

# Le Corbusier and Pierre Jeanneret's Cité Frugès: The Polychromy Issues

Paola Scaramuzza<sup>1,2</sup>

1. ENSAV Ecole nationale supérieure d'architecture Versailles, Versailles 78000, France

2. A-BIME Ancien Bâtiment Informatisé Modélisé Expertisé, Bouray sur Juine 91850, France

**Abstract:** From 1924 to 1926, with the Cité Frugès in Pessac, Le Corbusier and Pierre Jeanneret realized an urban area as a laboratory where research on architecture polychromy was achieved among others. Colored facade was applied as a tool to modify urban space. This neighbourhood has always been inhabited and transformed by its inhabitants over time. In the 90's, studies for the global image protection of the neighbourhood included polychromy research conducted to restore the shades of origin. However, the colors have often been interpreted in various ways. Nowadays, besides the shade problems, other challenges have arisen linked to the preservation of the facade materials. This paper presents the recent archive research done to clarify the shade references and lay the groundwork so as to choose the right material to use and further research in the future.

**Key words:** Le Corbusier, Cité Frugès, polychromy, architecture.

## 1. Introduction

The Cité Frugès, a housing project in Pessac in southwestern France, was an experiment of sorts, something entirely new, commissioned by Henry Frugès who allowed Le Corbusier to set up his theories.

In 1924-1926, with the so called "Quartiers Modernes Frugès" Le Corbusier and Pierre Jeanneret realized an urban area where each element was drawn in detail [1]. This is among the first research conducted by Le Corbusier on the modes of house grouping, the construction of a standardized housing, therefore cheap, and the implementation of facade polychromies. With standardization, industrialization and taylorized mass production were among the basic principles of the project. Combining a modular system six house types were created: the Quinconces, Zig Zag, Gratte-ciel, Arcades, Jumelles and Isolées. In this project Le Corbusier achieved a coherent and orderly landscape [2].

This neighbourhood has always been inhabited and will continue to be so, which is crucial to assure not only its life but also its authenticity. It is well-known that it has been transformed by its inhabitants over time [3].

The Cité Frugès was included in the UNESCO (United Nations Educational, Scientific, and Cultural Organization) World Heritage List in July 2016, among the 17 works by Le Corbusier that make up the series "The Architectural Work of Le Corbusier: An Exceptional Contribution to the Modern Movement" [4]. The history of its protection started in the '80 and went through various stages.

Since 1998 the ZPPAUP (Zones de Protection du Patrimoine Architectural Urbain et Paysager) regulation has especially provided constructive rules and advice on how to protect and develop housing<sup>1</sup>. It concerned the external appearance of the structures and therefore polychromy [5].

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**Corresponding author:** Paola Scaramuzza, Ph.D., maitre de conférence HCA, research field: ENSA Versailles-architect R&D A-BIME.

<sup>1</sup> ZPPAUP (Zone de Protection du Patrimoine Architectural, Urbain et Paysager), provision of a law whose purpose was to ensure the protection of the landscape and urban heritage and to

highlight neighbourhoods and sites to be protected for reasons of an aesthetic or historical nature ("500 m perimeter" around a historic monument) by replacing it with a "smart perimeter". In 2010, the ZPPAUP was replaced by the AVAP (Aires de mise en valeur de l'architecture et du patrimoine).

Nowadays some of the contents of this regulation deserve to be re-examined in the light of the new protection measures as historic monuments, new knowledge, and the inhabitants' new expectations.

Restoration, repair, and maintenance projects (past or in development), confront with the current practices of the restoration of 20th century architecture and the essential issues of ecological transition and sustainable preservation of the environment.

This article presents the most recent archival research on the topic of polychromies, cross-referencing data with *in situ* surveys, which has helped to highlight several aspects and lay the foundations for deeper future research.

Besides, not only should we focus on the conservation issues but also on the demands of use and contemporary living respecting the French "Monument Historique" heritage<sup>2</sup>.

### 1.1 The Le Corbusier "Architectural Polychromies"

"Il se dégage des constructions de Pessac une esthétique inattendue, neuve. Nous avons aussi appliqué une conception entièrement neuve de la polychromie, poursuivant un but nettement architectural modeler l'espace grâce à la physique même de la couleur, affirmer certaines masses du lotissement, en faire fuir certaines autres, en un mot composer avec la couleur comme nous l'avions fait avec les formes. C'était ainsi conduire l'architecture dans l'urbanisme"<sup>3</sup>.

In Le Corbusier's words color is used as a tool to modify space. A psychological component of the perception of space is also present in his reflection.

The essential theme of the function of color in architecture, indeed in the entire urban space, is present

in the letter sent to Le Corbusier by Piero Bottoni on December 12, 1927, with "annexes" photographs of watercolors entitled "Cromatismi Architettonici" [6].

In the response to Bottoni in 1928 Le Corbusier explained the architectural polychromy in the case of the Cité Frugès, saying that when fifty or a hundred houses created between them a space that was like an exterior room, whose walls were formed from the facades of various houses, the same problem was happening. Instead of accepting the white uniformity of all the houses, one could feel obliged to call on the color to modify these spaces (*Chambre extérieures*) so as to continue, thanks to the color, the effects of the order and therefore create larger spaces and clearly set the composition intentions.

He affirms that at Cité Frugès the external polychromy, treated with precise rigor, has come to constitute a prodigiously eloquent contribution to modern architecture. The list of colours mentioned by LC for Pessac includes: Terre de Sienne brulée pure, Bleu pale, Blanc, Vert pale, Rose, Terre d'ombre pure, Noire<sup>4</sup> [7].

Over time, decay but also inhabitants' modifications made the external polychromy no longer recognizable in most cases [8].

The studies in the 1990s for the definition of the preservation document ZPPAUP, were a great opportunity to research the hues of polychromy<sup>5</sup>.

However, the references taken, and the recommendations of this document, are also reinterrogated today according to the choice of the material of the tinting as well as the presence of decay and cracks.

The recent architectural and landscape study commissioned by the Municipality of Pessac was an

<sup>2</sup> "Monument Historique": this status recognises the heritage interest of a property. The protection implies a shared responsibility between the owners and the national community with regard to its preservation.

<sup>3</sup> "The buildings in Pessac exude an unexpected, new aesthetic. We also applied an entirely new concept of polychromy, pursuing a distinctly architectural goal: to shape space through the very physics of color, to assert certain masses of the housing development, while making others vanish, in a word, to compose with color as we had done with shape. It was a way of bringing

architecture into urban planning". (translated by author). Le Corbusier, brochure and presentation at the inauguration of the Quartiers Modernes Frugès, on the occasion of the official visit of M. de Monzie, Minister of Public Works in Pessac on June 13, 1926, FLC H1-20-36-001/4.

<sup>4</sup> Le Corbusier letter to Piero Bottoni, January 15, 1928, in Jenger, J. (2002).

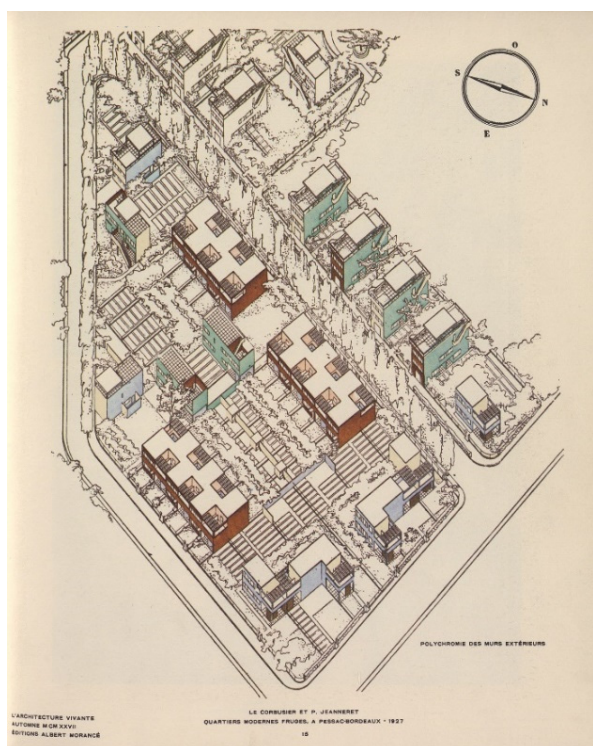
<sup>5</sup> ZPPAUP Ville de Pessac Accessed September 14, 2023. <https://urly.it/3y6bg>; <https://urly.it/3y6bp>; <https://urly.it/3y6bj>.

opportunity to reexamine archive documents in order to specify first of all the semantic definition of the tints, the materials and search for the principles of composition.

## 2. Cité Frugès Polychromy's Archival Research, Method and Materials

The historical research was based primarily on the corpus of archives of the Le Corbusier Foundation composed by the documents and letters between the architects and Henri Frugès and the operators on site<sup>6</sup>.

Three drawn plans describing façade polychromy are also well-known, as well as the color perspective published in the “L’Architecture Vivante” in fall 1927 [9] (Fig. 1). However, these documents do not give a complete and detailed view of the polychromy composition. Not all house façades are depicted.



**Fig. 1** Cité Frugès, Polychromie des murs extérieurs in *L’Architecture Vivante*, Automne & Hiver 1927.

<sup>6</sup> The main documentary sources are listed here: Archives FLC H1-17; H1-18; H1-19; H1-20; Archives FLC photographies d’époque, L2-15; Archives FLC “ensemble des plans des Quartier Modernes Frugès”; Archives Municipal Ville de Pessac-Bordeaux Métropole; Pessac 3Fi, 13W; T1; Archive DRAC Nouvelle Aquitaine: Quartiers modernes Frugès.

In order to understand the theme of polychromy in this period of Le Corbusier’s oeuvre, a number of other slightly earlier projects belonging to the same client and geographical context were analysed.

The archives relating to the *Maison Tonkin*, the experimental house realized just before, contain a list and a description of the precisely planned polychromy. An estimate of the house of paintings “Lefranc”, now “Lefranc Bourgeois” is present (FLC H1-19-328)<sup>7</sup>.

In March 1925, on the site of Lège, his first small housing development, Le Corbusier asked for photographs of the site to determine the polychromy of the facades (FLC H1-20-31)<sup>8</sup>.

The construction site photos of Pessac allow us to distinguish differences in shades on the facades and several details. For example, the shade of the entrance caps (a light or “Sienna earth” color as the wall) or the wall baseboard (darker than the wall). However, black and white images are still difficult to interpret, a closer look at the archives can give us more solid information.

### 2.1 Polychromy’s Chronology through Archival Documents

On August 6, 1925, the first exchanges on the prices of the paintings include the treatment of the shutters, a quote of the painter Gintrac: mention of linseed oil on natural wood (shutter) and price for oil paint in two/three layers, “peinture à la colle” (glue-based paint), without location accuracy. The quote also mentions wallpaper laying (FLC H1-19-75).

On August 19, 1925, the painter Courbu, offers an estimate of “peinture à l’huile” (oil-based paint) three layers on wood or iron with preparatory work, cleaning and filler paint, three layers of baseboard paint, layer paint on interior plasters, price differences between smooth or speckled plaster (FLC H1-19-331).

<sup>7</sup> Letter from Le Corbusier to Henri Frugès, experimental house built on the factory site

<sup>8</sup> Le Corbusier asked Frugès for photographs “that would make it possible to see how the pavilions looked in space and consequently to determine the polychromy of the façade” (trans. by the author).

In November 1925 Henri Frugès wrote to Le Corbusier telling him they had fired the painter, refused his work as the paint was already peeling, it was too thick and uneven: "in a word, it was bad work". Since half of the palette that Le Corbusier had made was missing because the painter had left with it, Frugès asked Le Corbusier to send his own back to him (*FLC HI-19-331*).

The painter Courbu was replaced by Gintrac, a photo showing "Peinture G. Gintrac" sign is present in the archive (*FLC L2(15)29*). In November, the first group had almost finished, Frugès made an urgent request for wallpaper and colour kitchen tiles (red or red & white) and he was waiting for the furniture (*FLC HI-19-330*).

On December 2, 1925 the painter asked through Frugès which tones the other groups should have, in particular number 32, 33, 30 (the "*Gratte-ciel*" house type), and the whole line of his double two-storey houses (*Quinconce* house type), because he was going to start soon, as soon as he could. A chromatography plan for all possible houses was also requested (*FLC HI-19-255-001*).

On December 10, 1925, Frugès wrote to Le Corbusier: the painter asked about the tone of the woodwork of the 1st floor for 6 houses, and if he wanted skirting stairs or not. Should the ramp be passed to the minium? For the outside facade: what is the tone of the porches? Is it a white underside and bands of burnt shade? Is there color stump fireplace on the terrace leading to the pergola? Are the exterior baseboards painted? Which color? (*FLC HI-19-241-004*).

Unfortunately, we could not find a response letter.

In March 1926, HF told Le Corbusier that "It is important that you also see the effect of the new *terre de Sienne brûlée* (burnt sienna colours) on buildings 61 to 66." (*FLC HI-19-259-001*).

It is interesting to note that on April 28, 1926, in preparation for the inauguration, LC indicated that the priority was for the facades to be painted (*FLC HI-20-3-004*).

In the article published in 1926 in "Mon chez moi" the author visits the neighbourhood and spoke about color images she refers to "brown, white or light green" houses [10].

Through the letter of July 21, 1927 we learn that they were very undecided about the type of paint to use for the final coats, because the provisional coat that had been applied for Monzie's visit, on an insufficient silicate base, had flaked all over, and the prices quoted for the complete restoration, the stripping, the first coat of pure silicate, then at least two coats of oil paint, made Frugès hesitate a little (*FLC HI-19-339*). On house No. 37 (the one destroyed during an allied bombing raid in the World War II) they used an oil paint containing 50% petrol, and the effect seemed good to Frugès; but he wondered if they could do without oil by applying two or three coats of silicate. Even if he knew that Le Corbusier was not in favour of implementing the latter process because of the streaks that rain makes. In any case it was urgent to know, or else definitively commit to the expense represented by oil paint, which would still have to be repainted every two or three years (*FLC HI-19-339*).

This reflection is noteworthy regarding the choice of materials and the issue of maintenance already present in this moment.

In September 1927 Mrs. Motorny, the painter's wife present on site, wrote to LC saying that work was in progress. This allows us to know that "three red groups, two green houses, and a blue house were completed. The first layer on seven *Gratte-ciel* as well as a red *Arcades* house was done. She asked Le Corbusier about the white color, because if it is pure white, it will not keep its freshness and within three weeks it will turn yellow. The painter should blend a small quantity of ultramarine or Prussian blue which will stabilize the white color or use a slightly creamy white"<sup>9</sup> (*FLC HI-19-340*). Le Corbusier answered proposing to add vermilion or Prussian blue as he did not like the creamy white (*FLC HI-19-341*). In the middle of

<sup>9</sup> Translated by author.

November 1927, Mrs. Motorny wrote that the work was almost finished (*FLC HI-19-342*).

Jumping in 1931, Mr. Gabriel, a lawyer, and Union President for the Defence of the Neighbourhood, asked if Le Corbusier could give some advice to make the neighbourhood more pleasant, he wanted some advice concerning maintenance as some inhabitants had begun to make some refurbishing.

Le Corbusier visited the Cité Frugès in May and was really aggravated by the situation noting that some colors had been changed. He wrote to Mr. Vrinat, engineer, Frugès's employees who later inhabited the neighbourhood, saying that it was unacceptable to have allowed the *Quinconce* to be painted in the glycine color (June 16) (*FLC HI-20-120*). Mr. Gabriel answered on June 11, asking for a model to advise people on the proper shades to use (*FLC HI-20-119*). LC replied on June 16 "we had the useful drawings prepared for the colors of the houses" (*FLC HI-17-239*). Le Corbusier said that Mr. Gabriel had a large painted plan and side sheets and 8 exact color samples (N° 1, 12, 23, 42, 91, 112, 120, 130), and pure base colors "without mixing anything else but white". The letter mentioned the eight colors: 1 = blanc, 12 = noir + blanc, 23 = outremer+ blanc, 42 = vert anglais + blanc, 91 = rouge vermillon + blanc, (un vermillon solide de commerce), 112 = rouge anglais + blanc, 120 = terre sienne brulée, 130 = terre d'ombre brulée (*FLC HI-19-345*). This plan and this palette have never been found.

## 2.2 Polychromy since ZPPAUP

In the 90's, the ZPPAUP regulations addressed the issue of the overall image of the city, which means restoring the public space, the streets, and their visual boundaries. The ZPPAUP study also analysed the theme of polychromy in depth. In addition to the study of the archives, numerous color tests were carried out in order to define a reference shade palette<sup>10</sup> (Fig. 2).

This document introduced in the palette the "terre de

Sienna Claire" (light Sienna color, translated by the author), a color that was not found in the Cité Frugès archival documents but that refers to the "*Salubra* color keyboards" [11, 12]. The work with the Swiss wallpaper manufacturer *Salubra* was, however, a research that Le Corbusier developed after, in the 30's, and was probably based precisely on the experiences of the Pessac construction site<sup>11</sup>. The only reference for the wallpaper in Pessac project is the brand *Maison HEIBEL peinture* in Paris, 29 rue Bonaparte (*FLC HI-19-334; HI-19-335, HI-19-336*). Le Corbusier himself wrote that "*Salubra* is 'oil paint sold in rolls'. Instead of applying three coats of colour to walls and ceilings in a site full of workers, this paint is now applied by a machine, at the last minute. *Salubra* paint must be applied to a healthy, durable substrate, this product is both flexible and resistant, with fine colours whose purity have been previously tested by chemists. It is colourfast and washable. For architects who are always more or less at the mercy of a painter's mistakes, *Salubra* paint offers great peace of mind, ensuring a constant quality of tone and texture with the right proportion of oil and colour" [13].

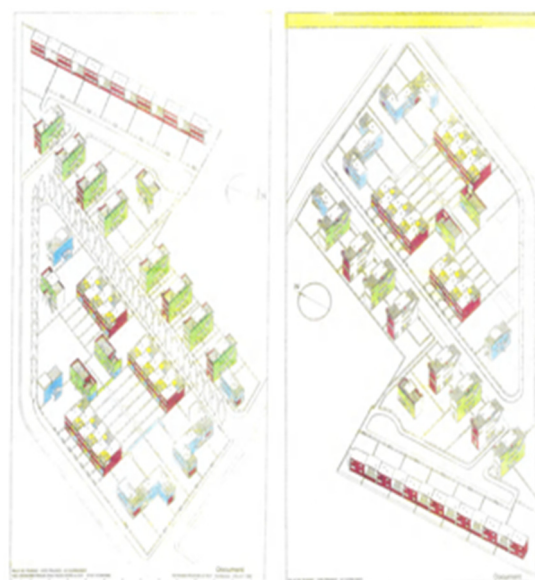
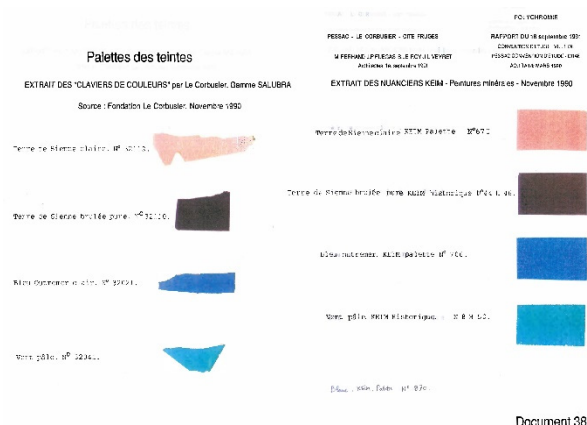


Fig. 2 Study on exterior polychromy as published in the ZPPAUP graphic document, document 30-31, 1998.

<sup>10</sup> ZPPAUP Ville de Pessac Accessed September 14, 2023. <https://urly.it/3y6bg>; <https://urly.it/3y6bp>; <https://urly.it/3y6bj>.

<sup>11</sup> Le Corbusier designed two color collections for a Swiss wallpaper manufacturer *Salubra* brand in 1931 and in 1959.





**Fig. 3** Color palette: on the left the Salubra range, on the right the transposition in Keim paints, source: ZPPAUP document 38, 1998.

Therefore, the colour palette that emerged after the ZPPAUP studies was willfully both based on archive research and on the *Salubra* range. It stated that “In the interests of authenticity and respect for this very delicate issue, and after examining the available archive documents, it was decided to refer on the one hand to the colour palette described by Le Corbusier on 11 July 1931 in a letter addressed to Mr. Gabriel, the site manager; and on the other hand to the corresponding *Salubra* range of colours, bearing in mind that they were published for Le Corbusier a few years after the Pessac experience”<sup>12</sup>. The shades in this palette are: *Le Blanc-Le Noir-Le Terre de Sienne Claire-Le Terre de Sienne brulée pure-Le Terre d'Ombre brulée-Le Bleu outremer clair-Le Vert pâle*.<sup>13</sup>

Thanks to the ZPPAUP research, tests and studies, these tones have found equivalents in the *Keim* range of mineral paints (Fig. 3). However, these tints were not always respected and the choice of using mineral paints on surfaces with dynamic cracks is now questioned.

### 3. Results and Discussions

Since the last in-depth archive search, three phases of painting have been identified during the construction and early life of the district. The first was in late April-June 1926 for the inauguration with Mr. de Monzie

(*FLC HI-20-03*). The second phase took place in September-November 1927, during Mrs. Motorny's letter, when the state of many of the houses was revealed (*FLC HI-19-340*). Finally, the third phase took place in July 1931 when the drawings and the palette of 8 colours were sent from Le Corbusier to Mr Gabriel (*FLC HI-19-345*). These three phases show us the challenges not only in the definition of colours, but also in the type of paint to be used, the choice of materials, number of paint layers, colour effects and maintenance issues. An “identical” restoration already poses a major problem in terms of interpreting the paintwork of origin.

Today, compared to the time when the ZPPAUP study took place, many issues relating to the reconfiguration of the overall image of the district can be considered achieved. The formal qualities of these architectures, which were previously falsified to the point of being unrecognisable in some cases—such as their massing, façades and polychromy—are now recognised, protected and even sought after by residents, who are asking for clarification so that they can intervene to conserve and sometimes restore them.

However, new issues and challenges arise nowadays. The deterioration of materials, and in particular of certain plasters and concrete parts, is becoming increasingly evident (Fig. 4).



**Fig. 4** Example of the current state of a Cité Frugès house's polychromy and its analysis.

<sup>12</sup> ZPPAUP Zone P1 article 8, commentary 8.4.

<sup>13</sup> ZPPAUP Ville de Pessac Accessed September 14, 2023. <https://urly.it/3y6bg>; <https://urly.it/3y6bp>; <https://urly.it/3y6bj>.



Fig. 5 Examples of sampling points for polychromy analysis.

#### 4. Conclusions

Studies of architectural polychromy in Le Corbusier's work have progressed in recent years. The historical approach to documents, including the building as a document, as well as the question of authenticity, now leads us to consider chronology more carefully. The "colour keyboards" in the Salubra range, as is also shown in the ZPPAUP, were invented by Le Corbusier after the Cité Frugès project. The latter may have led Le Corbusier to seek out "colour in rolls" in order to avoid the ups and downs of the building site. The role of the Pessac experience in the architect's career is now being examined in greater depth, and is increasingly revealing itself to be the cradle of certain research, notably on polychromy, which will be developed in the years to come.

Today, research into the palette used for the Pessac project is going on. The next step is to identify the samples to be analysed during the *in situ* surveys carried out on the basis of this archive research (Fig. 5).

#### Acknowledgments

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