have been similarly rich.

The Early Eighteenth Century

The use of imitations continued into the first half of the eighteenth century. For example, the Dining Room at the Ivy, Chippenham, Wiltshire, built about 1730, was painted at an early date in imitation of a dark green marble with white veins; and the Chandos Mausoleum by James Farquharson and James Gibbs was decorated around 1736 by Gaetano Brunetti with an elaborate scheme involving marbled walls.¹⁴ Nevertheless, although William Kent made extensive use of marbling in the 1720s in his painted decoration on the ceiling in the Cupola Room at Kensington

Palace, it seems that, under the Palladians, graining and marbling fell from vogue. Robert Campbell (1747:103) complained of the low standards prevailing among painters, noting:

When it was the Taste to paint Houses with Landskip Figures, and in Imitation of variegated Woods and Stone, then it was necessary to serve an Apprenticeship to the Business . . . but since the Mode has altered, and houses are only daubed with dead Colours, any Labourer may execute it as well as the most eminent Painter.

Nevertheless, the technique did not die out completely, and one still finds occasional references to doors being grained in the 1750s and 1760s, while marbling survived notably on floorcloths.

Techniques



Figure 1
Cross section from an area of orange-pink marbling dating from 1694 in the Balcony Room at Dyrham. Viewed by reflected visible light (quartz-halogen source). A dirt line separates the ground for the later graining from the original scheme, which is built up from several layers of opaque paint.

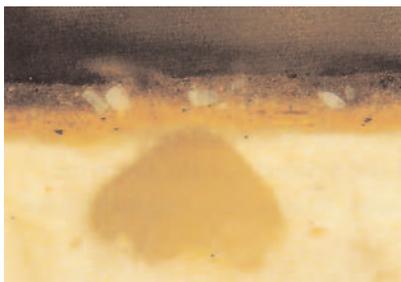


Figure 2
Cross section from an area of graining, probably of late-seventeenth-century date, imitating walnut, at the Queen's House, Greenwich. Viewed by reflected visible light (quartz-halogen source). Above the plaster ground are two opaque browns, to which darker veins have been added.

When the use of imitations was revived at the end of the eighteenth century, it was with the aid of improved techniques. In general, during the seventeenth century and earlier parts of the eighteenth, the figure of timber or marble had been built up in more or less opaque paint, often worked wet into wet. The typical appearance of a mounted cross section of marbling executed in oil in this way may be seen in an example from the Balcony Room at Dyrham (to which reference has already been made), the successive layers of opaque paint often having poorly defined boundaries (Fig. 1).

Similarly, a sample of graining from the Queen's House at Greenwich (here applied to plaster and probably dating from the end of the seventeenth century) shows the application of a darker brown on a lighter ground in the imitation of walnut, with a few still darker veins added above (Fig. 2).

At the end of the eighteenth century, a refined technique of graining was developed, based on the application of transparent darker glazes above a ground matching the lightest color in the timber to be imitated. Once the ground was dry, the glazes were applied evenly to it, and then brushed, wiped out, or otherwise manipulated to allow the base color to grin through. The method was illustrated by Nathaniel Whittock in his *Decorative Painters' and Glaziers' Guide* of 1827 and may be seen clearly in his plate showing the imitation of satinwood (Fig. 3). Typical of the implements used are brushes of various forms to create streaked effects, as well as combs (examples of which were illustrated by Whittock, shown here in Fig. 4), feathers, and pieces of leather or cork, all familiar to the modern-day practitioner.

On joinery items, the ground was generally oil, but the glazes could be in either an aqueous medium (commonly stale beer) or a mixture of organic compounds—including oil of turpentine, linseed oil, or wax—the resulting preparation being known as *megilp*. Both have the property of preventing the glaze from running back when manipulated, and of drying sufficiently hard to permit the application of darker veins or successive coats of glaze to add depth to the imitation. On completion, the finished graining was generally varnished (Fig. 5). Of course, the earlier methods were not completely superseded, and, for marbling in particular, veins were commonly added using more or less opaque paint, as shown by Whittock in the imitation of porphyry (Fig. 6).

Figure 3
Stages in the imitation of satinwood
(Whittock 1827:pl. 9).

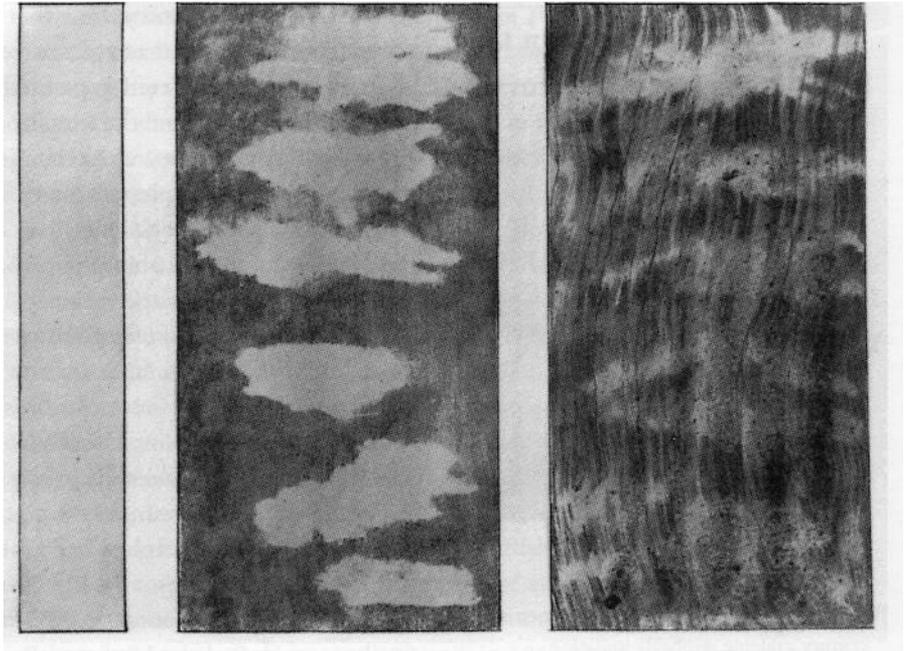
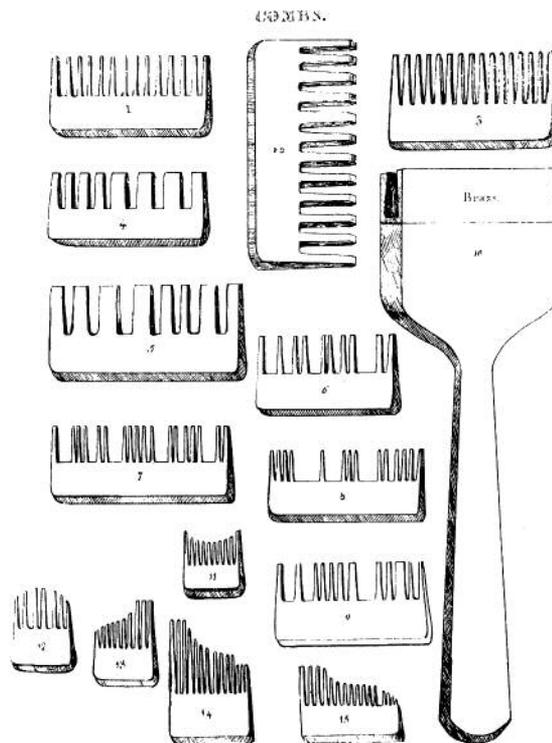


Figure 4
Graining combs (Whittock 1827:pl. 2).



Besides his illustrations, Whittock gave good descriptions of the developed methods used in the early nineteenth century, and further suggestions were included by the London paint manufacturer and merchant T. H. Vanherman in his *Painter's Cabinet* (1828:58–64). Earlier authors give little coherent information, but the best account of the older techniques is probably to be found in Hezekiah Reynolds's *Directions for House and Ship Painting* (1812:18–21).

Revival of Imitations in the Early Nineteenth Century



Figure 5
Cross section from an area of mid-nineteenth-century graining, probably imitating mahogany, from the Dining Room at Frogmore House, Windsor. Viewed by reflected visible light (quartz-halogen source). Above earlier schemes in white, a pinkish ground is overlaid by a thin glaze, varnish, and a later overpaint.

As the eighteenth century drew to a close, architectural Neoclassicism was pursued with ever increasing archaeological rigor. By the early nineteenth century, this was reflected in painted finishes, especially in the revival of the use of marbling and the imitation of bronze in interiors. John Soane's Breakfast Room of 1802 at Pitzhanger Manor, Ealing, Middlesex, is an important early example: porphyry, bardiglio, and *verde antico* were imitated on the walls, while the Coade stone caryatids in the four corners of the room were painted in imitation of patinated bronze (Bristow 1987) (Fig. 7).

All his life, Soane retained a fondness for bronzing, and, no doubt inspired by the sets of antique bronze doors (such as those of the Pantheon) that survive in Rome, he used it both internally and externally. In his design for the House of Lords in the 1820s, one can see clearly the rows of studs resembling rivets surrounding the bronze-green door panels,¹⁵ and again externally at the New State Paper Office of 1829.¹⁶ Bronzing was also commonly used on the iron balustrades of staircases, ousting the blue, which had been fashionable in grand buildings during the previous two centuries; an early example dating from about 1802 is to be seen in a design by George Dance the Younger for the staircase at the (sadly) now-demolished Stratton Park, Hampshire.¹⁷

The imitation of exotic materials played a particularly important part in the Royal Pavilion at Brighton, Sussex, altered and redecorated for the Prince of Wales (the Prince Regent) between 1787 and the 1820s; by 1803, imitated timbers included satinwood, rosewood, tulipwood, and tea wood (Crace 1803). A room elevation of 1802 or earlier shows the use of graining on both the doors and their architraves at a time when, in other fashionable interiors in England, such joinery items were being painted white.¹⁸ This probably reflects contemporary French taste at that time; since, in 1813, Thomas Martin commented, "at Paris, every species of wood-work used in their houses, as a part of the building, is done in this manner. The dead-white so much in vogue amongst us is not practised

Figure 6
Stages in the imitation of red porphyry (Whittock 1827:pl. 21).

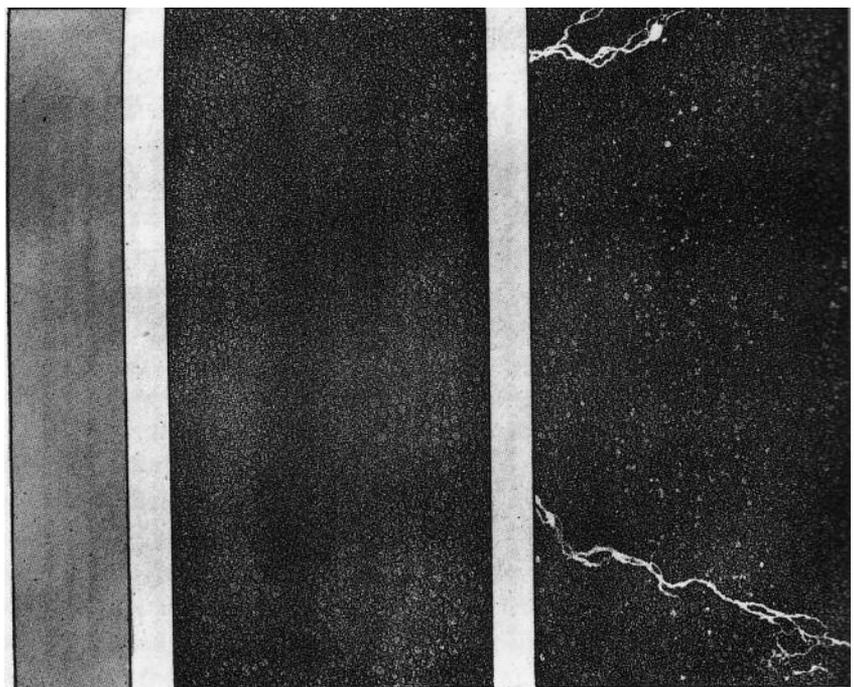




Figure 7
Cross section from an area of bronzing, dating from 1802, on a caryatid in the Breakfast Room at Pitzhanger Manor, Ealing, Middlesex. Viewed by reflected visible light (quartz-halogen source). Above the Coade stone substrate are several layers of white, a coat of dark green, and bronze powder entrapped in a varnish medium.

there” (Martin 1813:464). This reference is of particular interest, as it indicates that in Britain the real popularity of graining did not develop until the years after Waterloo, a suggestion apparently borne out by Nathaniel Whittock, who remarked that it had been the great improvements made in the technique in the ten years before publication of his book that brought graining into general use (Whittock 1827:20).

In the 1820s, graining was commonplace. In the Library at Nostell Priory, Yorkshire, Thomas Ward replaced Robert Adam’s delicate tints with graining (National Trust 1978:10); and, in 1827, Whittock noted, “There are few respectable houses erected where the talent of the decorative painter is not called into action, in graining doors, shutters, wainscots, &c.” (Whittock 1827:20). Perspectives showing the interior of Pellwall House, Staffordshire, designed by John Soane in 1822, show that its joinery was grained;¹⁹ and the same treatment may often be seen in watercolors of the succeeding decades, such as that by Charlotte Bosanquet of 1843 depicting the Drawing Room at Meesdenbury, Hertfordshire.²⁰ Soon, however, questions were to be asked about the propriety of such imitations. In the “Lamp of Truth,” one of his *Seven Lamps of Architecture*, John Ruskin inveighed against deceptions (Ruskin 1849:32); and, in 1857, the Gothic Revival architect George Gilbert Scott denounced “the whole system of marble-papers in halls, marble and granite painting on shop-fronts, &c., &c., [as] a sort of petty lying without wishing to be believed,—mere falsehood from habit” (1857:243). Nevertheless, graining remained a standard finish on architectural joinery and (allied with marbling on staircase walls) formed the basis for decoration in many humbler homes well into the present century.

Notes

- 1 For a more in-depth discussion (including details of the various pigments used), see Bristow 1996a, 1996b.
- 2 Manuscript at Public Record Office, London (hereafter PRO) E.351/3233:9 *recto*. Commenting on this, Edward Croft-Murray (1962:27) suggested a flecked or speckled effect was intended, deriving from the word *flother*, meaning a snowflake.
- 3 PRO E.351/3248:7 *verso*.
- 4 Ham boxes, manuscript at Department of Furniture and Woodwork, Matthew Gooderick’s account. Victoria and Albert Museum, London.
- 5 See note 4.
- 6 PRO WORK.5/23.
- 7 PRO WORK.5/24.
- 8 PRO WORK.5/3.
- 9 PRO WORK.5/32.
- 10 PRO WORK.5/41.
- 11 PRO WORK.19/48/1:50(iv).
- 12 PRO WORK.5/27.
- 13 PRO WORK.5/25.
- 14 Print housed at Victoria and Albert Museum, London. E.2-1953.
- 15 Watercolor at Soane Museum, London. Soane perspective albums. 6:33, 37.
- 16 Watercolor at Soane Museum, London. Soane perspective albums. 6:92.
- 17 Drawing at Soane Museum, London. Dance collection. 2/5/24.

- 18 Drawing at Cooper-Hewitt Museum, New York. 1948-40-52.
- 19 Drawing at Soane Museum, London. Soane perspective albums. 6:9–13.
- 20 Watercolor at Ashmolean Museum, Oxford. Bosanquet album. 13.

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Royal Painted Furniture in King Charles I's England

James Yorke



Figure 1
Chair, ca. 1630. Gilded with painted decoration. English. Victoria and Albert Museum, London. Inventory no. W58-1953.

THE PUBLIC COLLECTIONS in Europe and North America house a few often rather quaint examples of early painted furniture. Some of this furniture once had substantial traces of pigment. Others had no more than painted coats of arms to identify the owner and reinforce his or her status as a person who could afford prestigious or fashionable possessions. The Victoria and Albert Museum has a very fine armchair of about 1630 (Fig. 1), with sophisticated floral decoration applied to the gilded surfaces of the legs, stretchers, and uprights. It has always been a mystery: although it lacks either coats of arms or any known early provenance, its frame is nevertheless stylistically consistent with fashionable chairs found in England, France, or Holland during this period. Its decoration is quite unlike the heavily carved oak furniture so easily associated in the eyes of posterity with the early seventeenth century. This chair must have been made for someone with fashionable, or at least metropolitan, tastes. Nevertheless, no contemporary document that specifically referred to furniture decorated in this manner has, to date, been traced. The aim of this article is, first, to bring to light some recently discovered bills and what little is known of the artist who submitted them; and, second, to survey examples of painted furniture in English royal inventories and bills of the early seventeenth century.

King Charles I of England (1625–49) was renowned for his patronage of the great British architect Inigo Jones (1573–1652). Charles I strove to create a court as splendid as any in Europe, and he actively collected paintings and sculpture. Although no furniture designs can be safely attributed to Jones, he left plenty of drawings of chimneypieces and other interior features. Both the architect and his patron must have sought furniture that harmonized with these elegant Italianate interiors. Nevertheless, rather than look abroad for appropriate artisans, as they did for artists and sculptors, the king and queen seem to have contented themselves with English joiners, upholsterers, and cabinetmakers.

Much work on this subject has already been done by Hero Granger Taylor, a distinguished textiles specialist, as part of her research during the late 1980s, in connection with the redecoration of the Queen's House at Greenwich, London. She generously supplied the Textile and Dress Collections as well as the Furniture and Woodwork Collections of the Victoria and Albert Museum with copies of bills she found for the years 1635–39 in the London Public Record Office (U.K. PRO 1635, 1639; Jervis 1989). She found names such as Edward Cordell, the queen's cabinetmaker;

Thomas Hardwicke, her trunk maker; Philip Bromefield, her gilder; Ralph Grynder, her upholsterer; and Charles Goodyleare, her joiner.

This author's searches through the earlier years of the king's reign yielded some detailed bills for furniture gilded and painted by Philip Bromefield for Queen Henrietta Maria (U.K. PRO 1630, 1632). Bromefield himself remains something of a shadowy figure: under a variety of different spellings, ranging from Bromfield to Broomfeyld, he occasionally appears in the court minutes of the Painter Stainers' Company of London from 1626 until 1642. He is first mentioned on 1 April 1626, in a case against a certain William Drayton, whose apprentice he had borrowed to work "In the Country" without first paying him. On 6 September 1629, Bromefield was "chosen to be one of the lyverye but preferred to wayte in the Lyverye for this next year ensuing." On 12 December 1638, we learn that "Mr Broomfeyld [*sic*] made not his appearance at the court according to his promise," and on 2 August 1639, "Mr Broomfeld [*sic*] . . . made his appearance at the Court craving p'don for his neglect of gyving the fyne for his wardening but he promises upon his honour to bring it in this court to be paid to go next court day." (The "fyne" he promised to pay was his subscription.) Finally, on 27 October 1642 (Painter Stainers' Co. 1623–49),

it was declared that Mr Joseph Atkinson and Mr Philipp [*sic*] Bromefield have not made their appearance here a long time nor paid any quarterlies or other assets for duties. Therefore it is ordered by the vote and consent of the M[aster] and Wardens and assistants that the said Mr Atkinson and Mr Broomfield [*sic*] shall put among the livery non-attendance. But if they shall come and make their appearance and pay all their duties that are in arrears within two years ensuing the date of this order then they shall be restored into their place & agayne otherwise not.

That is the last that is heard of him: the dates of his birth and death are not yet known, and it can only be said that he flourished between 1626 and about 1640. We know that he was not a very conscientious warden of the painters and stainers but was skilled enough to decorate royal furniture—and for a queen more used to the sophisticated tastes of Paris.

On a bill for work executed between 1 October and 31 December 1630 (Fig. 2) (U.K. PRO 1630), Bromefield described himself as "Her Ma[jes]t[ie]'s Gilder." His work consisted of coloring a screen black, gilding the columns and molding, and decorating cartouches with a combination of gold and silver gilding—for £2—and painting and varnishing a folding stand "fair crimson"—for £1. He also painted "six folding stooles fair carnation" (i.e., very pale pink)—for £1–10–00—and four chairs colored "dark tawny" (i.e., buff colored) with gilded molding and ball finials. The legs and rails of these chairs were "wrought in flowers with all manner of collers" and "curiously shadowed to life varnished at XXV shillings a yard £06–00–00." He supplied six matching stools and a large tawny "great French table," as well. This monumental piece was partly gilded and rested on four pillars at the corners, the fluting of which was "rought in collers and shadowed like ye life." Underneath were two gilded pillars, linked by eight gilded balusters, rather like examples engraved by Jacques Androuet du Cerceau (fl. 1549–84) (Jervis 1974: figs. 73–75). Like the aforementioned chairs, the "long arches," which presumably ran beneath the edges of the tabletop, and connected the pillars in the corners and the upper surface of the table's stretchers (to interpret the meaning of "ye

Figure 3

Daybed, ca. 1630. English. Victoria and Albert Museum, London (Inventory no. W57-1953).



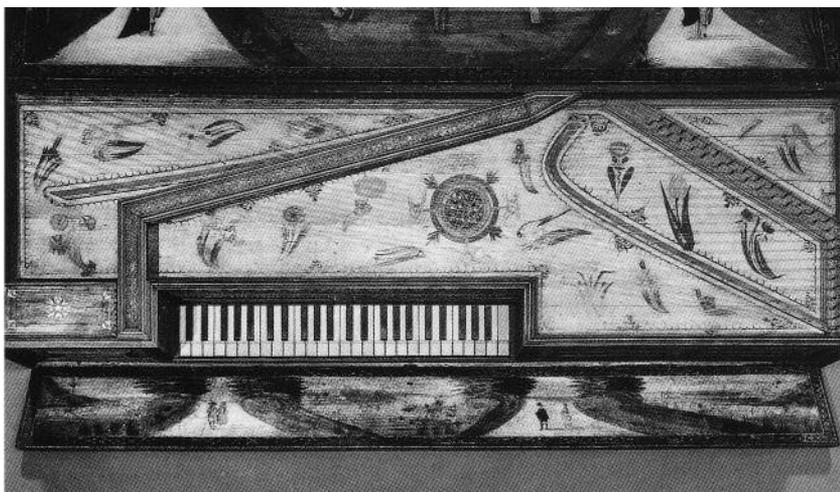
Figure 4

Detail of the floral decoration, English daybed. Victoria and Albert Museum, London (Inventory no. W57-1953).



Figure 5

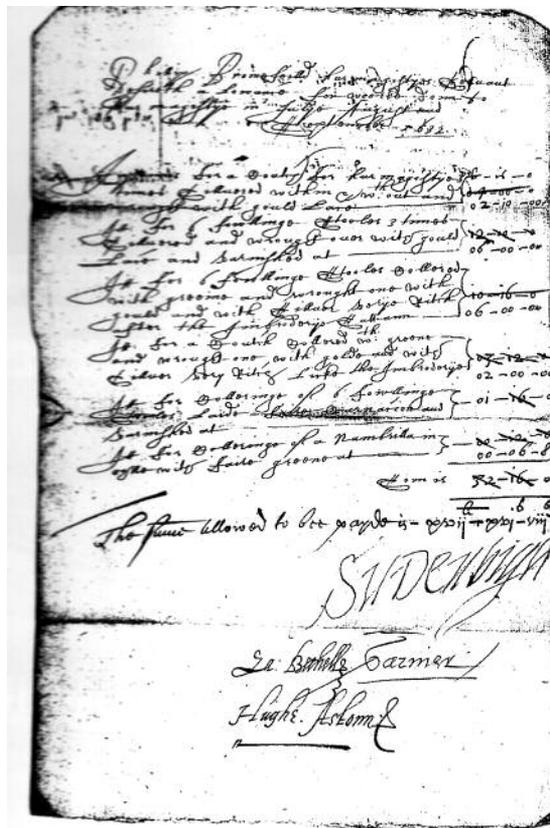
Thomas White, the soundboard of a virginal, 1642. English. Victoria and Albert Museum, London (Inventory no. W11-1933).



in the Ruckers workshop in Antwerp and (albeit with less virtuosity) Thomas White's in London.

Between July and September 1632, Bromefield was gilding a couch and six folding stools in silver (Fig. 6) (U.K. PRO 1632). He was also painting another couch and set of folding stools green, and gilding them in both gold and silver, and was painting six more folding stools in carnation. In addition, he supplied a "faire greene nambrilla"—presumably a bright green parasol. On 3 August 1635, he supplied eight folding stools, one part of each gilded and "laid in crimson" and "the other part 2 tymes silvered & wrought with yelloow" a screen to match (i.e., "gilded and wrought suitable"). The meaning of the word "laid" is puzzling: possibly part of the pigment lay beneath the surface? In addition, he supplied two folding stools and two square ones, both painted in crimson (U.K. PRO 1635). Finally, on 28 July 1639, he gilded—for £2 each—six folding stools "laid blue," which were destined for Somerset House (aka Denmark House), the former London residence of Queen Anne of Denmark, consort of King James I (who reigned from 1603 to 1625). In addition, these chairs were "offailed lyke unto the blewe damaske & varnished" (U.K. PRO 1639). *Offail* is a variant spelling of *offal*, which can mean "shavings" or "waste" (as well as certain types of meat)—for example, "powder of ye offal of golde" (Simpson and Weiner 1989:721). In this case, gold powder was presumably added to the painted surface and decorated in a damask pattern. Unfortunately, this is the only occasion when a royal residence is specified in these bills.

Figure 6
Bill for the painted furniture executed by Philip Bromefield for Queen Henrietta Maria (U.K. PRO 1632).



No further work by Bromefield has, to date, been traced. The instances mentioned may be the only occasions on which he painted for the queen. The colors he used (e.g., "tawny," "crimson," and "carnation") may have been fashionable, but owing to a dearth of similar bills and illustrations of this period, one cannot be sure. In portraits of the time—and to a large extent in inventories—the frame is painted merely to match the upholstery. However, the lavishing of lifelike floral decoration on the chairs and trompe l'oeil fluting on the table legs indicates that woodwork was being treated as more than just the framework to support lavish textiles.

Lavishly painted furniture appears in the 1616–18 inventories of Queen Anne of Denmark at the palace (formerly monastery) of Oatlands, Surrey (E.S.C. Record Office 1616:GLY 315; 1617:GLY 319; 1618:GLY 320). It is not known who executed this furniture. It is true that there were chairs, beds, and other upholstered furniture with "frames painted suitably" to match the general color scheme of the textiles (E.S.C. Record Office 1617:GLY 319). However, there was also one suite of stools and chairs with frames "painted with white and gold, spotted with red flowers," and another with "frames painted on a greene ground wth flowers of gold"—both in the queen's cabinet—one with "with red frames painted with red flames on a high ground" in "the Garden Stone Gallery" (E.S.C. Record Office 1616:GLY 315). The mention of "a high ground" suggests that flames may have been painted on built-up gesso. The 1617 inventory includes a field bed, painted red and gold, and a suite of green velvet stools and high chair with frames painted "on a greene ground wth flowers of gold, in ye [unspecified] Bedchamber," presumably decorated like the red and gilded chairs at Knole, Kent. In the North Gallery at Oatlands there was a suite of furniture "painted wth Carnation ground garnished wth flowers"; in the South Gallery there was one "painted with white & gold & spotted with red flowers" (E.S.C. Record Office 1617:GLY 319). It would therefore seem that beds and seating decorated with flowers were befitting to a sovereign or, indeed, to members of the court in the early decades of the seventeenth century. For example, in 1608, Rowland Buckett, a painter of German origins, supplied Robert Cecil, the king's chief minister, with "one grete bedstead with flowers, birdes and personages" (Croft-Murray 1962:164).

The "Inventories and Valuations of the Late King's Goods," compiled by Parliament after the execution of Charles I, include a few examples of painted furniture. Neither Bromefield's nor Queen Anne of Denmark's furniture can be identified with confidence. Nevertheless, one might be tempted to identify Bromefield's "Great French Table" with a table from Denmark (or Somerset) House "painted on ye frame and gilt" bought in 1651 by Nicholas Stone, the former royal sculptor. Denmark House also housed "an Ovall Table of Wallenutt tree painted with silver and other colours" and "Fowre Wooden painted Frames to sett Candlesticks upon valued at £00-04-00." The summer rooms of Oatlands housed "Twelv blewe stooles of wood gilt of ye Italian Table"; these presumably matched the Italian table in style and could well have been *sgabelli*, those richly carved Italian hall chairs that were finding their way to Holland House, Arundel House, or Ham House at this time (Millar 1970–72:57, 113, 118, 287).

It has to be admitted that painted furniture is rarely found among the lists of the king's goods; prominence is given to the lavish textiles that

cover seating, beds, and even cabinets. Nevertheless, if the frames were painted in a “suitable” manner, one might assume that such a fact was not always recorded.

John de Critz of Antwerp, sergeant painter to King James I since 1603 and later to King Charles I, worked extensively for Inigo Jones, executing his stage designs for royal *masques* at Whitehall. Although he seldom painted furniture, he did decorate royal carriages—or *carroches*, as they were called. In 1629 he was paid £80 for painting what must have been a spectacular “carroch wth fine gold and cullors the pannells being painted wth statues and for painting and gilding one cheire and working and painting Antiques on the pannells” (U.K. PRO 1628–29:148). It is to be regretted that this splendid object has not survived; the liberal use of classical ornament very much reflects the king’s cosmopolitan tastes, and suggests that Inigo Jones played a part in designing it.

The bills of Philip Bromefield are among the earliest known that concern the painting of furniture in England. Such documents are mostly confined to royal accounts, but one should remember that before the English Civil War (1642–45), lacunae in the records abound. Mentions in inventories of the sixteenth and seventeenth centuries are rare, as are illustrations. The frames of chairs that feature in portraits of those times, for example, would seem more often to have been covered with dyed cloth than painted. Few examples of painted furniture have survived, but in their time they were regarded as important; they proudly stood in state apartments—not just in garden buildings. Too little research has been done on French furniture of the early seventeenth century for one to know how fashionable painted floral decoration on chairs was at the court of Louis XIII. However, such embellishments could not have been regarded as provincial and peculiar to England. If this had been so, Queen Anne of Denmark and Queen Henrietta Maria would have thought them unsuitable for their state apartments, and they would not have paid high prices for them. As in the case of King Charles’s *carroch*, elaborate painted decoration enhanced the king’s dignity, and the artist was well paid. Although a minor manifestation of kingly splendor, painted furniture is worthy of note and—in the case of Queen Henrietta Maria—comparatively well documented.

Acknowledgments

The author is most grateful to the U.K. Public Record Office for granting permission to publish the bills in Figures 2 and 6, and to Lucy Wood, curator of decorative arts at the Lady Lever Art Gallery, for alerting him to the documents at the East Sussex County Record Office.

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Perished Perches: The Evidence for English Painted Wooden Furniture in Eighteenth-Century Gardens

Elizabeth White

SUFFICIENT PAINTED WOODEN FURNITURE survives from fashionable eighteenth-century interiors for us to know that it formed a substantial and specific contrast to the well-known corpus of walnut, mahogany, and satinwood (Macquoid and Edwards 1927:27–28). The place of painted furniture in the English vernacular tradition is also increasingly studied (Gilbert 1991); however, extremely little of it actually survives in situ in eighteenth-century gardens.¹ Made of woods susceptible to the ravages of woodworm, time, and the English climate, these pieces tended to be replaced by more durable cast-iron furniture in the nineteenth century. Consequently, extremely few datable pieces exist today; and where they do, they are unlikely to be in original condition. A more durable wrought-iron garden chair of around 1800, now in the Victoria and Albert Museum, has revealed thirty-five layers of paint under the microscope.²

Given such a catalogue of disasters, evidence for these “perished perches” must be interpreted through contemporary illustrations, inventories, and the extensive eighteenth-century literature on gardening, as well as the remarkable number of published furniture designs that proliferated from around 1750 and encapsulated the ephemeral spirit of Rococo garden ornament. This article was written with the intention of gathering and quantifying some of the available evidence, with a particular focus on the significance of those Rococo designs.

The decades from 1720 to 1780 were ones of fast-moving development in English furniture and of total revolution in garden design and construction. A correspondent to “Common Sense” in the *Gentleman’s Magazine* (1739:640) wrote:

Every man now, be his fortune what it will, is to be doing something at his place, as the fashionable phrase is, and you hardly meet with anybody who, after the first compliments, does not tell you that he is in Mortar and Moving of Earth—the modest terms for building and gardening. One large room, a serpentine river and a wood are become the absolute necessities of life, without which a gentleman of the smallest fortune thinks he makes no figure in his country.

Whether for early-eighteenth-century formal parterres or for the arranged circuit—or “route through nature” of the picturesque garden—resting points were designed to offer sunlight or (more advisedly) shade, the chance to admire a scenic view, take tea and other refreshments, or

explore the charms of any number and variety of ornamental buildings in order to experience the full range of romantic sensibility.

This enthusiasm for ornamental garden buildings became so intense that Richard Cambridge was induced in 1756 to record former, easier days (Honour 1961:154):

when the price of haunch of venison with a country friend was only half an hour's walk on a hot terrass, a descent into two square fishponds overgrown with frogspawn, a peep into a hogsty or a visit to the pigeon house. How reasonable was this, when compared with the attention now expected from you to the number of temples, pagodas, pyramids, grottoes, bridges, hermitages, caves, towers etc.

Chairs, benches, stools, and tables were provided for the garden and its decorative buildings in as great a variety as they were for the house and were given the same degree of attention in their design, construction, purpose, and finish. Some were made of stone, marble, slate, or wood with a natural finish, and are therefore beyond the scope of this discussion; but a very large number were made of native woods, such as beech and lime, and were painted with oil-based colors, which could afford some protection against the climate and hard use.

The greatest number consisted of seats, but even the description “seat” deserves examination. In the eighteenth century, the word could describe anything from the simplest bench to an elaborate sheltering structure—or could even, of course, refer to the entire country estate.³ John James’s translation of D ezallier d’Argenville’s *Theory and Practice of Gardening* (published in England in 1712) included the definition of

Seats, or Benches, besides the conveniency they constantly afford in great gardens, where you can scarce ever have too many, there is such a need for them in walking, look very well also in a garden, when set in certain Places they are destin’d to, as in the Niches or Sinkings that face principal Walks or Vista’s, and in the Halls and Galleries of Groves; They are made either of Marble, Free-Stone or Wood, which last are the most common, and of these there are two kinds, the seats with backs to them, which are the handsomest, and are usually remov’d in Winter, and the plain benches, which are fix’d to their place in the Ground.

Canaletto’s painting of the Thames as viewed from Richmond House, Whitehall, of 1747, in the Goodwood Collection, affords evidence of garden seats and benches of the d’Argenville types on the “hot terrass”—like that described by Cambridge—in full sun against a west-facing wall (Liversidge and Farrington 1993:70, pl. 12). They are not known to survive, although the Duke of Montagu’s painted canvas and wooden chinoiserie tea tent, partly shown by Canaletto next door on the terrace of Montagu House, can still be seen today at Boughton House in Northamptonshire (Bowden-Smith 1988). In this famous painting, Canaletto depicted a pair of formal white-painted settees with scrolled ends and a group of very curious green-painted seats with bench ends and centrally placed open backs and arms, which seem to be fitted to the walls of the landing stage.

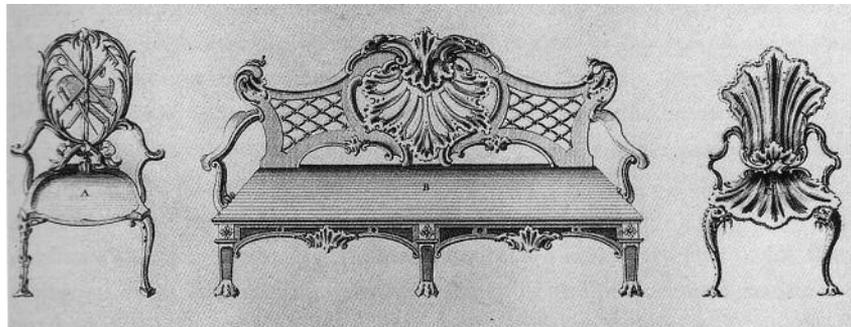
The first pair belong to an easily recognizable group of architecturally inspired seats that were probably intended, with their white paint,

to imitate more expensive stone examples, and that provided punctuation marks in the garden—at the ends of avenues, terraces, paths, and pergolas, against contrasting stone walls and dark hedges, and inside classical loggias and temples. They appear in illustrations of seventeenth-century Baroque gardens, in the designs of Daniel Marot in 1703, in Kip’s engravings of English estates, and in 1730s depictions of the formal areas of Burlington’s gardens at Chiswick (Harris 1979; Marot 1703; Atkyns 1712). Thomas Chippendale’s designs in the 1762 edition of the *Gentleman and Cabinet-Maker’s Director* (Fig. 1) specified that the seat “may be placed in walks or at the ends of Avenues,” while an early design by John Soane, dated 1778, also illustrated this type of formal garden seat in the Neoclassical style (Chippendale 1762; Soane 1778:pl. 1).

The pleasure gardens open to the public in and around London in the eighteenth century probably contained many painted seats for the use of customers as they rested during their promenades, took tea or supper, or listened to music. The end of an avenue may have been the original position for one such seat, which carries the date 1763 and was designed by William Hogarth for Jonathan Tyers, proprietor of the Vauxhall Gardens; the seat is depicted there in a 1777 sketch.⁴ Its formal design and decoration contrasts with the much more basic tables and chairs that seem to have been used in the supper boxes and can be seen, for instance, in J. S. Muller’s engraving after a view of the Grand Walk by Samuel Wale (ca. 1751).⁵ However, the ever-changing schemes at Vauxhall during its most successful years under Tyers and his sons have not left us with any clearer evidence of where this seat actually stood, and it is not known to have survived (Coke 1984:75–98).

There is a close relationship between these formal garden seats and seats for the eighteenth-century entrance hall and banqueting houses, either executed in plain wood or painted in stone colors and bearing the family crest.⁶ A further link exists in the use of Windsor chairs for both. The Windsor chairs made for the hall at Enmore Castle, Somerset, of 1756, are decorated all over the surface in checkerwork patterns of red and white paint, and have their full livery of family crest and motto.⁷ Many plainer Windsors, painted or unpainted, appear in eighteenth-century inventories for halls, passages, lobbies, and stairwells, available to be carried out to the courtyard, terrace, or lawn for use on fine days.⁸ Some were equipped with “skis,” or flat battens running from the front to back feet, to prevent them from sinking into the grass, and others were mounted on small platforms with wheels for children and people with disabilities.⁹

Figure 1
“Designs for Garden Seats.” Plate 24 from
The Gentleman and Cabinet-Maker’s Director
(Chippendale 1762).



By far the largest number of Windsor chairs and settees depicted in eighteenth-century English gardens or landscapes by contemporary artists were painted green, although other pigments are found on many pieces that have survived, though not necessarily with their original garden locations (Evans 1979; Cotton 1990:42–44). One of Oliver Goldsmith's Windsor chairs is now in the Victoria and Albert Museum; under its current top layer of black paint is a green layer, and the chair may well have been used in his London garden.¹⁰ The history and identification of English Windsor chairs have been discussed extensively elsewhere, and this article can do no more than mention them as the most standard, prevalent, and recognizable garden seats of the eighteenth century. Their sterling performance is renowned in most rooms of the domestic interior, as well as in offices, university common rooms and libraries, surgeries, farmhouses, schoolrooms, church vestries (and as family pews), in shops, ships' cabins, and even in the better class of prison cells (Evans 1979; Cotton 1990:42–44).

One early and very remarkable seat, described as a Windsor, was seen at Dyrham, Gloucestershire, by the plantsman and seedsman Stephen Switzer and recorded in an appendix to his *Ichnographica Rustica* of 1718. High up on the warren was a structure "called a Windsor Seat, which is so contriv'd as to turn round any way, either to take advantage of the prospect, or to avoid the inconveniencies of Wind, the Sun etc.," but there is no mention of painted decoration. However, at the end of the terrace to the northeast of the house were "large arch'd seats on which are painted Motto's suitable to their situation," and the square garden at the center of the wilderness had

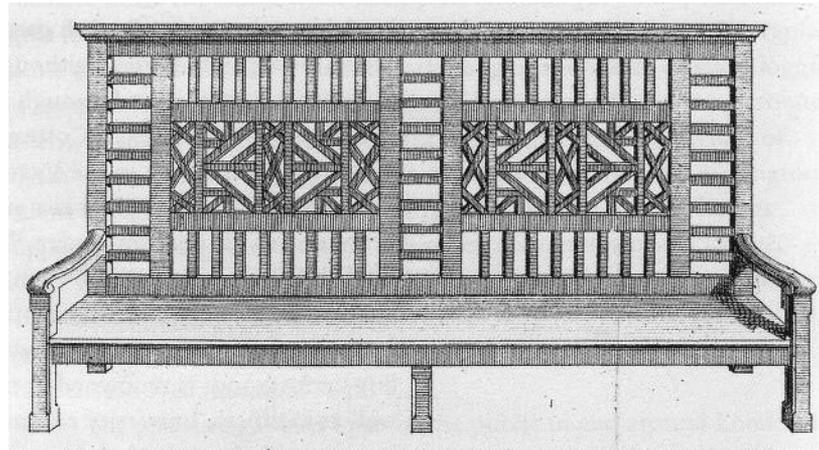
four seats at the corners, and a seat round an aspiring Fir Tree in the Centre, from where your Prospect terminates in a large old Church at a very great distance. I never in my whole life did see so agreeable a place for the Sublimest Studies, as this is in Summer, and here are small desks erected in seats for that Purpose.

Below the cascade were two large clipped thorns "encompass'd with seats"; the trunks of the thorns were entwined with green painted lead pipes that "appear more like ivy on rough bark," and that spouted small jets of water at the turn of a stopcock "as natural as if it rain'd" (Switzer 1742:125–26).¹¹ Johannes Kip's engraving of William Blathwayt's magnificent garden for Sir Robert Atkyns's *Ancient and Present State of Gloucestershire* (Atkyns 1712) is remarkably accurate when used with Switzer's text; taken together, these accounts give a good idea of the variety of garden seats, and their imaginative settings, in the early eighteenth century. Sadly, the formal garden layout at Dyrham was swept away later in the eighteenth century, and these seats have not survived (Mitchell 1978).

Related to the Windsor chairs and settees were a group of simpler "rural" white- or green-painted types with solid or slatted seats and rather delicate open backs, which were fairly portable and often used in conjunction with other light, indoor furniture brought out to the garden for tea parties—the tilt-top or Pembroke table and mahogany parlor chairs. Such a combination can be seen in Arthur Devis's alfresco portrait of Sir Joshua Vanneck's family at Roehampton House, Putney, around 1752 (D'Oench 1980:58, illus. 29).¹²

Figure 2

"A Garden Seat in the Chinese Taste." Plate 38 from *New Designs for Chinese Temples* (Halfpenny 1750).



Canaletto's green benches belong to this category—one of considerable inventiveness, if not always of stability—which was very much part of the vernacular English chairmaking tradition before the advent of nineteenth-century cast iron. Many had turned "sticks" for the uprights of their backs and turned legs; these may be the type referred to in some accounts as "forest chairs," denoting either their green paint or rustic design (Evans 1979:29–30).¹³ These simple types changed very little in the century between Kip's engravings (Atkyns 1712) and Diana Sperling's watercolors of the garden at Dynes Hall, Essex (ca. 1813) (Mingay and Sperling 1981).

From the 1740s, designs for more sophisticated examples were published to complement the plethora of Chinese railings, trellises, bridges, temples, pagodas, pavilions, Gothic ruins, hermitages, rustic retreats, and grottoes so abhorred by Cambridge, but which gave the "air of whimsical novelty" that pleased Horace Walpole (1973:166) and which can be seen in the illustrations of Thomas Robins (Harris 1978). This was where fashionable designers could let their fancy romp, unrestrained by the disciplines and propriety demanded of them for most indoor furnishing schemes. The architect William Halfpenny's plate for "A Garden Seat in the Chinese Taste" of 1750 (Fig. 2) shows in its rather solid nature an early fusion of the vernacular and the fashionable, which can also be seen in his designs for fences and gates (Halfpenny 1750:pl. 38–40, 46–48). The same may be said of William Pain's design from his *Builder's Companion and Workman's General Assistant* (Pain 1758:pl. 58),¹⁴ and of K. A. Heckel's fine portrait of Charles James Fox (ca. 1793), now in the National Portrait Gallery, London. Fox's massive figure occupies a robust, green-painted settee in the foreground of the painting, with an as yet unidentified landscape in the background.¹⁵

Printed designs proliferated throughout the 1750s and 1760s, becoming more and more fanciful, exaggerated, and exotic—for instance, in the publications of Edwards and Matthias Darly, Robert Morris, Charles Over, Paul Decker, John Crunden, and Robert Manwaring (White 1990:131–38) (Fig. 3). Some, like the little Chinese pavilions themselves, were brightly painted in a variety of colors—a style condemned by the architect Robert Morris in 1757, although he still included a design for such an enclosed seat: "A good choice of chains and bells, and different

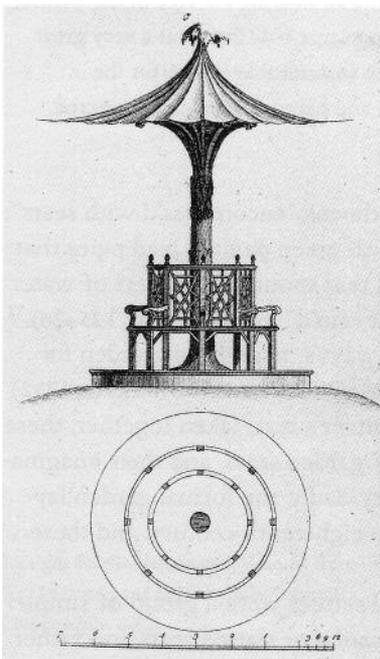


Figure 3

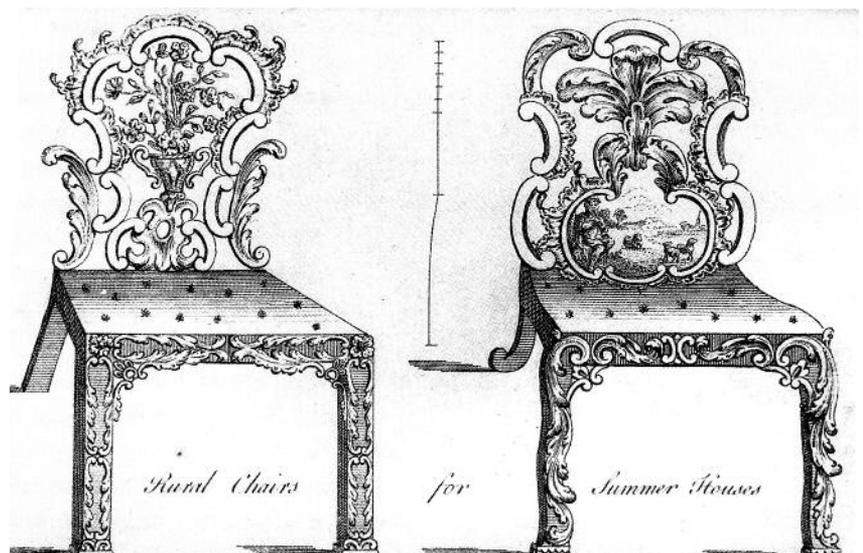
"An Umbrello'd Garden Seat after the Indian Manner." Plate 8 from *Ornamental Architecture in the Gothic, Chinese, and Modern Taste* (Over 1758).

colours of paint . . . a few laths nailed across each other, and made black, red, blue, yellow, or any other colour, or mixed with any sort of chequer work, or impropriety of ornament, completes the whole” (Morris 1971:41). Chippendale’s higher quality designs for Chinese chairs were, as the author wrote, “suitable for both Ladies’ Dressing Rooms and Chinese Temples”—another example of the indoor/outdoor exchange (Chippendale 1762: pl. 26, 28). Linnell’s designs for polychrome “Chinese Chairs” for the bed-chamber at Badminton House, Gloucestershire (ca. 1752), also give an idea of the multicolored style fashionable in the middle decades of the century (Hayward and Kirkham 1980:106–109, pl. 4).¹⁶

Any discussion of eighteenth-century paint colors used on garden furniture must be related to similar treatment of other woodwork and, in particular, the fences, trellises, and gates that complemented the garden. White paint had been used extensively to highlight the formal fences, railings, and seats of the early-eighteenth-century Baroque garden,¹⁷ and again for the trellises and “thin, fragile bridges of the Chinese” (Knight 1794:33). In 1766, Lady Mary Coke noted in her journal that “as soon as dinner was over I went out, order’d the reparation of all the old broken benches and a quantity of white paint with which I propose to new paint all the seats in the garden” (Coke 1970:42).

Combinations of white and green, and various shades of green, seem to have been more popular than multicolors in the 1760s, indicating the inexorable progress of the picturesque. Plates 29 and 30 of Manwaring’s *Cabinet and Chair-Maker’s Real Friend and Companion* show “two very grand and superb designs for Rural Garden Seats, the ornamental parts should be painted green, and shaded as expressed in the Plate, which will appear extremely beautiful.” Plates 31 and 32 are, Manwaring suggests, “in the Gothic taste; they will look very genteel painted white intermixed with green,” while plates 24–28 are, he claims, “ten very curious and beautiful designs of Rural Chairs, intended to be placed in summer houses, Temples &c., and are the only ones of this kind that ever were published. . . . there are landscapes introduced in some of them, which are intended to be painted,” while the other ornaments “may be painted green, and will look very genteel” (Fig. 4) (Manwaring 1765).

Figure 4
“Rural Chairs for Summer Houses.” Plate 24
from *The Cabinet and Chair-Maker’s Real Friend
and Companion* (Manwaring 1765).



Surviving examples of the green-and-white color combination on chairs include one made for the Chinese temple erected at Stratford-upon-Avon for the Shakespeare jubilee of 1769, organized by David Garrick.¹⁸ This chair is tentatively attributed to Thomas Chippendale (Gilbert 1978, 1:240, 2:pl. 136), but was derived from a design published by Matthias Darly (ca. 1751:pl. 3) and republished by Manwaring (1766:pl. 39). Another surviving example is a set of chairs (ca. 1775) with cane backs and seats, at Osterley Park, Middlesex.¹⁹ The use of these specific colors may express Jean-Jacques Rousseau's admiration of the simple, "natural" life visualized by him in *Emile*, published in 1762, which was so widely read in England: "I would have a little rustic house—a white house with green shutters—on the slope of some agreeable, well-shaded hill" (Rousseau 1979:351).

By the 1770s, a more definite appreciation can be detected of the "camouflaging effect" of green paint alone in the natural garden. William Mason (1724–97) wrote a highly influential poem, "The English Garden" (1777:44–5), that dwelled at length on the aesthetics of the invisible fence:

Let those, who weekly, from the City's smoke,
Crowd to each neighb'ring hamlet, there to hold
Their dusty Sabbath, tip with gold and red
The milk-white palisades, that Gothic now,
And yet now Chinese, now neither, and yet both,
Chequer their trim domain. Thy Sylvan scene
Would fade, indignant at the tawdry glare.
'Tis thine alone to seek what shadowy hues
Tinging thy fence may lose it in the lawn;
And these to give thee Painting must descend
Ev'n to her meanest Office; grind, compound,
Compare, and by the distanc'd eye decide.
For this she first, with snowy ceruse, joins
The ochr'ous atoms that chalybeate rills
Wash from their mineral channels, as they glide
In flakes of earthly gold; with these unites
A tinge of blue, or that deep azure gray,
Form'd from the calcin'd fibres of the vine;
And, if she blends, with sparing hand she blends,
That base metallic drug then only priz'd,
When, aided by the hurried touch of Time,
It gives a Nero's or some tyrant's cheek,
Its precious canker. These with fluent oil
Attemper'd, on thy lengthening rail shall spread
That sober olive-green which nature wears
Ev'n on her vernal bosom
The paint is spread; the barrier pales retire,
Snatch'd, as by magic, from the gazer's view.

Mason was thus describing a sophisticated mixture of ceruse (lead white), ochre, and blue (probably indigo), in an oil binder, to produce an "invisible green" for which many recipes were to be written down and published in the later eighteenth and early nineteenth centuries.²⁰ The standard, simple, and cheapest mixture of pigments for green oil-based garden paint was that of yellow ochre and lamp black.

Horace Walpole, who knew and corresponded at length with Mason, had plain green-painted furniture in the garden at Strawberry Hill, Twickenham; the accounts for Strawberry Hill mention green-painted garden benches in 1754 and 1775 (Toynbee 1927:5). However, the most famous of Walpole's garden furniture was the "shell bench," which was designed by Bentley,²¹ carved by Robinson in 1754, and placed "at the end of the winding walk" at Strawberry Hill. This was where he so admired the picturesque sight of the beautiful Countess of Ailesbury and her daughters the Duchess of Richmond and the Duchess of Hamilton, sitting there in 1759 (Walpole 1973:85, 87). There is no mention of the bench's finish; as an oak piece, it may well have been left in its natural state, but it was still in situ thirty years later (Walpole 1784).

Walpole's use of the shell bench against a tree shows that it was not restricted to the decoration only of grottoes but, through its association with Venus, could be applied to rather intimate arbors above ground—seen earlier, for instance, in John Carwitham's illustration of a shell seat (Reynolds 1740:468). For grottoes, Chippendale published a design in the third edition of the *Director* (1762:pl. 24), but the shell was also used in hall chair design by many of the midcentury publishers, where, once again, a painted finish was an acceptable alternative to mahogany (White 1990:124–28; Hayward 1984).

Walpole's shell seat, if left in its natural finish, may also provide a link with the increasing use of unpainted wood for rustic seats in the picturesque garden. One truly remarkable example survives at Badminton, Gloucestershire, attached to the side of the hermitage designed by Thomas Wright of Durham (ca. 1750), and designs published by Wright (1755) show the "Wizard of Durham's" imaginative use of these rustic themes. Chippendale picked up the theme in a design for a garden chair in plate 24 in the 1762 edition of the *Director*: it has conventional Rococo arms, a back composed of carved leaves and gardening tools, a dished "Windsor-type" seat, and one leg carved to resemble a rough branch. More rustic designs were published by Manwaring in the *Companion* (1765), with instructions about a painted finish. Those illustrated in his plates 26 and 27



Figure 5
"A Garden Chair." Plate 86 from *A New Book of Chinese Designs* (Darly and Edwards 1754).

may be made with the limbs of yew or apple trees, as nature produces them; but the stuff should be very dry, and well season'd: after the bark is peeled clean off, chuse for your pitches the nearest pieces you can match for the shape of the Back, Fore Feet and Elbows. . . . they are generally painted in various colours.

These "branch" chairs may be compared with the slightly older designs, first published by Matthias Darly in 1754, for "root" furniture (Fig. 5), inspired by the images seen on Chinese polychrome export porcelain of the 1730s in both brown and green (Darly and Edwards 1754:pls. 37, 66, 86, 117). In the entry for 29 May 1777, the accounts for Strawberry Hill include one "for a green root bench for the cottage garden, £2-0-0" (Toynbee 1927:50, 76).

Thus "natural" colors and designs became increasingly desirable in the picturesque garden. By 1785, English readers were aware of the "straw chair" in which Rousseau sat shortly before he collapsed and died in 1778 at Girardin's picturesque garden at Ermemonville, and of the

“elbow” chair made by Rousseau himself. It was formed of rude, unfashioned twigs, interwoven and grafted, as it were, into the tree, which served as a back to it” (Girardin 1982:50, 76).

Certainly by the end of the century the completely “natural look” for garden seats in the context of the Cottage Ornee was fully accepted. Edmund Bartell (1804:25) wrote of trelliswork, railings, bridges, and gates that were “generally painted white or green, which . . . is foreign to every principle of harmony; and although every thing that is slovenly offends and ought to be avoided, we ought equally to avoid a dressed appearance, which would destroy the connexion that should ever subsist between the house and the grounds.”²² The visual expression of this appeared in designs of all sorts of domestic furniture in an anonymous book titled *Ideas for Rustic Furniture*, published by I. & J. Taylor (1790–95), and in Middleton’s plate 46 of six designs from *The Architect and Builder’s Miscellany*, 1799 (White 1990:144–46; Heckscher 1975:pl. 128–48). A set of chairs now in the Victoria and Albert Museum, which are carved in beech in imitation of twigs, covered in gesso and painted brown, may date from around this time or even later, and may indeed be French.²³

Finally, some other Rococo designs need to be discussed in relation to two famous paintings (ca. 1750) showing green-painted garden settees. In 1766, Manwaring’s designs were included in, and his name given to, a third volume titled *The Chair-Maker’s Guide* published by Robert Sayer, but which also included plates first published in 1750–51 by Henry Copland and some by Darly, presumably just after the expiration of their original fourteen-year copyright (Paulson 1965). Darly’s influence in the English Rococo is complex and pervasive; although he was a freeman of the Clockmakers’ Company, his other professional activities included designing, engraving, and wallpaper making and selling; he was also a caricaturist and a publisher (Jervis 1984; White 1990:40).

The designs for parlor chairs of around 1751, originally issued by Darly as *A Second Book of Chairs*, were reissued as plates 41, 42, 44, 45, and 54 in Manwaring’s 1766 *Chair-Maker’s Guide* and have now been attributed to Darly by Christopher Gilbert (1975:33–39, pl. 74–78) and Simon Jervis (1984). They are characterized by flat, scrolling, interlaced patterns for their backs in the manner of De La Cour and are seen frequently in parlor chairs executed in mahogany, and in interior portrait settings, book illustrations, sketches, and engravings by Francis Hayman, Hubert Gravelot, and others of the Saint Martin’s Lane artistic set.²⁴

A green-painted version of Darly’s design can be seen in Francis Hayman’s portrait of Mr. and Mrs. George Rogers, *Margaret Tyers and Her Husband George Rogers* (ca. 1750), now in the Mellon Collection (Allen 1987:46, pl. 5, cat. no. 25). It has a distinctive sweep to the visible arm of the settee and is another example of how freely designers and makers adapted indoor furniture patterns for outdoor purposes. Margaret Rogers was the daughter of Jonathan Tyers, proprietor of the Vauxhall Gardens and friend of Hogarth, Hayman, Roubiliac, and Gravelot (Coke 1984:75–98).

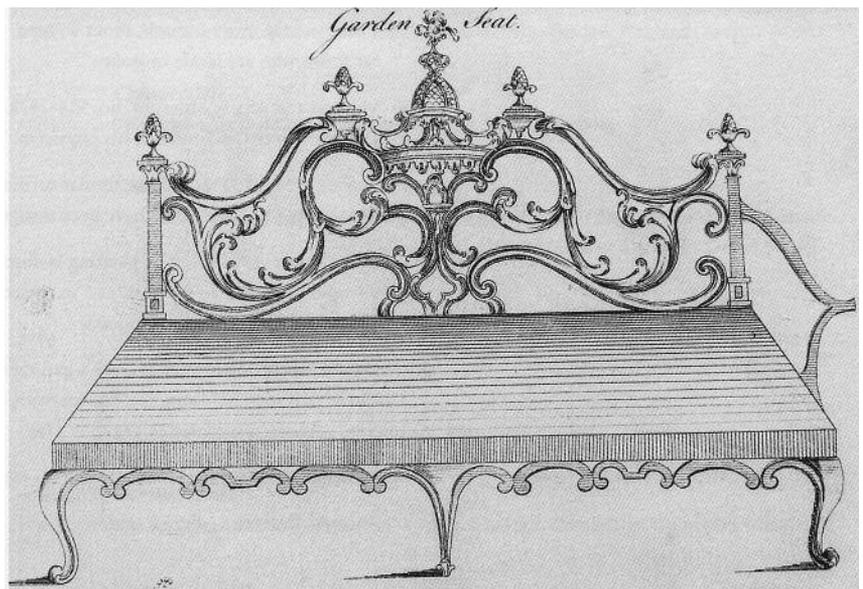
Plates 69–75 of Sayer’s *Guide* have recently been identified as reissues of *Six New Designs of Chairs*, printed in 1753 for John Smith, a map and print seller in Cheapside (Gilbert 1993). When Sayer reissued these plates in *The Chair-Maker’s Guide*, 1766, under the authorship of Robert Manwaring, he added the title “Summer House Chairs,” renumbered the

plates, and slightly altered some of the legs. Although curious to look at, these plates—especially the title page of Sayer’s 1753 edition (Manwaring 1766:pl. 70)—inspired a number of chair carvers.

Plate 47 of the *Guide*, at present unattributed, is a design for an elaborate garden settee with a finely proportioned, scrolling Rococo back in the Darly-Smith tradition (Fig. 6). Its design immediately recalls that most memorable of images of eighteenth-century garden seats—Gainsborough’s double portrait of *Mr. and Mrs. Andrews*, painted in Suffolk after their marriage in November 1748.²⁵ The composition of the painting is a reverse image of Hayman’s portrait of the Rogers couple, and the bench itself is a sophisticated version of Hayman’s but with the same, if more attenuated, treatment of the scrolling arm and derivative of the designs for root benches. Many suggestions have been made as to whether this seat really existed and has perished or was purely a piece of artistic imagination. If thought to be real, it is now usually described as being made of wrought iron (Cormack 1991:46, no. 8). But on the strength of Hayman’s portrait, so close in date to Gainsborough’s (ca. 1750), and based on the rest of the evidence that this article has hopefully clarified—the Darly and Darly-esque furniture designs of 1750–54, the variety and vigor of the wood-carver’s and designer’s oeuvre at this time, the extensive use of Mason’s “fluent oil” (that is, the green paint on garden woodwork)—and based on the lack of evidence for a parallel sophisticated wrought-iron furniture industry, this author is convinced that this most memorable of perches, perished or illusory, must belong firmly within the painted wood tradition.

In conclusion, therefore, the evidence currently available shows the extensive use of paint on eighteenth-century garden seats to provide both protective coatings on softwoods and decorative treatments following current fashions in garden design and ornament. The fashionable use of various colors during the middle of the century gave way to the simple use of green, or white and green, during the 1760s; complete naturalism in the use of “invisible” green, or just natural wood, was most prevalent by the end of the century. The study of contemporary pattern books,

Figure 6
“Garden Seat.” Plate 47 from *The Chair-Maker’s Guide* (Manwaring 1766).



accounts, literature, conversation, and landscape pieces extends our knowledge of a subject where few surviving objects can be used for research. Such study may assist us in the identification of yet rarer survivors, as well as in their correct conservation.

Acknowledgments

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Notes

- 1 One recent discovery by the Avon Gardens Trust is of a seat, probably designed by William Kent, ca. 1740, for a garden at Cleeve on the outskirts of Bristol, which is now suburbanized; the seat is covered in many layers of paint, including modern gloss.
- 2 Victoria and Albert Museum, no. W.11–1977. The report on paint by Jo Darrah, 3 March 1977, lists seventeen layers of green, eight of white, three or four of brown, and three of gray paint, with the possibility of some undercoats.
- 3 *Shorter Oxford English Dictionary*, 1933, s.v. "seat."
- 4 This sketch is housed in the Department of Prints and Drawings, British Museum, London.
- 5 Museum of London, no. 5352/7. Discussed in Coke (1984:88).
- 6 For example: Badminton House, Gloucestershire, North Hall and Sherborne, Gloucestershire (designed by James Moore).
- 7 Victoria and Albert Museum, no. W.34–1976. Some doubt has been expressed about the authenticity of these chairs, but see Cornforth (1991:98); also Shore (1789), who notes that "the walls are covered with family busts and coats of arms; painted chairs of the same etc.;" and Collinson (1791:89–96).
- 8 "Eight mahogany Windsor Elbow Chairs" are listed in Rosomon (1986:99).
- 9 Tradecard of William Webb (ca. 1785), Department of Prints and Drawings, British Museum, London. See also the *Gentleman's Magazine*, April 1746, for a design for a wheelchair "in which a person may move himself about a room, or garden, without any assistance; very convenient for those who are lame, or gouty."
- 10 Victoria and Albert Museum, no. 538–1872. This chair is made of ash and was bequeathed in 1774 by Oliver Goldsmith to his physician, William Hawes, founder of the Humane Society.
- 11 Defoe (1974:i.303) recorded a similar turning seat at the end of the great terrace at Windsor in 1724, which he believed to have been designed by Queen Elizabeth I.
- 12 See Webster (1976:47). The painting is described as "Conversation Piece: William Ferguson introduced as heir to Raith, 1769," in the collection of A. B. L. Munro Ferguson of Raith and Novar, National Gallery, London.
- 13 On the top of the Mount at Pope's garden in Twickenham, Surrey, stood "a Forest Seat or Chair, that may hold three or four persons at once, overshadowed with the branches of a shading tree" (*Epistolary Description* 1747).
- 14 For more on Pain, see Harris (1990:338–46).
- 15 National Portrait Gallery, London.

- 16 Traces of the original polychrome scheme have been found under the early-nineteenth-century black-and-gold japanning on chairs from the set now divided between the Bristol Museum and Art Gallery and the Victoria and Albert Museum (nos. W.33, 34–1990).
- 17 See Harris 1979, plate 14 (View of Denham Place, Buckinghamshire, ca. 1705), which shows the use of white paint.
- 18 For Garrick's green-and-white painted indoor furniture, see Galbraith (1972:47) and nos. W.21–32–1917 in the Department of Furniture at the Victoria and Albert Museum.
- 19 Green-painted chairs are listed in Tomlin (1986:126–27) for the Semicircular Greenhouse, Great Greenhouse, and Summer House; green-and-white ones are listed for the parlor of the menagerie; and the tent in the park was lined with green tammy.
- 20 Full details of which are to be published by Ian Bristow in his forthcoming monograph on historic paint colors. The author is grateful to Bristow for his generous gift of information before publication.
- 21 Bentley's design is now in the Walpole Library, Yale University.
- 22 "A coat or two of drying oil" was sufficient for the protection of natural wooden furniture and fittings (Bartell 1804:48).
- 23 Victoria and Albert Museum, nos. W.61–66-1952. Notes in Departmental Catalogues, Furniture and Woodwork Collections. They may well date from later in the nineteenth century if they did indeed come from Bagatelle just before Sir Richard Wallace's tenure. Further investigation of them would be welcomed.
- 24 For these designs by De La Cour, see White (1990:59–61); and De La Cour (1741). For other illustrations of this type of chair, see Allen (1987:25, 126).
- 25 National Portrait Gallery.

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Shaker Painted Furniture

Provocative Insights into Shaker Paints and Painting Techniques

Susan L. Buck

THIS RESEARCH WAS INSPIRED by a request from the owners of the Mount Lebanon Shaker Collection for help in interpreting the paint history of four Mount Lebanon objects that appeared to have been stripped and revarnished. In 1930, the majority of the buildings and land owned by the Mount Lebanon community (the Shaker spiritual center) were sold and soon after became the site of the Darrow School. At its peak in about 1860, the population in Mount Lebanon was almost six hundred. The Darrow School purchase included forty buildings—some quite massive in size—and all the furnishings in those buildings.

Over the years, the Darrow School periodically auctioned off its Shaker objects to keep the school solvent. In 1992, the balance of the collection, including the built-in furniture, was sold to a single buyer and became the core of the privately owned Mount Lebanon Shaker Collection. Some of the furniture that came from the Darrow School in this last sale had been badly abused. There were cat scratches on the drawer fronts of counters, student graffiti on the insides of cupboard doors, chemical and paint stains on cupboards used for storage of photochemical and cleaning supplies, and—in two instances—modern synthetic coatings on top of stripped or disk-sanded countertops. Despite the sad condition of some of these objects, there were still remnants of what appeared to be original paint in protected areas and trapped in the wood fibers. This was sufficient material for cross-section analysis and pigment identification to help reconstruct the paint history of these formerly painted surfaces.

This initial study of Shaker paints was intriguing, and it inspired an in-depth examination of similar painted objects from Mount Lebanon that had survived in better condition.

A comprehensive study of the architectural paints in the Canterbury Shaker Village Dwelling House was completed in September 1994 by the author and Alex Carlisle, a student in the University of Delaware/Winterthur Program in Art Conservation. The results of this study were also compared to the evidence found on Shaker painted furniture. Study of Shaker architectural paints is facilitated by the fact that the majority of paint recipes discovered during this research were for architectural paints; and, during certain periods, there are very specific Shaker dictates in the Millennial Laws for the colors of floors, moldings, and exteriors.¹ Large-scale Shaker built-in furniture—such as cupboards, counters, and closets—bridges the gap between furniture and architectural

elements (Fig. 1). These forms were intended to be immovable, but they are constructed with traditional Shaker furniture methods and are often finished like other movable furnishings.

Historical Background

In the 1930s, the simple, beautiful objects produced by the Shakers for their own use became surprisingly fashionable and desirable. This was due, in part, to the closing of several communities as older believers died and the celibate Shaker population dwindled. There was no longer the need for all the beds, cases of drawers, cupboards, tables, candlestands, and desks that had been built to serve the needs of the populous communities in the mid-1800s. As communities closed or were consolidated, many of the material goods were sold to what the Shakers refer to as “the World.” At the same time, the enthusiastic promotional efforts of Edward and Faith Andrews, noted Shaker scholars and dealers, also helped to build a strong market for Shaker objects, which continues to grow.

The early, romanticized vision of the Shakers producing divinely inspired furnishings and textiles has resulted in a considerable amount of misinformation about Shaker craft methods, and about the bright paints used on much of the furniture and in the buildings. One book describes Shaker furniture paint colors as “reflections of the way things were thought to be coloured in heaven” (Horsham 1989:45). Recently, a guide at one of the Shaker villages was overheard telling visitors that the dark blue paint on the woodwork in the Meeting House was made from blueberries and butter-milk. Original painted surfaces are highly desirable in the current market for Shaker furniture and wooden objects, and there are frequent references in auction catalogues to “original milk paint,” “original, untouched chrome yellow paint,” or “traditional red ochre paint.” However, there is no evidence in the literature to date that any analysis has been carried out on Shaker furniture to identify the pigments and binders in these “untouched” paints or to confirm that these objects have not been repainted.

The Shakers put a great deal of emphasis on cleanliness, and there are specific instructions in the 1845 Millennial Laws² about caring for and

Figure 1

An impressive set of cupboards and drawers built into the Meeting Room in the brick Dwelling House at Hancock Shaker Village, Pittsfield, Massachusetts.



cleaning furnishings, living spaces, and work areas. For example, part 6, “Miscellaneous Rules and Counsels,” rule 29, states: “All should be careful not to mar or destroy the furniture in their shops and rooms.” There also are a number of Shaker recipes dating from the early to late 1800s for cleaning and stripping furniture with caustic solutions, implying that painted and clear-finished surfaces that received regular handling may have been routinely washed, and periodically stripped and recoated, to meet the high standards for cleanliness.³ A recent study of the paint history of the Dwelling House at Canterbury Shaker Village also revealed large areas of woodwork that had been painted with oil-bound chrome yellow paint during an 1837 addition to the building, and then later mechanically scraped down before being repainted white.⁴ The bright yellow paint still survives in the fibers of the wood and is visible under magnification.

Given this Shaker penchant for cleanliness and a cultural emphasis on the highest standards of work—as well as, by the late 1800s, a willingness to adopt the styles and technology of “the World”—it appears unlikely that all the Shaker painted objects believed to have had original surfaces truly were untouched.⁵

Shaker Paint and Varnish Recipes

One invaluable recipe book was discovered during this research. It is a handwritten book titled *Receipt Book, Concerning Paints, Stains, Cements, Dyes, Inks, &c.* On the title page is the inscription: “Rosetta Hendrickson, A Present from Eld. Austin.” Rosetta Hendrickson (1844–1912) lived in the Watervliet, New York, Shaker community until 1865, when she moved to Mount Lebanon, only a few miles from Watervliet. This book is now in the Western Reserve Library and is believed to date from approximately 1848–49.⁶ It contains numerous paint and stain recipes, all written in the same hand, with a few citations for sources. Many of the recipes, including the following one for “Sky Blue for New Meetinghouse, Chh. Watervliet (1849),” were quite simple:

Inside Wash

To 10 #s White Lead, put
1# Prussian Blue, mixed in Linseed Oil and drying materials.
For the Meetinghouse doors &c. a little Varnish was added.

Analysis of paint cross sections and pigment samples from moldings of the Canterbury, New Hampshire, Meeting House confirm the use of Prussian blue and lead white in an oil binder with a resin varnish component, and help to disprove the fanciful blueberries and buttermilk theory.

A very detailed “receipt for making and applying the Tere-de-Sena stain” from the same book was found to directly correlate with the scant evidence on an 1860 Mount Lebanon counter made by Benjamin Lyon (1780–1870) and Charles Weed (b. 1831; left the Shakers in 1862). It appeared to have been stripped and refinished, and the evidence indicated the presence of an original oil-bound stain composed of burnt sienna.⁷ This counter now has three finishes that were applied later, including what appears to be a polyurethane layer directly on top of the wood substrate. There is a gum sizing in the wood, and the burnt sienna particles are trapped in the wood fibers.⁸

This recipe book helps disprove the commonly held belief that the Shakers had developed their own unique working methods and were using the materials most readily available in an agrarian society. The recipes incorporate traditional paint materials, such as lead white, Prussian blue, Chinese vermilion, verdigris, French yellow (ochre), chrome orange, chrome yellow, linseed oil, and shellac, all of which would have been purchased from outside sources. In fact, at the end of the recipe book there is a list of the materials and quantities purchased for painting the new Meeting House in Watervliet in 1848.⁹

Another intriguing discovery was a recipe for “fat copal varnish” in the Hendrickson book,¹⁰ which was identical in wording to a recipe for fat copal varnish in *Mackenzie’s Five Thousand Receipts* (1829:23), published in Philadelphia. Mackenzie, in turn, reprinted recipes verbatim from *The Painter and Varnisher’s Guide*, published in London at the beginning of the nineteenth century (Tingry 1804:80).

A number of Shaker paint and varnish recipes were discovered in handwritten journals and books containing medicinal, food, and household recipes. It is curious that many of the medicinal and household recipes incorporate common raw materials for paints, and are very similar, or virtually identical, to some of the paint recipes. The following recipe¹¹ would have produced a rather toxic green salve:

Green Ointment for cuts & wounds

Hogs lard ½ lb
 Verdigris one oz Rosin Do
 Turpentine Do Beeswax Do

A number of the recipes list only the pigments, not the binding media components. A recipe for green paint from Canterbury Shaker Village from Sister Mary C. Whitcher, dated 1863, is titled “To mix paint for outside of houses,” and it contains 125 lb. (56.75 kg) lead white, 6 lb. (2.72 kg) green chrome, 6 lb. (2.72 kg) French yellow, and 2½ lb. (1.13 kg) yellow ochre.¹² All of the exterior architectural paint samples examined in this study were oil-bound, and it seems likely that linseed oil was the primary binding component, as it appears in many other exterior paint recipes.

In addition to raw pigments, linseed oil, and turpentine, alcohol was a major component in “spirit” or alcohol-based varnishes such as shellac. It was also a base for Shaker medicinal herbal extracts, balms, and liniments. One potentially odorous recipe for liniment contains alcohol, turpentine, camphor, hartshorn (a preparation of ammonia used as smelling salts), “beefs gall,” and sweet oil.¹³

Perhaps one-third of the Shaker recipes discovered in the course of this study have citations from such sources as *N.Y. Farmer, Scientific American, The Dictionary of Mechanical Engines and Engineering* (1851), *New York Agricultur, Farmers Cabinet, Boston Journal of Chemistry* (1881), and *Popular Science News*. A recipe titled “Patent Composition for gum shelack” was discovered in an 1881 Shaker community recipe book from Harvard, Massachusetts, which was identical to a recipe in the Rosetta Hendrickson recipe book.¹⁴ It is therefore clear that the Shakers were drawing from numerous sources, including other Shaker communities, and were using proven recipes and materials. They were not inventing their own unique paints and varnishes.

Technical Analysis of Shaker Paints and Raw Materials

Cross-section and pigment samples were taken from more than forty objects from Mount Lebanon; samples from twelve objects from Canterbury Shaker Village, Hancock Shaker Village, and the Enfield, New Hampshire, community—as well as numerous unattributed Shaker objects—have been examined for purposes of comparison.¹⁵ At least three cross sections were taken from representative, protected areas of each object. Additional scrapings from specific paint layers were taken for pigment identification. This sampling is not exhaustive, and is still in progress, yet the results to date are quite revealing. Bottles and packages of raw pigments and resins found in the collections of Hancock Shaker Village in Hancock, Massachusetts, and the Shaker Museum in Old Chatham, New York, were also analyzed to identify the contents.

The cross sections were examined with visible and fluorescent microscopy techniques at $\times 125$, $\times 250$, and $\times 500$, using biological stains to characterize the binding media. Polarized light microscopy and microchemical testing procedures were employed to identify the pigments in specific paint layers. In addition, selected samples were analyzed at the Center for Conservation and Technical Studies, Harvard University Art Museums, using Fourier-transform infrared (FT-IR) microspectroscopy to study binding media components and to identify certain pigments, and scanning electron microscopy (SEM) to identify elements in the paint layers. The author also worked with Janice Carlson, senior scientist at the Winterthur Museum, to conduct X-ray fluorescence (XRF) analysis for inorganic components, as well as additional FT-IR analysis.

Analysis revealed that virtually all of the wooden objects, with the exception of the green beds, were first sized with a gum priming layer before paint was applied.¹⁶ This gum size would have sealed the wood fibers so the paint would form a more consistent, intensely colored layer on the surface. This means that less of the more expensive pigmented material would be required to produce an evenly painted surface. Despite the use of gum sizes, however, the paints often penetrated deeply into the wood fibers—an indication that there was a low ratio of pigment to binder.

There were surprising variations in the pigment combinations used to achieve specific colors. The pigments listed in Table 1 show, for example, that an intense red color was achieved by a simple combination of red ochre and inert fillers, such as calcium carbonate, or by more complicated combinations of red lead, burnt sienna, and raw sienna.

Chrome yellow was found most frequently in bright yellow paints, usually in combination with iron earth pigments and lead white. Zinc yellow was discovered on only one object: a large cupboard from the Mount Lebanon community. This was one of only two objects painted with what appears to be an egg tempera binder. Yellow ochre was also found in combination with chrome yellow, and it was the primary colorant on the yellow moldings dating from the 1793 construction of the Canterbury Meeting House. The massive built-in closets and drawers on the fourth floor of the Canterbury Dwelling House date to the 1837 addition, and the paint is composed primarily of chrome yellow and lead white in an oil binder. This is very similar to the yellow built-in closets and drawers from the Enfield, New Hampshire, community that are now installed in the Shaker rooms at the Winterthur Museum.

Objects with original blue paint were more difficult to locate, and the search is ongoing. The blue layer on an aqua-colored box in the Winterthur Museum collection turned out to be a second generation of

Table 1 Pigments and binding media components found on Shaker painted objects

| Object | Pigments ^a | Binder components |
|--|--|--|
| Red paints | | |
| 1. Red counter, 1820, ML | red ochre, ^b calcium carbonate fillers ^b | oil ^{c,f} |
| 2. Red wall cupboard, 1790–1800, ML | red ochre, lampblack, charcoal black | oil, ^c protein ^d |
| 3. Red cupboard, 1840, ML | red ochre, yellow ochre, raw sienna, chrome yellow | oil ^{c,f} |
| 4. Orren Haskins counter, 1847, ML | red lead, red ochre, burnt sienna, yellow ochre, raw sienna | oil ^{c,f} |
| 5. Red hanging cupboard, 1830–70, ML | red lead, ^b iron earth pigments ^b | oil ^{c,h} |
| 6. Benjamin Lyon counter, 1860, ML | red ochre, burnt sienna | oil ^{c,f} |
| 7. Benjamin Youngs Sr. tall case clock, 1806, WV | none | organic stain in oil ^{c,h} |
| Yellow paints | | |
| 8. Yellow cupboard, 1840–60, ML | zinc yellow, iron earth pigments | protein ^{d,g} |
| 9. Interior of red wall cupboard, 1790–1800, ML | chrome yellow, red ochre, burnt sienna | oil ^{c,f} |
| 10. Interior of Deaconesses cupboard, 1840, ML | chrome yellow, red ochre, iron earth pigments, charcoal black | oil ^{c,f} |
| 11. Interior of red hanging cupboard, 1830–70, ML | chrome yellow, ^b lead white ^b | oil ^{c,f} |
| 12. Dwelling Room built-in cupboards and drawers, 1840, EN | chrome yellow, ^b lead white, ^b iron earth pigments ^b | oil ^{c,h} |
| 13. Dwelling Room built-in cupboard and drawers, 1837, CA | chrome yellow, ^b lead white, ^b (massicot?) | oil ^{c,f} |
| Blue paints | | |
| 14. Blue counter, after 1815, CA | Prussian blue, ^j calcium carbonate fillers ^h | oil, ^{c,h} carbohydrates ^e |
| 15. Meeting House woodwork, 1792, CA | Prussian blue, calcium carbonate fillers | oil ^{c,f} |
| 16. Blue-green chest with drawer, 1821, HA | Prussian blue, ^j chrome yellow, ^h calcium carbonate fillers ^h | oil ^{c,h} |
| 17. Blue oval box, n.d. | lithopone, ^b lead white ^b | oil ^{c,f} |
| Green paints | | |
| 18. Green bed, ca. 1830, ML | chrome green, calcium carbonate filler, carbon black | protein, ^d oil, ^{c,h} carbohydrates ^e |
| 19. Green bed, n.d., ML | chrome green, calcium carbonate fillers | oil, ^{c,h} carbohydrates ^e |
| 20. Green oval box, n.d., ML | green earth, lead white, iron earth pigment | oil ^{c,h} |
| 21. Green headboard, n.d., ML | green earth, yellow ochre, charcoal black | oil ^{c,h} |
| Orange and salmon-colored paints | | |
| 22. Deaconesses cupboard, 1840, ML | red lead, ⁱ barium yellow, ⁱ iron earth pigments, ⁱ chrome yellow ⁱ | oil ^c |
| 23. Amos Stewart counter, 1860, ML | chrome yellow, ⁱ red lead, ⁱ red ochre, ⁱ burnt sienna, charcoal black ⁱ | oil ^c |
| 24. Tailoring closet, 1840, ML | red lead, ⁱ iron earth pigments, ⁱ chrome yellow, ⁱ charcoal black ⁱ | oil ^c |

Key

ML = Mount Lebanon

WV = Watervliet, New York

EN = Enfield, New Hampshire

CA = Canterbury, New Hampshire

HA = Hancock, Massachusetts

Notes^aIdentified by polarizing light microscopy only, unless otherwise noted.^bConfirmed by identifying characteristic elements by X-ray fluorescence, using a Model A Kevex X-ray fluorescence unit.^cIdentified by staining cross section with Rhodamine B.^dIdentified by staining cross section with fluorescein isothiocyanate (FITC).^eIdentified by staining cross section with triphenyltetrazolium chloride (TTC).^fIdentified by staining cross section with 2, 7 dichlorofluorescein (DCF).^gIdentified by presence of amide I and amide II bands in infrared spectrum.^hIdentified by presence of drying-oil binder by doublet between 2800 and 3000 cm⁻¹ and a peak at 1750 cm⁻¹ in the infrared spectrum; Fourier-transform infrared (FT-IR) spectroscopy using an Analect RFX-65 Model.ⁱConfirmed by identifying characteristic elements with X-ray fluorescence in a scanning electron microscope.^jIdentified by presence of peaks at 2950 and 2890 cm⁻¹ in the infrared spectrum.

paint over the remnants of an original yellow paint; notably, the primary pigment was lithopone ($\text{ZnS} + \text{BaSO}_4$), which was not produced until 1874. Of the seven blue objects examined to date, all but one incorporated Prussian blue as the primary colorant.

The blue paint on a handsome counter with an orange top and interior, originally built into a retiring room on the top floor of the Canterbury Shaker Village Meeting House, was found to be composed primarily of Prussian blue plus calcium carbonate-based fillers in an oil binding medium. This is the same blue paint as the second generation of blue paint found on the moldings in the third floor room of the Meeting House where the counter had been built in.

This consistent use of Prussian blue in oil disproves a popular theory among folk art collectors and dealers that many of the “dry-looking” blue paints were milk-based. It is highly unlikely that any blue paint containing Prussian blue would be a milk-based paint, as the high pH of a casein or milk-based paint would rapidly discolor the Prussian blue to an unsightly brown. This use of Prussian blue by the Shakers may also help to explain a belief that Shaker paint colors were divinely inspired. The name “celestial blue” appears in one Shaker recipe and in the records of C. Schrack and Company—a major manufacturer and distributor of paint, putty, and varnish in Philadelphia, Pennsylvania, founded in 1830—but it is a contemporary name for Prussian blue, not a descriptive term (C. Schrack and Company 1827–88).

Four green-painted beds and one green box were examined; in general, the green paints were far more opaque in appearance and thicker in application than any of the other paint cross sections examined. The green pigment on three of the beds was chrome green (a mixture of Prussian blue and lead chromate), which was readily available after the first quarter of the nineteenth century. One green bed (actually only a headboard), in the Shaker Museum collection, was painted with green earth (terre verte), yellow ochre, and charcoal black (Fig. 2). The green

Figure 2

Green bed from the Hancock Shaker Village collection. The cross-section analysis indicated that the green paint layer was a second generation of paint, above the remnants of the original orange paint found to be trapped in the wood fibers.



Figure 3

Shaker paint colors. These were replicated based on handwritten Shaker recipes, and the pigment combinations were identified using polarized light microscopy techniques. The linseed oil-based paints were applied to wood that had been sized with a gum on one side and remained unsized on the other.



box was painted with green earth, lead white, and a small amount of chrome green. A noteworthy characteristic of the paints on the green beds from the Mount Lebanon and Winterthur collections is the presence of a green-pigmented glaze of plant resin varnish applied directly on top of the green paint layer. There is no distinct boundary between the glaze and the paint, indicating that the green glaze was applied before the green paint beneath it had completely dried. This glaze would have made the paint more saturated in color, glossier, and more durable. This method of applying paint and pigmented varnish directly relates to an 1865 correspondence from Daniel Boler at the Ministry at Watervliet, New York, to Orren Haskins, cabinetmaker at Mount Lebanon (Rieman and Burks 1993:62): “In the present case as touching the use of Varnish on the wood work of our dwellings in the sanctuary at the Mount, we have unitedly decided to have what varnish is used, put into the last coat of paint.”

This use of a pigmented, plant resin glaze over a paint layer was also found on the original red moldings from the third floor of the Canterbury Shaker Dwelling House, dated 1793, and on the red moldings in the 1792 Canterbury Meeting House.

The distinctive bright orange and salmon colors found on many Shaker objects often appear to have been created from various combinations of red lead, iron earth pigments, chrome yellow, and charcoal and/or lampblack. Bright orange occurs commonly on both the interiors and exteriors of Shaker objects, and more objects need to be studied to fully understand the variety of pigment combinations (Fig. 3).

The analysis of paints found on Shaker objects and furniture directly relates to the raw pigments in several Shaker collections. Table 2 lists the results of the analysis of bottles and other containers of raw pigments found at the Mount Lebanon and Canterbury communities. One group attributed to Canterbury Shaker Village is owned by Hancock Shaker Village and was sold in the 1932 Jordan Auction; the other group is in the collection of the Shaker Museum and comes from a variety of sources.

Conclusion

The results of this initial phase of research indicate that there are several common characteristics in Shaker paints and their use on furniture and woodwork between approximately 1792 and 1860. The first is that a sizing layer was used consistently to seal the wood before the paints were applied. This sizing layer usually was a gum (perhaps gum arabic dissolved in water). A preparatory size layer meant that the first layer of paint would not penetrate deeply into the wood fibers but instead would form an even, consistently colored layer on the surface. This is an efficient way to conserve the more expensive pigmented material, and it means that one layer of paint would suffice to achieve an even color. Another recognizable characteristic is the use of thin, or dilute, paints. With the exception of the

Table 2 Raw pigments found in Shaker collections

| Color | Pigment ^a | Village, Source |
|---------------|--|---|
| deep blue | Prussian blue, ^{b,c} calcium-based fillers ^b | ML, Koster Auction, 1964 |
| pale blue | copper acetate ^b (verdigris) | CA, Jordan Auction, 1932 |
| deep red | red ochre ^b | CA, SM |
| deep red | iron oxide red ^b | CA, Jordan Auction, 1932 |
| deep red | red ochre ^b | ML, SM |
| medium red | red ochre ^b | CA, Jordan Auction, 1932 |
| pale red | vermilion, chrome yellow, ^b red lead ^b | HA, The Ansbacher Manufacturing Co., NY |
| dull yellow | yellow ochre, ^b titanium dioxide, ^b calcium carbonate ^b | CA, Jordan Auction, 1932 |
| bright yellow | chrome yellow, ^b lead white ^b | CA, SM |
| bright yellow | chrome yellow, ^b calcium carbonate ^b | CA, Jordan Auction, 1932 |

Key

ML = Mount Lebanon

CA = Canterbury, New Hampshire

SM = The Shaker Museum

HA = Hancock, Massachusetts

Notes^aIdentification by polarizing light microscopy only, unless otherwise noted.^bConfirmed by identifying characteristic elements by X-ray fluorescence, using a Model A Kevex X-ray fluorescence unit.^cIdentified by presence of peaks at 2950 and 2890 cm⁻¹ in the infrared spectrum.

green-painted objects and the architectural paints on moldings, the paint layers were often thinly applied, and they tended to penetrate into the wood substrate despite the presence of a size layer.

The paints were most often oil-bound, and when a clear coating survived, the earliest layer was a plant resin varnish. There are shellac recipes in the Shaker recipe books, but no original shellac coatings have yet been found on painted objects and architectural elements dating from approximately the late 1700s to 1870. Although many of the painted surfaces are quite worn, cross-section evidence indicates that approximately half of these objects originally were not varnished. Two of the counters were varnished only on the tops and knobs. This varnishing of work surfaces would have helped protect them from staining and dirt and is consistent with the 1845 Millennial Law (section 9, rule 10) that states: "Varnish, if used in dwelling houses, may be applied only to the moveables therein, as the following, viz., Tables, stands, bureaus, cases of drawers, writing desks, or boxes, drawer faces, chests, chairs, etc. etc."

The pigments and binders in use were readily available and comparatively inexpensive, particularly the iron earth pigments. An 1831 U.S. Government survey on proposed tariff increases for imported paints and pigments found that the domestic sources for pigments and paints were located primarily in Vermont, New Hampshire, Massachusetts, and New York. In the same year, a Prussian blue factory in New Bedford, Massachusetts, was producing approximately 4500 kg (10,000 lb.) of Prussian blue a year and shipping it across the country (Green 1965). All of the northeastern Shaker communities would have had ready access to raw

materials for making paint and varnish, as well as for their commercial medicinal industry.

The existence of numerous Shaker paint and varnish recipes dating from the early to late 1800s, the presence of a well-used paint mill in the Canterbury Village collection, and warnings in the Millennial Laws about boiling varnish and oil in the buildings¹⁷ all indicate that most of the Shaker communities were buying their raw materials in bulk and making their own paints and varnishes until at least the late 1800s, when the populations declined and commercially produced paints became readily available. Evidence from cross-section samples from objects remaining in Shaker communities supports this assumption.

Many of the objects that remained in the Shaker communities—such as buckets, beds, boxes, and countertops—were periodically repainted to freshen, brighten, or protect the surfaces. The more recent paint layers can be identified in cross section as modern, commercial paints because of the finely ground pigments, the even dispersion of the layers, and the intense staining reactions typical of modern emulsion, polyurethane, or alkyd-resin paints. In light of the fact that the Shakers eagerly embraced modern technology and timesaving devices, it is also very likely that they began using commercially made paints as soon as they became available in the late 1800s.

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Notes

- 1 The Millennial Laws are a set of dictates that were designed to enforce conformity among the widespread Shaker villages. They are reprinted in their entirety in Andrews 1953. Section 9, rules 3 through 5 of the Laws read:
 3. The meeting house should be painted white without and of a bluish shade within. Houses and shops, should be as near uniform in color, as consistent; but it is advisable to have shops of a little darker shade than dwelling houses.
 4. Floors in dwelling houses, if stained at all, should be of a reddish yellow, and shop floors should be of a yellowish red.
 5. It is unadvisable for wooden buildings, fronting the street, to be painted red, brown, or black, but they should be of a lightish hue.
- 2 The Millennial Laws were first written in 1821. They were substantially expanded in 1845, and again in 1860.
- 3 A recipe in a handwritten book (*Receipt Book, Concerning Paints, Stains, Cements, Dyes, Inks, &c.*, ca. 1848–49, with the inscription: “Rosetta Hendrickson, A Present from Eld. Austin. Watervliet, NY,” p. 15) reads:

To get Paint off from Wood

Pour about one handful of soda to a quart of water. Let this be applied to the paint on doors, drawer faces or whatever be required or desired, as hot as possible with a cloth & the better you can apply the Soda & Water, the easier the paint will come off. Care should be taken to not let the wood get wet where there is no paint, lest it become stained. Wash or rinse off with water, and it is done. NB. The soda and water may be used until it is as soap, with paint.

- 4 A study of the architectural paint history of the Canterbury Shaker Village Dwelling House was undertaken by Susan Buck and Alex Carlisle from June to September 1994 as part of a Historic Structures Report on the building undertaken by Ann Beha Associates, Architects, in Boston.
- 5 See Stein 1992:286–304 for a discussion of the Shakers' relationship to changing technology.
- 6 Jerry Grant, former assistant director at the Shaker Museum in Old Chatham, New York, introduced the author to this book.
- 7 See the Rosetta Hendrickson recipe book (note 3 above), p. 1. A recipe for "Tere-de-Sena" stain first instructs the painter to heat raw sienna to produce burnt sienna, and then add approximately 4 oz. (113.4 g) of Chinese vermilion to 1 lb. (0.454 kg) of burnt sienna in raw linseed oil. The mode of application is as follows:

Thin with raw Oil, and apply with a bit of sheepskin, or woolen cloth, (Sheepskin the best:) after which when sufficiently dry—say, 24 hours after staining, rub it off thoroughly.

This may first be done with the common Corn Broom partly worn, applying it briskly to the stained work, after which, rub off again with a piece of Flannel or woolen cloth.

It is said that this kind of stain never fades or darkens by age, and when applied to light-colored wood, it gives a kind of Mahogany color; especially when under a coat of varnish.

- 8 All samples were examined with an Olympus BHT Series 2 fluorescence microscope with UV (300–400 nm with a 420 nm barrier filter) and V (390–420 nm with a 455 nm barrier filter) cubes. See Wolbers, Sterman, and Stavroudis (1990) and Wolbers and Landrey (1987) for additional information about cross-section microscopy techniques.
- 9 See the Rosetta Hendrickson recipe book (note 3 above), p. 33:

The Chh. Expense in Paints, Oils, Lumber &c.&c. for the New Meeting House, Watervliet 1848

| Paints for Meeting House | | \$ |
|---------------------------------|---------|-----------|
| 56 lbs. Whiting (for priming) | @ 2 ct | 1.12 |
| 10 lbs do. | 2 ct | 20 |
| 278 lbs White Lead | 8 ct | 22.24 |
| 8 lbs Gum Shelack | 15 ct | 1.20 |
| 17½ lbs Verdigris | @ 40 ct | 7.00 |
| 3½ lbs Saleratus | 6 ct | 21 |
| 58 Gall Linseed oil | 81 ct | 46.98 |
| 2 lbs Venitian Red | 2½ ct | .05 |
| 6 lbs French Yellow | 3½ ct | .21 |
| 3½ Galls. Spirits Turpentine | 60 ct | 2.10 |
| 11½ lbs Prussian Blue | 12 ct | 6.75 |
| 2 lbs Saxon Green | 3 ct | .75 |
| 8 lbs Tere-de-Sena | ¼ | 1.50 |
| 2½ lbs Chinese Vermilion | 24 ct | 7.50 |
| 2 Galls. Varnish | 24/ | 6.00 |
| 6 brushes | 6/ | 4.50 |
| amt. card. forward | | 108.31 |

- 10 See note 3 above.

- 11 Shaker recipe from the Library of Congress collection, 1860, source unknown:

Papers of Shakers: Receipts/and/Practical/Instructions/Upon/Blue Dyeing/Wisdom gained by Adversity is Reliable/ A guide for the Inexperienced/Written August 1854 by Abigail Crosman!! Followed by cps. of letters, etc., dated 1854, 1858, 1861–1868, 1872–1875, 1888. A.Ds. and A. Cps. I Vol. 8^o. Source unknown. 364.

- 12 This recipe was provided to the author by Shery Hack, curator of buildings, Canterbury Shaker Village.
- 13 This recipe is from the Library of Congress collection, and it is the Shaker Receipt book no. 363. It is available on microfiche in the Joseph Downs Collection of the Winterthur Museum and Library.
- 14 See note 3 above.
- 15 These objects, now in the collections of the Winterthur Museum, the Shaker Museum (Old Chatham, New York), Hancock Shaker Village, and Canterbury Shaker Village, as well as two privately owned Shaker collections, were examined for this study.
- 16 The presence of a gum size was characterized by a pale yellow autofluorescent material trapped in the pores of the woods, which reacted positively for the presence of carbohydrates with triphenyltetrazolium chloride (TTC). Additional analysis with FT-IR also indicated the presence of a gum in these areas.
- 17 See section 2, rule 8 in the 1845 Millennial Laws: "It is not allowable to boil oil, or varnish in our buildings anywhere."

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