LE CORBUSIER'S DOMESTIC ARCHITECTURE AND TOWN PLANNING

by

PETER KENNEDY

MARCH 1991

A Dissertation Submitted To:

The Faculty of History of Art, Design and Complementary Studies

Department of Industrial Deisgn
Faculty of Design
National College of Art & Design

CONTENTS

LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS cont'd

ACKNOWLEGEMENTS

I should like to thank Paul Caffrey, my tutor, for all his help and encouragement, and also thanks to Judy Kelly for typing this thesis.

INTRODUCTION

The subject of this thesis is Le Corbusier's (1887-1965) formula of a new domestic architecture and town planning for the 'modern' individual.

It is very difficult to pinpoint the word 'modern'. As early as the Fifties, it had become customary to speak of modern architecture as 'mature' or 'grown up' and if that was a meaningful way to speak, then the word 'modern' in that context could no longer have the same characteristics as being up-to-date, born yesterday, as-of-now, as we might describe it. To describe modern in practical terms, one could use the phrase 'not overworked', honest to the point of brutal frankness in its use of materials. In other words, the construction was not disguised.

Le Corbusier's early domestic architecture is discussed and includes Villa Falet in La Chaux-de-Fonds, (1906-1907), Villa Faure Jacot in Le Locle, (1912) and his early education, thoughts and procedures including his many influences such as his teacher, L'Eplattenier, René Lalique, (1860-1945), who influenced Le Corbusier with his jewellery creations representing nature, John Ruskin, (1819-1900), with his treatment of projections and recessions on a building, Tony Garnier, (1861-1948), and Auguste Perret, (1874-1954), from whom he got inspiration from the garden city and flat roofs.

In 1910, Le Corbusier worked with Walter Gropius, (1847-1911), and Frank Lloyd Wright, (1869-1959), as assistants ~~for~~ to Peter Behrens, (1868-1940). They had one thing in common, they all became interested in mass production and standardization in one form or other.

Around the end of the First World War, Le Corbusier became aware of standardization and mass production as large quantities of housing was needed to accommodate people. As a result of Le Corbusier's teachings, travelling and working experiences, he had gathered together a manifesto of ideas and philosophies which became his

five points of a new architecture:

1. The pilotis
2. The roof garden
3. The free plan
4. The elongated window
5. The free facade.

This jump in style, (but not in principle), shows the step in which Le Corbusier had taken from being educated by L'Epattenier to working for Peter Behrens. Behrens transformed the concept of art. He pronounced the end of industrially produced 'art' in the sense of mechanical copying of traditional ornament, materials and craftsmanship. Instead of forcing new, mechanical appliances to conform to the formal and decorative norms of their hand build precursors, Behrens sought to give them a form appropriate to their nature and to the means of their production.

Le Corbusier's experiment with standardization brought him the "Domino Houses" just after World War I. The Domino house was basically a constructional prototype for the dwelling. Following the Domino houses, came Citrohan One and Two, which established the dwelling as standardized, mass produced and serviceable. I shall show, firstly, it was not Le Corbusier alone who looked at the future needs and considered mass production and its social implementation, that it was a gradual build up from, first of all, men like Peter Behrens and then followed up by the Bauhaus Movement in 1919. Secondly, that standardization is an ideology, (where a body of ideas are implemented over a long period of time), rather than a technical innovation.

A fundamental side of Le Corbusier's conception was the fact that he wanted to produce architecture by building houses at a time when very few people thought of dwelling houses as proper subjects for architecture and it seems that Le Corbusier's insistence on introducing architectural qualities into his houses was the chief reason for the astonishment evinced by the people, when first confronted with his work.

An example of this will be shown in the 'Villa Schwob,' Chaux-de-Fonds, (1916), where Le Corbusier introduces two rooms without a dividing wall, (a by product of the open plan).

The second chapter is largely descriptive and deals with Le Corbusier's town planning, the Ville Contemporaine, (1922), the Ville Radieuse, (1930), the Unite d'Habitation Marseilles, (1945-1952), and the development of Chandigarh for the Province of Punjab in India, (1951-1964).

Although Le Corbusier concentrated all his efforts on ordering the overall master plan of Chandigarh and not on the detailed development of the urban area, (which he left to his two colleagues), I have nevertheless included it because, firstly, Chandigarh was the only town plan which was taken off the drawing board to become a reality. Secondly, Le Corbusier's inner self is projected much more clearly in the design of the major architectural monuments and indeed in the general layout of Chandigarh as a whole. (This is probably because he was given a free hand to the project).

Le Corbusier's influence on town planning was Ebenezer Howard, (1850-1927). Howard was the originator of the garden city concept and had a clearly social attitude towards town planning. Camillo Sitte, (1843-1903), at around the same time, adopted a picturesque point of view towards town planning. Le Corbusier regarded this type of approach as unacceptable for the 'modern man' but was interested in Ebenezer Howard's garden city and social planning.

Le Corbusier's ideal city consisted of four points, which will be discussed:

1. We must decongest the centre of our cities.
2. We must augment their density.
3. We must increase the means for getting about.
4. We must increase parks and open spaces.
   (Le Corbusier, 1977: 166).

I will show how Le Corbusier enticed people into living in his houses/by varying the relative position of his standard components, Le Corbusier was able to achieve not only variety but also individuality. This also proves that rational construction, based on the use of component blocks, does not destroy initiative. At the beginning, Le Corbusier was trying to create very different concepts.

The first of these was derived from the horizontal structures of the garden city, (Ville Contemporaine), in which he found expression in his designs of individuality. Here Le Corbusier's main goal was to improve the living conditions of the working class. The principle of his city which governs its layout are opposed to current customs and habits of thinking which lead to overcrowded cities. His desired goals were to assure a flat, easy and noiseless traffic flow, to guarantee hygiene and well being, to facilitate family life, and to ensure at last the wholesome and unencumbered growth of the city by taking long term measures.

The second concept depends on high density, vertical structures, (Ville Radieuse), which formed the basis for his plan for Paris, 1925. It was from a combination of these two town plans that the Unite d'Habitation was created. It is a combination of collectivism and individualism and shows how Le Corbusier isolated the individual but yet housed them close together.

This leads to further proof that standardization was not motivated by technical considerations alone, it also served to justify an ideology which appears to have been based on town planning conceptions.

Chandigarh was the opportunity which Le Corbusier was waiting for. It presented a situation where he could let his imagination go, let his thoughts and inspirations flow and it shows that he wanted the world to know who he was and what he stood for.

The final chapter will concentrate on the relationship between Le Corbusier's domestic architecture and town planning. An architect

must not only do things, but say things in his work. Admittedly, Le Corbusier was not the only architect to realise that things have to be said, but as I hope to show that he was exceptional in that, although he said a great deal, he also did a great deal.

Le Corbusier was born Charles Edouard Jeanneret in La Chaux-de-Fonds, Switzerland, on the 6th October 1887 and he died in 1965 at the age of 78. Le Corbusier was an outspoken, theoretician, prolific writer, controversialist, urbanist, successful furniture designer, artist, sculptor and an accomplished exponent of the plastic arts.

During his long, creative life, Le Corbusier responded primarily to emerging tendencies rather than to the circumstances of a given moment. He gave form to a life pattern in the making, rather than to one already in existence. No wonder therefore, that especially during the early part of his career there were only a select few who could distinguish the nature and significance of his ideas. These critics were by no means always positively inclined towards Le Corbusier's vision. The determinism of his planning theories was flatly rejected even by those who admired his architecture and his most talented followers tended to criticise his examples even while extending them. Nonetheless, with the almost universal acceptance of modern architecture in the two decades after the war, it was Le Corbusier who supplied many of the points of reference.

CHAPTER I

DOMESTIC ARCHITECTURE

Le Corbusier grew up in the town of Chaux-de-Fonds where both his father and grandfather were skilful watch engravers. At this stage, it seemed Le Corbusier would carry on the family business, as he had developed a keen interest in the subject. L'Eplattenier, after becoming an art director in 1903, believed watchmaking was a dying trade and so encouraged the boy to set his sights higher.

Le Chaud-de-Fonds provided Le Corbusier with a truly, natural location and he immediately got interested in town planning. He studied books on l'Eplattenier's advice, one of which was entitled 'La Construction des Villes'. It dealt with the make up of the city, i.e. city plots, streets, squares and enclosing walls, which were illustrated with examples taken from historic European cities. Le Corbusier spent much of 1910 in Germany, visiting the best known German medieval towns, and took reference from postcards which had picturesque alignments of large buildings dominating intimate, enclosed squares or streets. Using these themes, Le Corbusier sent home postcards of his ideas for various towns like Chaux-de-Fonds, (Fig. 1) and New Hampstead, (Fig. 2).

Le Corbusier had always a love for nature in which he first got from his watchmaking experiences. The jewellery of René Lalique, (1860-1945), had longlasting influences. Lalique was an Art Nouveau jeweller, an instigator of an entirely new approach to jewellery. Using traditional skills he created an entirely new means of expression for the jeweller's art and he helped overturn the traditions of the 19th century French jewellery design and manufacture. Like Le Corbusier's career, Lalique had been struggling with his creations and their acceptance for many years, trying to find fresh and exciting ways to express his imagination and to break completely with the past.

Lalique expressed his work through nature and he studied flowers and insects that provided him with his theme. He focused on the

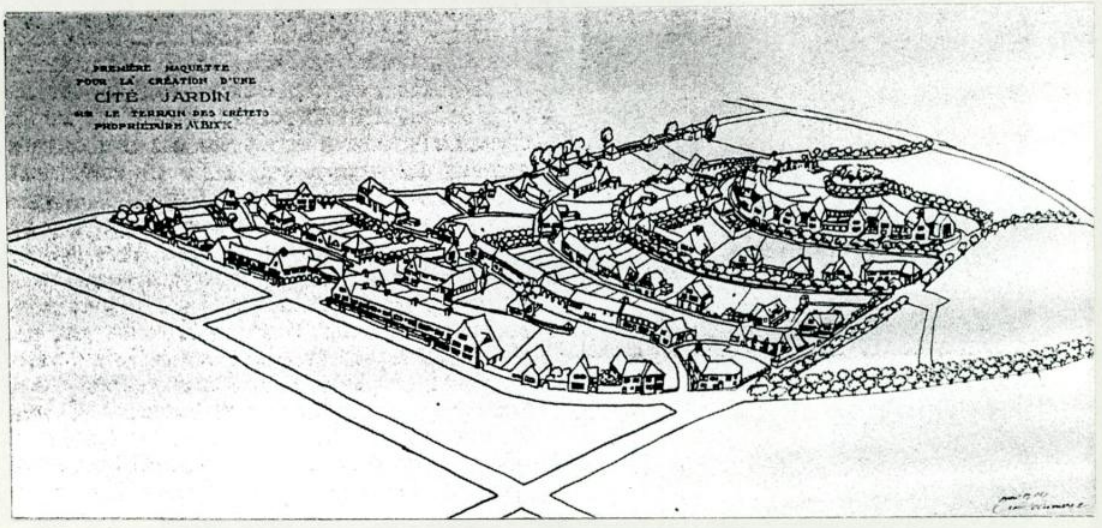

Fig. 1. Le Corbusier, Aux Cretets Suburb Scheme, La Chaux-de-Fonds, June 1914.

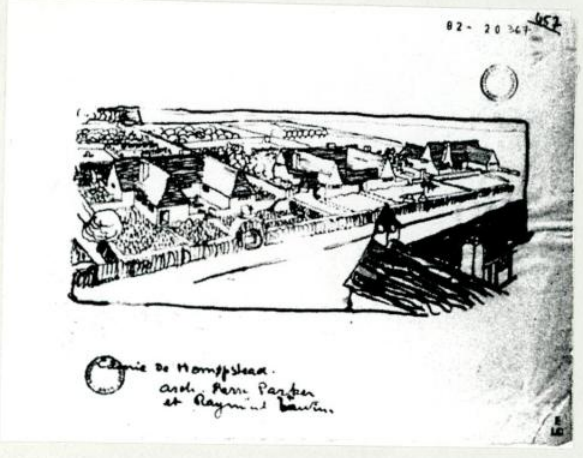

Fig. 2 Redrawing of Hampstead Plan, 1914

decay and rebirth of the natural world, choosing wilting leaves, world-weary anemones, or the humblest of field flowers like thistles about to disintegrate in the wind. He worked with gold, enamel and glass, conveying the dynamic forces or organic life, rippling water or budding stems. Fig. 3 shows one of a series of jewels depicting seasons, winter woodlands. Fig. 4 shows a watch case engraved with pine cones. (Lalique: 1987: 15-30).

Le Corbusier adapted similar detail in his architecture as we can see, especially in his earlier houses, in which he shows a very strong influence of nature. Le Corbusier always carried the nature theme throughout his work but later he uses it in a more abstract way.

His very first house was known as the Villa Fallet, Chaux-de-Fonds, (1906-07), Fig. 5, in which he got some inspiration from the Jura farmhouses. Its ornaments and silhouette were inspired by the geometry of conifer trees which transformed a natural form to the geography. His thoughts on the setting was to give a person moving through the landscape an experience by using curved streets of varying width with perspectives changing continuously as the person moves along. Everything was to avoid monotony, repetition and the wasting of good buildings to provide suitably dramatic and unexpected places for their discovery.

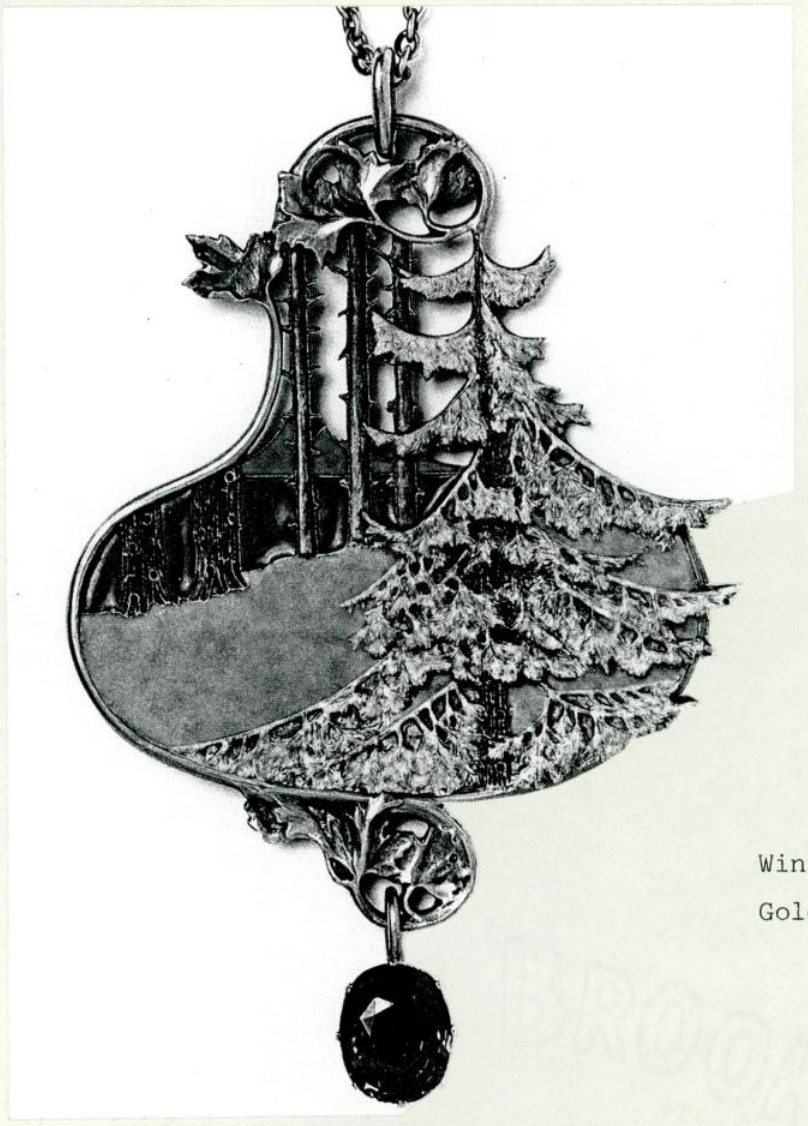

Fig. 3
René Lalique
Winter Woodland pendant
Gold, enamel, sapphire
(1898-1900)

Fig. 4
René Lalique
Watch case engraved
with pine cones.

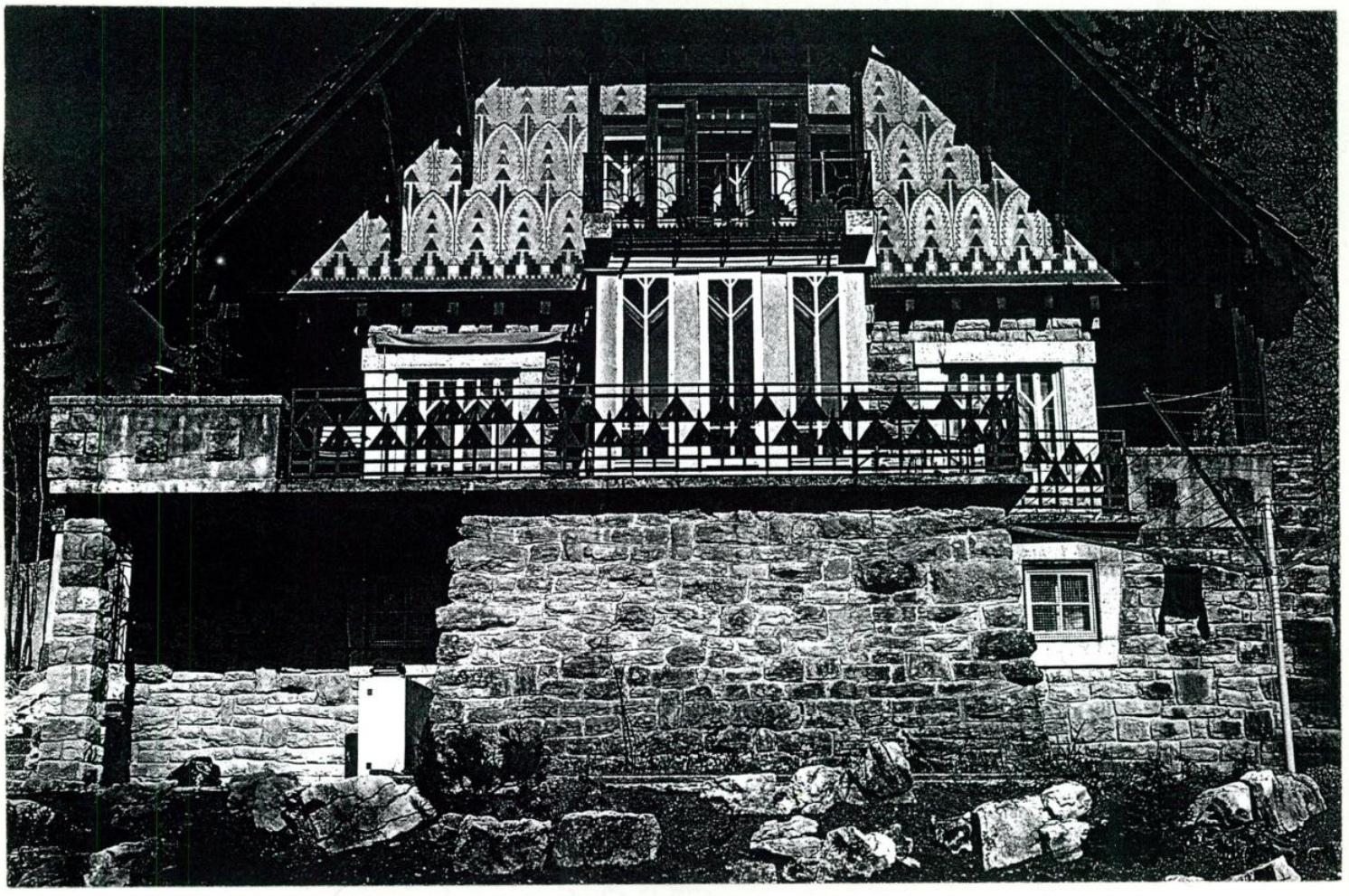

Fig. 5. Le Corbusier: Villa Fallet, (1906-1907), Chaux-de-Fonds. Its ornaments and silhouette were inspired by the geometry of conifer trees.

Le Corbusier wanted an artistic approach, that wasn't over concerned with planning criteria.

For the base he uses a raw natural stone, obtained from the local area. The gable has a neo-medieval appearance and is decorated with a display of decorative forms which derive from the firs of Jura. The timber of the roof and the crossbars of the window are geometric symbols of Jura pines. It also has two wrought iron surroundings on the balconies, highly decorated which give the house an extra layer, like the foliage on the trees.

Another great influence on Le Corbusier was John Ruskin, (1819-1900). Ruskin was most interested in sculptured decorations and mouldings. He believed that the treatment of the exterior of a building as a whole is aesthetically significant, its contrasts of block against block, the effect of a pitched or flat roof or dome. and the rhythm of projections and recessions (Fig. 6). It is this aspect of the building that seems of greatest concern to Le Corbusier and as we see he carries it through all of his work, particularly in houses like Villa Savoye, at Poissy, 1929 (Fig. 7), and Villa Garches, near Paris, 1927, (Fig. 8).

Another interesting house is the Villa Favre-Jacot, (Fig. 9), built in 1912, in the Le Locle for a watch manufacturer. The windows of the first floor, the strip window, both form and proportion of the hip roof are all taken from the Peter Behren's almost contemporary Villa Goedecke in Eppenhausen, (1911-1912), (Fig. 10). The windows on the first floor almost divides the top of the house from the bottom also, the fact that they are very close together. These were named "elongated windows" and were adopted by Walter Gropius in 1914. It gave the impression that the whole building was sitting on glass, which, of course, was totally independent of the structure. These windows broke up the mass of the buildings and allowed light to circulate.

Le Corbusier holds on to this feature throughout much of his work, and can be seen in the Villa Savoye near Poissy, 1929, (Fig. 11), and the Villa Garche, 1927, (Fig. 8).

Fig. 6. John Ruskin, (1819-1900)
Rhythms of projections and recessions -
Entrance to Feldkirch, Tyrol.

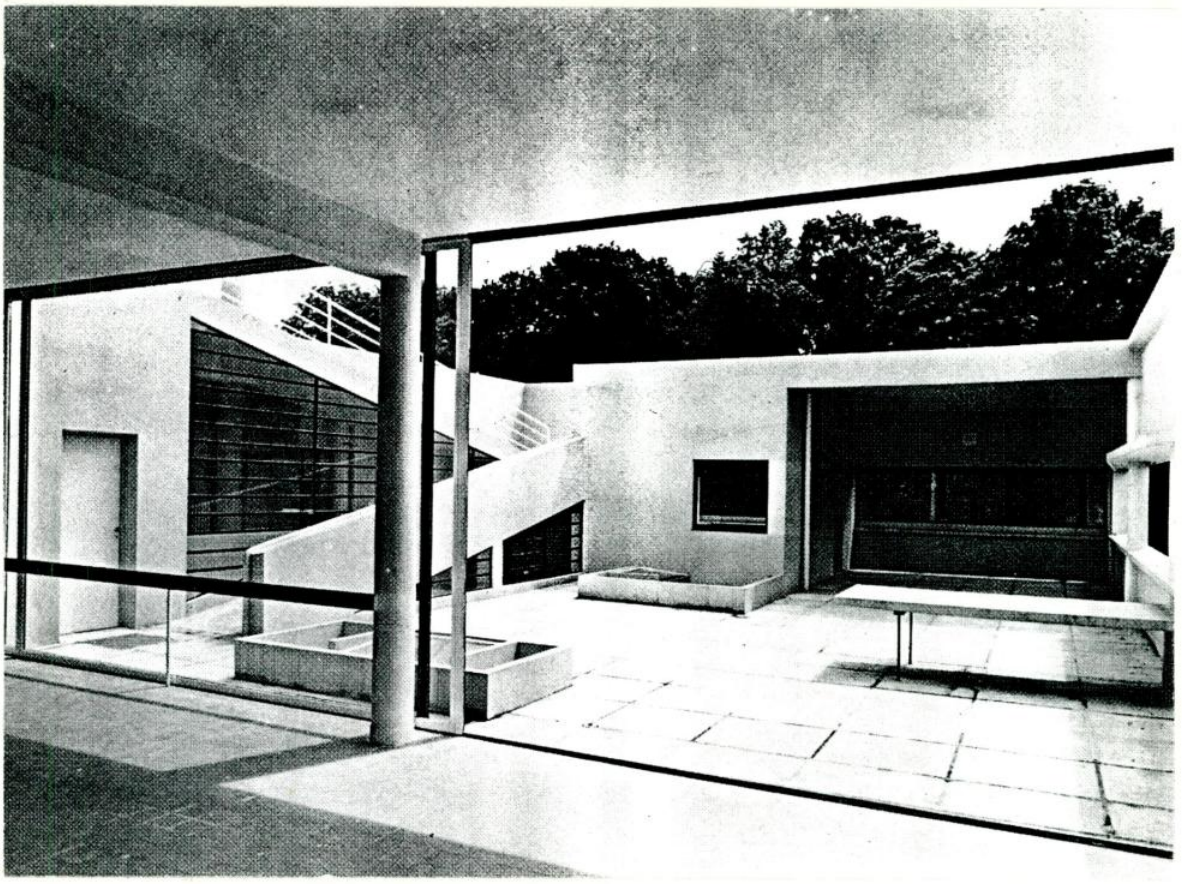

Fig. 7. Le Corbusier: Rhythm of Projections and Recessions, Villa Savoye at Poissy, 1929

Fig.8. Le Corbusier: Villa Garches near Paris, 1927.

Fig. 9. Le Corbusier, Villa Favre-Jacot, Le Locle, 1912
Form, proportion of hip roof and the strip window are taken from the Goedecke Residence by Peter Behrens, below.

Fig. 10. Peter Behrens, Goedecke Residence in Eppenhausen, 1911-1912.

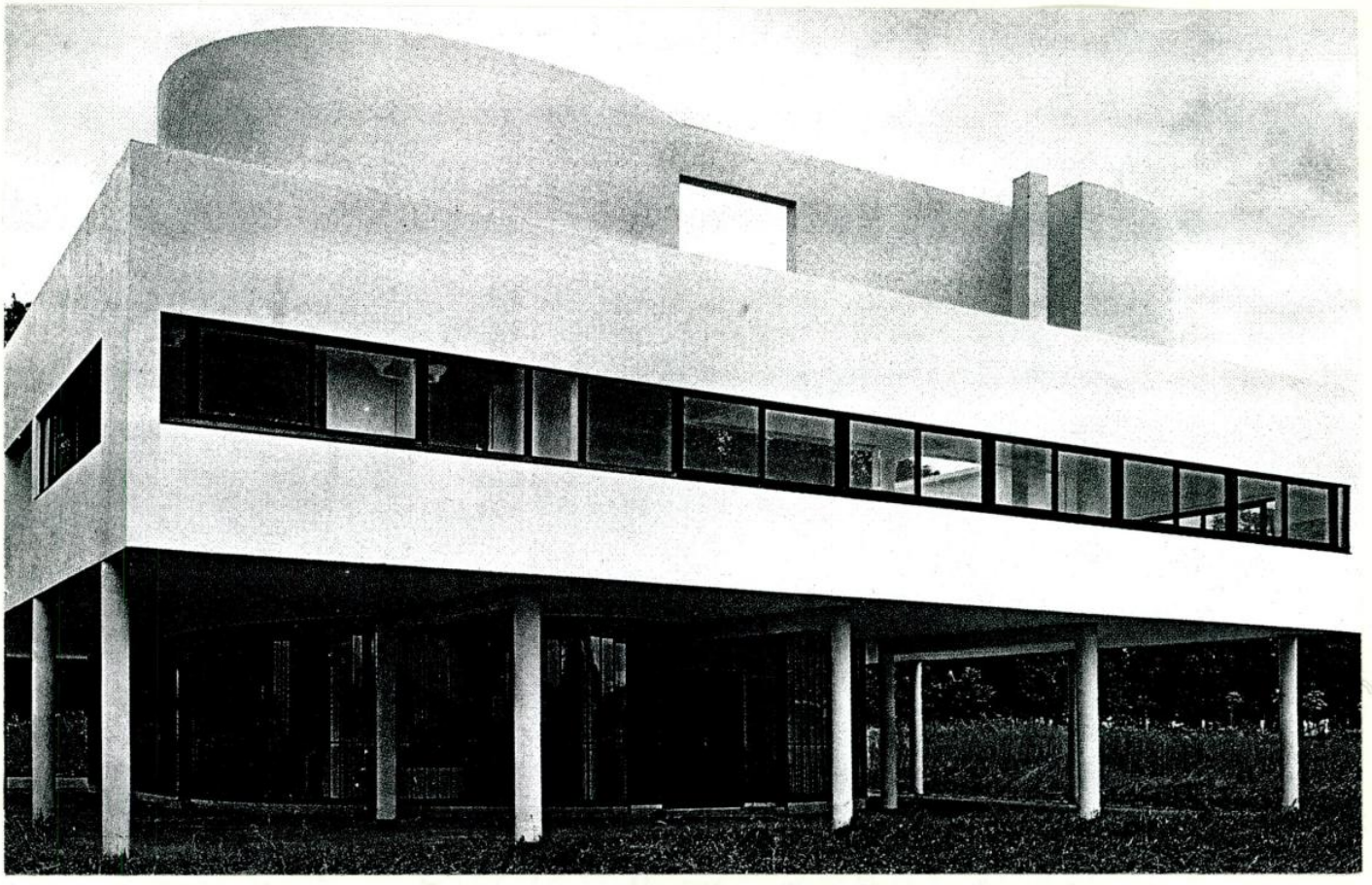

Fig. 11. "The Elongated Window"
Le Corbusier, Villa Savoye, Poissy, 1929

In 1910, Le Corbusier went to Germany to work as an assistant to Peter Behrens. There he met Walter Gropius, Frank Lloyd Wright and Mies van der Rohe, all of whom had a great influence on him. Behrens, at that moment, was the hero of progressive German architecture, responsible for the design of everything from factories to sales literature produced by the giant A.E.G. From the man behind Behrens, the theorist and design politician, Herman Muthesius, they all seem to have imbibed the faith in the virtues of standardization.

Behrens brought together practical utility and abstract beauty that was clearly hostile with each other for some time now. He believed that practical objects should no longer appear as something that merely serves its purpose, but as something that combines with its use a sense of satisfaction. Efforts were also made previously to add life to objects by adding decoration and ornament in order to conceal their crude work purpose. The object was loaded with unnecessary, purposeless decoration. The additions had a negative effect in another respect. The functional qualities of the object could no longer be seen and the desire to use it was thus unconsciously depressed, (Fig. 12 and 13, show Peter Behrens AEG, Turbine Hall, 1909).

Then came the recognition of the psychological delight in the useful and functional. One wanted to see the use, to recognise the function. This desire was carried out over to the production of the object and value was placed on its material and construction. One went even further and stressed the function and the design exposed the construction, and created forms that invited use. The artistic influence was now highlighted in the development and coupled with the progress of technology and the discovery of new materials, guarantees the fertility and legitimacy of the modern style (Behrens: 1901).

After World War I, reports of the damage caused as a result filled the papers and it seemed that the time for rebuilding had arrived. Le Corbusier designed a system based on two horizontal concrete slabs, supported by columns and connected by stairs. In plan,

Fig. 12. Peter Behrens, AEG, Turbine Hall, 1909.

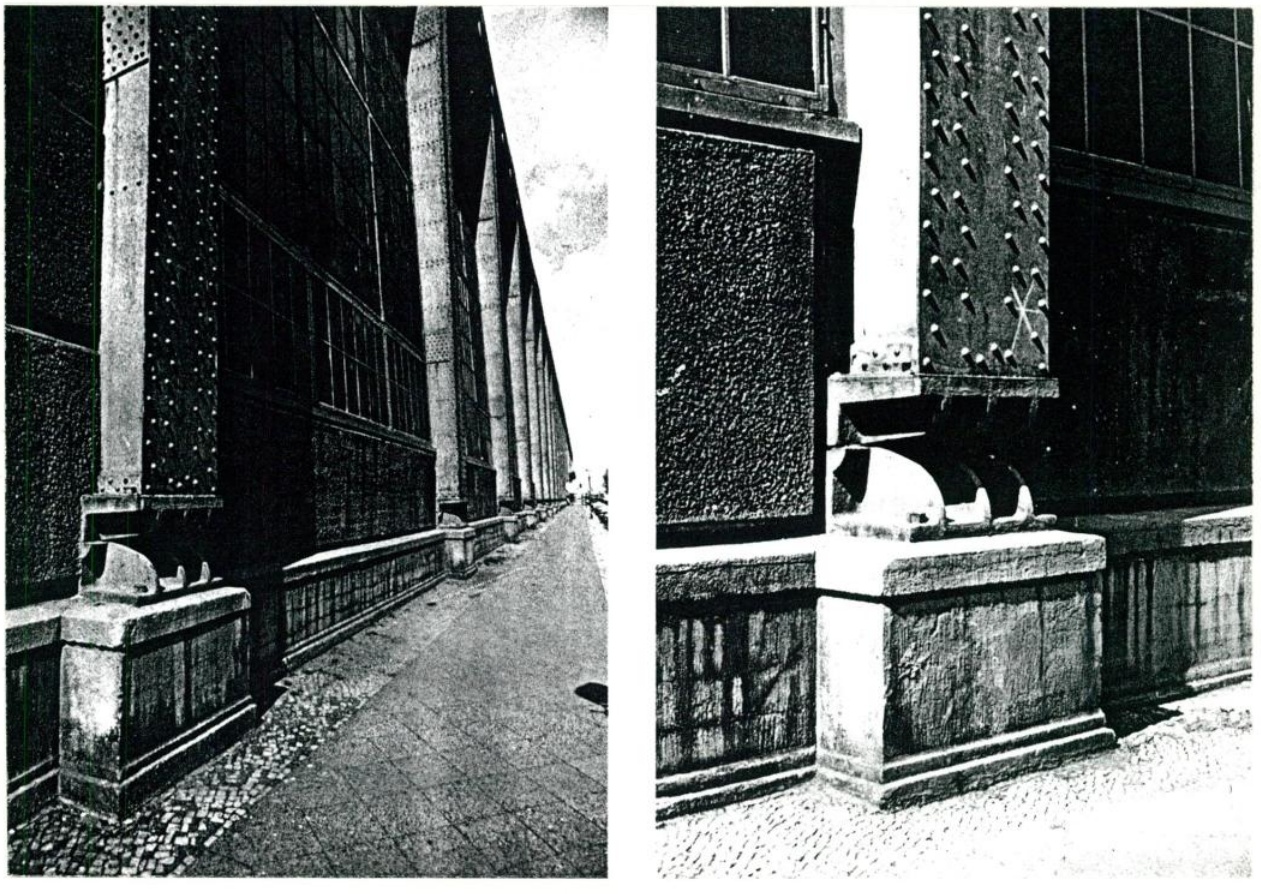

Fig. 13. Details of the hall in its present condition.

these slabs look like dominoes, hence their name "Domino", (Fig. 14). From this, Le Corbusier developed what was to be known as his five points of architecture:

1. The Pilotis
2. The roof garden
3. The free plan
4. The elongated window
5. The free facade.

Le Corbusier believed that the elements of this simple system could be easily mass produced. In large areas, where the war had damaged, he envisaged that the structure could be erected in large numbers and the owners could supply the missing parts. Prefabricated window and wall sections would be made available in order to permit completion of every unit according to the needs of each dweller. This skeleton made of steel and supporting reinforced concrete slabs was not Le Corbusier's invention. What was new was that the columns were recessed with respect to the outer walls. This made it possible for the exterior walls to be independent from the structural system. Le Corbusier sketched many variations of the Domino and these show us the influence Tony Garnier had on him when they met in 1915.

France was the first country to design houses of a genuine concrete character and were due to Tony Garnier, (1861-1948), and Auguste Perret, (1874-1955). In 1901, Garnier while in Rome worked on an ideal industrial city. It was pioneer work from the point of view of planning and appearance of the buildings. They were all to be of concrete, private houses, severely cubic and public buildings with cantilevering canopies, (Fig. 15). Perret, on the other hand, designed a block of flats in the Rue Franklin in 1902-3, also a garage in the Rue Ponthieu, 1905, where the concrete is exposed without any cladding, and, in 1911, the Theatre des Champs Elysees, the first public building constructed of reinforced concrete.

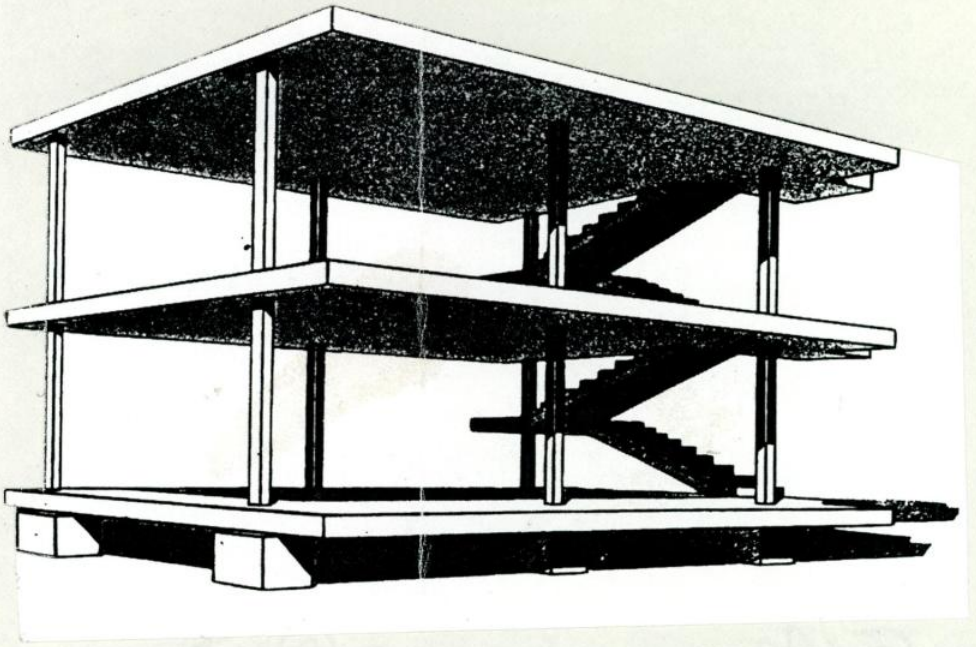

Fig. 14. The reinforced concrete structural framework of the Domino Houses, planned by Le Corbusier in 1918.

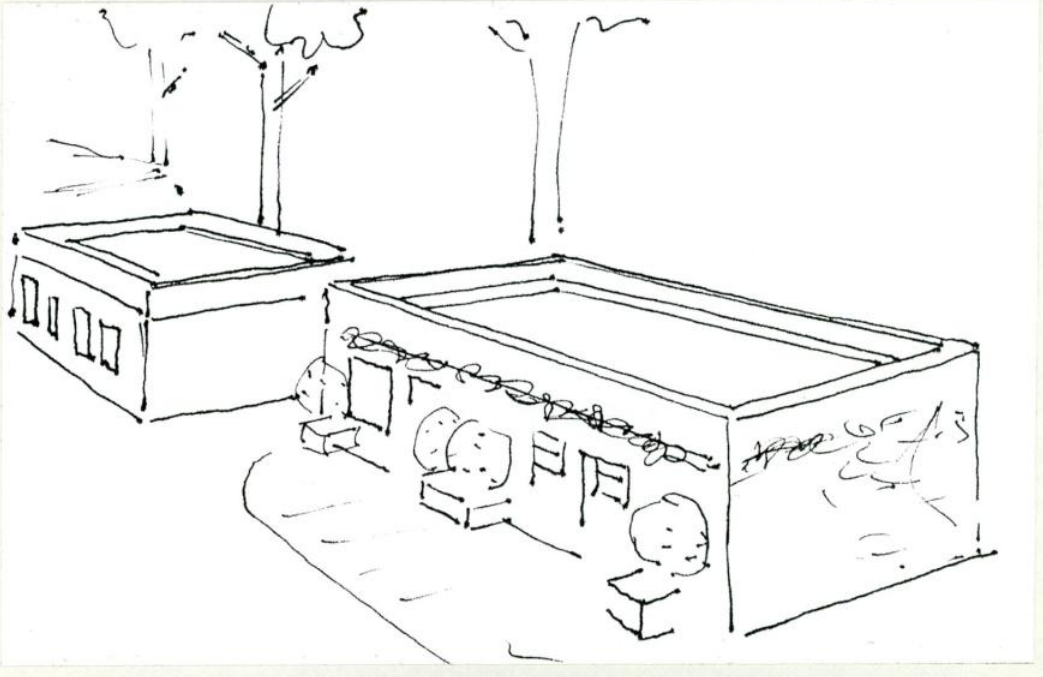

Fig. 15. Tony Garnier, (1861-1948), Private housing with cantilevering canopies.

A year later, in 1916, after Le Corbusier had met Garnier, he built the Villa Schwob, (Fig. 16 and 17), which was without doubt the most successful of his earlier designs and it has become historically known as one of the first concrete frame villas in Europe.

The idea of the flat roof derives from the Domino buildings and Le Corbusier later links this dominant feature in his town plans, expanding his idea to form garden rooftops. The flat roof brought many advantages, it eliminated the need for dark attics, with sloping ceilings, avoided timber rafters, (so often the cause of fires), it made it possible to turn the top of the house into an open air gymnasium, children's playground or garden, made it simpler for subsequent additions, eliminated the unnecessary surfaces presented to the action of wind and weather and, therefore, less need for repairs and the suppression of hanging gutters, external rain pipes that often eroded rapidly.

With the development of air transport, Le Corbusier paid attention to the bird's eye perspective of his houses and utilized the roof as a garden. There is probably no other single feature of Le Corbusier's work that summarizes and symbolizes the determining point of his philosophy: his idea of exposure to the sun and nature. This idea and feeling came further to him after he built a small house for his parents on Lake Geneva, 1923. He later describes it,

> To go up onto the roof! What a delight,
> like that experience by other civilizations
> in other times!
> (Le Corbusier, 1979: 72).

Here, Le Corbusier is referring to the Egyptians and the stepped pyramids of ancient times, that feeling of climbing to the top and exploring a new horizon with each step, a feeling of dominance for mankind.

The best example of Le Corbusier putting the Domino into practice is in the Villa Savoye in Poissy, 1929, (Fig. 7 and 11). He gathers his five points of architecture: the flat roof, pilotis,

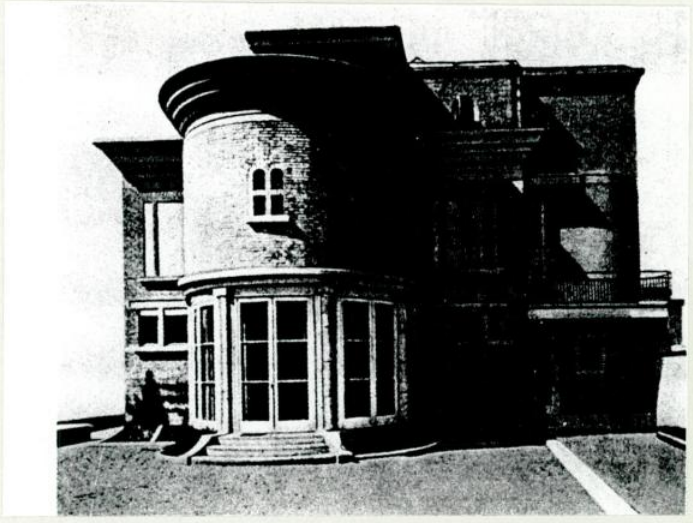

Fig. 16.
Le Corbusier,
Villa Schwob
La Chaux-de-Fonds,
1916.
One of the first
concrete framed
villas in Europe.

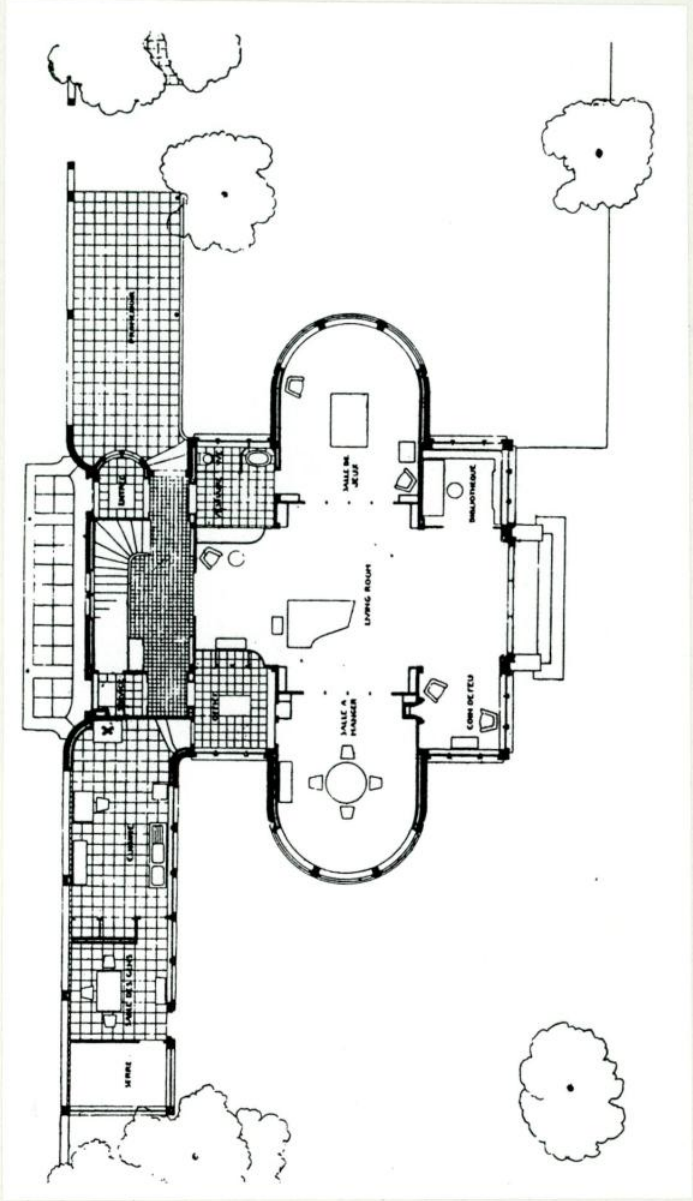

Fig. 17.
Villa Schwob
(ground plan).

free floor plan, elongated windows, the free facade and utilizes them within the same house. When designing the Domino concept Le Corbusier reserved the ground for vegetation and moving objects, in particular, traffic. Stationary activities such as working and living belong in the upper floors. To separate these, Le Corbusier put the house on stilts called Pilotis. These served not only as structural supports but more importantly they served as an element of dramatisation and visual isolation, (Fig. 18). They represent the link with the urban traffic patter, a visual separation from the soil almost like a spacecraft landing on earth. The Villa Savoye is a clear example of this principle: cars come and go by means of hairpin turn between the free standing pilotis where a curve encloses right under them to the entrance of the garage, hall, laundry and the servants quarters.

"The free plan" was where the concrete frame building allowed a free arrangement of floor plans, as the reinforced concrete could span over a large area, reducing the need for extra interior wall support. In some sketches of the Domino houses, Le Corbusier suggests a complete independence of structural support and architectural "infill". In one of the 'Weissenhof' houses, (Stuttgart, 1927), Le Corbusier introduces sliding walls where they divide the living room into three bedrooms at night time. The reason behind the free floor plan was to get the occupant more involved in the design process and, at the same time, breaking them in on the whole theme of 'modern'. The free floor plan is also introduced in Pessac, where Le Corbusier built houses in which the occupants could arrange the interiors to their own required tastes.

By using reinforced concrete , the Pilotis could retreat from the facades to the inside of the house. The facades became no more than light membranes consisting of isolating walls or windows. The facade was now "free" and the windows could now extend without interruption from one end of the house to the other. (Fig. 34).

The "elongated window" is where the windows could extend from one end of the house to the other without interruption, (Fig. 32 and 33). Reinforced concrete revolutionised the window by reducing

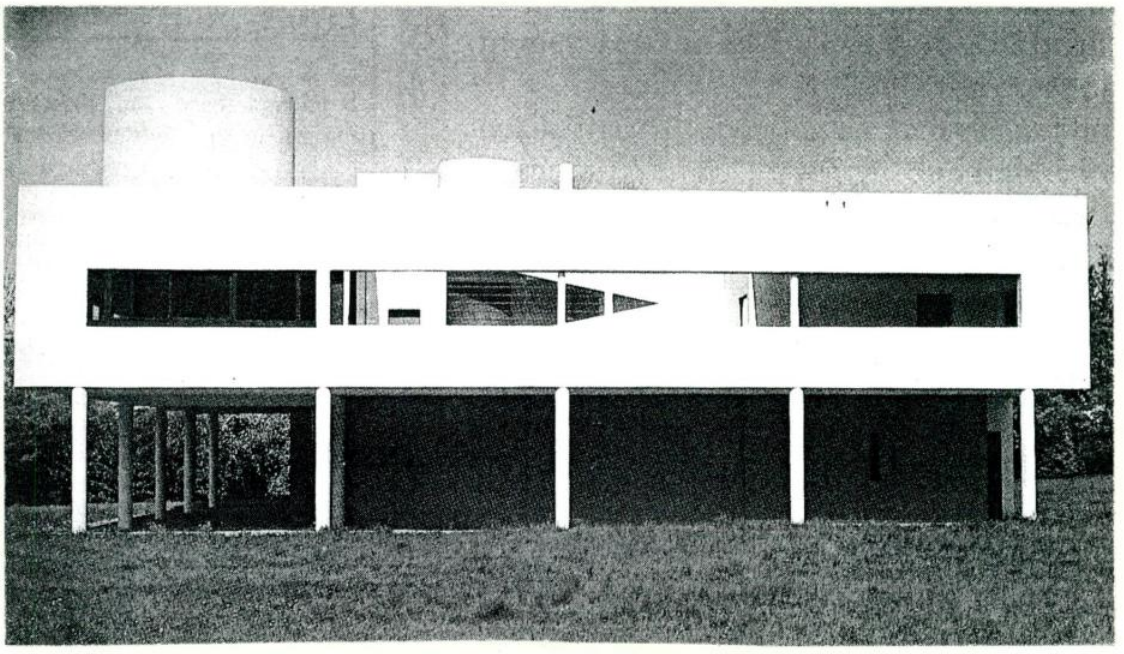

Fig. 18. Le Corbusier, Villa Savoye, Poissy, 1929.
The pilotis not only serve as structural supports but also as elements of dramatisation and visual isolation.

wall thickness and eliminating the need for much of the interior walls to give an open plan. As a result, maximum light could be emitted into the free plan.

The ramp first came about for Le Corbusier in the Villa Savoye, where it extends from the hall to the first floor while the living areas are, and then from the hanging gardens on the roof top the ramp leads to the solarium. This takes us back to Le Corbusier's early views on town planning in which he uses narrow streets and curving roads leading to a sudden unexpected area of growth and beauty. Examples of the ramp concept can be seen on the front of the Plainex House, Paris, 1927,(Fig. 19). Also to the side of the same house, Le Corbusier uses stairs in a very open fashion. Other buildings are the Mill Owners' Association Ahmedabad, India, 1954, (Fig. 20), and again in 1964, the Carpenter Centre for the Visual Arts, (Fig. 21).

In 1919, Walter Gropius took over the Weimar School of Arts and Crafts and the Weimar Academy of Fine Arts. He amalgamated the two institutions to form a wider variety of arts and in so doing, he renamed it Das Staatliche Bauhaus Weimar. The Bauhaus workshops were really laboratories for working out practical new designs for present day articles and improving models for mass production. The Bauhaus meant evolving goods specifically designed for mass production and to eliminate every drawback of the machine, without sacrificing any one of its real advantages. The ultimate goal, therefore, was the composite but inseparable work of art, the great building, in which the old dividing line between monumental and decorative elements would disappear for ever.

Le Corbusier was experimenting with standardization at a very early stage. He first began with Domino houses just after the First World War which were basically a constructional prototype for the dwelling. Shortly after came Citrohan One and Two. Citrohan established his conception of the dwelling as standardized, mass produced and serviceable, like the modern car. The Domino system implied the possibility of a complete reorganisation of the interior plan and exterior elevations which was barely exploited in

Fig. 19. Plainex House, Paris, 1927.

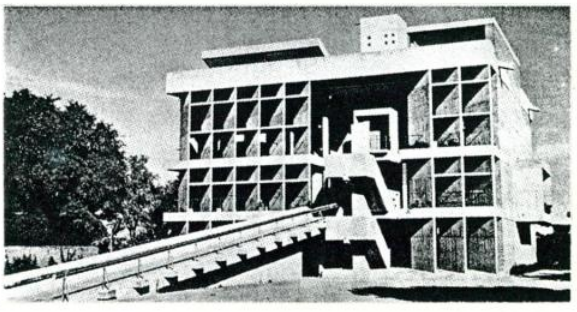

Fig. 20. Building of the Mill Owners' Association, Ahmedabad, India, 1954

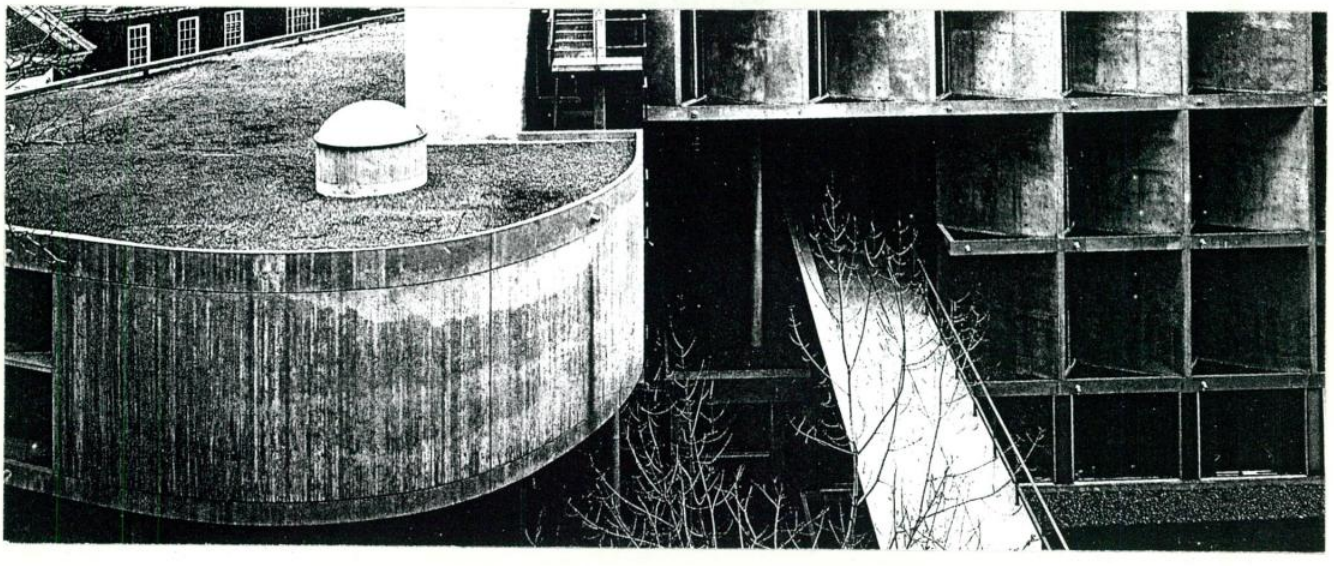

Fig. 21. Carpenter Centre for the Visual Arts, 1964.

any of Le Corbusier's proposals for the application of the system. By contrast, the Citrohan designs subjected the plan, interior volume and exterior appearance of the dwelling to radical overhaul. Le Corbusier was interested in building permanent high quality housing rather than temporary housing which was being produced as a result of the war. Citrohan 1, (Fig.22), is a three-storey, rectangular box, with an external staircase and enclosed roof garden on its upper storey. The front wall is almost entire glazed with an industrial window, based on examples he saw in factory buildings in the industrial suburbs of Paris. This window provides the main source of natural light to the interior. The long, loadbearing walls were intended to be built of materials appropriate to the particular region, wherever Citrohan was to be constructed.

Citrohan 2 was raised off the ground on pilotis, (Fig. 23, 24a. & b.). Its main emphasis was to free the ground for vehicular circulation. The first floor bedrooms project into the space of the living room forming a kind of gallery over the dining area. The dining room was very open while the living room was more emphasised as a family room. It is clear at this point that not only was Le Corbusier searching for a standardized house that could be mass produced but he was also creating a free interior plan. The reason for this is that Le Corbusier, in the back of his mind, was thinking of town planning and was simply still experimenting with a house that could be used in a built up area with its interior plan creating the sense of freedom and isolation. Le Corbusier was trying to take two steps at a time and, as a result, the Citrohan outreached its budget and was far from being a mass produced dwelling.

Le Corbusier, at this stage, was ahead of his time. He wanted to produce architecture by building houses at a time when very few people thought of dwelling houses as proper subjects for architecture. It was too great a step for people to accept and, as a result, Le Corbusier's future plans would prove more difficult to implement. It must be emphasized that it was not Le Corbusier alone who discovered standardization and mass production, and that

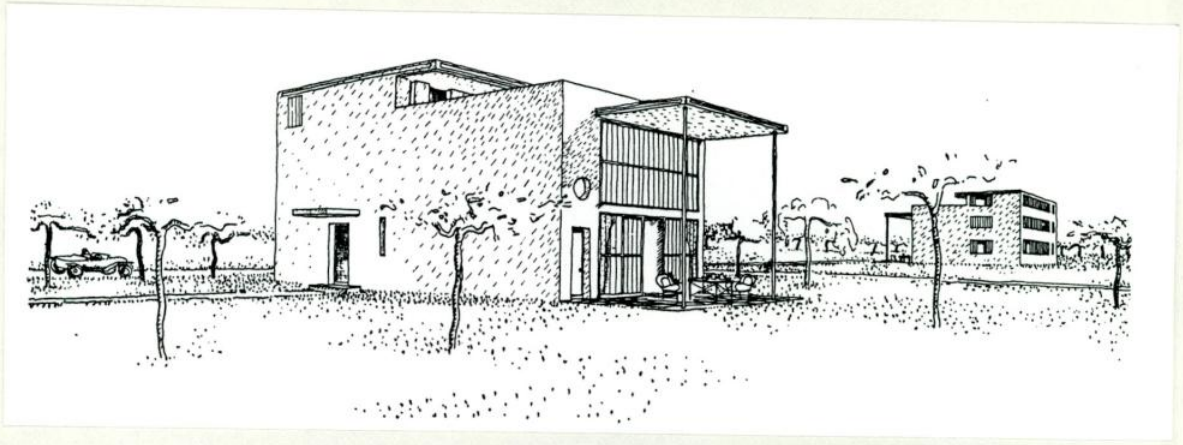

Fig. 22. Le Corbusier, Citrohan 1, perspective, 1920.

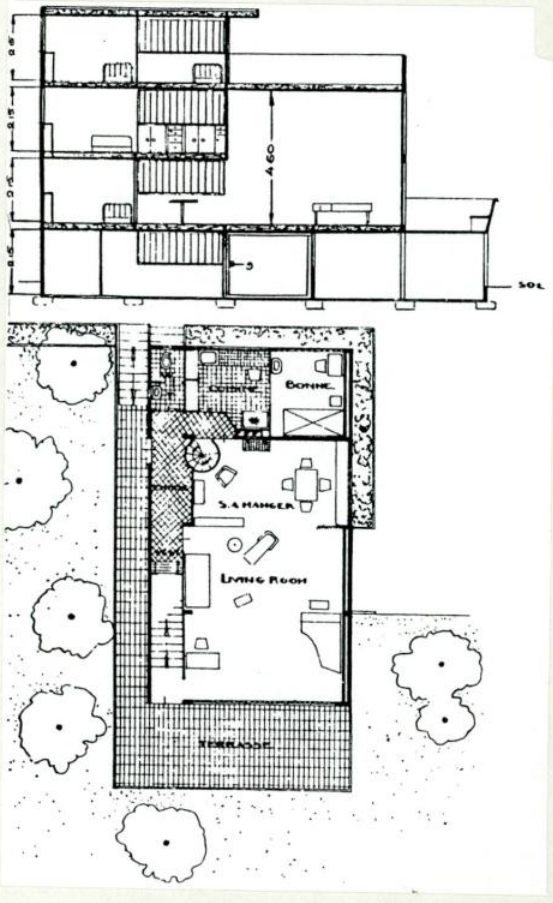

Fig. 23
Le Corbusier,
Citrohan 2,
Section and plan
of living room
floor

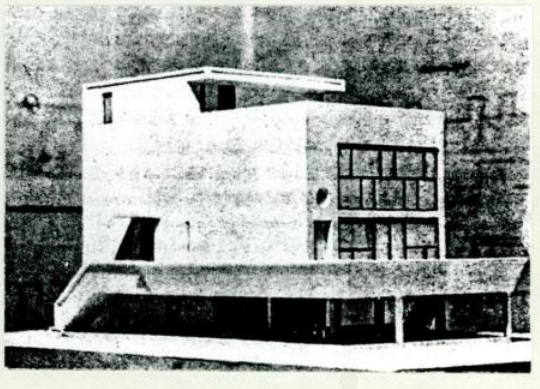

Fig. 24a. Le Corbusier, Citrohan 2, photograph
of model, 1922

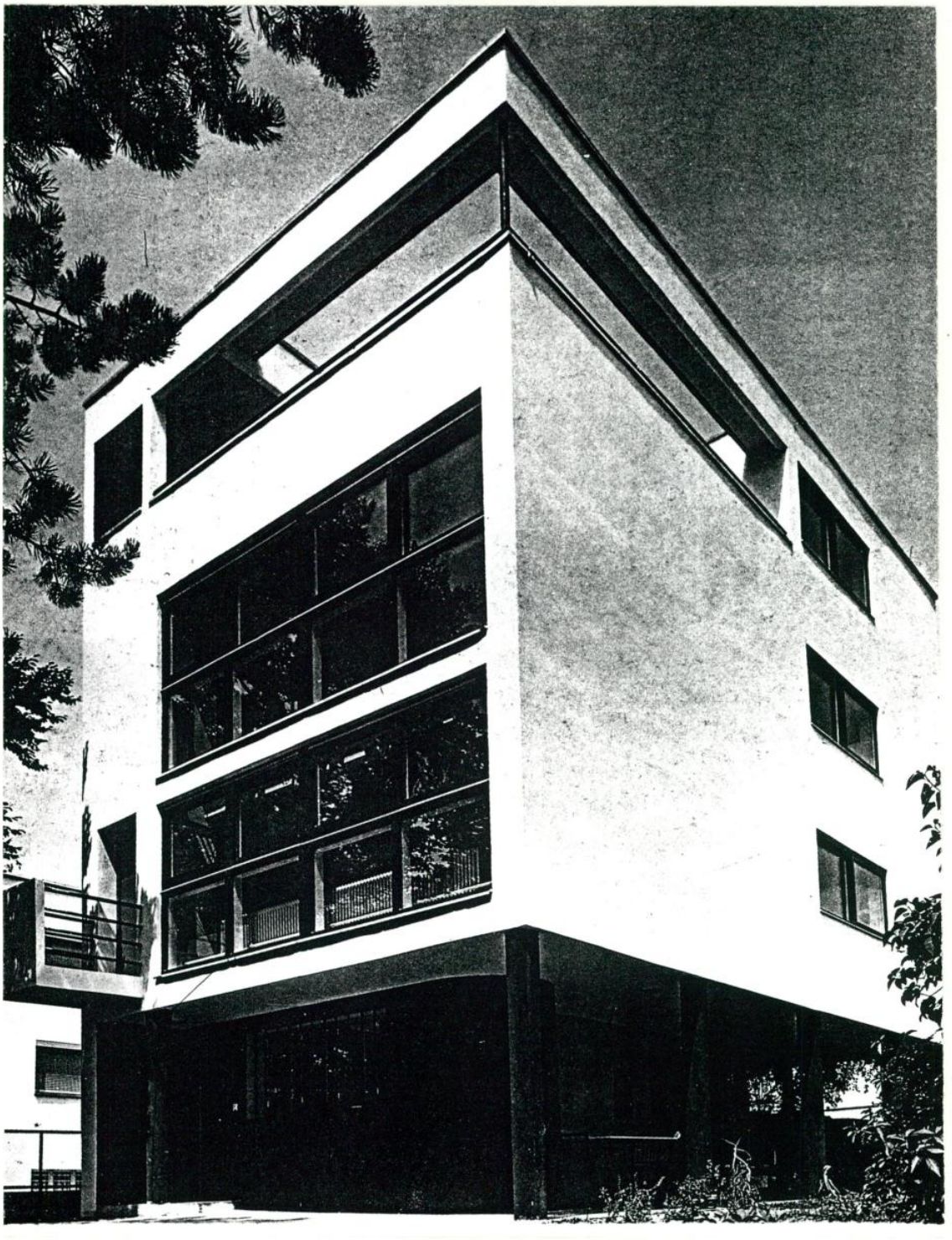

Fig. 24b. Le Corbusier, Citrohan prototype,
Weissenhof Siedlung, Stuttgart, 1927.

standardization was not a technical innovation but an ideology on which a body of ideas were built up and implemented over a long period of time. It began with men like Peter Behrens and then was followed up by the Bauhaus. Le Corbusier gave the impression that standardization and mass production was a technical innovation by implementing the whole body of ideas within a very short period of time in a way that people would have accepted.

It was also known that Le Corbusier was different than his predecessors. Unlike Walter Gropius and Frank Lloyd Wright, as we will see throughout Le Corbusier's work, he never altered his pattern of work. Walter Gropius and Frank Lloyd Wright's early buildings and statements were directed against style as an end in itself and the divorce between function and form. Wright had put forward an 'organic architecture' in contradistinction to the prevailing Beaux-Arts method of design. Gropius, who was reviving both futurist and functionalist ideas, had also put forward the idea of an organic architecture as an integrated approach opposed to that of the academies:

> We want a clear, organic architecture, whose inner logic will be radiant and naked, unencumbered by lying facades and trickeries,, we want an architecture adapted to our world of machines, radios and fast motor cars, an architecture whose function is clearly recognisable in relation to its form.
> (Gropius: 1923: 109).

Yet, in spite of these early statements of intent, by the Fifties both Wright and Gropius were designing non-organic images where aesthetic and construction disproved each other, and the function was clearly unrecognisable.

It is one of the strange ironies of history that both of these pioneers should achieve their most inorganic projects for Baghdad, Iraq, (Fig. 25 and 26). This approach typified much of their later work. It now appears that Gropius' 1923 synthesis of 'Art and Technology: a New Unity' and the whole Bauhaus method of design owes a good deal more to Le Corbusier than had been previously thought.

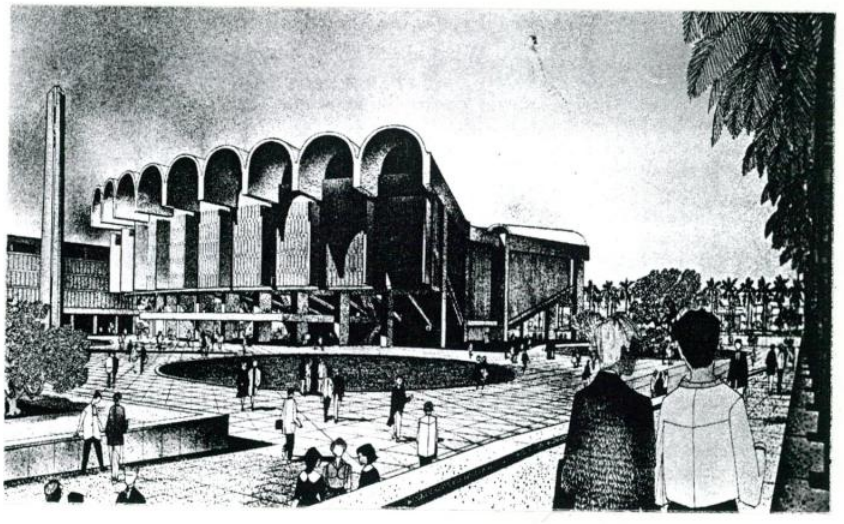

Fig. 25. Walter Gropius, TAC: Baghdad University, Central area and auditorium, 1958.

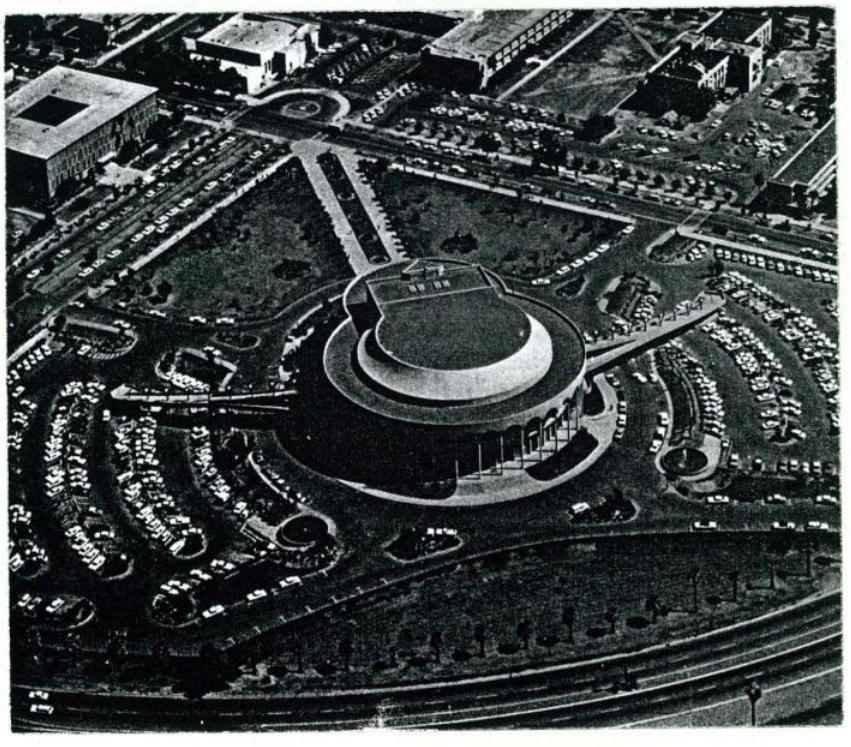

Fig. 26. Frank Lloyd Wright: Grady Gammage, Auditorium Tempe, Arizona, 1959-66.

CHAPTER II

TOWN PLANNING

It was only in the second half of the 19th Century that social planners became anxious to improve the living conditions of the working classes. Many programmes were drawn up for the construction of workers' housing but none of these gave allowance for the urban problem as a whole. Towards the end of the century, two comprehensive studies were made, one by Camille Sitte, (1843-1903), who adapted a strictly aesthetic point of view, and the other study was by Ebenezer Howard, (1850-1927), whose attitude was clearly social.

Le Corbusier accused Sitte of applying what he called the 'Donkey Path', (Le Corbusier: 1977: 11). Sitte admired the aesthetics of existing cities, with narrow, winding roads which were full of unexpectedness and beauty. He believed that straight roads were never ending and boring to walk on and were full of repetition. Le Corbusier, on the other hand, is saying that the winding road belongs to the donkey and must disappear from the technologically advanced city.

> The rational man goes straight to his goal, whereas the dull-minded donkey does not think, does not exert himself, avoids big stones and seeks an easy way of climbing hills.
> (Le Corbusier, 1977: 11)

Le Corbusier was influenced by Ebenezer Howard, who originated the Garden City concept. Howard opposed a more organic kind of city, limited in numbers, in area and in density of habitation. The city was organized to carry all the essential functions of an urban community such as business, industry, administration and education. In order to make the city visually appealing, it was equipped with number of public parks and private gardens. Howard surrounded his new city with a permanent agricultural belt. This belt had two purposes, it would keep the rural environment near and would keep other urban settlements from joining with it. Howard sought to give the new city all the advantages of the big city but he did

not want the city to expand in such a way as to put it beyond the means or reach of its inhabitants.

> What was significant about the garden city was not the mere presence of gardens and open spaces. What was radically new was a rational and orderly method for dealing with complexity, through an organization capable of establishing balance and autonomy, and of maintaining order despite differentiation, and coherence and unity despite the need for growth.
> (Mumford: 1961: 590).

The garden city which Howard proposed, in comparison with cities of today, seems like a town, but in fact it was a city, a city which refused to have a particular method of planning or a particular type of building. Once a sufficient number of these cities were built up, they would form a cultural organisation and they would pool their resources to provide such facilities as large numbers alone would make possible. By doing this, the small cities would have all the advantages without the disabilities of the larger city.

Le Corbusier had great admiration for the Romans. They were great colonisers, great administrators and when they arrived at a place, at a crossroads, or at a river bank, they took a square and set out the plan of a rectilinear town, so that it should be clear and well arranged, easy to police and clean, a place in which you could find your way about and stroll in comfort.

Le Corbusier believed that it was necessary to implement geometry to the modern city, unlike most western cities, which grew up by the 'law of the donkey'. (Le Corbusier: 1977: 13). The old city produced the beautiful, picturesque cities which Camillo Sitte and the younger Jeanneret had admired, with curved roads, steep hills, flanked with forests and valleys. These towns would break down under the modern man, with population growth, industrialisation and new technical and economic conditions, the delicate balance would crumble.

In 1922, Le Corbusier exhibited his study of the city, called Le Ville Contemporaine, at the Salon d'Automme in Paris,a contemporary

city for three million inhabitants, (Fig. 27). His plan consisted of four principles:

1. We must decongest the centre of our cities.
2. We must augment their density.
3. We must increase the means for getting about.
4. We must increase parks and open spaces.
   (Le Corbusier: 1977: 166).

This plan was not drawn up for a particular city, instead it was a plan that could be adapted to any city. In order to release pressure from the city, Le Corbusier devised the plan to move the population to the suburbs in contact with the countryside.

By adapting 850 metre high skyscrapers for the business network of the city, he could eliminate the squalor and density of the inner region, (Fig. 28), roadways could now be left down on a grid pattern which would leave access for cars and trucks to drive up close the business without difficulty, increasing efficiency and saving time, (Fig. 29). The skyscrapers were of cruciform shape with straightforward cubic elevations and fully glazed surfaces to provide good lighting to the interiors. The fact that they were organised in bays and recesses enabled maximum sight and lighting.

This idea was not entirely new, Louis Sullivan, (1856-1924), used cruciform skyscrapers and bays around 1890 in Chicago which was closer to the aesthetics of machines or grain silos than to anything that had been proposed in the field of architecture before 1920. (Van Moos: 1979: 191).

Between the skyscrapers and the apartments lie large parks of about 400 by 600 metres, providing amenities that no city could have hoped for in the past. Plants and greenery appear to Le Corbusier as the biological guarantee of sound urban living. Parks were the lungs of the city, its respiratory system. This overwhelming presence of plants and trees is a cultural stigma as well as a physical well being. This cultural stigma goes back to his home town of La Chaux-de-Fonds and his love for nature while

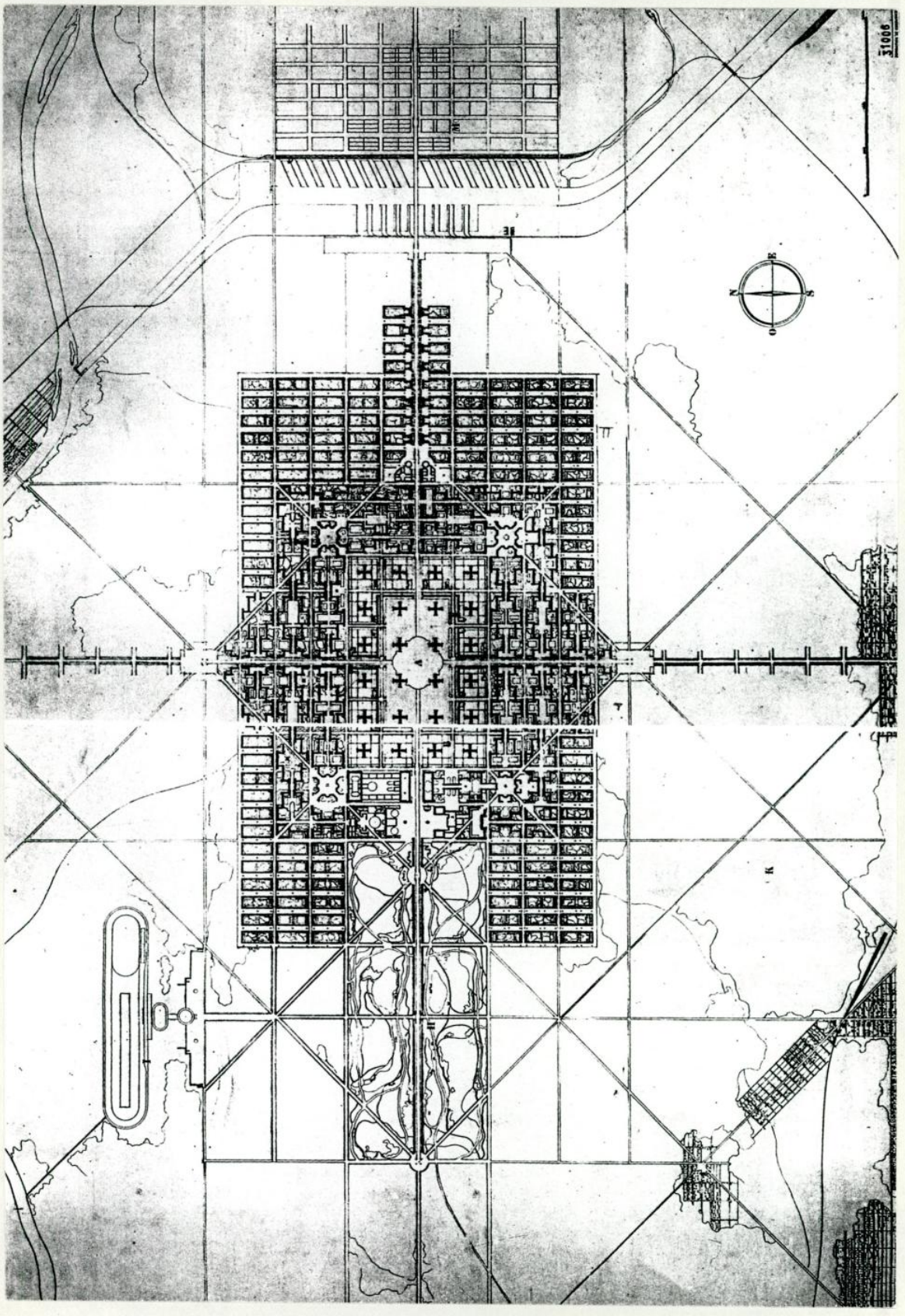

Fig. 27. Le Corbusier: Ville Contemporaine, 1922, Plan

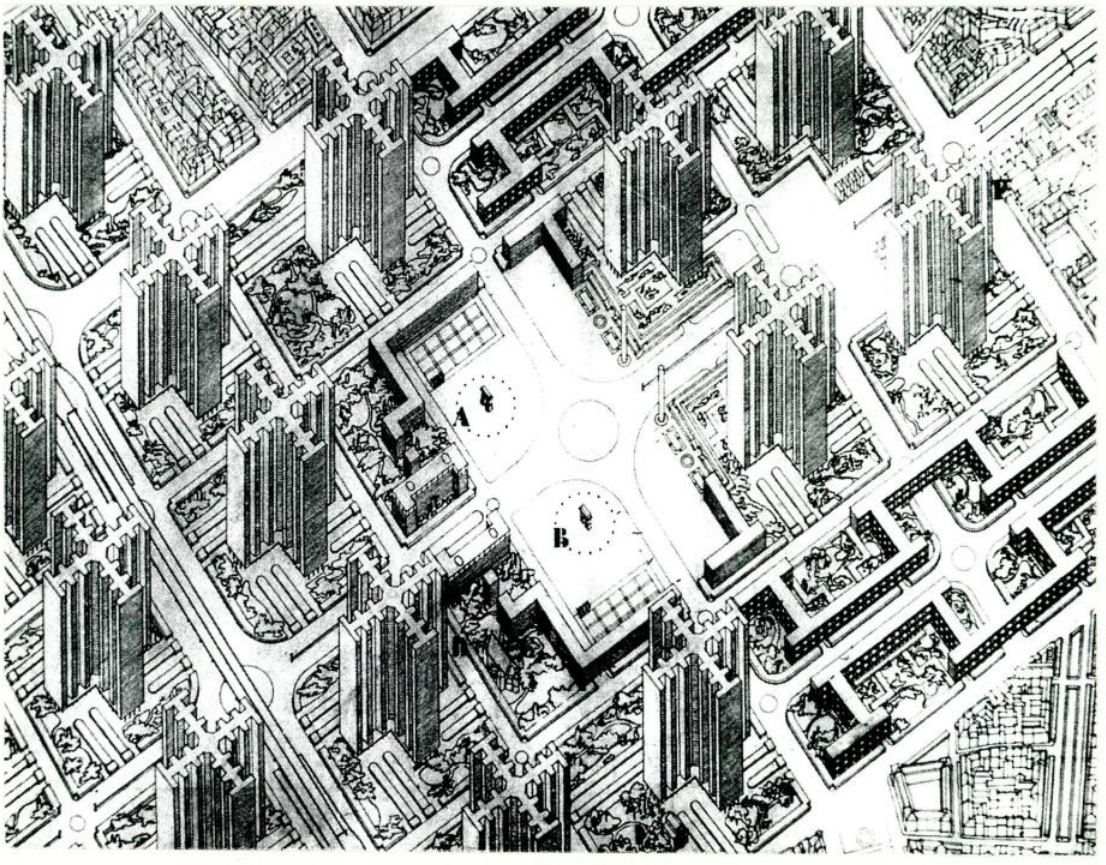

Fig 28. Le Corbusier, Perspective view of the city layout showing cruciform skyscrapers

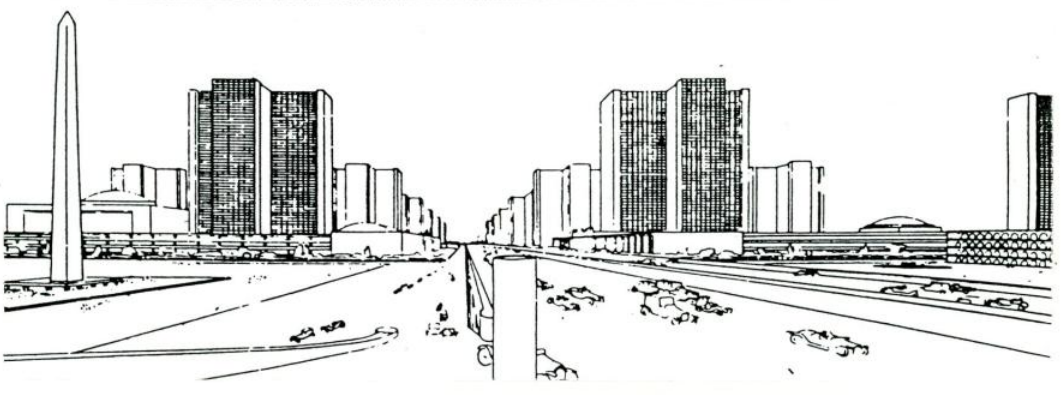

Fig. 29. Le Corbusier: Ville Contemporaine, 1922 showing transport network

working in the watchmaking business and, at the same time, being influenced by Rene Lalique, (1860-1945), whose jewellery designs were all centred on nature.

On the outskirts of the parks lay the residential housing, called 'lotissements a redents'. Here, Le Corbusier goes back to his five principles of architecture:

1. The pilotis
2. The roof garden
3. The free plan
4. The elongated window
5. The free facade.

These principles were taken from Citrohan II and adapted here to give individual freedom to the residents. The pilotis not only represent the buildings' organic links with the urban traffic pattern, they also give the houses individualism both from each other and the earth beneath. These pilotis are also universally applicable anywhere on the surface of the earth, they define a building as something ordered and controlled, just like a machine.

The main principle of the pilotis was to reserve the floor for cars entering and leaving beneath the house, redefining the house as a matter of form, function, and machine - age symbolism. Le Corbusier was totally reconsidering the dwelling house. The house was no longer a roof over one's head, it was now "a machine for living in". (Le Corbusier: 1972: 40). It resembled the machine in the sense that it was cheap, standardized, well-equipped and easily serviced, like a mass produced car.

In the roof garden, reinforced concrete provides the solution, a reclaimed surface free of tiles and gutters, what was a no-man's land is now an area to walk or grow plants. Fig. 30, shows the dwellings with setbacks. Here, we see an aerial view, which can be shown in contrast with an American town in Chicago (Fig. 31).

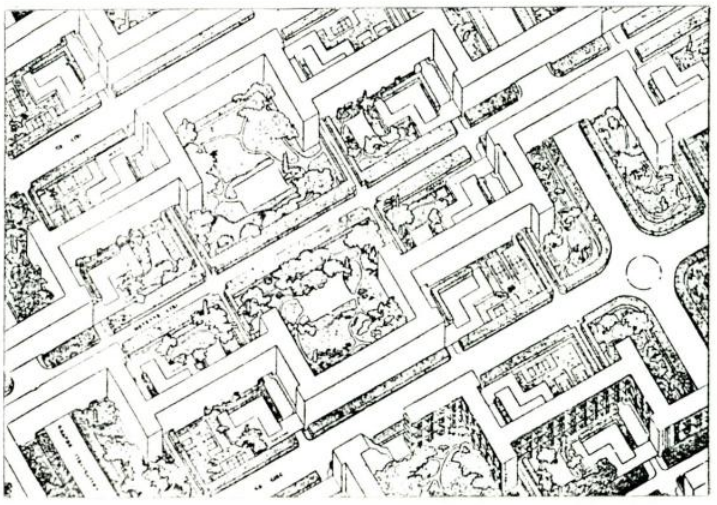

Fig. 30. Le Corbusier, Dwellings with "set backs" showing roof gardens.

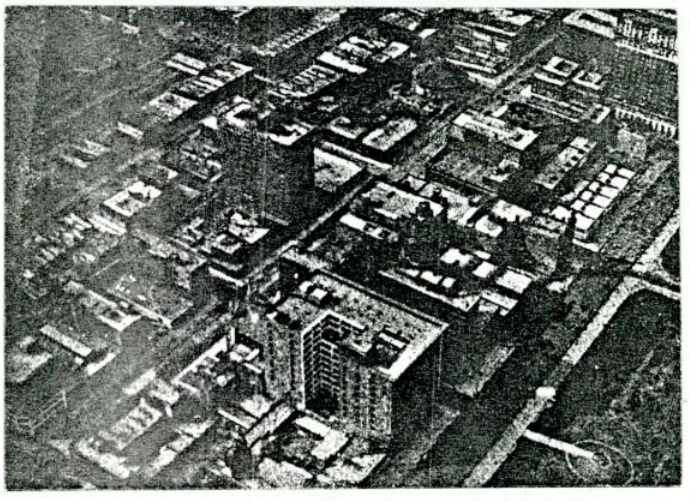

Fig. 31. Aerial View of an American town in Chicago.

The view factor was also an important factor in the contemporary city. Instead of viewing the city as a dirty dark plane, looking at back yards, broken roofs and dirty gutters, it was now a lush green area, laid out in beautiful patterns. The flat roof is the most dominant feature of Le Corbusier's work, it summarizes and symbolizes the determining point of his philosophy, his belief in moral and physical regeneration through hygiene and exposure of the body to the sun. Once again, the idea of the flat roof symbolizes his early life of freedom in Le Chaux-de-Fonds, freedom with nature and space.

The concrete frame of the buildings allow a free arrangement of floor plans so that the tenants could arrange the rooms to their needs. Extra space is created by the reduced wall thickness and this allowed more light in through the windows, unlike the houses in the past in which large holes were created in the walls resulting in the walls forming a patch of shade on either side. Le Corbusier had got his inspiration from ocean liners while developing the Citrohan houses and he compares the ship to them:

> The value of a 'long gallery' or promenade - satisfying and interesting volume; unity in materials, a fine grouping of the constructional elements, sanely exhibited and rationally assembled.
> (Le Corbusier: 1946: 92).

Because the residential houses were standardized, Le Corbusier had to take special care when designing them. He had to entice them onto the little plot of ground by adding quality features to them. He gave them good light, excluded harmful draughts, planted flowers and fruit trees in the sun, faced the door towards the garden path, placed the windows to provide a good view, his bedroom where he would not be overlooking neighbours and provided him with freedom and isolation by using the Pilotis and roof garden. If Le Corbusier did not provide these amenities, the whole system of serial production and standardization would have failed because the dwellings would not be pleasing to live in. What is very clear from this is that standardization was meant to apply to the structural components and not to the actual house.

The elongated window is one of the essential characteristics of the house. Fig. 32 and 33, show two examples of Le Corbusier's houses in which he uses the "elongated window", Villa Stein, Garches, near Paris, 1927, and one of two houses for the Weissenhof Housing Exhibition, Stuttgart 1927. Reinforced concrete revolutionised the window by reducing wall thickness and eliminating the need for much of the interior walls to give an open plan. It was now possible to place windows along the whole facade from corner to corner. The window was now a standardized element and was placed in a position to give maximum light while the thin outer walls reduced shadow being cast into the interior.

Reinforced concrete made it possible for the pillars to retreat from the facades to the inside of the house. The facades became no more than light walls and the windows could extend without interruption from one end to the other. Fig. 34, the Villa Savoye, Poissy, 1929, shows a good example of the "free facade".

In 1922, Le Corbusier directed the construction of the Ville Contemporaine as part of the reconstruction of Paris. It was known as the "Voisin Plan". As the plan was to be based on a new traffic pattern, Le Corbusier got financial support from the automobile firm, Voisine, hence the name. Here, Le Corbusier recommends massive surgery to the city centre by demolishing immense masses of houses and slums to make way for newer and better things. Only a few isolated buildings - The Louvre, the Palais Royale, the Palais de Vosges, the Palais de la Concorde, the Arc de Triomphe, plus a few selected churches and town houses were to be spared. (Le Corbusier: 1977: 250-265).

By doing this, the real history of Paris would be saved. Le Corbusier opened the heart of Paris with a splendid system of communication with wide roads and tall skyscrapers, creating a vertical city, giving the ground freedom. He again uses parks and greenery beneath the skyscrapers to secure the social aspects of the working class, but these working people were hundreds of feet above the ground so the green vegetation and the beautiful floral detail would now become a mere carpet. The rustling of leaves

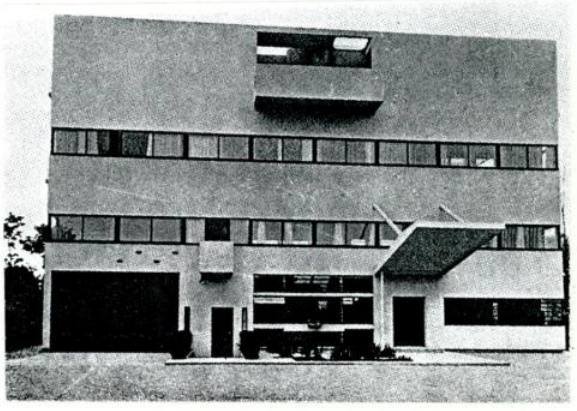

Fig. 32. Le Corbusier, The "elongated windows". Villa Stein, Garches, near Paris, 1927.

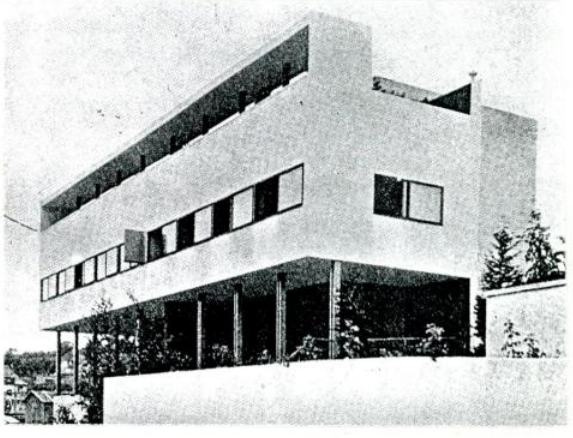

Fig. 33. Le Corbusier. The "elongated windows", one of two houses for the Weissenhof Housing Exhibition, Stuttgart, 1927.

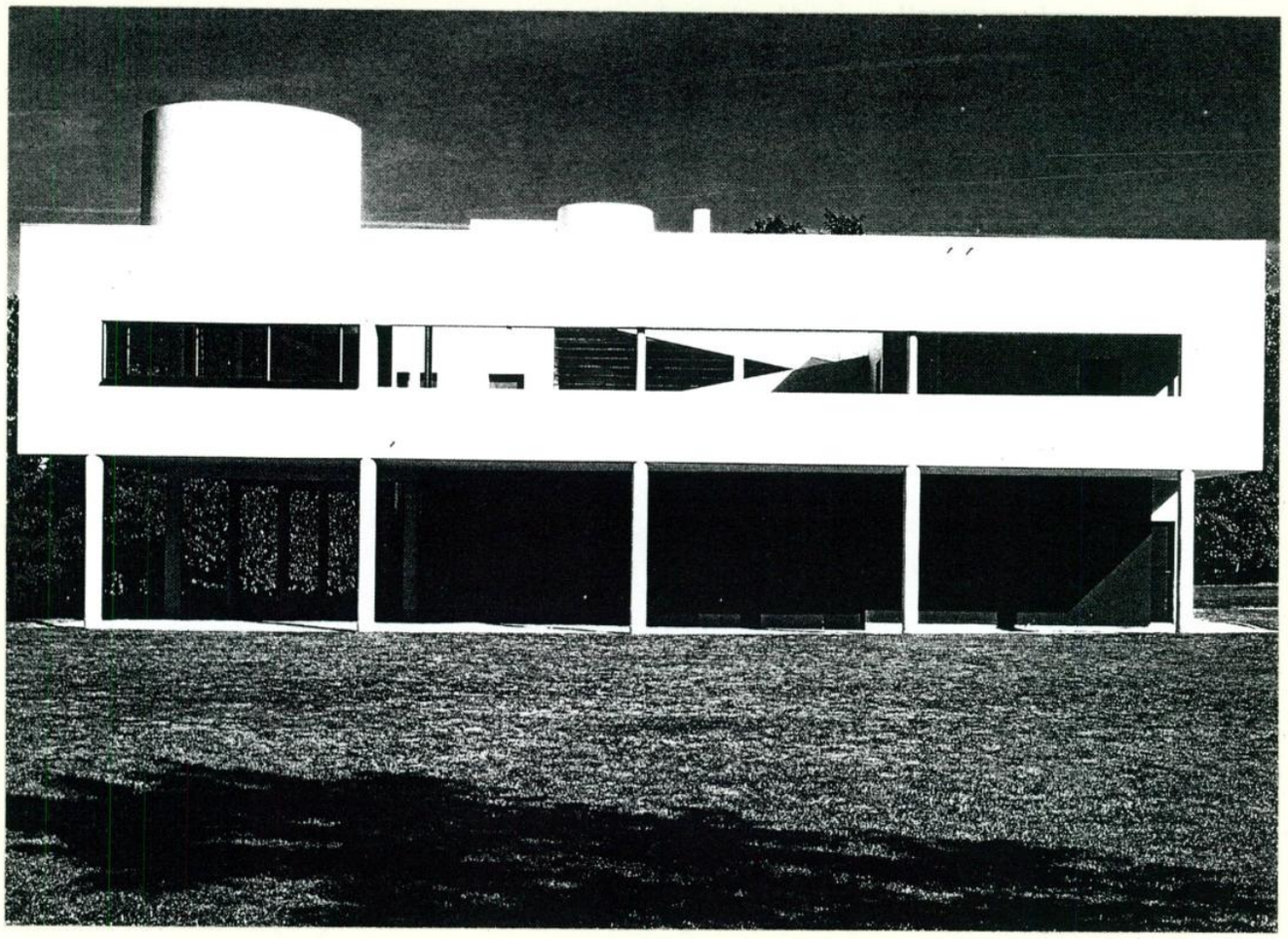

Fig. 34. Le Corbusier. "The free facade". Villa Savoye, Poissy, 1929.

beneath the feet would no longer be heard. The workers would only appreciate the parks and greenery after working hours as it would not be worth the effort to visit these parks during lunch time as it would take a long time to come down to them. However, Le Corbusier erected workers' apartments six storeys high where the contact with nature could be maintained. They could now come home after a long working day and enjoy the nature and leisure these parks granted. The Ville Radieuse contained key elements of the Ville Contemporaine, notably the office skyscrapers, the residential housing and the use of a modular grid. It also took the idea of the city raised off the ground on pilotis and of customary urban space.

The apartment blocks were to be laid out in a heliocentric plan, to allow available sunlight and their principal facades were to be completely glazed. Standardized apartments, based on a calculation of 14 square metres per occupant were provided for all. Completely soundproofed, the apartments would reinforce the privacy of the individual family. Elements of the Ville Radieuse were reflected in virtually all Le Corbusier's schemes of the 1930's for the redevelopment or extension of specific cities including Algiers, Stockholm, Barcelona, Buenos Aires, Moscow, Rio de Janiero and Paris. However, its material reality was to remain untested since none of these planning proposals were adopted.

Just after the Second World War modified fragments of the Ville Radieuse were built in the form of Unites d'Habitation. During the development of Le Corbusier's town planning, he was moving to and fro between opposite conceptions. The first of these derived from the horizontal structures of the garden city which gave individualism while the second, which depended on high density vertical structures, gave collectivism. In the Ville Contemporaine and the Ville Radieuse, there is both collectivism and individualism which, in the final analysis, determines all town planning problems, no matter what they are concerned with; fittings, property, aesthetics, legislation etc. It is this contrast between the two cities that Le Corbusier tries to resolve by combining isolation with collectivism in the Unite d'Habitation.

The Unité in Marseilles, (Fig. 35), was an experimental Government-funded project to house government employees. Le Corbusier was allowed to bypass the housing regulations and exceed the standard housing budget. Construction began in 1947.

> Opposition was violent among the various pressure groups, especially those involved in S.A.D.E. (Societe des Architects Diplome par le Government).
> (Van Moos: 1979: 158)

They objected to the building bypassing the existing housing regulations, saying it would endanger the building profession. The national planning and hygiene committees went so far as to say that the building would produce mental illness among its occupants. However, with various ministers' backing, the building was opened in October 1952.

The idea underlying the Unite was the creation of a model solution to serve as a prototype for France's coming construction campaigns. The structural principle is simple consisting of a huge reinforced concrete cage with 337 structurally, independent dwelling units, inserted like drawers in a cupboard, (Fig. 36).

The typical dwelling unit is split level with a two storey living room opening onto both the front and the rear of the slab. This is a variation on the Citrohan theme. For the Unité d'Habitation in Marseilles, Le Corbusier had to drop the idea of completely separate rooms for every member of the household: in the finished building, the rather narrow children's bedrooms are separated by a sliding blackboard partition wall. The attention to detail in the arrangement of the kitchens throughout the flats was considerable. Tradesmen could deliver goods in a special fitment attached to the corridor wall next to the door of each flat. Ice was manufactured for the whole block and delivered to each kitchen, the shops and hotel were situated half way up the building to economise on circulation. Clubs were situated off the staircase, and the schools and recreation facilities on the roof (Fig. 37).

Fig. 35. Le Corbusier: Unité d'Habitation, Marseilles, 1947.

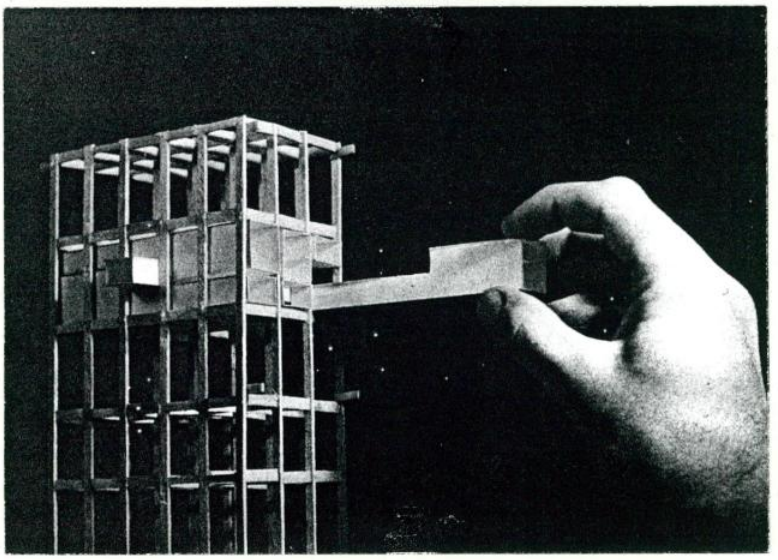

Fig. 36. The system of dwelling units inserted into the structural "grid" of the Unité d'Habitation. Model Photograph.

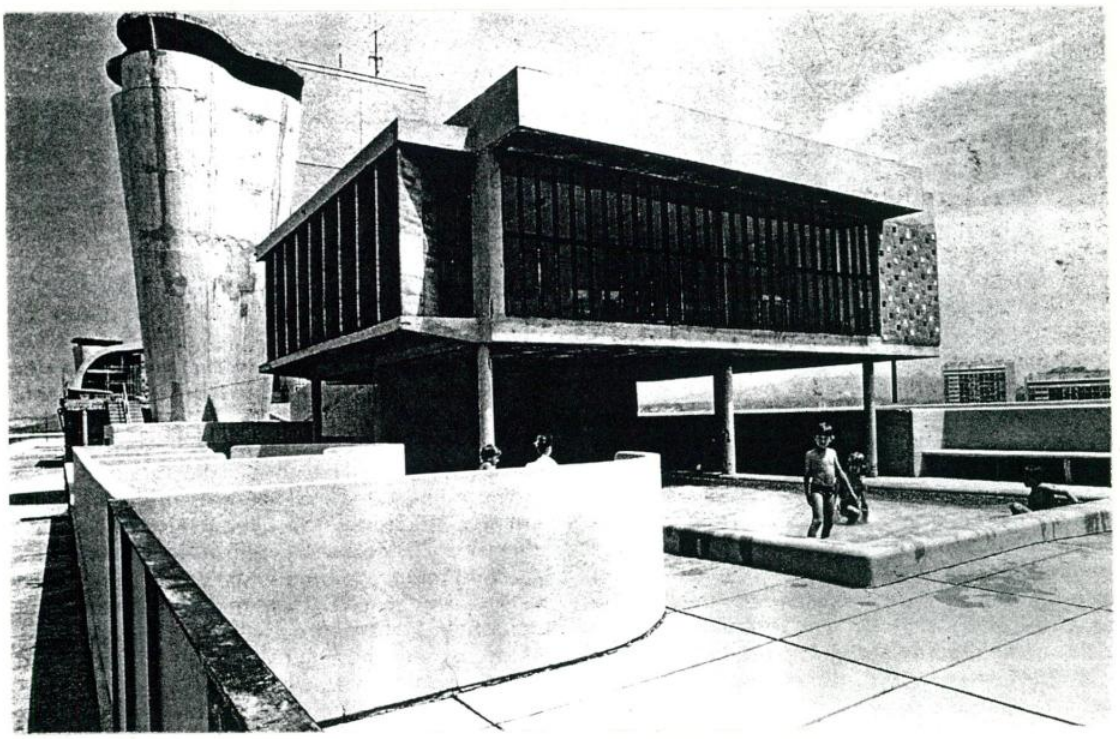

Fig. 37. Le Corbusier: Unité d'Habitation, Marseilles, 1947. Roofscape with children.

The idea of massively sculptured pilotis supporting a raised ground level on which the flats were stacked, originated in the Pavillon Suisse Cite Universitaire, Paris, 1931-33,(Fig. 38). The entrance stairs from the outside going up into the building can also be seen in many earlier designs.

What marks the Unite d'Habitation out from the earlier works is its scale, the boldness of its formal massing and the rough board marked concrete, (Fig. 39). Originally, the Unité was to be constructed of steel but the project had to be reconsidered from the ground up when the post War shortages required concrete to be used instead. All over the building the plank marks can be seen which was a result of the shuttering in which they had been cast, but these planks were specially arranged to give a pattern of consistency and was not considered a constructional flaw. Again, this whole project can be related to Le Corbusier's interest in ocean liners. All the indications are here which relate it to a ship's size, living quarters, hotels, kitchens and recreation.

The ship is compact and contains all these elements within. The ship is separated from the ground by water while the pilotis separate the Unite from the earth. This gives the Unite a sense of isolation, movement and individualism. The corridors are narrow and run in a straight line while the rooms are evenly distributed alongside. The kitchens are arranged so that food can be distributed with ease to the relative departments. Shops were situated half way up to economise on circulation while the schools and recreation facilities were on the roof. The roof of the Unite can be associated with the decks of the ships where fresh air was in abundance.

Following the Unité d'Habitation Marseilles, many more Unite d'Habitations were built: 1953 Nantes-Reze, 1958 Berlin, 1959 Briey-en-Foret and in 1968, after Le Corbusier's death, Firminy.

After 24 years of frustrated efforts and collapsed hopes, the rejection of the League of Nation's Competition in 1927 to his exclusion from the final design of the United Nations' Headquarters

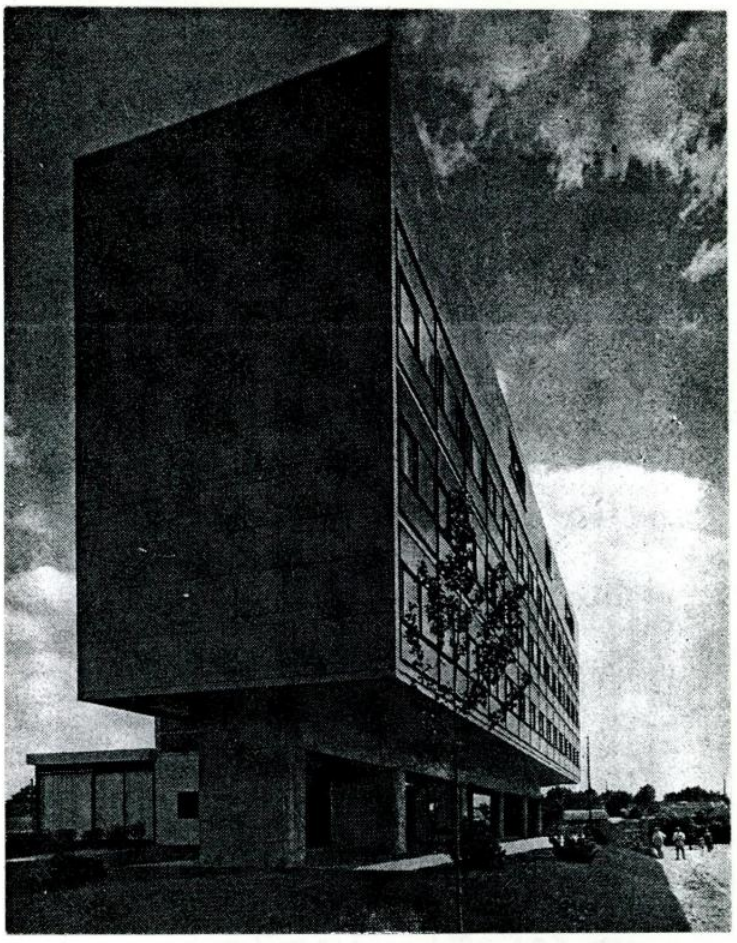

Fig. 38. Le Corbusier: Pavillon Suisse,
Cité Universitaire, Paris 1931-33.

Fig. 39. Le Corbusier: Boldness of its formal massing and rough board marked concrete.
Unité d'Habitation Marseilles, 1947.

in 1947, with shelved master plans for half a dozen cities in between - the sudden arrival in 1950 of two men from India was to be the prize of an entire area of Le Corbusier's career.
Le Corbusier was engaged primarily as an architect rather than as a planner for the development of a new capital for the province of Punjab in India.

To some, Chandigarh signifies progressive, socialist planning and outstanding architectural achievement, to others it is aggressive Western planning, ruthlessly inflicted upon the Third World. In fact, both these factors are encountered in the new capital of Chandigarh. Chandigarh had been conceived in a time of crisis, following the partition of India during which the province of Punjab had been divided. The decision to construct a new city was motivated partly by necessity, but represented also the desire to respond to political uncertainty with a symbolic gesture of strength and creativity. Viewing the new city as a focal point of national importance, Prime Minister Nehru had said,

> Let this be a new town, symbolic of the freedom of India, unfettered by the traditions of the past.... an expression of the Nation's faith in the future.
> (Nair: 1950: 6).

India wanted architecture of modern times, modern techniques to adapt to the extreme conditions they had. The initial planners, Matthew Newicki and Albert Mayer, intended to go for a garden city idea with low density picturesque design but Nowicki's death in a plane crash in 1950 and the difficulties in coming to a financial agreement with Mayer, interrupted the planning. Le Corbusier was then selected including his cousin, Pierret Jeanneret and two British architects, Maxwell Fry and Jane Drew. Le Corbusier concentrated his efforts on the overall ordering of the master plan and the design of the major architectural momuments, leaving the detailed development of the urban area and housing design to his colleagues.

Le Corbusier modified the original plans by using geometry, straightening major streets and transforming the slightly irregular super blocks into rectangles. This was now general

procedure for Le Corbusier after the Ville Contemporaine and Ville Radieuse of 1922. However, the means for large scale mechanised transport did not exist, a shortage of steel and inadequate services made high-rise building infeasible, also, the climate did not suit apartment housing.

The basic unit of the city, the residential sector was formed on a rectangle, 800 x 1,200 metres. The "7-V's" traffic system Le Corbusier had earlier employed in Ville Radieuse was adopted to divide traffic and organise the town. The town centre is a complete contrast to the Indian towns of 'old', where streets were narrow, shaded and noisy. Everything was cluttered, both people and goods were confined to a minimum of space. Contact with direct sunlight was avoided. Nevertheless, these vast plazas in which Le Corbusier adapted which became ovens under the glaring sun, were welcomed by some. They experienced spaciousness and openness, relieving them of the poverty and overcrowding sensations of the narrow streets. It must also be remembered that the Government Leader, Nehru, wanted to create wide open spaces, giving space, air and light. He condemned what he called the "horror slums". (Ward: 1987: 154).

Within the enclosed space of the capital, the three 'Palaces', the High Court, the Assembly and the unbuilt Governor's Palace, define what might be called a "monument park". It is developed for the pedestrian who can walk and live without fear. Le Corbusier's style at Chandigarh is very strong and there are a number reasons for this. Firstly, there are the political reasons already mentioned, and secondly, there is the climate. Le Corbusier shows the distribution of light and darkness, heat and coolness which is the basic theme of Chandigarh's architecture and, finally, there is the ritual element where solar festivals could be held every year. To accomplish all these elements, Le Corbusier uses 'scale' in his buildings in which John Ruskin, (1819-1900), had influenced him at an early stage and it was only now that Le Corbusier got the opportunity to apply scale to his buildings although he did use scale to a certain degree in the Unité d'Habitation Marseilles in 1947.

Ruskin displayed considerable interest in the large scale, volumetric composition of buildings. He believed that the relative majesty of buildings depended more on the weight and vigour of their masses, than on any other attribute to their design.

> Mere size may not ennoble a mean design yet every increase of magnitude will bestow upon it a certain degree of nobleness. The apathy which cannot be pierced through by a small steeple, nor shone through by a small window, can be broken through in a moment by the mere weight of a great wall.
> (Ruskin: 1959: 196)

Le Corbusier uses huge spaces between the High Court, 1956, and the Assembly Hall, 1961, and this space is not contained by these buildings as it is too great. Even by doing this, the unity of composition does not fall apart.

> The problem was no longer one of reasoning but one of sensation.... It was a battle of spaces fought within the mind.
> (Le Corbusier, Modular 2: 214).

The High Court, (Palace of Justice), consists of a gigantic shelter under which is stacked a honeycomb of what looks like structured, independent dwellings as used in the Unité d'Habitation Marseilles, but in fact, it is Le Corbusier's most characteristic contribution to architecture during the last 20 years of his life. He called the "brise-soleil" or sun break, (Fig. 40). The "sun-break" was a product of the free facade which he had developed earlier and the "brise-soleil" had originated from a skyscraper which he had designed for Algiers in 1938.

The "brise-soleil" takes a variety of forms, according to the changing requirements of the site and the various positions of the sun. It creates an architectural casing which is superimposed over the concrete facades to protect the interior from storing sun without the loss of light and air. At low sun elevations, the building was to receive as much light and warmth as possible while in summer when the sun is high, it was to be protected from heat and glare.

It seems that Le Corbusier was more concerned with visual expression of climate control than with its actual effectiveness. Le Corbusier used the brise-soleil throughout his work, as seen in the following buildings: Ministry of Education, Rio de Janeiro, 1936, (Fig. 41) and the house for Dr. Currutchet, Buenos Aires, 1945, (Fig. 42).

The High Court had also a symbolic reference. It is situated to the left of the centre and the construction opens as if to release ships which are being towed by all the gathering people into the sea, (represented by the man-made pond which the court overhangs). These huge structures symbolise the bows of ships and may represent their overseas visitors coming and going from the High Court, (Fig. 40).

In the eight storey block of accommodation called the "Secretariat", (Fig. 43), Le Corbusier again used the climate control. To regulate the breeze, he devised what were known as "ondulatoires", which was a total rethinking of the window principle. The essential functions of a window was to admit light, to admit air, to frame views and to create draughts for the necessary air movement. Using three independent elements, fixed floor to ceiling glass panes and 20 centimetre wide, vertically pivoting metal panels which acted as ventilators, the breeze could be regulated. He also adopted the brise-soleil to regulate the sun and when the metal regulators were closed, fans provided air movement along the corridors.

The Secretariat was 250 metres long and was to be used as administrative and ministerial offices. Each of the eight long floors is arranged as a central corridor with offices on either side which can reached by 3,000 workers directly from the outside by two great ramps, (which he first used in the Villa Savoy, Poissy, (1929). Le Corbusier originally though that by including lifts they would exceed the budget. Later the lifts were included.

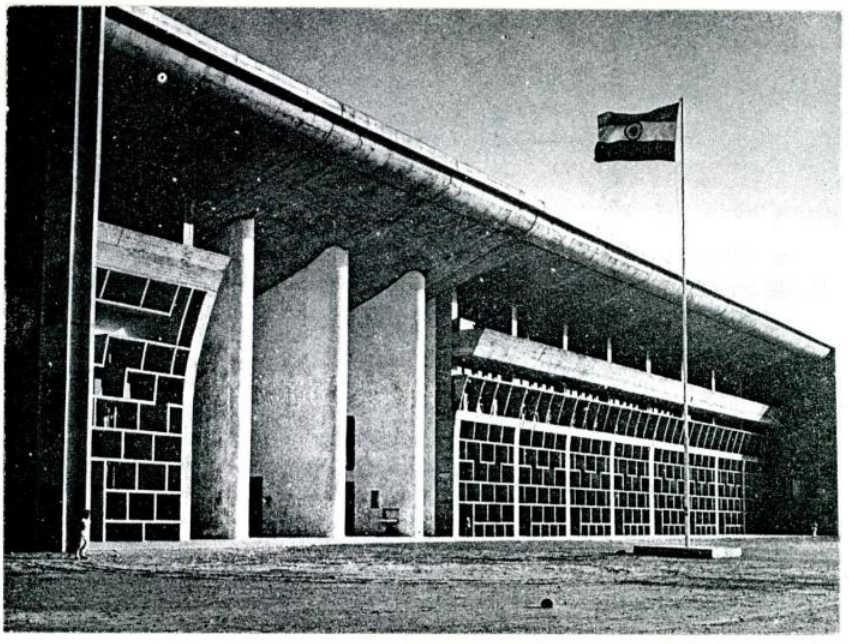

Fig. 40. Le Corbusier "Brise-Soleil". High Court (Palace of Justice, Chandigarh, 1956.

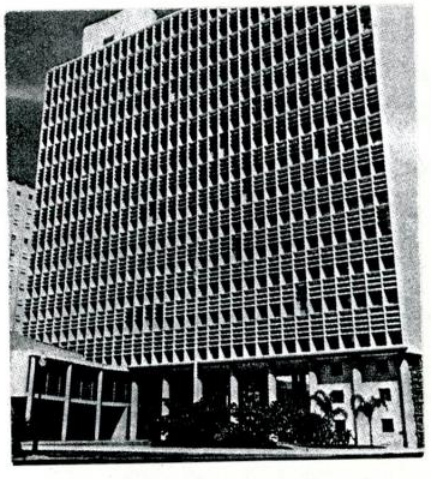

Fig. 41. "Brise-Soleil" Ministry of Education, Rio de Janeiro, (1936).

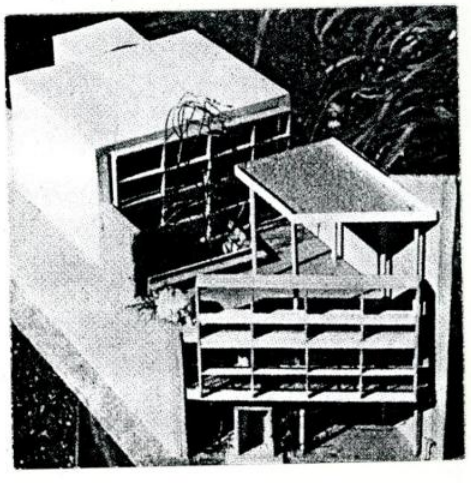

Fig. 42. "Brise-Soleil". House for Dr. Currutchet, Buenos Aires, (1945)

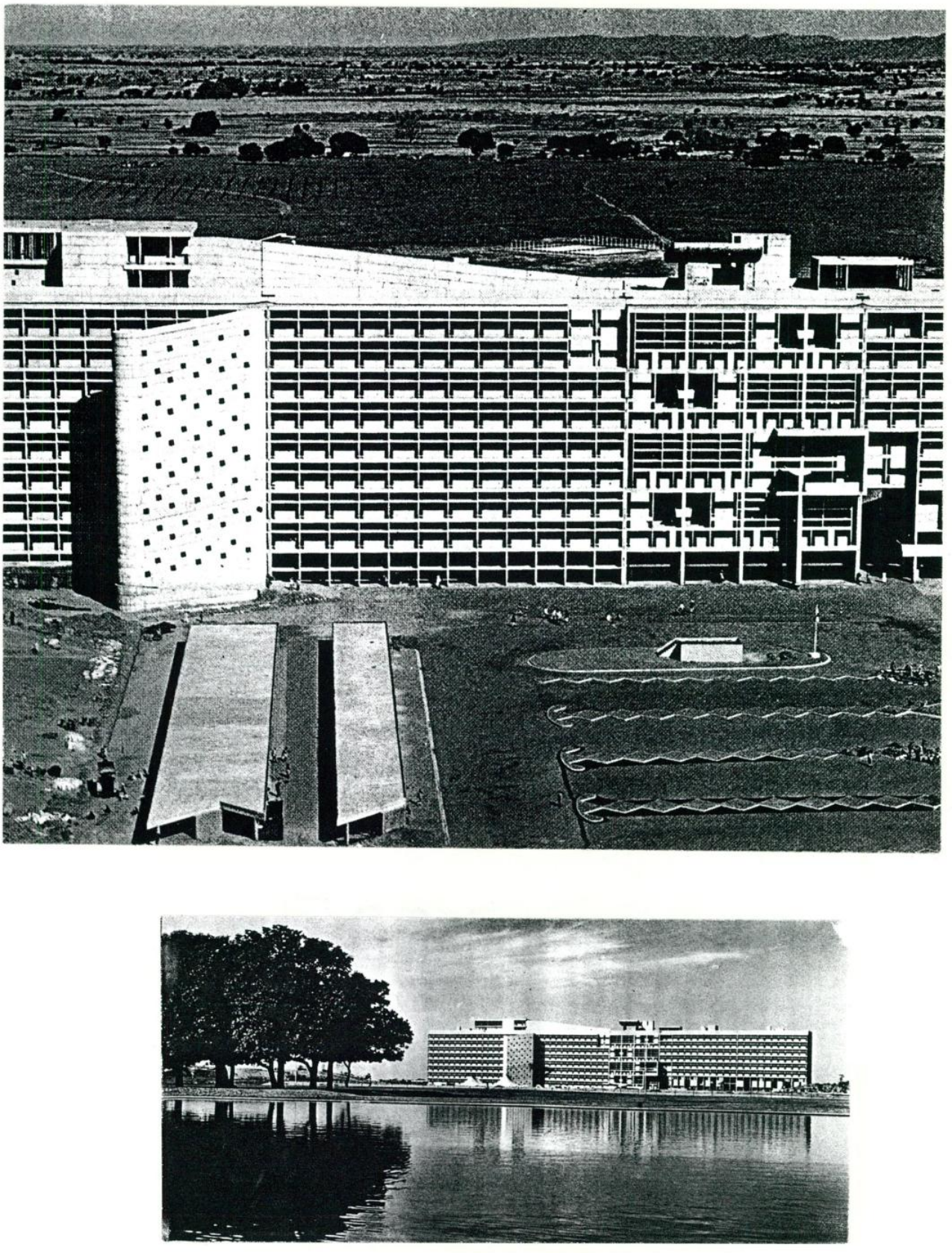

Fig. 43. Le Corbusier: West front of the Secretariat, Chandigarh, 1958. The use of climate control.

From the beginning, Le Corbusier had organised the complex programme for the Palace of Assembly by using the device of placing formally independent volumes. An incurvated cylinder, (the upper chamber) and an irregular pyramid, (the lower chamber), are within a large enveloping box, the irregular space between becoming the lobby or 'forum', (Fig. 44 and 45). Along one edge of the box, was a bank of offices on four levels under a sheltering canopy, and on the opposite side, a great portico facing the High Court, whose imagery the Assembly, at this stage, shared, (Fig. 46). The sun and even the moon were to penetrate the interior at significant times via holes and later via a chimney or inverted funnel that pierced the flat roof.

It was on his fifth trip to India in May/June 1953, that Le Corbusier got the inspiration to use the concrete shell hyperboloid which became the lower chamber. He saw the cooling towers of a power station near Ahmedabad and so decided to use their form as he felt a need for a tower-like structure in which he would, in normal circumstances, have placed a skyscraper.

The same hyperboloid, standing free in the landscape, was to reappear in Le Corbusier's design for the church at Firminy-Vert of 1963. The large pyramidical lantern over the upper chamber appears prominently on the roof in conversation with the great drum of the lower chamber. Here again, Le Corbusier feels the urge to accommodate the pyramid. Standing beside the hyperboloid it is like a contrast between early and modern architecture.

Offices placed behind angled "brise-soleil" occupy three sides of the perfectly square plan, the portico on the fourth consists of eight flat, blade-like columns perforated to show their slightness and to frame glimpses of the mountains. There is another direct similarity between the front columns of the Assembly and that of the High Court. They give a sense of space, light and most importantly, inviting the winds to ventilate the structure.

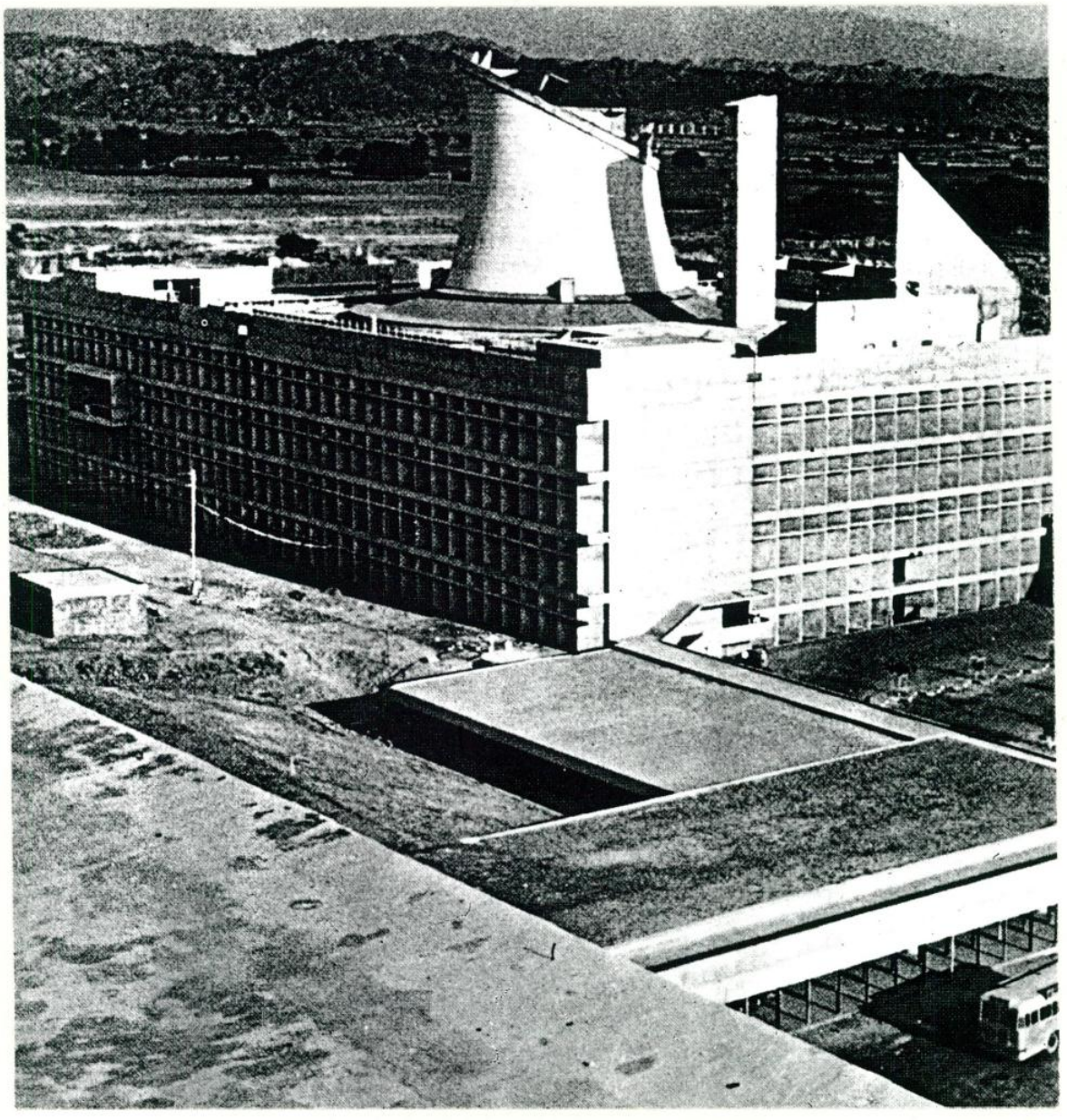

Fig. 44. Le Corbusier: The Assembly Building, Chandigarh, surrounded by a structure inspired by cooling towers.

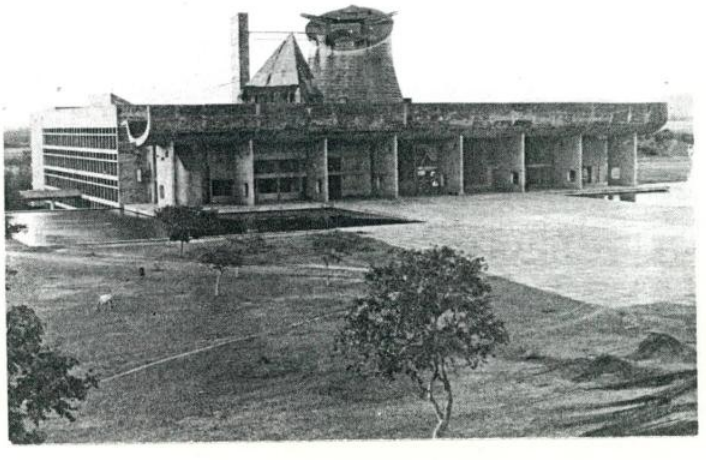

Fig. 45.

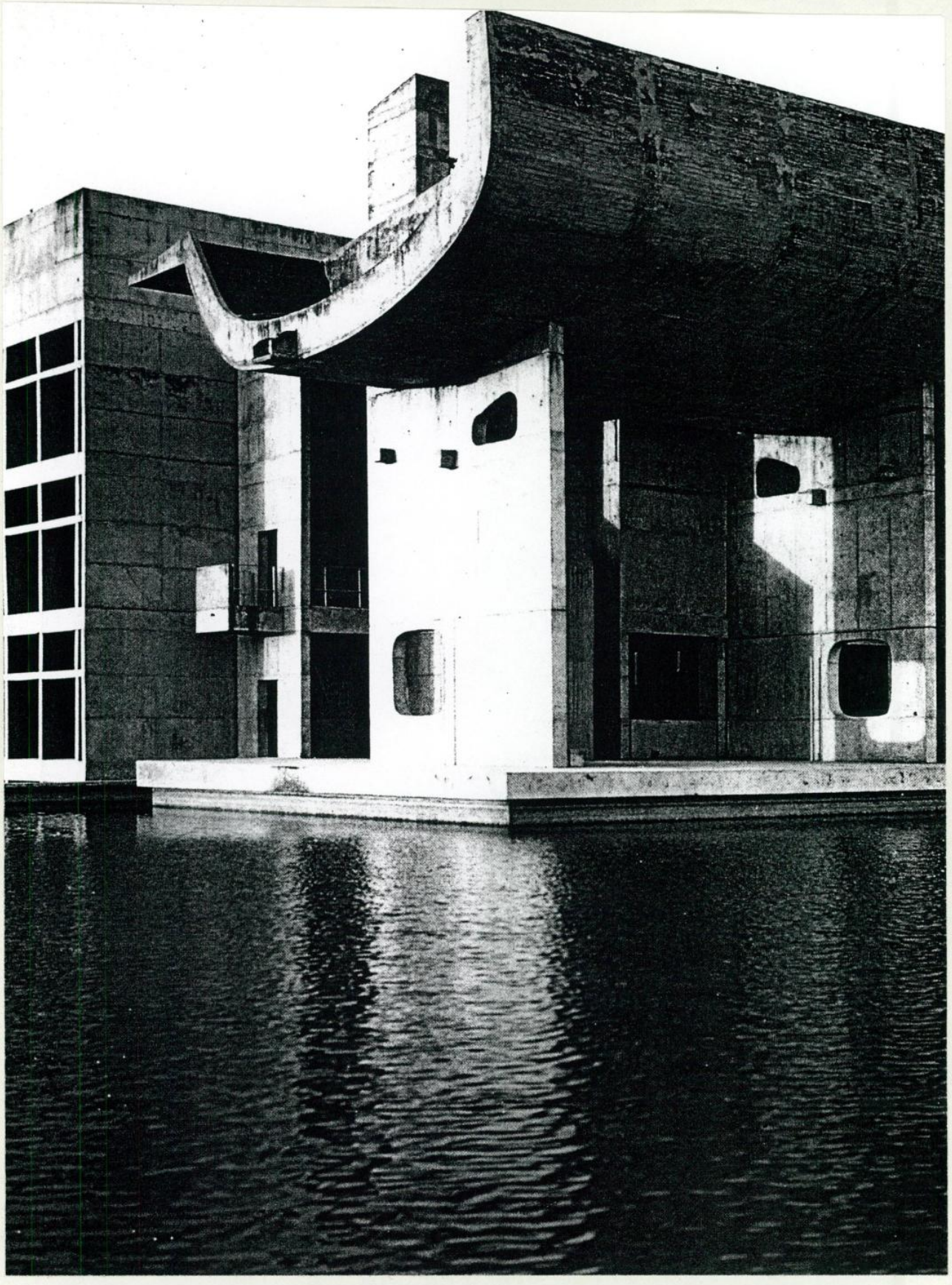

Fig. 46.Le Corbusier: Palace of Assembly, Chandigarh

Directly on top of the compelling structure of the hyperboloid is a sculpture that reifies in the Space Age (Fig.47). It takes the shape of bull horns which Le Corbusier had sketched previously on a visit to India. It can also be seen on the side elevation of the "brise-soleil" and is put across very strongly in the roof of the Governor's Palace, 1954, (Fig. 48). This again can be taken as a symbolic reference to India.

Chandigarh as a whole reflects Le Corbusier's enthusiasm for authority, and power which is a recurring motto throughout his work. It can also be said , by not distributing his authority, resulted in overlooking many of the real problems that faced Chandigarh. Distinctively, Indian ways of life were rarely taken into consideration and the city was more designed than planned. The city is segregated from the economic groups so the poor, who often cannot afford bicycles, let alone automobiles, have to travel long distances. The capital complex today is divided; once meant to hold one government, the Secretariat now houses two. Barbed wire and armed police are everywhere. Along the base of the Assembly, cloths are draped as makeshift tents to house whole families. Women tend fires on the plaza, while bullocks feed on the dry grass. Yet, in spite of everything, these buildings are unforgettable, full of Corbusian features, monumental facades made up of sun breakers and great abstract shapes. Whatever their shortcomings as functional government buildings, as architecture they are impressive.

Fig. 47. Le Corbusier: Assembly Building Chandigarh. Compelling structure of hyperboloid with a space age structure . It also takes the form of "bulls horns" which is symbolic reference to India.

CHAPTER III

THE RELATIONSHIP BETWEEN LE CORBUSIER'S DOMESTIC ARCHITECTURE AND TOWN PLANNING

In the early 19th Century, concrete was only used as an extension to the more traditional materials like brick, stone or metal. However, later in the century other possibilities of its use became apparent.

Reinforced concrete proved capable of producing better structural results with less material bulk than any previously known material with the exception of steel frame. Only in combination with economy, that is, the principle of achieving maximum results with a minimum of work, could concrete become the starting point for an architectural renewal. This is what happened in the works of August and Gustave Perret, Tony Garnier and others and it was from here that Le Corbusier continued from their attempts to transform concrete construction in the world of architecture.

Since the invention of the Domino system, (1915), the use of reinforced concrete has served as a basis for Le Corbusier's architecture. From the Domino system stemmed Le Corbusier's five points of a new architecture:

1. The pilotis
2. The roof garden
3. The free plan
4. The elongated window
5. The free facade.

From this point, Le Corbusier has carried these five points from his domestic architecture right through to his town planning. The box has become the basic theme of Le Corbusier's architecture and it has left the imprint on what has since been accepted universally as 'modern architecture'.

The box entered Le Corbusier's vocabulary as a solution to a number of problems and was first put to use in a project for a standardized dwelling unit called Citrohan. From this, the Villa Schwob became historically known as one of the first concrete frame villas in Europe. The idea of the flat roof derives from the "Domino Buildings" and Le Corbusier later links this dominant feature in his town plans, expanding his idea to form garden rooftops. Also, in the Villa Schwob, Le Corbusier had arranged the bedrooms and service rooms around the three sides of a large, two-storey living area.

The idea of focusing the family life around a large 'foyer' seems to have roots in traditional French rural dwellings but now in the Citrohan house, the foyer was redefined in terms of aesthetics. The concrete frame of the buildings allowed a free arrangement of floor plans so the occupants could arrange and rearrange them to their own requirements.

Another relationship between the domestic architecture is light and the Domino project, again, opened the way. The elongated window was the most natural means of allowing natural light to brighten up the free floor plan, and with it came the free facade both of which can be seen in the Villa Savoye in Poissy, (1929).

> I use light abundantly, as you may have suspected; light for me is the fundamental basis of architecture. I compose with light.
> (Le Corbusier: 1923: 132).

Le Corbusier, by reducing the wall thickness as a result of his experimentation with concrete, allowed more light in through the windows unlike the previous houses in history where large holes were created resulting in shadow being cast across the interior of the house.

In the Ville Contemporaine and the Ville Radieuse, Le Corbusier uses this light as one of the factors in enticing people to come and live there. Light also plays a large part in the development of Chandigarh as a symbolic representation. Le Corbusier uses the sun to dominate the large enamel door to the Assembly - the

ceremonial gate that opens once a year for the Governor of State. Furthermore, the larger of the two chambers of parliament is equipped for a mysterious solar ritual to be held each year. Le Corbusier also liked the sun to be regulated by natural means rather than using mechanics and is one reason for him adopting the "brise-soleil".

From the window theme, Le Corbusier adapts what he called "the framed view" which is the organisation both of pictorial and architectural space. To him the landscape was not something that floods all sides and is present everywhere in the house. He frames a view as if he would frame a painting. Here, we can see Le Corbusier, the artist, coming through and using his imagination in creating impact on his work. He regards the landscape as an element of surprise to be used in small amounts, therefore, creating surprise areas for the house owner.

One can see this in the Villa Savoye, (Fig. 48). From the ramp approaching the solarium, the eye is guided to a large rectangular opening in the eastern enclosure of the roof garden. A window is cut in the wall at the spot where the view spreads over the Seine Valley. In the Unite d'Habitation, Le Corbusier arranges the window views very carefully so as to create interesting viewing. He avoids views which overlook back gardens or views which come to a halt a short distance away, where a building opposite might give the occupant a depressing sensation. In the Ville Contemporaine, Le Corbusier avoids this cramped feeling by introducing parks and gardens in order to focus on areas of the park that give visual impact.

Unlike the Villa Savoye, the cities had no natural valleys and mountain setbacks, the surroundings had therefore to be created by man and so parks and garden rooftops were the alternative. These extras, the parks, the roof garden, the free plan, the sense of isolation and individualism have all played a part in encouraging people to occupy the houses both in the domestic and town planning situation. They have encouraged people to come to terms with modernisation and standardization.

To take another example of this symbiosis of urbanism and architecture, the thin concrete pilotis were both a response to the new constructional techniques provided by industry and urban solution, prefiguring the general segregation of circulation between cars and people. The combination of structural usefulness and urbanistic associations of the pilotis in the Unite d'Habitation projects, or, in the Villa Savoye, was an expression of the indissoluble links between architecture and urbanism. 'Architecture is circulation'.(Le Corbusier: 1976: 19)

The fact that Le Corbusier left a large number of drawings, watercolours, paintings, and even sculptures in addition to his architectural work is often regarded as mere curiosity. To many critics, his paintings were no more than a hobby but nevertheless, Le Corbusier used to say that painting represented his visual laboratory. He used art as an experimentation for his architecture.

> I am known only as an architect, and no one wants to recognise me as a painter although it was through my painting that I discovered architecture. (Le Corbusier: 1929: 80).

Historically, this is true, as a student he wanted to become a painter but L'Eplattenier, his teacher, succeeded in making him an architect. His paintings later became a private affair, an intimate dialogue with form, colour, memories, fear and joys emerging from the subconscious. He believed that art, that is true painting, was not meant for the general public and he was afraid that the authorities would use art as propaganda for their own ends.

There are several factors which link Le Corbusier's domestic architecture with his town planning. In early 1910, during his European visit, Le Corbusier made sketches of various picturesque settings to give him inspiration for his architecture and town planning. This helped him create an artistic impression for his works and from here he discovered by various means how to

complement such settings with his architecture. In his early domestic architecture, Le Corbusier brings his houses to very close range with nature. In the Villa Fallet, he uses nature side by side with the house. He simulates the fir trees on the gable end by carvings and the timber roof and crossbars of the windows are geometric symbols of the Jura pines.

In the Villa Savoye, Poissy, (1929), he keeps his distance with nature's detail, instead he views it at a distance. Le Corbusier realised that it was possible to get bored with looking at the landscape as a whole, instead he used the "framed view" to capture a certain area of interest. He frames the view just like an artist would frame a picture.

In La Ville Contemporaine and La Ville Radieuse, (1922), Le Corbusier has a more difficult task, he arranges the residential buildings in order to create maximum views and light. He has no longer the beautiful landscape like that of Poissy so he creates parks and gardens and adopts his own. In the city centre his skyscrapers go up into the sky again giving distant uninterrupted views. The same can be said for the Unite d'Habitation in Marseilles, (1947), which is interesting as it was the meeting point of Le Corbusier and Pablo Picasso in 1950.

In Chandigarh, Le Corbusier uses the mountains as the background for the city. He also invented a whole catalogue of symbols to be cast in the concrete walls the city's palaces and woven them into tapestries decorating its ceremonial chambers, (Fig. 49). The subjects were taken from his sketchbooks: the mango tree, the sacred cow, the Indian buffalo, the modular man with his left arm outstretched. Hands are also present and footprints, snakes, lightening, clouds, the sun and moon, the carriage wheel borrowed from the national arms of India, scales - the symbol of justice - and the Corbusian symbol of the sun's daily course, (Fig. 50). (Le Corbusier: 1957-1965: 111-115).

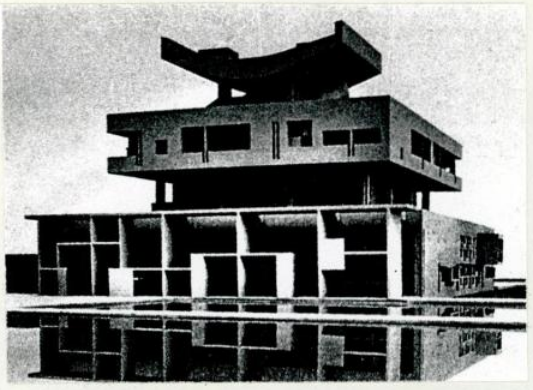

Fig. 48. Le Corbusier, Villa Savoye, Poissy, 1929. Showing ramp approaching the solarium to the large 'framed view' opening.

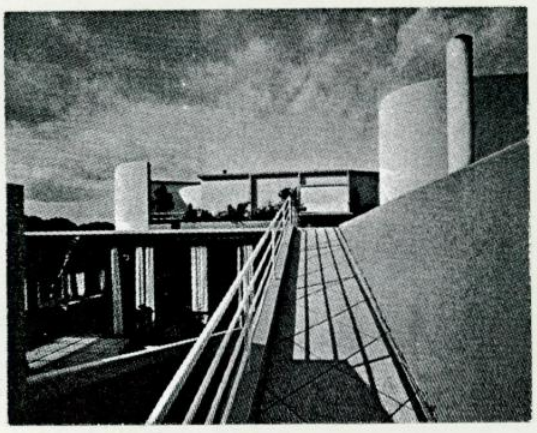

Fig. 49. Le Corbusier, The Governor's Palace, Chandigarh, 1954. Model. Sculpture on roof top symbolises 'bulls horns' a reference to India.

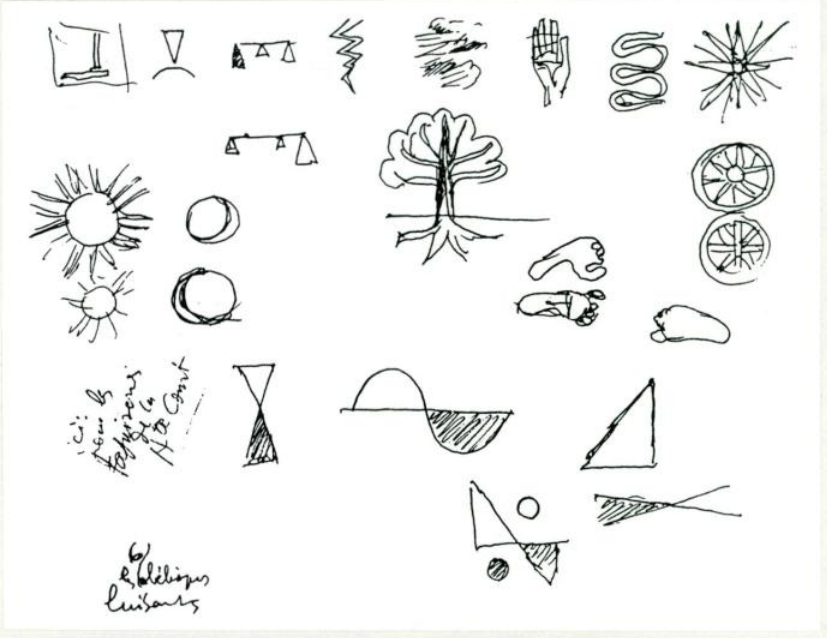

Fig. 50. Le Corbusier: Various symbols to be reproduced in sunken reliefs and tapestries throughout the buildings of Chadigarh's Capital.

CONCLUSION

Le Corbusier wanted to order the city structure by using geometry which he believed was the backbone of architecture. He denounced Camillo Sitte and his picturesque approach which he regarded as going against the grain of architecture.

Architects have thrown away the idea of strict geometry and we have put more value on variety and historical content of our towns and cities. Cities are designed in such a way so they can be modified rather than be radically overhauled. Cities have preserved the capacity to change. A city plan is not the product of a designing process but the starting point of a never ending process in which many besides the designer must participate. In this sense, Le Corbusier's diagnosis may seem simplistic.

Le Corbusier's city of tomorrow was pioneering work and if it had not been for such unprecedented designs as those Le Corbusier puts forward in it, (and a very few others like Tony Garnier's design of twenty years earlier for an industrial city), the progress made since would not have been possible. They provided the solid platform on which subsequent generations have been able to build - even though with a different emphasis from the one he recommended. This is so because they simply started where Le Corbusier left off, the city had been further developed so there was a clearer pathway as to the best direction to take.

Le Corbusier was a controversialist and this is one of the reasons for his decline. The sheer power in which he accompanied his statement of principles over-emphasised the limitations of his ideas by giving them an appearance of rigidity. As Le Corbusier's own buildings prove, he was himself a romantic, preferring passion and imagination to proportion and finish. There is no great difference between his meaning of an ideal city from those of Camillo Sitte's. The difference was that of timing.

Le Corbusier wanted to combine order with his romantic sensibility

and however difficult, organised and socially conscious the art of city planning has now become, it must still refer back to a definite orderly framework or structure. Town planning is a very disciplined art and concerns a number of specialists in other areas besides architecture. The architect must discipline himself in order to work as part of a team. The more free hand is given to the citizen to play a part in creating his own environment, the more chance there is of chaos.

Le Corbusier was a man of vision, he saw further ahead than we may think.

> At what rate do the trees that border our present streets wither and die as a result of the gases given off by petrol? We must require the legal establishment of that absolute necessity, a reserved zone of woods and fields.
> (Le Corbusier: 1977: 124).

Town planning has become a dumping ground for every difficult and unresolved problem such as birthrate, alcoholism, crime, accidents and so on. Le Corbusier's last sentence might have been written today. Le Corbusier was also aware of the traffic problems of today: 'We must create vast and sheltered public parking places where cars can be left during working hours'. (Le Corbusier: 1977: 118).

It must be remembered that this statement was made as far back as 1924. Le Corbusier also believed that the place to start rebuilding our present cities is in the centre and that, 'We must build on a clear site'. (Le Corbusier: 1977: 97).

Here, Le Corbusier is out of line with our present city. The city of today only accepts gradual change and great value is placed upon the historical content. The idea of demolishing a whole city centre is ludicrous. In the city of today, by closing only one road, great confusion and delays result. By demolishing the whole city centre would put the country at a halt.

Much of the unexpectedness of modern architecture is due to the new materials that have become available during the last half century, namely steel and reinforced concrete. The most obvious advantage of steel and reinforced concrete is that they will span very great distances easily and economically. Concrete and steel also allow architects to make openings in their walls of whatever size they want. Previously, the size of the windows in a building was determined by the width of opening possible, that is, by the distance that could be spanned by a stone or wooden lintel or a brick arch. The whole exterior appearance of traditional buildings is based on this distance, for the appearance, particularly of classical buildings, is largely given by the spacing and proportion of the windows. It is not surprising, therefore, that the use of steel and concrete for construction should alone produce a revolution in architecture.

It was from the discovery of being able to span over large distances using steel and concrete that Le Corbusier based his designs and philosophies. The Villa Savoye in Poissy, 1929, is an example, showing the design changes reinforced concrete brought about, the pilotis, the roof garden, the free facade, the elongated window and the free floor plan.

It is inevitable that the new forms which modern architecture is introducing, should take some getting used to and a large part of the disturbing effect that modern architecture has on some people is already disappearing as it becomes more familiar. But reinforced concrete and other new materials present special problems of this kind because they are so far removed from familiar materials. We have the unconscious habit of relating things to what we are already familiar with. We know from experience how strong wood or stone is, for we handle them in other contexts and we are satisfied that it is able to do the job that it has to do. But reinforced concrete construction is different and so is a building which uses a lot of glass. We cannot see the steel bars inside the concrete and reassure ourselves that it can safely span several times the distance of the stone lintel, nor can we see what is supporting the roof besides a row of elongated windows.

This was a problem Le Corbusier was faced with, especially with his domestic housing. The people were unwilling to accept such radical change in such a short space of time. Le Corbusier rushed into the application of his five points of a new architecture and applied them all at once throughout his buildings. He failed to get the public response he was looking for partially because he did not apply gradual change, winning over their acceptance. Another point which the public found hard to accept was the smooth white wails which also had a bare appearance and, in damp conditions, few of the white surfaces survived. They soon became dirty and needed repainting.

The late career of Le Corbusier is startling. His medium is still reinforced concrete, now used, however, not to draw thin planes around geometric volumes but to create bold sculptural effects with rugged textures and great weight and scale. At first, it is hard to believe that the late works are by the same architect, who designed the Villa Savoye. Beneath Le Corbusier's high modernist facade was a man of extremes and inner conflicts. Le Corbusier developed a ruthlessness to impose his artistic authority on the world. Nothing was sacred to him but the current phase of his art. In some of Le Corbusier's town planning, especially in Chandigarh, he turns to a raw brutalistic finish of concrete, sometimes making a feature of the shuttering marks to give the buildings an extra visual lift. In fact, Le Corbusier was just trying to compensate for the lack of surface treatment that concrete possessed.

Modern architecture was in an experimental stage and Le Corbusier's work shows this. His designs often took little account of the limitations imposed by building methods and materials of the day. Soon after completion, the Villa Savoye was found to have an enormous number of construction faults.

> The heating was impossible, the internal walls were paper thin and above all, the whole house suffered from damp.
> (Hill: 1987: 87).

Le Corbusier's architecture did not possess enough of the human kind of appeal. This was partly, (as is stated in Chapter 2), because modern architecture was unfamiliar but it is partly that his architecture concentrated to begin with, more on achieving the discipline it obviously needed than on the complete range of expression that a mature architecture can afford to use. One of the essential characteristics of modern architecture is that it remains flexible and as technology improves, any previous mistakes can be resolved. Today, the outside walls are given a more careful choice of materials and construction so preventing dampness and decay. Construction is now geared towards greater humanisation through the use of a greater variety of materials, old as well as new, and various finishes and textures. These new qualities are not going against the idea of modern architecture, in fact they are further exploiting the general principles which the likes of Le Corbusier set down and which they themselves failed to exploit.

REFERENCES AND WORKS CONSULTED

BOOKS

Architectural Press, Studies & Executed Buildings by Frank Lloyd Wright, Architectural Press, London, 1986.

Arts Council, Le Corbusier: Architect of the Century, Haywood Gallery, London, 1987.

BANHAM, Reyner, Guide to Modern Architecture, Architectural Press, London, 1962.

BANHAM, Reyner, Age of the Masters, Architectural Press, London, 1975.

BEHRENS, Peter, Peter Behrens, 1868-1940, MI.T. Press, London, 1984.

BENEVOLO, Leonardo, The History of the City, Scholar Press, London, 1980.

BESSET, Maurice, Le Corbusier, Skira Academy Editions, 1976.

BLASER, Werner, Mies van der Rohe, Thames and Hudson, London, 1972.

BOESIGER, Willy, Le Corbusier, Thames & Hudson, London, 1972.

BOUDON, Phillippe, Le Corbusier's Pessac Revisited, Lund Humphries, London, 1972.

DAVEY, Peter, Architecture of the Arts &n Crafts Movement, Rizzoli, I.P., 1980.

DAWES, Nicholaus M., Lalique Glass, Viking, G.B. 1986.

GROPIUS, Walter, The New Architecture & The Bauhaus, Faber & Faber, London.

GROPIUS, Walter, Modern Movements in Architecture, London, 1973.

GROPIUS, Walter & BUSIGNANI, Alberto, Twentieth Century Masters, Crown, U.S.A. 1972.

JENCKS, Charles, Modern Architecture, Butler & Tanner, London, 1980.

JENCKS, Charles, Modern Movements in Architecture, Penguin Books, England, 1973.

LE CORBUSIER, translated by ENTWISTLE, Clive, Concerning Town Planning, Architectural Press, London, 1947.

LE CORBUSIER, translated by ETCHELLS, Frederick, City of Tomorrow, MIT Press, Cambridge, 1977.

LE CORBUSIER (transl).,The Radiant City, Faber & Faber, London, 1967.

LE CORBUSIER, translated by de TRANCIA, Peter and BUTOCK, Anna, Le Corbusier, Modular 2,, Faber & Faber, London,1955.

LE CORBUSIER, Towards a New Architecture.

LE CORBUSIER, (transl.), Volume 2, Oeuvre Complete, Zurich Editions, 1946.

MANFREDO, Dal, translated by ERICH, WOLF, Robert, Modern Architecture/2, Academy Editions, London, 1980.

MUMFORD, Lewis, The City in History, Cox & Wymann, London, 1961.

PEVSNER, Nicklaus, An Outline of European Architecture, Jarrold & Sons, Nerwich, 1968.

RICHARDS, J.M., An Introduction to Modern Architecture, Hunt, Bernard, Aylesbury, 1962.

ROSENAU, Helen, The Ideal City, London, 1983.

RUSIN, John, The Lamp of Beauty, G.B., 1959.

SEKLER, Edward F., The Architectural Work of Josef Hoffmann, Princeton University Press, Surrey, 1985.

SERENYI, Piter, Le Corbusier in Perspective, New Jersey, U.S.A., 1975.

TRACHTENBERG, Marvin & HYMAN, Isabelle, Architeckture from Prehistory to Post-Modernism, Academy Editions, London, 1986.

UNRAU, John, Looking at Architecture with Ruskin, Thames & Hudson, London, 1978.

VENTURI, Robert, Complexity & Contradiction in Architecture, The Museum of Modern Architecture, New York, 1966.

VON MOOS, Stanislaus, Elements of Synthesis, Massachusetts Institute of Technology, 1979.

PERIODICALS

DOUGLAS, Stephen, 'Architect of the Century', Blueprint, Apr. 1987, p.66.

GROSSMAN, Loyd, 'Building Egos', Telegraph Sunday Magazine, Feb. 22, 1987, p.32.

HILL, Diane, 'Private Life of Corbu in Paris', Design Week, Vol. 2, No. 36, Sept 1987, p.27.

RAINES WARD, Diane, 'Up Against India', Connoisseur, Vol. 217, No. 910, Nove. 1987, p.152.

SMURTHWAITE, Nick, 'Le Corbusier as Architect', Design Week, Vol. 3, No. 8, Feb. 26, 1988, p.12.

ZAKNIC, Ivan, 'Journey to the East', Magazine of International Design, Vol. 34, No. 6, Nov/Dec. 1989, p.84.