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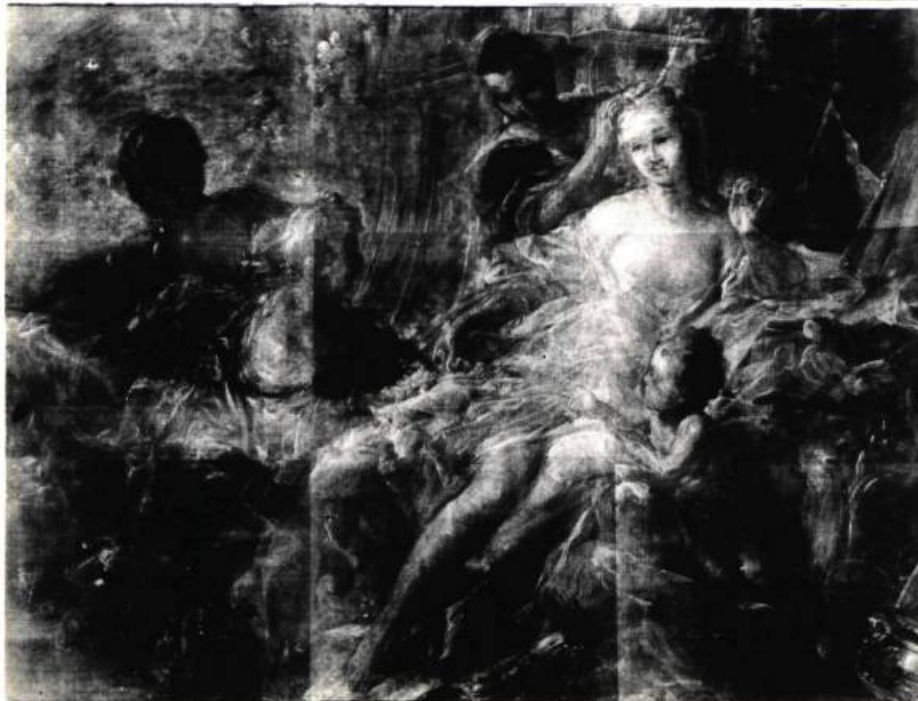
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TWO RESTORATION CASE HISTORIES

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In the post-war period there has been an increasing interest in the application of scientific method to the examination and preservation of works of art. A recent compilation of UNESCO reveals the existence of at least 133 museums and related institutions in 38 countries in which conservation laboratories have been established. In major centres scientific research is also carried out.

The following two case histories of examination and restoration treatment illustrate the present-day sophisticated scientific approaches taken in the National Conservation Research Laboratory of the National Gallery of Canada.

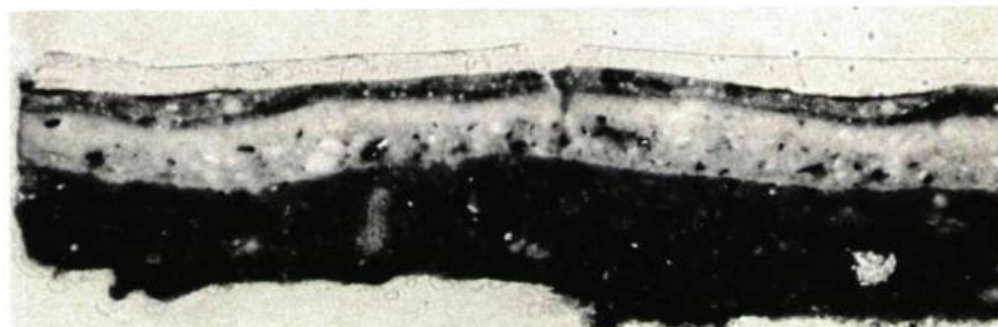
1. THE TOILET OF VENUS BY BOUCHER

In the latter part of 1961 this painting, from the collection of the Nationalmuseum, Stockholm, was circulated in Canada as part of the *Héritage de France* exhibition. On arrival in Montreal it was discovered that certain areas of paint were in danger of falling away, and as the painting had never been lined since 1746 (its date of execution) there was every reason to suspect that the canvas was in a very delicate state of preservation. It was also probable that it might not stand up well to the hazards of transportation during a Canadian winter. The exhibition organizers, in consultation with the Swedish authorities, decided that the best course of action was to transport it under careful supervision to Ottawa where it could be examined at the National Gallery, with the view of carrying out whatever conservation treatment would be deemed necessary to ensure the safe return of the painting to Stockholm. This, of course, presented a unique opportunity for the laboratory of the National Gallery to carry out documentation, examination, and conservation treatment on a painting of very great merit. During the winter and spring of 1962 the painting was examined in minute detail to ascertain its true condition. The painting was photographed in black and white, in colour, by ultra-violet fluorescence, infra-red, and radiography. In addition, a study was made of the palette of Boucher by means of cross-sections of minute fragments of paint removed from along the folded edges of the painting.

The painting had never been lined. The stretcher dimensions of the painting were



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38½ by 50¾ inches, and it was observed that as much as ¾ of an inch of the original painting was folded over this stretcher on all sides. At an early stage of the examination it was considered important to reclaim as much as possible of the previously hidden edges of the painting by constructing a larger stretcher, and by modifying the sight dimensions of the frame. The incompleteness of the composition of *The Toilet of Venus* suggested that the original painting was somewhat larger than that now shown. No documentation has yet been discovered which reveals the original composition. Examination of the folded edges of the painting, and the surface of the painting proper, allowed one to establish areas of overpainting, particularly along the upper edges. This has been detailed in the study of blue sky colour (Fig. 4). By combining the evidence of radiography (Fig. 2), ultra-violet photography (Fig. 3) and microscopic studies (Fig. 5), one was able to arrive at a fairly complete assessment of the areas of restoration, repaint, and regions of fragility. On the basis of the examinations carried out it was possible to es-

tablish a method of treatment: e.g., lining (using the hot table to consolidate fragile paint and canvas, especially loose paint film), removal of the yellowed layer of natural resin varnish with solvents, applying lined and cleaned painting to an enlarged stretcher, inpainting where necessary, and finally, the application of a suitable resin varnish coating. The following are brief notes from the treatment report of Mr. M. Ruggles who carried out the subsequent restoration work.

"The entire surface of the painting was faced with wet strength tissue paper using dilute parchment size. The tacks were removed, and it was then found that an old repair ½" diameter at upper edge 21" from right was firmly glued to the stretcher member. The only manner to free the support from its stretcher frame safely was to cut away the part of the stretcher affected and to chip away the wood from the canvas surface. After filling tack holes with gesso (calcium carbonate and dilute parchment size), as well as other losses, facing paper was applied, to these folded-over edges. The back of the support was vacuumed,

1. François BOUCHER, French, 1703-1770. *The Toilet of Venus*, 1746. Oil on canvas, 38½ in. by 50¾. Collection of the National Museum of Sweden, Stockholm. Before the restoration of 1962. 2. X-ray (radiograph) composite of the entire painting made by piecing together individual 14 inch by 17 radiographs taken under identical exposure conditions. 3. Ultra-violet (fluorescence) photograph of the painting (right section) before restoration showing areas of damage. 4. Cross-section of paint (blue overpaint) from upper left region of sky. The layers (top to bottom) are varnish, blue overpaint (cobalt blue and white lead), grey-brown layer (white lead, ochre, carbon black), pale blue layer (white lead, azurite), yellow ochre layer (white lead, ochre), rust coloured ground (siena, iron oxide). Magnification is about 300x. The original layers start at the pale blue layer. 5. Cross-section of original paint in area of green foliage. Note the thick layer of varnish on top. There are five distinct layers visible here.

the old paper patches removed and all knots and other imperfections sanded level. Impregnation with wax-resin adhesive, 4 parts beeswax; 1 part damar resin; 1 part gum elemi, was carried out on the vacuum hot table. The new unbleached linen lining canvas, warp 32, weft 27 double threads per inch (similar to that of the painting), was stretched on a temporary frame, moistened with water, allowed to dry, and then restretched. The lining canvas was then impregnated with the wax-resin composition on the vacuum hot table. The lining was carried out on the vacuum hot table, using an underlayer of wide blotting paper to prevent imprinting of the texture of the canvas on the paint surface when vacuum pressure was applied. Time and temperatures were recorded graphically. The duration of the heating process was approximately 40 minutes, with a maximum temperature of 75 degrees centigrade. The entire heating and cooling cycle lasted approximately 70 minutes, and the vacuum pressure measured at the edges was in the vicinity of 2/3 of an atmosphere.

After lining the facing tissue was removed using a damp cloth, and excess wax on the paint surface removed with an emulsion of petroleum hydrocarbons and water. The gesso fills were also levelled at the same time. The cleaning of the old discoloured varnish was carried out with the solvent mixture of equal parts of isobutyl alcohol, diacetone, and shell sol 715. Acetone was used in some areas where the resin appeared to be more stubborn, and in place of overpainting, e.g., upper left sky, right hand and right leg of Venus, left shoulder and head of putti at right. No attempt was made however to remove the overpainted drapery, 4" x 2" at upper edge, 16" from right hand margin, and the later paint, 1 1/2" x 2" at upper edge, 30" from right.

In order to conform with the new dimensions of the painting, brought about by the reclaimed margins, a new stretcher was made of basswood. The new dimensions were 40 1/8" x 52 1/2", compared with 38 1/2" x 50 3/4" for the original one. The lined painting was fixed to the new stretcher with tin-plated tacks.

A coat of damar resin in xylene was applied before inpainting. A grey water colour priming was added to all gesso fills and pigment ground in normal butyl methacrylate and xylene was employed for inpainting. The final coating was carried out with normal butyl methacrylate in xylene sprayed on after two weeks drying time."

2. THE VIRGIN AND CHILD ATTRIBUTED TO THE LABROSSE ATELIER

This work is a polychromed wood sculpture transferred to the National Gallery of Canada from the Musée de Chambly. No technical history was available from previous records. The carving was very generously coated with a glossy, white enamel paint which obscured to a great extent the



original surfaces of paint and gilding. The work consists of a great number of glued pieces of softwood (probably Eastern Canadian White Pine), and was apparently not carved from one block. The overall appearance of the sculpture before treatment is shown in Fig. 6. The overall height (excluding base) is 63 inches, and the maximum circumference 70 inches. The periodic splitting and separating of the glued pieces of the sculpture had necessitated restoration treatment in the past, and judging from the fills and especially the application of the white paint, such treatment had been most inexpertly carried out.

It was first necessary to locate the original polychromy underneath and to survey the extent of its coverage on the wood. For this purpose the technique of mounting and cross-sectioning of paint particles was used. While the layer structure varied with the particular location from which the cross-section was taken, a fairly consistent structure was found in the cloak and drapery of the Virgin. A white enamel paint covered most of the carving, and in particular covered in a single coat the inserted fills of wood of previous restorations. Areas not covered by the enamel were the feet, the face and hands of the Virgin, the Child's head, and the areas of gilding. The flesh and hair colours had been coated with a



heavy layer of darkened varnish, and in the Child the pinkish skin had been obscured by the white enamel paint.

Cleaning tests, in conjunction with cross-section analyses, showed that the brownish varnish on the face and feet of the Virgin and on the Child's head, could be removed with a mixture of shell sol acetone, and cellosolve in the proportion of 3:1:1. There was, however, some risk of damage by solvent action in the removal of the varnish from the hair regions. The original brown hair was probably resinous in composition. The white enamel over the pink of the Child's body was removable by swelling with ethyl alcohol followed by mechanical scraping. The removal of the major overpaint, i.e., the white enamel paint, required considerable study. It was found that the most efficient means for its removal was to employ a very selective and penetrative swelling agent which would act most quickly in the penetration and swelling of the two top layers of overpaint, such solvent being dimethyl formamide. By a pre-determined method of application of this solvent, i.e., by adding the right amount of solvent to a given area of overpaint, and by applying the scalpel at the right time of softening or swelling, it was possible to remove the two top layers before there was any appreciable swelling action on the

6. *Attributed to the LABROSSE atelier, Canadian, 18th century. Virgin and Child. C.1720-30. Polychromed wood, 62 inch high. Transferred to the National Gallery of Canada from the Musée de Chambly. Before the restoration treatment of 1962.* 7. *Detail before restoration.* 8. *Detail on back of Virgin showing removal in part of the extensive repainting.* 9. *Virgin and Child after restoration.*



ayers underneath. Any residual absorbed dimethyl formamide would be permitted to evaporate away. The appearance of the partly cleaned sculpture is shown in detail of Fig. 8. The cleaned areas reveal the ancient polychromy with its encrusted layer of dirt.

On the basis of the condition and examinations made, treatment commenced. This involved complete removal of overpaint, old fills, embrittled glue in joints, the filling of osseae where feasible, reconstructing the acunae (it was decided not to reconstruct the Child's feet), inpainting, regilding, and applying fungicide to the hollow interior of the carving. The following are brief notes extracted from the treatment report:

"The varnish on the hair of the Virgin and that of the Child could not be safely removed with solvent as had been judged during the examination tests. It was found that the hair colour was very thinly applied over a whitish ground, and was very readily removed by solvent action. Since no aesthetic gain could result, the cleaning of the hair was abandoned. The removal of the white enamel proceeded quite smoothly using the dimethyl formamide. Its removal revealed considerable damages in the numerous joints, restorations, embrittled adhesive, and a general condition which could not be determined except by cleaning. The osseae were compensated for by filling and levelling off with the surrounding areas of polychromy, using for this purpose calcium carbonate mixed with parchment size adhesive. The inpainting of these filled areas was carried out by means of pigments ground in Rhoplex emulsion. This contributed to the overall matt appearance of the cleaned sculpture.

The removal of the white enamel paint revealed worn and rubbed gilding on the edges of the Virgin's robes, and also on the ball held in the Child's hand. In some areas the gilding was shown to be metallic or bronze leaf, apparently of more recent restoration. The rubbed, eroded, or over-



bronzed gilding was redone using gold leaf applied over a preparatory layer of red armenian bole. Toning of the gilded surface was achieved with a suspension of burnt umber in a solution of polyvinyl acetate in toluene.

The base was detached, revealing the hollow interior of the sculpture and confirmed the 'patch-work quilt' piecing-together of the wood. After vacuuming, the interior was sprayed with a fungicide consisting of 10% paradichlorobenzene in carbon tetrachloride. The base was replaced with one of sounder construction and more

harmonious with the completely restored Virgin and Child (see Fig. 9)''

The two restoration case histories discussed here are but a sampling of the ever-growing list of projects undertaken in this Laboratory. Each work of art presents its own technical difficulties with its own recommended course of treatment. A considerable amount of time is always spent on extensive diagnosis before treatment. This precaution, often considered tedious, is in our view time well-spent.

(Traduction française, p. 86.)