LE CORBUSIER'S UNITÉ D'HABITATION - A. SLAB FOR ALL SEASONS ?

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SYNOPSIS OF THESIS

Most arguments about high-rise housing are waged in the shadow of Le Corbusier. The pervasive effects of his dogged half-century spent advocating the benefits of high-rise dwelling are still everywhere apparant. His watchwords - "soleil, espace, verdure","le grand gaspillage du temps moderne" , "les services communs", "les prolongements du logis" - are still in one form or another the ultimate weapons of the apologists and detractors of high-rise, and the Unités, in particular, have become the touchstone for much of the slab-building around.

In view of all this, one would expect that there exists a solid corpus of critical works explicating Le Corbusier's precise position whose meaning, as a result, would unambiguously and by common consent be implied whenever the Corbusian Freudian-father is invoked. There are not however, any such rigorous critical studies of Le Corbusier's housing proposals and among the general works that do exist, little concensus and indeed some contradiction exists on the definition of the Corbusian solution; that is, on the question of the Unités proper context - the planning matrix within which it fits. The Unité itself, its genesis and its ultimate canonization, has been the subject of even less objective investigation.

This study set out to fill that gap; in the course of my research it was found that Le Corbusier's supposedly consistent proposals concealed during their long evolution many shifts, disjunctions and non sequiturs. This uneven and disconnected dialogue between the former and latter parts of Le Corbusier's 'oeuvre' that is described in this

study reveals the Unité finally as being not at all firmly embedded in or clearly resulting from his overall design contexts and housing proposals. It stands, finally, as a separable declaration of Le Corbusier's particular understanding of the psycho/visual nature of human perception, and this is judged to be an inadequate and over - exclusive raison d'etre.

C O N T E N T S

CHAPTER ONE

INTRODUCTION - UNITÉS OF "APPROPRIATE SIZE"?

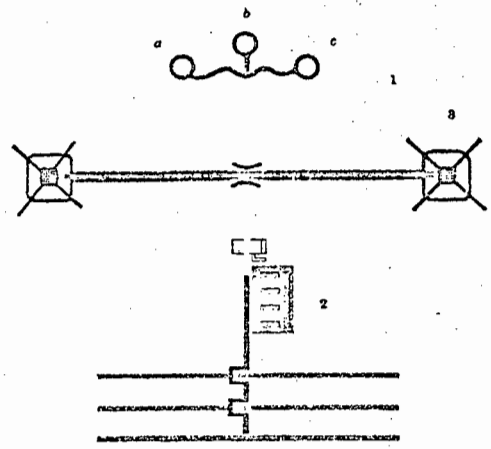
This enquiry, as the title implies, sets out to establish the contemporary relevance of Le Corbusier's most cherished housing prototype. What lessons does the "Unité" hold for us?

This sounds a simple enough question and suggests an equally simple method of enquiry; if the building is indeed a prototype, examine one such built example and reach conclusions about its validity and utility as a model. And this is what the critics mostly do; using the Marseille Unité as the invariable example, since it was the first-built and thus best-known, opinions are expressed about its success or failure as a model.

But both the abbreviated reference to the building as the "Unité" and this apparently straightforward critical method mask a very real complexity that our initial question must properly reveal.

For the full title of the Unité is the "Unité d'Habitation de Grandeur Conforme" - which can be translated as the "Integral Housing Unit of Appropriate Size".[1] Immediately, new shades of meaning appear -- in which sense 'Appropriate' and to what ?

Clearly the full title invokes something more than just the building itself, and even as regards only the building, the qualification 'Integral' imposes a standard to be met. Similarly critics discussing the Unité must assume (tacitly or explicitly) a context within which it is 'Appropriate' and likewise the adequate representa-



Une unité «de grandeur conforme»
1 Habiter
2 Travailler
3 Se cultiver
a Cité-jardin horizontale
b Cité-jardin verticale
c Les prolongements du logis

A 'unité' of consistent size
1 Living
2 Working
3 Cultural
a Horizontal garden-city
b Vertical garden-city
c Extensions of the home

fig. 1

1. This translation which, I believe captures the necessary overtones, is my own. Alternative versions I have come across include 'standard-size-Unité', 'Unité of consistent size', 'Unité of proportionate size', 'Housing Unity of congruent size'. Through non-translation of the word 'Unité' one loses its intention to convey the idea of 'wholeness' or 'entity' as well as the notion of a finite unit or measure, or, using a word still dearer to Le Corbusier's heart, that of an organ. The search for the right measure or scale for an enterprise of any kind, is true of all Le Corbusier's work and is of profound importance in grasping his intention. He uses the word 'Unité' in a number of ways. In the present work, though, its use will be taken to refer to the kind of building exemplified at Marseilles, Nantes, etc. An example of the wider kind of usage of 'Unité' nomenclature is found for example in the Oeuvre Complète, Vol.IV, p.72. (fig 1)

tiveness of whichever Unité is being discussed.[2] These are nearly always value-judgements made as a matter of course -- after all Le Corbusier was so prolix a polemicist that there is surely little doubt about the nature or proper context of the Unité :

When we look to the sources and contexts assumed by critics however, we find no such unanimity.

Sherban Cantacuzino would have us understand that " the theory of vertical living proposed for a whole city in the 'Ville Contemporaine'has taken form in one or two solitary examples, of which the most distinguished is the Unité at Marseilles"[3] from which, he believes, it follows that "it is important to remember, therefore, that the sense of social isolation which the uniqueness of the Unité must give its occupants is precisely the opposite of what was intended."[4]

Kenneth Frampton moves the ontogeny eight years forward and continues to draw similar conclusions :

> Only unintegrated elements of the Ville Radieuse were ever to be built. Already pre-figured as free-standing 'communes', in the pre-war projects for Nemours (1934) and Zlin (1935), the Unités d'Habitation which were erected out of context after the war, were to suffer, as might have been predicted, from both physical and social isolation.[5]

Dennis Sharp sees the Unité emerging at Marseilles thus: " The culmination of Le Corbusier's quiet wartime thinking was seen in the massive 'Housing Units' (Unité d'Habitation) at Marseilles, a residential complex designed principally for workers".[6]

2. There were, in all, five separate Unités built between 1947 and 1968 and many more projected.

3. Sherban Cantacuzino, Great Modern Architecture, p. 90.

4. Sherban Cantacuzino, Great Modern Architecture, pp.91-92.

5. Kenneth Frampton, "The City of Dialectic", Architectural Design, October 1969,p.545.

6. Dennis Sharp, A Visual History of Twentieth Century Architecture, p. 192.

Both Martin Pawley and Norma Evenson discuss the Unité as a single fragment of what was meant to be a larger design for Marseille-South. Pawley elaborates that "This large building, notwithstanding its close relationship to some of Le Corbusier's urban projects of the 1920's represents for the first time the architect's answer to the problems of construction cost, land value, maintenance and sheer practicability."[7]

Robert Furneaux-Jordan invents a generic context for the Unité as built at Marseille: "The block is of course only a fragment of Le Corbusier's complete city. There should be six, ten, twenty such blocks spaced out over half a mile of parkland, each with its twelve acres."[8] This is presumably meant as a faithful setting for a building that "was in a sense, the culmination for a lifetime's work and thought".[9] Though how this relates to the assertion repeated here by Furneaux-Jordan that the building was originally designed "for humble working people" is not clear. Was it then a universal prototype or one specifically for working classes ?

Lewis Mumford is content to evaluate the Unité at Marseilles 'as is' on the blithe assumption that "It embodies all the features Le Corbusier regards as essential for seemly urban living"[10] and is a "....unique sort of dwelling, a compact solution for the whole problem of urbanism, a modern version of that Fourierist phalanstery, isolated and self-contained, whose occupants need not leave the building in order to play, to exercise, to go to school, to visit

7. Martin Pawley, Le Corbusier, p.17.

8. Robert Furneaux Jordan, Le Corbusier, p.81.

9. Robert Furneaux Jordan, Le Corbusier, p.78.

10. Lewis Mumford, The Highway and the City, p.69, and p. 78.

their doctor or their dentist, or to market."[10]

Carlo Cresti repeats the Fourier analogy seeing the Unité as the result of an uncompromising, ever-improving and converging design process:

> When l'Unité d'Habitation and its unprecedented forms became an integral part of the Marseille landscape, the cycle of the 'town-planning revolution' was coming full circle. The social and political ideal of all-embracing harmony ('Grande Harmonie'), put forward by Fourier in his "Phlanstery' project, pursued by Le Corbusier, became a working reality....
> The shades of Utopia pale before such persistent and consistent proposals and any extremes, due to early ambitions, are eventually resolved as the overall design progresses."[11]

Norma Evenson echoes the Fourierist origins and adds to the requisite contextual backdrop that " in his conception of communal living, Le Corbusier claimed to have been influenced by monastic society. "[12] These two inputs, the Fourierist and the monastic, as well as the modern ocean liner analogy, Peter Serenyi regards as pivotal to the "invention of the Unité concept in 1922"[13] and this heavily influences his conclusion that "It seems.... that ideally at least, each apartment of the Marseille block is designed for a single human being, living completely alone, while sharing the advantages of a larger collective order."[14]

This sampling is fair indication of the wide range of backdrops thought necessary to an understanding of the Unité d'Habitation. And indeed, one may perhaps argue that they are all right; that the Unité must truely be seen as the most-evolved end-product of a widely rami-

11. Carlo Cresti, Le Corbusier, p. 36, 37.

12. Norma Evenson, Le Corbusier: The Machine and the Grand Design, p.32.

13. Peter Serenyi, "Le Corbusier, Fourier and the Monastery of Ema", Art Bulletin, December, 1967, p.282.

14. Peter Serenyi, "Le Corbusier, Fourier and the Monastery of Ema", Art Bulletin, December, 1967, p. 286.

fied and highly complex process; that there is no single optimum environment for it other than a broad generic concept in which all the sources partake without mutual cancellation; that this is the veritable slab for all seasons. Certainly from amongst the many writings of Le Corbusier himself one can advance enough evidence to support all these positions and we need not even go to such lengths for, at the drop of a hat in virtually any of his later books Le Corbusier does the job for us:

> In fifty years the search for a dignified dwelling has led us from the Carthusian monastery of Ema to what has now been achieved -- that is, to conception, then to creation, and then to construction of the Unités d'Habitation de Grandeur Conforme. An immense amount of labour has entitled us to write of this book and make this notable claim: the creation of a bold and effective dwelling, bringing with it the basic pleasures.
>
> The "basic pleasures" were defined in the Athens Charter of the CIAM (city planning).
>
> In 1922: Salon d'Automne de Paris, a proposed Contemporary City with 3 million inhabitants.
>
> In 1925: Pavillon de l'Esprit Nouveau, "Plan de Paris", actual full-scale living cell (dwelling) equipped with common services.
>
> From 1931-1935: study of the "Radiant City", symphonic city-planning proposal for modern times (a machine-age civilization).
>
> In 1942 (ASCORAL), the book "Les 3 Etablissements Humains" (The Three Human Establishments) was written (published in 1948).
>
> All of this (from 1922-1957) tried out, applied, perfected by confrontation (that's what city planning means) -- in the overall plans for Paris, for Stockholm, Buenos Aires, Bogota, Nemours, in Algeria Algiers, etc. etc. --with purely architectural research: dwellings individual houses, civic buildings, etc. etc.[15]

Here we have, then, gathered together for us by

15. Le Corbusier, Nursery Schools, pp.9-10.

the Master himself, the stream of experiences, events and projects that culminate in the Unité d'Habitation. The line connecting the contexts selected and cited by critics is made here to run unbroken through most of these. Not only, must we then assume, does the Unité spring directly from each of a number of specific sources, but, as Le Corbusier tells us, it unfolds over the years, nursed with great perseverance, in a consistent way, to become the standard it finally does. With great pride Le Corbusier would look back on this effort and echo a credo first trumpeted in "L'Esprit Nouveau" -- "It is necessary to press on towards the establishment of standards, in order to face the problem of perfection".[16]

The Unité, seen in this light, will embody and imply all the ideas and currents traced out down time for it is nothing but the diapason of consonant orchestration and of a true score.

How true is all this ?

Maurice Besset, longtime friend of Le Corbusier and perhaps his most illuminating critic has this to say about Le Corbusier's consistency with respect to the development of the 'pilotis' in his work.

> It is rare indeed for any invention of his to be the fruit of a single intuition, to take at once a definitive form. Even in the case of those elements which he called standards , the initial invention provided merely the point of departure for a series of re-elaborations, and reinventions, which from the initial premises, draw different and sometimes contradictory meanings: it is this perpetual reviewing and stating of a given problem that Le Corbusier called his "patient search", and that he opposed

16. Le Corbusier, Vers une Architecture, p.123

17. Maurice Besset, Who was Le Corbusier, p.75.

to passive, gratuitous, unfruitful illumination."[17]

On the surface of this passage we see a crack that could allow in the thin end of the wedge "... and sometimes contradictory meanings". Were this held more generally for Le Corbusier's work, it would be nothing else than the admission of a change in <u>kind</u> rather than in <u>degree</u>, traceable through Le Corbusier's supposedly consistent development. Besset is too close to Le Corbusier to desire or to be able to damage the Master's monolithic structure and pursues this critical option no further.

Unfortunately, even those critics that are unhampered by the Corbusian charisma, and who roundly damn the work of his hands, even the best of them, are still beguiled by his verbal patina, and assume a consistency in his vision and tend thus to bury him utterly, rather than selectively.

For if, in point of fact, Le Corbusier is inconsistent through time, if there are significant major shifts of ground which pass by more or less unacknowledged, then to what precise context is the Integral Housing Unit appropriate ? If the Unité or embryo-Unité does have quite a different meaning depending on the situation within which it is viewed, then before we can make any assessment of its contemporary relevance we must surely examine these various situations closely in order to correctly establish which, if any, qualify as the 'correct' or 'intended' context.

We have set outselves up to examine contexts for the Unités-- with a view to establishing whether the meaning of this unfolding prototype is consistent through time.

Now there is a group of concerns to which Le Corbusier was undoubtedly faithful from beginning to end. These concerns are the underlying and fairly abstract principles that are the ultimate justification for everything that Le Corbusier said or did. In essence they amount to the belief in Man's ineluctable involvement in two fateful sets of relations: that between Man and Nature -- Le Corbusier sometimes added 'Cosmos' to this binomial --and that between Man and his Fellow Men -- usually phrased as the Individual/Collective binomial. This constitutes Le Corbusier's unvarying view of the Human Condition and all of his attempts were directed towards a true resolution both within and between these dualities. For Le Corbusier, it was this essential resolution, this critical HARMONY, that was the goal of all planning and it was his belief that the techniques of the New Age offered unprecedented opportunities for re-establishing the time-hallowed hegemony of this Harmony.

These unchanging tenets of faith were embodied in the form of principles which were also physical design goals. Here is a fairly concise and complete version of these goals culled from Le Corbusier's labyrinthine 'Radiant City'.[18]

1. The city should provide liberty for the individual and the benefits of collective action

18. The book itself will be referred to as 'The Radiant City' in this study to distinguish it from Le Corbusier's project of 1930 which will be called the 'Ville Radieuse'.

on both the material and spiritual plane.
2. All urban planning should be ultimately based on the human scale.
3. Urban planning should fix the relations between the various places devoted respectively to residence, work and leisure according to the rhythm of the inhabitants' daily activity.
4. Housing should be considered as the central element in all urban planning.
5. The material elements at the disposal of the urban planner, and which it is his place to combine, are: sky, trees, housing, places of work, places for communal activity (including leisure activities), and traffic.[19]

These goals, which were to become axioms for CIAM,[20] though they forcefully define the scope and priorities of planning, do not extend to the determination of a very specific physical environment. The demands for the functional zoning of cities, the incorporation of natural elements into the city, the primacy of housing, insistence on human scale, and so on could actually be arranged in any conceivable number of ways depending on the precise manner in which they are put into practice.

These generalized goals are steadfastly reflected in all Le Corbusier's output (see Table Ia). In so far as some lend themselves to being related to Fourierism or Monasticism, as for example the first principle clearly does, these connections are valid.

But this is not the ground on which the questions we have asked must be settled; these principles gave rise to an interdependent series of particular design strategies and it is to these that we must turn to pursue our enquiry.

19. Le Corbusier, The Radiant City, p. 188.

20. CIAM are the initials of the Congrès Internationaux d'Architecture Moderne.

The first deliberate, comprehensive and all-embracing programme incorporating such strategies only became possible for Le Corbusier after 1930, when the architectural revolution could clearly be seen as a fait accompli and its extension into the sphere of urban and regional planning appeared necessary and logically unavoidable. With a new confidence and sweep of vision born of this 'necessity', Le Corbusier, moving to the helm of CIAM in 1933, was steering the Modern Movement towards the certainties vouchsafed him by his design of the Ville Radieuse three years earlier. Here is Le Corbusier's version[21] of these design strategies presented in the guise of a "resumé of the answers given to the questions about housing"[22] by the 1933 CIAM delegates.

a. A house is made up of a floor on a foundation, a water-tight ceiling, and walls that may either let light through them or not. This unit may either be placed on the surface of the earth itself (spread out) or be superimposed in vertical columns of 10, 20, 30, etc. Modern techniques (steel and cement) will now permit us to create these "artificial sites".

b. By using modern techniques, houses can be made soundproof.

c. Aside from its habitable area, housing should include certain indispensable extensions (psychology and physiology): space, sunlight and greenery.

d. By taking advantage of modern techniques permitting us to increase the height of individual buildings, the city's past tendency to spread in area can be reversed: it can contract.

e. Building taller housing units will permit the introduction into the city, whether artificially or naturally, of green areas, and natural elements (water, trees).

21. That the clear imprint of Le Corbusier's heavy hand is upon this programme is apparent when we compare this ostensible 'resumé' with what actually appeared in the final Athens Charter which resulted from this, the fourth CIAM gathering. Many items critical in Le Corbusier's thinking -- the notion of soundproofed dwellings within tall large housing units with common services as the only combination capable of compacting the city were excised from the Charter.

22. Le Corbusier, The Radiant City, p. 188.

f. The safety, efficiency and hygiene of our cities have been disrupted by the invention of new high-speed vehicles. These have made the introduction of a new kind of traffic classification essential: the pedestrian should not have to share roads with automobiles.
g. Different kinds of traffic should not be allowed to mix. They should be separated according to their functions (speed and weight).
h. Traffic lanes should be independent of the means of access to housing units.
i. No housing should ever run alongside a traffic lane.
k. The new high-speed vehicles necessitate greater distances between intersections, and therefore a decrease in the number of streets.
l. The introduction of communal services in domestic life could lead to a saving in the area of the individual housing unit. Such communal services lighten domestic labour and free wives for more useful work.
m. The organization of such communal services will necessitate the building of housing units on a larger scale.
n. This new housing unit will be in accord with the new traffic system.
o. These new housing and traffic systemswill provide space for a new system of green areas between the housing units.
p. The park outside each housing unit, will contain the nurseries, children's playgrounds, primary schools and areas for daily sporting activities or relaxation. [23]

The interdependent and overlapping nature of these provisions is clear (See analysis in Table lb), as is their rather self-serving progression which too neatly clinches everything into a readily interlocking total solution, not only to housing but to urban organization generally. There is the inescapable feeling that the inventory is a post-hoc rationalization of a synthesized design that has

23. Le Corbusier, The Radiant City, p. 189.

already been settled: high buildings (point d.above) for example, will not necessarily create a contracted city nor automatically allow of the introduction of natural elements into it (point e. above); only a particular density and a particular proportion of ground coverage in conjunction with high buildings can make these happen; the establishment of new larger-scale housing which, mirabile dictu, perfectly fulfills all the earlier-mentioned environmental objectives (points m-p above), also smacks of working forward from a particular preconceived design solution. What gets confused is any clear sense of the actual generating goals; instead we are more or less offered options for settling the actual hierarchical sequence of strategies.

This is not suprising since Le Corbusier himself said of the Ville Radieuse plans that"The necessary explanations about the modern City- the Radiant City- are infinitely complex: each question ricochets back onto the others in every direction"[24] and, by way of elucidating them, Le Corbusier immediately thereafter points to the very high densities achieved in the Ville Radieuse as its most crucial quality, allowing of the reduction in internal distances etc. Elsewhere, however, shifting the order of priorities, Le Corbusier proclaimed that:

> J'ai été le premier à proclamer que laville moderne doit être un parc immense, une ville verte. Mais, pour me permettre ce luxe apparent, j'ai quadruple la densité de la population, et j'ai --au lieu de les distendre--raccourci les distances.[25]

Examples like this could be multiplied.

With a view to resolving the question of actual priorities we have 'weighted' the strategies in a table[26](Table 1(b))

24. Le Corbusier, The Radiant City, p.106.

25. Le Corbusier, Precisions, p. 268.

26. This table is based on Le Corbusier's lengthy 'resumé' earlier quoted but certain points have been pruned or sub-divided for the sake of clarity, simplicity and brevity. To determine 'bonding value', the 'dots' have been given numerical values from 1-4.

according to the degree of inter-implication supported by any one measure. The resulting hierarchy of the most heavily 'bonded' strategies is as follows :

Housing Units on a larger scale
Extensive natural areas
Housing's extensions: Space, Sun, Verdure
Taller Buildings
Separation/Specialization of all Movement
Introduction of Common Services within Building
Development of Body/Mind in immediate verdure

These results do not, however, give us any clear indication of priority; they do show which strategies result in being the most powerfully justified within the system as a whole, but this is not necessarily the same as being the generators of the system. 'Housing Units on a larger scale', for example, is to be seen as the most logical outcome of the system, but not necessarily the first generating priority.

The only method, it appears to me, of establishing the generating strategies is to examine the application of all the strategies in practice with an eye on whether the most 'bonded' ones retain their supports down time. A tracing of consistency, mutation, or abandonment down time in relation to Le Corbusier's most characteristic projects should leave us with a firm empirical understanding of the Unités true conceptual context so that we can proceed to evaluate it.

There is, however, another facet to the principles and strategies elaborated to date, which, for all its being

in the shadow of Le Corbusier's writings and work, is nonetheless critical to their understanding and must therefore be examined for the light it can ultimately throw on the Unité as a solution.

I am referring to the implications of both design principles and strategies for re-organization of areas far broader than the physical sphere alone ; the major consequences for the re-structuring of society that are the inevitable result of believing in certain ends and means for the harmonized living environment. Le Corbusier (and therefore CIAM by and large) was always ambiguous about acknowledging this strata of issues as a problem worthy of serious and detailed attention, though he often stumbled upon it. Shortly after the adumbration of the design strategies earlier quoted at length from The Radiant City, Le Corbusier went on to state that :

> Any practical realization of these principles depends upon the development of the economic system. Research into the correct solution for this problem is not part of the architect's professional task. Architects and city-planning experts can only resolve the technical problems of urban redevelopment within the limits imposed on them by the economic system.[27]

Le Corbusier ignored the manifest internal contradiction inherent in this position -- how can an integral part of a system envisage any alternative to it without freeing itself from that system's mental bonds....while yet being warned that this is out of bounds ? Not one page

27. Le Corbusier, The Radiant City, p. 189.

earlier, however, Le Corbusier asserted that the CIAM Congress' "strictly technical investigation" had led them to:

> ...envisage the problems revealed in all their simultaneous reality:
> Anthropocentrism: Human biology and psychology (the individual).
> Sociology: (Collectivity).
> General Economy
> Authorities: Administration and Executive.[28]

The section immediately following on this one is, in fact a detailed excursion into the realm of socio-political thought.

This problem -- the inter-connection between planning and politics -- was to haunt Le Corbusier, in one form or another, all his life. His fullest coming to grips with it coincided in time with the development of the principles and strategies already described --that is, in the early Thirties. It is again the tome, The Radiant City, that furnishes us with the best overview of the social-planning measures that were deemed necessary. Table Ic (Page20) collects all these requirements from various parts of the book under the rubric 'AUTHORITY' and indicates their extensive mutual inter-relation as well as their strong relationship with both the other categories already described. The tightness and integrity of all the three strata of concerns is apparent. What is also apparent on examining these 'Design Consequences', is that all this 'Authority', must, in reality, precede or,

28. Le Corbusier, The Radiant City, p. 188.

at least, accompany the implementation of the full gamut of design strategies. That is, that all the measures constituting Le Corbusier's 'theoretical' concerns, either tacit or implicit, appear to require simultaneity of operation for consistent application to be maintained down the line.

Returning to our earlier intention of correlating Le Corbusier's projects with his various 'theoretical' concerns in order to establish consistency (or lack of it) and determine what were his generating strategies, it is clear that we must add this most recently uncovered strata, then, to the list against which the projects must be measured.

This composite process is visually depicted in Table Id (Page 21)

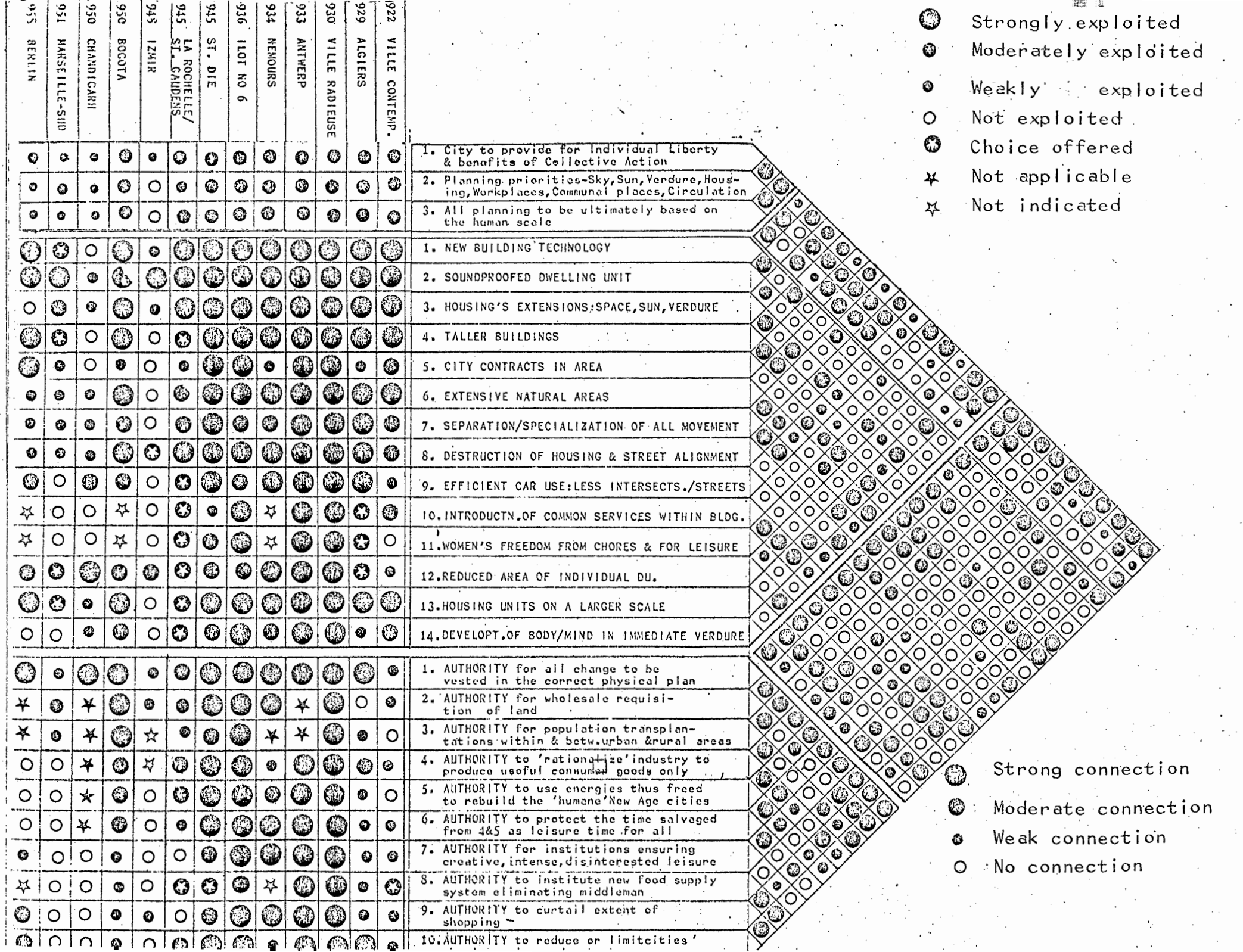
The immediate impression gained from this Table is that there was a definite movement from a position of maximum support for the projects on all fronts to be one of reduced and uneven support. The Marseille Unité, built 1947-52, is in these terms seen to fall transitionally. If what the Table depicts was, in fact, a process of withdrawal from an early stance which fulfilled a set of integrated desiderata (except at the level of most generalized principles), then we must begin to question Le Corbusier's much-vaunted blanket avowals of methodological consistency.

It follows, furthermore, that it needs to be asked whether the Unités of 1952 onwards can be appropriately seen in terms of earlier contexts where, mutatis mutandis, they or their forebears may well have had a different meaning.

Unavoidably then, we must take a close look at the phenomenon pictured on our table. If the significant changes here implied did take place, to what should they be ascribed and how did these affect the genesis of the Unité d'Habitation ?

CHAPTER TWO

THE CHANGING CONTEXT - CONSISTENCY OR CONTRADICTION ?


1955 BERLIN
1951 MARSEILLE-SUD
1950 CHANDIGARH
1950 BOGOTA
1948 IZMIR
1945 LA ROCHELLE/ ST. GAUDENS
1945 ST. DIE
1936 ILOT NO 6
1934 NEMOURS
1933 ANTWERP
1930 VILLE RADIEUSE
1929 ALGIERS
1922 VILLE CONTEMP.
1. City to provide for Individual Liberty & benefits of Collective Action
2. Planning priorities-Sky, Sun, Verdure, Housing, Workplaces, Communal places, Circulation
3. All planning to be ultimately based on the human scale
1. NEW BUILDING TECHNOLOGY
2. SOUNDPROOFED DWELLING UNIT
3. HOUSING'S EXTENSIONS: SPACE, SUN, VERDURE
4. TALLER BUILDINGS
5. CITY CONTRACTS IN AREA
6. EXTENSIVE NATURAL AREAS
7. SEPARATION/SPECIALIZATION OF ALL MOVEMENT
8. DESTRUCTION OF HOUSING & STREET ALIGNMENT
9. EFFICIENT CAR USE: LESS INTERSECTS./STREETS
10. INTRODUCTN. OF COMMON SERVICES WITHIN BLDG.
11. WOMEN'S FREEDOM FROM CHORES & FOR LEISURE
12. REDUCED AREA OF INDIVIDUAL DU.
13. HOUSING UNITS ON A LARGER SCALE
14. DEVELOPT. OF BODY/MIND IN IMMEDIATE VERDURE
1. AUTHORITY for all change to be vested in the correct physical plan
2. AUTHORITY for wholesale requisition of land
3. AUTHORITY for population transplantations within & betw. urban & rural areas
4. AUTHORITY to 'rationalize' industry to produce useful consumer goods only
5. AUTHORITY to use energies thus freed to rebuild the 'humane' New Age cities
6. AUTHORITY to protect the time salvaged from 4&5 as leisure time for all
7. AUTHORITY for institutions ensuring creative, intense, disinterested leisure
8. AUTHORITY to institute new food supply system eliminating middleman
9. AUTHORITY to curtail extent of shopping
10. AUTHORITY to reduce or limit cities'
Strongly exploited
Moderately exploited
Weakly exploited
Not exploited
Choice offered
Not applicable
Not indicated
Strong connection
Moderate connection
Weak connection
No connection

(d)
Table I depicts an evolution in Le Corbusier's projects that can be briefly summarized as follows :

The first phase of roughly ten years, from 1920 to 1930 was, for Le Corbusier, a period when the concentration on developing the new architectural vocabulary resulted in the creation of a large number of different housing prototypes. (See Table II a). These varied in size and purpose, most of them being in low-rise form and in a low to medium density bracket, those dwelling units (DUs) designed as cells of larger apartment blocks being compensated for loss of ground-contact. The implications of these studies for the wider context of socio/political planning were still relatively mild.

The next phase, which can also conveniently be fitted into a decade, that from 1930-1940, saw a radical shift from the development of individual dwelling-unit prototypes to the design of apartment prototypes which was the result of Le Corbusier's involvement with large-scale total urban planning where the relevance of the prototypical individual DU dwindled. An intensely wide-ranging enquiry into all facets of urban living produced a complicated system of checks and balances where, in a situation of dramatically increased densities, a smaller variety of fairly minimal 'sealed' DUs was compensated for by benefits from extensive large-scale physical and social-planning measures, which focussed on the whole city as an integrated organism.

A retreat from major social-planning initiatives at the end of the next decade into a more neutral physical/ organizational framework had the effect of undercutting some of the housing system's former strengths (while paradoxically making their realization more feasible) without any parallel re-adjustment of the actual DUs; these last had now solidified into a version of Le Corbusier's earliest and most-loved DU type and manifested certain endemic failings.

The last phase, from 1950-1960, is one of impasse; events and the contradictions within his own system having overtaken him, Le Corbusier attempted a reversion to a mélange of pristine 'strengths' which, in practice were incapable of fulfilment. He had thus, final recourse to verbal consistency only, transmuting the earlier once-functioning solution into symbolic terms. These, and elements of Le Corbusier's insights into 'psycho-visual' man, remained to prop up his housing solution, which had become sufficiently dissociated from its context to be considered in a new light and more or less in its own right.

With a view to fleshing out this précis, we propose to consider the salient changes in the realm of housing and related areas evinced by three selected projects[1] and to establish their causes and effects.

1. The criteria for selection have been either the evident generic nature of the project, or its obvious importance to Le Corbusier himself or its significance as a 'deviant' case.

> Les "Immeubles-Villas proposent une formule neuve d'habitation de grande ville. Chaque appartment est, en réalité, une petite maison avec jardin, située à n'importe quelle hauteur au-dessus d'une chaussée. Mais la chaussée, elle même, est modifiée; elle s'éloigne des maisons, des arbres envahissent la ville; la densité des quartiers d'habitation demeure la même qu'aujourd'hui, mais les maisons montent plus haut, sur des perspectives considérablement élargies. La crise de la domesticité est un événement social inévitable qui réclame l'organisation des services communs. Les "Immeubles-Villas", par les moyens co-operatifs de ravitaillement, proposent la solution même des Halles Centrales de grande ville.[2]

This pithy quotation moving from a description of the cell through the housing system to the level of socio-economic planning is pregnant with directions for the future; it also illustrates the design methodology Le Corbusier pursued, believing it to reflect Natural Law:- "du dedans au dehors" -- all things move from the inside to the outside.[3] It is, thus, both desirable and logical to treat each project in the order of Cell, Shell and Context.

Judging superficially from the various illustrations of the Ville Contemporaine made from 1922-1925, it would at first appear that only one dwelling unit was developed/to be replicated throughout the whole scheme, (figs 2-4) whether in the "lotissements fermés à alvéoles (closed honeycomb developments) or in the "lotissements à redents" (setback developments.) There is some evidence to suggest that this was not the case however, and that the double storey apartment-villa that Le Corbusier presented

2. Le Corbusier, Oeuvre Complète, Vol. 1, p.41.

3. It is interesting to note that Frank Lloyd Wright preaches precisely the same rule of 'organic growth' from within to without. In fact, I am generally struck by the parallel principles and goals of these two Masters which because of their differing cultural milieux however, manifest themselves in completely different ways.

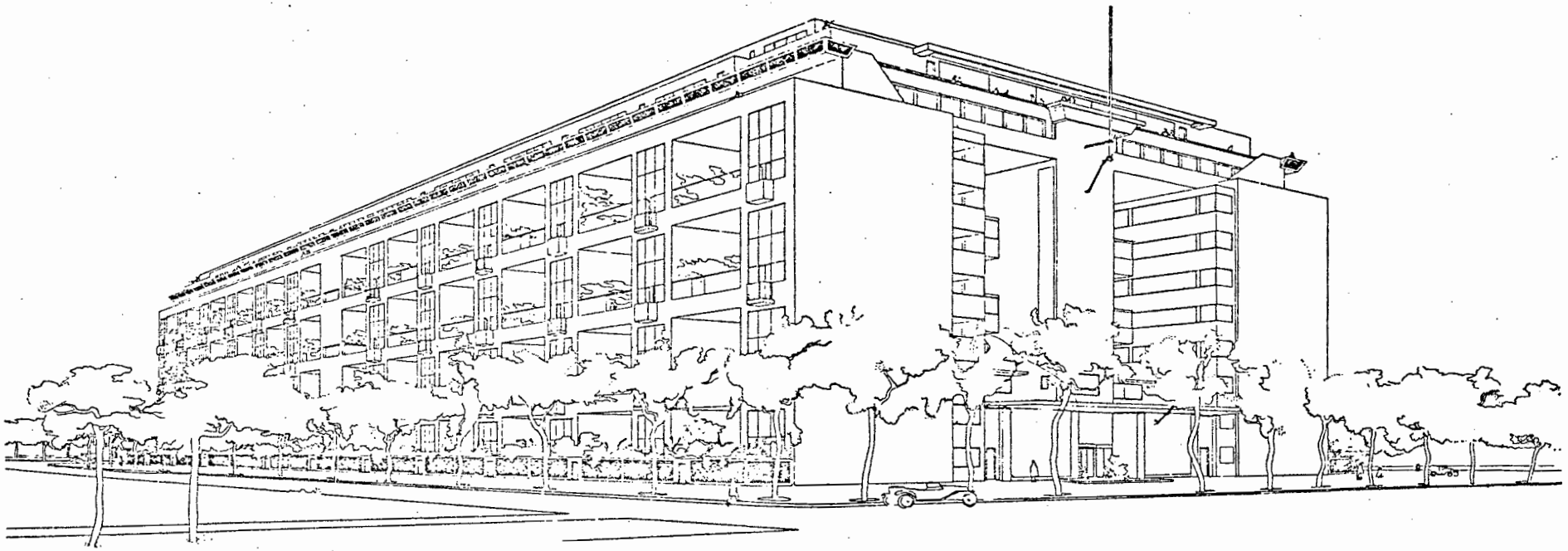
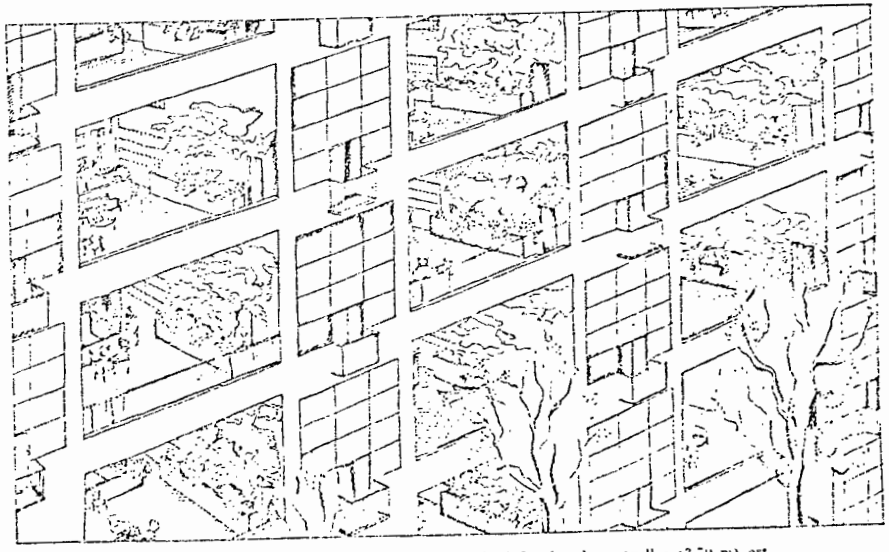


fig. 2 «IMMEUBLES-VILLAS» 1922 Un immeuble de 120 villas superposées

«IMMEUBLES-VILLAS» 1922



«Lotissements fermés à alvéoles». Le module étriqué des façades actuelles (3,50 m) est porté à 6 m. conférant à la rue un caractère d'ampleur tout nouveau.

fig. 3

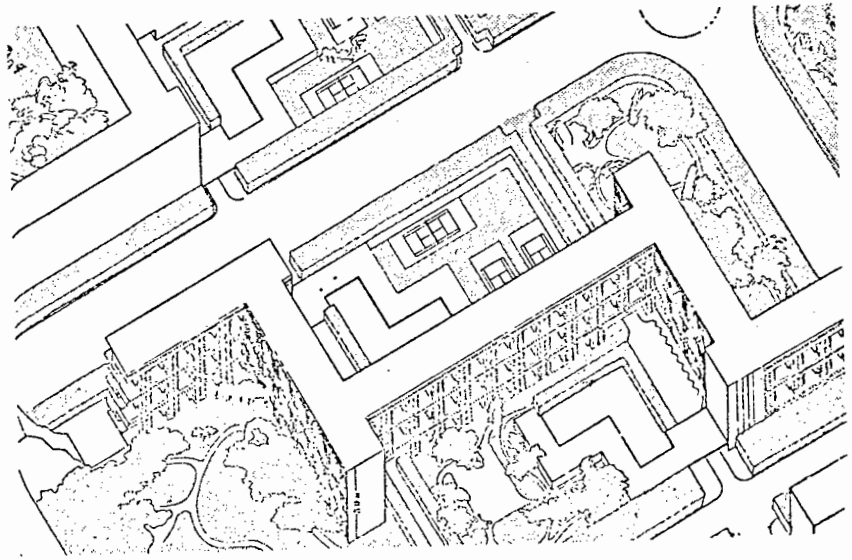


fig. 4

in some detail was destined for only the "lotissements fermés." Since this DU held centre-stage, we shall examine it first. *(figs 5-7)*

The most striking feature of the DU was its urban 'garden in the air' which brought light, greenery and ventilation deep into the cell, virtually doubled the actual facade length, provided a sound barrier between apartments and compensated for the garden and ground-contact traditionally available to suburban houses. The planning of this DU bore some resemblance to Le Corbusier's earlier prototype, the Citrohan I of 1920 (*fig 8*) -- notably the double-height living room with mezzanine -- but was designed to be multiplied as a cellular unit with integral open space, something the Citrohan type was able to achieve with less economy and flexibility. *(fig 9)* The hanging garden also provided separate light, prospect and ventilation to the mezzanine bedroom, a function performed by the side wall of the Citrohan. Other noteworthy features are the 'neutral' position of the staircase about which the house is zoned, the generous provision of toilet facilities (especially in relation to 'contemporary standards') and the space-standards generally which are sufficiently generous to absorb extra beds etc. This DU remained unchanged between 1922 and 1925 when the scale of the complex was increased; it was merely turned about to face the parkspace within the court. *(fig 10)*

The density of the "lotissements fermés" is given as 305 p.p.h. (122p.p.a.) and 52% of the ground is said to be covered by building, the remaining 48% being given over

Une terrasse-jardin (Jardin suspendu)

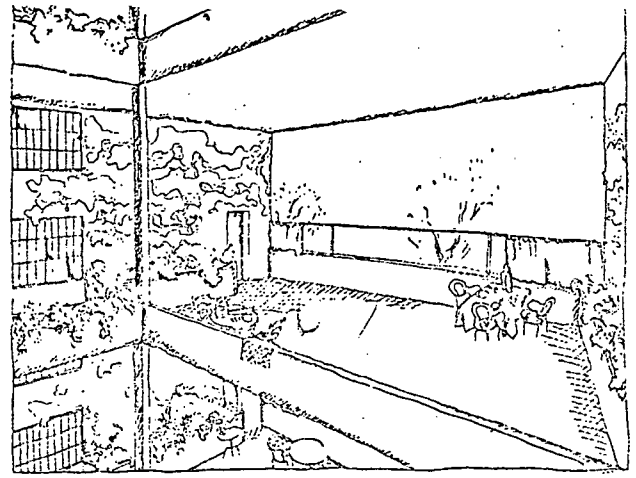


fig. 5

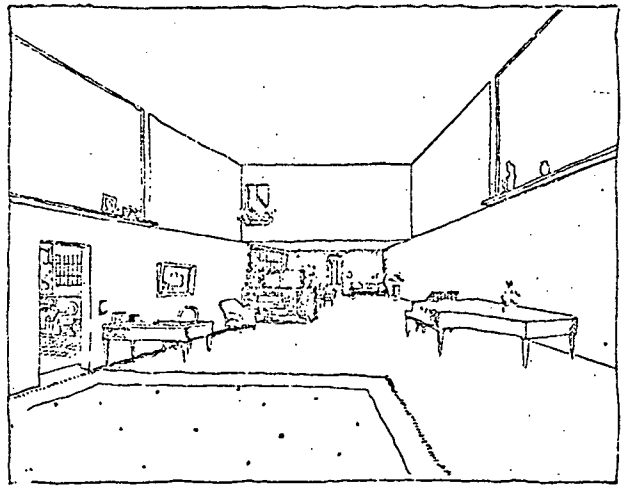


fig. 6

Un living-room

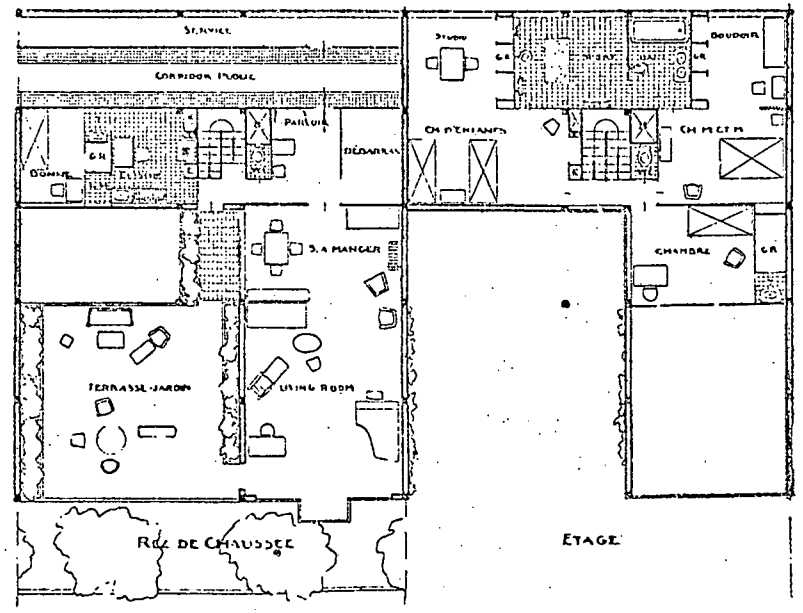
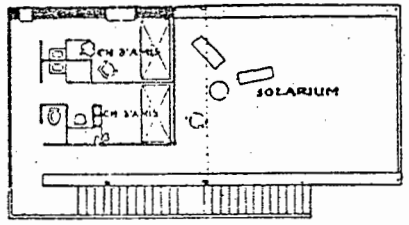
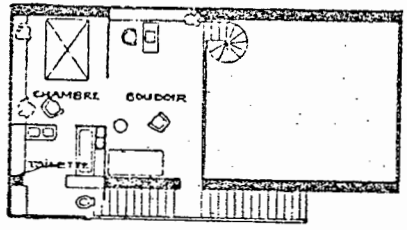


fig. 7

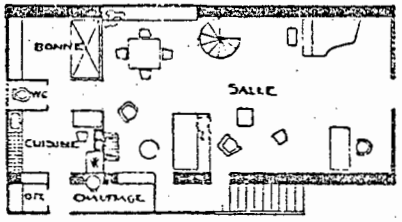
fig. 8



Terrasse



Entresol



Rez-de-chaussée

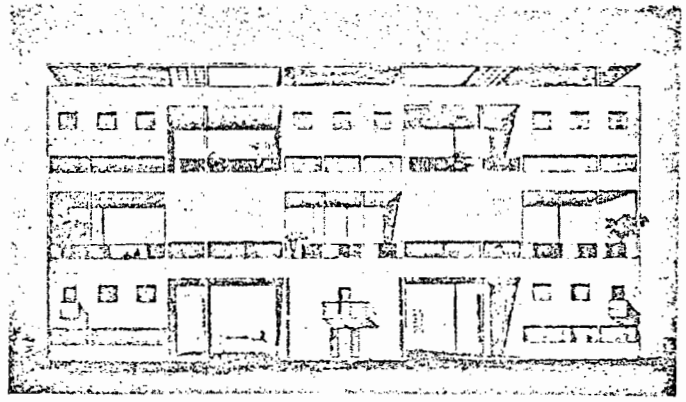
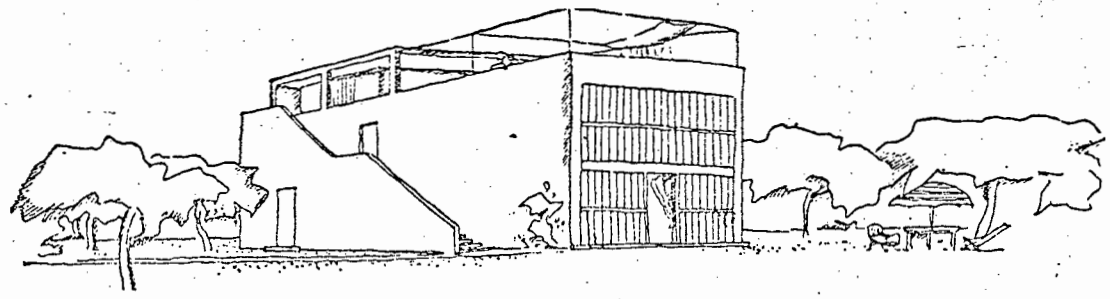


fig. 9

fig. 8



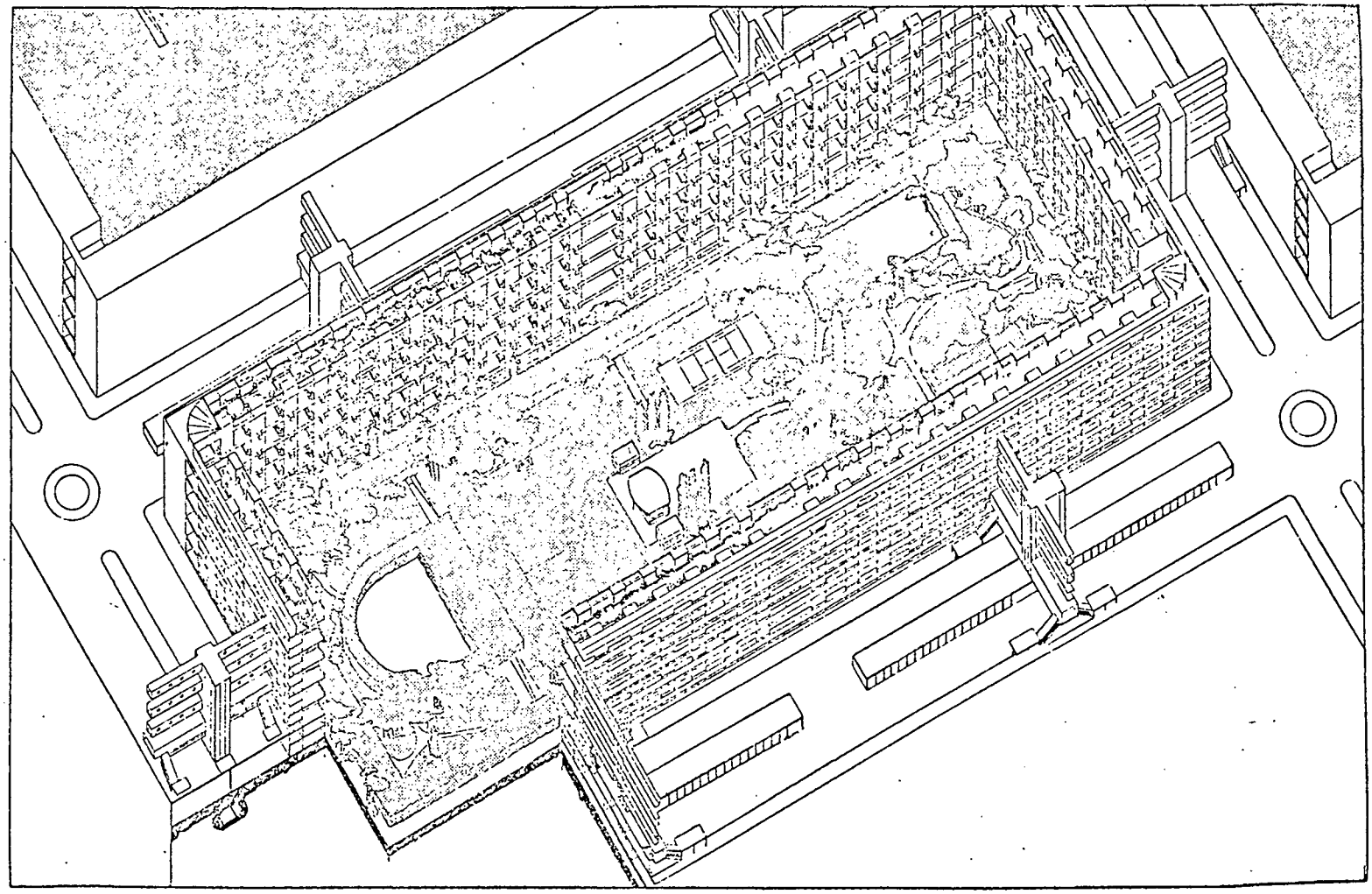


fig. 10 «Immeubles-villas». Perspective axonométrique d'un lot. La hauteur des immeubles est ici de 36 m environ au-dessus du sol naturel

to gardens and sports grounds. The density of the "lotissements à redents" for "luxury dwellings", is given as much the same --300p.p.h.(120p.p.a.*)-- but here the percentage of open ground is almostdoubled to 85% while the building's comparable developed length will be found to have been almost halved.

How has this been achieved ?

The answer would appear to be hidden away in the corner of a drawing in "The City of Tomorrow" and in its caption (*fig 11*). This"special arrangment of great importance" is none other than the kind of interlocking section used by Le Corbusier for the later Unités, which was supposedly first crystallized by him only in 1936, in the Îlot No. 6 scheme. There is however little clarity and some confusion (for example, the three corridors give access onto nine levels, not twelve, as claimed) as to how these DU s with their hanging gardens actually interlock. The only way in which the section can be interpreted is shown opposite (*fig 12*) and clearly results in a new kind of extremly large apartment-villa that Le Corbusier nowhere subsequently elaborated. An alternative solution, having some similarity to Le Corbusier's and more feasibly scaled could hypothetically be devised (*fig 13*), and indeed Le Corbusier's Wanner buildings (*figs 14, 15*) of 1928 came close to realizing this, but the resultant block depth would only be about 46 feet (14m), the same as for the Villas-Immeuble closed type, and some way off the 65 feet (20m) claimed by Le Corbusier for his 'system'. Le Corbusier used the same interlocking 'system' for the re-

* p.p.a. will always be used to mean people per nett acre. Density figures are based on my own measurements unless otherwise indicated.

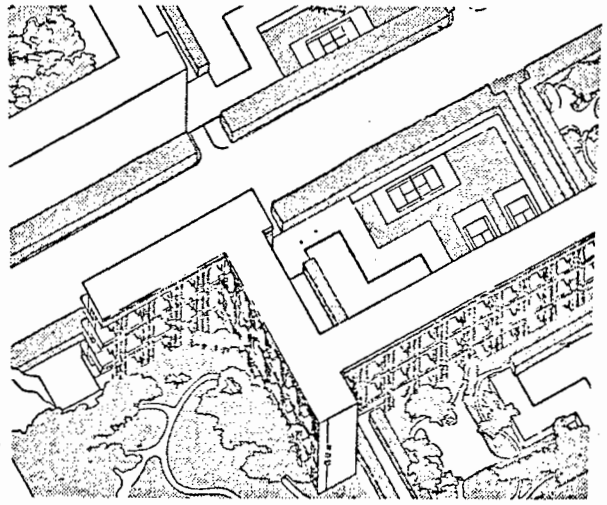


fig. 11

fig. 12

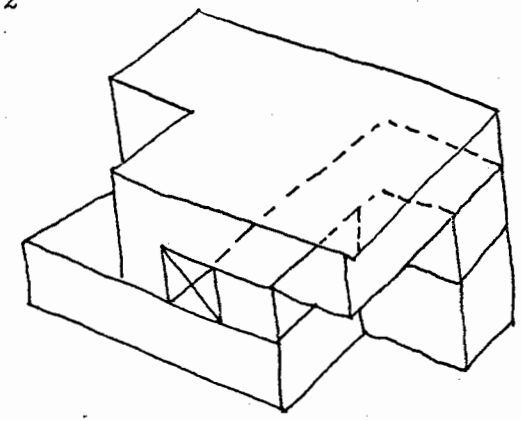
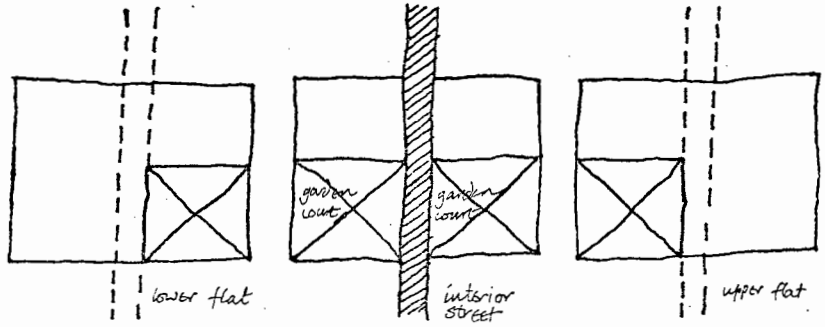


fig. 13



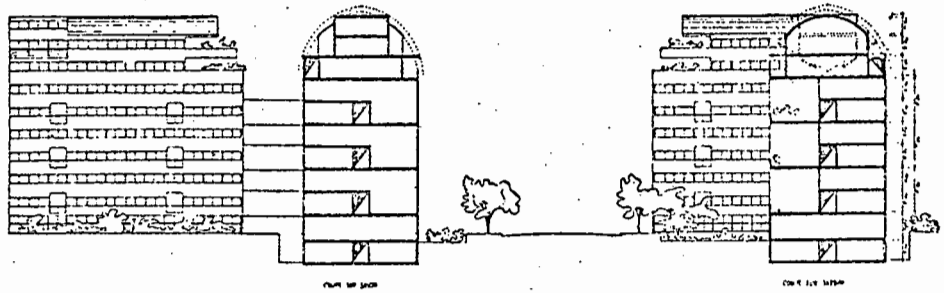


fig.14 Deux coupes en travers des immeubles

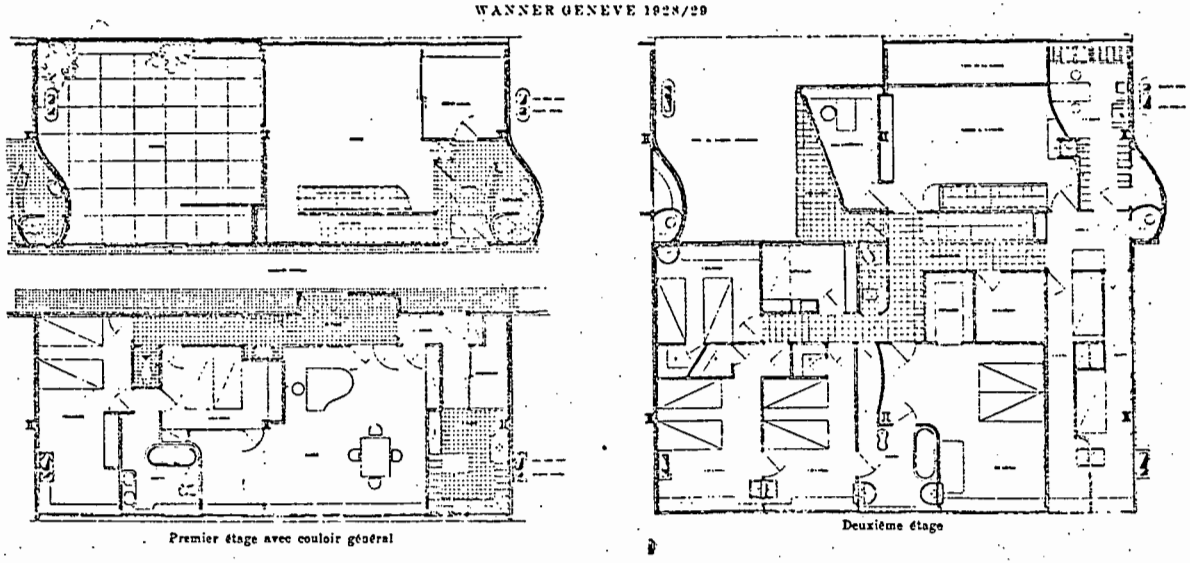


fig.15

dents of the Plan Voisin (fig 19) but here too omitted to illustrate its workings.[4]

The broad vistas and open green spaces gained for the 'luxury' redents rested, then, on the shaky foundation of an undisclosed redeeming section. This section postulated of apartments looking both ways across the large spaces that the setback pattern, freed from the adjoining streets, had succeeded in creating.

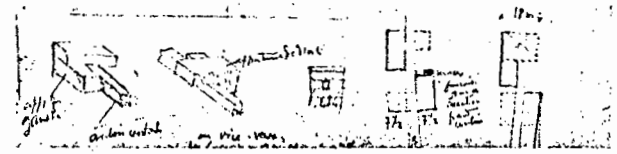
It is germane to ask at this point why Le Corbusier did not do the same for the "lotissement fermés" as for the setbacks.

The answer would appear to lie in the need to feed the common services provided on the ground and first floor levels of these 'standard'[5] housing units directly and continuously from the bordering streets.(fig 18) Though Le Corbusier said that the reduced superblock size of 400m x 200m was used " since this is the best dimension for the intersection of streets",[6] this module's patent lack of smooth connection with the larger road infra-structure of the rest of the city, its increased road surface area, the problem[7] of reconciling its grade-separation system of traffic with the "redent's" horizontal separation system, must make one question whether Le Corbusier's assertion was not too sanguine. (Compare figs 18 & 20)

The more likely reason for the reduced superblock is to be found I believe, in Le Corbusier's search for the correct 'population module' for the common services <u>combined with</u> the need to maintain a density high enough to make a pedestrianized city viable :

4. The pencil sketches for the Ville Radieuse show Le Corbusier investigating an overlapping-type section which, in the event, was not used; it bears no similarity however, to that described in the 1925 redent.

fig. 16

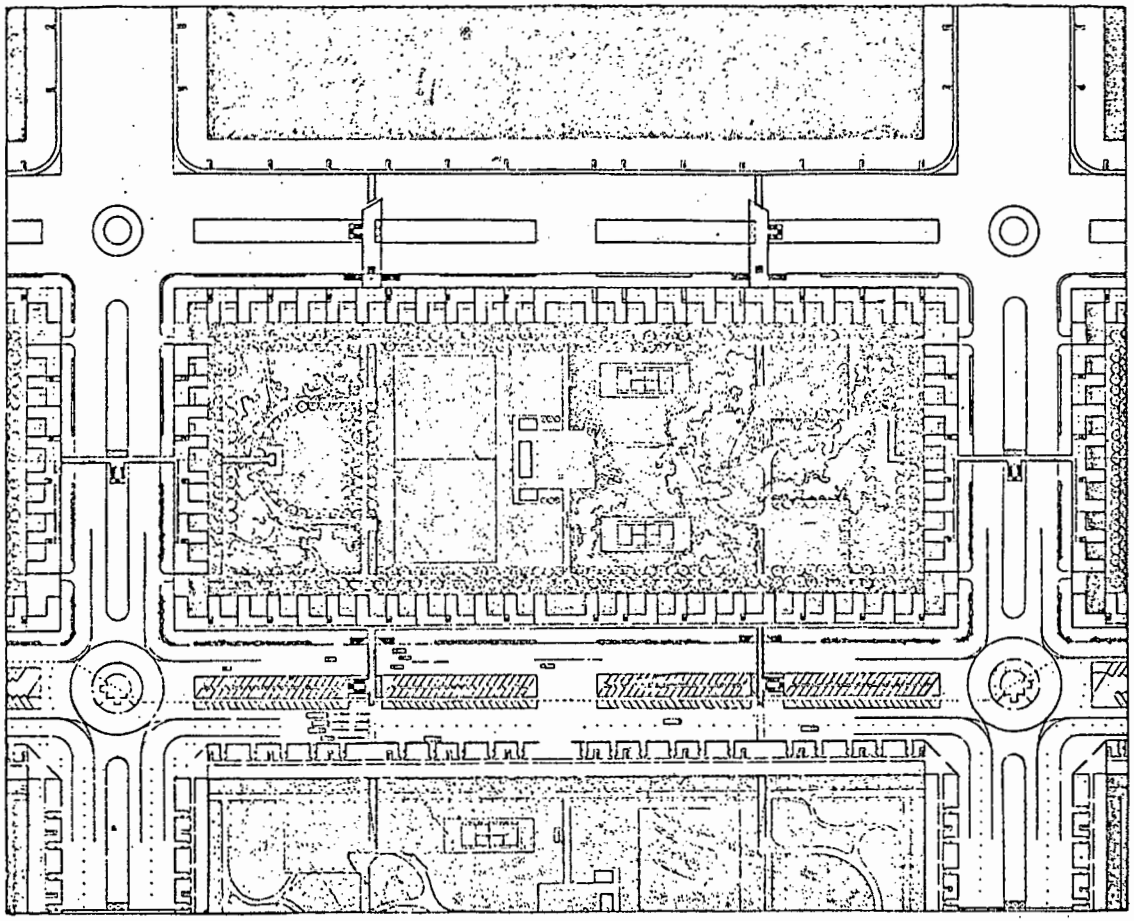


5. Le Corbusier used the word 'Standard' to distinguish the "lotissements fermés" from the "redents"; any less neutral word than 'standard' would have invoked a degree of non-egalitarianism that he preferred to avoid

6. Le Corbusier, The City of Tomorrow, p. 215.

7. A problem made to disappear when the two are shown together.(fig 17)

fig. 17



Le plan général des « Lotissements Fermés à Alvéoles » ou Immeubles-villas

Dimensions des lots 400 × 200 mètres (intersection favorable des rues). Les façades tournent le dos à la rue: elle ouvrent sur les parcs de 300 × 120 mètres 16 hectares environ). Point de cours ni de courettes. Chaque appartement est en vérité une maison à deux étages, une villa ayant son jardin d'agrément, à n'importe quelle hauteur.

fig. 18

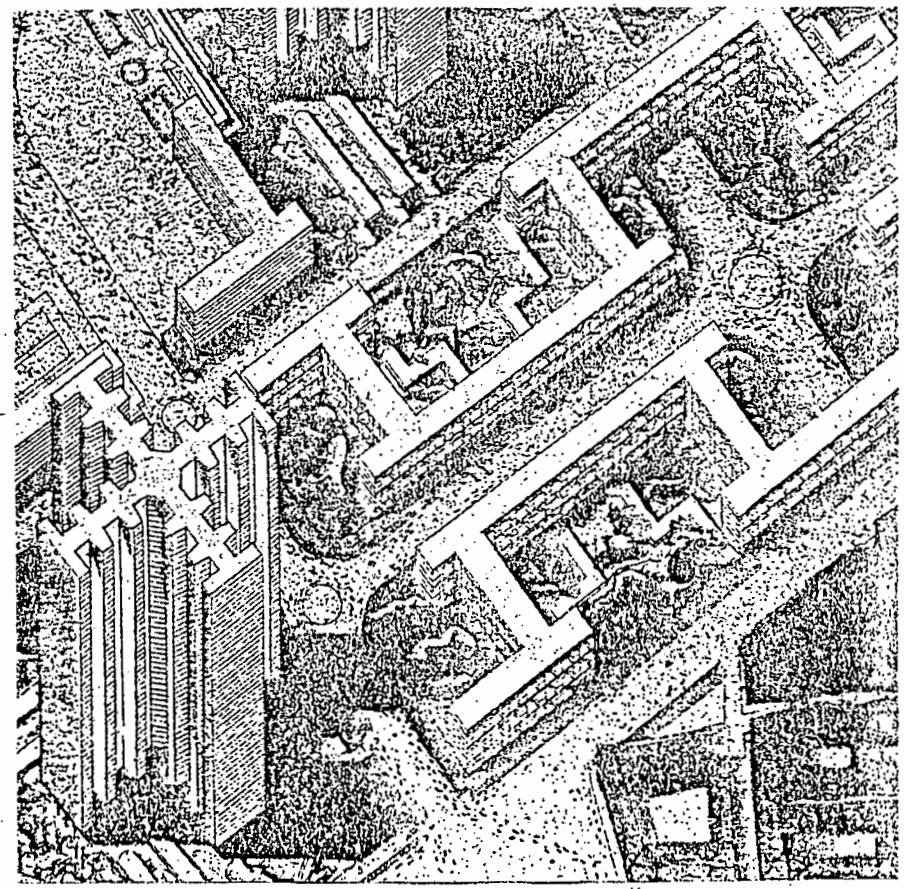
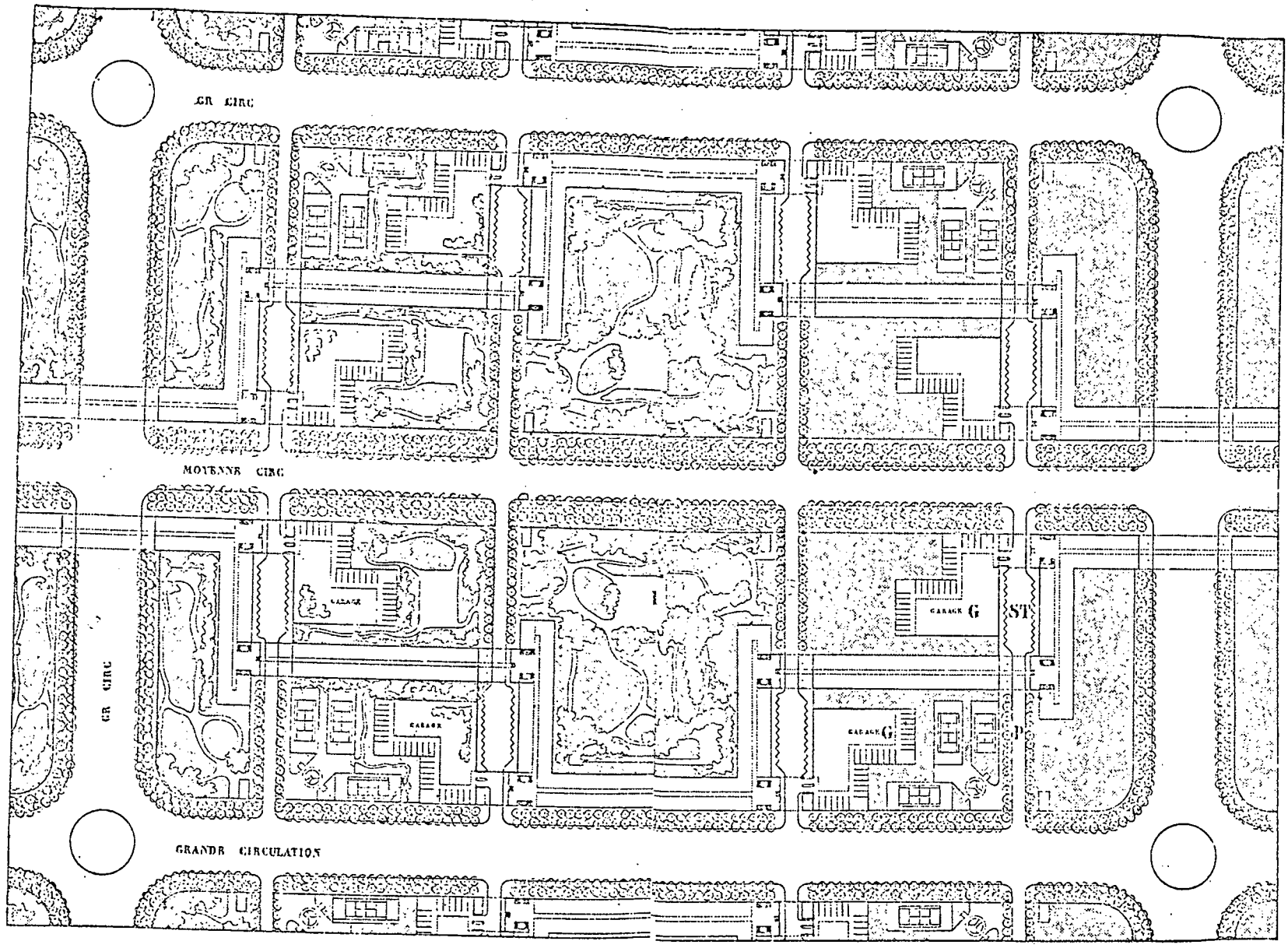


fig. 19



DWELLINGS WITH " SET-BACKS " FOR RESIDENTIAL QUARTERS

In this plan the main arteries are shown as 150 feet in width, and forming square large island sites thus formed could be enclosed by railings. Leading right up to the garage (G). *There are gardens and parks everywhere. The amount of ground which is built over is 15 per cent. of the total area, leaving 85 per cent. of open space. The density of population is 120 persons to the acre as against 145 in Paris to-day. blocks 400 × 600 yards in area. Every 200 yards lesser streets occur. The entrances are private roads with parking places for cars* (ST). *Each flat has its own*

fig.20

"The idea of grouping 660 flats, which means from 3000 to 4,000 inhabitants, in such a block of closed cell-like elements is to make of them a sort of community, the creation of which would bring about freedom through order. There would be six staircase wells and six entrance halls to serve the 660 flats on the five storeys....."[8]

A count of DUs in the entire court complex will reveal a total of 340 (68 DUs per floor x 15 floors)rather than 660 flats. The disparity between the number of flats of the apparently discrete court complex and Le Corbusier's 'service module' of 660 flats can be accounted for by looking at the quantity of DUs served by the six elevator cores which feed to both sides of the street thus doubling the quantity of DUs being served (*fig 21*). Le Corbusier could thus have what he considered to be the kind of population required to support a 'common services' installation (food storage, restaurant service, domestic service and laundering) as well as, by reducing the size of the courts i.e. increasing their number of sides per given area, maintain an adequate density.[9]

This does, admittedly, create a situation between blocks that is similar to the "corridor-street" Le Corbusier hated so fiercely and it comes as no surprise therefore, that in his next attempt to create an overall prototypical urban solution in the Ville Radieuse, Le Corbusier integrated the common services into the system of the freely meandering redents.[10]

Le Corbusier's emphasis on the Immeubles-Villas tends to obscure the fact that only one-sixth of the city's overall population was actually intended to live in them.

8. Le Corbusier, The City of Tomorrow, p. 217.

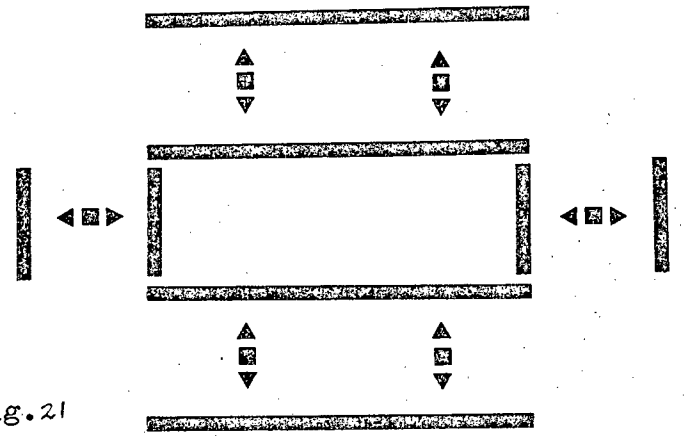


fig.21

9. The sense in which Le Corbusier used the word 'community' in the previous quotation should not be confused with any sociological notion of the 'absolute' or 'correct' size for a community; it simply represented the number of DUs arrived at as a result of certain organizational considerations (common services and density needs) which promoted maximum operational efficiency. The 'community size" of the larger redent superblock which did not need to taken into account these considerations to meet road-efficiency requirements was proportionately increased.

10. In the Ville Contemporaine, the redents are not furnished with common services presumably because, as 'luxury' housing where the "crise dans la domesticité" did not apply, these would be unnecessary. The redents thus enjoy the further benefit that their ground floor villas rest directly amidst verdure.

Two out of the total three million inhabitants of the Ville Contemporaine, those "who could only live to advantage outside the city" lived in a dormitory"garden-city" and commuted daily to either the city's business centre or to its "Industrial Centre". That this is no 'after-thought' community' but an integral part of the conception is clear, for example, from the road and railway infra-structures which are patently designed to handle the commuters:(fig.22,23) The following quotation describing the city's population makes the point quite clear:

> This consists of the citizens proper; of suburban dwellers; and of those of a mixed kind.
> (a) Citizens are of the city: those who work and live in it.
> (b) Suburban dwellers are those who work in the outer industrial zone and who do not come into the city; they live in garden cities
> (c) the mixed sort are those who work in the business parts of the city but bring up their families in garden cities.
> This would enable us to formulate and resolve the following problems:
> 1. The City, as a business and residential centre.
> 2. The Industrial City in relation to the Garden Cities (i.e. the question of transport).
> 3. The Garden Cities and the daily transport of the workers.
> Our first requirement will be an organ that is compact, rapid, lively and concentrated: this is the City with its well-organized centre.
> Our second requirement will be another organ, supple, extensive and elastic; this is the Garden City on the periphery. [1]

Indeed, the inner city can only be the compact, pedesestrian-

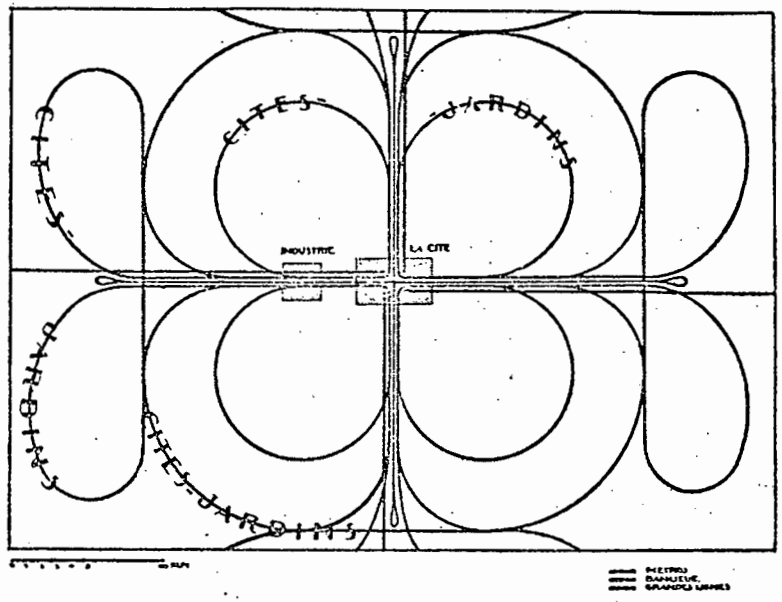


fig.22

RAILWAY SYSTEM: SUBURBAN AND MAIN LINES

The inter-urban system; the tubes, following the main arteries; the outer loop system of one-way traffic; the main lines.

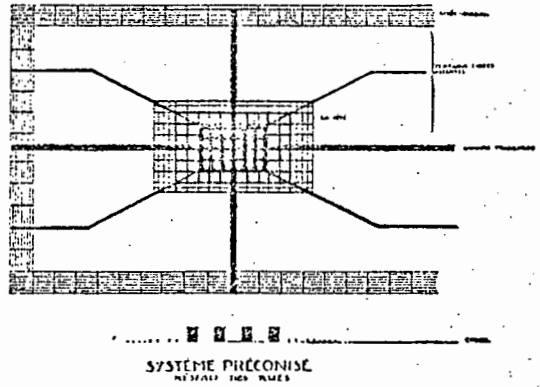


fig. 23

A diagram showing the relative importance of streets in a great city. The black lines give the width of the streets. This system, which indicates what is needed under the new conditions, is absolutely contrary to the present state of things (see the diagram at the beginning of this chapter).

[1] Le Corbusier, The City of Tomorrow, pp.161-62.

transversable place it is because it houses only a small fraction of the population, and that at densities no higher than those obtaining in the Paris of the Twenties.[12]

Le Corbusier paid considerably less attention to the surrounding Garden-Cities[13] than to the inner city. These were depicted on the plan as a 'normal' single-home-on-plot subdivision at the low density of between 20-30 p.p.a. (fig 24) Le Corbusier had not yet developed his massive opposition to the suburbs as the source of the great modern wastage -- 'la grande gaspillage' -- of people, time and resources, that was to mark his later discussion of the subject; nevertheless there was something about them that bothered him:

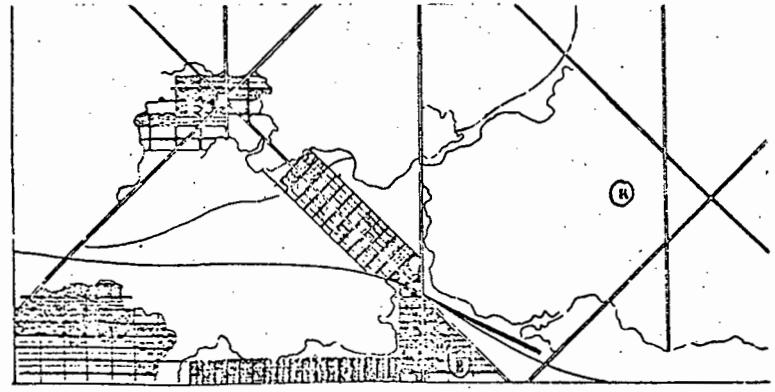
> The present-day solution, which exists all over the world and is looked upon as ideal; it consists of a plot of roughly 400 square yards with a little house in the middle. Part of the plot is a flower garden, and there are a few fruit trees and a tiny vegetable garden. It is complicated and difficult to keep up, and involves endless pains (call it the romantic simple life if you like) for the householder and his wife to keep things tidy, to weed it, water it, kill the slugs and the rest; long after twilight the watering-can is still on the go. Some people may call all this a form of healthy exercise. On the contrary, it is a stupid ineffective and sometimes dangerous thing. The children cannot play there, for for they have no room to runabout it, nor can the parents indulge in games or sports there. And the result of all this is a few pears, and apples, a few carrots a little parsley and so on. The whole thing is ridiculous.[14]

Le Corbusier was accordingly driven to envisage an alternative 'healthier' state of affairs which, while preserving the same density of development, deployed the

12. What has contracted most dramatically, of course, is the city centre; 'everything' is fitted into 24 cruciform skyscrapers; the "hideous" Central Market (Les Halles) has been excised from the city centre thanks to the common services. Shopping, cultural and other urban functions find their place in the open spaces between the skyscrapers and are surrounded by trees -- Le Corbusier, The City of Tomorrow, p. 246.

13. Le Corbusier used this phrase to mean low-density suburbs, a use in no way related to Ebenezer Howard's garden city idea.

14. Le Corbusier, The City of Tomorrow, pp.202-203.



A CONTEMPORARY CITY

fig.24

houses vertically,[15] and consolidated and redistributed the private open space formerly around the individual houses so as to create large areas for sport "at the foot of the dwelling", and for numerous kitchen gardens (*figs* 25-27), which were still to be privately owned, but were to be efficiently supervised and cultivated by a farmer, who, undertaking responsibility for all the heavy work, would be in charge of every one hundred such plots. Thus the garden-city inhabitant had his routine office or factory work balanced and enriched by a life of sport and agricultural labour and in this way "he becomes a producer".[16]

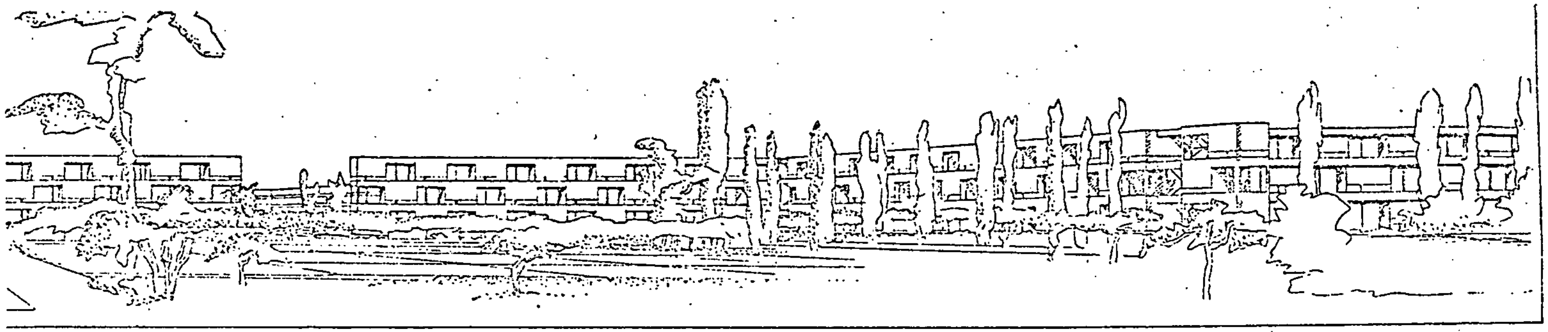
This emphasis on the creative and beneficial use of leisure is of no small importance to Le Corbusier; it is his answer to the looming challenge of increased leisure time due to the shorter working-day. Hence his reiterations that "the possibility of engaging in sports should be open to every inhabitant of the city. And it should take place at the very door of his dwelling".[18]

We have now covered all points bearing importantly on Le Corbusier's housing proposals. These are shown to their best advantage when offset against the environmental quality of a city like Paris, whose counter-image they consciously were: in these terms his model city (at the same residential density as Paris and within its permissible building heights)had, by virtue of exploiting a new scale of organization, opened up green areas for the enjoyment of the body in sports at the foot of these apartments; furthermore, to secure some relief for the less affluent from problems of obtaining domestic help, a system of 'common services' had been installed. Le Corbusier also made provision for those inhabitants who would trade

15. These DUs which Le Corbusier calls "La suite directe des immeubles-villas" are illustrated only by two perspective renderings. These indicate that the DUs were more akin to super-imposed Citrohans with their more generous roof terraces, than to the villa-immeuble type.

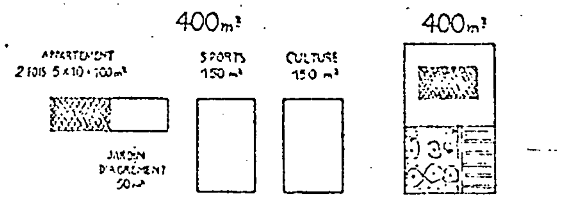
16. Le Corbusier, The City of Tomorrow, p. 206.

18. Le Corbusier, The City of Tomorrow, p.199.



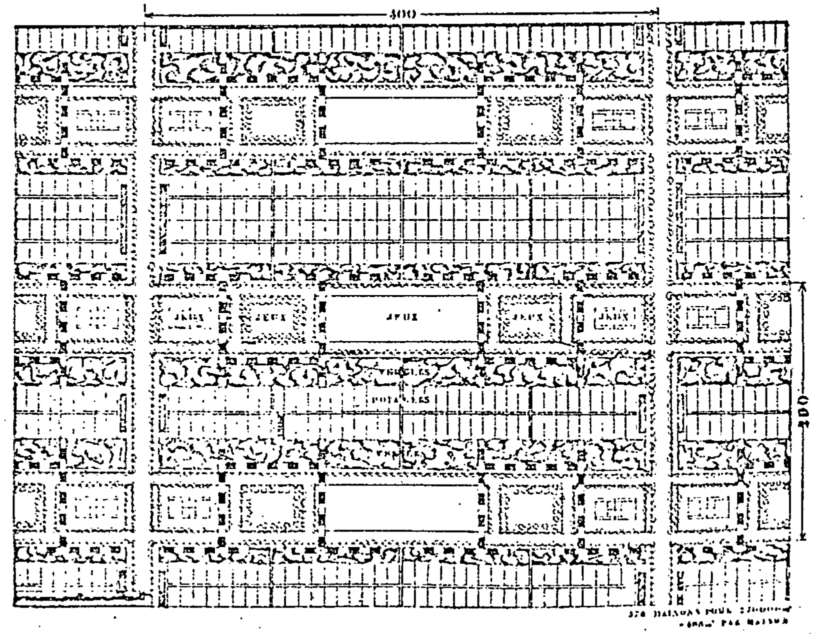
Lotissement à « alvéoles » pour cités-jardins

fig. 25



Analysons les 400 m² de terrain consacrés à chaque habitant d'une cité-jardin: maison et dépendances. 50 à 100 m²; 300 m² sont consacrés aux pelouses, verger, potager, parterre fleuri, terre-plein. Entretien absorbant, coûteux, pénible; rapport: quelques bottes de carottes et un panier de poires. Il n'y a point de terrains de jeux, les enfants, les hommes et les femmes ne peuvent pas jouer, ne peuvent pas faire de sport. Le sport doit pouvoir se faire à toute heure et tous les jours, et il doit se faire au pied même de la maison et non sur les terrains à stades où ne vont que les professionnels et les oisifs. Posons le problème plus logiquement: maison 50 m²; jardin d'agrément 50 m² (ce jardin et cette maison sont situés à rez-de-chaussée ou à 6 ou 12 mètres au-dessus du sol), dans des groupements dits « à alvéoles ». Au pied des maisons, de vastes terrains de jeux (football, tennis, etc.) à raison de 150 m² par maison.

fig. 26



Plan de situation

fig. 27

the advantages of...
of living within walking distance from their work for the benefits of a private house and garden within easy commuting distance of work.

It is easy to perceive in the Ville Contemporaine a great number of revolutionary implications for the existing order of things: private land-ownership, sources of finance, removal of Shopping and the Central Market, transplantation of urban populations and so on, are among the important questions raised by this project and requiring both methodical solutions and the authority to impose them. Le Corbusier, while not unaware of these problems, was too busy developing and sorting out housing prototypes, elaborating the Five Points of a Modern Architecture, establishing the hegemony of Order and of the Right Angle, to properly address himself to their solution. He had little doubt, though, that these problems were soluble:

> If we ask, therefore, whether such operations are possible or if the necessary steps of expropriation and indemnification are within the bounds of practical politics, we know that they were possible under Haussman and the Emperor. And they are possible under our own democracy also.[19]

Le Corbusier's faith was grounded in his belief that he was merely a harbinger of inevitable events, attending upon the birth of a phenomenon inherent in the times which must express itself physically, for "architecture is the expression of the way of thought of an epoch". This certainty gave rise in Le Corbusier to a great enthusiasm. It was an enthusiasm for the New Machine Age that he believed would inspire all men who had seen the beautiful vision and

19. Le Corbusier, The City of Tomorrow, p. 256.

would then drive them to action. All that was needed was to present men with this vision and both the desire for and the means of its implementation would come of their own accord, spontaneously.

> Beauty, which as it were waits upon creative powers, becomes incarnate in some new creation. Beauty, which is born of action, inspires enthusiasm and provokes men to action.....
> .....
> In that glowing and harmonious moment of construction and enthusiasm, pride will be born and satisfaction in achievements adequately conceived and capable of development and grandeur.[20]

20. Le Corbusier, The City of Tomorrow, pp.241-42.

VILLE RADIEUSE - 1930

> What an abortive undertaking, mere idle cerebration these somewhat miraculous and magical seeming planning ideas would be, these suggestions for the re-organization of traffic, for re-partitioning the land, for using the whole of the air volume above a city for living quarters, if, by some profound and gross piece of stupidity at their very conception, they had not been determined a priori by the fundamental notion of human happiness, which is: a man in the city, a man at home, comfortable at home, happy in that home.[21]

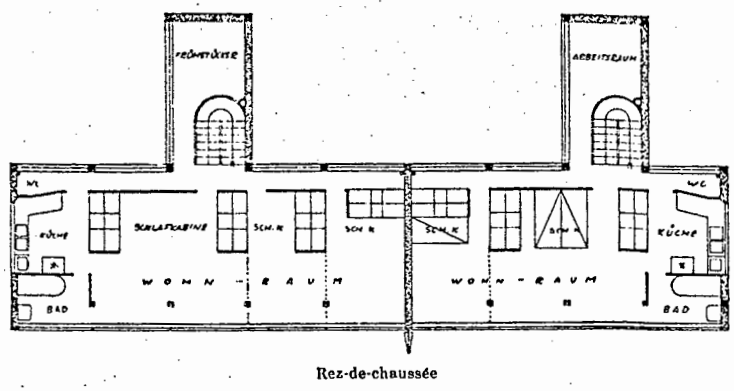
This passage, part of Le Corbusier's preamble to the presentation of the Ville Radieuse DUs, is further evidence of his golden rule of working from the inside to the outside from the internal structure of the cell to the structure of the city at large. The reader, taking Le Corbusier's statement at face value, and nurtured on the standards of the Villas-Immeuble, would be justified in looking forward to a DU even richer in amenity.

Nothing could be further from the reality. The DUs presented in The Radiant City are strikingly less well endowed than those of the Ville Contemporaine: there are no hanging gardens nor any private open space at all; interior double volumes have vanished and the size of the whole apartment has shrunk to about one quarter, from being based on $52m^2$ per person to $14m^2$ per person. Nor did this shrinkage

21. Le Corbusier, The Radiant City, p. 143.

have any convincing precedent in Le Corbusier's design of apartments till then: the two apartments built as prototypes at Weissenhof in 1927, even excluding their extensive roof terrace area, are considerably more spacious than the apartments intended for the Ville Radieuse (See Table IId p.152) despite the apparent generic similarity of the single-storey moveable partition type apartment to the Ville Radieuse DUs. (fig. 28) (figs 34-39). The only apartment design with space standards equal to those of the Ville Radieuse DU and similarly exploiting differences between day and night time activities to confer an added measure of spaciousness, is the "Project d'un Immeuble Locatif" of 1928/29 (figs 29-31). These ingenious plans do contrive, however, to retain a double-volume hanging garden and, by virtue of their width and shallowness, all rooms are provided with excellent natural lighting and ventilation.

One could plausibly argue, though Le Corbusier nowhere stated this, that the external open space of the Ville Radieuse DU has had to be sacrificed to the newly-introduced air conditioning system's need for sealed facades.[22] Regarding the reduced space-standard of the Ville Radieuse DU, one could point to a concern, common among the socially idealistic architects of CIAM, for the provision of low-cost mass-housing in a Europe slum-ridden and desperately in need of housing. And indeed, Le Corbusier derived his standard of $14m^2$ per person from the 1929 "Loi Loucheur", which amongst other things,



Rez-de-chaussée

fig. 28

22. This reason is suggested by Kenneth Frampton, "The City of Dialectic", Architectural Design, October 1969, p.542.

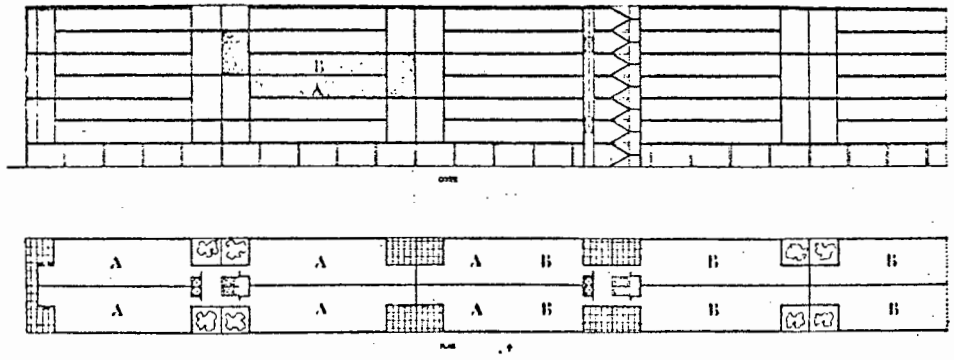


fig. 29

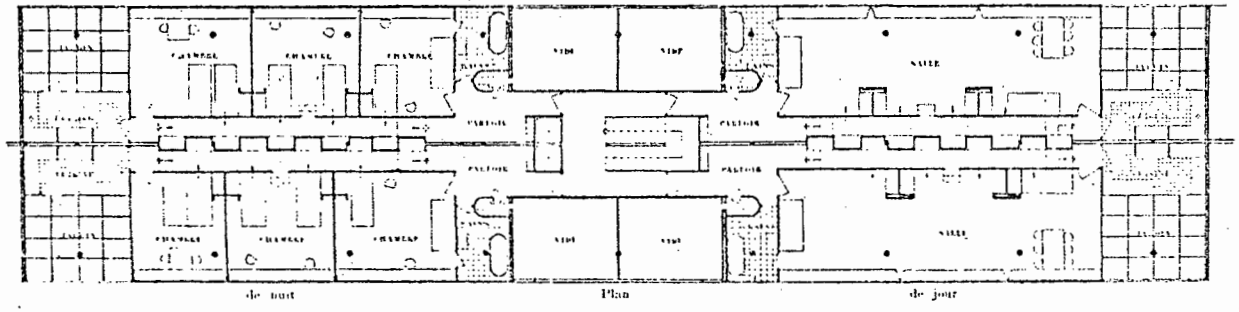


fig. 30

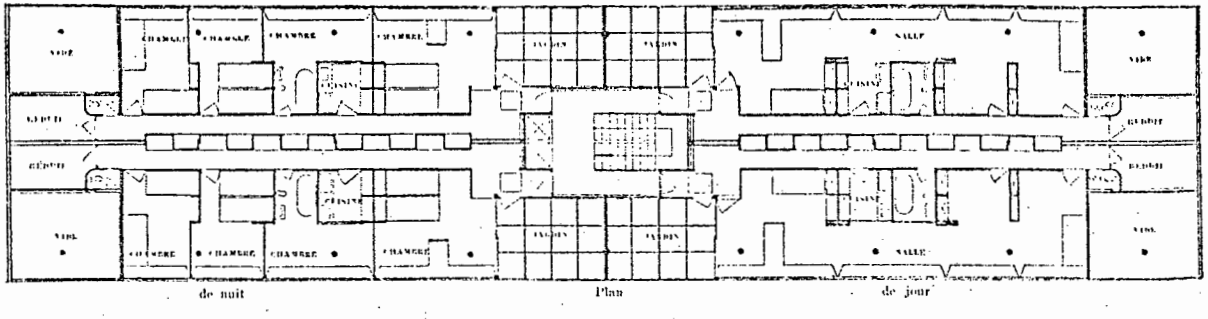


fig. 31

advocated for housing a provision of $45m^2$ per 6 inhabitants i.e. $7.50m^2$ per person;[23] Russia was at the time proposing a standard of $9m^2$ per person. Viewed in these terms Le Corbusier's position is not extreme and indeed he berates the Russians for their "figure of $9m^2$ which will cram the individual lives concerned; whereas my $14m^2$ will provide airiness, freedom, and elbow-room in which to organize things."[24]

Le Corbusier was not, however, seeking merely to create economical mass housing for the underprivileged masses; -- " I had already satisfied myself to the point of certainty that a human cell of $14m^2$ per inhabitant could provide a basis for calculations that would lead to the expansion and flowering of men's lives in a machine age".[25] It is, however, difficult to reconcile this enthusiasm for tightening up space standards with Le Corbusier's earlier more open-handed approach.

The explanation for this apparent inconsistency is to be found not in the DU itself but in Le Corbusier's intentions for the Ville Radieuse as a whole. His basic objective was to make available to all the citizens of the Ville Radieuse those advantages which in the Ville Contemporaine only the inner-city inhabitants had enjoyed. To accomplish this he had to postulate enormously increased densities for the Ville Radieuse and this in turn entailed drastically reducing the size of the individual DU's. Le Corbusier, however, would not allow that this was the causal pattern underlying the Ville Radieuse since he

24. Le Corbusier, The Radiant City, p.145

25. Le Corbusier, The Radiant City, p. 144

23. Le Corbusier's extrapolation of $14m^2$ per person from this standard is tendentious in the extreme:

"Let us begin with the figures envisaged by the Loi Loucheur: 45 sq.meters per 6 inhabitants; i.e. $7.50m^2$ per person. This Loucheur-type domestic unit can be occupied by 6,4,3 or 2 persons. If we suppose an equal space available in all of these four categories, we arrive at the following:

in a unit occupied by 6 people: $7.50m^2$ per person
" " " " " 4 " : $11.25m^2$ " "
" " " " " 3 " : $15m^2$ " "
" " " " " 2 " : $22.50m^2$ " "

giving an average of 14 sq.metres per person. 14 sq.meters per person. Magnificent ! "
(Le Corbusier, The Radiant City, p.107.)

wished to give the impression that his solutions were freely arrived at rather than imposed upon him by the pressure of necessity. Hence he declared that "it was using this figure of $14m^2$ per occupant that we were able to arrive at the extremely high population density of 1,000 to the hectare in the residential areas"[26] whereas, in fact, it was the desideratum of a density of 1000 persons per hectare that compelled him to scale down his spatial allocation to the figure of $14m^2$ per occupant. We are arguing in other words, that the Ville Radieuse DU is an instance where the order of invention proceeded from an outside constraint -- density-- to the determination of an internal sólution -- the much contracted DU.

Working within these tight space-provisions, and limiting himself to a single storey DU ,Le Corbusier resorted to various measures for preserving a degree of spaciousness and flexibility: the wide horizons embraced by the window-wall, apart from any other functions they perform, are also thought of as compensating for the small cells of the Ville Radieuse (*fig. 32*) -"logis petit mais vue etendue"; sliding partitions created larger play-areas between children's bedrooms that could also be used by the rest of the family; free-standing cupboard units stop short of the ceiling, allowing its continuity to suggest increased spaciousness.

26. Le Corbusier, The Radiant City, p.114.

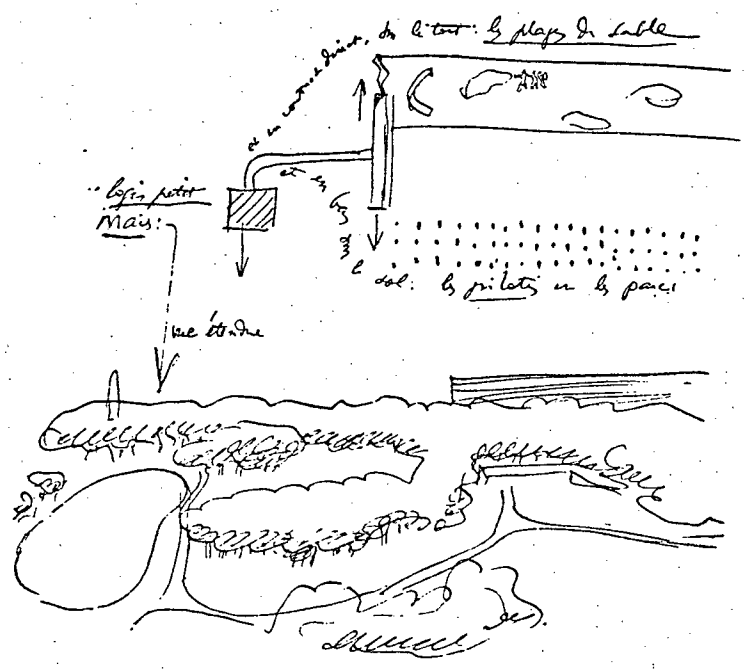


fig. 32

Further noteworthy attempts to mitigate the difficulties arising from decreased DU area and the reduced privacy inevitably arising from the above measures, are the re-organization of access to the service areas and children's bedrooms so as not to infringe on the living / dining space and the placing of service areas between parents' and children's domains to promote aural and visual privacy. (*fig* 34-39)

Whereas in the Villas-Immeubles we are presented with only one prototype,[27] a considerable variety is presented in the case of the Ville Radieuse, this being achieved by a simple increase in DU width along the facade or by an increase in DU depth or by exploring both directions simultaneously (*fig* 33). The only constraint on apartment depth for Le Corbusier was his desire to retain natural light and ventilation to habitable rooms, (a depth-constraint that Le Corbusier saw as significantly modulated by DU height) and for this reason service functions are at the DU's rear. The parents' bedspace, invariably also located at the rear of the larger apartments, appears to be thought of as a minimal sleeping-cubicle-with-toilet-facilities only, its direct connection with the living space, suggesting that this area is really an extension of the parents' realm. The simple relation of the DUs to an access corridor -- or "interior street" -- means that, depending upon the orientation of the parent-block, they can be either single or double banked.

27. Le Corbusier does not indicate his intentions regarding the housing of smaller families in the Ville Contemporaine. That the Villas-Immeubles are capable of incorporating smaller DUs, though with a proportionate loss of their exceptional amenities, is evident from the example of Le Corbusier's Wanner building projects. (Perhaps the smaller family DUs and those for couples or singles were meant to be housed in the central skyscrapers where, on one occasion, Le Corbusier said half a million inhabitants would live.)

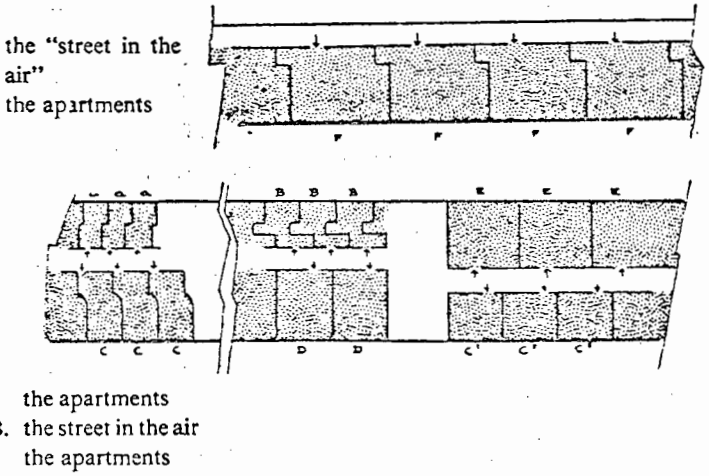


fig. 33

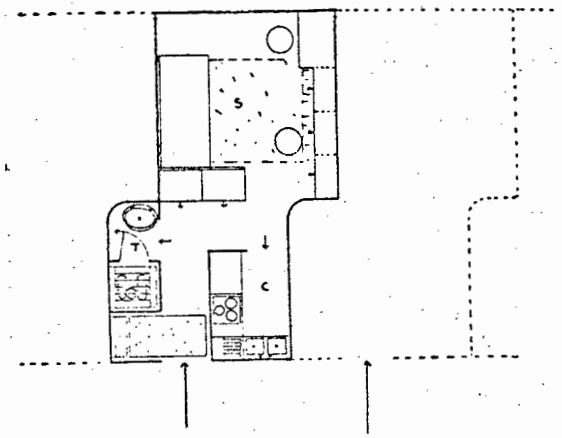


fig. 34

1. 1 x 14 m²

(see numerical table on p. 114)
Bachelor apartments

S: fitted living room.
T: washbasin and W.C.
C: kitchen

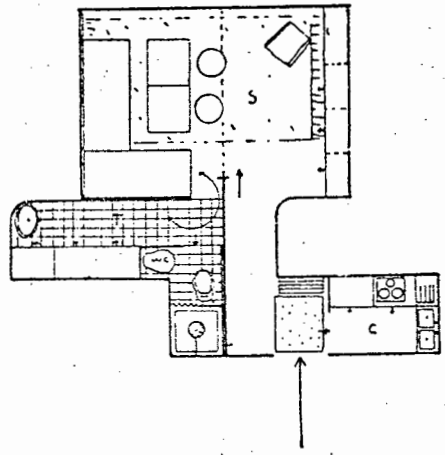


fig. 34

Further study of the cell, 14 m² per person (see page 143) applicable to the housing constituted by the great viaduct, elevation 100 meters (see pages 144, 145 etc.): little by little, it can house 180,000 people. In recent years several other studies have been made of a similar subject and published in various magazines. They have resulted in establishing a new, efficient heigh: for the home: 4.50 meters.

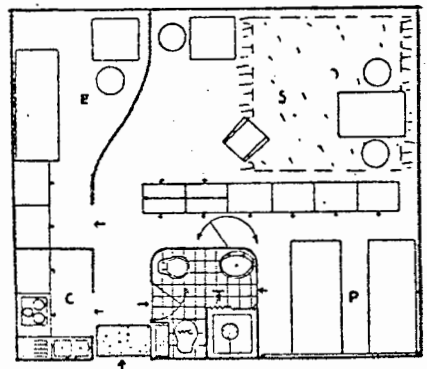
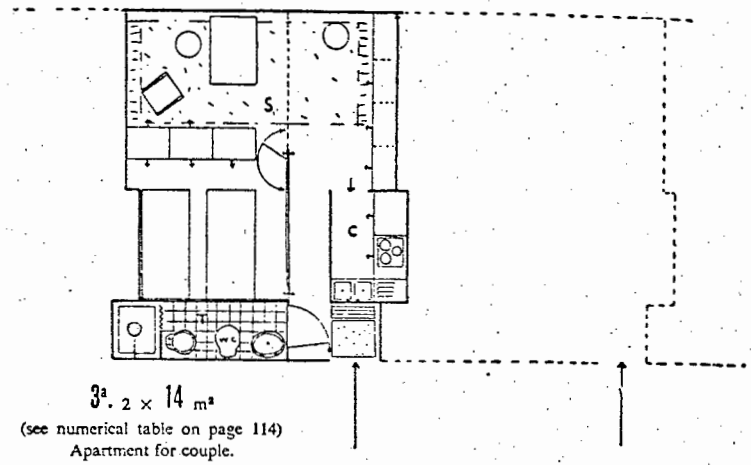


fig. 36



3ª. 2 x 14 m²

(see numerical table on page 114)
Apartment for couple.

fig. 35

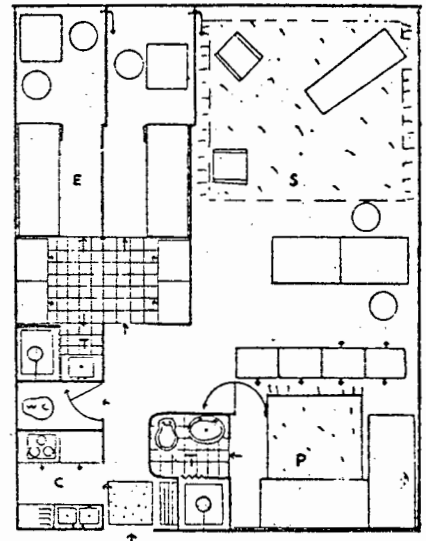
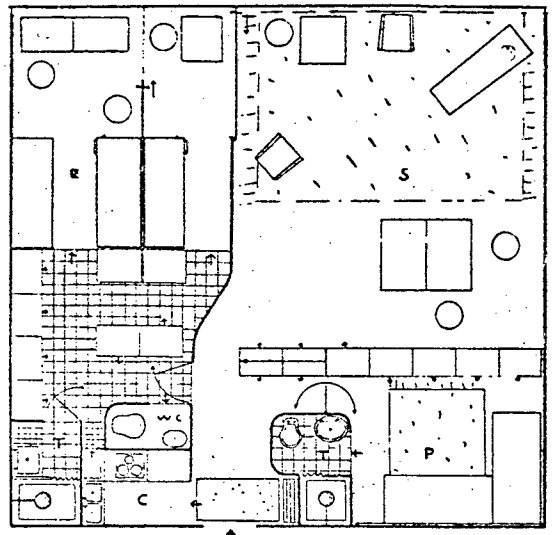


fig. 37

5. 4, 5 or 6 x 14 m²

Family with 2 children of different sexes or 3 or 4 children of both sexes.



6. 5, 6, 7, or 8 × 14 m²
Apartment for family of 3 children of both sexes or 4, 5, or 6 children.
Ideal arrangement of closets.

fig. 38

7. 7, or 8, or 9, or 10, or 11, or 12, etc. × 14 m²
Apartment for family with 7, 8, or 9 children, etc.

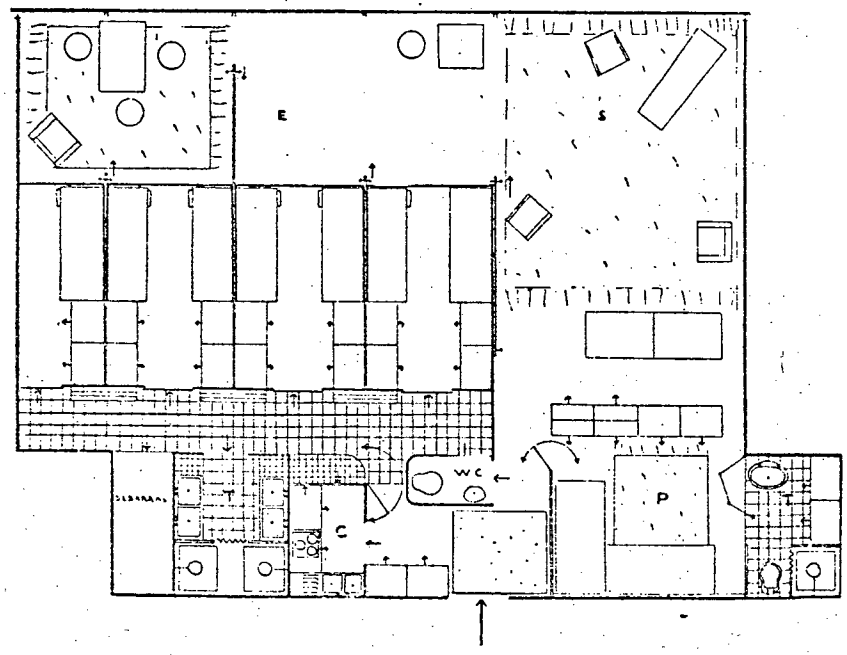


fig. 39

We earlier pointed to the Ville Radieuse DUs being unpresaged in Le Corbusier's earlier work; they were also to have no sequel. The nature of Le Corbusier's dissatisfaction with these DUs is contained in comments he made two years after their design:

> The basic housing unit of 14m^2 per inhabitant was evolved from data that included the current local regulations governing housing. These included a minimum height per storey of 2 meters 60 centimeters. This can be improved upon. Our "correct breathing" air-conditioning system will enable us to create much more efficient designs based on a new height for houses of 4 meters 50 centimeters divisible into two storeys of 2 meters 20 centimeters. With this diminshed height, the floor area allotted to each inhabitant can be reduced to 10m^2. A slight diminution in the volume of the whole building will also result, and, in consequence a further diminution in the city's area as a whole. But what is amazing is that the most outstanding result will be an improvement, an increase in the joie de vivre of the occupants, in the quality of comforts available. An increase of the basic pleasures.[28]

There is some sleight of hand here. A reading of Le Corbusier's feelings elsewhere in The Radiant City will plainly reveal that behind the alleged spur of the "correct breathing air conditioning system" to - wards "much more efficient designs", lies the root-desire to have dwellings based on the 4.50m / 2.20m height sub-divisions:

> Reader, had it occurred to you that a figure (that two figures), representing the city

28. Le Corbusier, The Radiant City, p. 146.

29. Le Corbusier, The Radiant City, p. 52.

> ordinances about the maximum height of the home, could hem in your happiness ? The omnipotence of harmony.....resides in the figure which determines the height of the home. [29]

Though even further reduced in size then this DU had no connotation of being a 'minimum home': "Behind this glass wall 4.50 meters high will stretch the 'room to live in' , that vast essential area where the human animal can feel at ease- adequate room, circulation, movement.....The maximum living room must be created". [30]

Not only was this DU with double-volume living room a 'rediscovery' by Le Corbusier of an earlier theme in his work that he had "instinctively" (as he had it) used in the Citrohan (1920), Ozenfant (1922) and La Roche (1923)houses; it was an echo of the funamental and time-hallowed " natural" scale of men's houses a height-type,so to speak :

> "Lets look at the past: .....- an economic and efficient height had naturally been adopted: 2.20 meters. In the course of my continuous travels, I have observed this rule has held good down through the centuries;". [31]

Certain that he was on the royal road of truth, Le Corbusier would not again be deflected from it, and all his subsequent apartment DUs were based on the 4.50 / 2.20m. sub-division; [32] i.e. they were commited to being double-storeyed.

What then, do these new DUs look like ?

Apropos of them Le Corbusier says :

> It was on this basis that we drew up our plans for Algiers, Stockholm and Antwerp. And on the same basis that we suggested a design to

30. Le Corbusier, The Radiant City, p. 53.

31. Le Corbusier, The Radiant City, p. 51.

32. This was adjusted after 1945 to conform to the Modulor's dimensional scale to become 4.80m/2.26m.

33. Le Corbusier, The Radiant City, p. 146.

to the municipality of Zurich for a most eloquent apartment house intended for 300 working-class families.[33]

There were however, no DU plans illustrated for Stockholm or Antwerp, and the perspective renderings of the latter do not in fact, suggest the existence of double-storey DUs (*fig 41*); the DUs of the Algiers scheme (to be used under the linear viaducts) are actually of the single-storey, 14m^2 per person type. The DUs of the "eloquent" Zurich apartment-house referred to, prove, on measurement, to be designed on the basis of 14m^2 per person and not 10m^2, (and this excludes the area of the double-volume).[34] While these last - mentioned DUs (*figs 42-45*) do give the impression of a considerably more spacious environment owing to the double-volume, there can be no doubt that in terms of the flexibility and quantity of actually usable space, they cannot compare with the single-storey units of the Ville Radieuse.[35]

As in the case of the Ville Contemporaine, we are once again left with an unsubstantiated claim for a redeeming DU, based on 10m^2 per person, and having its own special properties and implications.

Le Corbusier's intentions for this new DU, even if unfulfilled in any project between 1930-34, the years in which The Radiant City was written, are nevertheless clear from statements and from sketches inserted in The Radiant City probably roundabout 1933:

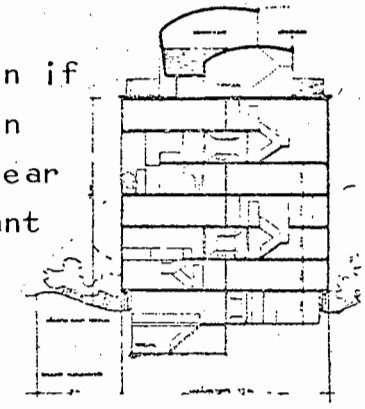
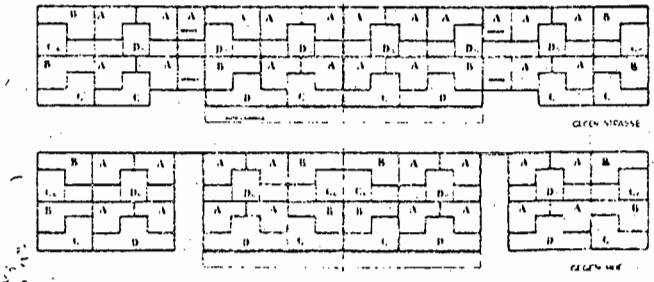


fig. 40



Deux coupes schéma avec l'emplacement des appartements dans les façades

34. This calculation, and all others in the Table IId on p.152 , includes 'service areas' (toilets, kitchen, storage space) since this is the way Le Corbusier arrived at his area-per-person figures.

35. It is surprising that Le Corbusier did not, at this stage (i.e. 1930-31), move directly on to the Unité interlock section solution; he had obviously been close to it in the redents section of the Ville Contemporaine (1925) and during his visit to Moscow in 1930, he would have undoubtedly seen the numerous housing projects by various modern Soviet architects embodying precisely this sectional principle. (*figs 46,47*)
In similar vein, Le Corbusier's Immeuble Locatif in Zurich (1932) displays a complex interlocking principle on its facade, while the very obvious sectional opportunities are not followed up. (*fig 40*)

Anywhere in the residential city

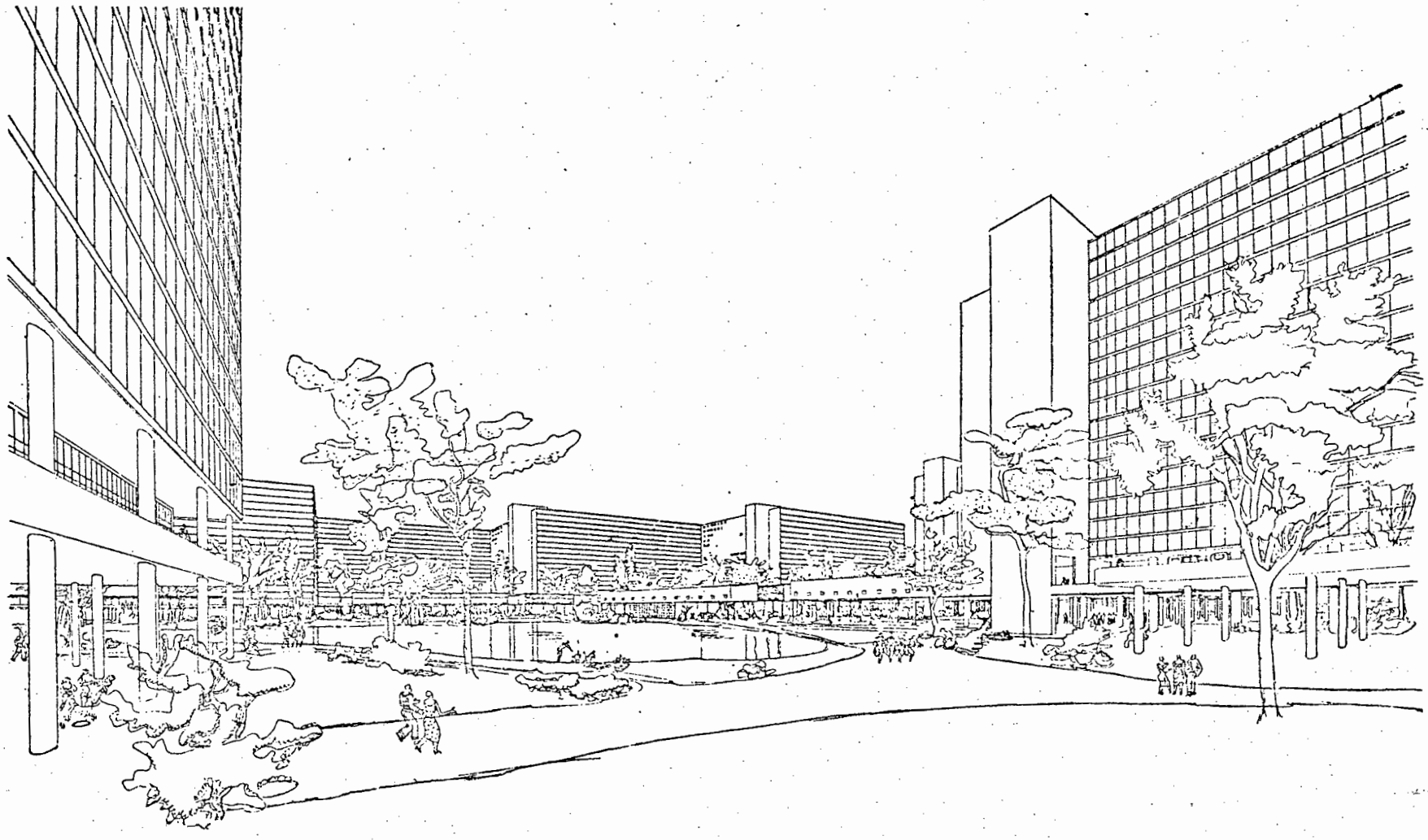
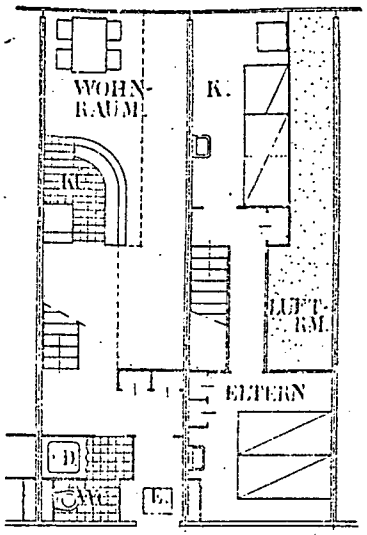
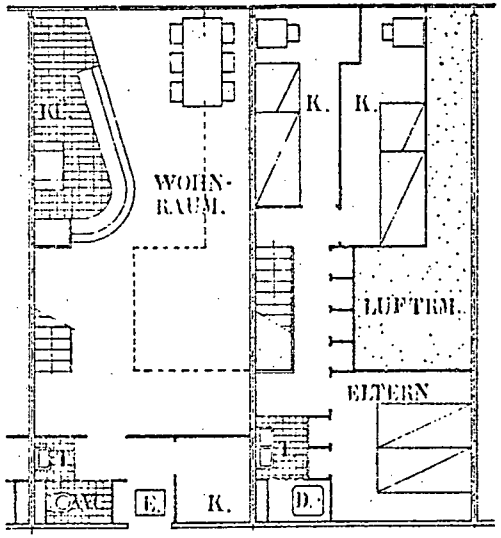


fig. 41



Type A pour quatre personnes

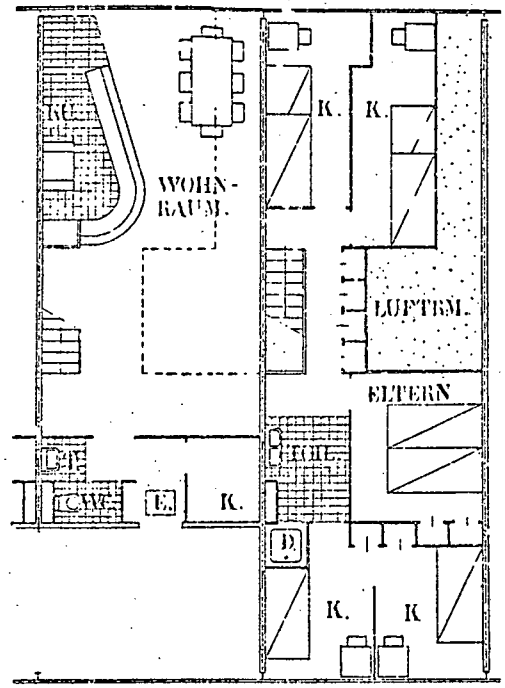
fig. 42



INNERE STRASSE

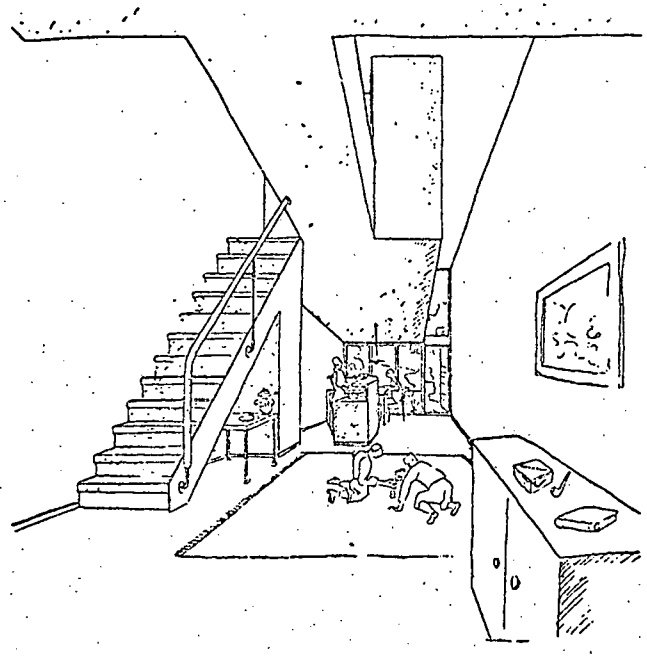
Type B pour six personnes

fig. 43



Type C pour huit personnes

fig. 44



Vue dans la salle et le bar, cuisine au fond

fig. 45

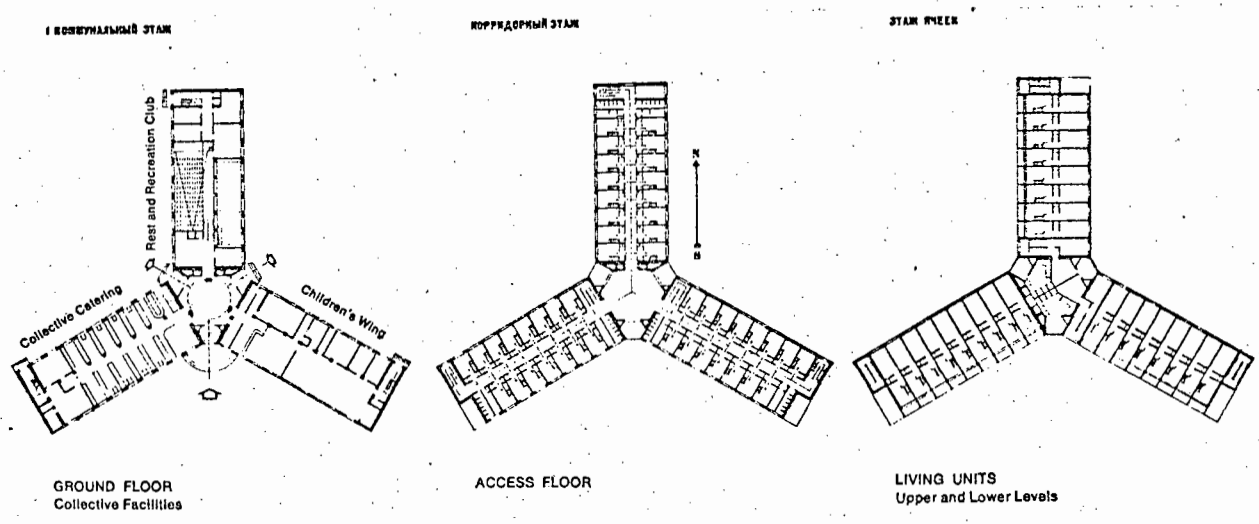

I КОММУНАЛЬНЫЙ ЭТАЖ
КОРРИДОРНЫЙ ЭТАЖ
ЭТАЖ ЯЧЕЕК
Rest and Recreation Club
Collective Catering
Children's Wing
GROUND FLOOR
Collective Facilities
ACCESS FLOOR
LIVING UNITS
Upper and Lower Levels

fig. 46

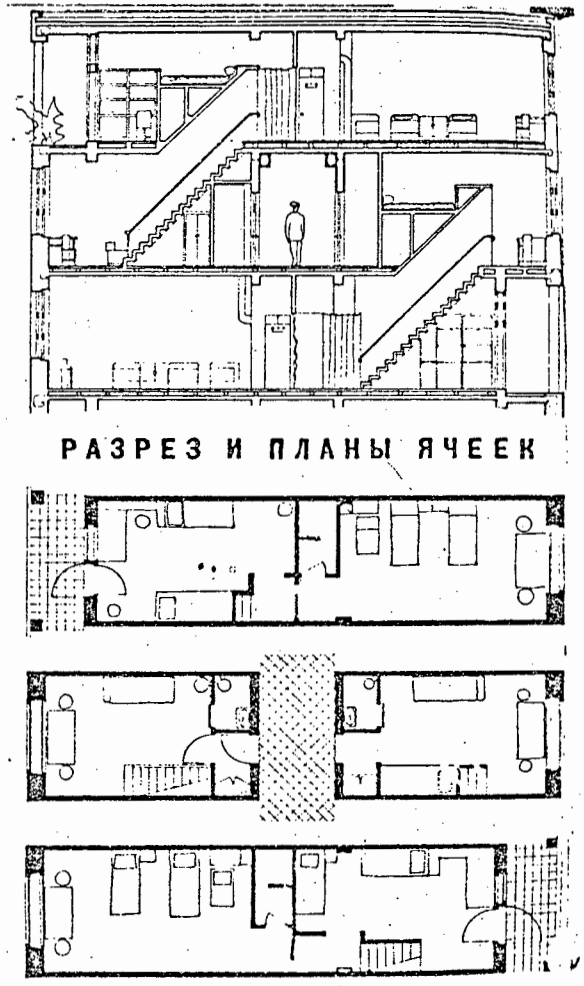

РАЗРЕЗ И ПЛАНЫ ЯЧЕЕК

fig. 47

If we adopt 4.50 meters as the height of the home, the glass wall will be of the same height; consequently, the sun's rays will penetrate far inside, very deep into the home. So we can make the home deep; so, a home that is relatively narrow."[36]

Again:

I make a drawing: *(fig 48)*
In front of every apartment, contiguous glass walls constitute the facade(A, A, A..). The home is behind it, in depth (L). The interior street leads to the door of each home (R). If the building complex has an east-west orientation, the homes are placed on either side of the interior street. If it is orientated north-south, homes will be placed only on the south.

This <u>depth-wise</u> disposition of each home is a departure from the traditional ways of stringing out each home all along the facades, T, T1, T2.

Several ways (shown in section) of grouping around the interior street can be adopted. Either: homes 1 and 2 around an interior street. Or: homes 1a and 3a on either side of an interior street. With living air Av not even the least little nook is left stagnant.

Let's read the new solution: with LT, I express the most intense utilization of traditional methods. For 16 homes, for instance, the building would have a length of <u>mn</u> . With the new arrangements <u>LN</u> , the building

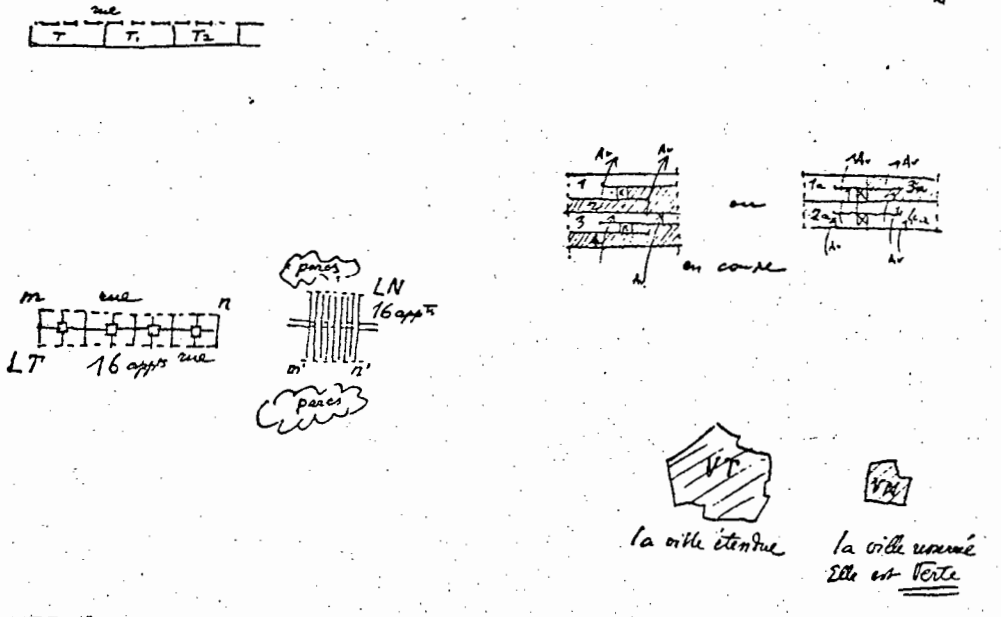


fig. 48

36. Le Corbusier, The Radiant City, p. 53.

37. Le Corbusier, The Radiant City, p. 43.

> will have a length of m'n', or in other words, one third as much.
>
> Whereupon the traditional city which extends over an area VT will extent only (new city) over VN : one third as great an area.[37]

The sectional sketches clearly show the crystallization of the Unité interlock section; its relation in the above passage to the need for reducing the developed length of continuous linear blocks (redents) so as to compact the city, is evident.

If, as has been argued, the reduced DU of $10m^2$p.p. or $14m^2$p.p., had its origins in the high densities required by the Ville Radieuse, it was also reinforced by a new "souped-up" conception of the common services : in a questionnaire drawn up by Le Corbusier at CIAM III in 1930 and addressed to all architects, this reinforcement is made explicit:

> Supposing that the principle of communal services expands more and more (nurseries, gymnasiums for daily physical culture sessions, food supplies, laundry - all services which will facilitate the running of the home and proportionately reduce the real volume of apartments), what is the minimum living area which you would allot to each resident ?[38]

In this sense the common services are a compensatory device for the small DU, relieving it of "unnecessary"functions and vesting these in other more efficient frameworks, to

38. Le Corbusier, The Radiant City, p.50

The same point is made by one of the strategums quoted earlier on :

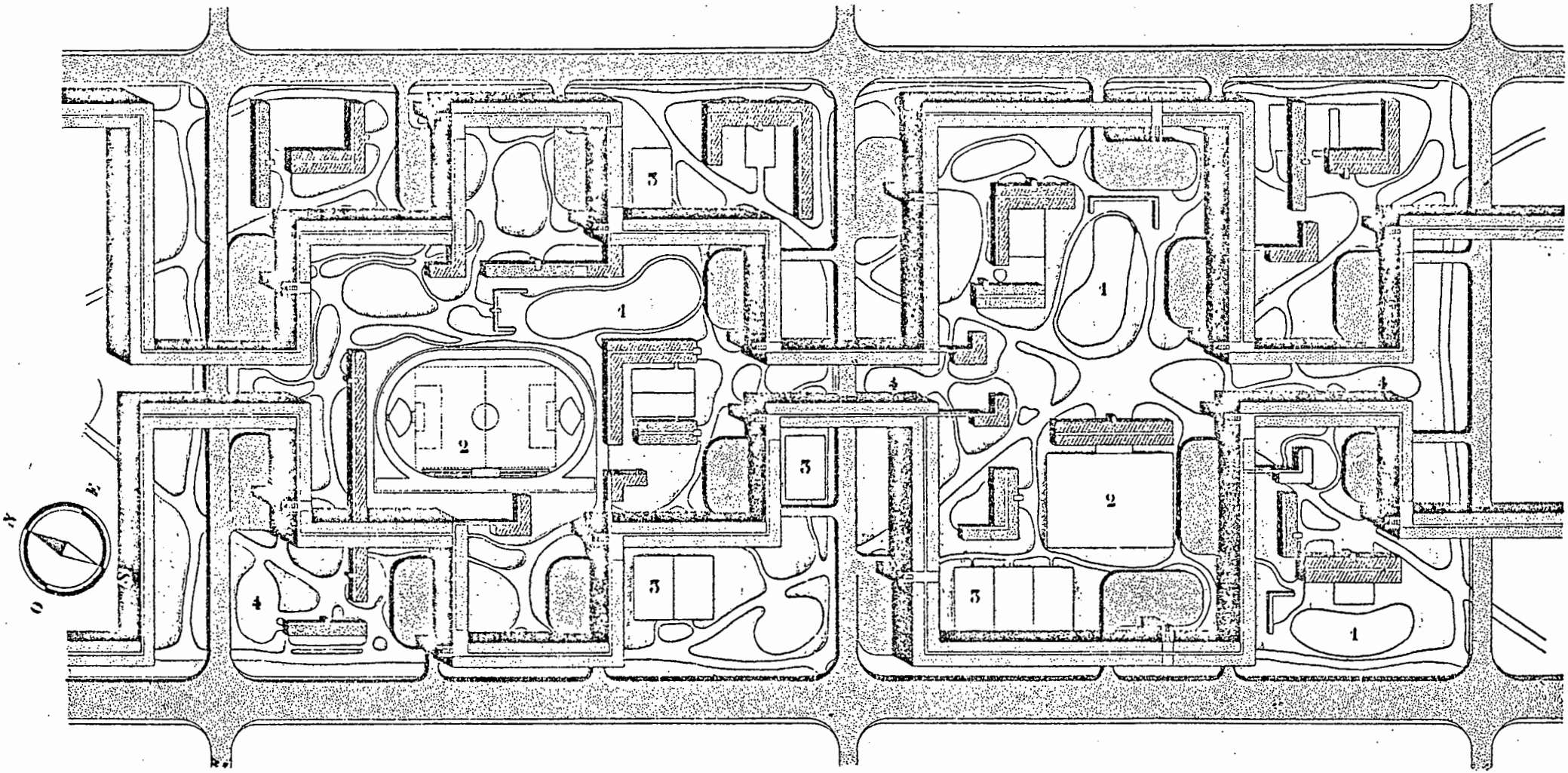
"The introduction of communal services in domestic life could lead to a saving in the area of the individual housing unit. Such communal services lighten domestic labour and free wives for more useful work."

(Le Corbusier, The Radiant City, p.189.

the presumed mutual benefit of both. The DU is no longer therefore, the self-contained and self sufficient cell that it was in the Ville Contemporaine where the common services, provided for the less affluent only, were envisaged as a measure for relieving the domestic staff crisis and circumventing the need for a central city market. The Ville Radieuse cell now has essential reciprocal extensions into a larger organizational system. This extension explains, for example, the fact that the kitchens of the Ville Radieuse DUs remained the same minimum-sized 'cockpits' whether they served one person or ten.

Applying this kind of logic to other aspects of the shrunken DU, we shall uncover another strata of common services: the free space available in and about the rooms of the Villas-Immeuble DU where children might play with friends, parents hold parties, the family do their physical jerks or a hobby be pursued, are eliminated in the Ville Radieuse only to be "returned" elsewhere on a larger scale in the form of clubrooms and meeting rooms, a large communal hall and gymnasium, continuous open space with solaria and greenery which are amongst the elements placed within, or on top of, the redents. The unlimited green space containing creches, kindergartens, primary schools, football fields, tennis courts, and swimming pools just a shout away from the apartments (*fig 49*)is yet another compensatory device which further widens the ambit of the extensions of the home --"les prolongements du logis"-- thus investing the word-image "home" in the Ville Radieuse with wider associations.

LA "VILLE VERTE" 1000 HAB.À L'HECT.



SPORT :

1 PISCINE
2 FOOTBALL, SAUT, ETC
3 TENNIS
4 JEUX

fig. 49

These wider associations must always be seen to underlie the word "cell" when Le Corbusier uses it in relation to the Ville Radieuse if we are to do that DU justice when we contrast it with earlier, more generous prototypes; only from this standpoint does Le Corbusier's claim for the centrality of the cell in the Ville Radieuse make sense: "It is now time to offer a justification for these studies of mine, and I can think of no better one than their own origin: the cell".[39]

This viewpoint means, of course, that cell and context inter-imply one another quite directly. A quick glance at the Ville Radieuse plan would seem to substantiate this physically, since the overall environment of the redents is created simply by the continuous multiplication, virtually ad infinitum, of the cells, with no intervening unit of a different order, to fracture this continuum. (fig. 50) A closer look at the more detailed plans will however reveal a subtly differentiated hierarchy of various organizational systems that do, in fact, relate to separate sections of the continuous redents (fig 51). These systems, while each of them seeks its own most effective level of operation, are all related to one basic module :

DETERMINING THE BASIC HOUSING UNIT:
MODULE: MAXIMUM DISTANCE OF 100 M,
ON FOOT FROM APARTMENT DOOR TO
ELEVATORS, RESULT:
2,700 RESIDENTS
- HOUSING + COMMUNAL SERVICES +
NURSERIES + SCHOOLS.[40]

This module of 2,700 residents is based on the deep narrow DU of $14m^2$ p.p. or $10m^2$ p.p. discussed earlier.

39. Le Corbusier The Radiant City, p.143.

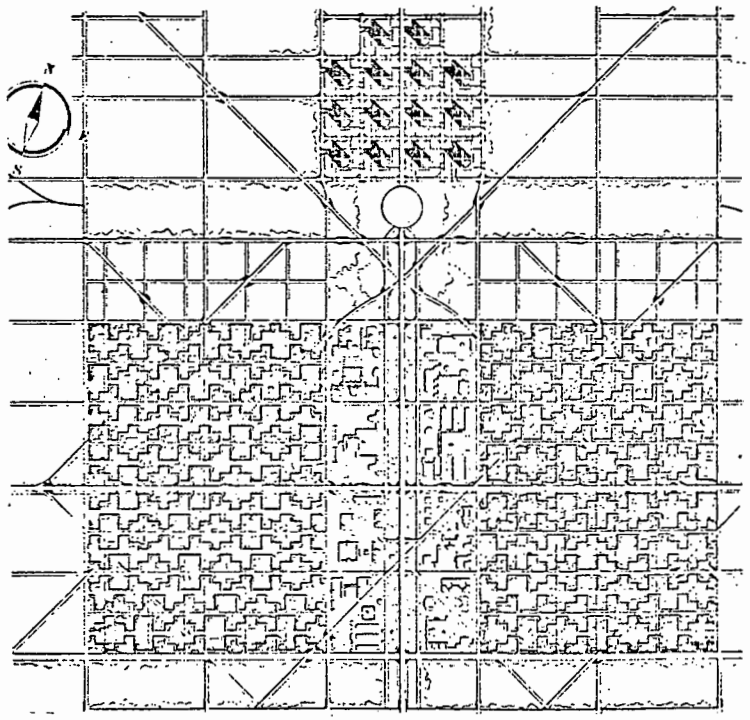


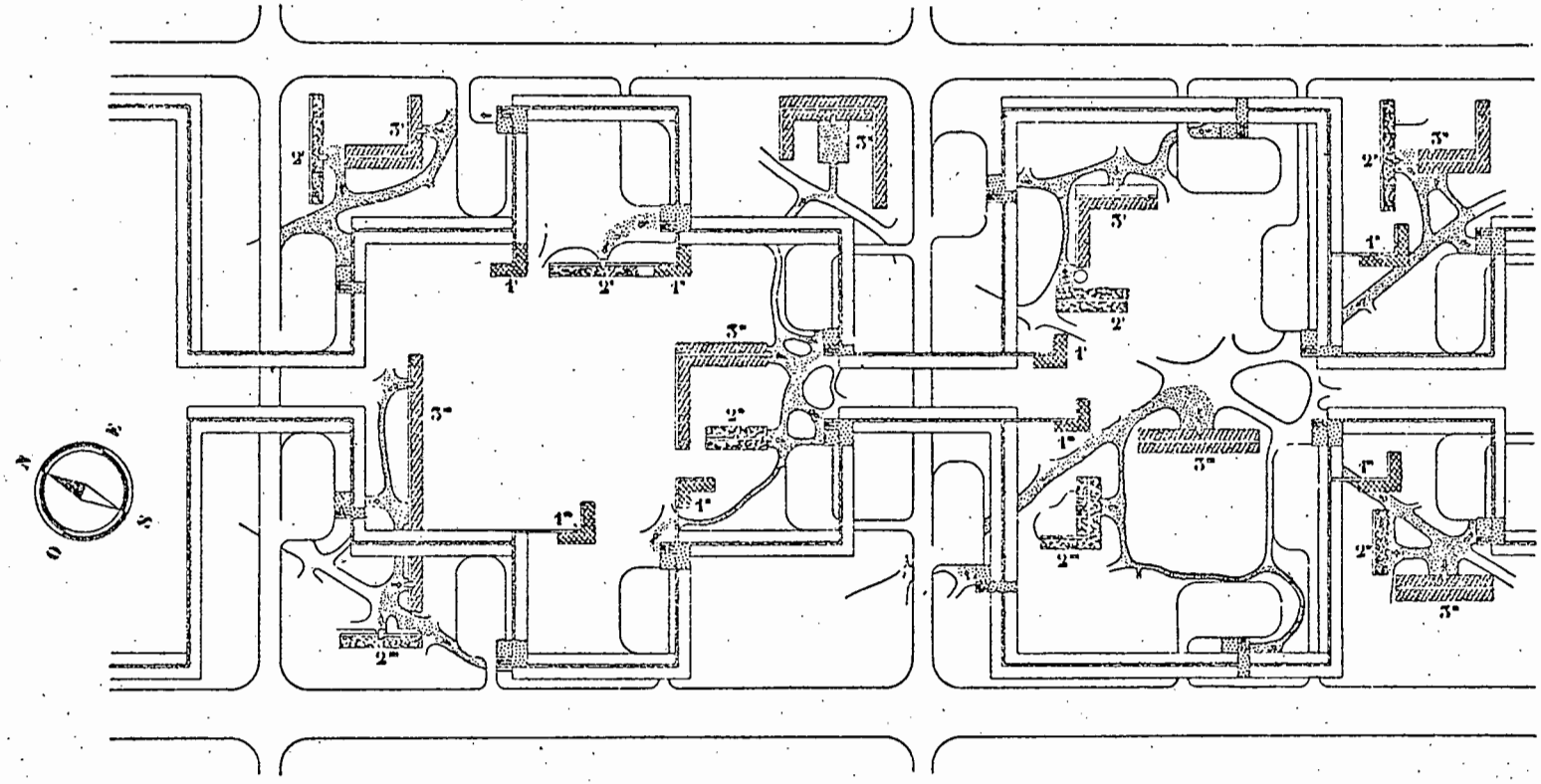
fig. 50

40. Le Corbusier, The Radiant City, p. 162.

VR

6

PUÉRICULTURE ET INSTRUCTION



1 : CRÈCHE 2 : ETBL PRÉ-SCOLAIRE 3 : ÉCOLE PRIMAIRE

fig. 51

There is an important 'hidden decision' involved here which fixes the population module at 2,700 per elevator core and that is the choice of a specific number of storeys for the "redents". To increase the density of the Ville Radieuse, Le Corbusier was also obliged to increase the number of storeys beyond that of the Ville Contemporaine, whose five double storeys were designed to conform to the building regulations of Paris. Ignoring such considerations in the Ville Radieuse, Le Corbusier fixed the maximum height for residential buildings at fifty metres from the ground, which allowed of ten double storeys, the two lowest being given over to the common services above the pilotis, which alone punctuate the continuous open space at ground level. This rather crucial prescription of 50m. which must have been a very considered one, since Le Corbusier was to follow it in all his subsequent high-rise housing schemes, he neither justified nor elaborated upon in the Ville Radieuse; all we have, almost by the way, is a casual presumption of its self-evident rationality:

> Finally, since exact air is mechanically distributed by pulsation, making it possible to bring life to limitless volumes of buildings, we can adopt a reasonable height of, say, 50 meters, for apartment houses. As a result of this vertical solution, open spaces, or parks (P), become available in front of the house and behind it.[41]

The single elevator core of the module fixes the position of the parking garages- auto ports - at the foot of the elevators and in this way, Le Corbusier would have us believe, determines the scale of the entire road infra-structure(fig 52):

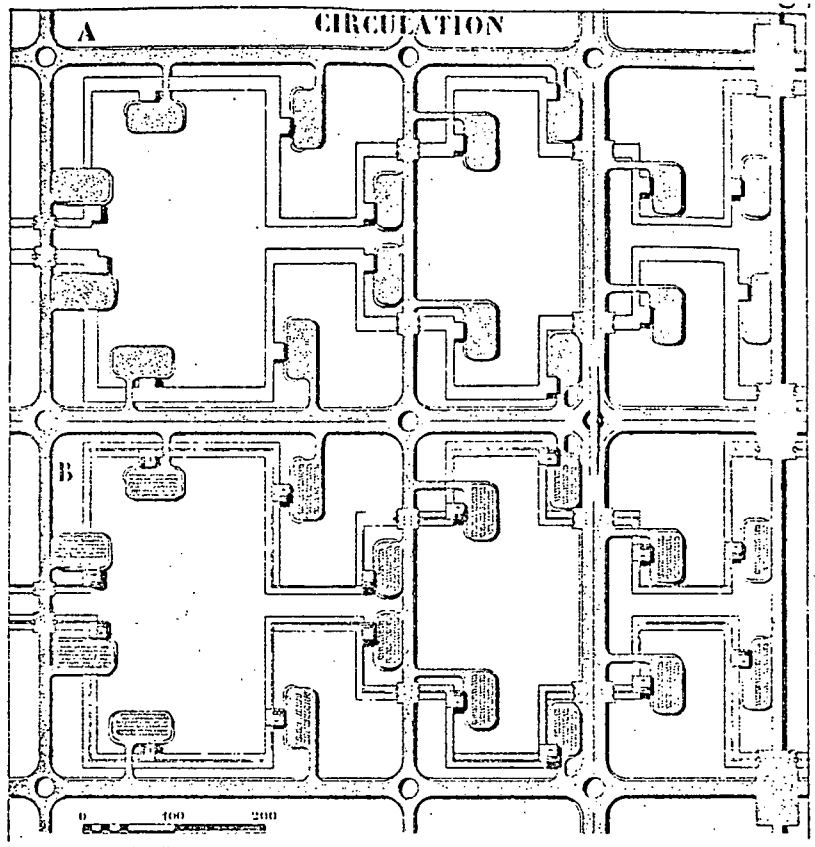


fig. 52

A: "AUTOSTRADES" REMPLACENT "RUES"
B: "AUTO-PORTS"

1° Here, we have adopted a basic unit for the highway network measuring 400 × 400 meters (we even tried a unit measuring 400 × 200 meters on this particular working drawing, but it is pointlessly cluttered);

2° According to the proximity of any given neighborhood to the city's main traffic arteries, we have allotted the different sections of highway adequate widths of, variously: 24 m., 16 m., and 12 m.;

3° Next, one considers the intersections: this is a residential neighborhood, therefore the traffic is not abnormally heavy; we have illustrated one fairly important intersection, then other, simpler or very simple ones;

4° The highways run all the time through open parks, outside the houses. Occasionally, however, they do run through the buildings. We have indicated three different ways in which this can occur;

5° The highways are connected by branch roads to the auto-ports built up outside the main doors to the apartment units;

6° Inside each of these doors is a vertical transportation system. Each of the doors here serves 2,700 residents;

7° The auto-ports provide for the temporary parking of taxis or private vehicles;

8° Beneath the auto-ports are garages for residents' private cars. The garages are linked to the auto-port by two one-way ramps, one leading up, the other down.

41. Le Corbusier, The Radiant City, p. 43.

> The basic module once accepted (maximum distance from any given apartment door to elevators: 100 meters), the astonishing ground plan above, is the result: this traffic network is both necessary and adequate to provide total facilities for a city of one and a half million inhabitants, all the various sectors included:*

The apparently greatly reduced number of streets must be balanced against the knowledge that the road infra-structure on the plan, which is 5 metres up in the air, has an identical one on the ground underneath it for service vehicles and public transport (figs. 53,54), and that the corridors within the redents are thought of, literally, as interior streets (This was where, for example, the policeman's new beat would be.)

Doubling the population module of 2,700 provided the "housing unit" which was the basis for the common services and "prolongements du logis"

> Each main door (in this illustration) intended for 2,700 residents. Two doors: 5,400 residents. This figure seems to provide a useful size of "housing unit" (divisible, moreover, into 2 x 2,700). Each of these units is therefore provided with its individual set of services directly connected with family life: communal services (catering and household supplies); nursery (with a direct link to one of the interior streets(1'); kindergarten, open-air playground in the park(2'); primary school (3') in the park. Between the ages of 1 and 14, children will have all necessary educational establishments outside their own front door, in the park (none of the present-day street dangers).[42]

It is clear from this passage that, as in the Ville Contemporaine, the superblock resulting from the road infra-struc-

* Le Corbusier, The Radiant City, p. 169.

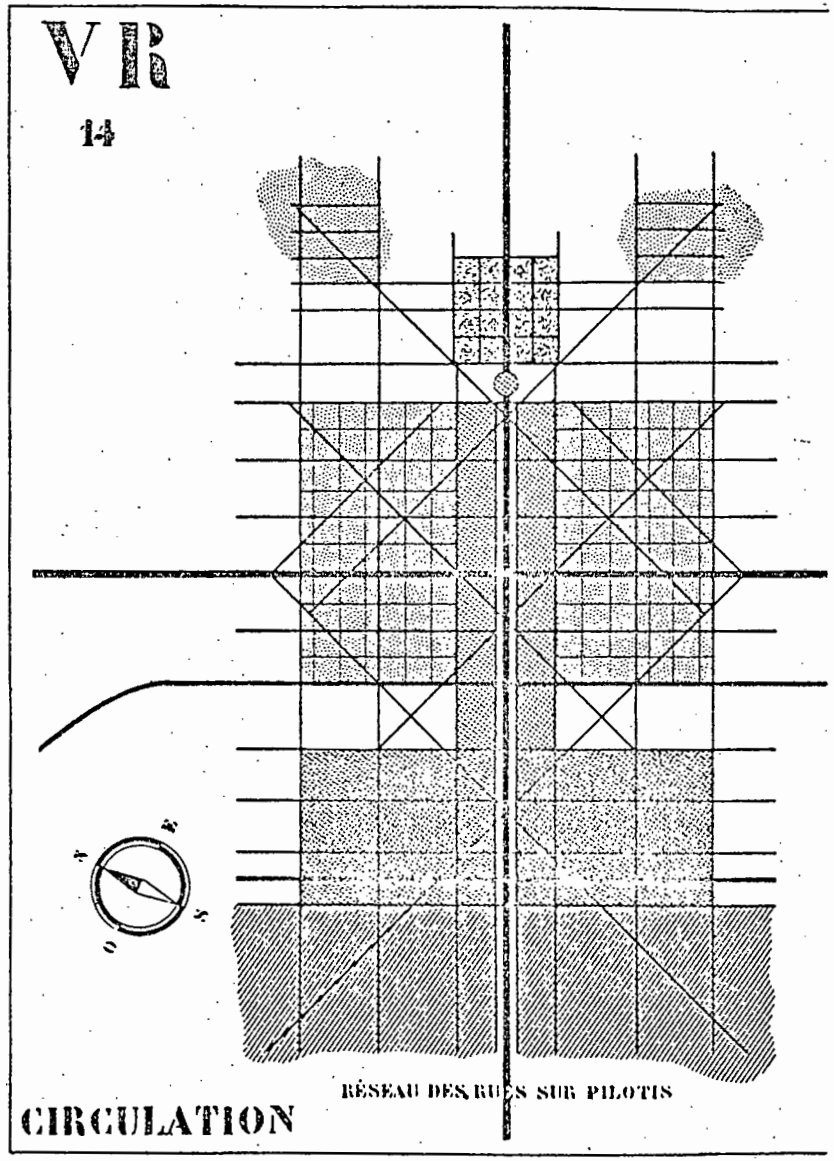


fig. 53

42. Le Corbusier, The Radiant City, p. 162.

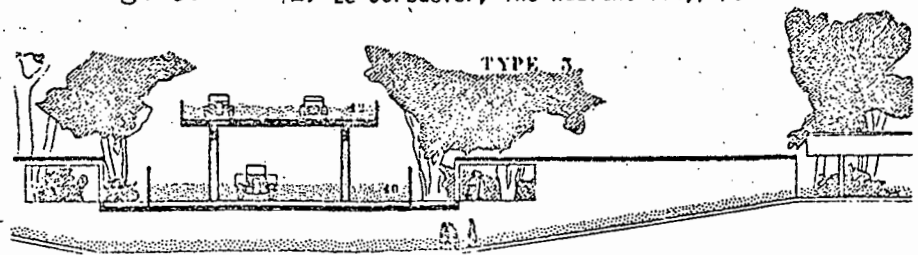


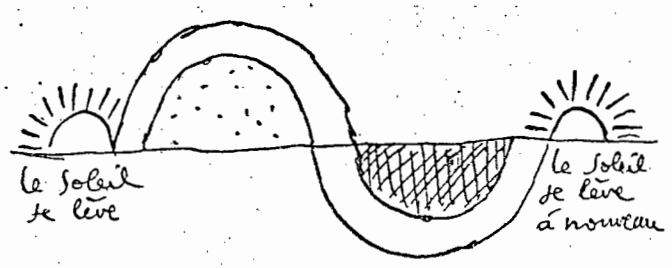
fig.54

structure does not in itself, constitute a neighbourhood that is meaningful in any sense; rather, four or eight (depending on whether we choose 2,700 or 5,400 residents as the basic unit) purely organizational modules happen to constitute a superblock containing 21,000 people and measuring on the ground plan 400m x 400m; the only benefit that appears to accrue to the housing from the superblock is that this sub-division seems to form the basis for providing one major sports facility, though the illustrations, it must be added, are insufficiently extensive to fully bear this out. Certainly the "redents'" visual continuity and the sameness of their environment would not appear to indicate any intention of creating "neighbourhoods". (*fig 56*)

All the physical and organizational strategies that re-inforce and support the Ville Radieuse high - density DU should be seen, on a more profound level, as being directed towards the manipulation of a non-physical resource -- the twenty-four hours of the solar day.

> Architecture, city planning,
> our happiness,
> the state of our consciousness,
> the equilibrium of our individual lives,
> the rhythm of our collective duties
> are all governed by the 24-hour cycle of the sun.[43]

This credo had found expression by 1930 in one of Le Corbusier's touchstone-diagrams (*fig 55*) which underpins his analysis of society and its ills as well as his solu-



la journée solaire de 24 heures : ... ... the twenty-four hour solar day
mesure de nos entreprises urbanistiques : ... the measure of our town-planning adventures

fig. 55

43. Le Corbusier, The Radiant City, p. 104.

Anywhere in the residential city

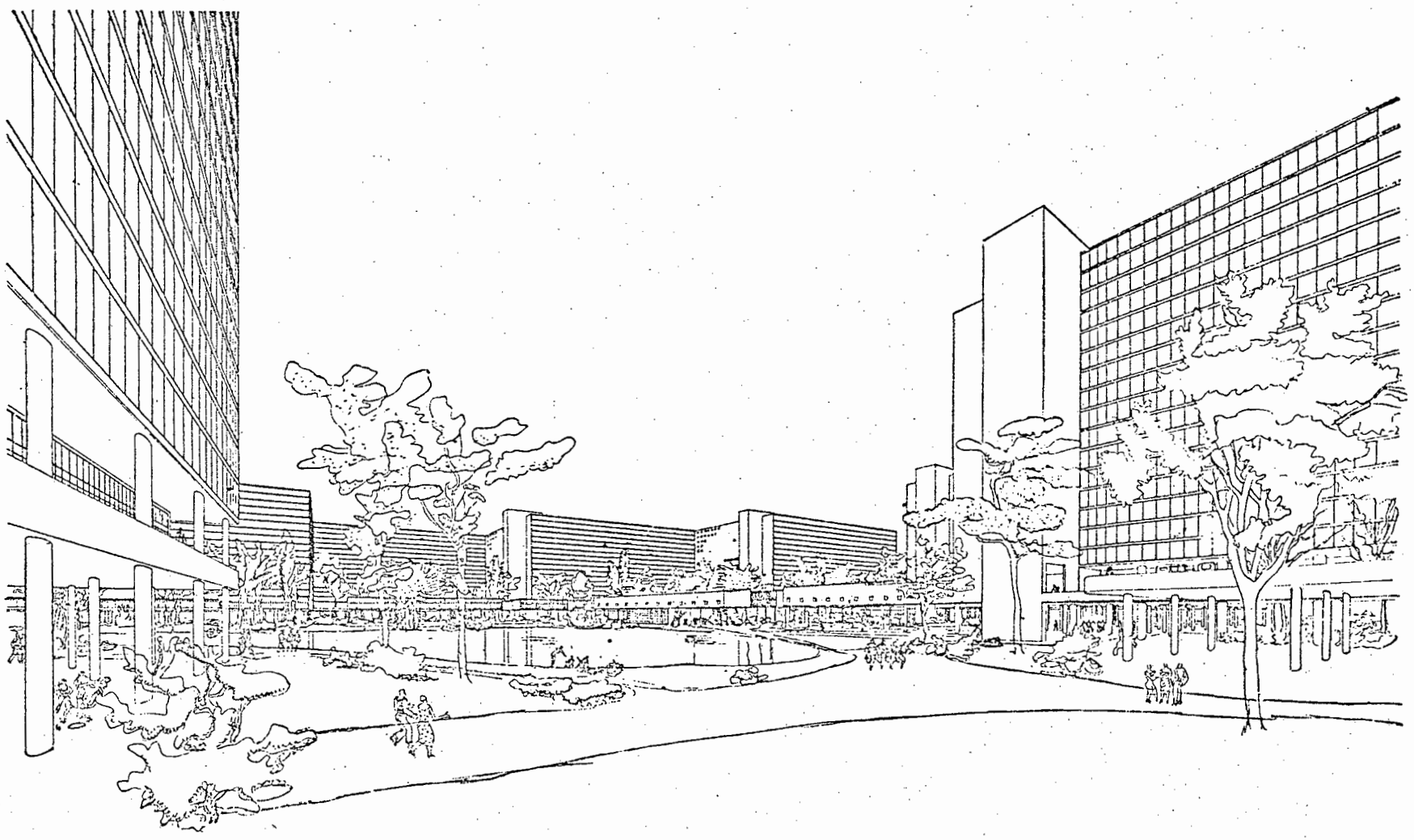


fig. 56

solution for them. Le Corbusier's notion of time[44] as the planner's most basic yardstick and resource, is a fruitful viewpoint from which to discuss the Ville Radieuse context.

As Le Corbusier saw it, the time spent by urban society's great mass of men and women at 'work' was meaningless and onerous and their so-called leisure time merely an anaesthetizing escape from their sordid living conditions -- all a far cry from the basic recipe for human happiness--the resolution of the Man/Nature and Individual/Collective binomials. Though this sad state of affairs had been brought about, both directly and indirectly, by the uncontrolled invasion of the first Machine Age[45] it was with these very same means, only rationalized and controlled, that Le Corbusier hoped to save the situation; not that the rationalized machine would of itself provide meaning in life -- it would merely create time; time for the men by reducing their quota of work hours and time for the women by freeing them from household chores. This free time, "the true working day of machine civilization"[46] would be filled with meaningful content by virtue of the provisions of the Ville Radieuse, which would thus restore the Man/Nature and Individual/Collective equilibrium (fig 57). All this is summarized in a passage in Le Corbusier's commentary on the Antwerp project of 1933, his purest and most trenchant real-life application of Ville Radieuse principles:

44. On occasion a distinctly obsessive note creeps into Le Corbusier's pre-occupation with time and its effects -- perhaps apt in a watchmaker's son.

45. This period, which Le Corbusier defined as the machine's first one hundred years of rapacious destructiveness, stretched from 1830-1930, which was when the first portent of its inevitable failure appeared in the form of the world-wide economic collapse (Wall Street crash and its reverberations in Europe in the form of unemployment and strikes). The date for the commencement of the millenial second Machine age was, however, progressively deferred in step with Le Corbusier's setbacks but it was re-proclaimed with unflagging perseverence till the end.

46. Le Corbusier, When the Cathedrals Were White, p. 177.

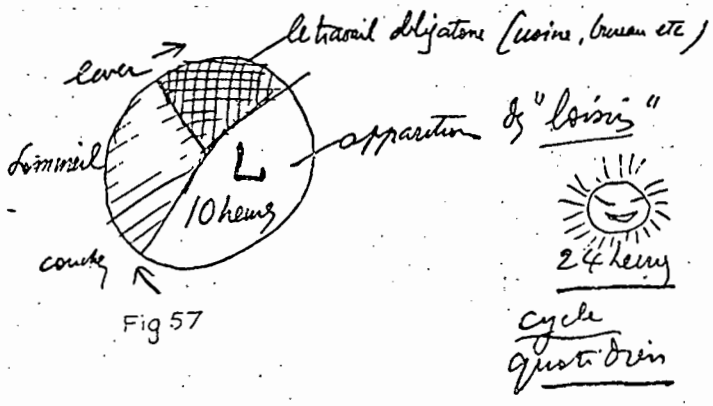


Fig 57

> Indeed, life in the machine age entitles us to expect, in the near future, a work day so shortened that of the 24 hours in the solar day, a considerable portion will be left free. Today's public officials have the obligation to prepare facilities capable of occupying tomorrow's leisure time, devoted to recuperating physical and nervous energy: sports practiced at the foot of each house, solaria and beaches as part of the roof-gardens, etc; room set aside for childrearing (to breed a healthy race and give the child special care starting at birth); places for study, for meetings and group activities, in appropriate rooms and halls. And finally, the freedom of the individual is guarenteed by the soundproof home, flooded by sunlight and opening, not onto the traditional street, but, onto the sky and an expanse of parks.[47]

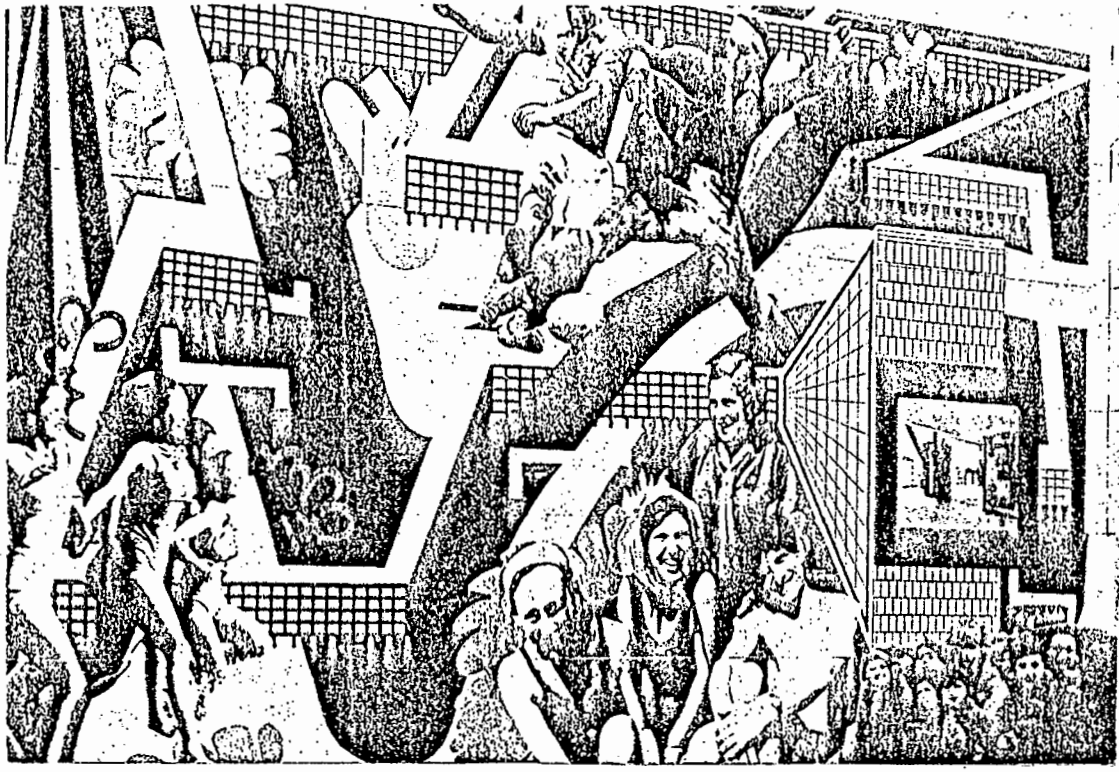
There is to be no place near the dwellings of the Ville Radieuse then, for the old concept of leisure, a concept "synonymous with amusements, with relaxation: movie houses, fishing, hiking, visits to amusement parks";[48] no place for "futile political squabbles in cafés", no place for shopping or even idle window-browsing near home. All these, together with their traditional habitat, the corridor-street have been sacrificed for the sake of a bright "intensity in consecrated work and leisure",[49] whose aura bathes the home and its environs. (figs 58,59)

We are now in a position better to understand Le Corbusier's burgeoning animus towards the suburbs which found powerful expression in The Radiant City subsequent to his extensive travels in the late 1920's and early 1930's through European, South American, North American and Soviet capitals and countrysides. These travels added

47. Le Corbusier, The Radiant City, p.272.

48. Le Corbusier, The Radiant City, p. 151.

49. Le Corbusier, The Home of Man, p. 112.



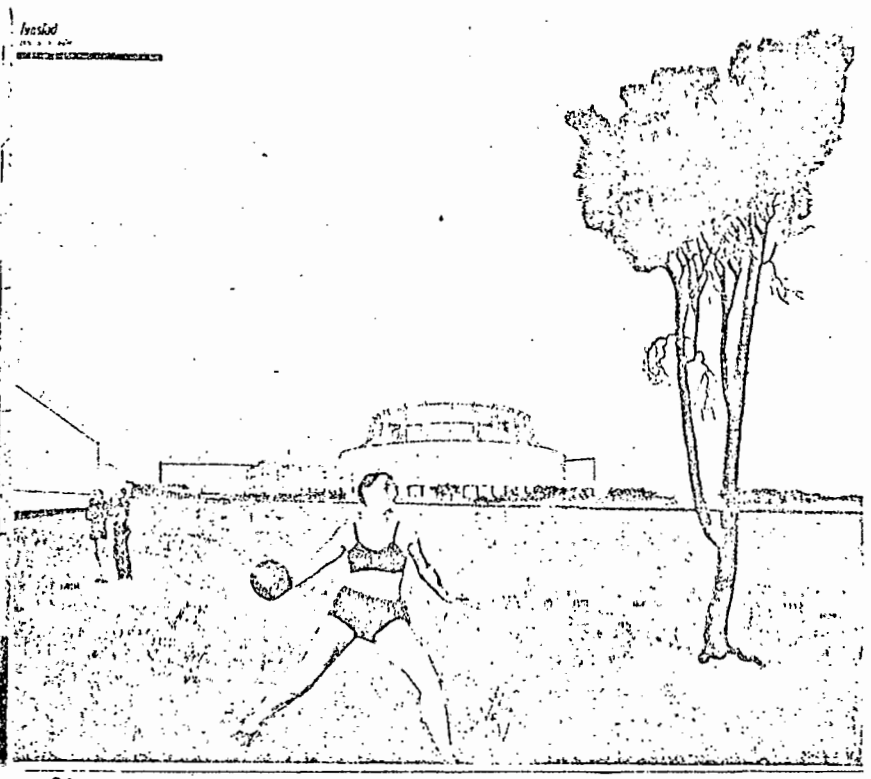


fig. 58

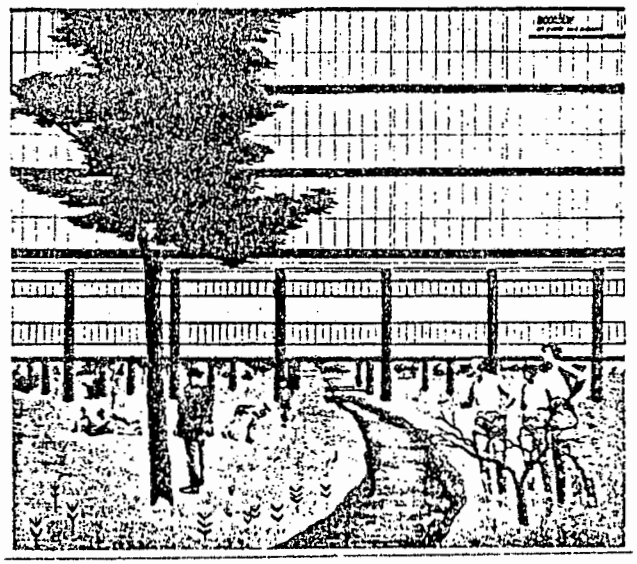


fig. 59

fuel to the fire of his earlier enmity towards suburbia which we quoted in connection with the Ville Contemporaine; to this basically anti-petit-bourgeois bias is added Le Corbusier's antipathy to the"disease" of suburban sprawl paralyzing the world's cities with its massive wastage -- "la grande gaspillage du temps moderne". The following extract illustrates the variety of standpoints from which Le Corbusier attacked the horizontal garden-city, opposing to it the tenets of his own beneficent solution

> .....garden cities as opposed to urban concentration. Of these two contradictory states, one must be chosen, the one which avoids waste (of time of energy, of money, of land).
>
> The garden city leads to individualism. In reality, to an enslaved individualism, a sterile isolation of the individual. It brings in its wake the destruction of social spirit, the downfall of collective forces; it leads to annihilation of the collective will; materially, it opposes the fruitful application of scientific discoveries, it restricts comfort; by increasing the amount of time lost, it constitutes an attack upon freedom.
>
> For the sake of one percent of society or one tenth of one percent -- for the sake of the people who are well off and whose needs it can satisfy-- the garden city plunges the rest of society into a precarious existence.
>
> Whereas urban concentration favours the introduction of "communal services".
>
> A mirage: decentralization, lowering population density to 300,[51] even 150 inhabitants per hectare, with the pretext of giving the countryside back to the city man. Sheer illus ion and falsehood, as the reality shows. (fig.60)

50. Le Corbusier, The Radiant City, p. 38.

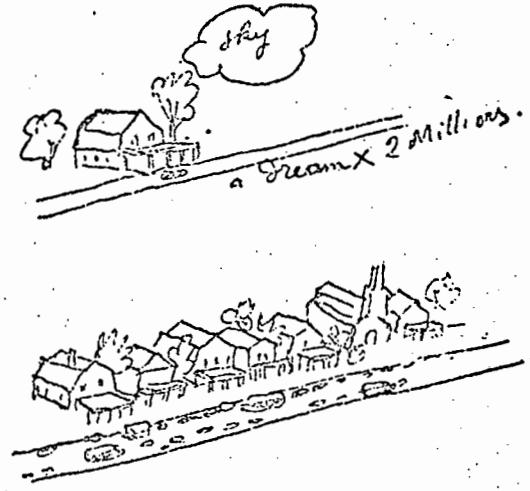


fig.60 un petit aspect de deux millions de rêves : ceci est baptisé : la liberté individuelle.-

51. This density was also that of the compacted residential district of the Ville Contemporaine!

> I believe that, on the contrary, the population densities of our present cities --300 or 400, even 600 (overpopulated zones) per hectare-- should be raised to 1000 by the prodigious resources of modern techniques. Then communal services can be multiplied, then genuine freedom can be achieved in the heart of family life, freedom instead of domestic slavery.[50]

The Ville Radieuse, as may be suspected from the above passage, ignores the question of socio-economic groupings. Unlike the Ville Contemporaine[52] and the Algiers project of 1929 which differentiated as regards location (and in the case of the latter, also in DU size) between "standard" DUs and those for "the more comfortable", the Ville Radieuse, as applied prototypically to Antwerp, "distributes residential neighbourhoods evenly over the city. There are neither poor nor wealthy neighbourhoods nor any sort of of distinction made to mark them off; probably this classification will come about of itself."[53]

In this conscious minimization of class divisions and in his treatment of other large-scale measures impinging on the socio-economic and socio-political spheres, Le Corbusier believed himself to be merely the instrument of the positive potentialities of the times which required only to be discovered, disclosed and developed. Thus, for example, he discovered that "modern society is better prepared than its predecessor for collective disciplines....."[54]

Le Corbusier was now having serious second thoughts as to whether the actual implementation of all the measures

NB

52. This distinction was admittedly minort Le Corbusier avers in The Radiant City that in the Ville Contemporaine he had"created the prototype of a classless city...."

53. Le Corbusier, The Radiant City, p. 276.

The reader will recall, for example, how the new concept of leisure enshrined in the Ville Radieuse was intended to contribute towards this withering away of the proletariat..

54. Le Corbusier, The Radiant City, p. 37.

required to realize the Ville Radieuse was still"possible under our own democracy" as he had argued in 1925. That the book The Radiant City is "dedicated to AUTHORITY", is in itself an indication of the drift of Le Corbusier's thought. The envisaged compass of such Authority can be gathered from the list, based on ideas repeated throughout the Radiant City, that is furnished in our Introductory section:

1. AUTHORITY for all change to be vested in the correct physical plan.

2. AUTHORITY for wholesale requisition of land.

3. AUTHORITY for population transplantations within and between urban and rural areas.

4. AUTHORITY to reduce or limit cities absolute size and extent.

5. AUTHORITY to curtail extent of shopping.

6. AUTHORITY to institute a new food supply system eliminating the middleman.

7. AUTHORITY to 'rationalize' industry to produce useful consumer goods only.

8. AUTHORITY to use energies thus freed to rebuild the 'humane' New Age cities.

9. AUTHORITY to protect the time salvaged from 7 and 8 as leisure time for all.

10. AUTHORITY for institutions ensuring creative intense, disinterested leisure.

Having thus prescribed all the wide-ranging changes flowing from the "correct physical plan" Le

Corbusier more or less stopped short; the seriousness and depth of enquiry characterizing the physical plans of the Ville Radieuse have by and large no parallel in Le Corbusier's didactic and exhortatory "discussion" of the accompanying processes of social, economic and political change. There exists a contradiction between his conviction of the masses approval of all these changes ("The masses will always go out to meet those who have something to give")[55], the apparently desperate need he discerns to redirect the general will of the masses ("We have an immense programme of social education before us that must be put into effect very quickly indeed")[56] and the absolute disregard he evinces for certain rights assumed to be inalienable to these same masses ("Do away with les Halles ? Yes!. That must be made quite clear. But does'nt that also mean doing away with thousands of little private businesses? Of course ! ")[57]

Le Corbusier, less confused on the more techinical aspects of these changes -- like, for example, the question of financing the huge building operations implied by his plans. -- delivered himself of long explanations backed up by figures, calculated to show how, once the land was taken over by the authorities and the owners were compensated at current land values, the proclamation of the new, efficient super-densities would dramatically increase the value of land, whose re-sale would then pay for the increased scale of building operations etc. etc. But the clearly harsher implications involved in pursuing some of the other objectives to their logical conclusions, Le Corbusier could not,

55. Le Corbusier, The Radiant City, p. 153.

56. Le Corbusier, The Radiant City, p. 146.

57. Le Corbusier, The Radiant City, p. 116.

would not, or dared not, spell out openly; here, as in the Ville Contemporaine, he sidesteps this ultimate issue by putting the cart before the horse: "The authority will follow the plan, not precede it". And through what magical agency, we are entitled to ask, would the plan then come into being in the first place? Le Corbusier's answer echoes that given to the same question concerning the Ville Contemporaine: it is 'people's' <u>enthusiasm</u> for the happiness clearly implied in the physical plan that will generate the necessary action:

> Yes, AUTHORITY: decisions as pregnant with consequences as a declaration of war. A call to arms in the field of organization. Action and conquest.
>
> First of all, the mobilization of enthusiasm, that electric power source of the human factory. Then, all the other kinds of mobilization that enthusiasm will drive us on to. Mobilization of the land and of people and the production we need to make our plan a reality. Action. The advance. The great advance at last, once the plan is established.[58]

58. Le Corbusier, The Radiant City, pp.344-45.

MARSEILLE - SUD

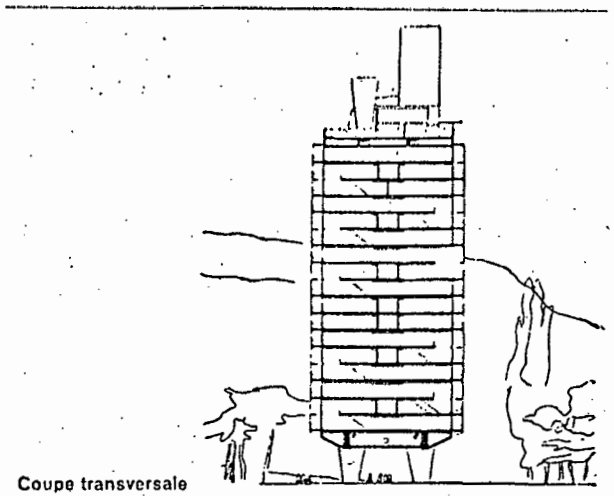
We can reasonably infer from the text, captions and illustrations of the Marseille-Sud project[59] that all the Unités there depicted would be similar in type and size to the one actually realized on the Boulevard Michelet, which is also included in the design (fig. 61, 64). We are also going to assume[60] that the DUs within all these Unités are identical to those projected for the Michelet Unité.

The Unité DUs appear to correspond, in essence, to the intentions apparent in the most evolved DU sketches for the Ville Radieuse (Compare figs. 62 and 63): this schematic correspondence is however, undermined by their considerable difference in size : the 'ideal $10m^2$ p.p. DU of the Ville Radieuse has distended into another 'ideal' DU based on $20m^2$ p.p. This increase in area is the result of a DU envelope that is deeper by 3 meters than the Ville Radieuse block-depth of 18m, and presumably (since the 'poltergeist' Ville Radieuse DU was never fulfilled in the flesh) also wider by some unknown amount.

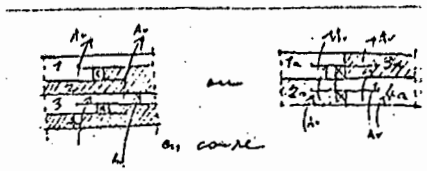
Le Corbusier passes in silence over this doubling of the space co-efficient, continuing to talk of the new DU in terms identical to those used for the earlier DUs.

59. Like many of his urban planning schemes, Marseille-Sud was not commissioned by any authority, but was a self-imposed labour of love. The project is rather wistfully introduced in the Complete Works : "L'entourage à réserver à l'Unité du boulevard Michelet et la sauvegarde de son principe (soleil, espace, verdure) devaient un jour conduire le ministre de la Reconstruction à demander à Le Corbusier de donner son idée sur l'urbanisation de "Marseille-Sud"....
(Le Corbusier, Oeuvre Complète, Vol.V.p99)
The design consequently, has no constraints imposed upon it 'from above' as at Chandigarh for example; its limitations are those accepted and imposed by Le Corbusier himself.

60. This assumption must be qualified: Le Corbusier was also busy in 1951 with his entry for the Strasbourg housing competition in which he proposed two Unités and a circular tower. The DUs for these, as well as the Unités themselves differed in some significant respects from the one built at Marseilles; these differences, mainly omissions, were the result, I assume, of economies imposed either by the brief or by Le Corbusier himself, or by the logic of the specific situation. Le Corbusier's rather guarded discussion of the changes in the Strasbourg Unités, contrasting with his obvious affection for the Marseilles Unité, would seem to suggest that the latter was the preferred example at the time.



Coupe transversale



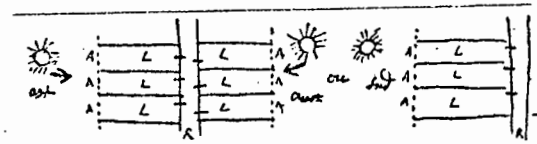
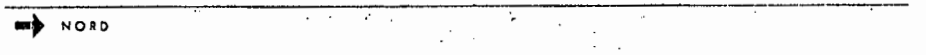
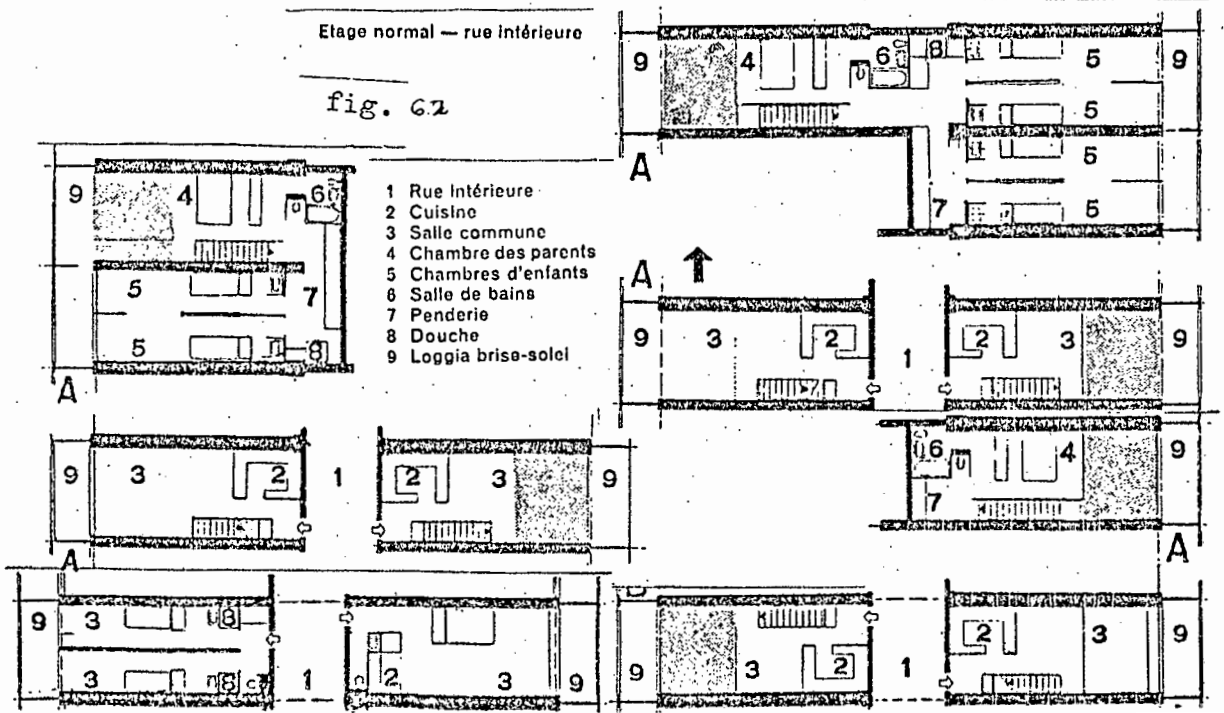


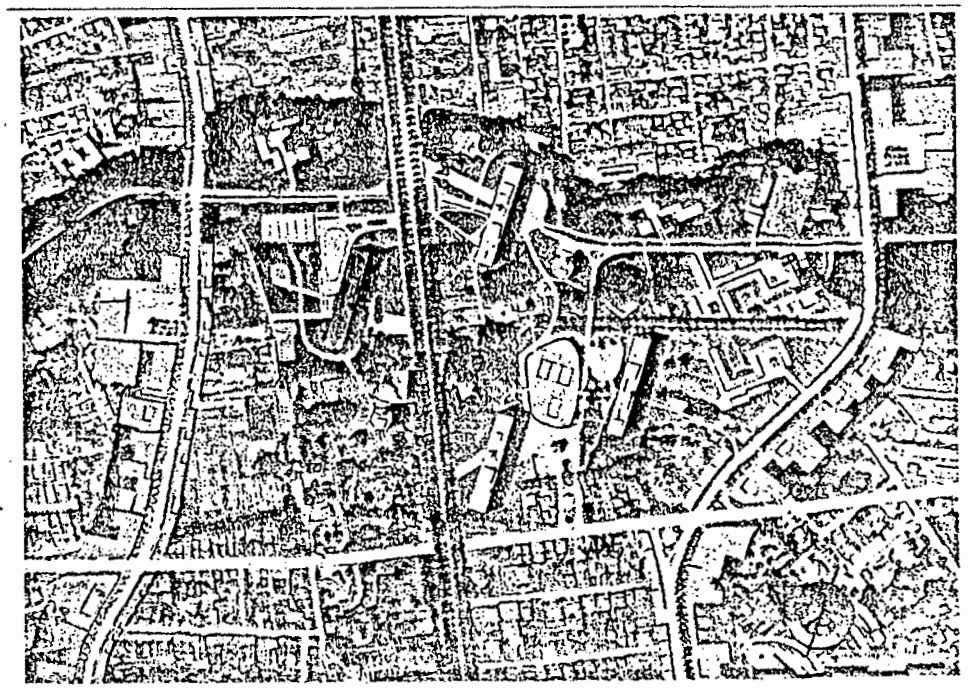
fig. 63



Etage normal — rue intérieure

fig. 62

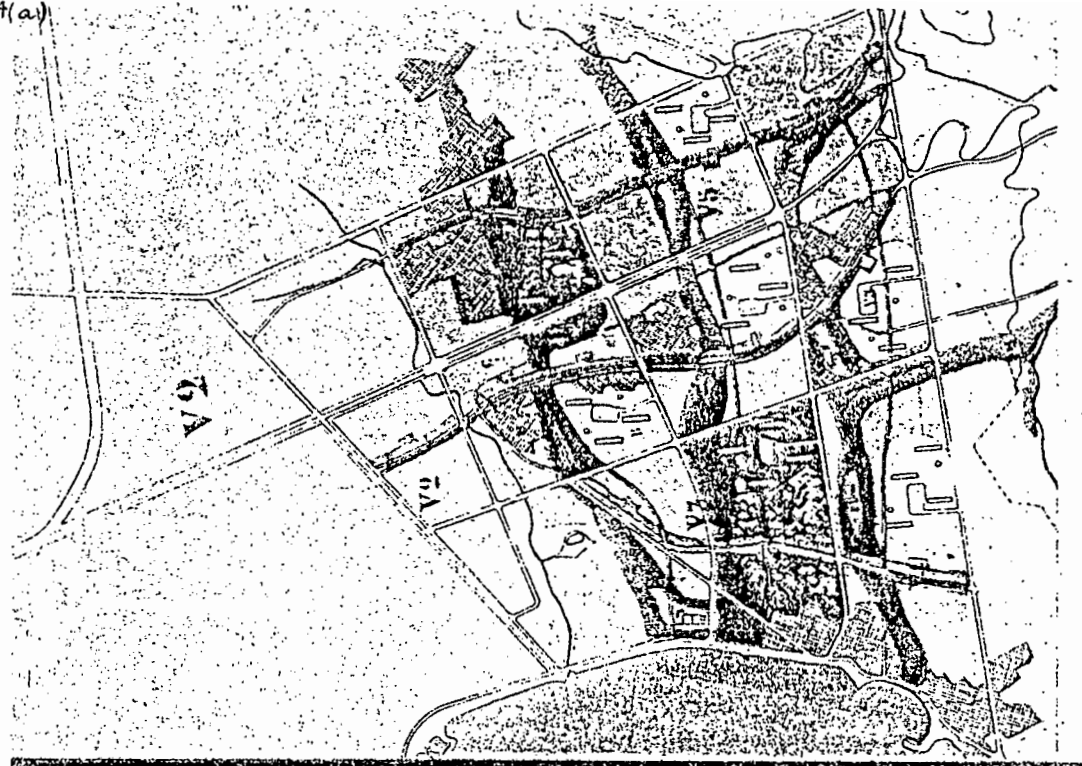




Urbanisation de Marseille-Sud (Michelet)1951. A droite de la route principale l'unité construite

fig. 61

Fig. 64(a)

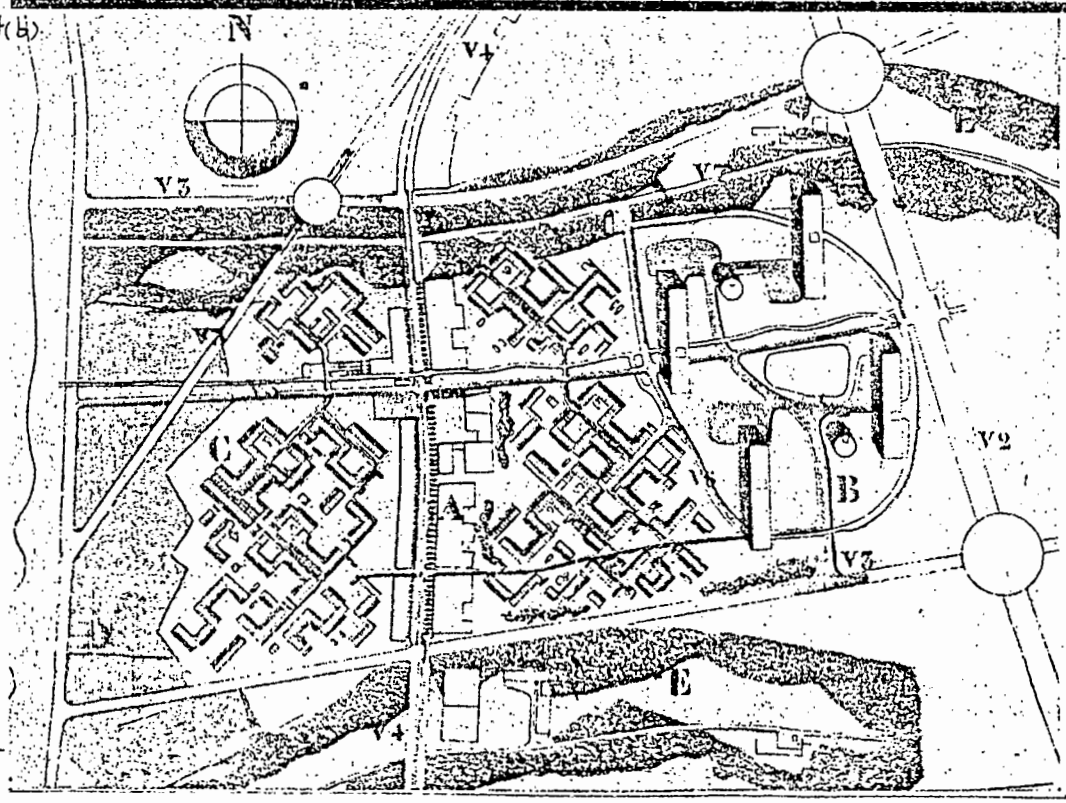


121–1.

Urbanisation de Marseille-Sud (Michelet)
Plan général Volume bâti

Indication à titre d'exemple de l'occupation du terrain par:
a) Unités collectives verticales
b) Maisons familiales avec pelouses communes pour l'enfance

fig. 64(b)



122–4

Urbanisation de Marseille-Sud (Michelet)
Secteur théorique
Circulation

Réseau intérieur
Distribution pour les catégories:
cat. A: V 4 et V 5, circulation lente mixte: autos, piétons
cat. B: a) ramification des V 3 = route, parking garages
b) Alimentation par V 5 et V 6 (autos lent et vélos – orange) par V 5 et V 6 (piétons seuls – jaune citron)
cat. C: a) Alimentation par V 5 et V 6 (autos lent et vélos – orange)
b) Alimentation par V 5 et V 6 (piétons seuls – jaune citron)
cat. E: Alimentation par V 7 (piétons seuls – autos par autorisation)

Marseille-Sud

> L'innovation de l'appartement type "V-R" se trouve dans sa position en travers du bloc bâti, et non en long. Un appartement n'occupe que 3,50m, 4,50m ou 5,50m de la facade. De là, la forte densité atteinte. Jamais l'appartement n'est considéré comme "Minimum". Certaines fonctions peuvent se contenter d'une surface réduite, mais le coeur de l'appartement (la salle) ne doit jamais être une cage. Au contraire: de l'espace .....
> .....
> On arrive même à des types très réduits d'appartements, mais, très amples, toutefois.[61]

[61] Le Corbusier, Oeuvre Complète, Vol. III, p.52

This suppression of factual contrasts between two given designs in order to achieve their correspondence at a more abstract level well exemplifies Le Corbusier's facility and need for rationalizing divergent elements into a 'consistent'package-deal. Rather than allow, for example, that this larger DU constitutes, in its more generous provisions of space, a design that is different and more satisfactory than earlier determinations, Le Corbusier feels constrained to suggest a congruency between the two designs in question.

Judging by the plan of the Unité DU, it may not be immediately apparent that we are in the presence of a new and unexampled amplitude since its extreme length and narrowness (a ratio of approximately 1:6) evoke an impression of constriction (*fig.65*). In actual fact, only the children's bedrooms, when the common partition is closed, could be (and often have been) described as constricting. The

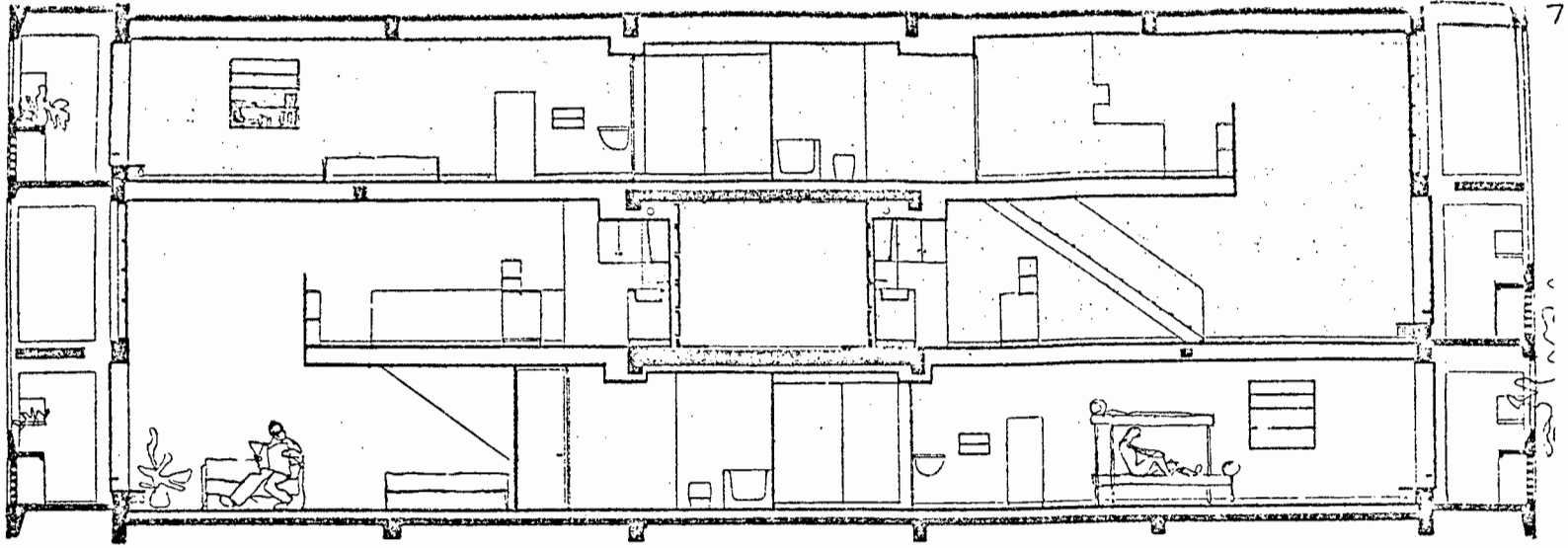
Appartement pour famille de 2 à 4 enfants (type supérieur)

Coupe longitudinale sur une «couple de cases». Une rue intérieure dessert les appartements

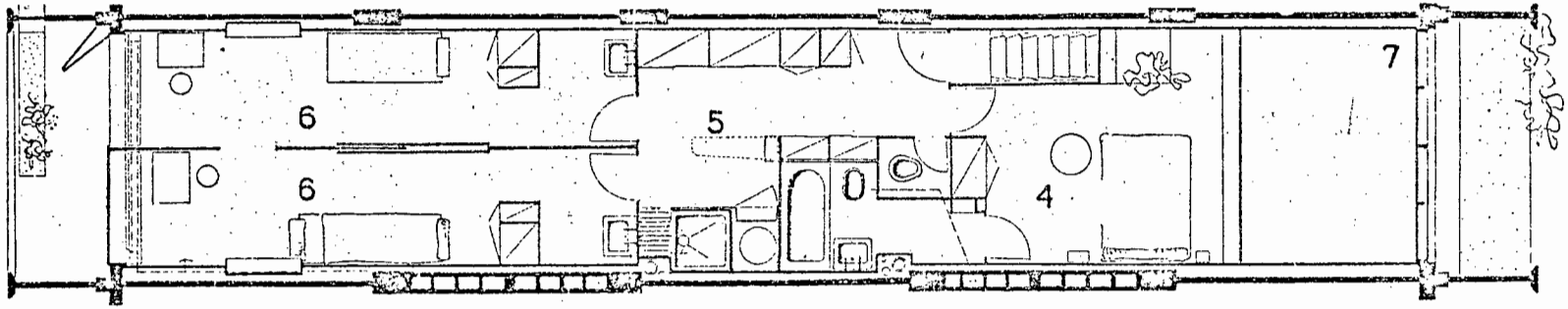
Longitudinal section through a "compartment couple". An interior street serves the apartments

Längsschnitt durch ein «Wohnungspaar». Eine innere Strasse führt zu den Wohnungen

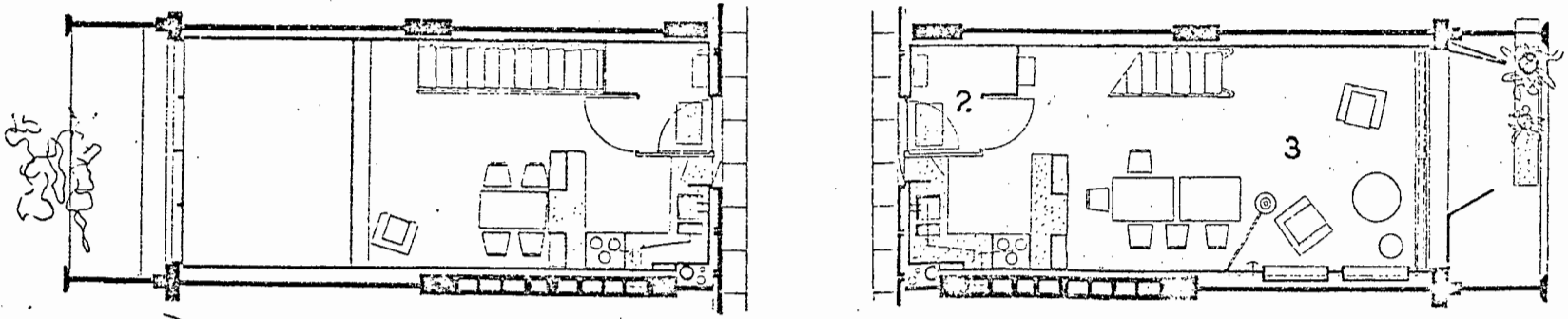
Appartement pour famille de 2 à 4 enfants (type inférieur)



Plan d'appartement type supérieur



1 Rue intérieure
Interior street
Innere Strasse
2 Entrée
3 Salle commune avec cuisine
Living-room with kitchen
Wohnraum mit Küche
4 Chambre des parents avec salle de bains
parents' room with bath
Elternzimmer mit Bad
5 Casiers, penderie, placards, planche à repasser, douche pour enfants
6 Chambres d'enfants
7 Vide de la salle commune



Plan d'appartement type inférieur

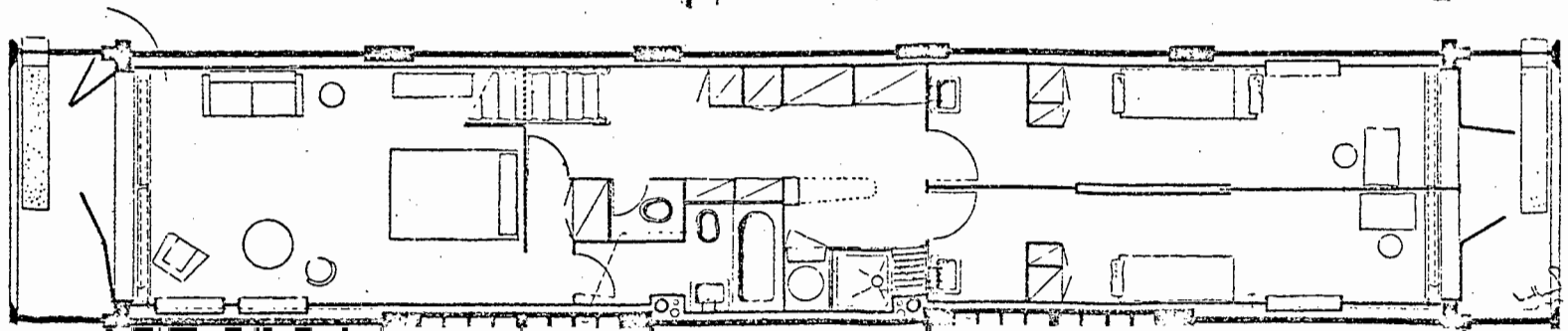


fig. 65

general planning of the DU lays itself open to criticism on the grounds of a different kind of constraint -- that on privacy.

The potential of the large double-storey dwelling unit for a home with more amenities and greater privacy than the humbler dwellings of the Ville Radieuse that were based on the formula of $14m^2$ p.p., are seen to be largely vitiated in execution: the overlooking mezzanines containing either the living/dining rooms ("inferieure"type) or the master bedrooms ("superieure"type) suffer from and create obvious privacy problems; the location of the interior staircase within the living space further violates privacy (especially if one concedes that, as in the Ville Radieuse, the living room, by virtue of its close connection with the main bedroom, is an extension of the parents' realm); while opportunity for greater spaciousness in the childrens' domain has been provided by means of a sliding partition, this is at the cost of privacy and soundproofing; the kitchens have little opportunity for modifying an open relationship with the living/dining space.

In making such an issue of privacy, one is not being captious or arbitrary; Le Corbusier considered each man's right to "meditation in a new kind of dwelling, a vessel of silence and lofty solitude" a pre-requisite for "healthy mental activity"(fig 66) On numerous occasions, he cited with deep approval Pascal's apophthegm: "the despair that, always, results for men from the inability to remain long enough in their own rooms".[62] The derogation of

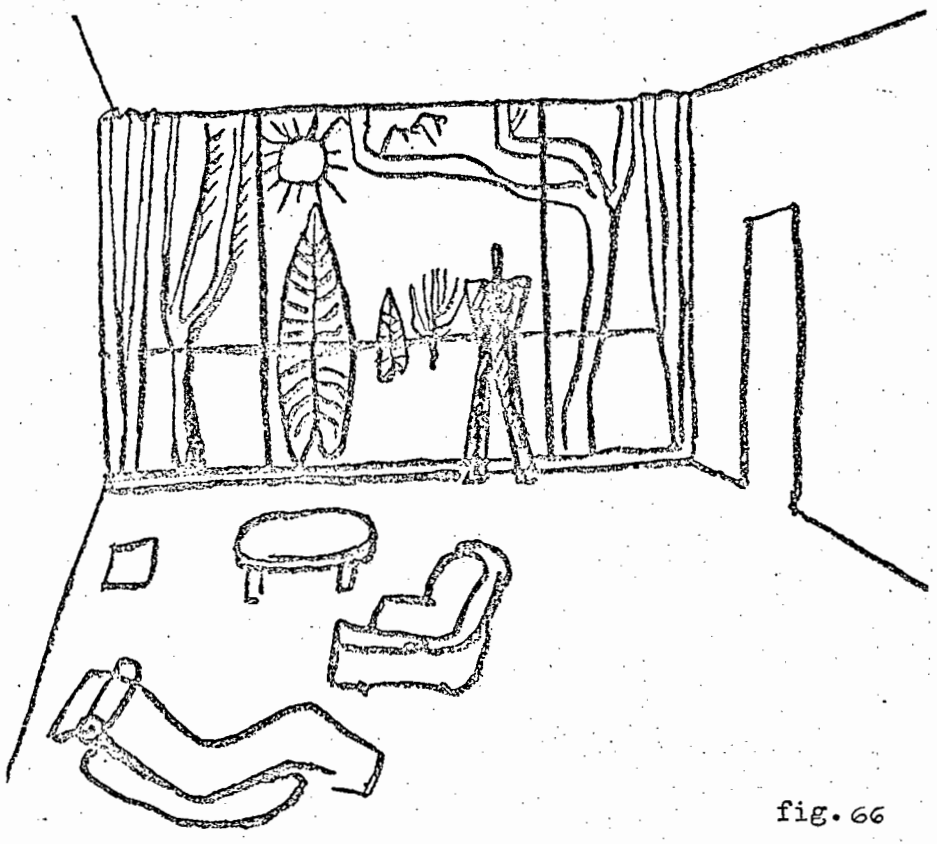


fig. 66

62. Le Corbusier, The Radiant City, p. 67.

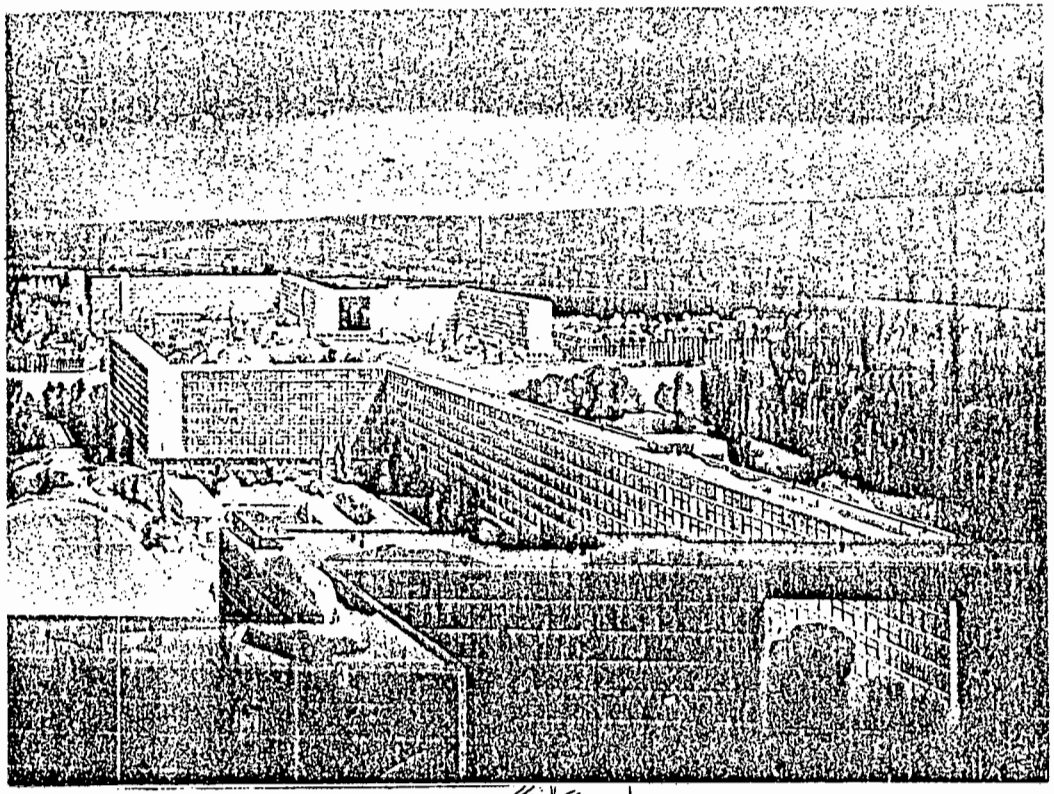
privacy implicit in the design of the Unité DU constitutes, therefore, a very serious instance of self-contradiction on Le Corbusier's part.

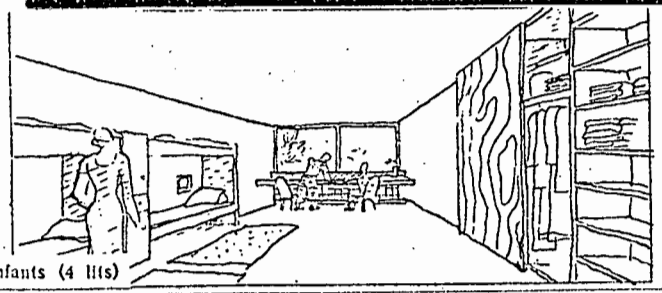
Such shortcomings are surprising in view of the adroit handling of similar issues in the Ville Radieuse DUs; they are even more unexpected when we set the Unité DUs against their direct precursors, the dwellings of Le Corbusier's project of 1936 for Paris' 'diseased' Îlot No. 6 (*figs. 67-71*).

Here, within a DU area more or less equal to that of the Unité DU,[63] all the aforementioned problems are resolved; mezzanine spaces can afford to seal themselves off from spaces below, or at least modify their open relationship with these, since they have access to their own light and ventilation; the staircase, now dog-legged, is neutrally placed within the DU and is closely related to apartment access; the childrens' bedrooms having proportions different from those of their counterparts in the Unité DU do not need a sliding partition to create the kind of space that games or group-entertainment require; the kitchens, separate from the living/dining space and with a neutral access of their own, have direct light and ventilation from the external window wall. The ability of the Îlot Dus to achieve these resolutions is clearly a function of their width advantage of one to two metres over the Unité DUs which are only 3.66m (12feet)wide.

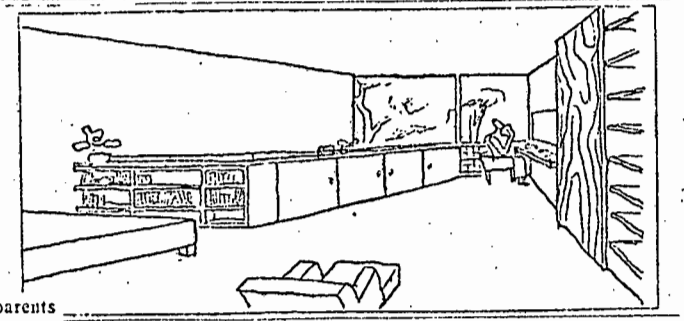
In a preliminary scheme for the Marseille Unité (*fig. 72*) Le Corbusier attempted to introduce some of the Îlot DU's benefits into the narrower Unité envelope, as well

63. The plans are drawn to the larger of the accompanying dimensions. The smaller result in a DU area of $91m^2$ for the basic crossover-type DU; the same Unité DU's area is $98m^2$.



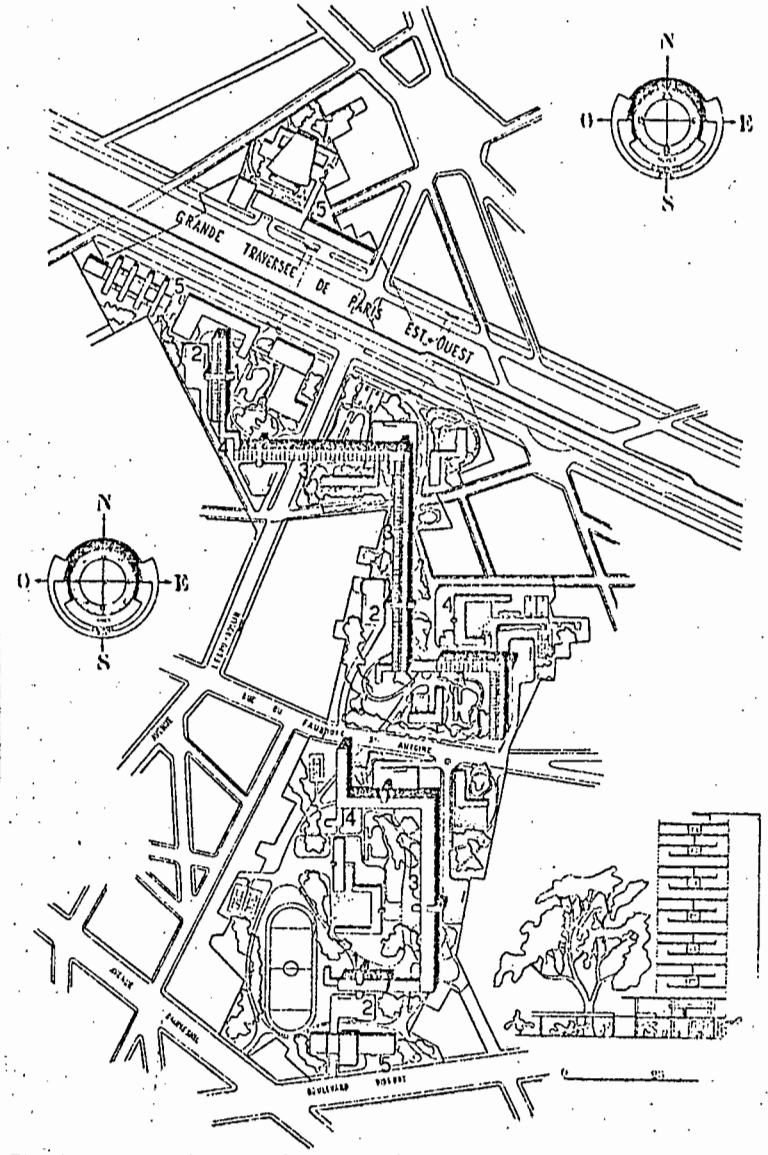


chambre d'enfants (4 lits)



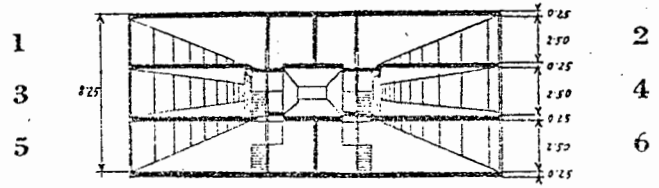
chambre des parents

1 Halls d'entrée et services verticaux
2 Autosports
3 Logis (au soleil)
4 Crèche
5 Edifices publics



Plan à niveau des étages et des toitures (selon programme du 6e Congrès CIAM 1939)

fig. 67

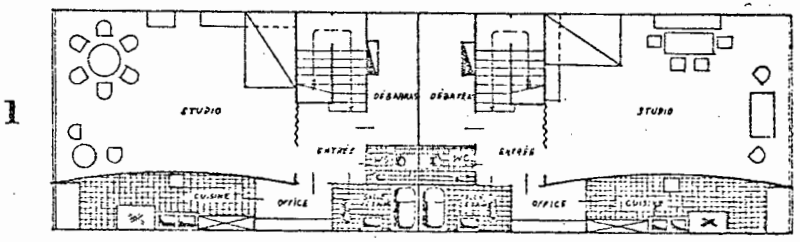


Type IV

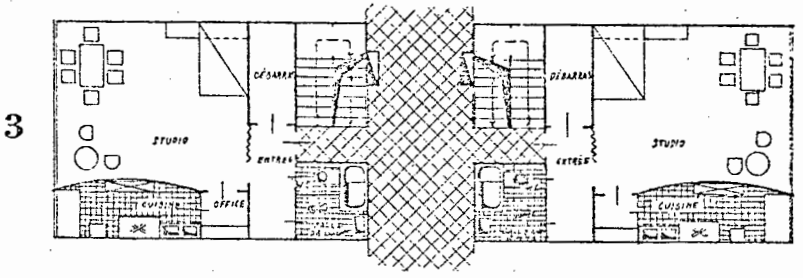
Appartements à 2 ou 3 personnes) par travées de 5,50 m :

Nombre d'habitants	60
Nombre d'appartements	30
Nombre des couloirs	5
Hauteur totale du bâtiment, non compris pilotis et services communs	41,25 m
Cube total (sans services communs)	4310,63 m³
Surface habitable	1384,30 m²
Cube des appartements	3460,75 m³
Surface d'un appartement	46,20 m²

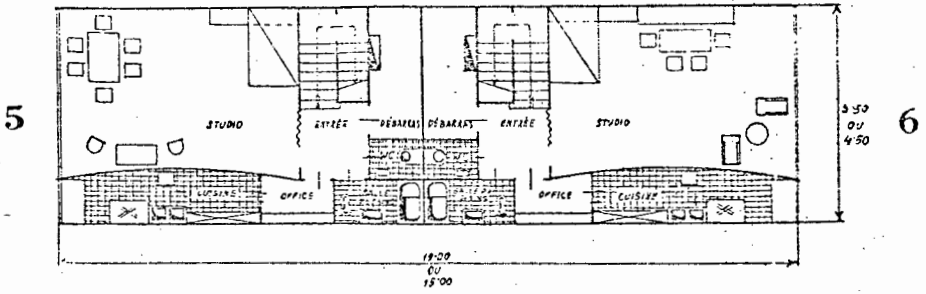
Nord



Etage supérieur

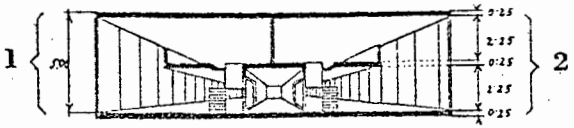


Etage médian



Etage inférieur

fig.68

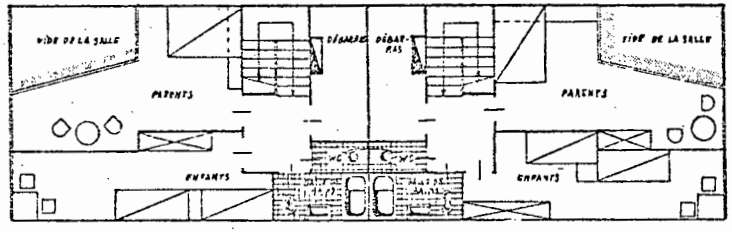


Type III

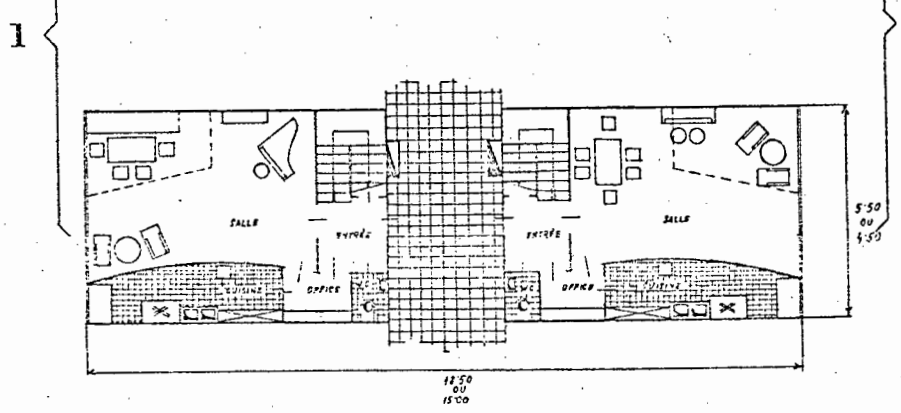
(Appartements à 4 personnes) par travées de 5,50 m :

Nombre d'habitants	64
Nombre d'appartements	16
Nombre des couloirs	8
Hauteur totale du bâtiment, non compris pilotis et services communs	40,00 m
Cube total (sans services communs)	4060,00 m³
Surface habitable	1403,84 m²
Cube des appartements	3378,00 m³
Surface d'un appartement	88,00 m²

Nord



Etage supérieur

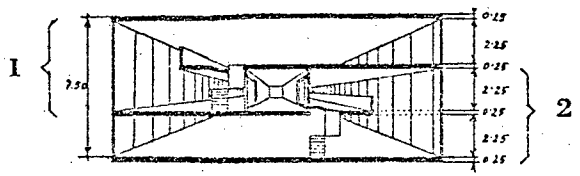


Etage inférieur

Appartements Est-Ouest

La surface nécessaire pour un habitant varie de 15,2 m² à 23,1 m²

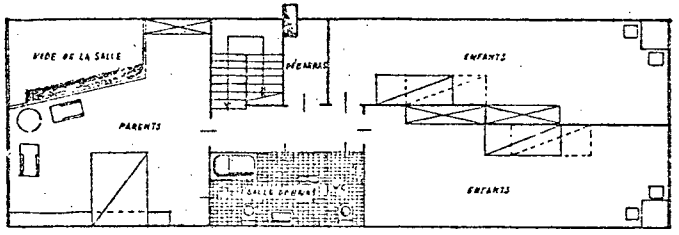
fig. 69



Type I

(Appartements à 6 personnes) par travées de 5,50 m:

Nombre d'habitants	60
Nombre d'appartements	10
Nombre des couloirs	5
Hauteur totale du bâtiment, non compris pilotis et services communs	37,50 m
Cube total (sans services communs)	3500,00 m³
Surface habitable	1250,00 m²
Cube des appartements	2968,00 m³
Surface d'un appartement	125,00 m²

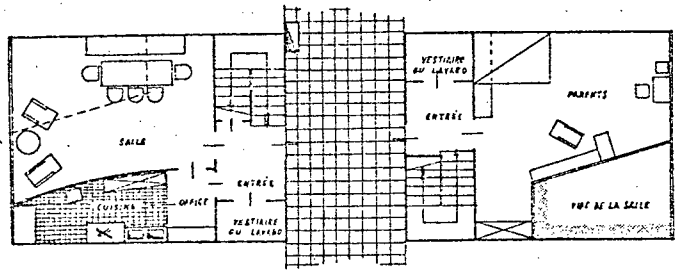


Etage supérieur

Nord

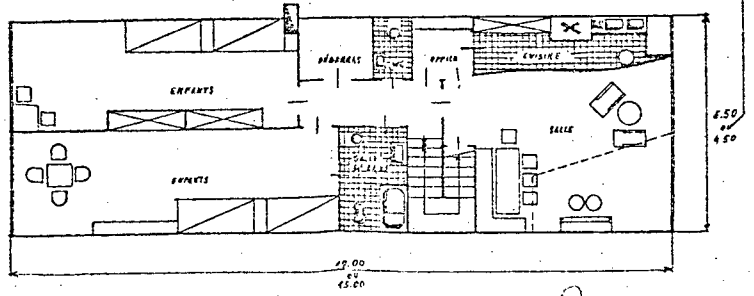
un appartement

1



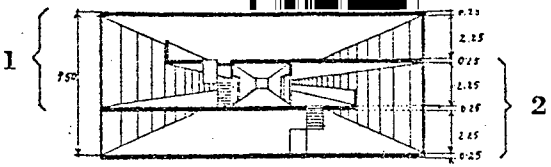
Etage médian

2



Etage inférieur

fig. 70



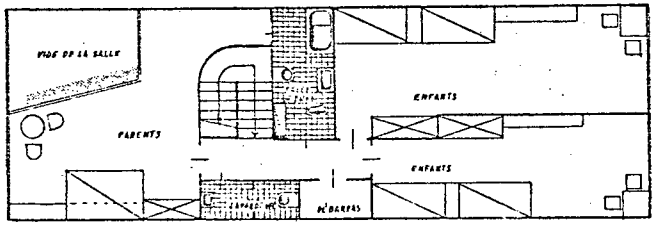
Type II

(Appartements à 6 personnes) par travées de 5,50 m:

Nombre d'habitants	60
Nombre d'appartements	10
Nombre des couloirs	5
Hauteur totale du bâtiment, non compris pilotis et services communs	37,50 m
Cube total (sans services communs)	3403,13 m³
Surface habitable	1200,55 m²
Cube des appartements	2878,00 m³
Surface d'un appartement	120,05 m²

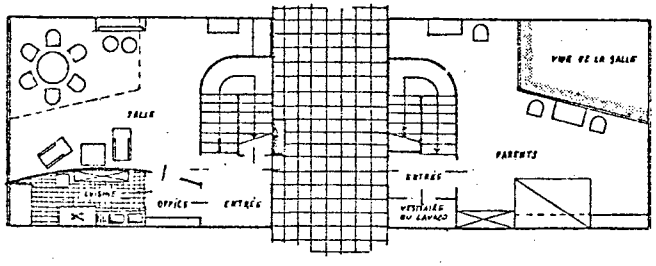
Nord

un appartement



Etage supérieur

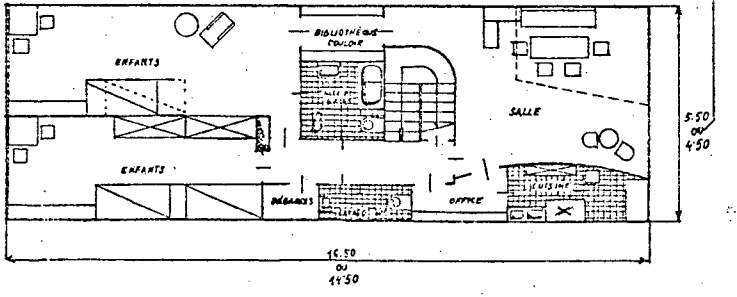
1



Etage médian

un appartement

2

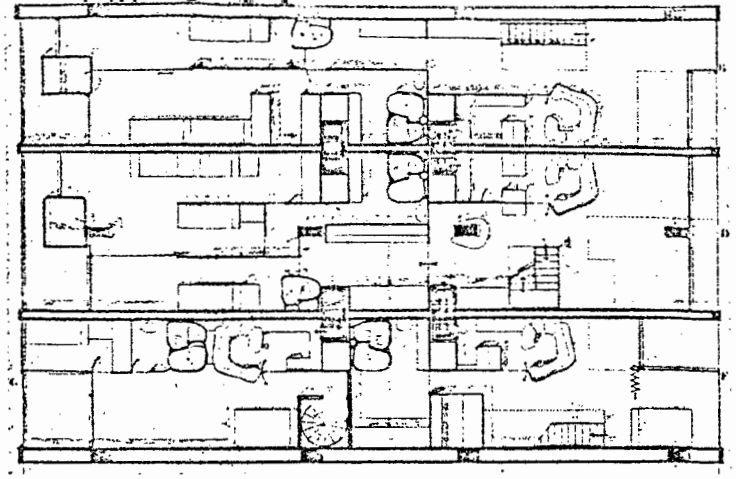


Etage inférieur

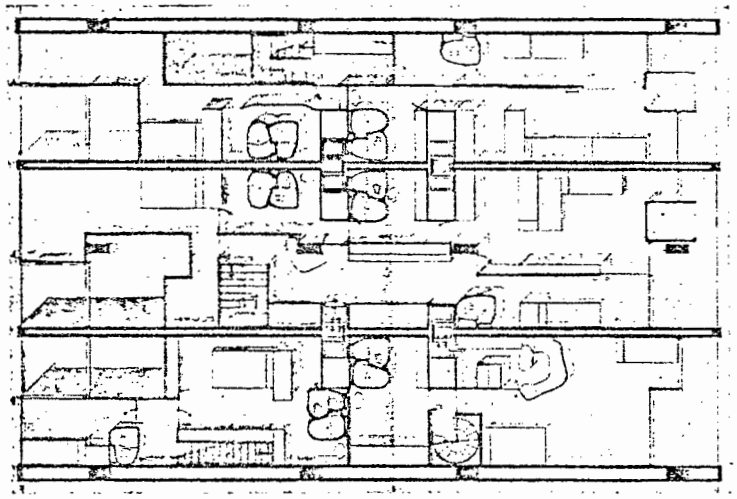
fig. 71

projecting a wider DU type. But none of these efforts nor any of the other richly inventive aspects of this planning scheme, were read back into the final Unité plans.

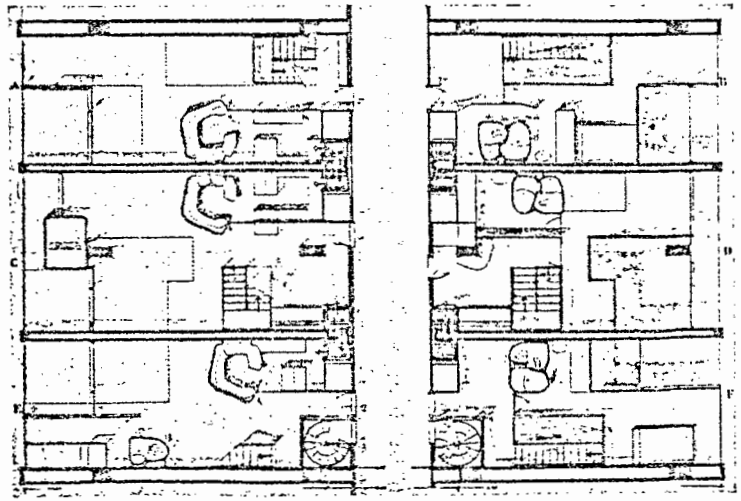
At about the same time that Le Corbusier was drawing up the final Unité DU plans, his cousin and ex-comrade-in-arms, Pierre Jeanneret, was presenting similar proposals relating to an apartment house project *(figs. 73-75)* whose DUs were based on a larger width module (18feet) the advantages of which they clearly demonstrated. These DUs combined some of the flexibility of the earlier single-storey Ville Radieuse type DUs with the double-volume and double orientation benefits of the Unité-type solution. And all this was achieved with a considerably tighter space co-efficient than the $20m^2$ per person of the Unité DUs- viz. $14m^2$ per person, the same as for the early Ville Radieuse DUs. Jeanneret's DU range, in addition, permitted of an increase in the size of the living/dining space as the number of bedrooms increased something of which the inherent geometry of both the îlot and the Unité DUs did not allow. This same geometry further conceals a pitfall, this time unconnected with the DU width, which the Unité DU does not succeed in avoiding, despite the fact that in both the îlot DU and the preliminary Unité DUs, Le Corbusier made the necessary adjustments within the sectional interlock's geometry. These adjustments were to the end of ensuring that the mezzanine space was always used as the parents'



Niveau 3 / Level 3

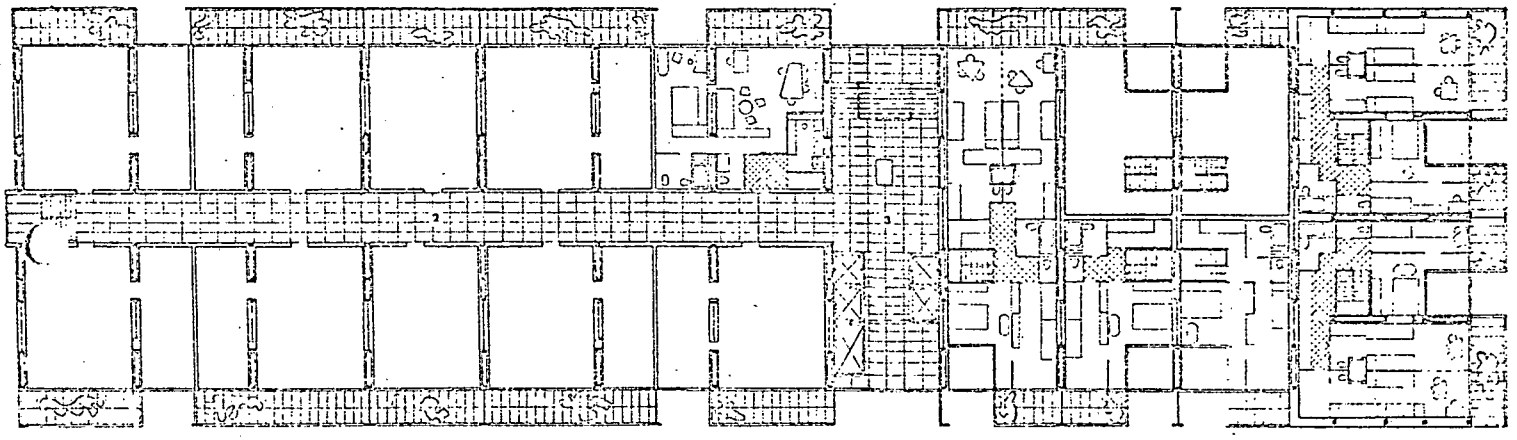


Niveau 2 / Level 2



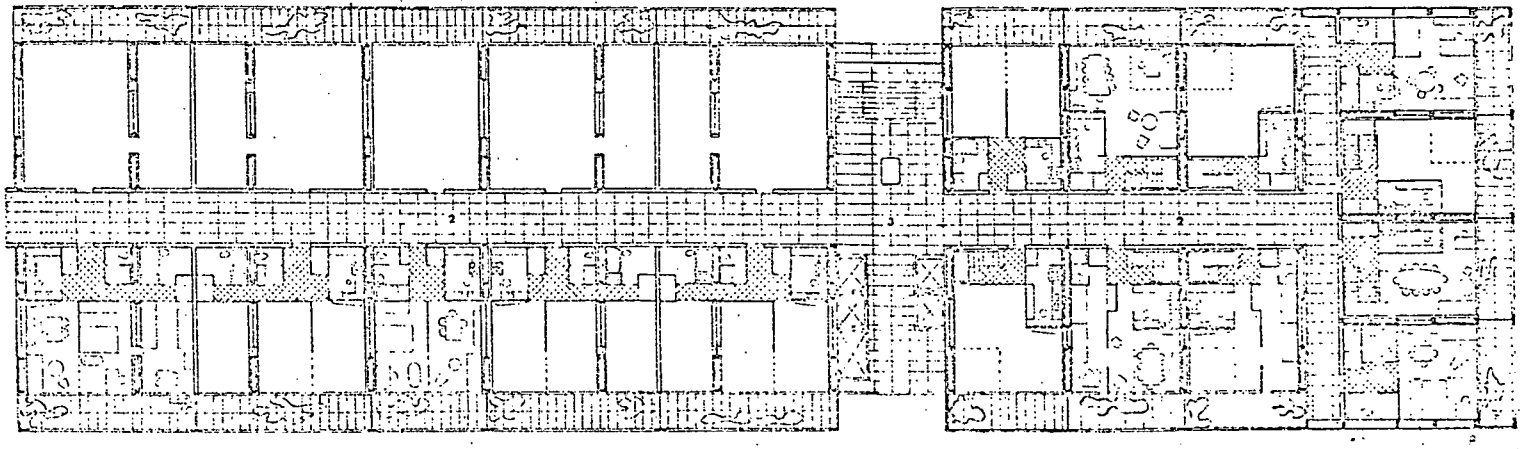
Niveau 1 avec rue intérieure / Level 1 with internal street

fig. 72



PLANS DES ETAGES PAIRS.

← Appartement sur un plan. → ← Appartement sur 1 et 2 plans. →



PLANS DES ETAGES IMPAIRS.

1. Escalier de service. — 2. Dégagement. — 3. Hall.

fig. 73

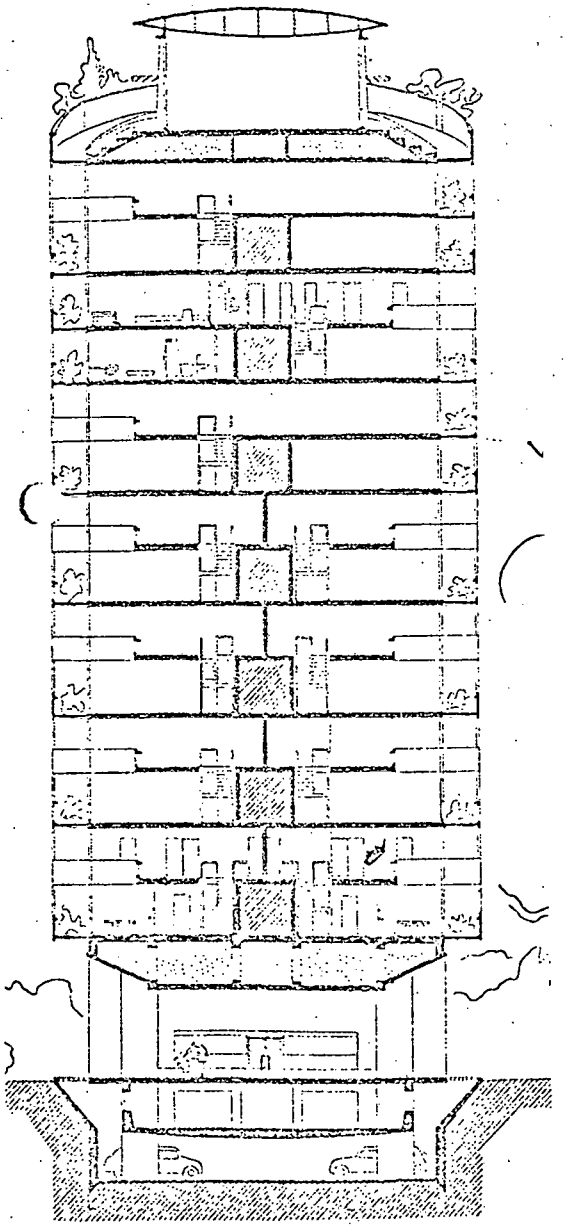
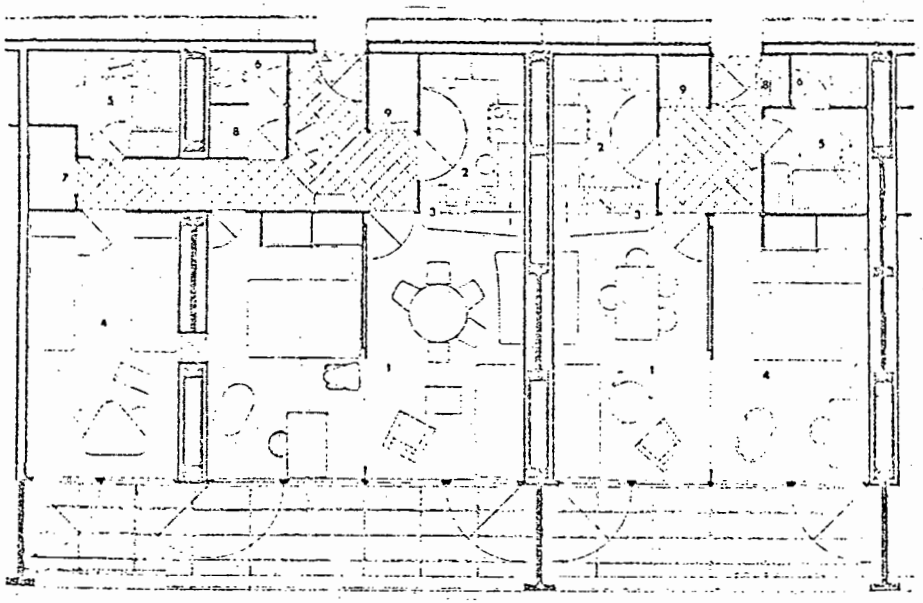


fig. 74

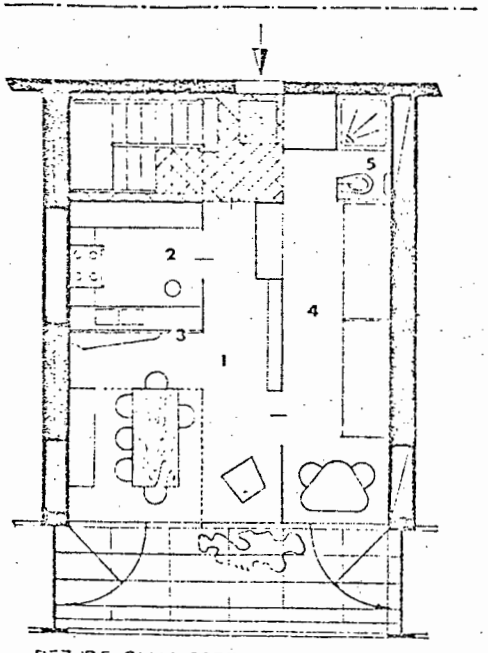
1. Salle commune. — 2. Cuisine. — 3. Cloison vitrée. — 4. Chambre. — 5. Cabinet de toilette comprenant soit un bloc bac-douche, soit une baignoire. — 6. W.-C. — 7. Rangement. — 8. Vestiaire.



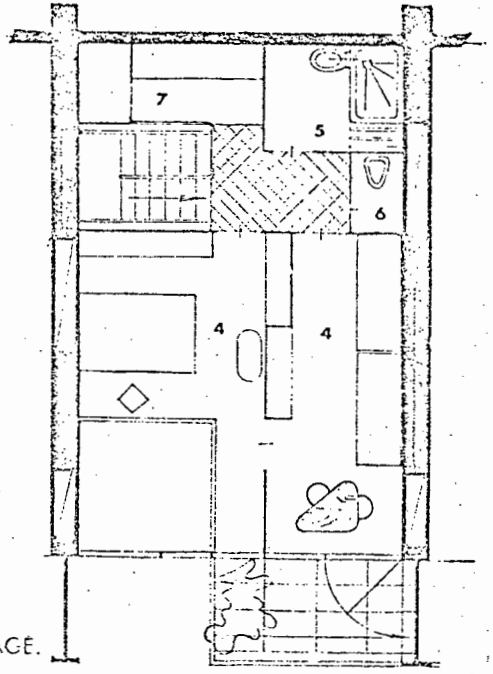
APPARTEMENT A 2 NIVEAUX.

PLANS DES APPARTEMENTS TYPES

L'ARCHITECTURE D'AUJOURD'HUI



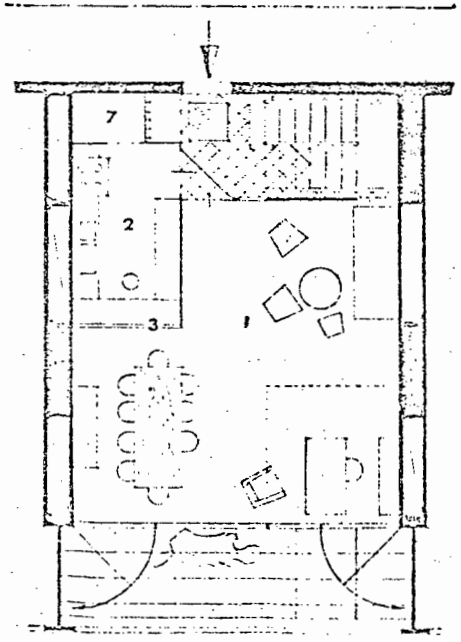
REZ-DE-CHAUSSEE.

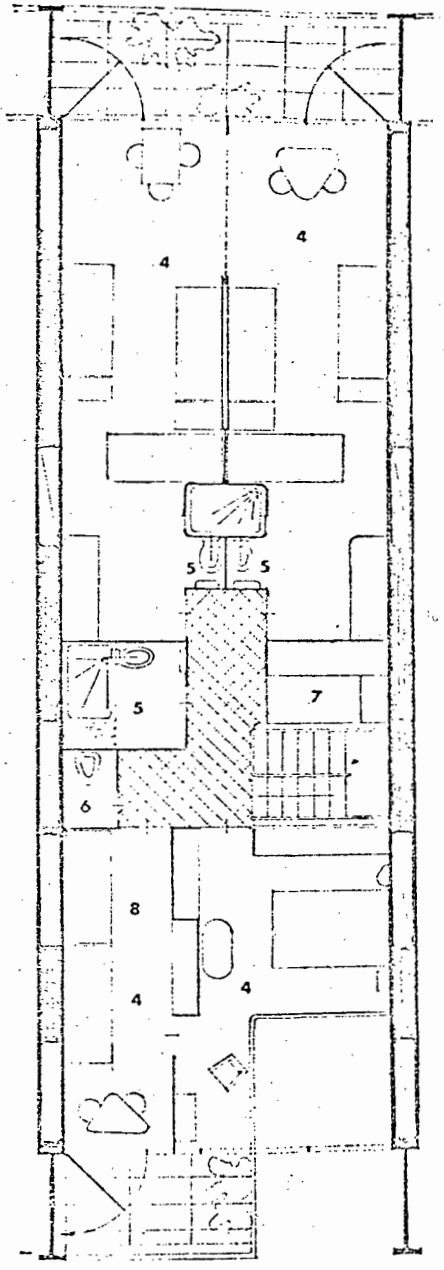


ETAGE.

APPARTEMENT A DEUX NIVEAUX.

REZ-DE-CHAUSSEE.





ETAGE.

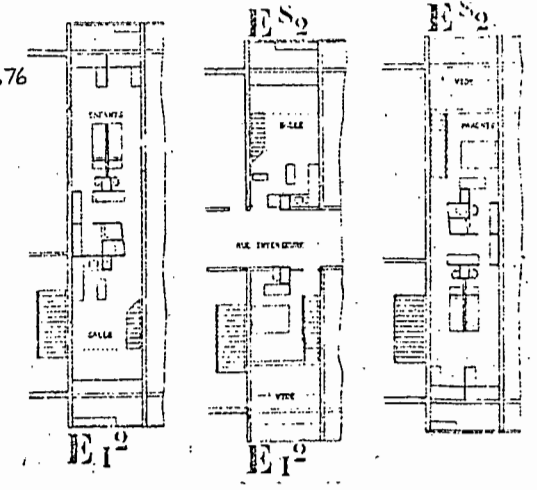
fig. 75

bedroom, while the remainder of the apartment was differentially organized according to whether it ran above ("superieur" type) or below ("inferieure" type)the interior street. In the Unité however, the play layout of DUs is identical for both "superieure" and"inferieure" types, irrespective of the obvious inequalities that result. To half these DUs, then, the nobility, "the sense of the sacred"* which was meant to be introduced into each home through the instrumentality of the double-volume living-room would simply not apply.

The selectivity of Le Corbusier's allusions to the Unité DUs betrays his awareness of the fault -- the "superieure" type is always the one that is described and illustrated. This obvious shortcoming in his design remained uncorrected for twenty years till he came to build his fifth and last Unité at Firminy in 1960 (*fig.76*). In the intervening Unités the problem was simply eliminated by the disappearance of its cause -- the DUs double volume.[64] The dictates of economy and, perhaps too, a private admission by Le Corbusier of the mezzanine's obvious disadvantages, persuaded him to accept this thrust at the very heart of his doctrine for dwellings.

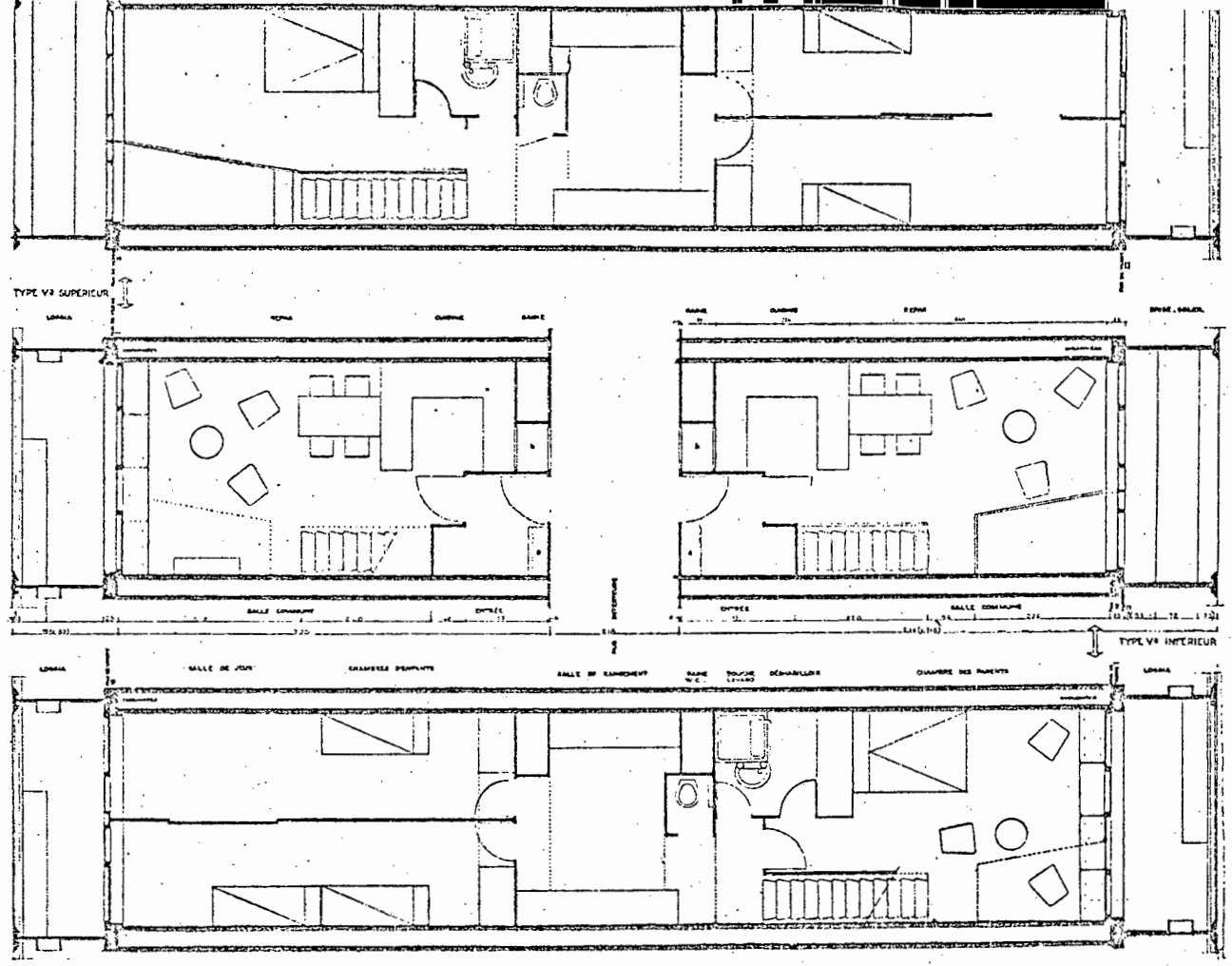
In mitigation of the rather unfavourable verdict which appears to be rendered upon the Unité DU when compared with some of its prècursors, one may point to the Unité's provision of private open space in the form of loggias, an

fig.76



* Le Corbusier, Mise au Point, p.31.

64. It is not strictly true to say the the double volume was eliminated; Le Corbusier claimed that it had really just been to the side of the staircase; Speaking of these modified DUs in the 1951 Strasbourg Unité (*fig 77*), Le Corbusier said : "Par rapport aux appartements type E de l'Unité de Marseille, la différence essentielle est la suivante: la chambre des parents va jusqu'au pan de verre, le vide de double hauteur étant latéral, côté escalier."
(Le Corbusier, Oeuvre Complète, Vol.V,p.106.) This is a rather hollow claim (*fig 78*); the former glory is gone (*figs.79,80*).



Plan d'un appartement type V supérieur et d'un appartement type V inférieur, type le plus nombreux pour famille de 2 à 4 enfants.

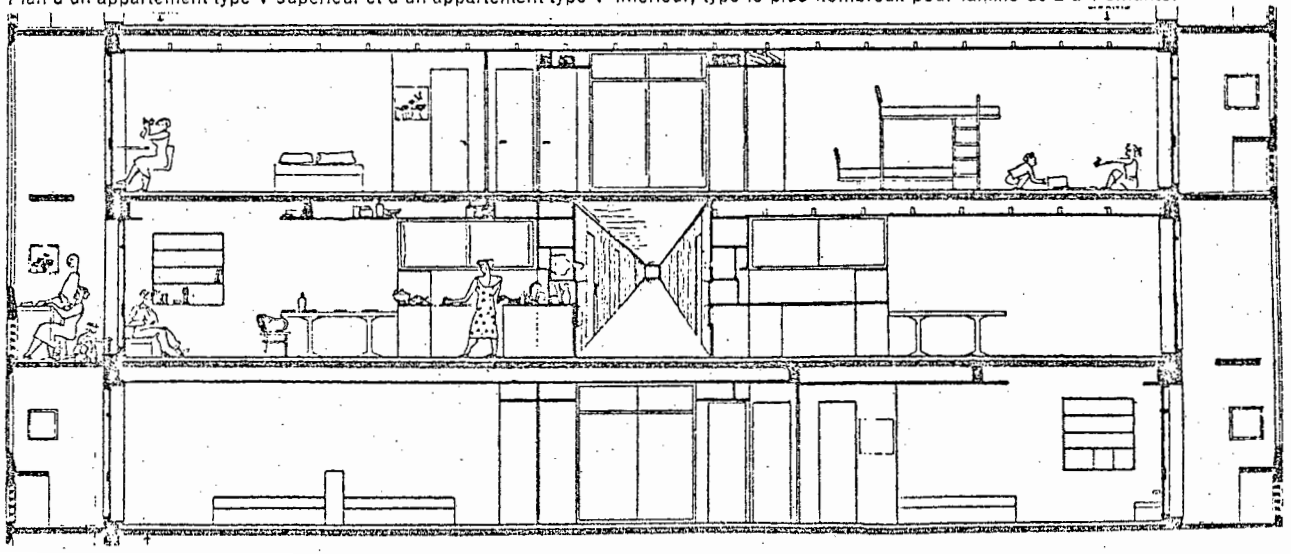


fig. 77

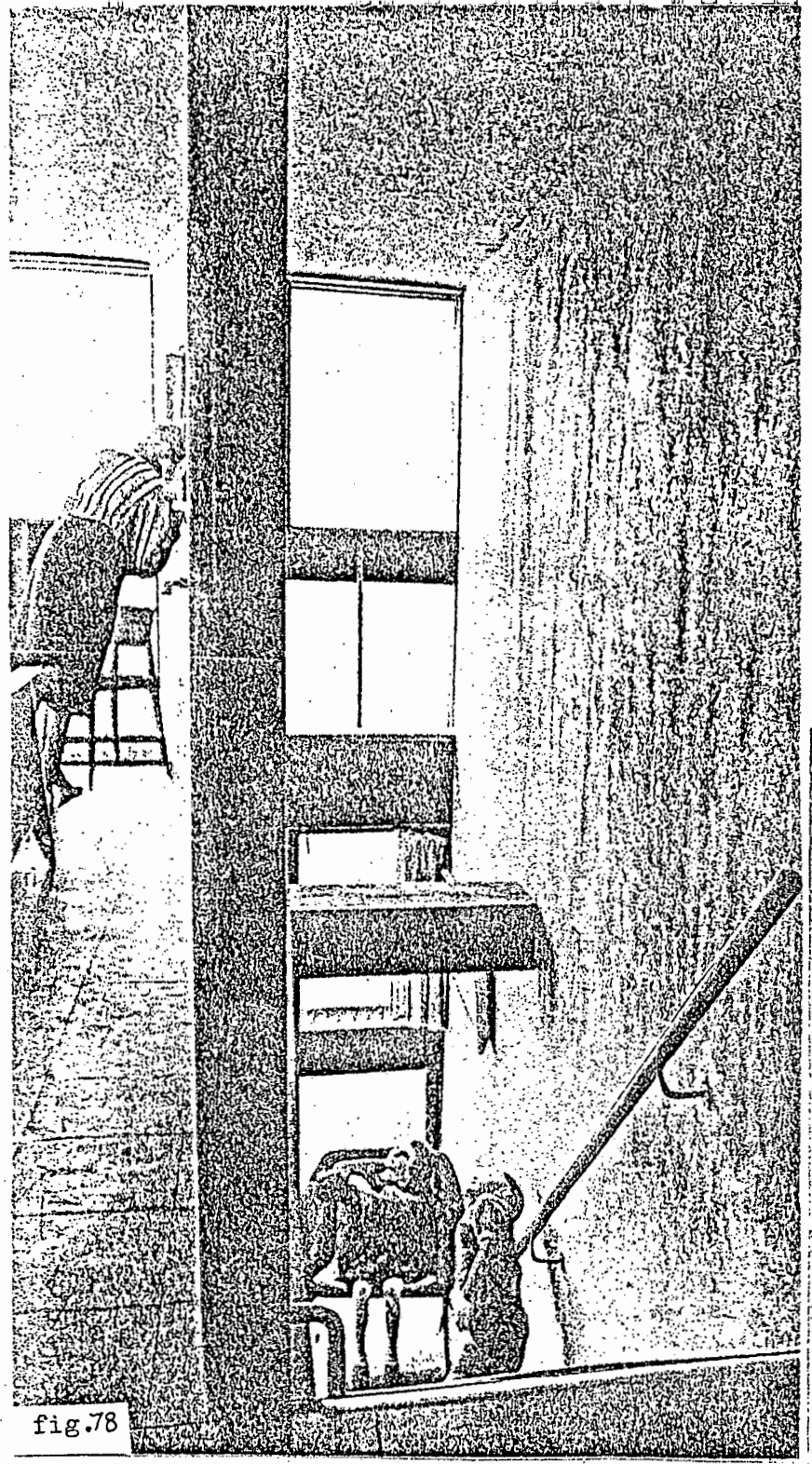


fig.78

fig. 79

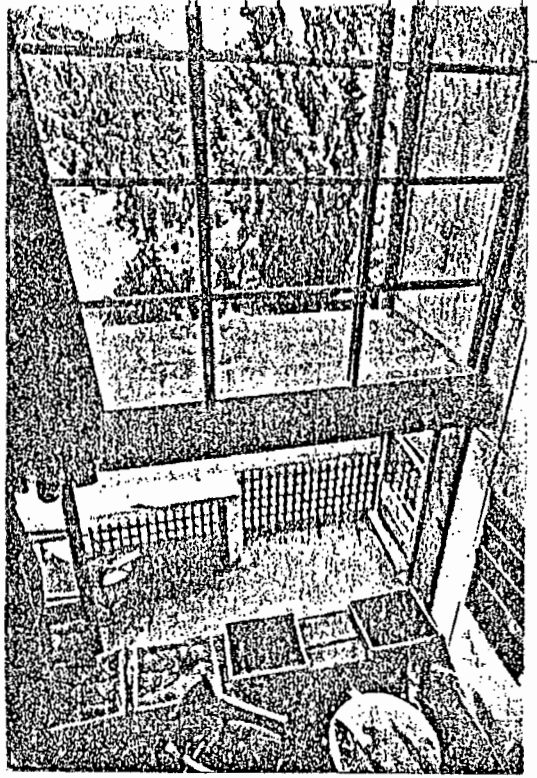
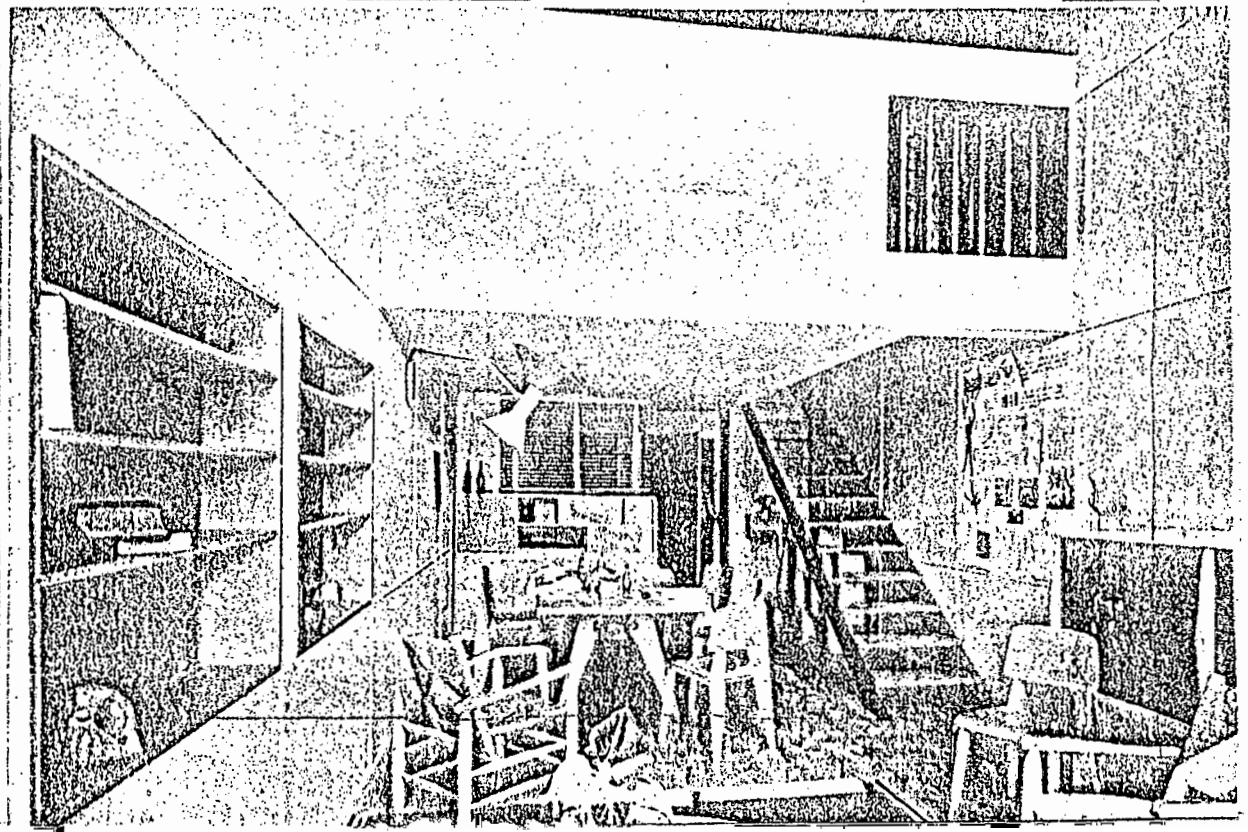


fig.80



amenity available in neither the Ville Radieuse nor Îlot scheme.

Though Le Corbusier made great play of this innovation, the loggia, in point of fact, was not motivated by the desire to provide private open space, but resulted from his taking advantage of the need for brise-soleil. That this is the order of priorities is borne out by Le Corbusier's own review of the invention of the brise-soleil, where, with an accompanying explanatory drawing (*fig. 81*), Le Corbusier avers that:

> ...des locaux de hauteurs différentes qui sont protégés par un brise-soleil proportionné. (22)a) Par exemple: en a, le local étant très haut, le brise-soleil est plus profond pour qu'il puisse produire son effet.... (22)b) En b, la hauteur étant plus faible, le brise-soleil est réduit proportionnellement. [65]

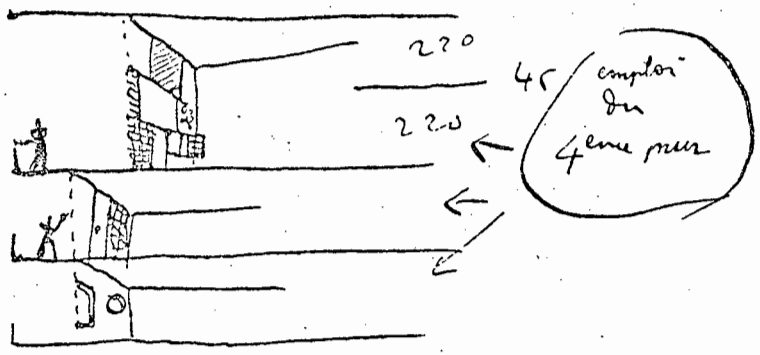


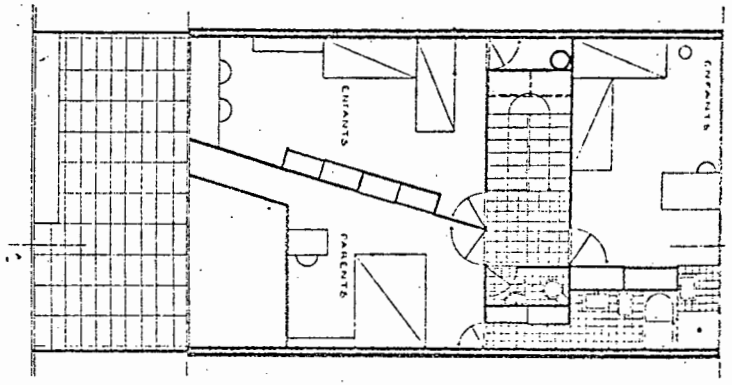
fig. 81

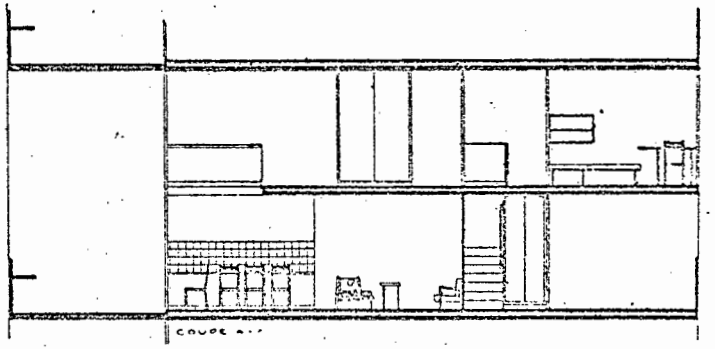
65. Le Corbusier, Oeuvre Complète, Vol. IV, p.107.

This principle is evident already in the design of an apartment house in 1939 (*fig. 82*). In the Unité, by contrast through inserting an intermediate horizontal louvre, Le Corbusier 'saved' himself terrace space. Even so, in terms of Le Corbusier's brise-soleil principle, the terrace should have been 8 feet deep rather than 4, since the loggias depth was calculated initially on the assumption that two louvres would be used, but one was removed in execution (*Cf. figs. 84 & 85*), presumably as a trompe-l'oeil to reduce the apparent height of the building. We have obviously travelled a long way from Le Corbusier's 'urban garden in the air' of the Immeubles Villas. [66]

66. Even the generous outdoor terraces of the 1933 Durand setback appartments (*fig. 83*) will be seen, on examination, to have their origin not in any desire for private open space, but in the wish to secure simultaneously the benefits of both view and sun which, as it happened, lay in opposite directions.

Un appartement courant
A cross-wall flat





La coupe
The section

La galerie
The gallery

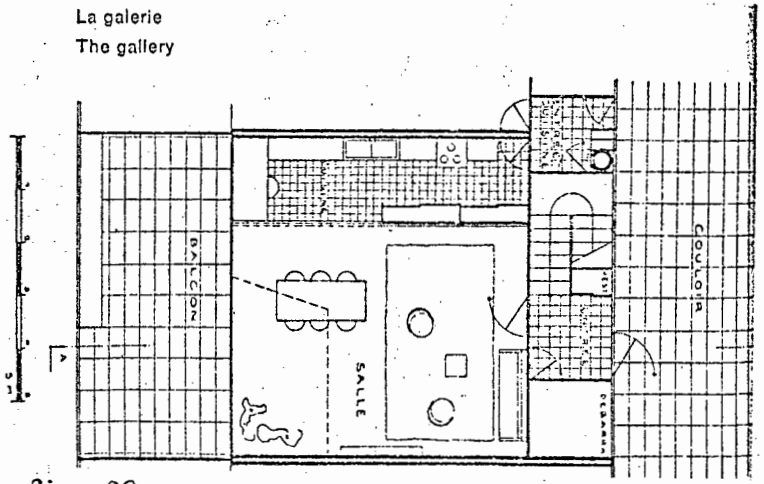
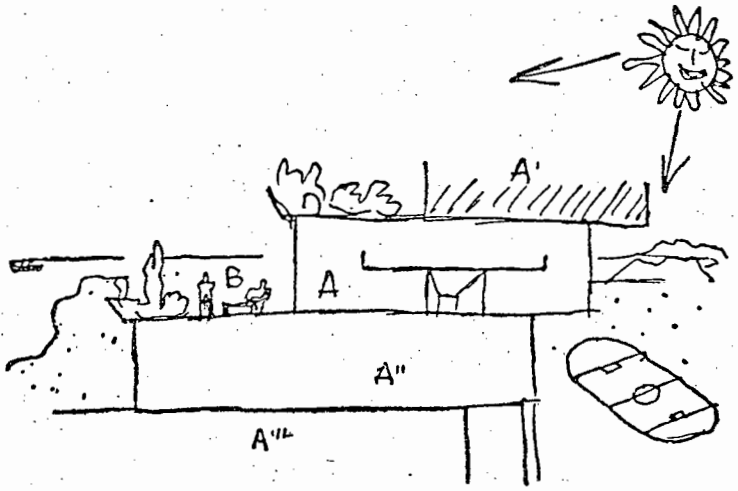


fig. 82



These technical conquests, when subjected to the law of the African sun, can take an unexpected form. The entire section of this edifice is ruled by the sun, the landscape, and the aim of giving to each dweller pleasures hitherto the prerogative of certain princes : an exceptional dwelling.

A : the apartment reached by the interior road ;
B : its outside extensions. Sport on the ground : the horizon is present every minute in life.

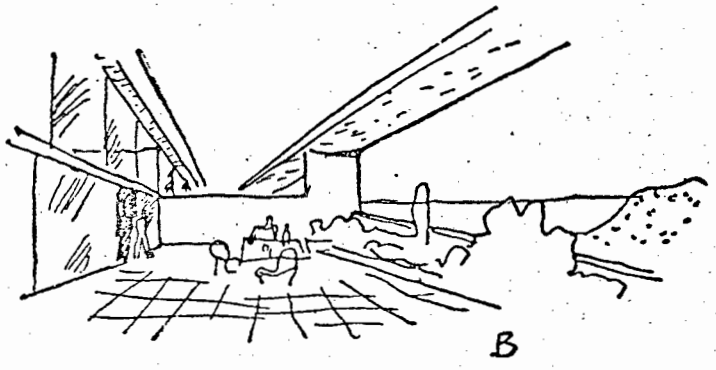
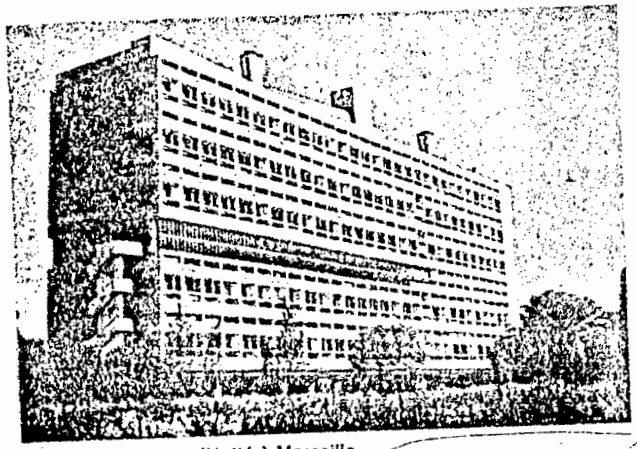


fig. 83



La façade ouest de l'Unité à Marseille

fig. 85

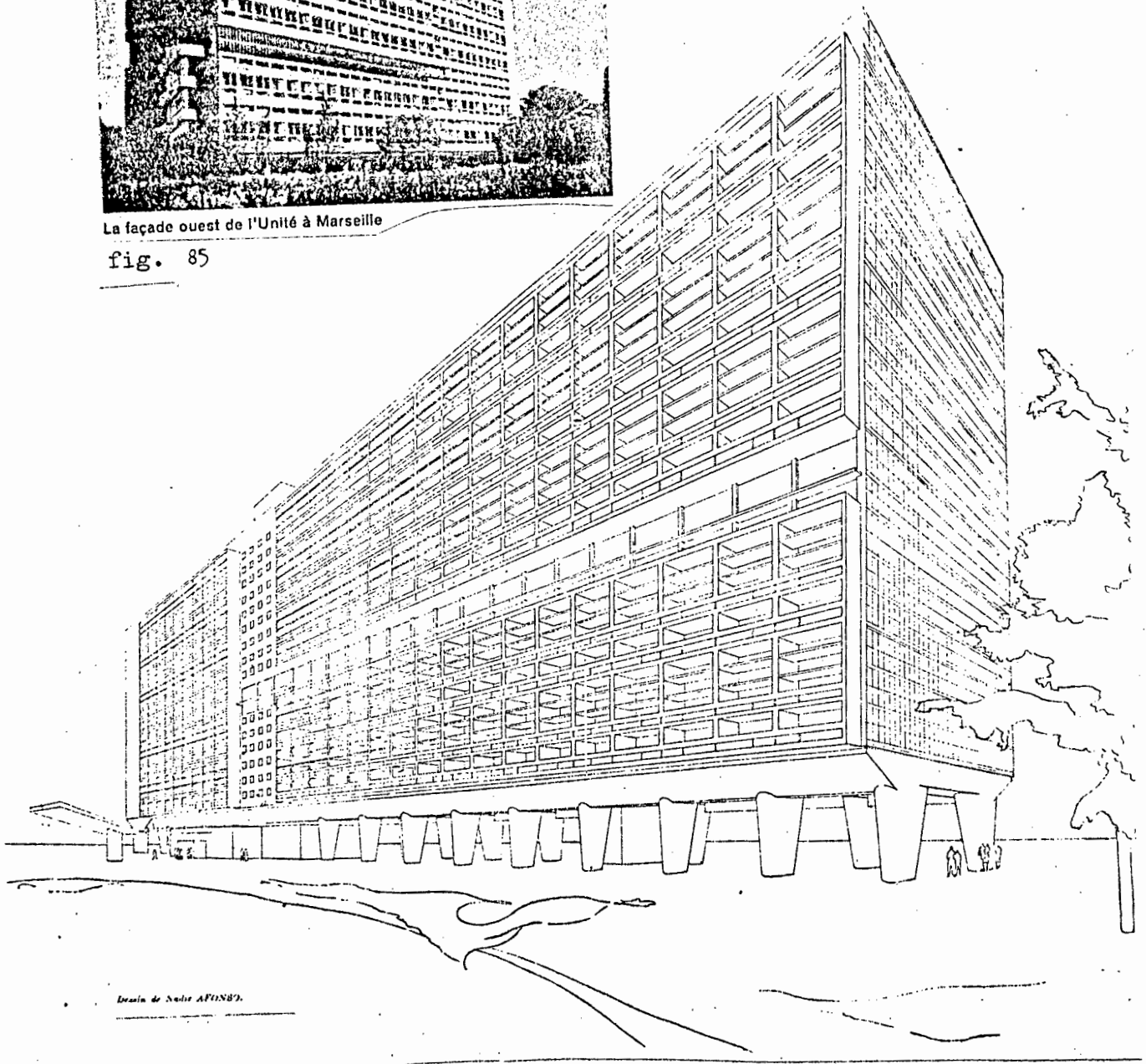
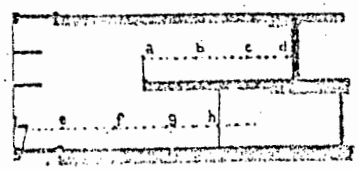


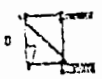
fig. 84



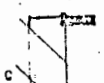
ENSOLEILLEMENT DES APPARTEMENTS

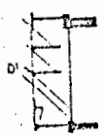
Les courbes de ces graphiques représentent le flux lumineux en m2 qui traverse le pan de verre des appartements. La courbe A est étudiée pour une pièce de 2 m. 26 de hauteur sans aucun brise-soleil. La courbe B pour la même pièce avec un balcon brise-

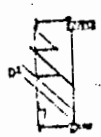
SOLSTICE D'ÉTÉ



soleil. La courbe C, pour une pièce de double hauteur (4 m. 80) avec balcon-loggia, mais sans lame brise-soleil horizontale. Enfin les courbes D pour la même pièce de double hauteur avec lames horizontales prévues pour les façades ouest (D1) ouest (D2). Pour permettre la comparaison avec les courbes A et B (pièce de 2 m. 26), les quantités représentées par les courbes C et D (pièce de double hauteur) ont été divisées par deux. Les courbes peuvent donc être comparées sans changement d'échelle.







It is worth noting the nature of Le Corbusier's initial grasp of the wider opportunities offered by the brise-soleil's 'invention':

> J'ajoute en terminant qu'en a,b,ou c, les diaphragmes obturateurs pourront être extérieurs ou intérieurs à volonté; le dispositif du brise-soleil est tel, désormais, que l'initiative personnelle peut intervenir sans trouble et sans dommage pour l'attitude extérieure des bâtiments. Un ordre impératif est apporte par le brise-soleil lui-même et derrière lui, la vie peut se dérouler à volonté dans l'infinie variété des goûtes et des besoins individuels.[67]

67. Le Corbusier, Oeuvre Complète, Vol. IV, p. 107.

This prospective freedom for the individual recalls Le Corbusier's even more 'permissive' Algiers project of 1930 where not only the facades but the entire internal area and exterior arrangement of the dwelling were open to resolution by the inhabitants' own initiative: (*fig.86*)

> The architectural aspect is stunning ! The most absolute diversity within unity. Every architect will build his villa as he likes; what does it matter to the whole if a Moorish-style villa flanks another in Louis XVIth or in Italian Renaissance?[68]

68. Le Corbusier, The Radiant City, p. 247.

This freedom so rich its potential, congealed, however, into its fixed 'optimum' designs along the lines of the Unité, and Le Corbusier followed an increasingly hard line towards 'personalization' of the individual's environment.

It would appear then, by way of summary, that the Unité DUs did not fulfil the promise inherent in some of

Le Corbusier's earlier dwelling-prototypes, nor did they provide the standards of privacy and amenity that Le Corbusier held to be so essential for " assuring a maximum of liberty to the individual... and provoking a real fulfilment of family life".[69]

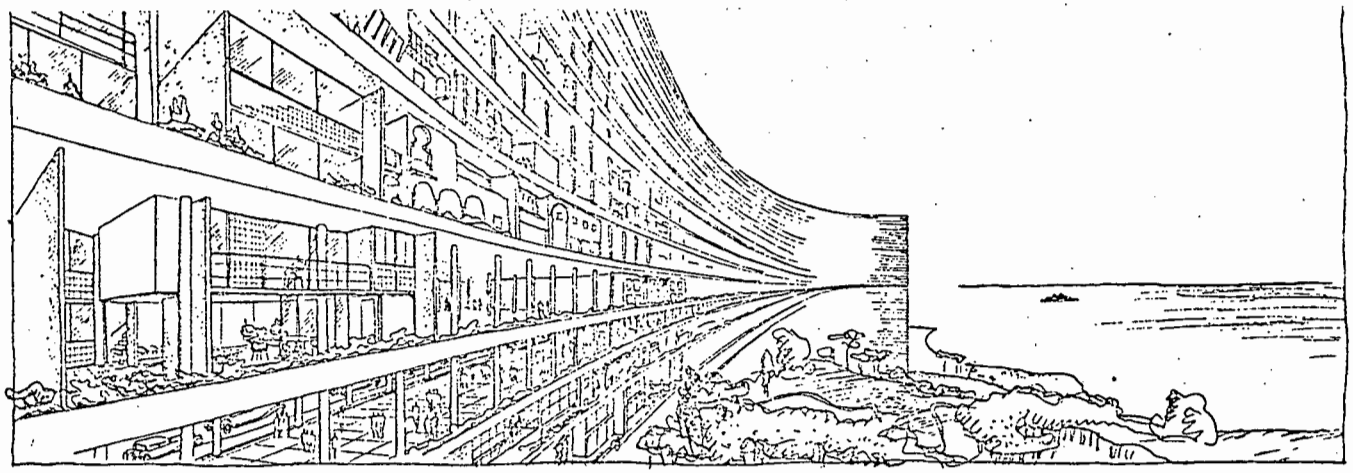


fig. 86

69. Le Corbusier, Concerning Town Planning, p.67.

SHELL

In the preceding section on the Ville Radieuse, the reader will recall that some essential aspects of the individual DU could only be comprehended in terms of its relationship with the overall context of the Ville Radieuse; thus, for example, the need for super-densities, the function of the common services within the "redents" and of the "prolongement du logis" in the greenspace outside, the question of meaningful leisure, all tended to account for and support decisions evident in the design of the individual DU.

When we turn to make a similar enquiry for the DUs of the Marseille-Sud project, the first and most striking difference to be observed between it and the Ville Radieuse is that the continuous "redents" of the Ville Radieuse (or of the Îlot No.6 scheme, for that matter) have now become discrete units, that is Unités. Proceeding on the assumption that Cell and Context are interdependent, we immediately have to ask how the introduction of discrete shells has affected the equilibrium of those strategies that manifestly supported the DUs in the Ville Radieuse.

For one thing, the population density postulated

of the Ville Radieuse -- 1000 p.p.h. has been reduced in the Marseille-Sud Unités to only 500 p.p.h. (See Table p.) The Unités clearly contribute to this decrease and can be seen, in a way, as snippets of"redent" . This dramatic decrease in density, apart from its other implications, poses a large question mark over the logic of retaining a DU-type evolved specifically to support an increased population density in a situation where such high densities are no longer envisaged. Nor can the increase in DU size from $10m^2$ to $20m^2$ be interpreted as Le Corbusier's adjustment to a quite new situation of lower density since a DU of increased size was posited, it will be remembered, in the Îlot No.6 scheme which was a true Ville Radieuse type fragment based on a density of 900 p.p.h., only slightly less than the'required' 1000 p.p.h. In particular, the narrow width of the DU, whose express advantage was claimed to be its facilitation of greater density through a reduction of the developed length of the "redents", makes little sense, and is indeed, as we have seen, a hindrance in a situation like the one exemplified in the Unités of Marseille-Sud, where developed length is not an issue.

The other feature of the Ville Radieuse that Le Corbusier invoked to reinforce the argument in favour of the diminished DU was the installation of the common services. These have been retained in the Marseille-Sud Unités (assuming that they are all intended to replicate the one built on the Boulevard Michelet) and to the extent that certain of their domestic functions were absorbed into the

common services, there is some residual logic in their being the same size as those in the Îlot No.6 in spite of a context of reduced densities; thus for example, the Unité DU's kitchens remain the same size for a 2-person or 10-person cell, as in the Ville Radieuse. This kind of reasoning however, does not seem to have been followed through consistently be Le Corbusier, since when the range of common services was pruned in later Unités (in some cases to virtual elimination), there was no corresponding compensatory increase in the provision of space or equipment within the DU (in some of these Unités there was even a significant decrease).

Undeterred, then, by the drop in population density and what it might imply or by the later diminished range of common services, Le Corbusier persisted in proliferating a DU whose basic rationale had been seriously weakened.

In the Ville Radieuse, density was clearly a function of the number of people whom it was intended to accommodate within the redents and this, in turn, determined the number of people that would relate to their organizational sub-systems. Accepting likewise that the Unités were the agents of a lowered density and were conceived of as retaining much the same organizational systems i.e. common services installa-

installa/....
tions and the"prologements du logis", we may logically expect the number of persons within them to bear some similarity to the number which was considered necessary in the Ville Radieuse for support of its systems; this would imply a population of approximately 2,700 per elevator core (based on a maximum walking distance along the interior street of 100 metres) and a grouping of roughly double this figure for common services and "prolongements du logis" (See p 62). This expectation is, however, not fulfilled by the Unités of Marseille-Sud: the Unités, their interior streets extended to nowhere near the 100m. limit, are intended to contain only 1,600 people each and this population also serves as the unit for the common services. What appears therefore, to be a significant inconsistency-- and one productive of a serious diseconomy, or at any rate, a significant revision of attitude -- is nowhere either explained or justified by Le Corbusier.

At almost the same time as the Unité plans were being conceived, we actually do find Le Corbusier producing a Unité scheme that conforms more closely to earlier prescriptions (figs 87,88)-but this is the first and last time he combines Unités in this way; the project, in any event, was one of the very few not included by Le Corbusier in the volume of his complete works -- a sure sign that he did not value it overmuch.

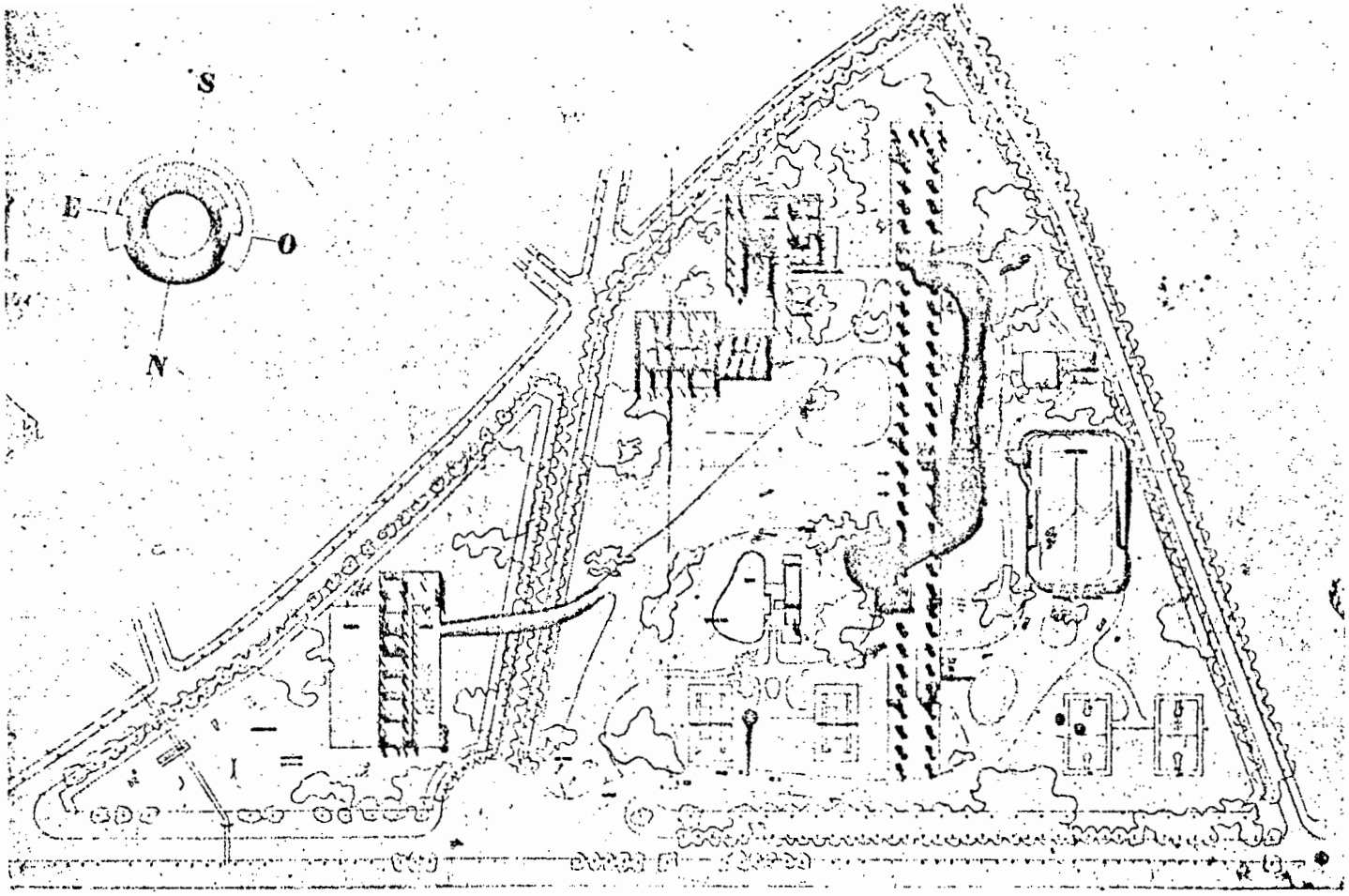


fig. 87

Two Unités at Anthony - 1947

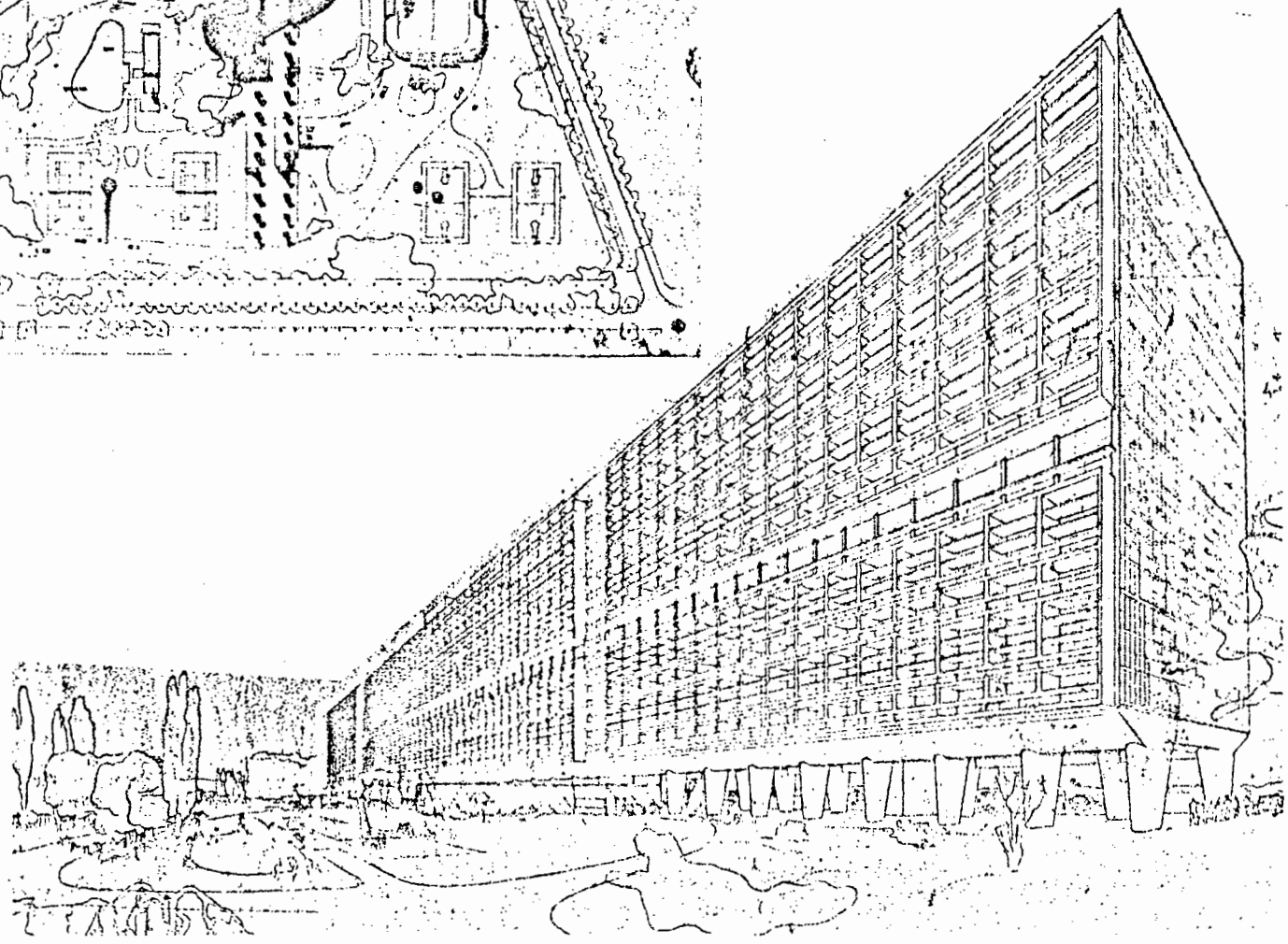


fig. 88

Since Le Corbusier was so mysteriously unforthcoming as to the reasons for this decrease in population module which characterizes the Unité scheme, we must do some investigating of our own to try to establish a rationale, or the lack of it, for this development.

The first occasion after the design of the Ville Radieuse on which Le Corbusier projected an urban housing prototype that was, by force of circumstances, non-continuous and free-standing, was in 1934 in the Bastion Kellerman design, intended as a 'live' exhibit for the International exhibition in Paris in 1937. Le Corbusier's first submission for the exhibition, which fell on deaf ears, was a plan for a large Ville Radieuse "redent" fragment outside the city (*figs. 89,90*); the Bastion Kellerman project which followed sought to retain that same principle on a restricted site :

> "Sur ce terrain, notre thème se modifie dans la forme, tout en conservant le même principe: sur le Bastion, nous construirons une "Unité d'Habitation" de 4,000 habitants". (*fig. 91*) [70]

Here then, in the form of a Y is a Unité which comes close logically to satisfying the population module required for the Ville Radieuse systems.

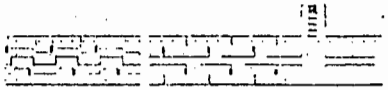
Describing his Îlot No. 6 scheme two years later, Le Corbusier seems to be speaking in terms of the earlier Ville Radieuse modules and is so confident in fact, of the adequacy of the doubled module for the common services,

70. Le Corbusier, Des Canons, p. 11.

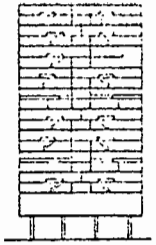
Tel est le projet de l'Exposition:

a) Le ruban en redents des immeubles de 50 m de haut, construits en vrai, stands inombrables à échelle humaine pour toutes les démonstrations relatives à l'habitation.

b) Les édifices de l'enfance (scolaires et pré-scolaires) calculés pour correspondre à la population de ce redent fixée de ville à raison de 1000 habitants à l'hectare).



Voici le détail de l'Exposition elle-même: locaux à disposition pour tous aménagements variés, tant en grandeur qu'en destination. Circulation horizontale à volonté. Circulation verticale tous les 250 m. Profondeur des immeubles: 23 m abondamment éclairés par les pans de verre des façades jusqu'au cœur des locaux.



La coupe, hauteur 50 m, vide d'étage à étage: 4 m 50, divisible en deux fois 2 m 20. Au sol les pilotis laissent le passage entièrement libre. Au-dessus, les locaux pour la démonstration des services communs.

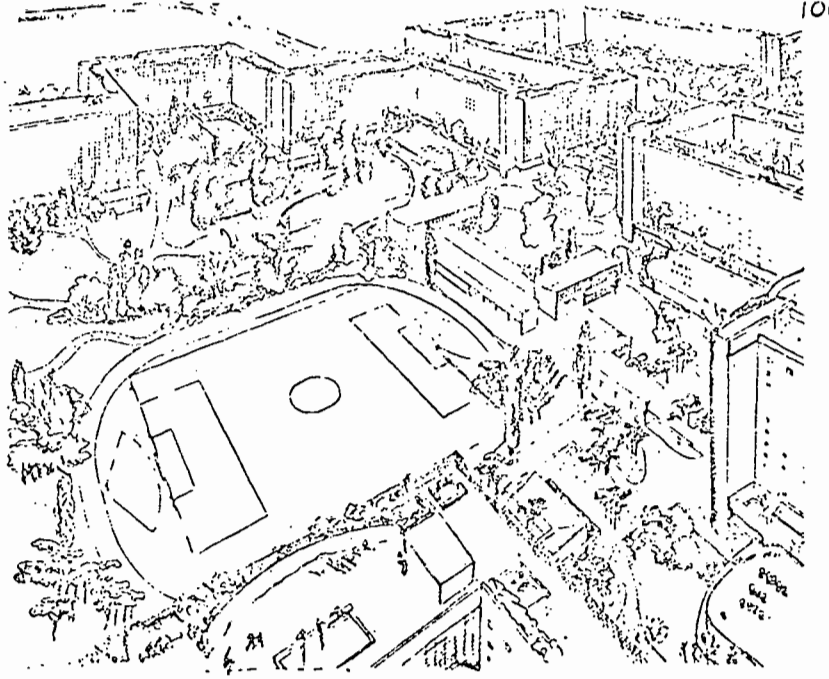


fig. 90

Aspect de l'unité d'habitation achevée après l'Exposition

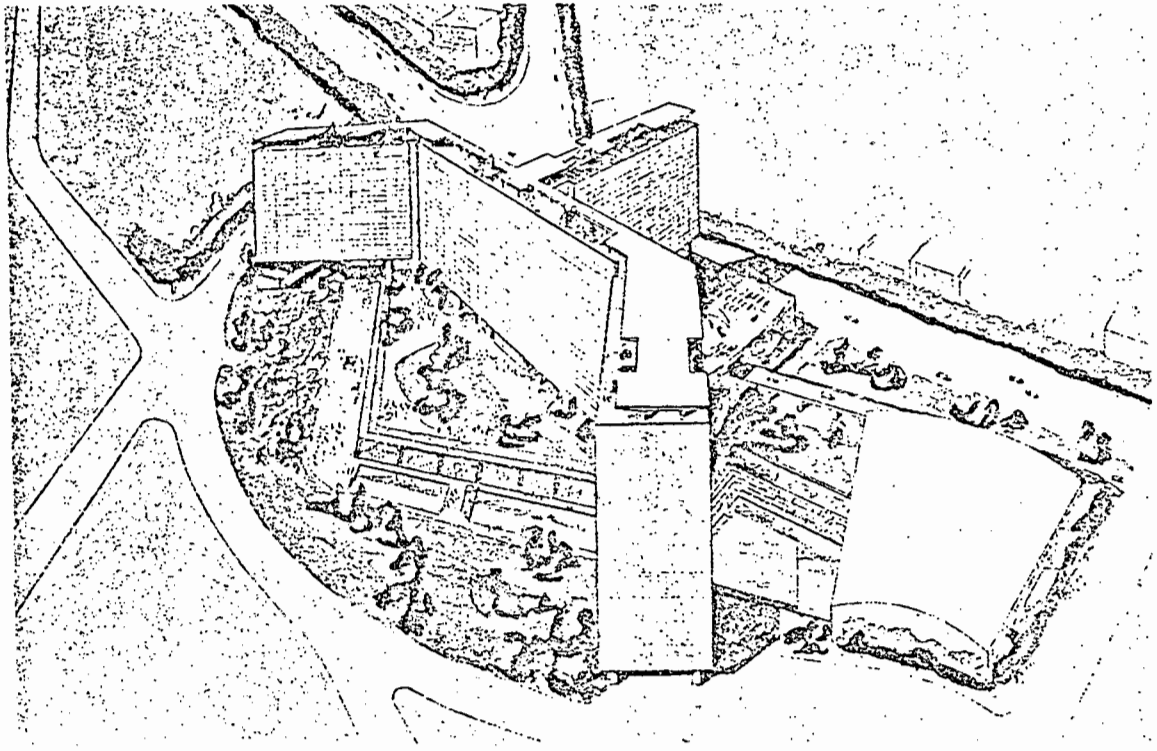


fig. 91

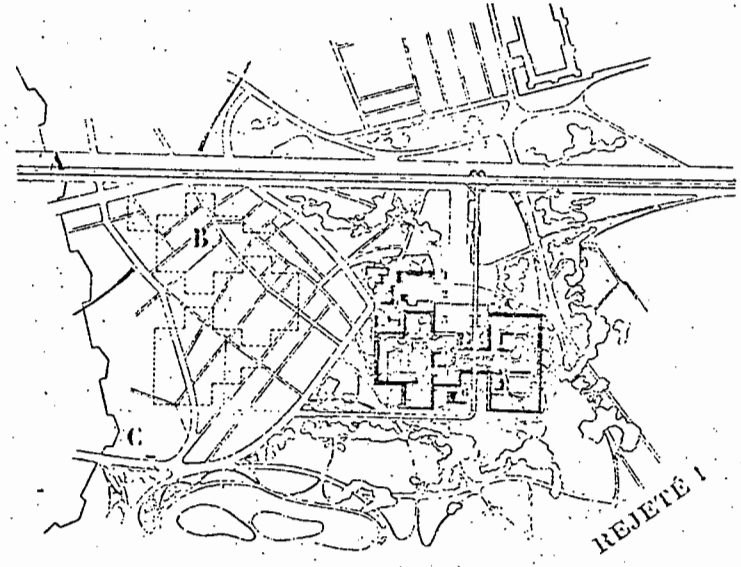


fig. 89

that the retailers, earlier blasted out of existence in the Ville Radieuse, have now been reincarnated in more exalted spheres:

> Au paradis des petits commercants....
> Une unité d'habitation comporte 2,700 habitants, c'est-à-dire 2,700 mangeurs et buvers, c'est-à-dire 2,700 clients. On peut conjuguer deux unités ensemble et obtenir 5,400 clients pour une coopérative de ravitaillement qui sera contrôlée par les habitants eux-mêmes et gérée par des spécialistes: bouchers, épiciers, etc...
> Le petit commerce sera donc tué ? Pas du tout. Au contraire. Le petit commerce sera sauvé. Il suffit de trouver la forme des contrats utiles entre le groupe coopérateur d'achat et les détaillants qui auront pour mission de prendre en charge à des conditions déterminées la marchandise et de la vendre dans des conditions normales de bénéfice.....
> .....
> 5,400 clients représentent la valeur d'une petite ville qui s'est assuré le nombre de bouchers utiles, d'épiciers utiles, de merciers utiles et qui est si fortement organisée que les achats peuvent se faire directement de provenance directe, en province. [71]

Just 10 years later, though, Le Corbusier is describing (fig.92) the same prototype in the following terms :

> ....Another reason for the provision of dwelling units of an adequate size i.e. for 1,000 , 1500, or 2700 inhabitants. Built on these dimensions, the dwelling unit allows the organization of innumerable common services and extensions of the home, for instance : physical culture, medical services, and preventative medicine, sport at the foot of the dwellings,

71. Le Corbusier, Des Canons, p. 89.

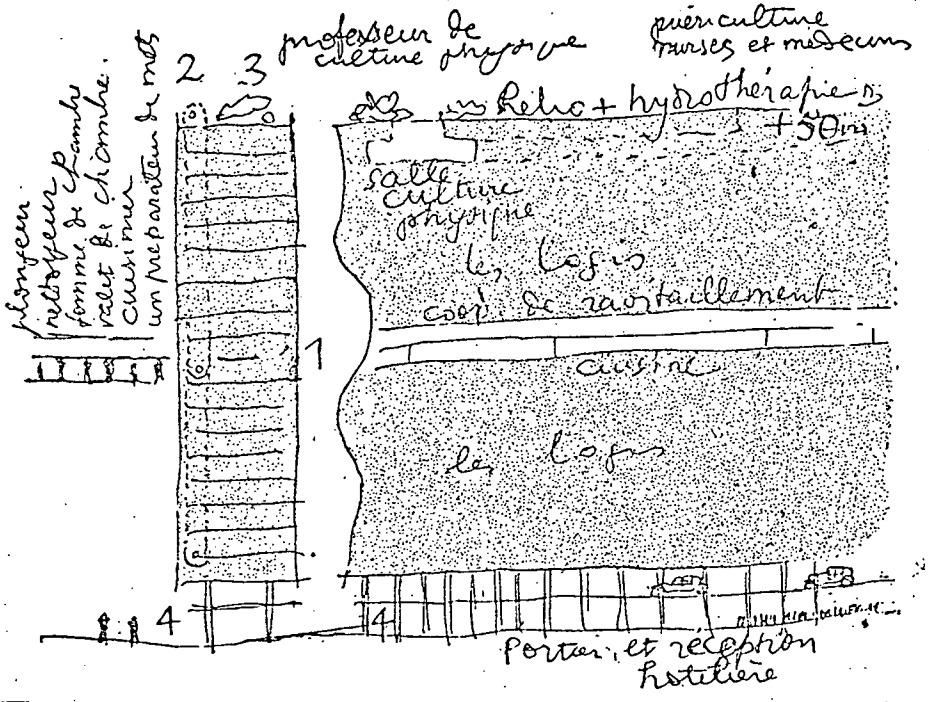
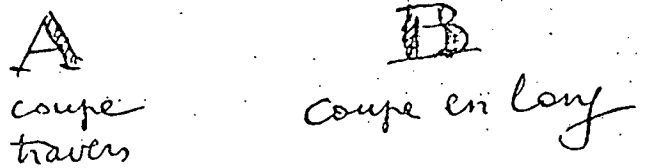


fig.92

72. Le Corbusier, Concerning Town Planning, p.76.



plongeur ... ... dishwasher
nettoyeur ... ... cleaner
cuisinier ... ... cook
preparation de mets ... food preparation
A ... ... cross section
B ... ... long section
puericulture ... ... child welfare

> organization of services on hotel lines for foot and domestic work, etc. etc., and finally the achievement of a separation of pedestrian from automobile (which is no mean advance).[72]

The slide down to the lower population module evident here is seemingly no longer accompanied by any rigorous concern for the 'right' number of people required to support a range of common service installations; though a variety of Unités was developed in the Thirties and a choice of these was offered during the years 1941-1946, the reason for this variety was connected neither with the size of the Unité nor with the question of common services:

> The inhabited quarter in the form of "habitation units" furnished with common services and with extensions of the home; the form of these dwellings of which the height does not exceed 170 feet may be Y-shaped (a), parallel (b), or normal (c), or it may be in the form of rectangular or arabesques. The choice of forms will depend on the nature of the site, its topography, and its vistas.[73] (fig 93)

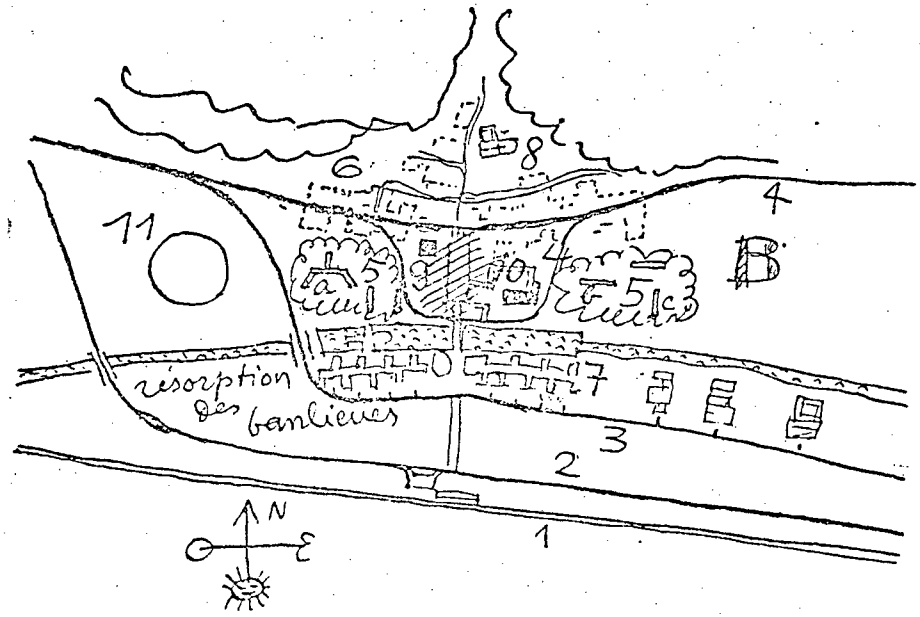


fig. 93

It was the lowered population module per Unité that contributed to and paralleled the decline in densities (Table IIb p.151) (mentioned earlier in connection with the DU) that was discernable between 1941-45. This lowered population module was not, however, a necessary cause of the decreased densities; Le Corbusier could equally well have retained the larger building modules more 'logical' for the common services and merely adjusted their spacing to conform to his density requirements.

73. Le Corbusier, Concerning Town Planning, p.56.

The decrease in population module is seen to have no functional rationale then; both the retention of the Ville Radieuse-type DUs and their final containment within a shell of finite size (1600 people) appear to bear no consistent relation to Le Corbusier's earlier work. We are at a loss to know which are the criteria that ultimately determine the "Unité of Appropriate Size", nor do Le Corbusier's abstractions on this subject really clarify the matter:

> Ainsi se reconstituent, dans des conditions de nature retrouvées, les plus anciennes formes des groupements humains, les plus efficaces notions de solidarité, les plus naturelles proportions s'opposant à la monstruosité des rassemblements tentaculaires représentés aujourd'hui par les villes de la civilisation machiniste. Le hameau réapparaît; la commune réapparaît, collectivité bien proportionnée: la "commune verticale".[74]

The suggestive vocabulary used in the above description, together with its accompanying illustration (*fig 94*), imply that the "human grouping" established by the Unité can be validated as "natural" or "correct" in terms of a sociological or socio-anthropological frame of reference: In this connection, we may recall that in the Ville Radieuse the raison d'etre of all Le Corbusier's physical manifestations resided in his desire to create more free time for men and women and to establish the conditions which might enable them to use it for their own improvement. Le Corbusier thereby put his foot

74. Le Corbusier, Oeuvre Complète, Vol.V,p.105.

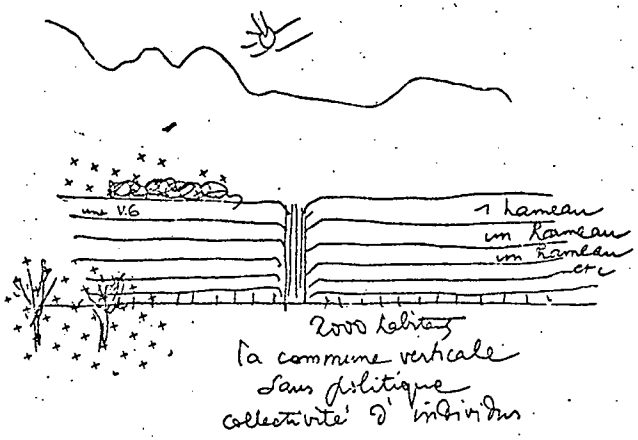


fig. 94

firmly inside sociological territory and though his 'enquiry' was more hortatory than rigorous, it is in this territory that the foundations of the Ville Radieuse ultimately rest. In view of this stratum of his thought, and in view of the implications contained in his description of the Unité above quoted, it behoves us to examine the Unité in its wider context as part of the Marseille-Sud scheme in order to ascertain whether any 'sociological' rationale for it is there revealed.

Before we can embark upon such an investigation, it is necessary to ascertain whether it is valid in the first place to view the Mars eille - Sud scheme as a significant prototype in Le Corbusier's work. What has been revealed of this project would not seem to put it in the same category of importance as the previous two projects discussed -- the Ville Contemporaine and the Ville Radieuse -- nor has it been shown to be the next step in Le Corbusier's evolutionary development.

Critics, generally, have accorded the Marseille-Sud scheme little or no attention and such coverage as it has received has tended to connect it sketchily with the Marseille Unité and/or equally has pointed to it as merely sketchily demonstrating Le Corbusier's 7-V[75] circulation principle. The contemporary Bogota and Chandigarh plans, both of which hold some major characteristics in common with Marseille-

75. "Sept Voies" - Seven Routes.

Sud, have invariably been the subject of a far more de - tailed scrutiny, particularly Chandigarh, which tends to be seen as the climax of Le Corbusier's 'late' carrer. Apart from the work of the Fifties, though, were there not amongst the twenty-odd projects that filled the years between the Ville Radieuse (1930) and Marseille-Sud (approximately 1950) any which have a greater claim upon our attention than the last named ? What of the regional planning system of the "three human establishments" 'invented' in 1942 ? What of the famous St. Dié plan of 1945, the sketches for which, after all, "signalent pour la prémière fois la morphologie des Unités."[76] (fig. 95)

These developments and any others in the years 1930-1950, intrinsically important or refined as they may have been, did not, I contend, have the same fateful meaning for Le Corbusier's "oeuvre" as the one we are about to discuss; they all exhibited to a greater or lesser degree (with the exception of the Izmir scheme of 1948) most of the essential characteristics associated with the Ville Radieuse, and such changes or innovations as were evident did not create any synthesis that could convincingly be called new. Most of these modifications can be seen only as tending towards something substantially different in kind from the Ville Radieuse. This tendency found its denouement in the Marseille-Sud project and was there provided with an accompanying theoretical rationale more explicit, and less equivocal than that sustaining

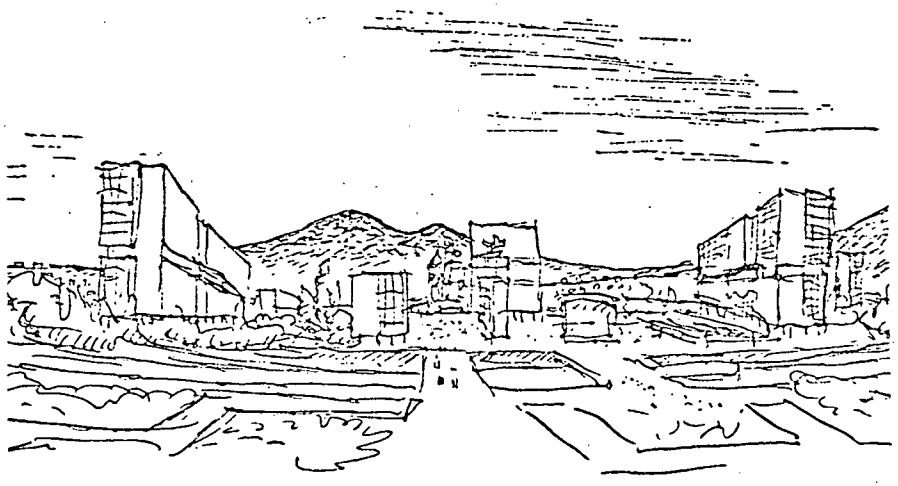


fig. 95

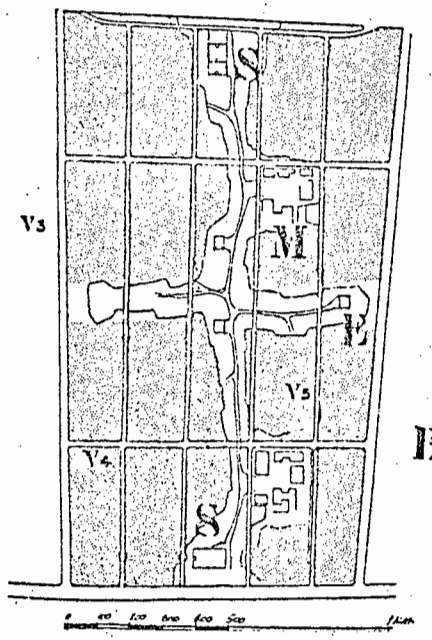
76. Le Corbusier, Oeuvre Complète, Vol.V, p.12.

either Bogota or Chandigarh. This rationale is contained in one of the periodic theoretical essays that pepper one's path through the Complete Works and whose invariable repetitiousness leads to a kind of highway hypnosis that conduces to a glossing-over of content, even when, as in this case, something new has been smuggled in. The essay in question, while theoretical, is quite clearly related to the Marseille-Sud project. It is Le Corbusier's last attempt in his writing to evolve any new thoughts. The rationale, like that of the Ville Contemporaine, and Ville Radieuse before it, is presented in the form of a design prototype to which the Marseille-Sud scheme(which immediately follows the essay in the Complete Works) closely approximates. Numerical data used in the essay is drawn in fact, from the Marseille-Sud project. We shall therefore be within our rights when, in the present discussion, we shall refer to the'Marseille-Sud prototype'.

The Marseille-Sud scheme proposed new densities, and a new system of circulation: it incorporated a volte-face on the question of the common services, a reappraisal of the location of the "prolongements du logis", a new posture towards the function of shopping, the intimation of a significant shift on the issue of time-usage and leisure, a seriously revised attitude towards housing types, and it implied palpable modifications regarding the processes whereby all these changes were to be implemented. The most searching effects of these changes was the dissolution of the very tightly inter-connected systems of the Ville Radieuse and their detachment from the housing component, the discardment of some of them and the reconstruction of others into a far looser organizational framework embodied in the "sector" (figs. 96, 97):

> 89. Le secteur est une conséquence de la V3 ainsi qu'un aménagement moderne du carré espagnol (venu de la Rome antique) qui règle les tracés des villes américaines.
> 90. Le secteur est en fait un premier stade de l'aménagement urbain moderne. Il peut contenir de 5,000 à 20,000 habitants. Il est consacré à l'habitation seulement. Mais il possède sa rue marchande avec les artisans, les boutiques, les divertissements quotidiens, le marché du secteur relié aux Halles centrales (la collecte et la distribution des denrées avec contrôle au prix et à la qualité).
>
> 91. La V4 traverse le secteur et peut se

C'est à l'occasion de l'étude pour Bogota (rapprochement des «cuadras» espagnoles de 110 m de côté) que fut créé le «secteur», unité autonome d'urbanisme, d'environ 800×1200 m



Un secteur M = marché du secteur
E = écoles
S = sports

fig. 96

77. Le Corbusier, L'Urbanisme est Une Clef, p.49, and p.51.

fig. 97

raccorder à la V4 des secteurs contigus, réalisant ainsi une continuité de la rue marchande.

92. Le secteur est traversé perpendicu - lairement à la V4 par la V7 où sont les écoles, les sports, etc. (la jeunnesse).

93. La disposition et la hiérarchie des 7V permet de réaliser des agglomérations résidentielles de type "ville-verte", assurant aux enfants la sécurité totale des jeux et de repos hors de la présence des véhicules.[77]

The clearest schematic representation of the sector and 7-V principles is to be seen in Le Corbusier's Master plan for Chandigarh (fig 98).

In contradistinction to his expositions relating to the Ville Radieuse's organization which always began by emphasizing its contraction and density, the above description of the "Sector" is consciously neutral regarding such questions and concedes a very great range of permissible densities within the sector (though apparently without any corresponding adjustments to the system). This description was formulated in 1954, after the "Sector's" use in the Bogota, Marseille-Sud and Chandigarh plans; the open attitude expressed towards the number of people comprising a sector is, I believe, a reflection of the low densities per "Sector" forced on Le Corbusier by the circumstances at Chandigarh rather than any indication that he now found acceptable densities so low as to encourage urban sprawl (5,000 people per Sector would work out to approximately

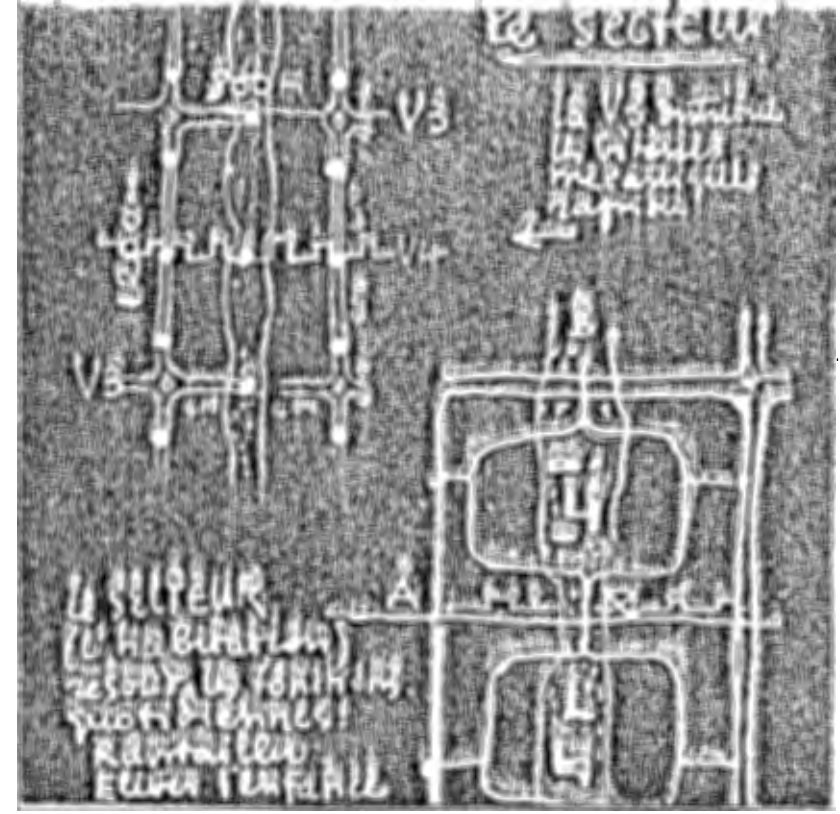
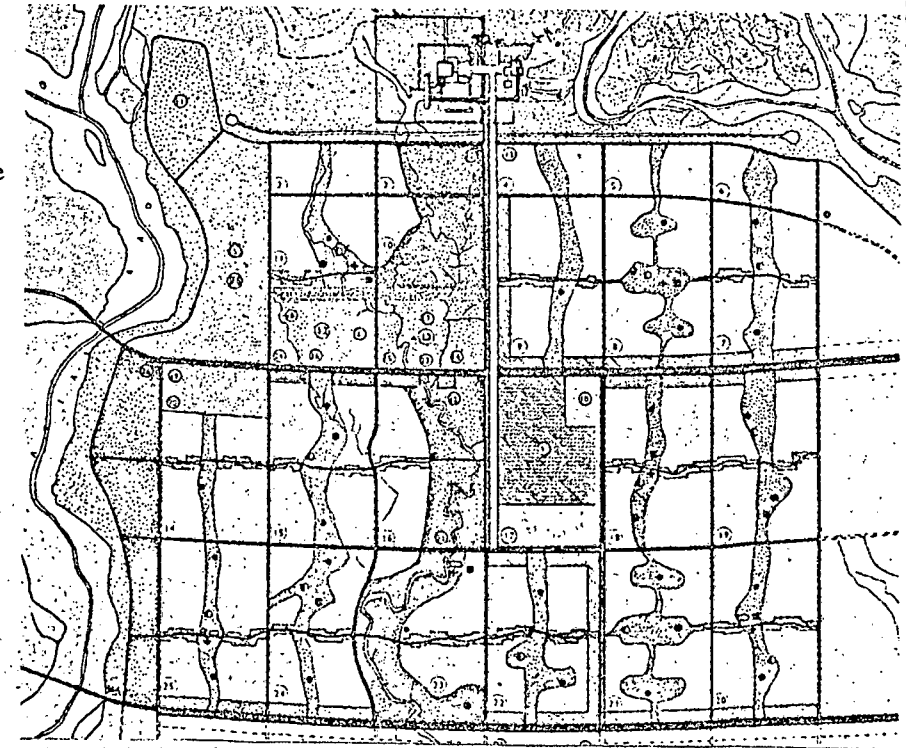


fig. 98

Chandigarh



Plan d'urbanisme de Chandigarh. Première étape pour 150 000 habitants, en haut le Capitol

20 people per acre, which is unacceptably low in terms of of his outlook. Le Corbusier was, in fact, patently unhappy with the 'infill' of the Chandigarh planning solution,[78] but for the sake of making it appear that all his work proceeded according to a consistent theory, a drive we have remarked on before, he saw fit to include the lower density registers in his account of the "Sector".

It is rather in the plans for Bogota and Marseille-Sud, both of which coincided[79] with the appearance of the 7-V and Sector principles, that we may discover what Le Corbusier's intentions and preferences on the issue of densities really were and what were the ramifications that flowed therefrom. Of the two,[80] Marseille-Sud furnishes more complete information and is, in addition, considerably more explicit as regards the treatment of the existing environment.

When discussing the Unité DU earlier, we mentioned that the Unité's densities were half those of the Ville Radieuse housing component. This does not, however, give the full picture. Unlike the uniform and even pattern of the housing redents in the Ville Radieuse which included within their own green space, educational, recreational and cultural facilities, the Marseille-Sud prototype contained several kinds of housing that were set apart both from the continuous swathes of green-space which incorporated these facilities and from linear shopping streets (*figs.102,103*); thus whereas in the Ville Radieuse the distinction between gross and nett housing densities had little meaning, in Marseille-Sud this

78. "I have conceived a capital for the Punjab.....

.....

but the programme provided by the authority is banal and unimaginative, both for the housing and for the istitutional elements of the town. Nowhere yet have the fundamental problems of Town Planning been put, the problems of economy, sociology and ethics, the conquest of which will make man the master of his civilisation."
(Le Corbusier, Oeuvre Complète, Vol.V, p.11.)

79. The Complete Works do not provide absolute clarity regarding the date to which the Marseilles-Sud scheme should be be ascribed ; though the project is filed under the date-heading of 1951. Le Corbusier says in the text that "Cette nouvelle étude est née au moment où apparut la 'Règle des 7-V'. Elle en fait application."
(Le Corbusier, Oeuvre Complète, Vol.V, p.113)
This would fix the scheme's conception between 1947 and 1949, contemporaneous with the first studies for Bogota.

80. In Bogota, a gross density of 350p.p.h. (140p.p.a.) is projected only for the redeveloped central part of the city which it was intended would absorb the existing 650,000 inhabitants, at the time widely and thinly spread (*figs. 99,100*); provision for an additional anticipated one million inhabitants is sketchy and is accompanied by no density co-efficient; the 'demonstration sector' around the 'core' (*fig 101*) is not typically sized, nor judging by the filigree road infrastructure in the other sectors, does it contain a typical cross-section of housing.

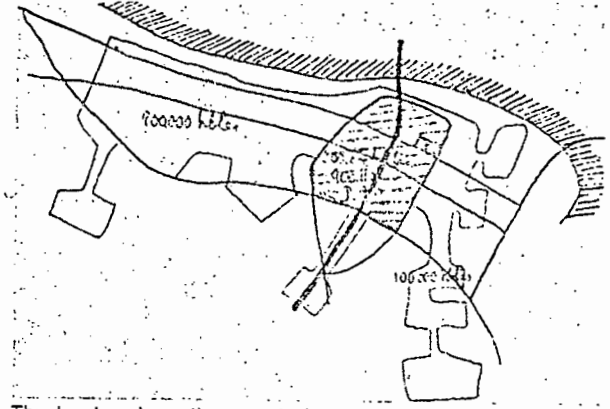


fig.99 The drawing shows the numerical distribution of the present population

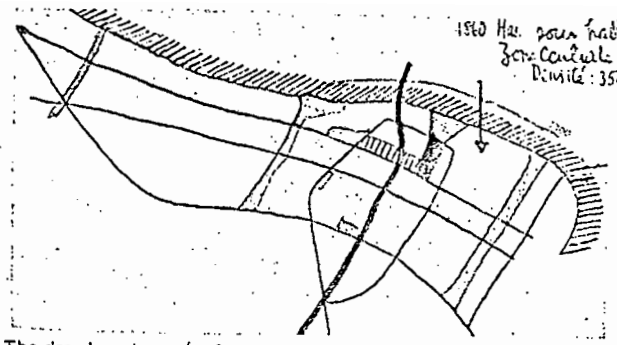


fig.100 The drawing shows by figures how through economical land-use, the population could be settled in the central area, only partly occupied today

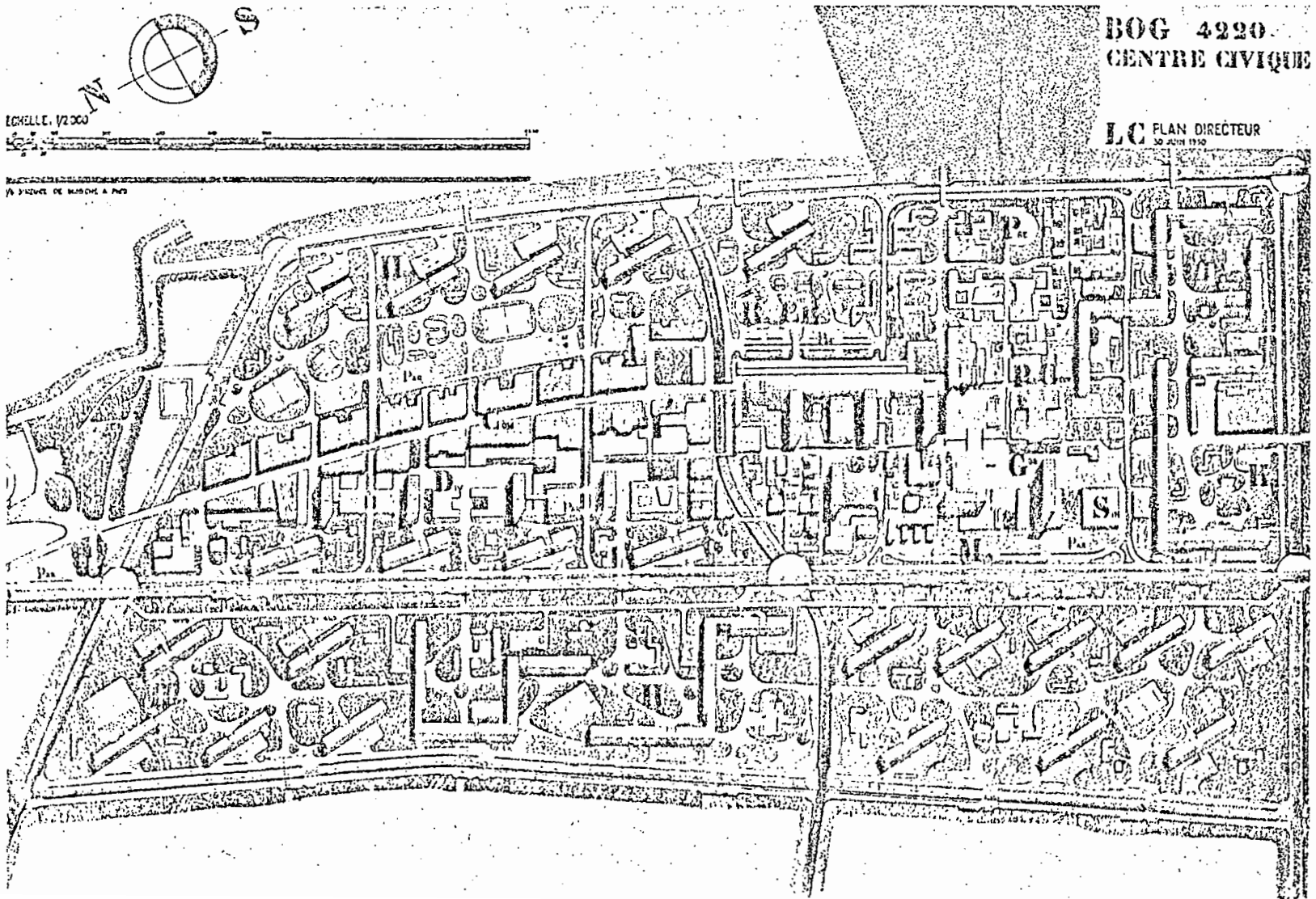
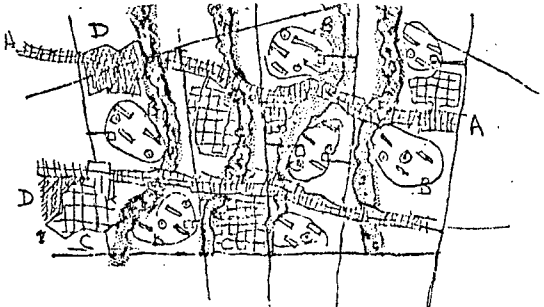


fig.101

fig. 102



apparition du tissu urbain moderne
(urbanisme à trois dimensions)

123-1

ROUGE

Urbanisation de
Marseille-Sud (Michelet)
Secteur théorique Volume bâti

Application à l'unité d'habitation L.C.
Bd. Michelet

cat. A: La grand'rue
cat. B: a) Type unité d'habitation L.C.
b) Tours
cat. C: Maisons familiales avec pelouses communes pour l'enfance
cat. D: Lotissements existants
cat. E: Bandes vertes avec écoles, clubs, sports

V 2: Grand tracé urbain
V 3: Alimentation des secteurs
V 4: Rue marchande
V 5: Conduit aux portes des maisons

fig. 103

becomes an essential distinction, for while the Unité in clusters, has a density of 500 p.p.h. (200 p.p.a.) the overall gross density of the project is 230 p.p.h. (92p.p.a.), about a quarter that of the Ville Radieuse. This would mean, if we were to follow Le Corbusier's rather simplistic reasoning, cities roughly four times the size of any built along Ville Radieuse lines. And indeed, whereas the Ville Radieuse was planned to house one-and-a-half-million people in an area 5km.x 3km. an area 5km.x 10km. would be required to house an equivalent number on Marseille-Sud principles.[81]

This is not to say that these principles are an invitation to urban sprawl; they still demand relative compaction (*fig. 104*); but they do mean that as applied to cities the size of Bogota (1950 population: half a million, anticipated population for planning purposes one-and-a-half million) or Marseilles (1950 population 750,000), the important walk-to-work goal realized in the Ville Radieuse is no longer capable of attainment. Easy pedestrian access to the business centre and cultural core of his cities was important to Le Corbusier as much for the "essential joy" of walking in the bosom of nature en route to these points, as for the spiritual nourishment and "participation in collective work" that were meant to occur upon arrival there. In the Ville Radieuse, indeed, the footpaths led not only to the city's cultural centre, they 'irrigated' its entire surface: " Where does this fluid network of paths lead to ? Everywhere in the city, by

81. Bogota, for example, was intended to house 650,000 people in the central area of 6km.x 4km, while Le Corbusier'sBuenos Aires scheme of 1938, planned according to Ville Radieuse principles envisaged three and a half million inhabitants within a 6km.x 6km. area.

82. Le Corbusier, The Radiant City, p. 125.

Table 5

Standards of Space required for a Neighbourhood of 10,000 Population (Alternatives Proposed by Various Sources)
(Relating Housing Areas to Remaining Areas as a Means of Arriving at Gross Neighbourhood Density, as well as Net Residential Density)

	'Housing Manual 1944' & 'Design of Dwellings 1944'		City of London Plan (interpolated)									APRR		'Density of Residential Areas 1952'	
	Cent. Normal	(Dudley) Concen. Develt	(a)	(b)	Purdom	Le Corbusier (Contemporary City)	Marseilles Sud	New Towns (UK)	Manthorpe (UK)	Keeble (UK)	Stone	Author	London 'A'	Inner Urban 'B'	Table 10	Tables 5,6,7
Housing	100	83	100	50	125	25		400	140	285	83	33	100	100	175	105
Primary Schools and Playing Fields	17	17	7		20			50	50		17	4		7	5	13
Open Space	50	40	40	40	30			100	10		40	14	70	40	42	60
Shops and Offices	6	5	6								5	5		6		5
Community Centres, Churches	3	3	6	25	15	40		10	10	233	3		25	40 4	7·9	
Public Bldgs	2	2									2			2		5
Service Industry, W/shops	4	4	4		10			100	50		4	18		4	34	4
Main Roads, Parking	17	14	17								14	12 (allotments)		17	87	10
								+ 100								
TOTAL	199	168	180	115	200	65	109	760	260	518	168	86	195	180	351	202
Av. net residl. density p.p.a.	100	120	100	200							(50 ac. for allotments and 300 ac./ 10,000 for Town Centre	300	100	100	57·2	145
Gross n'hood density p.p.a.	50	60	60·6	97·5			92					116		55		
Addtl. o/s in green belt	20–30 ac.										Town Density:	40·5			30	70

fig.104

from R. Jensen 'High Density Living' (p18)

the shortest route."[82]

In the much distended Marseille-Sud prototype such walking as would take place would be within linear green swathes which would contain the continuous pedestrian paths, as well as functions formerly within the equipotential greenspace of the Ville Radieuse: one of the effects of this arrangement is to render meaningless an important functional argument in favour of the pilotis of the housing units, an argument which had typically been expressed as follows:

> Since the apartment buildings are on pilotis the pedestrian may go where he likes; 100% of the ground is left free for the most complex network of pedestrian movement,[83]

and one should add also, for vehicular routes (separated from pedestrians to be sure) should this prove necessary in any given context. With specific routes provided in the Marseille-Sud scheme for the absorption of pedestrian movement, its housing units, especially considering how widely spaced they are, need not any longer be raised up on pilotis to assure a sufficiency of free and universal movement for all.

The lowered density of the Marseille-Sud prototype, apart from repercussions it has on the spread of the city, its pedestrian-transversability, and thus the validity of the pilotis, also makes necessary an adjustment to the traffic system so as to establish a new road economy suited to the less intensive land use: the through-

83. Le Corbusier, The Radiant City, p. 299.

traffic V3's delimit a superblock area (Sector) roughly 1,200m x 800m, though the earlier Ville Radieuse 400m. intersection module is still retained for the branch-offs to the in-sector road reticulation layout. The Ville Radieuse 400m x 400m grade-separated system has thus evolved into a larger-scaled and more differentiated hierarchy that is all on-grade the more easily to serve the various housing types.

This larger superblock has in fact begun to take on a life of its own, in a way that did not characterize the earlier Ville Radieuse superblocks. The facilities formerly relating to the "redent" module of 5,400 people have now been expanded into the V4 and V7 systems which are intended to serve an entire sector of approximately 16,000 people.

With this concern for the superblock-as-a module, Le Corbusier takes a step in the direction of the position staked out by Clarence Perry, Clarence Stein and Co. Describing Chandigarh, he observes:

> The V4 is the gathering place for the intense sector of activity of city life. The V4 is the route which will provide each sector with its own character. Consequently, each V4 will be different from the others and will furnish specific characteristics which are indispensable for the creation of a great variety through the city and the furnishing of elements of classification for the inhabitants.[84]

As soon as he permitted the introduction of low-rise housing as an alternative to Unité types, Le Corbusier opened

84 Le Corbusier, Oeuvre Complète, Vol. V, p. 109

the door to the possibility of creating a social focus common to both, grudgingly at first (fig.105) but quite explicity later on. (fig.106).

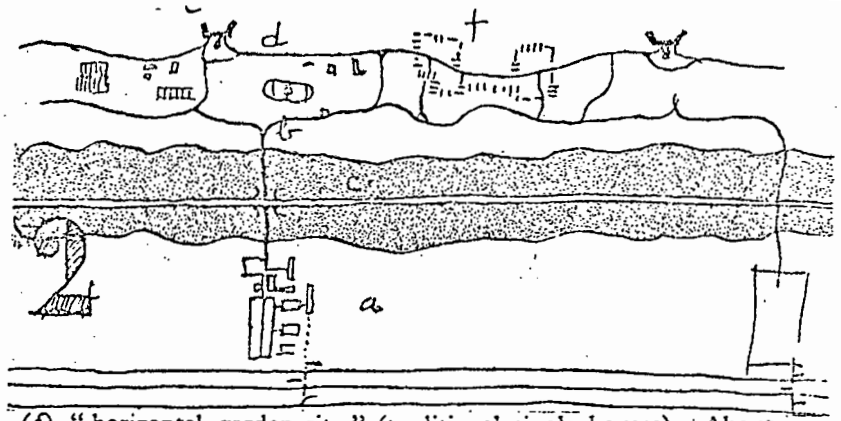
What has happened to the common services amidst all this ?

In all five pages of the article in the Complete Works containing the theoretical propositions supportive to the Marseille-Sud project, there is not a single reference in the text to the rôle of the common services. Le Corbusier's description of the continuous V4 shopping street would seem to indicate why:

> C'est sur leur parcours que sont les services à la vie quotidienne: les nourritures (le marché, l'épicier, le boucher, le boulanger, etc.); l'entretien (l'électricien, le serrurier; le pharmacien, le dentiste, le cordonnier, l'uni-prix); les distractions (le cinéma, les bibliothèques, les salles de conférences, les cafés etc.); la sécurité (la police). Et ainsi de suite.....[85]

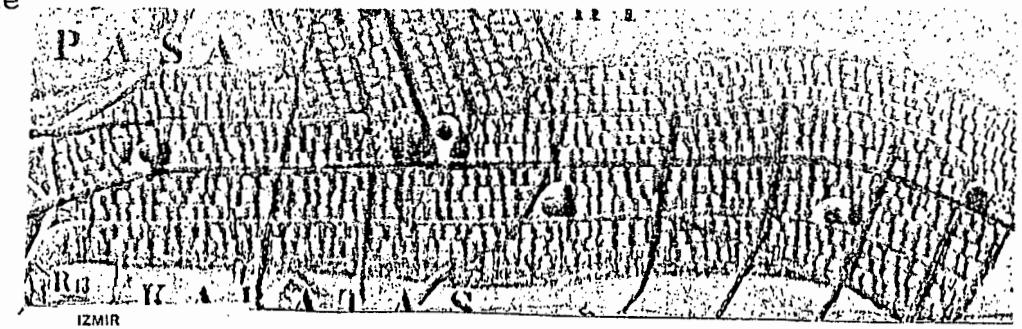
The function of the common services has quite obviously been subsumed into the V4's.

That this is the case is tacitly corroborated by the way in which Le Corbusier, at the beginning of the article, portrays the housewife in her kitchen (fig.107): he posits a direct link between her and the outside world's "gift of techniques"; previously any such 'gift' was always procured through the mediating agency of the common services. There is another note struck in the same passage and in the one following which is equally



(f) "horizontal garden-city" (traditional single houses). About (e) and with more difficulty about (f) are arranged crèches, maternity centres, primary schools, conference halls, adolescence clubs, clubs for men and women.

fig.105



IZMIR

Urbaniste
Le Corbusier

85. Le Corbusier, Oeuvre Complète, Vol.V, p.106.

NOUVEAU QUARTIER
d'HABITATION

Densité:
350 à 400 habitants
à l'hectare

Services communs

fig. 106

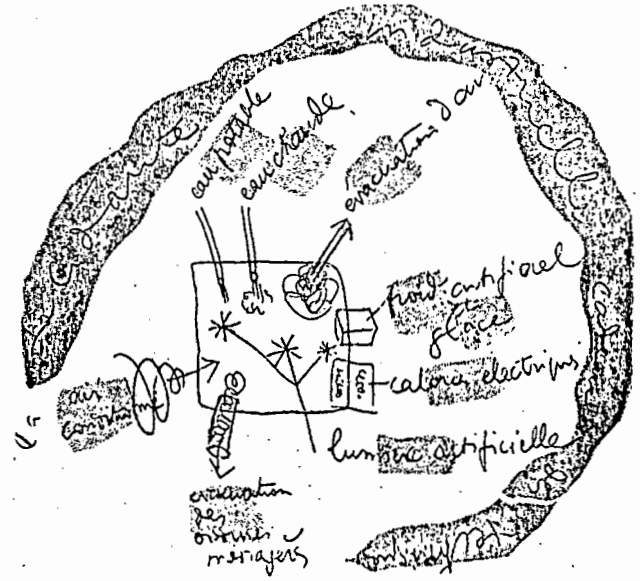


fig.107

unprecedented: under the heading "Les deux jambes de la maîtresse de maison ou l'urbanisme à domicile", Le Corbusier declares:

> Il est un lieu dans lequel s'écoule une part décisive de l'existence de la maîtresse de maison: sa cuison.....
> .....
> Nous occuperons la cuisin comme l'appareil de pilotage, permettent de nourrir, à savoir: préparer les mets, cuire, laver, ranger.
> Ceci peut tenir dans un carré de 2 mètres de côté. Et les deux jambes de la maîtresse de maison, le soir, ne seront pas gonflées de fatigue. [86]

So all the strenuous efforts to save the housewife from being chained to her kitchen, to furnish her with free time and in that way to free her for her own self-improvement, to which end the provision of the common services was intended to be the means, seem to have been abandoned for what is tantamount to a glorification of the "maîtresse de maison est à ses fourneaux préparant les nourritures:....." [87] It is now the compact planning of the kitchen that will ease her lot, rather than any ideal of a fully-serviced household. Such an ideal, in fact, begins to look somewhat antiseptic when set against the atavistic aspiration suggested by Le Corbusier's "L'abri de groupe familial le "Feu", le "Foyer" [88] and against the corresponding image of family life (*fig. 108*) enshrined in the frontispiece of his book The Marseille Block.

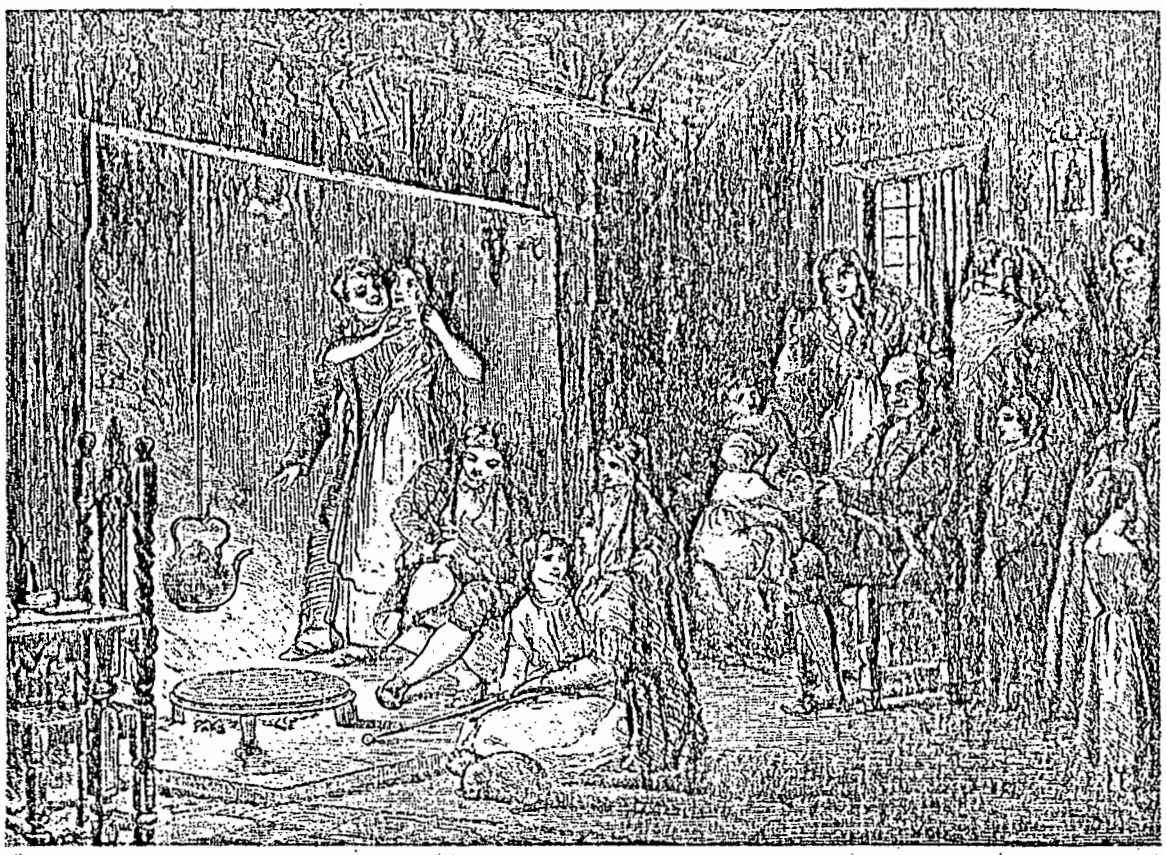
Our assumption, made right at the very beginning of this discussion, that the Unités of the Marseille-Sud

86. Le Corbusier, Oeuvre Complète, Vol. V, p. 104

87. Le Corbusier, Oeuvre Complète, Vol. V, p. 104.

88. Le Corbusier, Oeuvre Complète, Vol. V, p. 104.

fig. 108



THE FIRE . . . THE HEARTH . . . Focus of long standing tradition . . . meeting place of the famliy

scheme were similar to that on the Boulevard Michelet, an assumption which followed Le Corbusier's rather general statement to this effect, cannot thus be borne out; In Marseille-Sud, Le Corbusier has argued himself into a position where the common services can have no place.[89] Understandably he does not expose this contradiction. In terms of our highlighting of the inconsistent relationship between the Unité size and the common service module, a Unité of 1,600 people without common services is less illogical than one equipped with these. This does not make the module more logical though, since Le Corbusier simply abstracts the common services from the Unité, leaving it unaltered in all other respects.

The "prolongements du logis " have a fate similar to the common services: the tennis and basket-ball courts, soccer fields, running-tracks and swimming-pools that had been placed with such deliberation "at the foot" of the Ville Radieuse redents the better to encourage that physical exercise by men and women which would "fill them with joy and optimism ",[90] have all now been compressed into the linear 7-V green swathe so that to enjoy them now requires a special trip.

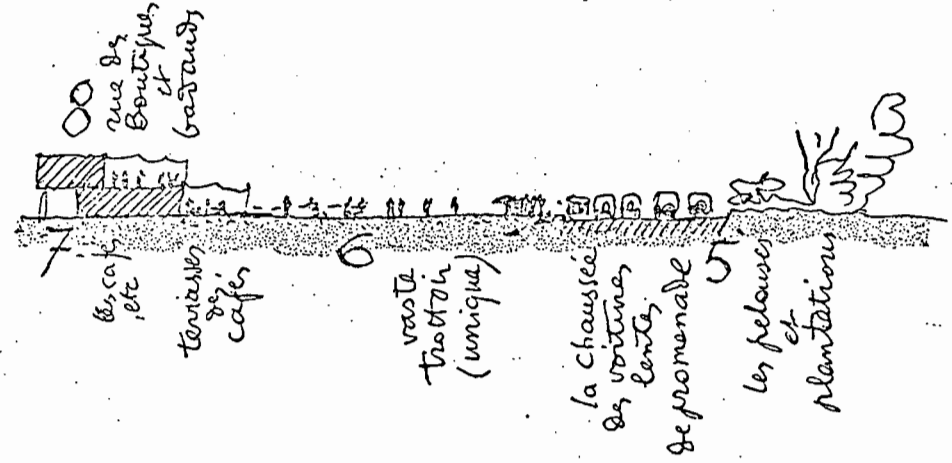
The notion of an "intensity in consecrated leisure" is no longer invoked and seems to have given way to an acceptance, albeit tinged with irony, of the little pleasures of everyday life on the V4:

89. In projects for "linear-industrial cities" at La Rochelle (1945), St. Gaudens (1945) whose populations vary between 10,000 - 35,000 inhabitants, and where the "Sector" principle is not used, Le Corbusier's insistence on the inclusion of common services is more credible though not necessarily more logical since all these Unités house 1,600 - 2,000 people.

90. Le Corbusier, The Radiant City, p. 65.

> Au long de la V4 s'alignent les boutiques les petits steliers d'artisants, les cafés les cinémas, etc.....
> .....
> On y circule, on y achète, on y discute, on s'assied aux terrases des cafés. Ici s'écoule la petite vie quotidienne, puérile mais equilibrée. Ce type de groupement urbain prend la forme d'une cité linéaire parcourant le paysage et puisant sa séve au long de son axe là où passent les automobiles au ralenti, les vélos, là sont les piétons sur les larges trottoirs à l'ombre des arbres. [91]

91. Le Corbusier, Oeuvre Complète, Vol.V, p.106.



Given the much-mellowed and newly-permissive attitudes evinced by Le Corbusier in the foregoing citations relating to our present discussion, it ought to come as no surprise to find him not only incorporating the existing areas of traditional low-density housing into his plans for the Marseille-Sud prototype but himself introducing "maison familiales d'un étage". These last are not, to be sure, the same as typical suburban lot-developments; the label given to this low-rise family housing --"unités horizontales d'habitation"[92] -- of itself suggests something quite different. But this does not materially alter the fact that what we have here is a plain acknowledgement on Le Corbusier's part of a family's need for ground-contact, "maison familiales avec pelouses communes pour l'enfance"[93] and that is an important concession. What may come as a surprise, though, in view of what we

92. Le Corbusier, Oeuvre Complète, Vol. V, p. 106.

93. Le Corbusier, Oeuvre Complète, Vol.V, p. 115.

have thus far been given to understand concerning Le Corbusier's attitude to urban housing,[94] is the numerical weightings he assigns to the different housing categories in his scheme. (fig.110) If we add to the Table that area and population represented by the existing housing[95] that is accepted into the Marseille prototype (See fig.102), the numerical importance of the Unités in the resultant distribution would be even further dimished.

Despite the obviousimportance of Le Corbusier's unexpected importation into the Marseille-Sud scheme of a low-rise/medium density (250 p.p.h. or 100 p.p.a.) housing component (i.e. the 'unités horizantales d'habitation'), his treatment of it is fleeting and purely diagrammatic. (See fig.103) Enough is shown, however, to piece together, with the aid of earlier comparable schemes, what Le Corbusier's general design attitudes are likely to be in this case. The dwellings would probably be partly raised off the ground, thus creating a sheltered open area underneath the house, without however enclosing any other private open space beyond the dwelling envelope in the way of gardens, yards, etc. A possible model for this housing-type is the M.A.S. house (1939) (fig.111-113) which was basically a single Unité cell that was potentially horizontally extensible as in the St. Baume and Roq projects (fig.114); another useful indication of Le Corbusier's general intentions is the Barcelona housing scheme (1933) for immigrant peasants (which was part of the larger Barcelona 'Macia'plan).

94. This can be conveniently summarized by a drawing and caption in The Home of Man, p. 73 : (fig 109)

The urban agglomeration laid out as a "green city": 100,000, 200,000, 500,000, 1 or 2 millions of inhabitants.

In its heart, the civic centre. The town, uncencumbered by any marginal vagaries, abuts sharply upon the meadows. Suburbs are forbidden and uninvited.

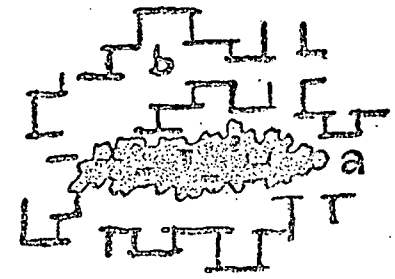


fig. 109

95. Le Corbusier describes this category, D, on the diagram (See fig.102) as follows :

" En D apparaissent d'anciens hameaux, bourgs ou villages traversés généralement par les "chemins des ânes". Ainsi la vie continuera-t-elle à s'écouler au long de sa piste la plus traditionnelle."

(Le Corbusier, Oeuvre Complete, Vol. V, p. 107).

Enoncé des densités

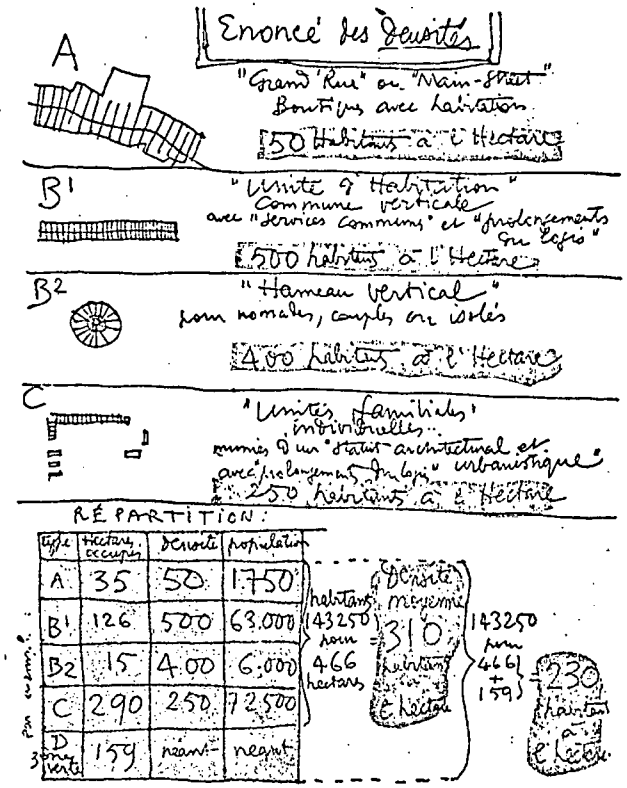
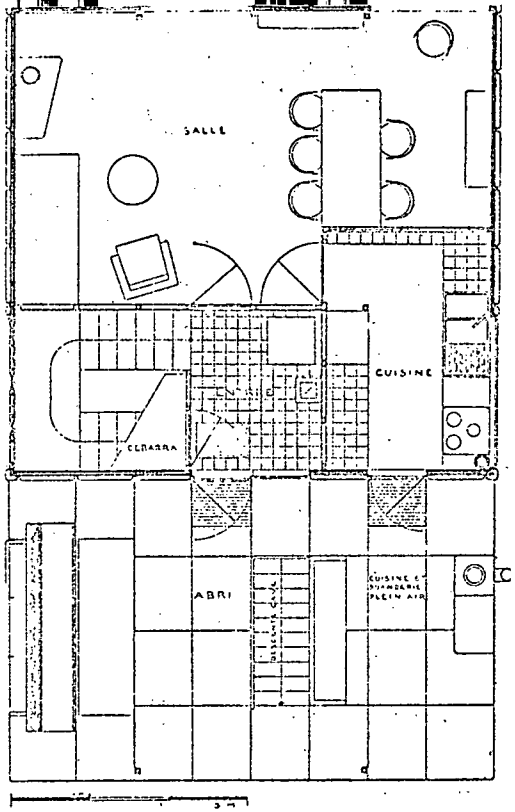
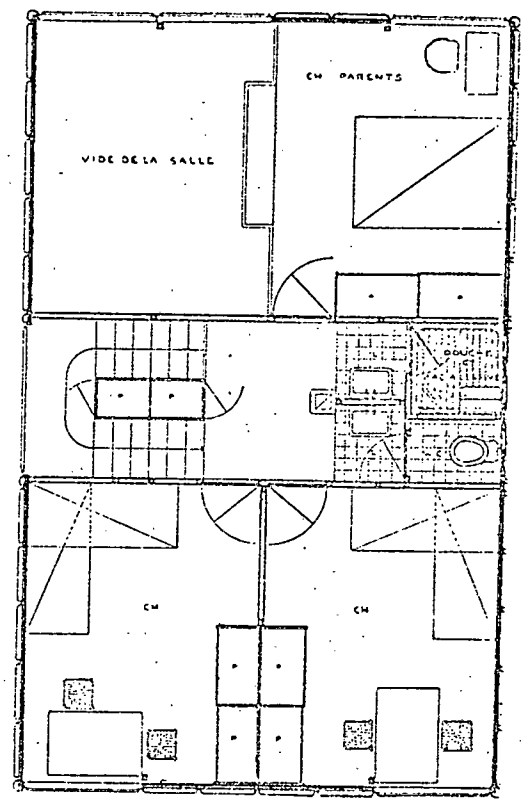


fig.110



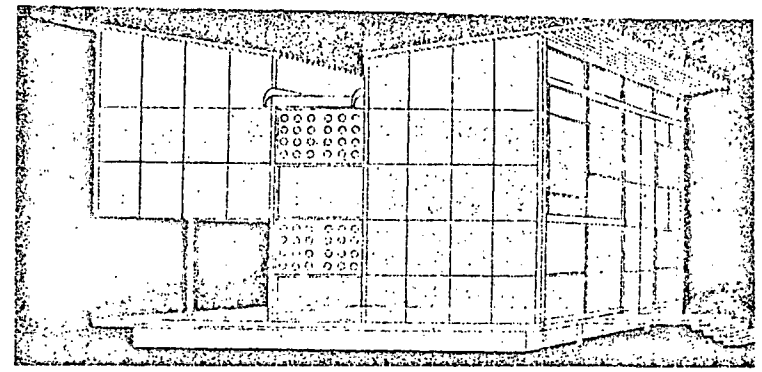
Le rez-de-chaussée
Ground floor

fig. 111



L'étage
First floor

fig. 112



Vue d'une maison préfabriquée et montée à sec
Perspective of a prefabricated house in dry construction

fig. 113

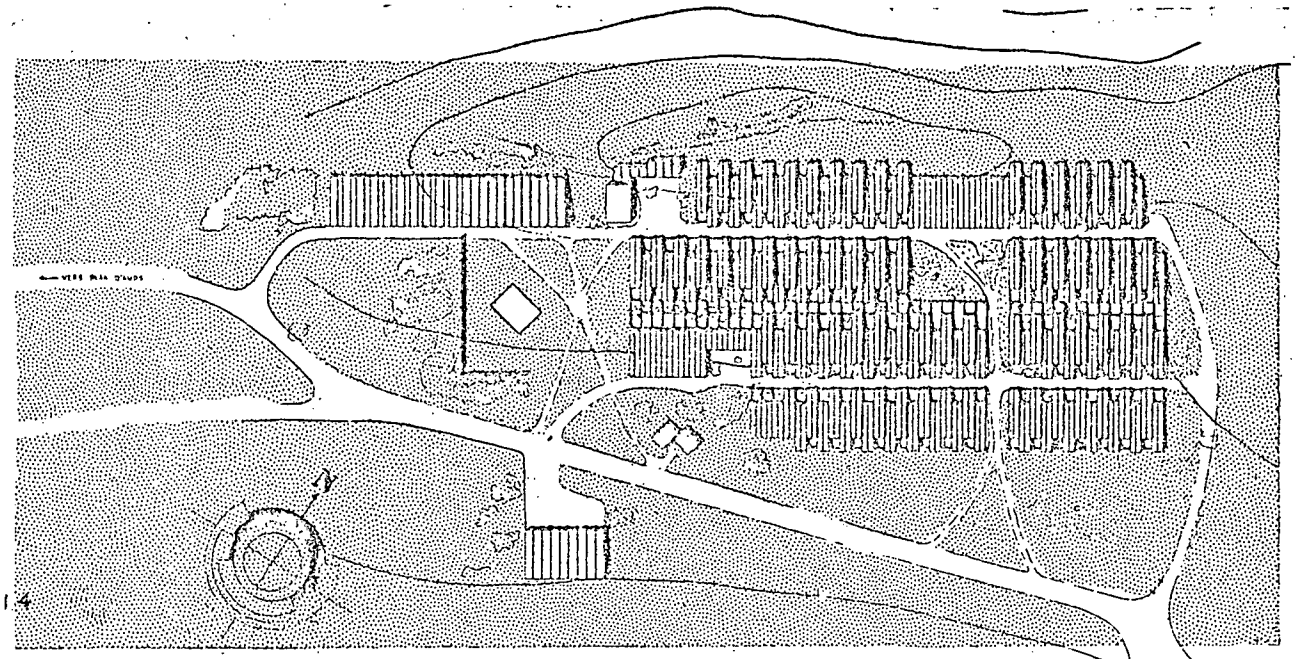


fig. 114

Plan d'ensemble de la Cité Permanente d'habitation. Premier projet, exécution en pisé

Though in the Barcelona scheme (figs 116-117) both layout and DU's were more tightly planned than is the case at Marseille-Sud, the layout managed to achieve a convincing degree of integrity and variety, largely because it completely eliminated the motor car (as did Le Corbusier's other schemes of this ilk at St. Baume, Roq and Rob); At Marseille-Sud, however, though Le Corbusier talks of a " Séparation totale de l'auto et des jeux. Le terrains de jeux sont accumulés sur l'autre face des maisons, à l'abri du bruit et des dangers"[96] this in practice proves to be unconvincing, and the complexities of this scale of design are handled with a lack of clarity and sophistication that is unusual in Le Corbusier's work. Certainly the proliferation of roads and 'hard areas' (presumably parking) within the low-rise housing area begins to give rise to doubts about the supposed economies of the filigree end of the 7-V system. (fig 115)

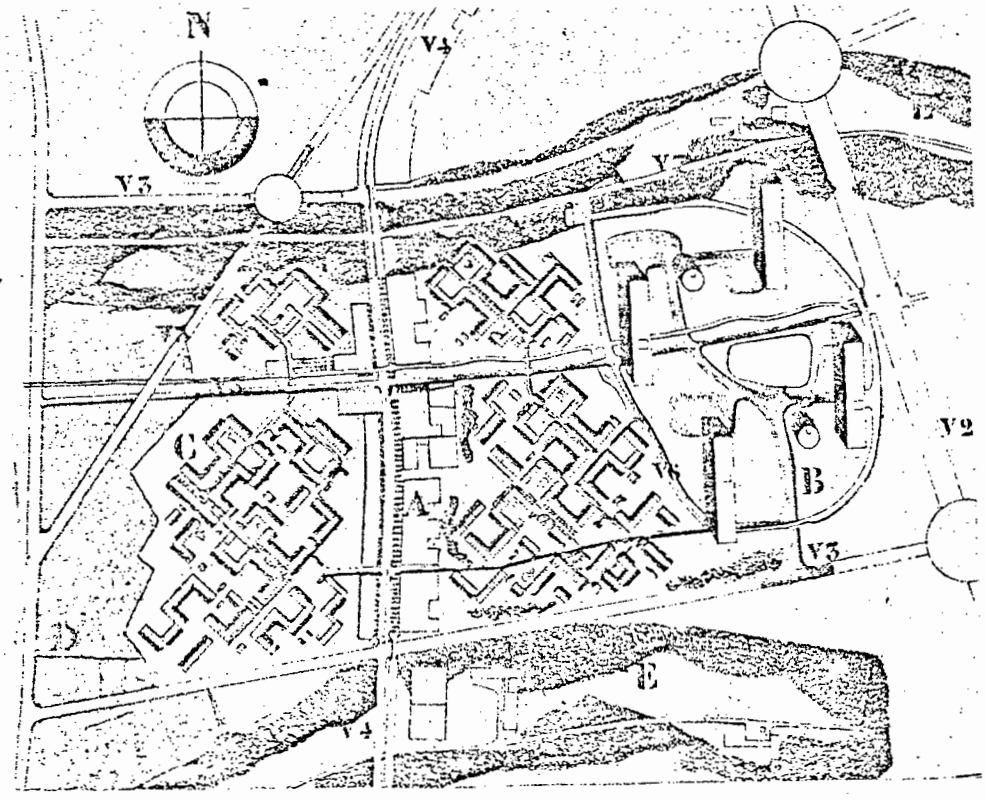
Another variety of low rise housing in the Marseille-Sud scheme, not elaborated at all, but potentially even more interesting than the above, is the row-house accommodation provided along one side of the shopping streets (Category A See figs 103,110) Though the quantity of this type of housing was to be severely limited to prevent "natural" market forces from creating the horrors of a 'corridor-street', this unprecedented concession on Le Corbusier's part to mixed function zoning of this kind is a significant one.

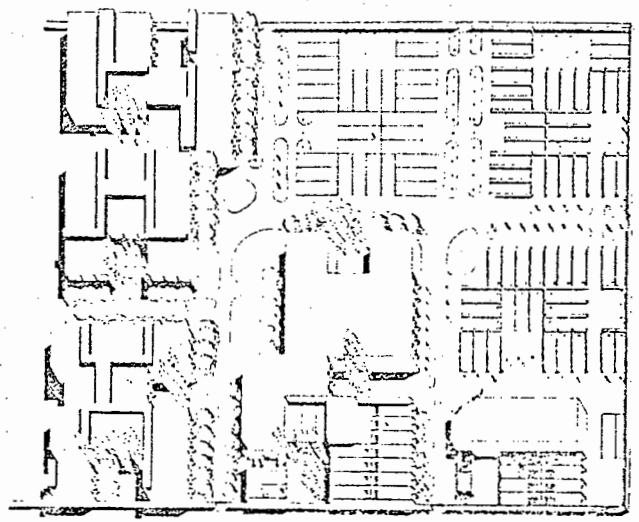
Urbanisation de Marseille-Sud (Michelet)
Secteur théorique
Circulation

Réseau intérieur
Distribution pour les catégories:
cat. A: V 4 et V 5, circulation lente mixte: autos, piétons
cat. B: a) ramification des V 3 = route, parking garages
b) Alimentation par V 5 et V 6 (autos lent et vélos – orange) par V 5 et V 6 (piétons seuls – jaune citron)
cat. C: a) Alimentation par V 5 et V 6 (autos lent et vélos – orange)
b) Alimentation par V 5 et V 6 (piétons seuls – jaune citron)
cat. E: Alimentation par V 7 (piétons seuls – autos par autorisation)

96. Le Corbusier, Oeuvre Complete, Vol. V, p. 113.

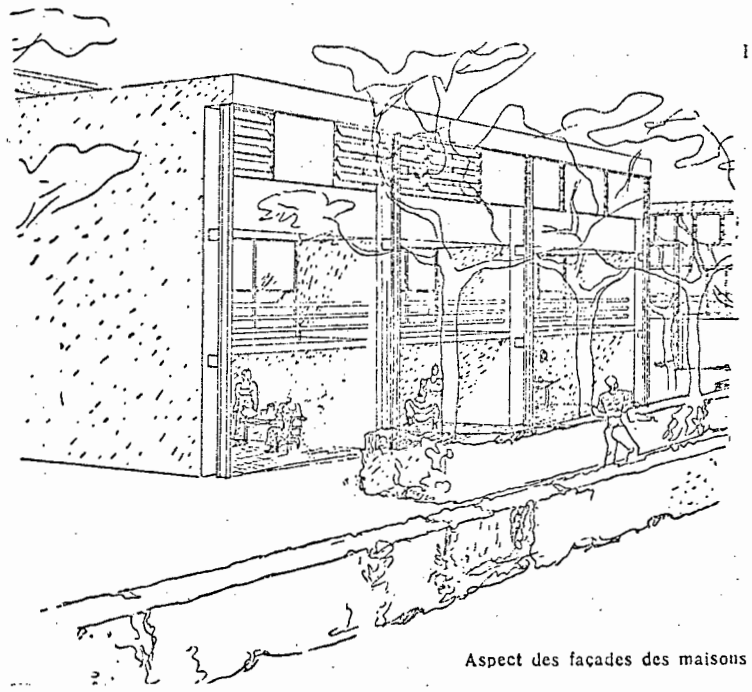
fig. 115





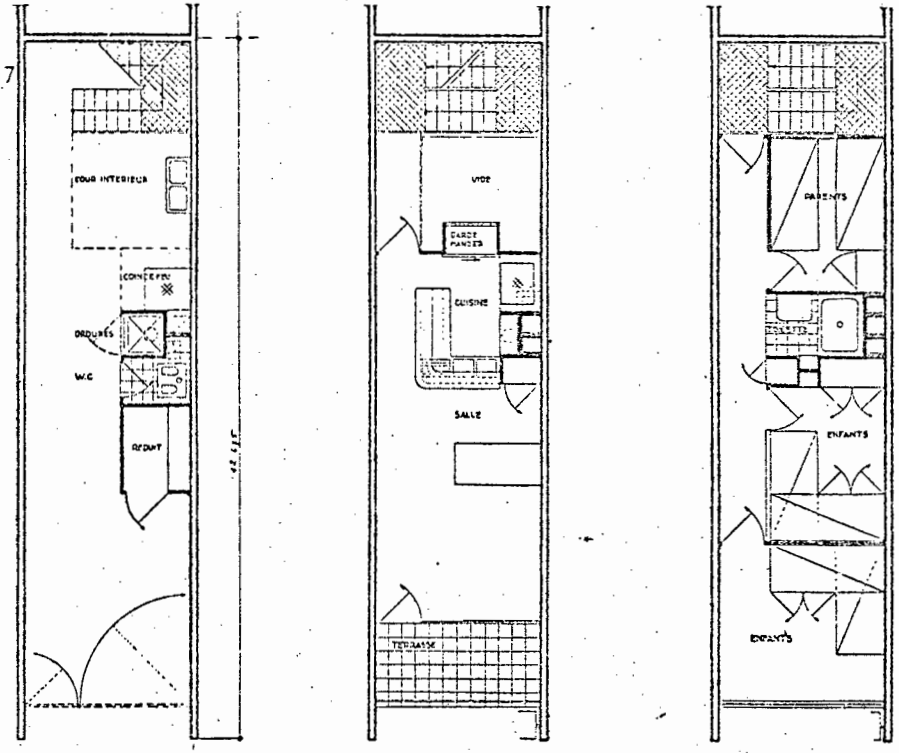
Lotissement type

fig. 116



Aspect des façades des maisons

fig. 117



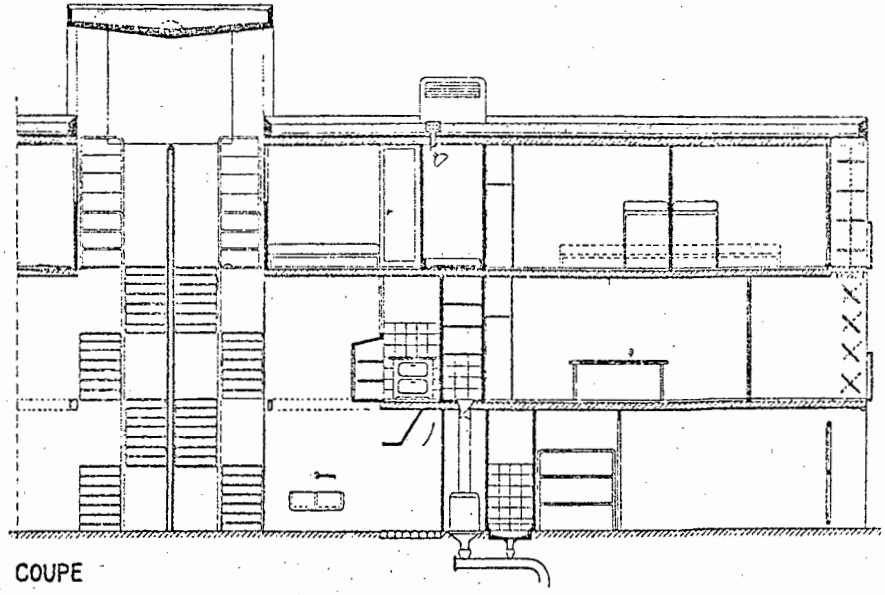
PILOTIS

REZ DE CHAUSSEE

ETAGE

BARCELONE, LOTISSEMENT 1933

Le projet définitif



COUPE

We are, it is by now clear, talking about an approach quite different in scale, technique, intention and mood to that characterizing the Ville Radieuse. In Marseille-Sud, numerous aspects of the prevailing urban pattern have either been compromised with or accepted: the superimposition of the design upon the established configuration of the area does a minimum of violence to existing road networks whose meandering shopping-street ribbons are pressed into service as the project's V-4's (Cf. figs. 118, 119 & 120); furthermore, much of the existing small-scale housing has been incorporated into the scheme intact.

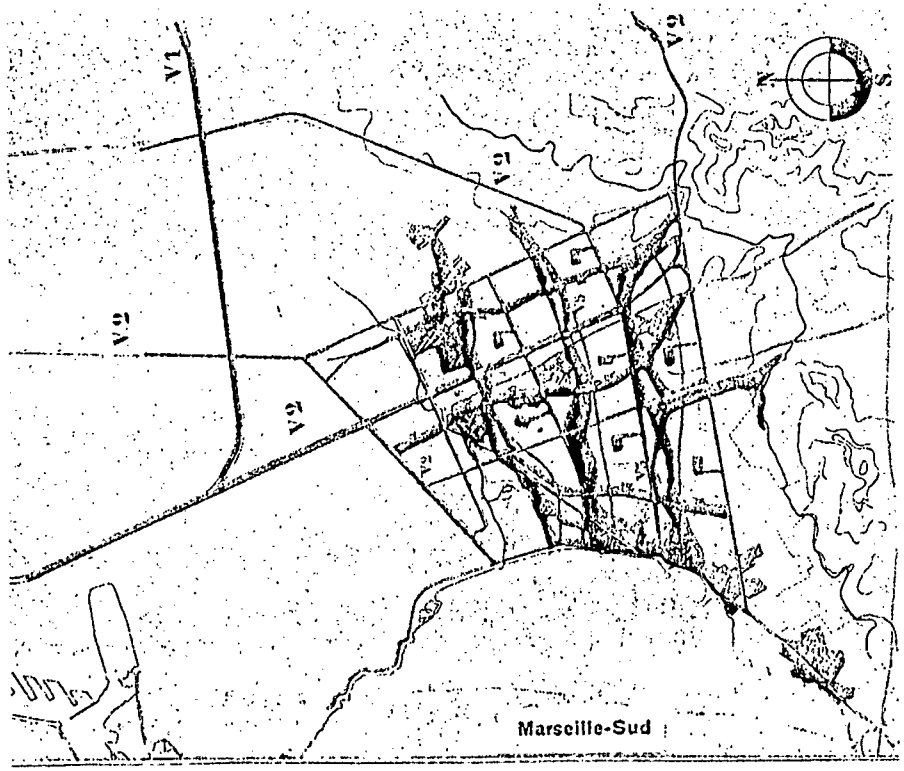


fig. 120

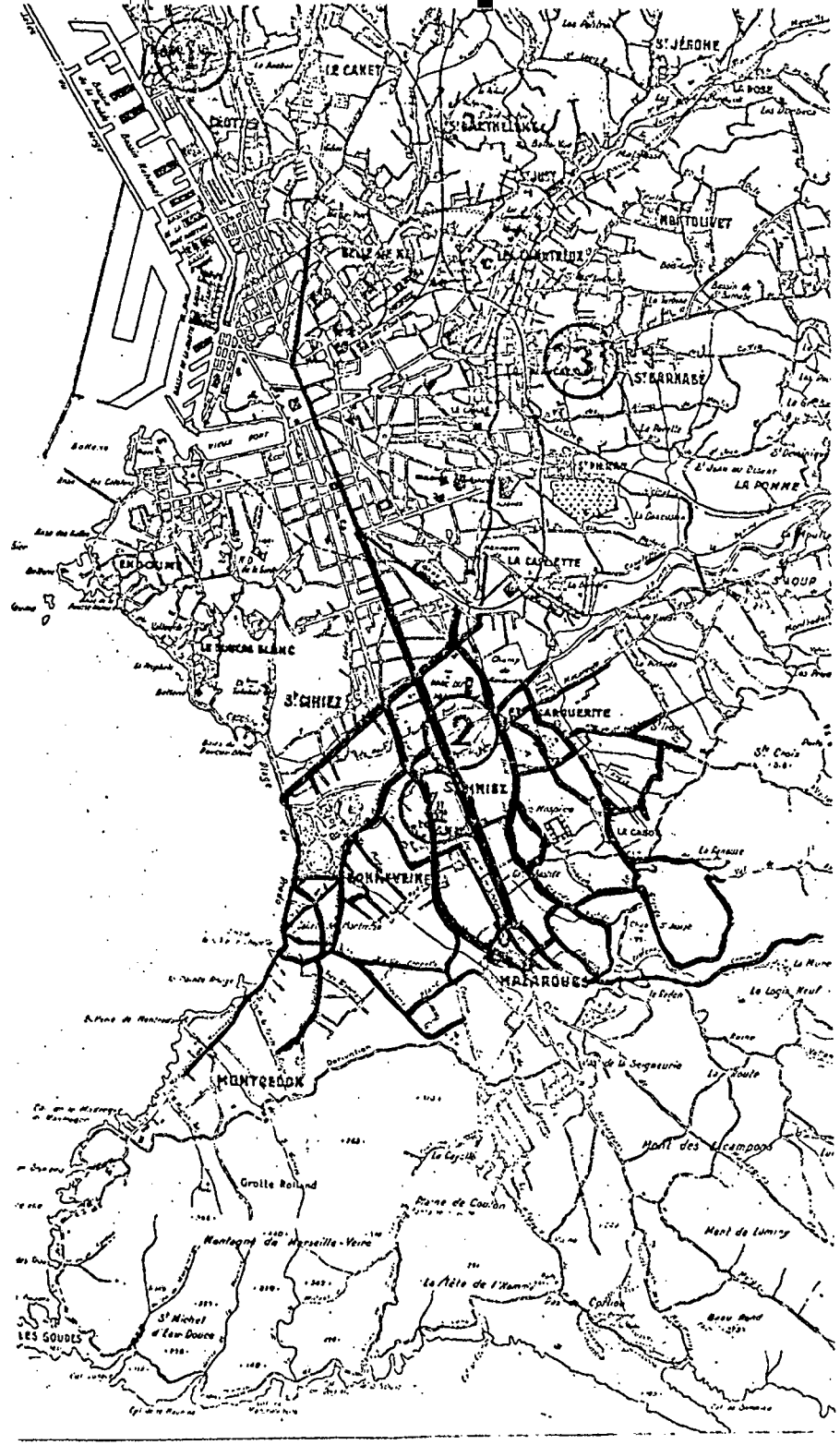


fig. 118

Solid black lines indicate existing road infrastructure that is retained

The project clearly then, is one which does not depend for its success on a massive injection of new inter-dependent systems into a given context, but which, through the separability of its constituent elements, can be phased into existing situations without a legislative revolution. Accordingly, in the text accompanying the project and in the essay preceding it, there are no desperate appeals to Authority as the only instrument capable of bringing about its realization. Absent too is the usual hallabaloo about the technological wonders of the new machine age write large on every horizon.

After the Second World War, which had demonstrated that technology as a weapon in the hands of total Authority could command the support of the masses for the most inhuman and destructive causes, the theoretical foundations of CIAM (and of Le Corbusier) -- new technology, the need for implementational authority and faith in the masses- no longer retained their former apolitical innocence.

This radical undermining of its philosophy threw CIAM into some confusion after the war and there was much soul-searching and much talk of 'human qualities' and 'human techniques', 'social contacts' in smaller neighbourhoods 'human friendliness' in the newly-discovered 'heart of the city' and so on.

Many of the revisions evident and many of the instances of retrenchment in the Marseille-Sud scheme should

against this background of shifting values and changed times.[97]

Marseille-Sud's considerable concession to established patterns of life appears to be accompanied by a provisional, patient and tolerant attitude towards the very difficult question of the acceptability by society-at-large of environmental change: "C'est par la qualité de chacun des individus que l'architecture moderne franchira l'étape décisive".[98] We have here a change of heart which was even more marked in the forum of CIAM where the roughshod trampling over the man-in-the-street by we-know-best-architects that had been characteristic of its deliberations in the Thirties, was now being seriously questioned. Though Le Corbusier could not go as far as his colleagues in these soul-searchings,[99] he began to evince a new-found concern for tradition, custom and permanence under the influence of which his earlier celebrations of the shining-new environments of the Machine Age and the joys of accelerating renewal suffered a decline. Thus the attitude expressed in, "Tomorrow there will be new beauties, new truths..... the day after tomorrow..... But in this way life is full and beautiful. We do not presume to dictate the course of imperishable things of the future,"[100] had been modified by 1944 to :

> Part of the daily environment, their familiar traits unite the present with the past. Custom for some of them a thousand years old, has made of them the companions of our lives. This

97. In a similar sense, Le Corbusier's euphoric belief in the feasibility of the Ville Radieuse should be seen in relation to the phenomenal idealistic upsurge in Soviet architecture and planning in the late Twenties and early Thirties, when, in the eyes of many West-European avant-gardists, both the means and ends of the good life seemed just around the corner.

98. Le Corbusier, Oeuvre Complète, Vol. IV, p.150.

99. A policy statement at the Bridgewater CIAM (1947) contains the resolution:
"Encourage CIAM groups to keep in touch with the public needs and observe the progress of the public's understanding of CIAM principles, with the object of assisting modern architecture to develop in sympathy with the aspirations of the people it serves."
(S.Giedion, Decade of New Architecture, p.17)

Van Eesteren, for example, one of the 'old guard' leaders was talking of "contemporary life" in these terms:
"Those banal fragments display to us a reality that we may not find pleasing, but that we cannot but accept"
(S.Giedion, Architecture, you and me, p.86.)

100. Le Corbusier, Aircraft, above fig.36.

101. Le Corbusier, Talks with Students, p.51.

> friendly pact with one's environment is something to consider. From it, we can get a feeling of security, of belonging, and in just this we have the secret, the precious source from which all architecture springs. [101]

These changes in Le Corbusier's outlook, the impact of which was reflected in the Marseille-Sud project had the effect of progressively undermining the raison d'etre of the Unité as a housing type. In more specific terms, the Unités of Marseille-Sud, stripped as they are of a high-density context, integral common services and the immediate environment of functional green space, begin to look like just another housing option rather than the touchstone for a new way of life.

Marseille-Sud was, effectively speaking, Le Corbusier's last statement on the large-scale organization of the urban fabric and its housing pattern. 'Effectively speaking' is used advisedly here, since in his competition entry for the reconstruction of the centre of Berlin (1958) Le Corbusier did attempt a final reversion to some of the pristine strengths articulated in the Ville Radieuse.

But even prior to the Berlin competition entry, he was already showing signs of uneasiness with the toned-down organizational systems that had been allowed into the Marseille-Sud scheme. The uncompromising boldness, the purity, the "Homeric" [102] world of the Ville Radieuse held allurements he could not easily resist; so just five years after Marseille-Sud, we see Le Corbusier retracing his steps in the direction of the Ville Radieuse....

102. This is the heroic phrase Le Corbusier uses in his 1964 epilogue to the reprinted and translated edition of The Radiant City, with reference to the Antwerp plan (1933).

while at the same time attempting, rather disingenuously, to keep open the option of the later less intense approach:

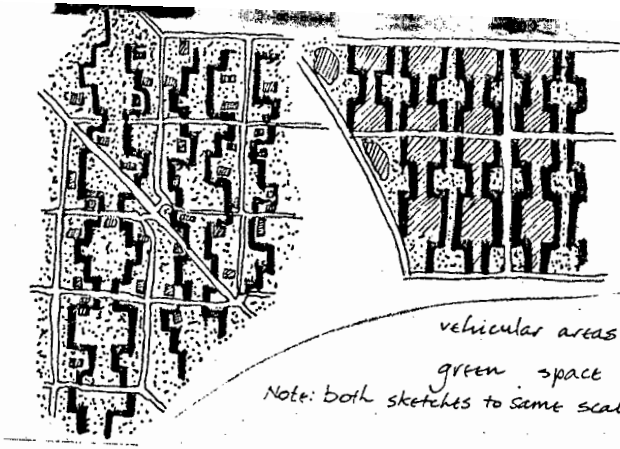
> Arithmetic of the Radiant City:
> By building 50 metres high, allocating 14 square meters of dwelling to each resident we will erect buildings covering 12% of the surface of the site.
> Still available: 88% of the ground surface to arrange the separation of pedestrians from cars, to set up schools right at the foot of each house, sports facilities at the foot of each house, etc.....
> Density can go as high as 1000 people per hectare! Likely figures are 200, 300, 400, 600. The city becomes green. (Buildings of the "redent", or setback type, as in the 1935 Radiant City.)
> And if we adopt Unités of the "Marseille MMI" type:
> $3\frac{1}{2}$ hectares for an optimum Unité (2000 residents)=500 people ler hectare.
>
> 1000 residents per hectare
> 500 residents per hectare
>
> are prodigious figures, capable of settling the modern problems of city planning.
>
> Whereas "the individual house" yields a density of 100 people to the hectare, an appalling waste. [103]

103. Le Corbusier, Nursery Schools, p. 21.

But the Ville Radieuse machine had not been put through its paces for some twenty years and its performance in the Berlin plan could not reproduce the spectacular gains achieved by the original: the hoped-for density of 1000 p.p.h. was realised, but the critical balance between sky, sun trees, steel cement, and tarmac was quite upset (*fig. 121*); the endeavour to integrate a DU based on $20m^2$ per person into a

fig. 122

123



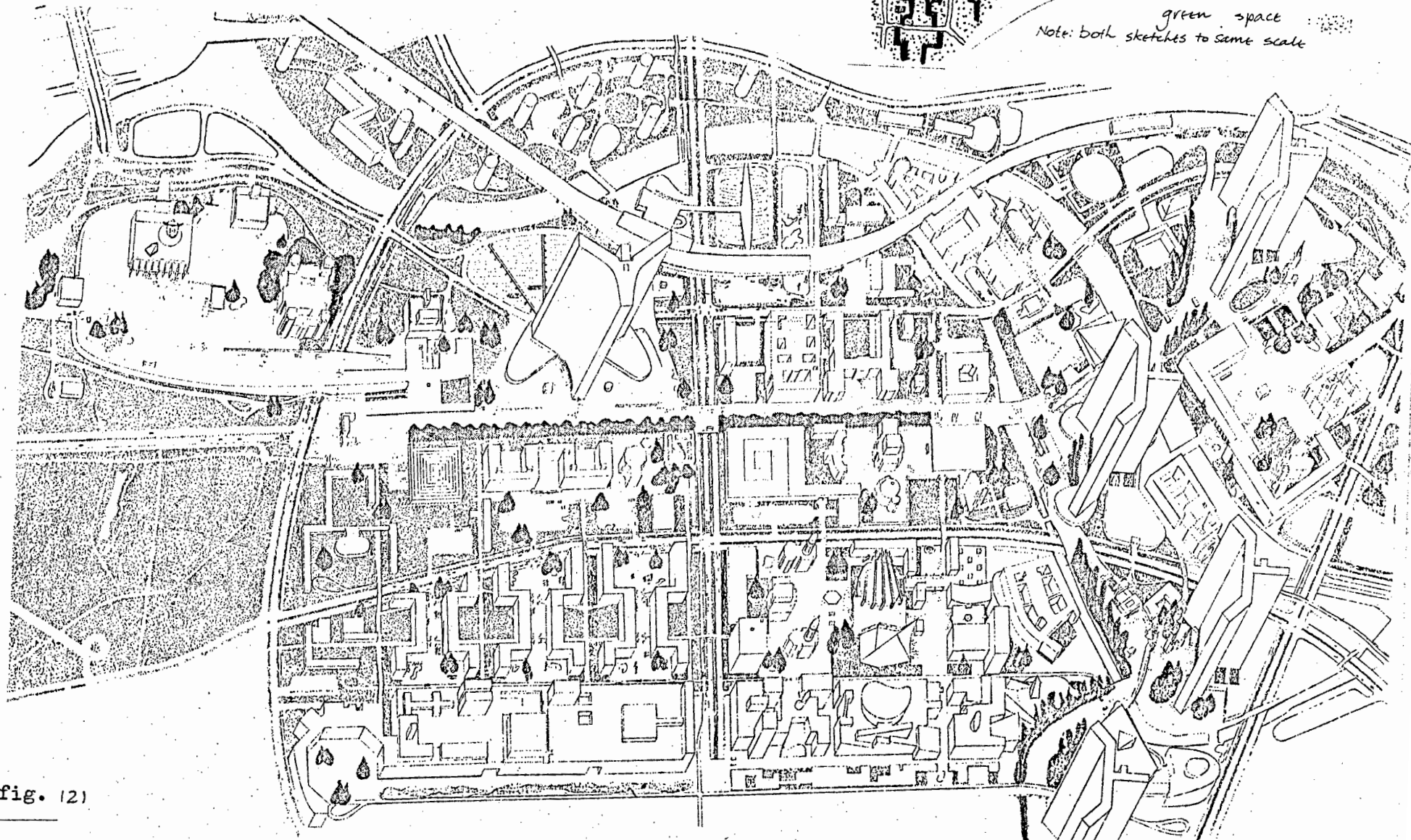


fig. 121

Vue Isométrique **Berlin**

mass housing configuration and the need to make provision for the mushrooming demands of the automobile placed an intolerable strain upon the whole system, as a comparison between the Berlin scheme's environment and that of the Antwerp scheme of 1933 makes clear (Cf. figs. 122, 123).

The year 1958 witnessed not only this demonstration of the inadequacy of the most cherished of all Le Corbusier's excogitations but also the collapse of CIAM at the hands of a new generation of militants over-reacting to the excesses of the old guard even as in their turn they had over-reacted to the physical horror of the slums of Europe. Le Corbusier, sensing in advance, it seems, the direction in which things were moving and concluding, evidently, that it all spelled impasse, if not the end of the road, as much for himself as for CIAM as he knew it, sent notice of his abdication already in 1956 to the tenth congress of CIAM in Dubrovnik.

> It is those who become 40 years old born around 1916 during wars and revolutions, and those then unborn, now 25 years old, born around 1930 during the preparation of a new war and amidst a profound economic social and political crisis, thus finding themselves, in the heart of the present period, the only ones capable of feeling actual problems personally, profoundly, the goals to follow, the means to reach them, the pathetic urgency of the present situaion. They are in the know. Their predecessors no longer are, they are out, they are no longer subject to the direct impact of the situation.

CHAPTER THREE

CONTEXT - THE UNEASY RESOLUTION

Despite the planning impasse Le Corbusier had reached by the Fifties and notwithstanding what I have interpreted as his admission of this, he continued to project the Unité as the answer to the problems of urban housing(or housing of any scale in whatever context for that matter)and was quite content to propose the erection of single Unités, as isolated elements, completely removed from any larger scale context from which they might have derived functional support.

We have seen that as an element of the Marseille-Sud context, the Unité had in fact, become quite dissociated from its former support systems and was deriving no significant benefits from being grouped together with other Unités (other than sharing a parking garage) and was thus eminently separable from this context to the extent that it could be regarded as an alternative housing option in its own right. At the same time, however, it has been argued that the Unité exhibited characteristics which certainly did make sense in earlier contexts but whose retention in later ones has to be regarded as illogical and unjustified in view of the disjunction that came to characterize the relationship between the Unité and its matrix or context.

Are we to assume, then, that Le Corbusier, in persevering with a Unité shorn now of all contextual justification, was acting more or less out of force of habit ? Or was it out of his characteristic desire to appear consistent, or even out of a belief that the Unité was, as it were, a

synecdoche for the treasure-chest of the Ville Radieuse?

There may be some truth in all of these assumptions but the grounds on which Le Corbusier chose to justify the Unité in his last fifteen years point rather to a stubborn faith in certain specific qualities that, as he saw it, continued to inhere in and animate the Unité quite irrespective of whether the structure, taken as a whole, still enjoyed contextual support and justification. The mere presence - or survival- of these qualities or attributes in the Unité was, apparently, justification enought for its perpetuation in toto.

The qualities here referred to operate on a more metaphysical and symbolic plane than those aspects of the Unité we have considered to date and at this more exalted level they continue to relate to Le Corbusier's prime concerns - the Man/Nature and the Individual/Collective binomials. The stratum of justification comprising these qualities had, in fact, always been present in Le Corbusier's verbal output, but it tended to be subsumed under other categories of justification for the greater part of his carrer; Towards the end, though these qualities cameto be his chief source of reference and justification and as such were raised to a new prominence.

Individual / Collective

The search for a 'sociological' rationale for the Unité hinted at by Le Corbusier in a passage cited earlier

leads to a dead end; he said nothing further about the specific social benefits which might be expected to accrue from living in Unités of the Marseille-Sud type. And while he continued to speak of the Unité's rôle in creating a 'collectivity', he did so in generalized and largely symbolic terms:

> ....les hommes aiment à se grouper pour s'entr'aider, se défendre et économiser leurs efforts..... Le rassemblement des foyers réalise les phénomènes d'entre'aide, de défense et sécurité, d'économie et d'épanouissement de la solidarité industrielle capable de servir à des buts fraternels, cadeau des techniques modernes.[1]

The mere fact of an agglomeration of dwelling units raised up for the eye to behold --"nothing that concerns the the surface can exist other than in terms of height. Here is the key to all solutions"[2]--has in itself, in the manner of an ideograph, already become an emblem of the collectivity, of man-writ-large:

> L'homme seul est faible et indigent; s'il se groupe en unités de bonnes dimensions, il acquiert une puissance gigantesque.[3]

The empathetic chord that Le Corbusier assumed would be struck in the beholder at the sight of this symbol that "stands upon its muscular legs as an image of human uprightness and dignifies all its individual units within a single embodiment of the monumental human force which makes them possible"[4] would be reinforced tenfold, he believed, by the literal imprint of the human scale throughout the building through the use of the Modulor.

1. Le Corbusier, Oeuvre Complète, Vol, V. p. 105.

2. Le Corbusier, The Radiant City, p. 198.

3. CIAM 5 --"Logis et Loisirs" p. 28.

4. Vincent Sculley Jr. Modern Architecture, p. 44.

It is only on this ideographic, symbolic level that the Individual/Collective binomial may properly be thoughtof as being embodied in the Unité ; in this interpretation the terms of the binomial are understood to have been reformulated so as to have reference to the Unité's visual impact, its power of scale and its proportion. The term, "Unité de Grandeur Conforme" takes on in this light a very specific meaning: "appropriate size" becomes simply whatever size accords with the rules of plastic form. Looked at in this light there is sound visual logic behind Le Corbusier's decision not to increase the length of the Unité to the limits he had postulated in theory (*fig. 124*) even though this meant that both vertical circulation and common services were under-utilized -- since in this way he avoided the visual duality such an increase would have brought about. Similarly the decision taken round about 1945, to move the common services to halfway up the building was equally a product of visual logic: "Le centre commercial de l'Unité se trouve ainsi véritablement en son"centre", compte tenu de la troisième dimension".[5]

What we have here, in fact, is a shift from an earlier position which viewed human participation in an environment in functional terms (provision of physical facilities on the basis of which the new Individual/Collective relationship was meant to develop) to a position where human participation was seen to

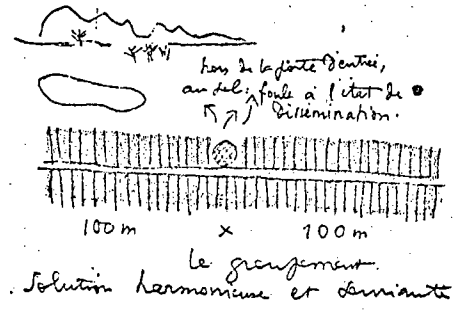


fig. *124*

5. L'homme et l'Architecture, p. 17. (Special issue: Le Homme et l'Architecture Unité d'Habitation a Marseilles de Le Corbusier, No's 11-14, 1947.)

proceed from symbolic/aesthetic identification, or, as Lipps had it, from "Einfühlung."

This proclivity may be illustrated, and the point amplified, by way of an example: Le Corbusier, in a paper delivered at CIAM 8 in 1951, consisting mainly of personal anecdotes upon the subject of "The Core (of the City) as a place for the Expression of Human Life", recounted the experience of witnessing a production of The Merchant of Venice, staged in a Venetian piazzetta, one of whose houses had been taken into service as a stage-set:

> Our amphitheatre of spectators was surrounded by three-storied houses whose windows were filled by the occupants and their friends. To the left a shop had been rented and here a fore-stage had been built to the side, in front of the canal. We found ourselves in the midst of a stage set that was itself alive. I assure you that it was an extraordinary - an overwhelming- experience to be present at this spectacle. When I came away I was intoxicated, moving in a world of fantasy.....
> .....
> Why was this performance so good ?[6]

At this point one would ordinarily expect the quality of the experience to be characterized by reference to 'total immersion in living theatre' or something of that kind; instead, Le Corbusier veers off in quite a different direction:

> Because of something to which I want to draw your attention. There are certain exactly <u>proportioned spaces of perfect harmony</u> which one could describe as places of 'visual accoustics' - places of such perfect proportions that the onlooker is made one

6. CIAM 8 - The Heart of the City pp.45-46.

7. CIAM 8 - The Heart of the City, pp.45-46.

with the surroundings. Move away a few paces and you no longer experience this: the harmony is broken or you are no longer in the play.[7]

This cast of mind[8] that leads Le Corbusier to derive an emotional experience of great intensity from a happy concatenation of purely physical and spatial rapports[9] also underlies his conviction that the Man/Nature binomial is brought to fulfilment in the Unité.

Man / Nature

Perhaps this issue is best introduced by reference to an argument that Le Corbusier puts most succintly in visual shorthand in The Home of Man (*fig.125*), though a similar idea is evoked in other ways in other places (*figs.126-128*).

It is to the end that he may gaze and meditate upon a bounteous vision of unspoiled Nature that Le Corbusier puts man in the cubic eyries of the Unité, to the end that he may gather a harvest from his meditation and come to realize both his smallness and greatness in the Universe:

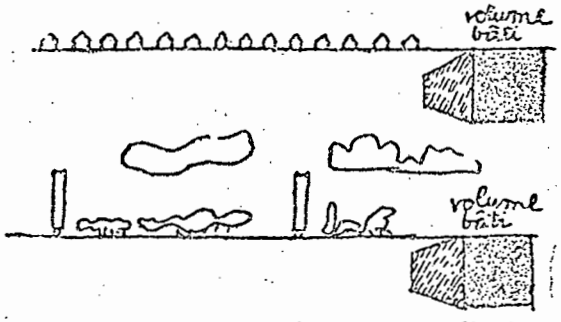
> ...Man is in a kind of cyclone; he builds solid houses to protect and shelter his heart. Outside, nature is nothing but indifference, even terror. The clouds come from far away, go far away, calm or broken up; sometimes the sky is blue. By itself the grand sport of the sky affects our hearts. Duality appears in the contrast between the unfathomable march of the elements and our precise, careful little calculations as sublime as they are puerile, established in the heart of the tumult.[10]

8. Compare Le Corbusier's priorities in his analysis of the Roman Forum in The Radiant City : "the Forum is a meeting place for collective action: it encourages such actions by the nobility of its ordered design and the charm of its proportions. Everything in it is synchronism and synthesis..." (p.186).

9. For Le Corbusier, one must remember, the most elevating emotion possible was the experience of what he called "L'espace indicible" ('inexpressible space'):

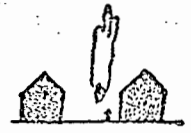
"It is not the effect of the subject chosen by the artist, but a triumph of proportioning in all things -- the physical properties of the work as well as the fulfilment of the artist's intention, controlled or uncontrolled, tangible or intangible,.....
.....
Then a fathomless depth gapes open, all walls are broken down, every other presence is put to flight, and the miracle of inexpressible space is achieved.
I have not experienced the miracle of faith, but I have often known the miracle of inexpressible space, the apotheosis of plastic emotion."
(Le Corbusier, The Modulor, p. 32)

10. Le Corbusier, When the Cathedrals were White, p. 161.

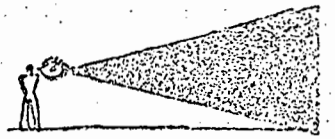


With equivalent built volumes, one can live in a "garden" city, or in a town of the type "radiant" city.

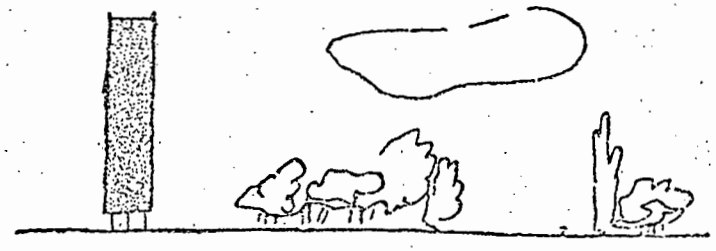
Who will be privileged, the inhabitant of the garden city or that of the new quarters of habitation?



a man,
his sky,
his tree,
his wall.

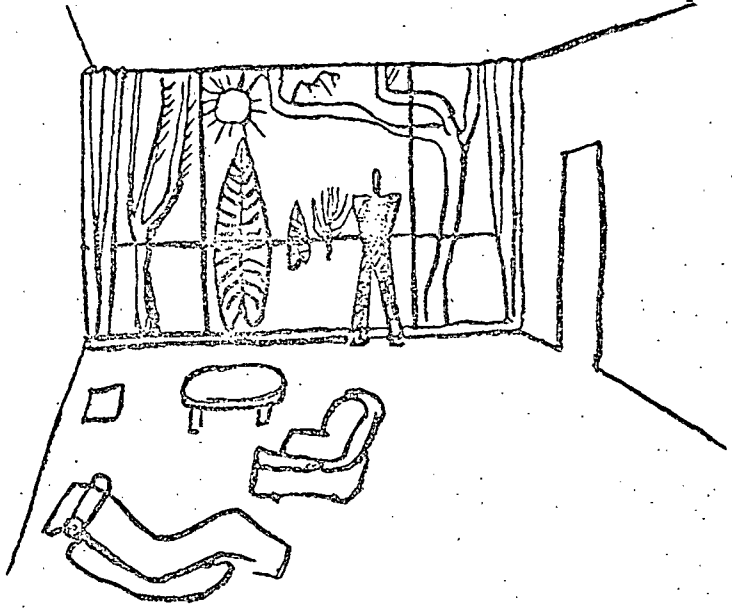


Let us not forget that our eye is five feet six inches above the ground; our eye, this gate of entry of our architectural perceptions.



A man,
his sky,
his tree,
his wall.

fig. 125



And the "essential joys" have entered the dwelling.
Nature is inscribed in the lease, a pact is signed with nature. Trees are present in the room of the dwelling.

fig. 126

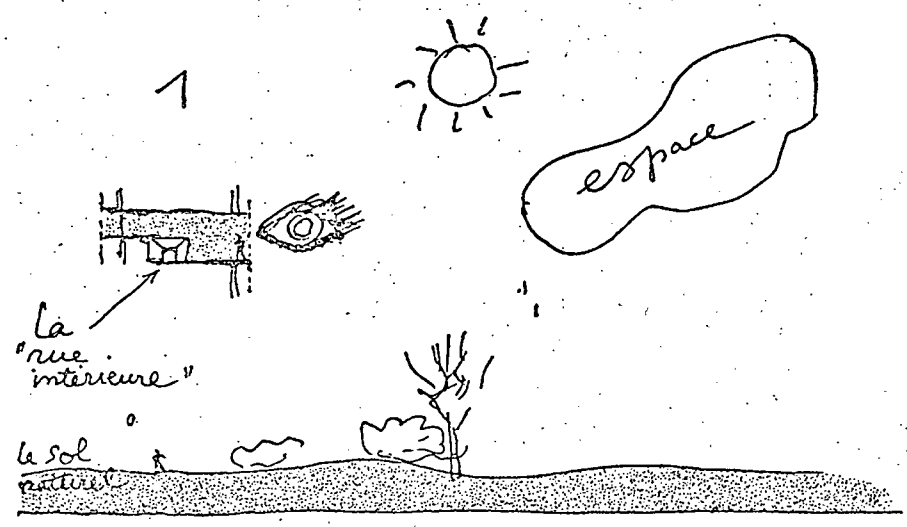


fig. 127

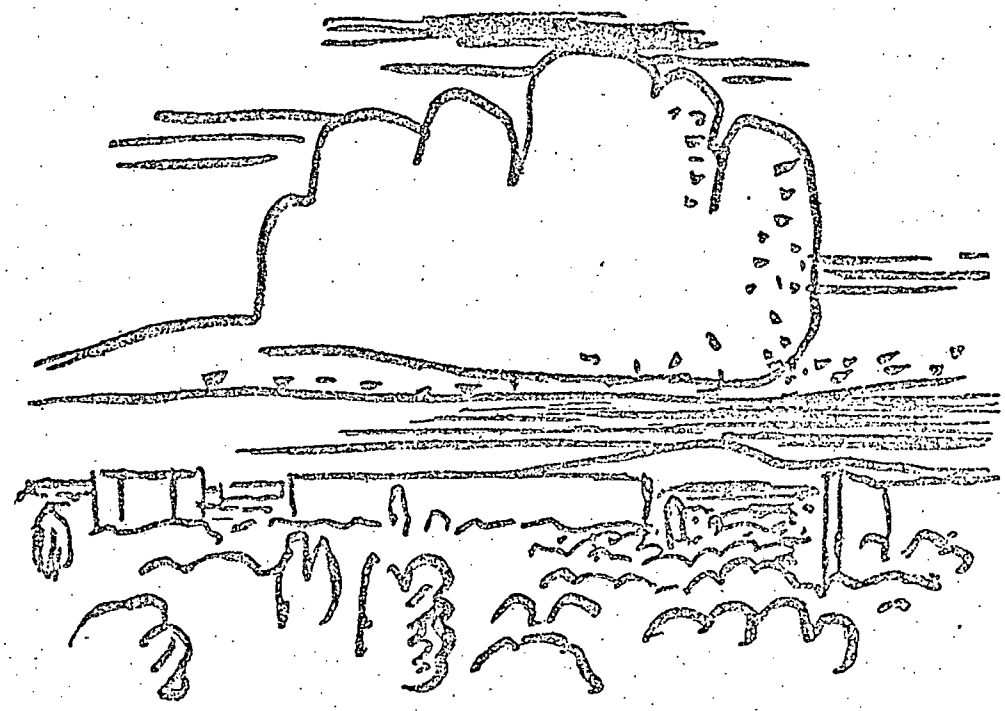


fig. 128

To dwellings high above the ground is offered the spectacle of the sky and all its movements and its colours, its forms throughout the seasons. A distant hill appears. From below push the green domes of the tangle of trees. The town is "green."

Of evident importance in the above passage is the juxtaposition of the perfect, geometric crystal of the Unité, (which Le Corbusier believed embodied the essence of the laws of nature)[11] with nature 'as found', that is, "Left free, wild or cultivated.....independent and whole; no longer crushed under the weight of building 'developments'.... a vision of beauty, natural and sublime will enter the homes of men through the window".[12] (*fig.129*)

It is vital, as Le Corbusier sees it that in this relationship Nature be perceived from a height,[13] a great extent of space and greenery be visible and the horizons remain distant. Generalizing his own experience into a response he believes to be true of all men, he declares:

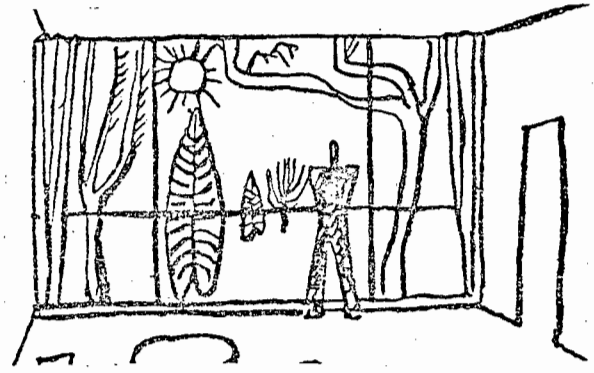
> Yet if I climb up to the platform of the Eifel tower,[14] the very act of mounting gives me a feeling of gladness; the moment is a joyous one, and also a solemn one. And in proportion as the horizons widens more and more, one's though seems to take on a large and more comprehensive cast. Similarly if everything in the physical sphere widens out, if the lungs expand more fully and the eye takes in vast distances, so too the spirit is roused to a vital activity. Optimism fills the mind. For a wide horizontal perspective can deeply influence us at the expense of little actual trouble.....Alpine climbers alone enjoyed the intoxication of great height.[15]

The visual expansion that comes from being 'elevated' in the Unité lookouts, then, catalyses a psychic expansion

11. These Le Corbusier sees as mathematical; they are only amenable to human interpretation through man's geometric constructions, which in the new Machine Age, approximate ever more closely to these mathematical purities:
"Never before the advent of steel and r.c. had our calculations got so near to nature. We have now tapped the very heart of the laws of matter; established a close correspondence with natural forces."
(Le Corbusier, Sur le Quartre Routes, p.22)

12. Le Corbusier, Sur le Quartre Routes, p.53)

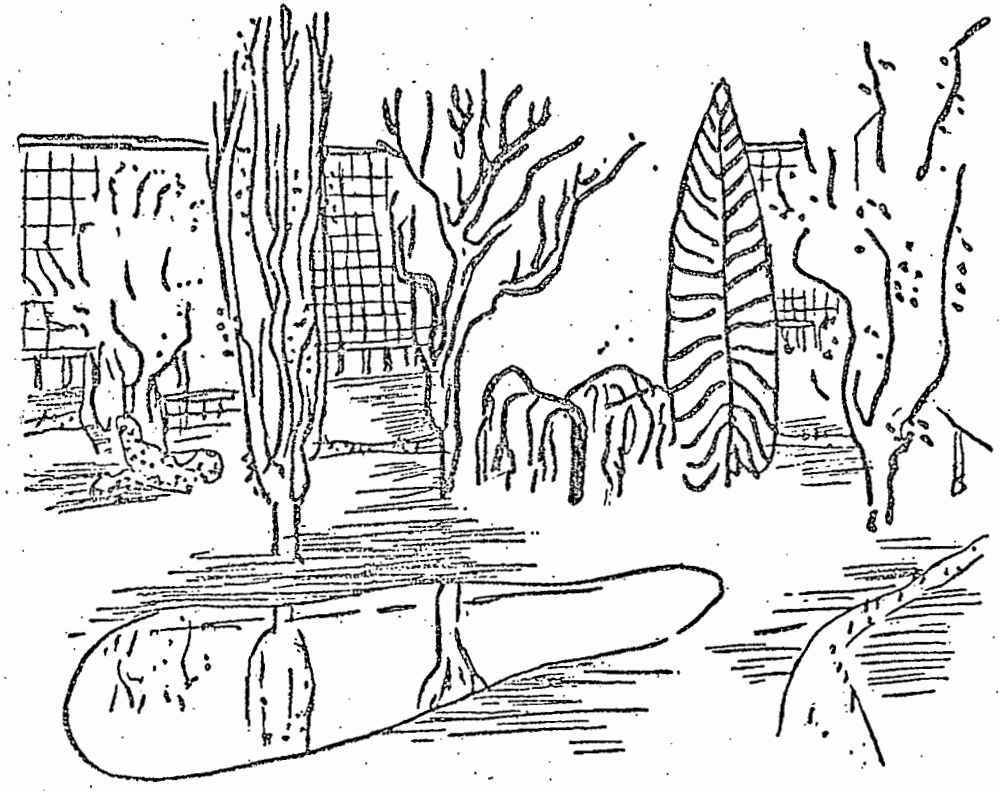
fig.129



Le Corbusier, The City of Tomorrow, p.184.

14. It is perhaps more than coincidence that the Eifel tower, up which Le Corbusier would regularly ascend to ponder Paris and which could thus plausibly have provided him with a measure on which to base the 'good height', has its first platform at 57m. from the ground, a height corresponding almost to the metre to the roof terraces of the Unités. (*figs.131,132*)

15 Le Corbusier, The Radiant City, p.106.



Sun, space, verdure: "essential joys." Through the four seasons stand the trees, friends of men.

Great blocks of dwellings run through the town. What does it matter? They are behind the screen of trees.

fig. 130

13. There was however a strict height limit of 50m set by Le Corbusier for his dwellings. The reader may recall that in our earlier discussion of the Ville Radieuse (See p61), Le Corbusier was shown to have glossed over this important determination without justifying it. Francois de Pierrefeu, a collaborator of Le Corbusier in the editorship of the magazine 'Plans' in theThirties who writes the first section of The Home of Man volunteers the following 'reasons' for the height limit:

> How high is it reasonable to make an apartment building ? Close discussions upon the various elements involved, discussions confirmed by experience, have led urbanists of several countries, chief among them the U.S.A., Holland, and Germany to agree upon 50 metres, say 160 feet. Beyond such a height increasing difficulties, psychological, structural, economic, would make illusory an extra gain in height. Fifty metres is about the height of the slopes bordering the average valley down which a river meanders; such also is the general limit governing monastic foundations that have successfully resisted the onslaught of centuries. Here is a rule then that might well remain valid in our times since it once more invites men to think before they act.
> (Le Corbusier, The Home of Man, pp.26-27)

Maurice Besset ascribes this height limit to Le Corbusier's desire to have his apartment -dwellers remain near enough to the ground to recognize natural features, and though Le Corbusier never confirms this in no many words, it is a plausible explanation of the value he placed on the tree- "Man's companion" (The Radiant City, p.41)

> "The tree is an element essential to our comfort , and its presence in the city is a sort of caress, a kindly thing in the midst of our severe creations".
> (Le Corbusier, The City of Tomorrow, p.237.)

Conversely, as seen from the ground, from within the spaces of the 'green city' a building 50 metres high was still capable of being screened by trees, so that the "severe creations" would not dominate but would merely be a <u>necessary</u> counterpoise to the arabesques of greenery (*fig.130*).

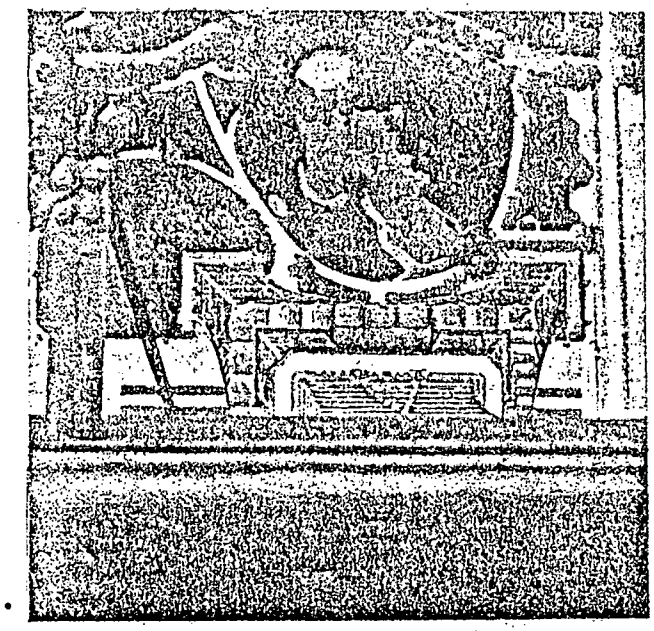


fig. 131

Vue du haut de la tour Eiffel

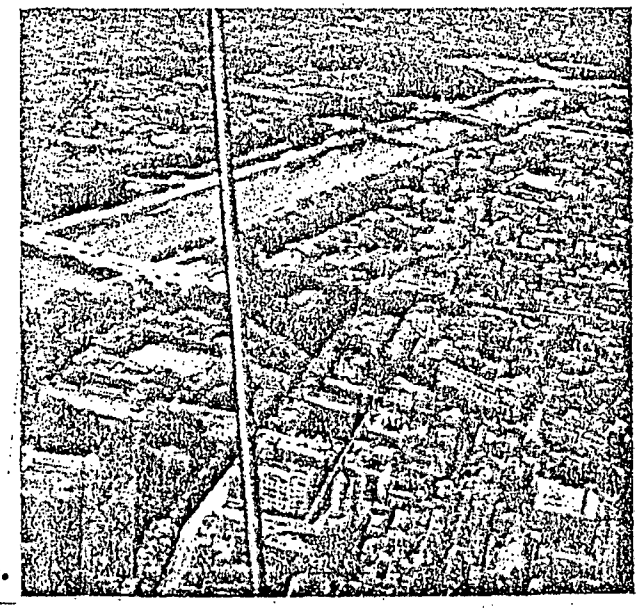


fig. 132

Vue de la tour Eiffel

in the minds of their inhabitants, "more especially of the young who will be exalted by the feeling that they dominate space"[16] and in whom will be awakened "l'esprit d'enterprise qui est à l'aise dans les grands espaces".[17]

The belief in the power of the high view and of the horizon was deeply rooted in Le Corbusier's weltaanshaung:[18] already as early as 1911, in his travel journal, he had given expression to the view that that level horizon, seen under certain conditions of lighting, had the power not merely of generating optimism , exaltation or enterprise but of actually propelling one to a perception of the absolute....[19]

> Je crois que l'horizontalité du toujours même horizon et surtout, en plein midi, l'uniformité imposante des matériaux perçus, installent en chacun la mesure la plus humainement perceptible de l'absolu.[20]

16. Le Corbusier, The Home of Man, p.26.

17. Le Corbusier, Oeuvre Complète, Vol. 1,p.112.

18. Le Corbusier's experience of aeroplane flight reinforced this "invitation to meditation" (a rapture that his boyhood excursions up the Jura Mountains had already implanted); after his first flights over South America in 1929, Le Corbusier observed that: "De l'avion j'ai vu des spectacles qu'on pourrait appeler cosmiques. Quelle invitation à la meditation, quel rappel des verités fondamental de notre terre! " (Le Corbusier, Precisions, p. 4.)

19. Retracing one's steps through Le Corbusier's perspective renderings of his urban projects, one notices that they are invariably drawn 'from a height' that would create a horizontal line out of their dwelling's rooftops.

20. Le Corbusier, Voyage de L'Orient,p.125.

Our investigation into the evolution of Le Corbusier's housing proposals as seen against their changing contexts yields the following conclusions: the Unité, as finally elaborated , is a housing option that claims major gains for its inhabitants in respect of their relationship with nature and their fellow-men in terms of assumptions about its symbolic power and the effects on the psyche of the high view over green space; for these benefits to accrue, the only contextual requirement is enough green space roundabout the Unité; once Unités are grouped together, this green space requirement, in practice, authorizes a distancing of at least 200m between Unités which results in a maximum nett density of 400-500 p.p.h. (fig.133); a range of support systems that in the Ville Radieuse was embedded in the housing component or surrounded it and thereby anchored it in a specific context and helped forge a particular life-style has in Marseille-Sud been withdrawn from this component and reconstituted so as to form part of a larger-scaled system 'irrigating' whole neighbourhoods (fig.134) on a basis of compromise with existing lifestyles; the effects of this withdrawal on the Unité were however, never compensated for , thus leaving it with certain characteristics and weaknesses that hark back to a cocoon phase in Le Corbusier's development long-since discarded.

The upshot is that if we take the Marseille-Sud scheme to represent the final stage in his elaboration of a

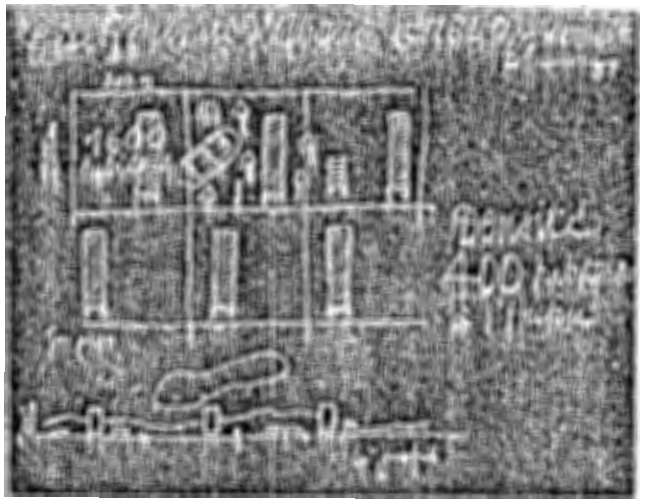


fig.133

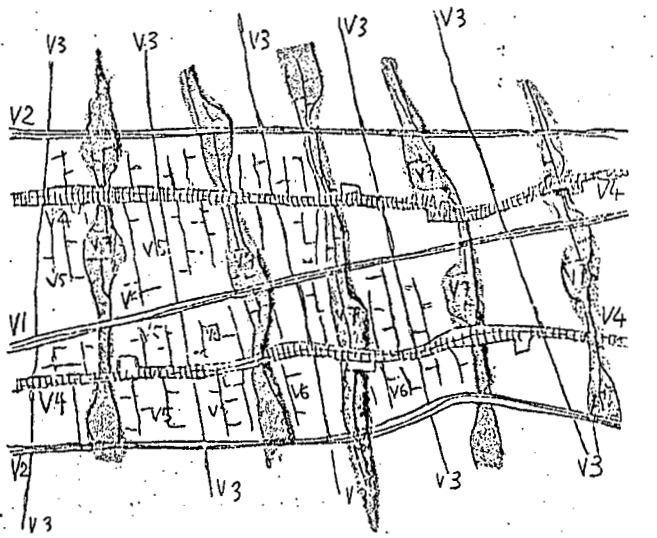


fig.134

l'irrigation du territoire
les 7 V

a context, we are confronted with the irony that his design for the Unités of Marseille-Sud serves only to point up their separability from this context as entities in their own right.

In view of this, it makes no sense to claim, as have some of the critics quoted in the Introduction, that justice can only be done to the Unité by appraising it as if it were part of the Ville Contemporaine or Ville Radieuse projects: the Boulevard Michelet Unité moreover, cannot upon examination serve as an example of the Unité-type since, as we have pointed out, its over-abundant (in terms of Le Corbusier's earlier standards) common services were shortly to be excised under the Sector-dispensation. The analogies that are commonly drawn between the Unité and 'total institutions' like the Fourierist phalanstery or the monastery are valid, therefore, only in relation to the Unité in its Michelet form, which was a transitional one. It was transitional also in the sense that Le Corbusier was continually making selective modifications to its structural system as well as to the DU plans and its 'ideal' number of inhabitants stabilized only in the mid-Fifties at 2000 people when additional DUs appropriated the space formerly occupied by the mid-building common services. It was, furthermore, only in his last Unité , at Firminy (1963) that Le Corbusier ironed out some of the prototype's most serious design shortcomings.

The notable strengths that were a feature of the housing of the Ville Contemporaine and the Ville Radieuse -- the generous DUs of the former (which compensated for the loss of ground-contact,

private open space and 'loose fit' generally associated with a private house) and the breadth of vision of the latter (which compensated for a tighter DU by augmenting the home with closely inter-woven supplementary systems that combined to promote a new life-style) are not in evidence in the Unité;

Further Le Corbusier's uncompromising insistence upon the Unité's superiority to traditional suburban housing begins to look somewhat less convincing when set against the low-rise medium-density housing element included in the Marseille-Sud scheme. This aspect of Marseille-Sud, in fact, constitutes a challenge to the entire raison d'etre and alleged indispensability of the Unité as a type, a challenge whose seriousness may readily be guaged when we consider that if the density of the"maison familiale" component were to be raised by only 50 p.p.h. from 250 p.p.h. to 300 p.p.h., it would be possible to abolish all the Unités of Marseille-Sud without having to concede any increase at all in the project's overall area. Alternatively, if we were to replace the Unités with the "maison familiales" at the densities recommended by Le Corbusier, it would be necessary to increase the total land area of the project by only 20% which, since pedestrian-transversability of the city has in any case been forfeited while the vehicular infra-structure remains well-articulated, there is not likely to be much overload on the scheme's 7-V system. The density differential between the 'maison familiale'(250 p.p.h.) and the Unités (500p.p.h.) is seen, therefore, to be considerably less significant than might at first sight have

appeared. The general principle underlying the whole of this argument is that really dramatic gains in compaction with respect to gross residential area can only be achieved in the lower ranges of the density scale. (fig 13)

The gains in green space brought about by the Unités of Marseille-Sud, are seen, upon examination, to be of questionable vlaue; they lay themselves open to the criticism voiced (as a fear) by Le Corbusier himself in the course of a discussion on the Ville Contemporaine in The Radiant City:

> I was filled with a great anguish lestthe immense open spaces that I was creating in ourimaginary city, spaces dominated by the wide sky on all sides, should be "dead" spaces I was afraid that they would prove full only of boredom, and that the inhabitants of such a city would be seized by panic at the sight of so much emptiness. [21]

21. Le Corbusier, The Radiant City, p. 106

At Marseille-Sud the green space is essentially visual green space which comes to life only in the eye of the man-behind-the-window . Le Corbusier's careful removal of the Unité from any relationship with nodes of activity and his conscious neutralization, through the use of pilotis, of its activity-generating potential at ground level are auguries of green space that will be not only excessive and 'boring', but given the realities of the urban situation, also quite unsafe.

Assuming, nonetheless, that a 'sufficient' amount of open green space is needed within the housing context as communal space, and assuming furthermore, that a degree of

Land needed for housing 1,000 people at various densities

Gross Population density p.p.a.	Net Population density p.p.a.	Housing Land (acres)	Total Land Requirements‡ (acres)	Land saving as density increases (acres)
20	24	42	50	
30	40	25	33	17
40	59	17	25	8
50	83	12	20	5
60	115	8·6	16·6	3·4
70	159	6·3	14·3	2·3
80	222	4·5	12·5	1·8

‡Assuming 8 acres per 1,000 people for other land uses (see footnote to para. 8).

fig. 135

(from "Residential Areas & Higher Density"; H.M.S.O. Publication; London 1965)

compaction is regarded as justified in order to limit the city's spread, these are desiderata that would seem to be quite capable of fulfilment by the low-rise, medium-density component Le Corbusier came up with in Marseille-Sud. At the same time, a resolution along these lines offers some of the familiar advantages of detached DUs such as: ownership or private open space, a greater likelihood of individual identification with the home-as-turf, privacy between DUs, a degree of flexibility as regards possible alterations to the DU both inside and out, the policing of public open space through the DU's closer association with paths and routes, a wider variety of options than is generally available in apartments for regulation of the public/private interface, immediate access to car and garage, a scale compatible with the traditional housing fabric, and so on.

It is gains such as these that (outwardly at least) are closerto the hearts of most people than gains of the kind Le Corbusier envisaged the Unité as conferring. It is obvious however, that there comes a density break-point beyond which the above-mentioned gains are increasingly compromised in any low-rise high-density project on account of the closing-in of the building-environment and the escalating difficulty of retaining good vehicular access to DUs. This break-point appears at present to be roundabout 500 p.p.h.(200p.p.a.)

It may be argued therefore, if residential amenity be indeed our first consideration, that densities for family housing at any rate, should generally not exceed the figure of 500

p.p.h. and in the case of low-rise, medium-density housing should not be much more than half of that. It follows on this basis that where we have a Unité-type with a density no greater than 500 p.p.h., as is the case at Marseille-Sud, it will need to offer most of the advantages noted above (or surrogates for them), advantages which are characteristic of low-density housing in order to justify itself. But even high-rise structures with densities in the order of 1000 p.p.h. (400 p.p.a.), which would be a response to particular situations of exceptional opportunity -- comercial, cultural or scenic -- where a fixed location for very large numbers of people would be warranted, even such buildings if they presume to offer family accommodation, will need considerably to upgrade the so-called 'average' or 'standard' apartment which most of them currently boast if housing that is raised up in the air is to 'make sense' and is to be viable and acceptable as family habitation.

TABLE II d

AREA PER PERSON (IN M^2)

FOR PROJECT'S DWELLING UNITS

DU nett area

DU + Double Volume

DU + Double Volume + Private Open Space

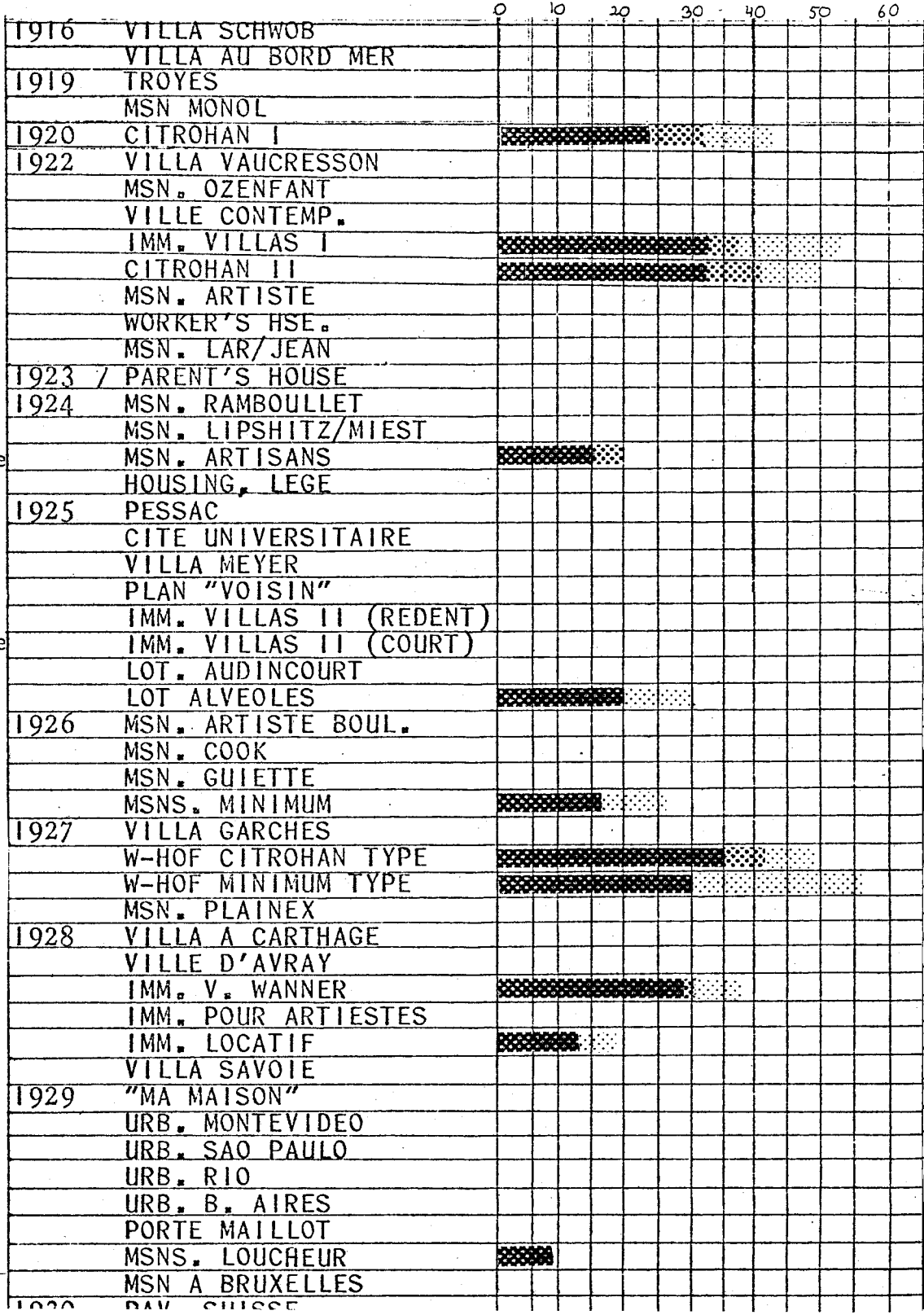


TABLE II d

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DU nett area

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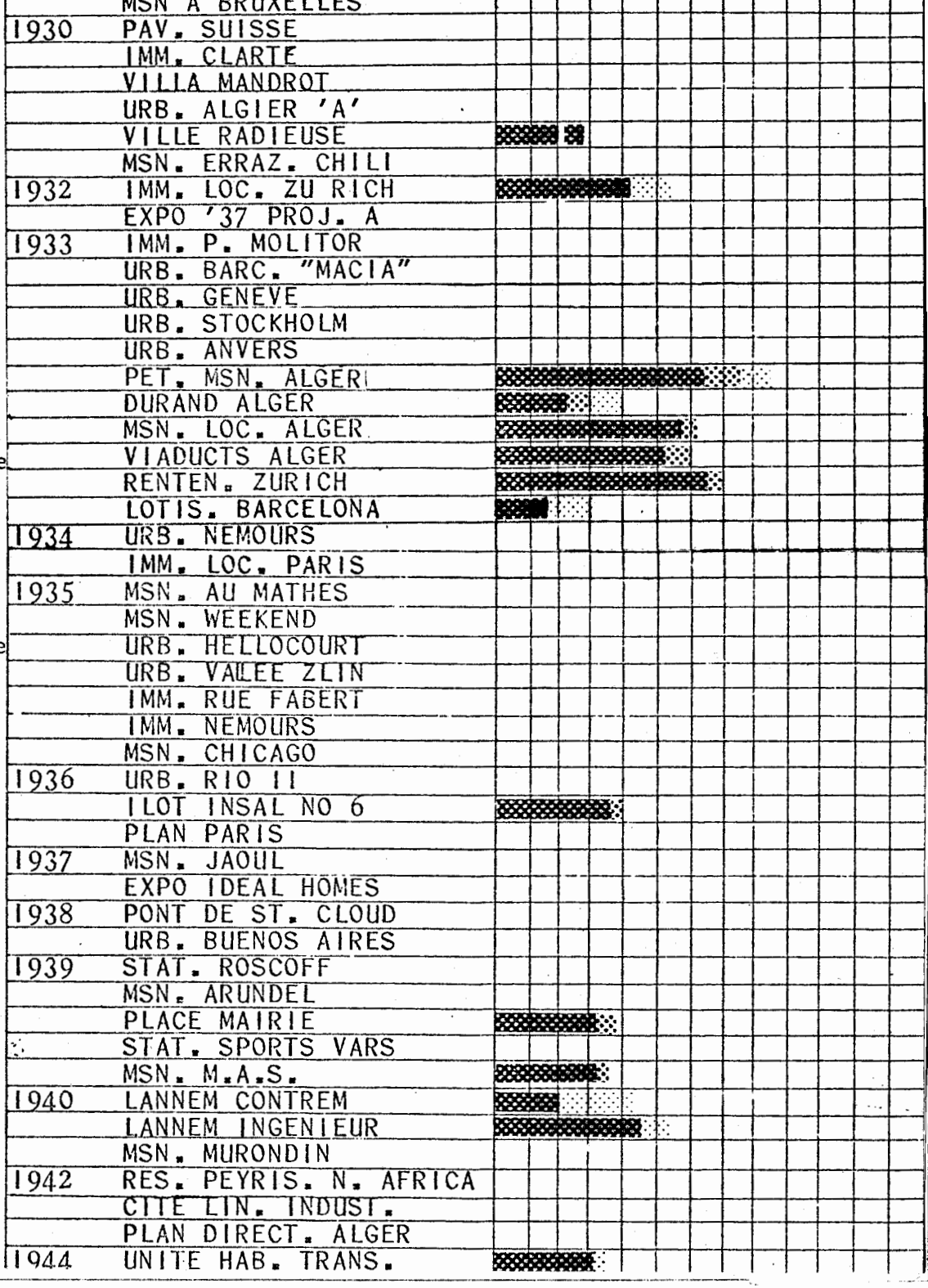


TABLE II d

AREA PER PERSON (IN M^2)

FOR PROJECT'S DWELLING UNITS

DU nett area

DU + Double Volume

DU + Double Volume + Private Open Space

	LOGIS PROV. TRANS.
	URB. ST. DIE
1945	URB. ST. GAUDENS
	URB. ST. GAUDENS
	URB. LA ROCH./PALL.
	URB. LA ROCH./PALL.
	UNITE MARSEILLES
1946	UNITE MARSEILLES
1947	MARS.-VEYRE
	UNITES ANTHONY
	7-V STUDIES
1948	ST. BAUME A
	ST. BAUME B
	URB. IZMIR
	'ROQ' A
	'ROQ' B
	'ROB'
1949	MSN. CURRUTCHET
1950	MSN. FUETER
	URB. BOGOTA
1951	URB. MARSEILLES-SUD
	URB. MARSEILLES-SUD
	CHAND. MASTER PLAN
	UNITES STRASBOURG
1952	UNITE NANTES
	MSN. JAOUL
	PEON'S HSE. CHAND.
	AHMED 3 VILLAS
	CAB. CAP-MARTIN
1953	LA TOURETTE
1955	VILLA SARABHAI
1956	VILLA SHODAN
	UNITE BERLIN
1957	MSN. RURALES LAGNY
	UNITE MEAUX
	UNITE BRIEY
	UNITE 'CAMPING' CAP-MARTIN
	PAV. BRESIL
1958	URB. BERLIN
1959	UNITES WITH RENAULT

★ web-like, 'carpet' prototype

■ row-house prototype

▲ single or paired house prototype

● high-rise prototype

Densities measured in DUs per acre

0 10 20 30 40 50 60 70 80 90

■ direct ground-contact

▲ associated dwellings

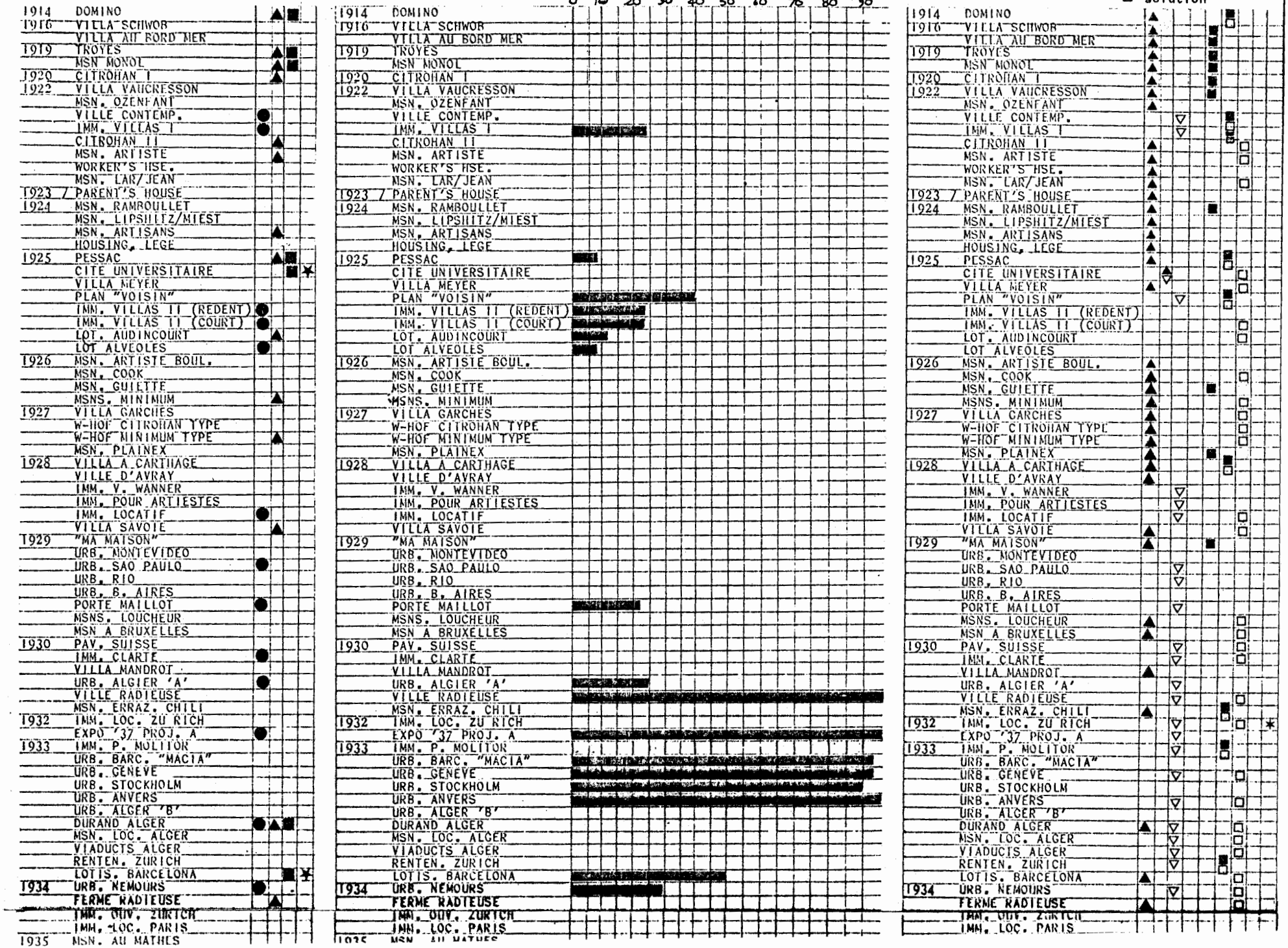
▽ apartment dwellings

▲ single dwellings

* contradiction

■ intermediate

□ solution



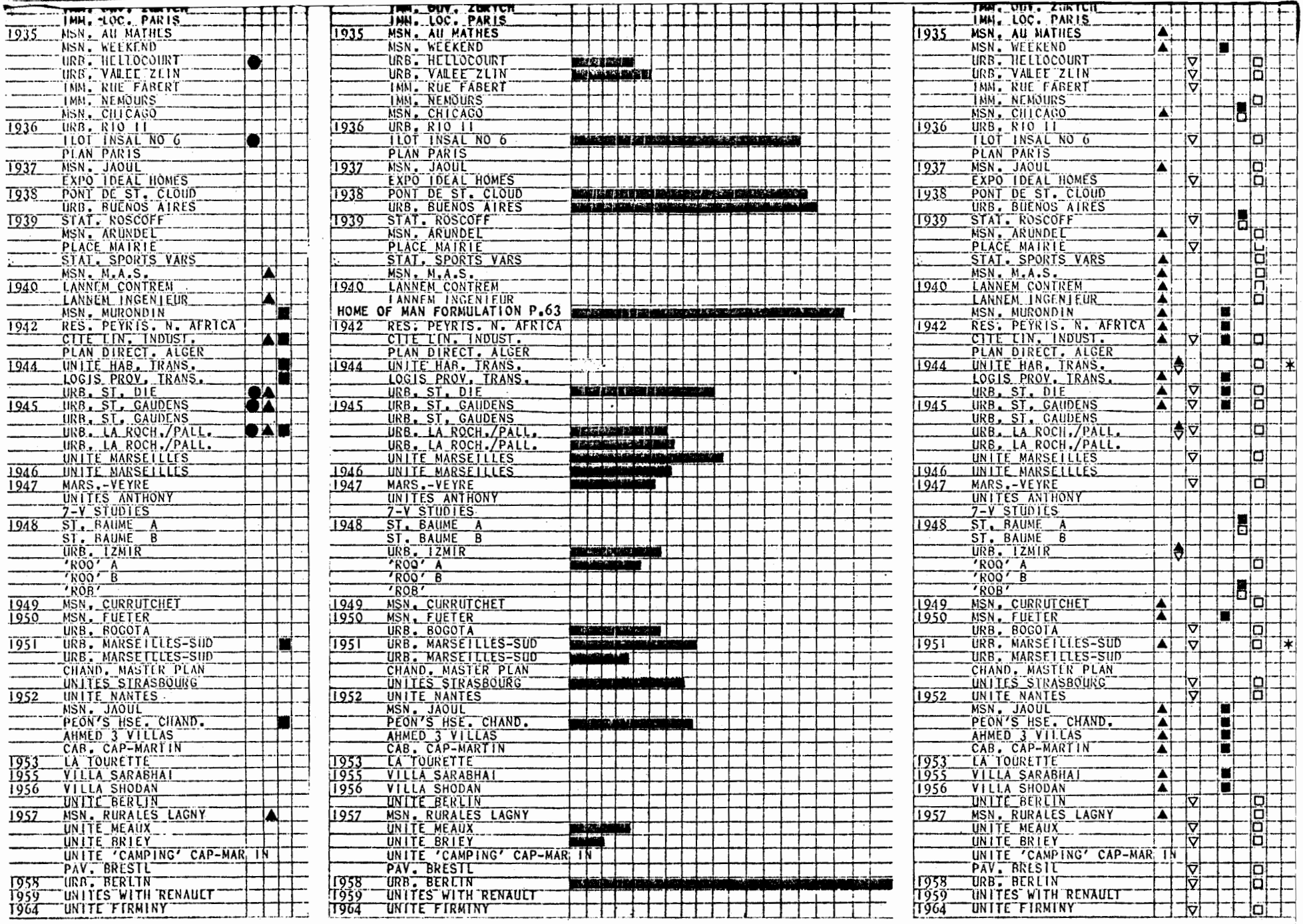


TABLE II a

PROTOTYPICAL HOUSING

TABLE II b

NETT HOUSING DENSITIES

TABLE II c

DWELLING TYPE / GROUND CONTACT

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