

Sample (1): 1M; scraping of green

The sample appears to be a fragment of a clear coating or varnish (bright autofluorescence) (i), followed by a yellowish-green paint (ii) (+RHOB; dark autofluorescence); and a white paint (iii) (+RHOB, dark autofluorescence); layers (ii) and (iii) both of which appear to be part of the same generation of dispersion paint (sample appears upside down in cross sectional view)

Sample (2): 1M; photo P10

The sample appears to begin with a composite or aggregate material (i) that appears to be glue bound or sized (autofluorescence), followed by a tan colored paint layer (+RHOB) (ii), and a transparent reddish brown glaze (iii) (+RHOB). Layers (i) to (iii) appear to comprise the original decorative surface. The surface to (iii) appears to be repainted in a white (iv) dispersion type of paint (+RHOB, +FLUR), that has been mechanically abraded (scratched), and repainted in a subsequent blue-green paint (v) (+RHOB). The surface to (v) appears to have been coated sequentially with a synthetic resin (autofluorescence; film characteristics) (vi), and carries two repaintings (vii, viii), a yellowish-green and a white, both bound with a synthetic resin (dispersion; latex) system.

Sample (3): IIM

Appears to be a fragment of a blue paint (i) (+RHOB), and a grayish yellow paint (ii) (+RHOB), both of which appear part of the same generation of oil paint. Layer (ii) has been repainted with two distinct layers of synthetic resin (dispersion; latex) paints, a yellowish green (iii) and a white (iv).

Sample (4): IIIM

Appears to begin with a yellowish green paint (i), followed by a light tan colored paint (ii) (+RHOB), and a light blue (iii) (+RHOB). Layers (i) to (iii) appear as all part of the same generation of decorative materials; all appear to be (+RHOB, +TTC, dark autofluorescence) synthetic resin dispersion (latex) paints.

Sample (5): IIIb; #4 layer next to original has shellac/waxy-like coating

Appears to begin with a dark aggregate of material (i) that carries a proteinaceous binder or sizing. Layer (i) is painted white (ii) (+RHOB), and a bright yellow (iii) (+RHOB). Layers (i) to (iii) appear as the original decorative system. Layer (iii) appears repainted in a yellow (iv) (+RHOB) that appears to have split-off or sheared at some point from (iii), and has been (possibly) consolidated with a waxy material (v) (no autofluorescence, staining). Layer (v) carries a natural resin coating (vi) on its surface (autofluorescence), and appears to have been repainted an off-white (vii); varnished (viii); repainted a white (ix) again, and subsequently a light tan or beige color (x). layers (vii), (ix), and (x) all appear to be synthetic resin dispersion (latex) types of paints.

Sample (6): IIIb yellow

Appears to be a fragment that begins with a yellowish green paint (i), and a white (ii), that are coated with a synthetic resin varnish (iii), and a light yellow repaint (iv). Layers (i) (ii), and (iv) appear to be synthetic resin dispersion (latex) paints (dark autofluorescence; +RHOB, +TTC).

Sample (7): IIIb2 middle

Appears as a fragment of off-white paint (i) (dark autofluorescence, +RHOB, +TTC), and is consistent with a synthetic resin dispersion (latex) type of paint.

Sample (8): IIIb1 lower

Appears to begin with a light pink layer of oil paint (i) (+RHOB). The surface to (i) carries a rather large fragment of paint consisting of three discernible layers of red (all +RHOB) (ii - iv). The large red layered fragment has been "consolidated" onto the surface of (i) with the application of a subsequent application of glue (v) (+FLUR). The surface to (v) has been repainted in white (vi), and light tan (vii). Both layers (vi) and (vii) appear to be synthetic resin dispersion (latex) paints (dark autofluor., +RHOB, +TTC).

Sample (9): IIIb3 upper

Appears to begin with a light pink paint (i); gray (ii) and a dark green (iii). Layers (i) to (iii) are oil (+RHOB). Layer (iii) is repainted in yellow (iv), and a white (v) that appears as oil paint (+RHOB). The surface to (v) carries a clear coating or varnish layer (vi). Three subsequent repaintings with synthetic resin dispersion (latex) paints follows next in sequence (a yellowish green and two white layers; (vii-ix)).

Sample (10): IVa1 lower

Appears to begin with four layers of green paint (i) to (iv) all (+RHOB). The surface to (iv) appears abraded slightly (scratched) and repainted in a white (v). the surface to (v) is clear coated with a synthetic resin varnish (vi), and carries two subsequent repaintings in synthetic resin dispersion media (a yellowish-green and a white; (vii) and (viii)).

Sample (11): IVa2; spray painted area

Appears to contain two layers; a rough aggregate layer (i) (dark autofluorescence (-stains) (substrate material?), covered with a thin black repainting layer (ii), which is consistent with a synthetic resin dispersion type of paint (latex) (+RHOB, dark autofluorescence).

Sample (12): IVa; flake below sandblasted area

Contains an initial aggregate layer (i), a bright yellow paint layer (ii), a white layer (iii), and a red layer (iv). Layers (i) to (iv) are all oil bound (+RHOB), and appear to be part of the original mural. The surface to (iv) is varnished with a clear coating (v) (est: natural resin, by autofluorescence) which is abraded (scratched) heavily. The layer (v) coating is repainted with a green paint (+RHOB) oil (vi), and a yellow-green (vii) (+RHOB). Next in sequence is a repainting green (viii), a clear resinous coating (ix), and the same green as the layer (viii) material, designated here as (x). Layers (viii) and (x) are synthetic resin dispersion (latex) paints. A final light blue synthetic resin dispersion paint (xi) appears in this section.

Sample (13): IVbiii; white next to wall

Appears to contain an initial white, or off-white layer (i) of oil paint with a transparent brown glazing or toning layer (ii) (oleo-resinous; bright autofluorescence, +RHOB).

Sample (14): IVb1; lower

Appears to contain an initial white, or off-white layer (i) of oil paint with a transparent brown glazing or toning layer (ii) (oleo-resinous; bright autofluorescence, +RHOB). (sample is upside down in photo)

Sample (15): IVb1; flake

Appears to begin with four layers of green paint (i) to (iv) all (+RHOB). The surface to (iv) appears heavily abraded (scratched) and consolidated (coated) with a synthetic resin (wax-resin?) mixture(v) (pale yellow autofluorescence, -stains). The layer (v) resin carries three subsequent repaintings in synthetic resin dispersion media (a light yellowish-green (vi), a beige(vii), and a gray(viii)).

Sample (16): IVb3; upper

Appears to begin with an initial layer of green oil paint (i) (+RHOB). The surface to (i) carries a light green synthetic resin dispersion paint (ii). Layer (ii) is coated with a synthetic resin (wax-resin?) mixture(iii) (pale yellow autofluorescence, -stains). The layer (iii) resin carries three subsequent repaintings in synthetic resin dispersion media (a light yellowish-green (iv), a beige(v), and a gray(vi)).

Sample (17): IVb2; middle

Appears to contain a bit of initial aggregate material, (i), whose surface is sized with glue (+ FLUR). An initial off-white oil layer follows next in sequence (ii) (+RHOB), and intermittent blue brushmarks (iii). The layers (ii) and (iii) materials seem to be varnished with a natural resin clear coating (iv) (soiled).

Sample (18): IIIa; yellow scraping center section above cleaning test #4 layer

Appears to be a fragment pale yellow (?) synthetic resin dispersion (latex) paint, in two applications, or coats (i).

Sample (19): IIIa; flake off lower section

Appears to be a fragment starting with a beige paint layer (i); a resinous (wax-resin?) clear coating (ii); a white paint layer (iii); and finally a beige or light brown paint (iv). Layers (i), (iii), and (iv) all appear to be synthetic resin dispersion types of paints (latexes).

Sample (20): IIb; yellow next to original #4

Appears as two fragments, one inverted over the other in the photomicrograph. The sample appears to be a pale yellowish (?; there is a blue pigment evident in this layer!) layer of oil paint (+RHOB) that carries a transparent brown toning or glazing layer on its surface (ii).

Sample (21): IIb3; upper

Appears to contain an initial white layer (i) (+RHOB); red layer (+RHOB) (ii), and a clear coating of a natural resin (iii). Layers (i) to (iii) all appear to comprise the original decorative paint system. Layer (iii) is repainted with a green oil paint (+RHOB) (iv). Layer (iv) is repainted with a yellow oil paint (+RHOB) (v). The surface to (v) appears fractured, and "consolidated" or coated with the application of a synthetic resin coating (vi) (-stains, dark autofluorescence). The surface to the layer (vi) material is repainted with a white synthetic resin dispersion paint (latex) (vii); a synthetic resin clear coating (yellow autofluorescence, -stains) (viii); and two subsequent repainting layers in white (ix) and a purplish gray (?) (x).

Sample (22): IIb1; lower

Appears to contain a small bit of aggregate substrate (i); then a resinous brownish transparent toning or glazing layer (ii) (bright autofluorescence, -stains). Both (i) and (ii) appear original; layer (ii) is repainted with a yellow paint (iii)(+RHOB, bright autofluorescence), that carries a natural resin coating (iv) on its surface (bright autofluorescence, -stains). Layer (iv) is heavily abraded, and repainted with a white paint (v), and a tan colored paint (vi). Both (v) and (vi) are synthetic resin dispersion paints.

Sample (23): IIb2; middle

Contains substrate aggregate (i); white or light gray paint (ii) (+RHOB); a red paint layer (iii) (+RHOB); and a natural resin clear coating (bright autofluorescence) (iv). (i) to (iv) appear to be original; the surface to (iv) is repainted with two synthetic resin dispersion paints, a white (v), and a tan colored paint (vi).

Sample (24): IIb; flake from middle

Contains an initial (non-original) yellow layer (i) (+RHOB); white paint (ii); natural resin coating (iii); a white layer of paint (iv)(similar to (ii)); and a final gray (?) layer (v). Layers (ii), (iv), and (v) are synthetic resin dispersion paints.

Sample (25): Ib; flake, middle upper right

Contains small curled or cupped fragments of a dark blue oil paint (i) (+RHOB); then a yellow repainting layer (ii) (+RHOB); white paint (iii); natural resin coating (iv); a white layer of paint (v)(similar to (iii)); and a final gray (?) layer (vi). Layers (iii), (v), and (vi) are synthetic resin dispersion paints.

Sample (26): Ib3; upper

Appears identical to Sample (24) above

Sample (27): Ib1; lower

Appears identical to Sample (24) above

Sample (28): Ib2; middle

Appears to begin with an initial white oil layer (i) (+RHOB), and a pink layer of oil (ii) (+RHOB). A yellow repainting layer (iii) (+RHOB) appears next in sequence; then a white paint (iv); natural resin coating (v); a white layer of paint (vi) (similar to (iv)); and a final gray (?) layer (vii). Layers (iv), (vi), and (vii) are synthetic resin dispersion paints.

Sample (29): Ia1; sheets of overpaint coating

Contains the upper portion of a dark red oil paint (i) (+RHOB); then a yellow repainting layer (ii) (+RHOB); white paint (iii); natural resin coating (iv); a white layer of paint (v) (similar to (iii)); and a final gray (?) layer (vi). Layers (iii), (v), and (vi) are synthetic resin dispersion paints.

Sample (30): Ia3; flake of overpaint coating

Appears to begin with a fragment of the substrate aggregate (i), then a white oil layer (ii) (+RHOB); and a blue (iii) (+RHOB), red (iv) (+RHOB), and blue (v) (+RHOB) again. Layer (v) is repainted with a green oil paint (vi) (+RHOB), and carries a clear coating of what appears to be a natural resin (vii) (bright autofluorescence, -stains). The layer (vii) resin appears fractured and cleaving, and is "consolidated" by the application of a light green (viii) synthetic resin dispersion paint, and an additional repainting in white (ix), also synthetic resin dispersion type of paint.

*Sample (31): Ia; yellow flake

There are two separate fragments in the photomicrograph; the most complete of which seems to begin a series of three oil layers (+RHOB); a pink or beige layer (i), a red layer (ii), and a slightly darker red layer (iii) (all original). The layer (iii) paint appears to be repainted with a darker beige or tan paint (iv), and a slightly lighter second tan layer (v); both of these layers appear to be oil dispersion paints (+RHOB, +TTC, mixed autofluorescence). A series of three consecutive repaints in a gray green (vi), red brown (vii), and gray (light blue?) (viii) follow next. These latter three appear to be synthetic resin dispersion paints

Sample (32): Ia; yellow scraping

Appears to be a fragment of a single layer of light yellow paint (i); synthetic resin dispersion.

Sample (33): Ia; yellow next to original red paint

This fragment appears to carry a small portion of the red at its bottom (i), and a repainting in a light yellow(?) (ii) that is also an oil bound paint (ii). Note: the sample is mounted upside down.

Sample (34): Ia; #4 hard yellow next to original

Appears to begin with substrate aggregate (i) (sized surface with +FLUR; suggests glue sizing). Then; five original oil (+RHOB) layers; a pink or beige (ii); white (iii); red (iv); and then a dark green (v) (dry brushed). The surface(s) to (iv) and (v) carries a varnish coating (vi) (natural resin (-stains). Layer (vi) has been repainted with a green (vii) and a gray (?) (viii) synthetic resin dispersion paints.

Sample (39): IIIa1; lower

Appears to begin with substrate brown aggregate (i); pink oil or gray oil layer (ii) (+RHOB), and a red brown oil layer (iii). Then repaintings in yellow (iv) (+RHOB; oil); white (v) and beige (vi). (v) and (vi) are synthetic dispersion paints (dark autofluorescence, +RHOB, +TTC).

Sample (40): IIIa3; upper

Appears to be a fragment of repaints of white (i) and beige (ii); both synthetic resin dispersion types.

Summary Observations:

In the sections examined, most followed the same generic sequence to the layering; an initial brown aggregate layer that appears "sized" with a glue or similar material on its surface (+FLUR). The murals seem to be constructed from oil paints, including an initial white or light colored first layer as a priming, and then usually between one and three paint layers of oil to develop the mural. The finished mural appears to have been varnish with a natural resin material originally; evidence in some of the sections suggests that this original coating was substantially cleaned away prior to repainting or overpainting. At some point a restoration was apparently made using oil paints (there is evidence that original "greens" were loosely matched with restoration "greens", etc., for instance). After this initial restoration set of paints went onto the mural here and there, it appears as if a general overpainting in a white, or light yellow (I think this is the #4 layer that seems so hard for you to break through) occurred. This paint is also essentially an oil paint, but extremely brittle, almost glassy in appearance. I'm guessing, but I

would say that this layer may contain a preponderance of a drier (Pb+2 salts ?), or other metallic salts (as an extender? filler? opacifier?). The effect is that it is hugely cross-linked and difficult to easily redissolve in solvents alone. Its brittleness may have greatly contributed to the further deterioration of the mural, mechanically speaking. And yes, a coating appears to have been applied over this layer in some of the sections, but I would characterize it as a natural resin type, and certainly not a "boiled oil" type of coating or consolidant. Beyond this coated "layer #4 material is consistently the same sequence of relatively modern (1960's and onward) latex paints (acrylic or PVA dispersion paints) used to overpaint the mural again and again. Typically though, it would appear that a dispersion paint was applied, then clear coated with a synthetic resin coating (yellow autoifluorescence), then coated again with a similar, if not identical dispersion paint. Then a second and sometimes a third latex was added over this.

I can't say that I see any evidence of a shellac being used in any of the sections examined. Waxes may be present here or there; it was only in one sample that a wax was indicated in a consolidative role (Sample 5). Perhaps only locally, here and there?

To "overpaint" existing losses, given the exterior presentation, I would use an acrylic resin system: Magna (butyl methacrylate/pigments), if you can still get it, or Lefranc and Bourgeois Restoration colors (B-67/pigments).

I'll be gone the week of the 19th of January Helen, but do call me if I can be of any further help on the project or with interpreting the cross sections, etc.

Best,

Richard