

RE-CONSIDERING LE CORBUSIER'S UNFINISHED PROJECTS

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ABSTRACT

Whereas the architecture of Le Corbusier (1887-1965) is again on the neo-Modernist agenda as the so-called “unfinished project”, he is also blamed for the alienation of the street as a public realm, and the dispersed nature of most contemporary cities. Critics ignore the fact that he relentlessly opposed the anti-urban paradigm, and that his urban objectives are entirely compatible with contemporary concerns. The paper investigates four unfinished projects. First is Pavillon de l'Esprit Nouveau of 1925, which remained a prototype at an international exhibition. The other three are the Housing Quarter in Barcelona (1933), and the La Sainte-Baume and Roq-et-Rob projects on the Côte d'Azur (1948, 1949). It explores the ways these projects achieve (1) walkability, (2) densification, and (3) private gardens. Analyses rely primarily on comparisons of computer-generated drawings. Finally, this paper concludes that reconsidering Le Corbusier *oeuvre* can enhance the current knowledge base and contribute towards more sustainable neighborhoods.

Key words: Modernism, Le Corbusier, densification, walkability, private space.

Introduction

Freestanding houses and dispersed dormitory suburbs are major causes of urban sprawl. But they remain desirable places to live in many parts of the world, arguably because contemporary medium- and high-density solutions rarely offer the same household privacy, private gardens and neighborhood tranquility. Considering the urgent need for more sustainable housing forms, there is obviously now a real need to develop alternatives that can provide a similar experience, but combined with higher densities in order to save land, energy and infrastructure costs and so also enhance walkability, reduce reliance on private cars and improve social contact.

Why a focus on Le Corbusier? Born Charles-Edouard Jeanneret, Le Corbusier (1887-1965) – controversial and creative Swiss-French author, artist, architect and urbanist – was unquestionably one of the most influential figures in the field in the 20th century and the undisputed leader of the Modern Movement. Even a cursory review of his work reveals not only the astonishing scope, diversity and volume of his urban designs and their associated architectural forms, but also a remarkable paradigmatic development – always of a pioneering, responsive and innovative nature.

Although Le Corbusier has emerged as a strong inspiration for a recent Modernist revival in architecture, his urban schemes are still often considered flawed and most contemporary publications on urbanism claim to offer the antithesis to Le Corbusier's theories by propagating compact, mixed-use, mixed-income, pedestrian-friendly neighborhoods. Paradoxically, he declared that his housing projects were neighborhoods at greatly increased densities, intended to reduce distances to amenities, improve social contact and allow the integration of different urban functions. But whereas his individual buildings are being subjected to continuous rigorous assessment, evaluations of his unbuilt multi-family housing projects and their urban implications are rare and often highly subjective, even though his design philosophy was totally compatible with contemporary concerns. This paper aims to determine the extent to which selected ground-oriented housing projects satisfy both his intentions and contemporary demands.

Objectives

The paper reviews four designs. First is Pavillon de l'Esprit Nouveau that was built at an international exposition in Paris in 1925. It was the prototypical dwelling unit in his *Une Ville Contemporaine*, or A Contemporary City (Figure 1), and *Immeubles-Villas* of three years earlier, both unbuilt. The other three, also unbuilt, are the Housing Quarter in Barcelona (1933), and the tectonically related La Sainte-Baume and Roq-et-Rob projects on the Côte d'Azur (1948, 1949). The paper commences with a very brief historical overview of the selected ground-oriented housing projects for orientation, followed by analyses of and speculative comments on the ways the

concepts underpinning these projects could contribute to making quality neighbourhoods, specifically through (1) walkability, (2) densification and (3) the provision of private, protected outdoor living space. Analyses rely primarily on comparisons of computer-generated drawings in order to work on a common, measurable format.





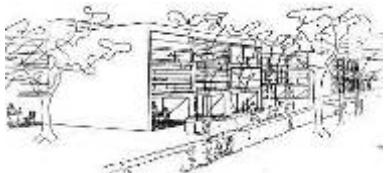

Figure 1 : 1922 – Panoramic view of a Contemporary City (Le Corbusier 1929: 190-191)

Historical Overview

Although Le Corbusier often retained and refined particularly robust concepts, he reinvented himself and his architecture every ten to fifteen years, introducing new paradigms for urbanism, neighbourhoods and buildings. The focus of this paper, ground-oriented, multi-family housing projects, is no exception (Table 1). His 1914 proposal for a village of 120 houses in the small Swiss town of La Chaux-de-Fonds, his birthplace, was in a picturesque, regionalist idiom. He settled in Paris in 1917, and the 51 houses built in Pessac near Bordeaux in 1925 were clearly a manifestation of his newly-emerging Modernist-Purist language. But with coverage of 13 % and 20 % respectively, and densities of 24 and 32 du/ha in detached and row configurations, they were unquestionably suburban. Le Corbusier himself referred to the latter as the “garden-city of Pessac” (1960: 70). Interestingly, stands vary from 225 m² for a thin plot of 45 x 5 m for row houses, to 300 m² for plots with living-work units on the street, to 550 m² for the larger freestanding houses.

Table 1 : A comparison of timelines, paradigms and projects

Paradigms (Charles Jencks 2000)		Examples and case studies	
1905-1916	Regionalism and classicism during his formative years in La Chaux-de-Fonds	1914 <u>Unbuilt</u> Village for 120 houses	

1917-1928	Purism – the white machine aesthetic	1925 <u>Built</u> Housing village at Pessac	
1929-1945	Hybrid and rough architecture Often vernacular forms <i>The brise-soleil</i> (sunbreaker)	1933 <u>Unbuilt</u> Residential quarter, Barcelona	
1946-1965	Assessment of timeless values Harmony with nature Mediterranean vernacular Monumental and symbolic	1949 <u>Unbuilt</u> Roq-et-Rob, Cap Martin	

Le Corbusier travelled widely and became fascinated by Ancient and Muslim architecture early on. So, whereas the layout plans for the “suburban” schemes remind of Medieval European market villages, those of the Barcelona and Côte d’Azur projects are more reminiscent of Ancient Greek and Roman, and Arab-Islamic urban forms (Figure 2). In fact, the *Immeubles-Villas* and its constituent building block, the apartment unit concretised as the Pavillon L’Espir-Neuveau, are clearly derived from the Roman domestic archetypes (Curtis 1986: 35).

The Case Studies

Pavillon De L’esprit Nouveau (1925)

In 1922 Le Corbusier released the proposals for the Contemporary City mentioned earlier and for the Immeubles-Villas. These Villas-Apartments consisted of 120 maisonettes, stacked over five levels, that is, 10 storeys (Le Corbusier 1927: 246-249). It has basement parking, a covered courtyard with tennis courts, and a communal sports hall and 300 metre running track on the roof (Figure 3).

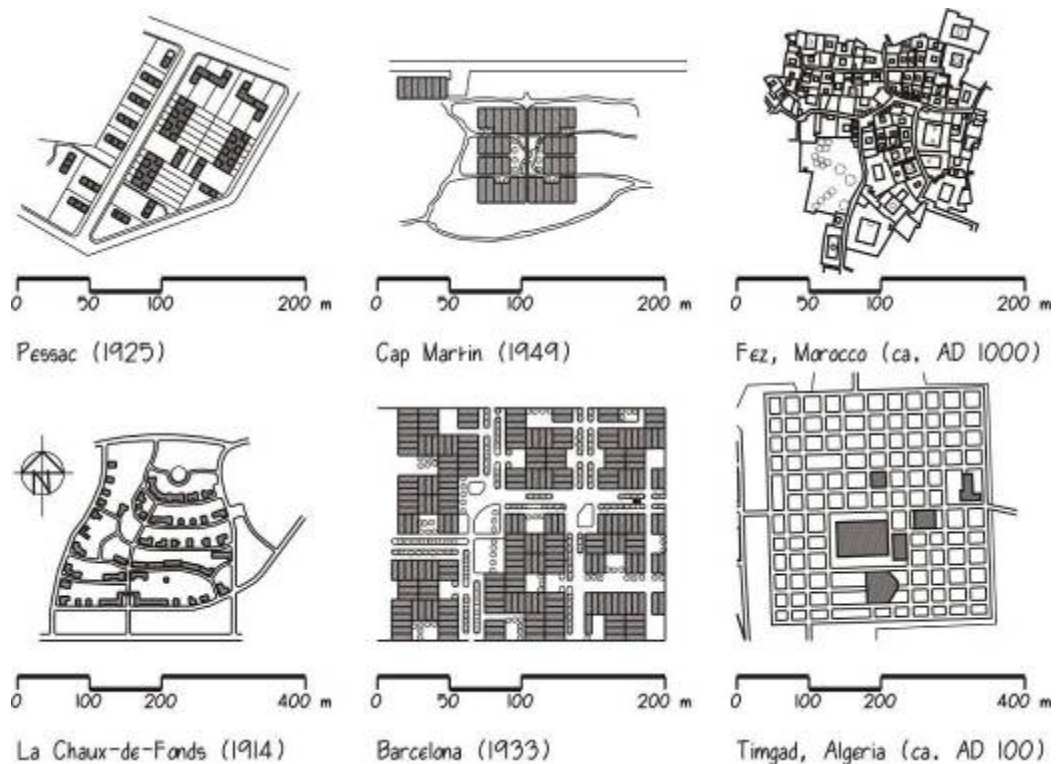


Figure 2 : Projects and precedents (Author's drawing)

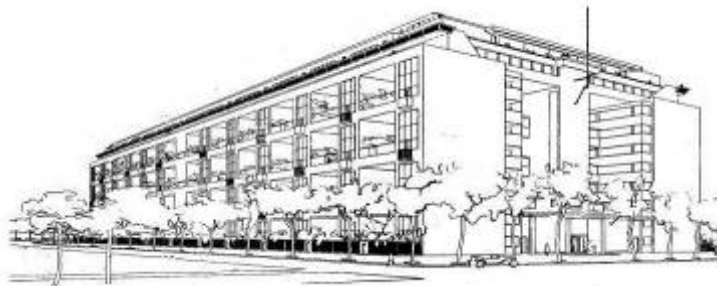


Figure 3 : 1922 – Villas-Apartments, also known as Immeubles-Villas (Le Corbusier 1927: 249)

The Pavillon L'Espirit-Nouveau was a showcase of the prototypical dwelling unit, the standard building block, not only of his Villas-Apartments, but also of the apartment buildings in his Contemporary City. His approach remains unique to this day: Each apartment is in fact a small L-shape double-storey patio house with a patio garden and double-volume living room, a configuration that would later prompt Rob Krier to comment (1988: 11): "It was an achievement that upgraded social housing enormously." He considered each apartment a cell from which the city is assembled (Figure 4).

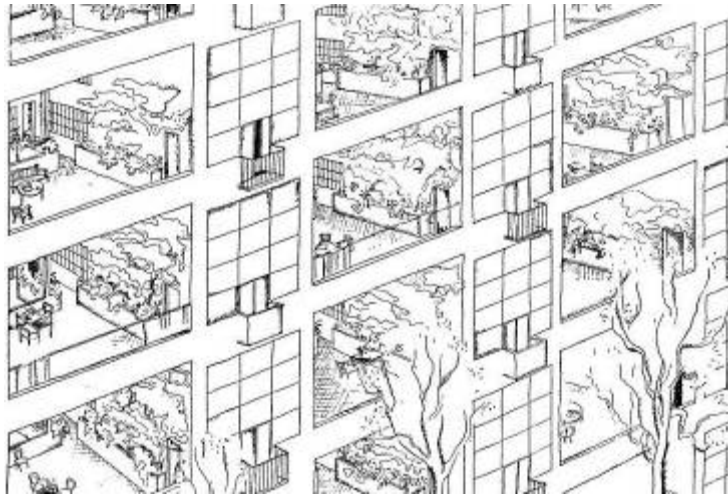


Figure 4 : 1922 – The “whole conception”: Aggregating the “basic cell” (Le Corbusier 1927: 246)

The unit offered six bed spaces (including one for a servant), a total of 187,0 m² enclosed floor area (90,7 m² first level and 96,4 m² second level), including a 28,9 m² double volume living room. Its most outstanding feature was the 64,0 m² double volume patio garden (Figures 5 and 6). This unit was a radical departure from the central European paradigm of rooms bunched around a huge fireplace, and was typologically similar to the courtyard houses of Antiquity and the Middle East. Wilhelm Holzbauer unquestionably used the Pavillon l’Esprit Nouveau as precedent for a Modernist villa in Vienna in 1994. Using this conception he managed to fit nearly 300 m² of floor area and a 72 m² garden onto a 250 m² stand.



Figure 5 : 1925 – Pavillon de l’Esprit Nouveau (Le Corbusier 1960: 72)

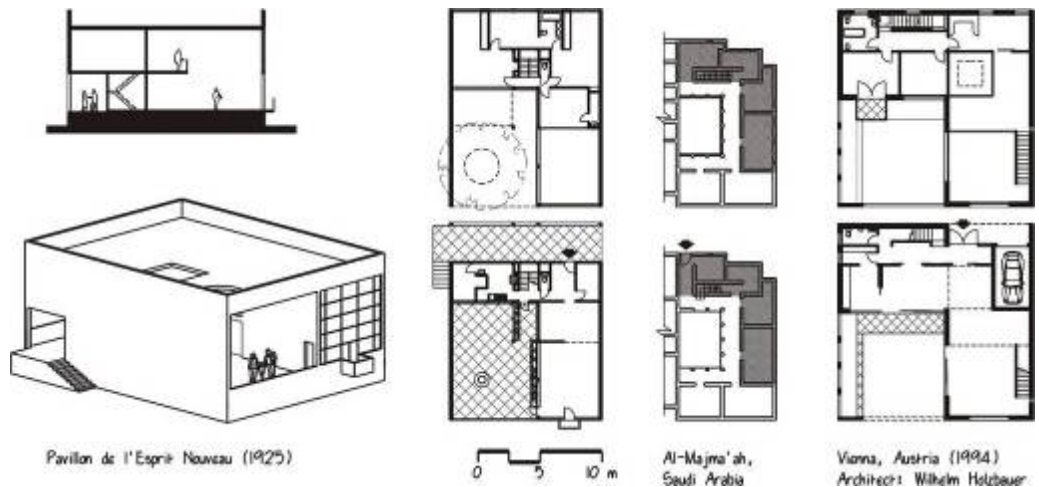


Figure 6 : Pavillon de l'Esprit Nouveau compared (Author's drawing)

Housing Quarter in Barcelona (1933)

From 1929 to 1942 he visited Algeria regularly and did a large number of projects. He toured many parts of the Maghreb, including the valley of M'zab in the Algerian desert (present-day Mauritania), known for the plain, egalitarian architecture of its Ibadhite ksour (Figure 7). Guibbert writes that Le Corbusier was inspired by the architecture of the M'zab (Guibbert 1982: 9). Apart from noting the pedestrian-friendly environment, he later commented: "I prefer the lessons taught by Arab architecture" (Risselada 1988: 60).

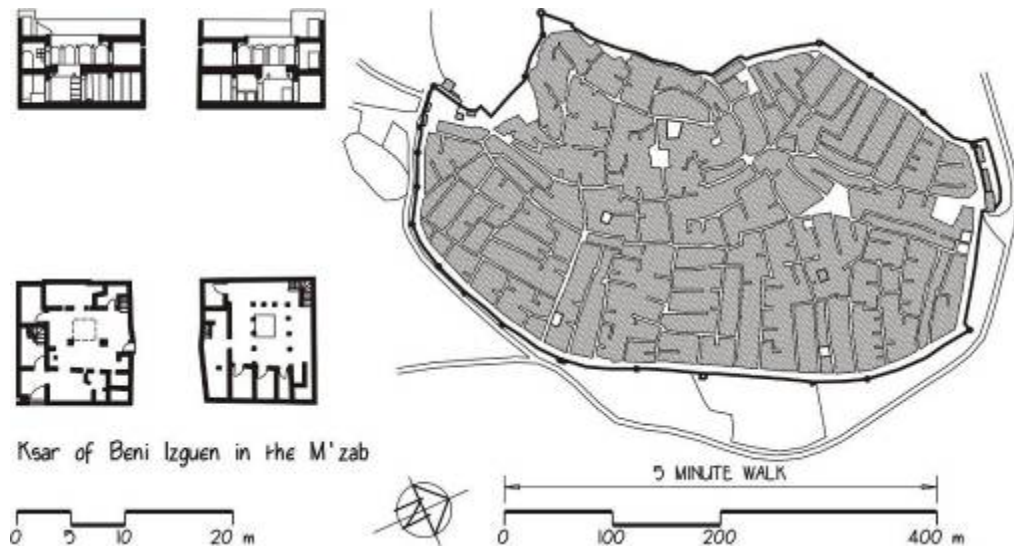


Figure 7 : Plan of the ksar of Beni Izguen in the M'zab, and floor plans and sections of a house in the settlement (Author's drawing after Guibbert 1982: 16, 19)

That appreciation of Arab architecture is instantly recognizable in the design of a low-cost residential quarter for workers in Barcelona in 1933. The circulation pattern has the same dead-end streets and small communal courtyards found in the M'zab, while the houses could well be reinterpretations of that vernacular, with a strict vertical privacy gradient (Figure 8). At ground level was a 55 m² space that could be used for a home industry and about 100 m² of living space in two levels over that, including the stairwell that served as a wind catcher and ventilation shaft. Like the M'zab houses there was also an open living space on the roof; a grassed terrace of 49 m². Instead of a courtyard there was a balcony of 9,0 m² off the living room, complete with moveable louvers for privacy and shade, an early example of his trademark *brise-soleil* (Figure 9). Curtis writes that LC “organised [the 253 dwelling units] as a tight-knit modern version of a Kasbah” (1986: 116), and with a dwelling footprint of only 64 m² a density of 84 du/ha was achieved. Le Corbusier commented that each house should have a tree in front: “The quarter would then become a delightful oasis of refreshing greenery” (1960: 110).

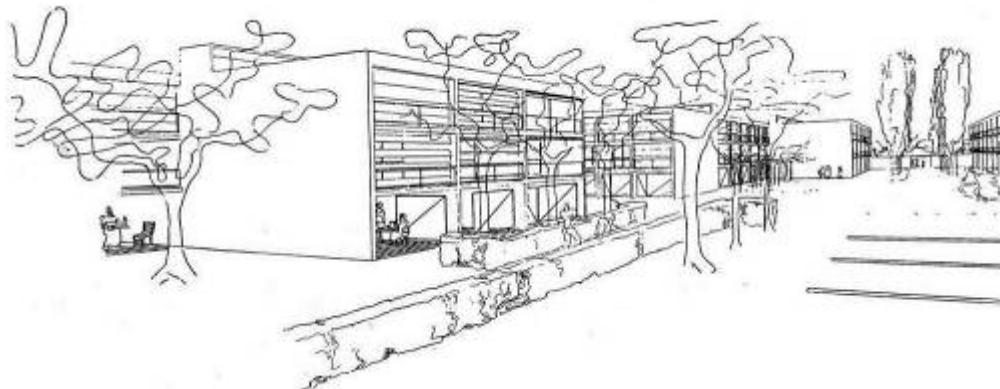


Figure 8 **1933 – A residential quarter for workers in Barcelona (Le Corbusier 1960: 110)**

La Sainte-Baume and Roq-Et-Rob Projects On The Côte D'azur (1948, 1949)

The influence of the North African climate and vernacular soon showed in his designs and his Agricultural Estate of 1942 in the Algerian countryside is clear evidence of his climatic responsiveness, also reflecting local forms and technologies (Figure 10).

These aspects were embedded in the tectonics and technology he transferred to the southern shores of the Mediterranean at the Côte d'Azur. The La Sainte Baume and Roq-et-Rob schemes (1948, 1949) were, according to Curtis, deliberately conceived at densities higher than in the suburbs, but in a morphology that would fit the natural landscape (Curtis 1986: 168). The vaulted roofs were planted. He combined European open-plan unit layouts with forms and circulation patterns that remind of North

Africa, responding to climate, site, vegetation, views and vernacular precedent, albeit from a different culture (Figure 11).

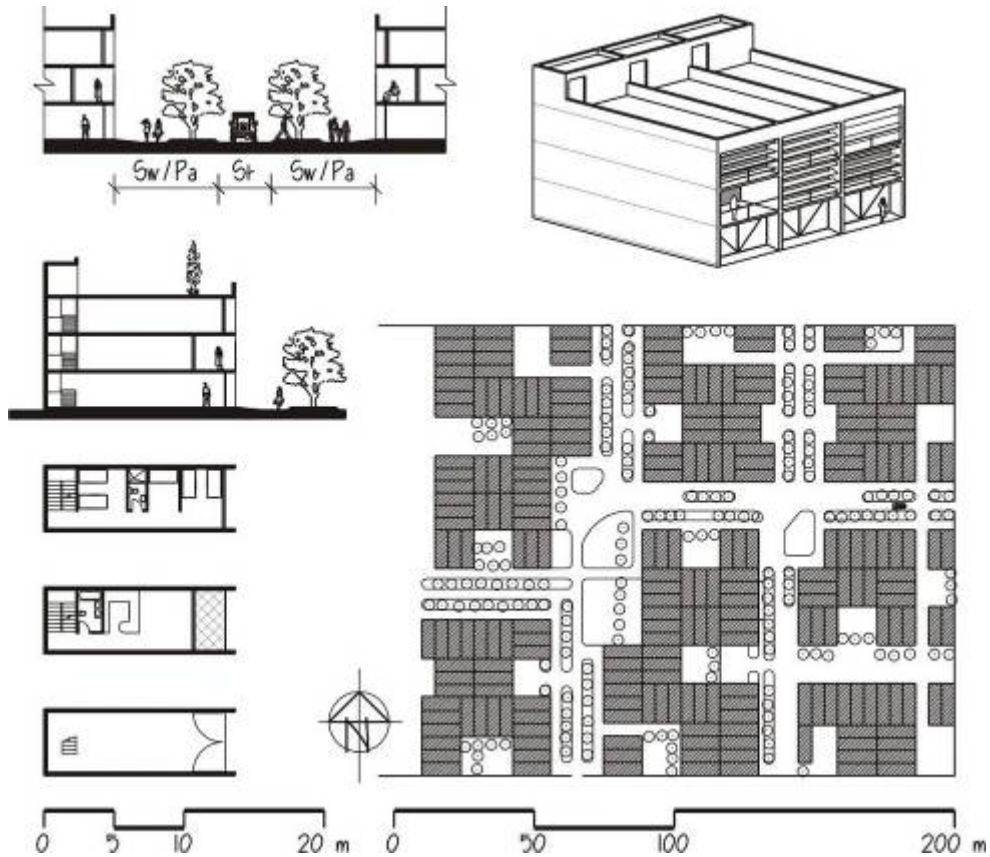


Figure 9 : A residential quarter for workers in Barcelona (Author's drawing)

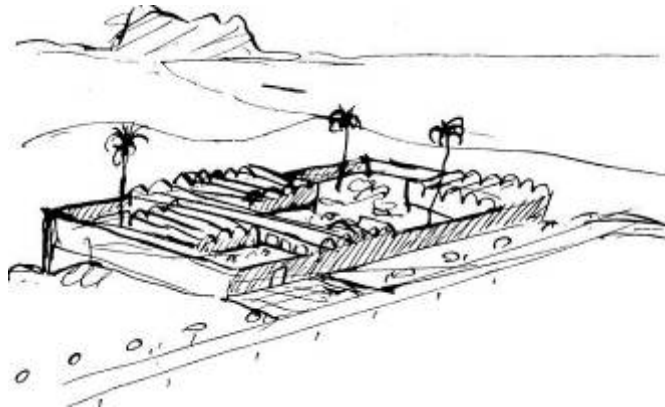


Figure 10 : 1942 – Compound on an agricultural estate in Algeria (Le Corbusier 1960: 144)

La Sainte-Baume's 188 units are aggregated to a gross density of 25 du/ha and each unit typically offers around 110 m² of useable floor space, a balcony of 11 m² and an attached courtyard of either 34 or 78 m². Cap Martin offered 47 units at a gross of 34 du/ha, with the higher density due to the larger number of smaller dwellings (Figure 12).

La Sainte-Baume exists in a country setting and the property occupies a lot of site. In a tight urban situation, the values are very different. It would then be possible to achieve a respectable 46 du/ha density with an agreeable 17 % of the footprint constituting communal space (Figure 13).

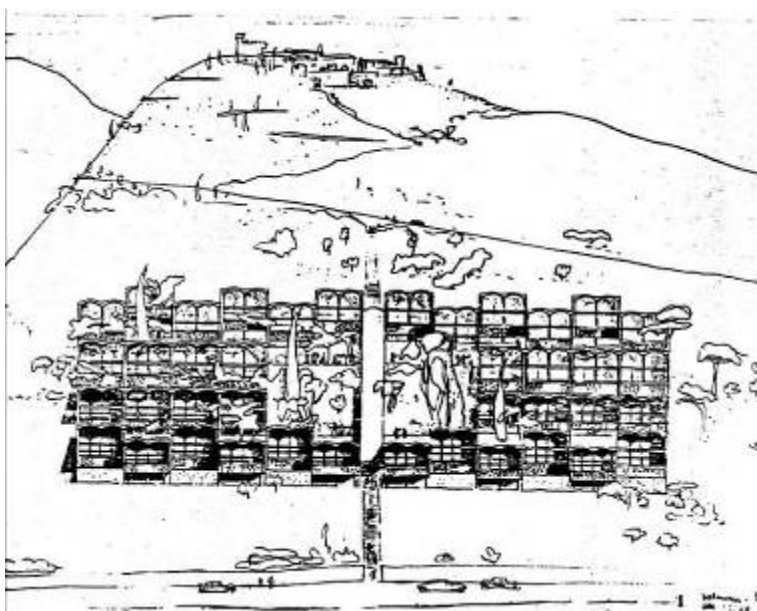


Figure 11 : 1949 – Roq-et-Rob at Cap Martin (Boesiger et al. 1967: 133)

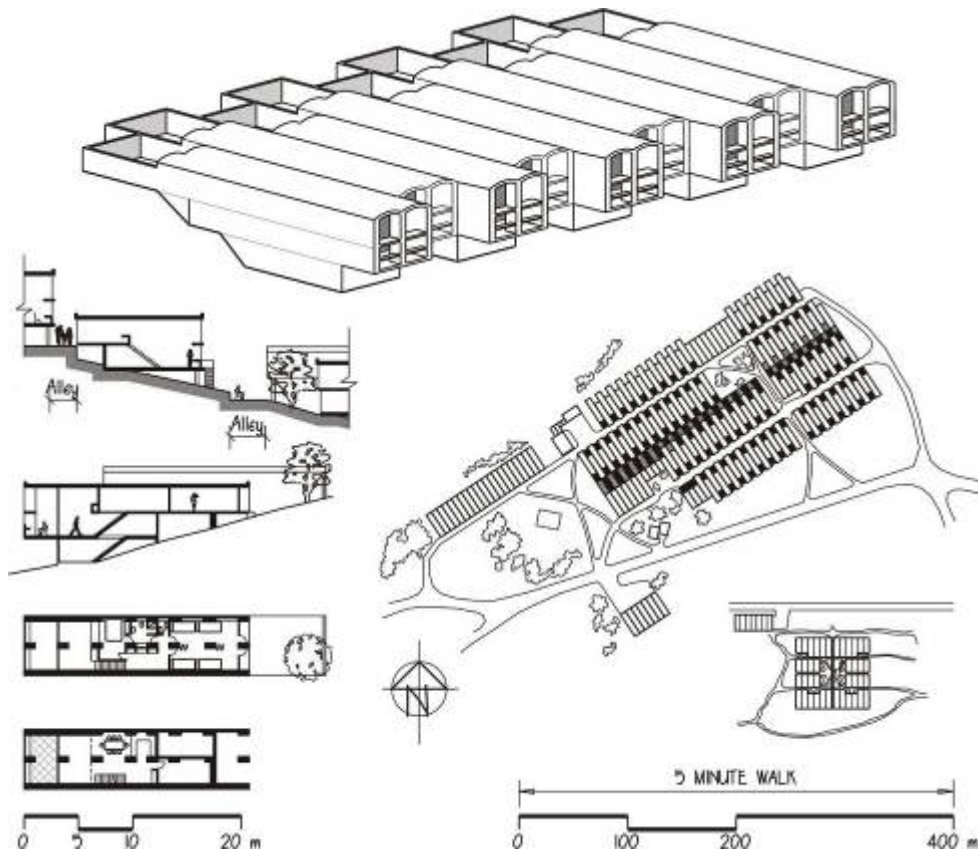


Figure 12 : The Côte d'Azur case studies (Author's drawing)

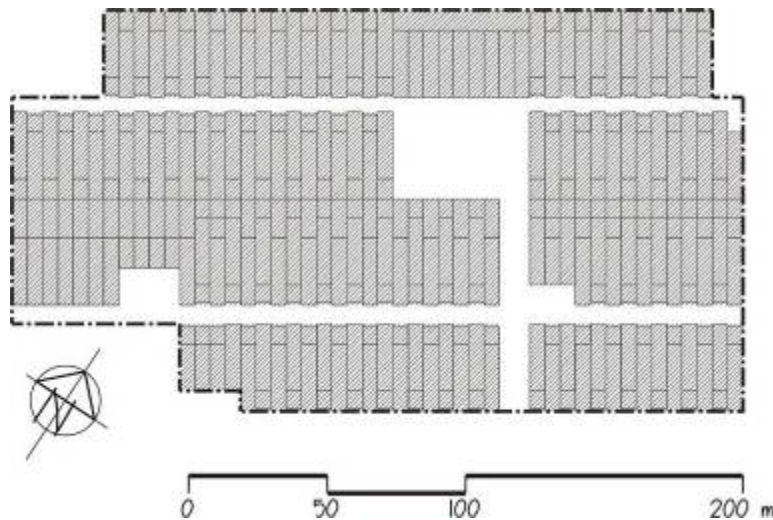


Figure 13 : Diagram for calculating urban densities using the La Sainte-Baume typology (Author's drawing)

La Sainte-Baume and Roq-et-Rob inspired a host of carpet-housing in the 1950s and early 1960s, and was even acclaimed as the essential model for most Post-Second World War low-rise housing schemes (Frampton 1973: 11). Frampton would later describe Siedlung Halen by Atelier 5 outside Berne in Switzerland (Figure 14), generally recognised as being inspired by Sainte-Baume and Roq-et-Rob, as “one of the most seminal pieces of land settlement built in Europe since the Second World War ... a model for reconciling development with place-creation and the maintenance of ecological balance” (1980: 311).

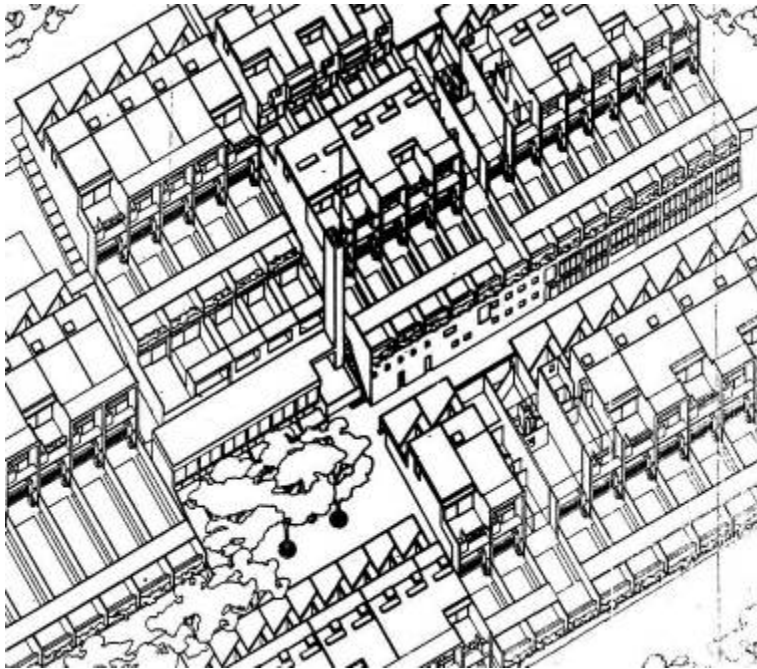


Figure 14 : Isometric view of Siedlung Halen (Mitra 1979: 197)

Quality Neighborhoods

Sidney Brower writes (2000: 15): “A good city should offer different types of neighborhoods.” While cities are the complex domains of diverse populations, neighborhoods are the legible territories of communities. “Good” neighborhood types range from lively mixed-use city centers, to urban villages with a small town atmosphere, to mainly residential suburbs, to quiet rural retreats. Current thinking on environmental, social, economic and political sustainability offers many criteria for analyzing quality in neighborhoods.

In the United States the majority of the people prefer to live in quiet, traditional suburbs, close to outdoor recreational parks, and with homogeneous neighbors and no

traffic congestion. The same is certainly true for South Africa, and probably also for Australia. Brower also found that, regardless of the neighborhood typology, whether it offers activity or tranquility, city-dwellers in the West appreciate walking environments and convenient, adequate public transportation (Brower 1996: 98), conditions that require higher densities and a measure of self-sufficiency. Densification must obviously be balanced with the need for adequate public and private open space. In the quest for alternatives to suburbia, the following sections discuss walkability, densification and private, protected outdoor living spaces.

Walkability

Neighborhoods constitute much smaller spatial units than cities and towns. Generally, an area of no more than about 1 600 meters across is suggested (Moughtin 2003: ix; Bartuska 1994: 283; Duany et al. 1994: xvii). Christopher Alexander and his collaborators maintain that a quality neighborhood is a mosaic of sub-cultures, occupying areas from 50 to 400 meters across (1977: 43-50), with “culture” denoting preferred life-style rather than socio-economic status. The various projects discussed here are all such urban entities.

Walkability and an effective public transport system clearly require a compact, fine-grained, mixed-use urban tissue. In fact, Moughtin is adamant: “Anything short of this holistic urban agenda is superficial, merely treating the symptoms of the ills that beset our cities” (Moughtin 2003: 279). A fine-grained fabric enhances permeability – the number of alternative routes to a destination – and is mainly achieved with small street blocks. Permeability can be measured using a technique used by Southworth and Ben-Joseph (1997: 105-107), namely comparing the length of streets, and the number of intersections and access points in a representative 400 by 400 meter fragment, the distance that can be comfortably walked in five minutes, and drawn to a scale of 1: 10 000. Values are extrapolated to fill out the fragment, with original measurements in brackets (Figure 15).

New Urbanist principles prescribe that block sizes should be no larger than 195 by 80 meters (Moule & Polyzoides 1994: xxii). That means at least 15 intersections and about 3 200 metres of streets and/or pathways are necessary to achieve permeability. Accordingly, a traditional South African neighbourhood, Riviera in Pretoria, is not permeable at all because of its large street blocks, but, as expected, Seaside and the ksar in the M’zab are. All Le Corbusier’s projects are permeable, with the Barcelona scheme particularly fine-grained. Walkability needs destinations, and both Seaside and the M’zab ksar have public institutions distributed throughout the fabric. Le Corbusier’s projects all offer communal parks, but only the Barcelona scheme offers an inherent mixed-use morphology that can truly make a neighborhood come alive.

A comparison (Figure 16) shows the internal streets of the Unités d’Habitation, an arrangement for which he has been widely condemned, as well as a typical car-

dominated suburban street. But it also shows how similar the pathways of the Côte d'Azur projects are to those of Arab cities shaped by Islamic law, and how conceptually similar a Barcelona street is compared with a street in Seaside, the quintessential pedestrian-friendly New Urbanist creation.

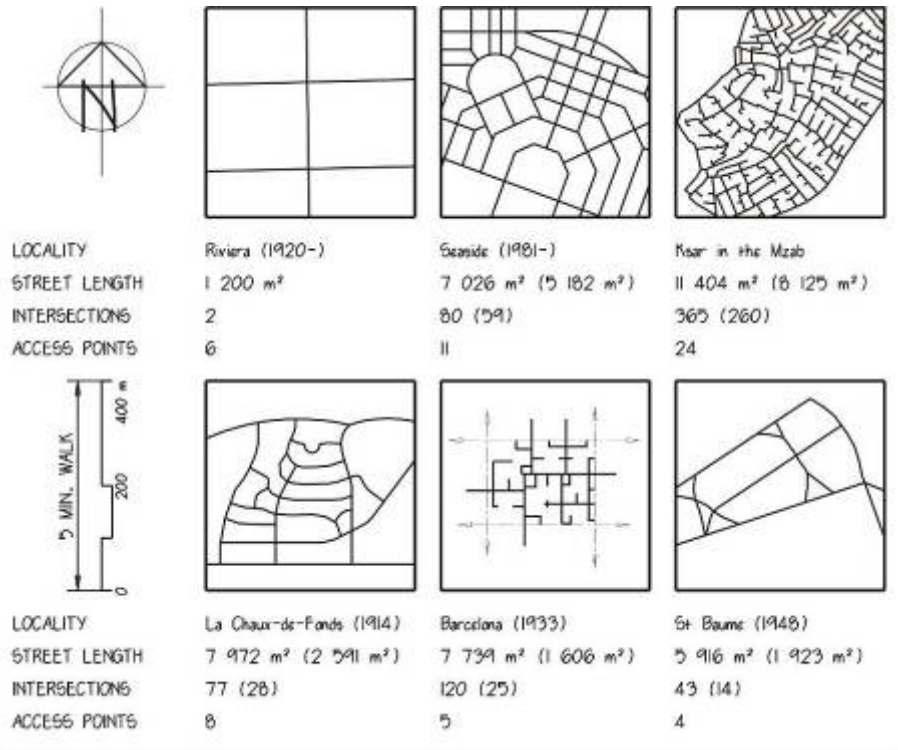


Figure 15 : Comparative analysis of street patterns (Author's drawing and calculations)

Densification

What is an appropriate density for such a walkable neighborhood? The typical suburban density in the United States is about 20 dwelling units per hectare (du/ha) and "too low to support corner stores, cafes, and all the kinds of places associated with conviviality" (Van der Ryn 1986: 40). In South Africa suburban densities are even lower due to the large plots. It is significant that in both the USA and UK densities of at around 50 du/ha in a mixed-use have been recommended for some time to counter sprawl (Van der Ryn & Calthorpe 1986: 56; Colquhoun & Fauset 1991: 47), and it seems reasonable to accept this standard as a benchmark. This can easily be achieved with row houses with private courtyards and common open space. The limit for ground-oriented housing seem to be about 100 du/ha in a terraced configuration,

but these would then have no open space, very small private gardens and grouped carports (Untermann & Small 1977: 9).

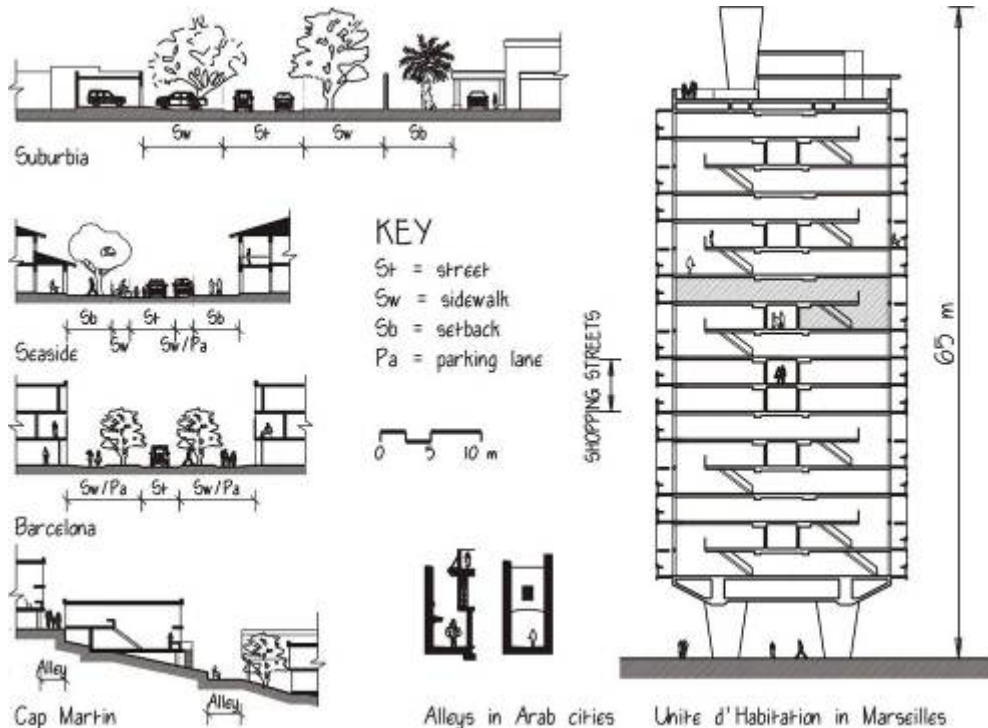


Figure 16 : Comparison of street sections (Author's drawing)

Land-use intensity is determined by comparing representative 100 by 100 meter 1:2 500 urban fragments of each case study, a procedure developed by Norbert Schoenauer (2000: 144) of McGill University (Figure 17). While built-up and open spaces can be accurately measured and compared, determining building and population densities is problematic because of different typologies, floor areas per person and household size and composition, and values should be considered broad trends only. The population densities (in brackets) indicate how the houses are actually being inhabited in the top row, and in Le Corbusier's case, how many bed spaces he allowed. Densities then vary from 50 m²/person in Riviera to about 40 m² in the Tunis Medina, exactly the same as Le Corbusier allocated to each person in the Barcelona units. Both the Pavillon de l'Esprit Nouveau and the Côte d'Azur units offer 30 m²/person, still extremely generous. Considering that the Tunis Medina is truly vibrant with a population density of about 240 people per hectare, but only 30 units per hectare because of their large size and the extended families, it follows that building density is only a reliable criteria when a population has the same demographic characteristics. In spite of all these concerns, it is clear, no matter what is measured, that Le Corbusier's projects are acceptably dense, with the Côte d'Azur

schemes being borderline and the Barcelona quarter exceptionally compact, even with coverage of only 49 %.

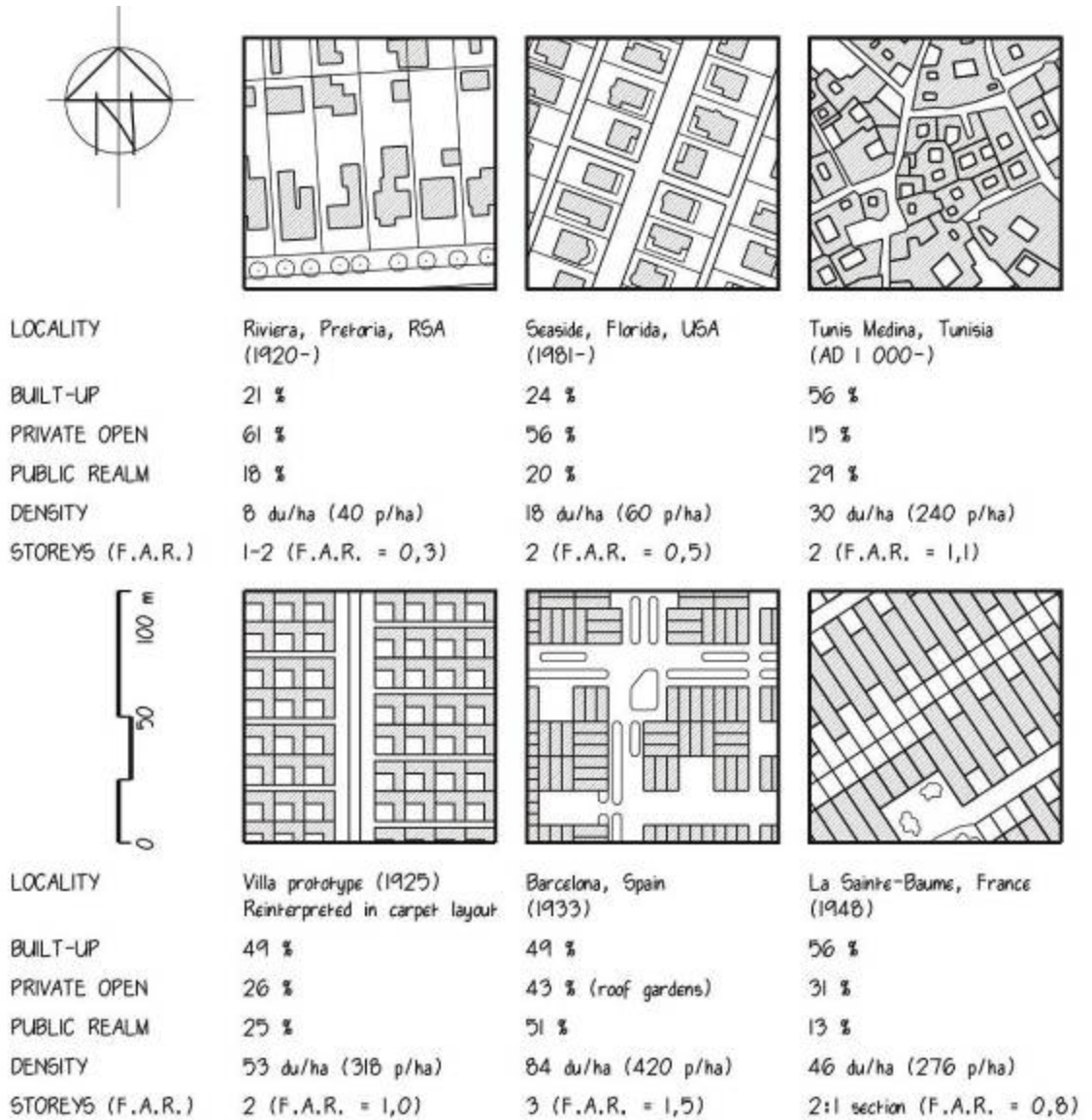


Figure 17 : Comparative analysis of land-use intensity (Author's drawing and calculations)

Private, Protected Outdoor Living Space

A private garden is so important that Alexander et al. are adamant that even a high-density rental apartment should have one. When reconsidering housing typologies in the USA after the Second World War, George Gray suggested that individual ground-oriented houses with private gardens tend to maintain the strength of the family as a social unit, whether configured as single, semi-detached or row houses (1946: 123). As discussed, reasonable densities can in fact be achieved by aggregating units into clusters of three or more dwelling units separated by party walls, each still with a private entrance and a small yard or garden at the front and/or rear.

Marjorie Keiser (1978: 111) observes that one of the greatest disadvantages of cluster complexes is the lack of privacy. She argues that innovative design is required that affords privacy while accommodating large numbers of people. Since privacy is so important, it follows that more habitable rooms can be located to face the private garden side if the unit is sufficiently wide, but wide frontage units are also expensive to service. A reasonably cost-effective width seems to be between 5,1 m and 6,3 m. The true narrow-frontage two-storey house is not only the most economical of all attached house types, but it also allows the highest densities, according to Colquhoun and Fauset (1991: 272-273). The frontages of Le Corbusier's units vary from 4,5 m in Barcelona to 5,0 m in the Côte d'Azur units. The Pavillon de l'Esprit Nouveau was 12,0 m wide; probably the reason it was abandoned so soon after its inception.

There is no general agreement on the most appropriate size for a private garden to an attached house. Untermann and Small recommend a 46,0 m² garden including a paved area of 18,0 m² (1977: 106), while Colquhoun and Fauset recommend a walled patio area of 50,0 m² minimum in patio housing (1991: 205). To put these values in perspective; even an L-shape patio house in a 12,0 m grid, offering about 82,0 m² of usable floor space, will have a garden area of only 44,0 m². But Colquhoun and Fauset also concede that the size of gardens is not as critical a factor of satisfaction as might be commonly believed, and that a small, easy-to-manage garden would be preferred by most.

Le Corbusier is often accused of neglecting private gardens. Geoffrey Baker writes that Le Corbusier simply assumed "that people would prefer large open spaces to smaller private ones" (Baker 1996: 278). Recognizing his "great devotion and seriousness", Christopher Alexander argues persuasively (1979: 284) that "[Le Corbusier] forgot, or did not realize, that there was one essential force at work in the system – the human instinct for protection and territoriality". Certainly as far as the projects under review are concerned, these remarks are not justifiable. Pavillon de l'Esprit Nouveau offered a patio garden of 64 m², the Barcelona house had a roof garden of 49 m² and a balcony of 9,0 m², and the La Sainte-Baume unit had walled courtyards of either 34 or 78 m², as well as a balcony of 11 m². Only Cap Martin, actually a residential resort hotel, had only balconies and no private gardens.

Impacts

The influence of the Côte d'Azur projects on carpet housing in Europe was discussed earlier (Figure 18). A problem with their unit configuration, derived from the Unités, was the dark, unventilated central part of the house. In 1962 Peter Phippen designed twenty-eight 7,0 m wide linear houses at the Ryde, Hatfield, in the UK. He solved this problem neatly by introducing internal courtyards. In the mid-eighties, Tadoa Ando's Rokko Housing was designed for a previously unbuildable hillside site overlooking Kobe Harbour, clearly derived from Roq-et-Rob.

It was also noted that Pavillon de l'Esprit Nouveau was resurrected as a villa in Vienna, but what was its impact on multi-family housing? Around the 1930s many of Le Corbusier's Modernist peers, including Hugo Haring, Hannes Meyer and Ludwig Hilbersheimer, designed L-shaped patio houses, albeit with rather mundane plans and always in a freestanding or terraced configuration – and certainly without acknowledging Le Corbusier's concept. In the early sixties Jørn Utzon (who also designed the celebrated Sidney Opera House) revived the concept and produced the best known patio schemes to date; the Kingohusene projects at Elsinor (1959) and Fredensborg (1963) in Denmark. Utzon inspired a whole generation, but as Colquhoun and Fauset explain (1991: 52), patio houses are more expensive than the standard two-storey row house and were essentially abandoned in the 1970s.

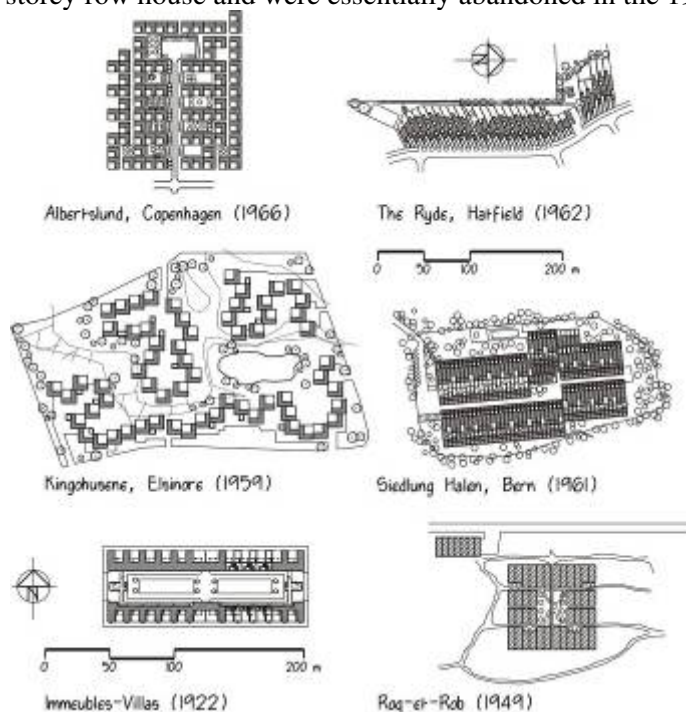


Figure 18 : The gynaecological development of Le Corbusier's concepts (Author's drawing)

Just as Tadao Ando developed the Roq-et-Rob concept into an award-winning design, so should Le Corbusier's *oeuvre* be searched for seminal concepts that might contribute towards solving current problems. Too many projects are driven by profits rather than design quality, and it is ironical that in 85 years architecture could not improve on the spatial qualities of Pavillon de l'Esprit Nouveau. The concept should be updated to satisfy current tastes and accommodation requirements, and could be repacked as clustered ground-oriented villas (Figure 19). Similarly, the Côte d'Azur concept could benefit from Phippen's small internal courtyards and be reconfigured and reassembled to make diverse and robust mixed-use streets. But really puzzling is the fact that the Barcelona concept was never (as far as could be established) developed, in spite of a very rational plan, an economical shell, very favorable land-use properties and a potentially very pleasant and safe public realm.

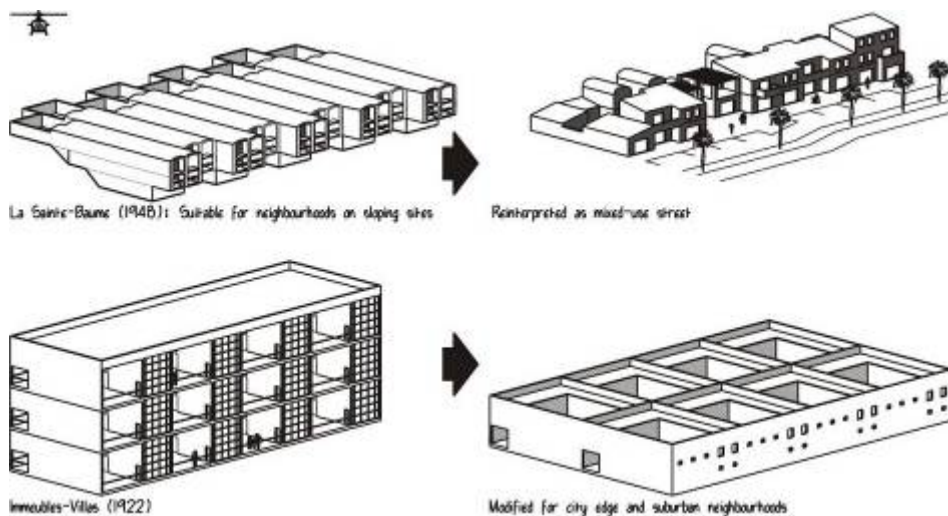


Figure 19 : Manipulation of Le Corbusier's housing concepts (Author's drawing and design)

Conclusion

This paper explored a small number of unbuilt but pertinent ground-oriented housing projects that offer concepts that could enrich the current knowledge base, but also highlight some concepts to avoid. These concepts could arguably produce better cluster housing, and could enhance the quality of a neighborhood if it is integrated as a mixed-use precinct, rather than as a gated enclave. As infill projects such schemes would not only densify a neighborhood, but also contribute to achieving variety and choice. When viewed in conjunction with recent developments in town planning and urban design, it becomes clear – as this paper demonstrates – that many of Le Corbusier's ideas are still innovative ... and perhaps only now becoming truly relevant.

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