

The Rediscovery of Polychromy in Some Le Corbusier's Works: A Problem of Restitution

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Abstract: The theme of the restoration and conservation of polychrome surfaces will be addressed through several recent case studies of interventions on Le Corbusier's work owned by the Fondation Le Corbusier: the Petite Villa sur Le Lac Léman (1923-1924), the Maisons La Roche and Jeanneret (1923-1925), and his apartment-studio in the Immeuble Molitor (1931-1934). The recent interventions allowed for numerous preliminary studies (*in situ*, archival, and laboratory), and proved to be an opportunity for historical and material knowledge, paying close attention to discoveries and observations during the construction phase. An important aspect of these experiences was the in-depth study of polychromes, conducted on architectural surfaces but also on furniture and fixed furnishings made of concrete, metal and wood. This was an important moment in the knowledge of the work during the restoration phase because of the richness of the stratigraphic surveys related to the many modifications made over time sometimes by Le Corbusier himself. This text exposes technical, scientific, and operational aspects specific to the study of interior and exterior polychromes, and in parallel raises theoretical-methodological questions of restoration of the polychromies and the painting.

Key words: Le Corbusier's polychromies, world heritage, modern heritage preservation.

1. Introduction

The Fondation Le Corbusier, universal legatee of the architect, custodian of all his archives and owner of three of his architectural works, holds the moral and patrimonial rights of the architectural, literary, artistic and plastic works of Le Corbusier. Therefore, any intervention on the architectural work anywhere in the world, should be authorized by the Fondation, whether or not the work is protected as an historic monument.

Many of Le Corbusier's works have been restored, in the last years, including projects under the control of the Fondation Le Corbusier, as the La Roche and Jeanneret houses, between 2008 and 2015, which underwent restitution of the interior's polychromies and of the original colored plaster on the facades.

Some of these projects have contributed to renewing the methods of approach to restoration to more understand the authenticity, integrity, and history of the

buildings. Each restoration campaign is also the opportunity to enrich the material understanding of the work, its genesis, and the processes involved, thanks to the research undertaken, and the materials uncovered.

This is particularly true for the knowledge of polychromies in Le Corbusier's work.

1.1 The Le Corbusier's Polychromies

Color is a constant theme in Le Corbusier's work, both as an artist and an architect. From his earliest texts (articles in *Esprit Nouveau*, *Almanach*, etc.), color in architecture seems to have a clear function, which is at the same time necessary, repeating the truth already recalled by Fernand Léger: "Man needs color to live, it is an element as necessary as water and fire" [1].

In his fundamental text on this subject (1931), "Polychromie architecturale, étude faite par un architecte (mêlé, d'ailleurs, à l'aventure de la peinture contemporaine) pour des architectes"¹, which was to

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¹ Archives Fondation Le Corbusier, Paris.

accompany the presentation of the *Salubra* 1 Keyboards, the role of color is clearly defined by Le Corbusier: “color acts on a psychophysiological level, producing sensations that are specific to it, sometimes even unrelated to the concrete fact of the architectural spaces in which we find ourselves; color can provide a ‘lyrical escape’ from the constraints of reality. [...] attached to sensations of ‘order and sentimental wellbeing’; color masks form, alters volume ‘allowing you to appreciate from a volume only what you wish to show’” [2].

To work with Le Corbusier's architectural polychromy in today's restoration projects, it is essential to understand the architect's intentions.

Among the authors who have analyzed the theme of color in architecture through Le Corbusier's texts, we should mention historian Luisa Martina Colli in the early 1980s, who traces the path from Le Corbusier's youth, through the articles in *L'Esprit Nouveau* with Amédée Ozenfant, to the development of the three *Gammes du purisme* in the *Salubra* Color Keyboards. In the 1987 *Encyclopédie*, she wrote: “on this tool for organizing architectural color, which is in any case one of Le Corbusier's most sensitive and beautiful ideas” [2]. This author had already stressed the importance of other texts in addition to the 1931 text, and of conferences such as Le Corbusier's 1936 speech at the *Congresso Volta* in Rome, notably on the role of mural painting in architecture.

Other authors who have dealt with this subject include Arthur Ruegg, who has worked extensively on the 1910s and the Purist period, on the use of color from artist to architect: “it was obviously a transfer of the painter Jeanneret's experiments to the practice of the architect Le Corbusier” [3]. He also deserves credit, as an architect and restorer, for having understood the value of republishing the *Salubra* Color Keyboards with Le Corbusier's 1931 text, stressing first and foremost the importance of “matter”. Indeed, he explains that: “Le Corbusier, for example, often

demanding very smooth, matt paints. Before the war, these were powdered pigments bound with glue or oil, and painted with a brush [...] today's synthetic paints give quite different results, the only advantage being their resistance to wear” [3].

The problem of documentation and iconography is fundamental to the question of color when it comes to restoration projects. Indeed, we have images in black and white at least up to the end of the 1950s. As Gérard Monnier pointed out at the *Fondation Le Corbusier's Rencontres* on the theme of Color in 1982² in the text “la couleur absente”: “[...] contemporary ‘colored’ sources are lacking. Long after the end of the Second World War, architectural photography was still not represented in color in books and magazines (particularly in Europe and France). So we have to make do with a deficit in the representation of color in buildings”. Another of Monnier's observations is that “until the 1960s, color work in LC buildings was absent and ignored” [4].

All these elements certainly also contributed—but that is another subject—to transmitting an image of Le Corbusier's architecture, and modern architecture in general, as white architecture (Fig. 1).

In all the works on architectural polychromies, focused on its theoretical reflection, it seems to us that



Fig. 1 Maisons La Roche et Jeanneret, Paris XVI, 1926 © FLC.

² The IVth *Rencontres de la Fondation Le Corbusier* was held in Paris in 1982.

the question of interior polychromy is limited to paint, in particular to tint (red, blue, green...), without taking into account its materiality, its composition, which can modify its perception and effect in space. For interiors, other surfaces beyond walls, such as “cream”, black or ochre porcelain stoneware flooring, dark havana or green marbled linoleum or pink or grey rubber; right down to the color of curtains and furniture.

Information on *Salubra* (1931-1959) is also necessary to understand Le Corbusier's projects. *Salubra* wallpapers are “oil paints sold in rolls” for interiors. They are color charts, the first of which, from 1931, derives from purist ranges, notably the Grande Gamme, made up of natural pigments: earths, ochres, ultramarines ...). These color keyboards were designed to facilitate the construction phase, the painting of interiors, in an industrialized approach, to apply the desired color evenly and without error: “To the architect who is always more or less at the mercy of a painter's mishap, *Salubra* offers great peace of mind, ensuring, with a proportion of oil and color that is always right, a constant quality of tone and material” [5], just as one chooses a door handle or porcelain stoneware tiles from a catalog. It is worth remembering that, in those days, painting was done on site: the painter prepared the mixture to obtain the desired shade, and mistakes were easy to make.

But what is even more interesting than the color charts and shades themselves is the combinations Le Corbusier proposes between these colors, presented in “ambiances”. As Martina Luisa Colli explains, “the collection comes with special masks that make it possible to isolate in detail two or three colors (for frames, chairs, rugs, etc.) by relating them to the basic colors of the walls, ceiling or floor” [2].

Reference publications often claim that there are no examples of *Salubra* wallpaper still in place. However, at the time of the restoration works, we found several walls still covered, notably in the architect's most intimate buildings: the Petite Villa and, above all, in Le Corbusier's apartment-studio (Fig. 2).

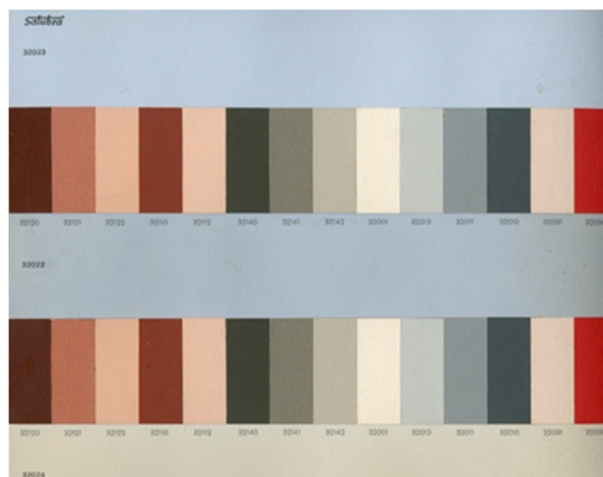


Fig. 2 Les claviers de couleurs, *Salubra* © FLC.

For all these reasons, the question of architectural polychromy remains, in our opinion, entirely open. This is apparent in every restoration project, with questions raised about materials, supports, pigments and binders, ageing, and about implementation, whether or not there has been any preparation, modifications, repainting or restoration, and so on. Indeed, the difficulty of studying the polychromes of Le Corbusier interiors and their transformations, through texts and archival documents (letters, estimates, invoices, company memoirs, annotations on sketches, etc.), black and white photos and possible *in situ* remains, has prompted us to present some of the discoveries made in the field, to answer questions, cross-reference information and formulate questions.

2. Method and Materials

The Fondation Le Corbusier is fortunate in its role, and as part of the creation of the archives of the restauration of Le Corbusier's architectural work, to participate in numerous projects, and to follow studies and construction sites, important moments in the knowledge of the work built.

Preliminary studies are an important and necessary phase in any restoration project. For each project, we are confronted with Le Corbusier's writings on polychromy, with archival and iconographic documents, and then with the site and the work itself. We have to take into

account the specificity of each architectural object, and each restoration project must be carefully examined.

Today, polychrome surveys are carried out almost systematically—it has become “normal”—before any work is carried out, often supplemented by specialized laboratory analyses.

These studies must be carried out before the choice of project, the objective (to return to an original state or another reference state, or to do nothing), and for documentary reasons. The context of a restoration project is a time for study and questioning, and the ideal moment to try and find new documents (color photos/diapositives, publications, testimonials, etc.), confirmations and new information on the polychromy of the work. These studies, carried out by specialists, are important beyond the scope of the planned project, since the aim is not to systematically return to the “original” polychromies or other reference condition. The aim is to understand, document and provide new elements of understanding for future research.

The presentation of some examples of restoration work on sites owned by the Fondation Le Corbusier may illustrate these questions and attempt to provide some starting points for reflection.

2.1 *The Maisons La Roche and Jeanneret*

The interior polychromies of the Maison La Roche are certainly the best-known and most studied. Indeed, in his 1931 text entitled “Polychromie architecturale, étude faite par un architecte (mêlé, d'ailleurs, à l'aventure de la peinture contemporaine) pour des architectes” [1], Le Corbusier presents two cases together: the Maison La Roche in Paris, for its interior polychromy, and the Cité Frugès in Pessac, for the polychromy of its façades³.

Begun in 2008 with the work on the interiors of Maison La Roche, and completed in 2015 with work on

the façades and garden of Maisons La Roche and Jeanneret, the restoration work on the buildings housing the Fondation Le Corbusier was the outcome of a process involving intense research and experimentation and intended to be exemplary⁴ [6]. It contributed to renewing techniques used in previous decades for the preservation of Le Corbusier's built work. The aim was to systematize and combine historical and archival research, core drilling and other types of material analyses, technical studies, to confront data acquired with historical accounts, and to create scientific committee to monitor work in progress.

We know from the texts that for the first time Le Corbusier implemented an architectural polychromy based on purist theories at the Maison La Roche in 1925, before the creation of his *Salubra* color keyboards. In *L'oeuvre Complète* published in 1929, Le Corbusier explains: “Inside, the first polychromatic experiments, based on the specific reactions of colors, allow for ‘architectural camouflage’, i.e., the affirmation of certain volumes or, on the contrary, their concealment. The interior of the house must be white, but for this white to be appreciable, a well-adjusted polychromy must be present: walls in half-light will be blue, those in full light will be red; we make a body of the building disappear by painting it in pure natural umber, and so on”⁵. In the archives, we have two important documents. The specifications for the “painting lot”, in which it is described: “Kitchen, W.C., toilet, pantry, cloakroom, radiators: recoating and two coats of oil; on all joinery (wood and iron), recoating, priming and two coats of oil. In the rest of the building, sanding and two coats of glue”⁶. And an invoice from Célio from March 1925, at the end of the works, with “the list of colors used for the composition of the tones of glue and oil-based paints on Rue du Docteur Blanche in Auteuil [...]: yellow ochre, red ochre, ivory black, natural Sienna, burnt Sienna;

³ About the case of Cité Frugès in Pessac, in this same publication: Paola Scaramuzza, *Le Corbusier and Pierre Jeanneret's Cité Frugès: The Polychromy Issues*.

⁴ Study and work on the interiors between 2008-2015, by Pierre-Antoine Gatier chief architect des Monuments historiques and Ariel Bertrand, wall painting restorer.

⁵ Le Corbusier. 1964, op.cit., p. 60.

⁶ FLC 5-1-176, Archives de la FLC, Paris.



Fig. 3 Archive's document of the painter, Celio, 1925.

natural umber, burnt umber, English green, ultramarine blue, charcoal blue, chrome yellow"⁷ (Fig. 3).

As part of the pre-restoration study carried out in 2008 by the agency of Pierre-Antoine Gatier, chief architect of historic monuments in charge of restoring the houses, restorer Ariel Bertrand carried out a polychrome recognition campaign (stratigraphy, sampling of the pictorial layer and laboratory analysis) of the entire building (wall, ceiling, skirting boards, joinery, built-in furniture), in order to recover the shades and materials used. The reference layer chosen for the restoration was the original one, from the time of delivery in 1925. This work, combined with the analysis of archival documents such as period publications and old photographs, confirmed the use of the binders cited in the archival documents from the outset. Oil paint was used for metal (radiators, doors, window frames), wood (furniture, window frames), cement (shelves, window sills) and humid rooms (kitchen, pantry and bathrooms). Glue paint was used for certain pigments (such as sienna or ultramarine), while oil emulsions (a mixture of oil paint and water, which dries more quickly) were used for other rooms.

This type of application was found in all buildings of the period, from the Purist period onwards.

During the restoration project, a color chart was created for the interiors, based on La Roche's specific palette for maintenance work.

Important information about the Maison mitoyenne Jeanneret, the home of Albert Jeanneret, the architect's brother, and his wife Lotti Raaf, comes from a letter discovered in the living archives of the Fondation Le Corbusier. The letter was written by the former owner to the President of the Foundation in December 1970, following her visit to Paris for the inauguration of the Foundation. She writes about the colors restored during this first major restoration of the two houses. She vividly recalls her memories of the original colors: "The back wall of the salon was all white, as was the neighboring wall on the left, while the one on the right was pale green as you had it painted. The pink color was used only on the back wall on the left as you enter, as well as on the area around the large window. The tone of this pink you chose is not very good, it should be, not darker, but less yellow, more pinkish. The door to the kitchen was blue in the same tone as the other areas (...) The radiators were steel gray everywhere, as were the two garage doors. Terrace: skirting boards and shelves in a fairly deep blue-grey, fireplace in green-grey (...) "⁸.

This document gave us a better understanding of the polychrome surveys and the knowledge required for the restoration. For example, we were able to confirm that the radiators were painted dark grey, rather than the same color as the wall, to differentiate them as an element of comfort, a sign of modernity, but also for more technical reasons. This arrangement can also be seen in the photographs of the period, although in black and white something that had not been noticeable during the first restoration campaigns.

The correspondence also highlights the role played by Lotti Raaf, who seems to have played an important

⁷ FLC H-1-3-2, Archives de la FLC, Paris.

⁸ Letter of Lotti Raaf to Gimonet, president of the FLC, 7 December 1970, Archives vivantes de la FLC, Paris.

role in the choice of colors for her house. But this document also confirms the surveys carried out on the exterior facades, some years later the restoration work of the Maison La Roche's interiors, and reveals the original state of the coatings, as Le Corbusier had intended. Lotti Raff wrote to Gimonet: "As for the exterior of the two houses, I find it deplorable that they were painted, especially in white. Le Corbusier had applied a cement coating mixed with powdered cut stone, resulting in a 'slightly' rough surface with a very attractive yellowish sand color. (...), who told you that the houses have always been white, has forgotten what they were like in the beginning (...) would it be feasible to scrape it off and see for yourself? That would be n° 10, which has never been painted, only repainted"⁹. Surveys carried out by restorer Ariel Bertrand on the coating on the facades confirmed all the information given in Lotti Raaf's letter.

Rediscovering the polychromies of the interiors and the "stone colored" facades (Le Corbusier's expression) was a surprise to specialists and novices alike, reared on images of the famous "white villas" of the Modern Movement (Fig. 4).

As regards to the exteriors, the same principles presided over the choice of colors and materials when restoring



Fig. 4 Stratigraphic survey on the facade of the Maison La Roche: in layer 1 the original plaster (Cimentaline).

the interiors as closely as possible to the originals. Restoration of Maison La Roche helped to underline the pertinence and plastic qualities of the original architectural polychromies and to emphasize the role of color in the design and perception of the different spaces. It thus seemed logical to echo these interior spaces in the outward surfaces. Maisons La Roche and Jeanneret thus found again their original 1925 façades.

2.2 The Petite Villa Sur le Lac Leman

The polychromies used for his parents' second house in Corseaux, is rarely mentioned in texts, yet it is still partly in place and present in archives and family correspondence.

The project and the work carried out since 2011, based on Elise Koering's historical study, first revealed a very pale green façade¹⁰ [7]. We know from correspondence that Le Corbusier wanted a green-tinted lime (then "oiled") and that the company, convinced of its fragility, proposed a silicate paint. This arrangement still exists under the metal claddings of 1931 and 1951, whereas oil paints were used on the other facade elements (Fig. 5).

What is interesting to note for the interiors is that the first paint campaign was practically never called into question, apart from one proposal in 1951 which seems not to have been carried out, not being present in the *in situ* stratigraphic studies. Over time, the original shades were "evoked" by colors that were close to each other, but produced with different materials and applications, modifying the perception of color and space. During the most recent repainting of the interiors, carried out as part of the house's centenary celebrations, the shades were recaptured according to the original materials, based on polychrome surveys carried out on site: glue paint, oil paint and emulsion. During this last campaign of work, it was possible to observe the installation of the wallpapers as described in the archive documents. In a letter from Le Corbusier, precise instructions were

⁹ Letter of Lotti Raaf to Gimonet, president of the FLC, 7 December 1970, Archives vivantes de la FLC, Paris.

¹⁰ Historical studies: Elise Koering; Jean-François Dedominici painting; Fanny Pillet, restorer.



Fig. 5 Stratigraphic survey and essay of painting for the façade of the Petite Villa, 2012 © FLC.

given for horizontal wallpaper hanging, which was found here and, in his apartment-studio, notably in the servant's bedroom.

2.3 The Painting of His Personal Apartment-Studio in Paris

Indeed, one of the surprises of the restoration work on Le Corbusier's apartment-studio in the Immeuble Molitor is the discovery of *Salubra* wallpapers, not only those whose existence was known from the texts, but systematically, for example under the wooden plywood added in 1939 to the ceilings and walls. This was the first layer, the first campaign of "painting" that Le Corbusier had in mind, when he moved into his new apartment in 1934, a few years after *Salubra* had been marketed. The apartment subsequently underwent several painting campaigns, some of which were of Le Corbusier's own design, identified with the help of mural restorer Marie-Odile Hubert. We can summarize: a 1934 state, mainly wallpaper that disappeared under the wood panelling in 1939, with a partial repainting, of which Le Corbusier testified to his mother: "The painters left. We've rearranged and it's fine! It's going very well and now my apartment looks finished. The problem was the blackness due to the soot from

Boulogne: the ceiling was all covered in black, and the walls in pale green. I installed natural oak paneling on the ceiling. Ditto on the green wall. Ditto on the elevator shaft. The previously gray wall where the little fireplace used to be is now a slightly stunned vermillion red. The dining room has been repainted white (walls and vault)"¹¹. A 1948-1950 state, with more vivid color changes, for example in the bedroom, the last state before the architect's death (Fig. 6).

Subsequent renovations were identified by the FLC's living archives and *in situ* surveys, the first of which dates back to 1969.

For the apartment, the Foundation wished to restore the interior polychromy of 1965, the last known state desired by the architect. Indeed, the state of the interior masonry made it impossible to preserve the historic paintings. So, once the layers had been identified, they were characterized using laboratory analysis to obtain the most precise possible knowledge of the paints used



Fig. 6 Bathroom, with the discovered blue of the apartment-studio of Le Corbusier, 2018 ©FLC.

¹¹ Letter by Le Corbusier to his mother, 8 April, 1939. Le Corbusier-Correspondance-tome 1-Lettres à la famille 1900-1925, In-folio, 2011.

to restore them. The identification of pigments and binders enabled oil emulsions to be remade for the entire apartment-atelier¹².

We therefore felt it necessary to preserve most of the stratigraphic surveys carried out by Marie-Odile Hubert *in situ*, after the restoration work, in order to leave a trace of this work, to understand the stratifications over time, and to enable us to reconsider a choice of shade [8-13].

3. Conclusion

As far as the Purist period is concerned, we now know—thanks also to academic work¹³ confirmed by these latest restoration projects and the studies carried out in connection with them—that none of Le Corbusier's Purist works were originally “white”, despite the major references also by Le Corbusier. “Left totally white, the house would just be a pot of cream” [14]. Facades seem to have changed color from the late 1960s, after the architect's death, with the first major restoration campaigns. The very first was the Villa Savoye and the gardener's lodge, whose restoration started in 1967 by architect Jean Dubuisson (1914-2011), but shortly followed by the La Roche and Jeanneret houses in 1970 by the Fondation Le Corbusier.

The latest restorations, based on increasingly comprehensive historical and scientific studies, have also made it possible to rediscover the interior polychromes. This knowledge of the architect's wishes seems to have resulted in a choice to restore the original polychromes. This applies not only to the colors, but also to paint materials and application. For this reason, it is important to preserve the stratigraphic surveys, to conserve superimposed layers and the history of color changes, with an educational objective that also allows us to revisit the choices made in the restoration work.

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¹³ For example, the work of Anna Rosellini for the grant of the FLC on “Théorie et construction de la surface Puriste”, 2005.

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