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Le Corbusier: Architecture, Urbanism and Theory

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**Le Corbusier:
Architecture, Urbanism and Theory**

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Integrated Design: Collaboration and Experimentation in Le Corbusier's Immeuble Clarté

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Figure 1: Immeuble Clarté, north façade (photograph by author).



Figure 2: Immeuble Clarté, entry (photograph by author).

Introduction

"L'Immeuble Clarté', Geneva. A client risked it... the bankers smothered it... but the building has survived." (1)

As is the case with many of Le Corbusier's works, the Immeuble Clarté was at least 50 years ahead of its time with its glass façades and large exposed concrete entries. Completed in 1932, the Immeuble Clarté was the first realized, multi-family housing project by Corbusier as well as his first steel frame building. It served as the testing ground for many of Corbusier's ideas that are found throughout his writings and later works. However, there has been little documentation by Corbusier or others on this pivotal work, and consequently those studying Corbusier could easily overlook its importance in the development of his theories on housing as well as the merits of Clarté as an example of integrated design. The synthesis of multiple modes of inquiry and the collaboration between client, architect and builder are fundamental to the success of Clarté.

Corbusier succinctly describes the Clarté, located in the southeast of Geneva, Switzerland, in his *Le Corbusier 1910-65*: "The program called for a building housing 45 apartments with double floor heights and a large variety of dimensions and interior furnishings. The building is, nevertheless, constructed entirely of standard elements, upon a frame of standard steel sections electrically welded and conforming to a strict module of columns, beams and windows. This standard, pushed to the absolute, did not limit in the slightest the search for variety in the interior of the building." (2)

The uniform façade of the Immeuble Clarté, so named by the first residents and translated literally means "clarity" or "clear" building, belies the complex spatial organization of units within the building. The building consists of "two-room to nine-room studio flats for professional class, particularly doctors, writers and painters." (3) To accommodate the wide variety of units, some have south-facing double height spaces while others do not even open onto the south façade. Some units run the entire width of the building while others are only half width. Some units are two stories (those with the double height spaces) with their own stair within the unit while others are only one story. The plan of the upper floors (those labeled 1 through 6 in the small section) shades the different unit types. The unit plans of the

Clarté on these upper floors are mirrored across its middle.

The units are accessed by two vertical circulation cores each with stairs and an elevator. The stairs and landings are glass block and the entire stairwell is lit from large skylights, creating two shafts of light that penetrate eight stories into the lobby on the ground floor. The ground floor also houses "fourteen garages, stores for cycles and prams, two porters' flats, central heating, incinerator with chutes." (4)

The Client

The schematic development of the Clarté can be seen as a result of the unusual relationship between Corbusier and his client, Edmond Wanner, a Geneva industrialist, who was also the contractor for the project. Wanner, whose iron and steel working business created items from lamps to iron gates to airplane hangers, had previously asked Corbusier in 1928 to develop a scheme for typical rental buildings for Geneva, often called Project Wanner. The unrealized project consisted of Immeuble Villa based apartment buildings such as those documented in *Towards a New Architecture*, each with an outdoor terrace and accessed by an interior "street" or corridor. Early plans and elevations for Clarté show Corbusier pursuing a similar strategy of an interior street to access the units and only one vertical circulation core as well as two terraces at the end of each corridor. However, this scheme was abandoned, and the final design of Clarté closely resembles a schematic plan by Wanner done in response to Corbusier's initial design. Wanner's plan was accompanied with a letter describing the changes he wanted Corbusier to make:

"I have received your scheme whose idea is acceptable, but not perfect.

In fact, there are three main defects:

1) Orientation...

2) Corridors: in spite of the two gardens that you foresee for lighting the corridors, it remains, however, that each of the corridors measures 12 meters without any lighting whatsoever. This is certainly bothersome and since it is why the disposition of the plot absolutely does not allow comparison to a general case, but leads rather to the resolution of a specific case, wouldn't it be better to treat it only as such, bringing out its greatest advantages?

3) The apartments are too big: in fact, in the apartments that you have foreseen, there are more than 200 square meters of habitable space per apartment, which is too much for the inhabitants we can expect in this part of town.

I am therefore sending you an outline of my idea that needs further development. The buildings



Figure 3: Immeuble Clarté, interior view of a south facing, double height space (photograph by author).



Figure 4: Immeuble Clarté, exterior view of south facing, double height space (photograph by author).

will have 18 bays measuring 2.75 meters in width and will be distributed every two floors with 5 apartments on 2 floors and four apartments on one floor." (5)

Why would Corbusier abandon his concept of Clarté for Wanner's design? First, as a wealthy industrialist, Wanner could of conceivably hired Corbusier for a series of more commissions if Clarté was successful. On this level, one would think Corbusier would not want to alienate such a client. As the contractor, Wanner could have more influence over the construction method used and not only engineered the steel frame but supplied the double-paned, "Wanner model" windows. As this was both Corbusier's first large scale housing

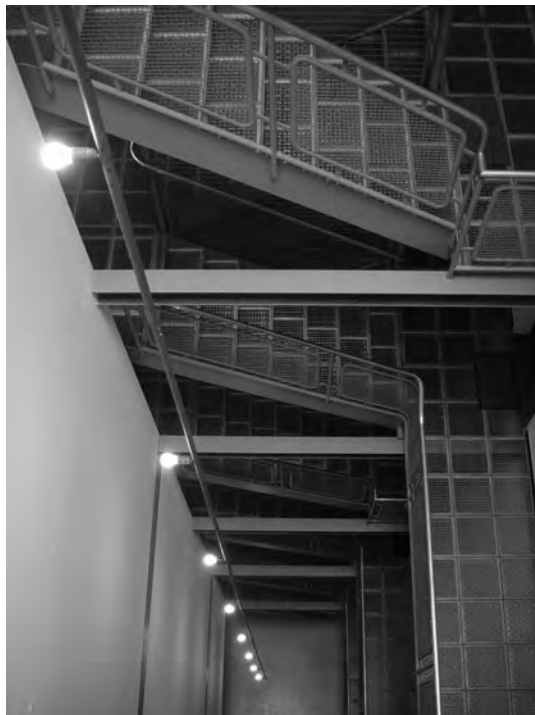


Figure 5: Immeuble Clarté, stairwell (photograph by author).

project in comparison to his villas of the 1920s and his first steel framed building, Wanner would have had more experience with projects of this scale and how the structural system worked. Despite the fact that Corbusier would later reuse



Figure 6: Immeuble Clarté, south façade highlighting the recessed upper floors (photograph by author).

the design concepts discarded by Wanner in future projects, one of the strengths of the Clarté design comes not from Corbusier's resistance to the wishes and experience of the client but from the eventual cooperation between the two men.

Immeuble Villa

Long before the design of Clarté, Corbusier gave serious thought to the multi-family, or apartment dwelling. An entire chapter of *Towards a New Architecture* is dedicated to "mass-production houses" and focuses both on factory-made villas as well as three to five-story "Immeuble Villas" with a single unit type repeated. A prototype of the proposed Immeuble Villa unit was built as the "Esprit-Nouveau" Pavilion at the International Exhibition of Decorative Arts in 1925 in order to demonstrate the "practical, habitable cell" that could be "grouped in large colonies, both in height and breadth." (6) The Immeuble Villa would serve as the root of Corbusier's thoughts and designs for Clarté.

In the years leading up to the design and construction of Clarté, Corbusier traveled to Moscow for the first time in 1928 and returned in 1930 lecturing as well as designing the Centrosoyuz and his competition entry for the Palace of the Soviets. During these visits Corbusier observed modern Russian architecture including the flat, glass façade ("pan de verre") of the Gostorg building, which Corbusier called an "ideal vertical beehive." (7) He also visited the communal house of Narkomfin that featured another smooth façade with elongated, ribbon windows, repeated units with double height spaces and the entire building lifted off the ground on columns. Lit the entire length by a ribbon window, corridors on two of the five floors provided the horizontal circulation to the units. This organization served as a built example of the interior street Corbusier had and would propose for his housing schemes.

Edmond Wanner was present at the International Exhibition of Decorative Arts in 1925 and certainly knew of the "Esprit-Nouveau" Pavilion. However, it is uncertain if he met Corbusier at this time. What is known is that in 1927, Wanner had been in contact with Corbusier when Wanner and his wife went to visit the Weissenhof settlement in Stuttgart. (8) In 1928, Wanner commissioned Corbusier to design "typical rental buildings" for Geneva. The nine-story buildings, collectively called Project Wanner, consisted of double height units with roof gardens similar to the Immeuble Villas. The units would be served by an interior street for circulation on every other floor, much like the Unité d'habitation that would be built over twenty years later. The upper floors are recessed from the otherwise uniformly flat façade, like Clarté, to conform to the Geneva planning requirements.

Designed at the same period between 1930-32, the Swiss Pavilion did not begin construction until after Clarté, as many of the elements of the Swiss Pavilion were borrowed directly from it. The Pavilion's steel frame used the same 2.8 m module and "Wanner model" windows as Clarté. Having no previous experience with structural steel framing, it would have been difficult for Corbusier to design and build the Swiss Pavilion without having first worked with Wanner and learned how to use this construction system. While the Pavilion may have been the second built, it included more concepts from Project Wanner and Corbusier's vision for a multi-story, communal dwelling including raising the building on pilotis to allow people as well as nature to pass underneath, a roof garden, and the all-glass, flat façade. The structural columns pushed to the exterior still broke up what would otherwise be an ideal "pan de verre," free of balconies.

Corbusier's own apartment building, Porte Molitor, and the Salvation Army Refuge built shortly after Clarté in 1933, demonstrate the "pan de verre" as Corbusier has intended it for Clarté. In the *Oeuvre Complete*, Corbusier reflects on the Molitor and his desire to have a pan de verre exist, "intact, clear and with right proportions." (9) The Molitor, unlike Clarté, has the rolling shutters installed on the interior, "maintaining in the way the façade in its precise proportion of iron and glass and assuring its dignity." (10) However, the overheating problems with the inoperable windows of the Salvation Army Refuge as well as summer heat in his own east and west-facing apartment in Molitor would lead Corbusier to later conclude that the balconies on Clarté were useful to block the summer sun and became the roots of the development of the brise-soleil.

The Unité d'habitation at Marseille represents the culmination of Corbusier's ideas regarding multi-family, apartment dwellings. As Corbusier himself states, many of these ideas came from Clarté: "Clarté offers a demonstration of a modern apartment building and well merits being followed by further new realizations." (11) The units all have double height spaces and are accessed by an "interior street" on every other floor. This is similar to the initial sectional sketch of Clarté. The main difference lies in that the long façades of Clarté face north and south with double height living spaces only on the south side to take advantage of the light, while the Unité faces east and west with double height spaces on both sides. Furthermore, by the design of Unité, Corbusier had invented and successfully used the brise-soleil that is applied to the façades of Unité whereas he was trying to create the purest "pan de verre" possible at the time of Clarté.

Brise-soleil

Both the north and south façades of Clarté have



Figure 7: Immeuble Clarté, south façade with balconies, awnings, and wooden screens (photograph by author).

two types of adjustable sun shading devices. The first is a wooden screen directly in front of the glass façade that can be raised or lowered from within the units. The screen slides between metal brackets attached to the steel columns, and consequently each wooden screen is the width of a bay (2.8 meters). The second adjustable shading device is a red awning either attached to the end of each balcony for double height units or to the façade at the floor plate between balconies for single height units. In the case of double height units, the awning extends from the underside of the balcony above to the railing of the unit being shaded. For single height units, the awning extends at a 45-degree angle from the façade to the balcony railing of the unit being shaded.

Without deploying the adjustable devices, a solar analysis of Clarté, using a $1/8" = 1'$ scale physical model and a heliodon, highlights Corbusier's thoughts about the direct sunlight with respect to the composition of the entire building. Placing most living spaces and all double height spaces to the south, he maximized the amount and depth of direct sunlight in the most used spaces within a unit. In the same fashion, he placed bedrooms, bathrooms and the kitchen on the north side of the building, which are typically the least used, and in the case of the kitchen, the room that needs the least heating.

Due to the 20 degrees east of north orientation of the building, the south façade receives more direct sun in the afternoon and the sun is perpendicular

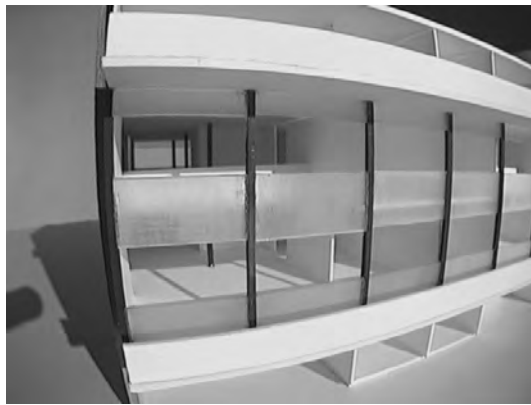


Figure 8: 1/8" = 1' scale model of Immeuble Clarté, south façade with sunlight simulated for noon on December 21 (photograph by author).



Figure 9: 1/8" = 1' scale model of Immeuble Clarté, south façade with sunlight simulated for noon on March 21 (photograph by author).

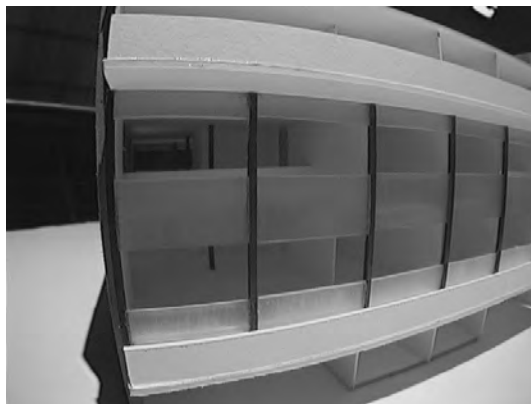


Figure 10: 1/8" = 1' scale model of Immeuble Clarté, south façade with sunlight simulated for noon on June 21 (photograph by author).

with the building at about 1:30 pm solar time. The orientation of the building at the latitude of Geneva (46 degrees north) only allows direct sun to enter units on the north façade during the early morning in June. By 9 am solar time any time of the year, the north façade is completely shaded.

The balconies on the south side of the building

extend (1.5 meters or 4.5 feet) and act as shading devices keeping direct sun out of units in the summer during the warmest, and sunniest season of the year in Geneva and allowing direct sun to stream into the units during the winter, the coldest season with the least sunshine. In a retrospective of the development of the brise-soleil from *Œuvre Complète 1938-1946* published in 1946, Corbusier claims it was instinct that led to the first use of the brise-soleil on Clarté:

"But in the "Clarté" apartment building in Geneva, thus baptized by the users, we have instinctively triggered a working approach for the brise-soleil. I draw the floors, these extend beyond the pan de verre across a balcony with a rather conspicuous projection of 1.50 meters, furnished with its own railing. The first shadow is cast; and for the dog days there is the supplement of rolling shutters vertically to the balcony railings, thus creating very satisfactory conditions of admitting the sun in wintertime (sun low on the horizon) and of blocking the sun in the summer (sun high on the horizon)." (12)

However, Christian Sumi suggests the balconies were more likely the wishes of the client, Wanner, who "exhorted Le Corbusier to place a continuous balcony in front of the glass façade... a request that must have contrasted profoundly with Le Corbusier's idea of the pan de verre as a flat continuous membrane." (13) This is most likely the case as Corbusier's next three works, the Salvation Army Refuge, the Swiss Pavilion at the Cite Universitarie, and his own apartment building at the Porte Molitor, all used a pan de verre façade not compromised by balconies, wooden shutters or red awnings. After experiencing the unpleasant summer months in his own flat in Molitor, Corbusier claims that with respect to the all-glass, west facing façade of Molitor that, "We stood in the wrong, we knew it. We have wanted it judiciously so at least, a pan de verre existed, intact, clear, and with right proportions." (14) Again, the give and take relationship between Wanner and Corbusier would help spark the one Corbusier's most important design tenants in his later works, the brise-soleil.

Urbanism

Designed in between Corbusier's proposal of the Contemporary City for 3 Million People in 1922 and the Radiant City in 1935, Clarté can be seen as a bridge between these two urban designs. As his first multi-family dwelling, Clarté also represents the first opportunity for Le Corbusier to apply his urban planning concepts, which include higher density housing, to a real project in an urban context. To create higher densities than the nearby existing housing, the nine-story Clarté took advantage of the maximum allowable height in its district of Geneva by tapering the top stories. Similar to the housing

of the Contemporary City, Clarté is double loaded with the long façades facing North and South. However, while the surrounding urban grid was oriented approximately with the cardinal directions, the plan of Clarté was deliberately canted so the façades faced 20 degrees east of north and 20 degrees west of south and required the construction of a new street.

This shift can be explained by examining the contemporary thoughts on urban planning leading up to the design of Clarté. Physicians during the Industrial Revolution attributed disease to a lack of direct sunlight in workers' housing, and consequently urban planners in the early 1900's developed different tools and thoughts about maximizing light in urban areas. (15) In 1913, Augustin Rey, a French housing official, mapped both the length of days throughout the year as well as the maximum temperatures at different times of the year on a circular graphic. Finding the longest day of the year, the summer solstice in June, and warmest day of the year, typically August in France, he drew a "solar axis" from the center of the graphic to June and a "thermal axis" from the center to August. Rather arbitrarily assigning the direction of south to the solar axis, Rey determined that the optimal direction for a building to face would be in the direction of a "heliothermic axis" or the average of the solar and thermal axes. A building oriented toward a heliothermic axis would face slightly west of south. Corbusier was aware of Rey's theories and drew similar diagrams when discussing the orientation of buildings in the Radiant City.

A simpler and more straightforward explanation for orienting a building west of south can be found in the writings of Raymond Unwin. After compiling information on the position of the sun throughout the year and making the assumption that "sunshine before 8 a.m. is little enjoyed, while that from 4 p.m. to 8 p.m. is perhaps the most enjoyed," Unwin came to the conclusion that "taking the whole year round, there can be no doubt that an aspect south or slightly west of south may be considered the most desirable for dwelling rooms." (16) These thoughts on solar orientation manifest themselves more fully in the housing of the Radiant City with its double loaded corridors in buildings with units facing east and west and single loaded corridors with units facing south.

However, the organization and complexity of Clarté is significantly different from the proposal for housing seen in either the Contemporary or Radiant City concepts. In all likelihood, these differences are the result of the client, Edmond Wanner. In the letter from Wanner to Corbusier dated April 26, 1930, Wanner argued to replace the design of an interior street, a strategy common to the housing designs in Corbusier's urban design proposals. This interior street would eventually be built in L'Unité d'Habitation designs



Figure 11: Immeuble Clarté, balcony (photograph by author).



Figure 12: Immeuble Clarté with surrounding context highlighting the unusual orientation of the building (photograph by author).

of the late 1940's and early 1950's. Wanner's concern was that the corridors "measure 12 meters without any lighting whatsoever." (17) Furthermore, Wanner continued to argue in the same letter that "the disposition of the plot does not allow comparison to a general case, but leads rather to the resolution of a specific case" implying that Corbusier was trying to apply his urban design concepts to Clarté. The "general case" that Wanner referred to is likely the designs for Project Wanner, the Immeuble Villa based housing proposal Corbusier had designed for Wanner two years earlier. The design for the Immeuble Villas and Project Wanner is similar to the housing of the Contemporary City, and Corbusier continues to

develop this concept of using a repeated housing unit with interior streets connecting them in the Unite-like housing schemes for the Radiant City proposal. The question as to why Corbusier designed Clarté with a variety of unit types if his urban planning schemes continued to emphasize the use of a single repeated unit. The answer can be found once again in the desires of Wanner who wanted a variety of unit types for different perspective inhabitants.

Nature

Corbusier designed five projects for Geneva between 1927 and 1933 including the Palace of the League of Nation, Project Wanner, and the only design actually built, Clarté. Throughout the drawings of Corbusier's Geneva projects, there is an understanding of the landscape and nature with the city located in a valley between the lake and surrounding mountains. The elevation of the Palace of the League of Nations and the Cite Mondiale perspective clearly shows this relationship. The perspectives of Project Wanner demonstrate how the housing frames a view of the distant mountains and sits in the landscape with visual access to nature on the ground level granted by the use of pilotis.

Based on these other projects (especially those designed before Clarté), one would expect Corbusier to be fully aware of the Geneva landscape and nature and incorporate it fully into the design of Clarté. However, the sketches and



Figure 13: Immeuble Clarté, view of an adjacent building from the interior (photograph by author).

drawings of Clarté show the building completely out of context as an object floating in space. Often times, Corbusier only draws part of the building denying the surrounding landscape and nature.

From perspectives drawn during the design of the building and photos taken at the end of construction, it is clear Corbusier designed Clarté without having known the site. Although he drew one existing building (with no detail and much shorter than the actual building to the south of Clarté) in the perspective drawing, Corbusier completely ignores the large tree on the corner of the site that casts a striking shadow on the west façade. Also, the street along the north façade, lined with tiny trees (and no other buildings), does not exist as the "street" along the north is more like an alley ending into the rear of an existing building. In his writings, Corbusier stresses this separation of building and its surroundings: "Today, the agreement of the ground with the house is no longer a question of site or of immediate context." (18)

Since Corbusier did not know or chose to ignore the site and surrounding context, he also would not know what views were offered from the site of Clarté. However, Corbusier had thought about the advantages of tall apartment buildings and states in *The Home of Man* that "to dwellings high above the ground is offered the spectacle of the sky and all its movements and its colours, its forms throughout the seasons. A distant hill appears." (19) In his sketch accompanying this quote is Corbusier's ideal city with more nature, trees and landscape, rather than buildings occupying the view. In contrast, existing buildings dominate the view over Geneva near Clarté with the mountains and any existing nature far in the distance.

When Clarté is completed, instead of taking a photograph from the roof garden of the complete surroundings, Corbusier published a photo carefully framing the view from the roof garden of only the sky, a landmark church nearby and the distant mountains. Unlike his roof garden on the Apartment for Charles de Beistegui in Paris, Corbusier does not use the architecture of Clarté to block the views of the cluttered cityscape leaving only the tops of monuments, the sky and the distance landscape because he did not know what the view was going to be like in the first place. In order for his first tall building to successfully offer his idealized view from a "dwelling high above the ground," the documentation of Clarté must be manipulated.

Furthermore, Corbusier draws the inhabitant as an eye looking down and across the nature surrounding the building. However, it is obvious from an aerial view of Clarté, that the only views offered from within the units and on the balconies is of the surrounding buildings. The East façade of Clarté, which offers one of the few unobstructed

views of a nearby park, is solid with no windows, showing further that Corbusier either did not know or ignored the context of the site.

The Villa Savoie is perhaps the best example of Corbusier's work that frames views of the surrounding landscape. He designed Clarté in the same fashion with columns in the foreground framing your view at first, then the window frames and frosted glass emphasizing the view across the horizontal. Finally, the balcony railing continues to emphasize the view of the horizon and the sky by blocking the view of the ground below. However, in each of the photos taken to document Clarté the framed view is obscured by overexposed photographs, drawn curtains, or both. In the case of the one photo from the balcony, the view is carefully selected in the one direction, the east, where there are no surrounding buildings to block Corbusier's idealized view of nature from a "dwelling high above the ground."

Beatriz Colomina argues that Corbusier viewed many of his villas as detached from the surrounding landscape: "If the window is a lens, the house itself is a camera pointed at nature. Detached from nature, it is mobile. Just as the camera can be taken from Paris to the desert, the house can be taken from Poissy to Biarritz to Argentina." (20) In the case of Clarté, the camera cannot frame the desired views of nature and sky if other buildings surround it. Corbusier's apparent lack of knowledge about the Clarté site and the surroundings undermined the potential of Clarté to fully take advantage of its height and views.

Conclusion

Clarté represents a series of firsts for Corbusier: his first steel frame building, his first large scale, multi-family dwelling, his first use of the brise-soleil and his first attempt at creating a "pan de verre." In this capacity, the Clarté served as a testing ground and Wanner as a sounding board for Corbusier's ideas about high-rise buildings. Perhaps, most interesting is how long it took Corbusier to incorporate many of successful elements from Clarté such as the brise-soleil

balconies into other projects and how he ignored the success of the vertical circulation light well and returned to his dark interior street for the Unité d'habitation. Despite its minor shortcomings, Clarté is a major turning point in Corbusier's work and should be recognized as such.

If the Clarté is such a pivotal work, then the question arises why did Corbusier not write about it more or document the project more thoroughly? As the project was a collaboration between Corbusier and Wanner, perhaps Corbusier felt there would be some question of ownership over the design if he discussed Clarté too often or in too much detail. Corbusier also could have been disappointed that his first dwelling high above ground does not sit in nature or frame views like he idealized it would. In both the *Oeuvre Complete* and *Creation is a Patient Search*, Corbusier complains about the obstacles that the bankers proved to be on the Clarté project, and perhaps this situation as well as his other difficulties in Geneva was reason enough to ignore Clarté.

Despite his reluctance to highlight Clarté, the design process of this seminal work serves as a prototype for integrated design and holds many lessons for contemporary architects. The collaboration between design and building professionals is critical as the complexity of building systems increases. The relationship between Corbusier and Wanner, while at times contentious, succeeded in producing a building that benefited from the combined design and technical expertise of both men. The technical advantages of the structural steel frame gave Corbusier the ability to explore his theoretical propositions such as the free plan, free façade and the pan de verre. The successful use of single architectural elements to achieve multiple goals is another attribute of integrated design. While providing access to nature, the balconies also serve as highly successful brise-soleil, blocking the sun during hottest months of the year. With these strengths in mind, it is clear that the longevity of the Immeuble Clarté is proof of how integrated design can create enduring architecture.

Notes

1. Le Corbusier, *Creation is a patient search* (New York: Praeger, 1960) 90.
2. Le Corbusier, *Le Corbusier 1910-1960* (New York: Thames and Hudson, 1967) 62.
3. F.R.S. Yorke and Frederick Gibberd, *The Modern Flat* (London: Architectural Press, 1937) 150.
4. Yorke, 150.
5. Christian Sumi, "The Immeuble Clarte" in *In the footsteps of Le Corbusier*, edited by Carlo Palazzolo and Riccardo Vio, 177-178 (New York: Rizzoli, 1991).
6. Le Corbusier, *Le Corbusier 1910-65*, 28.
7. Jean-Louis Cohen, *Le Corbusier and the mystique* of the USSR: theories and projects for Moscow, 1928-1936 (Princeton, N.J.: Princeton University Press, 1992) 55.
8. Christian Sumi, *Immeuble Clarté Genf 1932: von Le Corbusier & Pierre Jeanneret* (Zurich: GTA/Amman, 1989) 159.
9. "Nous l'avons voulu pertinemment ainsi afin qu'au moins, un pa de verre existât, intact, proper, et de bonnes proportions." Le Corbusier, Pierre Jeanneret, and Willy Boesiger. *Oeuvre complète, 1938-1946*. (Erlenbach-Zurich: Éditions d'architecture, 1947) 104. All translations from the French by Associate Professor Susan Ubbelohde, University of California, Berkeley.

10. "...les volets roulants furent installés a l'intérieur, maintenant ainsi la façade dans sa précise proportion de fer et de glas, lui assurant sa dignité..." Le Corbusier, *Œuvre complète, 1938-1946*, 104.
 11. Le Corbusier, *Le Corbusier 1910-65*, 62.
 12. "Mais dans l'immeuble "Clarté" de Genève, baptisé ainsi par les usagers, nous avons amorcé instinctivement des travaux d'approche vers le brise-soleil. Je dessine les planchers, ils se prolongent au-delà du pan de verre par un balcon d'une assez forte saillie de 1,50 m muni de son parapet. Une première ombre était provoquée; on y ajouta pour la canicule le complément de volets roulants installés au droit des parapets des balcons, créant ainsi des conditions très satisfaisantes d'admission du soleil en hiver (soleil bas sur l'horizon) et d'obstacle au soleil en été (soleil haut sur l'horizon)." Le Corbusier, *Œuvre complète, 1938-1946*, 104.
 13. Sumi, "The Immeuble Clarté," 181.
 14. "Nous nous mettions en tort avec nous-mêmes, nous le savions. Nous l'avons voulu pertinemment ainsi afin qu'au moins, un pan de verre existât, intact, propre, et de bonnes proportions." Le Corbusier, *Œuvre complète, 1938-1946*, 104.
 15. Ken Butti and John Perlin. *A golden thread: 2500 years of solar architecture and technology* (Palo Alto: Cheshire Books: 1980) 160.
 16. Raymond Unwin, *Town planning in practice; an introduction to the art of designing cities and suburbs* (London [etc.]: T.F. Unwin, 1909) 312.
 17. Sumi, "The Immeuble Clarté," 178.
 18. Le Corbusier and François de Pierrefeu, *La Maison des homes*, trans. Beatriz Colomina, in *Privacy and publicity: modern architecture as mass media*. (Cambridge, Mass: MIT Press, 1994) 318.
 19. François de Pierrefeu, Le Corbusier, and Clive Entwistle, *The home of man* (London: Architectural Press, 1948) 93.
 20. Beatriz Colomina, *Privacy and publicity: modern architecture as mass media*. (Cambridge, Mass: MIT Press, 1994) 312.
- Le Corbusier and François de Pierrefeu, *La Maison des homes*, trans. Beatriz Colomina, in *Privacy and publicity: modern architecture as mass media*. Cambridge, Mass: MIT Press, 1994.
- Le Corbusier. *Le Corbusier 1910-1960*. New York: Thames and Hudson, 1967.
- Le Corbusier, Pierre Jeanneret, and Willy Boesiger. *Œuvre complète, 1938-1946*. Erlenbach-Zurich: Éditions d'architecture, 1947.
- Le Corbusier. *The radiant city; elements of a doctrine of urbanism to be used as the basis of our machine-age civilization*. New York: Orion Press, 1967.
- Le Corbusier. *Toward a new architecture*. London: Architectural Press, 1965.
- Pierrefeu, François de, Le Corbusier, and Clive Entwistle. *The home of man*. London: Architectural Press, 1948.
- Rey, A. Augustin. *La science des plans de villes: ses applications à la construction, à l'extension, à l'hygiène et à la beauté des villes, orientation salaire des habitations*. Lausanne: Payot et Cie, 1928.
- Sutcliffe, Anthony, "A Vision of Utopia" in *The Open hand, essays on Le Corbusier*, edited by Russell Walden, 216-243. Cambridge: MIT Press, 1977.
- Sumi, Christian. *Immeuble Clarté Genf 1932: von Le Corbusier & Pierre Jeanneret*. [Zurich]: GTA/Amman, 1989.
- Sumi, Christian. "The Immeuble Clarté" in *In the footsteps of Le Corbusier*, edited by Carlo Palazzolo and Riccardo Vio, 177-178. New York: Rizzoli, 1991.
- Unwin, Raymond. *Town planning in practice; an introduction to the art of designing cities and suburbs*. London [etc.]: T.F. Unwin, 1909.
- Yorke, F. R. S., and Frederick Gibberd. *The modern flat*. [London]: Architectural Press, 1937.

Bibliography

- Bellinelli, Luca, Le Corbusier, and Catherine Courtiau. *Le Corbusier: la costruzione dell'immeuble Clarté = la construction de l'immeuble Clarté : mostre di architettura*, Museo d'arte, Mendrisio, 18 dicembre 1999-6 febbraio 2000. I Cataloghi dell'Accademia di architettura, 4. Mendrisio (CH): Accademia di architettura dell'Università della Svizzera italiana, 1999.
- Blake, Peter. *The master builders*. New York: Knopf, 1960.
- Butti, Ken, and John Perlin. *A golden thread: 2500 years of solar architecture and technology*. Palo Alto: Cheshire Books, 1980.
- Choay, Françoise. *Le Corbusier. The Masters of world architecture series*. New York: G. Braziller, 1960.
- Cohen, Jean-Louis. *Le Corbusier and the mystique of the USSR: theories and projects for Moscow, 1928-1936*. Princeton, N.J.: Princeton University Press, 1992.
- Colomina, Beatriz. *Privacy and publicity: modern architecture as mass media*. Cambridge, Mass: MIT Press, 1994.
- Le Corbusier. *Creation is a patient search*. New York: Praeger, 1960.