

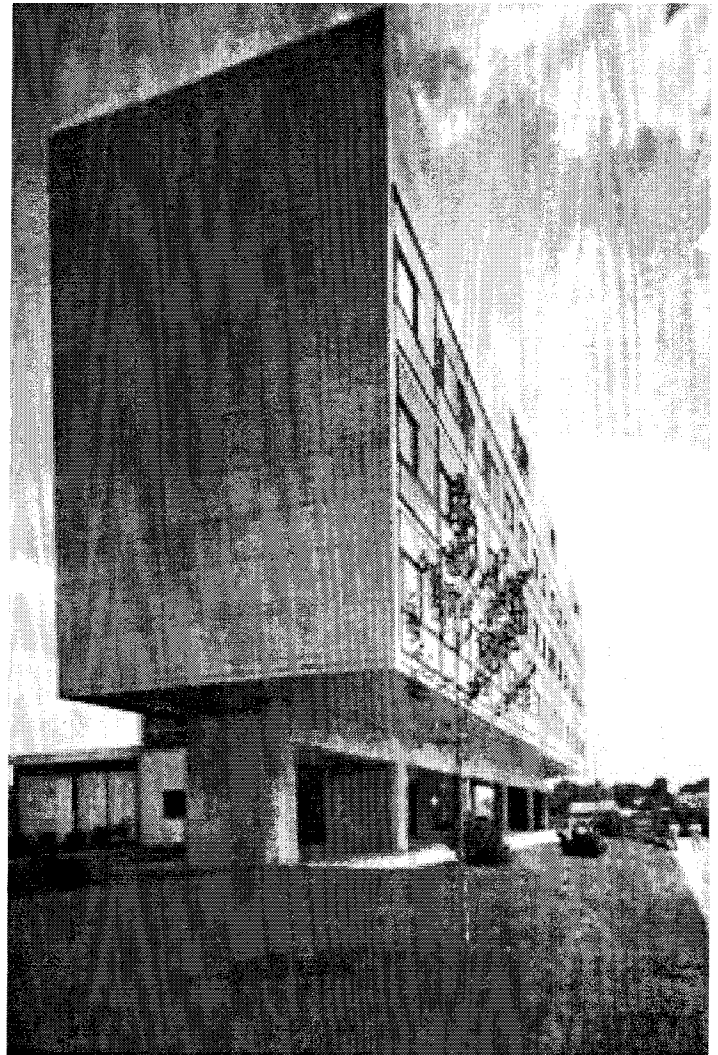
## Towards Standardization and Industrialization: Le Corbusier's Swiss Pavilion and His *Polychromie Architecturale*

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### TOWARDS STANDARDIZATION AND INDUSTRIALIZATION

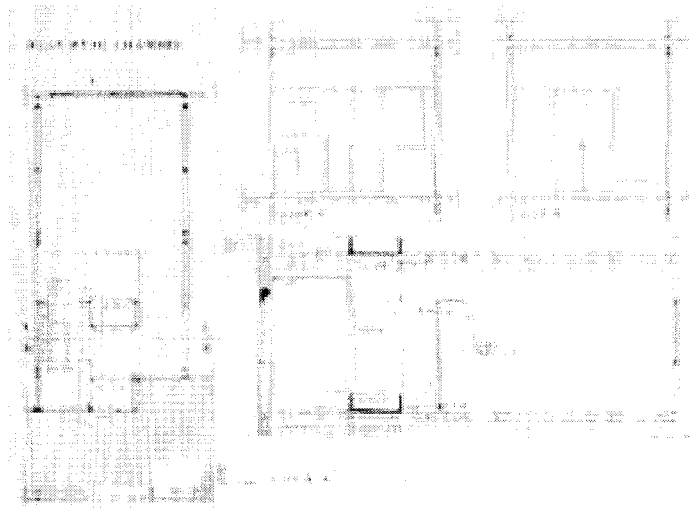
Together with Maison Clarté in Geneva and Cité de Refuge in Paris the Swiss Pavilion represents one of three larger building commissions that Le Corbusier designed at the beginning of the 1930s. All three projects are collective housing forms within urban structures. William Curtis wrote: "Le Corbusier was obsessed with creating the prototypes of a new era of harmony for the industrial city."<sup>1</sup> Le Corbusier used the individual project as a laboratory to explore new construction methods, spatial ideas, and urban and socio-economic principles for the city of the 20th century. In this regard the Swiss Pavilion played a central role in demonstrating his ideas for standardization and industrialization of the construction process. He wrote: "This construction is not an architectural fantasy, it is a demonstration. It is in reality a laboratory, which has allowed solving certain points for the future of the contemporary architectural problem."<sup>2</sup> On his list of "essential principles" for the pavilion we find: 1. Principle of pilotis, 2. Standardization of elements for their most rational usage and "industrialization", 3. Dry construction and 4. Windows (*Pan de verre*). Le Corbusier believed these principles formed the basis for a rationalized construction process, which would guarantee sufficient housing comfort for a broad population at reasonable cost. Thus, he saw the dwelling produced as a "*produit standard*"<sup>3</sup> (standard product) becoming the central task of modern industry and the challenge for contemporary architects. In this context we have to consider the communal bedrooms of the Cité de Refuge, the apartments of Maison Clarté, and the student rooms of the Swiss Pavilion as exemplified solutions for a future industrial product of the machine age.

As a demonstration of this objective, the "*chambre standard*" (standard bedroom) turned into the key idea of the project. In many ways the construction of student rooms anticipated the "*simples cellules-tiroirs*" of the Unité d'habitation in Marseille.



Swiss Pavilion, Le Corbusier 1931-1933, Paris.

With the *chambre standard* Le Corbusier demonstrated his solutions, to create the most important industrial product of the new era: the *logis* (dwelling). Standardization of the room itself, of its materials and their production, as well as sound insulation and comfort, were central issues of the planning process.



Swiss Pavilion, Le Corbusier 1931-1933, Paris Chambre Standard.

In this context Le Corbusier's development in 1931 and 1959<sup>4</sup> of two wallpaper collections with color keyboards for the Swiss manufacturer Salubra reveal a deeper meaning as standardized products for a broader audience. In both cases Le Corbusier was simultaneously designing the color concepts for the Swiss Pavilion<sup>5</sup>. The executed color schemes of 1933 and 1958 for the *chambres standards* of the Swiss Pavilion represent significant examples of his color theory *polychromie architecturale* (architectural polychromy) and his own usage of the color keyboards as standardized tools.

### SALUBRA I AND THE COLOR SCHEME OF 1933

During fall 1931, Salubra marketed their first Salubra wallpaper collection *Le Corbusier* (also called Salubra I) including 43 monochrome colors, one rhomboid pattern, 9 large and 9 small dot patterns. A separate book with twelve color keyboards accompanied the sample collection. This allowed the user to choose between 12 different color moods and to specify their choice using Bristol board viewers to select predetermined color combinations.

Building on his *polychromie architecturale*, which he had developed over the previous 10 years in painting and architecture, Le Corbusier had worked on the development of the collection and the color keyboards since 1929. In addition to the color keyboards and the offered color combinations, the depicted colors for the collection guaranteed an architectural expression of the wall: "This collection comprises strictly "architectural" shades, of pronounced value for mural effect

and of proved quality."<sup>6</sup> Comparable to the *Modulor* this was a tool for a broad population, which gave a "sound systematic basis" to the task of choosing a controlled color combination. In the introduction to the collection Le Corbusier wrote: "In my opinion they offer a method of approach which is accurate and effective, one which makes it possible to plan, in the modern home, colour harmonies which are definitely architectural and yet suited to the natural taste and needs of the individual."<sup>7</sup>

A text containing instructions for using his purist *polychromie architecturale* survives at the Fondation Le Corbusier and may have been intended to accompany the first Salubra collection, but Le Corbusier never published the text itself.<sup>8</sup>

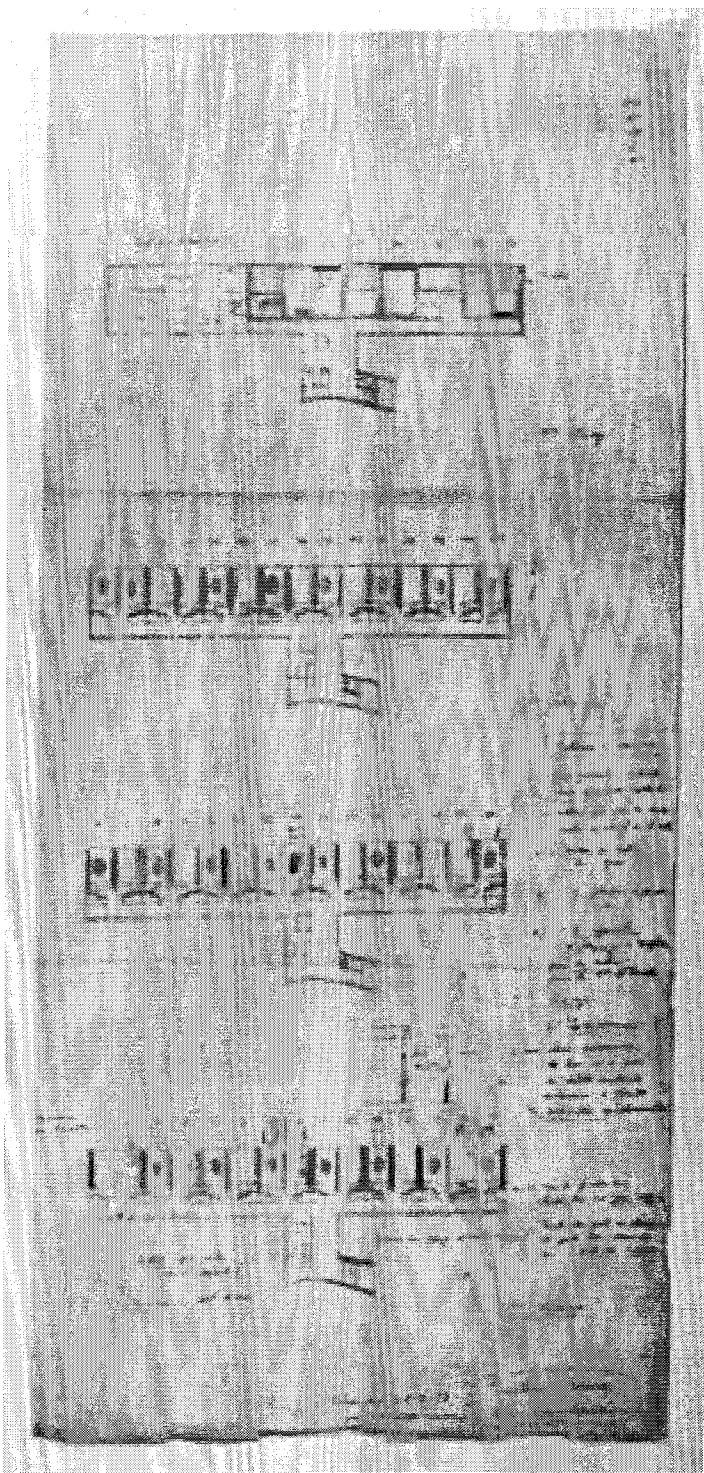
Groundbreaking for the Swiss Pavilion coincided with marketing Salubra I in 1931. In this context, it seems interesting to investigate whether the Swiss Pavilion served as a demonstration object for the Salubra wallpaper and color keyboards and to what extent Le Corbusier adapted or changed his *polychromie architecturale* tested and developed through smaller projects, to the new conditions of a large building project. The colors chosen in 1933 for the Swiss Pavilion were changed in 1958.

A survey<sup>9</sup> of existing colors prepared in September 1957 by Le Corbusier's office in anticipation of renovations and a handwritten note<sup>10</sup> of Le Corbusier provide primary evidence of the color scheme executed in 1933. Without the note, the survey alone would not be sufficient to represent the original scheme of 1933. In the note, which probably preceded the publication of the Swiss Pavilion in *L'Architecture Vivante*, Fall & Winter 1933, Le Corbusier wrote:

"The 50 rooms are built alike. With identical interior furnishing. But, a very daring polychromy allowed a total diversity: all even rooms are alike: walls and ceilings painted grey. The uneven rooms, which alternate with the even ones, are covered with "Salubra" (collection Le Corbusier) in the brightest colors and diversify the walls of one room from the other through color."

The note confirms the concept that the survey reveals: With very few exceptions, rooms with ceilings and walls painted grey alternated with rooms having white ceilings and walls covered with wallpaper in contrasting colors. In addition, sketches that show studies with different color variations confirm this concept of alternating calm grey rooms having green linoleum floors with colorful wallpapered rooms having brown linoleum floors. As the note observes, "Every second room = strips of wood and linoleum green. The others linoleum brown and plain Salubra."<sup>11</sup>

Two different sketches illustrate findings from the survey. The first sketch<sup>12</sup>, which presents the "even" type, shows the ceiling to be painted in a lighter grey than the walls (*colle gris plus pale*), with the dividing wall and doors executed in natural



Swiss Pavilion. Le Corbusier 1931-1933. Paris FLC 15412. Survey of existing color scheme (possible color scheme of 1933), dated September 27, 1957, drafted by A. Maisonnier.

wood. Joints between the Xylolekt panels are left visible, stressing the idea of dry construction. A small sketch at the bottom of the drawing shows the washing and closet unit painted in *ombre brulée* for all rooms. A second sketch<sup>13</sup> investigates the “uneven” type: brown linoleum, Salubra 32023,

*bleu pale*, Salubra 32013, *gris clair* for the side wall, Salubra 32011, *gris sombre* for the entrance wall and a small built-in shelf in natural wood. With the exception of the ceiling, walls are now shown without joints. Both sketches carry the remark “admitted”.

A closer look at the survey of 1957 reveals that Le Corbusier varied the theme of “even” and “uneven” rooms. Some of the “even” rooms have one grey wall with the opposite wall painted or wallpapered in a different color. In addition to the dominant *gris moyen* in every second room, the survey shows a reduced color palette of seven different shades and tints for the remaining side walls, which are applied in a non-determined sequence: *Rouge fort*, *bleu pale*, *bleu fort*, *vert moyen*, *vert d'eau*, *rose*, *ocre rouge*. Furthermore the survey says: “All backs of the rooms in *gris moyen*” and “All doors into room and service doors in *tête de nègre*”.

Additional sketches<sup>14</sup> confirm that Le Corbusier used the color keyboards in searching for color harmonies. Here he applied a complimentary contrast of red and green in combination with white, which can be found using the color keyboard “Landscape” No. 9. For the very first time in his architectural work, we see the idea of collage with different materials emerging. In opposition to the purist doctrine, where the wall as a whole carried the color<sup>15</sup>, he now positioned different shades next to each other on one wall, juxtaposed with built-in elements left in natural wood. He then abandoned the idea of collage for the *chambre standard*. However the sketches announced the break which was yet to come with this important purist principle of his *polychromie architecturale*. We find material collages in his paintings and the idea finds its way through the Swiss Pavilion into his architecture. The large photo mural of the library is made out of a collage of close-ups of structures in nature. Here, the collage was meant to “dematerialize the space,”<sup>16</sup> according to Le Corbusier. If we see the repetition of the *chambre standard* as the polarized spatial concept of the library, then the collage for the *chambre standard* was meant to materialize space: all materials used for the *cellules-tiroirs* are displayed in a three-dimensional collage. Here Le Corbusier anticipated and rejected the collage of different materials and colors on one wall as a new design principle, which we will see emerge later in his post-World War II buildings, such as the director’s office of the Usine Duval in St. Dié.

Unlike the Villa Savoye, where color selection primarily determined the sculptural expression, polychromy for the Swiss Pavilion served as spatial differentiation. It followed a defined system where color was used to counteract the uniformity of standardized rooms and to reinforce the individuality of each room and its inhabitant. This theme we will see being repeated in 1947 in the color design for the loggias of the Unité d’habitation in Marseille.

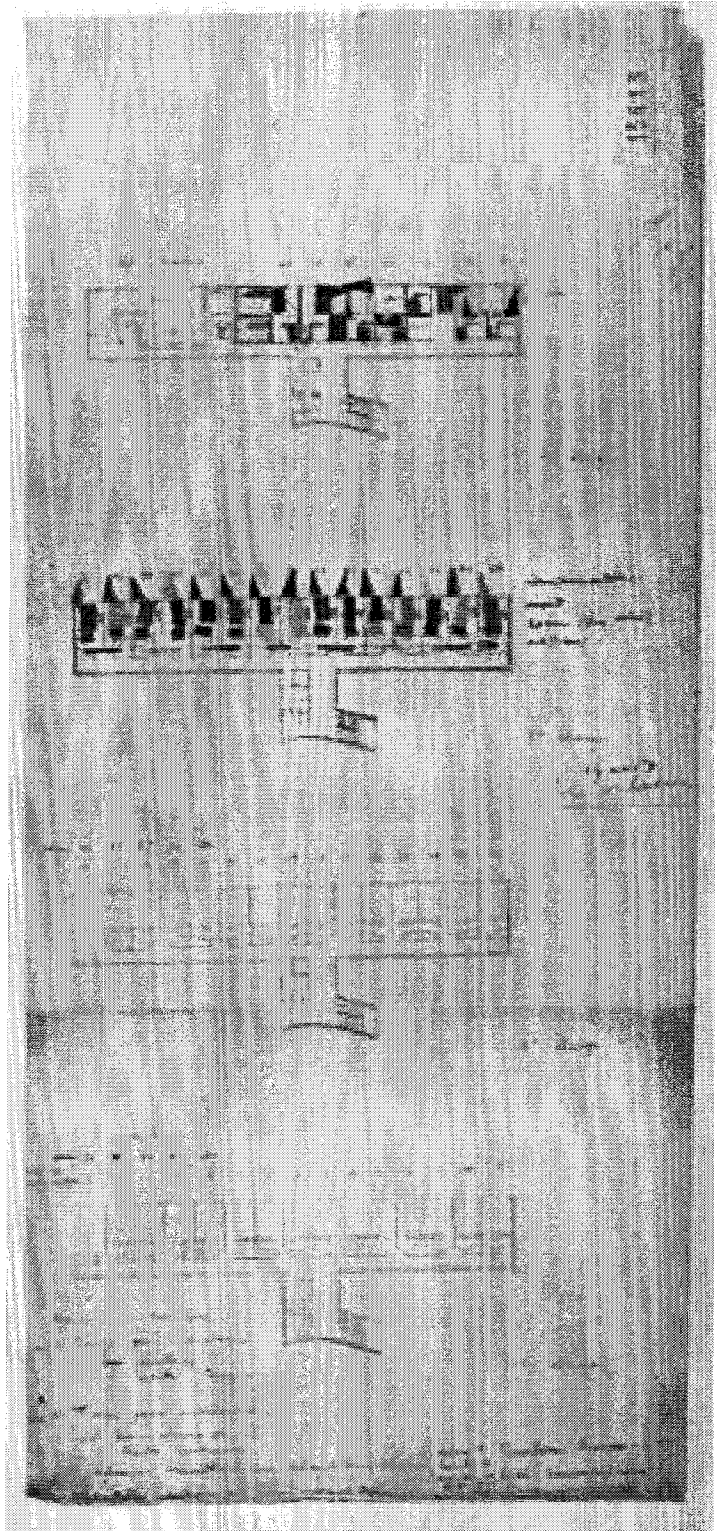
A reduced range of colors for the student rooms of the Swiss Pavilion are drawn from the 43 monochrome shades of the first Salubra wallpaper collection *Le Corbusier*. The building is one of very few where Le Corbusier used Salubra wallpaper. Whereas at the Maison Clarté Le Corbusier specified uniform curtains and allowed Salubra wallpaper to be chosen, "according to individual taste,"<sup>17</sup> at the Swiss Pavilion students had no choice regarding the colors for their rooms. Instead, the Swiss Pavilion turned into Le Corbusier's experiment in the use of the wallpaper and color keyboards. He designed the color scheme and thus controlled the differentiation of the spatial concept. He tried and demonstrated the many-faceted possibilities of his new product with a "daring polychromy" that broke with fundamental purist principles.

### SALUBRA II AND THE COLOR SCHEME OF 1958

During the summer of 1957, Le Corbusier's office began renovation work<sup>18</sup> on the Swiss Pavilion. In addition to a new south façade, interior repairs and up-grades, renovation involved the development of a new color concept, which took shape between July and October of the same year. Simultaneously, there was a new correspondence with Salubra, which was interested in a "new publication of a color palette Le Corbusier". Le Corbusier and Salubra signed the contract in February 1958, naming a color palette to consist of 15 shades. In late June 1958, Le Corbusier finished development of the collection and after initial disagreement over a name for the collection, Salubra marketed the second wallpaper collection as *Le Corbusier-Salubra* in 1959<sup>19</sup>. The collection now included 20 partly bright shades, based directly on Le Corbusier's current color palette containing approximately 40 shades<sup>20</sup>. With the sample collection Corbusier again presented a color keyboard, in which he juxtaposed the 20 shades in two rows allowing for up to 400 different color schemes to be isolated through Bristol-board viewers. In contrast to the first collection, where the color keyboards offered controlled color choices, Le Corbusier wrote of the new collection, "Our imagination may now speak!" The freedom of the new system facilitated choosing a sequence according to one's own rules within a carefully limited color palette, without having to consider "spatial qualities" of the individual color revealing a changed attitude towards the relationship of color and form. Salubra II can be regarded as a summary of his adapted *polychromie architecturale* which emerged and changed from collected experiences over time.

Le Corbusier considered the design of color schemes for his buildings a very personal act and an important part of the overall expression of the building. As a process comparable to the painted sculptures that he produced in collaboration with Joséphe Savina, the colored impression of his buildings always emerged directly out of his hands. "Color is a fundamental

element in the architectural perception"<sup>21</sup> and consequently he demanded absolute control over it.



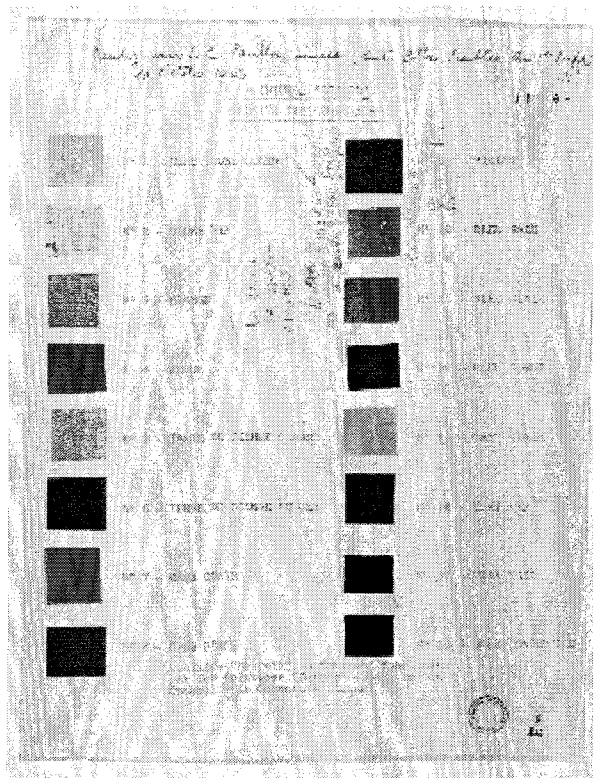
Swiss Pavilion, Le Corbusier 1931–1933. Paris FLC 15413 Color Scheme, date August 16, 1957. Signed la Corbusier.

The second color concept<sup>22</sup> for the Swiss Pavilion dated August 16, 1957 and signed by Le Corbusier, differs significantly from the 1933 scheme and reveals further development of Le Corbusier's *polychromie architecturale*. It not only shows a changed color repertoire, but also suggests a new meaning for color within the architectural context. Whereas the first color concept of 1933 employed the muted colors of the purist *grande gamme*, a color gamut with "constructive qualities", the second one used a very select range of bright and pure hues. Few colored planes are placed as color accents in front of an "absolut white"<sup>23</sup> background – which was an exception in Le Corbusier's work to date. In a letter to Jakob Ott he wrote: "I have told Mr. Moreillon that I will employ only very few bright colors of the series "Matroil". (...) I have established a series of approximately 40 colors which are included in the "Série Le Corbusier" of which only a couple will be taken into consideration for the Swiss Pavilion. The Swiss Pavilion will be painted white with a small percentage of bright colors, which I will give in a nomenclature to Moreillon."<sup>24</sup>

After the war Le Corbusier began to work with the paint manufacturer Berger de La Courneuve, who produced using a British patent the paint brands "Matroil" and "Matone"<sup>25</sup>, both paints which had the matte qualities that Le Corbusier desired. Berger produced exclusively for Le Corbusier the "Série Le Corbusier", also referred to as "Palette Le Corbusier". From this palette he employed in addition to pure white a range of primary colors: *bleu foncé* (No.12), *vert vif* (No.14), *rouge* (No.4), *jaune vif* (No.2), in combination with *terre de sienne foncée* (No.6) and *gris foncé* (No.8).<sup>26</sup>

The revised color concept for student rooms in the Swiss Pavilion took into consideration the interior furnishing and included colored ceilings, curtains, doors and bed covers. All walls were painted white. The color sequence, which first seems to be arbitrary, followed a determined rhythm reflecting a musical composition: The four colored elements of each room follow their own color sequence, resulting in 15 controlled color combinations. These are repeated in a staggered repetition over three floors. A lead rhythm a/b/a/b... is established for the colors of the ceilings, green, yellow and red, is followed by the combination blue, brown, and blue. Considering that the horizontal planes of the ceilings were the ones to be seen from outside, we can imagine the checkered color impression of the south façade. Curtains, bedcovers and doors each had their own color sequence, which in repetition varied each room and its color impression.

Le Corbusier thus superimposed rational plans for the Swiss Pavilion, which exemplify his thinking towards general goals of standardization and industrialization, with a color concept based on its own internal ordering system and independent of plan, section and elevation. Color emerged as an autonomous design element in the interplay of the architectural elements and entered as another layer the architectural composition.



Swiss Pavilion. Le Corbusier 1931–1933 Paris FLC J1–8 Palette le Corbusier Berger de La Courneuve.

It is common knowledge that Le Corbusier's paintings and his architecture were mutually influential and that he often transferred experiences from painting into architecture. Both share fundamental principles such as similarity, layering techniques, ordering principles, and colors. In his paintings, we can observe the metamorphosis of color as an element. In his early paintings, the color concept is directly connected with the form concept, whereas in his later paintings color and form turn into independent and often even contrary systems.

The painting, *Nature morte au siphon* of 1921, exemplifies his Purist technique of the 1920s. Color and form relationships are based on his important Purist principle: "The idea of form precedes the idea of color. Color completely depends on the material form."<sup>27</sup> Color fills in the shapes, which are created through superimposed *objet types* and their "marriage of contours". Shades employed were derived from the *grand gamme*, a color palette resulting from natural pigments used by Amedée Ozenfant and Le Corbusier with "constructive and spatial qualities".

By 1929 a painting entitled *Saint-Sulpice*, has broken with the purist tradition. Purple and yellow shades, which in the article "Le purisme" of 1921 were considered non-constructive, are applied in an architectural context. The painting shows the transformation of Saint-Sulpice into a labyrinth. Color palette and a color concept, which is superimposed and partially independent from that of form, announce the change that was



yet to come: color as an independent system in the equilibrium of elements.

The painting *Taureau V* of 1954 shows that Le Corbusier now was using bright colors of high chroma. As in the Swiss Pavilion, he employed primary colors. The painting shows three superimposed layers: a line drawing, a layer with black and white amorphous forms, and a layer with rectilinear planes colored in primary colors. Two heads – a male and a female or a head and its shadow – emerge out of the painting, which could be interpreted as the personification of color and form that now coexist as two distinct systems.

Similar to the process observed in painting, we can see a change in his architecture. The color concept of 1931 of Villa Savoye was based on the principles established in his article *polychromie architecturale*. Selected shades and their location, determined through their spatial quality and light conditions in the room, supported the spatial concept and the desired sculptural expression. Here the purist *polychromie architecturale* can be seen as a polychromatic counterpart of the concept of spatial transparency. Between the poles of space creation and space dissolution, color becomes the catalyst for the spatial perception. The Villa Savoye represents Le Corbusier's last built project, using the purist principle: "Color completely depends on the material form".

By 1933, the color and material concepts for the Swiss Pavilion reveal far-reaching changes. Not only can we observe that Le Corbusier has turned away from dematerializing walls and space through plaster and paint towards a demonstration of employed materials and their assembly process, but we can also see in the color arrangement for the *chambres standards* that color has ceased to be employed as a space articulating and modifying device. Instead, Le Corbusier has developed a color concept independent of plan and light conditions, which ultimately announced a new era regarding his use of color in architecture. This break did not take place after the war, even though his color palette, which at this point contained brighter and more saturated shades, could lead to this assumption. It took place during the early 1930s as a consequence of his ideas to standardize and typify the *logis*. A sketch of 1950<sup>28</sup> shows Le Corbusier's search for color equilibriums for the loggias of the Unité d'habitation in Marseille. It reveals a similar process to the second color concept of the Swiss Pavilion: the color sequence and arrangements following an internal ordering and classification system, driven by the desire to create the *équilibre coloré* (colored balance). Color and form now acted as independent systems in the interplay of the architectural elements.

I would like to come back for a very short moment to the second Salubra wallpaper collection. The arrangement of samples on the color keyboard of two rows of 10 shades each is directly related to Le Corbusier's design method in search for a

"colored equilibrium". Even though he did not employ the wallpaper for the renovation in 1957 and the following in 1963, his color concept not only demonstrated the possibilities of controlling an architectural polychromie using a selected color scheme from his palette, but also the liberties and implied principles embedded in the color keyboard.

I would like to end this presentation with a remark of Le Corbusier: "I should admit that at the occasion of the Pavilion, it is a question of leaving a sign of color. Color is one of the fundamental elements of the architectural perception."<sup>29</sup>

## NOTES

<sup>1</sup> William Curtis, "Ideas of Structure and the Structure of Ideas: Le Corbusier's Pavillon Suisse, 1930-1931" in *Journal of the Society of Architectural Historians*, Dec. 1981, pp 295 – 310.

<sup>2</sup> FLC A3-2-214 Le Corbusier, "Le Pavillon Suisse à la Cité universitaire", Zitat: " Cette construction n'est pas une fantaisie architecturale, c'est une démonstration.". Later published in Le Corbusier, " Le Pavillon Suisse à la Cité universitaire" *L'Architecture Vivante*, Automne & Hiver 1933, pp 34 – 39.

<sup>3</sup> Idem footnote 2. "Vous trouverez finalement que la société moderne a besoin d'un " produit standard" le *logis*. Voilà le thème à proposer à l'industrie ; voilà le programme véritablement nouveau de l'industrie moderne." Le Corbusier in " Le pavillon Suisse à la Cité universitaire". *L'Architecture Vivante*, p. 39.

<sup>4</sup> For more information regarding Le Corbusier's wallpaper collections and color keyboards for Salubra refer to Arthur Rüegg (ed), *Le Corbusier – Polychromie architecturale. Le Corbusier's Color Keyboards from 1931 and 1959*, (Basel: Boston: Berlin: Birkhäuser) 1997

<sup>5</sup> Nov. 14, 1931 laying of the foundation stone for the Swiss Pavilion. Note: Salubra marketed the *Collection Le Corbusier* during fall 1931

<sup>6</sup> Introduction to first Salubra collection written by Le Corbusier. Translated to English in A. Rüegg (ed), *Le Corbusier - Polychromie architecturale*, p. 148-149

<sup>7</sup> Idem footnote

<sup>8</sup> FLC B1-18, no date. Le Corbusier, "Polychromie architecturale – Etude faite par un architecte (mêlé d'ailleurs à l'aventure de la peinture contemporaine) pour les architectes". Published in French, and translated to German and English in A. Rüegg (ed), *Le Corbusier – Polychromie architecturale*. Rüegg dates the text: 1931 (?). He remarks on page 95: "Two versions of this text exists in the Fondation Le Corbusier, which was intended for Salubra I. The first, hand-written sketch had the title "Salubra". The second version is a typeface edited by Le Corbusier. (...) obviously a publication following the making of the *L'Architecture Vivante* albums was being considered."

<sup>9</sup> FLC 15412, *Relevé*, dated 27.9.1957, drafted by A. Maisonnier. At this point I would also like to refer to document FLC 15407, which includes handwritten color names. I think that Le Corbusier documented the remaining colors of the rooms, because the majority of the original colors were still present in 1957. A remark in room No. 23 "peinture riante" may be an indication that the color (s) of this room had changed.

<sup>10</sup> FLC A3-1, 90-94, no date (1933 ?), hand-written note by Le Corbusier. "Le Pavillon Suisse à la Cité universitaire de Paris, inauguré le 7 juillet 1933.", Sequence of described photographs is similar to the sequence of photographs published *L'Architecture Vivante*, Automne & Hiver 1933.

<sup>11</sup> FLC J1-8, 57 + 58 and FLC J1-8, 37 – 42, color studies for *chambres standards*. FLC J1-8, 57 dated 24.November 1932 and edited 14.January 1933 with remark „admis". FLC J1-8, 42 with remark „admis". no date.

<sup>12</sup> FLC J1-8, 57, dated 14.January 1933

<sup>13</sup> FLC J1-8, 42, no date

<sup>14</sup> FLC J1-8, 58, no date

<sup>15</sup> "...il faut que les murs soient des entiers qui entre comme des unités dans l'équation." Le Corbusier. "Déductions consécutives troublantes". EN 19 (1923).

<sup>16</sup> FLC A 3 -1, 93. „La fresque murale photographique (composition dont l'effet a été de donner une impression d'espace toute immatérielle)”.

<sup>17</sup> The Maison Clarté in Geneva is one of Le Corbusier's only building where he employed Salubra wallpaper. „Für das in Genf 1930-31 entstandene Mietshaus „Clarté” wurde die Verwendung von Salubra-Tapeten und einheitlicher Vorhänge vorgeschrieben und damit eine Kontrolle der gesamten Innenräume erzielt, obwohl die *Auswahl* der Tapeten nach individuellem Geschmack erfolgte. (...) Im übrigen benützte Le Corbusier selbst die Salubra-Tapeten wenig.” Compare Arthur Rüegg (Hrsg.), *Le Corbusier – Polychromie architecturale: Le Corbusiers Farbenklaviaturen von 1931 und 1959*, (Basel: Boston: Berlin: Birkhäuser) 1997, pp. 52-54.

<sup>18</sup> The office was commissioned to lead the renovation for which Le Corbusier did not charge a honorarium. Responsible architect by order of the administration of the Swiss Pavillon: M. Moreillon. Jakob Ott, *Directeur des constructions fédérales*. Berne: M. Beutler, director Swiss Pavillon; Project architect in office of Le Corbusier: A. Maisonnier

<sup>19</sup> Correspondence Le Corbusier – Salubra at FLC

<sup>20</sup> LC J1-7-341. “ J'ai établi une série d'une quarantaine de couleurs qui constituent la “ Série Le Corbusier”

<sup>21</sup> Idem footnote<sup>20</sup>

<sup>22</sup> FLC 15113, dated August 16, 1957, signed Le Corbusier

<sup>23</sup> FLC J1-8 (number missing), letter LC to Jakob Ott, dated 20.Juli 1957 :” Je vous prie instamment de bien vouloir noter que le blanc que je prévois comme étant base de toute la peinture du Pavillon Suisse doit être un *blanc absolu* et non pas teinté de gris, de jaune, crème, etc... Je vous prie, *blanc absolu*.”

<sup>24</sup> FLC J1-7-340 + 341, letter Le Corbusier to Jakob Ott, dated 1.Juli 1957

<sup>25</sup> FLC J1-7-341 “Matroil est un brevet anglais exploité en France par la maison Berger de La Courneuve, qui est une des firmes les plus sérieuses dans la fabrication de la couleur”

<sup>26</sup> FLC 15644. “Peinture des chambres”, with color code “Palette Le Corbusier”

<sup>27</sup> Ozenfant und Jeanneret, *Après le Cubisme*, Paris 1918. „L'idée de forme précède celle de couleur. La couleur dépend entièrement de la forme matérielle.”

<sup>28</sup> FLC O-10, 295, dated 26.December 1950, signed Le Corbusier

<sup>29</sup> FLC J1-7, 340-342, letter LC to Jakob Ott, dated 1.July 1957