https://theses.gla.ac.uk/

Theses Digitisation:

https://www.gla.ac.uk/myglasgow/research/enlighten/theses/digitisation/

This is a digitised version of the original print thesis.

Copyright and moral rights for this work are retained by the author

A copy can be downloaded for personal non-commercial research or study, without prior permission or charge

This work cannot be reproduced or quoted extensively from without first obtaining permission in writing from the author

The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the author

When referring to this work, full bibliographic details including the author, title, awarding institution and date of the thesis must be given

Enlighten: Theses
https://theses.gla.ac.uk/
research-enlighten@glasgow.ac.uk

THE APPROPRIATE PHYSICAL EXPRESSION OF HABITAT IN THE ALGERIAN CONTEXT

A Thesis presented for a

Ph.D Architecture (Urban Design) to the

Mackintosh School of Architecture, Glasgow

by

Mr. H. Dekkiche

Dip. Arch., M. Arch. (Urban Design)

The Mackintosh School of Architecture
University of Glasgow

Session December 1989

Supervisors: Mr. A. G. Vogt
Prof. A. MacMillan

" © H. Dekkiche, 1989 "

ProQuest Number: 11007421

All rights reserved

INFORMATION TO ALL USERS
The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript
and there are missing pages, these will be noted. Also, if material had to be removed,
a note will indicate the deletion.

ProQuest 11007421

Published by ProQuest LLC (2018). Copyright of the Dissertation is held by the Author.

All rights reserved.
This work is protected against unauthorized copying under Title 17, United States Code
Microform Edition © ProQuest LLC.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

Acknowledgements

With genuine humility, I acknowledge your aid, God. Without your guidance and love this work would not have been possible.

First of all I owe my thanks to the Algerian government for giving me both the opportunity and the financial support to carry out this study. I wish to thank especially my supervisors Mr. A. G. Vogt for stimulating and sustaining my interest throughout the whole period of my reseach and Professor A. MacMillan for his early valuable recommendations and references.

I wish also to express gratitude to Mr. M. Calthrop and Mr. D. Niven who provided constructive critical analysis and encouragement, to Mr. C. Porteous for his assistance on climatic expertise and recommendations, and to Mrs. J. Annan for her help on sociological matters.

I further acknowledge and thank the Mackintosh Library staff, especially Mr. N. MacVicar for his help in providing the necessary documentation. Also this work could not have been acheived whithout the skill and patience of Mr. M. Strang who offered great assistance in Computer Design work (AutoCAD) and presentation.

My thanks are also expressed to Mrs. J. Crichton for her bureaucratic help, Mr. D. MacLaren, and Mr. C. Laurie for their technical assistance throughout the whole period, and all the people in Algeria who helped in obtaining the right documentation.

My greatest debt, however is owed to my wife, my family and all my friends who have provided encouragement and support during this period of studies.

To my wife, my mum,
and also
to the memory of my father

Contents

ILLUSTRATION LIST		IV
ABSTRACT		XIV
PART ONE:	***STATUS OF THE EXİSTING PROBLEM***	1
	Chapter 1: Problem of the Algerian habitat	2
	Chapter 2: Nature of the state's response	17
PART TWO:	***ANALYSIS***	49
	Chapter 1: Traditional urban form and its environment	50
	Chapter 2: Contemporary urban form and its environment	119
	Chapter 3: Building form analysis	195
PART THREE:	***APPROPRIATE HABITAT***	262
	Chapter 1: Approach to the appropriate urban habitat	263
	Chapter 2: General conclusion	289
APPENDIX		293
BIBLIOGRAPHY		320

Illustration list

PART ONE

Chapter 1

Fig.1. "Ville Contemporaine".1922.
Source: Le Corbusier 1910-1965, by W. Boesiger & H. Girberger.
Thanes & Hudson, London, 1967.

Fig.2. "Unite d 'habitation".
Source: The New Architecture of Europe, by G.E. Kidder Smith.
New york.

Chapter 2

Fig.1. Location of the Z.H.U.N. and its relationship with the urban context.
Source: Introduction 'a l'urbanisme operationnel et 'a la composition urbaine.
By A. Zuchelli, EPAU, OPU, Algiers, 1984.

Fig.2. Z.H.U.N.'s general layout Activity zones & Road network.
Ibid.

Fig.3. Configuration of the basic residential spatial unit.
Ibid.

Fig.4. Example of typology and layout organisation.
Ibid.

Fig.5. Example of typology and layout organisation.
Ibid.

Fig.6. Example of typology and layout organisation.
Ibid.

Fig.7. Example of typology and layout organisation.
Ibid.

Fig.8. Z.H.U.N: COPEMAD North. (1976-78)
Ibid.

Fig.9. Z.H.U.N: ANASSERS 2. (1971-78)
Ibid.

Fig.10. Z.H.U.N: Cite' des Sources. (1975-78)
Ibid.

Fig.11. The typical building unit of the Z.H.U.N. COPEMAD North.
Ibid.

Fig.12. The typical building unit of the Z.H.U.N. ANASSERS 2.
Ibid.

Fig.13. The typical building unit of the Z.H.U.N. Cite' des sources.
Ibid.

Fig.14. Example of imported prefabricated system.
Source: The role of the courtyard in contemporary housing. "The case of Algiers".
Thesis, university of New Castle up on Tyne, 1986.

Fig.15. A newspaper illustration and comment on housing.
Source: Horizon, Algerian news paper.
3rd, March, 1987. Algiers.

Fig.16. An urban scene that is typical to most housing environment.
Photograph by the author. Algiers,1989.

Fig.17. Typical implementation of the residential building on a park-like.
Ibid.

Fig.18. The outside as a space for drying daily washing.
Ibid.

Fig.19. The real aspect of the open space.
Ibid.

Fig.20. Open balconies that changes into sreened or even glassed windows.
Ibid.

Fig.21. A dwelling that turned into a forteress.
Ibid.

Fig.22.23. The changing appearanceof the facade and the neglect of the out door spaces.
Ibid.

Fig.24. The outdoor space that turned into a large parking.
Ibid.

Fig.25. A residential area that ignores the human scale, but favourises the car.
Ibid.

Fig.26. The only separating line between the building and the road is a fence and a slop.
Ibid.

Fig.27. A window that turned into a cage for security reasons.
Ibid.

Fig.28. The close up of balconies still persists.
Ibid.

Fig.29. Yes, the close up balcony becomes a fashion.
Ibid.

Fig.30. The outdoor space is still waiting for finishing.
Ibid.

Fig.31. A balcon: a "brave attempt".
Ibid.

Fig.32. A sade expression that is common in most contemporary housing.
Ibid.

Fig.33. This is the image of most (if not all) housing that is all over Algeria.
Ibid.

PART TWO

Chapter 1

Fig.1. The Roman layout of Icosium. 40 AD.
Source: Notes sur l'histoire d'Alger dans la periode precoloniale, by F. Cresti.
EPAU, Algiers. 1980.

Fig.2. The islands which gave name to the city: "El Djazair".
Ibid.

Fig.3. Algiers: XVI 's engraving.
Ibid.

Fig.4. The main axes and the five gates of the Casbah.

Fig.5. Urban form of the Casbah.
Source: Projet de revalorisation de la Casbah d'Alger.
ETAU, UNESCO/ PNUD. Atelier Casbah, Algiers, 1981.

Fig.6. Street pattern and its hierarchy.

Fig.7. View of a "Sharaa" in the Casbah.
Source: Casbah, Architecture et Urbanisme
ORF, GAM, Algiers, 1984.

Fig.8. View of two "Zenka(s)" in the Casbah.
Source: EPAU, Algiers, 1981.

Fig.9. View of a residential "Znika" in the Casbah.
Ibid.

Fig.10. View of a "Driba" serving several houses.
Ibid.

Fig.11. View of a short "Driba" leading to two houses.
Ibid.

Fig.12. Table of street categories and their aspects.

Fig.13. View of a projection over a street.
Source: EPAU, Algiers, 1981.

Fig.14. View of a projection over a "Driba".
Ibid.

Fig.15. A covered commercial street in the Casbah.
Source: Casbah, Architecture et Urbanisme.
op, cit.

Fig.16. View of a "Fina" as a semi-public space
Source: EPAU, Algiers, 1981.

Fig.17. Diagram of land use coverage in the Casbah.

Fig.18. Axonometric view of a grouping of houses: the Cluster.
Source: An enhansed drawing, from The restructuring of the "quartier de la Marine".
An urban opportinuty. Thesis, Glasgow school of Architecture. 1986.

Fig.19. Layouts of clusters and their land subdivision.

Fig.20. View of a typical cluster.
Source: Projet de revalorisation de la Casbah d'Alger.
op, cit.

Fig.21. Layout of the above cluster.
Ibid.

Fig.22. Location of the socio-econonic activitiesin the Casbah: The "souk".
Ibid

Fig.23. Interior view of a "Hammam".
Source: Casbah, Architecture etUrbanisme
op, cit.

Fig.24. Frontage of a small shop.
Ibid.

Fig.25. The Major City Mosque: "Djammaa El Kebir"
Ibid.

Fig.26. View outside a "Foundouk".
Ibid.

Fig.27. View inside an oil "Foundouk".
Ibid.

Fig.28. Organigram of a traditional urban pattern.
Source: Rappoport, 1977; Brown, 1973; Delaval, 1974.

Fig.29. The complex balance between social homogeneity
and the heterogeneity of the socio- cultural system.
Source: Vernacular Architecture: The house and Society. In Architecture of the
Islamic World. Peterbridge, Thames, London, 1978

Fig.30. Table of the relationship between the spatialand the social hierarchy
and the intensity of use in the traditional environment.

Fig.31. The complex organisation of spaces in the tradiotional house.

Fig.32. The hierarchy of spaces in Muslim Towns.
Source: Urban communities of the Algerian Sahara.
Ekisties, B. Delaval. 1974.

Fig.33. Sharaa: the through street
Source: Arab-Islamic cities. Building & planning rules.
By S.H. Besim, KPL, London, New york, Sideney, 1986.

Fig.34. The Fina.

Fig.35. The required clerance under a projection.

Fig.36. Projections over a Sharaa.

Fig.37. Creation of a Driba.

Fig.38. Creation of gate in a Driba.
Source: Arab-Islamic cities.
op, cit.

Fig.39. The measure of the Driba's width.
Ibid.

Fig.40. Rules for door positions
Ibid.

Fig.41. Height of window position as determined from the exterior
Ibid.

Fig.42a. Height of window When levels of street and interior approx. same.
Ibid.

Fig.42b. Height of window When interior level is appreciably lower than street.
Ibid.

Chapter 2

Fig.1. Military Urbanism. Algiers. 1833.
Source: Cahier de l' EPAU.
EPAU. Algiers, 1982.

Fig.2. Colonial development. Algiers. 1946.
Ibid.

Fig.3. View of a straight cut: Bab-Azzoun street. Algiers. 1886.

Fig.4. Plan showing the straight cuts through the traditional fabric of the Casbah.
Source: Casbah. Architecture et usbanisme
OREF-GAM. Algiers, 1985.

Fig.5. Eastern expansion of the colonial development. Algiers. 1880.
Source: Cahier de l' EPAU.
op,cit.

Fig.6. The Superstucture of the colonial development.
Source: The role of the courtyard in contemporary housing. "The case of Algiers".
Thesis, university of New Castle up on Tyne, 1986.

Fig.7. Plot division in a rectangular "ilot".
Source: Formes urbaines: de l'ilot a la barre.
By J. Castex, J, Ch, Depaule, Ph, Panerai
Collection: Aspets de l'urbanisme. Dunod, Bordas, Paris, 1977.

Fig.8. Plot division in a triangular "ilot".
Ibid.

Fig.9. Form and size of the plots.
Ibid.

Fig.10. Axonometric view of the colonial tenement buildings.

Fig.11. Location plan.
Source: Street map

Fig.12. Decorated corners of the colonial tenement buildings.
Source: Cahier de l' EPAU.
op,cit.

Fig.13. Decorated main entrance of a colonial tenememt building.
Ibid.

Fig.14. Urban form of the colonial fabric.
Source: Street map

Fig.15 Diagram of land use coverage of the colonial urban fabric.

Fig.16. Aspects of the slab adaptability to the hilly site of Algiers.
Source: L'urbanisme et architerture d'Alger. Apercu critique.
By J.J. Deluz. OPU, Algiers, 1988.

Fig.17. A bridge building as an adaptability solution to the hilly site of Algiers.
Ibid.

Fig.18. Elevation of the bridge building.
Ibid.

Fig.19.a. Le Corbusier's proposal; The skyscraper. Algiers.(1938-42).
Source: Technique et Architecture. N° 329.
Special Algerie. 1980.

Fig.19.b. Le Corbusier's proposal; for the "Marine quarter". Algiers.(1938-42).
Ibid.

Fig.20.a. Perspective of the dwellings in the viaduct.The "Obus plan". Le Corbusier.
Ibid.

Fig.20.b. The "Obus plan" for Algiers. Le Corbusier. 1931.
Ibid.

Fig.21. The "Immeuble-lane": l'Aero-habitat. Algiers. 1954.
Source: L'urbanisme et architerture d'Alger. Apercu critique.
op,cit.

Fig.22. The typical buildings. Cite' SORECAL I. Algiers. 1971.
Ibid.

Fig.23. The typical buildings. Cite' SORECAL II. Algiers. 1976.
Ibid.

Fig.24. The typical buildings. Cite' Badjarah. Algiers. 1976.
Ibid.

Fig.25. The typical buildings. Cite' .Ben Omar. Algiers. 1976.
Ibid.

Fig.26. Mendes's typical plan of urban housing.
Plan reproduced from the model's photograph.

Fig.27.a. General view of Mendes's model.

Fig.27.b. General view of Mendes's model.

Fig.28. plan of land use zone system.

Fig.29. Urban form of the typical model.

Fig.30. Road pattern and its hierarchy.

Fig.31. Table of road categories and their aspects.

Fig.32. Plan showing the undefined open space.

Fig.33. Land use coverage of Mendes's urban form.

Fig.34. Plan of slab 1.
Source: Dossier des plans. Mendes Junior.
Minitery of Housing and Construction. Algiers, 1986.

Fig.35. Plan of slab 2.
Ibid.

Fig.36. Plan of slab 3.
Ibid.

Fig.37. Local and central public buildings.

Fig.38. Central public buildings.

Fig.39. Diagrams of Walter Gropius principles.
Source: Walter Gropius and team work.
By S, Giedon, Architecture press, London, 1954.

Chapter 3

Fig.1. Axonometric view of "Lalahoum" cluster.
Source: Projet de revalorisation de la Casbah d'Alger.
ETAU, UNESCO/ PNUD. Atelier Casbah, Algiers, 1981.

Fig.2. Perspective views of the slab.
Source: Dossier des plans. Mendes Junior.
Minitery of Housing and Construction. Algiers, 1986.

Fig.3. Land use in the cluster unit.

Fig.4. Land use in the slab unit.

Fig.5. External wall exposure to sun radiations in the cluster unit.

Fig.6. External wall exposure to sun radiations in the slab unit.

Fig.7. External wall exposure to sun radiations in the cluster unit.

Fig.8. External wall exposure to sun radiations in the slab unit.

Fig.9. Shaded area on the surrounding space of the cluster unit.

Fig.10. Shaded area on the surrounding space of the slab unit.

Fig.11. Shaded area on the surrounding space of the cluster unit.

Fig.12. Shaded area on the surrounding space of the slab unit.

Fig.13. Section through the cluster unit showing the shade area.

Fig.14. Section through the slab units showing the shade area.

Fig.15. Ventilation in the cluster unit:

Fig.16. Ventilation in the slab unit:

Fig.17. The area and barriers of the cluster unit.

Fig.18. Hierarchy of space in the cluster unit.

Fig.19. Diagram of the Hierarchy.

Fig.20. Driba and Skifa as a semi-private or a private space.

Fig.21. Diagram of the intensity of the use of space.

Fig.22. Area and barriers in the slab unit.

Fig.23. Hierarchy of space in the slab unit.

Fig.24. Diagram of the intensity of use of space.

Fig.25. The inward-looking built form of the cluster unit.

Fig.26. The external tiny openings in the cluster unit.

Fig.27. The position of openings in the cluster unit.

Fig.28. The position of doors in the cluster unit.

Fig.29. The bent entrance as a filter: Skifa.

Fig.30. The courtyard: as a private open space.

Fig.31. The outward-looking built form of the slab

Fig.32. The external large openings of the slab unit.

Fig.33. The position of the doors in the slab unit.

Fig.34. The loggia as a substitute for a private open space.

Fig.35. The dominance of the open space:

Fig.36. Proximity of the clusters.

Fig.37. Diagram of proximity in the cluster.

Fig.38. The narrow streets concentrate people.

Fig.39. Space hierarchy between community and domestic life.

Fig.40. Diagram of people's mobility in the cluster.

Fig.41. Isolation of the slabs.

Fig.42. Diagram of proximity in the slabs.

Fig.43. The large open space disperse people.

Fig.44. Hierarchy of community and domestic life.

Fig.45. Diagram of people's mobility in the slab.

Fig.46. Sequential scale and enclosure in the courtyard house.

Fig.47. Scale and enclosure in the courtyard and in the street.

Fig.48. Scale, enclosure and character of private and public space.

Fig.49. Sequential scale and enclosure in the slab unit.

Fig.50. Scale of enclosure in the flat and in public space.

Fig.51. Scale, enclosure and character of private and public space.

Fig.52. Horizontal expansion around the courtyard.

Fig.53. Vertical expansion around the street.

Fig.54. Vertical expansion around the courtyard.

Fig.55. Horizontal and vertical expansion in the public open space.

Fig.56. Horizontal expansion of the flat.

PART THREE

Chapter 1

Fig. 1. The Casbah: the starting point of the model.

Fig.2-5. The upgrading stages of the Casbah model.

Fig. 6. The Mendes's model: the starting point of the model.

Fig.7-10. The upgrading stages of the Mendes's model.

Abstract

More than any other country in the "Maghreb" - or even more, in Africa - Algeria is marked by the intense and rapid urban development which derives from the impacts of the huge rural migrant and the sharp increase of the demography. Many urban problems have emerged from this situation and are still far away from resolution and before any of them, is the one of "habitat".

Many solutions have been envisaged for housing people during the last twenty five years, but almost non of them seems to be satisfactory. The new structural and physical aspects of housing, especially in cities have left many socio-cultural factors behind and the results are that people do not want to live in this urban environment. In addition to that, there is no continuity with tradition in such environment, and the climatic considerations are not taken into account. Thus, a new form of urban habitat has to be developed in relation to tradition , climate, and to socio-cultural component of the Algerian society.

There has already been much research about the Algerian housing in many different ways, such as in planning , sociology, and in architecture, which refer at some point to an aspect of the present situation. The range of material is therefore very wide, but much of this deals with a particular field of comment, such as building techniques, climate and thermal comfort, social experiences and planning policies.

The aim of this thesis is to establish a suitable physical expression for the urban habitat developments envisaged in Algeria in the immediate future. In order to produce a comprehensive environment, this expression will recognise the Algerian cultural, as well as economical, sociological, and physical context, and will seek to determine appropriate structural, environmental, and cultural criteria.

I will to discuss the problem of the Algerian housing from an urban design point of view. The method envisaged is to examine traditional and contemporary urban layouts, in addition to analysing their building forms. Broadly speaking, the thesis is divided into three parts.

Part one deals with the status of the existing problem of housing and is subdivided into two chapters. In chapter 1, a general description of the present Algerian habitat is stated with some particular emphasis on the new attitudes towards modernity in terms of housing. In chapter 2, however, the nature of the state's response is revealed with particular interest on the last experiences and the resent trend. This chapter will be referring to the zoning policy and the prefabricated building process of modern housing, then I will describe some aspects of the real problem that follows and how people respond to it. This should lead us to a more accurate picture of the housing crisis in Algeria.

Part two is the core of this thesis and it deals with the analysis . This part is subdivided into three chapters and will examine two different types of environments determined by the traditional and the contemporary urban forms, then it will compare their respective building forms, i.e. the cluster unit and the slab unit.

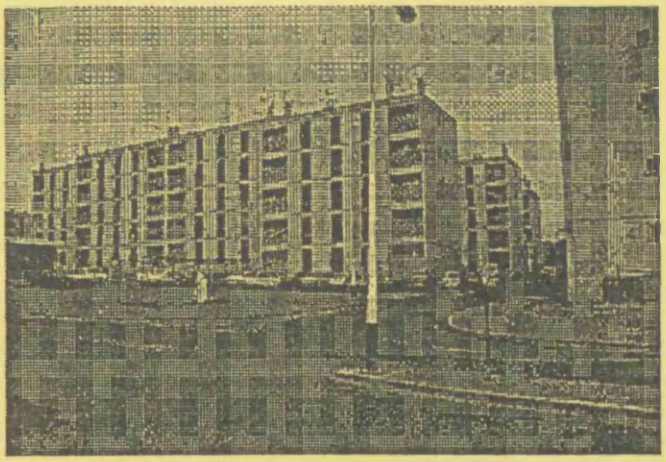
Chapter 1 will analyse the traditional urban form and its environment and look at the principles generating such a pattern. The pattern selected in this study represents the traditional urban settlement of Algiers: the Casbah.

In chapter 2, similar analysis will be performed on the contemporary urban form, I will also look at the principles behind such a pattern. However, the pattern representing this contemporary urban form is not a real existing settlement but a typical master plan (Mendes's urban housing model) that symbolises not only most contemporary housing that prevailed during the last two decades but also the latest trend in terms of urban habitat which is strongly favoured by the present policy makers.

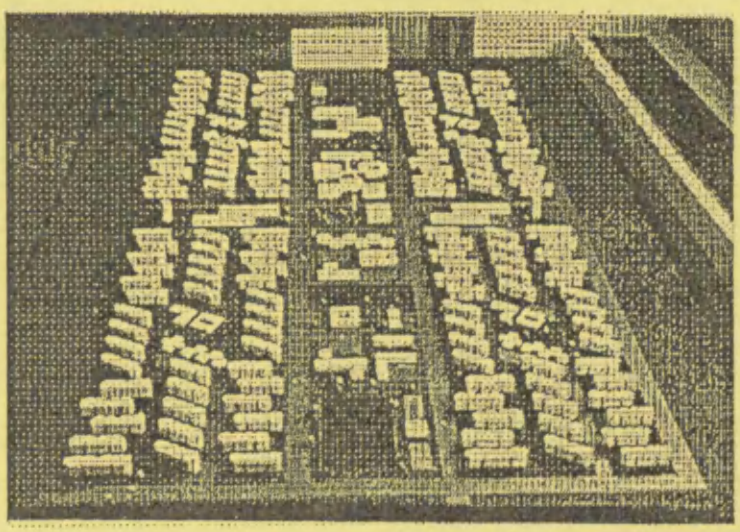
In chapter 3, in order to do a thorough comparison of both the cluster unit and the slab unit which are generating the two district urban forms. I will first set 10 criteria according to what is found fundamental in determining both traditional and contemporary environments. Second, I will compare both units according to each criterion. This should lead us to evaluate and measure adequately which building form does perform perfectly according to each criterion which itself should also reflect the Algerian context. As a result of this, it should be possible to assess which building form is more responsive to the criteria, how the two building units account for the criteria, and what does need improvement in order to meet each criterion in order to enhance its resultant environment.

Part three is the last stage, and is mainly divided into two chapters. Chapter 1 will be looking at the two selected urban forms, the Casbah and the Mendes's model it will then aim to establish a middle ground of acceptable habitat by adjusting each model against critical criteria. This process will examine the possibilities of upgrading both models which should lead us to a more appropriate housing layouts.

Chapter 2 will take the form of a general conclusion that should determine the main important concepts behind the physical expression of an appropriate habitat for future development in Algeria and what measures can be taken by a governmental department in order to select appropriate proposals for future habitat that it would be worth the government investing in.



PART ONE STATUS OF THE EXISTING PROBLEM



Chapter 1: PROBLEM OF THE ALGERIAN HABITAT

1. Background
2. Housing Crisis
3. Housing Situation
4. Modernity in our context
5. Continuity with tradition

1. Background

Since the Second World War in Europe and since 1960 in Africa, the growth of cities has caused several problems for the authorities. Cities had profound transformations due to the new system of production. The process of urbanisation shaped by history has at a particular period a corresponding urbanisation. Algeria and many other developed countries illustrate well this alarming pattern of urbanisation. Since the city has become a battlefield of social contradictions and relationships leading to brutal changes which clash with the established order.

Following 1962, achievement of independence Algerian cities confronted with demographical boom due to both natural growth and rural exodus, started going into a severe housing crisis. In 1962, Algeria had inherited from the French colonisation a reasonable housing stock apt to house only the local population. This was estimated at 500,000 dwellings.[1]

However the urban population which represented one third ($^1/_3$) of the rural population in 1974 reached two fifths ($^2/_5$) in 1977, and about a half ($^1/_2$) in 1982. For Algiers itself the growth rate increased from eight percent (8%) between 1954 and 1966 to seventeen percent (17%) between 1966 and 1982.[2] This rapidly growing number of urban population has turned the inherited housing stock upside down to an important housing deficit, which is still far from resolved today.

Consequently, a number of 250,000 housing units per year was thought to be necessary to eliminate this deficit, but at the present time the rate of building has only reached half this figure. Therefore a considerable effort had to be made by the Algerian government to meet this housing demand. Unfortunately housing was never given priority compared to the industry and infrastructure, and as a result housing went into even greater crisis.

2. Housing Crisis

In Algeria, the housing problem is a crisis which is first of all expressed in terms of social demand. The amount built depending on natural production turned out to be limited due to constraints of the building industries' capacity. Since the early 1970's the amount built has never been sufficient to satisfy the social demand. This deficit can be seen as a result of various factors, historical, sociological, and economic.

Historically: Both the inherited structure and the organisation of building activity from the colonial period which relied upon the economical help from the west (France) turned out to be inadequate. In addition, a considerable lack of qualified labour in the housing sector did not encourage housing production.

Socially: The continuous growth of urban population as well as changes in the family composition and size were considerable factors. The reduction of the extended family of up to twenty people to a nuclear family of about six people has undoubtedly considerably increased the demand.

Economically: Priority was not given to housing but to other sectors such as industry and its supportive infrastructure. This was to be the prime concern of the state. In fact, in 1965, the development of the country was to be based on rapid industrialisation. This was supposed to provide each city with an industrial base able to absorb the rural migration relying on the existing inherited housing stock, which was surely overestimated. Consequently industrialisation was to be developed at the expense of other social services such as housing.

These are the main factors which contributed directly to increase sharply the housing deficit in Algeria. Four years after independence, the housing deficit was evaluated at 217,000 houses and in 1977 it had reached 558,000. This deficit almost doubled in ten years however more than 200,000 dwellings were realised between 1966 and 1979. According to the chart, 100,000 dwellings a year till the year 2000 is necessary to satisfy the need of the population. Therefore

to deal with this urgent growing housing crisis, the Algerian government set a target of 100,000 houses to be built per year.[3]

3. Housing Situation

In 1969 assessments on housing showed a deficit of 180,000 dwellings and the migration towards urban cities was estimated at an average of 122,000 people per year.[4] In contrast, the rate of housing production was very low in both private and public sectors. This production reached 20,000 new dwellings during this period. It is worth noting that housing programs set by the government were never fully implemented due to both the lack of investment and the influence of the political instability after the 1965 socialist revolution. [5]

In conjunction with the rural exodus, the rate of urbanisation of big cities has gone up from 3.2% to 5.3%. This represents an increase of 2.1%. However, Algiers in particular has increased dramatically, its population has passed from 1 million inhabitants to 2.1 million inhabitants in 1985.[6] In contrast with the limited building realised, a typical image of overcrowding remained a feature of big cities during the 70's.

In this context then, the government opted for the "ZHUN" (*Zone d'Habitat Urbain Nouvelle*) as an efficient tool and rational organisation of land use in order to control the alarming extension of cities and to ease overcrowding. In 1972, the "PUD" (*Plan d'Urbanisme Directeur*), as a master plan was introduced to identify the needs and the expansion of cities. Most of these plans lacked liaison between economic and physical planning and their impact on housing developments appeared to have only negative effects of control, restrictions and zoning.[7]

This new approach of "ZHUN" and "PUD" came then as a foreign attitude to both development of the urban environment and housing form. Between 1966 and 1977 the increasing pressure of demand forced immediate actions and limited research on housing and growth control. Consequently the question of housing became based only on facts and quantitative figures. A relentless surge of technology started in which human feelings were forgotten.[8] The socialist

orientation of the country indicated as a first solution to deal with the crisis stipulating that it should be *"du fonctionnel pas de lux"*.[9]

As a result, the question of housing was that of quantity only and the debate which followed was generally expressed by quantitative aspects which gave total priority to an industrial production of housing. This highly centralised and standardised effort resulted in the production of large urban areas of monotonous and uniform building driven on by industrialisation. [10]

However, individual initiative in housing construction was much higher than public housing, particularly in terms of quality. This private sector covered buildings for various uses including small industry, but most of this private development did not subscribe to the development plans set by the authorities. There have been cases where, even local authorities, public and private housing did not respect the plans of the "PUD".

Being in such a situation, the trend in town planning showed a change of policy after the inefficiency of previous plans of urbanisation. For more control, nationalisation of land within the area of the urbanisation was introduced. One year later, in 1977, the planning department established official planning regulations and standards. This was based on the neighbourhood unit principle which became an instrument of town planning. Subsequent descriptions talked repeatedly about numbers of dwellings to be built and numbers of people to be housed together. Quantitative standards enforceable by government bodies were seen as the means of remedying the existing housing situation. In the same year, following the new policy, imported heavy and light prefabrication systems for public housing were to be found. This system of application of housing standards has resulted in a massive expansion of public housing programs which relied upon foreign technology and imported system of fabrication.

Speed and efficiency which was thought to be an urgent remedy to housing shortages turned out to be uneconomic and creating an important dependence on the West. Even though this attitude towards the housing crisis in Algeria has continued for quite some time. Since 1978, the emphasis on housing provision had been on prefabricated construction of high rise flats

which have proved expensive and heavy users of cement and steel. Despite the promise of increased speed and efficiency through prefabrication, the supply of houses has failed to meet the demand.

This situation has undoubtedly added to the already existing contrast between subsidised low rent of public housing (6%-8% of the household income) and the astronomic investments required by the housing construction (275% price increase between 1969 and 1979).[11] Consequently any home seeker must count himself very lucky to acquire a dwelling at all. The choice is in fact very limited according to the deficit which still persists even today, and the immense increase in construction price, overcrowding and implend developments are likely to continue.

The 1980's were the period in Algeria in which housing was thought of only in terms of standards. The full promotion of the collective prefabricated building which followed, began to be even more separating the process of adaptation of people to the previous traditional house form. The question of quality in housing was raised only for standards of space, amenities, and services. This attitude towards quality is still the same today.

Because standards were the determinant factor in housing, it is not surprising that existing housing stock classified as substandard counts as deficit, and will add to the already important shortage. This systematic application of housing standards has increased the deficit and therefore it has resulted in a massive expansion of public housing programs.

It is worth noting that two main factors have increased the housing deficit, the first being the classified substandard housing was evaluated at the time of census and does not consider housing under improvement or capable of improvement. Therefore increased numbers of substandard housing needs replacement. The second is the size of the dwellings set in a standard house (80% less than 3 rooms) turned out to be very small to accommodate the extended family. In some cases the extended family led to an occupation of 3-5 persons per room. Therefore overcrowded dwellings needed relief by new ones.

The rigid application of these standards has intensified the already severe housing crisis, rather than to ease it. Planning standards are often based on images rather than socio-cultural criteria, however the validity of these standards is highly quantitative.

The expression of housing demand has to recognise cultural, social and economic reality of a society, whereas standards relate only to projected images of those needs in the future. Thus the evolution of the housing deficit must be done according to the demand related to the real needs. So far the demand in its actual formulation is not real and as Affane stated:

The demand should be based on three parameters:

1. *Affordability based on income*
2. *Suitability based on dwelling size and design.*
3. *Affordability of resources (land, building materials, and public and private investments).*

So far the problem of housing in Algeria is always described in terms of demand which is evaluated on the basis of quality standards. This quality is at the end of the production process, reduced to figures indicating a number of dwelling units and numbers of square metres per person. It is therefore necessary to draw a line and clarify this misleading concept of quality which is so often called modernisation.

4. Modernity in our context.

Speed and efficiency of building construction are the main determining factors of recent housing developments in Algeria. Pressure of demand is usually the cause of promoting such rapidly built environment. The result is in most cases the creation of suburbs in which the quality of the environment is determined by the random juxtaposition of prototype buildings.

For decision makers, the quality of space is assumed satisfactory since the standards are respected. For those who have been on the waiting list for so many years and desperate for

shelter, it is an enormous amelioration. However for those who were at ease and acquired a new flat, it is a temporary step before the dreamed urban villa.[12]

According to this then, modernity in our context is more concerned with numbers and large scale operations in which the author is essentially bureaucratic. Consequently the housing environment took the shape of a new quick mass reproduction, based mainly on prefabrication. In these aspects, modernity tends to be seen as an answer to the crisis. For the decision makers prefabrication was the only solution, and hence it was realised in large housing developments where free standing building such as slab, and point block were the main repetitive features.

During this process, the idea of a house, with all it's implication of uniqueness, relationships to the ground, the street and the public domain were sacrificed in favour of the neutral term "dwelling unit". This word unit implies statistical quantitative notions about living, and necessary similarity in ways of life among families whatever their predispositions to different ways of living.

This new process of construction and planning design which was foreign to our tradition was seen as a means of modernisation in the housing environment. However, this idea originated in the middle of the 19th Century in which the dominant Western intellectual tradition for the design and production of housing has been based on quantitative ideals. The idea of modern housing is therefore not a modern one. It has emerged since the industrial revolution in Western Europe, when towns similar to Algiers testified overcrowding in which living conditions of the massive work force reached a most drastic situation.

Family workers were living in a cramped housing environment, with very bad hygiene and health conditions, in which the risk of fire was very likely to spread quickly and destroy an important part of the city. These were the alarming conditions which stimulated a whole new conception of the city, where health, light, air and sun were given more attention. The aim of this new conception was to provide an orderly and efficient urban environment.

In the first attempts towards improvements, two different directions were taken. The so-called "Utopians" such as Owen, Saint Simon, Fourier advocated starting again right from the beginning. They confronted the cities such as they were, with completely new forms of communal living, which were purely theoretical. Others, tried to solve each problem separately without wanting to reform the whole. [13] From this school of thought, which was mainly restricted to private initiative, which corresponded to the liberal office thinking, our present legislation on building was developed by constantly refining hygienic and legal regulations.

A series of new ideas, since then, set town planning principles and regulations which were to be more developed with the introduction of the modern movement just after World War One. It was Le Corbusier who dealt more concretely with the problems of town planning. In his ideal plan for the *"Cité Contemporaine"* of 1922, for 3 million inhabitants, he introduced town planning and technical innovations based essentially on modern industry, light, air, sun and on mechanical transportation.**(Fig.1)**. In his proposals, he introduced elements such as street corridors, large open spatial areas, and high rise buildings. These developments which Le Corbusier called the *"Vertical Garden City"*, found its most extreme form after World War Two in his *"Unité d'habitation"*. **(Fig.2).**

Since the design of the modern city was based on the new circumstance: the industrial town and the modern movement. The issue of the modern city has - apart from Ledoux- always been conceived in terms of uses-zones. Each activity was a clear cut division into industry, residential and welfare. The division was mainly on land use, each being sited with reference to its own individual requirements and linked to the whole by route system.

Since then land use zoning became a wide spread principle in modern urban planning. Later, this method of dividing the urban environment into different words, lead directly to the subdivision of residential areas into neighbourhood principles, which have been used in housing development in Algeria since the early 1970's.

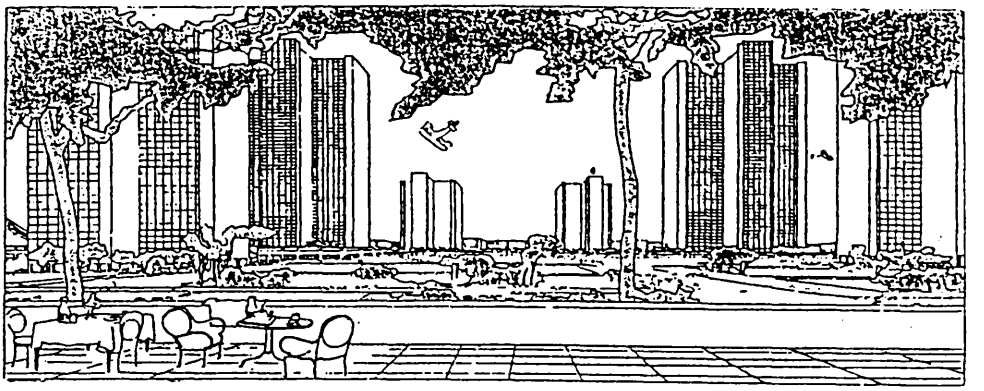


Fig.1. "Ville Contemporaine".1922.
Le Corbusier.

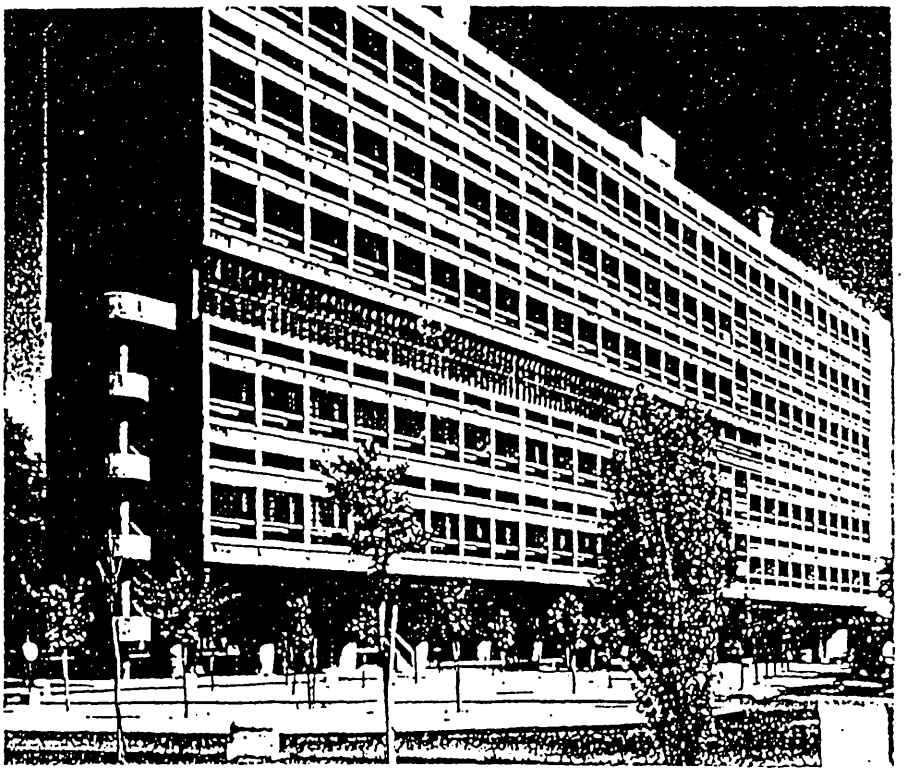


Fig.2. "Unite d 'habitation".
Le Corbusier.

This new process of housing development mentioned earlier as a symbol of modernity turned out to be insensitive to the social and cultural traditions of the Algerians, because at a primary stage the authors of planning and design decisions are very often foreign or influenced by foreign attitudes. Thus domestic traditional architecture has been dying out and swept by a wave of INTERNATIONALISM in the form of industrialisation where quantity is favoured to quality.

This dilemma of quantity versus quality has resulted in an impoverishment of housing environment which can be described as follows:

1. Development of programmatic standards that are exclusively quantitative; Quantitative concerns based on human experience are typically excluded.
2. Emphasis on economic formulae and prefabrication as determinants of housing form.
3. Pursuit of new egalitarian symbolism based on uniformity and repetition of building and dwelling form.
4. Fixation on the singularity of individual dwellings and buildings, their relationships, landscape or urban articulations are ignored.
5. Typological discontinuity; emphasis on the development of new units aimed at social transformation.

Sadly, today, all over Algeria, modern housing developments based on quantitative elements constitute an important part of urban areas. It is a widely visible and recognisable style which can be found anywhere in the world. It is in fact a universal style determined by modern forms of building, however human needs may be universal but cultural and climatic characteristic to each socio-economical context which causes the needs - as A. Rapoport points out in his book *House Form And Culture* - are accomplished in different ways.[14] Therefore, housing is a fundamental cultural matter which cannot and must not be subject to universalism.

5. Continuity with tradition

Determined to give a modern image to the country and in particular to the habitat, public authority attitudes relied on foreign assistance, in both design and construction. This attitude towards housing environment, marked by international style has left out the cultural traditions, thought to be incompatible with modern life style and ignored totally the Algerian context such as climate and family structure.

These new expressions of housing environment which are supposed to denote an aspiration, for change and improvement of the previous situation, appeared to be an incongruous form of progress. In Fact, this conflict between the people's need and the so-called modern housing environment has created a process of rejection of the quality offered by such an environment. The new organisations of spaces within and around the dwelling often apartment or flat were imported and never experienced before; as such undoubtedly they created a sense of discontinuity with the past and real alienation for their inhabitants.

Part of the new system, the apartment or flat requires for its occupant new adaptations and certain life style different from the traditional house. This modern type of house supposes new practices and calls for new relations between members of the family. In other words it supposes new domestic behaviour and economy. The modern dwelling as opposed to the traditional house, appears therefore as a system of constraint rather than a remedy to peoples requirements.

The access to modern habitat requires a real cultural metamorphosis, however all users of these new settlements are neither economically stable nor have the necessary possibilities to face these new situations and yet it cannot be achieved without a continuity of tradition. However, confined within such an environment, where the dwelling becomes a strange world with which no dialogue is possible, the householder will have to find ways of communicating with this new type of spaces where he is obliged to fit to the life standard of the modern dwelling.

The scarcity of dwellings creates situations where most families have to stay for many years in the same dwelling. Consequently, inadequate dwellings are subject to modification according to the families aspirations. These physical alterations appear as soon as the people move in the new dwelling, and can be as important as changing the position of the toilets with its piping in a multi-storey block. Although alterations vary in type and importance according to the householders cultural background and the type of dwelling he occupies, the most common modifications can be seen as, transformed balconies into inside space, screened balconies by canvas, or constantly closed shutters.

These alterations have produced a total chaos and are seen as a deterioration of the visual and physical aspect of the environment. The public authorities put the blame on the occupants, but who is to blame in the first place, the planners and architects, or the people who are in a constant struggle against this newly imposed lifestyle based on western traditions? In reality what the occupant is doing is to reproduce his living pattern based on his own tradition in a different structure. The result is then without any doubt affecting both the environment and the people, due to the lack of understanding between man and his new environment.

As a result of the industrial boom and the change in the process of building, a lot of human cultural and anthropological patterns have been lost in housing and settlement. If we look at the earliest housing and settlement products made during this time, we can see that certain patters emerge as human necessities. This is not only in Algeria but all over the world. The need to respect the known patterns or pattern still in use in the traditional architecture is more important than the need to respect or preserve a known *"style"*. To think that the addition of the missing ingredients, like transformation of balconies into inside space, or to screen them from the outside, has no link with Algerian culture or society, is to misunderstand the problem. The respect of certain types of process or an adequate spatial hierarchy would be more to the point.

Without denying the importance of trying to give everyone an adequate living space in terms of square metres, we must realise that this is far from being the only matter that must be

considered. As A. Casault describes: *"To be numerically well off in a large but human compound could be far worse and engender far more social problems than living in crowded but humanly satisfying surrounding".* [15]

In recent terms in Algeria, as in many other cities, tradition has been challenged. As a result a physique that is markedly different from the traditional one is being introduced in our cities, few vernacular compounds have been considered as an inheritance worth protecting, not just in their original form but with their history and their transformations not only as nostalgic places but as people's living places.

Regarding this, Popper argues that tradition arises because of our need for a certain predictability in social life, in this sense tradition provides order and regularity in our natural social environment, it provides us with *"means of communications"* and a set of conventional usages and ideas upon which we operate. Thus the function of tradition is *"explanation and prediction";* our need for structure and regularity in social life makes tradition persist.[16]

In addition, a genuine tradition does not just belong to the past, but is cyclical and forms the most important source of our knowledge, it also serves as a base for our insights and actions, in other words tradition consists of a platform upon which one can operate. Traditional forms are fundamental components in a constantly evolving and coherent expression of cultural identity. Because tradition carries within it innovation and change without rejecting the past, it embodies wisdom and understanding of both man and nature. Thus continuity with tradition should be regarded as a starting point in understanding the housing problem of the Algerian society. And I quote; *"consciously or not, societies are organised to ensure their own continuity and thereby serve the function of preserving something from the past. Society's awareness of the past is in fact society's awareness of its continuity."* [17]

References

1. Benmatti, N.A. L'habitat du tiers-monde. "Cas d Algerie". Algiers. 1982.

2. Panorama. Sciences sociales. "Special Algerie". Revue No: 4-5, october / oovember. O.N.R.S. Algiers. 1980.

3. Revolution Africaine. La grande rue. Revue, july / august. 1984. pp.8-9

4. Affane, Z Planning for incremental development: an alternative to urban housing in the Algerian context. Thesis. University of New Castle upon Tyne. 1983.

5. Ibid.

6. Ibid.

7. Meisershein, A.M. Forward in "Pour une antropologie de la maison". By Rapoport, A. (see ref. 8).

8. Rapoport, A. "Pour une antropologie de la maison". Collection aspets de l'urbanisme. Dunod, 1972.

9. Benatia, F. "Appropriation de l'espace d'Alger apres 1962." S.N.E.D. Algiers. 1978.

10. Settouane, F. Plea for courtyard house. Thesis. University of Glasgow. 1986.

11. Benmatti, N.A. op, cit.

12. Angal, A A critical exanimation of industrialised building in Algeria and proposals for future housing schemes considering useres. Thesis. University of New Castle upon Tyne. 1983.

13. Benevelo, L. The origins of modern town planning. Routledge & Kegan Paul. 1967.

14. Rapoport, A. House form and culture. Foundations of cultural geography series. Philip, L. Wagner, 1969.

15. Open House International Housing and the built environment. Theories, Tools and Practice. ISSN 0168, 2601 Vol: 12 No: 1, 1987. p.40

16. Popper, K. Toward a rational theory of tradition Harper & Row, New York. 1968. p. 125

17. Pocock, J.G.A. The origins of study of the past: A comparative approach. In comparative stuties in society and history. 1961-1962.

Chapter 2: NATURE OF THE STATE'S RESPONSE

1. Last experiences

1.1. The Z.H.U.N.
1.2. The prefabricated systems
1.3. The recent trend

2. The real problem

2.1. Conflict with the socio-cultural context
2.2. The user's actions
    2.2.1. The dwelling alterations
    2.2.2. The surrounding alterations

3. Conclusion

1. Last experiences

After more than a decade of using imported Western systems of prefabrication, the housing crisis had not been solved but rather worsened. First, the promise to meet the housing deficit in terms of numbers has been broken secondly, the living environment has deteriorated in a drastic way. In addition to that, this new option of housing production which relies on imports, proved expensive and denied most local materials. Beside all this, the option of town planning that relied mainly on the Z.H.U.N. system as the only means of housing organisation, turned out to be inappropriate and incongruous with the Algerian realities.

1.1. The Z.H.U.N.

The Z.H.U.N. is a new zone of urban housing that is linked to an existing city in order to ease over-crowding conditions. The planning aspect of this zone is usually a general layout showing its location and its relationships with the surrounding space. **(Fig. 1)**

On a bigger scale the Z.H.U.N. has a schematic organisation of the different activity zones and the road net work. **(Fig. 2)** The planning process produces different densities which determine the physical aspect of the basic residential spatial unit. **(Fig. 3)**

In the final stage of this planning process, residential layout organisation and typologies are determined according to what is thought by the planners adequate to the regulations set previously. **(Fig. 4.5.6.7).**

The result of the Z.H.U.N. is a mass housing production where typical residential building are reproduced in park-like sites. **(Fig. 8.9.10.11.12.13).** However, the building process that characterises these buildings is based on prefabricated systems imported from the West.

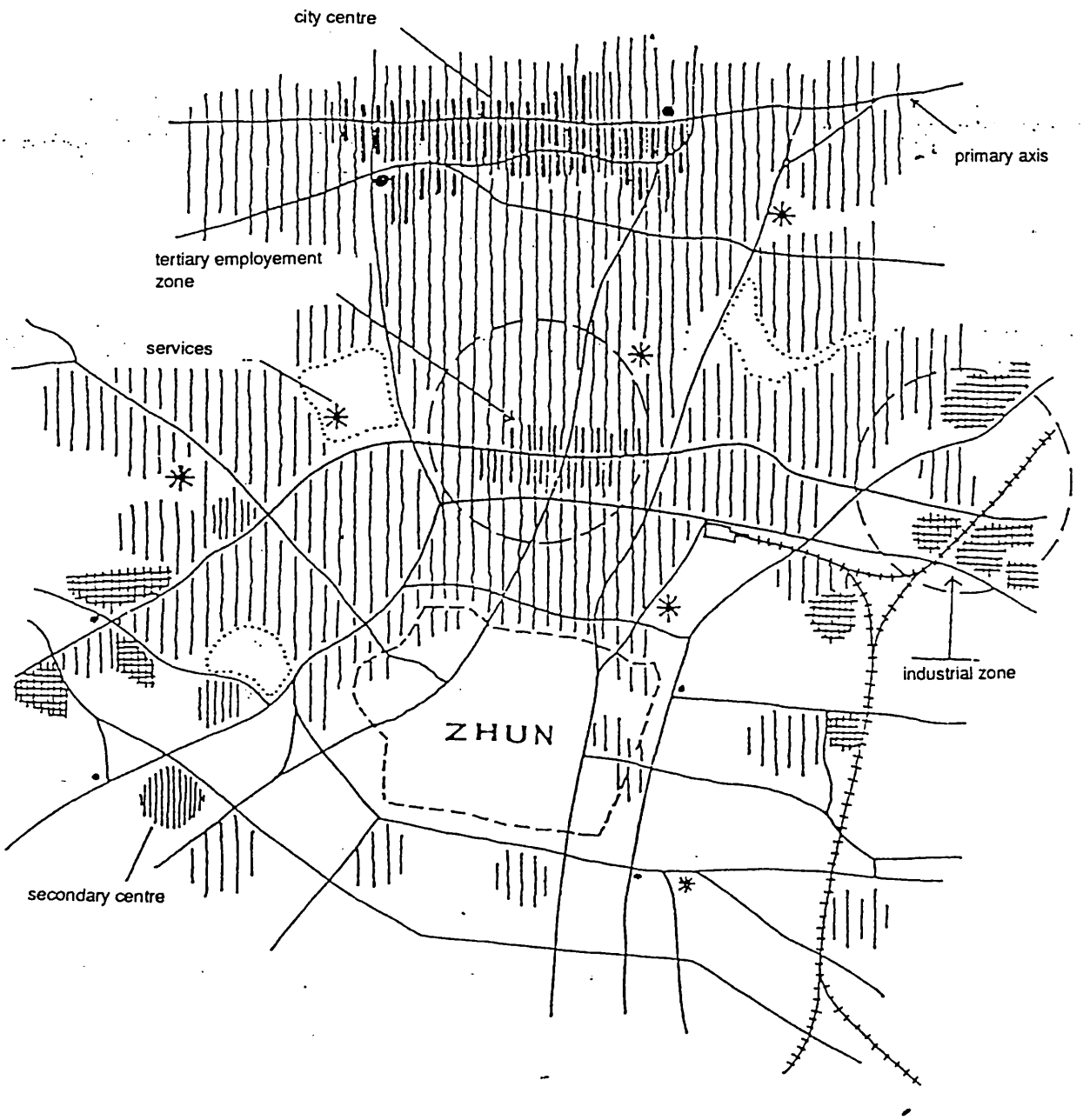


Fig.1. Location of the Z.H.U.N. and its relationship with the urban context.

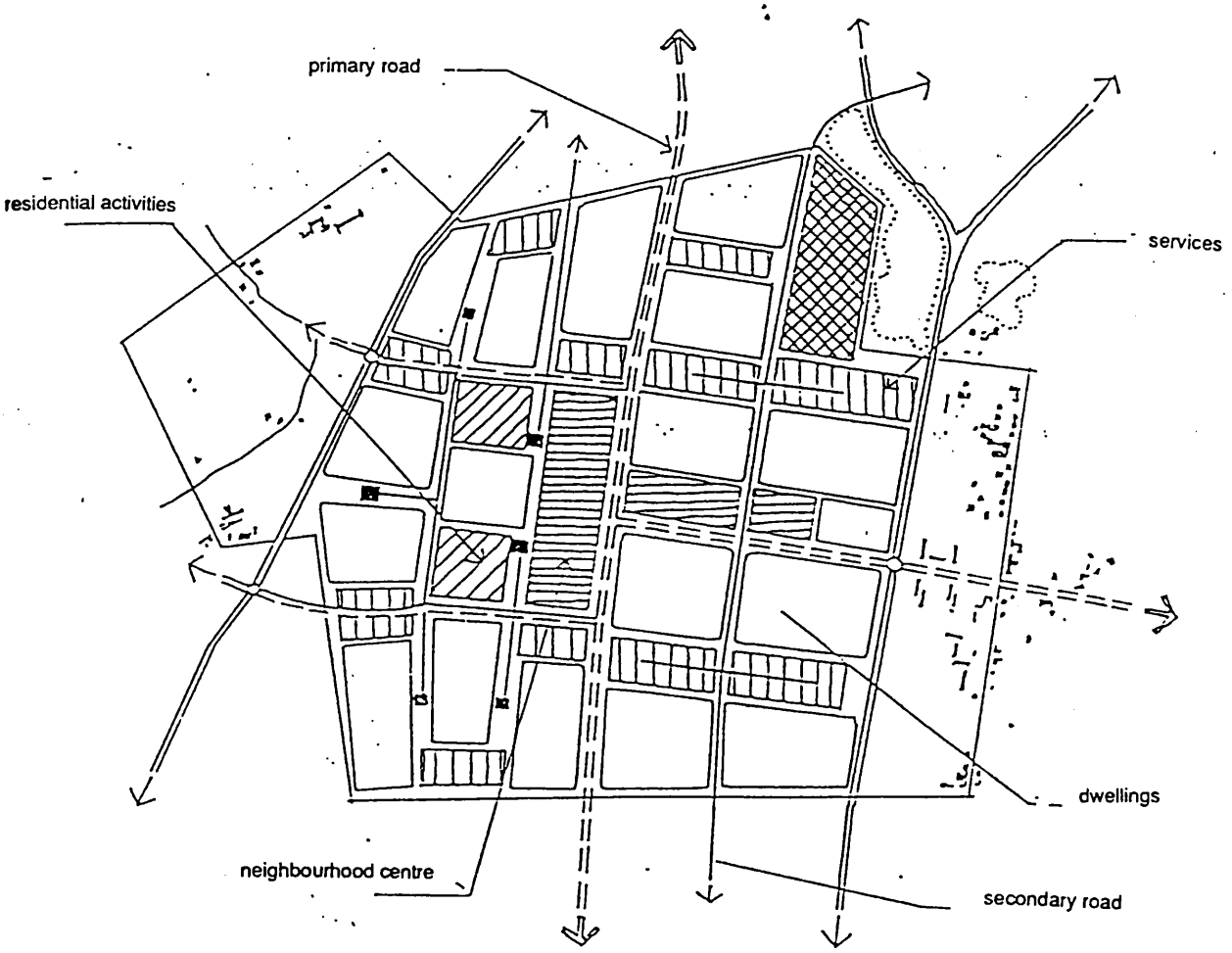


Fig.2. Z.H.U.N.'s general layout
Activity zones & Road network.

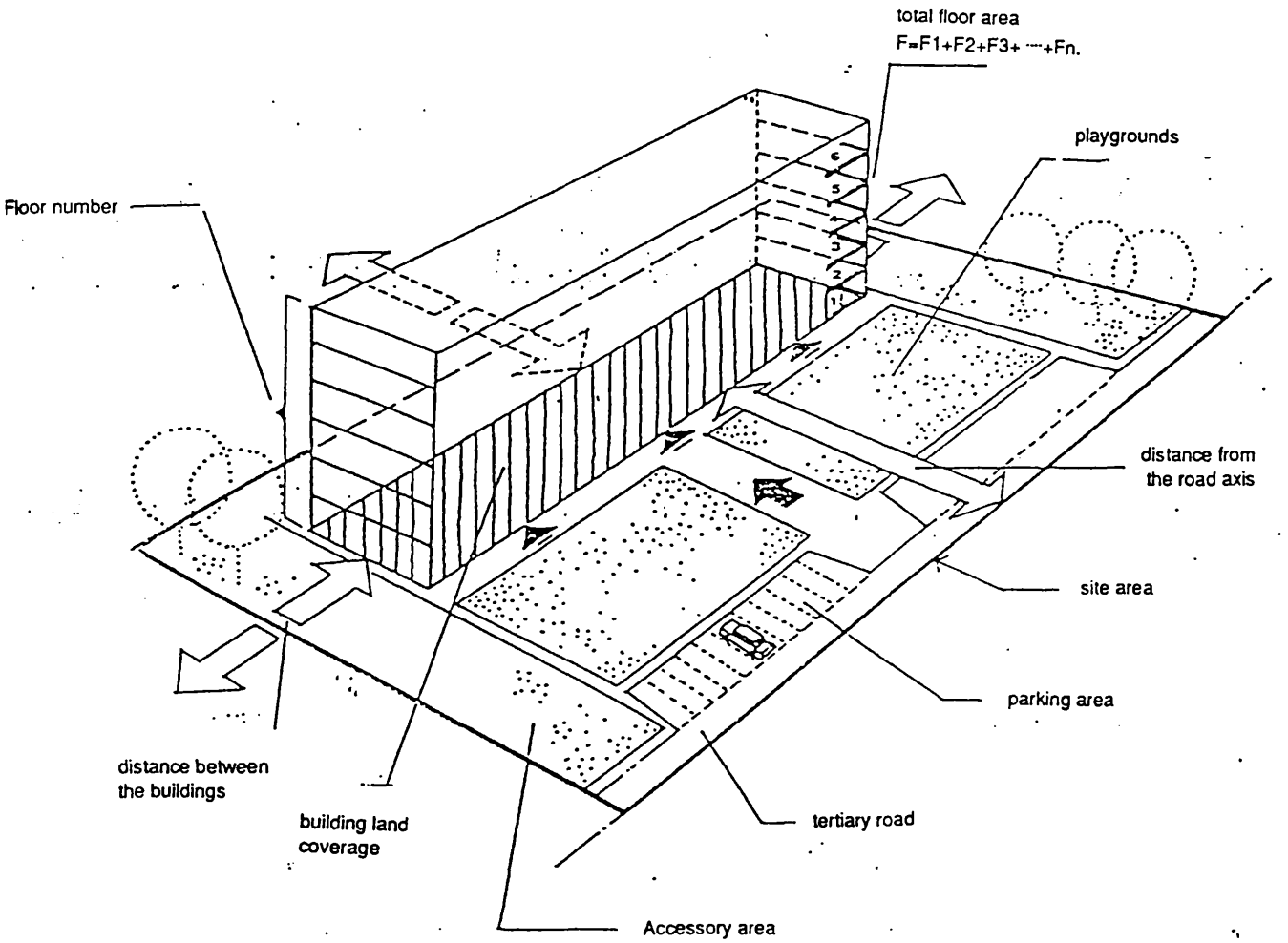
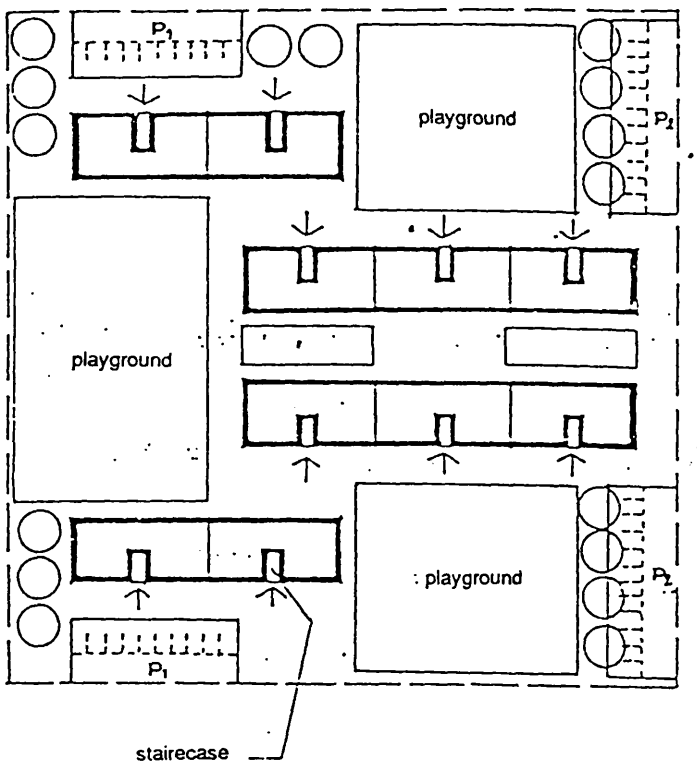


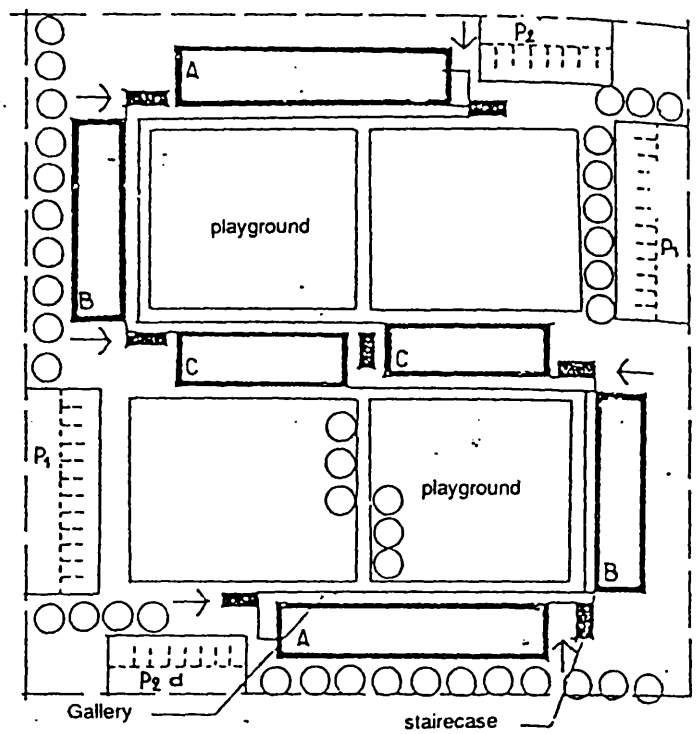
Fig.3. Configuration of the basic residential spatial unit.



Example of solutions for 1 hectare
Plot ratio = 0.8 Floors = 4
Total floor area = 8,000 m²
Built up area = 2,000 m²

Typology with starecase:
Dwelling = 100
2 dwellings per landing
Number of dwellings = 80
Rate of occupancy = 6
Number of inhabitants = 480
Rate of vehicule ownership = 1/2 familie
P1= 10 parking places
P2= 12 parking places
Density = 80D/ha

Fig.4. Example of typology and layout organisation.



.Typology with gallery and "duplex":
Slab A: 18 dwellings
Slab B: 12 dwellings
Slab C: 10 dwellings
Number of dwellings = 80
Number of inhabitants = 480
.Density = 80D/ha

Fig.5. Example of typology and layout organisation.

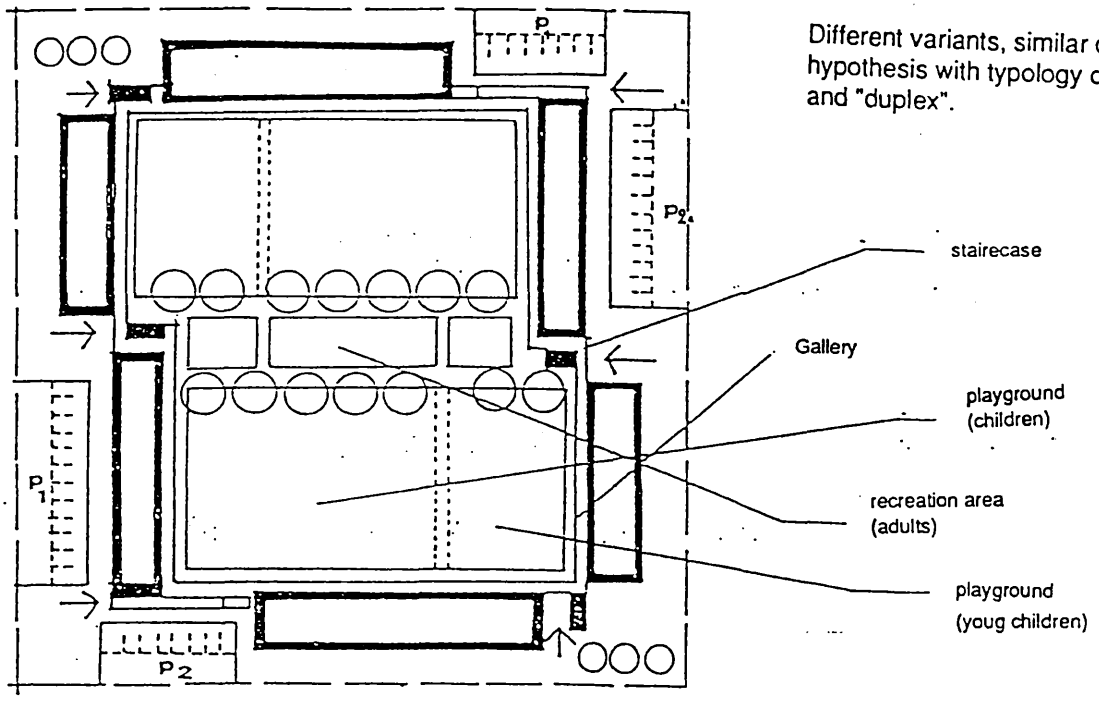


Fig.6. Example of typology and layout organisation.

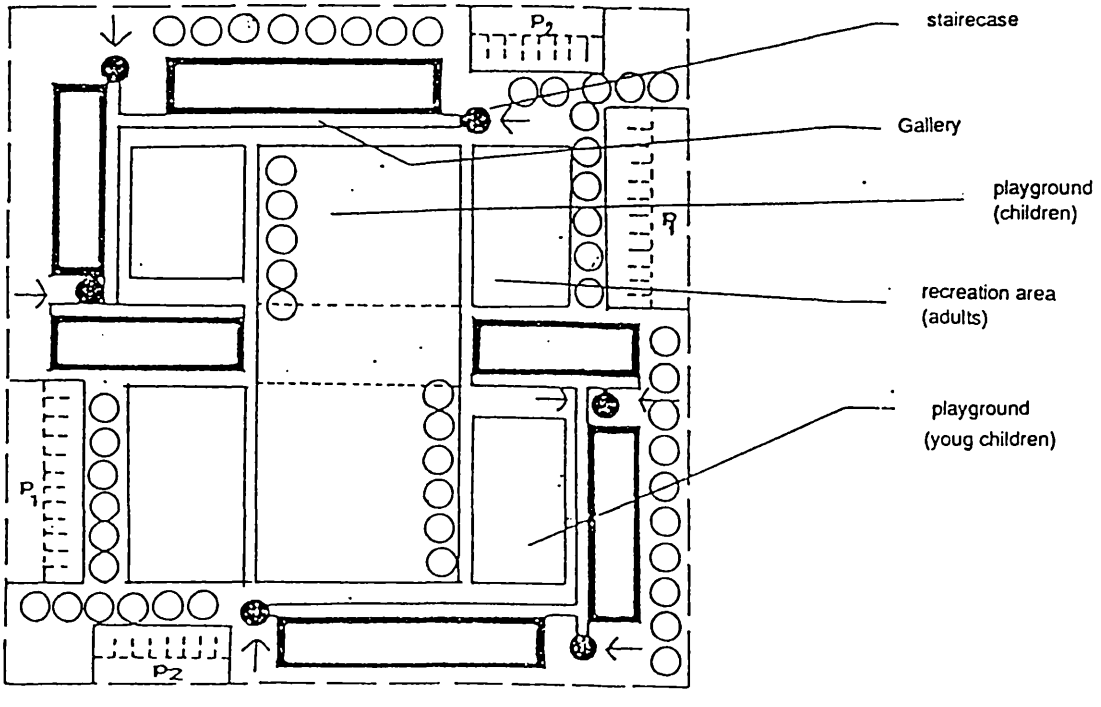


Fig.7. Example of typology and layout organisation.

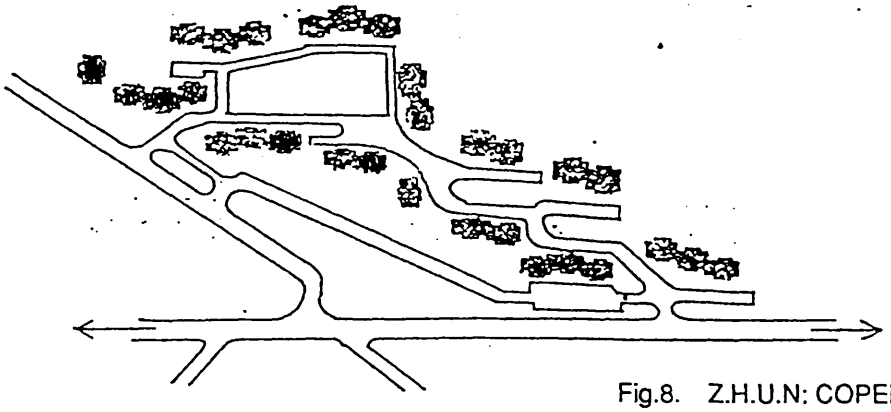
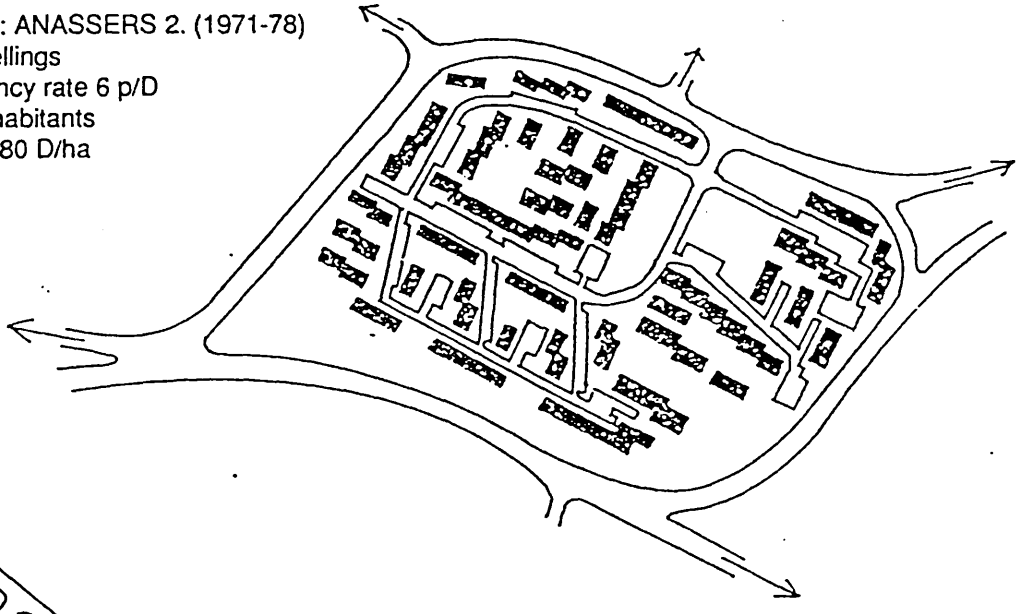


Fig.8. Z.H.U.N: COPEMAD North. (1976-78)
300 dwellings
Occupancy rate 8 p/D
2400 inhabitants
Density 50 D/ha

Fig.9. Z.H.U.N: ANASSERS 2. (1971-78)
800 dwellings
Occupancy rate 6 p/D
4800 inhabitants
Density 80 D/ha



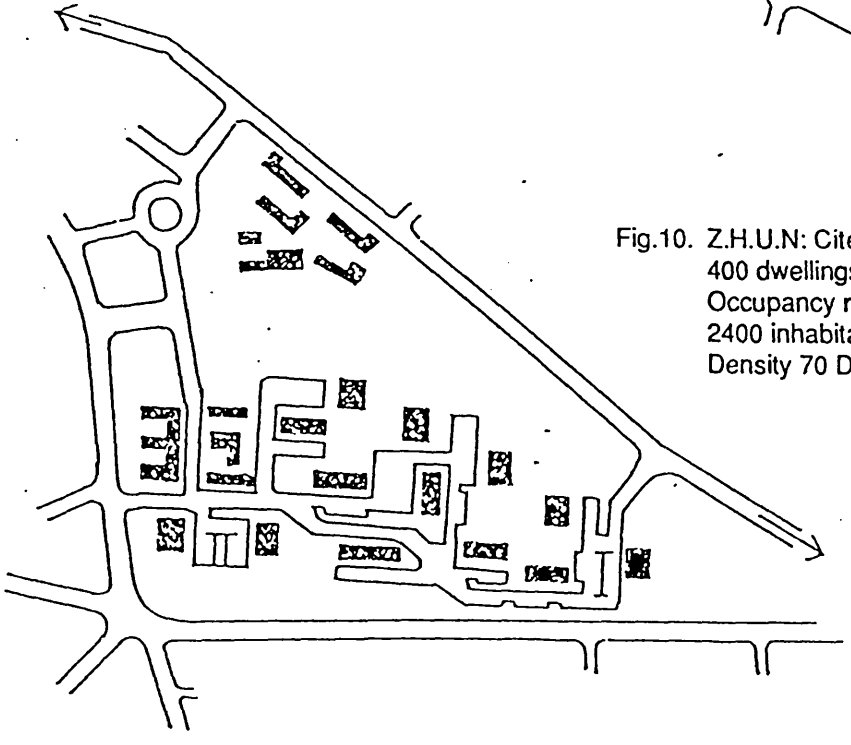
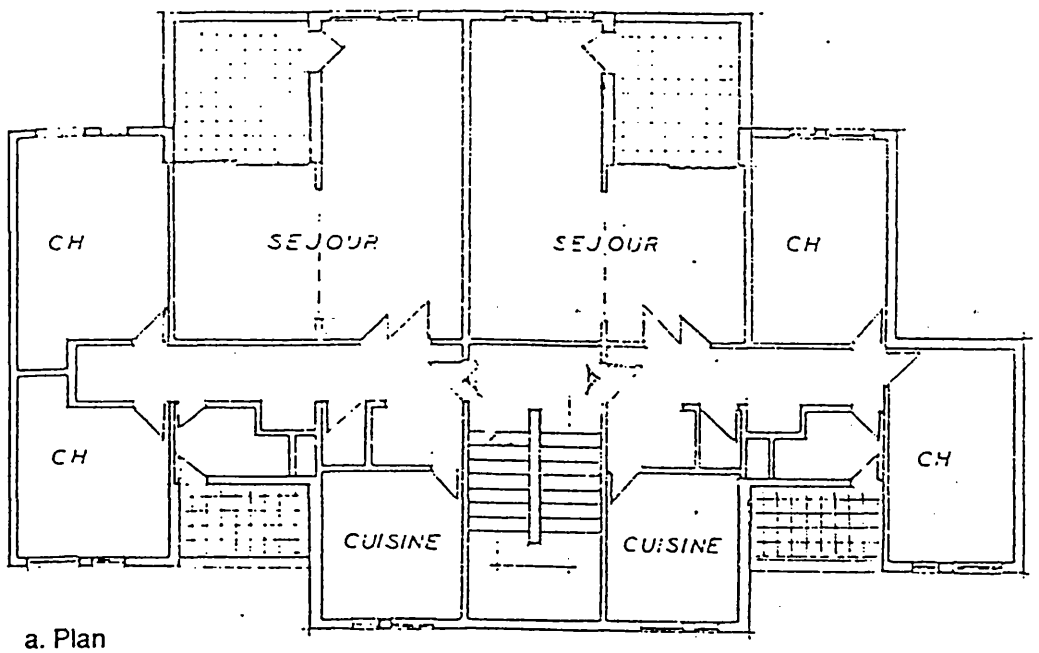
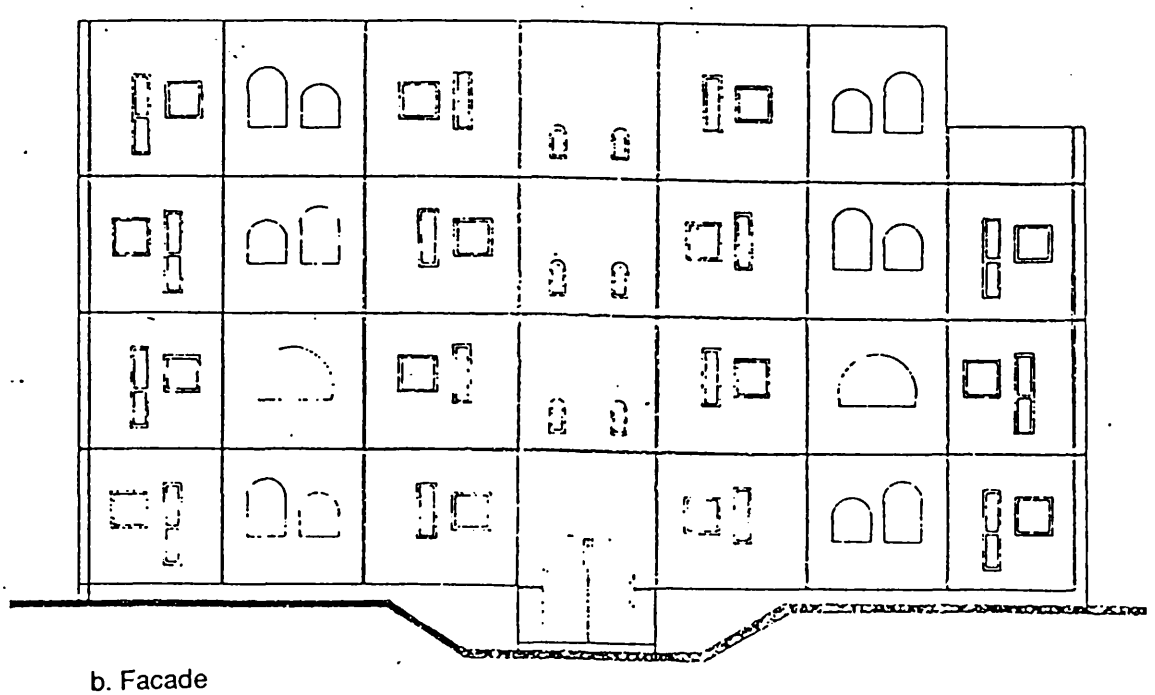


Fig.10. Z.H.U.N: Cite' des Sources. (1975-78)
400 dwellings
Occupancy rate 6 p/D
2400 inhabitants
Density 70 D/ha

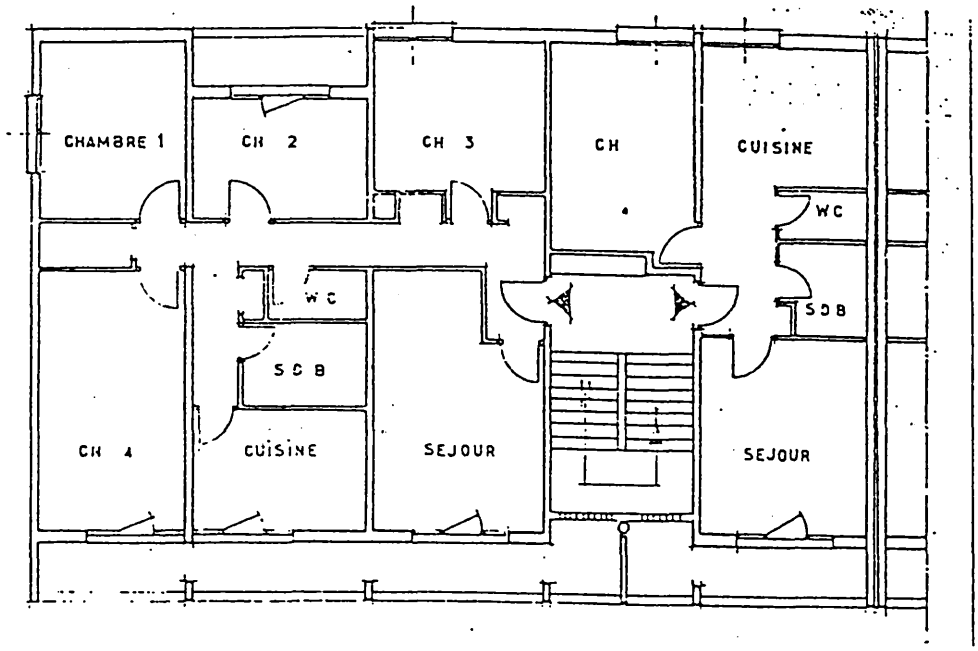


a. Plan

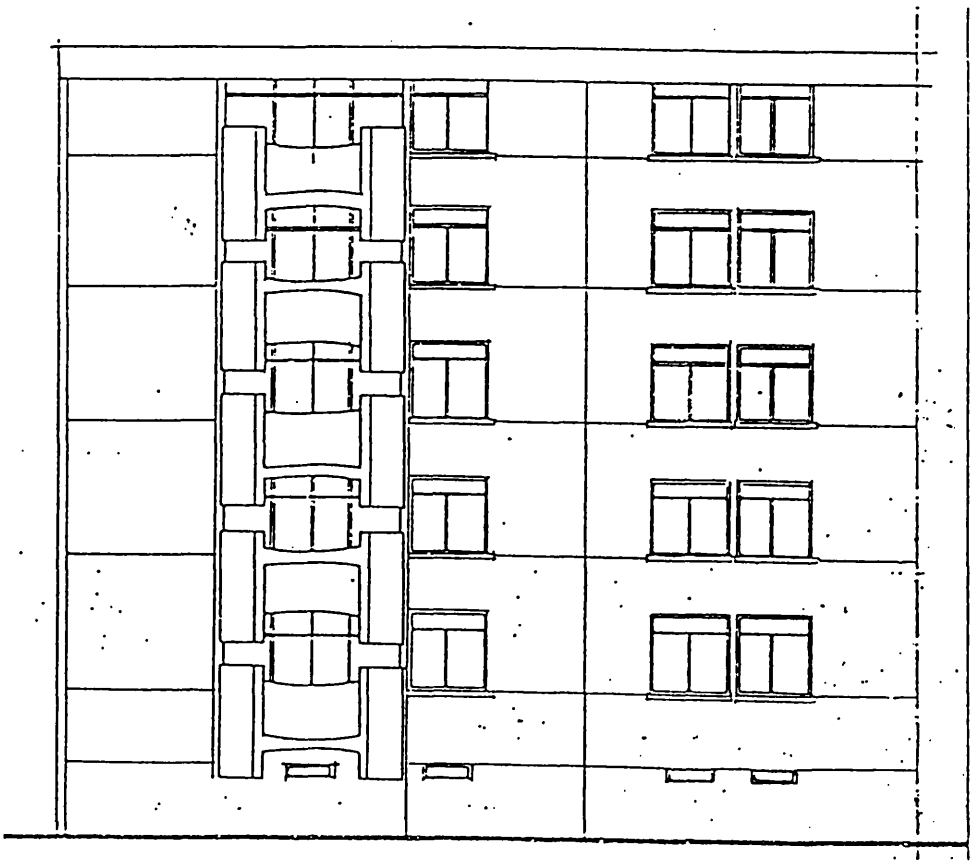


b. Facade

Fig.11. The typical building unit of the Z.H.U.N. COPEMAD North.

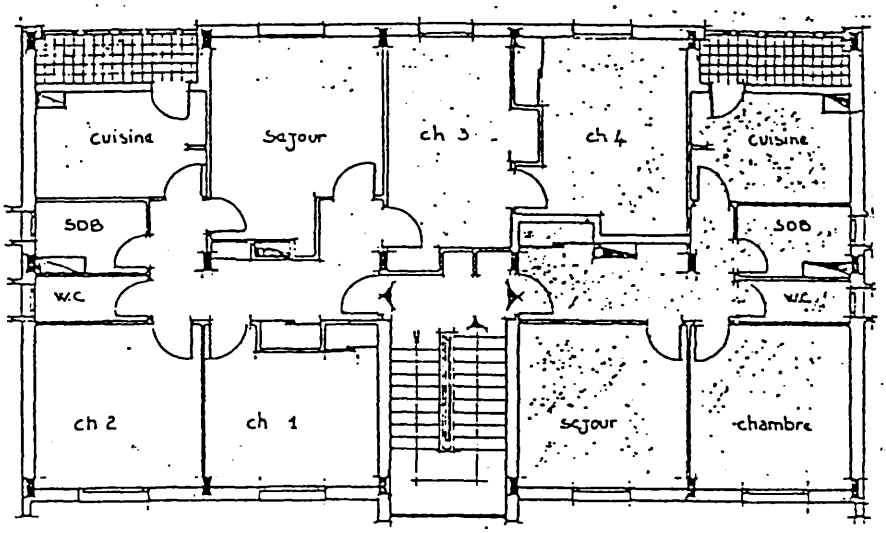


a. Plan

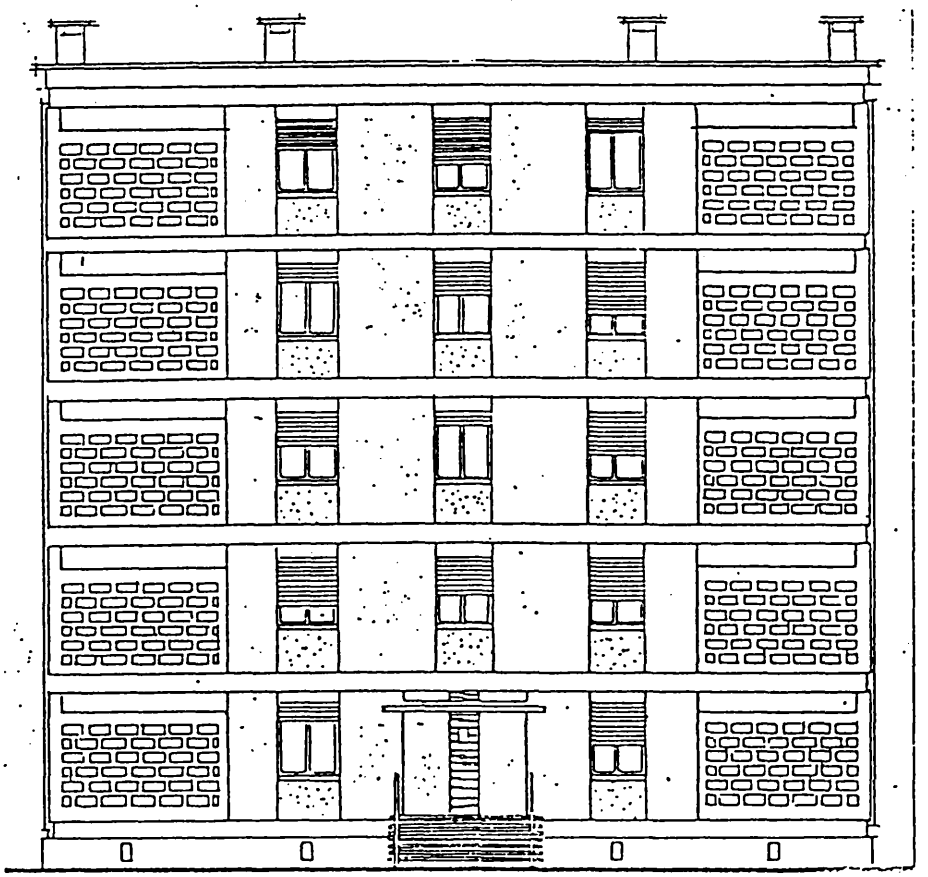


b. Facade

Fig.12. The typical building unit of the Z.H.U.N. ANASSERS 2.



a. Plan



b. Facade

Fig.13. The typical building unit of the Z.H.U.N. Cite' des sources.

1.2. The prefabricated system

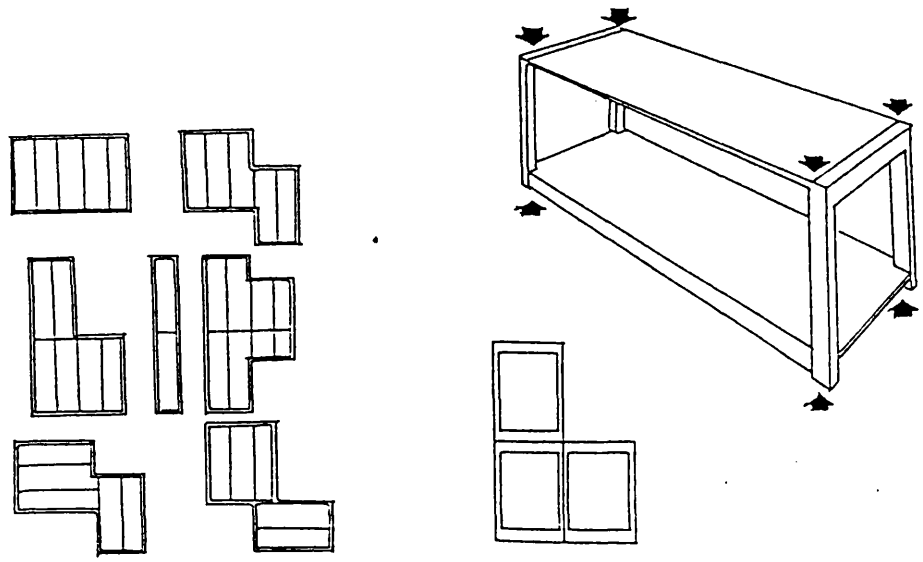
Prefabricated systems have been introduced in the Algerian building process to support mass housing production in order to decrease the deficit. As a result various systems were imported from different developed countries to be used by national building companies.

The "VARECO" Swiss system used by the ECOTEC (National Company) and others such as the *"Coffrage-tunnel"* (tunnel-coffering) system, are just examples to show how these systems are rigid. **(Fig.14).**

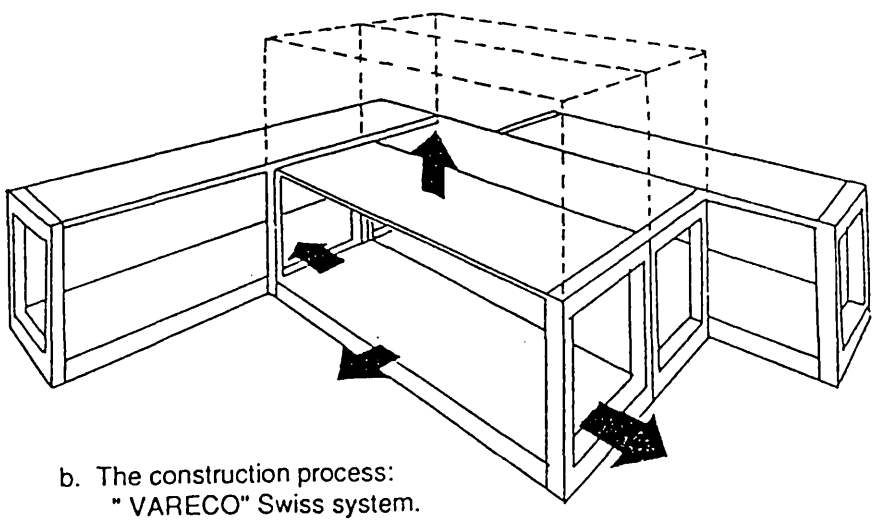
1.3. The recent trend

The recent trend in terms of housing production has not changed at all. Today, the Z.H.U.N. are neither mentioned in their full sense nor referred to as a planning policy. However, the authorities still favour housing that produces an exactly similar physical environment , in fact most people still refer to such housing environment by the number of dwellings that are precent in the area. In this sense, many recent housing settlements are called: " les 1,000 logements, les 800 logements, etc..."

Can we say then, the problem of housing is solved, or it is just a creation of maximum shelters where people are obliged to fit in, what ever their cultural and social traditions are.**(Fig.15).** However, one might ask the question; are we trying to shelter people in an anonymous world or should we create an appropriate dwelling environment where people appreciate their daily living spaces without changing their life style or even their environment.

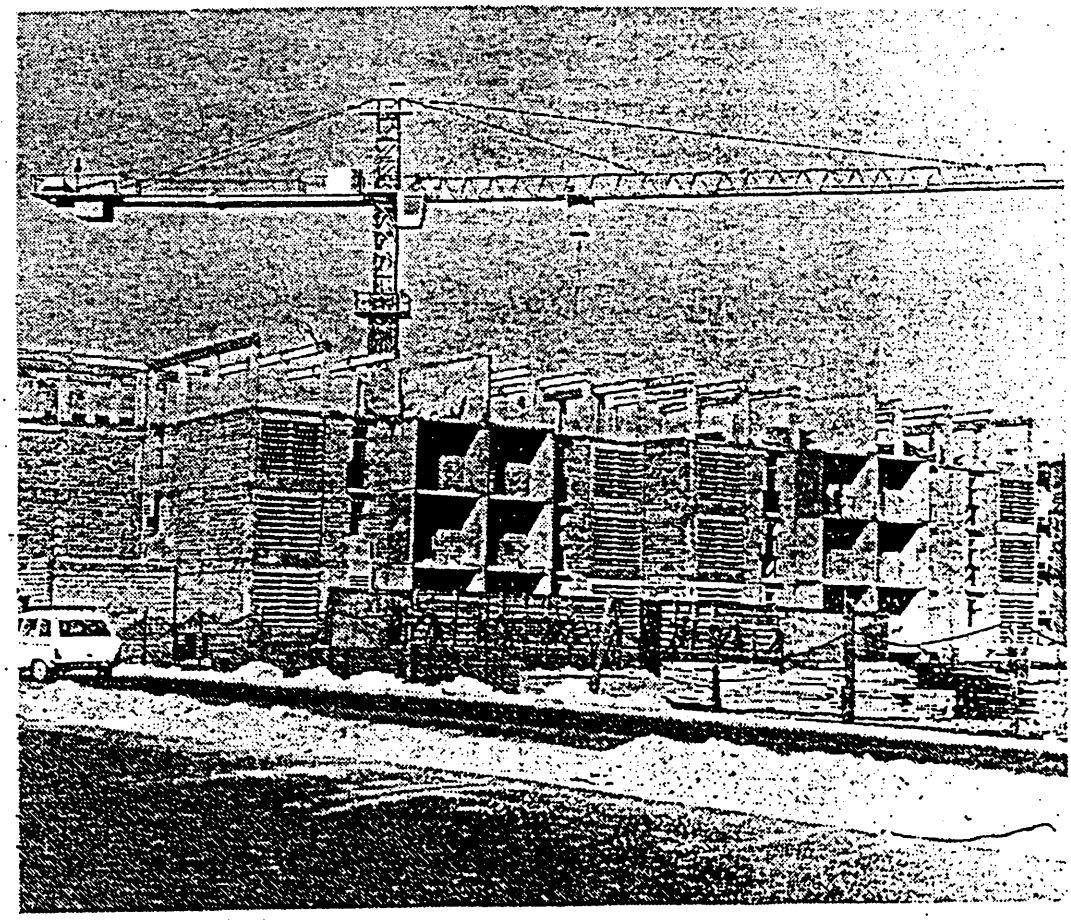


a. The standard elements and their different forms of assembling.



b. The construction process: " VARECO" Swiss system.

Fig.14. Example of imported prefabricated system adopted by a National Company (ECOTEC).



Les cités poussent comme des champignons aux alentours de la ville, peut-on dire que le problème du logement est réglé ?

(Photo M. LADJAL)

« HORIZONS » — Mardi 3 Mars 1987

Fig.15. A newspaper illustration and comment on housing

2. The real problem

The real problem of the housing environment today, is that the government decisions on prefabricated systems and the planning option which follows are insensitive to the socio-cultural aspects of the Algerian society. This highly centralised and standardized planning and building process resulted in the production of huge housing areas that are totally incongruous with people's need. Scenes of identical linear slabs, set in parallel rows or in other geometrical orders and spaced by vast parking and recreation areas, are today one of the most frequent landscape of our cities

In such urban areas, the environment is so anonymous that people are referred to as numbers and not as families; and if it happens to any one to go there to visit a friend, the situation might become a real nightmare, as these areas have usually little sense of orientation.

Architecturally, it is a clear violation of both the social and the physical environment. If similar experiences have proved disastrous in Europe in the 70's, today their apprehended outcome do not serve as a lesson. In fact, such architectural images are common to our living environment even though the strong sense of rejection that is felt by the users.

2.1. Conflict with the socio-cultural context

The precent contemporary housing environment adopted by the government seems and sounds perfect solutions but in reality, such mass housing production has gave mass problems today, due to its inadequacy with the socio-cultural values of the people.

The physical nature of this type of housing has brought many problems. In fact, if time and resources permitted a thorough survey, the list of problems would be very long. Nevertheless, according to my own poll, when I asked a significant number of people, the most common problems that were mentioned very often are : insecurity, personal isolation, lack of supervision

of the public spaces (playgrounds, planting areas, parking spaces, rubbish stores areas and staircases.) and the loss of privacy.

Amongst the women, as Farida stated " personal isolation is the main complaint"[1], beside the insecurity fear that arises from the loss of privacy. Generally, most of the tenants living in this type of housing have lost their identities and hardly know each other. As a result of this, the strong community spirit that was precent in the traditional environment has weakened drastically, leading to total neglect and social irresponsibility. Thus, people became concerned about their domestic space only , the communal open space however, became no-mans land where physical degradation and vandalism prevail.

In my own opinion, insecurity, isolation, and the lack of supervision of both shared and public spaces, emerge from the loss of effective territory,or what Newman calls "Defensible space"[2]. Because no boundaries or limits define properly the communal and public spaces, these problems are occuring and most people are aware of this situation, and as they mentioned to me in their terms "what is outside our houses is nobody's business."

However, most of the degradations are clearly seen in areas such as the rubbish dumping areas, the staircases, the presumed planting areas, and the parking spaces. Due to the lack of supervision staircases are vandalised and end up in very poor conditions where electric lighting and letter boxes are always major problems for the inhabitants. Another problem that is also related to the lack of supervision, causing very bad hygienic conditions, is the rubbish dumping areas that are very messy and constantly there.

2.2. The user's action

Any environment that goes through changes means that its users are acting against certain things that need improvement in order to enhance the quality of life. " Like any living environment organism, changes in the dwelling environment are natural and essential"[3]. Changes then happen frequently as people tend to satisfy and meet their ever changing needs.

However, changes are of two kinds. When they occur through a long period of time, in response to light adaptation of some aspect that need readjustment to make the environment more appropriate and more appreciable; these changes are supposed positive since they reflect a reasonable sense of improvement of a satisfactory environment. But, when they occur within a very short lapse of time, in response to some very inadequate aspect that are greatly conflicting with people's need; these changes are supposed negative since they are major and intense, they also reflect an indicative sign of dissatisfaction which arise usually from most inappropriate environments.

In this precent study, it is thought necessary to identify some modifications and alterations that have happened to most contemporary housing, since these latter have significant importance on the understanding of people's struggle with their environment. It is also worth mentioning that despite strong regulations that are enforced by the authorities, most householders end up modifying the living space "in" and "around" their dwellings in order to suit their families aspirations.

The main concern here is ,therefore, to stress such changes that are occurring in the latest housing areas which came through mass production. Because of their immediate appearance (usually, alterations occur as soon as tenants move in), and their negative aspects, these transformations carry signs of inadequacy of the new housing environment to the society.

In my opinion, this is a simple cultural reaction of the Algerian society against the precent contemporary dwelling environment. However, this cultural act is conscious and should therefore be interpreted as a strong and clear message to all who are involved in the housing process.

2.2.1. The dwelling alterations

Alterations on the dwelling cell occur mainly in the entrance hall, the kitchen, the bathroom, the toilet, and the rooms. These changes have considerable bearing on the external aspect of the residential buildings.

At the entrance hall, usually the householder adds a heavy curtain in order to stop direct view from the landing to the hall, as this may cause considerable harm to privacy requirement.

In the kitchen, changes affect partition walls. Sometimes, the kitchen is extended to the loggia in order to gain more working space, as traditional cooking requires. As a result, partition walls are removed and the loggia's open character changes into a closed space.

In the bathrooms, changes concern the form, the position , and even the use of this space. The most frequent alteration is generally, the removal of the bath sink as this latter is never or reraly used, due to the presence of public baths (hammam). **(See part two, chapter 1).** However, sometimes it is replaced by a shower sink. But when it is not replaced and as space is gained, its is thus, used for storage or for clothe washing (in some cases, a washing machine is installed).

For hygienic and religious purposes, many people replace the English toilet by a Turkish one, since this latter offers no contact with man's body and allows adequate cleaning. Because clean water is necessary for washing, some users prefer to install a tap instead of having to provide continuously a clean basin of water.

In the rooms, alterations concern mainly their use. Generally, rooms are used as a polyvalent space due to the size and the nature of the flat. They are used as a living space during day time and as a sleeping space at night. In some cases, heavy physical changes are made involving living rooms to be extended to balconies in order to gain more space. As a result, the balconies usually change their physical aspects. Due to privacy requirement , the balconies become

small windows, but sometimes they are screened by material that stops views from the public domain.

2.2.2. The surrounding alterations

Some of the surrounding alterations are a direct consequence of what is occurring in the dwelling cells; these are affecting mainly the external facades of the residential buildings. Alterations such as, screened or closed balconies, loggias and windows, which derive from spatial, privacy and security requirements, are in fact changing entirely the preconceived architectural image of the residential buildings. However, as everybody acts on his own possibilities and personal desire, the uniformity of the buildings is broken down leaving the facades appearing with all kinds of individual styles.

The other alterations that are occurring in the surrounding space concern mainly the physical, the visual and the use of the external open spaces. It is worth mentioning that all these changes that are taking place, are due to the inadequacy of design and the total irresponsibility of both the users and the local authorities.

Most contemporary housing areas are dominated by the open space that gives great emphasis to the inhuman scale. However, the so-called planting or green areas and playgrounds, that are preconceived by the architect, are a totally chaos. First of all, in most projects these areas are left unfinished as money usually runs out. Thus, these spaces become vast no-mans land. But, when the work of these areas is achieved, the result of the housing project is often satisfactory and mainly appreciated by the local authorities, since at the inauguration day it will give good advertisement.

However, just a few months after people move into new residential areas, the real aspect of the open space begins to emerge due to their design principles that disregard the climatic conditions and to the total neglect of both the inhabitants and the local authorities. As a result of the none maintenance and bad design, these public areas with all their facilities such as

lighting, fences, pavement, etc... go through a real state of impoverishment in which, physical, visual and use character are different from what they were intended for originally.

Thus, these open spaces result as rubbish dumping areas, as small puddles of waste water in winter, and sometimes as parking spaces since they are usually nearer to the dwellings than the real ones which offer also better supervision. The real parking spaces however, are functionally transformed since these latter are paved, they are usually appropriated by the local children as football grounds.

The foot-paths or pavement that link most of these areas are usually not used since they do not offer logical pedestrian routes. People often prefer to use short and handy cuts to get around their residential environment and these creates along the vast open space, new organic pedestrian alley-ways. *"However, in rainy periods, these paths, as they are unpaved, become marshy ground and cause enormous troubles for the inhabitants"*.[4]

Beside all these changes, in some housing areas where public facilities are lacking, few tenants who acquired a ground floor flat usually succeed in obtaining permission for opening a shop or other similar services such as, a chemist or a hairdresser, etc... This is changing drastically the physical and visual aspect of the residential buildings. This act, whatever necessary for users, is still violating the already poor architectural environment that exists in the latest housing areas.

It is necessary to point out that the inhabitants reaction to their environment, in terms of the changes they have made, can only reflect part of the problem as there are many aspects that they cannot solve by physical change either because such problems do not have a physical solution i.e. loneliness, or because the nature of the changes required is beyond their powers i.e. effective territory definition, greater external shade provision. In fact, all changes at a public level are denied expression.

However, in this section, it is thought necessary to give some real illustrations of the recent housing environment. But, for privacy reason, that made difficult to obtain permission to shoot

photographs inside the dwellings, the only possible shots were the ones taken outside the dwellings. The following illustrations **(Fig.16-33)** show some external aspects of the precent housing environment and the alterations that are made by the users.

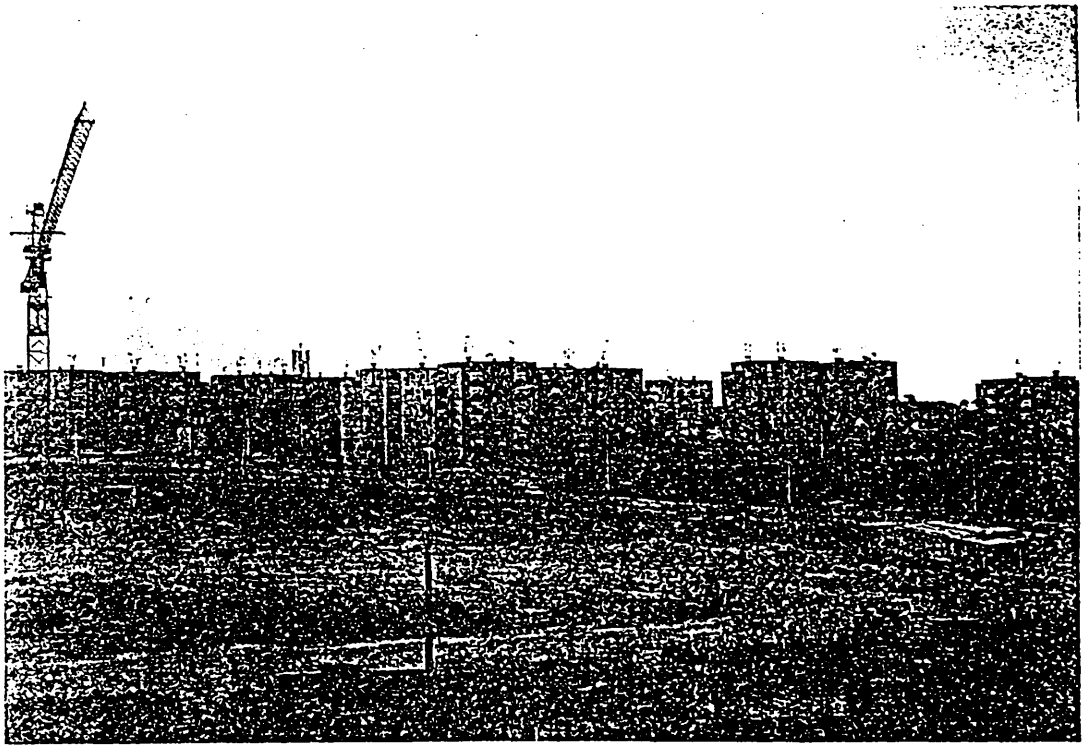


Fig.16. An urban scene that is typical to most housing environment.Monotony of the steriotype buildings and the dominance of undefined open space.

Fig.17. Typical implementation of the residential building on a park-like area that is too difficult to maintaine due to the climatic conditions.

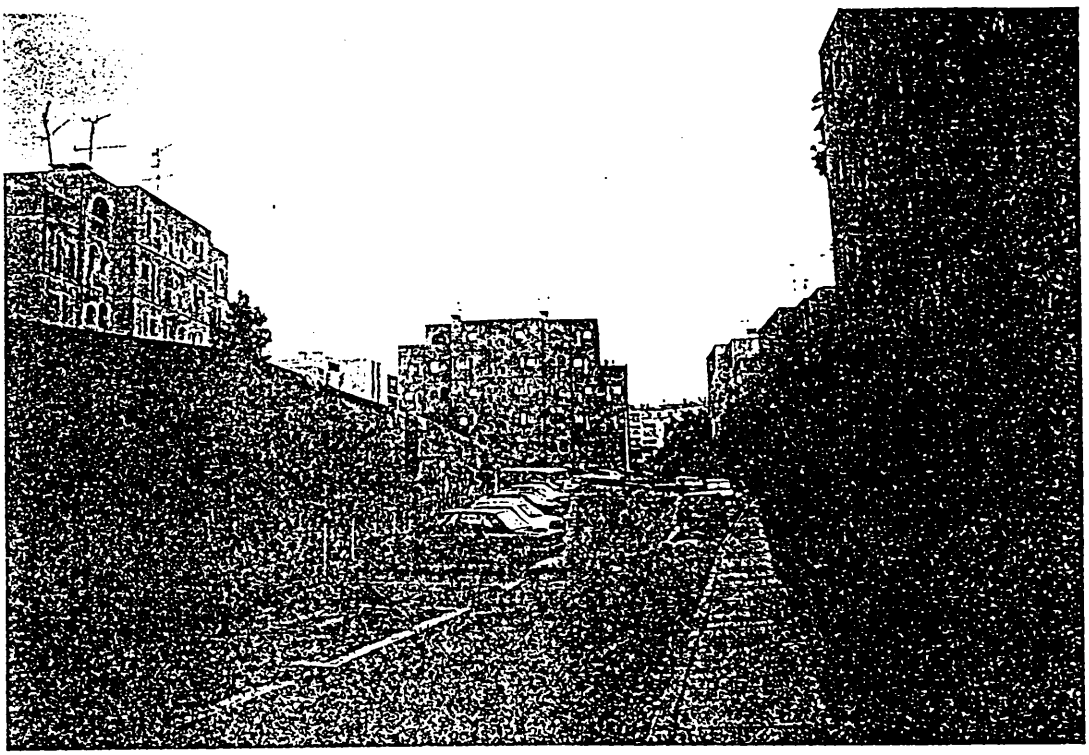


Fig.18. Due to the lack of private open space people use the outside space for drying their daily washing.

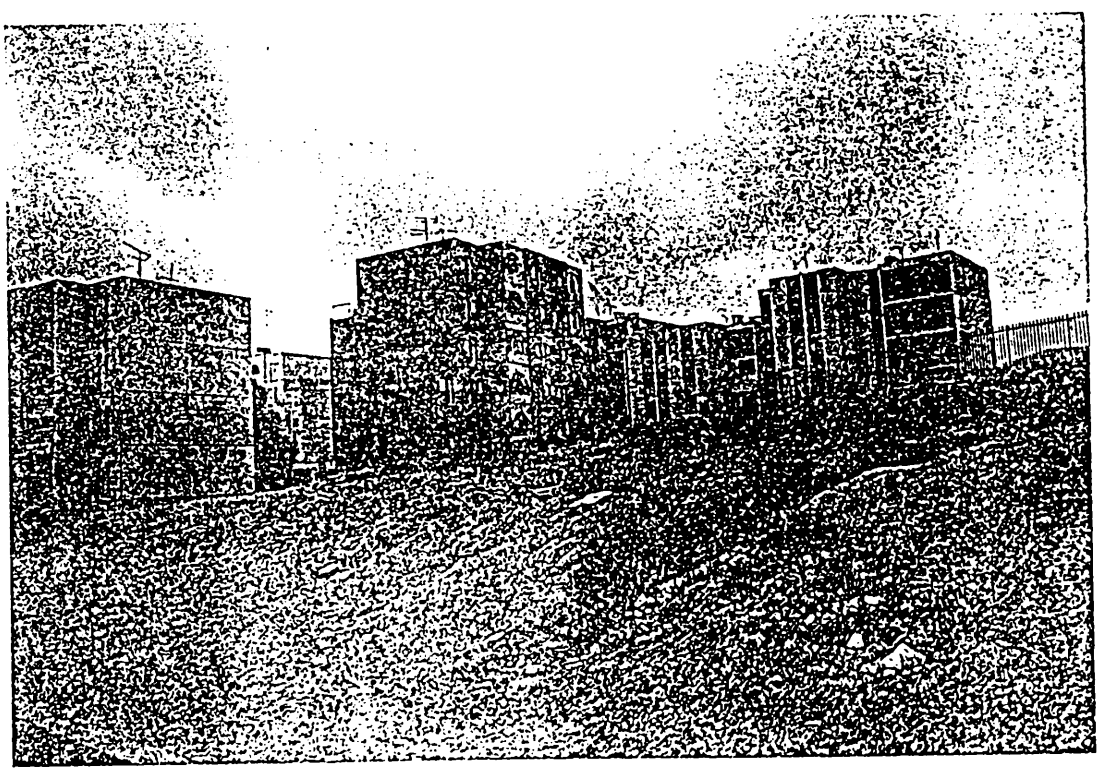


Fig.19. The real aspect of the open space and it is much more worse when it rains. Note also the transformation of a ground floor flat into a pharmacy. (Left hand side).

Fig.20. Open balconies that changes into sreened or even glassed windows for privacy reason or for space shortage.

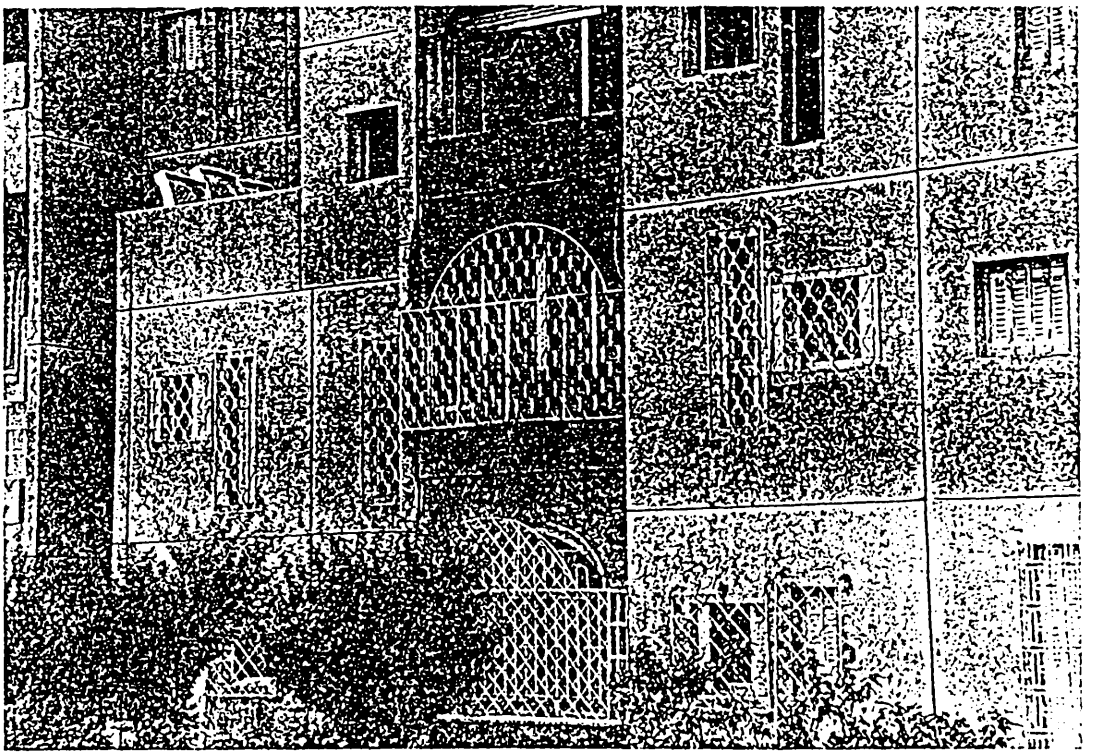
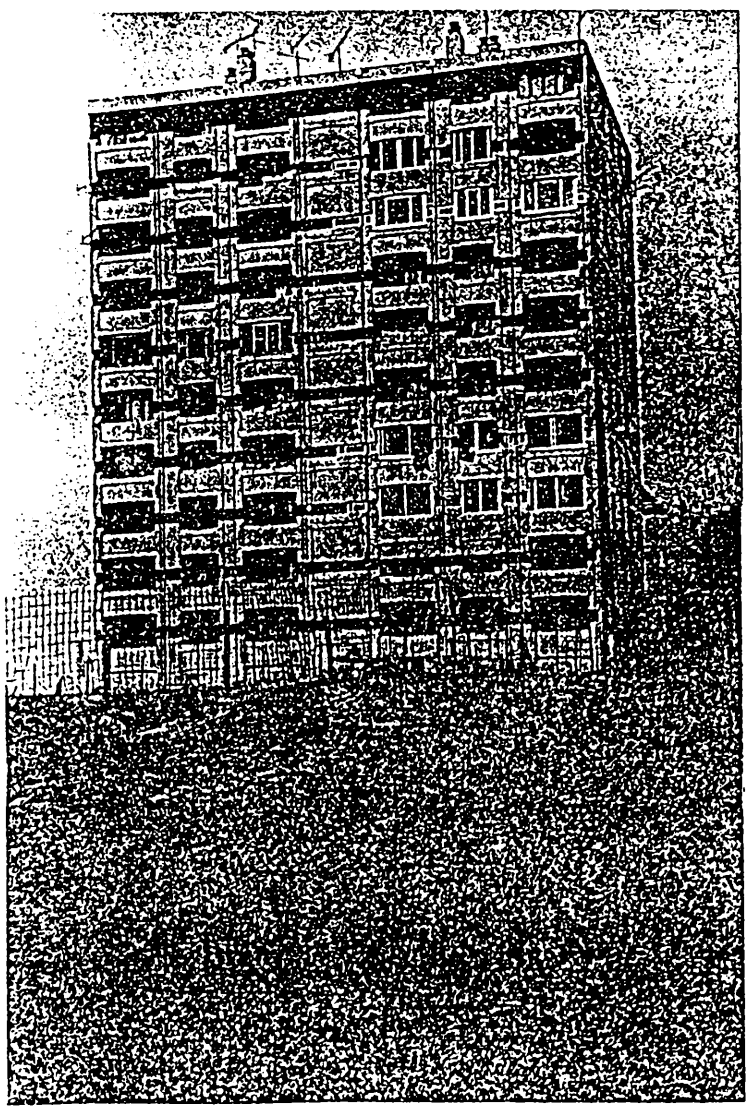


Fig.21. A dwelling that turned into a forteress due to security reasons; But what about the emergency access in case of fire.

Fig.22.23. The changing appearance of the facade and the neglect of the out door spaces.



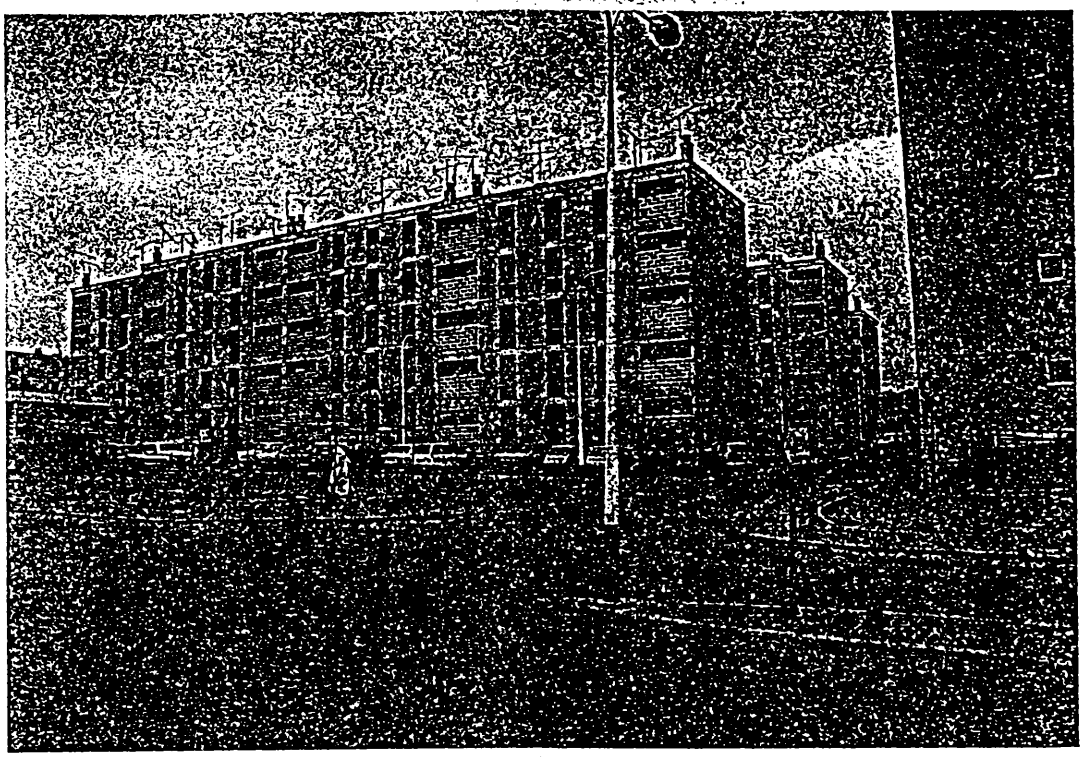


Fig.24. The outdoor space that turned into a large parking space where people park cars in disorder.

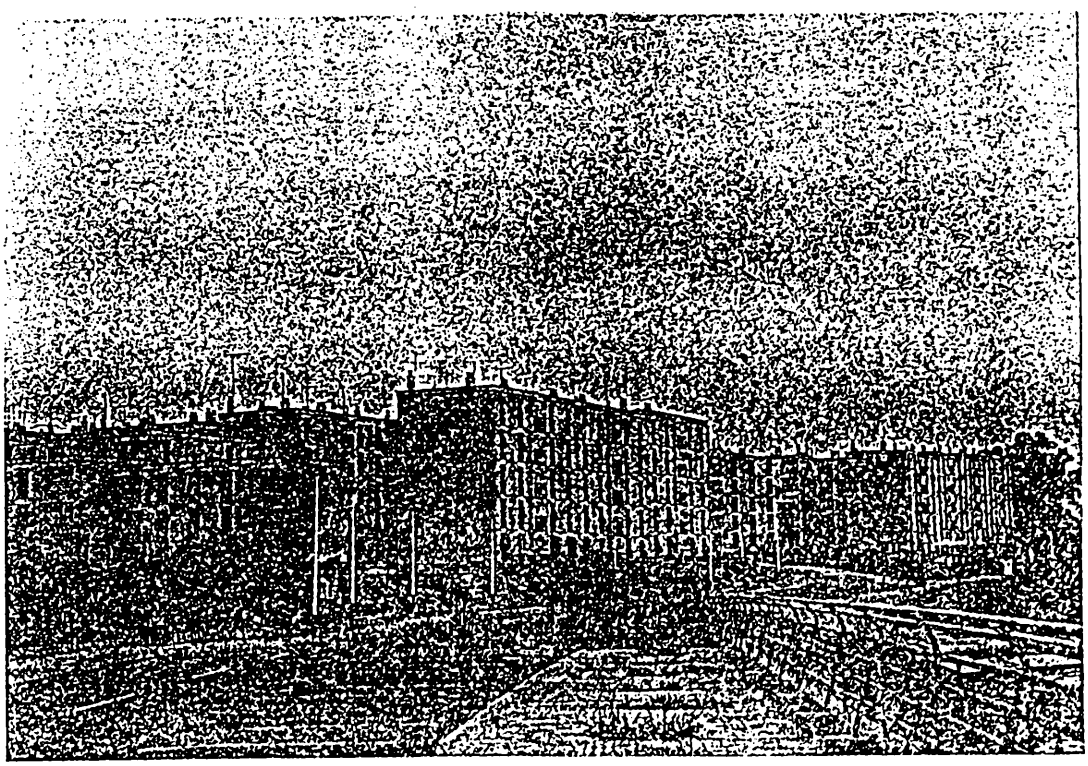


Fig.25. A residential area that ignores the human scale, but favourises the car.

Fig.26. The only separating line between the building and the road is a fence and a slop.

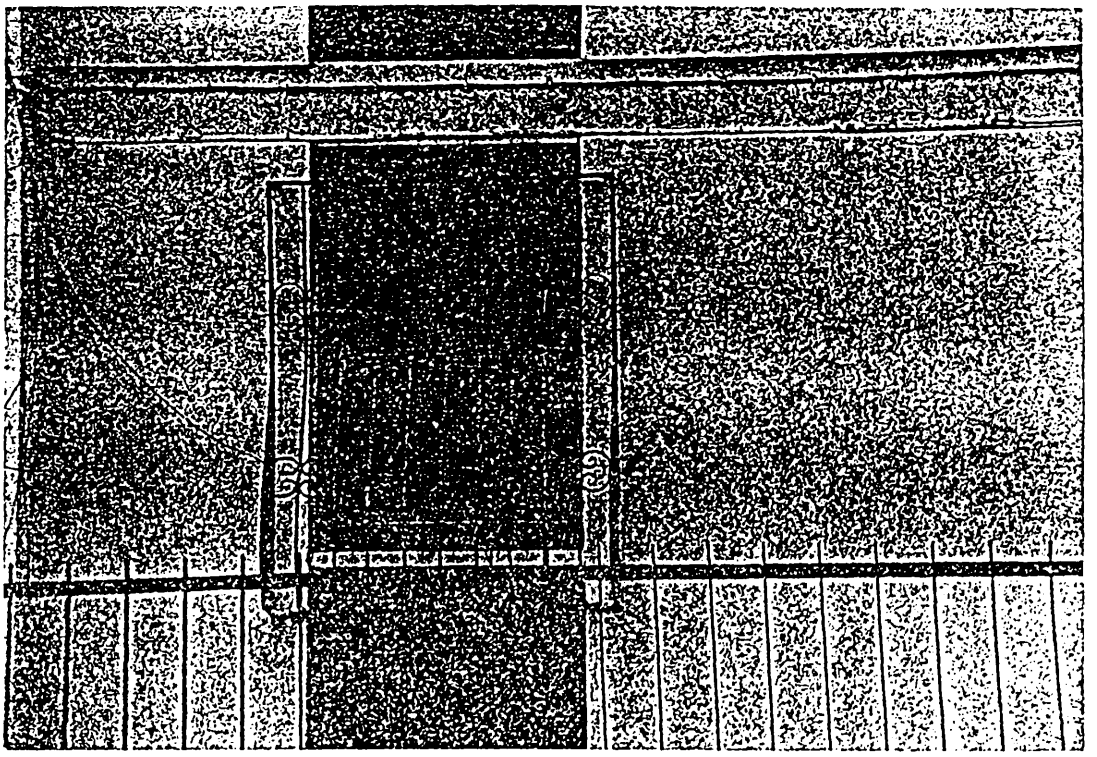


Fig.27. A window that turned into a cage for security reasons.

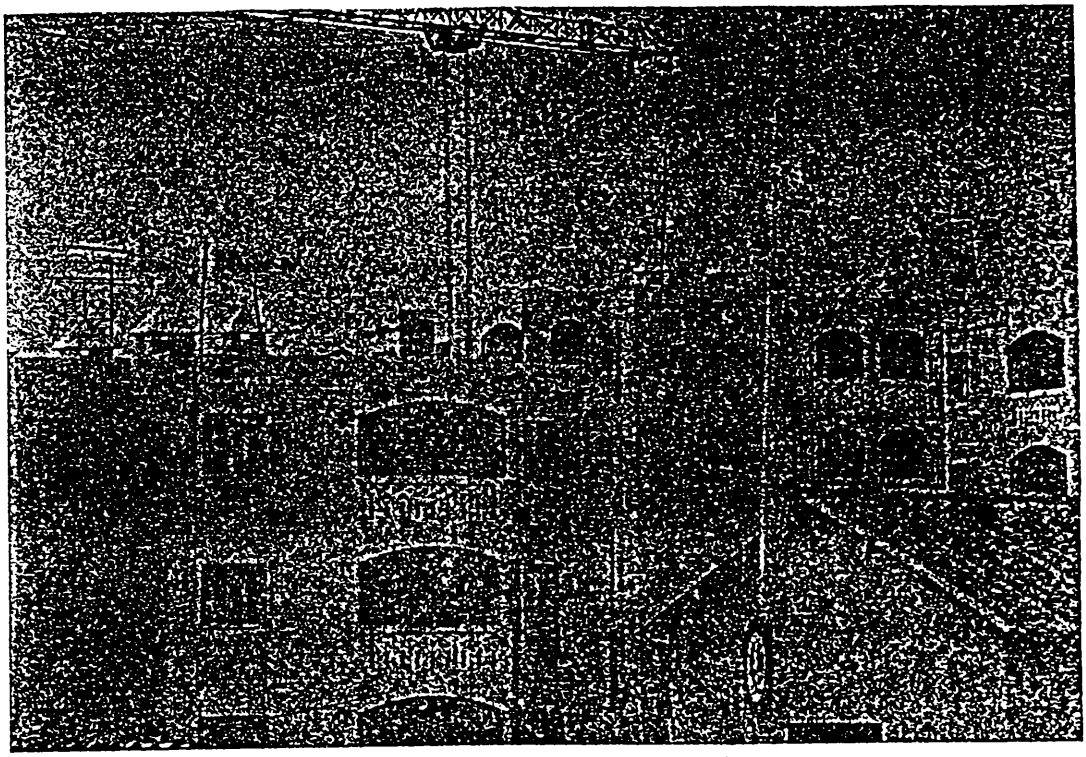


Fig.28. The close up of balconies still persists even in the latt'est housing environment.

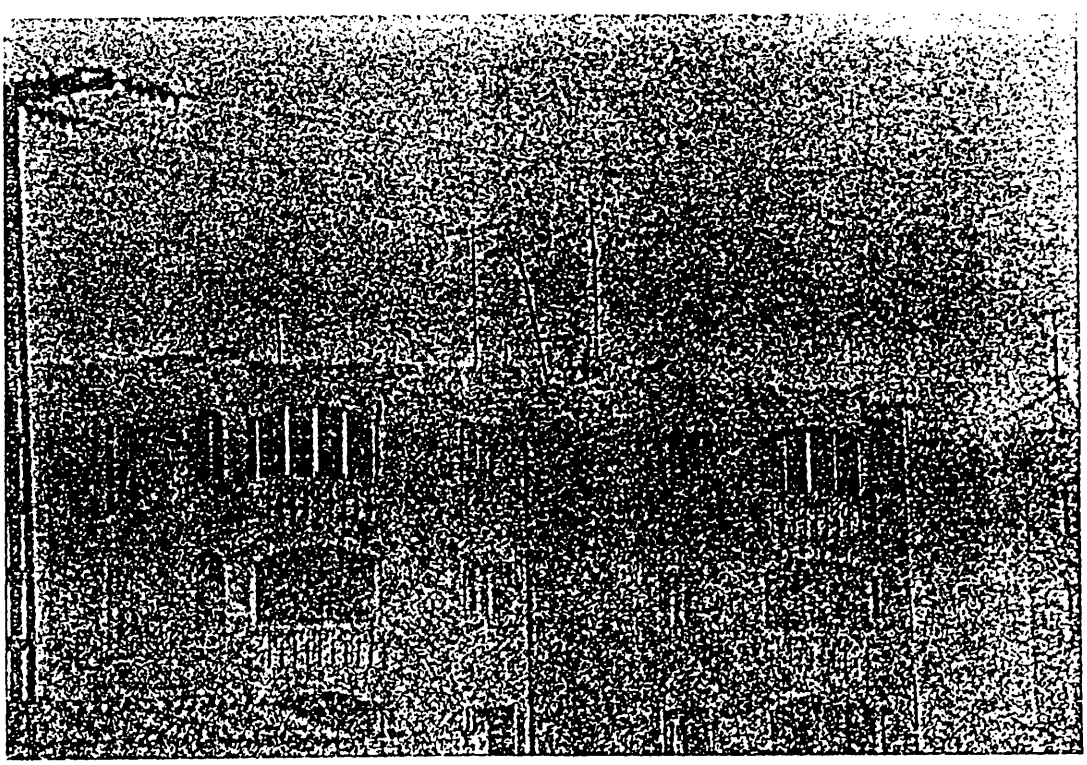


Fig.29. Yes, the close up balcony becomes a fashion.

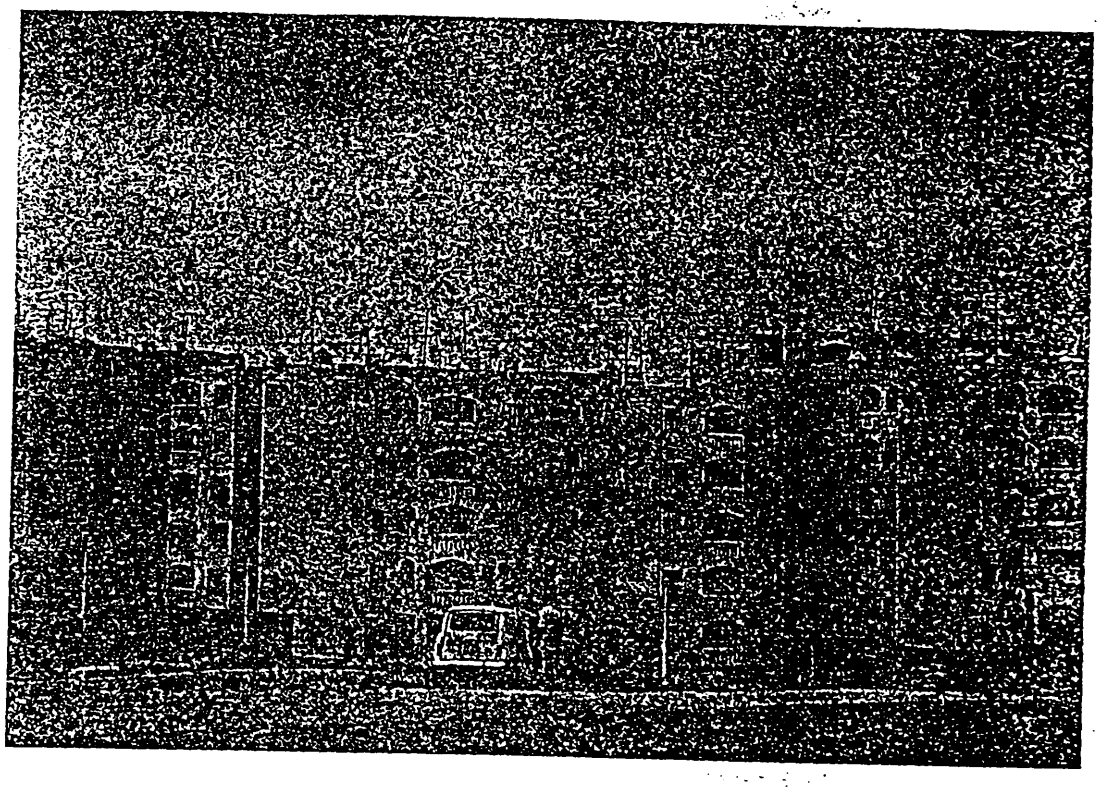


Fig.30 The residential buildings are ready and people inhabit them but the outdoor space is still waiting for finishing.

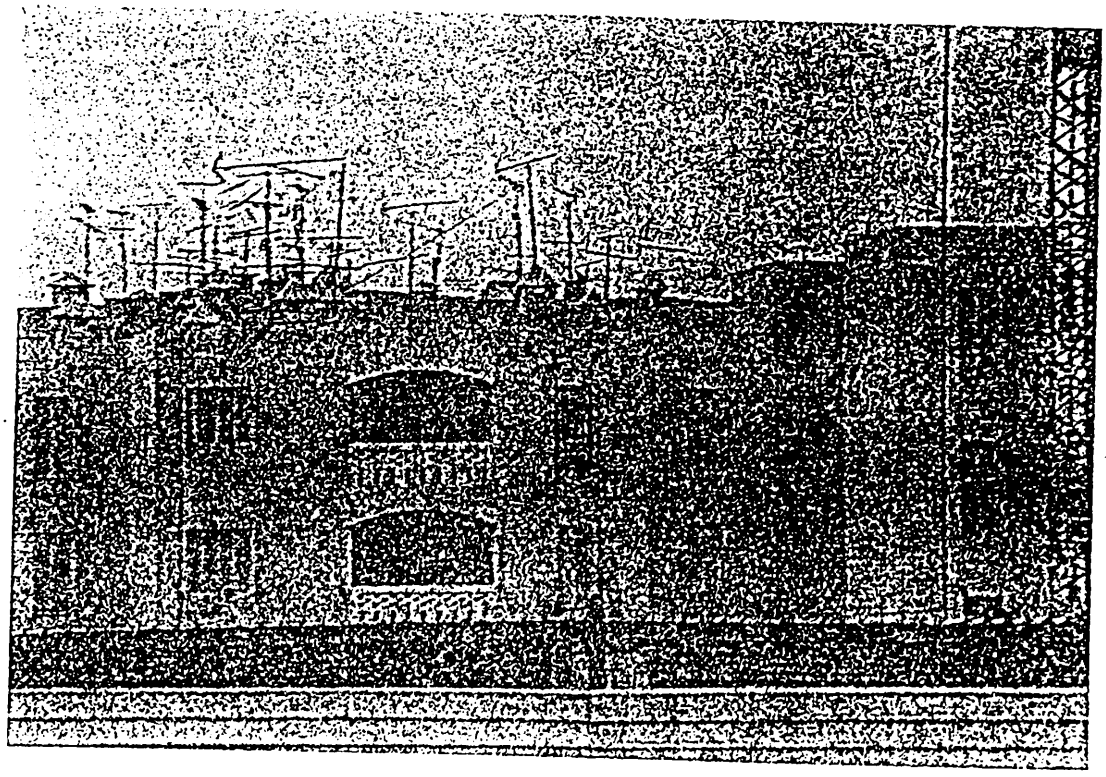


Fig.31. Eventhough many people have changed their balcony one inhabitant is trying to make a "brave attempt".

Fig.32. A sade expression that is common in most contemporary housing which is also typical in all cities.

Fig.33. This is the image of most (if not all) housing that is all over Algeria. In fact, this kind of dwelling has no sense of place at all. "It could be anywhere in the world".

3. Conclusion

This chapter aimed at some visual observations of the contemporary architectural environment that is dominating our latest housing areas mainly determined by new planning policies and the imported industrialised systems.

Different alterations of both private and public space showed clearly that the present housing production does neither respond to the socio-cultural and spatial requirements of the Algerian society nor to the climatic conditions of the country.

In fact, the transfer from the traditional inward-looking built form of housing to the contemporary outward-looking form meant an inevitable drastic consequences on both domestic and communal life.

In the dwelling environment, the Algerian family shows how contemporary design of the house form is inappropriate for the daily life through changes that derive from the family's real needs. Similarly, in the communal spaces, people show how the open character of this domain is ill suited for their needs and the climate. As a result a real lack of community spirit is felt amongst people which consequently means a total social irresponssability for the public space; it is a no-mans land where everybody acts on his own will.

It is worth to note that, the attention of this study is neither to reject contemporary housing in response to some traditional nostalgia, nor to idealise the traditional housing represented by the courtyard house, but to demonstrate that behind those alterations lies a strong message that reflects a sign of design inadequacy to house form and its environment.. However, so far these visual observations are superficial, but significant enough to stimulate further thorough analysis of both housing environments which will surely reveal the real appropriateness with the Algerian context.

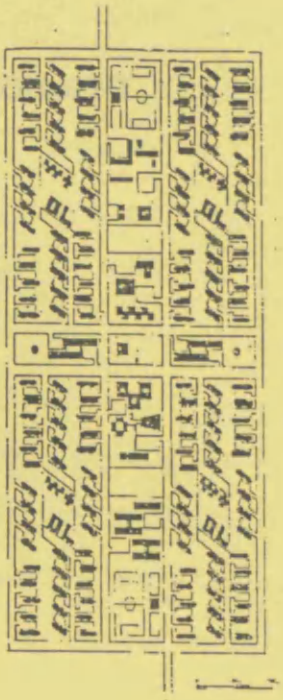
References

1. Settouane, F. Plea for the courtyard house.
   Thesis. University of Glasgow. 1986.

2. Newman, O. Defensible space. "People and design in the violent city".
   Architecture press, London. 1971.

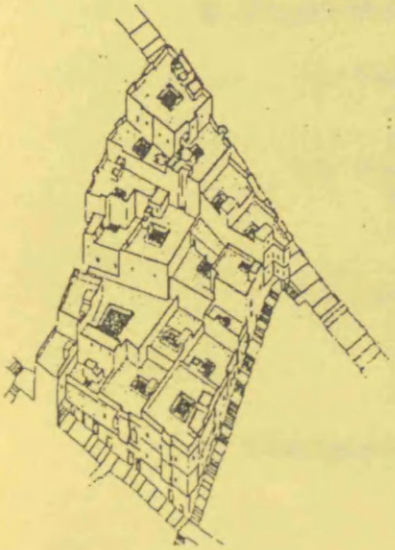
3. El Wakil, A.B. Identity, Tradition and Architecture.
   p. 26.

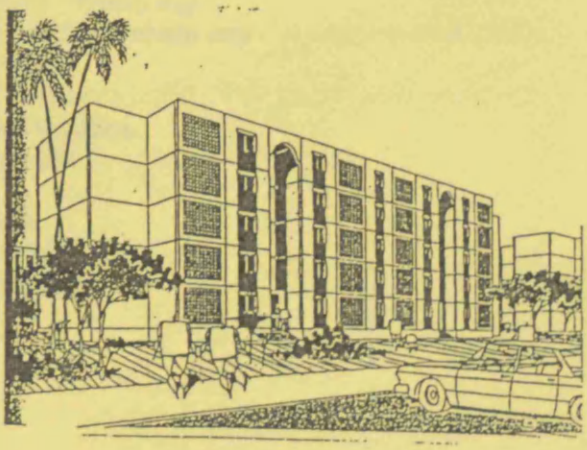
4. Benhamouche, M. The role of the courtyard in contemporary housing.
   "The case of Algiers".
   Thesis. University of New Castle upon Tyne. 1986.



PART TWO

ANALYSIS





Chapter 1: TRADITIONAL URBAN FORM AND ITS ENVIRONMENT

1. Introduction

2. Historical background

- 2.1. The Phoenician era
- 2.2. The Roman
- 2.3. The Arabo-berber era
- 2.4. The Ottoman era

3. Physical structure

- 3.1. Spatial organisation
- 3.2. Physical pattern
- 3.3. Street pattern
  - 3.3.1. The "Sharaa"
  - 3.3.2. The "Zenka"
  - 3.3.3. The "Znika"
  - 3.3.4. The "Driba"
  - 3.3.5. Street pattern characteristics
  - 3.3.6. Projections and extensions over the streets
- 3.4. Public open space: the "Fina"
- 3.5. Land use and density
- 3.6. Grouping of houses: the cluster
- 3.7. Public buildings
  - 3.7.1. The "Souika"
    - 3.7.1.1. The "Moussalla" (small mosque)
    - 3.7.1.2. The "Hammam" (public bath)
    - 3.7.1.3. The Shops
  - 3.7.2. The "Souk"
    - 3.7.2.1. The major city mosque: "Djammaa El Kebir"
    - 3.7.2.2. The "Zaouia"
    - 3.7.2.3. The "Foundouk" (caravanserai)

4. Social structure

- 4.1. The traditional community
- 4.2. Impact on the urban form

5. Physical development process

- 5.1. The right of way
  - 5.1.1. The "Sharaa": Public way
  - 5.1.2. The "Driba": Semi-private way
- 5.2. The concern for privacy
  - 5.2.1. Building heights
  - 5.2.2. Doors and windows
  - 5.2.3. Rooftops walls
- 5.3. Land subdivision
  - 5.3.1. The Needs
  - 5.3.2. The Inheritance
  - 5.3.3. The Pre-emption

6. Conclusion

1. Introduction

Part one exposed the need for modern housing to respect the socio-cultural background of the people. This part therefore examines this tradition in detail.

The characteristics of all medieval Algerian cities are markedly influenced by traditional Islamic urban form, who's process of physical formation is based on the Muslim way of life dictated by Islam. Those cities or *"medinas"* are compact, organic, homogeneous and inward looking, where the ruling metaphor is the container, everything is walled and gated, from the city itself towards, streets and quarters of the city to local residential cluster to the house and its rooms.[1]

One of the most prestigious of these urban forms is the Casbah of Algiers, its role in history, is outstanding site and architectural heritage underline a great importance not only for Algiers but for the whole country. It is for these reasons, that the Casbah of Algiers has been selected in this study, as a stereotype which represents the Algerian traditional urban form.

2. Historical Background

2.1. The Phoenician era

The site of the Casbah has always been favoured by early civilisations which reigned in North Africa, because of its location within the Mediterranean sea. During the Phoenician era, it was an early settlement serving as crossroads for important routes. Known as *"ICOSIUM"*, it was a relatively small city based on the phoenician trade, supported by the harbour located on the existing site. One of the reasons why this site was chosen is that four islands facing this settlement created shelter for the harbour. Little is known about this early phase.

2.2. The Roman era

In 40 AD, ICOSIUM came under the control of the Roman Empire it was a small flourishing city which grew continuously until the 4th century AD. The city had major routes running from north to south, which correspond today both to one of the main axis of the Casbah, and another route going down to the port from which four streets were running at right angles. At this stage, the urban structure of Roman ICOSIUM had clear street layouts based on a rectangular grid.[2](**Fig.1**). In the following century the Roman Empire came to an end and for six centuries the city was confined to its original form due to the Vandal and Byzantine invasion in North Africa.

2.3. The Arabo-Berber era

By the middle of the 11th century, the *"Almoravids"*, the first of the two great Berber empires was being formed. Prince *" Bologhine Ibn Ziri"* founded the first nucleus of the city *"EL DJAZAIR"*, named after the islands facing the city. According to the geographer *"El Kebir"* in the 12th century described *"El Djazair"* with four islands facing the coast.(**Fig.2**). Little is left or known from this era in terms of urban form, however one major building, the great mosque situated on the south east of the city remains even today, testifying to the architectural aspect of the time, influenced by the Muslim Arabs.

The second Arabo - Berber Empire succeeding the *"Almoravids"*, namely *"Almohads"* took under control the whole of North Africa and by 1160, they expanded to Spain. Because of El Djazair strategical position within North Africa and the Mediterranean sea, it was converted by a number of conquerors,and in the 16th century, Spanish attacks on El Djazair precipitated the Turkish interference and led to the creation of Ottoman Vassal states in El Djazair.[3]

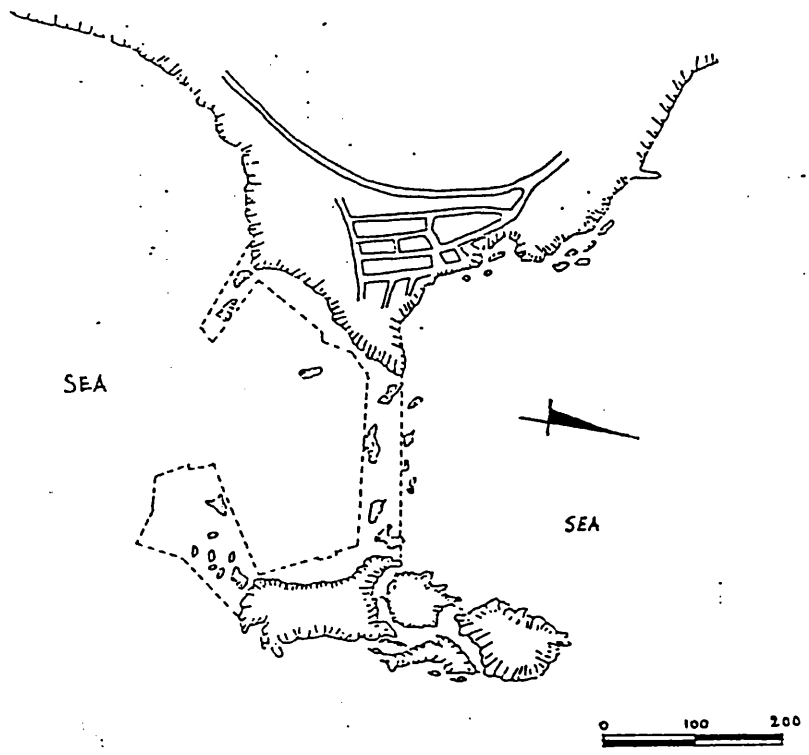


Fig.1. The Roman layout of Icosium. 40 AD.

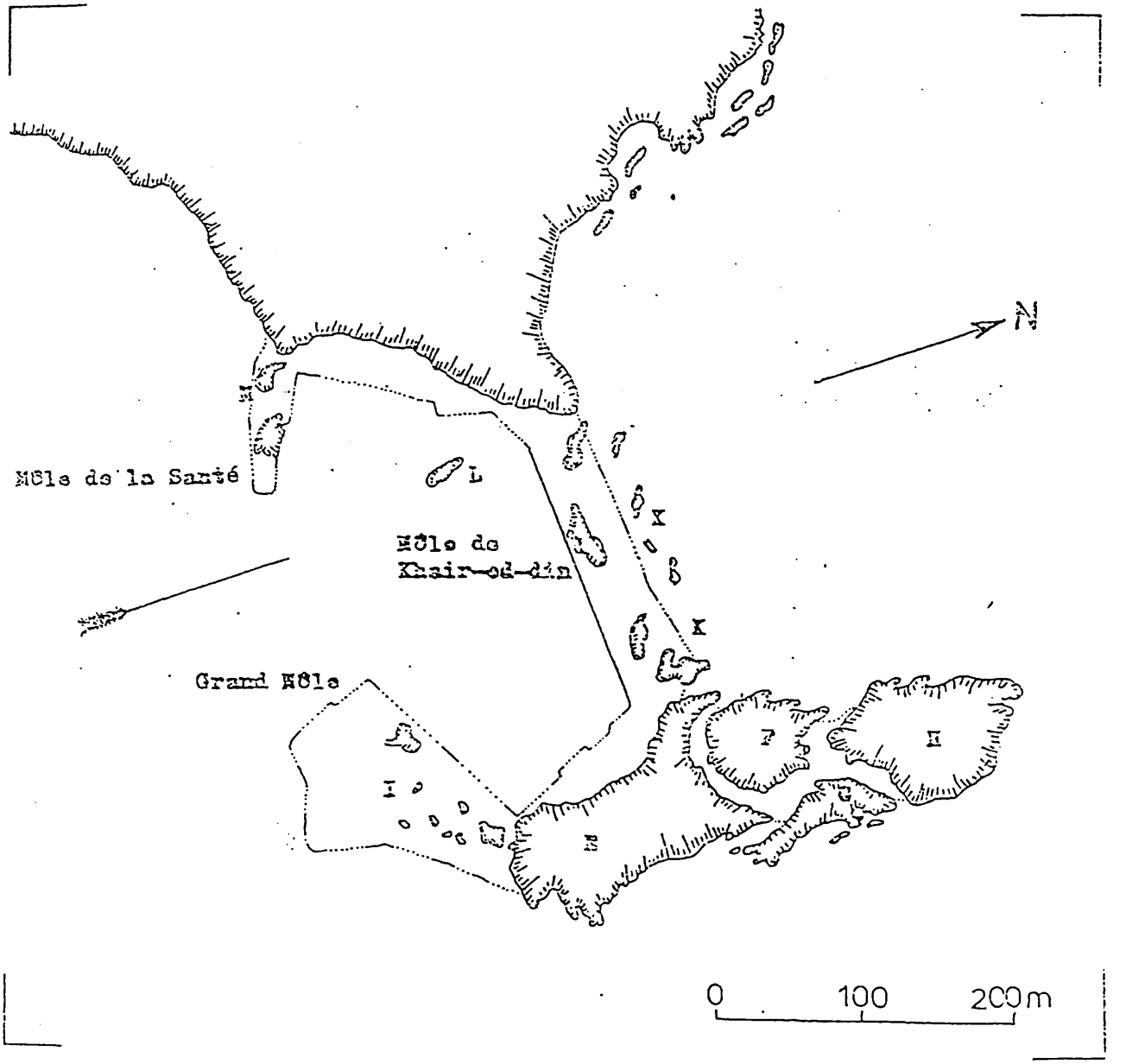


Fig.2. The islands which gave name to the city: "El Djazair".

E: Big island of the Marine.
F: Pellon island.
G: Small island.
H: North island.
I: Eceuils of the big island.
L: Rock just above sea level which was removed long time ago by the turcs.
N: Eceuils which was used as a holding chaine for the port closure,and later the Mole de la Sante was built on.
K: Eceuils,of the Passe.

2.4. The Ottoman era

During the 16th century El Djazair became known as the Turkish walled city: The *"CASBAH"*. During this period the city was subject to profound changes and soon became one of the most powerful cities of the Mediterranean sea. With the support of *"Kheirredine Barberousse"*, the city became of strategic value to the expansion of the Ottoman Empire. Between 1516 and 1830, the Casbah was in full flower and most remarkable constructions were in fact built near the harbour, now protected more than ever.

In 1529 the Turk *"Kheirredine"* attacked the island occupied by the Spanish at that time, and pulled down one of the two towers of the fortress, and used the other one for building the lighthouse, he then built the breakwater by linking the islands to the coast.[4] At the same time an improvement of the fortification rampart was accomplished as a defence against enemies.**(Fig.3).**

For more than three centuries, until 1830, date of the French Colonial era, the Casbah of Algiers grew and developed following a similar pattern to other Islamic cities. Its urban form was and is still even today, marked by its organic, homogeneous and compact urban tissue, and this is still relevant for future developments in Algeria.

2. Physical Structure

3.1. Spatial organisation

During the 18th century the population of the Casbah reached 50,000 people, when trade and crafts dominated urban economics.[5] The spatial organisation of the city was confined within its fortification. This impregnable walled city was entered by five gates, namely:

A. Bab Djedid: The new gate

B. Bab Azoun: The Azoun gate

C. Bab El-Bhar: The sea gate

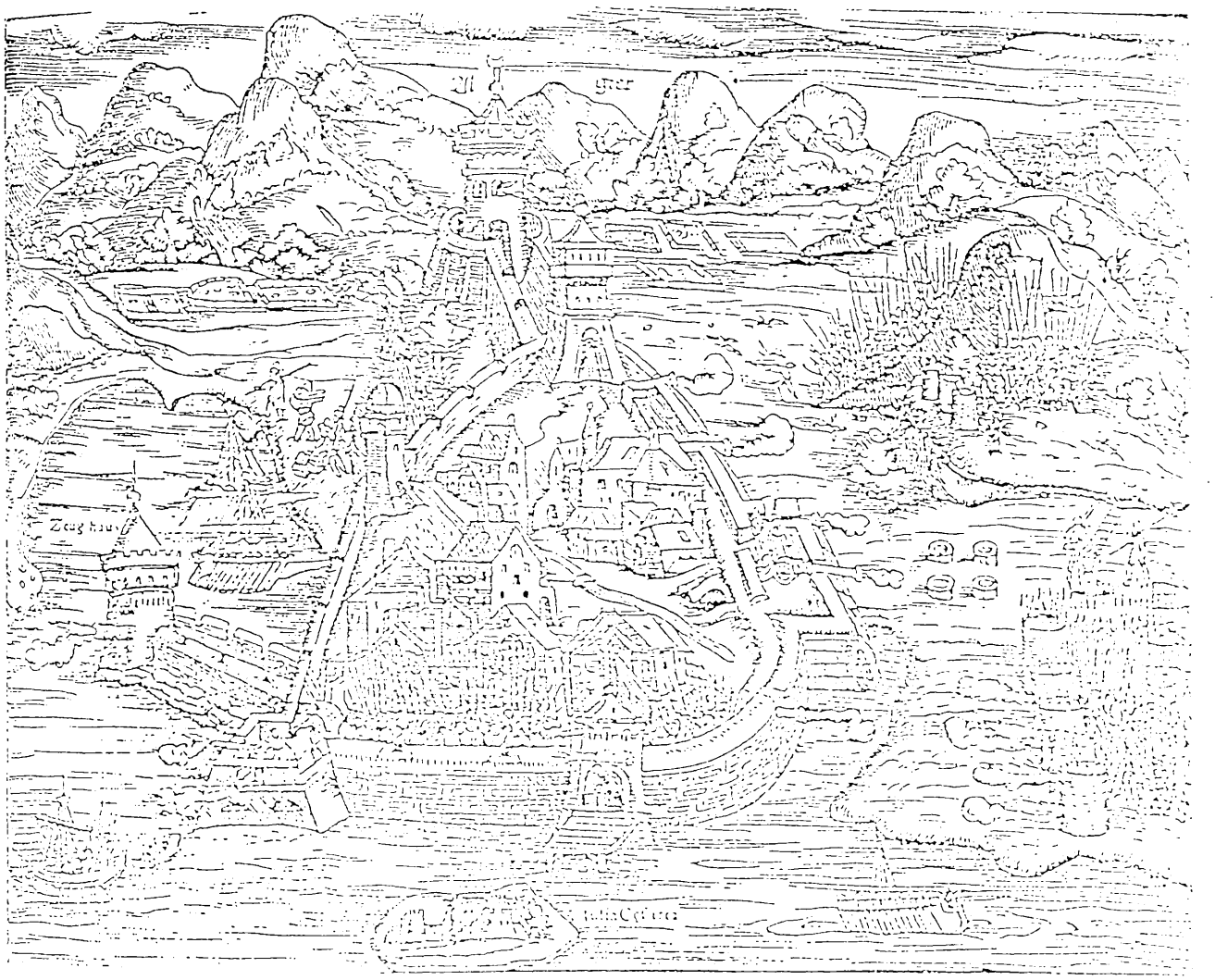


Fig.3. Algiers: XVI 's engraving.

D. Bab El-Djezira: The Island gate

E. Bab El-Oued: The River gate

From these city gates, main routes running into the heart of the town converged on the major mosque, the focal point of the Casbah. Around this major mosque, along those thoroughfares were located retail trading establishments, craft workshops, administration offices small mosques and palaces of the *"Djenina"*. Until 1816 the Djenina in the lower Casbah housed successive rulers of the country, before moving to the Castle on the top of the hill, dominating the whole city and known as the *"Citadelle"*.[6]

Those thoroughfares which cut through the city, generated two main axes where most of the economical activities took place. One of these axes running North-South divided the city into two distinct zones, one situated on a hilly site, mainly residential, the other spread out on a flatter site, residential but dominated by a concentration of the principal activities of the city. This latter, located nearby the port, supported trade with other countries. The main characteristics of the spatial organisation of these two zones lie in the homogeneity of their components. In fact, the whole town was distinguished by its dense and compact morphological urban form.**(Fig.4)**.

3.2. Physical pattern

The physical pattern of this urban form was composed of four main wards confined between the thoroughfares and the city wall. Each ward was like a solid built volume, in which hollows and winding lanes have been excavated. Each ward had its mosque and its essential services located on main thoroughfares, as this was the most public space of communication. However, these public services tended to concentrate toward the intersection of the thoroughfares where the major mosque and the souk were located. In these wards, people of different incomes lived close by each other, but ethnic groups could be separated in distinctive quarters.

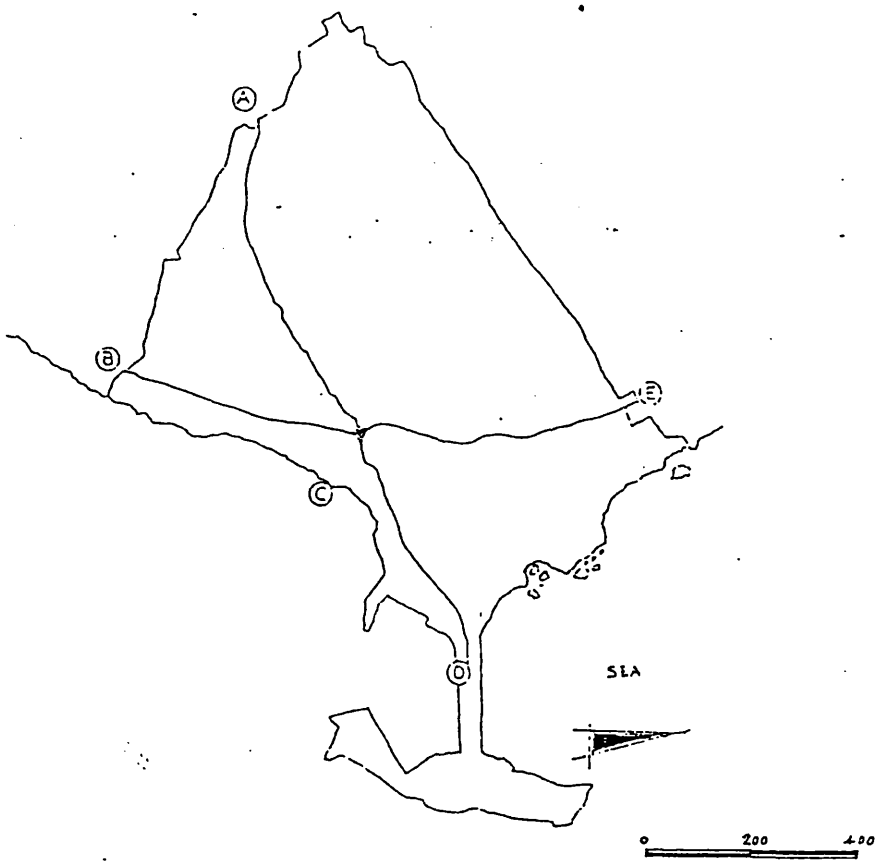


Fig.4. The main axes and the five gates of the Casbah.

A: Bab Djedid.	New gate.
B: Bab Azoun.	Azoun gate.
C: Bab El-Bhar	Sea gate.
D: Bab El- Djezira	Island gate.
E: Bab El-Oued	River gate.

Each ward was divided into several quarters *(Harat)* of different shape and size, surrounded by twisting alley-ways. These quarters had an average depth between 100 to 300 metres. Along those alley-ways local services were provided for the inhabitants. Each unique quarter was composed of several neighbourhoods *(Houma)* served by those alley-ways which led into a net work of narrow winding lanes.

Finally, each neighbourhood was subdivided into smaller residential clusters served by tiny culs-de-sacs, each with its own limited number of courtyard houses. This type of physical pattern was expected to bring security for its inhabitants by excluding all strangers and unwanted passers by. This spatial organisation which corresponds to the hierarchy of domain, seems to work perfectly in terms of privacy and preservation of both public and private space.

In general then, the layout of the Casbah is characterised by narrow winding streets and informal singular arrangements of buildings. Though the arrangement of the buildings and the quarters may seem haphazard, there is a structural unity underlining them. This unity is based on the hierarchy of space, the intricate movement of the streets and their human scale, and on the organic form of the clusters which derive from the irregular shape and size of different building plots.**(Fig.5).**

3.3. Street pattern

In the Casbah it is possible to identify a clear hierarchical organisation from the most public to the most private in the cul-de-sac serving three to eight houses. This order led to a strict, controlled circulation system formed of different categories of streets that could be classified with references to their locations, functions and sizes. This system of streets then can be classified into four categories namely: *"Sharaa, Zenka, Znika, Driba"*.**(Fig.6).**

Fig.5. Urban form of the Casbah.

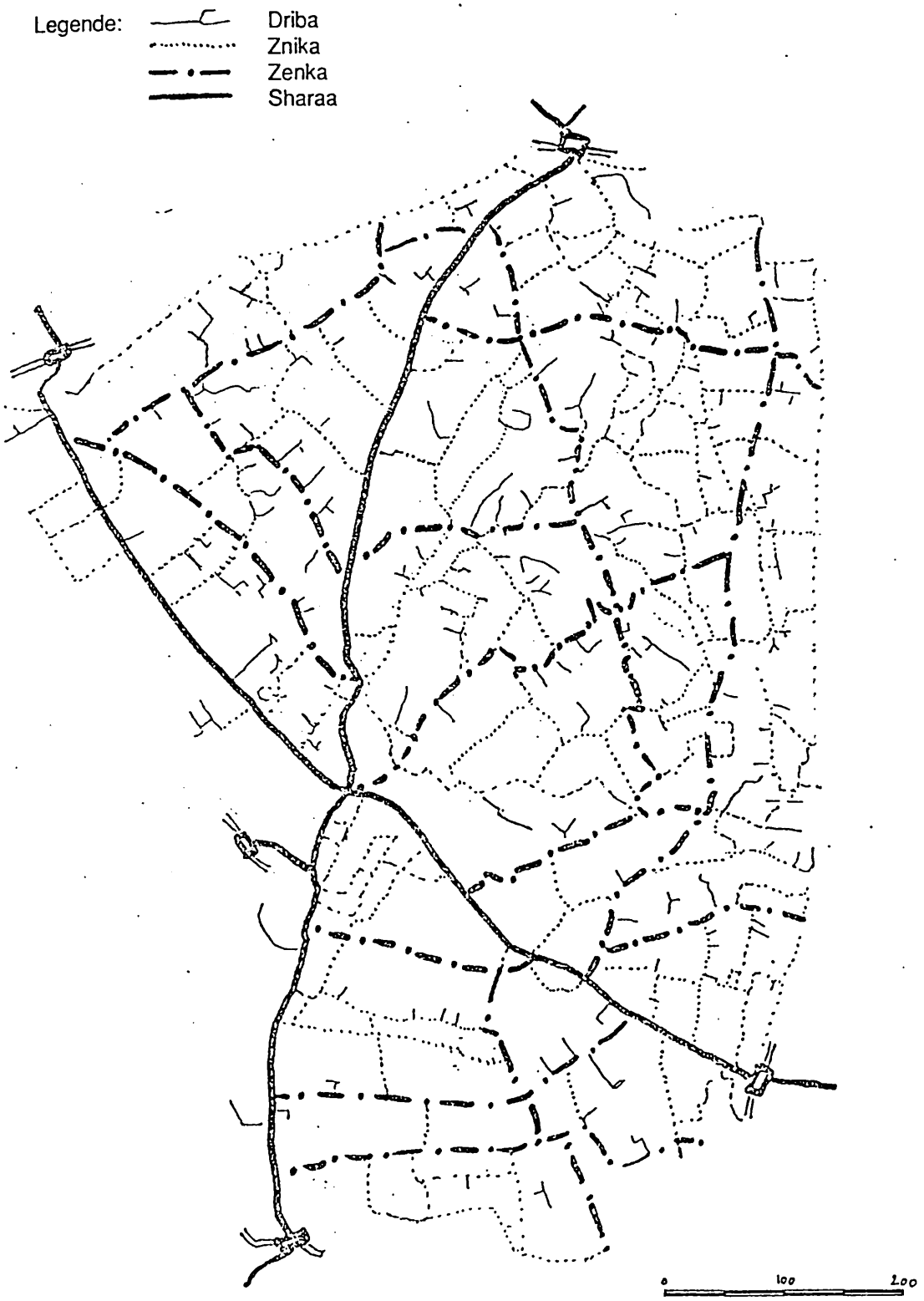


Fig.6. Street pattern and its hierarchy.

3.3.1. The "Sharaa": (Thoroughfare)

The Sharaa(s) were the most public thoroughfares which make up the backbone of the system and divided the town into wards. They connected all major city gates with the core of the Casbah where the major city mosque and souks were located. The Sharaa was the highest public level in the city where all citizens can meet with each other or with strangers.

Because of their public function, these streets were the widest and were longer than any other category. In width they varied from 4 to 7 metres and their length, stretching from gate to gate, was about 1,000 metres. Due to their strategic location, their easy access, and the high pedestrian flow that accommodated, many commercial and other public activities took place along them.**(Fig.7)**. These thoroughfares represented about 10% of the total circulation area.

3.3.2. The "Zenka": (Alley-way)

The Zenka(s) were public alley-ways which divided each ward into different quarters. They connected the primary streets and were the main access routes between adjacent quarters. These streets tended to form short cuts across the main arteries of the town. Being of public domain, small local shops, public baths (hammam), ovens and fountains were located along them.**(Fig.8)**. Their width ranged between 2.5 to 4 metres and their pedestrian flow was consequently less. The length of these winding streets was between 100 to 300 metres, and they represented about 30% of the total circulation area.

3.3.3. The "Znika": (Lane)

The Znika(s) were semi-public residential lanes which divided each quarter into smaller neighbourhoods of different sizes, and they can be identified as major neighbourhood streets providing access and linkages to areas within quarters which are not served by the secondary streets. They tended to be used by local people who lived in the neighbourhoods or by others who required frequent contacts there. They were distinguished by their residential character

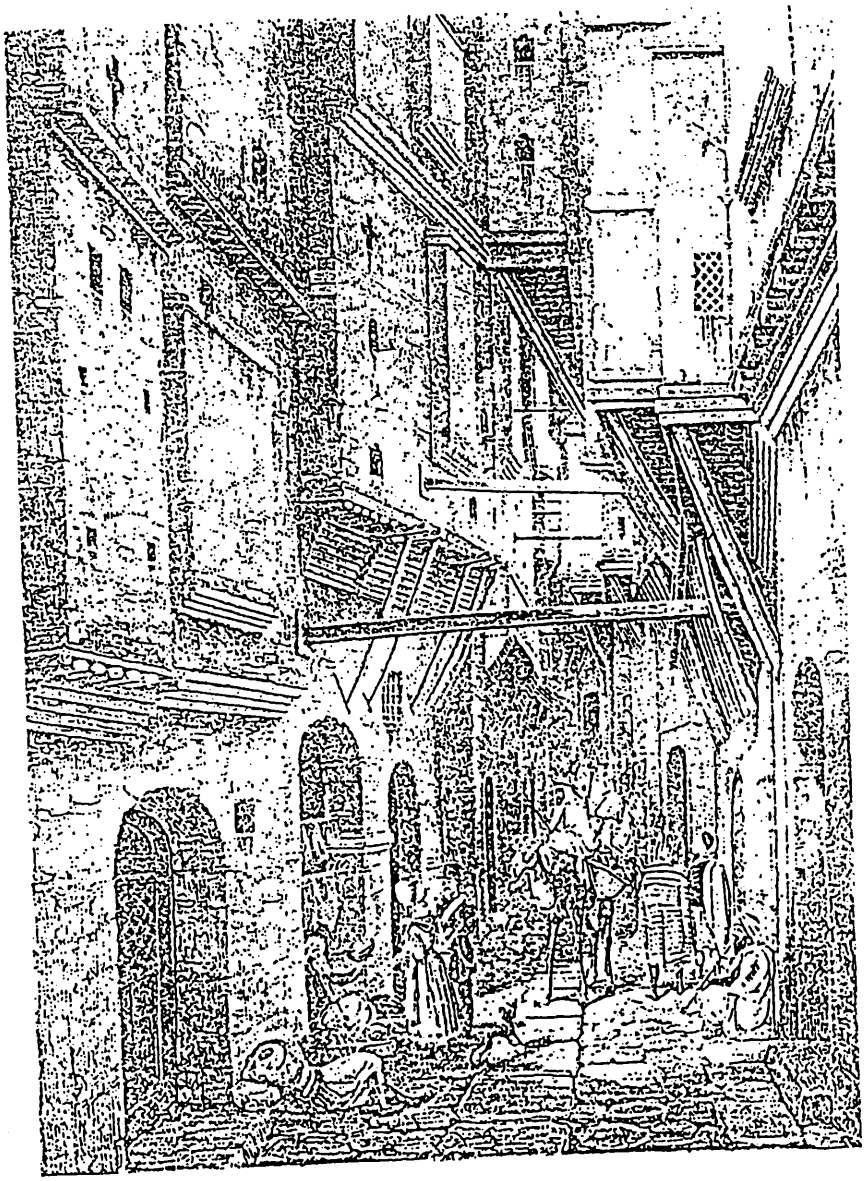


Fig.7. View of a "Sharaa" in the Casbah.

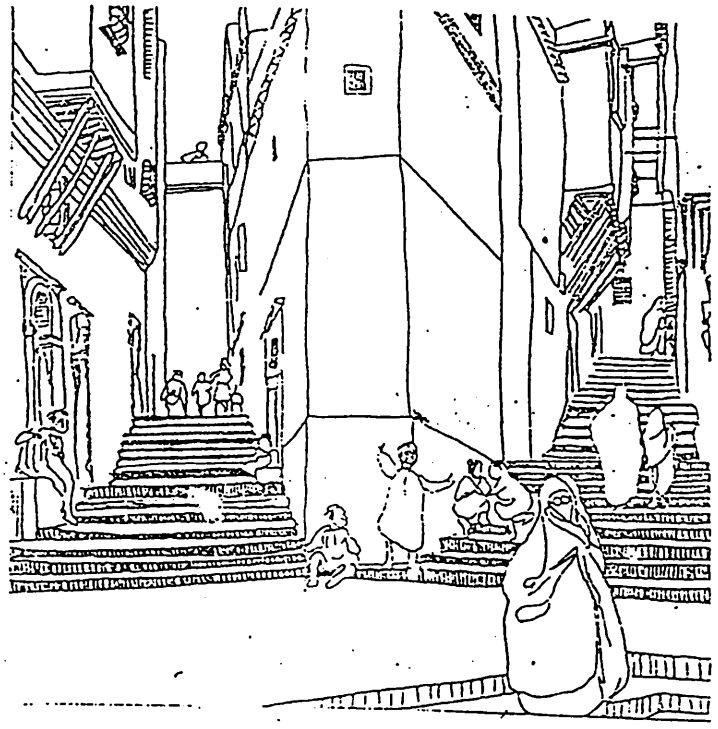


Fig.8. View of two "Zenka(s)" in the Casbah.

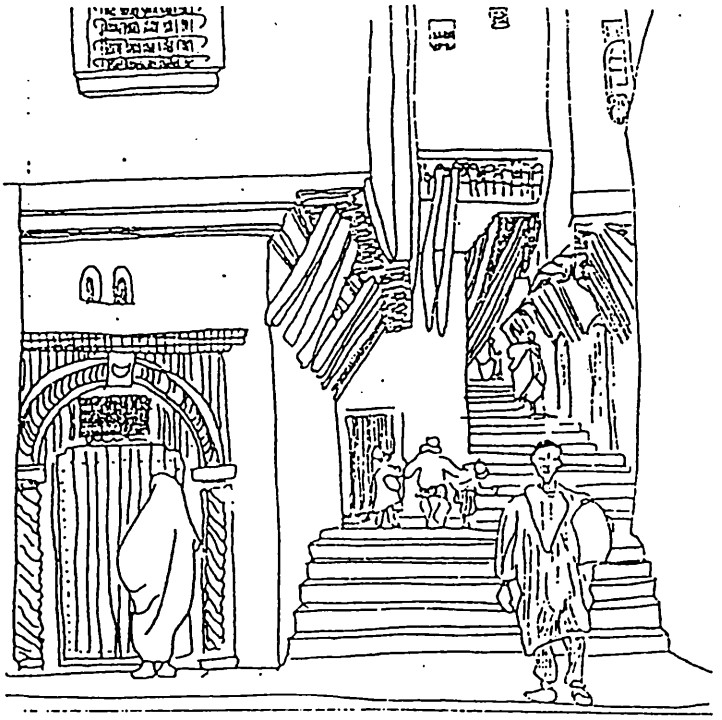


Fig.9. View of a residential "Znika" in the Casbah.

and accommodated no public activities except some fountains.(**Fig.9**). Their width varied between 2 to 3.5 metres. Being mainly residential, their length was consequently shorter than the alley-ways and varied between 40 to 200 metres.

3.3.4. The "Driba": (Cul-de-sac)

These dead-ends were mainly semi-private with the exception of few being totally private and closed by a gate when they served only one single big house.(**Fig.10,11**). These narrow cul-de-sacs served as access into private houses which composed the neighbourhood, usually they gave access between 3 to 8 houses. Consequently their pedestrian flow was restricted only to the number of families living there. These dead-ends were distinguished by the blind perimeter walls of the courtyard houses, along with entrances slipped in between. Their width varied between 1 to 2.5 metres, with a relatively short length stretching from 3 to 40 metres. Znikas and Dribas together represented about 60% of the total circulation area in the Casbah.(**Fig.12**).

3.3.4. Street pattern characteristics

The street pattern of the Casbah is similar to most street patterns of Arab Islamic cities and can be described as an arboreal system of streets enclosed everywhere by blind walls, doors or shop fronts. Conceived to deal only with human movement and animal transport, the scale of the street was therefore basically in harmony with the human scale and the donkey movement which was used at the time as the main transportation system within the city. Consequently street proportions between width and height concerned in the Casbah were humanly oriented and their ratio never exceeded 0.5 ie. W/H<0.5. The average of the ratio (W/H) according to each street type can be summarised as follows:

Street Type	**W/H**
Sharaa	1/2
Zenka	1/4
Znika	1/6
Driba	1/8

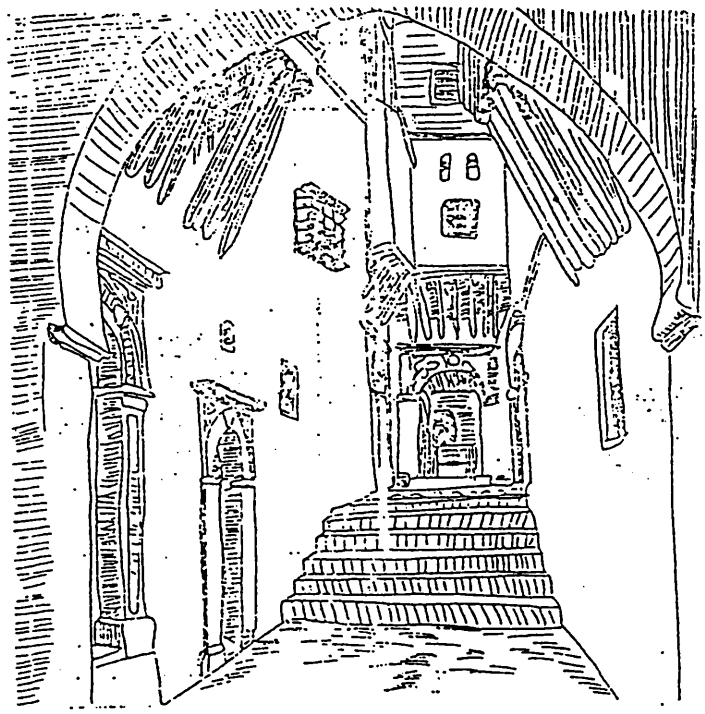


Fig.10. View of a "Driba" serving several houses.

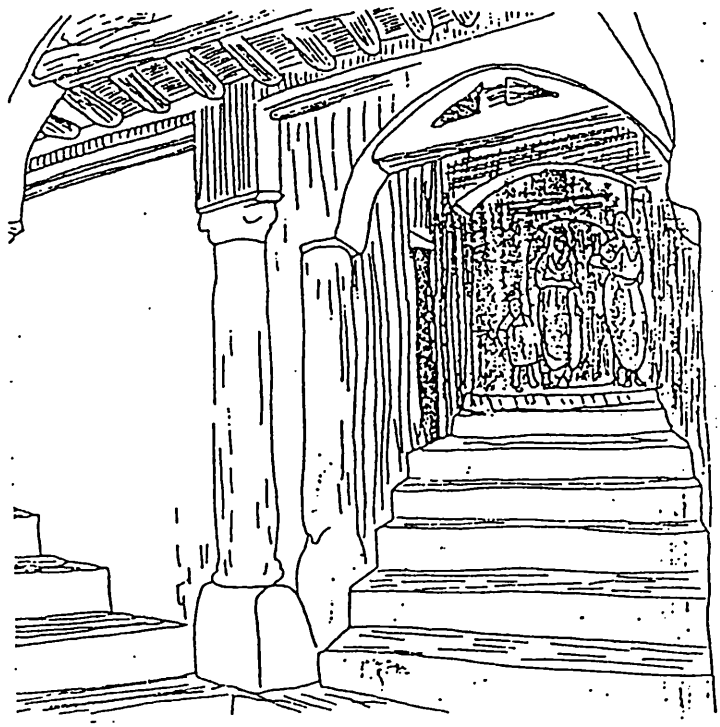


Fig.11. View of a short "Driba" leading to two houses.

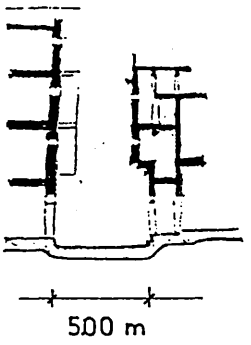
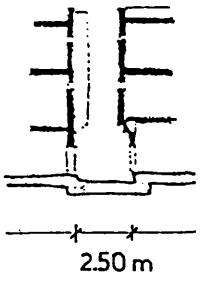
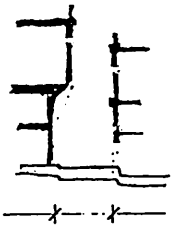
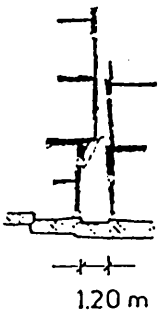
STREET CATEGORY	SECTION	OVERAGE WIDTH	OVERAGE LENGTH	% FROM TOTAL CIRCULATION AREA
SHARAA (HIGHLY PUBLIC)		4.00 – 5.00 m	1.000 m	10 %
ZENKA (PUBLIC)		2.50 – 4.00 m	100 – 300 m	30 %
ZNIKA (SEMI-PUBLIC)		2.00 – 3.00 m	40 – 200 m	60%
DRIBA (SEMI-PRIVATE)		1.00 – 2.50 m	2 – 40 m	

Fig.12. Table of street categories and their aspects.

Another important feature of this street pattern is that the longest straight section of any main street does not exceed 200 metres and is very much less in the inside streets of residential quarters. Thus when walking from one part of the city to another, the distance one has to go is subdivided into sections, each one easy to walk and each one having its individual identity. This makes the journey interesting and ensures the street retains a human scale.[7]

This spatial hierarchical organisation emerging from the location, the activity and the physical form of the streets, as well as the ambience that characterises the space, represents a perfect example of *"Defensible space"*.[8] Thus a strong sense of territory arises from these serpentine lines of pedestrian movement providing therefore a strict control of different neighbourhoods.

Because of the interrupted motion which appears from each street to another by sudden shifts of directions, sharp angular bends or by architectural intrusions, the feeling of intimacy is continually maintained and acquires a sense of individuality and seclusion even in the least private area, the most public space, that is the main artery of busy traffic.

Answering the necessity to accommodate themselves to whatever empty space has been left by the residential clusters, the streets have become a network of tortuous and labyrinthine channels, adopting the most diverse curvilinear forms whether on a slope or a flat site. Even though this existing characteristic lacked a sense of flow and continuity of movement, in the Casbah these qualities did not disrupt its feeling of continual flux.

In terms of streetscape, the irregularity of the street provides a variety of view points that enliven the architecture of individual buildings and the townscape of the neighbourhood. In the streets of the old quarters of the Casbah, each street section had its own visual termination which sets the dominant note. This is not seen at ground level, it is three dimensional. This may be a mosque with its towering minaret, or a palace, or a house with a particularly interesting feature such as a high level protrusion onto the street. It is worth stressing that this visual aspect arises from the irregularity of the streets and the house plans.

3.3.6. Projections and extensions over the street

Projections and second floor extensions built over the street were dominant features of the Casbah. The common projections were the small extensions of rooms at an upper floor, and their projections over the street stretched from 20 to 60 centimetres. These projections became in some cases, a direct relationship between the interior of the house and the exterior. In these circumstances, it is called "Musharabiya", which is a wooden lattice work hiding the window behind it.

These musharabiya(s), common in most Islamic cities, were a type of projected screened balcony used to cover most of the fenestrations in the traditional courtyard houses. Regarding the height and the width of the projections, the musharabiya had to provide a sufficient height for a pedestrian to pass below without any risk to his head. Its width however was not limited and can project over the total width of the street. The most frequent types of projections were the opposing houses extending against each other and meeting at the middle of the street.

Another type of projection present in the Casbah is the second floor chambers built over the narrow street linking two houses together and emphasising the compactness and denseness of this urban form. Due to the limited strength of the materials used at the time, these projected chambers generally did not exceed 2 metres. Consequently they were present only along small lanes and dead-ends.

The last type of projections present through the narrow streets of the Casbah were the arches and vaults. Arches were usually used when consolidation and strength of the external wall of two opposite houses needed support.**(Fig.13)**. However vaults were used when a great section of the street needed to be covered, such as dead-ends or commercial streets.**(Fig.14)**. In the souk for instance, the traffic alley-ways were always sheltered from the sun and rain by being completely roofed **(Fig.15)**. Many streets of the Casbah then, had this characteristic of being fully or partially covered. Such disposition was a purely functional one, being a product of the crowding of housing within the city walls. Lacking sufficient building space, the dwellings

Fig.13. View of a projection over a street to give more usable space and to strengthen the external walls.

Fig.14. View of a projection over a "Driba". A great section is covered by voults.

sometimes had their upper storeys projecting orials, attics and chambers over the passageways by means of corbels supported on braces or brackets.

At other times, the encroachment was much more pronounced and the upper storeys over extended to constitute roofs for sections of the streets without taking away traffic space, the building volume was increased.[9] These partly or fully covered ways, however functional in the physical sense, also emphasised the atmosphere of enclosure and seclusion so welcomed by the Casbahians.

3.4. Public open space: "Fina"

After the street network, the only remaining public open space present inside the walled city was the "Fina", a term used for the exterior space immediately adjacent to the exterior wall of the building. This term is also used for the interior courtyard of a house. The fina was a small open space resulting from a sudden infrequent deviation of the street line forming a wider space within the street itself.

The Fina was used for activities related to domestic life as well as to the community. In fact the activities which took place in the Fina depended totally on the location of this space.**(Fig.16).**

When it was related to domestic activities, the Fina was used as a semi-private area by all the surrounding residents for ceremonial or recreational purposes. It was also used as an extension of the house as a children's playground, when it was on a semi-private lane.

When the Fina was located on the Sharaa, busiest street of the city, it accommodated public activities such as the extension of a cafe, or the display area for goods of a shop or even a small souk. The physical form of the Fina is not only apparent at ground level, it is also reflected above. Projections from the houses towards the streets were very frequent in such public spaces as long as they did not obstruct the passage.

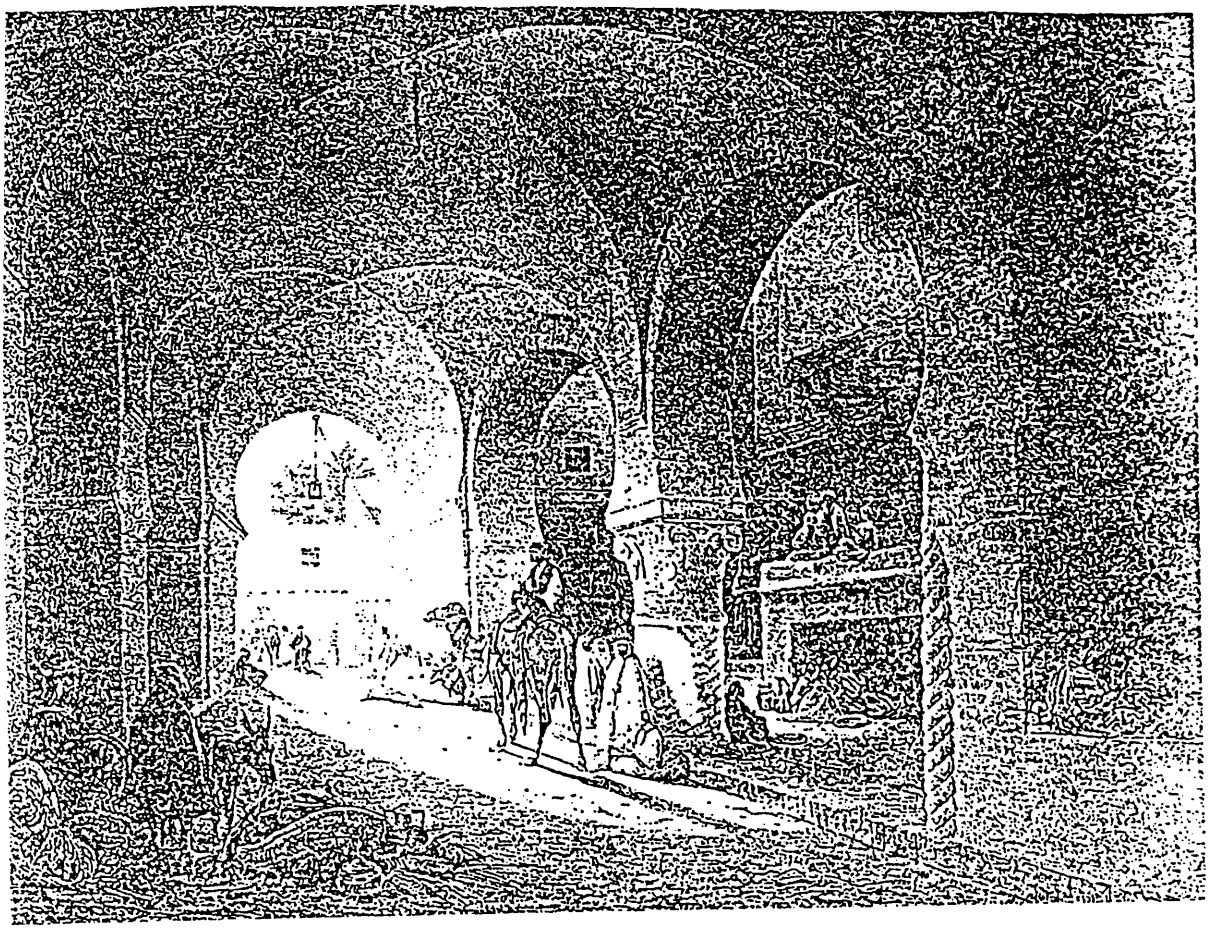


Fig.15. A covered commercial street in the Casbah.

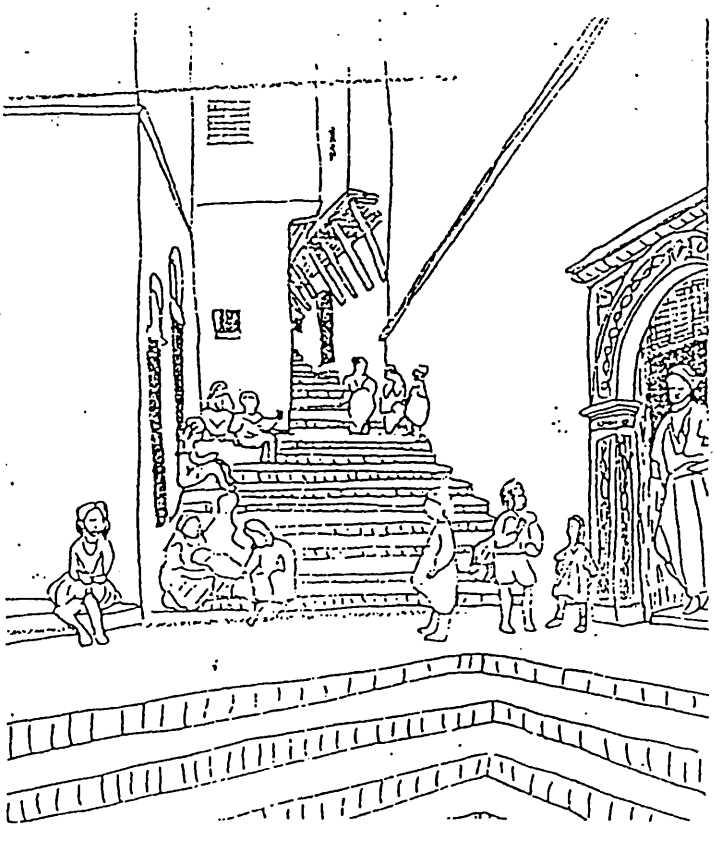


Fig.16. View of a "Fina" as a semi-public space,
here it is used as a playground for chidren.

3.5. Land Use and Density

As in traditional Islamic cities, the urban space was characterised by an extremely dense and compact texture. Houses were close to each other and formed large clusters of buildings. In the context of the walled Casbah, it was characterised by a land shortage due to the reduction of the city wall's length to a minimum. Land was thus to be used economically in order to accommodate the growing population. Being confined within its fortifications, no waste of land was tolerated, consequently it was to be built to its maximum, restricting the public open spaces to just narrow passage ways and a few Finas.

According to A. Raymond, the density of the Casbah was higher than in any other Islamic town.[10] It was around 646 person/hectare, whereas the average density was just over 300 persons/hectare. This as M. Benhamouche explained is due to the compression of the town within the surrounding wall as the site afforded no more expansion, and also because of the vertical character of buildings resultant upon a sloped site.[11]

As a result of this high density ground coverage in terms of built up area was also high compared with the ratios of open spaces. After a close look at this land coverage, a rough measurement by using a polar planimeter showed these following ratios:

Built Up Area	75%
Private Open Space	15%
Public Open Space	10%

These ratios of land coverage are congruous with the urban form which they represent; in fact they are not surprising but reveal the very compact urban form of the Casbah. The ratios show that only 25% of land is left for open spaces for both private and public uses. However the private open space which represents the courtyard of the houses is significantly high (15%) when compared with public open space (10%) which represents mainly the street network. **(Fig.17)**.

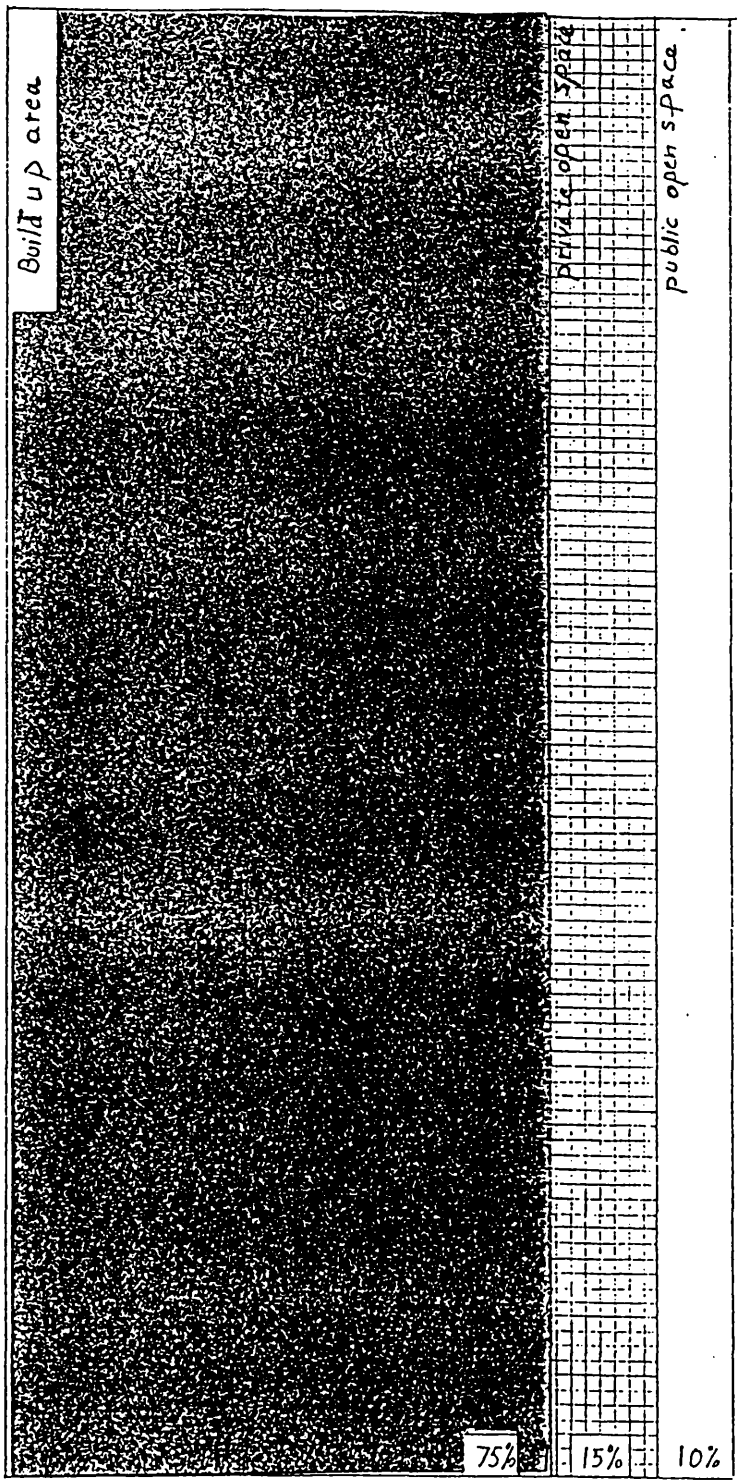


Fig.17. Diagram of land use coverage in the Casbah.

These figures are almost similar to the distribution of land coverage of other traditional Islamic cities, such as the old city of Tunis. According to H. Besim in Tunis, the street network represents 12.5%.[12]

This figure corresponds to the one found in the Casbah. It is worth noting that he used a more precise measurement, nevertheless the difference between the figures is negligible, therefore my figures are confirmed.

The picture is not complete without describing how land was used in the Casbah, and referring to land subdivision which was highly irregular. Because the Casbah went through an incremental development, its building plots resulted in very irregular forms, with diverse shapes and different sizes. In other words almost every single plot was unique and developed according to the needs of the owner. This is not only a characteristic of the Casbah but of all traditional Islamic cities, which explains to a large extent, the high irregularity of cluster and the alley-ways serving them.

3.6. Grouping of houses: The Cluster

In the Casbah as in many other traditional Islamic Cities, residential areas were characterised by an extremely compact tissue. This dense texture of the residential space has resulted from the houses being built side by side forming large masses of buildings. Being of various sizes and shapes, they make up different organic types of clusters.**(Fig.18)**. However, some general observations can be made about the formal aspects of these clusters.

The layout of the clusters tended to take an elongated form of parallel rows of plots. The width and depth of the cluster depended upon the number of rows on each side; these generally varied between one to five rows. A twelve metre row has been selected as it represents an average plot-width of the land subdivision.**(Fig.19)**. Most small clusters were directly accessible from their periphery. However, in the case of large clusters, houses located in the inside were accessible by long and narrow cul-de-sacs.**(Fig.20,21)**.

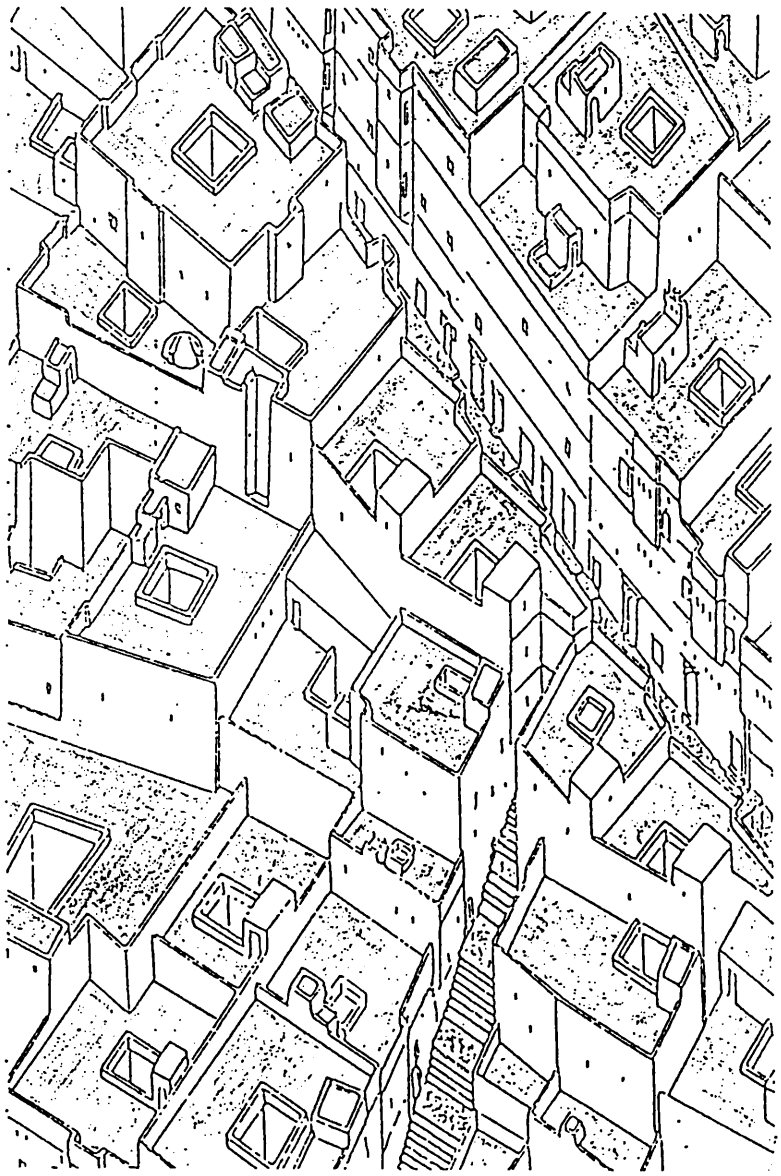


Fig.18. Axonometric view of a grouping of houses: the Cluster.

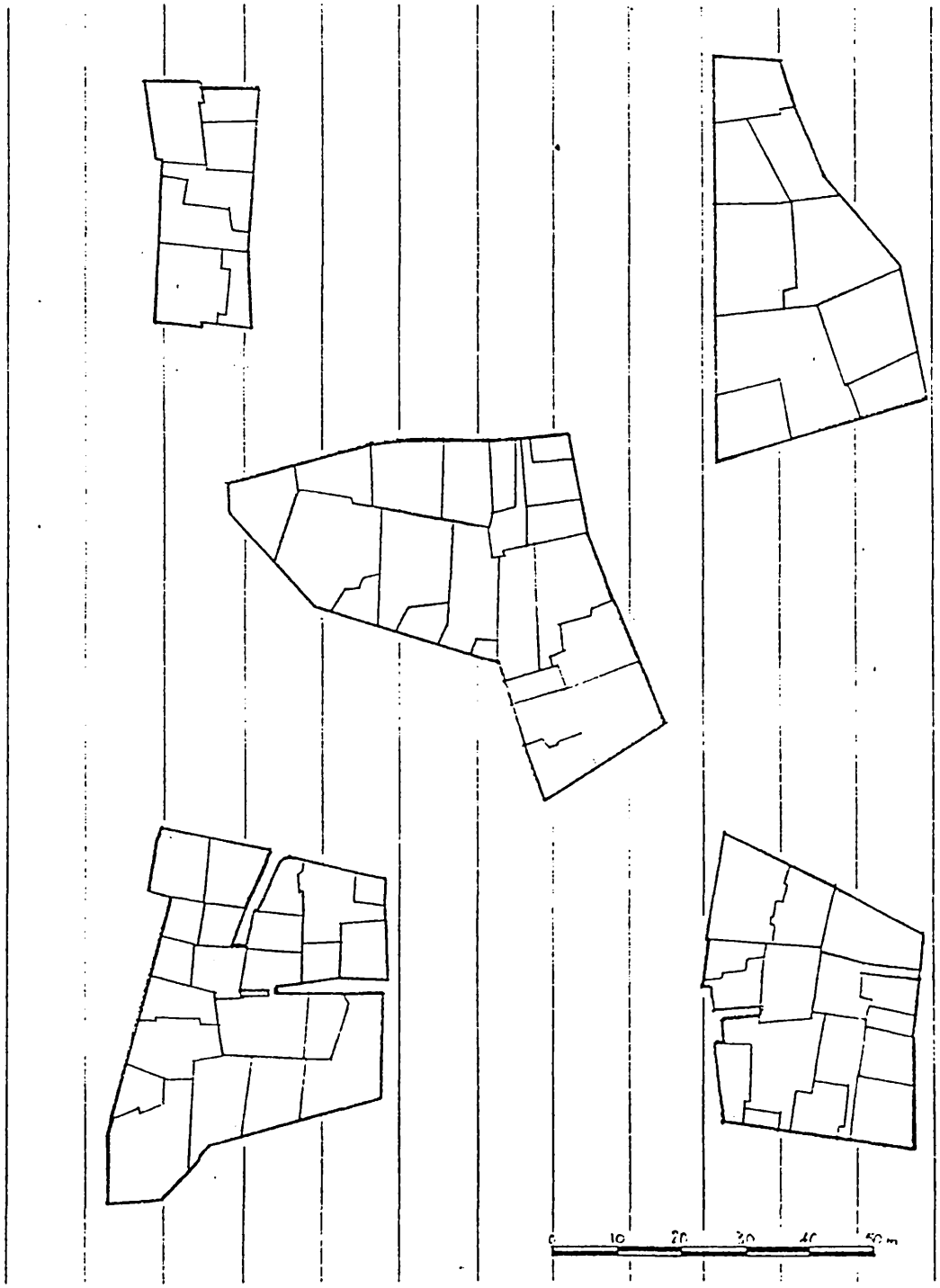


Fig.19. Layouts of clusters and their land subdivision.

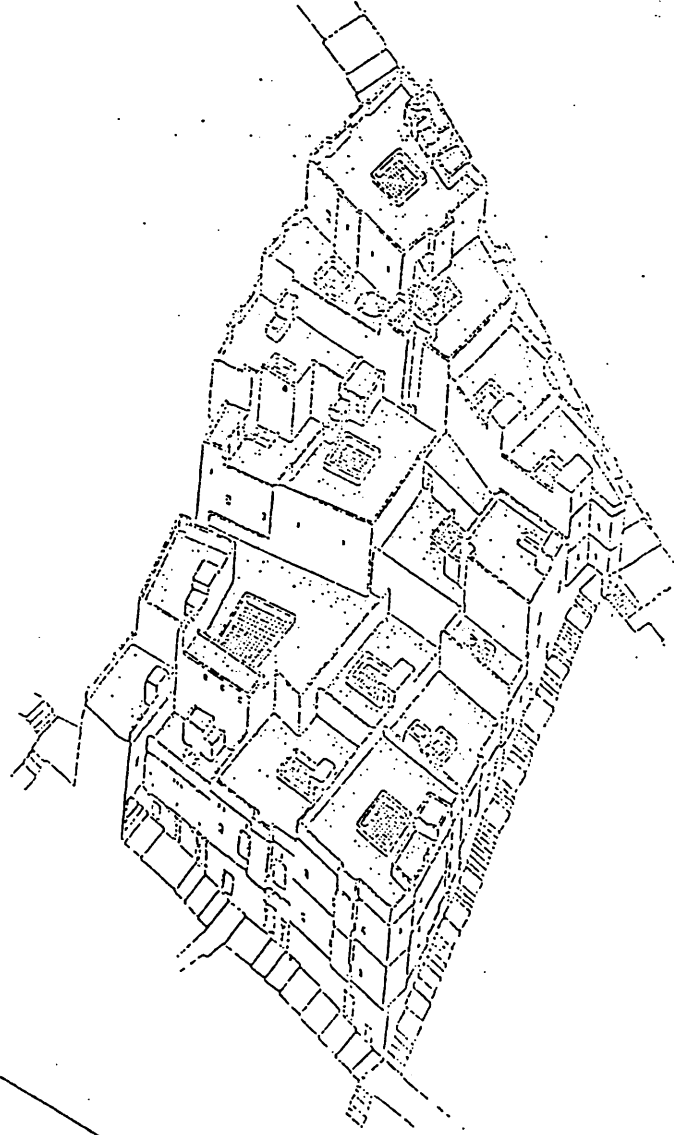


Fig.20. View of a typical cluster.

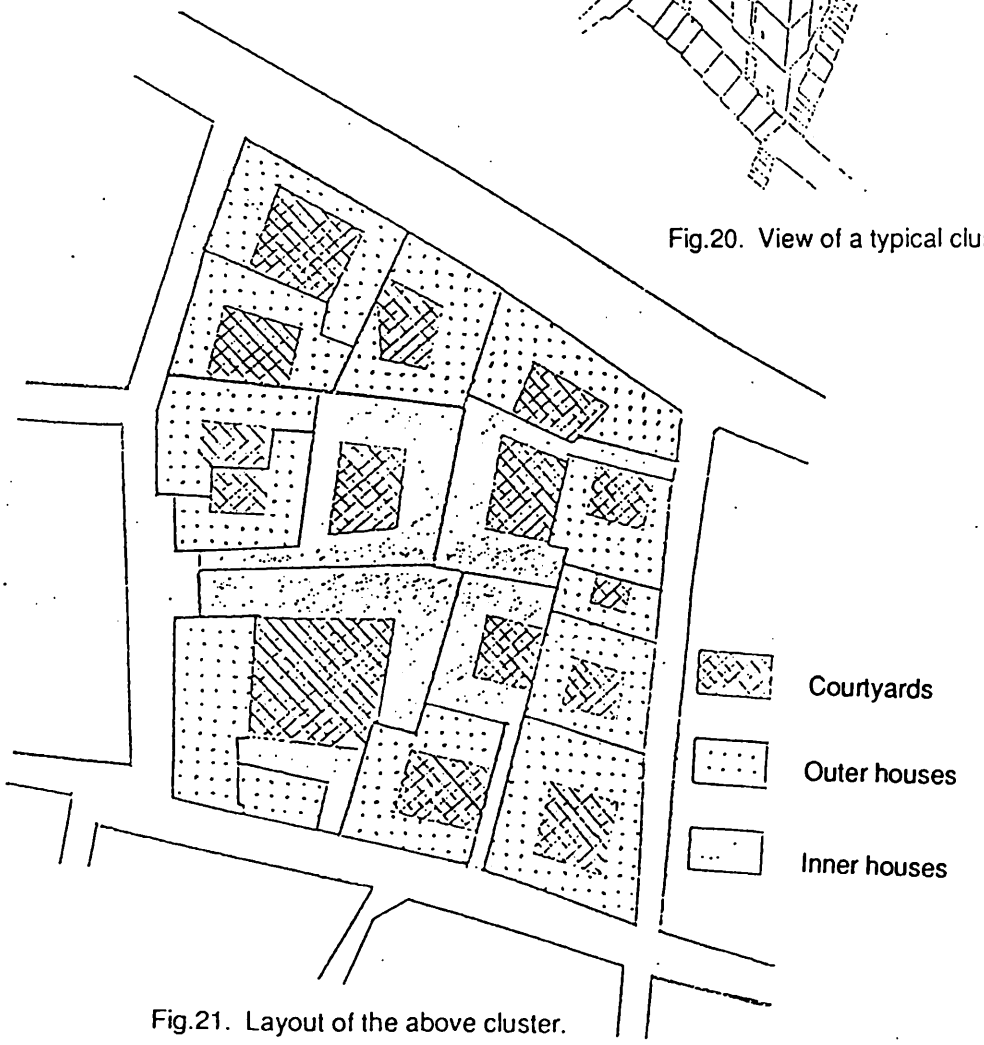


Fig.21. Layout of the above cluster.

Generally plots tended to have square forms which were in harmony with the form of the courtyards. But due to the factors of land subdivision, most of the plots were not regular, and the layout of the cluster looked as M. Benhamouche described "like a jigsaw of various pieces of land."[13]

Despite their identical appearance, houses within the cluster were of various sizes, depending on the wealth and the number of families living in them. This difference of family status did not result in an automatic segregation between the rich and the poor. In fact, wealthy houseowners, for instance, coexisted side by side with ordinary or even poor houseowners. Nevertheless the difference in wealth was apparent on the inside. Wealthy families had richly decorated and big courtyards. In contrast poor families had smaller courtyards with very modest ordinary arrangements.

In structural terms, traditional courtyard houses within the cluster were built contiguously back to back and side by side, with party walls usually along three sides of their building plot. Consequently they have produced in effect a multi-cellular structure giving mutual lateral support.

The steep gradient of the site made it possible for the houses to be at different levels, and therefore made it possible for each one to have a direct view of the sea. Since these houses were located at different levels, it was common to find a whole storey difference between two adjacent houses.

In spite of the long time over which the physical development of the city extended, and in spite of the diversity of owners, builders and the irregularity of land subdivision, unity of character was always maintained. This consistency could not have been achieved without tradition, nor without the same natural response to the local environment.[14]

3.7. Public buildings

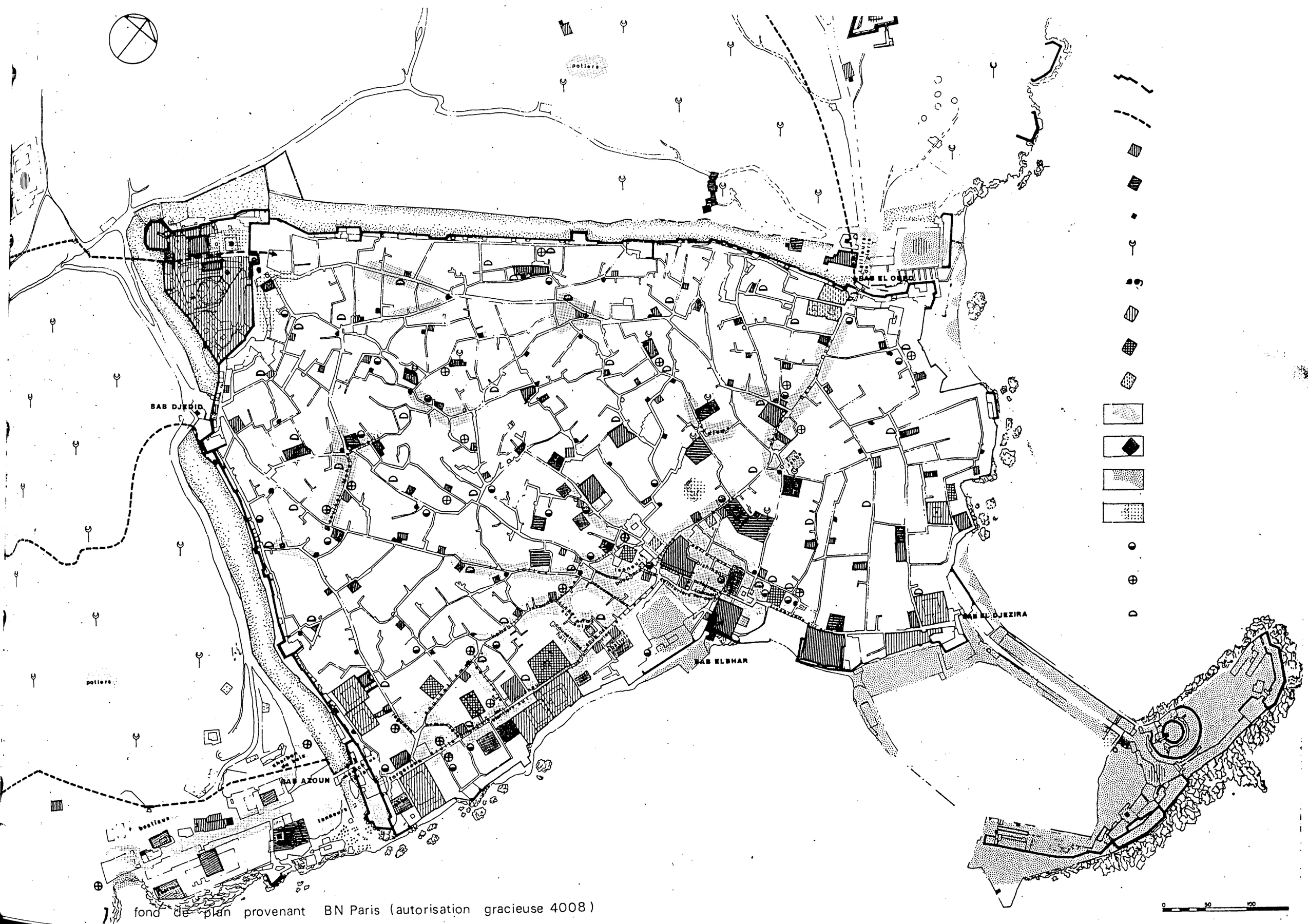
Public buildings in the Casbah were provided to promote socio-cultural and economic activities. In these types of buildings, different services were provided for local communities. At a neighbourhood level (Houma) these services were often located along the same street as a "Souika". However at a higher public level of the city other services were present, generally located along the main thoroughfares with a high concentration toward their intersection. This linear concentration of activities was called a "Souk".**(Fig.22)**.

3.7.1. The Souika

The Souika consisted of a small market of primary services, formed from a series of small honeycombed spaces opening directly on to the street. Most of the activities were shops, and were integrated in the ground floor of the houses bordering the street. Communication between shops and houses did not exist. However in some cases the basement of the house was used as a store for the shops.

The common activities found in the Souika were a moussalla (a small daily prayer mosque), a hamman (public bath), a cafe and various shops such as grocers. Most of these activities were supported by the local population of the houma. In fact, due to the compact layout of the city and its short distances, some of these activities were shared by two or three neighbourhoods.

As in most Islamic cities, in addition to these activities, some neighbourhoods also contained light industries such as textiles and traditional crafts. These activities were free from dirt and pollution. They were also quiet and did not disturb the residential character of the neighbourhood. It is important to note that these activities tended to form groups of similar trading professions in each houma, which consequently gave a trade character to this latter.



fond de plan provenant BN Paris (autorisation gracieuse 4008)

3.7.1.1. The Moussalla (small mosque)

The term "Moussalla" means a place where prayer is performed. Thus it was to be used by the local inhabitants of the Houma for daily religious practices. It also refers to a space allocated for the purpose of religious teaching. In other words, it was used as a small Quranic school (a Madressa) for young children.

It is important to note that these "Moussallat" were simple prayer facilities, which were conveniently located in large numbers in the city. According to A. Devoulx there were 109 small Mosques all over the Casbah.[15] Their purpose was to provide an easily accessible place for the performance of the five daily prayers. However, due to their small size, the Friday mid-day prayer and other religious festivals were excluded.

These spaces were usually provided with a water source for ablution and an adequate area for a small number of people to pray. Architecturally, most moussallat did not have a monumental expression like the major city mosque. In fact they were simple rooms integrated within the residential clusters and the majority did not require the call for the prayer, if they were located within hearing distance of the main city mosque.

3.7.1.2. The Hammam (Public Bath)

The term "Hammam" means a location where people went for their regular cleansing as bathing facilities within private houses were scarce, mainly due to a shortage of running water. In fact the whole Casbah was supplied by only four main aqueducts which distributed water all over the city through public fountains. But very few were supplied by running water. In these cases a private hammam could be found. It was only a tiny minority of people who had hammams in their houses.

Some Arabic writers have mentioned that the presence of one Hammam or more is an essential component of a complete urban settlement because of its ritual use in the

performances of the major ablution.[16] Besides ablution rites and hygiene, the Hammam became one of the centres of the neighbourhood. Local inhabitants went to it for relaxation, as well as for meeting other people and exchanging news and gossip. They were numerous in the city and used alternately by men and women during the day. Thus these baths generated important revenue for their owners.

Architecturally, most Hammams were similar in their general layout, and the way in which they worked. The area reserved for the users consisted of two quite distinct parts: one for dressing and resting, the other was reserved for bathing, which included warm and hot rooms, usually three in all, one leading on to the next.**(Fig.23)**. The Hammam did not have a monumental expression; from the exterior, the building appeared to be like any other residential building except for its main entrance. It was the only element of the building visually tangible to the pedestrian and which was appropriately identified and decorated.

3.7.1.3. The Shops

Basic daily necessities for the inhabitants of the Houma were obtained from a series of shops found in the Souika. These shops were created from the surrounding housing fabric and usually they occupied small rooms at a ground level and opened directly on to the street in its Souka form. Due to their small size (generally 2-2.5m in width and 4.5m in length)[17] most of them were inaccessible to the public, clients made purchases from the street behind a counter formed from a large bay window provided with a long desk.**(Fig.24)**.

Because individual shops in the Souika rarely used written placards for advertising, the visual aspect of the Souika during business hours was different from when it was closed. H. Besim described it as being sometimes difficult to find one's way in the Souika, after business hours even though one is familiar with a particular location owing to the radical change in the visual environment when the Souika was closed[18] All shop fronts were of similar size with similar doors and uniform colours. This fact reinforces the importance of the products, their display, and the individual vendor's salesmanship which collectively act as the advertising medium.

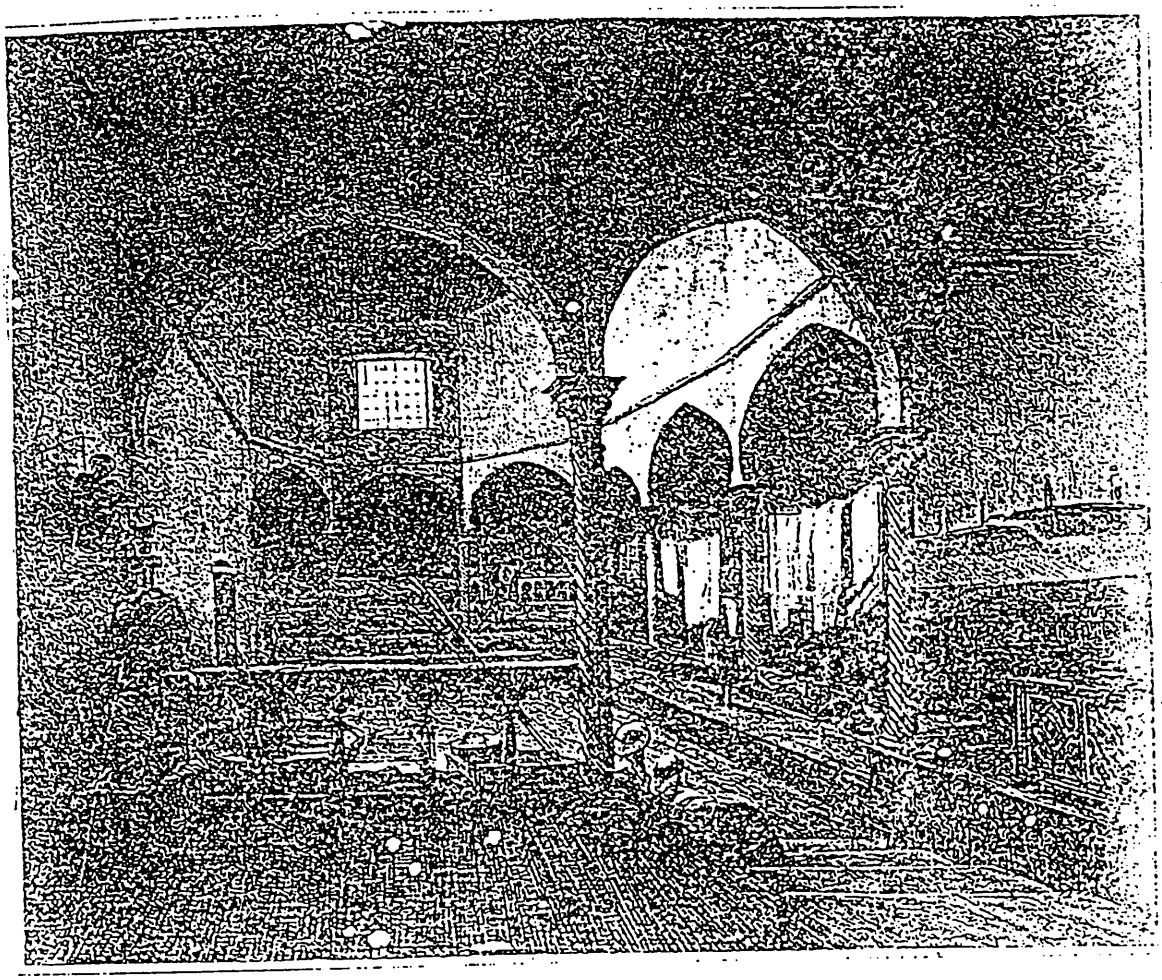


Fig.23. Interior view of a "Hammam".

Fig.24. Frontage of a small shop.

3.7.2. The Souk (Market)

The term Souk means a place for goods and necessities of various types, and it was a major market of the city. Generally it consisted of several retail trading establishments, craft workshops and "caravanserais". These public activities occurred on the major city thoroughfares, particularly those connecting city-gates with the core of the city. These activities formed a linear, continuous, or semi-continuous Souk. They were also sometimes covered by vaulting. Linear Souks used ground floor or street levels and were overlapped on upper levels by other uses, particularly housing. Shops within the souk were almost similar to those found at a neighbourhood centre in terms of physical form, organisation and goods display. However these shops were in large numbers, and were more specialised, containing a wide range of goods. Consequently during business hours of the day, it was inevitable to find along these linear Souks a more active and busy environment.

At the intersection of the main thoroughfares of the city these activities tended to density, particularly around the main city mosque where more specialised establishments evolved. Besides these commercial activities, a large number of religious and administrative buildings were erected which formed the core of the city.

3.7.2.1. The Major City Mosque (Djammaa El Kebir)

The core of the city was symbolised by the major mosque which constituted the culturo-religious life of the city. It was the biggest gathering space where the Friday noon prayer was performed. The Friday noon prayer, which should be performed in the mosque, is obligatory for every free male Muslim who has reached the age of discretion. The major mosque, which for this purpose has to be particularly large, was given an appropriate name. It was and is even today referred to as "Djammaa El Kebir".

Due to the growing population, other mosques began to be created in which the Friday noon prayer was also performed. "Djammaa El Djedid" was one of these, being the second principal mosque located within short distance of the previous one.**(Fig.25)**. Both of these mosques opened out to the Marine street, being at one time the busiest thoroughfare, particularly on Friday.

These mosques were of a large scale and comprised of an enormous central space for prayer performance, ablution facilities, and other small rooms for religious debates. In both mosques, a minaret was erected creating a sudden change in the skyline. These were the strongest landmarks of the town because of their multiple viewpoints.

Because the Casbah grew and developed under the Ottoman empire, it was not surprising to find that the architectural aspect of its major public buildings was treated with special attention. In almost any Islamic town, the architecture of many public buildings was indifferent to external display. The concept of laying out a town with major streets bordered by prominent public buildings , often visible on all sides, found little favour in the Islamic world. Public buildings in fact were sometimes given imposing facades, but there was very rarely an attempt to show a building on all sides.

However the Ottoman reversed this trend, siting and landscaping their buildings so as to lend them maximum impact from vantage points. Ottoman mosques in particular have the crucial advantage of considerable height, so that no matter what the surrounding structures are it is still possible for the mosque to make an impact.[19]

The importance of Djammaa El Kebir as a major mosque within the city illustrates this impressive and monumental character which derives from Ottoman style. In contrast, Djammaa El Djedid, being a second principal mosque, it was given less consideration in terms of scale, height and siting.

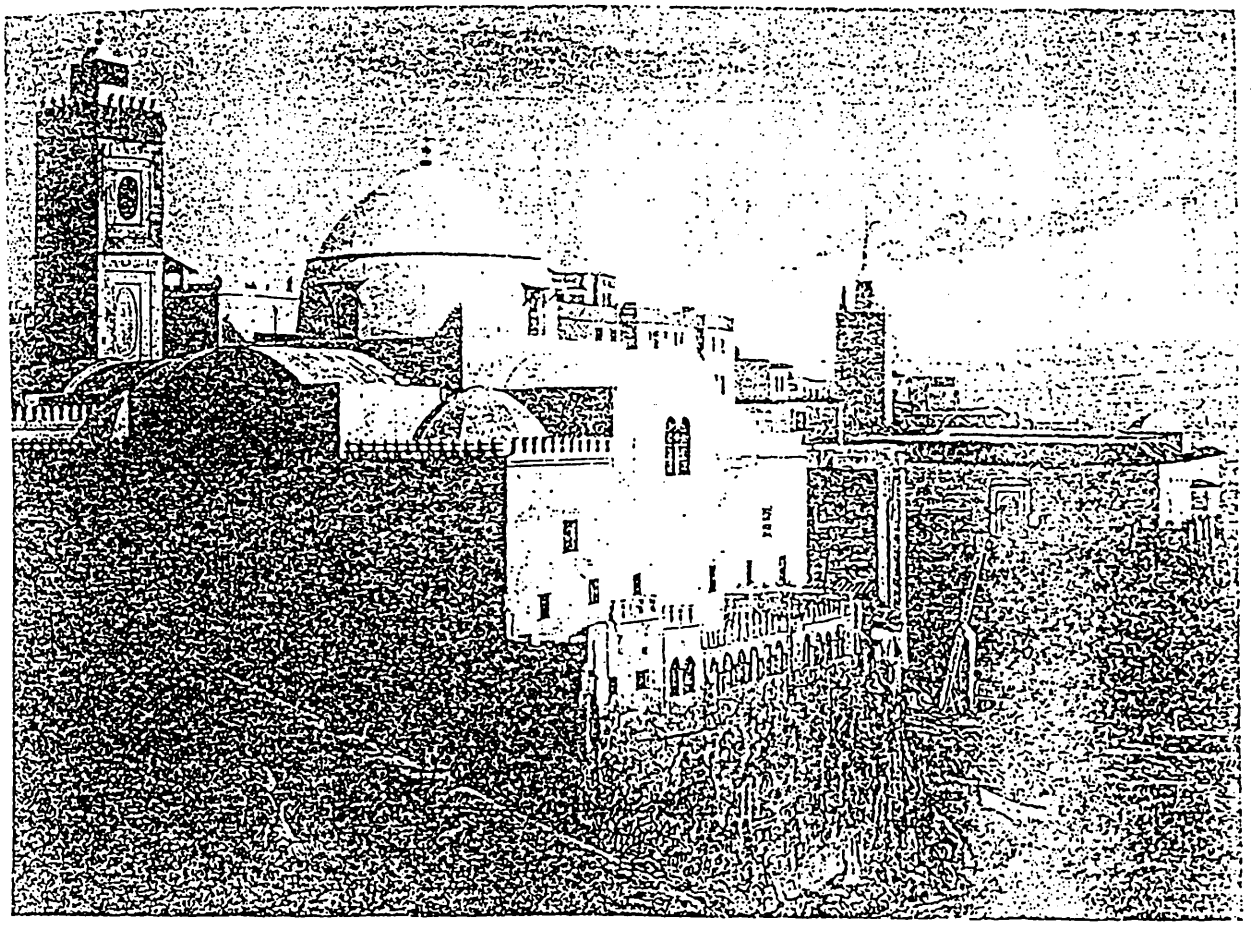


Fig.25. The Major City Mosque: "Djammaa El Kebir"

3.7.2.2. The Zaouia

The "Zaouia" is a building or group of buildings of a religious nature, which resembles a monastery and school. The literal meaning of the term "Zaouia" is "corner", which corresponded to its location. Usually it was associated with a mosque at one of its corners.

According to A. Devoulx he located 12 Zaouias [20] in a concentric area around the previous Djenina places of the ruling days, or governors situated near by the major mosque. Thus all these public buildings confirmed the real heart of the city, where the active life happened.

In the Zaouia, several rooms were given over to the religious activities which took place; a room for prayer, a room for recitation of the Quran, a school, and other rooms for guest such as travellers and students. As this latter offered accomodation, bathing facilities were often attached to it. THe Zaouia was also adjoined by a small cemetery with the tombs of those who have during their lifetime expressed a wish to be buried in it.

3.7.2.3. The Foundouk (Caravanserai)

The "Foundouk" was an establishment of several functions, such as trading, manufacturing and lodging. it was a hostelry where foreign merchants would lodge to display and sell their products. This type of Foundouk, functioning mainly as a hostelry was usually located near the city gates. However, Foundouks functioning as storage or workshops were also found in the industrial or trading quarters. Most of these latter where located along the main thoroughfares of "Azoun" which was dominated by commercial activities.**(Fig.26).**

All Foundouks were designed around a relatively large courtyard with a large gate allowing entry for loaded animals or wagons. On the ground level, stables were provided to house the animals such as donkeys, horses and camels. Storage for merchandise were also found at this level, as necessary, until the consignee took delivery of it. Most of these Foundouks were identified by the products sold there such as wheat, coal straw, oil etc.**(Fig.27).** On the upper

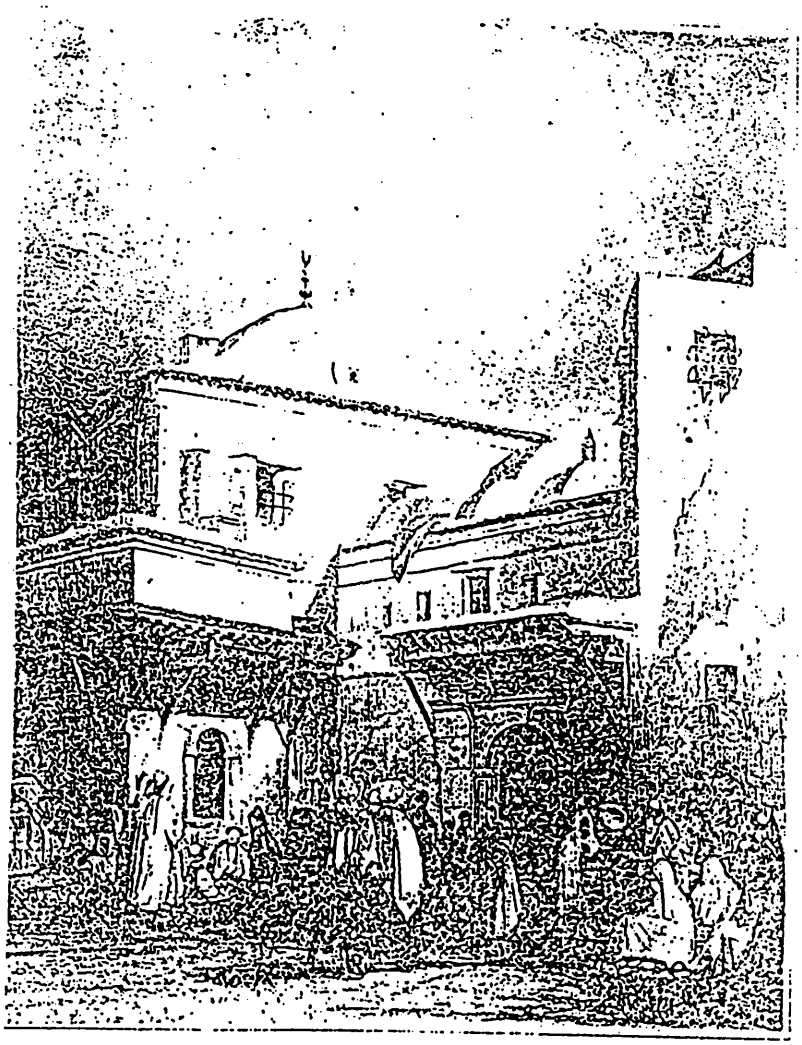


Fig.26. View outside a "Foundouk".

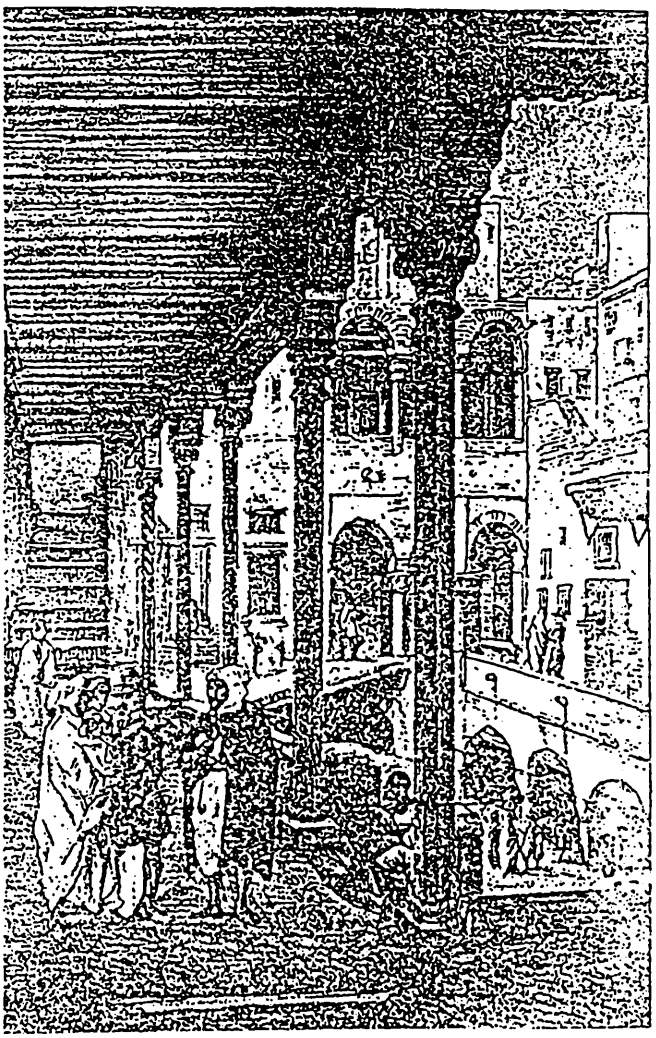


Fig.27. View inside an oil "Foundouk".

floors, rooms were grouped around a covered access gallery these rooms were small and modest in which the merchants were accommodated.

4. Social Structure

4.1. The Traditional Community

Like all Islamic towns in the Ottoman Empire, the Casbah was characterised by the existence of various community organisations. These communities were identified according to religion, profession (tradesmen or craftsmen), ethnic group and geographical origins. Each community represented a specific neighbourhood placed under the authority of a leader (Sheikh), and named after him.

Every community was divided into a number of kinship groups of common identity. This latter was also submitted to a further subdivision into a number of extended families (aylat). The "Ayla" or extended family was composed of several nuclear families belonging to the same descent and usually living in the same courtyard house.

The identity of people was then determined according to community, the kinship group and the family to the extended family to which they belonged. Thus a person in the Casbah was not known as an individual but as a member of a community. However a person can also be recognised as a subject who belonged to a professional community with regard to his job.

As a result of this community organisation system which arose in the Casbah, one person could belong simultaneously to more than one community. For instance he might be a member of a defined traders community, at the same time he could be referred to as a member of a particular regional group and even as a member of a kinship group, i.e Family name).

Every member of the society was then part of a series of community networks but these networks were most often superimposed. A. Raymond stated that Mozabite monopolised the

trades, whereas the members of the Turkish community were ruling the city and occupying the administration.[21]

Such a community organisation system in the Casbah helped maintain an established order of the whole social structure. It gave to each community an internal autonomy according to customs, religion and language (such as Jewish and Spanish communities which were present at the time in the Casbah). And more importantly, it has thoroughly facilitated the behaviour and mobility of the entire population.

4.2. Impact on the Urban form

Examining traditional Arab urban patterns in terms of socio-cultural and activity systems shows that the need to control behaviour and social contact is the main determinant in the design of spaces.[22] This can be seen at all levels of spatial organisation in the Casbah: micro, meso and macro spaces, i.e. form the internal spatial distribution of the house to the way that buildings were organised and the neighbourhood and city were designed.**(Fig.28).**

The main design principle of the Casbah's urban pattern was characterised by the physical manifestation of the equilibrium between social homogeneity and heterogeneity in a social system which required both segregation of domestic life and full participation in the economic and religious life of the community.

According to these two social values, the design of such an urban pattern had to deal with two extreme poles of need, in which their satisfaction was in conflict. Even in community life there were different levels of social communication, which required another dimension of control over social contacts.**(Fig.29).**

In the Casbah, as in most traditional Islamic settlements, these needs were satisfied by arranging spaces in an hierarchy, from the very private to the very public. The organisation of

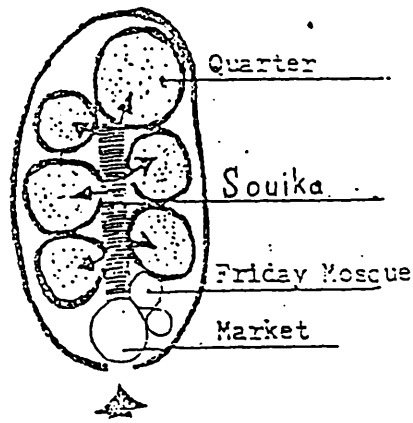


Fig.28. Organigram of a traditional urban pattern.

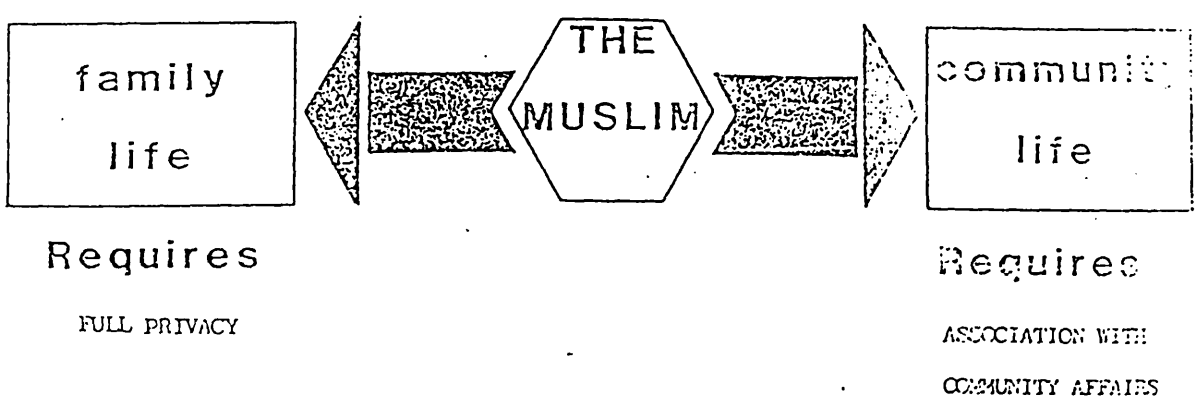


Fig.29. The complex balance between social homogeneity and the heterogeneity of the socio- cultural system.

the hierarchy was based on controlling access and mobility, thus controlling social contact.**(Fig.30).**

Characteristically, the Casbah compromised a system of public, semi-public, semi-private and town spaces, varying in degrees of accessibility and enclosure. The highly public areas of the town were those of the Souk (market), lined with shops, workshops, cafes and caravanserais, associated with a major mosque. This was the main domain of the men's active life, with the emphasis on accessibility, and unrestricted contact.

By contrast private areas were those of the houses related to family living quarters. This was the domain of the women. Accordingly the Muslims built their houses inward-looking and enclosed to achieve full privacy and peace for women. The right and obligation of the family to live enclosed in its house has led to a clear separation between public and private life, which is perhaps the most significant social characteristic of Islamic culture.[23]

As mentioned earlier, the hierarchy of spaces limited movement and controlled behaviour by controlling mobility of the people. Even at intermediate areas between inside and outside this system of distribution was applied. For example a reception room (Family semi-public area) was located on the boundary of the house measuring an intermediate area between domestic and community life.**(Fig.31).**

At the neighbourhood community level, each group of houses was clustered to form one unit. The community contained a closely-knit group providing consciousness of social identity and security. In order to ensure community privacy and initiate social activities without disturbing house privacy, the houses were clustered along short narrow blank-walled lanes and cul-de-sacs. These latter enclosed elements, representing community private areas, usually named after the family who were living there.

	Hierarchy of space	Intensity of use	Social hierarchy
Community life	Sharaa	Highly public	Group of communities
	Zenka	Public	Communities
	Znika	Semi-public	Community
	Driba	Semi-private	Kinship groups
Domestic life	House	Private	Extended family
	Room	Highly private	Individual person

Fig.30. Table of the relationship between the spatial and the social hierarchy and the intensity of use in the traditional environment.

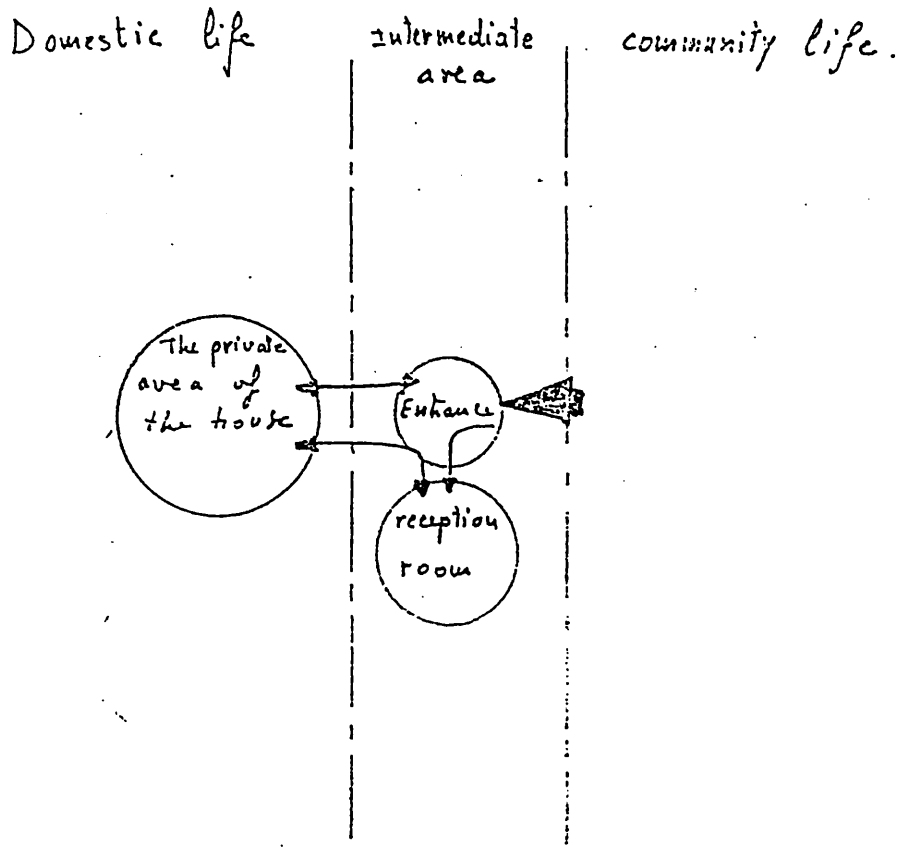


Fig.31. The complex organisation of spaces in the tradiotional house.

The lanes and alley-ways flow into a small "Fina" (community semi-private level) where community social and recreational activities were conducted. In most cases these small open spaces were related to a small mosque, cafe and fountain.

At the level of the quarter, each group of communities was arranged around a small centre (community semi-public) where its daily activities took place. This centre, the Souika, contained a mosque, a school and some local shops. The quarters were not divided according to status, as each can be seen as a microcosm, where rich and poor, indeed all classes lived together.[24]

At the city scale, different quarters were grouped into wards. The thoroughfares bordering these wards were the main public area with a strong emphasis at their intersection where the major city mosque was located. This highly public area formed the centre of the town. It was mainly the domain of men, where all economic and public activities took place. It contained the souk, specialised shops, workshops, caravanserais, cafes, hammams and public fountains. There was no direct access from each quarter to the centre, but no direct route went through a quarter.[25] This helped to maintain a strict and continuous control of peoples movement between the highly public city affairs and the residential quarter which required quieter community activities.

As in all traditional Islamic towns the hierarchy of spaces in the Casbah appeared without any doubt as a consequence of an urban form shaped to suit its socio-cultural patterns and traditional activity system.(Fig.32). It also helped to establish a strong relationship between social perception and spatial organisation.

5. Physical Development Process

Like any other traditional Islamic city, the physical development of the Casbah was not built in a single operation but arose by continuous growth from within. Problems of planning were solved as they occurred on the spot and by process of accretion, almost like the modelling of a piece of sculpture.

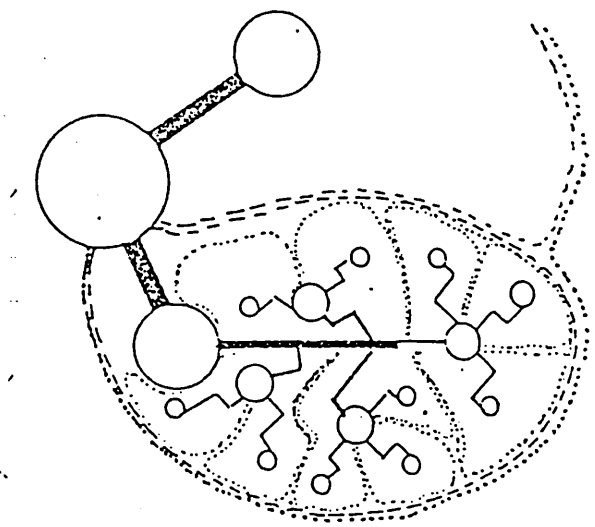


Fig.32. The hierarchy of spaces in Muslim Towns.

The physical form of such a city, with its compact sets of buildings, its terraces, its courtyards as sole open spaces, with those narrow and tortuous thoroughfares and dribas, was not a rationalised or planned type of structure but rather a purely natural and biological one. In appearance, the graphic format of such a Muslim civic community resembles the diagram of a living organism. It recalls an anatomical drawing of the nervous system or a cross section of the organ.[26]

Although settlements such as the Casbah are usually typified as being a confusion of buildings and streets old senseless labyrinths impossible to unravel even with the help of maps, they do still conform and obey rules which governed their physical forms. However, these rules are not geometrical regularised planning principles but rather socio-cultural and religious principles based essentially on the essence and spirit of Islam.

It is essential to mention that the Islamic religion, besides its socio-cultural effect, had significantly shaped the institutional and legislative system of the society. The "Shariaa" constituted the framework for all the social, economic and behavioural conduct of the Muslims in their daily life, and the only source for jurists to establish the legislation and regulation system of the government.[27]

The "Shariaa" is the institutional aspect of the Islamic religion. In this regard the law can be seen as a highly institutionalised form representing a valuable asset, where the Shariaa regulated all aspects of problems. Legal decisions were in a form of convention which represented an important, if not the most important part of the social fabric. These decisions made a genuine connection between the physical and social fabric.

The favourable attitudes of a Muslim toward his neighbours produced proximity and compactness in their relationships. This factor clearly influenced the layout of clusters within the Casbah. It is therefore not surprising to encounter irregular alley-ways covered by connecting chambers linking two houses. One can also see two neighbours having or even

building rooms on each others land. All these practices occurred with a complete awareness of respective rights of way, rights of privacy, rights of light and air etc...

These rights, when necessary reinforced by building codes and regulations, derived from Islamic law; the Shariaa. When these rights were in dispute, it was the duty of the jurist (Kadi) to maintain them.

Our concern here is to illuminate some aspects of the development of building and urban design principles which centred primarily around housing and access.

5.1. The right of way

In the city, Muslim law distinguishes the through street (Sharaa) as the public way in which all people have the right of way, from the lane or cul-de-sac (Driba) which most jurists consider as a private street related to its surrounding properties. As stated earlier movement in the Casbah was subject to a strictly controlled circulation system based on hierarchy; from the very public to the very private. This latter was composed of different categories of streets classified according to their location, function and size.

The two extreme hierarchical and distinguishable categories of street were, firstly the main thoroughfares (Sharaa), dividing the town into two distinct wards, which everybody had the right to use, and secondly the no-exit streets (Driba) which dwellers used as common private access space just outside their houses.

5.1.1. The Sharaa: Public way

This category of street, which represented the through streets, was for public uses and was shared by local citizens of the town as well as strangers. It contained all public activities such as the Souk and other economic functions. Due to high public uses, the Sharaa had to

accomodate both the high pedestrian flow and the animal transport system of the time which relied mostly on horses and donkeys.

As previously stated, in the Casbah, the width of the Sharaa varied between 4 and 7 metres. These dimensions seem to conform to seven cubits as the minimum width for the public thoroughfare.[28] The cubit ranges fro 46 to 50 centimetres so the width thus ranges from 3.23 to 3.5m.**(Fig.33)**. This shows that the Sharaa in the Casbah respected this limit to a large extent.

It is worth mentioning that this imposed rule came from a saying of the Prophet "if you disagree about the width of a street, make it seven cubits".[29] Therefore, this measure was respected in most (if not all) Islamic cities. According to H. Besim when analysing Tunis, he found also that seven cubits was respected as the minimum width for public thoroughfares.[30]

Supervising and maintaining these arteries of the Casbah was the duty of the "Muhtassib". This latter was a person who enforced laws within the Muslim establishment. In detailing his obligations, the Muhtassib had to keep from the Sharaa and Souks anything that might cause them to be dirty, or to make them dark or narrow. They went even further and provided specific rules for maintaining their good functioning and their flanking buildings.

One of these rules related to the sudden widening of the Sharaa; the public Fina. The owner of a building beside this space had the right to use it as an extension to his property.**(Fig.34)**. For instance, this public Fina could be a cafe terrace, an outside space adjacent to a mosque or a private parking area for unloading animals outside a Foundouk etc... The rule allowed the appropriation of a part of the Sharaa as long as the public circulation was not hindered. However if such an act hindered or caused any other harm to the passer-by, the Muhtassib intervened by stopping it.

Another important rule which characterised the flanking buildings of the Sharaa concerned the projections and extensions over the public spaces. Such features as previously described, were

allowed to take place provided that the public function of the street below remained undisturbed. Regarding the clearance between the projection and the street ground the jurists were more specific, projections were allowed only above a certain height, providing sufficient distance for a rider to pass with enough clearance over his head.**(Fig.35).**

By contrast, the width was not limited; a projection might partially or even entirely cover the street when agreement was obtained from the owner of the opposite building. Such cases however were not common in the Casbah. This was due to the limited strength of materials which allowed only small spans. Consequently the most frequent type of projections found in the Sharaa were the two opposing buildings extended toward the middle of the street.**(Fig.36).**

To recapitulate the rules governing the right of way in the Sharaa, there was a common agreement on not narrowing this way, hindering circulation or causing harm to the public.

5.1.2. The Driba: Semi-private way

This category of street which represented the no-exit street was of semi-private use, shared only by the few resident's who's houses opened into it. The Dribas (Dead-ends) as previously described, constituted the common distributor access streets to private houses which formed the neighbourhoods.

As such, the Driba was not affected by the right of way as was the Sharaa. It was a private common affair of the local residents who acted freely according to their common needs. But, if a disagreement or claim by any neighbours took place, the duty of the Muhtassib to intervene became necessary.

According to M. Benhamouche, the formation of the Driba was also a consequence of an agreement between the users and the authority. As long as the users actions did not affect the public they could act freely on their spaces.[31] Therefore, when residents on both sides of a lane (Znika) judged it possible to close off that passage, without causing harm to the public,

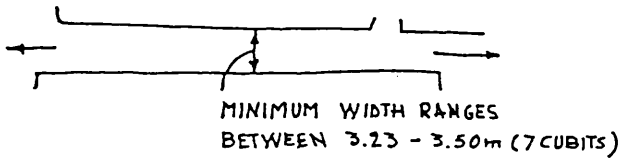


Fig.33. Sharaa: the through street
((public right of way)

Fig.34. The Fina.

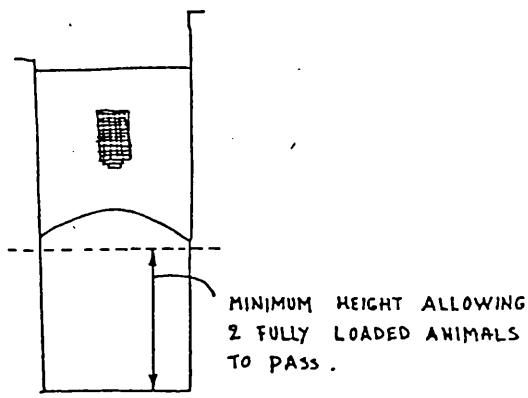


Fig.35. The required clerance under a projection.

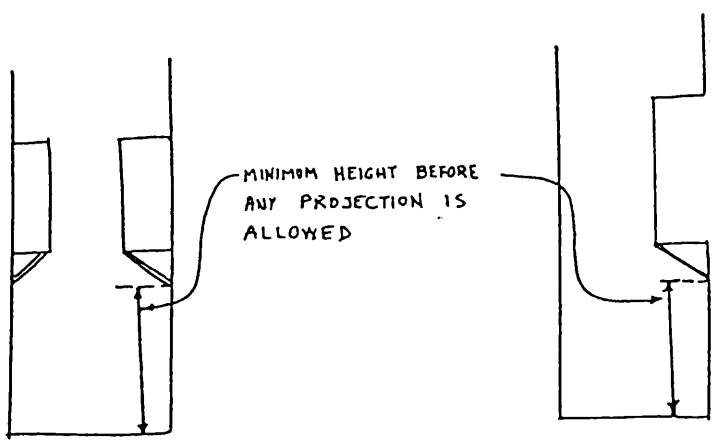


Fig.36. Projections over a Sharaa.

they had the right to turn it into a Driba by extending parts of two opposite houses to meet each other in the middle.(**Fig.37**).

Because of the non-interference of jurists, and presumably of Muhtassibs, in the affairs of lanes and cul-de-sacs, except when petitioned by some of the residents of these lanes, the local people provided the development of gates within the neighbourhood. In this case, the dwellers located along the same lane agreed to build a gate for their cul-de-sac or lane.(**Fig.38**).

This gate system was very common in the Casbah due to the security measure it provided for the small communities of neighbours. In fact the Driba was traditionally closed at night in order to isolate and the protect the residents from any troubles or external invasions.

Every resident had the right to uses the Driba from its entrance to his doorway. In some cases the person who lived at the end of the cul-de-sac was allowed to move his door forward if it did not obstruct other doors, thus privatising the end part.

By contrast to the typical function of any Sharaa, which was to lead continuously from one area to the other by way of an entry and exit, in this manner being a key component to the city's planned public space. The Driba did not have an outlet continuation or public function. Its role was a semi-private one, and thus serving a determined number of houses. As a result, its width was relatively small, varying between 1-2.5 metres.

Most common width of the dead-ends in the Casbah ranged between 1.8-2m which corresponded to 4 cubits, but sometimes they were narrower with the general principles that a fully loaded animal could pass. These dimensions were similar in most Islamic cities such as Tunis, where H.Besim found 4 cubits as the frequent measure of a Driba's width.(**Fig.39**).

Projections and extensions over the Driba went through the same regulations as for the Sharaa. They were allowed only at a specific height and they had to leave a sufficient distance from the ground, so that enough clearance for passage was possible.

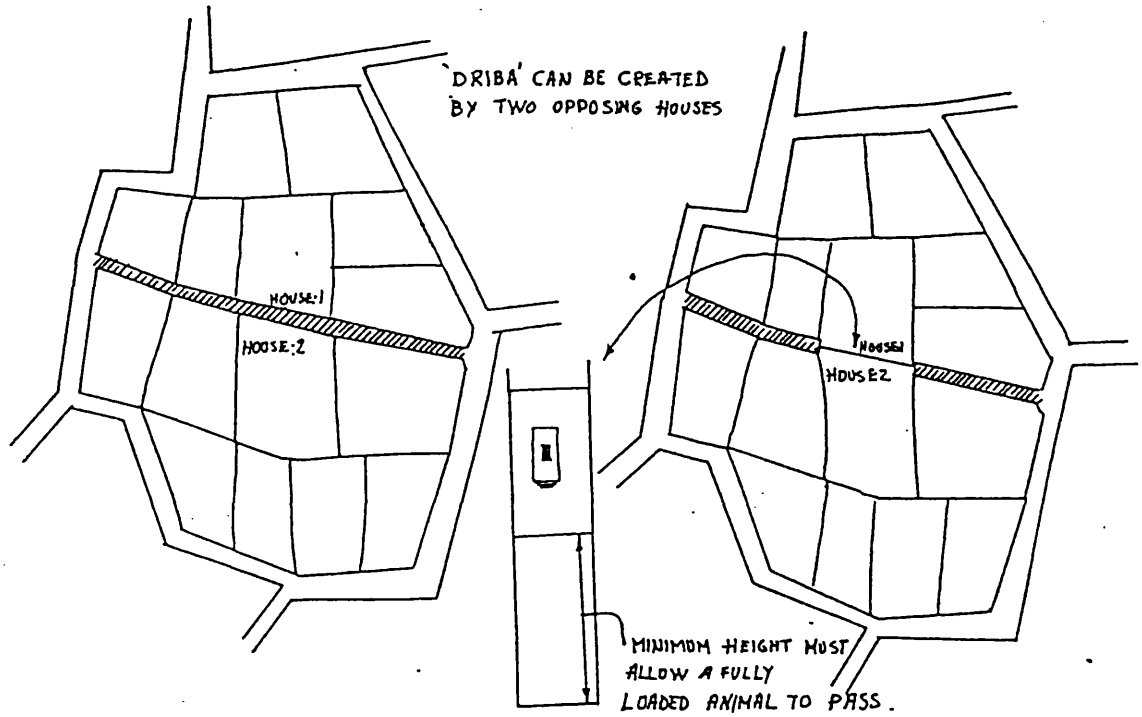


Fig.37. Creation of a Driba.

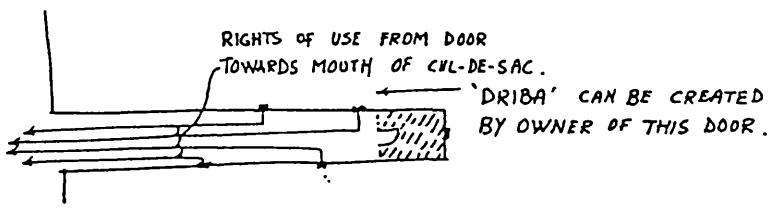


Fig.38. Creation of gate in a Driba.

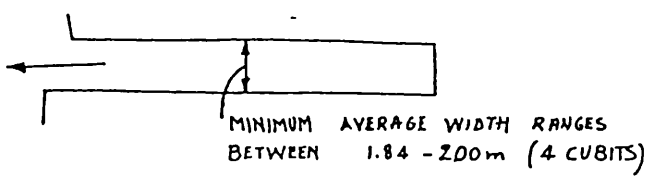


Fig.39. The measure of the Driba's width.

Most projections present over the cul-de-sacs in the Casbah were entire chambers crossing the whole width. In these cases the opposite house was usually owned by the same family. The Finas present along or at the end of the Driba had different regulations compared with those present on the Sharaa. The Fina in the Driba or the lane were domestic semi-private uses related to the houses adjacent to it. In this case it was used as a meeting place for the neighbours as well as a playground for their children, or on occasions of weddings it was used as an area for celebrations.

To sum up the regulations which governed the semi-private way in the Driba, there was a common general agreement between the neighbours to keep this space only for semi-private use and access to their homes, with specific respect for each other so as to cause no harm to anyone.

5.2. The concern for privacy

In Islam, privacy is very important; every Muslim has the right to it as well as to respect it and fulfil its requirements. Consequently, the strong desire for it dictated that the basic format of his residence be a confined space, hermetically closed to the exterior, which in term forced the concentration of domestic life in and around the dwelling's courtyard. The Muslim then created a type of housing inside which he could enjoy the pleasure of life in strict seclusion.

According to the code of conduct of Muslims, jurists considered privacy as an issue protecting family life thus a general consent was established to keep order. Privacy must be respected and its invasion or intrusion was prohibited as it might cause great harm and damage. To be able to see into a house more than a passerby would see, was looked upon as an intrusion into the private life of the house; one which could not be tolerated either by the residents or by the jurists.[31] All mediums affecting privacy are included in Muslim teaching, but the visual mediums especially is directly affected by urban and building form.

In the Casbah, privacy has remarkably affected the physical form of the urban spaces as well as the buildings. Urban design principles insured privacy for women, as well as sufficient air and sunlight. This has affected the regulations of building heights, the design and placement of doors and windows, and the design of rooftop walls so that the interiors of buildings and courtyards remained remote from the outside.

5.2.1. Building Heights

Restrictions on the limit of building height as such were not predominantly established in most Islamic cities. Building heights were mainly determined by the technique and the materials used at the time. However, intrusion or damage caused by heightening a building was not tolerated and therefore it was prohibited by the jurists.

In the Casbah, this rule seems to have been applied. In fact any citizen had the right to raise his edifice as long as the height of his building did not inflict damage on the surrounding dwellings. Since intrusion into the private life of the neighbours is considered to be of great harm and unacceptable, it is obvious that the neighbours would not tolerate being constantly under the view of others.

Another important regulation of building heights seems to have occurred not only in the Casbah but in most Arabic Islamic cities. It is the one concerning the height of the mosque's minaret. The minaret is the highest point in the city. Apart from serving a religious function and being a strong landmark, this did not exclude it as an element which might cause harm and intrusion.

The "Muezzin" when ascending to the minaret's top, to call for prayers could look into the interior surrounding houses and therefore inflict damage. Due to the peoples' concern about this issue, the Muhtassib's duty was to ensure when a prayer call is performed, that the Muezzin should keep his gaze lowered and not look into peoples' houses. In other cases, the Muhtassib did not allow any Muezzin to ascend the minaret unless blindfolded, so that he would not intrude on the surrounding dwellings.

5.2.2. Doors and windows

Regulations about doors and windows were most strict and specific as the latter may easily allow intrusion to the interior of the citizen's private house. Due to the risk of damaging privacy which was strictly unacceptable to both citizens and the jurists, these openings were under the thorough control of the Muhtassib. They had to obey certain rules of position and size so as not to inflict harm.

Accordingly, doors were not allowed to be located opposite one another in the same street, as this facilitated visual intrusion into each houseowners privacy, when the doors were opened. However, doors facing each other were allowed in wide thoroughfares. As stated earlier, the limit set for thoroughfares was 7 cubits, which seems to be large enough when compared to the average width of other street types which offered more visual intrusion.**(Fig.40).**

In fact, preventing people opening a door opposite to an existing one helped not only to keep privacy but also retained the benefit of the place in front of their door, as a loading area (without causing inconvenience to anyone) or as reception and entertainment area or for similar matters.

Windows generating complaints due to overlooking were always prevented by the jurists. In the Casbah as in most Islamic cities, one had no right to open a window which could inflict harm or damage to his neighbour, even when what is done is within his own property.

This rule goes even further, as such an opening was prohibited even when the neighbour's plot was not yet built upon. However, if an agreement was obtained from this latter, a window opening could be allowed so long as this did not interfere with his privacy.

Due to privacy requirements, most windows were very small in size and high in position and this was determined according to certain acceptability of height measured from the inside as well as the outside.

Determined from the interior, the acceptable height of a window sill was approximately 2.5m. This represented an average eye level of a man standing on a bed or object in a room, and still not being able to look through.**(Fig.41)**. In this case the window was allowed to remain. Otherwise, if a man standing on whatever object could see through, the window had to be shut.

Determined from the exterior (street level), the acceptable height of a window sill was 1.75m. This represented an adequate height to prevent a passerby from overlooking the interior of the house.**(Fig.42a)**. This condition assumed that the ground level of the room was approximately the same as that of the street. However when the ground level of the interior is appreciably lower, then the exterior window below 1.75m is allowed if the sight lines from it are above the level of a standing person in the interior.**(Fig.42b).**

All these regulations concerning window height were narrated by Malik from the solutions of "Caliph Omar Ben Al Katttab" as stated B.. H. Hakim.[32]

5.2.3. Rooftop Walls

In the Casbah, most houses have access to their rooftop terrace, namely "Stah", as this latter was an extension to the house, particularly during the summer. It served also for basic functions, such as drying the washing and the late afternoon gathering of the family. In other words it was an important living space not only in the Casbah, but in most Islamic towns.

Due to its frequent use, the Stah had to obey strict design principles which must offer maximum privacy for its users. As the rooftop facilitated intrusion into the neighbouring houses, parapets had to be constructed to prevent direct overlooking.

This rule indicated clearly that rooftops could be used only if they were surrounded by walls in order to protect neighbouring dwellings from exposure. The height of the wall was not exactly defined but it was to be raised to a level where the passerby would not be able to see behind it.

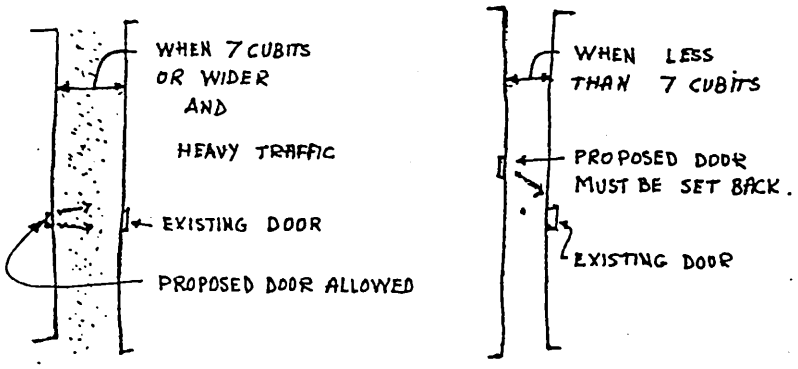


Fig.40. Rules for door positions

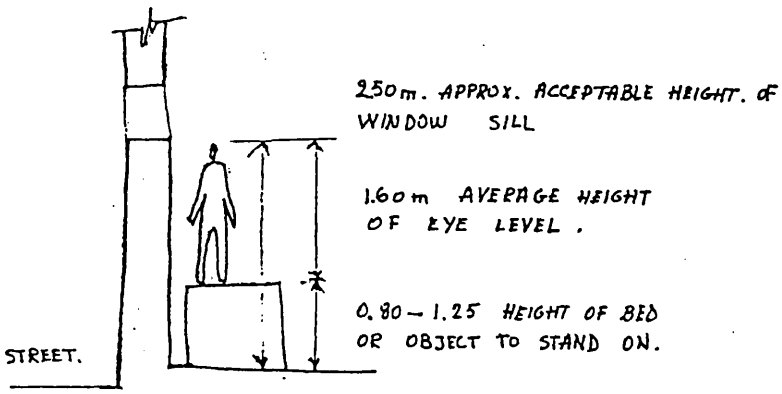


Fig.41. Height of window position as determined from the exterior

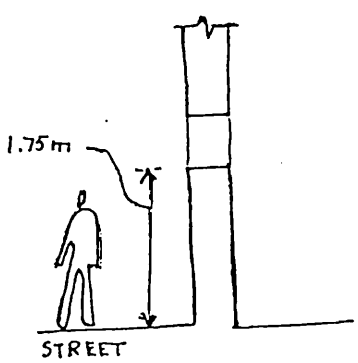


Fig.42a. Height of window When levels of street and interior approx. same.

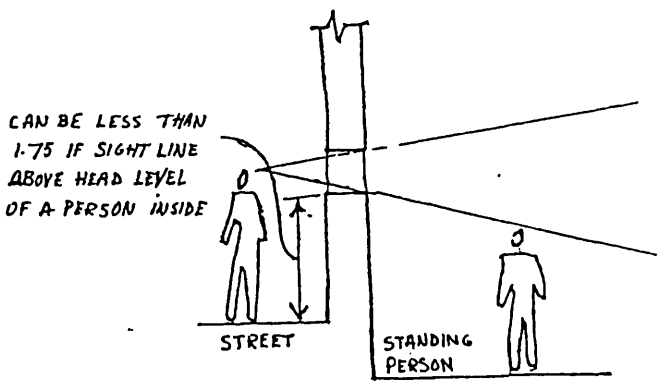


Fig.42b. Height of window When interior level is appreciably lower than street.

It is in this way that the privacy and intimacy of family life was kept on the Stah of different houses in the Casbah. It has ensured every family the uses of this open space. However, due to the close relationships between the neighbours who lived in the same cluster (usually one extended family or kinship relations), this rule was more flexible as they agreed most of the time not to have parapets and therefore they connected their houses by rooftops and this was mainly the common route for women when visiting each other.

5.3. Land Subdivision

The process of land subdivision was without any doubt one of the most determinant factors of the physical development within the Casbah. As in most Islamic settlements, at their birth, land was granted to tribes or groups of individuals. According to S.A. Hathloul, these grants, namely "Khitat", seems to have formed the origin for the city quarters.[33]

Through time as the city grew, these Khitat underwent continuously further subdivisions in order to correspond with the needs of the new generations. The subdivision of land within the "Khitat" was left to the discretion of the quarter's inhabitants. They had to divide each single "Khitta" amongst their members according to their needs, and that was to be accomplished even when each plot of land was built. Subdivision continued within the members of the same family due to its growth in numbers.

This process of land subdivision appeared not to follow any rules as how to proceed in regard to the internal spatial organisation. However, with regard to distribution, this process appeared to have developed according to three main rules related to the needs, the inheritance, and the pre-emption.

5.3.1. The Needs

Each tribal group had the right to own a Khitta, its size was determined according to the tribe's evaluated needs. This latter was subdivided respectively among the tribe which constituted the extended families.

This process was constantly repeated when each extended family became numerous and had to make room for its members till the building so increased that the Khitta closed in on itself.

5.3.2. The Inheritance

In the Casbah, the inheritance rule has played an important role in land subdivision. Indeed, the Islamic law of inheritance and its application may explain a great deal about the structure and the process of transformation of land and property within most Islamic cities.

According to S.A. Hathloul, the jurisprudence books introduce many hypothetical cases regarding this subject, which usually comes under inheritance laws. These cases deal with what can be divided and with the question of access when a large house has been partitioned. Malik (leader of Maliki school) had the opinion that any property, either land or buildings, inherited by a group, must be divided among them, should anyone of them demand it.[34]

This process was however continued until a subdivided property (a house or a plot of land) reached its minimum and still being functional enough to serve as such. In a case when a house was subdivided into two parts (or sometimes three or more), new access arrangements had to be made as well as new partitions of the courtyard and other rooms. This has surely affected the urban form of the Casbah and explains the irregularity of plots as well as the overlapped houses.

5.3.3. The Pre-emption

The development within Islamic jurisprudence of the system of Shafa'ah (the pre-emption), which gives a preferential right for a neighbour to buy his neighbour's house or land if the latter decided to sell, helped to preserve the clusters and neighbourhoods character within the city. This has surely played a major role in maintaining social unity and has prevented access for outsiders within the neighbourhoods of the Casbah.

6. Conclusion

This chapter aimed to contribute to an understanding of the environment of the traditional urban form of the Casbah by analysing its fundamental physical and spiritual character, and by exposing the major religious and social aspects which motivated those distinguishing traits.

The traditional urban form of the Casbah was pre-eminently characterised by a dense, organic and homogeneous spatial organisation based on the incremental development of introvert buildings. This inward looking character affected all types of buildings, from the public to the domestic ones; the courtyard houses.

This unique typology was then the ruling instrument upon which form depended. Despite the informal singular arrangement of buildings this typology has offered a great diversity of organic clusters and houses of various sizes. In addition due to its high potential for internal flexibility, it has also offered different possibilities of houses contiguity. As a consequence of this introversion, the fabric of the Casbah resulted in a very compact and irregular physical form.

The physical irregularity of this urban form did not obey any geometrical order. In fact, the inhabitants of the Casbah did not seem to care for spatial effect produced by the endless line of continuous, longitudinal urban vista, since such impressions destroy all feelings of intimacy.

Consequently buildings were not designed for external display and the concept of laying out a town with major streets bordered by grandiose public buildings, often visible from all sides, found little favour in the Casbah.

The conception of the Casbah was based upon the privacy of life and the religious sense of that life and from this notion stemmed its urban form and environment. In spite of the seeming lawlessness and geometric disorder, its spatial organisation was dictated by a methodical intrinsic order. This order derived from the socio-cultural and religious principles based essentially on the essence of the spirit of Islam.

The city's spatial organisation was then essentially emphasised by legal notions of proper behaviour in space and legal regulations in property relationships. Those notions and regulations were responsible for both the micro and macro organisation of the urban space.

The micro conditions came as a mechanism governing particular events occurring at the neighbourhood scale. This mechanism functioned as a guide for participation and decision making in matters of building, particularly amongst proximate neighbours.

The macro conditions however, governed other particular events taking place at the city scale, such as the position and location of major buildings of public affairs. These conditions also specified some physical and functional aspects of the street pattern which followed a strict hierarchy found so important in controlling people's behaviour as well as their mobility throughout the city.

In the Casbah, as in most traditional Islamic cities, the spatial hierarchy was predominant and corresponded to the social pattern. Indeed it has created a balance between the social homogeneity of the socio-cultural system. Being so important, this hierarchy developed a clear distinguishable terminology and its respective urban design principles helped to create a real defensible space.

To sum up briefly, the traditional urban form of the Casbah was designed and built with reference to basic principles of human scale. It has helped to satisfy Islamic requirement for family and social life. It has also helped to strengthen social relations. In other words, the city emphasis was on social behaviour rather on prescriptive physical regulations.

References

1. Lunch, k. — A theory of good city form. M.I.T. press. Combridge, Massachusetts. 1981. pp.381-384

2. Cresti, F. — Notes sur l'histoire urbaine d'Alger dans la periode coloniale. Alger. E.P.A.U. 1980.

3. Lesbet, D. — La Casbah d'Alger. Gestion urbaine et vide sociale. Alger. O.P.U. 1985.

4. Aiche, B. — The restructuring of the "quartier de la Marine". An urban opportunity. Thesis. Glasgow School of Architecture. 1986. p.9

5. Lesbet, D. — op, cit.

6. Aiche, B. — op, cit. p.11

7. Lebbal, N. — Housing in the old city. Article in CARDO magazin Housing in Egypt. University of New Castle upon Tyne. 1986.

8. Newman, O. — Defensible space. "People and design in the violent city" Architecture press London. 1971.

9. Balbes, L.T. Cervera, L. Checa, p. Bigador, p. — Resumen historico del urbanismo en Espagna. Madrid. 1954. p. 28

10. Raymond, A. — Grande ville Arabe a l'epoque Ottoman. 1983. p.63

11. Benhamouche, M. — The role of the courtyard in contemporary housing. "The case of Algeries". Thesis. University of New Castle upon Tyne. 1986.

12. Hakim, B.S. — Arabic-Islamic cities. "Building and planning principles" K.P.I. Limited. London,1986.

13. Benhamouche, M. — op, cit. pp.66-71

14. Lebbal, N. — op, cit. pp.29-30

15. Devoulx, A. — Note historiques sur les mosques et autre ediffices religieux d'Alger. Revue Africaine. 1962. pp. 372

16. Marcais, w. — L'islam et la vie urbaine. Comptes-rendus de l'Academie des Inspections et Belles-Lettres. Paris.1928. pp.65-66

17. Benhamouche, M. — op, cit. p.80

18. Hakim, B.S. — op, cit. p.81

19. Hillenbrand, R.H. Observation on the use in medieval Islamic building. Paper from the symposium on Islamic architecture and urbanism. King Faisal University. 1980.

20. Devoulx, A. op, cit.

21. Raymand, A. op, cit. p.239

22. Delaval, B. Urban communities of the Algerian Shara' Ekistics. 277, October 1974. pp. 252-258

23. Akbar, J.A. Support for courtyard houses. Riadh, Saudia Arabia. Open house. vol.5, No.4, 1980.

24. Petherbridge, G.T. Vernacular architecture: The house and the society in the architecture of the Islamic word. Thames & Hudson Ltd, London. 1978. pp.195-197

25. Delaval, B. op, cit. p.256

26. Montequin, G.-A. The essence of urban existence in the world of Islam. Paper from the symposiun on Islamic architecture and urbanism. King Faisal University. 1980.

27. Benhamouche, M. op, cit. p.66

28. Hakim, B.S. op, cit. p.146

29. Ibid. p.20

30. Benhamouche, M. op, cit. p.88

31. Al-hathloul, S.A. Tradition,continuityand change in the physical environment. The Arab-Muslim City. Thesis, Combridge Massachusetts.1981.

32. Hakim, B.S. op, cit. pp.33-36

33. Al-hathloul, S.A. op, cit. p.53

34. Ibid. p.97

Chapter 2: CONTEMPORARY URBAN FORM AND ITS ENVIRONMENT

1. Introduction

2. Historical background

- 2.1. French colonial establishment
  - 2.1.1. The Military Urbanism
    - 2.1.1.1. The Superstructure
    - 2.1.1.2. The "Ilot": the urban unit
  - 2.1.2. The Bureaucratic Urbanism
    - 2.1.2.1. The zoning concept
    - 2.1.2.2. The slab
  - 2.1.3. The Modern Movement
    - 2.1.3.1. Le Corbusier
    - 2.1.3.2. Le Corbusier successors
- 2.2. Trend since independence
  - 2.2.1. The Western contribution
  - 2.2.2. The Algerian contribution

3. Physical structure

- 3.1. Spatial organisation
- 3.2. Physical pattern
- 3.3. Street pattern
  - 3.3.1. Vehicular roads
    - 3.3.1.1. The main roads
    - 3.3.1.2. The minor roads
    - 3.3.1.3. The access roads
  - 3.3.2. Pedestrian streets
    - 3.3.2.1. The pavements
    - 3.3.2.2. The foot-paths
  - 3.3.3. Street pattern characteristics
- 3.4. Public open spaces
  - 3.4.1. Defined spaces
  - 3.4.2. Undefined spaces
- 3.5. Land-use and density
- 3.6. Grouping of flats: the slab
- 3.7. Public buildings

4. Social stucture

- 4.1. The new community
- 4.2. Impact on the urban form

5. Physical development process

- 5.1. Rationalisation of spaces
- 5.2. Planning regulations
- 5.3. Technical regulations

6. Conclusion

1. Introduction

Having concluded the socio-cultural historic needs that seems to be lacking in the contemporary city, it is now necessary to consider recent history of housing and the city to establish its effect on the present.

Contemporary urban environment in Algeria and particularly in the north is mainly a result of both, the colonisation and the western modernist vision of the built environment. The characteristics of all contemporary urban settlements are markedly influenced by a functional and formal approach to urban form who's process of physical formation is based on the rationalisation of space dictated by new planning regulations never experienced before.

The resulting contemporary urban form the took shape of a random collection of formal solids and voids (often unrelated), with an extrovert looking architecture, where attention is no more given to the socio-cultural matters but rather to height, light, air, sun and to the vehicular movement. The aim of this new conception which is based on quantitative ideals was to upgrade the living conditions and to provide an efficient urban environment.

In Algeria contemporary urban form began long ago, it was born in 1830 when the French invaded the country. Since their establishment the urban environment has undergone several options of town planning. First, it has experienced the military planning options for some years and was remarkably influenced by the *"Haussmannian"* urbanism of the mid-nineteenth century. By 1924 , it was followed by the *"Bureaucratic"* urbanism in which the zoning system appeared as a solution for rational urbanised areas.

By 1933, with the appearance of modern architecture, the urban environment became soon under the influence of the *"Ville Radieuse"* fashion of Le Corbusier. Even though his plans for Algiers were never carried out, other architects with similar vision performed smaller schemes.

Since, the urban environment and particularly Algiers became an interesting field of experiences, where new ideas were tested. Schemes like *"Soccard's Plan"* (1945-1950) for the Marine quarter of the lower part of the Casbah, and latter, *"Pouillon's"* contribution of *"Diar-El-Mahcoul"* and *"Climat De France"* projects (1954-1958) where the first major experiences in which the dogmatism of Le Corbusier's lessons was faithfully followed.

By 1962, the urban environment came under the control of national authorities. But, due to the very small number of Algerian architects listed at that time, the urban environment was still depending on foreign expertise. This latter contribution of the west (France), being based mainly on quantitative figures, new standards, and on foreign technology, produced an environment of massive urban areas of uniform residential buildings.

Today, it is almost three decades since independence, however, the new urban developments which took shape in these years remains very much unchanged. It still relies on prefabrication as a determinant built form of uniform repeated dwelling units based on programmatic standards that are exclusively quantitative, and on the vehicular movement, air, sun and light.

In 1986, a typical master plan on display at the Ministry of Habitat and Urbanism in Algeria was described to me as *"the solution"* for urban housing areas which the decision makers prefer and designate as the comprehensive environment. It is for this reason that I have chosen this model for comparative analysis since it represents the latest trend.

2. Historical background

Since 1830, traditional Algerian urban environment has undergone drastic changes which ignored both the socio-cultural pattern and the climate. As a consequence, these changes have undoubtedly produced a new urban environment unrelated to the past and based on new regulations and principles, both foreign to the Algerian citizen of that time.

This new urban environment was a starting point of contemporary architecture. Unlike its predecessor, it relied on a new structure of functional and formal spaces where the visual perception and movement are the main ruling aspects. This new vision of the built environment was first brought by the French colonisers who first imposed their strategic plans which soon became a fashion of the day as it insured political control of the urban space.

2.1. French Colonial Establishment

2.1.1. The Military Urbanism

As soon as the Casbah of Algiers came under the French reign, the first stage planning policy used was the *"Military Urbanism"*. This latter was thought to enhance control over the local population and aimed to transform the existing structure of the Casbah, which was described by the French colonisers as an *"indigenous chaotic city"*.

The first intervensions of the *"Military Urbanism"* on the Casbah were of *Haussmannian* model, experienced in Paris during the period of *Napoleon III*.[1] Large surgical cuts through the traditional fabric were then created for military purposes, as these intervensions facilitated the movement of the army and their heavy mobile equipment. The two main axes of *"Bab El-Oued"* street and *"Bab Azoun"* street, both 20 metres wide and the *"Governmental Square"* were a consequence of such planning regulations of the 19th century, which ignored totally the pre-established urban structure.**(Fig.1,2,3,4).**

Despite vast open land all around the Casbah, the French army decided on the alternative of the lower part of the Casbah itself, as this latter offered strategical establishment for their first bases. Such intervension has surely added disruption to the pre-existing connection between the old town and its port. This tyrannical attitude toward the pre-existing urban environment was aimed at over-turning the established structural order of the Casbah.

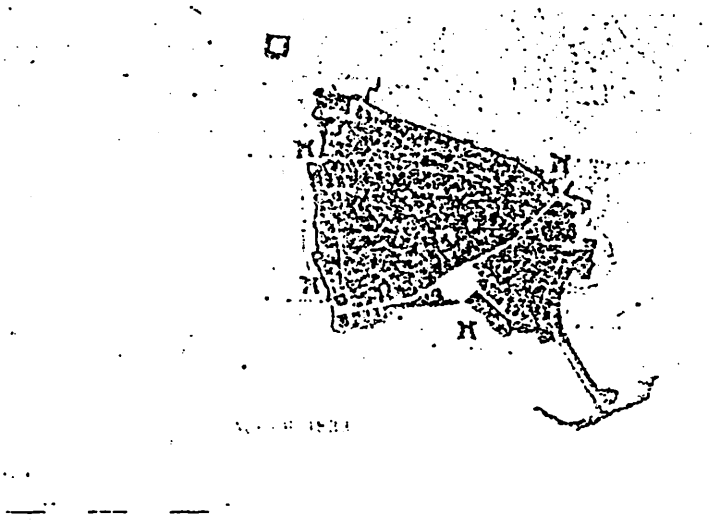


Fig.1. Military Urbanism.
Algiers. 1833.

Fig.2. Colonial development.
Algiers. 1946.

Fig.3. View of a straight cut: Bab-Azzoun street. Algiers. 1986.

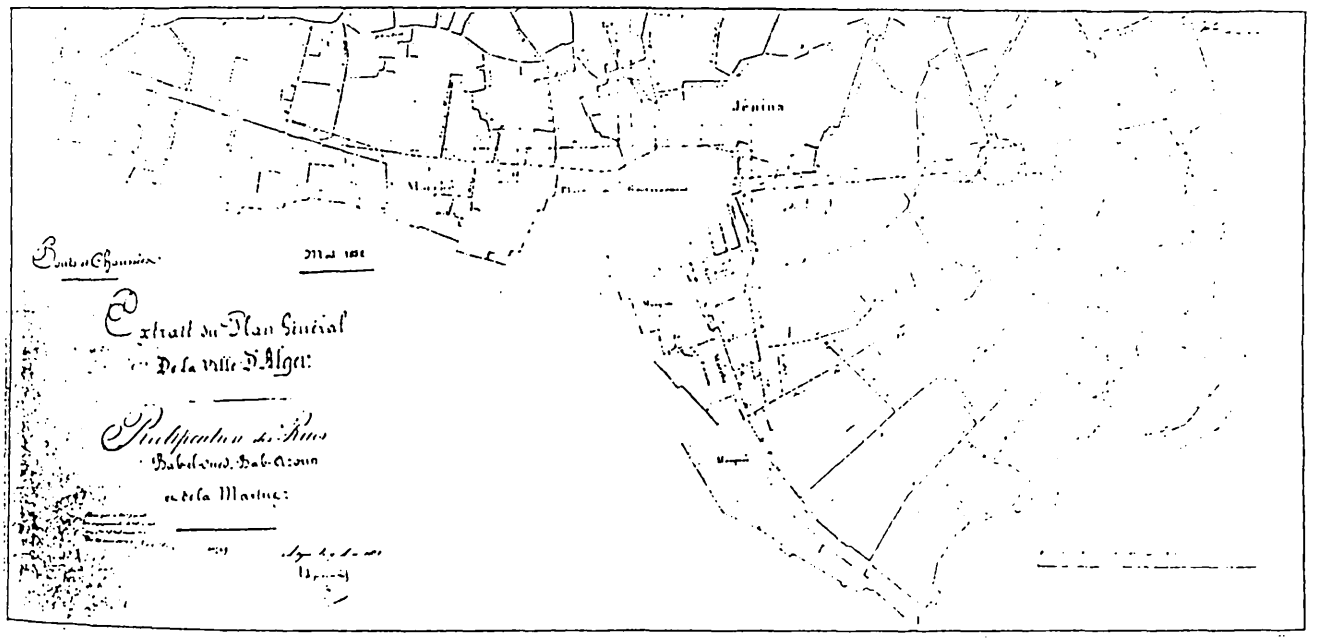


Fig.4. Plan showing the straight cuts through the traditional fabric of the Casbah.

In fact, in this period, the French wanted to give a new image to Algiers based on European experiences. As a result, in their next step of development, they extended the previous cuts through the Casbah into wide boulevards along the coast. Along these latter, the colonial town took place and was built over a century in many distinct portions consistently with the different architectural styles that occurred during this time.**(Fig.5).**

The first portions built during this period, were of *Haussmannian* style which was favoured by the *Military Urbanism.* However two elements of town planning can be identified in these intervensions, these are the *"Superstructure"* and the *"Ilot"*. Both elements were used in *Haussmann's* model, and both respectively attributed to the town level and the district level.

2.1.1.1. The Superstructure

The Superstructure consisted of functional and formal link between a network of main arterial streets and major urban spaces and physical monumental elements such as public buildings, public square, railway station and other important public institutions.

These arterial streets had a double character: they were conceived as places to live and shop according to new standards of French upper middle class influence, as a kind of stage for elegant living, promenading and socialising in outdoor cafes and restaurants, and also as connecting corridors between key points of the city.[2] As links the streets had two directions, thus providing rapid access and easy flow. When these arteries met, the intersections would become major nodes of traffic and urban activity.

Such a superstructure was thought to act, at a town level, against the unhealtheness and decline of old towns. It was therefore aimed to bring a modern image to the city *(l'espace et la lumiere)*[3] where the vehicular movement, efficiency of space required and beauty had more significance.

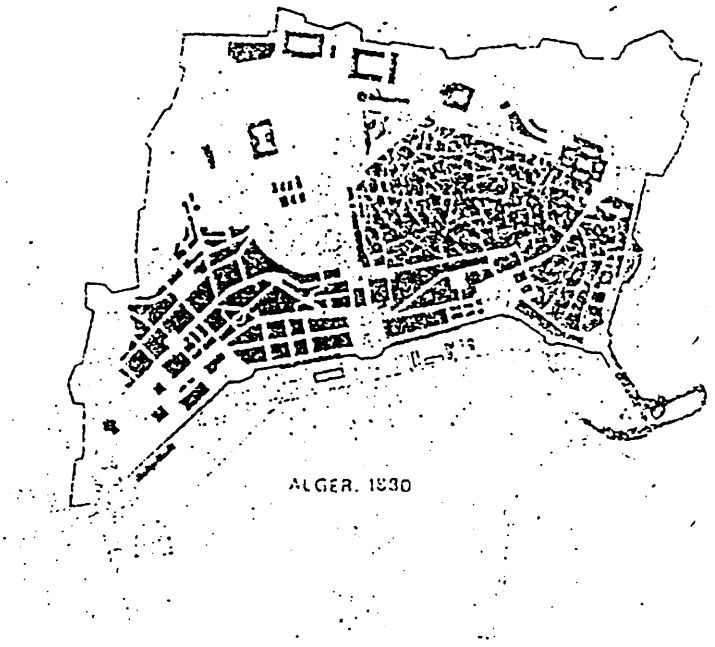


Fig.5. Eastern expansion of the colonial development. Algiers. 1880.

To fulfil a good functioning of this superstructure, the arterial cuts were conceived of as grand, straight, wide avenues, with long perspectives leading to important visual and physical events such as public squares or public movements. At their main junctions, large open spaces were conceived in order to reveal the formal organisation of the urban superstructure, as well as to ensure a total linkage between different parts of the city.

In Algiers, the superstructure took place along the coast on the eastern side of the Casbah where the site is flat. However the early cuts made through the old town itself were in relation with this new development. These arteries were treated with the *Haussmannian* design regulations, such as the uniformity and straighteness of the building facades that bordered the streets, and the large openings with balconies that characterised those facades.

This superstructure was composed of various urban portions of regular grid layouts, alternated by several public elements, being an open space, a building or a monument.**(Fig.6).** Each urban portion was formed of two rows of regular blocks *(ilots),* generally spreading over an area of 300 to 400 metres long, which makes a crossing journey from one end to the other remaining under 5 minutes walk.

2.1.1.2. The "Ilot": The urban unit

The *"Ilot"* is a French appellation for an urban block which is usually bordered on its four sides by streets. According to *Haussmann's* model, this represented the urban unit for each portion, and obeyed certain formal rules in order to enhance the function and the visual aspect of each portion.

In Algiers, the *"Ilot"* resulted essentially from the regular grid layout which the military option favoured as this was thought to bring control and flow of movement within the city, as well as to promote speculation due to the new system of land subdivision.

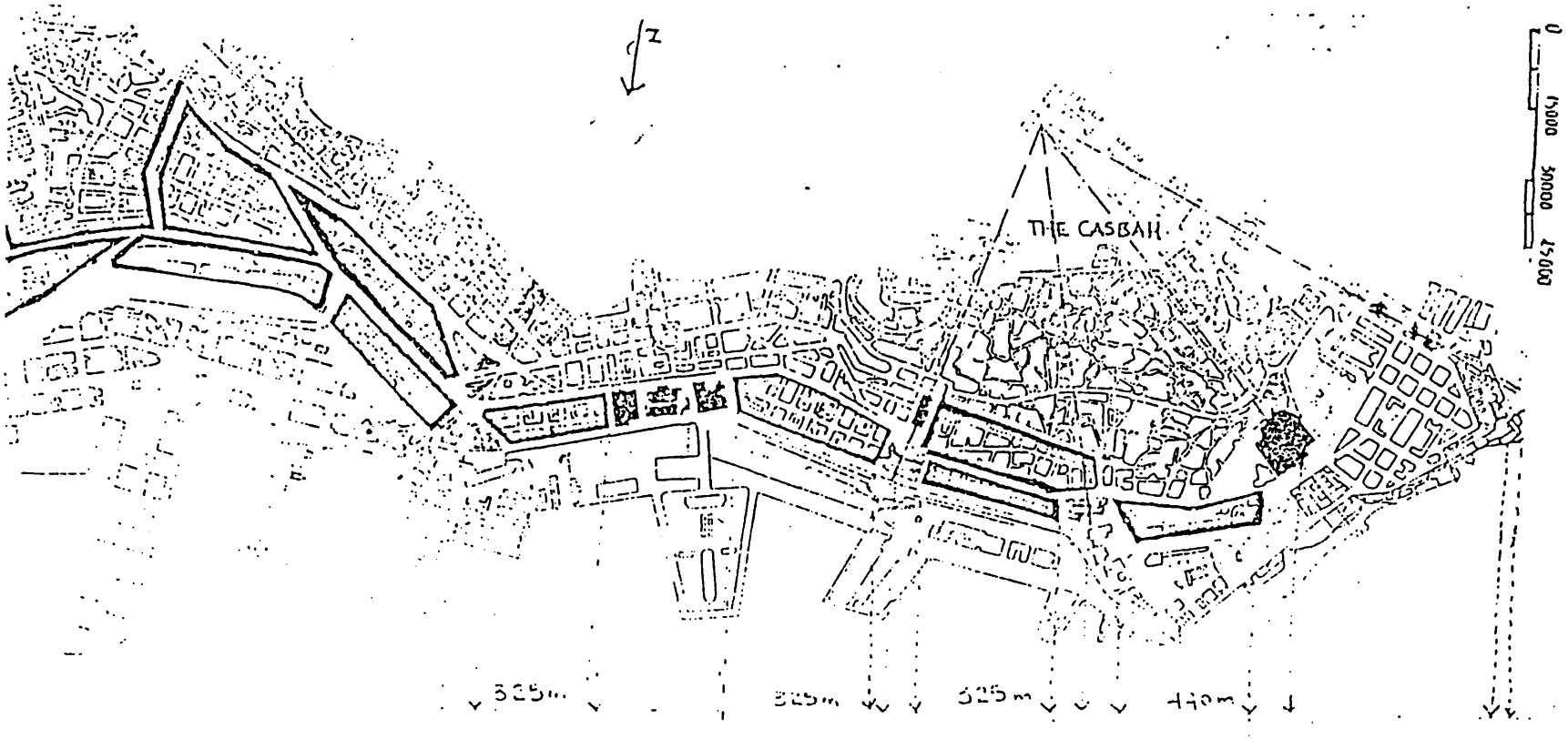


Fig.6. The Superstucture of the colonial development.
(Haussmanian urban planning). Algiers.

Each *"Ilot"* was subdivided into several, similar plots lined along the streets. All the plots, composing the block, had a regular, defined geometrical shapes deriving from the *Haussmannian* regulations. These regulations consisted of the common separating line between the plots being perpendicular to the periphery of the block. As a result each plot within the block had right angles on the street front.

However, in side the *"Ilot"*, a dividing line between the two rows of plots was drawn. When the *"Ilot"* was a regular rectangle, this line was situated in the middle of it, but when it took on an irregular shape, the separating line became a bisector.**(Fig.7,8).**[4] Due to these two regulations concerning land subdivision within the block, all plots had to be within a predetermined range of sizes and forms in order to avoid or limit the geometrical anonymity that might result from the application of the two previous rules.**(Fig.9).**

As a result of this land subdivision, which systematically lined up the plots into a straight line adjacent to the street, a new type of urbanism evolved and became known as *"Urbanisme D'Alignement"* of the 19th century. This latter characterised all the urban fabric of the French colonial Algiers, and is still even today a dominant aspect of central Algiers.

In terms of Architecture, each block or *"Ilot"* has developed as a homogeneous building form known as the *"Immeuble de Ville"* or the tenement building, which represents today 18.5% of the housing stock of central Algiers.[5]

Each building contained residential as well as other public activities and was organised around a courtyard as this was the only open space at the rear of the building. In general the buildings were of 3 to 5 stories high with the ground level and the first floor usually devoted to shops, boutiques, services and other public amenities, whereas the remaining upper floor were only used for housing.

This vertical spatial organisation was ensured by a staircase, usually located in the centre of the building. In some cases the staircases came with a lift and were highly decorated. Generally,

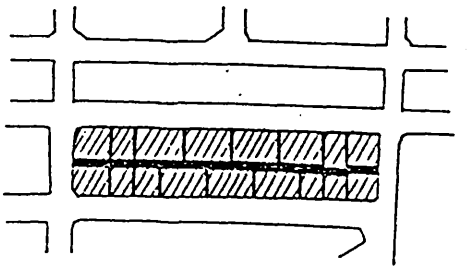


Fig.7. Plot division in a rectangular "ilot".
Heavy line indicates the middle line.

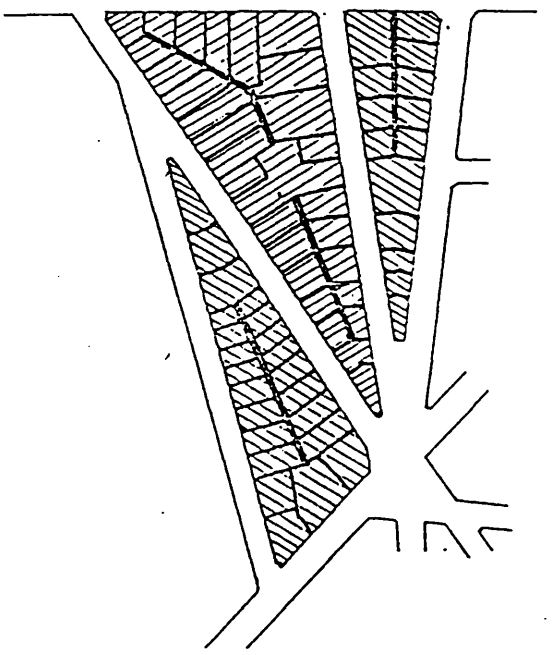


Fig.8. Plot division in a triangular "ilot".
Heavy line indicates the bisector.

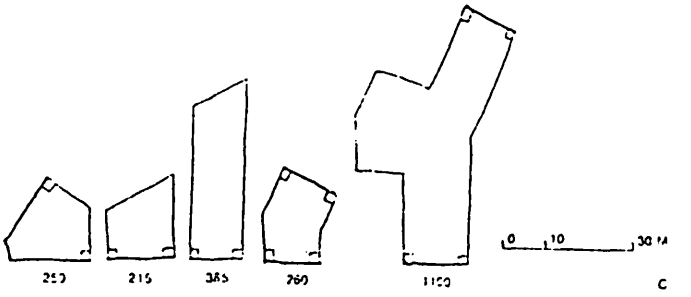


Fig.9. Form and size of the plots.
Heavy line indicates the street side
c: area (m^2)

both staircases and lifts were adjacent to the inner courtyard of the building in order to gain daylight and to provide easy distribution.

Due to the *"side by side"* linear assembling of the buildings, the tenements had only two facades; one being opened to the main urban spaces of the street, creating continuity and dynamism on the frontage of the *"Ilot"*, the other being at the neighbouring buildings.

The outer main facade of the buildings was designed as part of the public scenery, therefore, it obeyed strict geometrical order which ensured its aesthetic value. In fact, it was divided into three parts: The ground level which was usually shops and offices, was designed with large openings and highly decorated entrances, the upper levels were apartments and had a determinant horizontal direction due to the succession of the balconies, and finally the top of the building,which in most cases contained an accessible open terrace, has a specific treatment as to emphasis the roof of the building.**(Fig.10,11).**

It is worth noting that, most of the decorations used in these buildings are of *"floral style"* which gave a *"cachet"* to this early colonial period. The *"floral style"* was of tremendous artistic work and was particularly shown and exhibited at the main entrance as well as at the corner of the buildings, which makes it's form even more elaborate.**(Fig.12,13).**

The size of the tenement building depended on the size of the apartments within it and the number of apartments on each floor. Basically, the kitchens and bathrooms were arranged to the backyard. Whereas, the principal rooms were located on the main facade to benefit from the daylight and the view of the street.

This spatial organisation of the apartment has surely enabled the *"side by side"* juxtaposition of the tenement buildings which composed the *"Ilot"* to take form. As a consequence of this early colonial urban form, ground coverage in terms of land-use was different from that the one found in the previous existing urban form of the Casbah. In fact, by using a planimeter, a rough

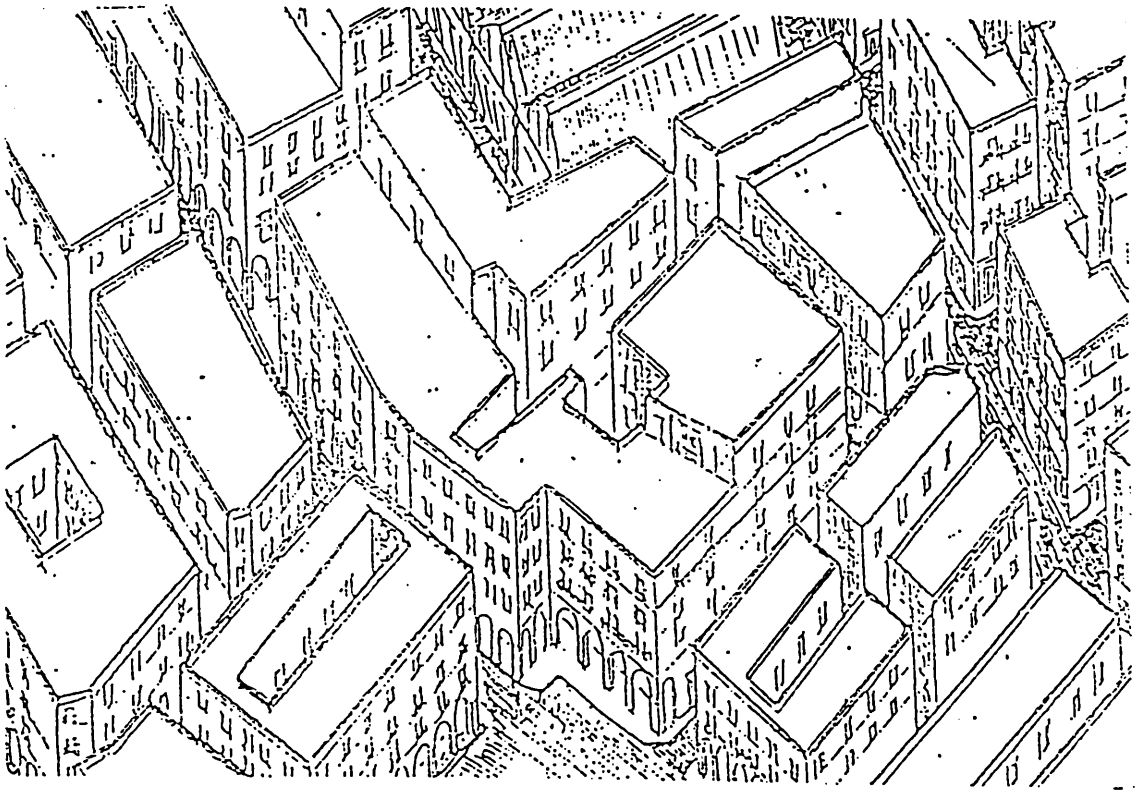


Fig.10. Axonometric view of the colonial tenement buildings.

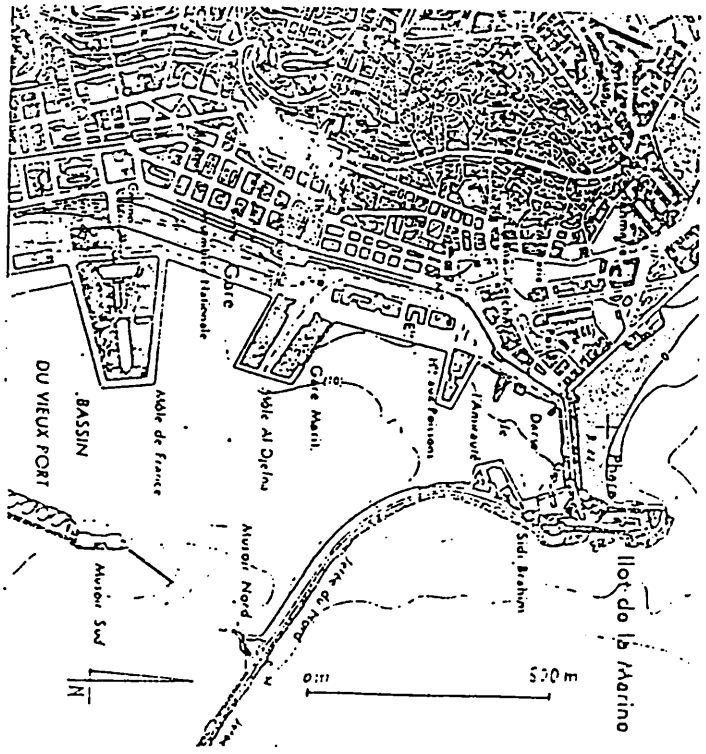


Fig.11. Location plan.

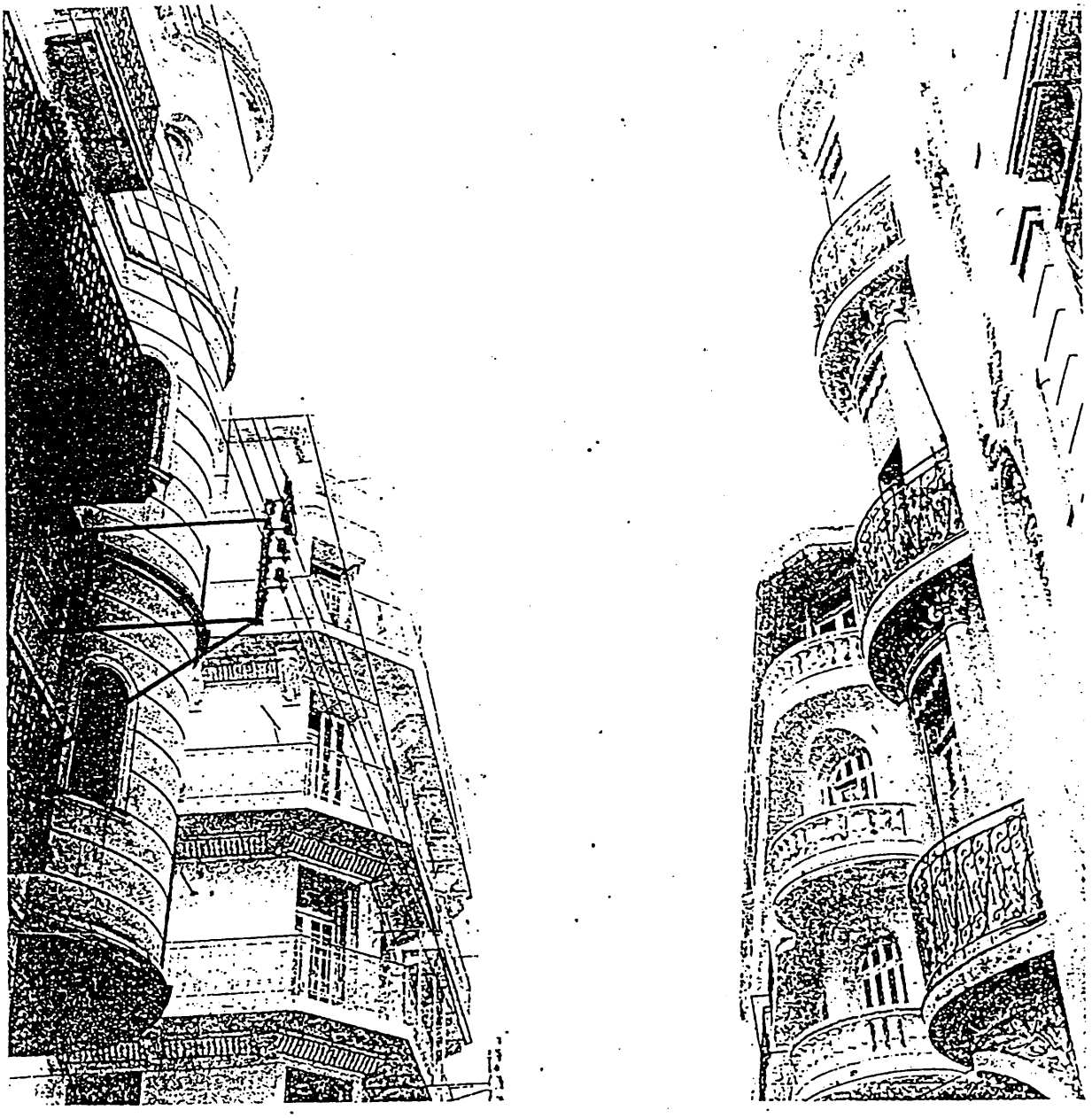


Fig.12. Decorated corners of the colonial tenement buildings.

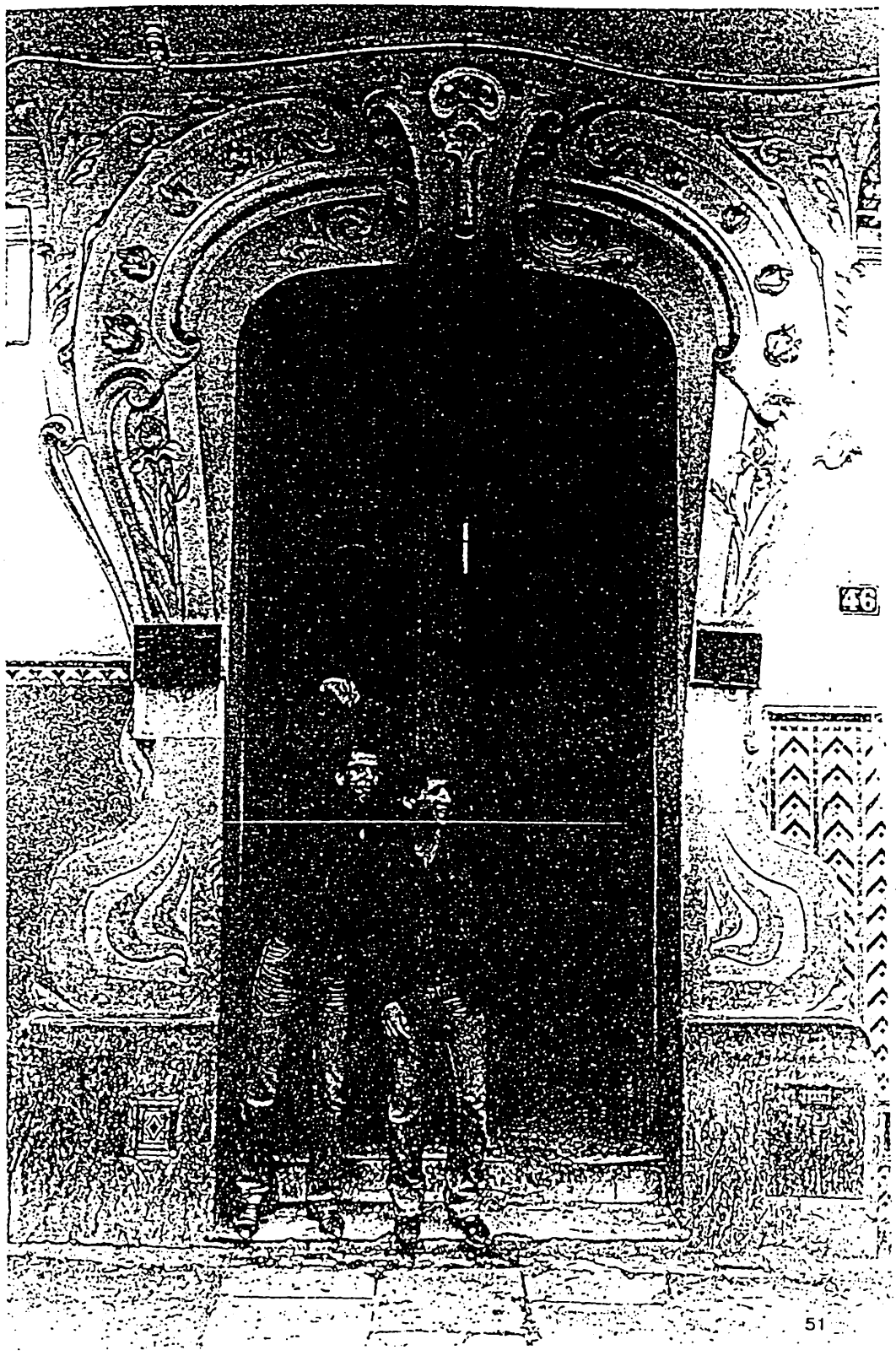


Fig.13. Decorated main entrance of a colonial tenenemt building. (Floral style).

measurement of this early development which includes the *"Governmental Square"* showed these following ratios: **(Fig.14,15).**

Built up area	33%
Private open space	0%
Semi-private open space	1%
Public open space	66%

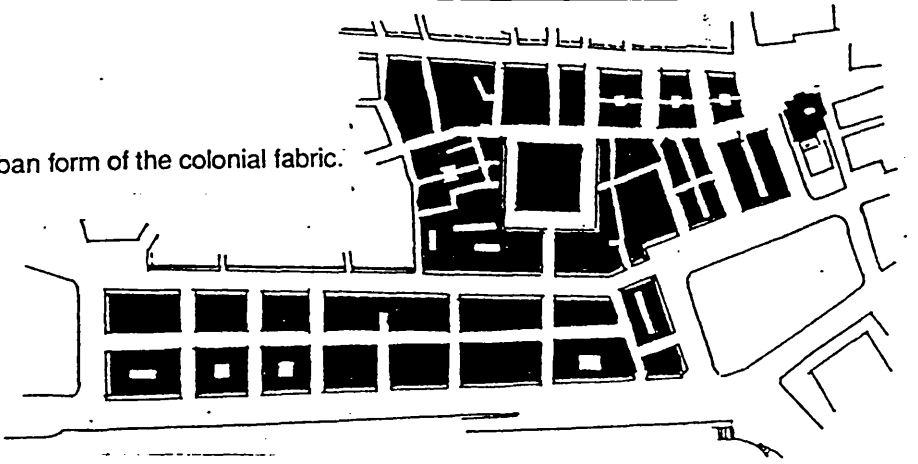
These ratios of land-use are congruous with the urban form they represent in fact, they reveal the apparent dominance of the open space which is double the built up area. This latter being mainly public, contained the street network and the square. However, despite the 1% of space needed for the functioning of the buildings, it is not private open space, but rather a semi-private one shared by all the inhabitants of the buildings surrounding the *"Ilot"*. Private open space in these developments was of no more concern, but instead, streets became grand avenues and wide boulevards.

To sum up, the *"Military Urbanism"* in Algeria and particularly in Algiers has given birth to new urban elements never experienced before: The *"Ilot"* as a structural urban regulator and the *"Immeuble de Ville"* as an extrovert building form. Both elements have considerably changed the structure of the city because it became subject to formal physical rules and monumentality based mainly on the organisation and the concept of the open public space.

2.1.2. The "Bureaucratic Urbanism"

It is during the year 1924 -1925 that the *"Bureaucratic Urbanism"* was born. It is also the year where the *Military Urbanism* became *Bureaucratic* this planning option is still even today governing most urban agglomerations. Accordingly, it became by law an obligation for every town with more that 10,000 inhabitants to produce a plan of urbanisation namely:*"Plan d'Urbanisme"*.[6]

Fig.14. Urban form of the colonial fabric.



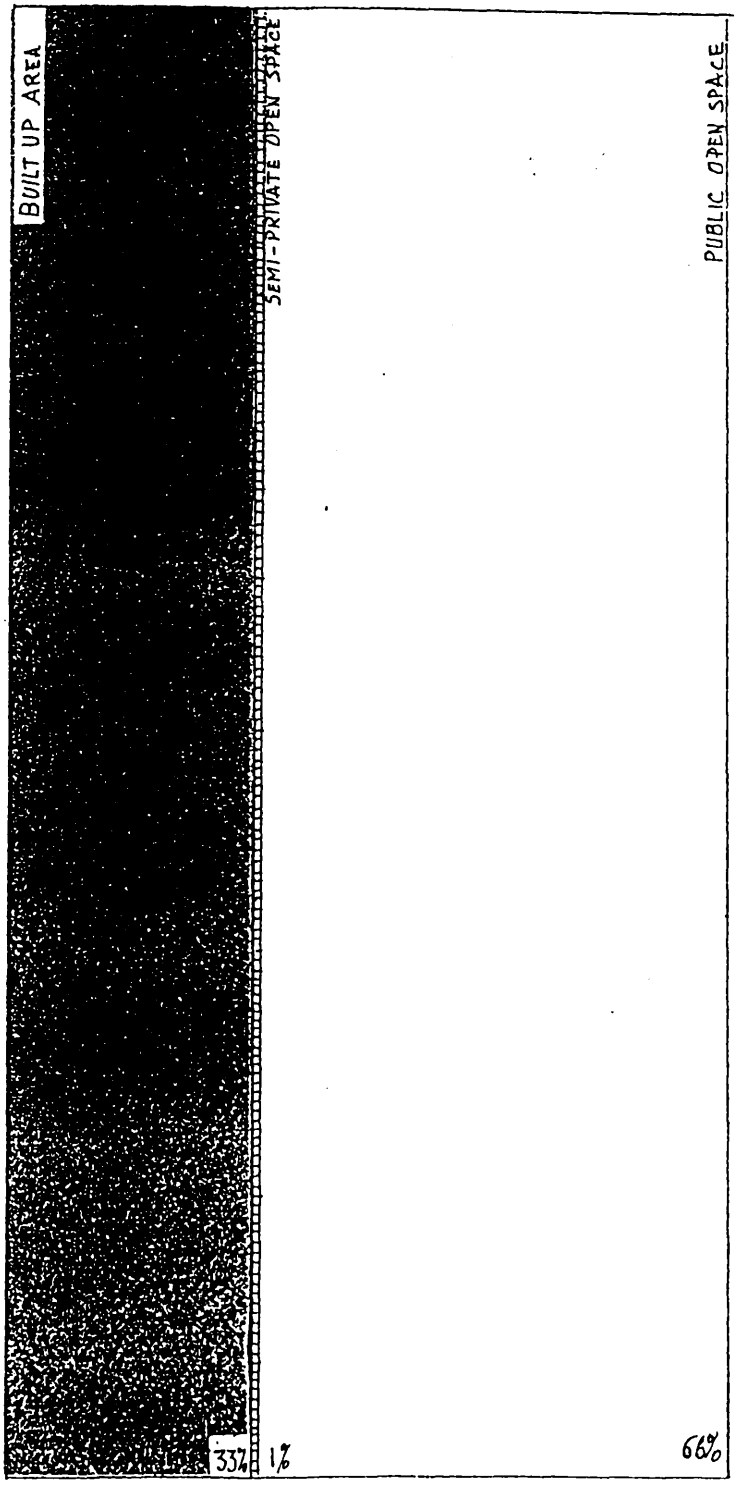


Fig.15 Diagram of land use coverage of the colonial urban fabric.

1930 was the triumphant centenary of French Colonisation. It was during this year that the first plans of urbanisation were produced by the town council. These plans being based on a totally new conception, came to mark a transition between the *"Urbanisme D'alignement"* of the 19th century and the zoning urbanism of the 20th century.[7]

Since that period, the zoning system became a common tool of planning to rationalise and control the future expansions of cities. However these plans were never aimed to upgrade the Algerian living conditions, but instead, they were aimed to respond to the new European standards which were based on European living habits.

During this period then, Algiers as well as other big cities were used as a field for experiments, in which new building process and unprecedented theoretical ideas of town planning were tested. However, the most common approach the French favoured in terms of town planning was the zoning system and the building process which followed took the shape of a new building form: the slab.

2.1.2.1. The Zoning Concept

The French planners used extensively the zoning system in order to determine future organisation of the urban space which characterises cities. This new planning system carried over the concept of sub-division. However, three aspects of sub-division can be defined. In current terminology, these are economic sub-division (use-zones), social sub-division (suburbs, neighbourhoods etc...), and spatial sub-division (street-blocks etc...).[8]

For the city of Algiers, this new planning option, being based on the zoning concept, organised the urban space into a number of various types of zone. Each urban zone was defined according to its distinct use, be it housing, administration, leisure and greenery or industry.

However, in order to ensure a good functioning and link between these different activity-zones, a complex circulation network of streets and roads was thought necessary to guarantee a complete route system.

By 1948, the consequences of this new approach to town planning were taking place. In fact, the *"Plan d'urbanisme"* for Algiers of that year, designated new sites around Algiers for future developments of housing. It was the first time that major residential zones were to be built on the outskirts of Algiers. Residential areas such as *"Les Annasers"* and *"Kouba"* were amongst the first zones to be implemented and aimed to alleviate the over crowding conditions of the pre-existing urban agglomeration.

Such residential zones were designed according to new housing criteria and standards based on the functional and visual hygiene of the spaces. However, these criteria which in fact came with the modernist vision already evolving at that time, consisted of sun, greenery, views and horizon[9], which led to the free standing building option: the slab.

2.1.2.2. The slab

The slab is a free standing building of several piled apartments which developed during the early years of the modern movement. This building, conceived as a detached block unit, was regarded and used by French modernist architects as the key element for the organisation of housing layouts in the new residential areas, taking place in the outskirts of Algiers. For the French population, as well as for their authorities, this building form has proved highly efficient in terms of land-use, density, building process and economy; besides all these, it offered adaptability to the hill sites of Algiers.[10]**(Fig.16,17,18)**

As a consequence of this option, most developments which were implemented during the mid 20th century were no more than a mass housing production. This latter was composed of random block units obeying to a two dimensional geometric order only. This disposition of buildings was meant and did allow more light, air and sun into the apartment within the block, as

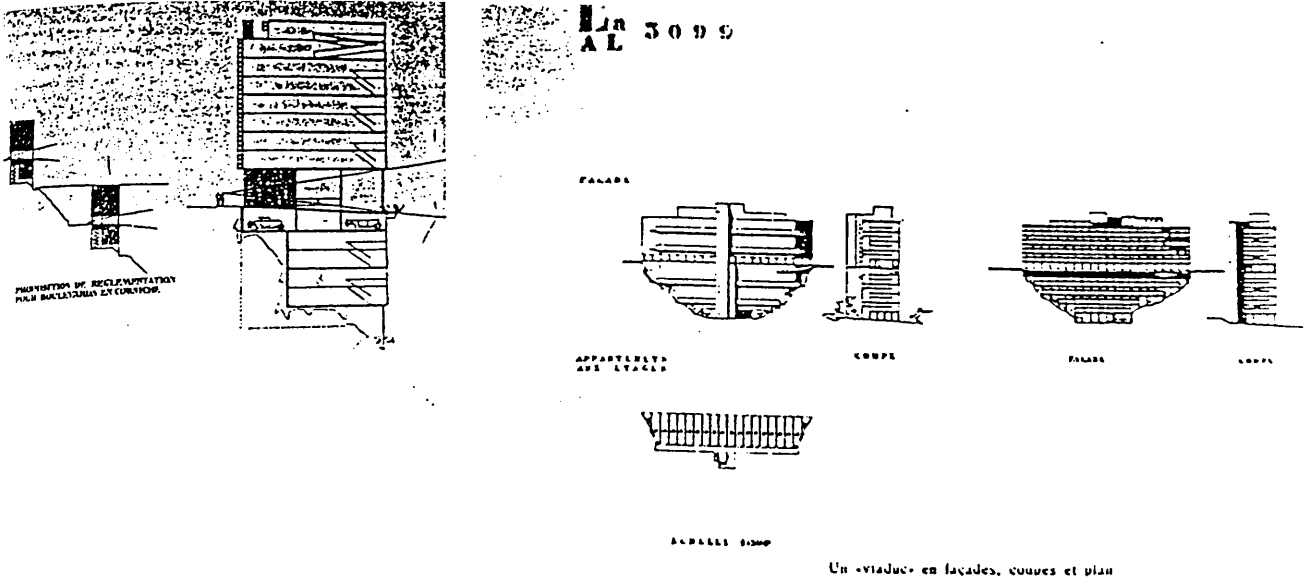


Fig.16. Aspects of the slab adaptability to the hilly site of Algiers.

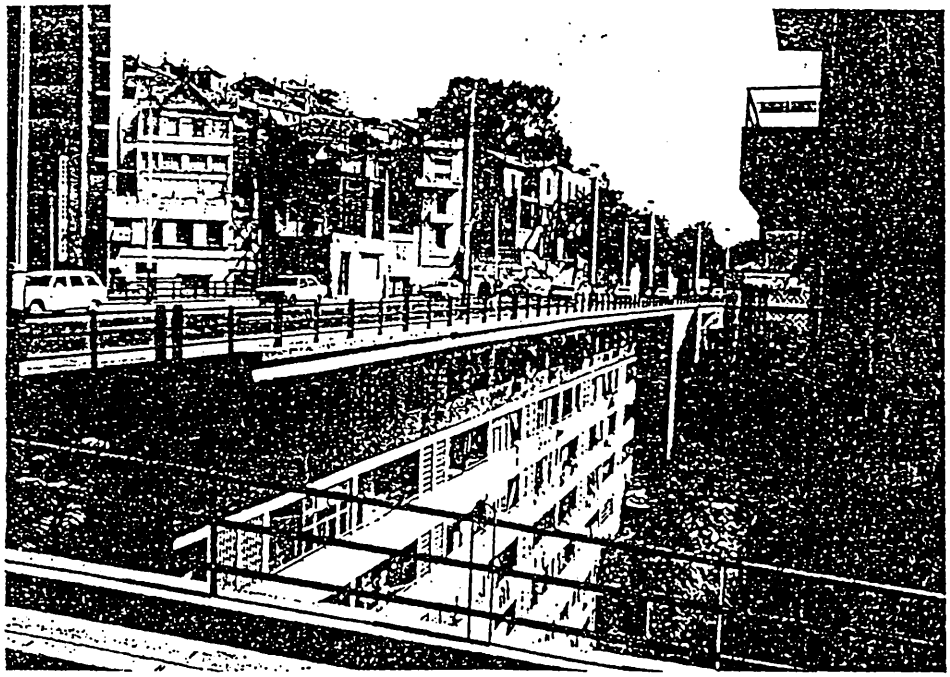


Fig.17. A bridge building as an adaptability solution to the hilly site of Algiers.

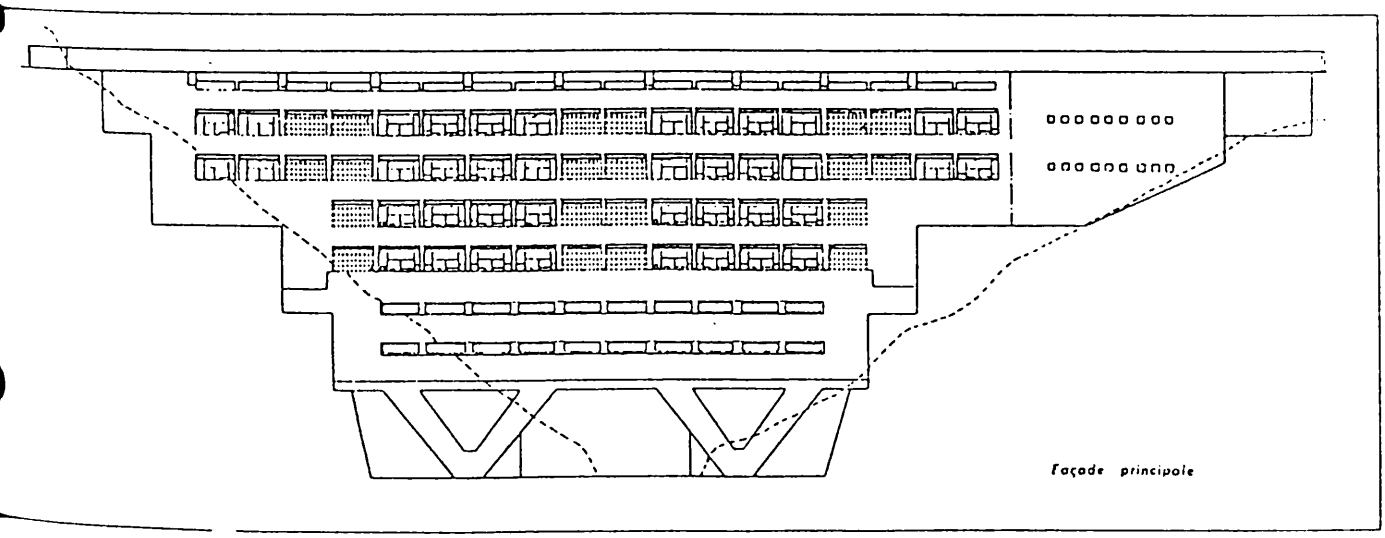


Fig.18. Elevation of the bridge building.

well as to provide a parking area and a green space for the inhabitants. However, due to the wide spacing between the block units, a dominance of the open space was unavoidable.

Generally, the slab was composed of 5 to 10 stories and the spatial organisation of each story consisted of 2 to 6 extrovert apartments. These latter were linked to the ground by staircases but a presence of lifts in some buildings was thought necessary especially where the number of stories exceeded 5; both lift and staircase constituted the main vertical access area within the block unit.

However, the internal arrangement of the apartment consisted of two distinct areas, one being a living-room, kitchen and services was designed for daily activity, the other being only bedrooms which were located far away from the entrance and the daily area.

Being designed for French European standards, the size of the apartments had to be according to their lifestyle and to the family-size that was aimed to be accommodated. Consequently, the most frequent sizes ranged between 2 to 5 rooms, depending also on the size of the block unit itself.

Due to the extroversion of the building, each apartment was provided with large openings and accessible balconies which opened directly to the outside allowing its French users to contemplate and perceive the outside views.

It is worth mentioning that all the slab units which were built during the 1950's were of concrete structure and their resulting external image was no more than massive cubicle boxes pierced with identical holes which reflected the consequences of the modern movement taking place in Algeria.

2.1.3. The Modern Movement

The period of 1930 to 1939 was distinguished by two new major phenomena. First, it was the appearance of the Modern Architectural movement. Even though, *Le Corbusiers* proposals were only drawn on paper, architects like *"Emery* and *Lathuilliere"* carried out their plans of residential concrete boxes. Second, it was the era where social housing began in Algeria.[11]

2.1.3.1. Le Corbusier

The Modern Movement hit the Algerian environment during the early thirties when the *C.I.A.M.* threw *Le Corbusier* like a bomb on Algiers. During his visit to Algiers he developed a special relationship with the city and was consulted on several matters of town planning .

During the same year, when he was consulted over the reconstruction of the Marine neighbourhood of Algiers, *Le Corbusier* proposed a new town plannning scheme. In his proposal, "the entire area is cleared to be replaced by a skyscraper in the completely razed*"Quartier de la marine"*, containing a business district skirting the historical Casbah on the west".[12]**(Fig.19.a,b).**

The *Marine* neighbourhood scheme was not the only design tentative proposed by *Le Corbusier.* In fact, during his short staying in Algiers when consulted over the future urbanisation of the city, he recommended a linear development for the extension of Algiers. It was the *"Obus plan"*.**(Fig.20.a,b).**

Both schemes of *Le Corbusier* had the most provocative aspect of a very contemporary idea. As a result of this, his influence was considerable on the building form as well as on the urban form due to the new approach to the building and planning process.

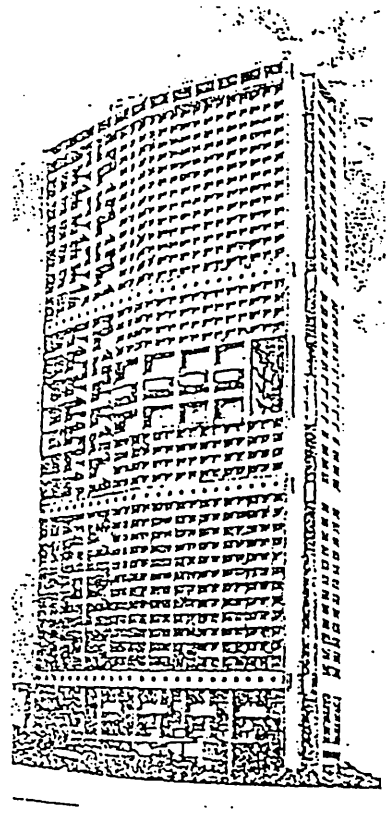


Fig.19.a. Le Corbusier's proposal;
The skyscraper. Algiers.(1938-42).

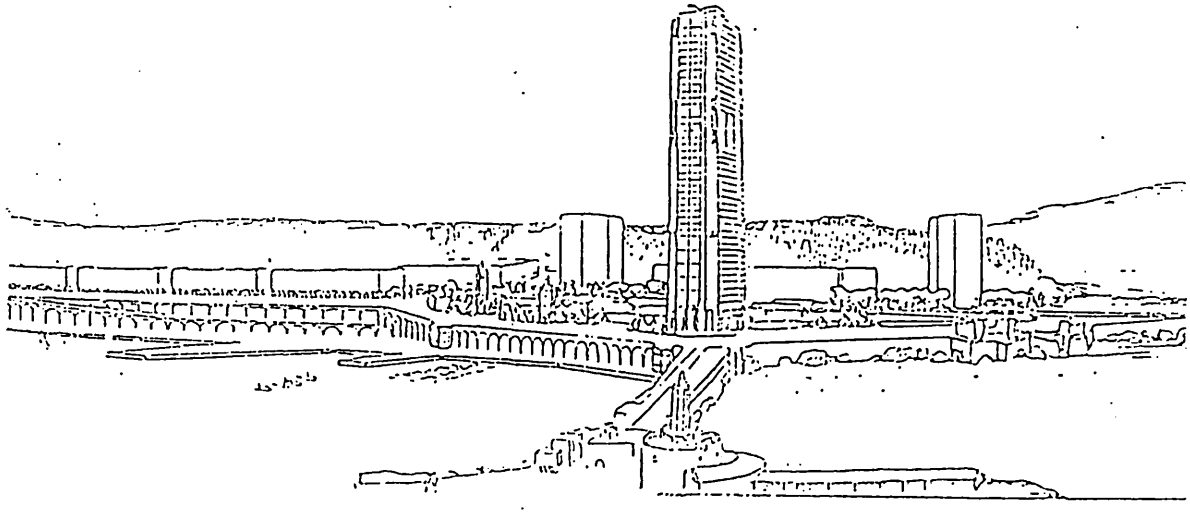


Fig.19.b. Le Corbusier's proposal;
for the "Marine quarter". Algiers.(1938-42).

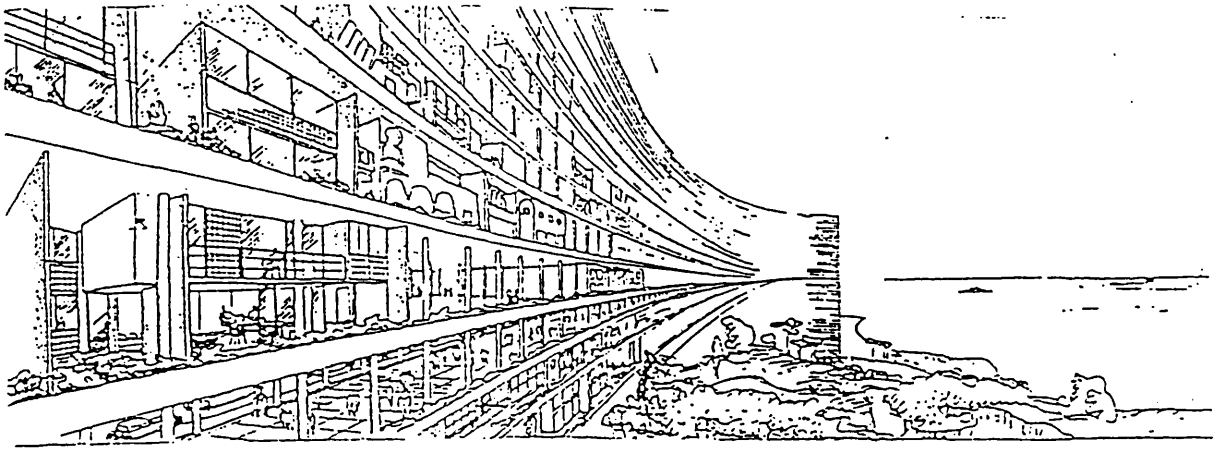


Fig.20.a. Perspective of the dwellings in the viaduct
The "Obus plan". Le Corbusier.

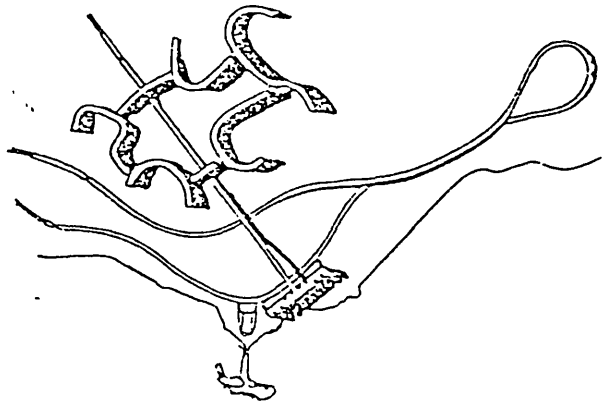


Fig.20.b. The "Obus plan" for Algiers.
Le Corbusier. 1931.

Even though, such schemes were never realised which was fortunate in the Algiers context, this did not exclude the following generations of French architects from using them as a source of inspiration.

2.1.3.2. Le Corbusier's Successors

In Algiers, if *Le Corbusier* did not realise his projects, other architects influenced by his new vision of the contemporary urban environment did. Nevertheless, their schemes were at least at a smaller scale and less imposing.

However, most projects implemented after *Le Corbusier's* visit to Algeria took the form of free standing buildings. Schemes designed by *"Soccard"* for the *"Marine Quarter"* and by *"P. Bourlier, L. Miquel,* and *J. Ferrer-labe"* - who composed the *"Aero-habitat group"* for the *"Cite Henry - Sellier* and *Telimeli"* illustrate this new type of urbanisation of the *Le Corbusier* era.**(Fig.21).**

The *"Aero-habitat group"* of architects were more faithful in following the dogmatism of *Le Corbusier.* In fact, their buildings consisted of free standing high rise structures which occupied only 22.3%[13] of the site, leaving an important open spaces to be used for greenery which turned out to be inappropriate for the climate.

These multi-story buildings were equipped with large lifts, opened to the public (kind of vertical tramway), lifting to an upper floor where a commercial gallery was opened to the people and giving access to several wings of the building itself.

The apartments within these massive buildings were of various sizes from one room to five rooms with the majority being three and four rooms. Their general layout did not differ very much from the apartments found in the slab block described previously, however duplex maisonettes were present in the largest part of the building.

This was the fashionable way of dealing with social housing during that period. It was mainly aimed to the European lifestyle, and even when an attempt was made to house Algerian families, little effort was made to suit their traditions. As a result, this modern fashion persisted unchanged all though the French occupation and even for quite some time after independence.

2.2. Trend since independence

During the early period of independence, being preoccupied by major political issues, the Algerian government was not able to give attention to the social requirements of the country.

Consequently, housing was not a priority and believed not urgent, especially when a large vacated bulk of inherited housing was thought to be sufficient not only to new comers to urban areas, but also to ease the existing overcrowding conditions.

However, this inherited housing stock turned out to be both insufficient and inadequate for the Algerian population, and the major cities such as Algiers were not even able to absorb the local population.

As a result, housing went into a crisis. **(see part one, chapter 1 and 2).** This crisis was denied for a decade due to both the limited resources of the country as well as the limited number of national architects.

It was only during the year 1974, that the housing problem was recognised and became an important concern for the government, which subsequently gave a reasonable funding for the habitat and its supportive infrastructure.

In the first attempt to solve this problem, the government confronted with the huge deficit in term of housing demand on one hand, and the low potentialities of the local system of production on the other hand, opted for foreign help which was to be provided by the west.

2.2.1. The Western contribution

The Algerian government called for Western help in order to raise the production rate, and therefore to be able to face the massive housing demand. The problem expressed, by the authorities was formulated in terms of quantity, in other words they required a very high housing production, in a short time and with minimum investments.

Inevitably, the expression of the housing problem in such a simplistic quantitative way, led the decision makers to opt for quick mass production. Subsequently, the building program set by the authorities was to rely on Western expertise in terms of building process and technology in order to provide quick mass housing.

Mass housing was then implemented in the Algerian context as a solution of urgency which would solve the existing crisis. The scale and conception of such housing implied that the government had to import industrialised systems already experienced in the West.

Accordingly, to support this big operation, various systems of prefabrication were imported from different countries such as France and Switzerland. These systems were to be adopted by national companies in order to increase their production capacity.

The result was inevitably a creation of new housing areas where prototype buildings were endlessly repeated in order to achieve a maximum number of dwellings. These areas were designed according to regulations based essentially on a new planning instrument namely the Z.H.U.N. *(Zones d'habitat urbain nouvelles).*

The Z.H.U.N. as a planning tool was supposed to organise new urban settlements mainly on the outskirts of big cities in order to ease overcrowding and to provide a decent and healthy environment for the inhabitants.

Theoretically a Z.H.U.N. is a residential area of some 20 hectares composed of several neighbourhoods which acccommodates about 9,000 inhabitants. This is equivalent to a housing area of about 1,500 dwelling units.

Such Z.H.U.N's are to be located along easy access to urban agglomerations. Nevertheless, every Z.H.U.N. is to be provided with all its primary services and amenities which would ensure its functioning as a comprehensive environment where all the inhabitants would have their necessary facilities, such as health, education, business, social and recreational activities.

The building process of the Z.H.U.N. is generally characterised by the company owner of the prefabrication system imported from Western countries. This industrialised system determined also the building form of the dwelling units which usually did not offer any flexibility. Hence an imposed uniform typology in most housing areas was without any doubt unavoidable.**(fig.22,23,24,25).**

As a result of this rigid typology, imported systems such as *"Pascal"*, *"Vareco"* and *"Coffrages-tunnel"*, despite their use to increase the quantitative necessity which housing required, did not improve the qualitative physical aspect of the environment. In fact, little housing of this era improved the quality of the physical environment. The consequence of such decisions, was an impoverishment of housing areas where monotony, anonymity and the none adaptability to the local context and lifestyle dominate.

It took more than a decade for the authorities to realise that such experiments, besides their failure in coping with the massive demand, they were also heading toward an unsatisfactory environment, where users and context were absolutely ignored.

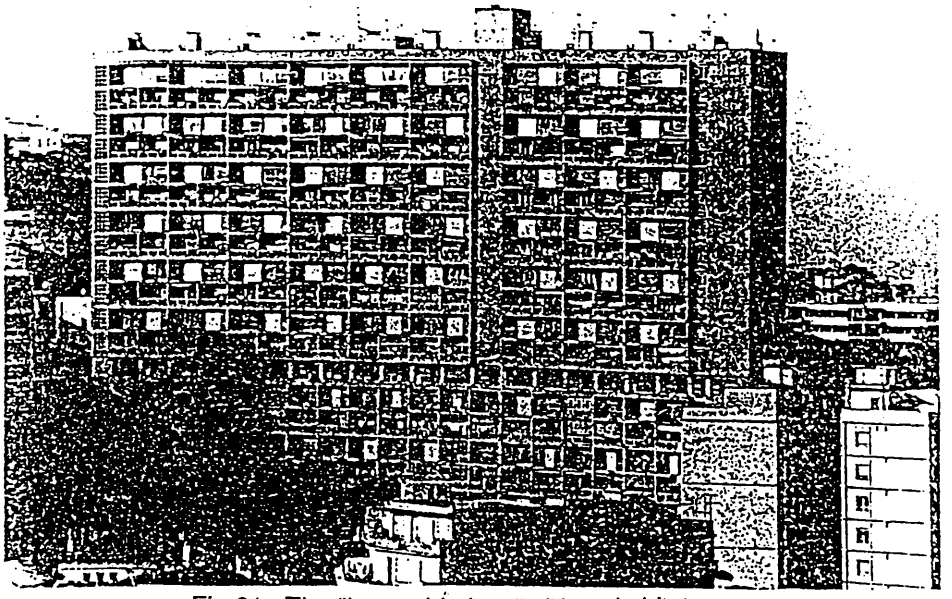


Fig.21. The "Immeuble-lane": l'Aero-habitat.
Algiers. 1954.

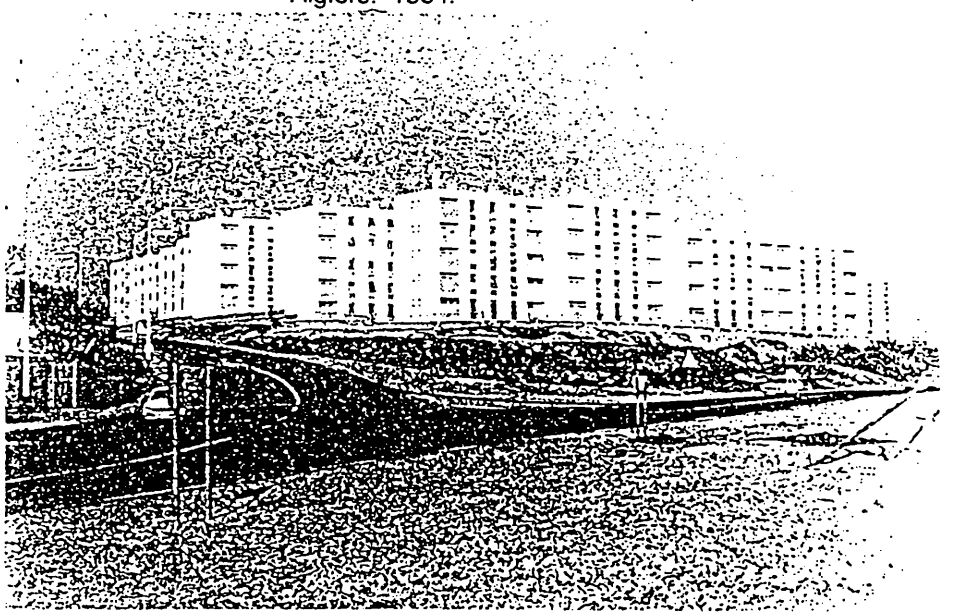


Fig.22. The typical buildings.
Cite' SORECAL I. Algiers. 1971.

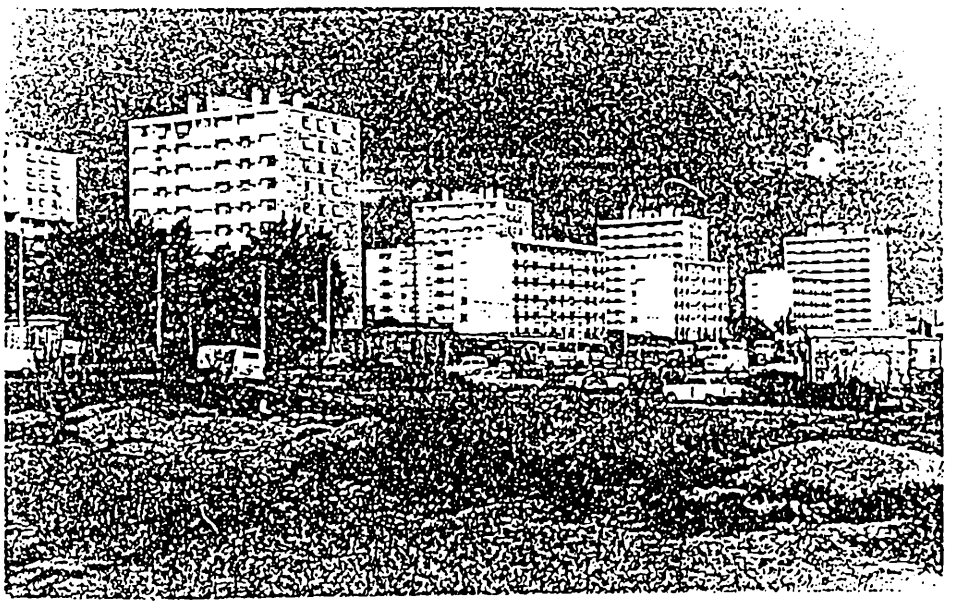


Fig.23. The typical buildings.
Cite' SORECAL II. Algiers. 1976.

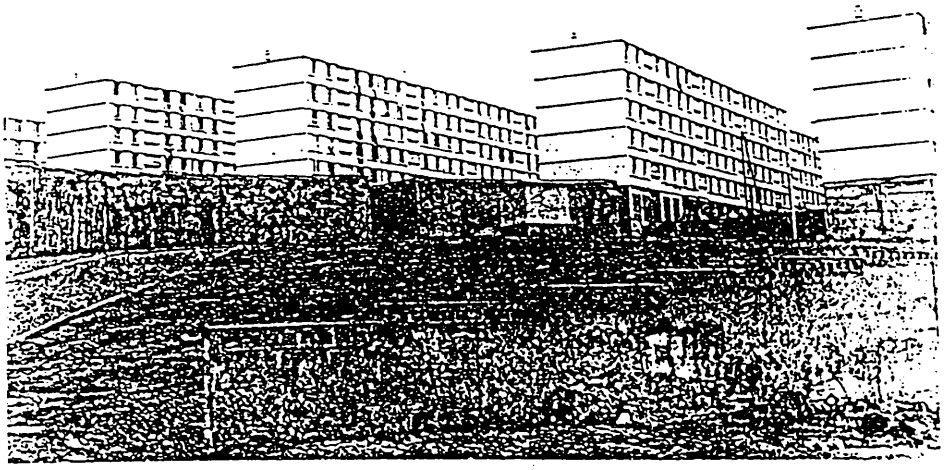


Fig.24. The typical buildings.
Cite' Badjarah. Algiers. 1976.

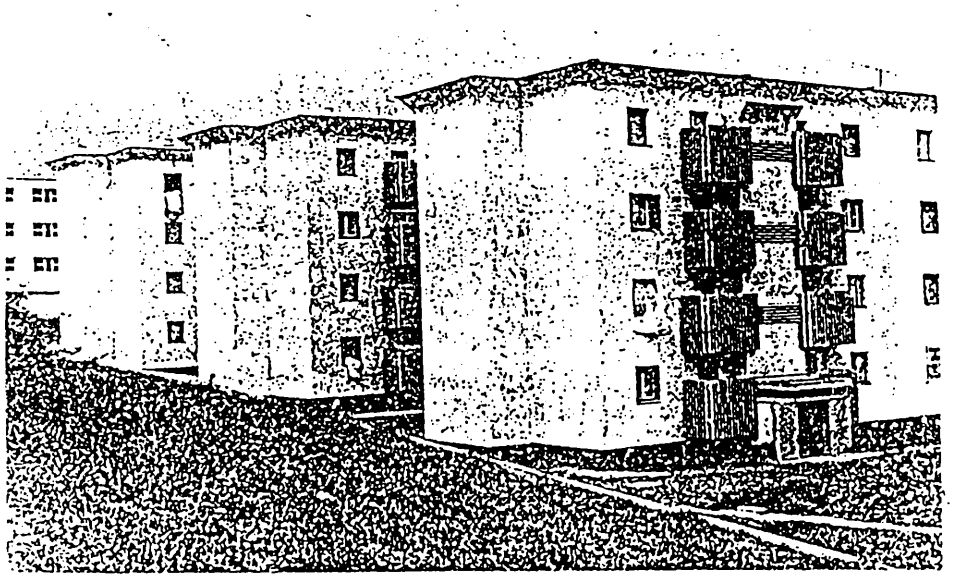


Fig.25. The typical buildings.
Cite' .Ben Omar. Algiers. 1976.

2. 2. 2. The Algerian Contribution.

During the two decades which followed independence, the small number of national architects had little participation in the construction process, and were totally isolated from the actions of urbanism which determined the housing environment.

Due to the emphasis on imported prefabrication systems which continued to be the only means to solve the crisis. Algerian architects, being confronted with a highly complex technologies were left with little ability on how to use them due to their rigid process of assemblage. Confined by such inflexibility, they were asked to organise " master plans " or " facades ", even though these latter aspects demanded a real study of the prefabrication systems themselves, and in response to that J.J. Deluz stated: *"Toutefoie, les architectes n'ont guere participe' a cette transformation. Les procedes arrivant en Algerie avec toute leur complexite' technologique laisent peu de place a une reflexion nouvelle sur leur utilisation."* [14]

With regard to the physical expression which prevailed in these experiments, the result is similar to the previous ones, which were totally dependent on foreigners. In other words, the Algerian architect, however sensitive to his environment and tradition, was still producing "Typical plans" where rectilinear slabs where organised according to certain technical and climatic rules, but leaving out most requirements of an orderely comprehensive environment.

Today, such typical housing areas are seen all over the country, they are still being built and represent the majority of the housing production. Even though most authorities know how unpopular and inefficient they are not only for the Algerians but for any people, they still favour this form of housing production. For them, it is the only quick answer to the housing crisis.

Despite, the attempt of some conscious architects and sociologists who point out continuously how bad and incoherent is this type of housing . The decision at a higher level is still persisting on the multi-story building as the most efficient solution.

In fact, in 1983 the minister of construction and housing goes even further when he stimulated the idea of the urban "densification" instead of using new sites, and he added this can be done by building even higher, and he declared: ...*"Il etait desormais necessaire de sortir de l'aire des ZHUN sans vie et d'avoir une vision nouvelle pour ameliorer le developpement des grandes cites par la construction verticale."* ..." *La ou sont prevu par example 2000 logements, il est possible d' en edifier 10000 et de gagner des espaces pour les infrastructures socio-educatives et autres."* [15]

As a result, the "Old Hamma quarter" located in the centre of Algiers was to be demolished leaving a vast site where the new *"Centre des Affaires"* is going to be built. The general aspect of this enormous project is without any doubt very ambitious and certainly calls for a degree of technological application which does not exist in the country at the present.

In this area, where an equilibrium between activities and housing existed for so long, residential buildings were demolished to be replaced by high rise buildings of some 15 stories. This illustrates well the general tendency of urbanism and architecture which is so favoured by the decision makers.

The example of the "Hamma" is the most alarming expression of urbanism, however in other areas located in different parts of the country, similar attitudes are still taken without regard to cultural and social realities or economic and climatic efficiency, they are still regarded as the most appropriate for our country.

In 1985, the social and cultural reaction by the people of Algiers against such massive operation of the "Hamma", which is already under construction, had a significant impact on the authorities. In fact, attitudes were changing and the minister stressed the national identity in terms of urbanism and architecture, then suggested, why not leave the Z.H.U.N style and occupy land like in the Casbah, and he said:" *Pourquoi ne pas rompre avec les ZHUN et occuper le sol a l'image des villes du Djurdjura, du Mzab, des Aures ou de la Casbah? Il est possible d'utiliser les outils modernes pour reprodure une culture authentique... Il faut reprodure le modele*

urbanistique et architectural authentiquement algeriens, avec toutes ses variantes, telles que nous l'ont enseigne ceux qui l'ont concu, bati et legue..." [16]

For the first time, attitudes were changing from the top authorities, toward an acceptable and recognised environment. However, a year latter, when visiting the ministry of construction and housing, a typical model of a housing settlement was on display. This model which was designed by the Brazilian architect: Mendes Junior, using similar principles to the Z.H.U.N.

In fact, it was described by one official architect as the solution which is favoured by the top policy makers, he said: "*For them, this is a modern style, easy to grasp and also easy to count the number of flats which they are after anyway*" and he added "*this is supposed to be a typical model which is thought to be reproduced in many urban areas of different cities. The master plans can be different by the principles and prototype buildings are exactly the same*".[17]

Fortunately, Mendes's proposals will never be implemented due to some financial disagreements. Nevertheless this shows that, the hope of 1985 to stimulate the production of an appropriate housing based on local technologies and on traditional principles has already been swept away by once again what is known as the Z.H.U.N system and its derived urban form.

3. Physical structure

To give a complete picture of such urban form, we will examine Mendes's model in detail as when this study started, it represented the lattest trend of housing environment in Algeria. It is also worth mentioning that this model is theoretical, it is still only on paper, however, it illustrates most housing which prevailed since 1962 until today. **(Fig.26,27.a,b).**

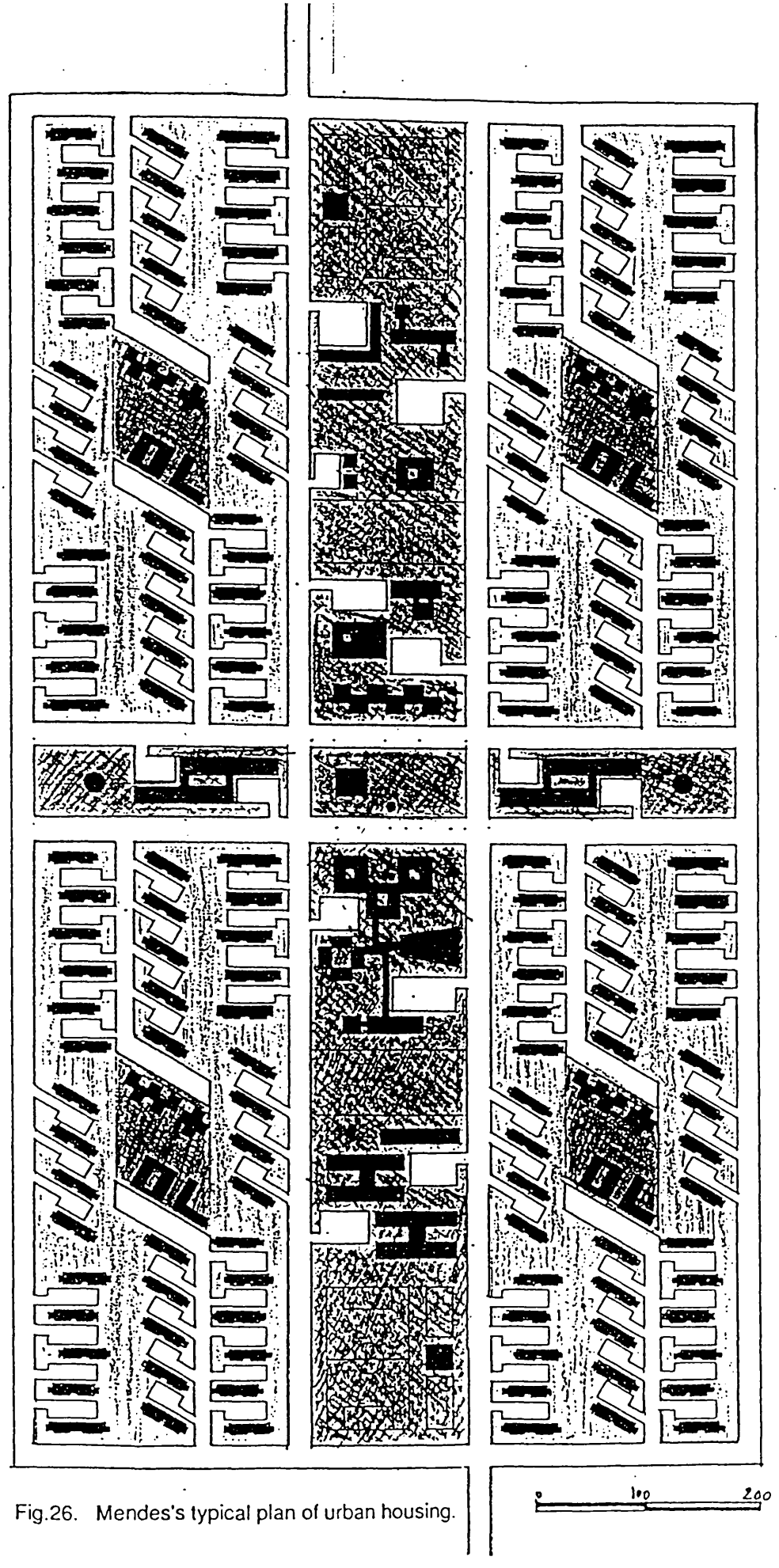


Fig.26. Mendes's typical plan of urban housing.

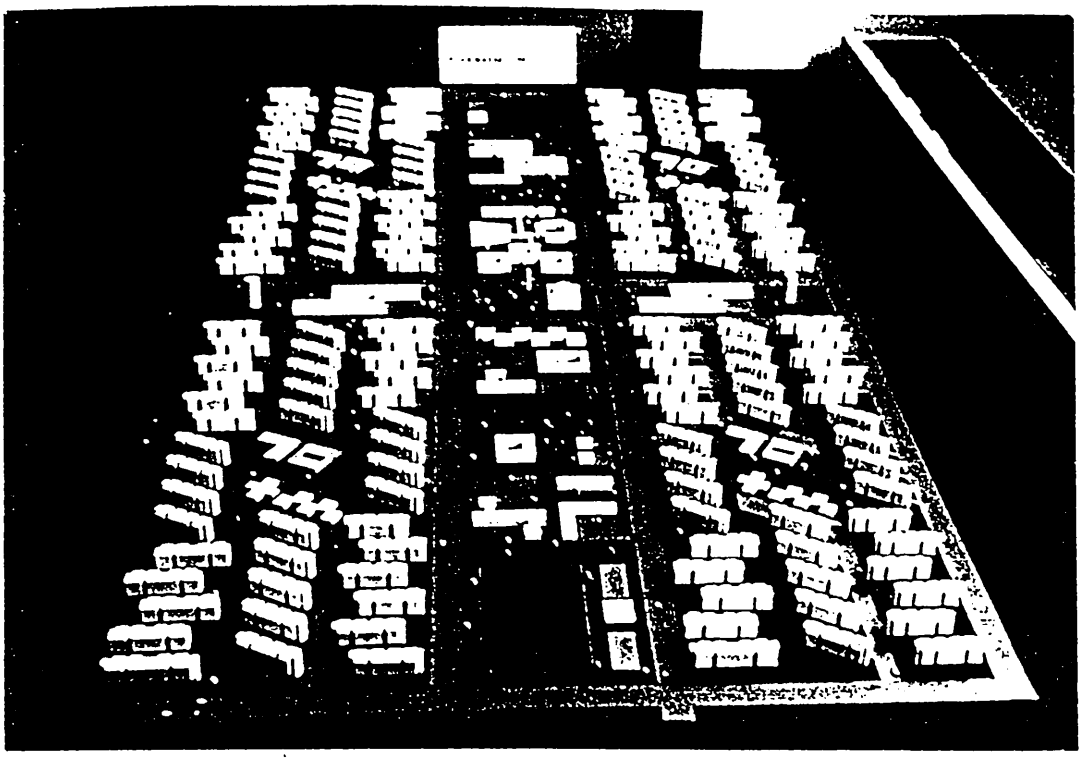


Fig.27.a. General view of Mendes's model.

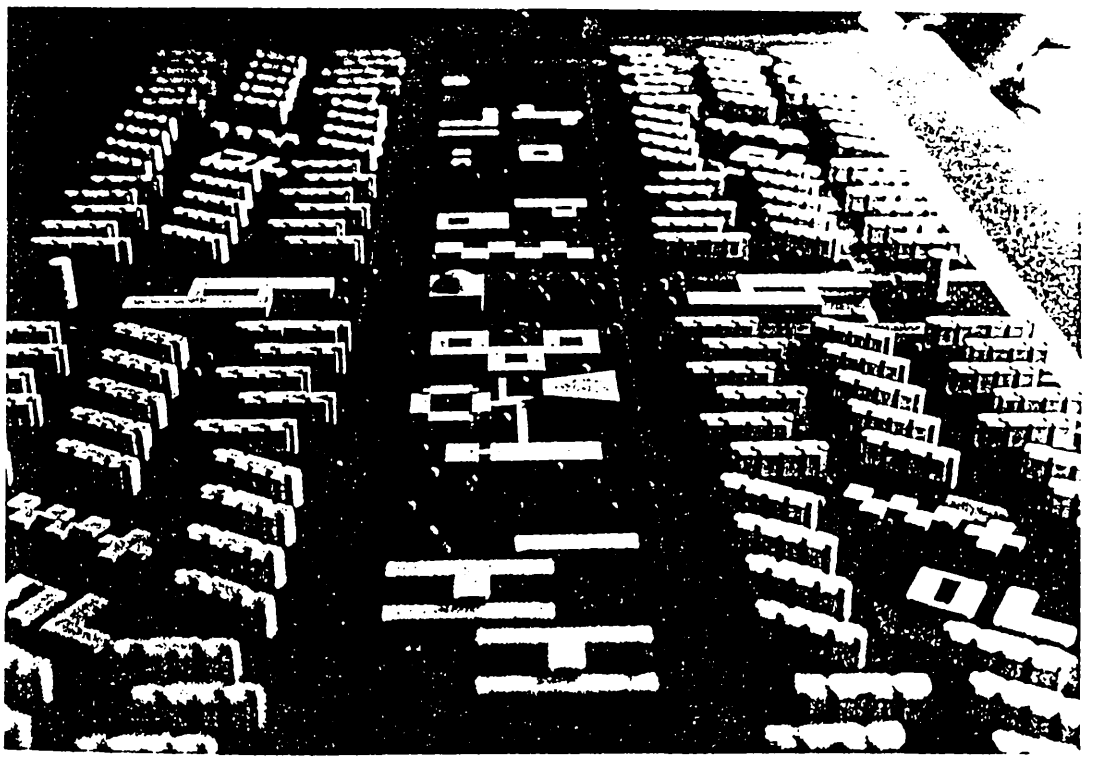


Fig.27.b. General view of Mendes's model.

3.1. Spatial organisation

Mendes's typical model is a housing settlement which accommodates some 18,000 people in a flat area of 76 hectares. This large area contains 3,000 flats ranging from 2 to 4 bedrooms, and organised into 160 slabs of identical forms.

Beside the 3,000 flats, this area provides for most necessary daily needs such as shopping, education and other socio-cultural and recreational activities. However, these activities are markedly segregated from the residential buildings. They are located in clear and distinct zones.

The spatial organisation of this settlement is confined within a rectangular peripheral road. Being bordered on four sides by this large mechanical road which also gives access to the entire area, entry points are undoubtedly needed to bring in and out all kind of movements. In this settlement, two entry points are present, one being situated on the south side, the other being on the opposite north side.

From these entry points, two parallel axes run through the whole area to cross two other parallel roads running from east to west. This perpendicular road crossing forms nine rectangular blocks on which different use-zone system is applied.**(Fig.28)**.

Consequently, the grid system which arose from this road network formed blocks of different sizes in the four outer blocks which represent the residential neighbourhood units are larger and contain in their centre facilities to serve daily needs. The other five remaning blocks that are located between the neighbourhoods are smaller and include retail trading establishments, such as supermarket and boutiques, administration offices, recreational facilities and a major mosque. This latter is located on the central block alone leaving the remaning open space as the major square of this settlement.

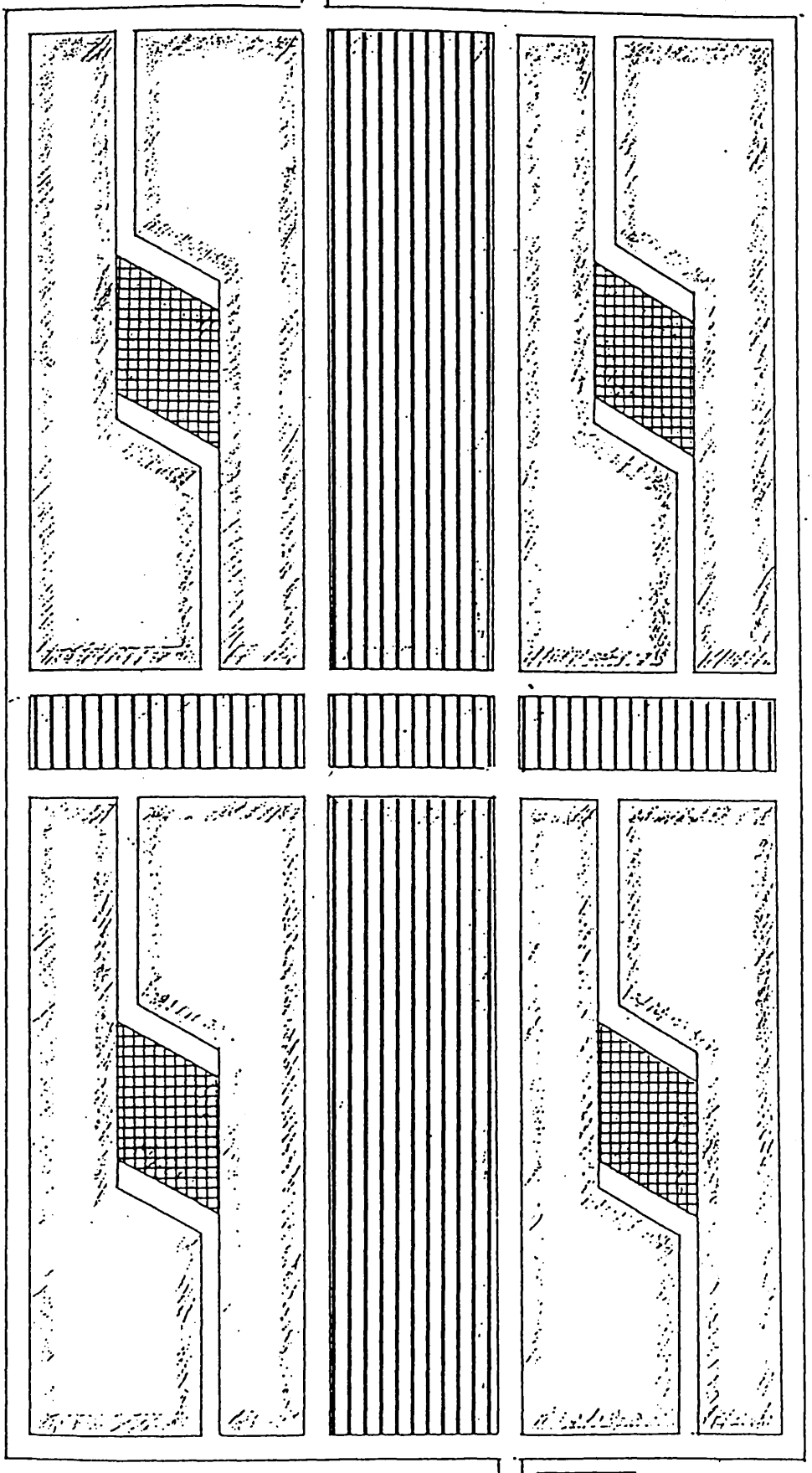


Fig.28. plan of land use zone system.

The main characteristics of the spatial organisation of this urban settlement lie in the simplistic uniformity of its components. In fact, the whole area is distinguished by the systematic repetition of one building form and the dominance of the open space.

3.2. Physical pattern

The physical pattern of this urban form is composed of four main neighbourhoods confined between a wide road network and large service areas. All four neighbourhoods are exactly identical and each one resembles a park-like space where free standing buildings are arranged according to some geometrical rules that derived from scientific and quantitative criteria, which unfortunately have been applied without consideration for their differing circumstances.

This urban form is dominated by thé open space and the systematic disposition of one basic unit: these latter with the addition of the road network constitute the main elements of urban composition which clearly characterise this settlement.

Each neighbourhood spread on an area of 12.44 hectares containing 40 residential building units in which 4,500 people are to dwell. These building units however, are organised into 8 rows of 4 or 6 slabs forming therefore groups of residential buildings around a centre where daily local services are provided for the inhabitants. These latter are located along the easy access offered by the wide rectilinear roads which surround the neighbourhood.

The slabs are located distant from each other leaving parking spaces in between. A minimum building spacing is set to a distance of 20 metres, as this is considered to acheive privacy, as well as to allow sun-light to reach flats situated at ground floors.[18]

The position of the slabs also shifts slightly in order to acheive good air flow, to enhance the view, to strengthen privacy and last to create a balanced harmony for the master plan.[19]

Some building units however are on stilts leaving therefore space continuity a ground level. These stilts slabs are located along main roads which, due to their frontal position can be used for future developments such as shops or small offices.[20]

Finally, each building unit, being sub divided into two parts each one with its own staircase leading to 10 flats, have 2 main entrances which have access directly from the parking space and the side walks which are around this latter.

This type of physical pattern is expected to provide for the inhabitants all the needs they require in terms of spaces, hygiene, social and cultural activities by separating every function into its own space, and that is clearly seen from the master plan.**(Fig.29).**

In fact, the spatial organisation of this settlement corresponds exactly to the zoning system and seems to work perfectly in terms of hierarchy of functions. However it favours rapid mechanical movement rather that the human interactions and it ignores completely the socio-cultural context as well as the climate.

In general then, the layout of this urban settlement is characterised by wide open spaces and a road network, and the formal symmetrical arrangement of free standing buildings. Though the arrangement may seem highly organised in terms of use-zones and responds perfectly to the movement and its requirements, there is a strong negative respond to the human factor which is a fundamental aspect of all settlements.

3.3. Street pattern

In Mendes's urban settlement, it is possible to identify a hierarchical organisation from the rapid to the slowest vehicular movement which runs in the parking areas just outside the residential units.**(Fig.30).** However it is very difficult to find a hierarchy in terms of pedestrian movement even though, there are considerable paths which link different areas, such as the residential buildings and the local services.

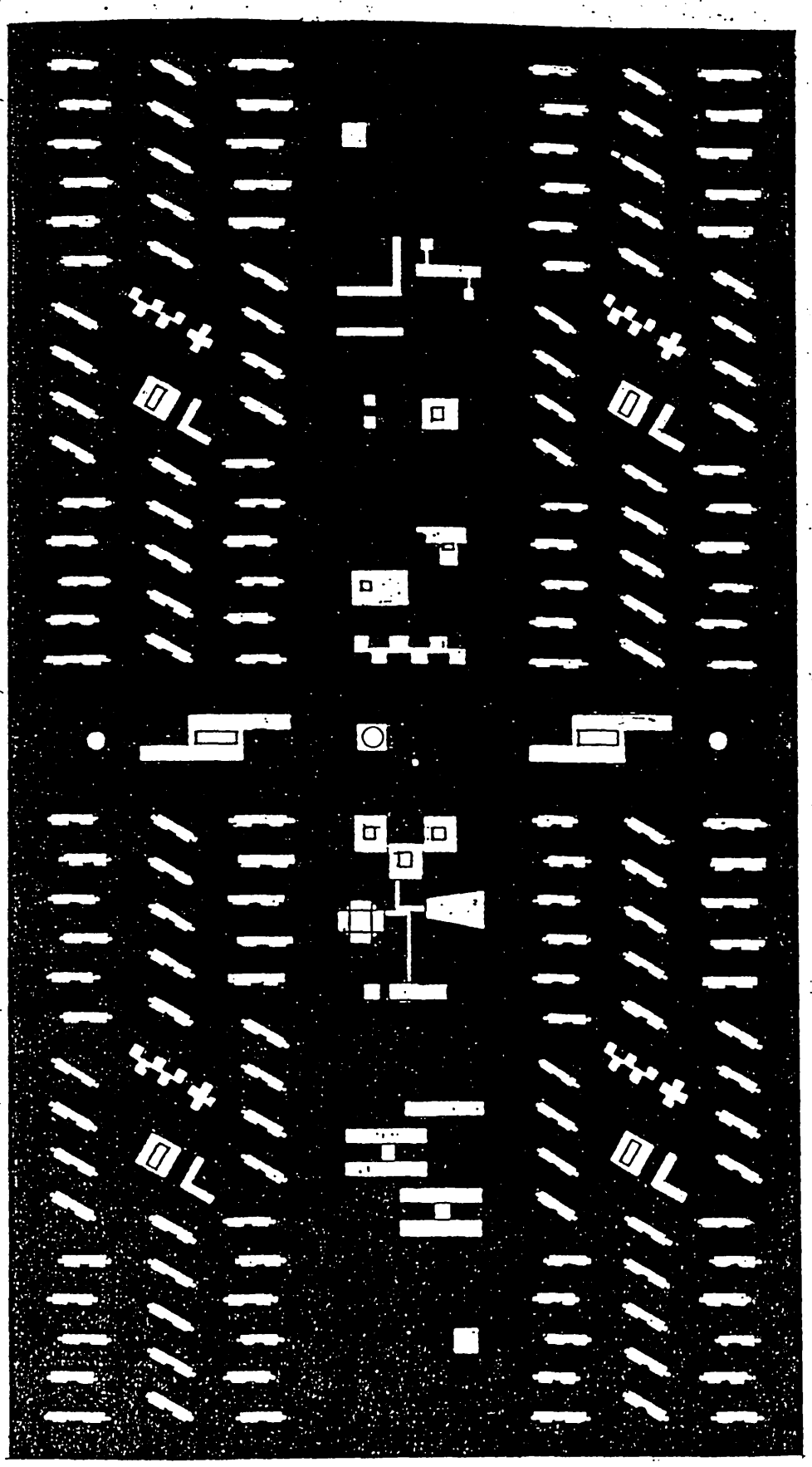


Fig.29. Urban form of the typical model.

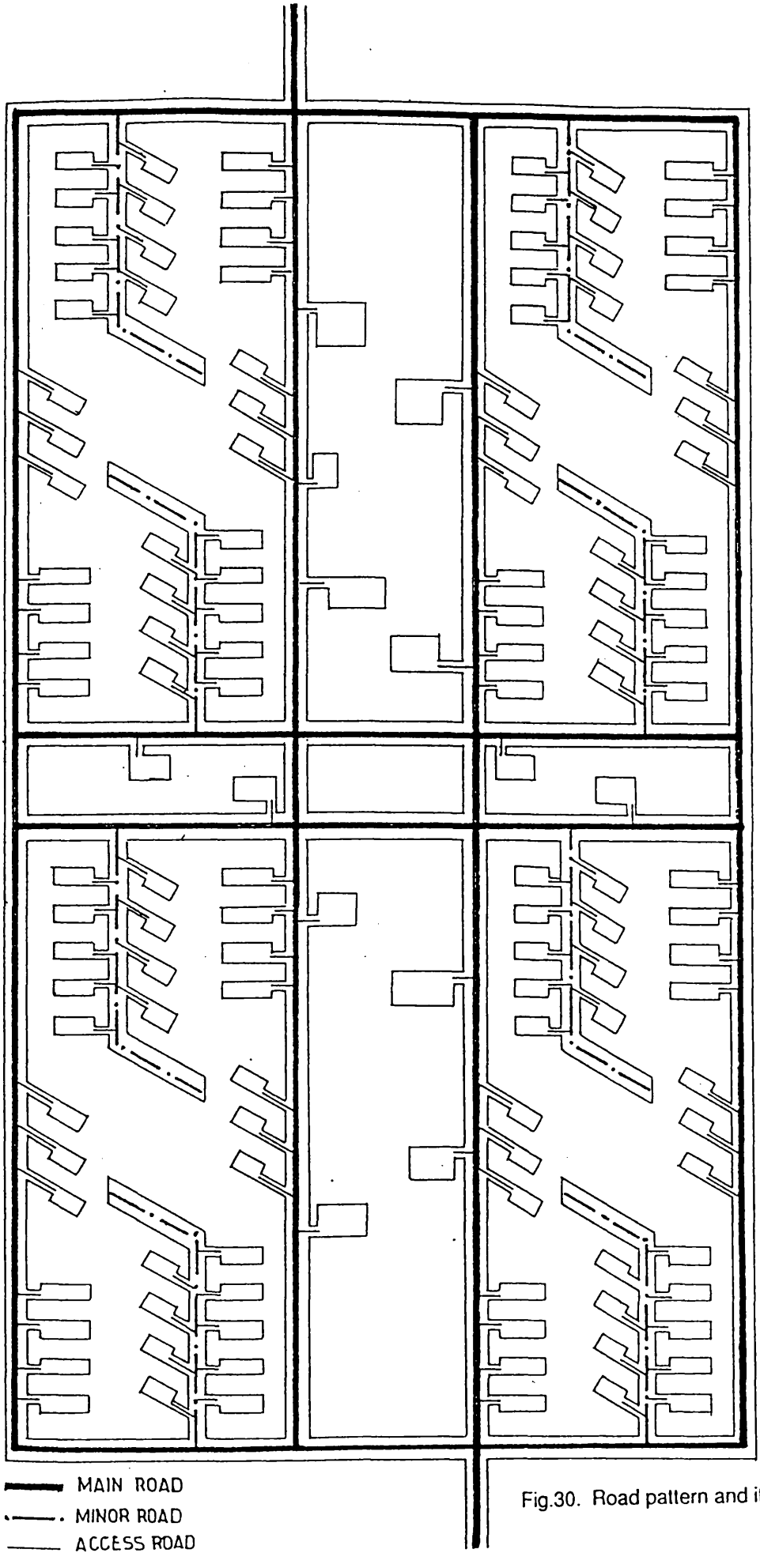


Fig.30. Road pattern and its hierarchy.

This settlement's circulation system is based on the convenience of rapid movement only, which led to the emphasis on the road network rather than on the traditional street as it was used in the Casbah. Thus the presence of pedestrian paths and pavements beside mechanical roads which are supposed to segregate the pedestrian from the traffic.

Mendes's concept is based on direct and shortest routes serving the maximum number of dwelling units, so that the budget is reduced to a minimum and open space is saved for community services.[21] By using vehicular hierarchy and segregated pedestrian movement, he created a banal order to control the circulation system. This order however is formed of different categories of roads and pedestrian alleys that could be classified with reference to their locations, functions and sizes. This system then can be classified into two main categories namely: vehicular roads, pedestrian streets.

3.3.1. Vehicular roads

The vehicular roads are the principal traffic routes designed with the convenience of rapid movement in mind. There aim is to connect together the built-up areas of different neighbourhoods and the main services which are located in between these neighbourhoods. However, the concept of flow movement present in this scheme seems to suffer. The road system has been designed with major road indicative of an expected high rate of the traffic flow, but no account has been taken of the fact that traffic flows not round hard right angles but on relatively slack curves. It would appear this fact was ignored as it does not fit the geometric pattern preconceived by the designer.

In this settlement there are three types of vehicular roads which are supposed to control traffic movement according to its flow. These latter are: main roads, minor roads and access roads.

3.3.1.1. The main roads

The main roads of this urban settlement are the layout forming the grid system which is dividing the entire area into a series of rectangular islands. These roads are of public use and carry all the transport system without disturbing the residential areas within the neighbourhoods. However, these roads do not make full sense unless joined to a larger system.

Because of their big volume of traffic and their function as a prime connectors, these roads are the widest and are longer than any other type of road. In width their carriageways are of 14 metres with 3 metres pavements on both sides, the overall width is 20 metres. Their length however, varies, the roads running from South to North are of 1,175 metres whereas the others which are running from East to West are of 660 metres. Due to their location and their high vehicular flow which they accommodate, not a single commercial or public activity is taking place along these main roads. However, it is worth to note that due to the nature of the general layout, some buildings are bound to be facing these roads that are surely creating a potential noise problem due to the extrovert form of the buildings. These main roads represent about 70% of the total road network area.

3.3.1.2. The minor roads

Two minor roads penetrate each neighbourhood on the southern and northern sides, linking therefore the main roads with the local service areas which are at the centre. These roads are of local residential use and for both, safety and economy reasons, they do not run through the neighbourhoods, and the width of their carriageways is appropriate to the volume of traffic on them. The carriageway is 7 metres wide with 5 metres pavements on each side; the overall width is 17 metres.

By passing between two rows of block residential flats, these roads functions are used as distributors inside the neighbourhood. They also provide easy access for emergency vehicles in case of accidents. These minor roads have no exit, but bend at 60° when they reach the

centre line along the buildings where local services are provided. Finally the length of each minor road is 280 metres, and all these roads represent about 16% of the entire road network area.

3.3.1.3. The access roads

The access roads are of semi-public use intended mainly to the residents of each two blocks of flats which bound a parking space. There are 32 access roads in each neighbourhood, 18 are located inside the neighbourhood zones with 9 being located on both sides of each minor road. These roads are short in distance and vary according to their location. If they are connecting a minor road with a parking space, their length is about 15 metres, whereas if they are linking main roads with a peripheral parking space their length is little longer and is about 20 metres. This is due to the angle created by the intersection between access roads and minor roads. The overall width of these roads however is about 10 metres with 1.5 metres of pavement on each side of the road which leave the carriageway 7 metres wide. These access roads represent about 14% of the whole road network area.

3.3.2. Pedestrian streets

The pedestrian streets in this urban settlement are present in each island which is determined by the grid of the road network. These latter are the only channels designed for human movement and connect most places within these islands. In the neighbourhoods they link parking with the block of flats and also connect the residential buildings and service areas which are at the centre of these neighbourhoods. However in the main service areas located between the neighbourhoods, they link buildings of public activities together and connect these latter with the public parking.

According to the *"Dossier des plans"* which describes the circulation system in this settlement , these streets are of two types, the pavements and the foot paths.[22]

3.3.2.1. The pavements

The pavements are present along every vehicular road described earlier and their width varies between 1.5m to 5m depending on the type of road. These pavements are of public use mainly, but when they bound residential parking spaces they become semi-public and their width is 5 metres as this accommodates the comings and goings of the residential unit, as well as the adjacent playing grounds.

3.3.2.2. The foot-paths

The foot-paths are not present on the master plan of this settlement, nevertheless, according to the *"Dossier des plans"*, these foot-paths are connecting most public buildings which are located on the amenity areas as well as the local service areas.[23] These paths are offering a safe route to pedestrians to reach any public activity within their neighbourhood. However if the journey has to link a residential are with a high public activity which is located on the amenity areas, a crossing of a vehicular road is inevitable.

3.3.3. Street pattern characteristics

The street pattern of Mendes's urban settlement is similar to most street patterns of new urban developments which are designed with the neighbourhood unit principle and its derivative building form the free standing blocks. These street patterns can be described as a system of routes connecting different use-zones. In fact these streets or roads are not enclosed by buildings but, run solely through vast open spaces often undefined offering no public activities or social contacts.

Conceived to deal mainly with fast vehicular movement and mechanical transport, the scale of the roads is essentially related to that movement and not to the human being. Although, there is a high proportion of pavements and foot-paths provided for the pedestrian movement, these latter also have a lack of human scale and their enclosure is very attenuated as a result, their

only remaining role is to connect one place with another whether a person is travelling in a car or walking on his feet.

In fact the proportions between width and height of the roads show clearly the open character of these channels and the gaps which exist between the buildings. These road proportions are not determining enclosure or legibility which often drives from enclosure. However, this effect is totally ignored in the road system of this settlement.**(Fig.31).**

Due to both the long, straight distances of these roads and the wide open character of this urban form, the pedestrian will undoubtedly have the feeling of walking even greater distances, especially when at a glance the far end of the road or even the whole settlement is seen. This makes the journey appear far longer than necessary, and induces boredom due to the similar character of these roads and the total lack of activity on them. i.e. shops, sceneries, entrances, etc...

By contrast, this road system is convenient to car drivers, offering them a great sense of flow and continuous movement, accept for the right angle corner. Due to the hierarchy of the vehicular roads, which mainly derives from the widths of these roads, most people when they become passengers in a car, moving at a particular speed, their understanding of this settlement might be more appropriate than most pedestrians who are walking at a relatively slower speed.

The spatial hierarchical organisation emerging from the location and the physical form of the roads as well as the ambience that characterises the spaces, represents an environment where car dominates man. Weak sense of territory arises from these wide channels disrupting any intimacy in the spaces outside the flats of the residents

In terms of landscape, the open character of this urban form with the regularity of the roads and the building forms, provide similar infinite number of open view points that is sadly offering one type of architectural image which is clearly dominated by one identical building unity: the slab.

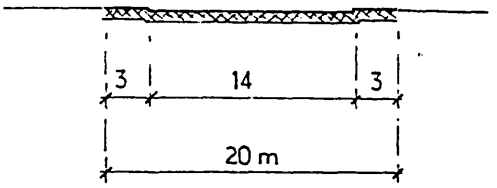
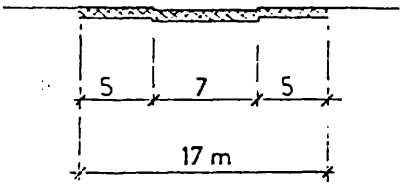
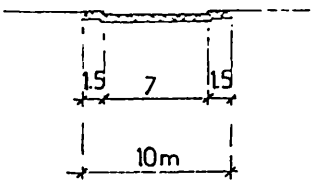
ROAD CATEGORY	SECTION	WIDTH	LENGTH	% FROM TOTAL CIRCULATION AREA
MAIN ROAD (HIGHLY PUBLIC)		20 m	660 – 1175 m	70 %
MINOR ROAD (PUBLIC)		17 m	280 m	16 %
ACCESS ROAD (SEMI-PUBLIC)		10 m	10 – 15 m	14 %

Fig.31. Table of road categories and their aspects.

In fact, each road section has a very similar identity with no visual termination, and this sets the dominant visual note of this settlement.

3.4. Public open space

Besides roads, pavements and foot-paths, there is a considerable amount of public open space which is dominating this urban form, this open space surrounds every single building present in this area. However, some spaces are provided for parking, sport fields and playgrounds but others are clearly a result of this geometrical urban pattern. As a consequence of this, two types of public open spaces have to be identified: first, the defined spaces with clear boundaries and activities; second, the undefined spaces with no particular boundaries and no specific activities.

3.4.1. Defined spaces

Three types of defined open spaces are used for public and residential activities. These spaces consist of the public and residential parking areas, playgrounds, and the sport fields. Public parking spaces are generally large and located in the service areas just outside the public buildings whereas, residential parking spaces are smaller but more frequent, and are located between each two blocks of flats. The area of these latter is calculated to satisfy a minimum of two building units, with the forecast of one parking space for every three flats. But due to their location it is part of this projects character that future extensions can be possible, and that is a consequence of the open pattern of this urban form.

However, about four playgrounds in each neighbourhood are provided for youth recreation. These outdoor open spaces where children can play are located in the gaps separating the different rows of slabs. The playgrounds are supposed to be shared by children coming from the adjacent buildings which surround these spaces as well as the children who live in the other buildings beyond. Thus, for families who are living just in front of these playgrounds, supervision for their children can be done easily, as their mothers are able to watch directly

these spaces. Whereas, for others who are living far away from these spaces, supervision can become a real problem due to the great distance which separates the residential flats and the playgrounds. This latter can be as far as 150 metres which is too great for a child to reach these areas.

The last remaning defined public spaces present in this settlement are the sport fields. Being provided for public use, these spaces are located on the central service precinct at both North and South ends, and at equal distances from the flanking neighbourhoods. Each one of these sport grounds consists of a football pitch and two open courts for various activities.

3.4.2. Undefined open spaces

In this settlement, there is an important part of the open space that is undefined.**(Fig.32).** In fact, the urban form resulting from this mass housing production that is essentially dominated by slabs and free standing buildings does not shape this urban open space, or very little. Supposedly, this open space is used for planting as green areas, but since the climate in Algeria most of the year is hot, this means a great effort of maintenance is required.

However, by experience of what these spaces have become in similar housing developments, the result is far different of what the designer has intended. **(See Part one, Chapter 2)** In reality these areas become inmanaged, thus left as wasted land in which use, character and the control of movement through them is not defined. In fact, such structure where this kind of open space dominates, it is to some extent uncontrolled and awaits adaptation and configuration according to cultural and aesthetic criteria.

3.5. Land use and density

As in most contemporary housing settlement, the urban space is characterised by an extremely open and scattered texture. Flats are pilled one on top of each other to form multistory buildings. In Mendes's typical urban model, land shortage does not seem to be a problem as

was the case in the Casbah, however the area of this settlement is defined according to the number of people it accommodates. Land is thus to be used depending on standards that are often evaluated in terms of square metre per person and per activity. (m2/person/activity).

Due to the strict segregation of all use zone activities of both and public level, these latter do not overlap and that has surely resulted in an uneconomical land use where waste is not only tolerated but defined by the building form of the slab which pretends to use land to its minimum, offering more public open space for people.

As a result of this, ground coverage in terms of built up area is very low compared with the ratio of open space. A close look at this land coverage shows these following ratios:

Built up area	11.50%
Private open space	0.00%
Public open space	88.50%

These ratios of land coverage are congruous with the urban form which they represent. In fact, they are not surprising but reveal the dominant openess of this urban form. These ratios show that 88.50% of land is provided for public open space whereas, private open space is totally lacking. However this large amount of public open space is composed of two types, one that is defined and represents 27.50% of the whole settlement; the second, that is undefined represents 61%.**(Fig.33).**

It is worth noting that the defined open space is justified and it is composed of road area, parking spaces, playgrounds and sport fields. Whereas, the undefined open space that can be used as green areas is unjustified but rather a consequence of such urban form.

In terms of densities however the gross residential density is 236.8 person/hectare, which is equivalent to 39.5 dwelling/hectare according to a rate of dwelling occupancy of 6 persons.This gross density is relatively low for an urban housing, however it is still low even when considering

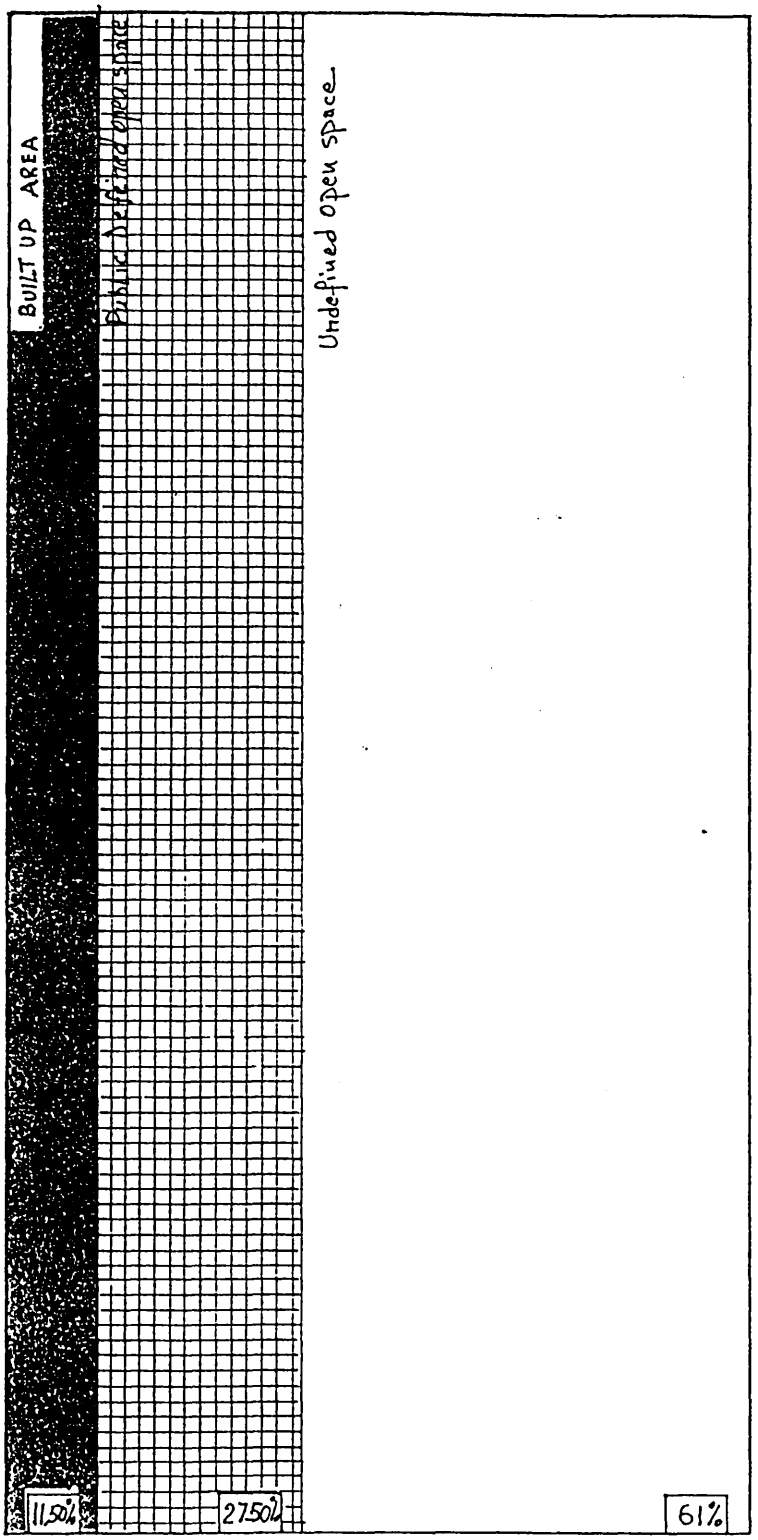


Fig.33. Land use coverage of Mendes's urban form.

the net residential density which is 68.7 dwelling/hectare, and that is equivalent to 412 person/hectares.

Both, land use and density do not give a revealing picture of this urban pattern. To complete this, it is important to describe how land is used in terms of subdivision that is highly rational and regular. Because it is a planned settlement, the building plots or one should say building "sites" resulted in a very regular geometric form with identical shapes and similar sizes. In other words, accept public buildings, almost every single residential building that is composed of similar flats, is identical and developed according to rules set by the designer and the modern technology he applies. This is not only a characteristic of this particular settlement but of most contemporary developments present in Algeria and even elsewhere.

3.6. Grouping of flats: the slab

In this urban settlement as in many contemporary housing developments in Algeria, residential areas are characterised by an extremely opened tissue, this open pattern of the residential space has resulted from the flats being piled into blocks forming identical straight slabs that are standing freely on the ground. However, some general observations can be made about the formal aspect of these slabs.

The layout of the slabs takes an elongated rectangular form in which four extrovert flats per floor are organised. Due to the difference of area and number of rooms within the flats, the building units are standardised into three types of slabs. **(Fig.34,35,36).** These latter are composed as fallows:

Building type	living area/Flat	Numbre of rooms/Flat	Percentage in the settlement
Slab 1	75.31 m^2	3	85 %
Slab 2	87.73 m^2	4	10 %
Slab 3	101.81 m^2	5	5 %

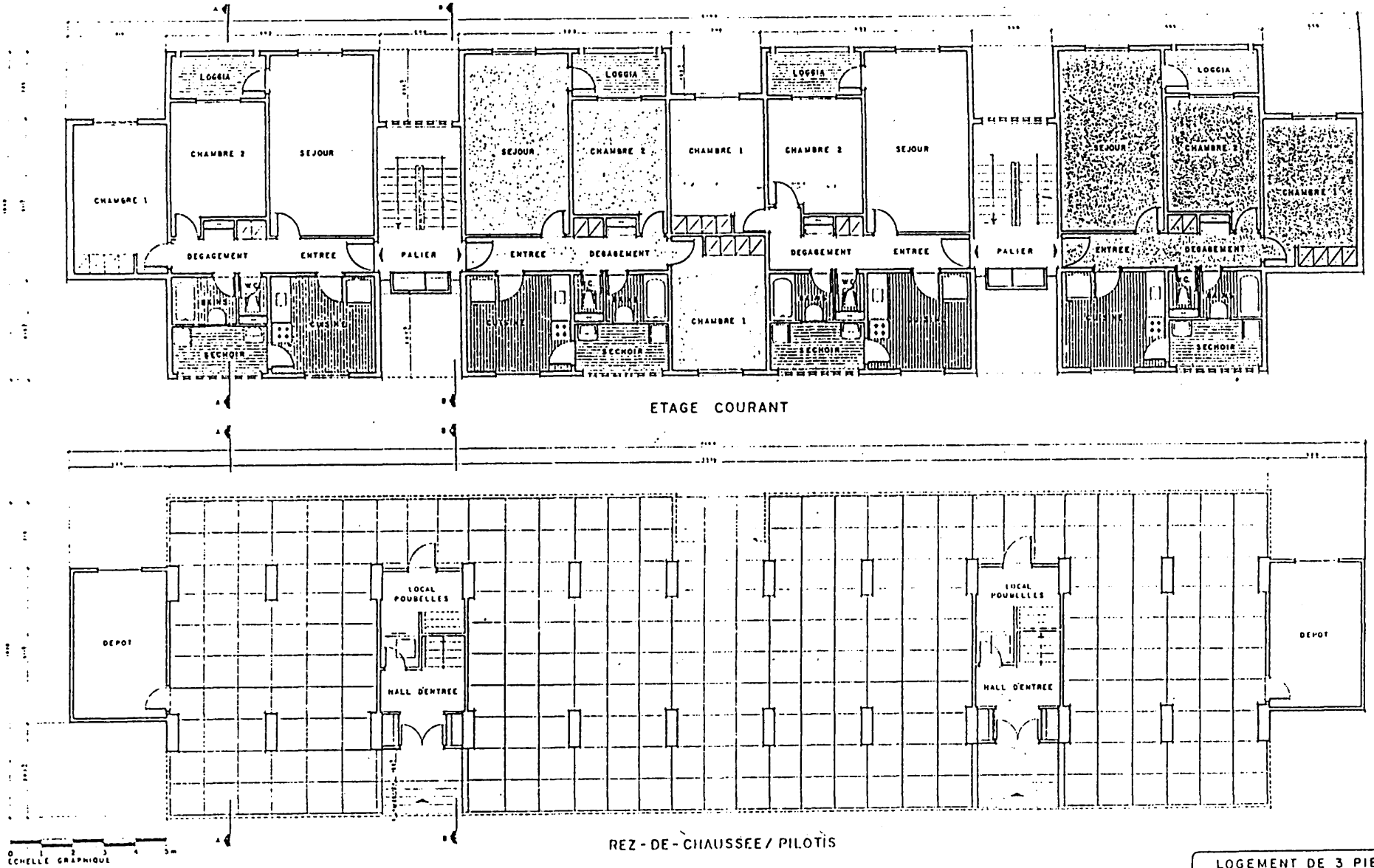
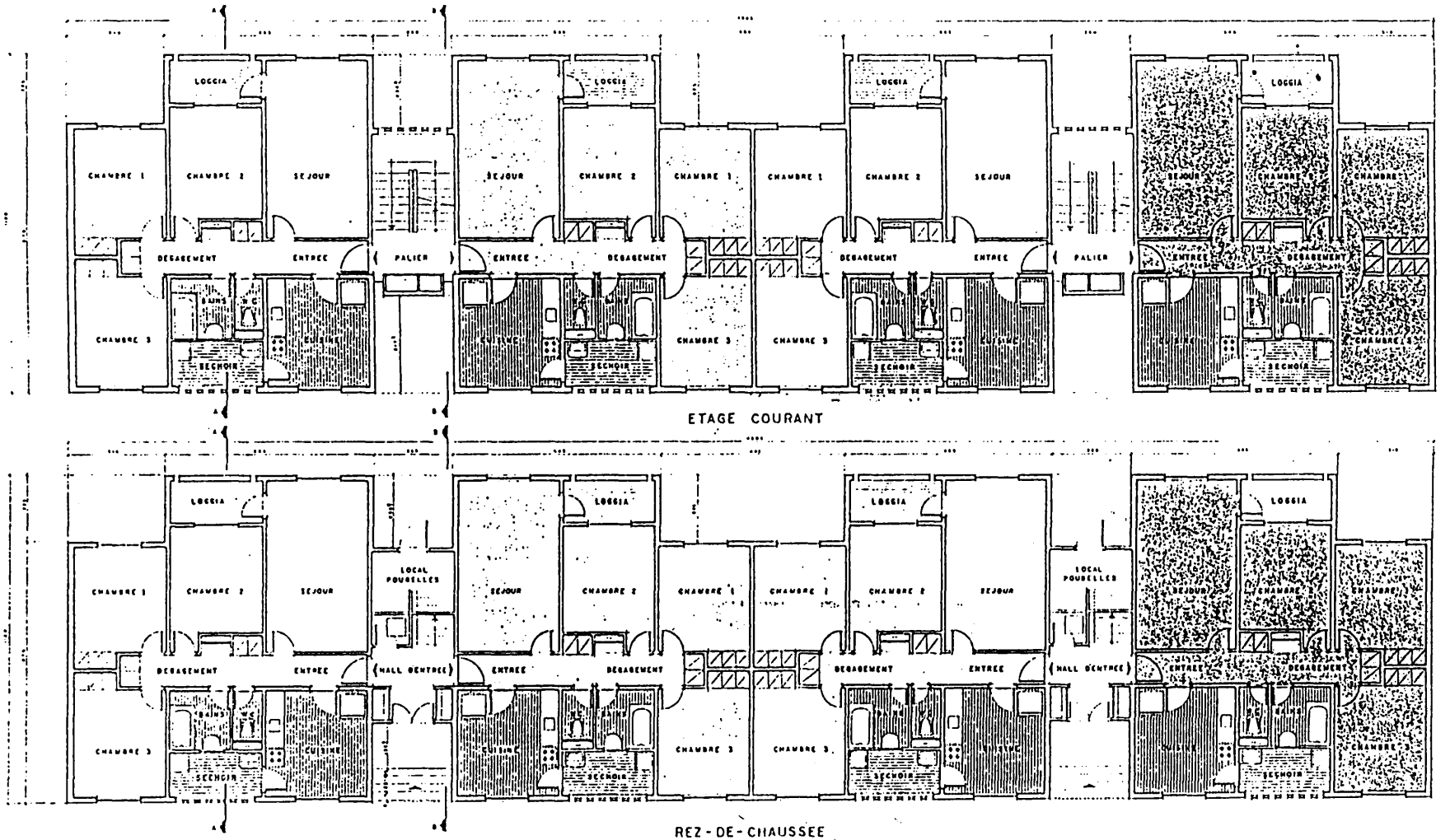


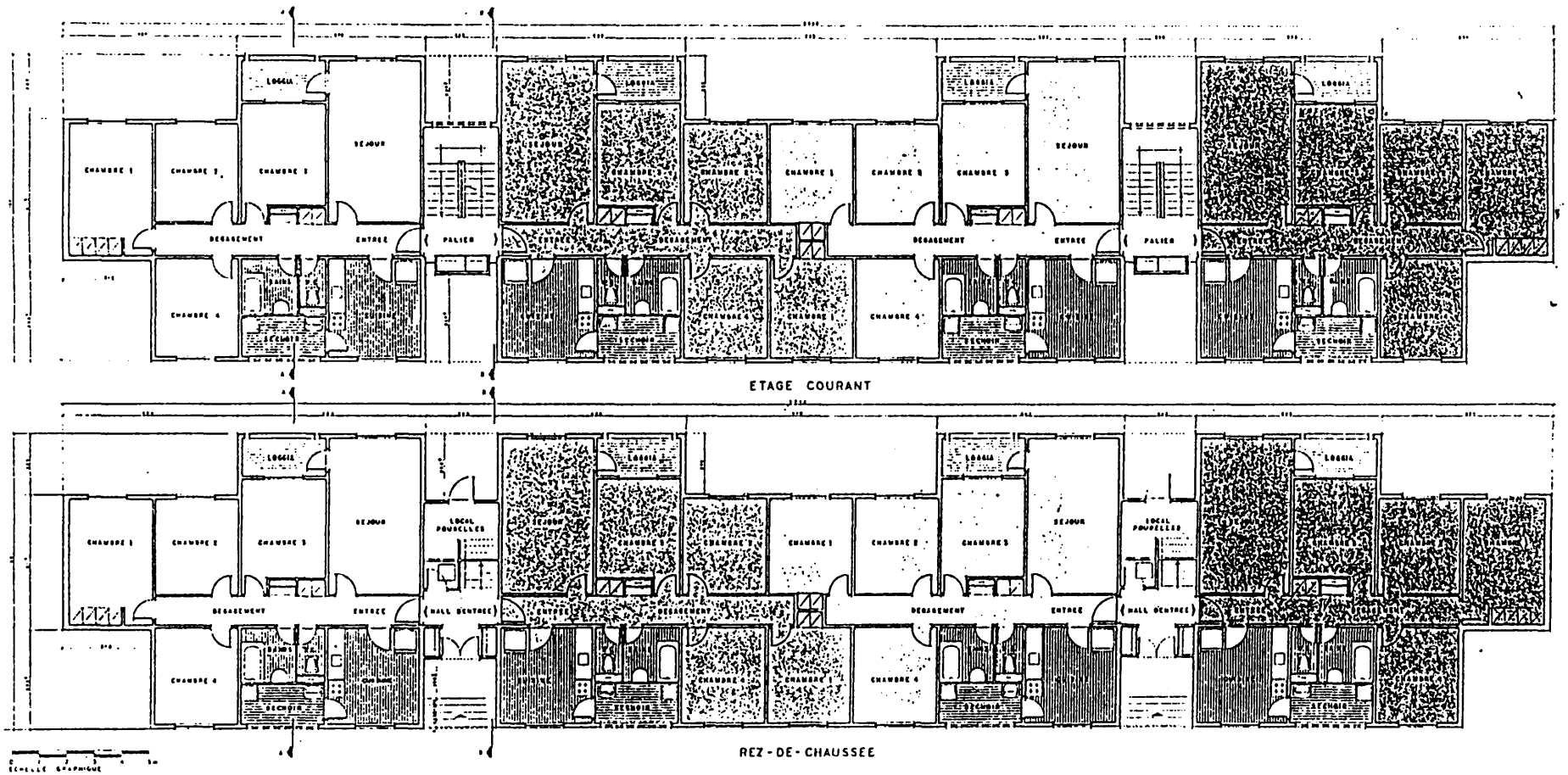
Fig.34. Plan of slab 1.



LOGEMENT DE 4 PIECES
ARCHITECTURE
PLANS 30

MENDES JUNIOR

Fig.35. Plan of slab 2.



LOGEMENT DE 5 PIECES
ARCHITECTURE
PLANS 44
MENDES JUNIOR

Fig.36. Plan of slab 3.

Despite the difference in area and in room number, all types of slab look the same and have a very similar layout. However, the few stilt slabs that are located on the periphery of the residential neighbourhood are different in terms of height organisation. These stilt slabs have only four habitable stories over a free ground floor that is provided for future commercial utilities, whereas the others have five habitable stories including the ground floor.

The flats within each slab are identical and have an outword-looking organisation. This latter is achieved on both sides of the slab by large openings and balconies that set the dominant architectural feature of the facades.

The consequences of this extrovert organisation is that buildings have to be located on the ground at a determined distance from each other in order to ensure the implementation of other activities such as access routes and parking spaces as well as to provide good day light, air and sun for each flat within the buildings.

However, for the inhabitants, privacy is not the same as it used to be in the traditional environment, which rejected all the aspects of the public world by introversion. In this case, privacy becomes a function of the distance required for the set back and that is 20 metres minimum, this distance seems not satisfactory and does not offer a total privacy, instead it allows visual and sound intrusion especially for flats at ground floor. In contrast however, this arrangement provides day illumination, sun exposure, and air ventilation for all the flats within the slabs, and even for those located at ground floor levels. In addition it offers a view on the outside world. The spacings that derive from this organisation is also used for other public activities such as parking spaces, playgrounds, and green areas.

In terms of access, each slab is directly accessible by two entrances situated on the main facade. Each entrance is raised from the ground by a small stair to mark its location. However, each entrance leads to a semi-public staircase serving two flats per story. It is worth to note that the use of this vertical space is less busy at the fifth floor as this serves only two flats and therefore becomes considered more as a semi-private space rather than a simi-public.

The layout of the flats within the slab are mirrored on each floor on either side of the staircase, thus forming one typical standard plan which facilitates and speeds up the building process of this housing environment. This is one of the fundamental principles that determines this design approach.

Generally most peripheral building units of each neighbourhood are East/West oriented living therefore all the service areas, such as kitchens and bathrooms being oriented to the North, whereas the rooms are facing South. However, the internal slabs that are in between, are deflected by 45° . In other words their orientation is North-East / South-West, this change in orientation is not a functional requirement but it is only a design balance that Mendes favoured in this approach.

In structural terms, the unique system used is based on a precast reinforced concrete that dictates uniformity and speed in the execution. It seems easy to forecast the consequences of such a system as this has already been experienced in similar developments. The experience shows that, it has poor sound and thermal insulation, it offers no room for the house holder to do any light transformation and finally it has proved expensive.

In spite of the short time over which this housing environment can be built (due to prefabrication), and in spite of the regularity of the dwellings (due the identical plans), unity of character is not guaranteed to be maintained due to the inadequacy of the building form that is disregarding tradition and cultural context. However, such a settlement is likely to prove similar to it predecessors in that it it does not take into account the Algerian realities.

3.7. Public Buildings

Public buildings in this settlement are provided to promote socio-cultural and economic activities. In these buildings, different services are provided for local communities. At a

neighbourhood level, these services are located along the end section of the two minor roads that are present in the central part which constitutes the neighbourhood centre. **(Fig.37).**

In this centre, four buildings of different forms and sizes are present, offering to the local residential people most necessary daily needs. These buildings are supposed to consist of a small supermarket a primary school and nursery. Due to the lack of information about the public buildings, one might suppose that the remaning edifice is for other basic necessities.

However at a higher public level of this settlement, other services are present these latter are located along the inner blocks that are separating the neighbourhoods, forming therefore an entire cross-zone area of public amenities where a high concentration of activities are provided for the inhabitants. This is supposed to be equivalent to the linear souk of an Islamic traditional town. **(Fig.38).**

Unlike the traditional Souk where all public buildings are tightly located along the thoroughfares, here the situation is reversed. Buildings are far more distant from each other standing freely on the ground. As such, they generate another type of public activities where human contact is reduced.

In this urban environment, the consistency of the design principle in terms of building form is maintained for both residential and public edifices. This consistency concerns the sitting of the buildings as a free objects that do not define the open space around them.

Thus, the concept of laying out a town with major roads bordered by prominent public buildings, often visible on all sides found a great favour in this design approach. In fact, public buildings are given imposing facades, scale and sitting. Buildings are shown not only on all sides but from long distances. These aspects seem to not respond neither to the social structure nor to the traditional culture, and even more they neglect totally the climate.

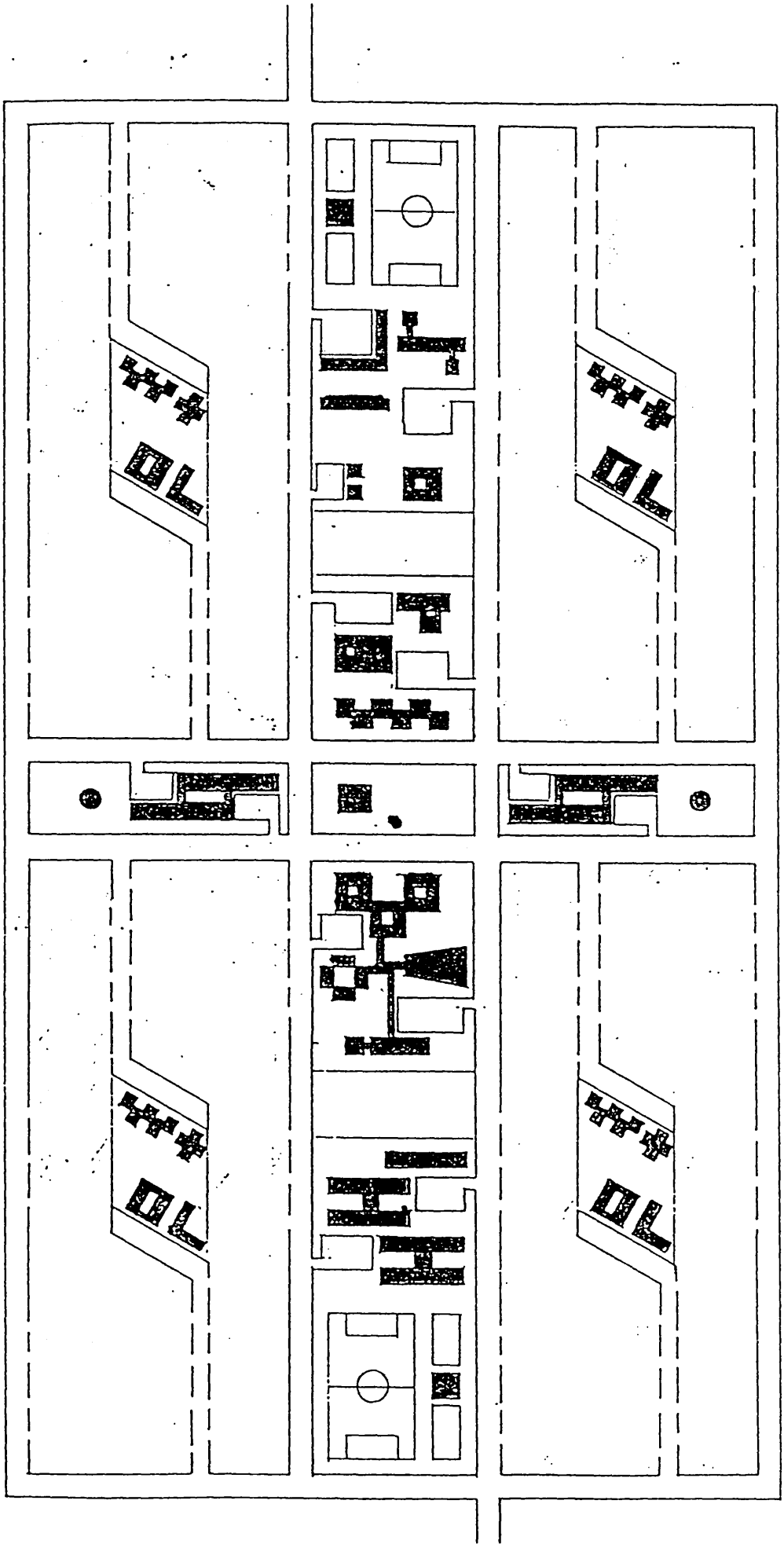


Fig.37. Local and central public buildings.

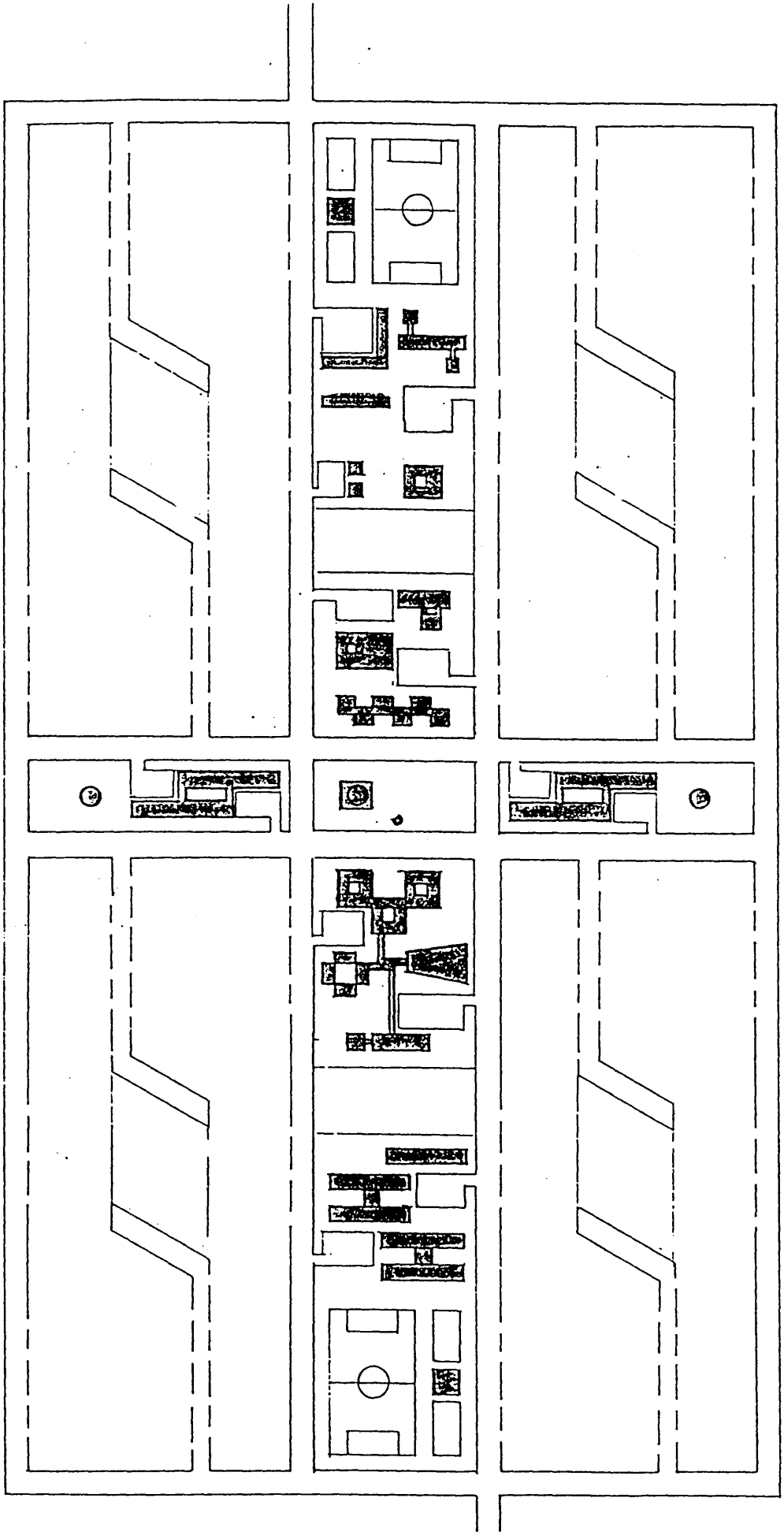


Fig.38. Central public buildings.

Similarly to Islamic cities, where the major Mosque is the strongest landmark of the town due to its location and multiple viewpoints. In this urban settlement, the core is supposed to be symbolised by the main Mosque which constitutes the culturo-religious life. The presence of this biggest gathering public building where the Friday noon prayer is to be performed is located on the central block that forms the junction of the public-cross zone.

Unlike the traditional Islamic urban form where main axes stem form the major Mosque that is very often not at the geometrical centre, in this contemporary urban form, the main Mosque is at the geometrical centre, but does not generate strong and clear axes. Instead, it is a totally isolated public building sitting on a large block that is similar to a traffic roundabout and yet, it is supposed to be the focus of this entire environment. Such an act appears to be a direct result of a concept that is blindly borrowed from the traditional urban environment.

To sum up briefly, public buildings in this housing settlement are first scattered on a large open areas that requires the use of the car second, each one of them is offering a singular service thereby reducing social contacts and the unplanned day to day business that happens in a community.

4. Social Structure

4.1 The New Community

As in most contemporary housing environments, this planned urban model is based on a new type of community organisation. Here, communities - if there are any - are not to be identified according to their profession, ethnic group or geographical origins. The community is no more divided into kinship groups of common identity that were subdivided into a number of extended families as was the case in the traditional environment.

The new community is composed of individuals that belong to mono-nuclear families of different profession, ethnic group and geographical origins. In this context, people are know as

individuals by their family names. Thus a person is no more recognised as a subject who belongs to a certain community but rather as a member of a nuclear family that has neither a strong root nor a clear identity within the social structure of his communitiy.

Because it is a large planted urban environment, the building process is ordered in mass through an agency that considers the case essentially a bureaucratic matter where everybody is thought of as an average person with standardised requirements and needs. Thus the design that follows is automatically aimed for the average man, which in reality does not exist. Such an act is therefore, materialised by uniform buildings forms and open spaces that have inevitably contributed to the creation of this new community which has a weak and confused social structure.

Such a community organisation system helped disrupt the established order of the traditional social structure where people were referred as real members of the community that had specific ranks, identities, profession and even origins. This disrupted order means one can hardly mention the existence of a community spirit as interests within similar urban environment have clearly became rather individual than communal.

4.2. Impact on the urban form

Examining this contemporary urban pattern in terms of socio-cultural and activity systems shows that the social structure ceased to be the main determinant in the design of the spaces. This can be seen at all levels of spatial organisation from the internal spatial distribution of the flat to the way that the block of flats are organised in the neighbouhood and the entire settlement is designed.

The main design principle of this urban pattern is characterised by the physical openess that maximises accessibility at all levels, from the residential building units of the neighbourhood, and to the global urban context. Thus the control of mobility within such a physical environment

appears uncontrolled due to the total loss of hierarchy; the hierarchy that defined and segregated domestic and public life of the community.

In this urban pattern, these two social values are not emphasised but rather belittled and simplified, the new community life has consequently lost its different levels of social communication which requires certain control over social contact. In fact, the hierarchy organisation of spaces that was based essentially on controlling movement, mobility and social contact has altered to a new type of space organisation that depends no more on the hierarchy of domains.

Characteristically, this urban pattern comprises a system of public spaces that do not vary in degree of accessibility and enclosure. All these areas are open places for public use where social contact is unrestricted. These latter represent the domain of both men and women's active life, with an absolute disregard to segregation.

In fact, private areas that are related to family living quarters are not emphasised as a domain of women. Family life that required full privacy is no more a concern. Thus, the significant social characteristic of Islamic culture to segregate public and private life has been widely ignored in this urban environment .

As in most contemporary urban environments, the elimination of space hierarchy in terms of use appear without any doubt as a consequence of an open urban form shaped to suit new outward-looking physical forms, modern communication, and activity system rather than the socio-cultural patterns. This has surely disrupted the pre-existing relationship between social perception and spatial organisation.

The designer of this scheme has produced formulas for determining spacing to achieve adequate sunshine and fresh air around the buildings, he has also produced a wide meeting spaces and large channels for car movement. However, the human factor is noticeably missing from his architectural equation.

The point is, the social life of the traditional street that was "complex" and "overlapping" has resulted in a new architectural form; this form is supposed to mirror these complex relationships without repeating the old form of the street. Unfortunately in similar urban environments, this new form of the street has proved unlikely to promote proximity where relationships breed.

The main mistake in producing a physical environment lacking good community spirit and social organisation is due to the fact that the planner and even the designer advocated essentially one programme for all people in all situations where the technical question became more important that the social one in determining architectural and planning solutions.

The result of such an act will result without any doubt in creating urban areas of weak physical and social identities where public spaces are likely to become no-mansland or even transformed according to people's needs into other kinds of spaces different from what the designer has intended.

5. Physical Development process

Like most contemporary urban environment, the physical development process of this model has been planned and designed mainly by one or a team of designers that prefer essentially standardization to variety. Variety here is refered to the different characters and distinguishing traits that define the people as well as their social structure, within the community.

The generalisation that derives directly from the standardization of the plans is a consequence of the design process which dictates one uniform building that has to be implemented in one single operation in order to gain time and supposedly speeding up the building process.

The physical form of such a contemporary settlement with its identical random slabs, its grid system of roads and its immense open spaces that are often undefined are supposed to derive

from a rationalised and planned type of structure that is offering a comprehensive physical environment for the average man.

In fact, problems of planning and design are believed to have been solved in the office, on the drawing board, bringing an answer to everything. However, whatever the design solutions might be, if they are not related to the context and particularly to the people who are destined to live in this environment, those solutions will always remain inappropriate and therefore rejected.

Although settlements such as this, are very often typified by some designers and others as a clear logical organisation of buildings, open spaces and roads, that represent a striking simple image of the physical environment, their contemporary planning ideas have very often failed wherever they have disregarded the social and aesthetic values of the users.

In fact, Mendes's design shows exactly this point concerning his proposed urban housing, he was not interested on how the Algerian live but how they should live. Thus, assumptions defined by his personal values having assumed that the world shares these values or will soon accept them, he then proceeded to conceive his design, however by and large these values have been rejected.

Urban form, proclaiming that its universal form-language is the logical outcome of a rational approach to design, with new materials and techniques, is a result of modern architecture that is based mainly on functionally adopting rational method determined by practical values which place great emphasis on economy, efficiency and simplicity.

Mendes's settlement is a result of rules set to govern its physical form. However, these rules are neither socio-cultural nor religious, nor even climatic or practical principles, but rather geometrical regularised planning principles and technical regulations based essentially on the rationalisation of spaces.

5.1. Rationalisation of spaces

In the context of Mendes particular environment, the rationalisation of spaces meant that each activity should have its own segregated zone, which itself is determined according to its function and the area that it requires. This area is usually evaluated in terms of square metre per person, number of car per family, or time of sunlight per flat, ect.....

This system of rational approach determined thus the necessary living area of each flat as well as all the required activities that come with this living space, such as access and major roads, parking spaces, playgrounds, open spaces and even the public amenities that housing needs.

This approach, that most architects followed for sometime, is supposed to be comprehensive, i.e. Every single space within the environment is supposed, planned, attributed the sufficient required amount of space and conceived as a clear segregated zone that is presumed to function according to the designer's conceived pattern.

The architect, by using rational methods based on practical values thinks he is achieving the correct solutions. However, an appropriate and accepted physical environment includes not only physical forces that are expressed just in terms of areas and the technology which provides these built areas, but also cultural associations, perceptions and such impractical factors as beauty, which do not easily submit to the vigour of reason.

In my opinion architecture is not an exact science that accepts rational methods due to the fact that, each place where the designer creates an environment has its own context, and belongs to a particular group of people that has that something which makes them different. For this reason architecture and more over the housing environment can not be rationalised because both must reflect human and cultural differences.

Nevertheless when these values are not reflected, which is the case in this housing environment, the result is inevitably a mass-production of block of flats that came through the

adoption of standardization and mass-production techniques. This environment which derives from a wasteful rationalisation of space, is usually offering impersonalised monotonous spaces devoid of all human feelings.

5.2. Planning regulations

Due to the rational approach, planning regulations are written with a minimum standard and are usually practical for the bureaucrat to quantify spaces and densities related to the physical environment. In fact, all the additional physical aspects that are difficult for the bureaucrat to quantify are ignored.

In fact, these regulations are rules made by the people who believe they are for the best but implementing the rules is the problem; they must be implemented uniformly and must be simple enough to implement. However, the environment is not so simple, therefore the implementation of simple and naive rules will give a simple and banal environment. One must admit, complex rules to get a complex environment.

The system of communication that set these planning regulations is from the planner to the designer and last to the user. However such chain of communication requires a new pattern that must put the user at the top, followed by the planner then the designer. This process as it is, is far too long and complicated, taking away from the user anything he might say about his environment.

However, in the case of Mendes's scheme, the most significant planning regulations that helped to shape the urban form concern mainly the zoning system, the roads classification, the parking space ratio, and the building regulations. These latter can be summarised as follows:

1- The zoning consists of the segregation between the neighbourhoods and their activity system that concerns the domestic and public domain. It also segregates the public service area on it own.

2- The road system classifies two categories of routes. One being mainly vehicular that is subdivided into three types (main, minor, and access road), with a minimum of 7 metres carriageway and a minimum of 1.5 metres pavement; the other being entirely pedestrian, generally segregated, and with 5 metres minimum width.

3- The parking space ratio is 1 for every 3 families.

4- The significant building regulations consists of a minimum 8 metres distance to be left between the road and the building facade, and a 20 metres minimum distance to separate two opposite residential buildings.

All these regulations have been faithfully followed by the designer. In this respect, he creates a logical urban environment that corresponds exactly to all the planning regulations mentioned above. However, due to the nature of these regulations that are mainly emphasised on the quantitative aspect of the different spaces involved in the scheme, the other aspects concerning quality are clearly missing.

In other words , if one looks to see if this scheme is successful according to those regulations, the answer is yes, it is a successful one. But, if one tries to look at the other aspects of quality that a comprehensive environment needs, I believe and intend to prove that the answer is no, it is not a successful scheme, because however efficient it is, according to the standards that determined those planning regulations, It is still lacking those qualitative aspects that are so important for a living environment.

5.3. Technical regulation

The technical regulations involved in such a massive operation are not known in their details. However, some technical decisions made by the architect himself and that are significantly affecting this housing scheme can be identified.

The technical decision that the architect made is first of all to design one single house-plan that can develop from two bedrooms to four bedrooms, without changing the general organisation of the layout. This consistency has thus enabled three types of flats that are very similar and most importantly , it has enabled the combination of identical flats which produced identical slabs.

As such, the technical solutions had to be normalised in order to maximise the building process in terms of speed and economy. However, these technical solutions that rely mainly on uniformity to maximise the functional and the constructive problems appear infused with the local feelings and the human scale. In fact, these regulations seem only concerned about the efficiency of the building process and its economic aspects.

According to this, in terms of structures, the residential buildings are designed to be made with reinforced precast concrete elements in order to acheive a uniform and rapid execution. Nevertheless, in the case of the few stilt slabs, the structures of the ground floor levels are to be made with reinforced concrete.[24]

In addition to that, the designer adopted for the three types of flats some common spaces as well as their technical solutions. For example, bathrooms, toilets, kitchens, and logias are identical in all the flats so that sanitary groupment can be achieved within each residential building.[25] These domestic services are normalised in order to acheive a serial of advantage in terms of economy, construction, circulation and also some functional aspects.

6. Conclusion

This chapter aimed to contribute to an understanding of the contemporary urban environments such as Mendes's scheme, by analysing its fundamental physical and spatial character, and by exposing the main principles and design decisions that motivated such urban pattern.

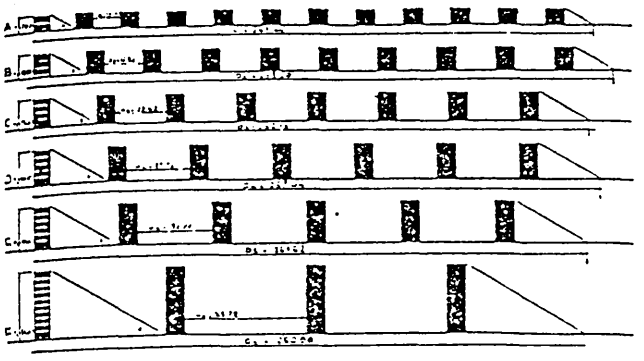
The urban form of this particular model is an application of a Western approach to contemporary housing environment. This approach is pre-eminently characterised by an extremely open and uniform spatial organisation based on modern principles that came through a rational method.

The open character of this urban form derives mainly from the old argument of Walter Gropius who said: In order to loosen-up the city, the slab-like form is the most appropriate solution as when ranged into rows, it creates a free open spaces while retaining the same overall density of population; this solution eliminates also the back-to-back houses and lightless tenement wells, and above all it enables a good orientation towards the sun as this became a basic requirement of any town planning program.[26] Walter Gropuis then emphasised the advantages of this solution by providing a series of diagrams that explain the relationship between the height of the slabs and the spacing between them.**(Fig.39,a,b,c,d).**

Mendes seems to have used the same principles in determining the distance between the buildings in order to acheive day light illumination, sun exposure and air ventilation for each flat within the slabs. However, he seems to have designed cleverly these spacing areas to squeeze in all the required parking spaces. With regard to light, sun, air and parking space, this urban form appears then achieving a rational spatial organisation.

However, the uniform spatial organisation of this urban pattern derives from the standardization of the residential buildings that is composed of three very similar slab units, as well as from the systematic geometrical order that the design preconceived.

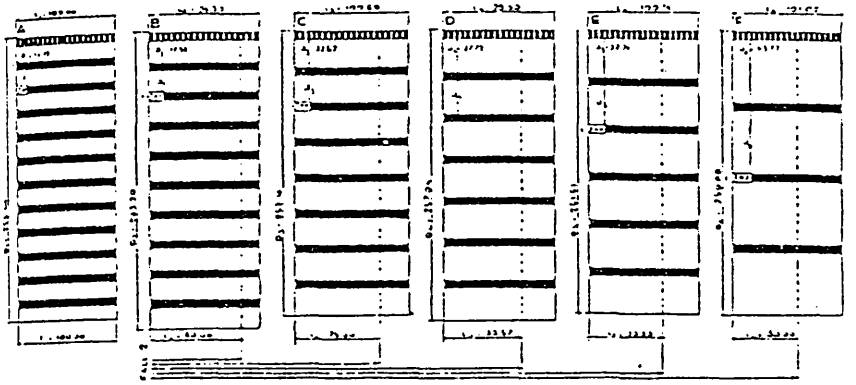
In fact, Mendes used one unique typology : the outword-looking slab. This unique typology is the ruling instrument upon which form depended. This formal singular arrangement of buildings offers uniformity in order to speed up the building process and to reduce the cost. The elements used are minimised so that the production process of the different elements can be maximised by means of prefabrication.



a.

Diagrams illustrating the development of a rectangular building site with parallel rows of dwellings of different heights, from the one-story row houses to the ten-story apartment blocks.

On the same site, slablike, ten-story buildings result in much broader green spaces between buildings than the narrow spaces between walk-ups or row houses.

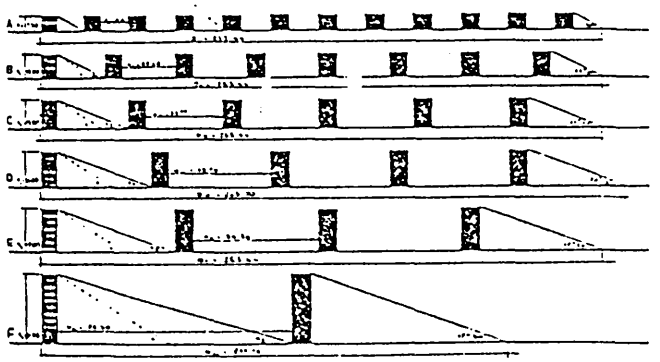


b.

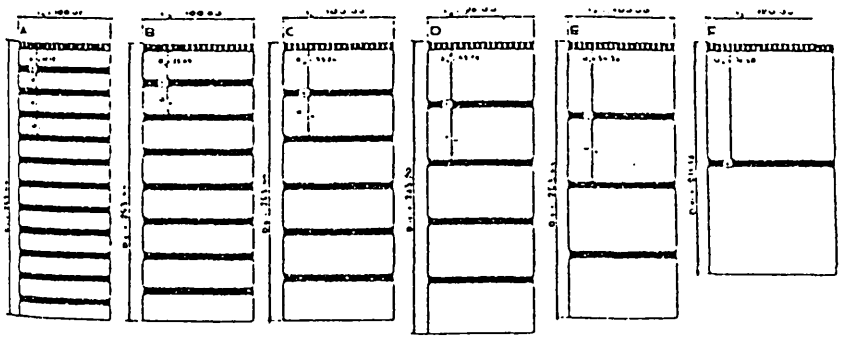
First example **a**, **b**.
If the size of the ground and the illumination angle (sun exposure) remain the same, the number of rooms increases with the number of stories.

Second example **b**.
If the illumination angle and the number of rooms remain the same, the size of the ground diminishes as the number of stories increases.

Third example **c**, **d**.
If the size of the ground and number of rooms remain the same, the illumination angle diminishes, the sun exposure improves.



c.



d.

Fig.39. Diagrams of Walter Gropius principles.

So far, the principles and decisions cited above appear favouring an efficient, rational and healthy environment to manifest even though, there are some questions that cannot have satisfactory answers. Because this scheme is destined to Algerians, one might ask simple questions that relate to the climatic considerations of Algeria, to the privacy aspect that is so important to family life, and finally to those questions that point out the socio-cultural requirements of the people.

In fact, aspects such as climatic requirements or privacy are in conflict here, due to the nature of the extrovert building form. If privacy requirement pushes buildings apart, the hot Algerian climate suggests the opposite by closing up buildings to each other in order to provide shade. Beside this, in Mendes's alternative as in most contemporary housing environment present in Algeria, there is no emphasis on spatial hierarchy that reflects the social pattern. Indeed, this open spatial organisation does not favour social contacts, but instead, it favours other new contacts of modern life that are mainly based on cars and technological communications.

To sum up briefly, the evolution of the Algerian housing environment since the early colonial period until today has brought radical changes to both building and planning process, starting by the Military Urbanism that had mainly political goals, while ignoring the pre-existing traditional urban pattern; this has been followed later by many foreign experiments of new planning ideas that prevailed during that time.

The result of this Western influence has meant that even after independence, the physical environment had to be determined by foreign theories and principles. This situation has persisted unchanged till recent times, eventhough a large amount of signs proved that it is inefficient and inadequate for Algerian society.

Most contemporary environments such as Mendes's, are designed and built with reference to quantitative, scientific and technologic principles that to an extend ignored the human scale. This has helped to disrupt Islamic requirements for family life. It has also helped to weaken

social relations. In other words, the environment became mainly emphasised on its prescriptive physical regulations rather than on social behaviour.

In short, this contemporary urban form seems working perfectly at a superficial level; every aspect appears to have been designed with a great thorough and meticulous emphasis. Yet, it came through the analysis that there are so many questions, especially those related to the people and their context, that are conflicting. Thus to decide and prove if this type of urban form is appropriate to Algerian context, a close and thorough analysis of the building form is required in order to reveal even better the evaluation of such a pattern.

References

1. Saalman, H. Haussman: Paris transformed. Planning and cities. George Brazillier, New York. 1971.

2. Ibid. p.14

3. Castex, J. Formes Urbaines: De l'ilot a la barre. Collection Aspects de l'urbanisme. Dunod. Paris. 1977. p.19

4. Benhamouche, M. The role of the courtyard in contemporary housing. The case of Algiers. Thesis. University of Newcastle upon Tyne. 1986. p.21

5. Settouane, F. Plea for the courtyard house. Thesis. University of Glasgow. 1986.

6. T. A. N°: 329. Special Algerie. 1980.

7. Ibid.

8. Houghton, Evans, W. Architecture and urban design. The Construction Press. London. New York. 1978. p.67

9. Deluz, J. J. Apercu critique sur l'architecture et l'urbanisume. E.P.A.U. Alger. 1979.

10. Ibid. p.53

11. T. A. N°: 329. op, cit.

12. Le Corbusier. The radian city. Faber and Faber. London. 1954. p.226

13. T. A. N°:329. op, cit.

14. Deluz, J. J. L'urbanisme et l'architecture d'Alger. "Apercu critique". O. P. U. Alger. 2nd ed. Pierre Mardaga. Liege. 1988. p.142

15. El Moudjahid Newspaper Article Algeria. 23/01/1983.

16. El Moudjahid Newspaper Article Algeria. 20/02/1985

17. Quotations These are quotations from an official architect at the Ministery of Housing and Construction, Algeria. 1986.

18. Mendes, J. Dossier des plans. Ministery of Housing and Construction, Algeria. 1986.

19. Ibid

20. Ibid.

21. Ibid.

22. Ibid.

23. Ibid.

24. Giedon, S. Walter Gropious and team work.
Architectural Press, London. 1954. pp.79-82.

Chapter 3: BUILDING FORM ANALYSIS

1. Description of the building forms

1.1. The cluster unit
1.2. The slab unit

2. Comparative study

2.1. Selection of the housing criteria
2.2. Performance and evaluation
- 2.2.1. Land-use efficiency
- 2.2.2. Density evaluation
- 2.2.3. Economic efficiency
- 2.2.4. Climatic efficiency
- 2.2.5. Territoriality
- 2.2.6. Privacy performance
- 2.2.7. Sense of community
- 2.2.8. Visual aspect
- 2.2.9. Movement performance
- 2.2.10. Flexibility performance

3. Conclusion

1. Description of the building forms

For a better understanding in terms of efficiency and performance of both traditional and contemporary environment , it is necessary to analyse and compare the building forms which are at the very bases of such urban pattern.

The determining building form of the traditional pattern, as seen in the Casbah is the courtyard house which led to the formation of an enclave: The cluster. However, the contemporary pattern, such as the model of Mendes Junior, is a result of the flat as a determining form which led in these circumstances to the formation of the slab.

1.1. The cluster unit

In the traditional environment, the cluster unit was a result of a dense incremental development of courtyard houses. The cluster unit selected for this study is the cluster *"Lalahoum"*. It is an enclave situated on the East part of the Casbah.**(Fig.1)**. This cluster is bordered by four streets and has an irregular geometric form. It is located on a slop and contains 17 plots on which courtyards houses of different sizes stand.

It is worth to note that, two houses located at the middle of this cluster are missing in the original plan. However, for the sake of this study, it is thought necessary to do reconstruction plans of these two houses similarly to the others in order to give a complete plan of the cluster. Today, this cluster is partly demolished due to some rehabilitation work.

1.2. The slab unit

In most contemporary environments the slab unit is a result of a planned housing where identical houses are pilled in thin straight blocks. The most common block of flats is the slab. The slab unit selected for this study is from Mendes's scheme. It is a linear slab, " type 1". This latter has been chosen because it is the most frequent building unit in the scheme.**(Fig.2)**.

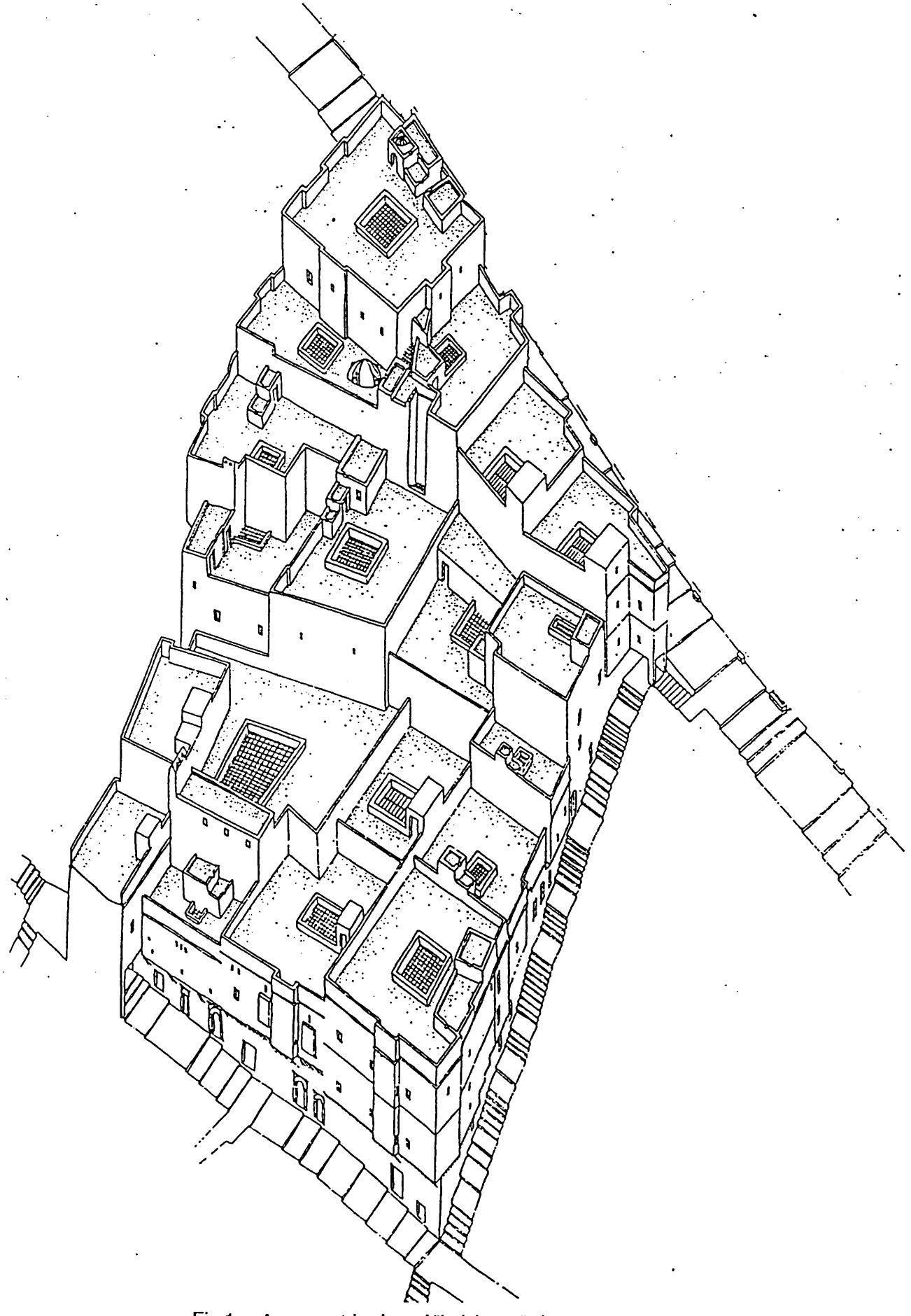


Fig.1. Axonometric view of "Lalahoum" cluster.

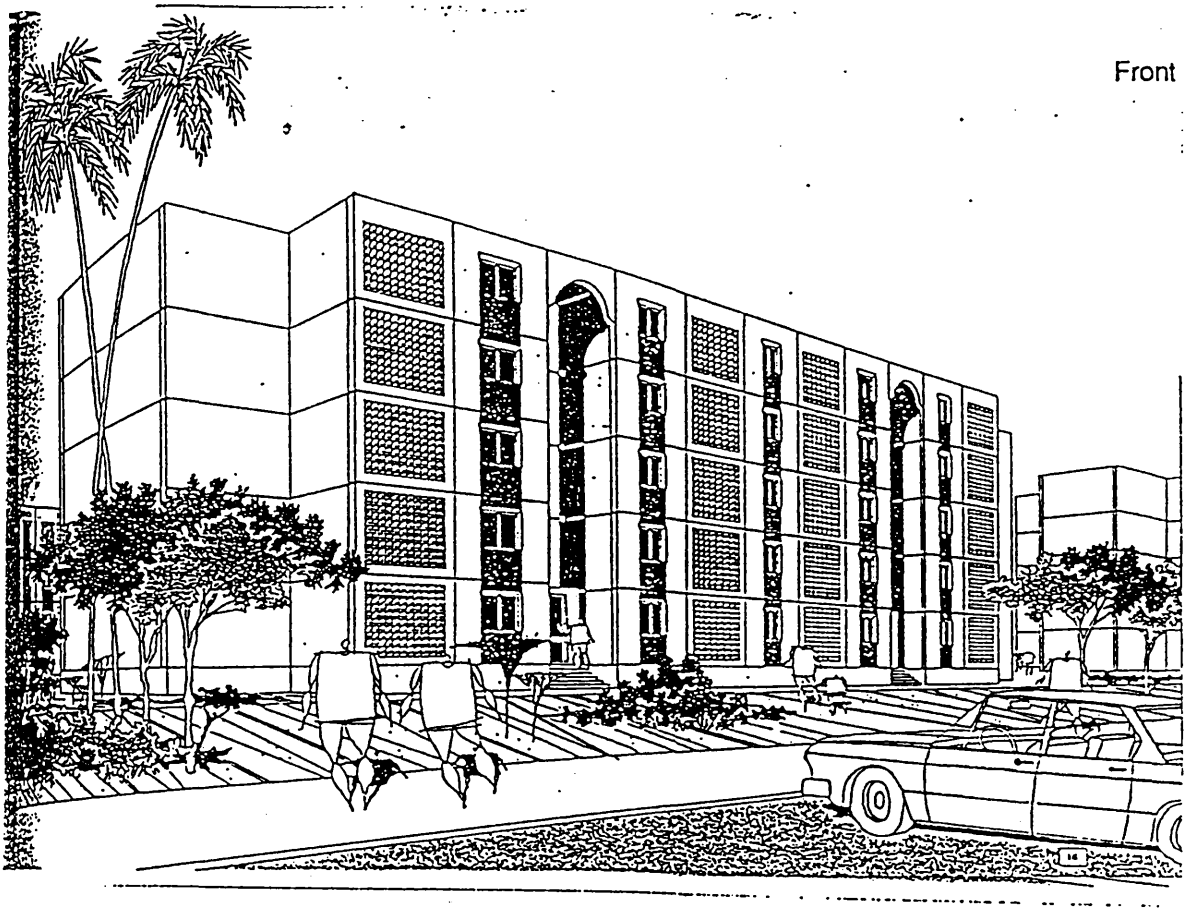
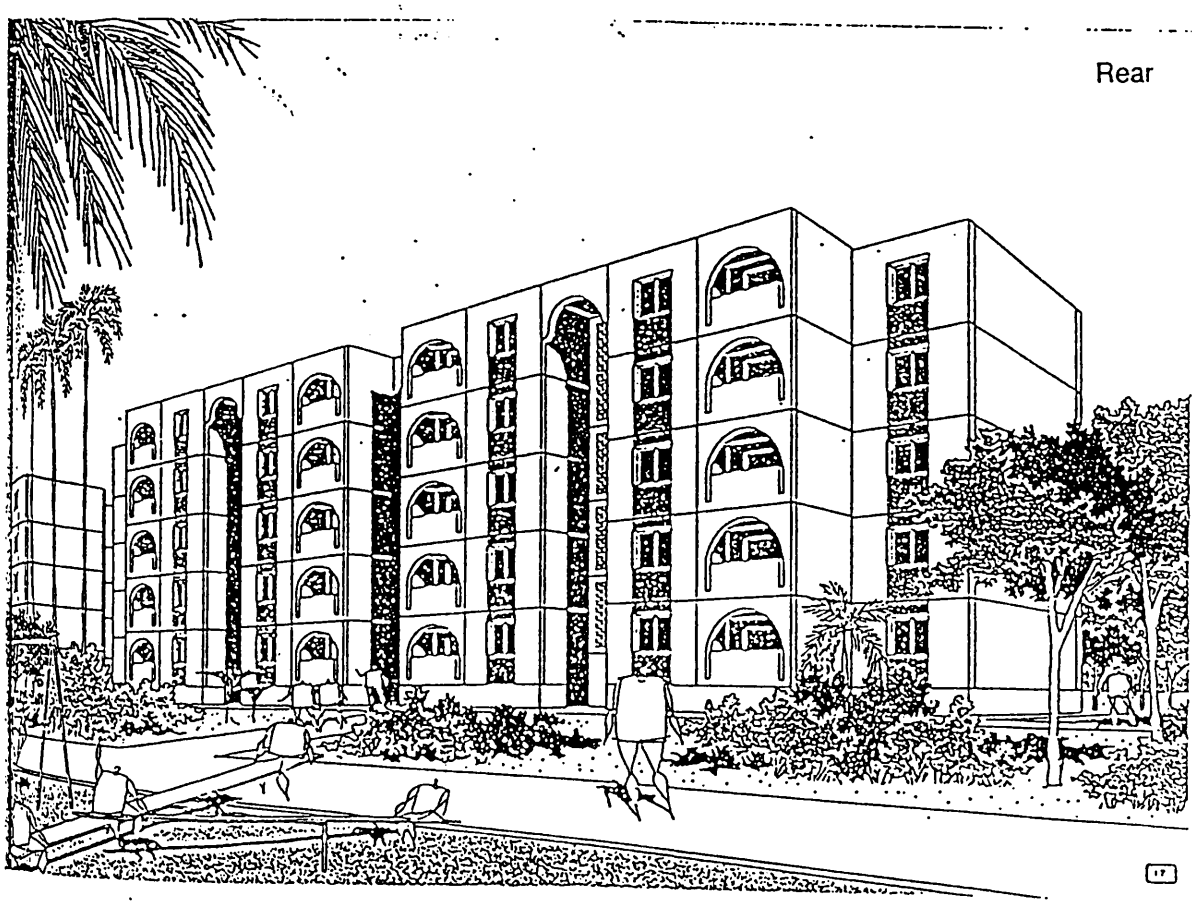


Fig.2. Perspective views of the slab.



This slab is bordered by identical units on both North and South sides. It is a 5 stories high building containing 2 staircases that serve 4 flats per floor.

2. Comparative study

2.1. Selection of the housing criteria

To be able to compare and evaluate each building unit in terms of performance and efficiency, 10 criteria have been carefully selected in order to speculate on building form with a constant reference: the Algerian context. The selection of these criteria is achieved by referring to the two previous chapters **(Part two, Chapter 1,2)**, in which the determining aspects of both traditional and contemporary urban forms are examined. All the 10 criteria will enable a comparative study to decide on the evaluation of each building type.

In addition, these criteria are thought adequate and responsive enough to go a long way to correct the present housing situation described in **(Part one, Chapter 2)**. For example, problems such as loneliness, lack of territory and lack of external shade that are existing aspects of all contemporary housing, can be avoided if for instance, criterion such as land-use is respected; efficient land-use means also a provision of greater external shade and clearer effective territory.

Criterion such as this can therefore adjust the design adequacy of housing to the Algerian context. As seen earlier **(Part one, Chapter 2)**, if some criteria are not respected, the users, what ever alterations they may make, they still cannot solve the physical nature of the environment.

However, the prime concern of the comparative study is with the physical nature of the two different units and their potentialities with regard to criteria that are thought to be basic to determining the quality within the housing environment. The second concern is the performance of these different aspects, their interpretation and more significantly, their impact

upon each building form in terms of space requirement. These criteria of measure and analysis are as follows:

Criteria

1- Land-use	6- Privacy
2- Density	7- Sense of community
3- Economy	8- Visual aspect
4- Climate	9- Movement
5- Territory	10- Flexibility

2.2. Performance and evaluation

2.2.1. Land use efficiency

Using land efficiently means no waste of land is permitted, therefore a reduction of certain areas as well as a provision of multi-use of some areas (overlapping system in term of land use) can be very significant. Efficiency is regarded also as a more effective use of the open spaces. This criterion will enable us to determine how much building land is obtained by various building form of different layouts, how much land has been allocated for open spaces and roads , and last how much land has been wasted.

a. Cluster unit performance. **(Fig.3).**

Land-use	Area	Percentage
Built up	1014 m^2	64.75 %
Private open space	306 m^2	19.54 %
Street	246 m^2	15.71 %
Site	1566 m^2	100.00 %

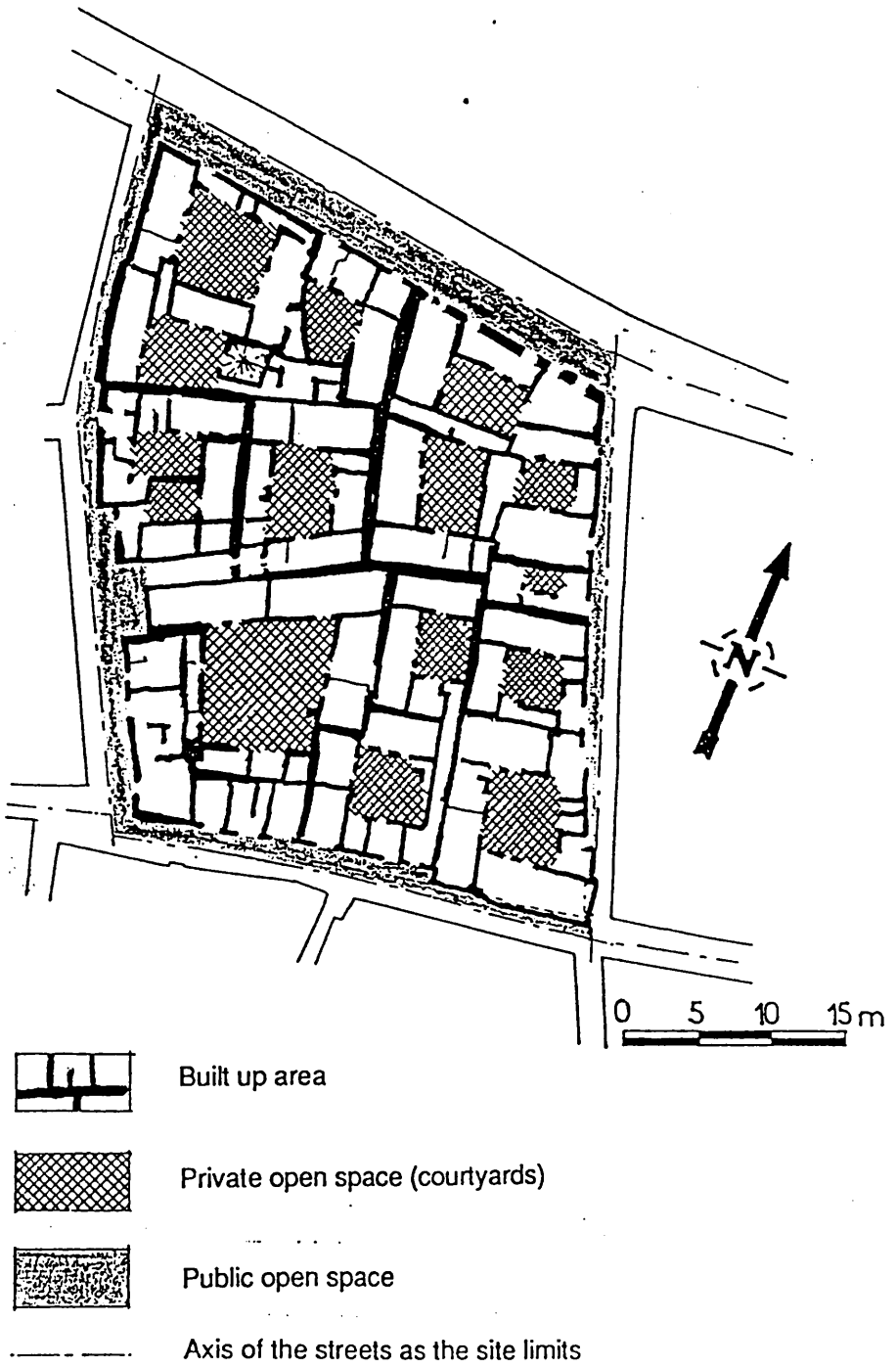


Fig.3. Land use in the cluster unit.

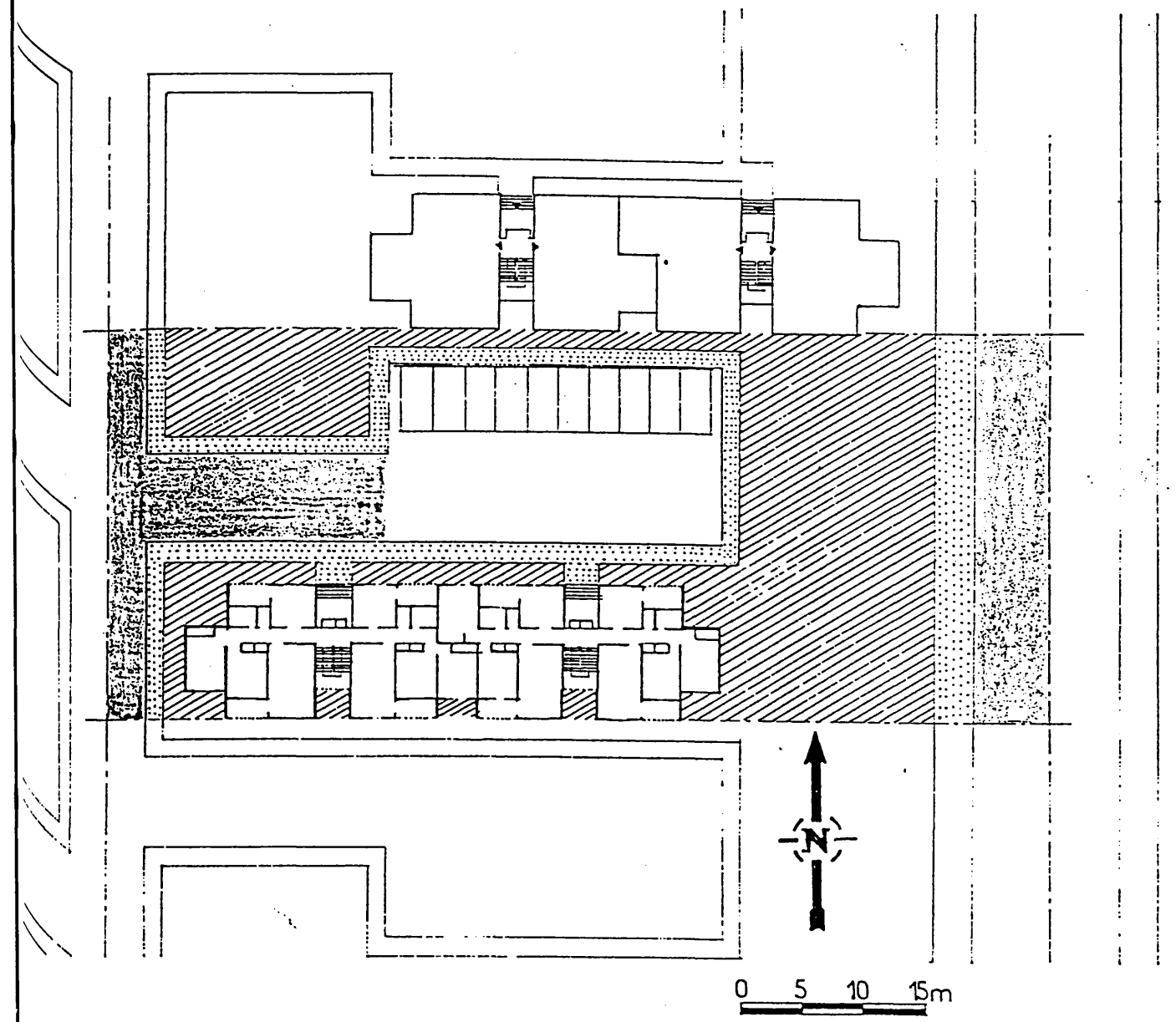
b. Slab unit performance. (Fig.4).

Land-use	Area		Percentage
Built up	375	m^2	16.80 %
Public open space	787	m^2	35.46 %
Road	409	m^2	18.45 %
Pavement	284	m^2	12.79 %
Parking	364	m^2	16.50 %
Site	2219	m^2	100.00 %

It is worth noting that, the built up area i.e. (building land coverage) that is determined by the cluster unit includes also the access area. In this case, it represents the cul-de-sacs and the "skifa"(s) (entrance areas) which are sometimes both private. This access area at ground level is 79 m^2 and represents 5 % of the entire site area. Similarly, the built up area in the slab unit includes the access area. In this case, it is located within the building itself (lobbies and stairs). This access area at ground level is 28.04 m^2 and represents 1.26 % of the site area. However, this access area is repeated at each level within the building itself (5 levels).

Note that the total open space area in the cluster unit occupies 35.25 % of the site , however 19.54 % of this, is for private open space: the courtyards. Thus only 15.71 % is left for the public open space, which is in fact the street area. By contrast, the total open space area in the slab unit is 83.20 % (5 times more) and is entirely public.

The interpretation of the analysis shows that both building units have a comparable pedestrian access area i.e. the street area that the cluster unit requires is almost the same as the pavement area of the slab unit. In addition to these pedestrian access areas that both unit need, the cluster requires 20% open space (courtyards) in order to meet the requirements such as ventilation, light and privacy.



Built up area

Public open space

Pavement area

Road area

Parking area

Axis of the roads as the site limits

Fig.4. Land use in the slab unit.

By contrast, the slab requires at least 35% open space (roads, parking spaces) in order to satisfy its requirements which also include the accommodation of the car. Thus, the slab unit needs nearly twice more open space than the cluster unit in order to acheive its requirements. Eventhough, if this 35% is acceptable, since the slab unit benefit from the use of the car that is totally rejected in the cluster unit, it still has an extra 35% open space that is undefined. This latter is simply a consequence of both the physical nature of the slab and the layout that it generates.

However, it should be noted that, supposing that we add to the cluster unit a parking space and a road area that are similar to the slab unit, the total open space that the cluster unit will have is 20% (courtyards) + 15% (streets) + 35% (parking space and roads) equal to 70%. It is still 13% less open space than what the slab unit is using. This also means that the cluster unit needs a 548 m^2 of extra land in order to accommodate the car.

In theory, the slab unit sounds more efficient than the cluster unit since logically it requires only 48% open space i.e. (road, pavement and parking space) which is also considerably lower than the 70% that the cluster unit requires if it has to accept the car. However, due to the physical nature of the layout, the slab unit wastes 35% open space which is equivalent to 776 m^2.

In terms of multi-use, the cluster unit has an elaborated overlapping system of open space i.e. the courtyards are not only used to provide light, air and privacy, but also used as a private space. Whereas, the slab unit does not obey perfectly to this rule, even though it has an overlapped use zone that provides parking space, roads, pavements at the same time by separating the slabs, this zone is achieving a kind of privacy that is expressed in distance. In short, the slab unit has a less elaborated overlapping system than the cluster unit, and is considerably less efficient than the cluster unit.

2.2.2. Density evaluation

This criterion in itself if taken as a number of persons per area or per dwelling does not reveal the living condition of an environment. Therefore to ensure that families are provided with an optimum total environment "in" and "around" the dwelling for both comfort and heath, it is necessary to have in mind the Algerian context, because habits, standards and customs, as well as the services available, have a considerable bearing on this problem. The unit of measurement of persons or dwellings per hectare taken alone can be misleading, and is not necessarily a relevant indication of actual living conditions. Thus we will accept satisfactory densities of different layouts as the ones which provide a high number of people and dwellings on the identical area. Simultaneously, this layout should respond to all other criteria. Our concern is to examine the density of living area per hectare which also reflects the plot ratio and the floor ratio or (FAR), the net density of dwelling per hectare , and the net density of people per hectare considering a constant rate of occupancy that is equal to 6 persons per dwelling. Finally we will examine the living area per person.

Note: The total living area in the cluster unit is 2322 m^2, housing 185 people.

The total living area in the slab unit is 1506 m^2, housing 120 people.

Densities and ratios		Type of unit			
		Cluster		Slab	
Density of living area D.Lv m^2/hectare		14827	m^2/ha	6786	m^2/ha
Plot ratio	P.R	0.59		0.15	
Floor ratio	F.A.R.	1.48		0.67	
Net density person/hectare	Dn	1182	p/ha	540	p/ha
Net density dwelling/hectare	Dn	197	d/ha	90	d/ha
Living area / person m^2/person		12.5	m^2	12.5	m^2

The first observation indicates that even though the living area per person in both units is the same (12.5 m^2/person), the cluster unit offers more than twice living space per hectare than the slab unit. Thus, the cluster unit has a higher net density of people per hectare, it accommodates twice more people than the slab unit can acheive. In other words, the cluster unit offers twice the number of houses than the slab unit. This is also confirmed by the floor ratio of the cluster unit that is twice higher than the floor ratio of the slab unit.

In terms of plot ratio, the slab unit , due to its physical nature has relatively low plot ratio which explains also its very small land coverage when compared with the cluster unit. However, as observed previously, most of the remaining open space (35%) can be interpreted as waste land, because it is undefined. It is just there due to the physical nature of the slab and the layout that the designer preconceived.

In short, it is possible to conclude that the cluster is twice more efficient than the slab unit , because it can accommodate twice the number of people than the slab unit.

2.2.3. Economic efficiency

This criterion will determine which building form is more economic. Economic, in terms of governmental maintenance, and affordability according to land-use budget, in terms of infrastructure. Our concern is to determine for each building unit, how much road area is needed to create 100 m^2 of living area, how much access area is needed to serve one dwelling, how much open space is needed per 100 m^2 of living space and per person, and how much external wall and roof are needed to enclose 100 m^2 of liveable space. Finally we will examine how much parking area is needed per 100 m^2 of living area. All these economical aspects will determine which building form is more economic.

Note:	In the cluster unit	the access area is composed of the driba(s) and the skifa(s). the road area is composed of the streets.
	In the slab unit	the access area is composed of the staircases. the road area is composed of the roads and the pavements.

Area / dwelling or / 100 m^2 of living space	Type of unit			
	Cluster		Slab	
Access area / dwelling	2.32	m^2	7	m^2
Access area / 100 m^2 of living space	3.4	m^2	9.29	m^2
Road area / 100 m^2 of living space	10.50	m^2	46	m^2
Public open space/ 100 m^2 of living space	10.5	m^2	122	m^2
Public open space/ person	1.32	m^2	15.36	m^2
Roof area / 100 m^2 of living space	43.66	m^2	24.9	m^2
External wall area / 100 m^2 of living space	186	m^2	132	m^2
Parking area / 100 m^2 of living area	0	m^2	16.33	m^2

In terms of economic efficiency, the direct observations that can be made are first of all, the slab unit requires about 3 times more access area than the cluster unit. However, it should be noted that the access area that serves the cluster unit is at ground level, and does not require considerable investment, whereas the access area that serves the slab is located in the staircases and surely requires high financial investments to be built.

In addition to that the staircases demand also maintenance services that are expensive and usually supported by the authorities, but in the case of the cluster unit, the cost of maintenance of the driba(s) and skifa(s) is first of all financially lower, second it is usually supported by the users because they are mainly semi-private and private areas.

Secondly, the slab unit requires nearly 5 times more road area than the cluster unit, and that is just to accommodate the car. It should be noted, however, that it is difficult to compare the two road areas due to their different nature; one is for both pedestrian and vehicular movement, whereas the other is only for pedestrian movement and rejects entirely the car.

However, in terms of public open space which also include road, pavement and parking area, the slab unit requires 12 times more public open space than the cluster unit. To be more

precise about this, it should be noted that for each 100 m^2 of living space, the slab unit requires 122 m^2 of open space in order to function, whereas, the cluster unit requires only 10.5 m^2.

With regard to roof area, the cluster unit requires twice roof area than the slab unit. However, the roof area of the cluster has the advantage that it can be used as accessible terraces, whereas, the slab's roof is just a shelter and has no other functions.

In terms of external wall area, the observation shows that the cluster unit needs 25% more external wall than the slab unit to provide 100 m^2 of living space. However, the cluster's external wall can be made from simple load bearing construction, whereas the slab unit, because of its height, requires an accuracy and a higher technology.

In terms of parking space, it is obviously difficult to make any statement at this stage since only one building form accepts the car. However, it is important to note that, the cluster unit as it cannot accommodate the car on its immediate surroundings but, it is still always possible to integrate the car either at some distance from the cluster and that means without disturbing its physical nature or by enlarging its surrounding streets; at the periphery this would entail no greater walking distance (50 m) than in the slab unit.

In short then, it is possible to conclude that the cluster unit is 3 times more economic than the slab unit in terms of access areas, it has a lower maintenance cost of the access areas (it is provided by the users), it provides more living space by using identical external wall area as the slab unit, and it uses 5 times less road area than the slab unit, and 12 times less open space than the slab. However, one should keep in mind that the cluster unit needs considerable improvement in order to accommodate the car.

2.2.4. Climatic efficiency

This criteria will determine to what extent the building form works with nature. Nature is here used to denote designing buildings which cope with natural elements such as sun, rain and

wind. The concern of this study will be limited only to those aspects of sun protection being the most important, such as reducing wall exposure to sun and creating more shade on external walls. In addition to protection, the type of building form should provide an opportunity for cross ventilation. This criterion should evaluate the quality determining factor of climatic comfort within the cell itself as well as in its surroundings. In other words our concern here is to shelter from the sun and its effects in both building form and outdoor spaces. Our interest is to determine how much external wall area is exposed to sun, what provision of shade is allocated for the surrounding spaces, and what kind of ventilation is provided. We will assume that the worse case governs in this situation. We will consider a summer day, 21st of june, at 12.00 hrs and at 15.30 hrs true solar time, and at a region of 35° latitude. **(For climatic data, see appendix 2).**

a. External wall exposure to sun.

It is a summer day, 21 st of june. Latitude 35°.

1- Conditions: **(Fig.5,6).** True solar time 12.00 hrs

Altitude angle 70°

Azimuth angle 180° or 0°

Type of unit	Total external wall area		External wall area exposed to sun		Percentage
Cluster	3360	m^2	770	m^2	22.91 %
Slab	1674	m^2	650	m^2	38.82 %

2- Conditions: **(Fig.7,8).** True solar time 15.30 hrs

Altitude angle 45°

Azimuth angle 90°

Type of unit	Total external wall area		External wall area exposed to sun		Percentage
Cluster	3360	m^2	510	m^2	15.17 %
Slab	1674	m^2	164	m^2	9.79 %

1- Conditions: True solar time 12.00 hrs
Altitude angle 70°
Azumuth angle 180° or 0°

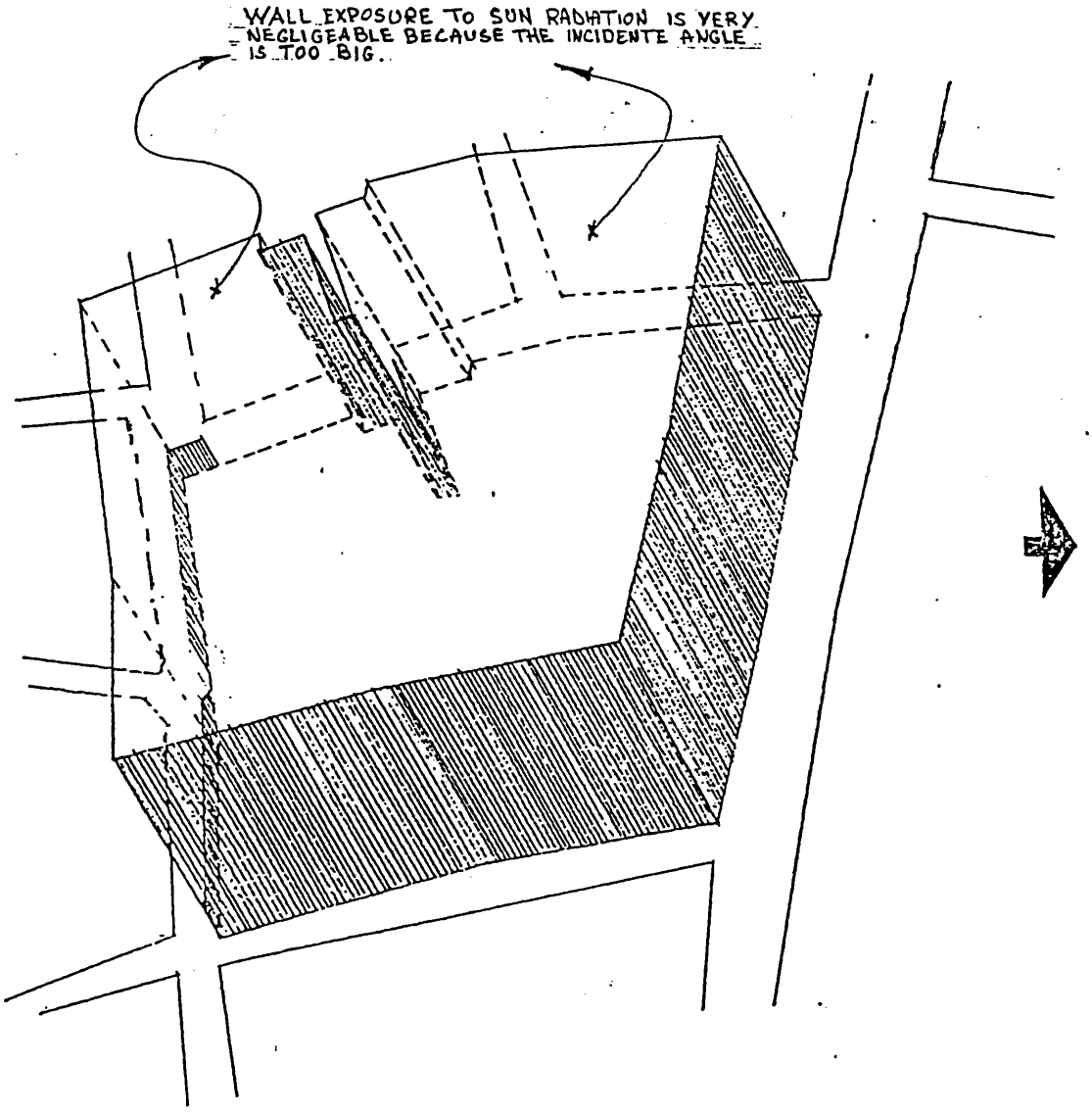


Fig.5. External wall exposure to sun radiations in the cluster unit.

1- Conditions: True solar time 12.00 hrs
Altitude angle 70°
Azumuth angle 180° or 0°

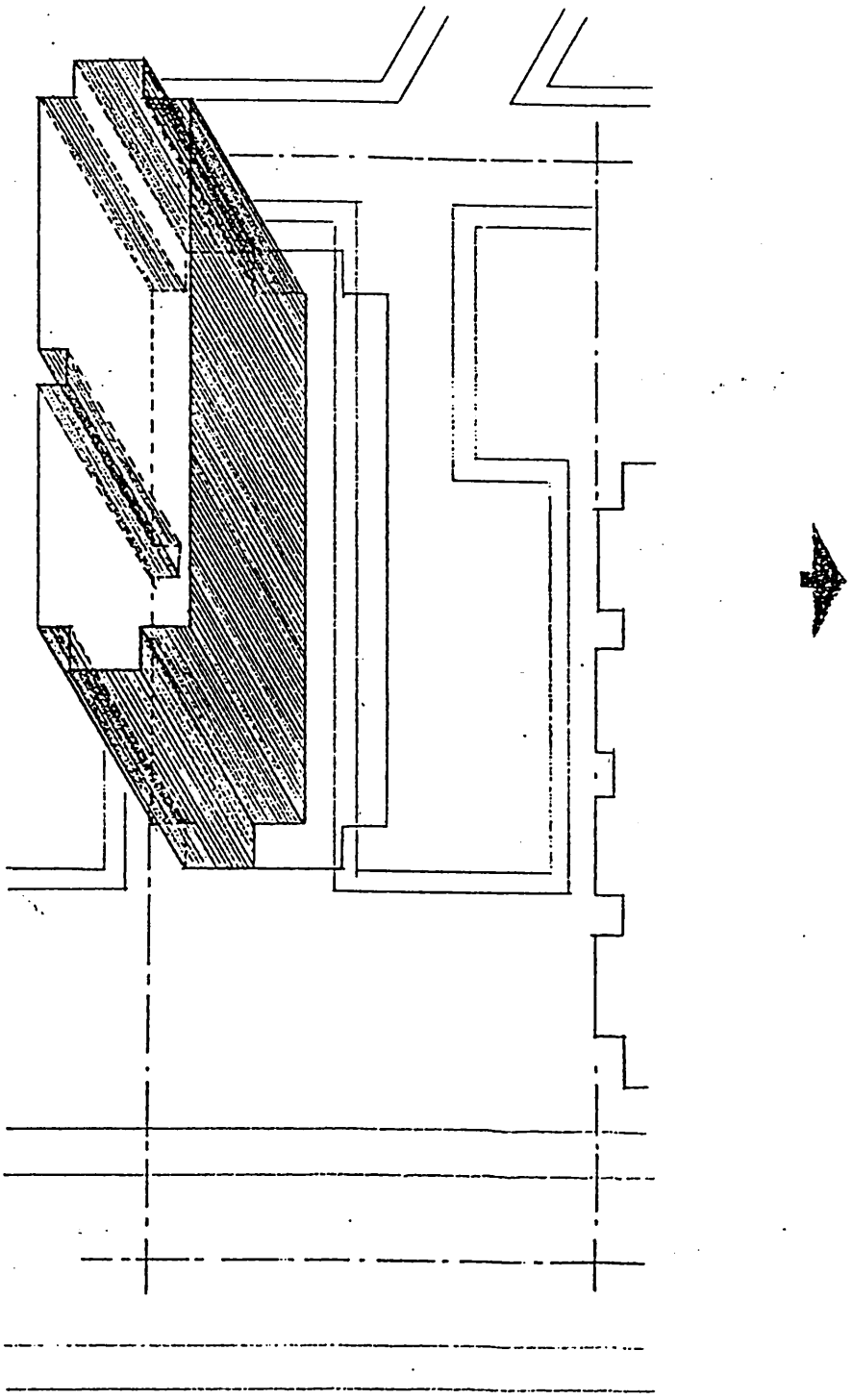


Fig.6. External wall exposure to sun radiations in the slab unit.

2- Conditions: True solar time 15.30 hrs
Altitude angle 45°
Azumuth angle 90°

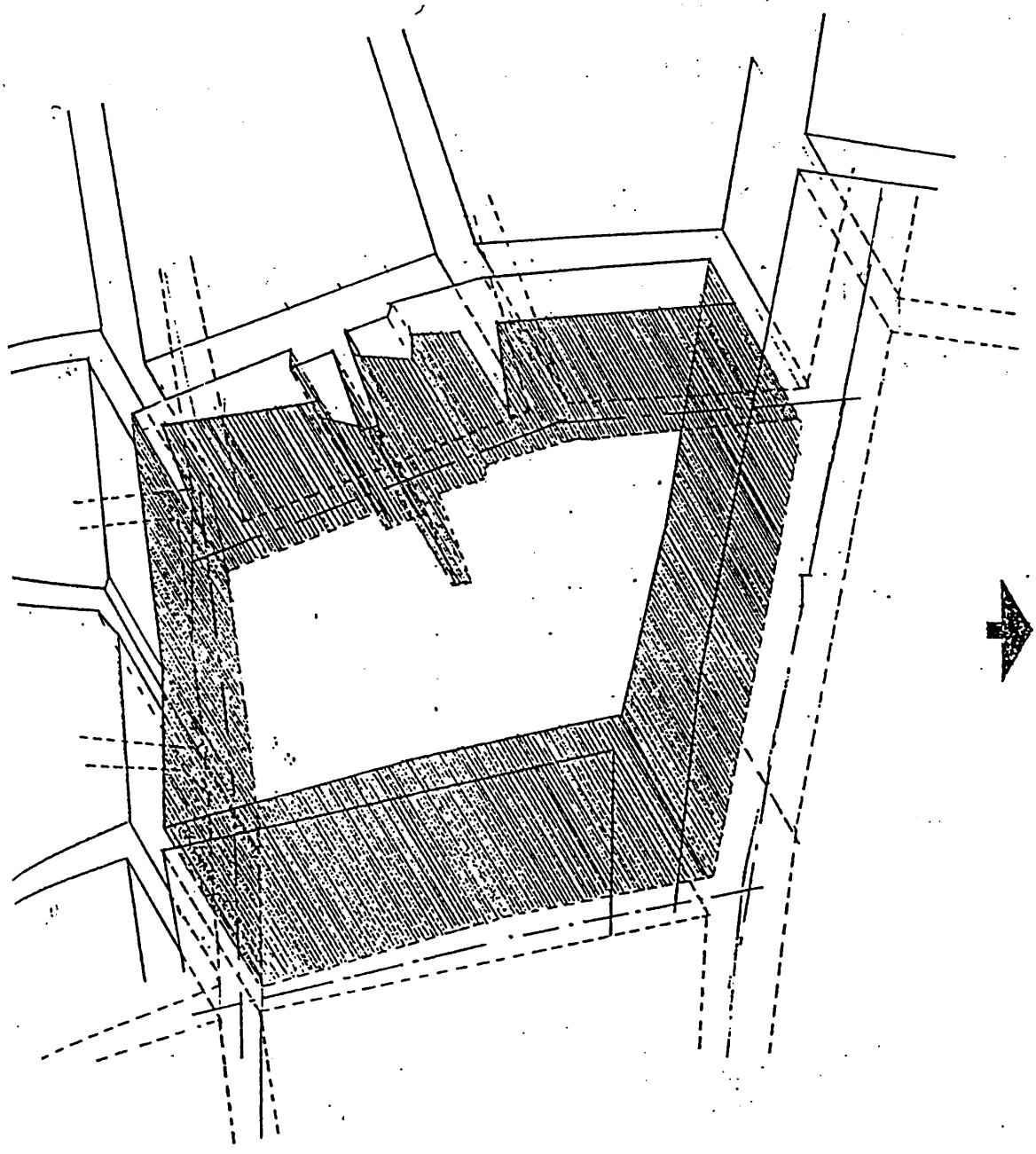


Fig.7. External wall exposure to sun radiations in the cluster unit.

2- Conditions: True solar time 15.30 hrs
Altitude angle 45°
Azumuth angle 90°

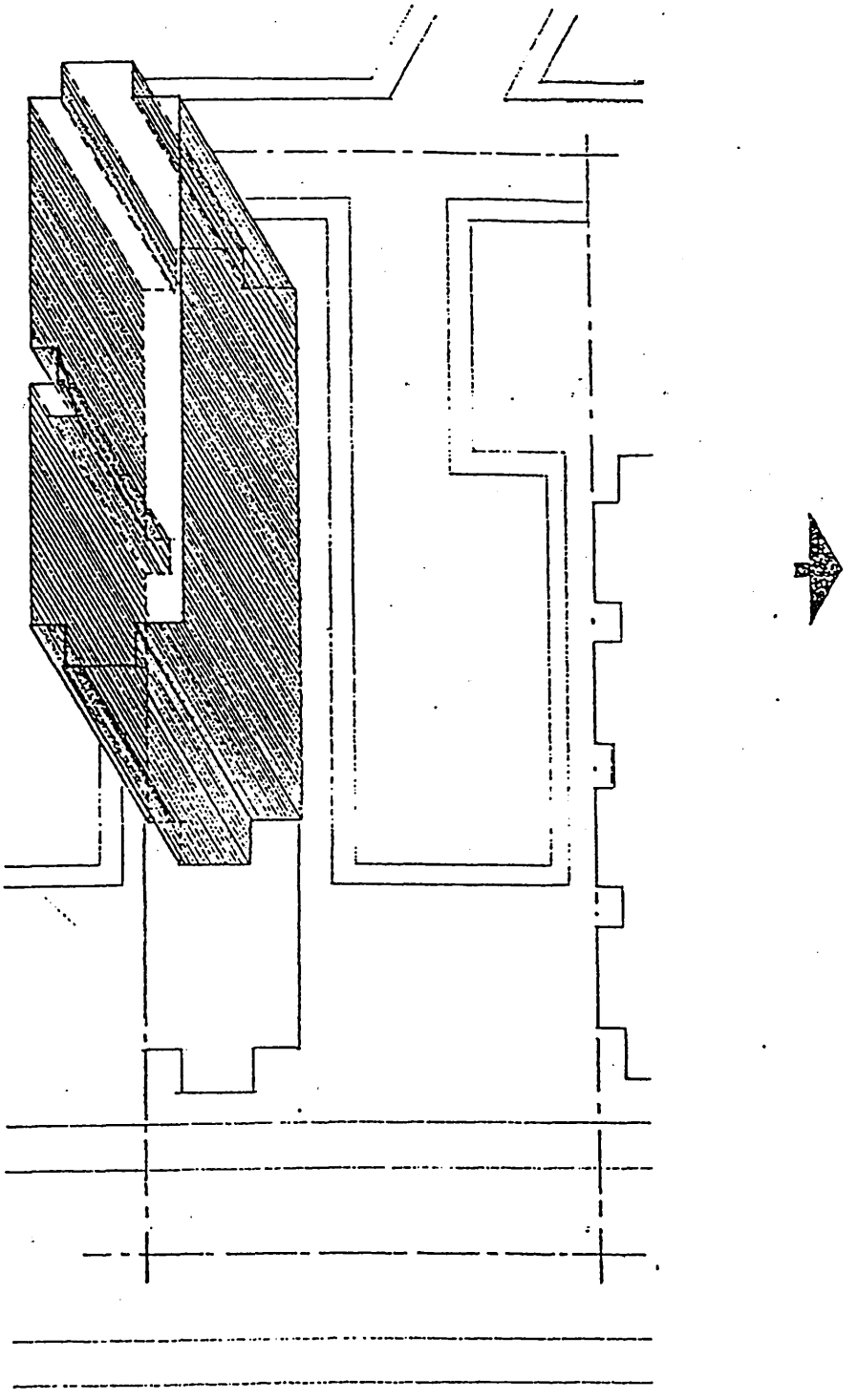


Fig.8. External wall exposure to sun radiations in the slab unit.

It is unrealistic to refer to solar radiations with out mentioning the impact that the radiations have on the roof area. It is important to note that the maximum impact of solar radiations is on the roof area of both units. According to this then, the cluster unit should logically gain more heat due to its large roof area **(see 2.2.3. economic efficiency)**, however, due to the vertical layout of the courtyard houses that is usually 3 stories high, the upper floors are often used only for night activities, such as sleeping, and therefore the impact of the radiations becomes less relevant depending also on the construction (thick and dense material means long time lag and weak heat transfer). According to these characteristics, the roof exposure cannot be the main issue, besides, the roof of the cluster offers better option use. This is to say that, the heat gained by the roof can be avoided either by using the lower floors or by using the terrace itself at night, where it is very pleasant during summer periods.

In terms of external wall exposure to solar radiations, the observations show that, at 12.00 hrs, when solar radiations are at their maximum, the external walls of the cluster are less exposed by about 16%. Besides, solar radiations that strike on the cluster's external walls are less significant since these latter do not have important windows, whereas, solar radiations that affect the slab's external walls are striking directly onto large glassed windows which reflect a considerable heat into the flats. But, at 15.30 hrs, when the solar radiations are less intense, the external wall of the cluster unit are more exposed by about 5%. However, it should be noted that, the time lag in traditional courtyards houses is at least 8 hours, which means by the time the heat should defuse into the rooms, it will already be a night time, and the external temperature would have dropped considerably reversing therefore the process by making the walls rejecting the heat gained during the day. Thus, from 15.30 hrs, the whole wall area of the cluster unit that is exposed to solar radiations can be ignored because it does not affect considerably the internal living spaces.

To have a better understanding on wall exposure and more accurate comparison, it should be necessary to clarify that, because the cluster unit has a more external wall area per person (18 m^2/p) than the slab unit (14 m^2/p), the rejection of heat at night in the cluster unit is more efficient. In addition, when less exposure is really needed i.e. at 12.00 hrs, the cluster unit has

4m²/p of exposed wall, whereas the slab unit has 5 m²/p. But, when wall exposure is not really needed i.e. at 15.30 hrs, the cluster unit has 2.75 m² of exposed wall, whereas the slab unit has only 1.50 m² of exposed wall.

b. Provision of shade on the outside spaces.

It is a summer day, 21st of june. Latitude 35°.

1- Conditions: **(Fig.9,10).** True solar time 12.00 hrs

Altitude angle 70°

Azimuth angle 180° or 0°

Type of unit	Total surrounding space area		Shaded area on the surrounding space		Percentage
Cluster	246	m²	200	m²	83.30 %
Slab	1844	m²	240	m²	13.00 %

2- Conditions: **(Fig.11,12,13,14).** True solar time 15.30 hrs

Altitude angle 45°

Azimuth angle 90°

Type of unit	Total surrounding space area		Shade area on the surrounding space		Percentage
Cluster	246	m²	214	m²	87.00 %
Slab	1844	m²	164	m²	8.89 %

In terms of external shades, the observations show that in both conditions, the cluster unit offers more than 7o% extra shade than the slab unit. Besides, it should be noted that, at both times, the slab provides only about 10% external shade on its site, whereas, the cluster provides more than 83% external shade on its site. This means that because the slab unit has a considerable 90% of its external space that is exposed to solar radiation, it is obvious that it will produce a high defuse proportion of solar radiations into the surrounding slabs. This is to say that, according to external shade the cluster unit is at least 8 times more efficient than the slab unit. However, it is important to point out that, this climatic efficiency is a consequence of

1- Conditions: True solar time 12.00 hrs
Altitude angle 70°
Azumuth angle 180° or 0°

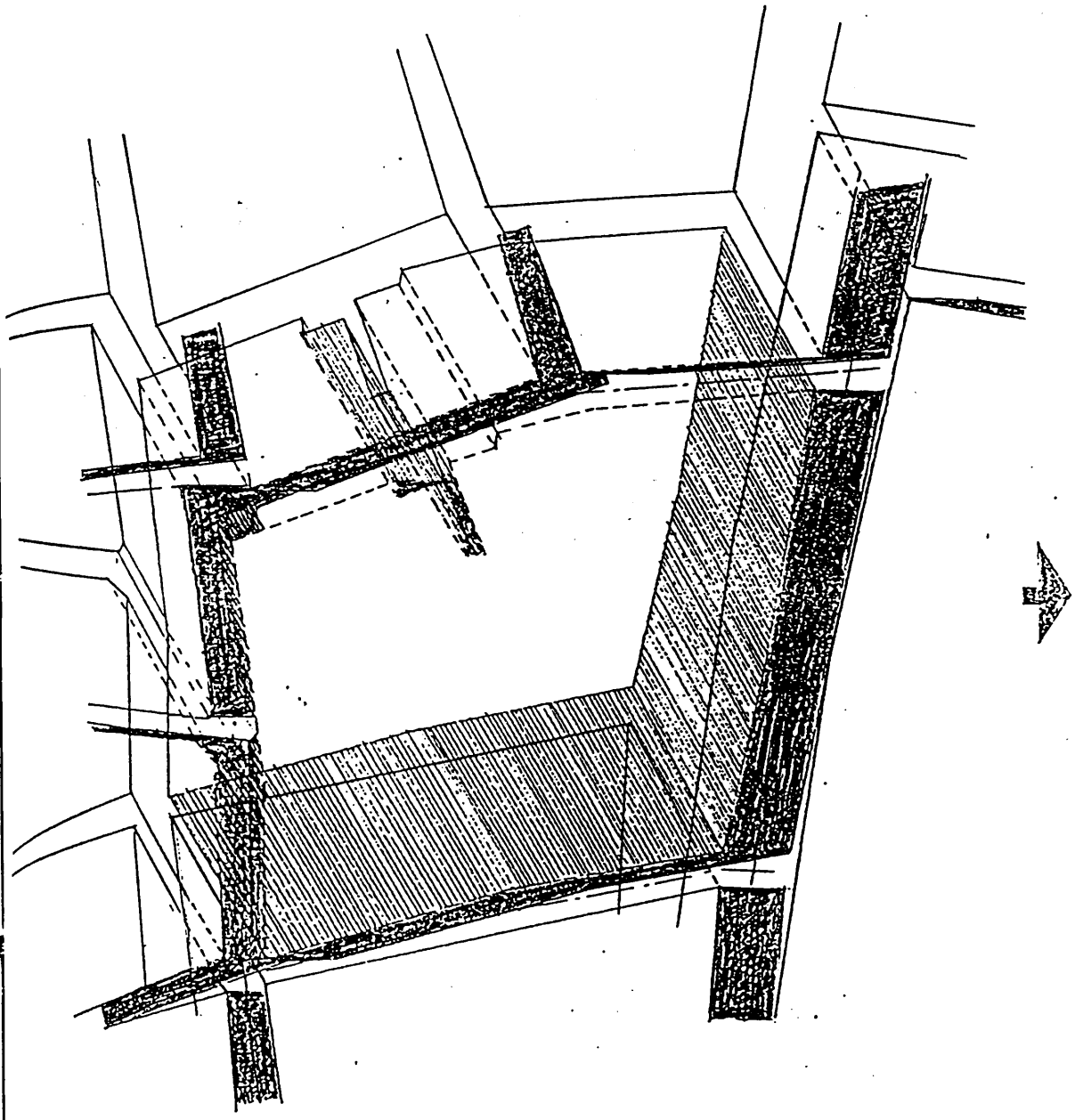


Fig.9. Shaded area on the surrounding space of the cluster unit.

1- Conditions: True solar time 12.00 hrs
Altitude angle 70°
Azumuth angle 180° or 0°

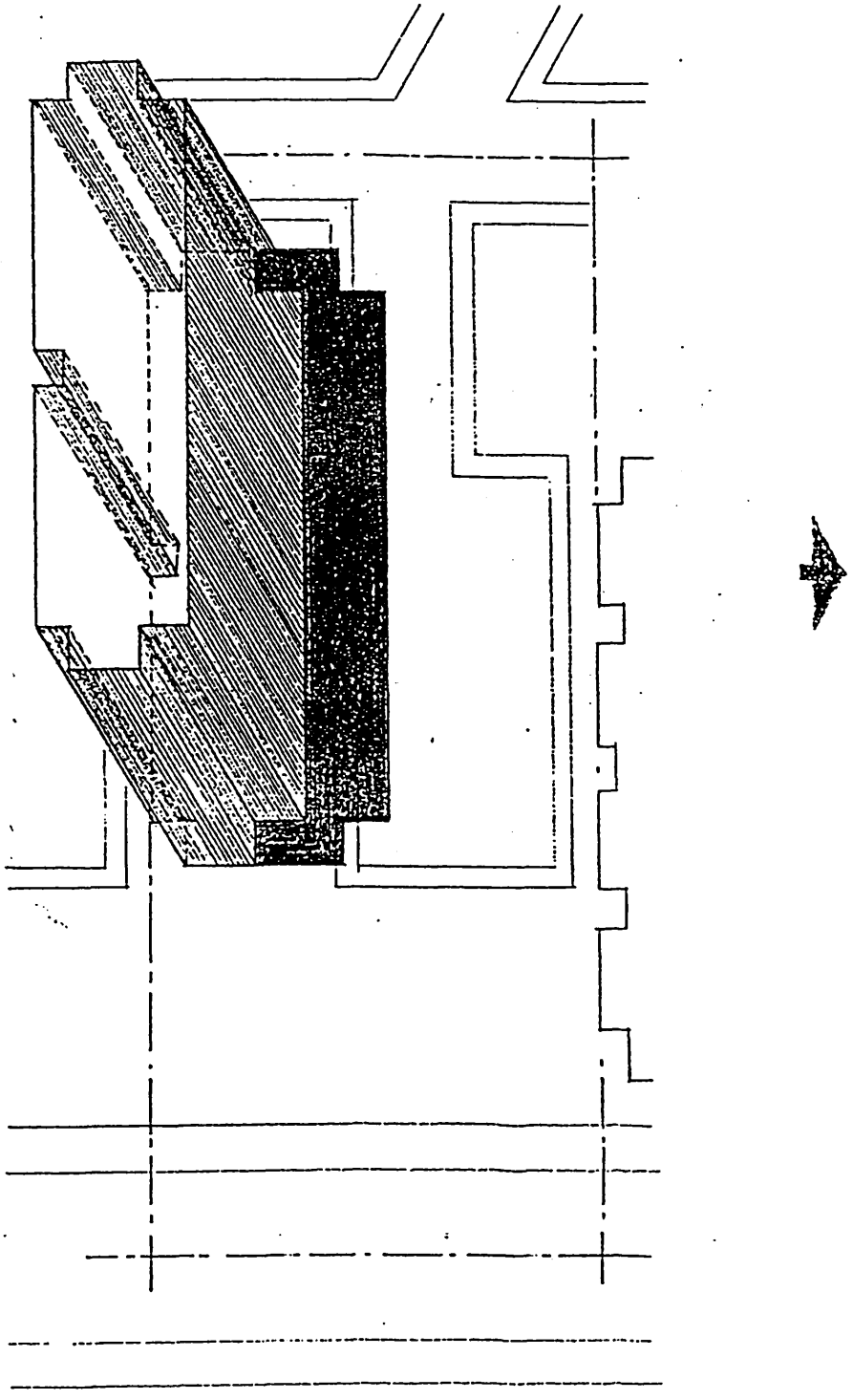


Fig.10. Shaded area on the surrounding space of the slab unit.

2- Conditions: True solar time 15.30 hrs
Altitude angle 45°
Azumuth angle 90°

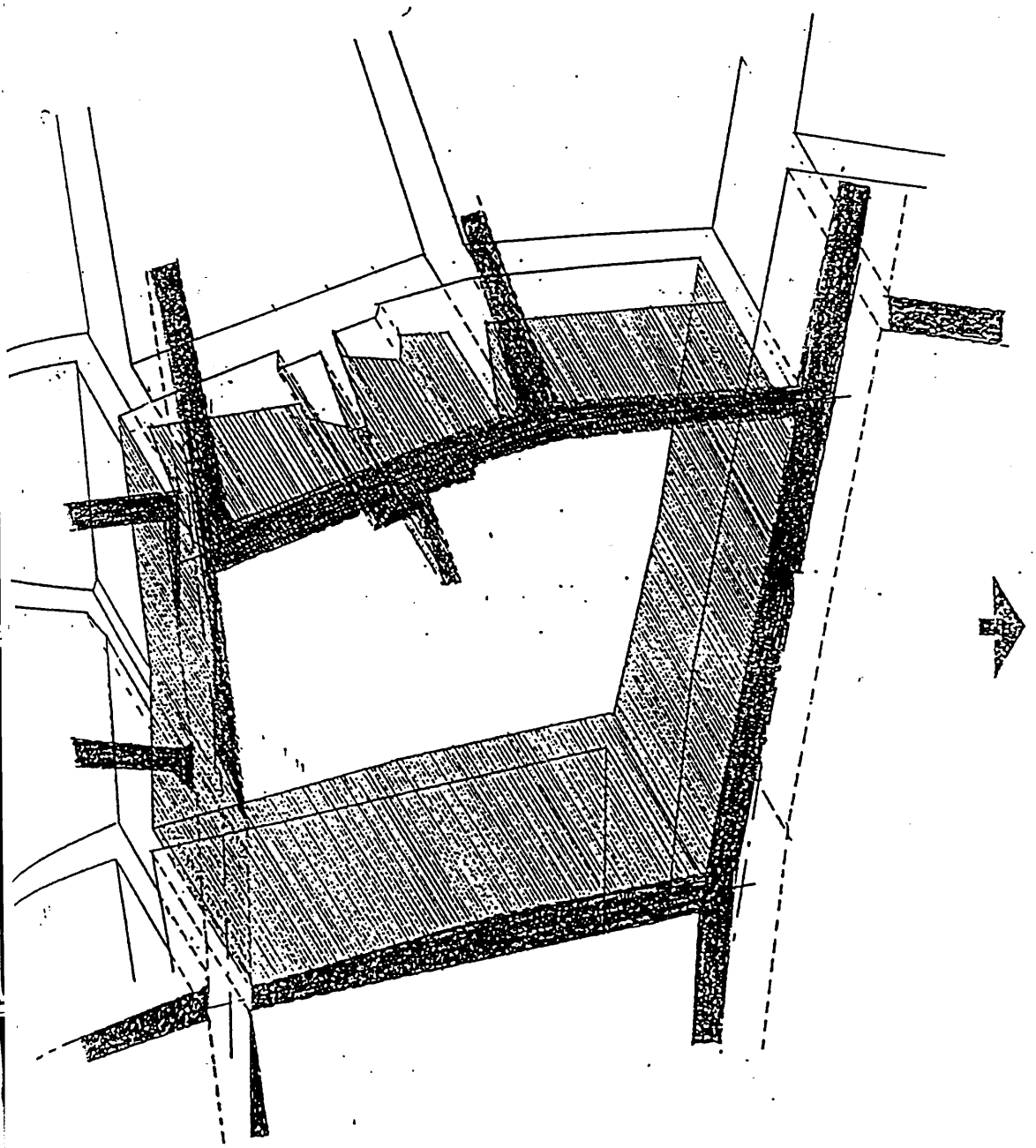


Fig.11. Shaded area on the surrounding space of the cluster unit.

2- Conditions: True solar time 15.30 hrs
Altitude angle 45°
Azumuth angle 90°

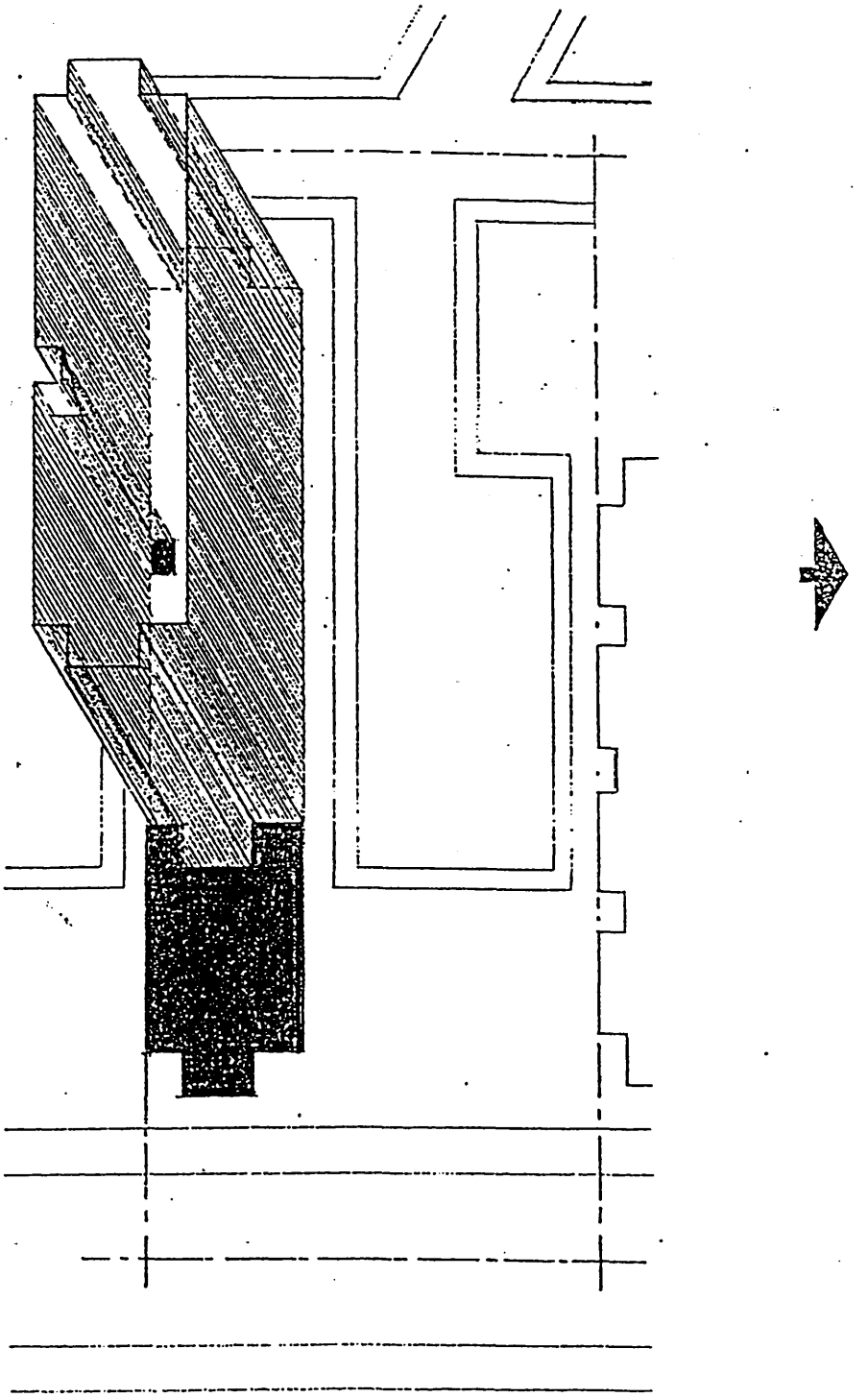


Fig.12. Shaded area on the surrounding space of the slab unit.

1- Conditions: True solar time 12.00 hrs
Altitude angle 70°
Azumuth angle 180° or 0°

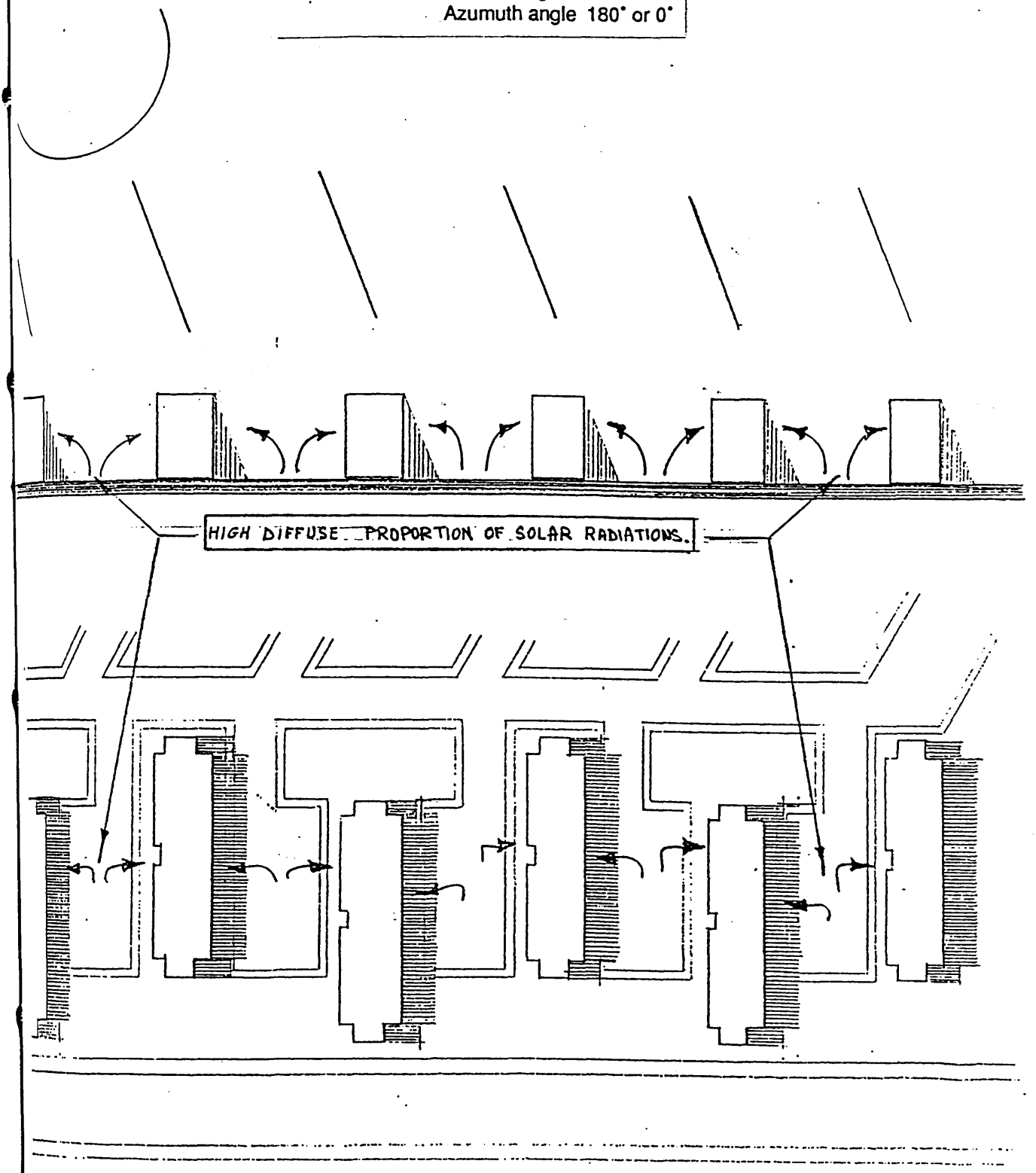


Fig.14. Section through the slab units showing the shade area.

the courtyard house as a built form that provides a highly dense urban pattern; it is the compacteness of the clusters that offers this quality.

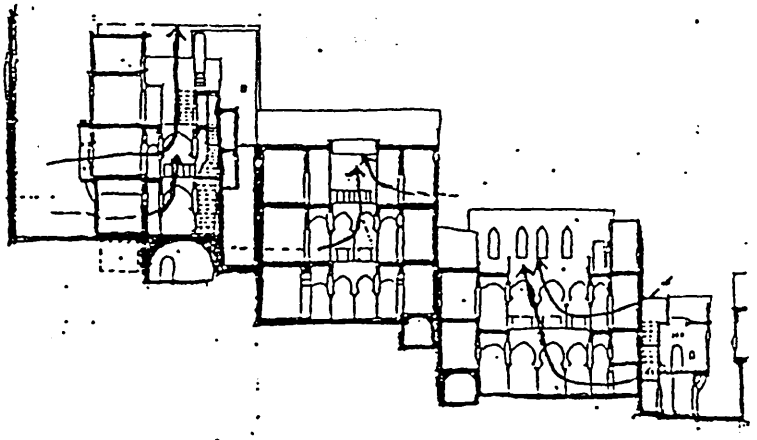
This is the basic fact behind the use (by people) of the outside space in the cluster unit and the avoidance of the open space in the slab unit. Also, planting can survive in the shaded space therefore less evaporant areas of the courtyard but not full sun area adjacent to the slab. Thus external shade help sociability and community spirit.

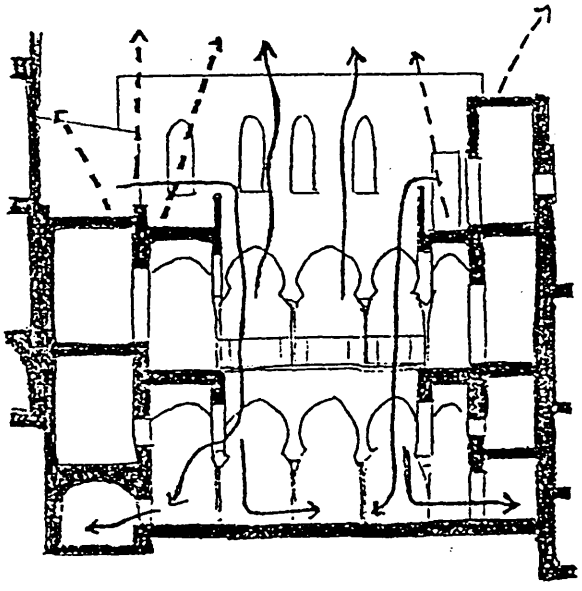
C. Ventilation.

	Type of unit	
	Cluster	**Slab**
Type of ventilation	Cross ventilation: the air flow is stack dependent and not so wind dependent. The patio acts as a climatic regulator. **(Fig.15).**	Cross ventilation : the air flow is very much wind dependent. **(Fig.16).**

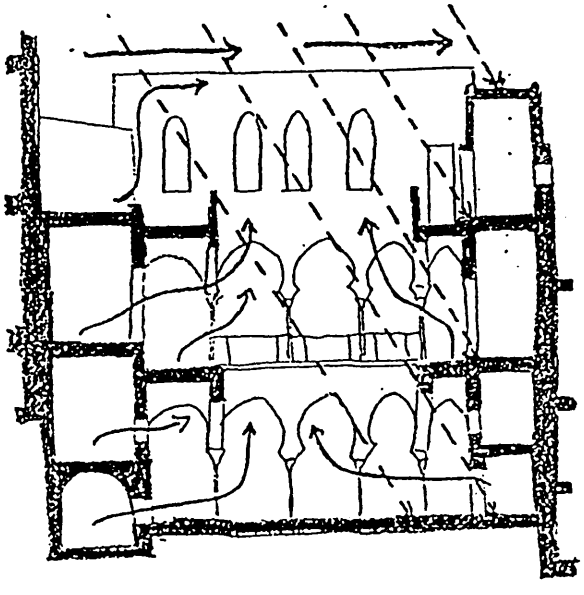
In terms of ventilation, the air flow in the cluster unit is stack dependent which also means, due to the courtyards that are acting as a climatic regulators through the changes of temperature that occur between day and night , the air is continuously flowing through the patios bringing a cool fresh air with out any artificial assistance. By contrast, the slab unit has a wind dependent ventilation, which means , during hot summer days when the wind is less frequent, the air flow has to be forced by opening windows on both sides of the flats, which surely disrupt the privacy aspect of the users. Thus, it can be conclude that the cluster unit has a more efficient ventilation that is constantly operating and does not affect any other requirement.

In general then, the external walls of the cluster unit are less affected by solar radiations than the external walls of the slab, in terms of external shade, it is 8 times more efficient than the cluster, and finally, the cluster offers a better ventilation system that is efficient, constant, and natural.



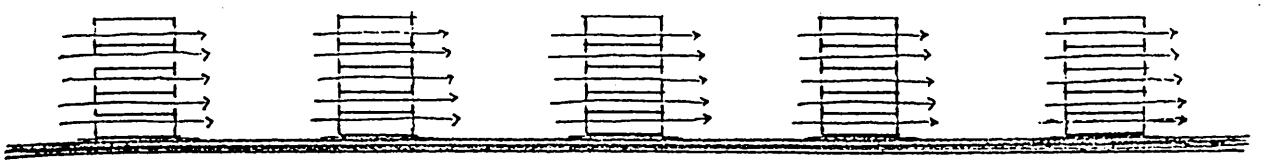


NIGHT



DAY

Fig.15. Ventilation in the cluster unit:
(Stack dependent not so wind dependent).



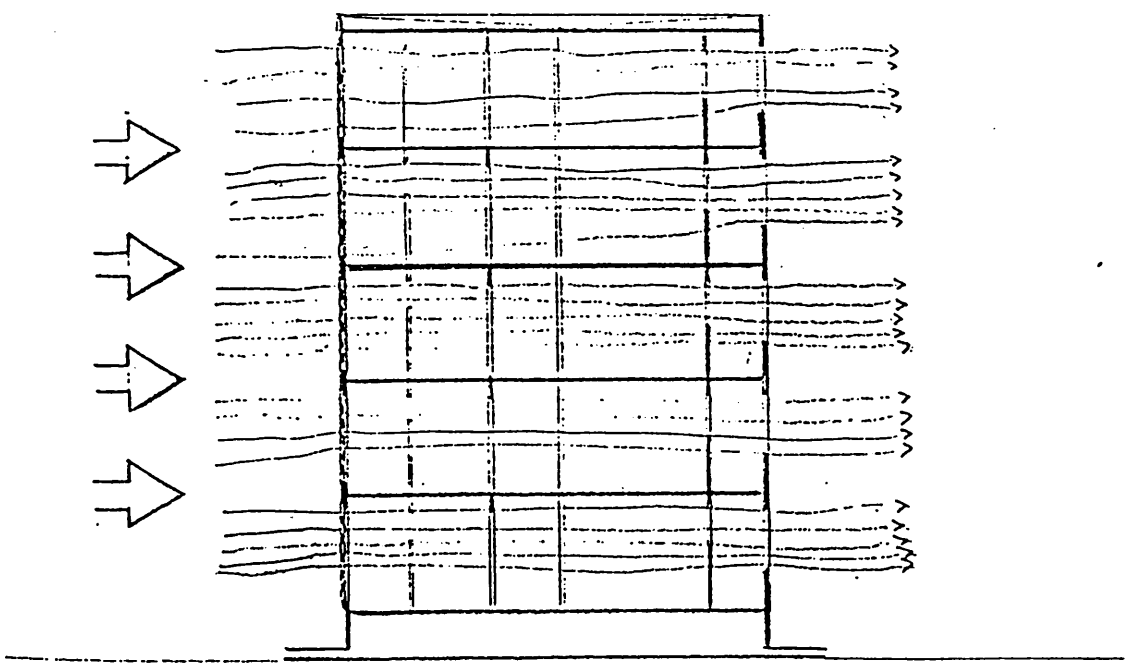


Fig.16. Ventilation in the slab unit:
(Wind dependent).

2.2.5. Territoriality

In this criterion our concern is the control of shared spaces in building form in terms of movement and maintenance. Movement here is meant as a progression of a high sense of territory as one moves from the public domain to the private one. In other words, this criterion should reflect the aspect of shared semi-private space in terms of security, privacy and supervision of both the space itself and the playing areas. Maintenance is meant as keeping in good condition the living environment in terms of hygiene and non degradation of shared spaces. This criterion should determine the qualitative aspect of the housing environment resulting from each building form in terms of "defensible space".[1]

Thus, the housing environment that has good defensible space qualities should be considered as the one that provides a high feeling of territory, In this sense then, it is important to refer to Newman's thesis of "defensible space";

"Defensible space" is a term for a range of mechanism - real and symbolic barriers, strongly defined areas of influence, and improved opportunities for surveillance - that combines to bring an environment under control of its residents. A defensible space is a living residential environment which can be employed by inhabitants for the enhancement of their lives, while providing security of their families, neighbours, and friends ".[2]

In order to determine the aspect of this criterion in both environments, Newman's definition of "defensible space" is used as a reference. Therefore, the aspects of barriers and spaces are the main determining factors of territory.

a. The cluster unit.

Due to:

1- Its small and manageable area. i.e. (easy to control). **(Fig.17).**

2- Its strongly defined physical barriers. i.e (clear physical edges). **(Fig.17).**

3- Its strongly defined visual barriers. i.e. (clear visual barriers). **(Fig.17).**

4- Its strongly defined hierarchy of spaces, from public to private. **(Fig.18,19, 20,21).**

The cluster unit has a strong sense of territoriality.

b. The slab unit.

Due to:

1- Its vast and non manageable area. i.e. (difficult to control). **(Fig.22).**

2- Its vague and undefined physical barriers. i.e. (imagined edges). **(Fig.22).**

3- Its vast and undefined visual barriers. i.e. (dominant open space).**(Fig.22)**

4- Its weak and confused hierarchy of spaces, from public to private. **(Fig.23, 24).**

The slab unit has a relatively weak sense of territoriality.

In terms of defensible space qualities, that exist in both the cluster and the slab units, it is possible to conclude that, the cluster unit offers greater territorial feeling due to the strong barriers that define the spaces, as well as the structure of the spaces themselves that obey to a clear hierarchy of domain. By contrast, the slab unit, due to its non-existent barriers (not even symbolic) and its confused space definition, it offers a very low territorial feeling.

It should be noted that, the weak territoriality in the slab unit is a consequence of several aspects:

- Buildings positioned in a "free" Le Corbusier manner.
- Grounds designed as one continuous space, open to surrounding streets.
- Buildings where there was seldom any attempt to make portions of ground relate to specific aspects of the development.
- Sites of huge number of blocks.

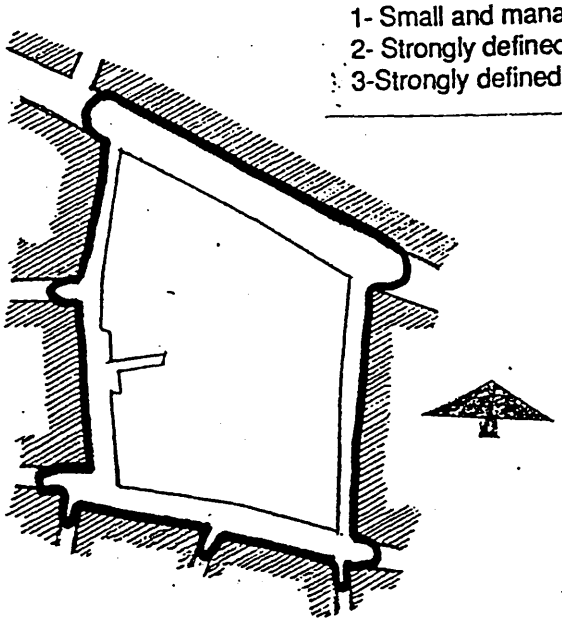


Fig.17. The area and barriers of the cluster unit.

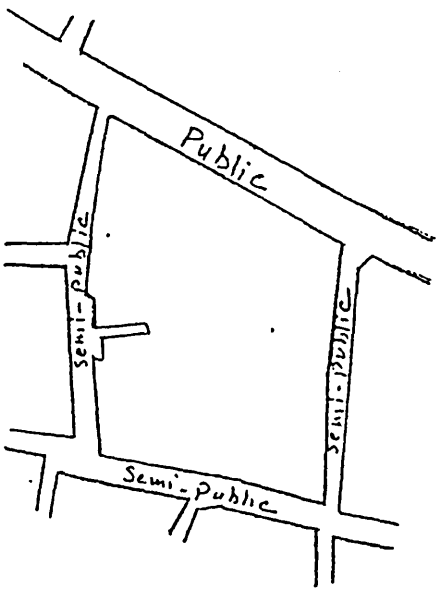


Fig.18. Hierarchy of space in the cluster unit.

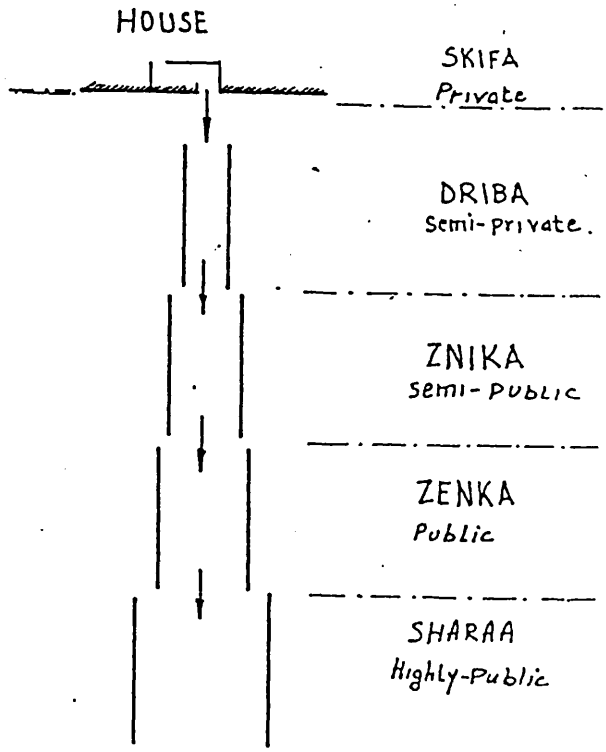


Fig.19. Diagram of the Hierarchy.

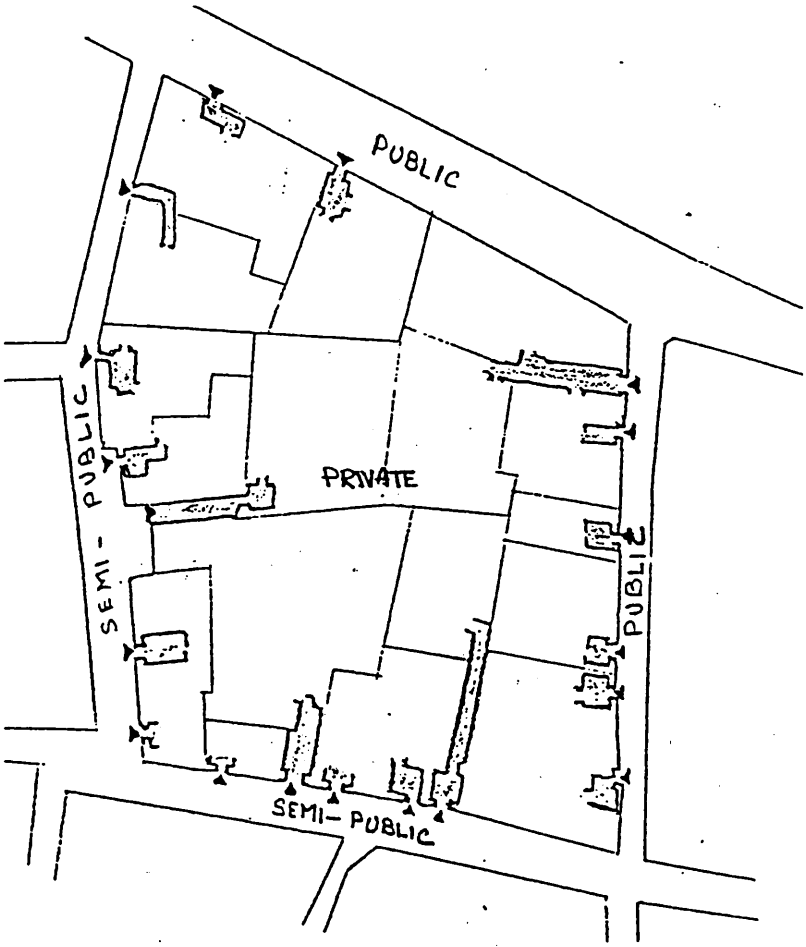


Fig.20. Driba and Skifa as a semi-private or a private space.

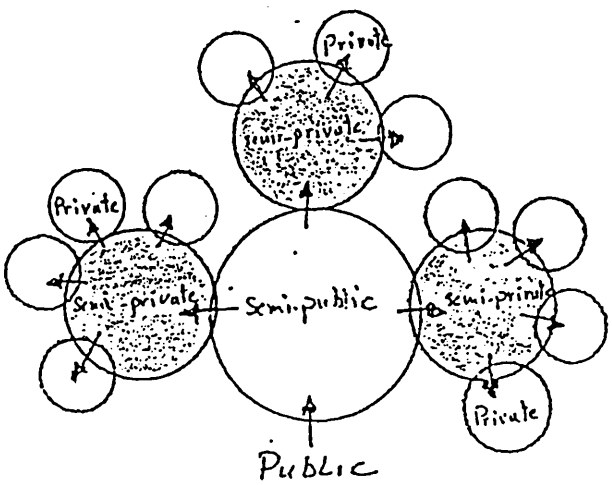


Fig.21. Diagram of the intensity of the use of space.

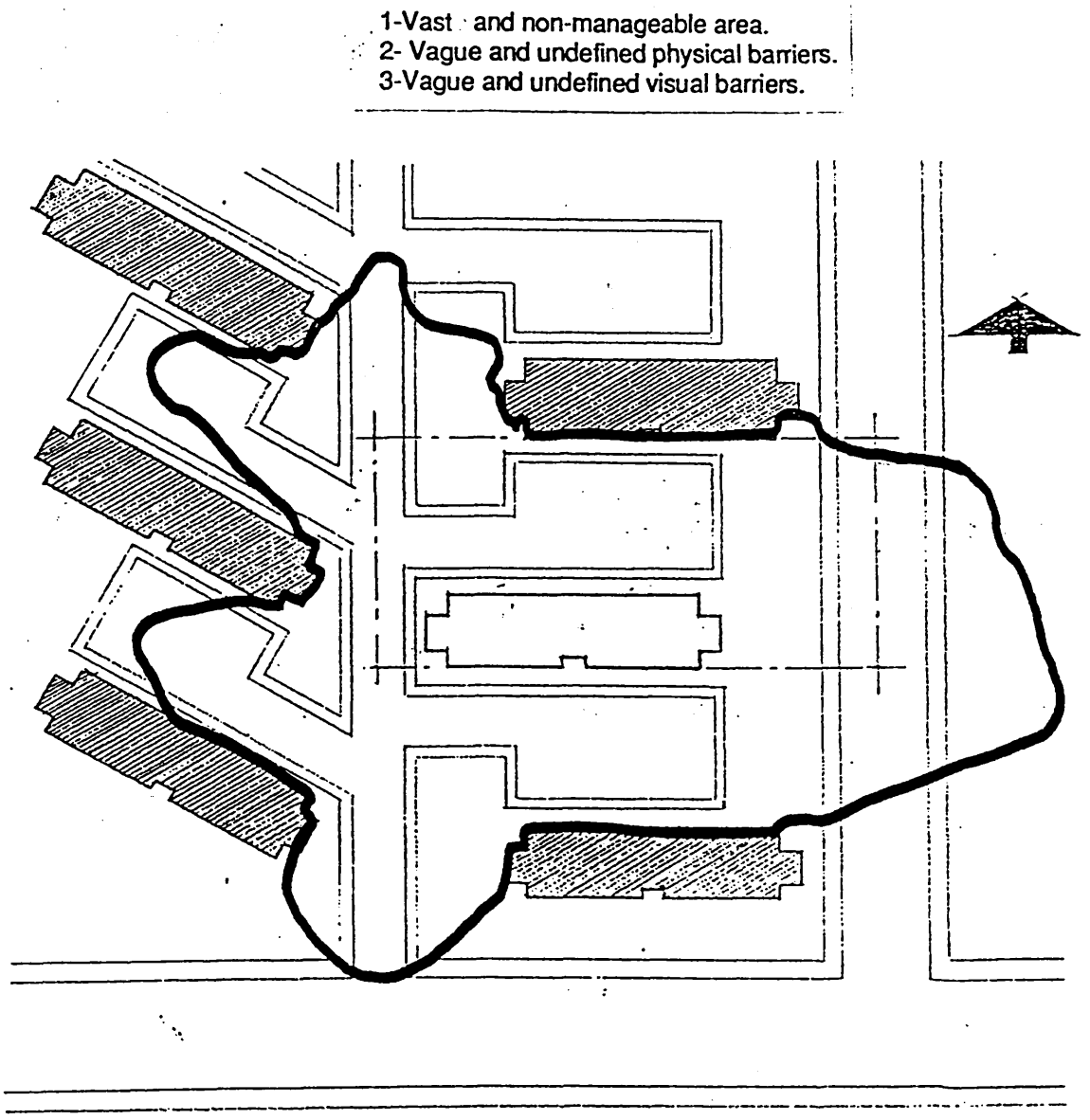


Fig.22. Area and barriers in the slab unit.

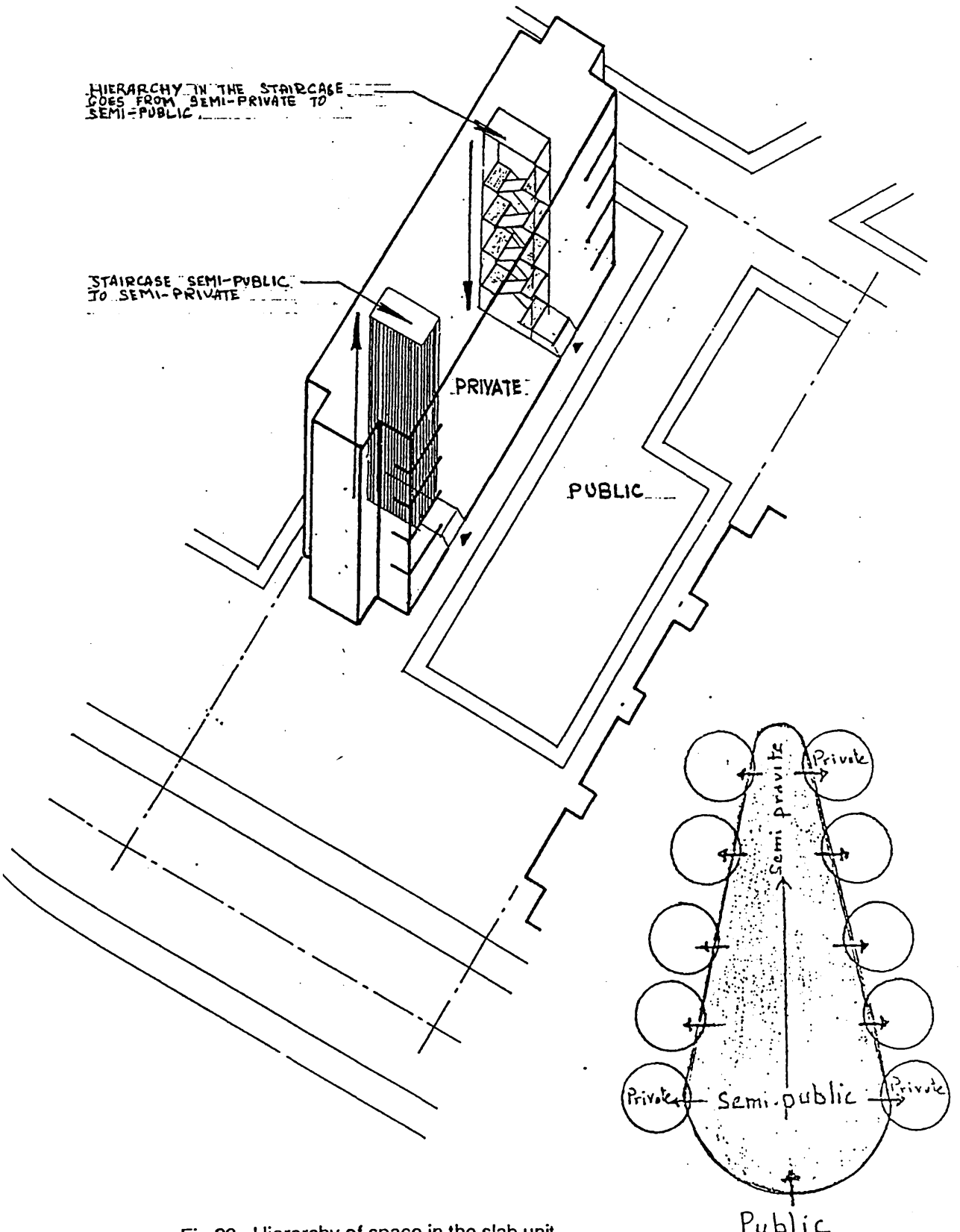


Fig.23. Hierarchy of space in the slab unit.

Fig.24. Diagram of the intensity of use of space.

All these aspects which are also emphasised by Newman, contribute to make the environment insecure, difficult to control and costly to maintain.

In parallel, Newman's recommendations for a good defensible space come in line to emphasise our conclusion. In fact, recommendations such as, creating a hierarchy of public, semi-public and private areas and paths, and the differentiating of small private areas outside each dwelling from the public path, are already existing in the traditional environment into very similar physical aspects, such as, the hierarchy of the street **(see hierarchy of the streets, Part two, Chapter 1)** and the presence of a cul-de-sac (driba) and the bent entry (skifa) and for this reason, it has produced a greater defensible space than the slab environment.

2.2.6. Privacy performance

In Islamic countries like Algeria, privacy is considered as an important aspect of quality within the housing environment . However, privacy is of several aspects: visual, and aural. According to Algerian cultural factors privacy requires a maximum segregation from the outside activities. Full privacy or what is acceptable as satisfactory privacy is freedom from what is defined as unwanted thus, freedom from any intrusion by outsiders to internal spaces and private open space. As seen, privacy is of two kinds but in this study visual aspect will be our concern and will determine which building form offers a high sense of privacy in the housing environment. Aural privacy is primarily combated by building technology i.e. thick walls, this aspect of building is not examined in this thesis.

There are differences between privacy gained by the use of a visual distance between buildings and privacy gained by the total exclusion of the external world by the use of screen walls or buildings. For the Algerian context, Settouane, defines 35 m as the distance that is achieving tolerable level of visual privacy, in that she determined (by the experiments) that at 35 m, it is not possible to distinguish what a person is doing. This is in the case of building facing each other.[3] Thus, in this study, this distance (35 m) is considered as a minimal building spacing, that is acceptable. However, it is important to note that, the spacing distance between building

responds better to aspects such as, accessibility, movement, ventilation, and daylight rather than privacy.

a. The cluster unit.

Due to:

1- Its inword-looking building form. **(Fig.25).**

2- Its very small and carefully positioned windows. i.e. (high in position). **(Fig.26,27).**

3- Its shifted entrances. i.e. (never face to face). **(Fig.28).**

4- The presence of the skifa. i.e. (bent entry). **(Fig.29).**

5- The presence of a highly private space. i.e. (courtyard). **(Fig.30).**

6- The hierarchy of spaces. i.e. (from public to private). **(see hierarchy of streets, Part two, Chapter 1).**

The cluster unit has a very satisfying privacy performance.

b. The slab unit.

Due to

1- Its outword-looking building form. **(Fig.31).**

2- Its large windows, that are only at 22 m away from opposite windows. **(Fig.32).**

3- Its face to face entrances. **(Fig.33).**

4- The lack of a private open space. **(Fig.34).**

5- The lack of space hierarchy. **(Fig.35).**

The slab unit has an unsatisfactory privacy performance.

In terms of privacy then, the cluster unit has a very high performance than the slab unit. This quality would not have been achieved without the existence of the courtyards. These latter, by rejecting entirely the public open space, do not only provide a very satisfactory privacy for the residents but also still offer a private open space. By contrast, The slab unit has a very poor privacy performance, because firstly it is a function of a distance that accepts some aspects of the out side world, secondly the 22 m distance does not comply with the acceptable minimal building spacing.

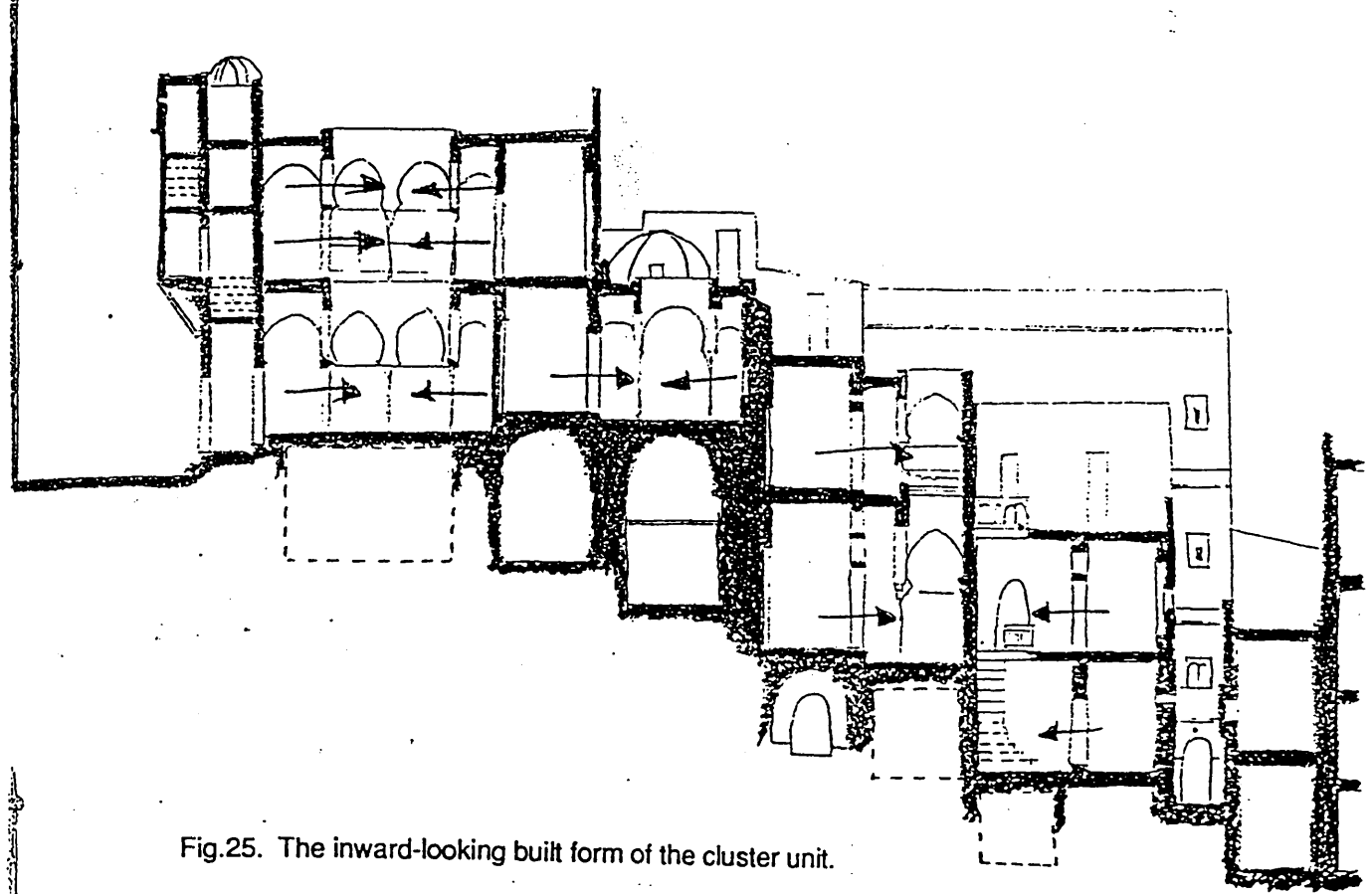


Fig.25. The inward-looking built form of the cluster unit.

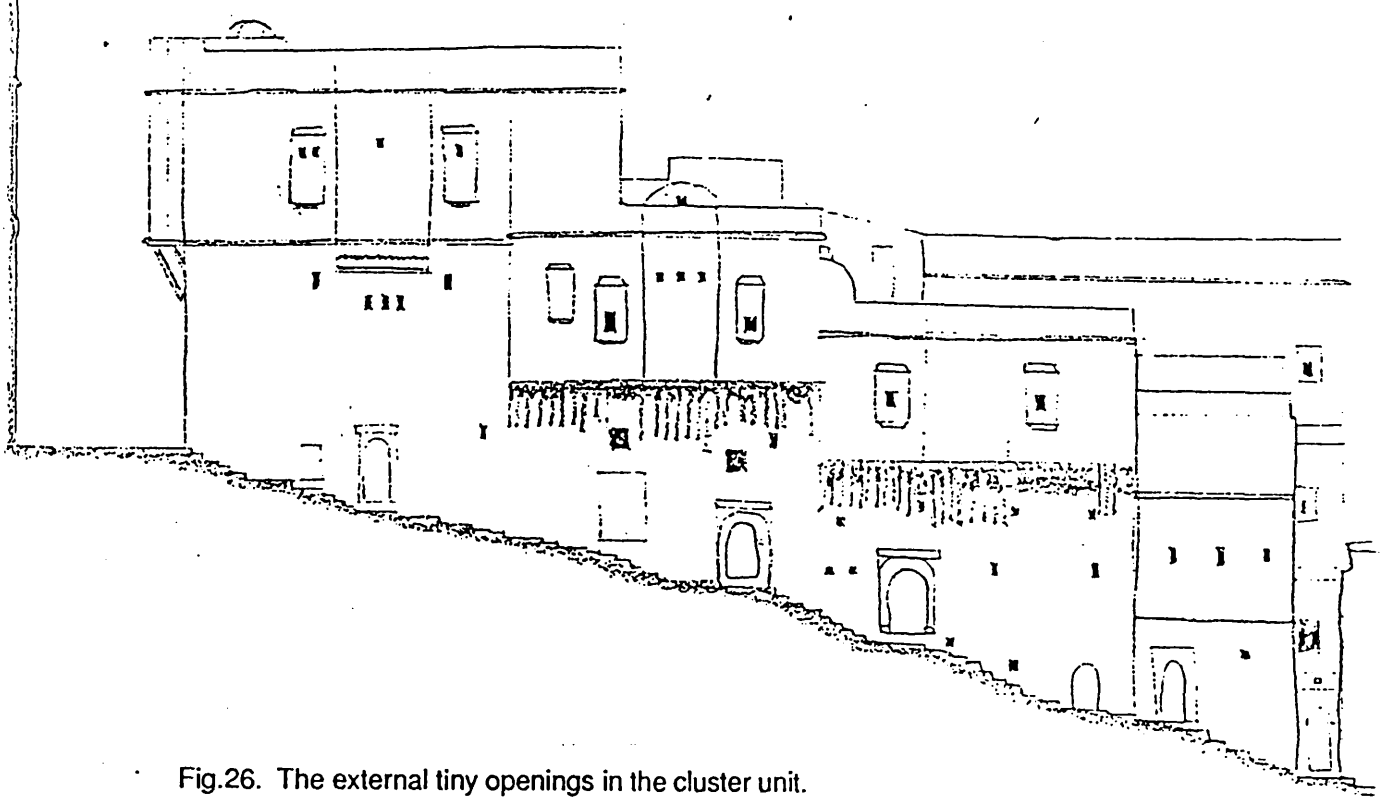


Fig.26. The external tiny openings in the cluster unit.

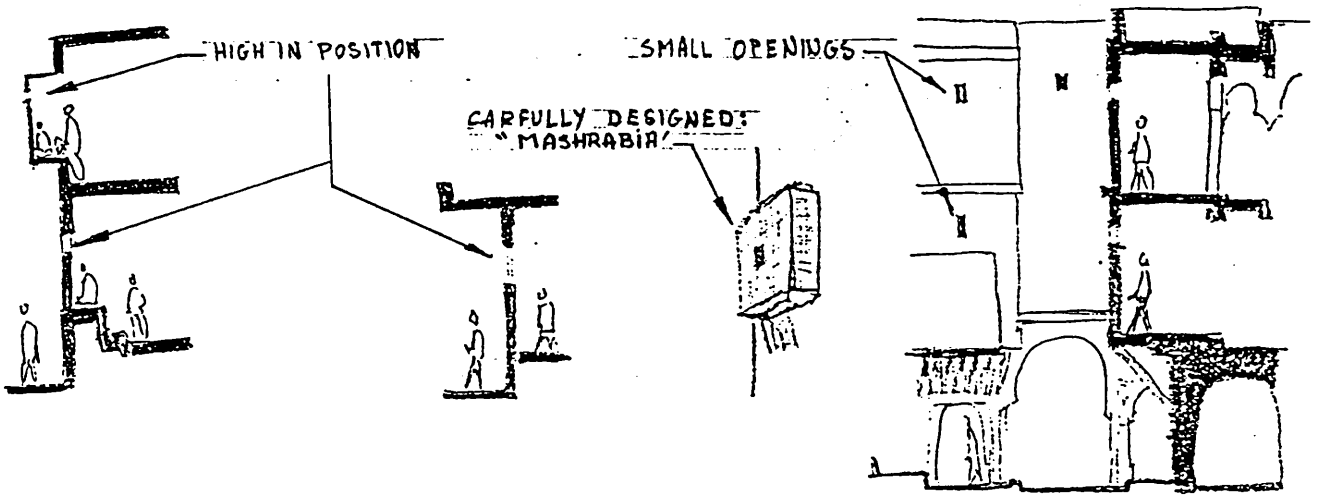


Fig.27. The position of openings in the cluster unit.

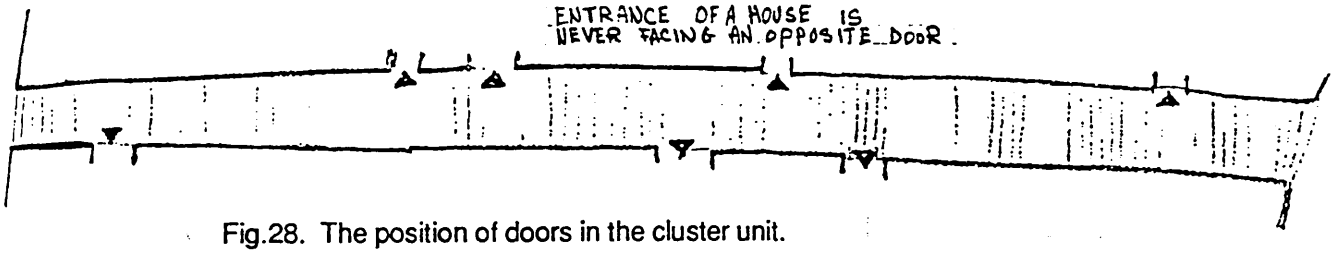


Fig.28. The position of doors in the cluster unit.

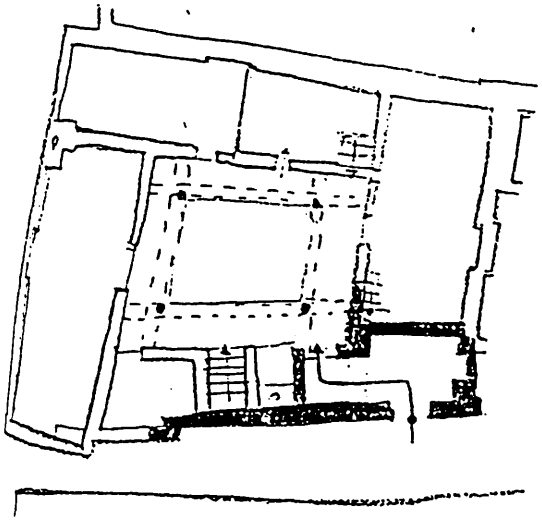


Fig.29. The bent entrance as a filter: Skifa.

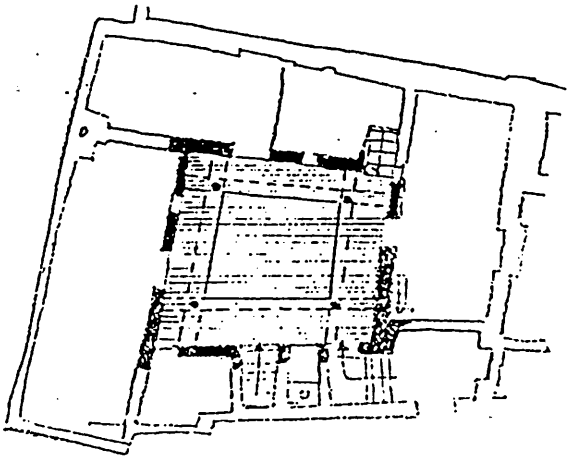


Fig.30. The courtyard: as a private open space.

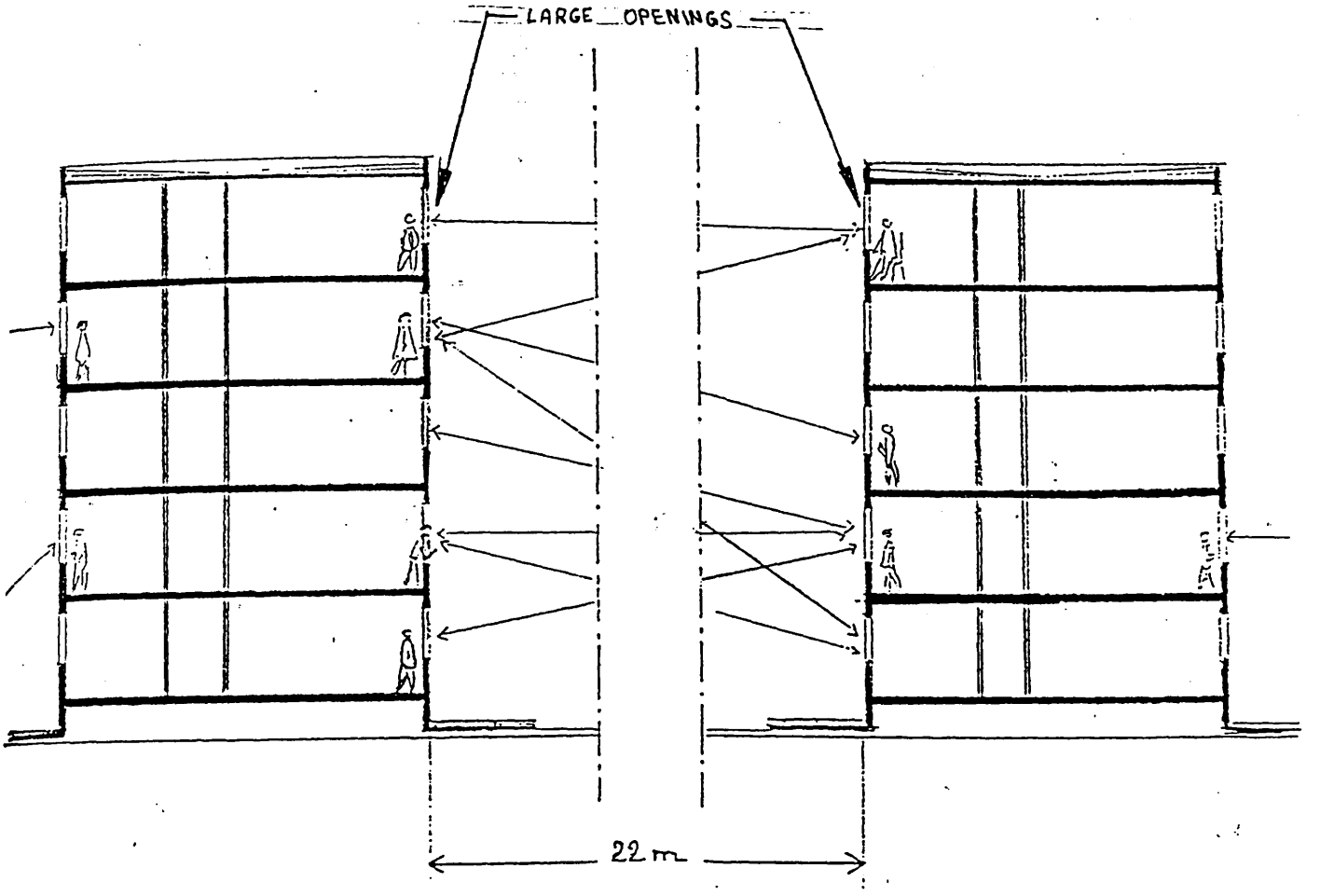


Fig.31. The outward-looking built form of the slab unit and the space between the units.

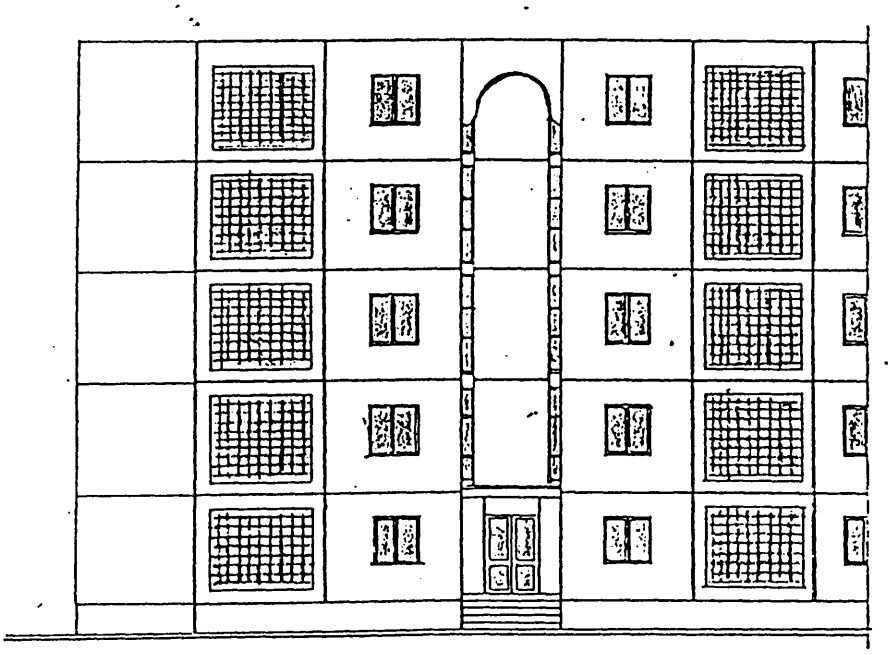


Fig.32. The external large openings of the sllab unit.

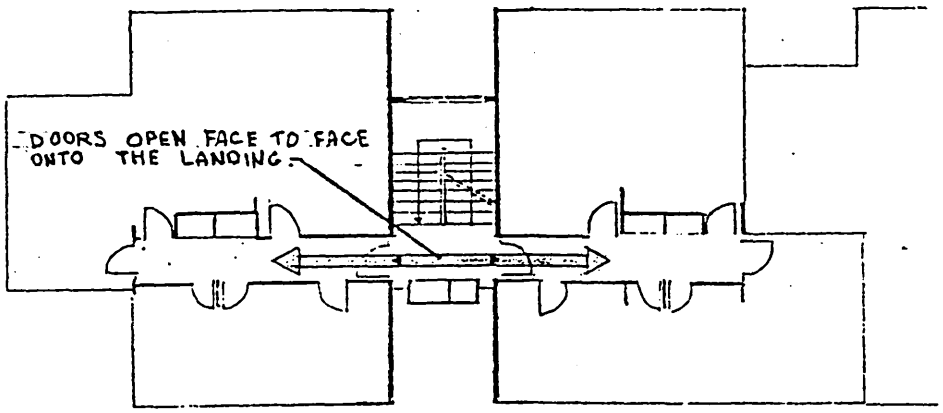


Fig.33. The position of the doors in the slab unit.

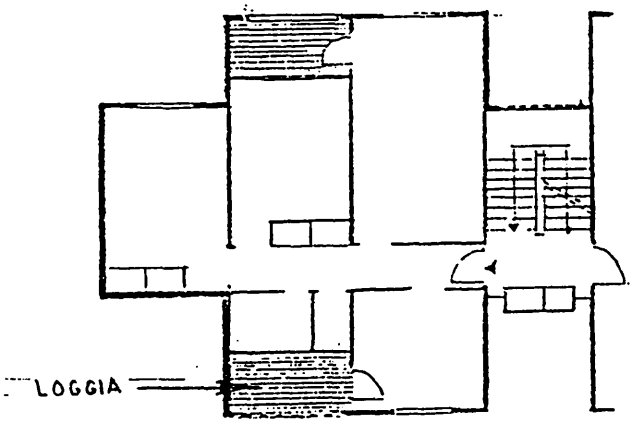


Fig.34. The loggia as a substitute for a private open space.

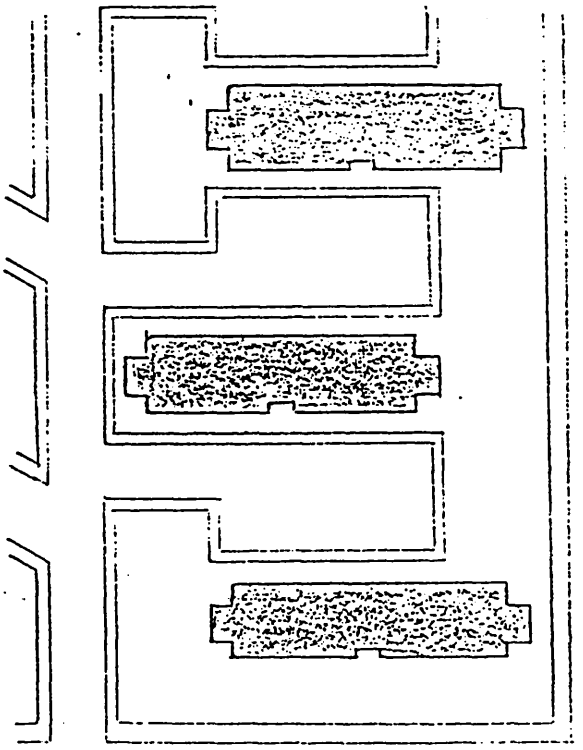


Fig.35. The dominance of the open space: no hierarchy.

2.2.7. Sense of community

Good building form should mirror the social structure: the community. It should also reinforce social interaction of different social groups, this is to say that proximity is a very important factor which may increase contact amongst people. To understand proximity, isolation should be referred too, because it acts contrarily, and this can be seen in many modern mass housing where in fact isolation is achieved in both families and free standing buildings. Isolation in our context is seen as a bad planning and design solution because it does not respond to social need and does not stimulate social contacts. Isolation in itself is obviously permissible for those that want it, but given that this study is of urban housing, it should cater to people seeking an urban life style i.e. community. This criterion is social and is a qualitative determinant of housing environments. It cannot be measured objectively or numerically, however identification of some aspects is possible by looking at people's mobility within their neighbourhood.

a. <u>The cluster unit</u>

Due to:

1- The proximity of the houses. i.e. (short distances).

2- The closely related clusters. i.e. (dense urban form). **(Fig.36,37).**

3- The high concentration of people on a relatively small area. **(Fig.38).**

4- The strictly defined spaces of both community and domestic life.

i.e.(hierarchy). **(Fig.39).**

5- The densely used routes that arises from the channelled movement. i.e. (oriented mobility). **(Fig.40).**

The cluster unit offers a very good likelihood that the opportunities for community involvement will develop.

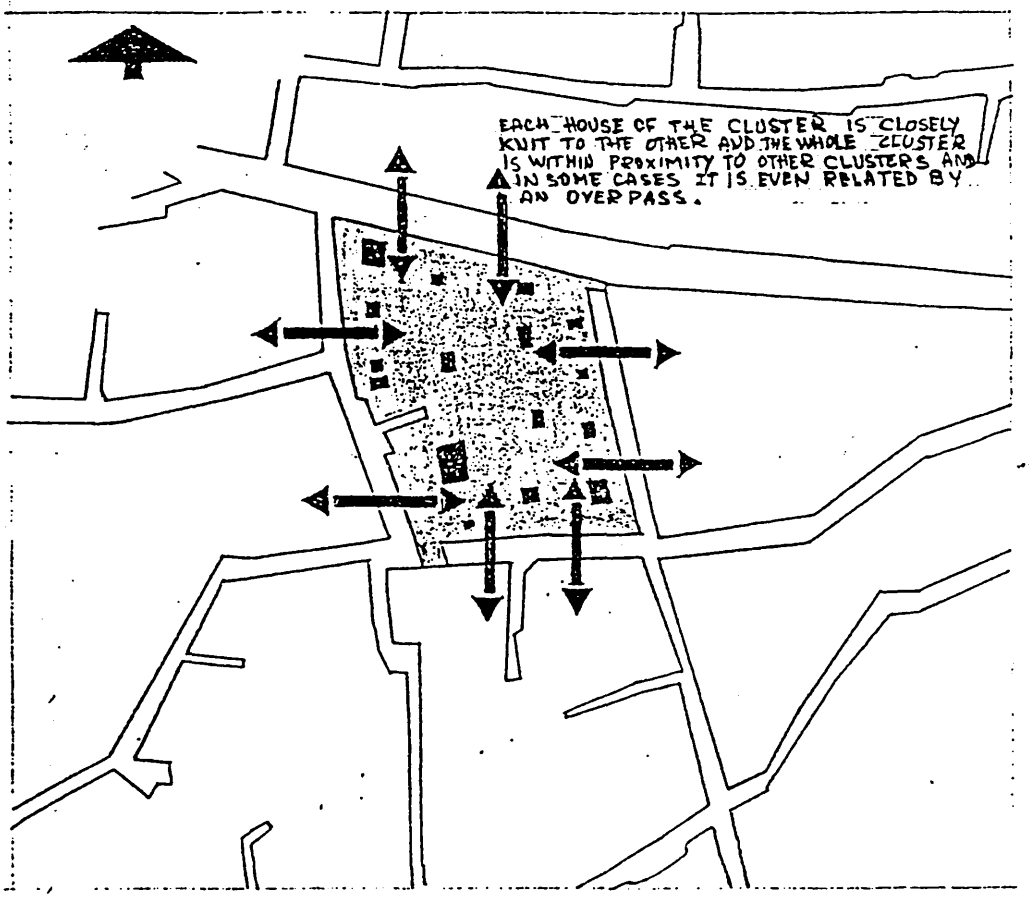


Fig.36. Proximity of the clusters.

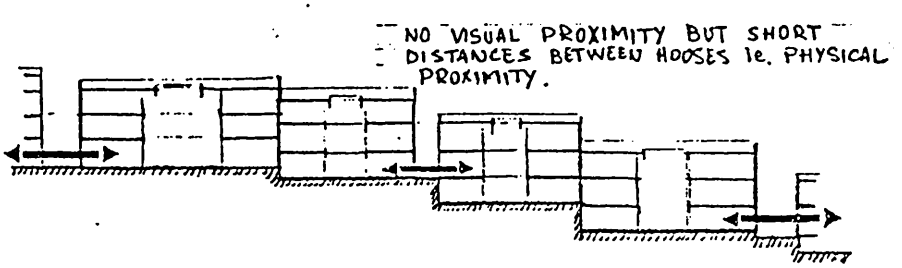


Fig.37. Diagram of proximity in the cluster.

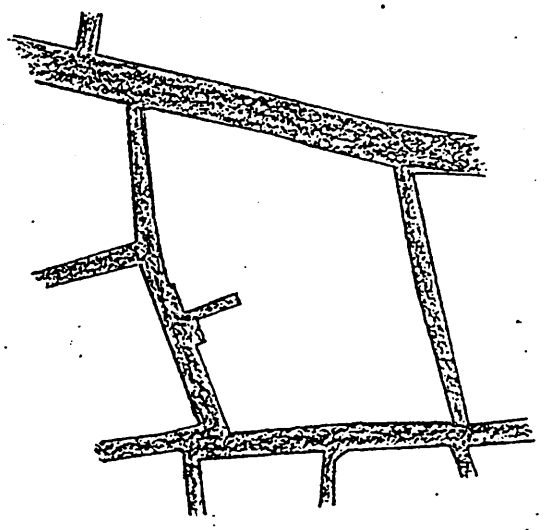


Fig.38. The narrow streets concentrate people.

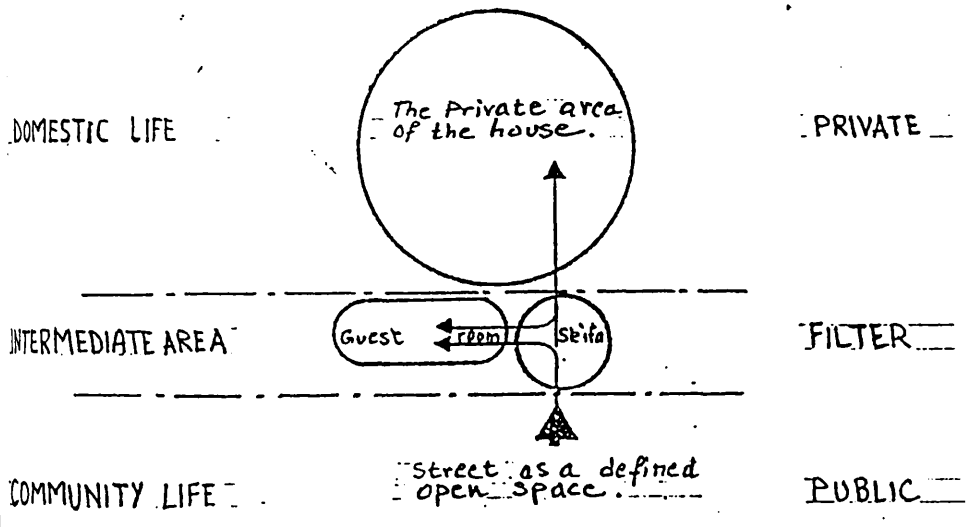


Fig.39. Space hierarchy between community and domestic life.

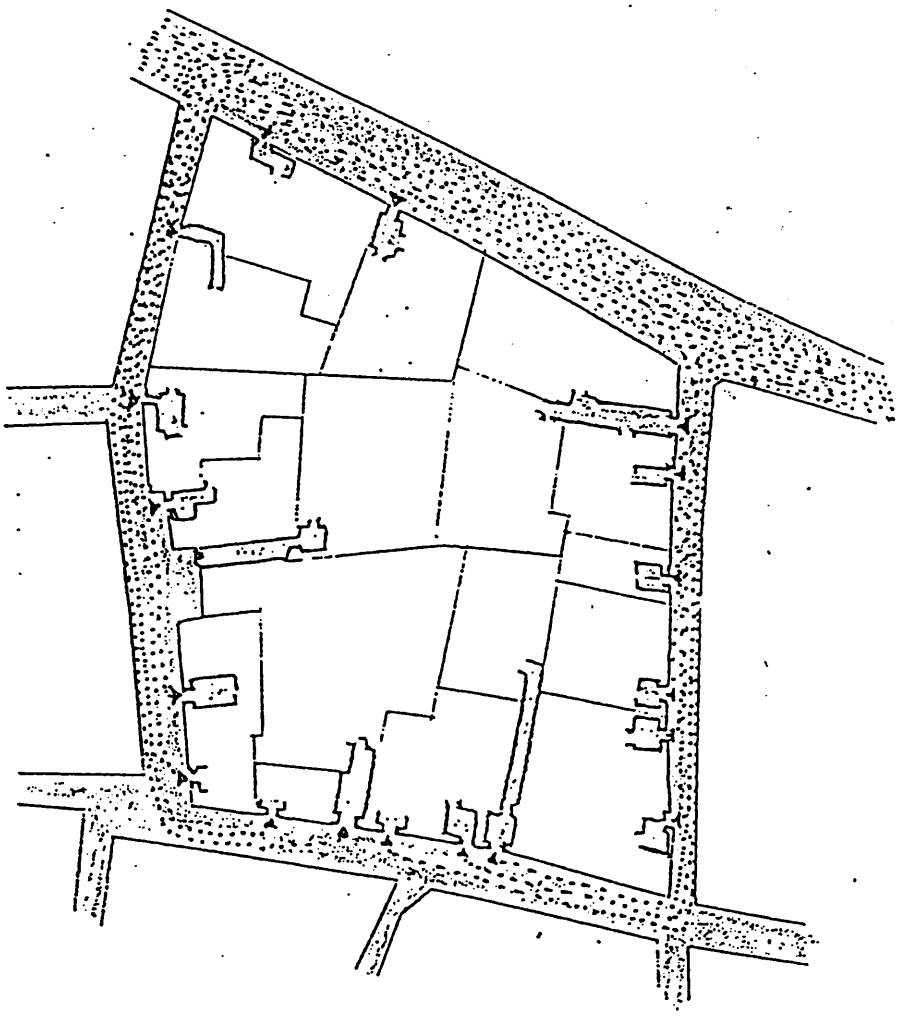


Fig.40. Diagram of people's mobility in the cluster.

b. The slab unit.

Due to:

1- The isolation of the slabs. i.e. (long distances). **(Fig.41,42).**

2- The low concentration of people on a relatively large area. i.e. (sparse urban form). **(Fig.43).**

3- The vague and undefined open spaces of the community life. i.e. (park like). **(Fig.44).**

4- The sparsely used routes that arises from the scattered movement. i.e. (non-oriented mobility). **(Fig.45).**

The slab unit offers very little sense of community .

In terms of community aspect, the cluster unit offers the opportunity for greater social contact than the slab unit. This is due mainly to the urban form that the cluster generates. It is likely to stimulate social contact in a dense urban form rather than in a loose pattern, because a dense layout tends to concentrate people's mobility, and to provide visual and physical proximity that are vital for casual meetings, whereas, the sparse urban form tends to disperse people, decreasing therefore the chances of social contact. (**see 2.2.4. climatic efficiency,** related to social meeting opportunity). In short then, it is possible to conclude that the cluster unit provide a very high opportunity for community spirit than the slab unit.

2.2.8. Visual aspect

This criterion is mainly concerned with the public domain because a success of any housing environment does not depend only on the form of the dwelling itself but also on the surrounding in which people spent their daily life. It is very difficult to decide what is visually agreeable to the eyes since everyone of us has its own historical background and cultural expectations which are the main determinant factors for human reaction toward a visual aspect of any dwelling environment. This is to say for instance, most Algerian city dwellers would accept and understand an urban scene that has a high sense of enclosure, whereas, most Europeans

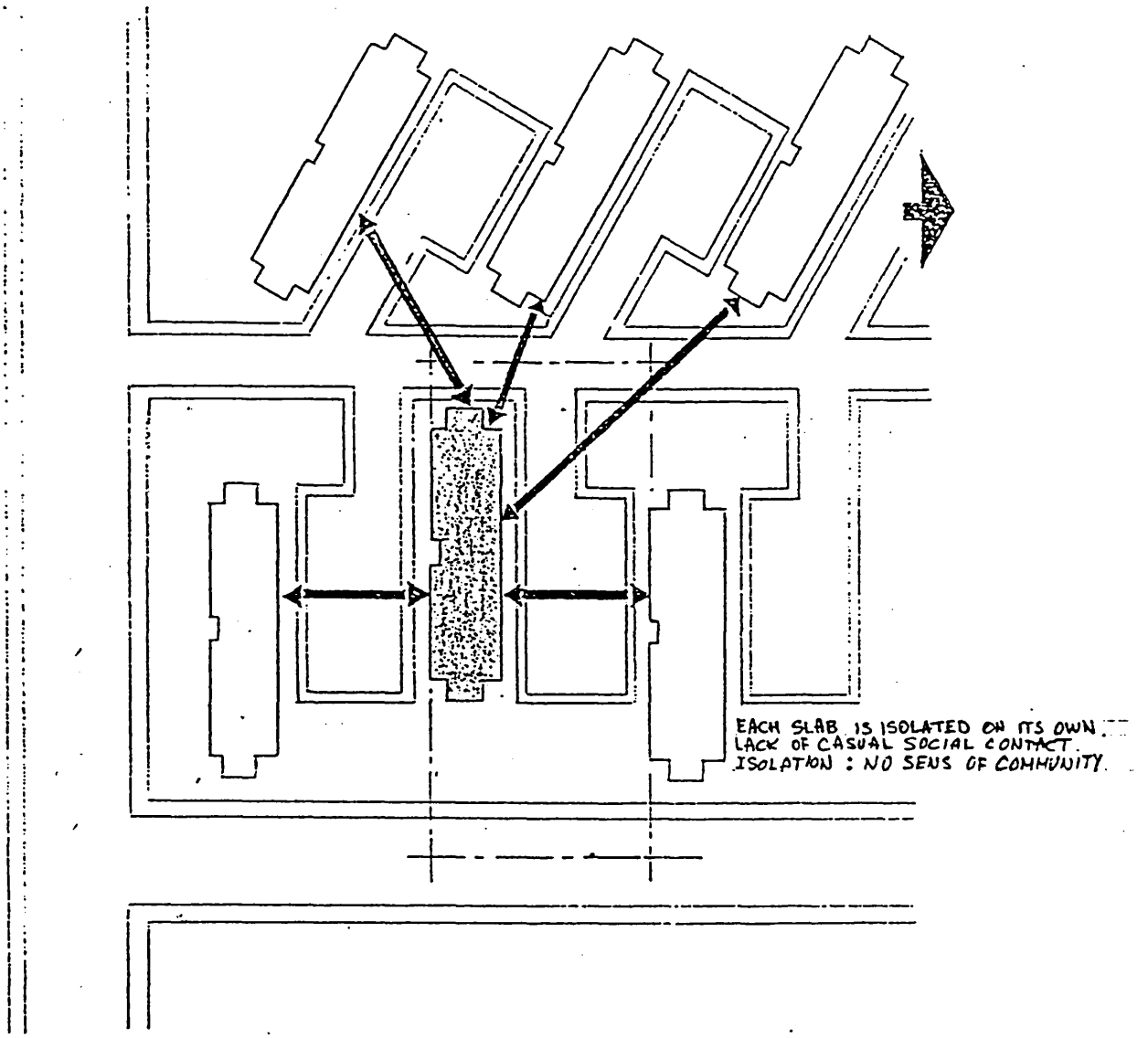


Fig.41. Isolation of the slabs.

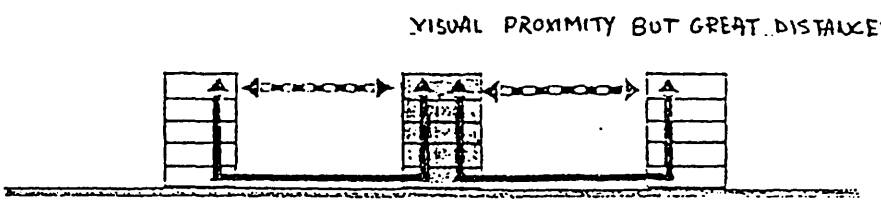


Fig.42. Diagram of proximity in the slabs.

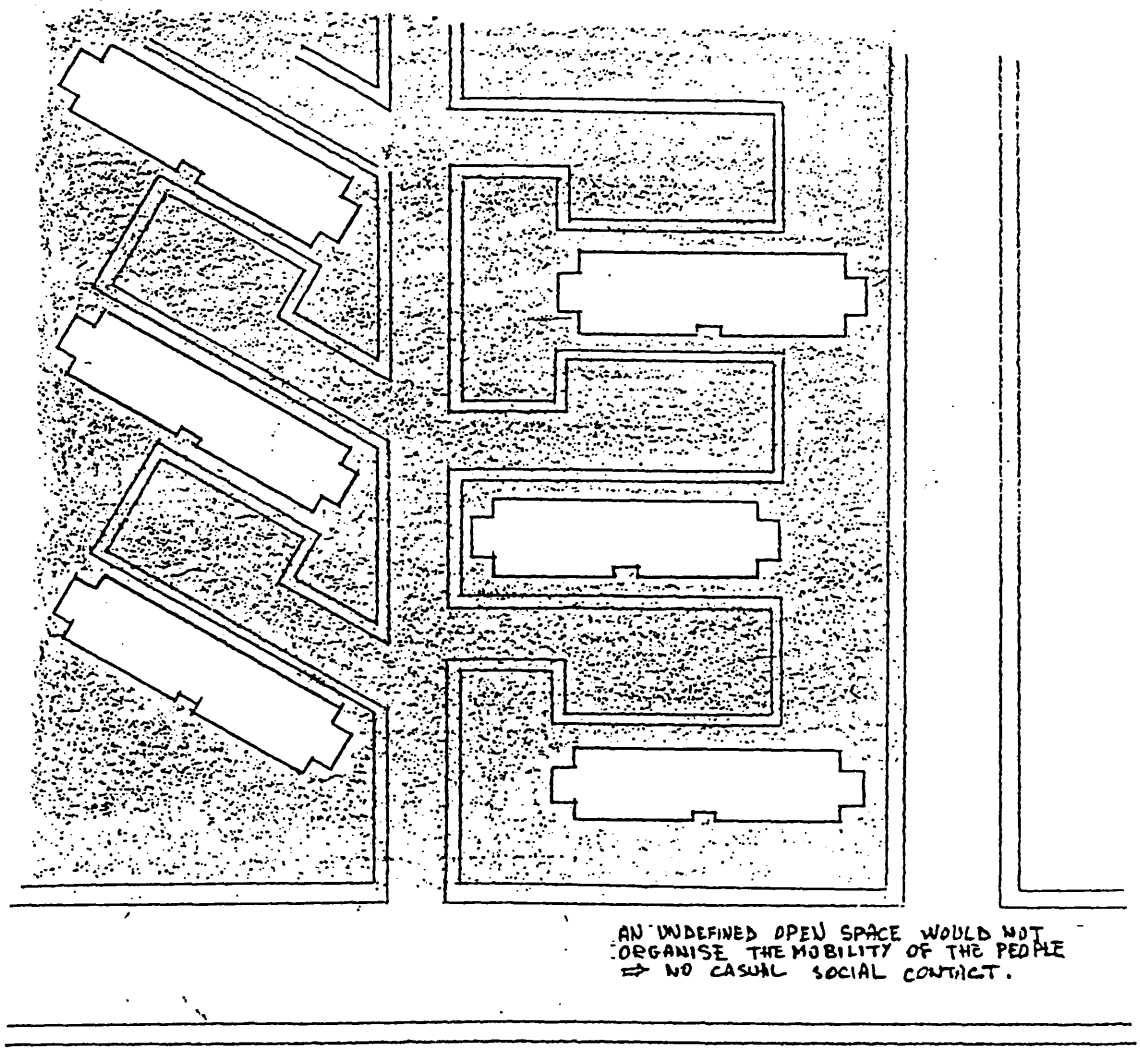
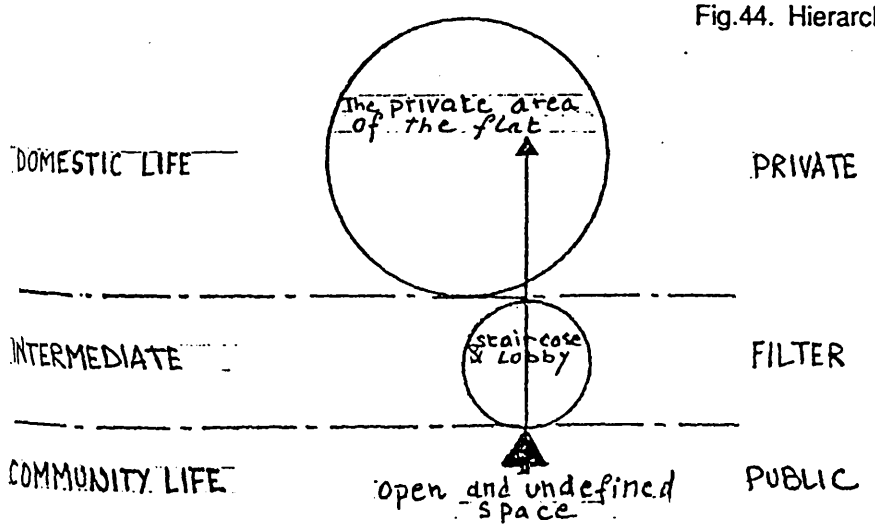


Fig.43. The large open space disperse people.

Fig.44. Hierarchy of community and domestic life.



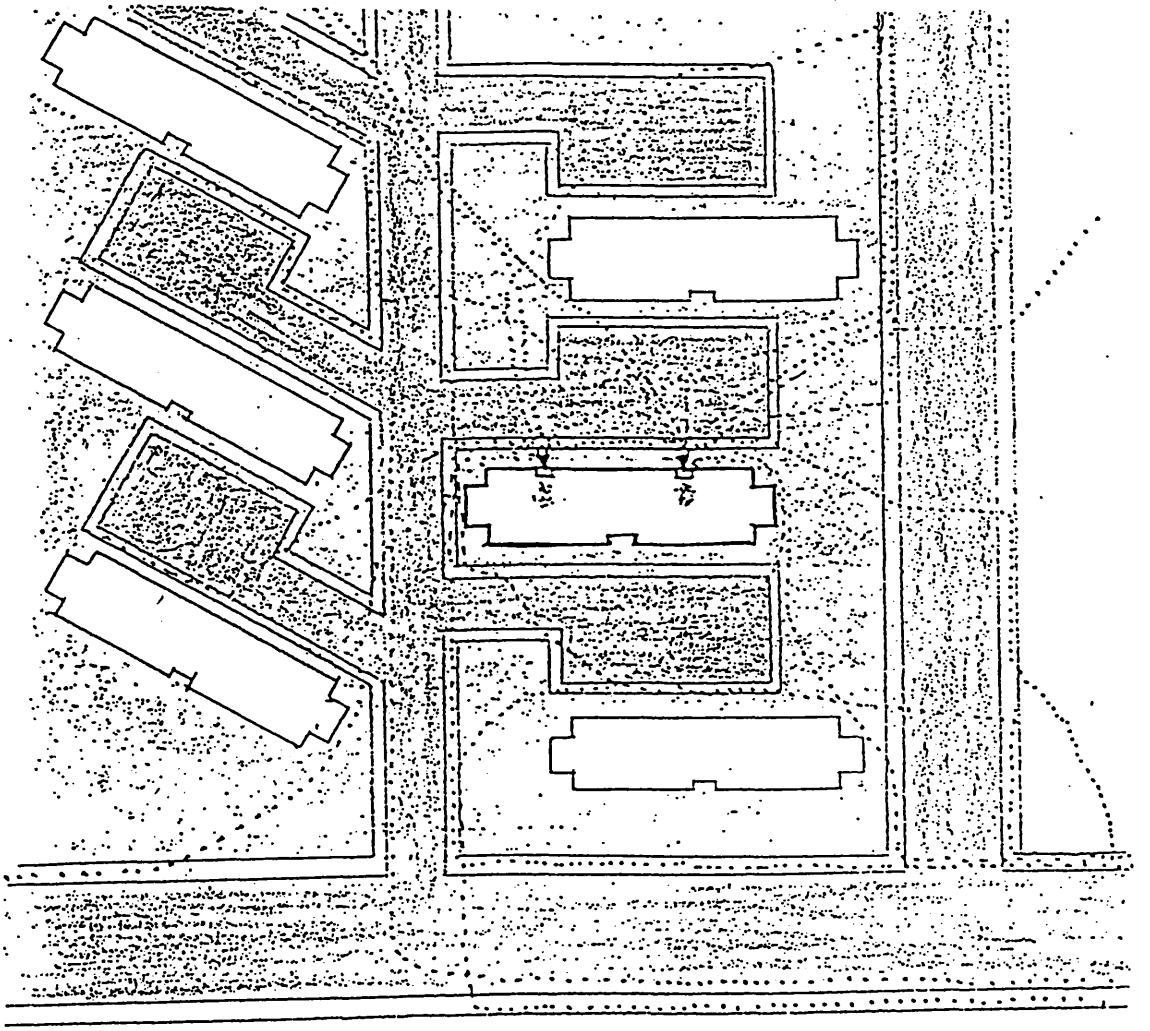


Fig.45. Diagram of people's mobility in the slab.

would reject such a visual feeling, because they are used to a more open urban forms that have less enclosure.

Due to the complexity of this criterion, our concern will be limited only to those visual aspects which are very significant to people in recognising their routes and places within their housing environment. Thus, we should look at how legibility is produced and how the environment responds to the human factors which involve scale, enclosure, and the cultural expectations.

This criterion cannot be measured, but it can be tested, because it is possible to identify and describe certain elements such as route systems, places, and hierarchy which are usually very significant to legibility. Other secondary aspects such as scale, enclosure, monotony, and character are also identified, as these latter can also be a determining factors of this criterion

a. <u>The cluster unit.</u>

Due to:

1- Its recognisable places. i.e. (different location points).

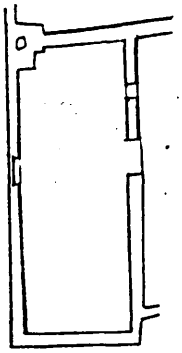
2- Its recognisable hierarchy of routes. i.e. (street hierarchy). **(see fig.6,8, Part two, Chapter 1).**

3- Its recognisable route system that works only at a local level and is not provided at a larger scale.

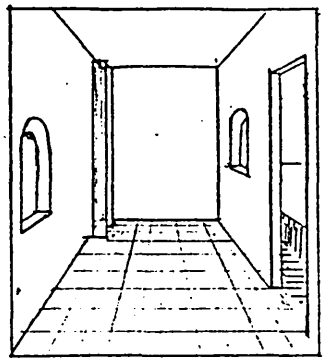
4- Its maintained scale and enclosure that exist in both the private space and the open public space which also respond to the Algerian culture. **(Fig.46,47,48).**

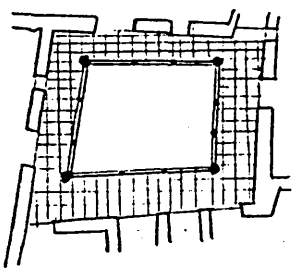
5- Its recognisable character. i.e. (distinct buildings due to their divers man-sized details). **(Fig.48d).**

The cluster unit creates an appreciable visual aspect that provides an acceptable legible environment but only at a local level.

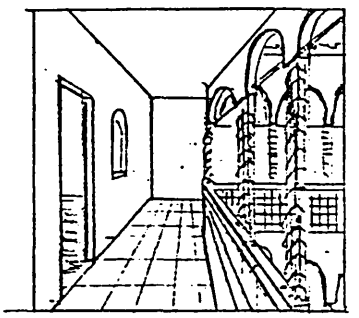


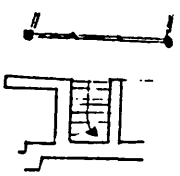
ROOM



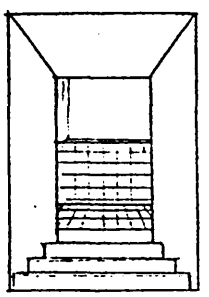


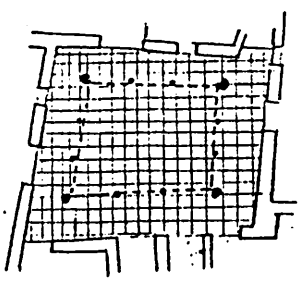
GALLERY



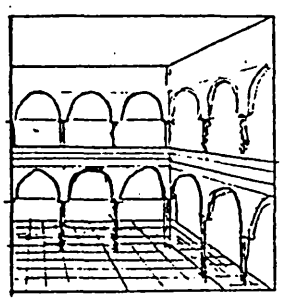


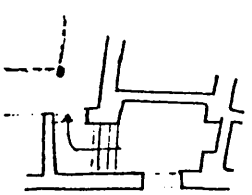
STAIRS





COURTYARD





BENT ENTRY

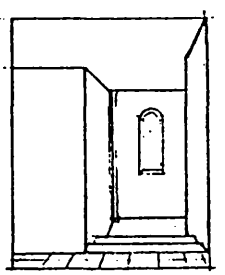
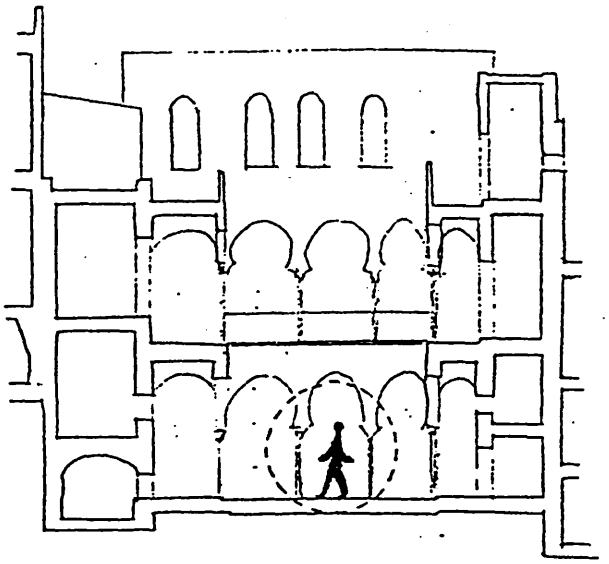
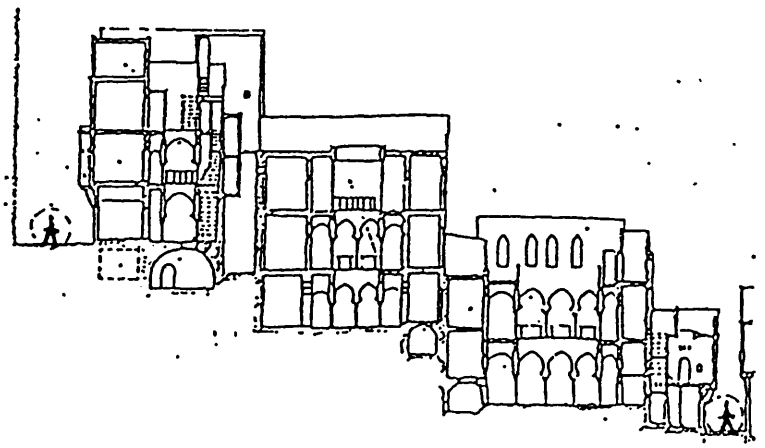


Fig.46. Sequential scale and enclosure in the courtyard house.

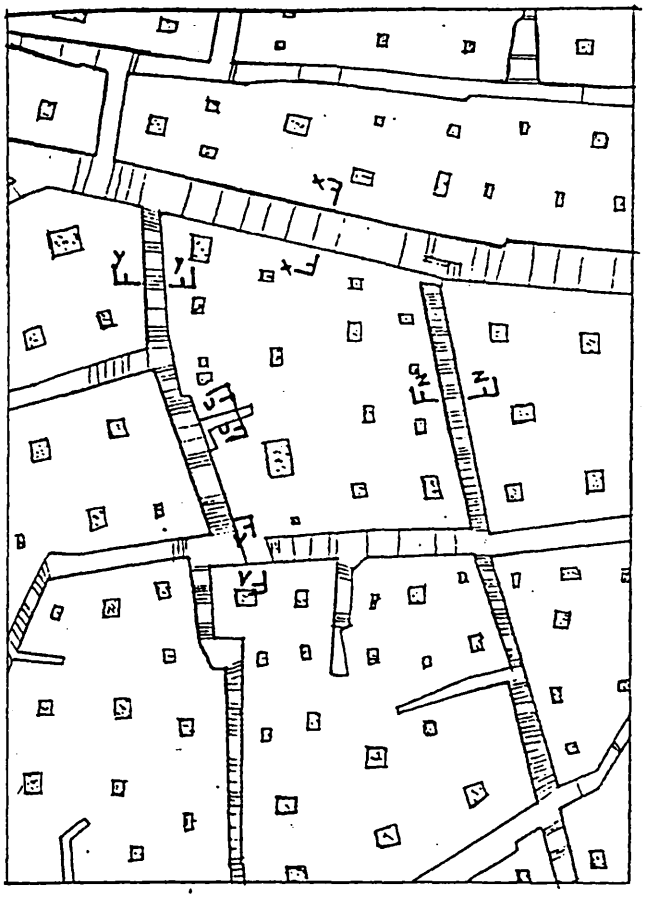


a- Scale and enclosure
in a private space (courtyard).

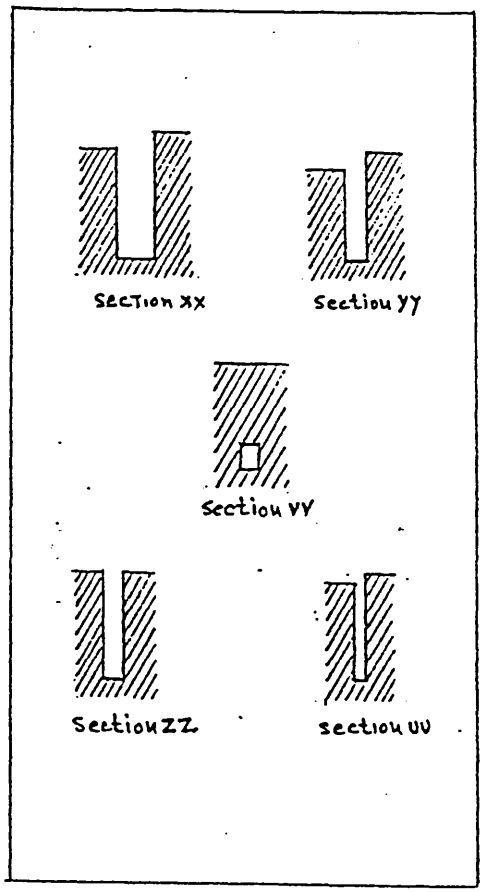


b- Scale and enclosure
in a public space (street).

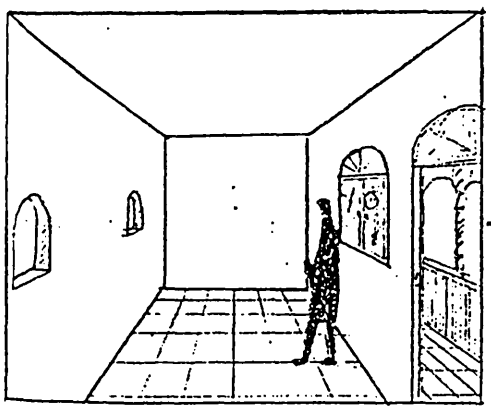
Fig.47. Scale and enclosure in the courtyard and in the street.



a- Plan of a local area.

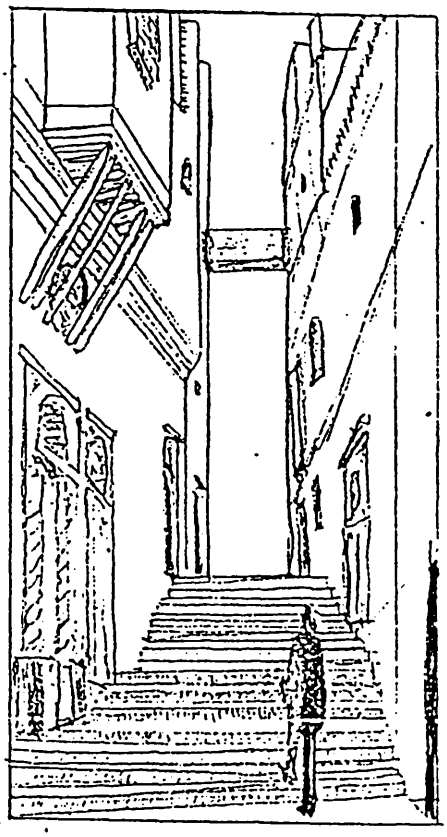


b- Sections showing the enclosure.



c- Scale and enclosure in a private space (room).

Smooth change



d- Scale and enclosure in a public space (street).

Fig.48. Scale, enclosure and character of private and public space.

b. The slab unit.

Due to:

1- Its non-recognisable places. i.e. (identical location points).

2- Its non-recognisable hierarchy of route at the local level. i.e. (dominated by the open space).

3- Its recognisable route system that works only at a grand level. **(see fig.30,31, Part two, Chapter 2).**

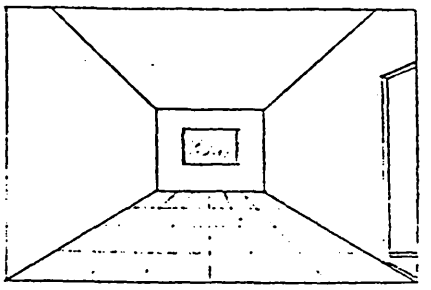
4- The sudden variable scale and lack of enclosure between the private space and the public open space. **(Fig. 49, 50, 51).**

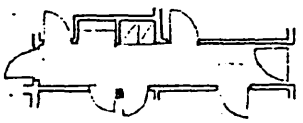
5- Its uniform character. i.e. (no distinct buildings due to their repetitive regular detail. The slab unit creates a monotonous visual aspect that provides a certain acceptable legible environment at a grand level only. By contrast, this visual aspect provides a comparatively weak legibility at a local level.

In terms of visual aspects, the cluster unit seems responsive to human scale, and enclosure. The human scale arises from the external wall of the cluster that has divers man-sized details i.e. (doors, mashrabias, ...etc), and from the enclosure that provide a smooth sequential movement along the streets. In addition, the cluster unit generates a very high legibility at a local level due to its recognisable places, the hierarchy of route, and the character that is determined by those man-sized details which make each scene remain at a human scale. In fact, all these visual ingredients act together as a method of identifying places in order to acheive good legibility. However, at a grand scale, because the general route system is not easily recognisable due to its confusing "gestalt" that arises from the dense and random pattern, legibility is therefore very weak especially for non residents. But because at some location points it is possible to identify tall minarets, this means especially for the people who live there, and not for outsiders that legibility can still be achieved.

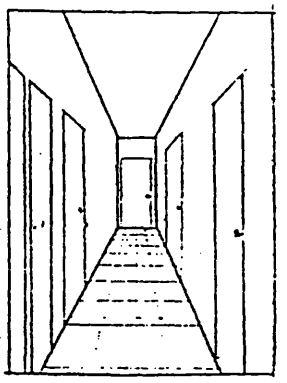
By contrast, the slab unit is not responsive to human scale and enclosure. This arises mainly from the typical buildings that visually strike one as total objects due to their uniform detailing, and from the sudden shift of the enclosure that exists inside the dwellings and the staircases, to

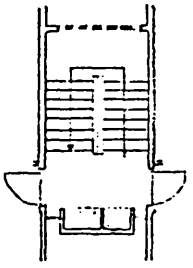
ROOM



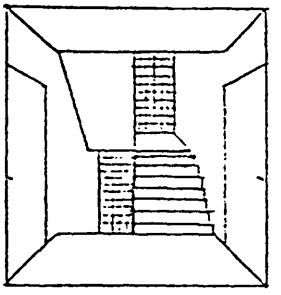


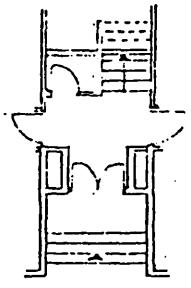
CORRIDOR





STAIRS





LOBBY

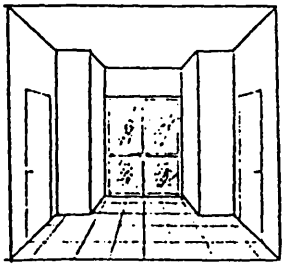
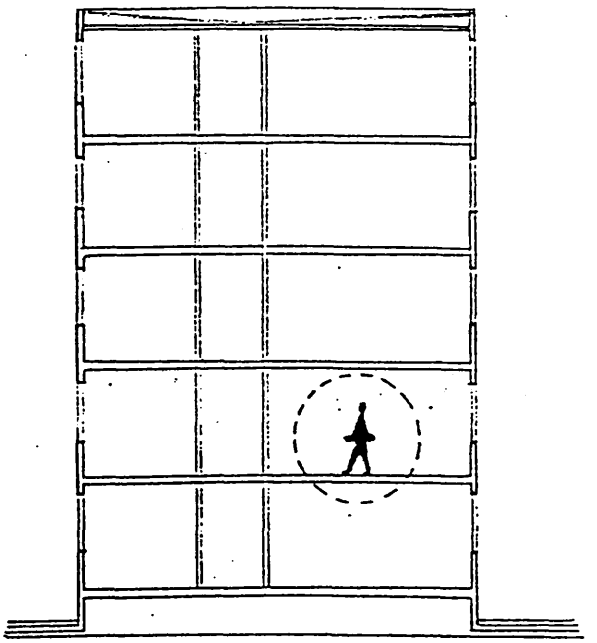
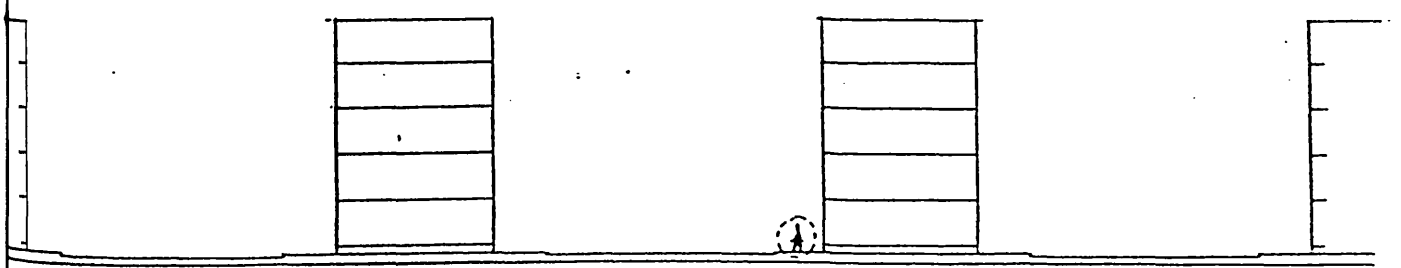


Fig.49. Sequential scale and enclosure in the slab unit.

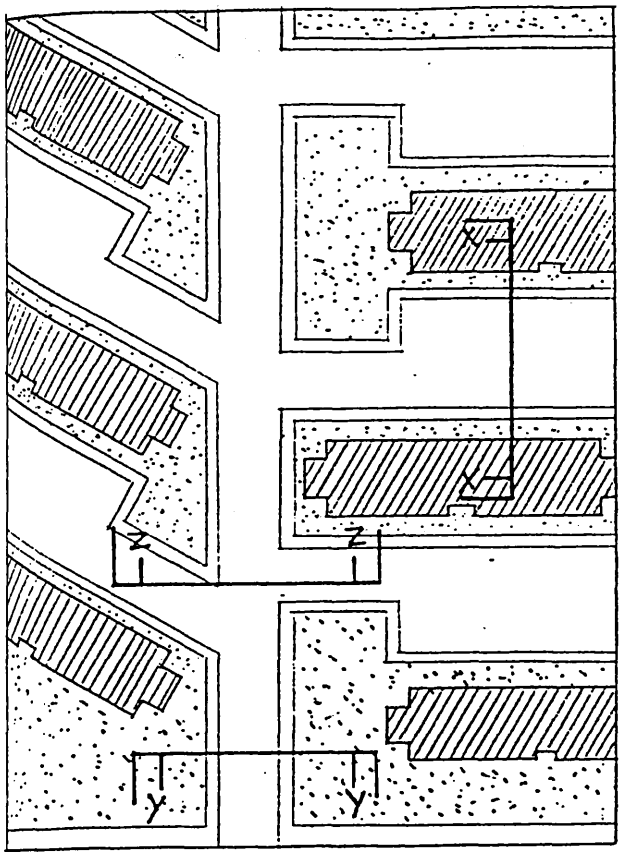


a- Scale and enclosure
in a private space (flat).

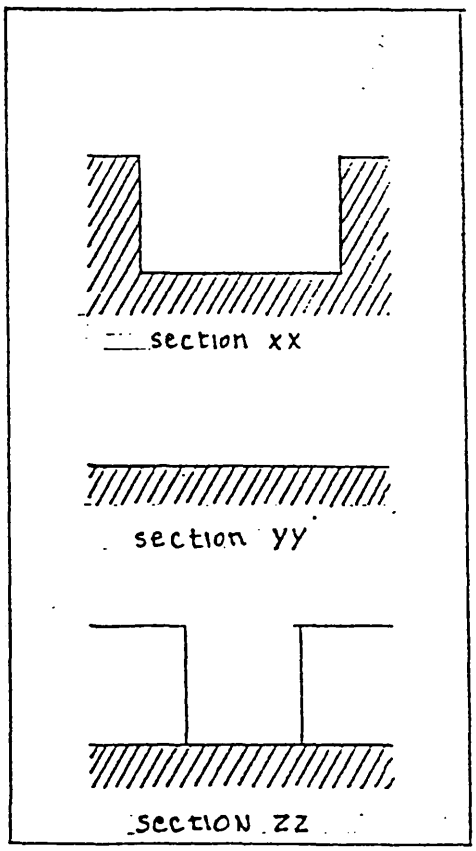


b- Scale and enclosure
in a public space.

Fig.50. Scale of enclosure in the flat and in public space.

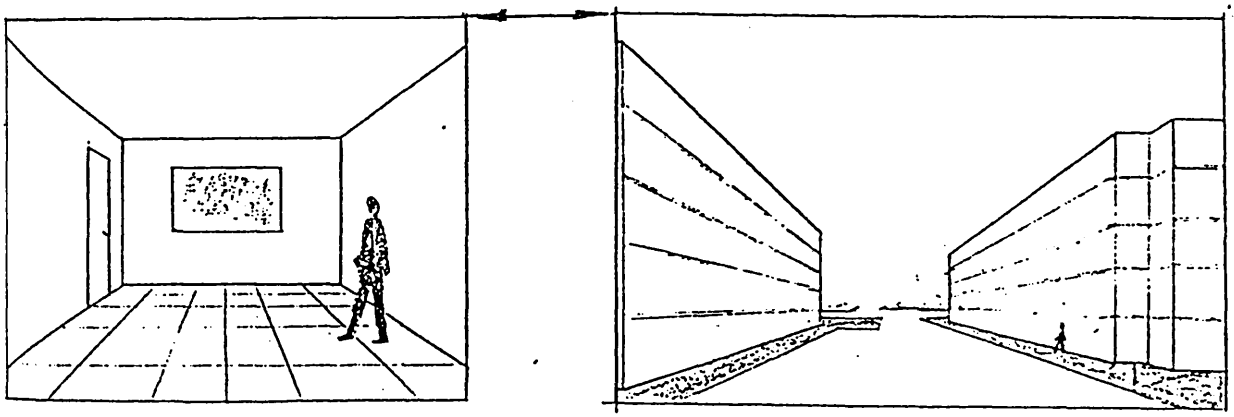


a- Plan of a local area.



b- Sections showing the lack of enclosure.

Sudden change



c- Scale and enclosure in a private space (room).

d- Scale and enclosure in a public space.

Fig.51. Scale, enclosure and character of private and public space.

the disclosure that dominates the public open space and does not create an orderely sequential movement. In addition, the slab unit generates a less legible environment at a local level due to its identical surrounding slabs, and its similar location points and roads. In fact, all these visual characteristics do not provide a good method of identifying places, and therefore legibility is weakened. However, at a grand level, because the general route system is easily recognisable due to its visible "gestalt" that arises from the geometric and open pattern, legibility is therefore achieved for both, the inhabitants and the outsiders.

In general then, it is possible to conclude that the cluster unit has a more responsive visual aspect to the Algerian human factors than the slab unit, but in terms of legibility, while the cluster unit works easily at a local level and with some difficulties at a grand level, the slab unit works perfectly at a grand level.

2.2.9. Movement

This criterion illuminates the characteristic of the pedestrian as well as the vehicular movement within the housing environment, deriving from the two building forms. Our concern is to see to what extend the control of movement is performed and achieved in terms of quality, safety, and walking distances to neighbouring buildings, to parking spaces, and to daily activities. We will also look at the time distances, the convenience of proximity, and if emergency access is possible. This criterion will enable us to decide which building form offers more controlled movement, without bringing conflict to the other aspects of the living environment.

In terms of movement, the cluster unit offers a very pleasant routes for pedestrians due to the enclosure, the varying scenes which result from the diversified details, and the smooth sequential movement **(see 2.2.8. visual aspect)**. These routes are very safe since no cars can get through the narrow streets. Besides, the pedestrian movement is highly controlled since all routes are channelled through a hierarchy system of streets. With regard to walking distances, the cluster unit provides very short distances to both the neighbouring clusters (from 1 m to 20 m) and the daily activities (from 100 m to 400 m) which are usually located on the

main public street i.e. Sharaa. In fact, the clusters are so close that sometimes they connect with each other, thus reducing the time distance to just a few seconds walk, but for the daily activities the journey can take from about 2 to 5 minutes walk. However, most of these routes are sheltered from the sun which is an important advantage for the pedestrians especially during hot summer days.

Unlike the cluster, the slab unit offers a very boring and unpleasant routes for the pedestrians due mainly to the uniform scenes and the openess that characterises the places. These routes are safe since car and pedestrian routes are segregated, however, at crossing points and junctions the pedestrians are put at great risks due to the road layout that allows high speed vehicular movement. Besides, the pedestrian movement is uncontrolled and random through the open space. With regard to walking distances, the slab unit provides long distances between the neighbouring slabs (from 22 m to 50 m), acceptable distances to daily activities (from 100 m to 600 m) which are at the secondary centres, but very short distances to parking spaces (about 40 m) which is very convenient to the users in terms of proximity and supervision. However, most of the routes are exposed to the sun which is uncomfortable for pedestrians.

In terms of motorcar movement, the cluster unit rejects it entirely which is very inconvenient for today's life style, whereas, the slab unit works in favour of the car. However, the layout that is generated by the slab unit is not handy to drivers at junctions that have hard right angles, since car movement flows better around smooth curves.

Because the slab unit offers a very good performance for car movement, it also offers a good emergency access; in fact, due to the openess of the layout, most emergency engines can reach closely any building within this environment. In contrast, the cluster unit does not have any emergency access thus, if anything serious happens in side such environment, it has to be handled only by men.

In general then, the cluster unit offers only a good, safe, and pleasant pedestrian movement, whereas, the slab unit does not only offer an acceptable pedestrian movement but also, it offers a very convenient vehicular movement that is so important to modern life.

	The type of unit	
Type of movement	Cluster	Slab
Pedestrian	Pleasant. i.e. (enclosure and varying scenes)	Unpleasant. i.e. (openess and uniform scenes)
	Very safe. i.e. (no cars)	Safe accept at crossing points and junctions
	Controlled and channelled through the streets	Uncontrolled and random through the open space
	Short walking distances between clusters (average 1 m to 20 m)	Long walking distances between slabs (average 22 m to 50 m)
		Very short walking distances to parking space (average 40 m)
	Acceptable walking distances to daily activities (average 100 m to 400 m)	Acceptable walking distances to daily activities (average 100 m to 600m)
	Mainly sheltered from sun	mainly exposed to sun
Motorcar	Entirely rejected	Very convenient Not handy at junctions
Emergency access	Entirely rejected	Very convenient

2.2.10. Flexibility

This criterion is of important significance to the Algerian context because it supposes a possible ease on the housing demand. In other words, this aspect of housing should reduce the importance of the present crisis. Our concern here, is to look at the spatial flexibility, in terms of horizontal and vertical expansion, and in terms of functional adaptability according to people's need or to the season's climatic changes. We will explain how an average dwelling can expand, and to what extent the functional aspect is flexible in both the building form and its surrounding.

In terms of flexibility, the open space surrounding the cluster unit has a very little horizontal flexibility i.e. (it can only be narrowed), but does not have any possible vertical flexibility, since such an act will surely disrupt not only privacy but also the whole layout organisation. This surrounding space is mainly for pedestrian circulation and its function can hardly take any other aspect, accept when it is narrowed, this latter may became a semi-private or private cul-de-sac **(see physical development process, Part two, Chapter 1)**.

By contrast, the huge open space around the slab unit is theoretically very flexible at ground level but in fact, the possible horizontal expansion that can take place will be located only where space has no other function than being an assumed green area, and even there, this horizontal expansion will be limited to a certain extend due to the geometrical order of the existing layout . Vertical expansion is theoretically only limited by the strength of the existing structure. Due to the nature of the outword-looking slab, when privacy is concerned, expansion should be located only at the side of the slab unit.

With regard to internal flexibility, the cluster unit can expand horizontally mainly around the courtyards if the house plots are not entirely built, and vertically up to three floors, always around the courtyards, at upper levels offering each time similar living space as the first floors, but in some cases where the house plot is at the periphery of the cluster, the living space can be even bigger since at a higher level projections over the street are allowed.

None of the expansions can take place in the slab unit due to its rigid physical nature. Theoretically, it seems possible to expand the flats located at ground level, however, if such operation take place it will not only affect the functioning of the public open space, but also the layout organisation of the flats i.e. the inner spaces will have difficulty to be naturally ventilated and lit.

In terms of functional adaptability, the cluster unit offer more flexibility due to the open courtyards and the terraces that can be used for several activities depending also on the

climatic conditions of the seasons. Whereas, the slab unit, due to its physical nature, does not offer any functional adaptability; it offers only one type of use and this latter is very resistant to changes.

In general then, the slab unit offers good flexible adaptability of its open space only, and this can happen mainly at ground level. In contrast, the cluster unit does not offer any major external flexibility, but offers flexibility.

Type of unit		Flexibility		
		Horizontal (expansion)	Vertical (expansion)	Function (use)
Cluster	Surrounding space	Flexible (very little)	Not flexible	Not flexible
	The courtyard house	Flexible around courtyards only. (Fig.52).	Flexible (Fig.53,54).	Flexible
Slab	Surrounding space	Flexible (theoretically) (Fig.55).	Flexible (theoretically) (Fig.55).	Flexible (very)
	The flat	Flexible (theoretically) ground floor only (Fig.56).	Not flexible	Not flexible

3. Conclusion

The first observation is that both building forms do not meet all the criteria. By comparing the two building forms, according to the 10 selected criteria we found that, the cluster unit responds adequately to 7 criteria (land use, density, economy, climate, territory, privacy, and sense of community), whereas, the slab unit responds adequately only to 1 criterion that is the movement.

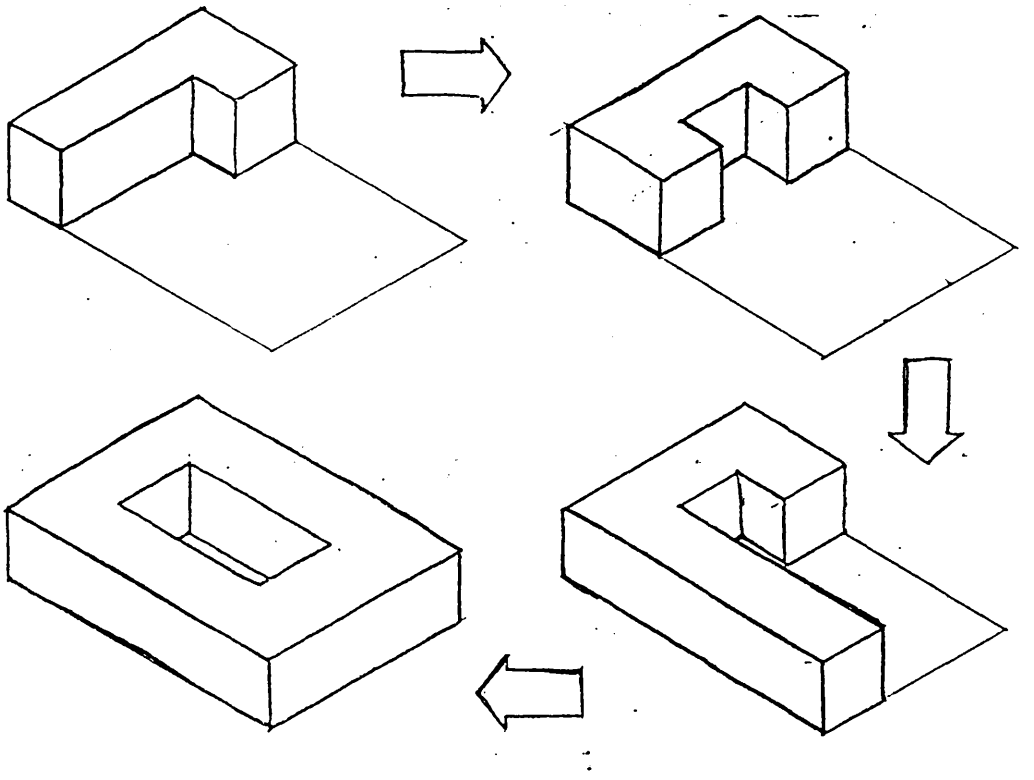


Fig.52. Horizontal expansion around the courtyard.

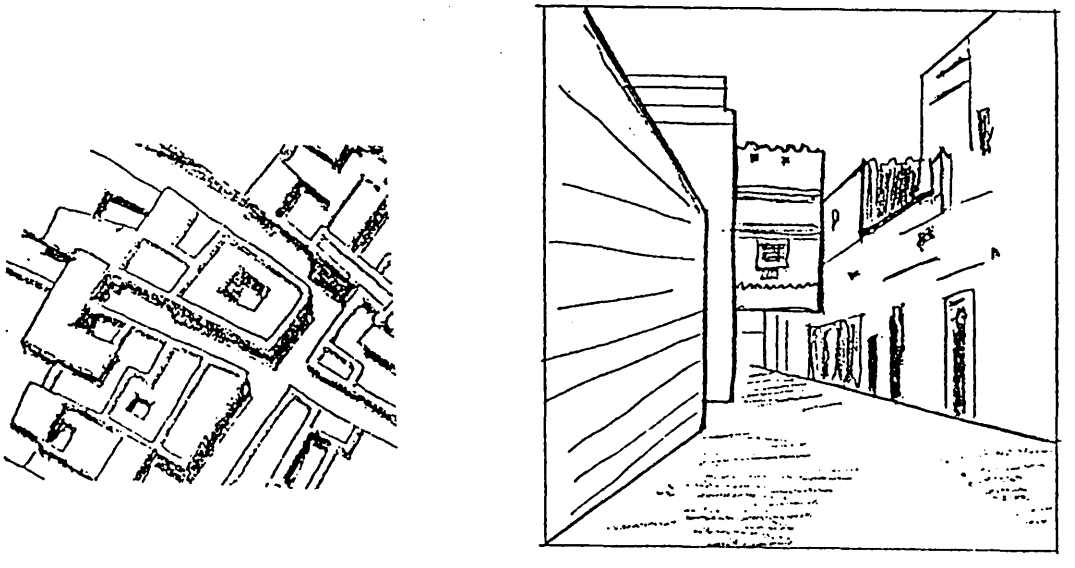


Fig.53. Vertical expansion around the street.

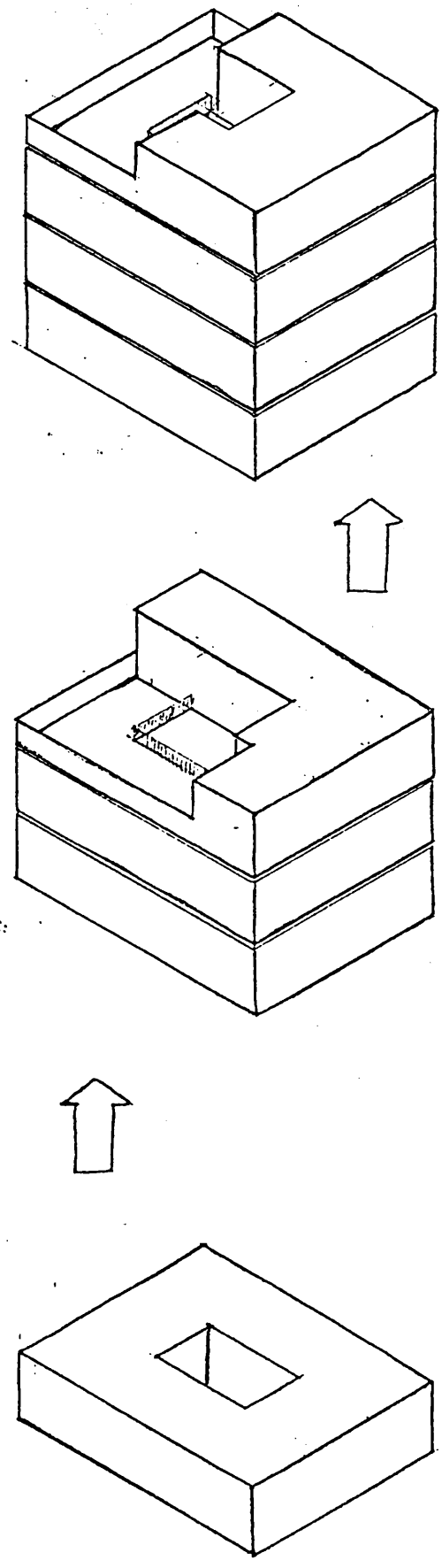


Fig.54. Vertical expasnsion around the courtyard.

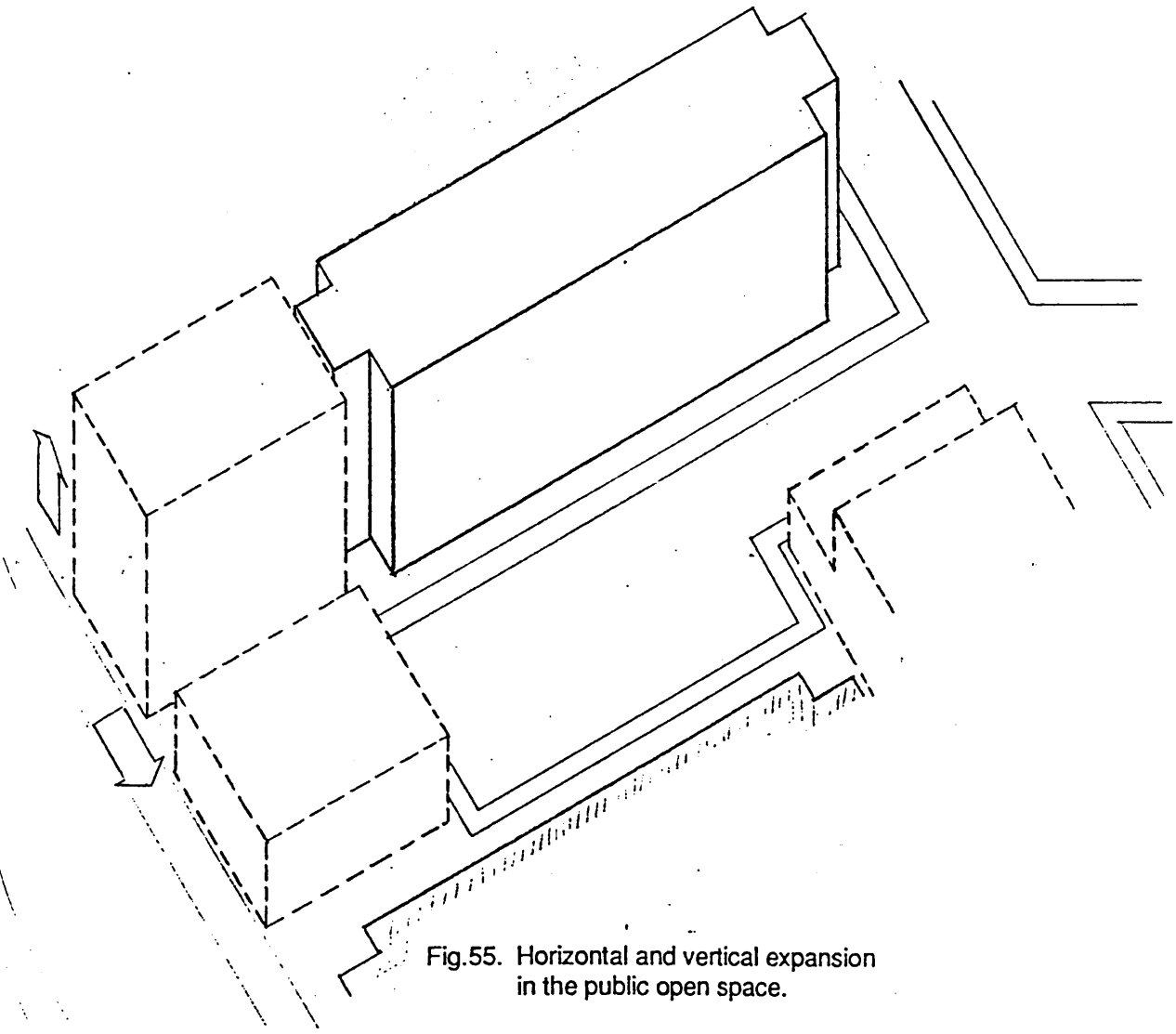


Fig.55. Horizontal and vertical expansion in the public open space.

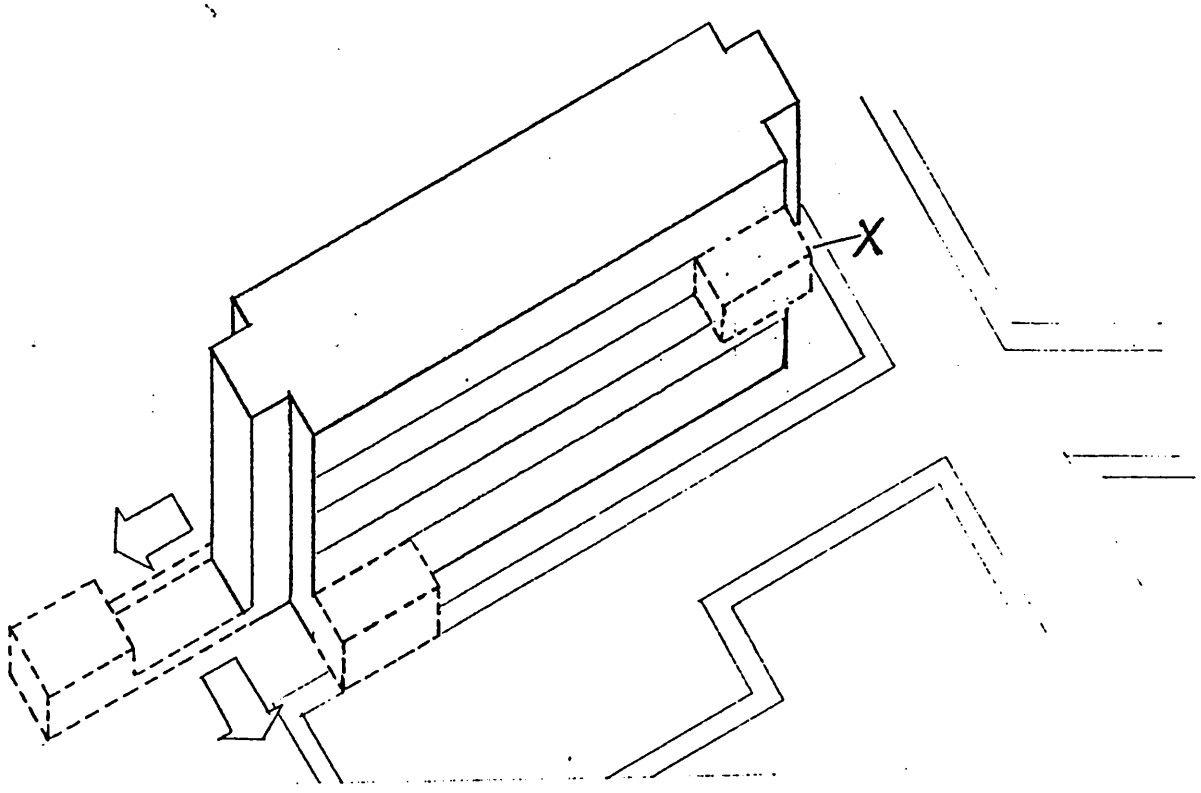


Fig.56. Horizontal expansion of the flat (only at ground level).

However, both the cluster and the slab units do not respond very well to 2 criteria, which are the visual aspect and the flexibility. Both criteria performed partially in each building form i.e. while the visual aspect proved positive at a local level in the cluster unit, it has proved negatively at a city scale, whereas, in the slab unit the same criterion produced an acceptable visual aspect at a grand level but it proved unacceptable at a local level.

However, by looking at the nature of the criteria that performed well in the cluster unit, we found that these latter centred mainly around one particular aspect that is essentially socio-cultural. In fact, the concern for privacy seems to be the main determinant criterion that shaped the cluster unit. Because of its strong requirement, this criterion has overlapped with the others, leading therefore to a complex relation between them, which obviously created a complex environment. The physical determining factors of the cluster unit depended directly on these overlapped criteria that offered a qualitative and humane environment which responds perfectly to social requirements. Besides, this social requirement called also for a particular land use that helped to offer a comfortable climatic conditions and a high density with minimum investments.

However, in the slab unit the nature of the movement criterion centred mainly on the physical aspect of its environment. In fact, the vehicular movement called only for a more open and geometric pattern which obviously led to a banal and simplistic environment. Indeed, criteria such as, land use, density, and economy where not determinant factors but, a consequence of the movement system. Because the slab unit responds mainly to one criterion, it has created a non-complex environment where man is forgotten.

In general then, the building form analysis revealed that the slab unit as a housing environment is not only inefficient but also does not respond to social requirements whereas, the cluster unit proved efficient and has a humane environment. However, due to modern life requirements such as the car for instance, the traditional environment needs considerable improvement to accommodate them. In short, both cluster and slab need improvement in order to meet at least the 10 selected criteria.

References

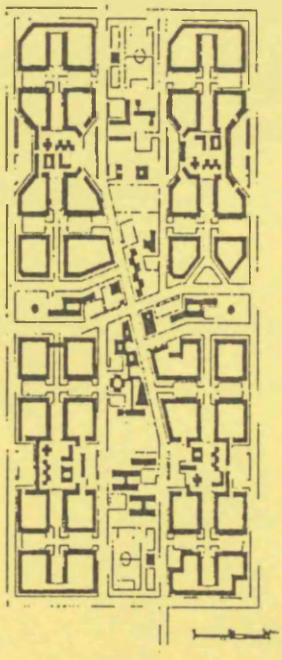
1. Newman, O. Defensible space.
"People and design in the violent city".
Architecture press, London, 1971.

2. Ibid.

3. Settouane, F. Plea for the courtyard house.
Thesis, University of Glasgow, 1986.

PART THREE

APPROPRIATE HABITAT



Chapter1: APPROACH TO THE APPROPRIATE URBAN HABITAT

1. Method of approach
2. Upgrading of the Casbah model
3. Upgrading of the Mendes's model

1. Method of approach

Having examined the previous 10 criteria, I now intend to adjust both Mendes's model and the Casbah to account for the criteria.

This process is analogous to a government department faced with proposals such as the Mendes's model and demanding that it be improved to meet the criteria established. This has been done by the Algerian government but the point of this thesis is that, it has been considered against too few criteria.

The first logical method suggests to take the existing models (Mendes's model and Casbah) and adjusting them firstly individually against critical criteria, then against multiple criteria, as any change will normally effect more than one criterion these processes will not be a steady incremental rise but will proceed irregularly.

The intention is to establish a middle ground of acceptable habitat. This to continue the analogy above would be buildings that it would be worth the government investing in.

Theoretically each model required 10 test stages since we have 10 criteria. Also in theory it is possible to evaluate each stage, but by experience, it is possible to short cut this long process and combine or even omit some unnecessary stages. Simply, we can also omit obvious calculations and only identify them where they are significant.

In this thesis many attempts have been made to upgrade both models **(see Appendix 3)** but this part will refer only to those test stages thought very important in terms of improvement.

2. Upgrading of the Casbah

This exercise is carried out on the Casbah. It must be emphasised that there is not a proposal to be executed on this historical Casbah - which must be treated in relation to its historical value and conservation of as much as possible and its fabric would be a priority.

This exercise takes the Casbah as a starting point to examine theoritically what would have to be changed to bring it to modern standards and then the result and diagrams will be used to generate a new settlement obeying the successful aspect of the old Casbah.

The following drawings **(Fig.1,2,3,4a,4b,5)** are to be read with the standard sheet describing the inprovement at each stage.

Stage No. 1 Fig. 1	Improvement				
Criteria	*None*	*Little*	*Considerable*	*Satisfactory*	*Good*
1. Land Use					✓
2. Density					✓
3. Economy				✓	
4. Climate					✓
5. Territory					✓
6. Privacy					✓
7. Sense of Community					✓
8. Visual Aspect				✓	
9. Movement	✓				
10. Flexibility			✓		

Observations

This stage represents the starting point of the Casbah Model

Fig. 1. The Casbah: the starting point of the model.

Stage No. 2 Fig. 2	Improvement				
Criteria	*None*	*Little*	*Considerable*	*Satisfactory*	*Good*
1. Land Use					
2. Density					
3. Economy					
4. Climate					
5. Territory					
6. Privacy					
7. Sense of Community					
8. Visual Aspect					
9. Movement			✓		
10. Flexibility					

Observations

In this Example, in order to introduce the Car: Main Routes are enlarged; also main accesses are added

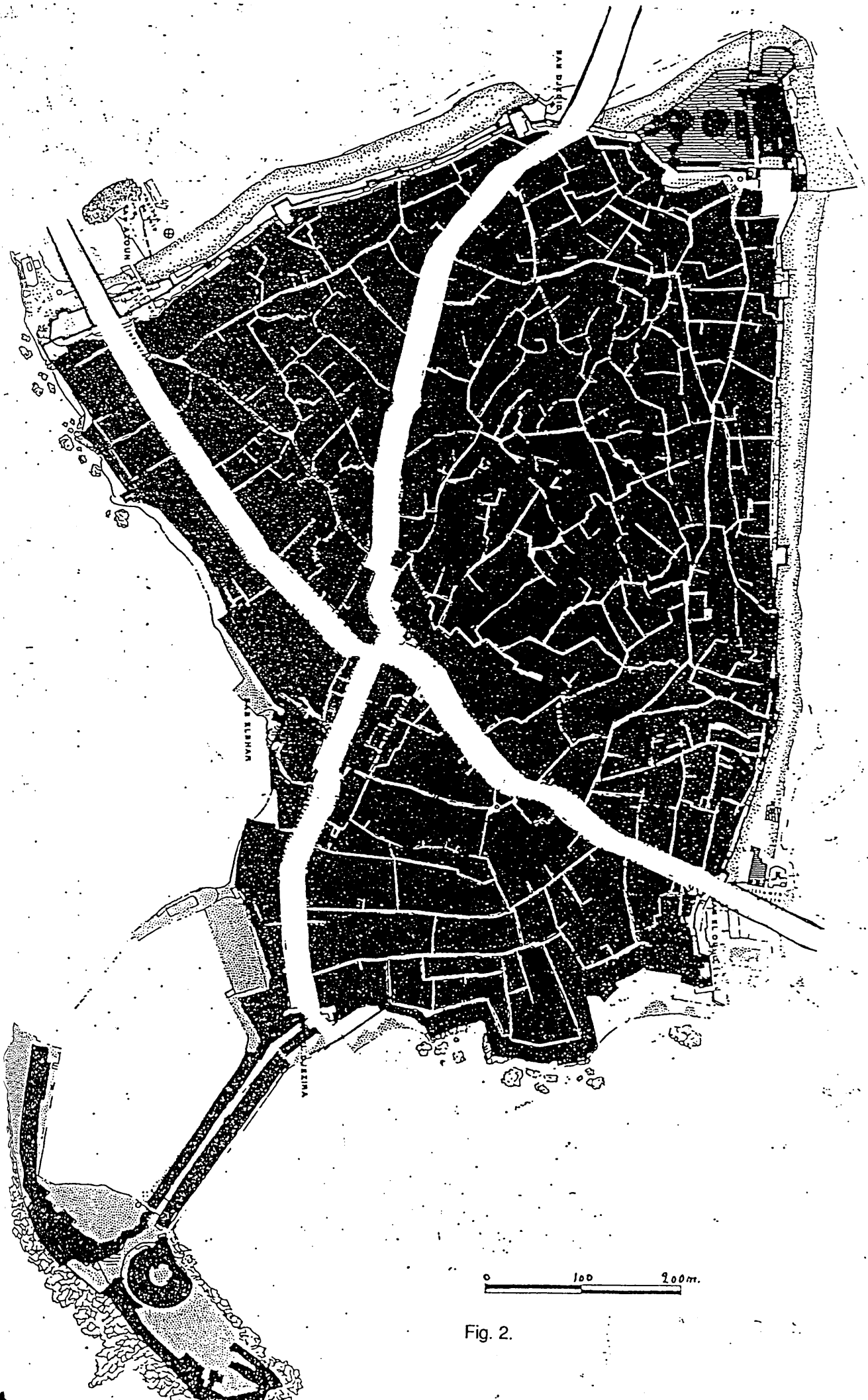


Fig. 2.

Stage No. 3 Fig. 3	Improvement				
Criteria	*None*	*Little*	*Considerable*	*Satisfactory*	*Good*
1. Land Use					
2. Density					
3. Economy					
4. Climate					
5. Territory					
6. Privacy					
7. Sense of Community					
8. Visual Aspect					✓
9. Movement				✓	
10. Flexibility					

Observations

- introduction of sub-routes to complete vehicular access; also parking spaces are added
- visual aspect at a 3 local level will consequently improve legibility

Fig.3.

Stage No. 4a Fig. 4a	Improvement				
Criteria	*None*	*Little*	*Considerable*	*Satisfactory*	*Good*
1. Land Use					✓
2. Density					✓
3. Economy					✓
4. Climate					✓
5. Territory					✓
6. Privacy					✓
7. Sense of Community					✓
8. Visual Aspect					✓
9. Movement				✓	
10. Flexibility				✓	

Observations

This example is specifically included to meet the possible objection that in the late 20th century one cannot build the individual houses of the existing Casbah, i.e. irregular plans. Therefore a computer generated standard courtyard house has been produced to form a cluster. **(See Appendix 3)**
This is then imposed on the existing main street layout of the Casbah.

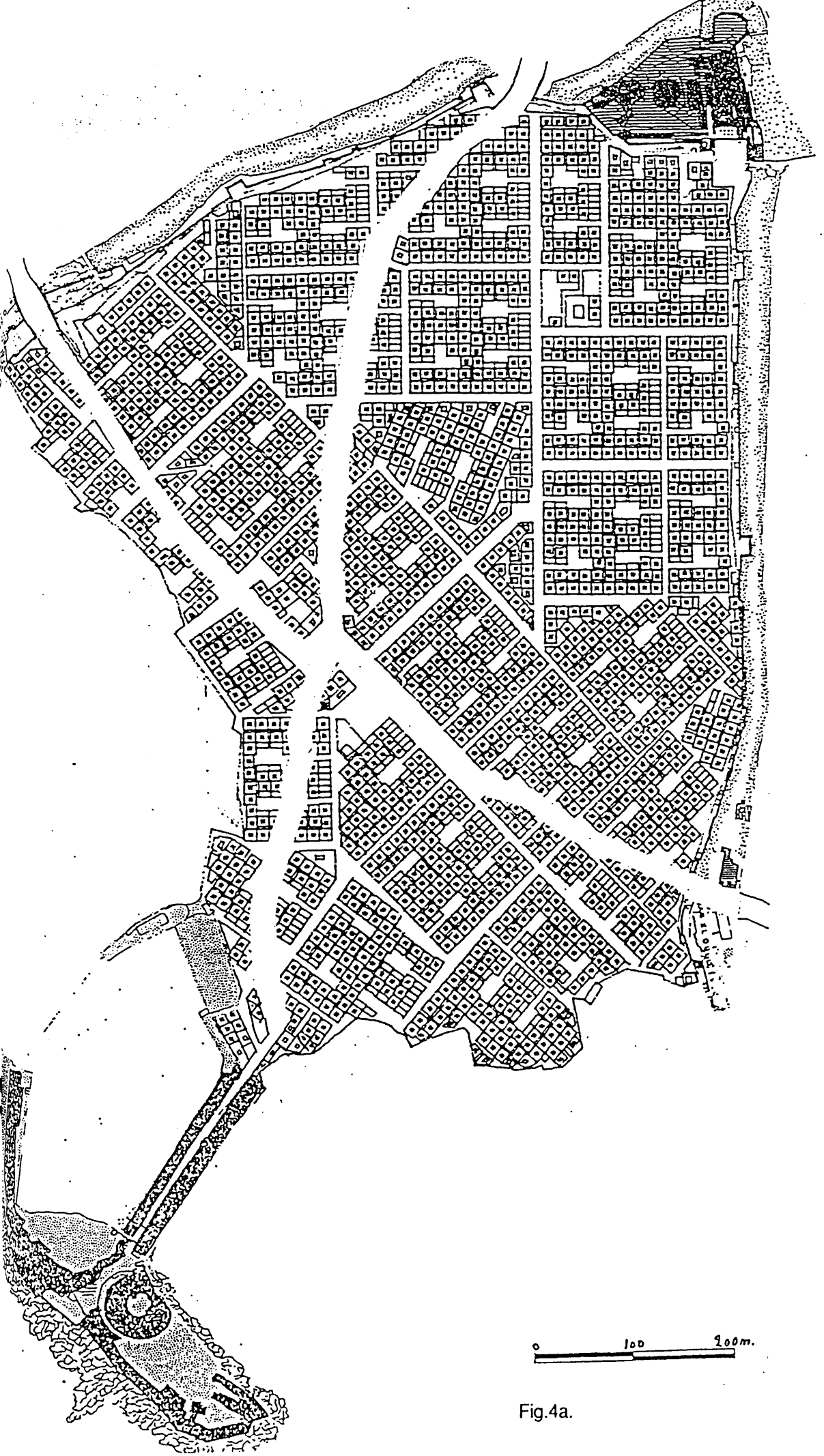


Fig.4a.

Stage No. 4b Fig. 4b	Improvement				
Criteria	*None*	*Little*	*Considerable*	*Satisfactory*	*Good*
1. Land Use					✓
2. Density					✓
3. Economy					✓
4. Climate					✓
5. Territory					✓
6. Privacy					✓
7. Sense of Community					✓
8. Visual Aspect					✓
9. Movement				✓	
10. Flexibility				✓	

Observations

Similar to 4a, but if the Casbah site was available and built then one would expect a layout of the nature of 4b to be produced.

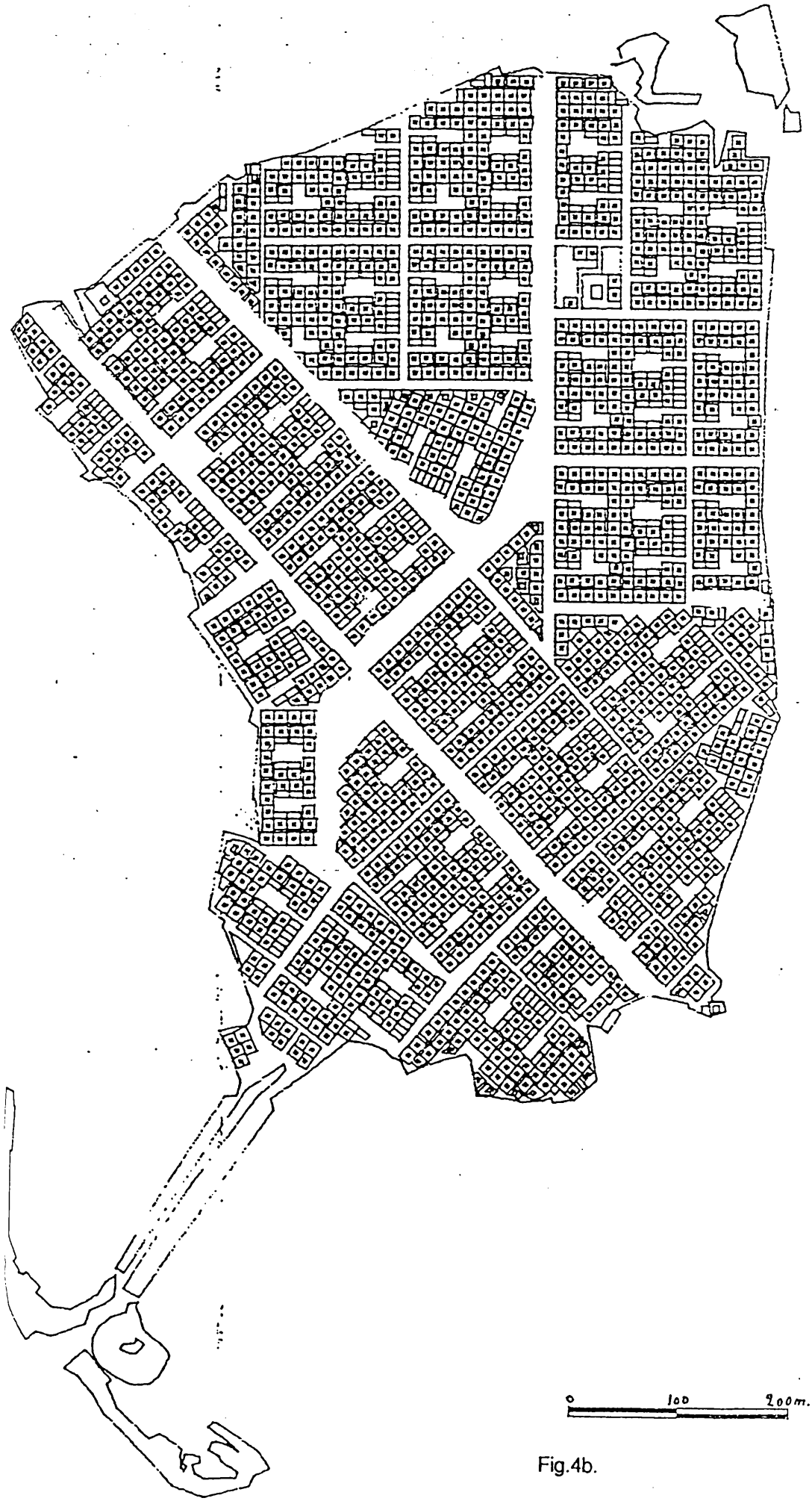


Fig.4b.

Stage No. 5 Fig. 5	Improvement				
Criteria	*None*	*Little*	*Considerable*	*Satisfactory*	*Good*
1. Land Use					✓
2. Density					✓
3. Economy					✓
4. Climate					✓
5. Territory					✓
6. Privacy					✓
7. Sense of Community					✓
8. Visual Aspect					✓
9. Movement					✓
10. Flexibility					✓

Observations

This example is achieved by using the cluster designed using the computer, but adjusted to the site conditions and its main street layout. It is hand drawn since each cluster had to follow the imposed main street layout and the site.

Fig.5.

3. Upgrading of the Mendes's model

This exercise is carried out on the Mendes' s model. It must be emphasised that there is not a final proposal to be executed, it is only a theoretical demonstration on how to improve such a "banal" model of housing to a more complex environment responding to maximum criteria thought necessary for the Algerian context.

This exercise takes the Mendes's model as a starting point to examine theoritically what would have to change and added to bring the present model to meet the criteria established previously. The resultant diagrams of this exercise will be used to generate new settlement patterns obeying the successful aspect of the upgraded model. All aspects of the model are assumed to remain the same unless changed on the plan or stated in the observations.

The following drawings **(Fig.6,7,8,9,10)** are to be read with the standard sheet describing the inprovement at each stage.

Stage No. 1 Fig. 6	Improvement				
Criteria	*None*	*Little*	*Considerable*	*Satisfactory*	*Good*
1. Land Use	✓				
2. Density			✓		
3. Economy		✓			
4. Climate	✓				
5. Territory	✓				
6. Privacy	✓				
7. Sense of Community	✓				
8. Visual Aspect			✓		
9. Movement					✓
10. Flexibility			✓		

Observations

This stage represents the starting point of the Mendes Model

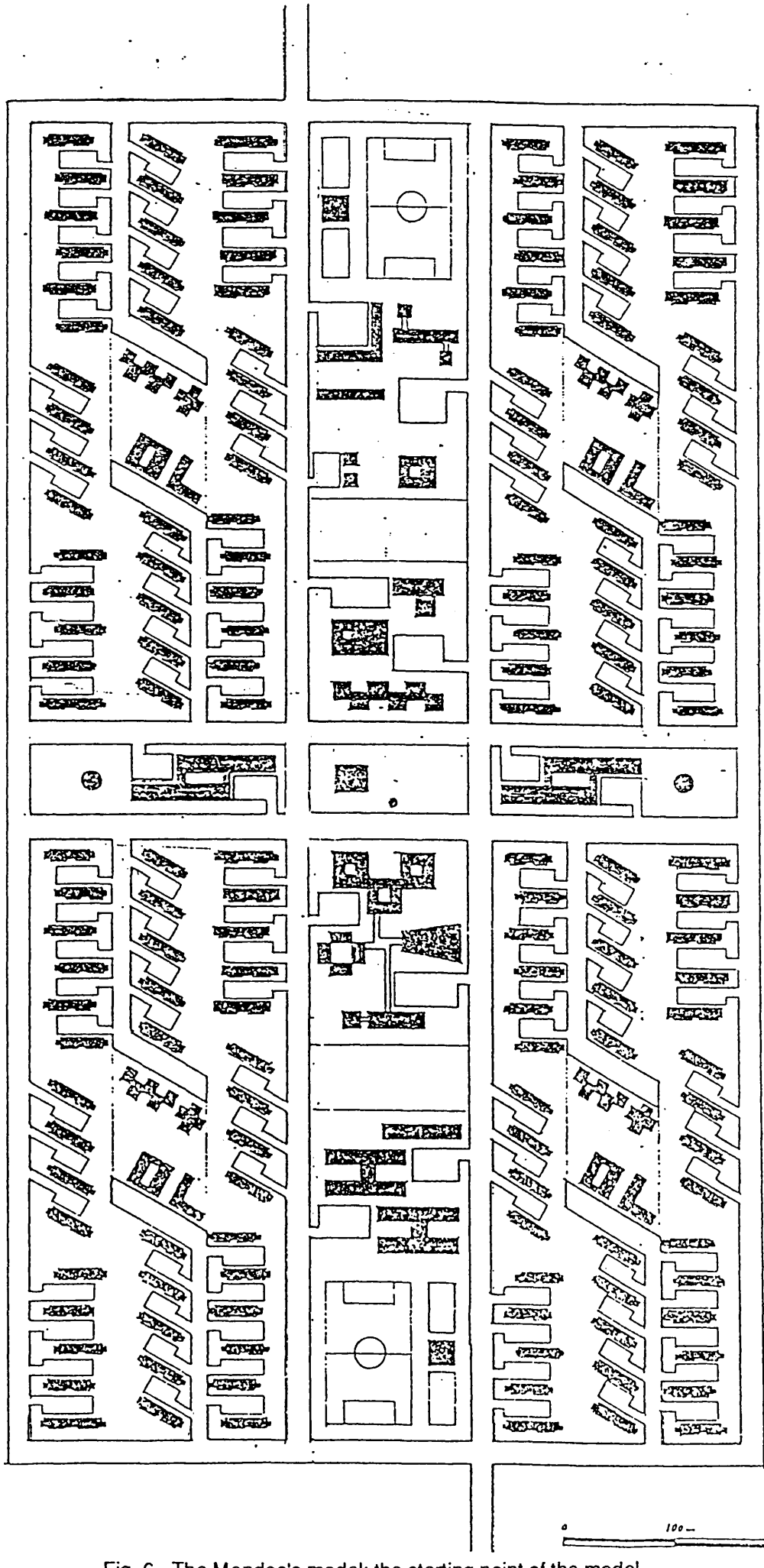


Fig. 6. The Mendes's model: the starting point of the model.

Stage No. 2 Fig. 7	Improvement				
Criteria	*None*	*Little*	*Considerable*	*Satisfactory*	*Good*
1. Land Use					
2. Density					
3. Economy					
4. Climate					
5. Territory					
6. Privacy					
7. Sense of Community					✓
8. Visual Aspect					
9. Movement				✓	
10. Flexibility					

Observations

This example is a "Martin and March" solution. Here it is aimed to improve the quality of the open space i.e. criterion 7, only the road layout is kept.

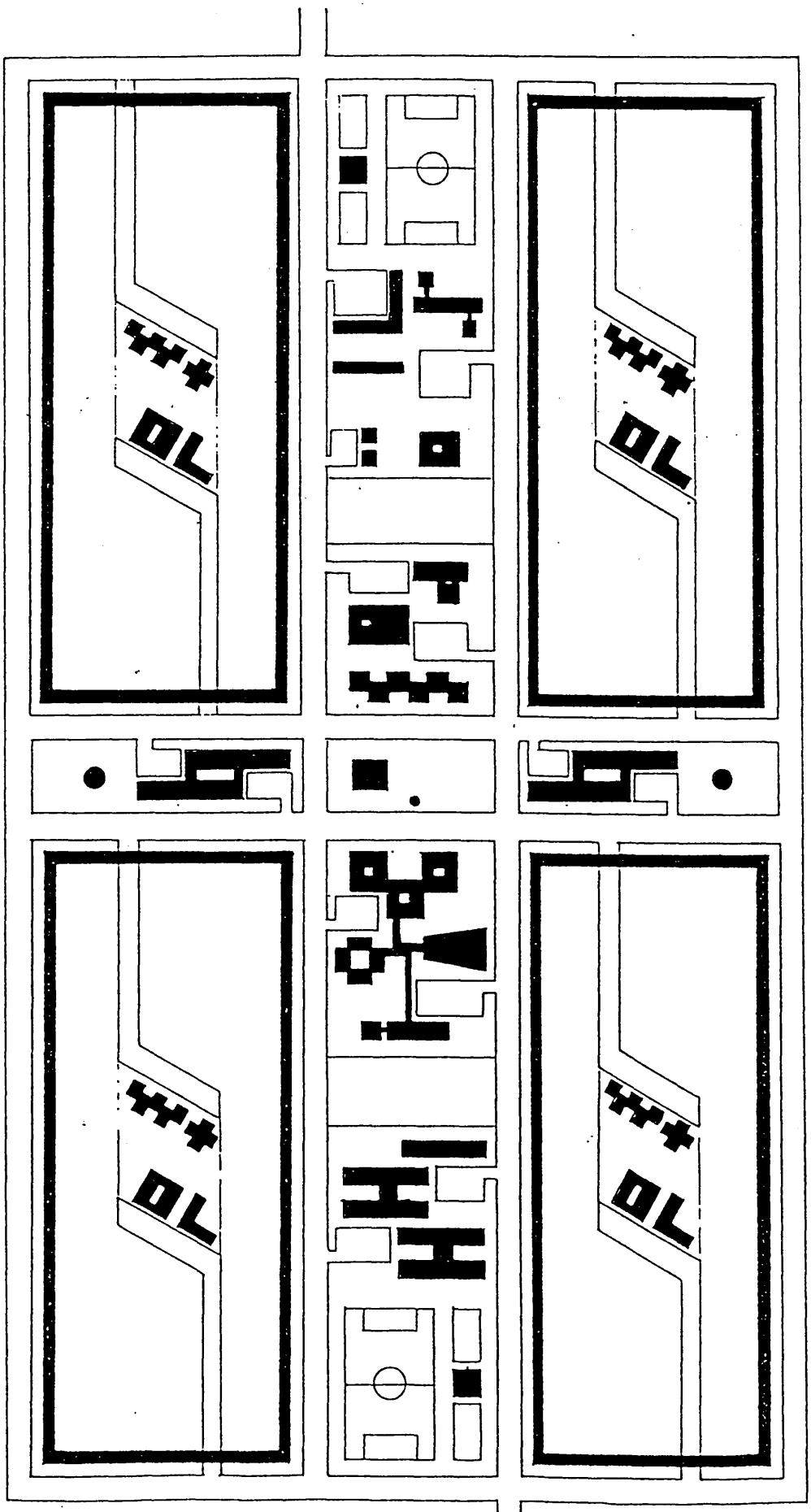


Fig.7.

Stage No. 3 Fig. 8	Improvement				
Criteria	*None*	*Little*	*Considerable*	*Satisfactory*	*Good*
1. Land Use			✓		
2. Density				✓	
3. Economy			✓		
4. Climate		✓			
5. Territory				✓	
6. Privacy			✓		
7. Sense of Community				✓	
8. Visual Aspect			✓		
9. Movement					✓
10. Flexibility			✓		

Observations

In this stage the local road layout is slightly changed, and an attempt to subdivide this block i.e. stage 2, into smaller blocks.

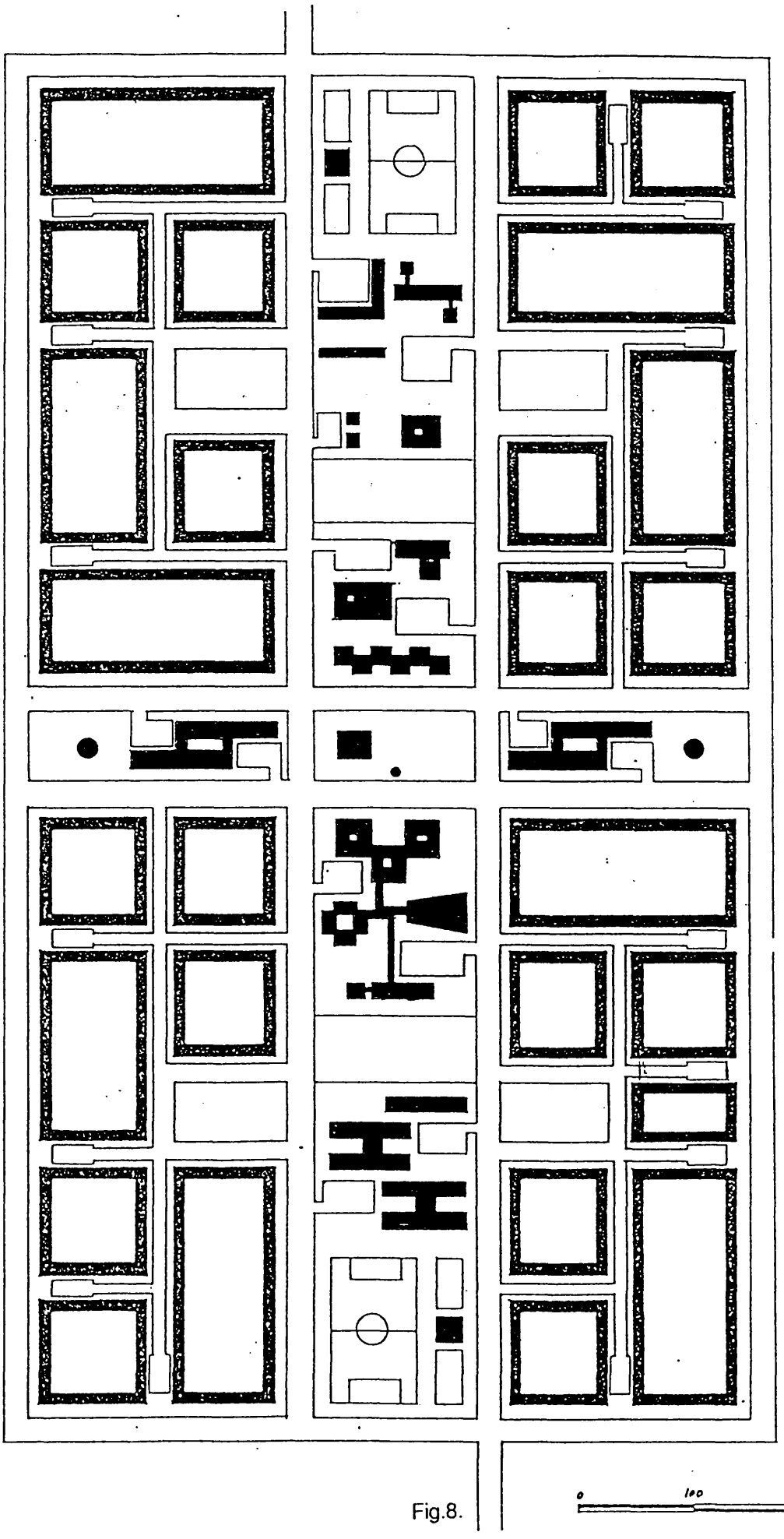


Fig.8.

Stage No. 4 Fig. 9	Improvement				
Criteria	*None*	*Little*	*Considerable*	*Satisfactory*	*Good*
1. Land Use				✓	
2. Density				✓	
3. Economy				✓	
4. Climate				✓	
5. Territory					✓
6. Privacy				✓	
7. Sense of Community					✓
8. Visual Aspect				✓	
9. Movement					✓
10. Flexibility				✓	

Observations

In this stage, almost similar conditions as the previous one are kept, except that now the blocks are at a 35m distance from each other in order to improve privacy. In addition each neighbourhood has a new specific configuration.

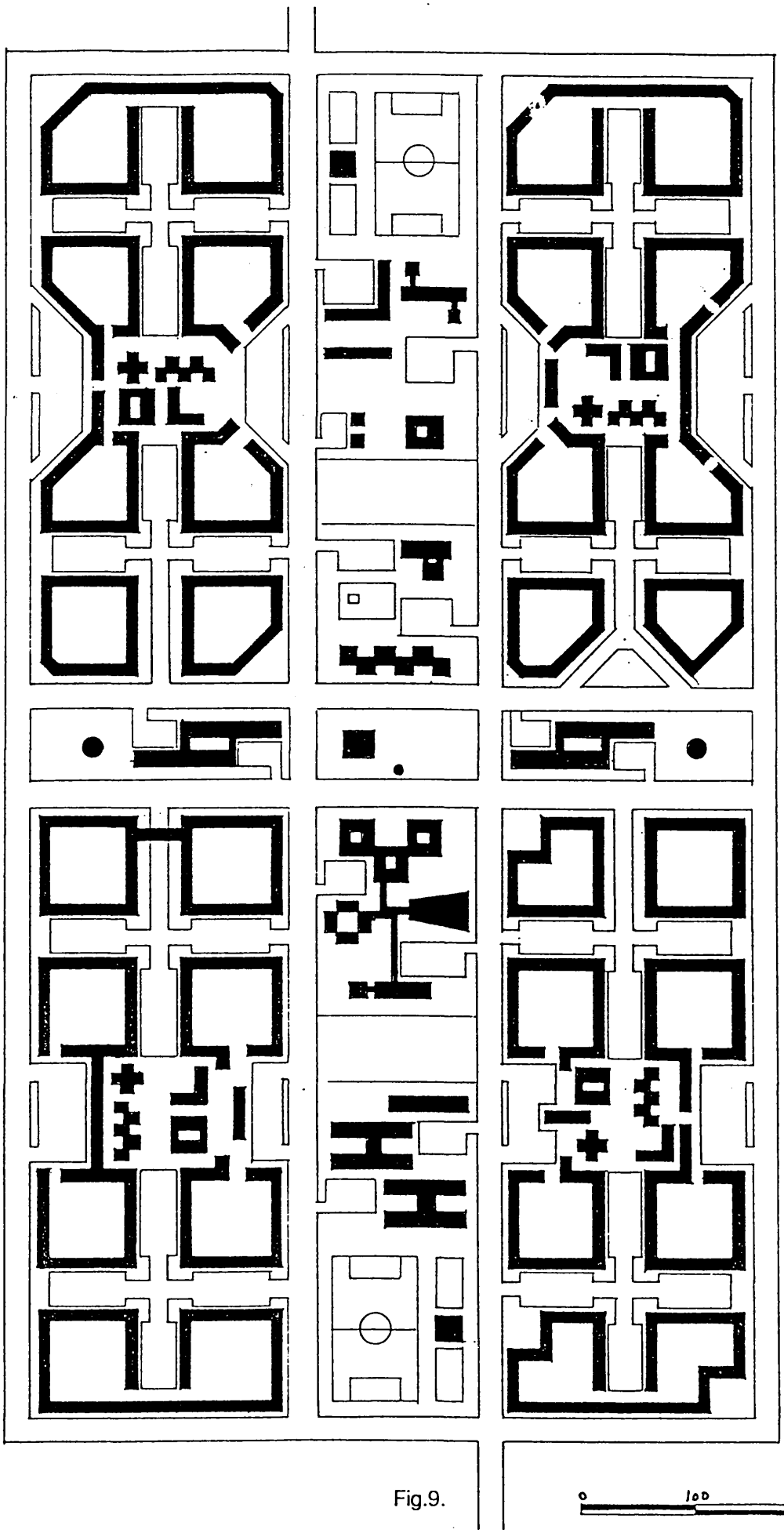


Fig.9.

Stage No. 5 Fig. 10	Improvement				
Criteria	*None*	*Little*	*Considerable*	*Satisfactory*	*Good*
1. Land Use					✓
2. Density					✓
3. Economy					✓
4. Climate				✓	
5. Territory					✓
6. Privacy				✓	
7. Sense of Community					✓
8. Visual Aspect					✓
9. Movement					✓
10. Flexibility					✓

Observations

This stage is similar as previous (Stage 4) except that diagonals are introduced to change the rigidity of the road layout. This should enhance legiblity at a grand scale.

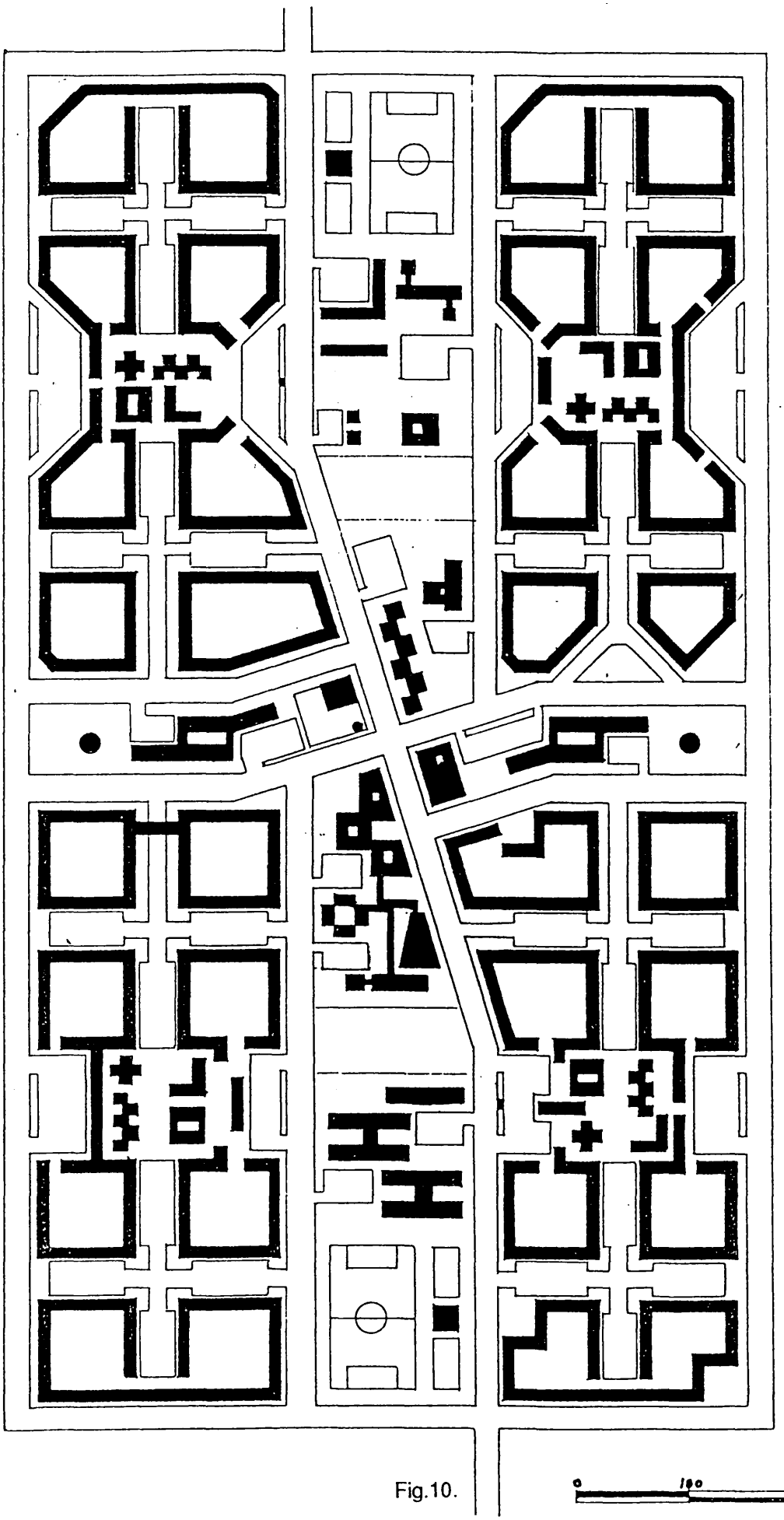


Fig.10.

Chapter 2: GENERAL CONCLUSION

1. Conclusion
2. Further research

1. Conclusion

This work started with a heart felt knowledge that the way housing has been produced in Algeria during the last two decades and is still being produced is wrong. "How come"? with all the technology of today we have not solved this basic problem, whereas people produced satisfactory housing more than a century ago.

This shows that today we are creating an environment that is lacking so many elements which at one time where very important in determining its nature.

It is obvious to any "honest" architect that contemporary housing is so ill designed that it does not fit the Algerian context; In fact such environment is unacceptable for any society.

Again, one is forced to ask how can highly trained designers be responsible for this, and why does society accept it. It has become apparent through this work that the simplifying of the criteria for good housing is a root cause.

Criteria were therefore evolved from a study of both a modern designed piece of housing - the Mendes's model -, and a traditional evolved housing - the Casbah -. Ten criteria were selected. To test the relevance of these they were used to generate a series of upgradings of the two models to the point where a "satisfactory" minimum was achieved.

It is the authors opinion that this upgrading process produced a satisfactory habitat and that with furthermore work **(see chapter 2)**, such a set of criteria could be used as "tests" for satisfactory habitat.

Although it has already been stated in this work, it must be repeated. There appears to be a correlation between:

- Housing that is judged against too few criteria will be correspondingly simple and answer few problems.

- Housing that is judged against to many criteria will be rich and answer many problems.

A conclusion which should be obvious but apparently is not so for the present policy makers and their architects.

It must also be stated that the ten criteria produced here are by no means exhaustive and are also not universally applicable they represent the minimum for the North Algerian context.

It is of interest to note that when these extreme housing types were processed against the criteria, they began to be more like one another and furthermore, if these evolving types are compared with the chart of " Urban Forms, Land use & densities" **(see appendix 4, poster)** then the evolving forms start to resemble the well known and tested urban forms shown as the centre ground of that poster. Although it has to be recognised that this check is only a visual one it is yet further evidence that the criteria will work. The only ultimate test is of course to build.

To end, there are two further aspects that need consideration. Is this entire process the correct way to obtain housing? and, if the present minimum criteria are allowed to continue what will be the result?

In the production of housing for a utopia, one could agree that every family has its own individually designed dwelling. Unfortunatly this does not seem possible for the foreseeable future. Some form of state organisation and aid are necessary. This thesis accepts that necessity.

If the present situation is allowed to continue, one can confidently predict that the housing stock produced will suffer the fate of the infamous "Pirit Iglo" estate and that hanging over much such housing of the 50's and 60's in the UK.

It is simply a matter of time.

2. Further research

The following is a list of research required for the future to insure that this process could be defended in the public realm.

1. Land use should also be determined in terms of numeric proportions. This could be a factor of both location i.e. climate and type of building form.
2. The impact of density of the "public" on a movement system to create urbanity and the opportunity for social contact; this needs study to establish the boundaries between loneliness and excessive crowding.
3. Economic efficiency should be enumerated in actual cost for particular location.
4. Territory - The nature of control barriers and the size of control areas need quantifying, possibly by reference to existing good and bad examples to establish acceptable parameters. Newman, unfortunatly does not do this.
5. Extend research of privacy distance, the 35m setting used in this work needs further checking.
6. Scale and enclosure - Two perennials of architecture that are so important to the visual aspect of the urban environment.

Appendix

1. Description of the "Dossier des plans"

2. Climatic data

3. Intermediate stages of housing layouts

4. Poster: Urban Forms, Land use & densities

I. Description of the "Dossier des plans"

"Dossier des plans" is a general description of Mendes's housing models. These documents are neither available in libraries nor in any bookshop, it is only obtainable at the Ministery of Housing and Construction in Algeria. For this reason, it is thought necessary to be mentioned in this study. However, it is only available in French language but most of it relevant contents has already been mentioned in this thesis.

The following sections are extracted from a particular document concerning two urban housing proposals "BEJAIA CITY CENTRE" and "EL K'SEUR". Due to the similarity of the Mendes's models these following descriptions are identical in all his urban housing proposals.

1 — CONSIDERATIONS GENERALES

BEJAIA CENTRE VILLE

L'emsemble habitationnel de BEJAIA prévoit l'implantation de 2.500 appartements.
Dans la conception de l'ensemble quatre ilots on été projetés, situés aux extrémités avec des surfaces et éloignements identiques, avec des surfaces centrales, entre les ilots, on a réservé les espaces pour les futurs équipements communautaires.

La disposition des bâtiments dans les ilots, se trouve dessinée sur les plans de masse.

EL K'SEUR

L'ensemble habitationnel de El K'Seur prévoit l'implantation de 500 appartements, situés sur un seul ilot.

La distribution des bâtiments est indiquée sur le plan de masse.
Le système d'urbanisme projeté consiste en une surface fermée par une voie périphérique ou l'espace central est réservé pour les futurs équipements communautaires. Les bâtiments résidentiels se développent autour de cet espace central facilitant l'accès des habitants aussi bien aux équipements, comme aux surfaces extérieures à l'ensemble.

Comme directrice de base pour les deux villes, les voies nécessaires pour l'accés aux bâtiments, aux stationnements et aux futurs équipements communautaires, ont eu leurs parcours et longueurs étudiés pour permettre une circulation rationnelle des véhicules, desservant toutes les zones d'habitations et d'équipements.

Dans cette conception, on a adopté le principe de rechercher les trajets les plus courts et les plus directs, desservant les plus grand nombre possible d'unités d'habitations, de manière à réduire le coût du revêtement et préserver au maximum les espaces destinés aux équipements communautaires.

Le système de voierie consiste en une voie périphérique principale qui délimite la surface.
Les voies secondaire sont la liaison entre la voie périphérique, les bâtiments, et les stationnements.

Pour l'élaboration du projet on a considéré des voies de 7 mètres de largeur de rue et des trottoirs de 1,50 mètre de chaque côte.

Des voies pour piétons, selon ce qui est indiqué sur le P.A.Z., auront 5 mètres de largeur, prévoyant les liaisons du système de voierie autour des bâtiments, avec les futurs équipements communautaires.

Elles seront éloignées des routes de circulation des véhicules, facilitant la sécurité des usagers et dans certains cas, délimitant naturellement les espaces destinés aux futurs équipements communautaires.

2 — POSITION DES BATIMENTS DANS LES ILOTS

Le principe de base adopté pour la position des bâtiments a été l'orientation solaire. On a cherché à orienter les façades principales dans le sens NORD-SUD ou NORDEST-SUDEST.

Les façades où se trouvent les salles de séjour et le plus grand nombre de chambres, sont de préférence orientées au SUD.

La distance minimum entre 2 bâtiments est de 20 mètres, et leur position relative est légèrement décalée dans le but d'améliorer les conditions de ventilation, la vue, et l'intimité des appartements, de même pour l'harmonie d'ensemble du plan de masse.

Les bâtiments comportant des pilotis sont de préférence situés au périmètre des ilots, proches des voies principales de circulation des automobiles, considérant que ces mêmes bâtiments avec pilotis pourraient éventuellement abriter des installations commerciales au niveau rez-de-chaussée.

3 — STATIONNEMENT

Les surfaces destinées au stationnement ont été étudiées pour satisfaire au minimum aux besoins de deux bâtiments. La prévision est de une place de stationnement pour trois appartements, et sa localisation a été étudiée pour permettre des extensions futures.

La distance des routes à l'alignement des façades des bâtiments est de 8 mètres, maximum. De cette manière il a été répondu à l'exigence de prévoir une voie d'accés des véhicules pour combattre l'incendie pour l'ensemble des façades de tous les bâtiments.

4 — LES BATIMENTS

En fonction du système d'exécution adopté et du grand nombre d'unités programmées, les bâtiments on été normalisés en trois types, avec des surfaces et des nombres de pièces différents, mais gardant toujours le nombre de 4 appartements par étage desservis par deux cages d'escalier, chacune permettant l'accès à deux appartements par niveau.

Ces trois types de bâtiments sont dénommés: trois pièces, quatre pièces et cinq pièces, en fonction du nombre de salle de séjour et chambres. Ils seront implantés dans la proportion de 85%, 10% et 5% respectivement.

Dans le sens vertical on a projeté 2 types:

— Bâtiments avec quatre niveaux habitables et un niveau libre destiné á une future utilisation commerciale; ce type de bâtiment comprend 16 appartements;
— Bâtiments avec cinq niveaux habitables, comprenant 20 appartements.

Afin de faciliter le procédé de construction, on a toujours pris en compte les critères technico-économiques, adoptant le parti, que seulement dans quelques-uns des bâtiments de trois pièces, le premier niveau sera libre pour un futur commerce. Dans les autres cas, c'est-à-dire, les autres bâtiments de trois pièces, et tous les bâtiments de quatre et cinq pièces, auront leurs cinq niveaux entièrement habitables. Leurs quantités et leur distribution sont indiqués sur les plans de masse.

Les structures des bâtiments sont prévues en béton armé préfabriqué, permettant l'uniformité et la rapidité de l'exécution.

Dans le cas des bâtiments avec le rez-de-chaussée libre, les structures de ce niveau seront aussi en béton armé, coulé sur place, en accord avec les normes et recommandations en vigueur.

Les escaliers ont été prévu en deux volées avec un palier intermédiaire, et le rapport de dimension entre la marche et la contremarche permettra un confort optimum.

Il y a en outre, pour chaque bâtiment, deux espaces situés au niveau rez-de-chaussée, sous les cages d'escalier, destinés au local poubelles. Il est d'accès facile, aussi bien pour déposer comme pour retirer le matériel.

5 — DESCRIPTION DES APPARTEMENTS

Dans la solution adoptée pour les appartements, il y a quelques points qui sont communs aux trois types: trois, quatre et cinq pièces.
Il convient de remarquer:

a) La salle de bains/WC et cuisine/séchoir, c'est-à-dire les aires humides sont regroupées permettant une série d'avantages d'ordre économique et constructif, de circulation et de fonctionnalité telle que:
— Une même gaine qui permet les descentes des eaux usées et des eaux vannes;
— La continuité des sols humides qui facilite l'imperméabilisation;
— Le séchoir qui fonctionne comme un prolongement de la cuisine ce qui revient à augmenter l'espace de travail.

b) La circulation privée donne accès directement aux chambres et à l'ensemble salle de bains/WC.

c) Tous les appartements sont prévus pour recevoir un système de chauffage. On a aussi considéré une protection thermique appropriée pour les murs extérieurs.

d) On a prévu des couleurs claires pour les peintures intérieures, en fonction du climat et dans le but de créer une ambiance plus ample et agréable.

e) Les hauteurs sous plafonds sont de 2,70 m.

Les appartements de 3 pièces se composent d'un hall d'entrée, d'une salle de séjour, de deux chambres, de la cuisine, salle de bains et WC, de la circulation et des rangements.

Ces pièces comprennent ce qu'on dénomme "surface habitable".

Dans les appartements de 3 pièces cette surface est de 66,79 m2.
Dans le prolongement de la cuisine il y a le séchoir et, relié à la salle de séjour, il y a un autre espace qui est la loggia. Ces espaces, additionnés à la "surface habitable" donnent la surface totale qui est de 75,31 m2 pour les appartements de 3 pièces.

Ou a prévu pour BEJAIA CENTRE VILLE l'implantation de 2.120 appartements de 3 pièces, et pour EL K'SEUR 440 appartements du même type.
Les appartements de 4 pièces diffèrent de ceux de 3 pièces par l'adjonction d'une chambre supplèmentaire.

Leur "surface habitable" est de 79,21 m2 et leur surface totale en additionnant le séchoir et la loggia est de 87,73 m2.

Ou a prévu pour BEJAIA CENTRE VILLE 260 appartements de 4 pièces et pour EL K'SEUR 40 appartements du même type.

Les appartements de 5 pièces comprennent une chambre de plus que ceux de 4 pièces.

Leur "surface habitable" est de 93,09 m2 et leur surface totale en additionnant le séchoir et la loggia est de 101,61 m2.

Ou a prévu l'implantation à BEJAIA CENTRE VILLE de 120 appartements de 5 pièces et 20 pour EL K'SEUR du même type.

La conception pour chacun des types d'appartements décrits, de même que l'indication des surfaces pour chacune de leurs pièces, se trouvent détaillés sur les plans d'Architecture.

6 — RESUME POUR BEJAIA CENTRE VILLE ET EL K'SEUR

TYPE DE LOGEMENT	NUMERO DE LOGEMENTS	SURFACE HABITABLE (m2)	SURFACE TOTALE (m2)
3 PIECES AVEC PILOTIS	320	21.372,80	24.099,20
3 PIECES SANS PILOTIS	2240	149.609,60	168.694,40
4 PIECES	300	23.763,00	26.319,00
5 PIECES	140	13.032,60	14.225,40
TOTAL	3000	207.778,00	233.338,00

MENDES JUNIOR

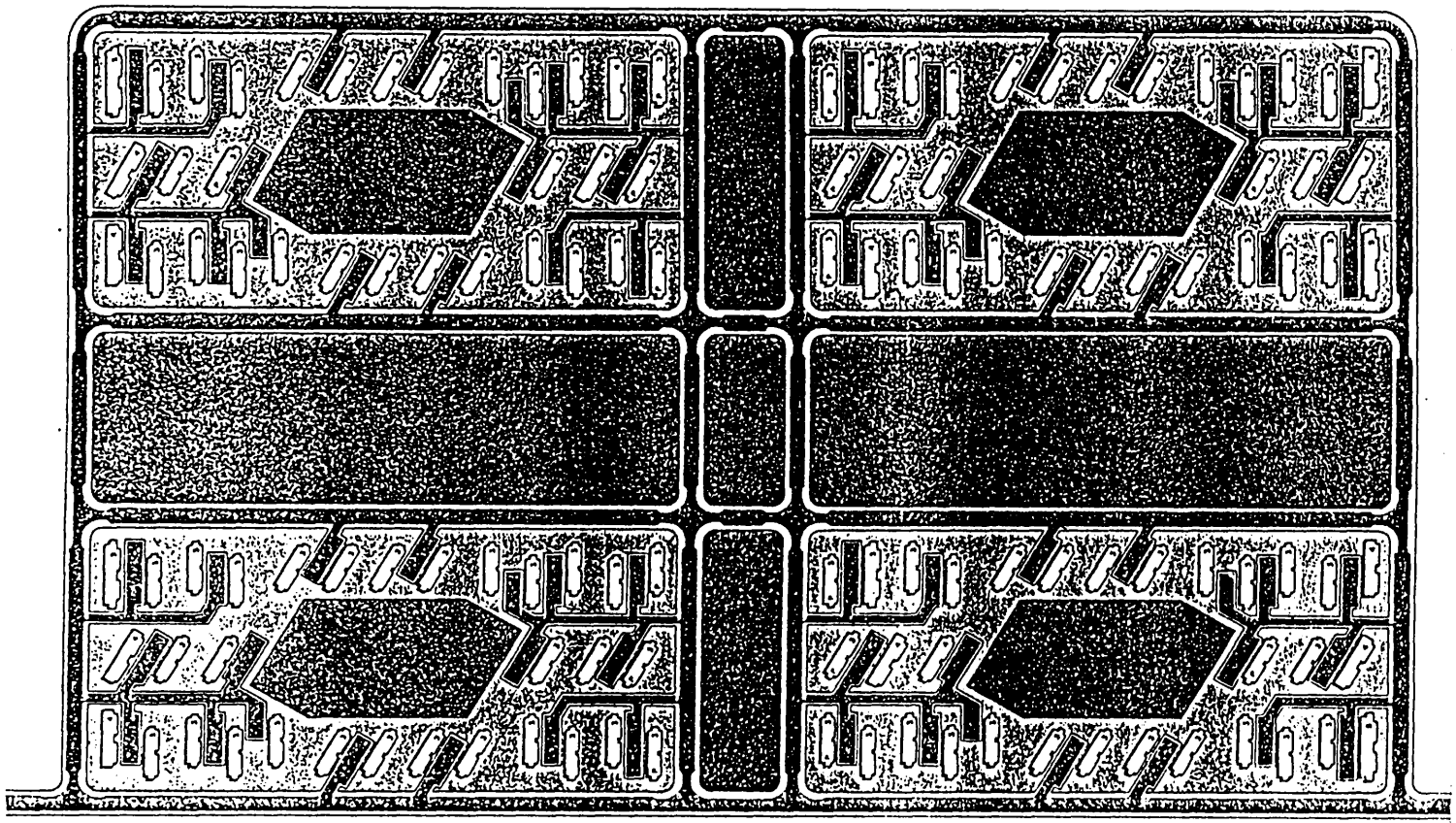


TABLEAU RESUME

TYPE		BATIMENTS	LOGEMENTS
P 3	3 PIECES PILOTIS	15	240
3	3 PIECES S/PILOTIS	94	1880
4	4 PIECES	13	260
5	5 PIECES	6	120
TOTAL		128	2500

LEGENDE

- ESPACE VERT PUBLIC
- EQUIPEMENTS

ECHELLE GRAPHIQUE

WILAYA DE BEJAIA

BEJAIA

HABITATION

IMPLANTATION 01

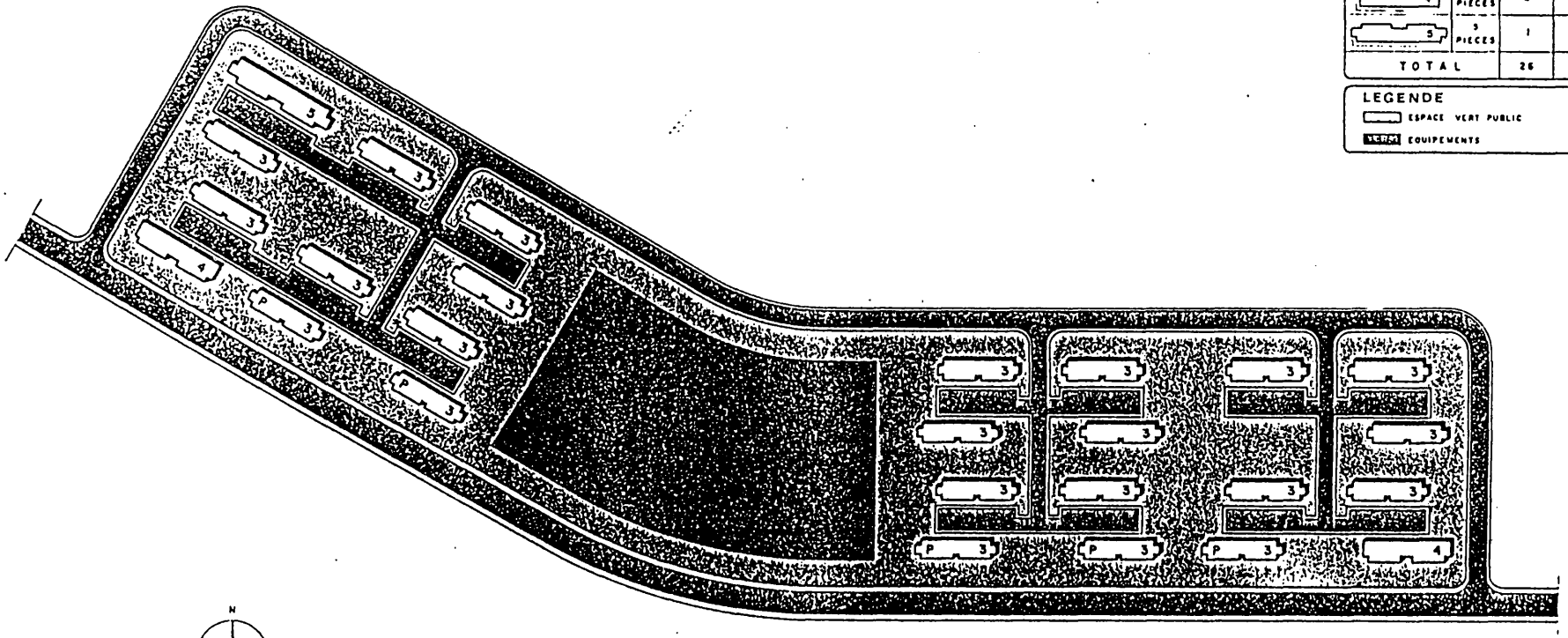
MENDES JUNIOR

TABLEAU RESUME

TYPE		BATIMENTS	LOGEMENTS
P 3	3 PIECES PILOTIS	5	80
3	3 PIECES S/PILOTIS	18	360
4	4 PIECES	2	40
5	5 PIECES	1	20
TOTAL		26	500

LEGENDE

- ESPACE VERT PUBLIC
- EQUIPEMENTS

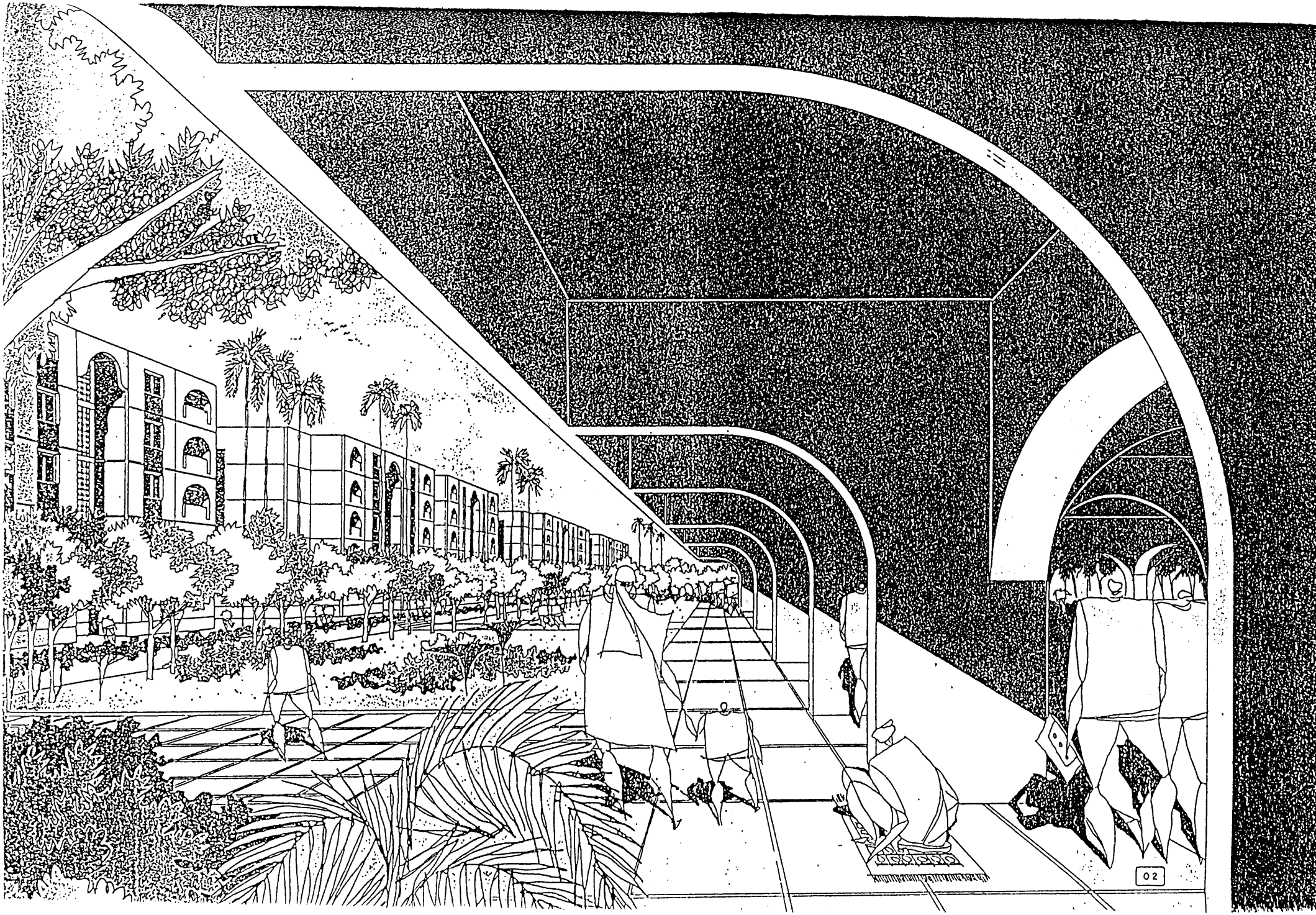


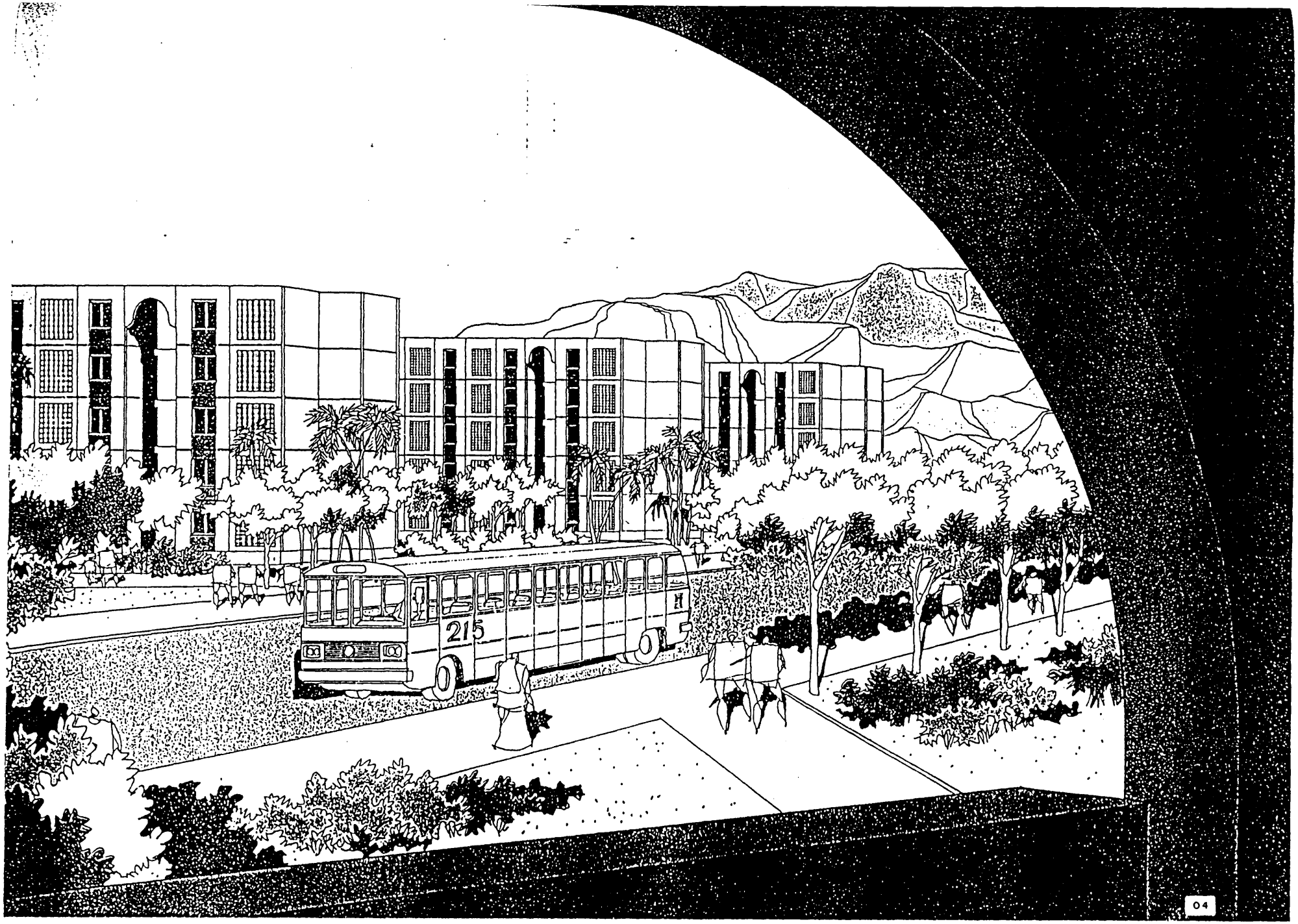
0 10 20 30 40 50 75 100 m
ECHELLE GRAPHIQUE

WILAYA DE BEJAIA
EL KSEUR

HABITATION
IMPLANTATION 01A

MENDES JUNIOR


02


215
04

2. Climatic data

Algeria lies in the Subtropical high pressure belt between the parrallels of 19° and 37° North latitude and between 9° and 12° East longitude. **(Fig.1)**. It has the tenth largest area in the world, but may be divided in two areas, belonging to distinct morphological regions.

1. The Nothern region (325,000 Km^2) lying between the Mediterranean Sea to the North, and the Sahara Atlas mountains to the South in which over 90% of the population live.

2. The Sahara region to the South is a sparsely populated desert of an immense area.

However, Algeria has four distinct climates which correspond to four major zones:

Zone one: The "Littoral" or the coast-line including the North versant of the coastal mountains. It has a *Mediterranean marine climate* characterised by cool and mild winters and hot rainless summers.

Zone two: The valleys of the coastal mountains and the Telli Atas. It has a *Mediterranean mountains climate* characterised by cold winters often with consederable snowfall.

Zone three: The high plateaux lying between the Telli Atlas and the Saharan Atlas. It has a *Mediterranean continental climate* with very marked seasonal contrast. The winters are cold, while the summers are hot with often dry air.

Zone four: The Sahara desert. It has a *hot dry climate* with a mean annual temperature exceeding 40°C.

This study dealt with the climate affecting the Northern part of Algeria since this region accommodates most of the population. This part of the country has in general a Mediterranean climate. For the readings of both altitude and azimuth angles refer to the diagram of the sun path determined at a latitude of 35° North. **(Fig.2, 3)**.

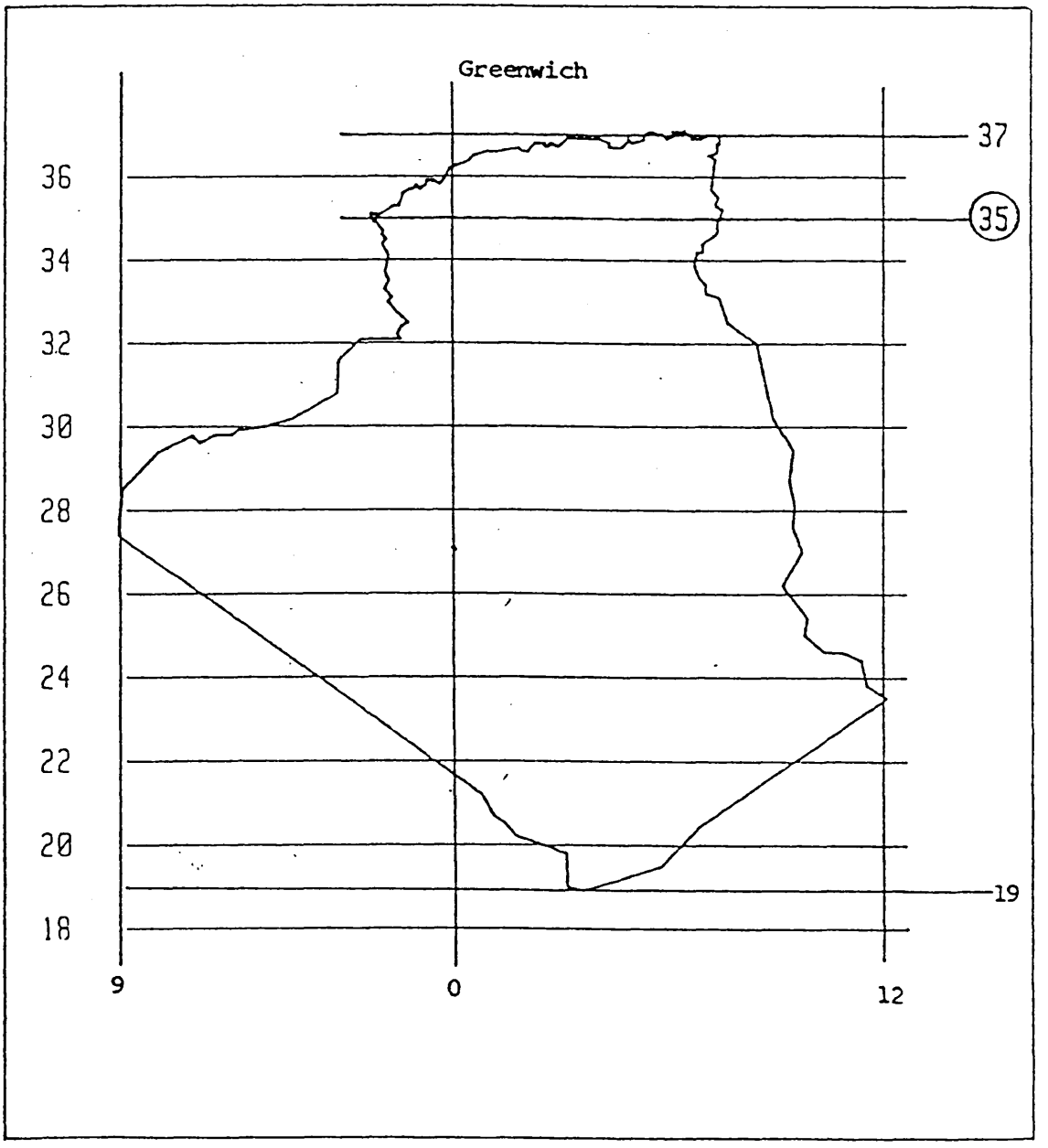


Fig.1. Algeria geographical location
(Latitudes and Longitudes)
Source: CAPDEROU, Atlas solar de l'Algerie, p.56.

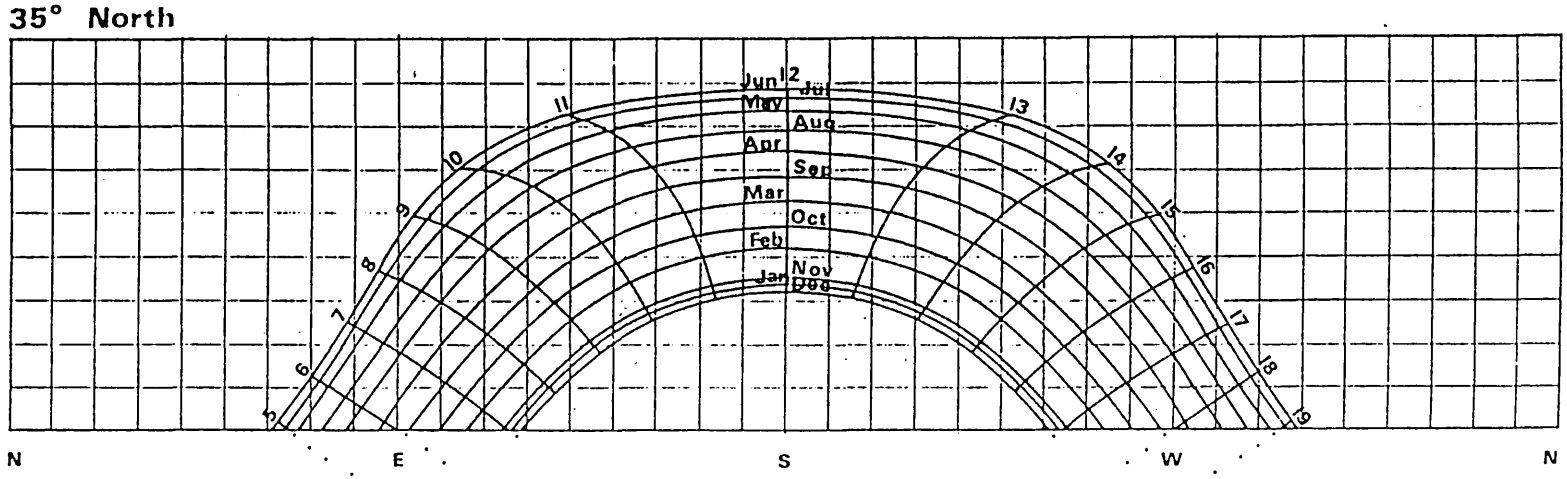


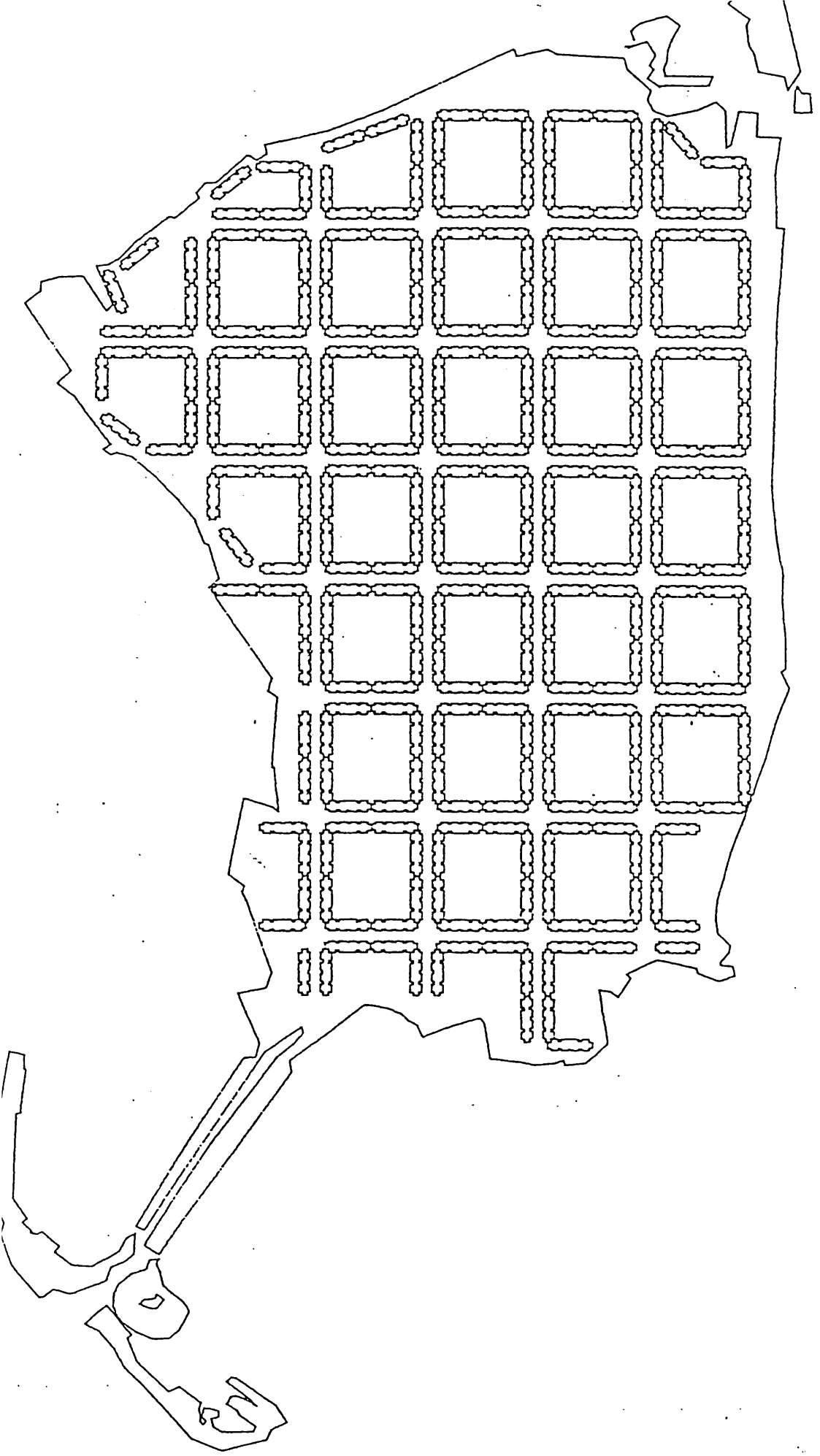
Fig.2. Sun path at 35° North
Source: Housing climate and comfort.
by M. Evans, the Architecture press, London, 1980.

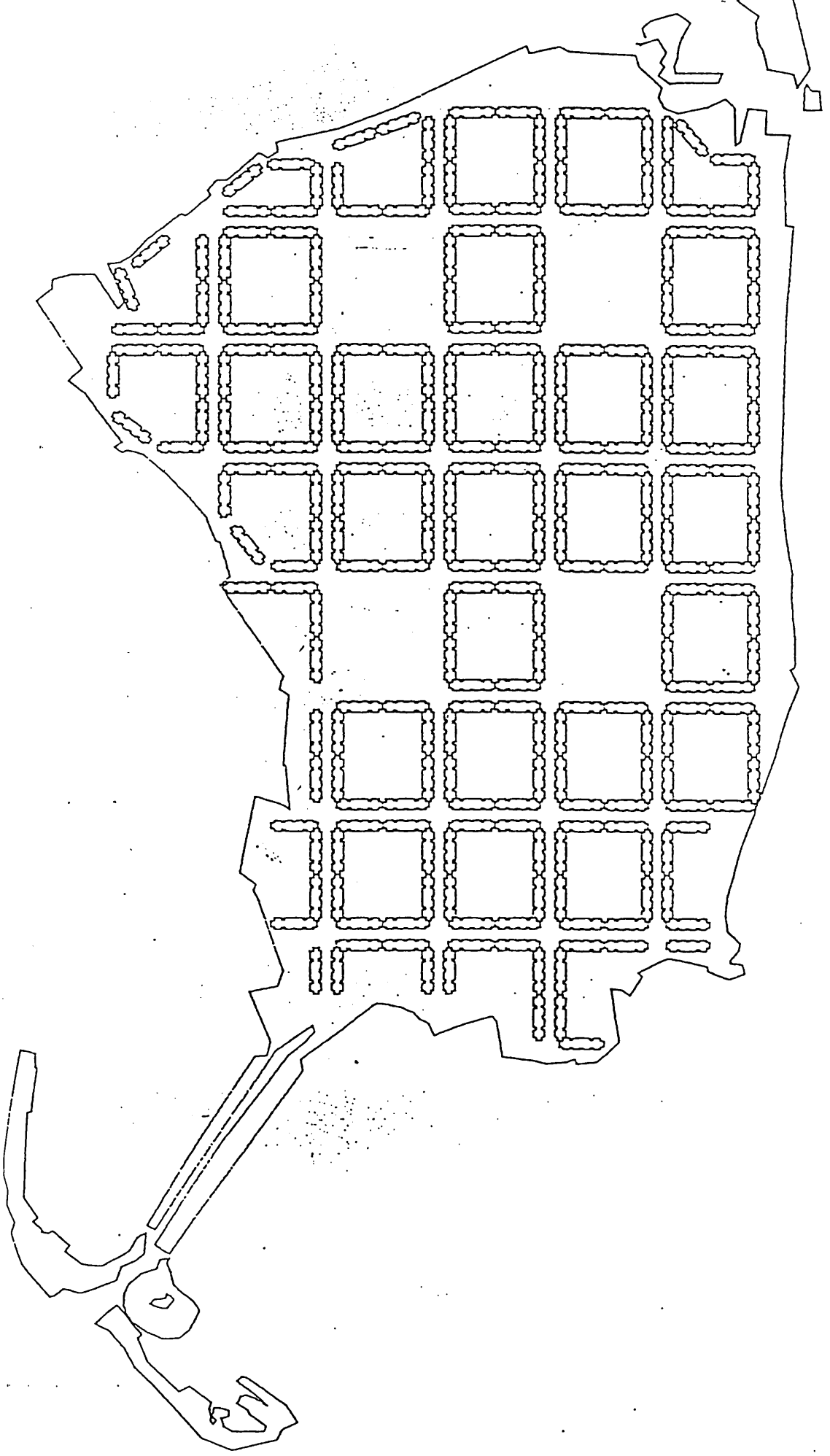
Latitude	Date	Time	Altitude angle	Azimuth angle
35° North	21st June	12.00	70°	180° or 0°
35° North	21st June	15.30	45°	90°

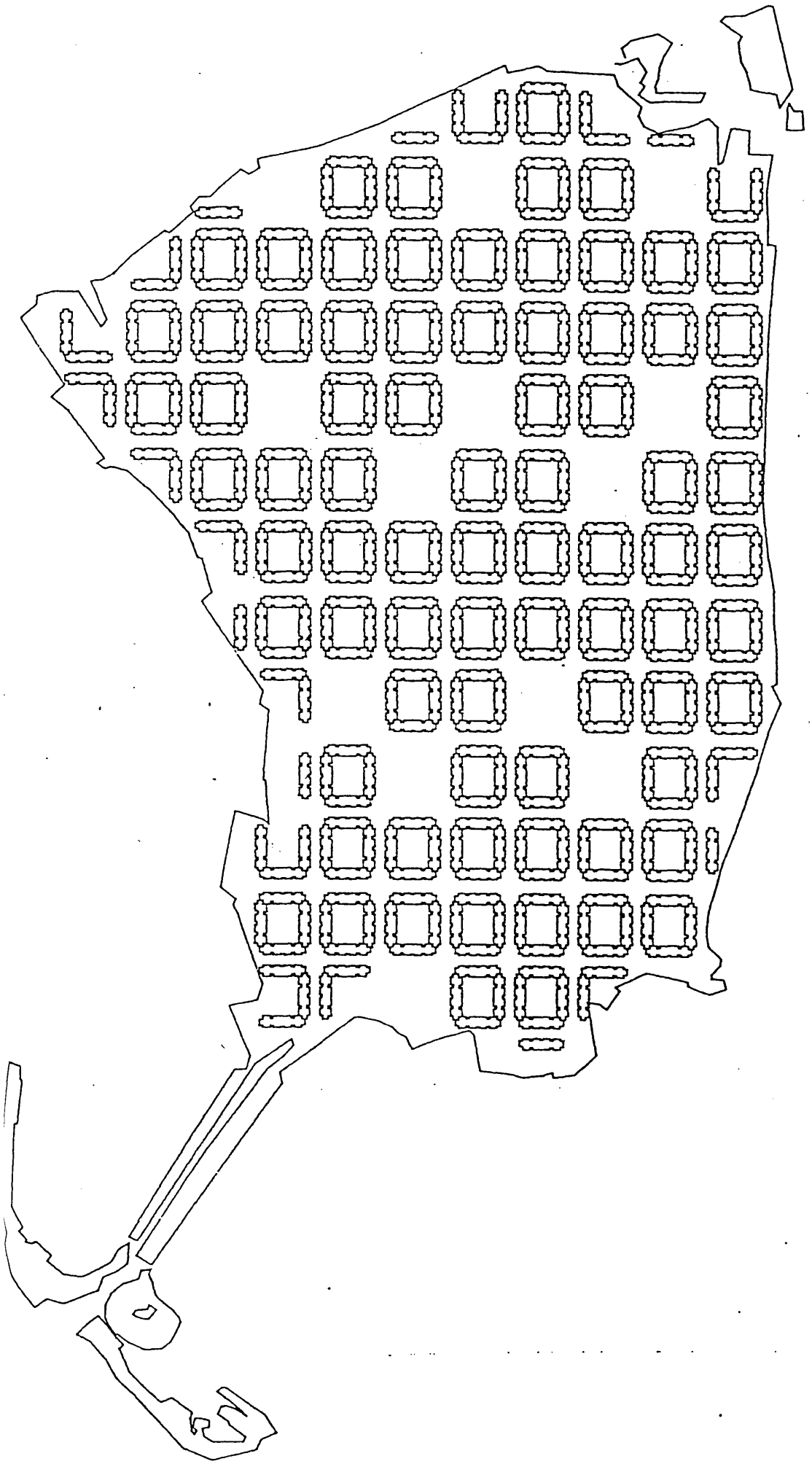
Fig.3. Table determining both Altitude and Azimuth angles at two different true solar times.

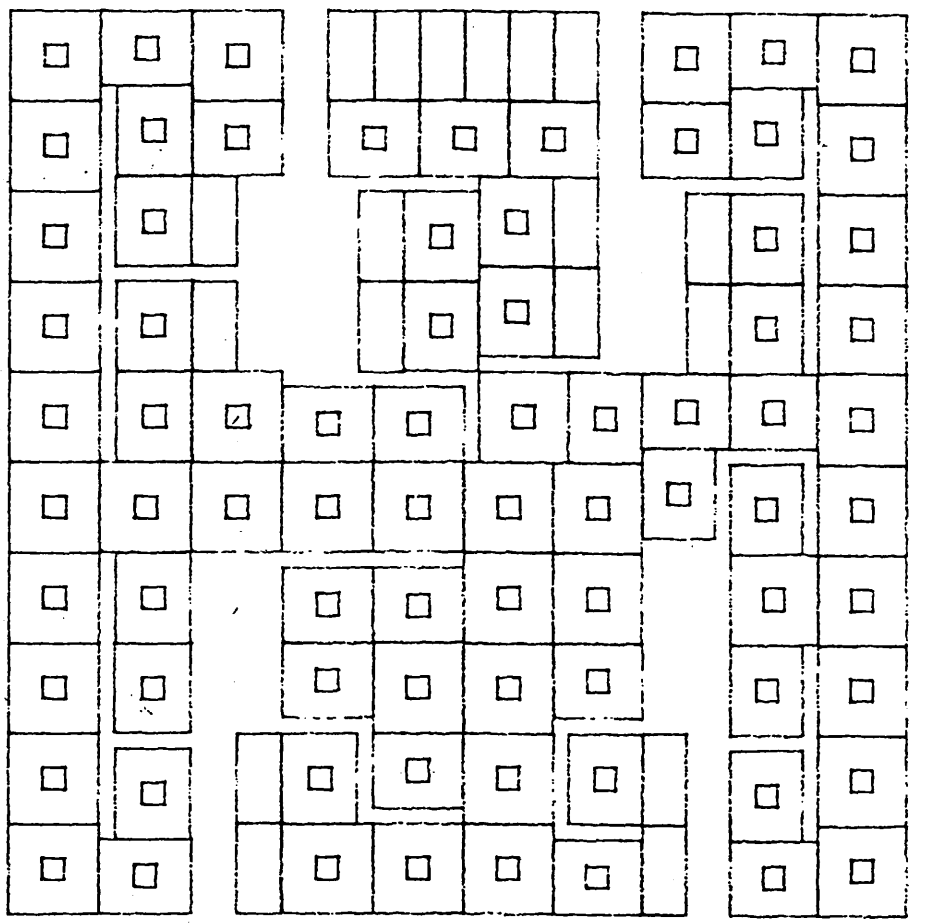
3. Intermediate stages of housing layouts

The following drawings are the intermediate stages of the upgrading of both the Casbah and the Mendes model. These intermediate stages of housing layouts are based on some criteria of analysis desccribed in **Part two, Chapter 3**. For practical reasons, the following layouts do not responde only to one criterion at the time but to a combination of several criteria since these latter are strongly related.



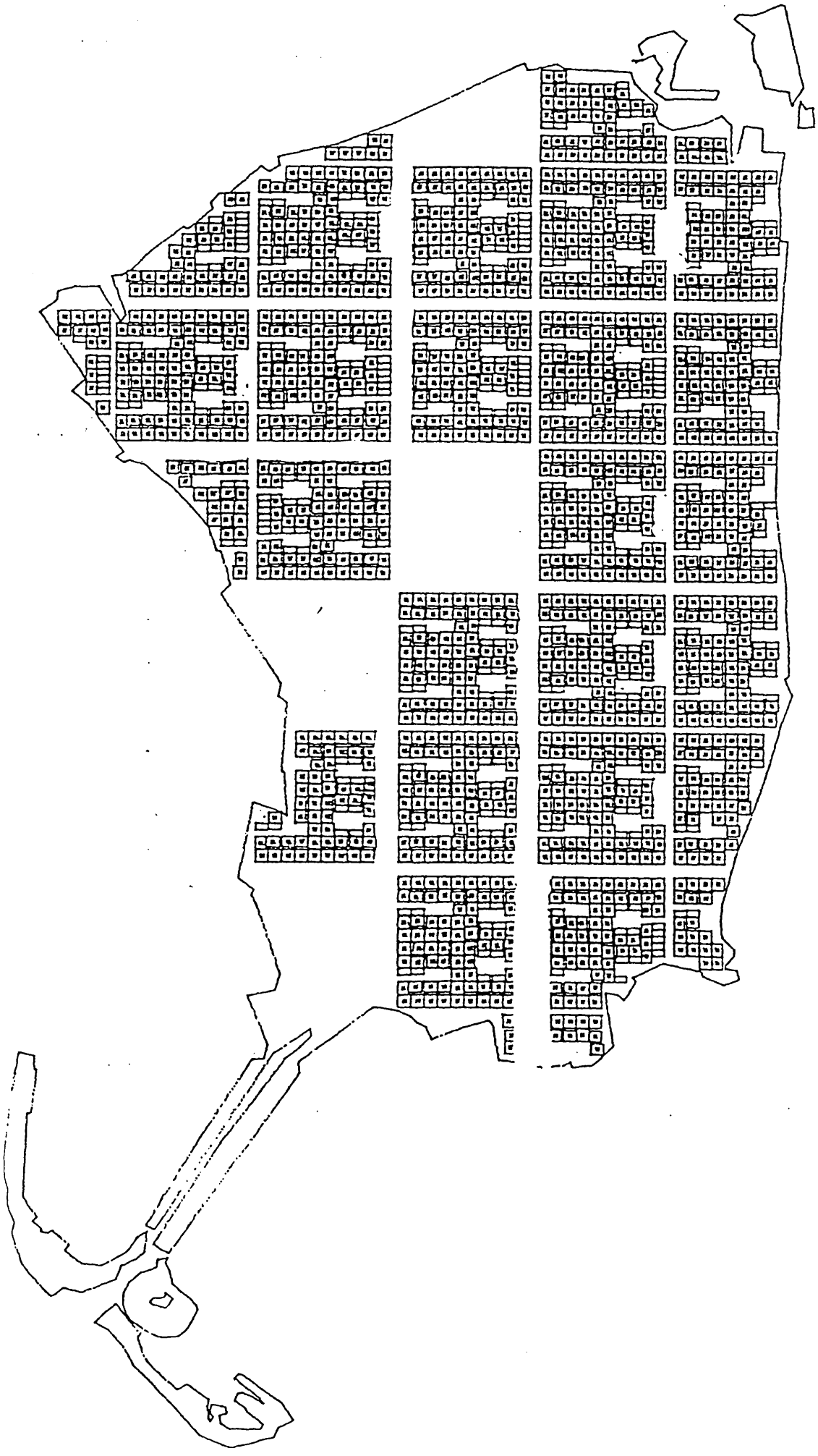


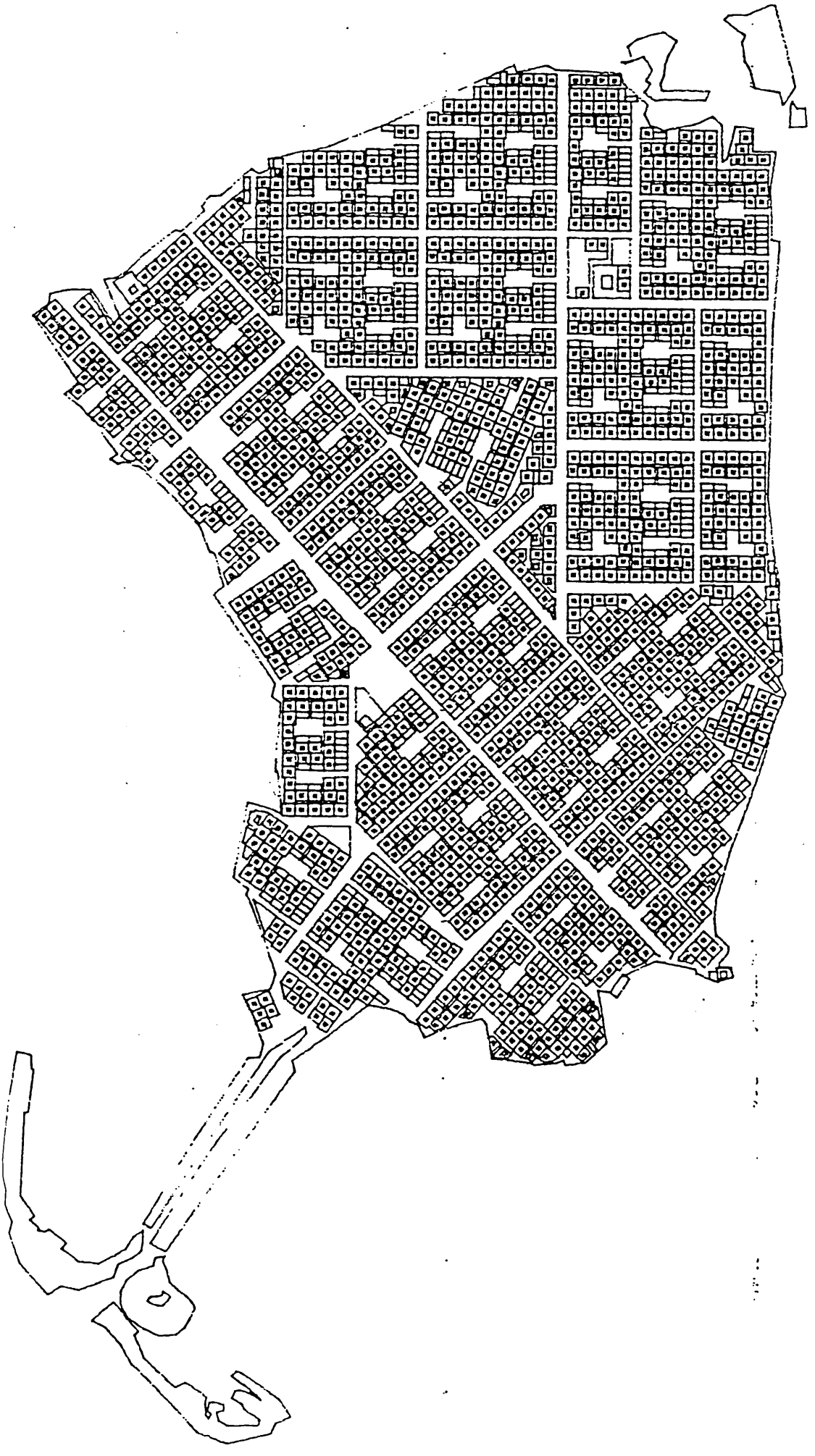


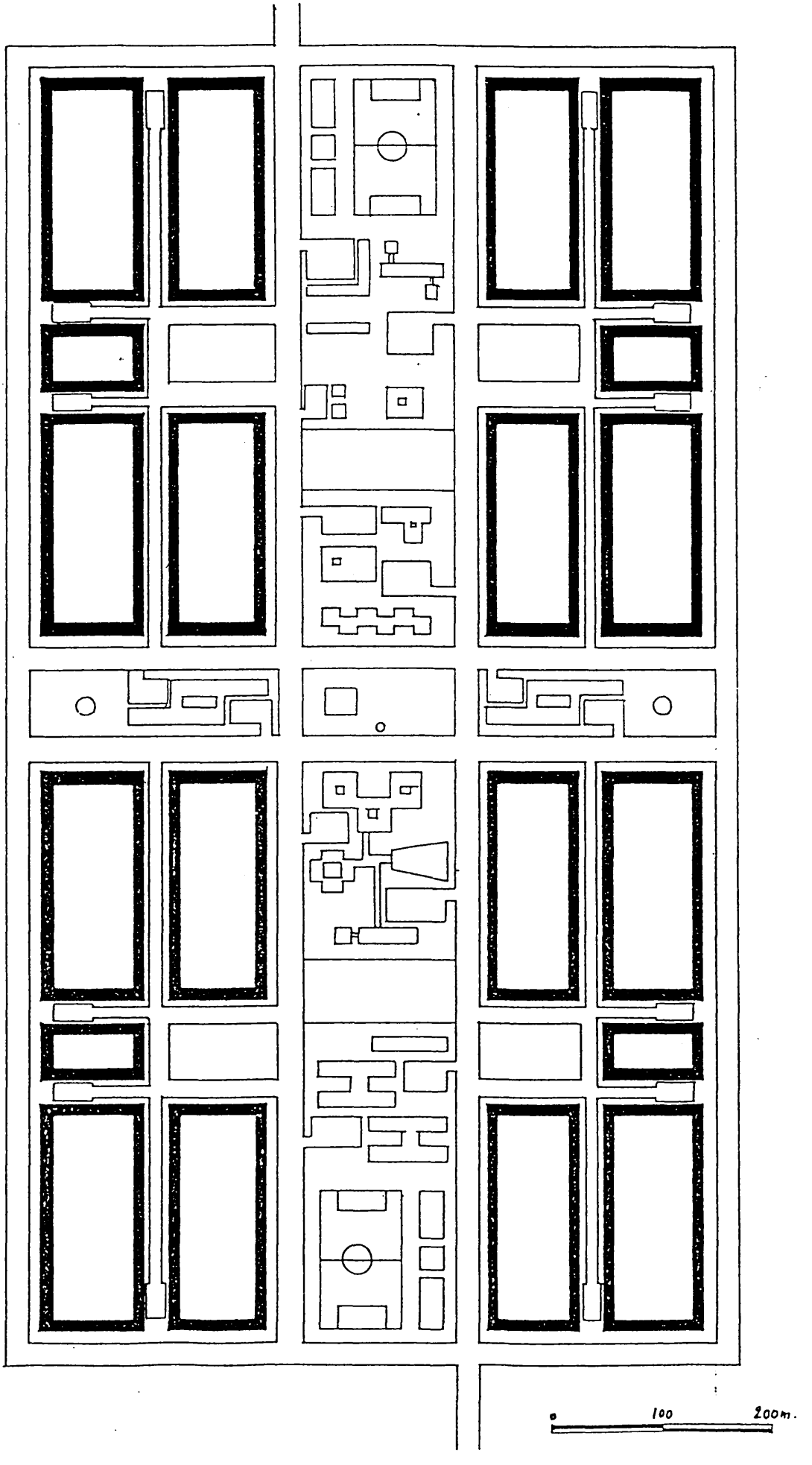


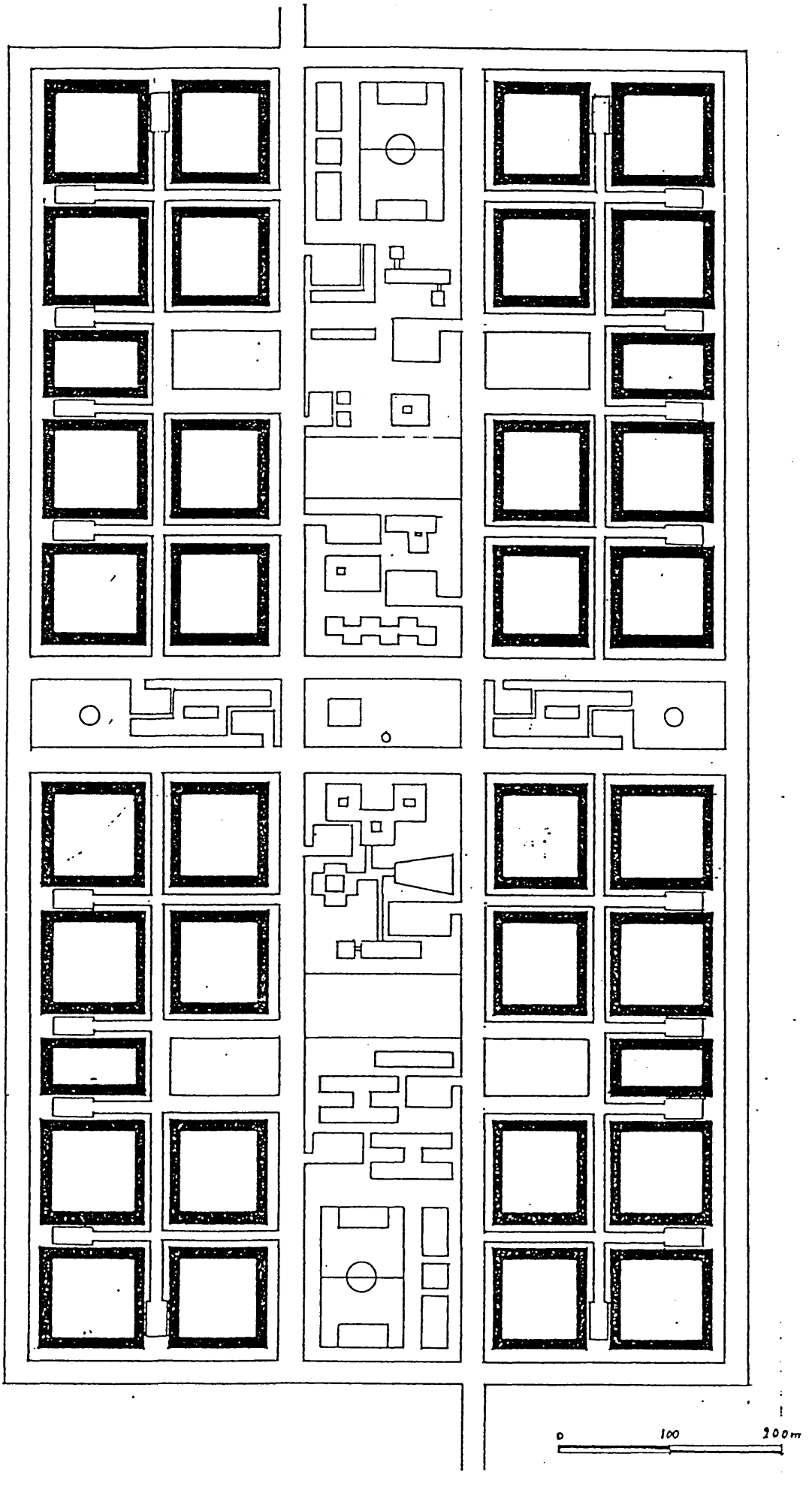
Scale: 1/1000

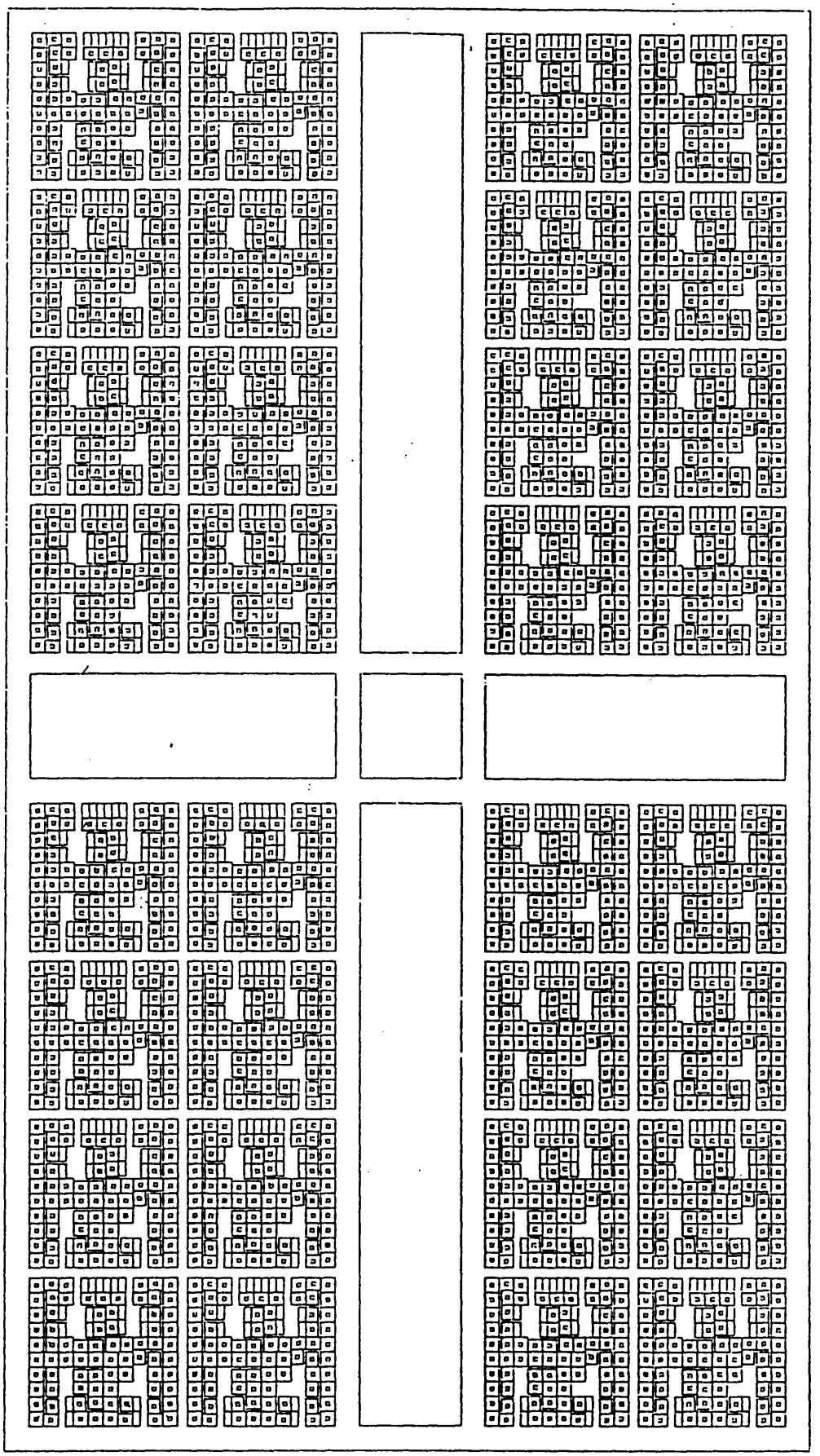
This drawing represents the standard cluster designed by using the computer (AutoCad) It was achieved by using a standard houses of 12x12 m or 12x10 m.






0
100
200m.


0
100
200m



Bibliography

Alexander, C.
A pattern language
Towns - Buildings - Construction.
New York, Oxford university press, 1977.

Alexander, C.
The city is not a tree
Architectural forum, 1965.

Anderson, S.
"On Streets"
Edited by Stanford Anderson
Institute for Architecture and Urban Studies.

Ashihara, Y.
The Aesthetic Townscape
The MIT press Massachusetts institute of technoloty
Cambridge, Massachusetts, 1983.

Bacon, E.
"Design of cities"
Thames and Hudson, London,1982.

Barnett, J.
"An introduction to urban design"
Harper and Row publishers, New York, 1982.

Benatia, F.
"L 'Appropriation De L'espace a Alger Apres 1962".
SNED, Algiers, 1978.

Benevelo, L.
The origins of modern town planning.
Routledge & Kegan Paul. 1967.

Bentley, I. Alcock, A.
Murrain, P. McGlynn, S.
Smith, G.
Responsive Environments
A manual for designers
The Architectural press, London.

Boesigner, W.
Girsberger, H
Le Corbusier
Thames and Hudson, London, 1967.

Brolin, B.
The failure of modern architecture
Studio vista, London, 1976.

Castex, J. Depaule, J.
Panerai, Ph.
Formes urbaines: "De l'ilot a 'la barre"
Collections aspects de l'Urbanisme
Dunod, Bordas, Paris, 1977.

Coleman, A.
Utopia on trial
Vision and reality in planned housing
Hilary shipman Ltd, London, 1985.

Cresti, F.
Notes sur l'histoire urbaine d'Alger dans la periode coloniale.
Alger. E.P.A.U. 1985.

Crichlow, K.
Islamic patterns
An analytical and cosmological appraoch
Thames and Hudson, London.

Cullen, G.
"The concise townscape"
The architectural press, London, 1961.

Davis, s. — The form of housing
Van Nostrand Reinhold Company, London, 1977.

Deazley, E. Harveison, M. — "Living with the Desert"
"working buildings of the Iranian plateau"
Limited and Published by Aris & Phillips Ltd.
Teddington House, Warminster Wilk, England, 1982.

Deilman, H. — Housing Groups
Karl Kramer Verlag, Stuttgard, 1977.

Deilmann, H. Kirschenmann, J. Pfeiffer, H. — The Dwelling
Unischlagentwurf Gerhar Schwab.
Printed in Germany, 1973.

Deluz, J.J. — L'urbanisme et l'architecture d'Alger. "Apercu critique".
O. P. U. Alger 2nd ed . Pierre Mardaga. Liege. 1988.

Echenique, M. — "Model of Town: Reading": Land use and Built Form studies
making paper No 2,
University of Cambridge School of Architecture.

Echenique, M. — "Urban systems": towards an explorative model
making paper No 7.
University of Cambridge School of Architecture.

Evans, M. — Housing Climate and comfort
The Architectural press London, 1980.

Gibberd, F. — Town Design
The Architecturan press London, 1959.

Giedion, S. — Walter Gropius. Work and Teamwork
The Architectural press London, 1954.

Grabar, O. — Muqarnas
An annual on Islamic Art and Architecture
Volume 2. The Art of the Mamluk
Yale University press. New Haven, London 1984.

Hakim, B. — Arabic-Islamic Cities
Building an Planning principles.
K.P.1 Limited, London, New York and Sydney, 1986.

Krier, L. — "Houses, Places, Cities".
Architecture Design Profile. Guest edited by D. Propyrios
Belveder, Berlin - Tegel, 1980.

Lesbet, D. — La Casbah d'Alger. Gestion urbaine et vide sociale.
Alger. O.P.U. 1985.

Lynch, K. — A theory of good city form
Massachusetts Institute of technology.
The M I T press, Cambridge,
Massachusetts and London,1981.

Lynch,K. — The image of the city
The M I T press, Massachusetts, 1960.

McCluskey, J. Road and Townscape
The Architectural press London, 1979.

Macsai, J. Housing
John Wiley & Sons, New York, 1982.

Markus. Order in Space and Society
Architectural Form and its context
in the Scottish enlightenment.
Edited by Thomas A Markus.

Martin & March. Urban space and structure
Edited by Leslie Martin and Lionel March
Cambridge at the University press, 1972.

Morris, A,E, J. "Prehitory to the Renaissance"
History of urban form.
Published by George Godwin Ltd., London, 1972.

Nairn, I. Britain's Changing Towns
The Broad Water press Ltd.
Welwgn Garden City, Herts, 1967.

Newman, O. Defensible space
"People and Design in the violent city"
Architectural press, London, 1972.

Norberg-Schulz, C. Genius Loci
Towards a phenomenology of architecture.
Academy Editions, London, 1980.

Osborn, F,J. Whittick, A. The New Town
The answer to megolopolis.
Leonard Hill, London, 1969.

Rapoport, A "House Form and Culture"
Foundations of cultural geography series
Philip L, Wagner, edition
Prentice Hall, Ing, Englewood Cliffs, N.J. 1969.

Rapoport, A "Pour une antrapologie de la maison".
Collection aspets de l'urbanisme. Dunod, 1972.

Ritter, P. Planning for man and motor
Pergamon press, Oxford-London, New York,
Paris and Frankfurt, 1964.

Saalman, H. Haussman: Paris Transformed
Planning and cities. General editor George R. Collings,
Columbia University. George Braziller Inc. New York, 1971.

Schwerdtfeger, F. Traditional housing in African cities.
John Wiley & Sons, 1982.

Sear, F. "Roman Architecture"
Batsford Academic and Educational Limited, London, 1982.

Sharp, T. — Town and Townscape
Printed in Great Britan for John Murray,
Albemarle Street, London by Jarrold & Sons Ltd, Norwich.

Sitte, C. — The art of building cities
Reinhold Publishing Corperation, New York ,1945.

Talib, K. — Shelter in Saudi Arabia
Academy editions 1st Martin's press, 1984.

Thiis-Evenson, T. — The Postmodernists Jan & Jon
Universitets For Laget. Onslo Norway, 1984.

Vance, J, E. — This scene of man
The role and structure of the city in the geography of western civilisation.
Harper's Collgeg press, 1977.

Vogt-Goknil, U. — Living Architecture: Ottoman
Oldbourne, London, 1966.

Wurman, R, S. — Cities: Comparisons of form and scale
Philadelphia Pa 19107 U.S.A library of congress, 1974.

Zucker, P. — Town and square
From the Agord to the village green.
The M I T press, Massachusetts.