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# THE PROGRESSIVE DEVELOPMENT OF HOUSES IN A SITES AND SERVICES PROJECT

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*...a la memoria de mi madre.*

## ABSTRACT

The concept of progressive development - the construction of houses in stages - represents a fundamental principle of the sites and services approach, the most popular policy put forth to deal with the present Third World housing shortage. Through an analysis of the development process occurring in a completed sites and services project in Zihuatanejo, Mexico, this thesis investigates such a concept as a physical phenomenon. The physical evolution of the houses towards consolidation is analyzed with regard to two of the factors that shape the development process: the habitable area, and the construction quality, from which the people's physical priorities for housing are inferred. The findings of this study are compared with those of earlier studies, and the broader implications of such findings are briefly outlined. This study suggests that space takes precedent over permanence as a priority in the course of the early development of the house.



## RÉSUMÉ

L'idée de l'aménagement progressif, la construction par étapes des maisons, constitue un principe fondamental de la méthode dite "des sites et services" proposée pour repondre à la crise du logement qui sévit dans le tiers-monde aujourd'hui. A travers l'anayse de l'aménagement complet d'un projet à Zihuatanejo au Mexique, ce travail aborde le concept dans la réalité spatiale. L'évolution des maisons vers leur parachèvement est analysé selon deux facteurs encadrant le procéssus d'aménagement: la surface habitable et la qualité de la construction. Ceux-ci constituent implicitement les deux aspects prioritaires. Ces principales remarques sont comparées avec celles de recherches précédentes et permettent de dresser un éventail plus large de leurs conséquences. Enfin cette étude nous suggère que la question de l'espace l'emporte sur celle de la permanence lors des premières phases d'aménagement du logis.

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# CHAPTER 1

# INTRODUCTION

More than a decade has passed since the introduction of sites and services as a strategy for the provision of low-income housing in developing countries. This approach grew from the observation that families were building a large part of the low-income housing stock themselves. The owner-occupier's housing process, therefore, rather than representing a problem, suggested, instead, a solution to the housing problem.[1] Families in sites and services schemes are provided with plots having access to basic services, but the actual construction of the house is usually left to the owner-occupier to be developed over time.[2] This approach has come to replace the conventional one which was based on a supply of fully-serviced and finished houses.

Strongly supported by international agencies, particularly the World Bank, the sites and services approach is the most popular policy put forth to deal with the present deficit of low-income housing.[3] Hence, by the late 1980's, there is hardly a developing country which has not at least experimented with this approach. In many countries the experimental phase has already been concluded and the actual implementation of the approach has begun. Therefore, in order to suggest what directions future developments should take, post-occupancy evaluation of completed projects is an urgent concern.

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1. Skinner and Rodell, 1983:1

2. Rybczynski, Bhatt and Mellin, 1983:10

3. Linden, 1983:14

## THE PROBLEM

Several evaluations have already been carried out.[4] Commonly undertaken by the implementing housing agencies themselves, these evaluations are primarily concerned with the efficiency of implementation and administration of the projects, so as to assure the successful re-application of the approach.[5] However, while the evaluation of the managerial aspects of the projects is indeed vital, equally so is an evaluation of their qualitative effects, an aspect to which relatively little attention has been paid.[6] The appraisal of the process by which the owner-occupiers are building their houses within the sites and services approach represents a first investigation of this neglected area of research. It also represents the subject matter that concerns this particular thesis.

The concept of progressive development refers to the construction of the houses in stages, over a period of time. It represents, together with the self-help philosophy, the two fundamental principles of the sites and services approach. This study is aimed at investigating the concept of progressive development as it takes place in a sites and services project. In an attempt to better understand progressive development as a physical phenomenon, this study observes the dynamics of the actual physical development of houses in an existing sites and services project, through the two factors which shape the house development: the habitable area and the construction quality. Hence, the following research question is posed:

**What is the relationship between the habitable area and the construction quality within the progressive development of houses in a sites and services project?**

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4. Rakodi, 1982.32

5. Ibid.

6. Mosley, 1983:596 and 603

## THE SCOPE

The progressive development concept is analyzed in this study as a physical phenomenon occurring within a set of locally specific, socio-economic constraints. This study will focus on the analysis of two dynamic physical aspects which shape the house development: the habitable area and the construction quality. The particular condition of these two factors during the process, as well as their relationship, will be investigated. An appraisal of the socio-economic and cultural factors which might affect the house development is beyond the scope of this study.

This study takes the "Los Amuzgos" sites and services project as a case for analysis. This four-year old project is located in the city of Zihuatanejo, Guerrero, Mexico. The study is limited to the analysis of the physical development of the houses occurring within this four-year framework.

## THE ORGANIZATION

This study is organized into five chapters. Chapter 2 reviews the literature relevant to the study under consideration. It presents general notions on the progressive development concept and reviews previous studies within the same area of interest. Chapter 3 describes the research strategy followed, and explains the process by which the data were collected. Chapter 4 describes the methods of analysis, as well as the detailed analysis of the data. Chapter 5 synthesizes the research and its most relevant findings, which are interpreted. Some general reflections on the subject matter are also presented.

# CHAPTER 2

# PROGRESSIVE DEVELOPMENT AND LOW-INCOME HOUSING: A LITERATURE REVIEW

This chapter presents both the general and particular issues relevant to the research under consideration which were derived from the review of the literature. The chapter is divided into two sections: the first describes progressive development in the low-income housing process, the second presents a review of previous studies which have attempted to understand the process by investigating its physical aspects. The main findings of these studies are reviewed and summarized.

## 2.1 PROGRESSIVE DEVELOPMENT AND LOW-INCOME HOUSING

### 2.1.1 THE CONCEPT

"Progressive development," "incremental development," "installment building," "evolutionary building," and "incremental construction," are different terms used to describe the same concept. Progressive development concerns the method by which low income families in developing countries build their houses. As mortgage financing is largely unavailable and as house construction depends on a money economy, houses are constructed in stages, over a period of time.

The concept of the progressive development of housing is defined by the Fundación Salvadoreña de Desarrollo y Vivienda Mínima as the building of houses in stages, making use of the resources of the family.[1] This concept refers in general to the process by which the dwelling unit

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1. Bamberger, Gonzalez-Pollo and Sae-Hau, 1982:58

accommodates itself to a changing socio-economic situation in order to provide better living conditions. The one-room, unstable and insecure initial dwelling is gradually evolved into a stable and solid structure and expanded into a multi-room unit capable of meeting the family's needs. The process is described by Dluhosch as follows:

> "Popular dwelling types are conceived as a continuously changing evolving process, marked by successive stages of completion, such as more space added at each stage, level of finish and varying patterns of use over time. In that sense, the 'informal' house is never 'finished', while - paradoxically -it is always 'complete'in each of its many stages."[2]

At its best, the process offers a great deal of necessary flexibility to the low-income family. A family needing space can extend the structure at will, while a smaller family who may prefer higher physical standards to space, can also achieve that goal.[3]

The progressive development of houses is not a new concept; in most cultures urban development has traditionally taken place progressively.[4] However, the importance of the role it plays in the production of low-income housing in developing countries has been stressed through the work of several scholars, in particular Abrams (1964), Turner (1967, 1969) and Mangin (1967). They observed that what initially started as a shack was frequently the basis for future shelter and that through a process of gradual improvement over time, it developed into what could be considered a 'standard house'. John F.C. Turner, a British architect whose thinking has played an important role in contemporary housing theory, recalls his personal experience in squatter settlements in Peru:

> "In the 'Pampas de Cuevas Barriada', the invasion took place on November 17th, 1960, . . . by 1965, a sample of the dwelling structures surveyed showed that permanent construction had been started on 80 percent of the plots, 42 percent had walls completed to roof height. Only 9 percent had a finished first floor structure and 2 percent had started a second floor."[5]

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2. Dluhosh, 1987:6

3. Gilbert, 1981:90

4. Caminos and Goethert, 1980:228

5. Turner, 1967:171-174

Such observations helped to confirm that under favourable circumstances the poor were able to produce substantial, spacious and reasonably-serviced homes.[6] The procedure is widely practiced today by the popular sector in legal and illegal developments.[7] What follows is an overview of the main characteristics of the process and its benefits to the owner-builder.

## 2.1.2 THE NATURE OF THE PROCESS: OWNER-CONTROL

One of the most important features of progressive development is the high degree of control that the family has over the building process.[8] The families themselves usually have the best perception of their own shelter needs and of their ability to pay for these needs. Hence, the process, which is very adaptable, allows the family to make the decisions that concern them the most. All the tasks related to the design, the administration, and the programming of activities remain strictly in the hands of the family.

An owner-builder administers and manages the construction of his/her house.[9] As manager of the construction process and general contractor, while simultaneously acting as user-client, the owner is in a position to influence the outcome, select the methods and speed of construction, and receive the direct benefits therefrom. Thus, owners are able to adapt the phasing and planning according to personal financial resources. The progressive development of houses has almost always been found to be a self-financed process since there are rarely sufficient formal loan mechanisms to support housing construction by incremental development.[10] The family's command over goods and services provides it with enough flexibility to postpone construction expenditures for the higher

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6. Gilbert, 1981:84

7. Caminos and Goethert, 1980:228

8. Vernez, 1973b:4; Sudra, 1979:30

9. Grindley, 1972:9

10. Vernez, 1973a:13

priorities of food, education and health care, or to simply reduce expenditures to a minimum if forced to do so by unemployment, illness or other domestic crises.

Field studies have demonstrated that owner-builders' planning, construction and maintenance methods can be efficient, and many economic benefits are obtained as a result of the owner performing several functions.[11] These functions include:

a) Acting as his own general contractor; the owner-builder eliminates the cost of administrative overheads. It has been observed in a very wide variety of contexts that self-managed building represents rarely less than 10%, and often more than 20% in savings, over the total cost of the dwelling unit.[12]

b) Designing and building without paying professional and legal fees. Various sources suggest that the largest savings over conventional construction do not come in the form of reduced out-of-pocket costs for materials or labour, but rather from the avoidance of the up-to 20% additional costs due to overheads and professional fees.[13]

c) Avoiding official codes and building regulations. Usually such codes are oriented towards the achievement of a minimum standard house in a single development stage, and do not permit the owner to occupy the house until it is "officially" completed. By following a progressive development, occupation can occur before completion, allowing the family to invest what otherwise would be rental payments to landlords into improvements and the expansion of the house.[14]

d) Working themselves and obtaining a higher productivity from hired labour. Field studies have shown that if a family provides all labour input, it can save up to 40% of the total monetary costs compared with an equivalent dwelling unit built using conventional techniques.[15] On the other hand, when labourers are hired, the higher productivity can reach up to two thirds of the total expenditure,

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11. Turner and Mangin, 1968:159

12. Turner, 1981:30-31

13. Hamer, 1985:19

14. Vernez, 1973b:27

15. Vernez, 1973a:14

as a result of the personal relationship between the contracting parties as well as the subsequent close supervision.[16]

It has been observed that people's needs and priorities for housing, as well as their financial capacity, change over time in response to the family life-cycle and the changing circumstances of urban life. Turner and Mangin identify two basic measures of change in the family: its general life-cycle and its socio-economic status. They explain:

> "The most obvious change is in the composition of the household (another term is the 'extended' family of several generations living together) and of each generation or 'nuclear family' within it. . . . In general, for households that participate in squatter developments their socio-economic status changes along with the changes that occur in its structural composition."[17]

Thus, without the planning and decision-making done by the families themselves, there would be no way to adapt the phasing of the construction to these fluctuations.

Turner points out that the principal disadvantage of the progressive development procedure is that the family must live in a mixture of provisional and incomplete structures for a long period of time.[18] This, however, is offset by the numerous advantages described above and which Tomasz Sudra summarizes as follows:

> "-The possibility of getting, in a gradual way, the housing better than that which they could get through a mortgage system, thanks to the possibility of using more resources and of investing in a way which is better adjusted to their family economy.
>
> -The possibility of adjusting the characteristics of housing (space, level of services, etc.)to their priorities and economy during the entire process of the family and of the dwelling.
>
> -The possibility of capitalizing on the resources that could be used in other kinds of housing..."[19]

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16. Turner and Mangin, 1968:159

17. Ibid.:156

18. Ibid.:159

19. Sudra, 1979:38

The family's control over the construction process permits it to make efficient use not only of its own labour and monetary resources but also of its non-monetary ones. Sudra comments that acting as the manager of one's own house-construction, the owner-builder is able to use more personal resources such as initiative and enterprising spirit; determination and tolerance for the sacrifices required by the chosen course of action; and imagination and ability to anticipate changes within the dwelling unit.[20] The greater the possibility of using various resources, the bigger is the housing improvement relative to the investment effort, and the better adjustment to the needs of the family.[21]

It is important to mention that an additional social benefit brought by progressive development is the fact that the process can serve as vehicle for family and community integration. As Turner emphasizes "nothing cements relationships more than faith in a common objective and mutual dependence for its achievement".[22]

## 2.1.3 OWNER-BUILDING OR OWNER-CONTROL OF THE PROCESS

House construction by progressive development is sometimes referred to as "self-help housing." The following discussion looks at the appropriateness of this term.

Among the interesting issues raised by progressive development are the roles played by both paid and unpaid labour. It has been claimed that an important characteristic of the progressively-built house is that it is invariably built through "self-help".[23] Such a statement, without a proper definition of "self-help", can be misleading. This is due to the frequent misinterpretation of the term as synonymous with "self-built". While the former refers to the users' self-management and

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20. Ibid.:30

21. Ibid.

22. Turner and Mangin, 1968:161

23. Bender, 1980:250

autonomous decision-making throughout the construction process, according to Mathey et al. the latter refers exclusively to the users contributing with their own labour.[24]

Field studies have revealed that in fact very few low-income families build their houses completely on their own. They normally contract help from skilled neighbours who can do the more difficult parts of the work, e.g. laying the foundations, installing plumbing, or designing the electrical system. As Vernez reports on his work in Colombia:

> ". . .labour inputs in the actual building of the dwelling unit are not exclusively provided by the family, subcontracting was found to be widespread and to be increasing as family income increases."[25]

His observation on the relationship between the nature of the work and the family income coincides with that of other authors: for example, Peattie states that only for the very poorest is the process of progressive development truly self-built.[26]

Other studies have shown that in the case of the first phase of construction, which has been generally found to be provisional in nature, the use of the "self-built" term may be correctly applied. Ziss and Kotowski-Ziss found through their studies of housing consolidation in squatter areas in Mexico, that in most cases when the houses were built with non-permanent materials they were invariably self-built, but the use of durable and expensive materials generally implied special skills and, hence, paid labour.[27]

Most trained observers agree that "self-help" is a vital ingredient in the process of the progressive development of houses. However, the term should be understood in its broader sense and not as "self-built" since this last represents only one aspect, and not necessarily a basic one, of the "self-help" process.

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24. Mathey et al., 1985:3

25. Vernez, 1973b:4

26. Peattie, 1982:134

27. Ziss and Kotowski-Ziss, 1985:17

## 2.1.4 FACTORS INFLUENCING THE PROCESS

The following discussion looks at the factors which influence the progressive development of houses and their impact on the duration of that process.

The process of progressive development is a direct outcome of the relationship between the family's changing needs and demands, and its investment potential. This process is, nevertheless, influenced, and often accelerated by other factors; these factors stimulate the family's housing investments both financial as well as personal energy. Several factors outside the control of the individuals also shape their lives and cause life-cycle changes. Some of the factors that affect the housing process are: land tenure, family income, age of the settlement and the provision of public utilities.

The provision of tenure has often been associated with the household's investments in housing as illegal squatters are reluctant to make dwelling improvements unless they are confident that the government does not intend to evict them.[28] It has been observed that when squatters have no possibility of being legalized, and a high risk of being evicted exists, any investment in housing construction beyond the minimum necessity is unlikely.[29] The important role that security of land tenure plays within progressive development has frequently been reported:

> "Ownership is always a recognition to successful self-help operation everywhere. The degree of cooperation will rise with ownership and decline with land tenancy. . . The occupant puts more work on his own house."[30]

and:

> "Where incomes are high in relation to housing conditions, it appears to be a universal rule that occupation is insecure; conversely, where investment is disproportionally high in relation to incomes it will surely be found that inhabitants are secure and optimistic."[31]

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28. Ward, 1982:203

29. Vernez, 1973a:48

30. Abrams, 1964:172

31. Turner and Goetze, as quoted in Vernez, 1973a:48

However, although it would seem that de facto security of tenure is one of the most important factors accelerating the process, other authors have maintained that the development processes occurring in clandestine and government-developed settlements do not differ greatly. And that, with or without legal tenure, the household's housing investments and the actual house's physical development evolved in similar ways.[32]

In addition to tenure, those factors which are related to family income and to the age of the settlement have also been found to have a considerable impact on the house's development, and on the economic benefits derived from that process. Vernez comments on the basis of his analysis of three pirate subdivisions in Bogota as follows:

> "Higher income increases the family's capacity to pay for materials and labour and should therefore lead to larger dwelling units. Equally, the age of the barrio is a proxy that indicates the opportunity to accumulate capital in the form of a larger size housing unit."[33]

Through his analysis, he demonstrates that in the illegal pirate subdivisions in Colombia, investments are encouraged and highly dependent on family income and on the age of the settlement.

Not all authors agree on the impact of the family income. Merrill, for instance, after his study of illegal settlements in Santiago, Chile concluded that contrary to expectations, household income is not a crucial determinant, or at least not necessarily associated with the household's shelter investment.[34] Other studies have also found that the importance of family income may be only relative and only partially explain the family's investment in housing. Based on his studies of squatter areas in Mexico, Ward mentions that family income appears to be important only in explaining the levels of consolidation when housing improvements may be achieved at relatively low cost. However, when greater monetary outlays are involved, the relevance of family income as an explanatory factor seems to be less important. This happens especially when adequate assurance of ownership and occupancy

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32. Bender, 1980:251

33. Vernez, 1973a:47

34. Merril, 1971:67

are not given to the household.[35]

On the other hand, the importance of the age of the settlement in terms of housing improvements may be considerably diminished under certain circumstances. One example of this is when legal sanction is given, the original residents are bought out by economically better-off new residents. This tends to occur particularly in settlements with attractive locations that are already legalized.[36]

There is also evidence that the timely provision of public utilities accelerates the process of incremental construction. Field studies in Colombia in relation to the official plot-connection to each of the utilities (power, water and sewers) suggest that the connection of public services to the dwelling unit is important and has a positive influence on the progressive development process.[37] The same studies have demonstrated that the process was accelerated primarily by the installation of water and/or power; the sewer connection, being rarer and subject to substitution by septic tanks, did not have the same impact. However, the presence or absence of any given utility had no particular effect when the houses were in their initial stages of development.[38]

The above-mentioned factors are certainly not the only ones which can affect the process of a house's development; however, they have been frequently identified by different studies as relevant to the process. Factors such as the household's level of education, or the creation of an investment surplus, among others, have been considered by some researchers as influencing the process but to a lesser degree.

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35. Ward, 1982:196

36. Ibid.

37. Hamer, 1985:vi

38. Ibid.:22

## 2.2 BUILDING A PROGRESSIVE DEVELOPMENT MODEL

### 2.2.1 INTRODUCTION

What follows is an overview of field studies that have investigated the actual physical development of owner-built houses, and a summary of their most relevant findings.

Although the importance of the process of progressive development in the present housing situation of developing countries has been stressed repeatedly by scholars, only a few studies have attempted to understand the dynamics of the actual physical development of the dwelling unit. The studies reviewed in this work represent different context in which progressive development can take place. These studies are: the study by Bazant, Nolasco and Gomez, on squatter settlements in Mexico; the World Bank-DANE study, on pirate subdivisions in Colombia; the study by Vernez, also on pirate subdivisions in Colombia; the study by Ziss and Kotowski-Ziss, on illegal settlements in Mexico; and the FSDVM study, on a sites and services project in El Salvador. These studies can be divided into two general groups. The first group defines the phases of development of the house according to its physical characteristics, the second establishes a scale of physical priorities in the development of the dwelling unit based on the families' needs. Since these studies cover a wide range of physical contexts (squatter areas, illegal subdivisions and a sites and services project) their sources of information, methods of analysis and depth of findings vary considerably.

It is important to mention the fact that although these studies have analyzed the physical aspects of the process, only one of them, to the best of the author's knowledge, was undertaken exclusively with this purpose in mind. For the remainder, physical aspects were only one of the many factors documented.

## 2.2.2 PHASES OF DEVELOPMENT

Among the studies undertaken that defined the phases of development of the house, a study of Mexico City's spontaneous settlements conducted by Bazant, Nolasco and Gomez appears to be the one that describes them the most completely.[39] The study was based on information on illegal settlements available at CECODE (Centro de Ecodesarrollo) and it was presented in 1979 in report form during the "Primera Reunión Nacional sobre Investigaciones en Autoconstrucción" in Mexico City. The report, however, does not provide information on data sources, collection methods, or analysis.

The study identifies three general phases of development with regard to the house's physical characteristics. These phases are:

a) Formative phase: Characterized by the construction of a multi-use room (16-30 M2) of a non-permanent character which is built with second-hand or low-cost materials and the use of family labour. The time for this phase was estimated to range from one to five years.

b) Developmental phase: Defined as occurring immediately after the family is provided with security of tenure which represents the beginning of the house's physical consolidation. The developmental phase is characterized by the horizontal expansion of the dwelling unit, with separation of specific spaces (kitchen and bathroom), gradual introduction of basic services, replacement of non-permanent materials with permanent ones, and consequently the replacement of the family labour by more specialized hired labour in the construction process. The time calculated for this phase ranged from five to 15 years. By the end of this phase, the family has already fulfilled its basic housing needs in terms of habitable area and the physical stability of the dwelling unit.

c) Consolidation phase: Characterized by the vertical expansion of the house, the addition of a work place within it and the improvement of services. Figure 1 illustrates the three phases of progressive development according to Bazant et al.

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39. Bazant, Nolasco and Gomez, 1981:70-87

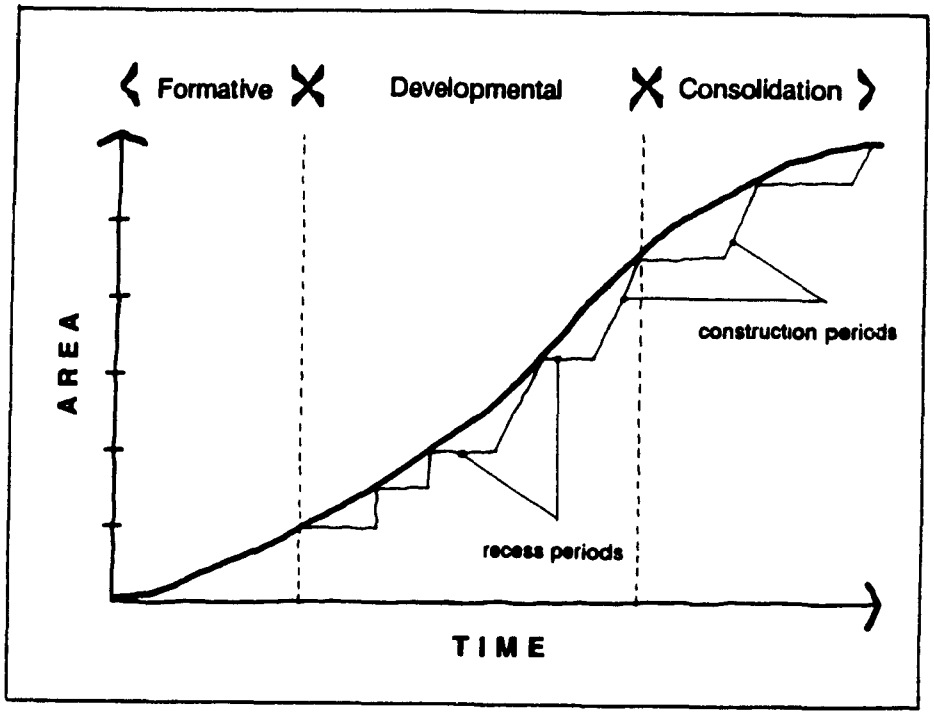


Fig. 1 Phases of Development of Low-Income Housing.
(After Bazant, Nolasco and Gomez)[40]

Other studies do not provide as complete descriptions of the phases of development as this one, although they do identify different construction phases during the development process. The phases are defined based on the physical condition of the houses at the time the field studies took place. One such study on illegal subdivisions in Bogota, Colombia was carried out by the Colombian National Planning Office (DANE) and the World Bank in 1978.[41] It relied on two main sources: the 1978 DANE-World Bank survey conducted in Bogota and Cali, and another 1978 (July and September) survey of 212 households living in 12 relatively new peripheral subdivisions. The study found clear distinctions between different construction phases: the first phase is called tugurios, or shacks; the second, casalotes, or rooms added to the walled-in lot; the third, one-story structures;

40. Bazant, Nolasco and Gomez, 1981:79

41. Hamer, 1985

and the fourth, two- or three-story structures. The first two phases were identified as transitional phases, while the rest were classified as more or less advanced conventional dwellings.

The phases identified by this study tend to coincide with those of Bazant and the descriptions correspond to the three general phases. The tugurios illustrate the formative phase, the casalotes and the one-story structures represent both extremes of the developmental phase, while the two- and three-story structures fit into the consolidation phase.

The findings of the study conducted in 1970 by Vernez do not differ greatly from the previous two.[42] The study took its data from a sample study of three pirate settlements in Bogota which was part of an effort to establish minimum standards for the delivery of public services to illegal settlements. The study defined three phases of development, which were based only on the family's physical priorities for housing as the study did not consider building materials (i.e. non-permanent or permanent). The first phase was defined as the building of a multi-use room, which coincides with the description of the formative phase defined by Bazant's study, the second was described as the addition of habitable area and the separation of specific spaces (kitchen and bathroom), and the third, as the provision of internal services. The latter phases can be placed within Bazant's developmental stage. The study also considered the time elapsed within the phases: an average of 2.25 years for the first phase, and one year for the remaining two. In this regard the results differ considerably from the study by Bazant, although the land ownership status of the settlements may explain these differences.

Contrary to Vernez's study, the one undertaken by Ziss and Kotowski-Ziss (in 1984) investigated squatters' housing consolidation processes based only on the building materials used.[43] This study analyzed 151 cases within four squatter settlements in Mexico, covering a variety of climatic, socio-economic and tenure conditions. The findings distinguish three house types as indicators for stages of consolidation. These types are:

a) Non-permanent type: a shack made of non-durable building materials, either of local and traditional, or of cheap and perishable materials of industrial origin, or of waste materials; usually the first stage.

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42. Vernez, 1973a

43. Ziss and Kotowski-Ziss, 1985

b) Semi-permanent type: durable materials for walls and roofing, non-durable materials for the framework; these buildings are usually without foundations; usually the intermediate stage.

c) Permanent type: framework of reinforced concrete, walls of solid materials, often reinforced concrete roof and foundations; usually the final stage.

The findings of this study generally support the previous conclusions. And by analyzing a very specific aspect of the development process (i.e. the building materials used), it provides complementary information on the phases of development. The first stage (non-permanent type) and the final stage (permanent type), illustrate, in terms of materials used, the formative phase and the end of the developmental phase, respectively. It is the intermediate stage (semi-permanent type), that appears to contradict the findings of the previous studies, as its description does not fit within any of the previously defined phases. However, the authors explain that only a very small percentage of the surveyed lots (5%) went through the intermediate stage to consolidation. The rest went directly from non-permanent or semi-permanent to the permanent type, or they started the construction with permanent materials right from the beginning. Thus, the semi-permanent type may be considered as a variation of the non-permanent type and representative of the formative stage as well. The study found that the time needed to reach the final stage averaged 17 years, which is very close to the findings of Bazant's study.

## 2.2.3 OWNER-BUILDERS' PRIORITIES

A study undertaken in 1976 by the Fundación Salvadoreña de Desarrollo y Vivienda Minima (FSDVM) has been the only one, to the author's knowledge, with the specific objective of examining the owners' priorities in the progressive development of the dwelling unit.[44] This study is a post-occupancy evaluation of the San Jose del Pino sites and services project, the first of this type undertaken in El Salvador. During this project's implementation, families were given the option of three

44. Silva, Linares and Lara, 1977

different housing types: a) a serviced lot (including a 6 M2 sanitary unit); b) a half house (a 21 M2 room and sanitary unit); and c) a complete house (a 36 M2 room and sanitary unit). In order to define a progressive development model in terms of the owners' physical priorities for housing, the study assumed that these three types of units also represented stages within the consolidation process. The research was done by analyzing the first improvements undertaken by the owners of the three different types of units.

The FSDVM study identified the need for a habitable space as the owner's most important priority. The addition of additional habitable area and the replacement of construction materials in the original unit were identified as second priorities within the process. Both were considered by the owner-occupiers as indispensable in order to house the family properly. They were observed to be the first improvements after the construction of the first habitable space. The personalization of the property by the family was defined as the third priority; this was achieved through the individualization of the facade and other physical improvements with an "aesthetic" character. Such cosmetic improvements were made first by the owners of the complete-house type. The family's security and privacy were found to be the fourth priority. These were achieved through the construction of the property walls and observed as the second and third improvements undertaken by the occupants of all three housing options.

The studies mentioned in the previous section did not define such a specific list of owners' priorities within the development process; however, these priorities can be inferred from the descriptions provided by the phases of development they identified For instance, in the studies by Bazant and by Vernez, the construction of a basic habitable space represented the first priority of the owners. Both studies found the addition of more habitable space along with the separation of specific spaces to undertake specific activities (e.g. cooking and sleeping) to be secondary priorities. The provision of internal services was identified as a third priority within the process. The study by Bazant was also the only one that considered the addition of a workplace. This stage occurred only after the house had satisfied the family's basic shelter needs.

The priorities suggested by the definitions of the phases of development identified in the previous studies, although not contradicting the ones identified by the FSDVM, do differ to some

extent. For example, the FSDVM study did not define the separation of specific spaces as a priority, while the studies by Bazant and by Vernez gave it the same importance as the addition of more habitable area. A similar situation occurred with the replacement of the building materials, which in the case of the FSDVM study seems to have taken place in a very early stage.

On the other hand, the FSDVM study did not consider other priorities, due to the way the sites and services project was implemented. For example, the study did not contemplate the provision of internal services as a basic priority since these were connected to all plots from the beginning.

Although the studies reviewed were undertaken in different contexts, the phases of development identified appear to be consistent, and since the studies have focused on the analysis of distinct aspects of the progressive development process, their findings complement each other. However, it is important to underline the fact that the main discrepancies occurring between the studies seem to be the result of the different legal status of owners. Thus, in many cases the status of the settled land appears to lead the process causing the divergences between studies in the owner's housing priorities.

The preceding review has shown in particular that while several studies have analyzed different aspects of the progressive development process as it occurs in illegal settlements, only one study has analyzed it within the context of a sites and services project.

The lessons learned from previous experiences cannot be simply extrapolated to other contexts. Further research on the process, therefore, is required to better understand the different facets of the phenomenon of progressive development as it occurs within sites and services projects. The present study aims in that direction. For such a purpose, it relies on a field study that was undertaken in a sites and services project in Mexico, which is described in the following chapter.

# CHAPTER 3

# THE FIELD STUDY

Following the experiences of previous studies investigating progressive development, it was decided for the present study to rely on a field survey as a primary data source. The survey was conducted in the city of Zihuatanejo, Guerrero, Mexico, in the course of the last two weeks of December 1987 and the first week of January 1988. It had as a general objective the collection of relevant information for analysis on the progressive development of houses in a sites and services project.

This chapter describes the survey in question. The chapter is divided into three sections: the first underlines the factors that governed the decision-making process; the second concentrates on the description of the research strategy; and the third provides a detailed description of how the survey was actually carried out.

## 3.1 FACTORS GOVERNING THE DECISIONS

### 3.1.1 THE LOCATION OF THE STUDY

The place chosen for study was Zihuatanejo, Guerrero, Mexico, a relatively small tourist-oriented city located on the Pacific coast of the country, which is presently experiencing rapid urban growth. Zihuatanejo, together with Ixtapa form Ixtapa-Zihuatanejo, one of the newest tourist resorts in the country. (See Fig. 2)


Fig. 2. Zihuatanejo, Guerrero, Mexico

A small but growing city was chosen, rather than a large urban area where housing problems have been most acute and have continued to worsen (e.g. Mexico City, Guadalajara, Monterrey). There were several reasons for this choice. First, the real and potential role of the emerging urban areas in developing countries has been stressed recently.[1] It has been demonstrated that housing problems cannot be separated from the overall urbanization process. In the case of Mexico - a developing country - the aforementioned facts are particularly significant. The current federal government's policies are geared towards the development of specific areas of the country since these are potential centers for employment generation and also because of their natural resources. Such policies attempt to encourage these areas to develop through the allocation of funds for the provision of public amenities. The rapid growth faced by Zihuatanejo illustrates the effect of such policies.

Second, the type of project chosen for study - sites and services - is not being implemented in the metropolitan areas of the country. Presently, central policies are attempting to control the physical growth of these already over-extended urban areas.[2] The lack of available land therefore interferes with the implementation of housing programmes such as sites and services projects which require

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1. Ziss and Kotowski-Ziss, 1985:14

2. Ward, 1982:203

land as a primary ingredient. On the other hand, emerging urban areas, such as Zihuatanejo, posses open land which make the sites and services approach feasible.

Third, the author's familiarity with the city made a field study possible. As a native of the state of Guerrero, and having worked in Zihuatanejo for one year, he had solid knowledge of the local and state housing conditions, which made the collection of relevant data within a considerably short lapse of time possible.

## 3.1.2 THE SITES AND SERVICES PROJECT

The project selected as a case study was the "Los Amuzgos" sites and services project. The 260-plot project was implemented in early 1984. It initially provided regular lots of 120 M2 and two water taps as the only infrastructure. (See Fig. 3)

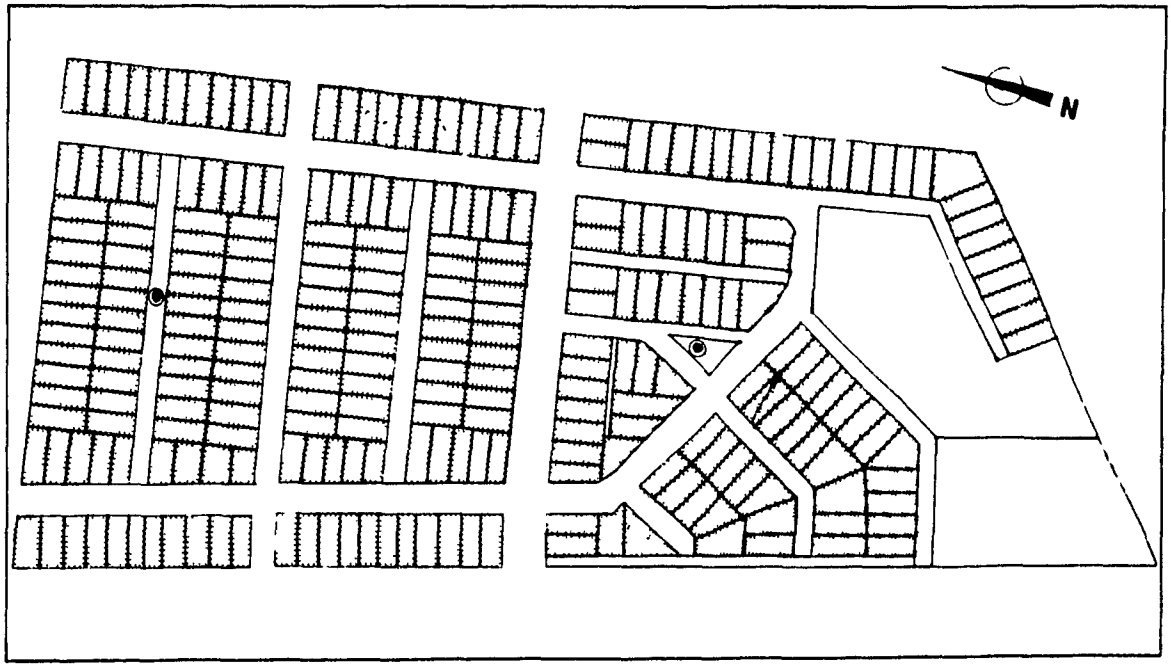



Fig. 3. The "Los Amuzgos" sites and services project

"Los Amuzgos", however, was not the only sites and services development in the city. The project represented, jointly with "Los Tlapanecos", the two sites and services projects implemented in the city by the "INVISUR", the state housing institution. Although both have similar characteristics (e.g. financial and plot-allocation systems), the selection of "Los Amuzgos" as a case study was based on its longer time of occupancy (four years) and its higher rate of occupancy (95%). Thus, a considerable number of changes in the dwelling units could be observed and recorded for analysis.

### 3.1.3 SELECTION OF PLOTS

Considering the fact that the field study was to be undertaken by one person, time became a crucial factor when determining the number of plots to be surveyed. This was especially relevant since the time originally available to conduct the field study was reduced by external circumstances from three weeks to 17 days, and some of this time was devoted to the collection of official information on the specific project and on housing programmes in general at the national and state levels.

The number of plots to be surveyed was influenced by the available time. To calculate such a number, a 'pilot' plot was selected and surveyed. This 'pilot' plot showed that at least 45 minutes were needed to survey one lot.

A tentative number of eight plots to be surveyed per day was set. Considering the available time (17 days) a total of 130 plots could be expected to be surveyed. This represented 50% of the plots in the project. Since all plots already had specific numbers assigned during the project's implementation, odd numbered plots were selected for survey. The number of plots to be included in the study was altered after the first day of work, since during the entire day only five plots were surveyed, due to the length of some of the interviews. As a result, the number of plots was reduced to 79, representing 30% of the total, which was still a significant sample. The specific plots were selected by using a simple random sampling method. (See Fig. 4)

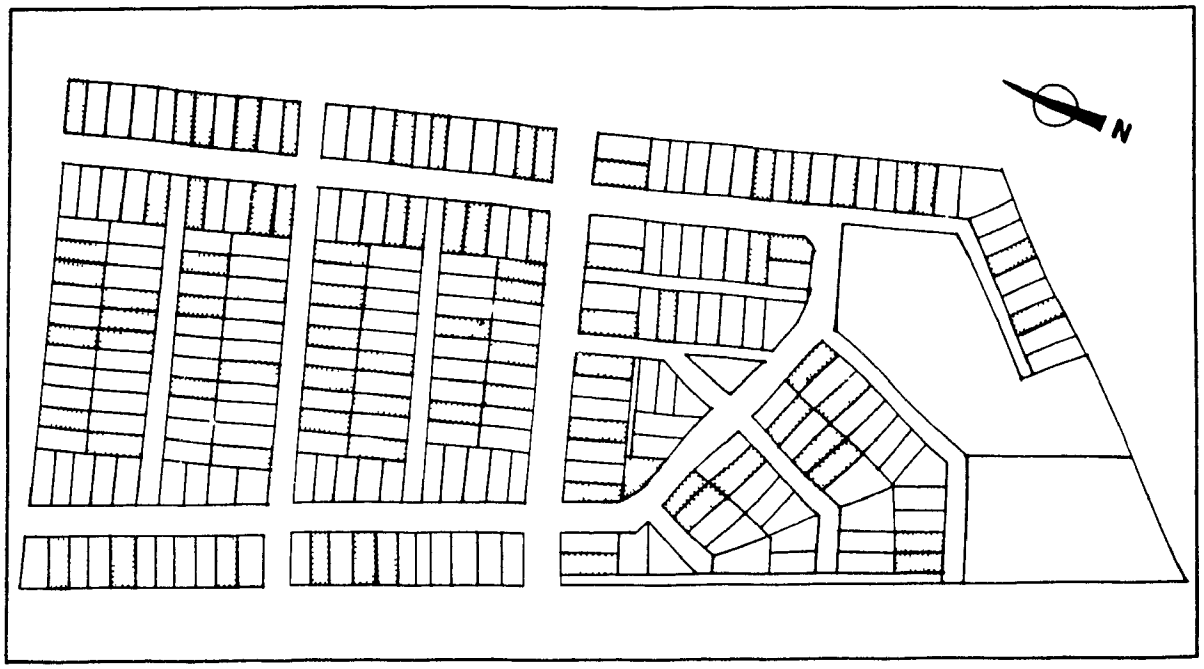



Fig. 4. Selected plots

Before the actual survey was carried out, some basic criteria was set and kept throughout the field work. As the sample had been reduced considerably, all selected plots were to be surveyed, unless: a) they were unoccupied or b) the household was uncooperative. In such cases, the plot would be replaced by the one immediately on its right side.

## 3.1 RESEARCH STRATEGY

The data collected can be classified as primary and secondary. The primary data includes: a) physical measurements and b) informal interviews. The secondary data includes: c) photographs and d) observational notes.

**a) Physical Measurements**

All information was recorded through sketches, plans and sections of the houses in a random sample. The objective was to record the present physical situation of any existing construction within the surveyed plots. The data collected included: location of the erected structures within the plot, dimensions of rooms, ceiling heights, and building materials used in walls, roofs and floors. The particular uses of the internal space and the furnishing were also recorded.

**b) Informal interviews**

Information was gathered by interviewing the head of the household and with the help of an interview guide. (See Appendix No. 1) The interviews were aimed at collecting general information on the household's background and its present situation and, in particular, detailed information on the house's progressive development. The latter dealt with the following aspects: the additions of habitable area, the changes and/or improvement of building materials, as well as any other alteration on the dwelling unit that had modified its physical constitution.

**c) Photographs**

Photographs complemented the data regarding the physical aspects of the dwelling surveyed. Internal and external pictures of the dwelling units were taken. The specific number of photographs to be taken per plot depended on the complexity of the structures within the surveyed plot; however, at least two photographs per plot (interior and exterior) were taken.

**d) Observational notes**

The main purpose of the notes was to record relevant information that due to its characteristics, could not be registered neither by the physical measurements, nor could be confirmed during the course of the interview. Notes also helped to record the level of reliability of the information gathered for each of the surveyed plots.

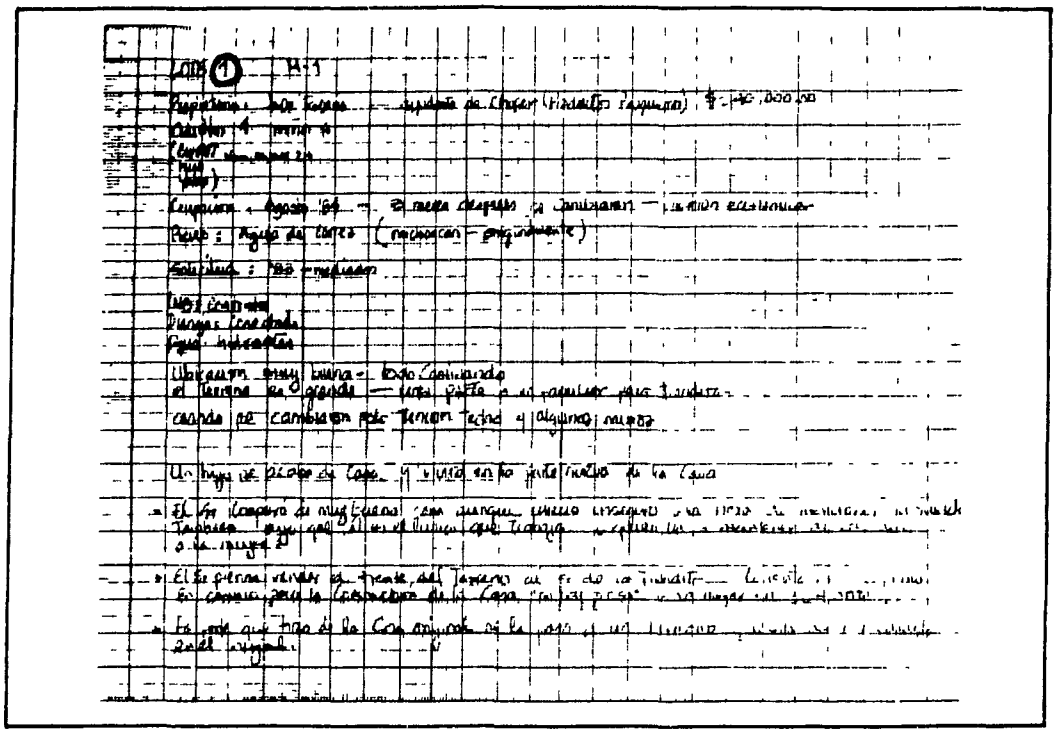
## 3.3 THE SURVEY

### 3.3.1 PLOT SURVEY DESCRIPTION

All interviews were conducted with the head of the household or spouse, to whom the purpose of the questions was explained and a request to collaborate with the survey was made. The survey was generally initiated with an interview. This was carried out in two parts. The first part aimed at obtaining general information about the household and was conducted in a very informal way. All aspects marked in the interview guide were investigated, although in no specific order. For the purpose of obtaining more reliable data, no notes were taken during this part of the interview so as to make the interviewee feel most at ease when giving personal information. Pertinent information was generally recorded at the end of the plot survey. The second part, focusing on the progressive development of the house, took a different course. All aspects related to such development were inquired about and recorded through written notes and sketches.

Once the interview was over, and with the interviewee's agreement, the physical condition of the dwelling unit was recorded. All structures on the plot were measured. The building materials used, uses of spaces and furnishing of these spaces were recorded. All physical data was recorded in sketches of the dwelling unit's plans and sections, which were drawn on grid paper. (See Fig. 5)

After conducting the interview and taking the physical measurements, photographs were taken. (See Fig. 6) For control purposes, each picture was assigned a number indicating the number of the film and of the picture itself. The number was written on a master list and on the dwelling unit's sketches; the position of the photographer as well as the direction of the shot were also recorded on the dwelling unit's sketches.



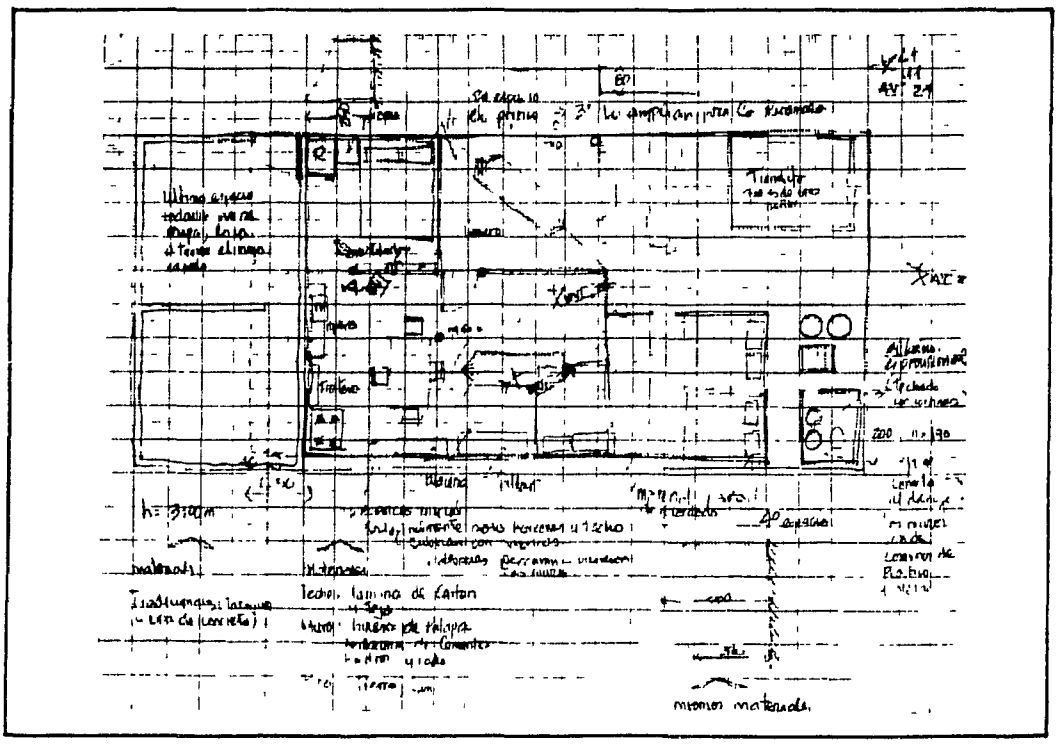


Fig. 5. Sketches containing the gathered data

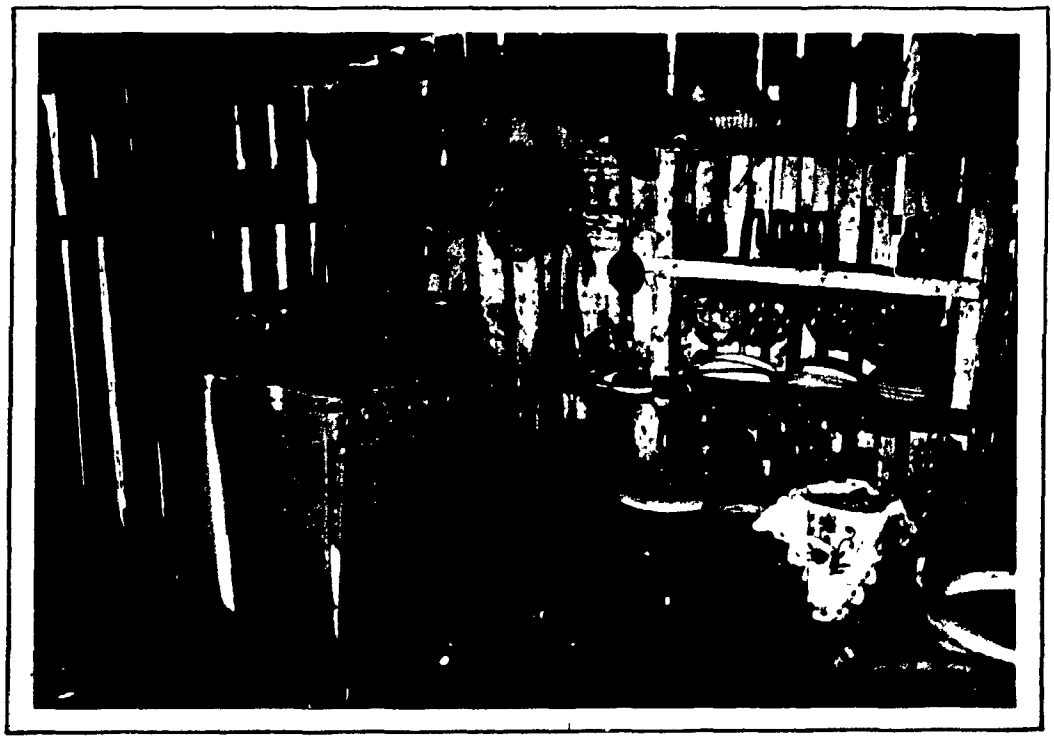


Fig. 6. Photographs (interior and exterior)

Once the plot survey was finished, and the interviewer had left the dwelling, the information gathered was rechecked, and the information obtained through the first part of the interview was written down. Where necessary, additional notes pertaining to problems or constraints during the interviews were also made.

### 3.3.2 DAILY ORGANIZATION OF THE SURVEY

The work was undertaken during two periods, the first in the morning and the second in the afternoon, each period lasting approximately three hours. Two to three plots were surveyed during each period. After each period of field work and once back at the author's residence, all the information gathered was reorganized; notes were transcribed and sketches redrawn, thus avoiding any possible future confusion of the data collected. Also, all material required for the next set of plots to be surveyed was prepared at this time.

### 3.3.3 ADDITIONAL REMARKS

In the course of this field study, a considerable amount of relevant data for analysis was collected, thus fulfilling the set objectives. However, the field survey encountered a constraint, which made the work more difficult than expected. The time chosen to conduct the study (December and January) - determined in accordance with the academic schedule - was not ideal. The survey coincided with the high season of tourism in Zihuatanejo. This represents one of the major opportunities for employment, with the result that some of the house holders selected for the survey were not available during the survey period. Others, although at home, were not available as they were undertaking housework. Consequently, many plots were visited more than once, until the interviewee was able to cooperate. Furthermore, some of the people that did cooperate did not have

enough time to complete the interview, and it had to be conducted in more than one visit.

It is also necessary to note that almost all the interviews were characterized by initial feelings of hesitation and reluctance on the part of the interviewees. This calls into question the validity of some of the more confidential information divulged during the interview (i.e. family income). For this reason, family income will not be considered as part of this study, even though it was highlighted in Chapter 2 as a relevant factor within the development process.

Nevertheless, in evaluating the people's cooperation, it should be said that since 90% of the occupants selected were willing to participate, the gathering of data was made easier and the physical data gathered should be considered reliable. The organization and analysis of the collected data are presented in the following chapter.

# CHAPTER 4

# ANALYSIS OF THE DATA

This chapter presents a detailed analysis of the progressive development of the houses surveyed in the "Los Amuzgos" sites and services project. The chapter is divided in two parts: the first describes the methods of analysis; the second analyzes the data on its own terms, and draws inferences from the results.

## 4.1 METHODS OF ANALYSIS

### 4.1.1 ORGANIZATION OF THE DATA

The first step in the analysis of the data was its systematic organization. For each of the surveyed plots the physical development of the house was graphically illustrated by its successive stages of completion. These represent the different stages that the unit has gone through since the initial occupation of the plot. Each of the sketches shows the unit after an improvement or modification. Such improvements were of the following nature: addition of habitable area; improvement or replacement of the building materials in the roof, walls, or floor; and the transformation of the physical nature of any existing space. (Fig. 7).

The organization of the data in such a manner corresponds to the fact that, as noted in Chapter 2, the stages of completion were used to distinguish systematically phases within the development process. The number of stages, their order, and the specific material conditions of the units at each stage are based on information provided by each household.

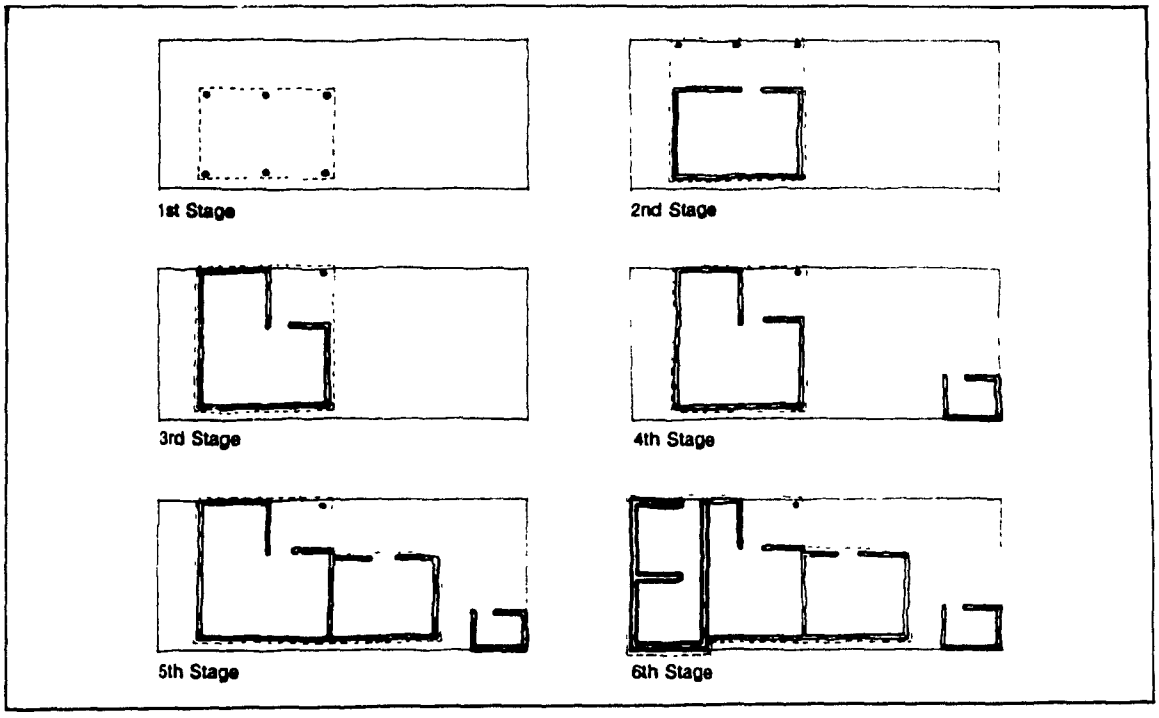



Fig. 7. Stages of completion

## 4.1.2 ESTABLISHMENT OF DESCRIPTIVE CATEGORIES

Before the analysis of the data, the establishment of several categories was necessary in order to carry out the analysis systematically. The categories established were: a) the size of habitable area; b) the construction quality; c) the nature of built spaces; and d) the location of the unit on the plot.

### a) Size of Habitable Area

For the purpose of analyzing the habitable area in the plots at the initial stage of the house development and its subsequent growth, seven categories of areas were established with ranges of 15 M2. For the purposes of this study, the area considered was the total built area on the plot, regardless of its physical characteristics. The seven categories of areas are presented in Table 1.

| | |
|---|---|
| A. | 1 - 15 M2 |
| B. | 16 - 30 M2 |
| C. | 31 - 45 M2 |
| D. | 46 - 60 M2 |
| E. | 61 - 75 M2 |
| F. | 76 - 90 M2 |
| G. | over 90 M2 |

Table 1. Size of habitable area

**b) Construction Quality**

In order to document the physical evolution of the houses towards consolidation, in terms of construction quality, building materials were grouped into four categories. These categories represent an attempt to define construction quality according to building materials and how they were used. The classification was done as follows:

1. All construction materials observed in the survey were listed and separated according to physical components: roof, walls and floor.

2. The materials were ranked in terms of their cost, from the least to the most expensive.

3. All existing combinations of materials, as per physical components, were noted for the total sample, for all stages of completion.

Mexican official building standards consider the materials in the dwelling units as either "sub-standard" (or non-permanent), or "standard" (or permanent). Because of the unstable seismic condition of the area of study (and of the country in general), the physical stability of the unit is of great concern. After the materials had been separated and ranked and their combinations of materials per element noted, it was possible to establish two general groups of houses: the first group used inexpensive (non-permanent) building materials and the second used more expensive (permanent) building materials. This basic classification of building materials also follows the experiences of

previous studies, as noted in the literature review, which have investigated such a particular aspect of progressive development.

For greater accuracy, both major groups were further subdivided. The houses built with non-permanent materials were divided into two groups, based on the type of floor. Dwellings without floors (earth) were ranked lower than those with a cement floor. Cement floors were considered an important difference among this type of structure since they give the units a less temporary character and limit the possibility of the unit's relocation within the plot.

The dwellings built with permanent materials were divided according to the type of roof. Dwellings with a concrete-slab roof were ranked higher than those with other kinds of roofs because the former represents the only type of roof that provides the house with the possibility of vertical expansion. Also, concrete-slab roofs are considered to be maintenance-free and represent the most expensive alternative.

Building materials were thus grouped into four construction qualities, which vary from the cheapest (non-permanent) type, to the most expensive (permanent). The final groups were assigned numbers from one to four. (See Table 2)

Following this classification, the different stages of completion of all units were assigned the appropriate number based on their construction quality. If the unit incorporated more than one construction quality at the same stage of completion, the analysis always assigned the higher number.

c) **Nature of Built Spaces**

In order to examine the nature of the built spaces and to evaluate the hierarchy of the physical elements forming these spaces at the early stages of the house's development, built forms were grouped according to their degree of enclosure. The three categories are: 1. semi-enclosed (roof only), 2. semi-enclosed (walls only), and 3. enclosed (roof and walls). (See Fig. 8).

d) **Location of the house on the plot**

The relatively generous area of the plots (120 M2) allowed this study to explore the location of the house on the plot. For the purposes of this study, three different locations of the house on the

| | Roof | Walls | Floor |
|---|---|---|---|
| QUALITY 1 | 1. grass<br>2. cardboard sheet | 1. plastic/clothes<br>2. scrap materials<br>3. palm ribs<br>4. mud<br>5. wood | 1. earth |
| QUALITY 2 | 2. cardboard sheet<br>3. clay tile | 3. palm ribs<br>4. mud<br>5. wood<br>6. brick/wood<br>7. brick | 2. cement (rustic)<br>3. cement (polished) |
| QUALITY 3 | 3. clay tile<br>4. asbestos cemento | 8. wood/concrete<br>9. brick/wood/concrete<br>10. brick/concrete<br>11. brick/concrete/ plastered | 2. cement (rustic)<br>3. cement (polished) |
| QUALITY 4 | 5. concrete slab | 10. brick/concrete<br>11. brick/concrete/ plastered | 3. cement (polished) |

Table 2. Construction quality

plot were established. They were defined according to the house's relationship with the street: 1. on the street, 2. in the center of the plot, and 3. at the back of the plot. An exception was noted if a plot was located at the corner of two intersecting streets. In this case the house's location was based on the street facing the shorter side of the plot. The three types of locations are presented in Fig. 9.

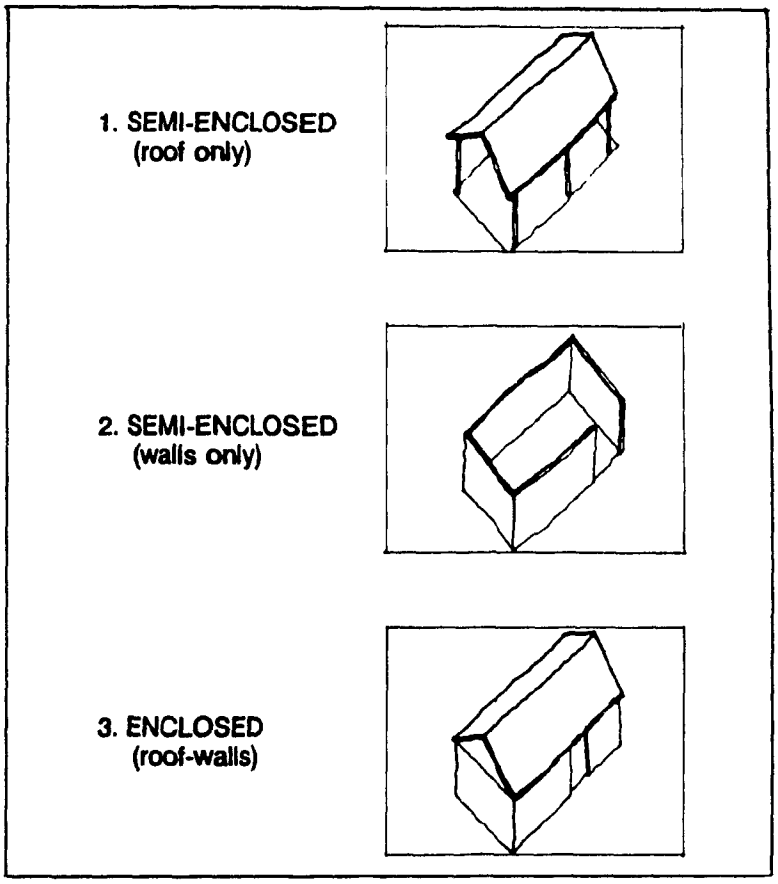



Fig. 8. Physical nature of built spaces

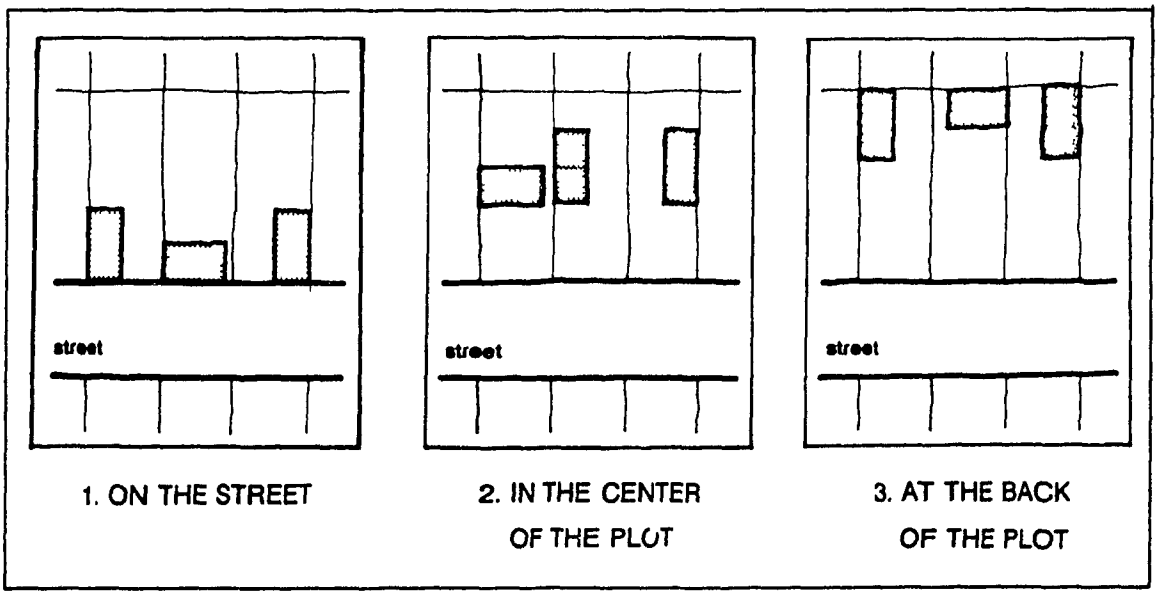



Fig. 9. Location of the house on the plot.

### 4.1.3 ANALYTICAL PROCEDURE

Once the data was organized and categories established, the analysis was undertaken in two parts: the analysis of the initial stage and the analysis of the subsequent stages.

The initial stage occurred when the families moved onto their plots. The analysis observed the physical constitution of the houses at this stage of development. The quantitative analysis of the following aspects was undertaken: a) areas of the built spaces; b) the construction quality used; c) the relationship between areas and construction quality. In addition, and in order to provide a more complete overview of the physical constitution of the initial dwellings, the physical nature of the built spaces as well as their location on the plot were also investigated.

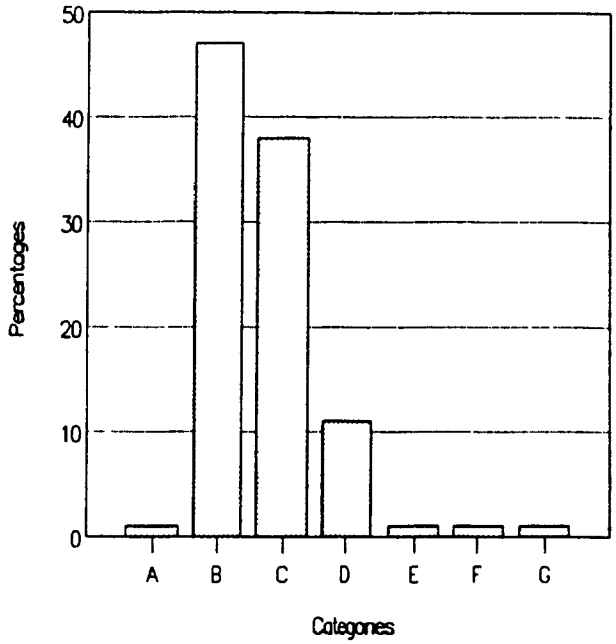
The analysis of the later stages examined the physical priorities of the household in the early stages of progressive development. Did they want a bigger house or a better quality house? This was done by a quantitative analysis of the nature of the development stages and their particular characteristics. The analysis concentrated on the first three subsequent stages, since at least three stages had been undertaken by the greater percentage of the sample. Although some households have carried out a fifth, or even a sixth stage, the reduced number of these (14 and only one, respectively), limits the possibility of drawing any particular inference from such data.

## 4.2 THE ANALYSIS

### 4.2.1 THE INITIAL STAGE

**a) Built area**

An analysis of the built areas indicates that 47% of the sample initiated their houses' development with areas ranging within 16-30 M2, while 38% started with areas of 31-45 M2. Together, these represent an overwhelming 85% of the sample. Only 11% of the sample built areas within 46-60 M2. The percentages decrease remarkably towards categories with areas bigger than 61 M2, and smaller than 15 M2, as only one plot was found in each of them. (See Fig. 10)




| Categories | No. of Plots | % |
|---|---|---|
| A. 0-15 M2 | 1 | 1% |
| B. 16-30 M2 | 37 | 47% |
| C. 31-45 M2 | 30 | 38% |
| D. 46-60 M2 | 8 | 11% |
| E. 61-75 M2 | 1 | 1% |
| F. 76-90 M2 | 1 | 1% |
| G. over 90 M2 | 1 | 1% |
| Total | 79 | 100% |

Fig. 10. Number of plots and built area

Although built areas at this stage vary from 11.34 M2 (minimum) to 95.25 M2 (maximum), the most frequently recurring areas (modes) were 26, 27, 28, 31 and 35 M2 all of them with 5 cases, as shown in Fig. 11. The mean area was 33.90 M2.

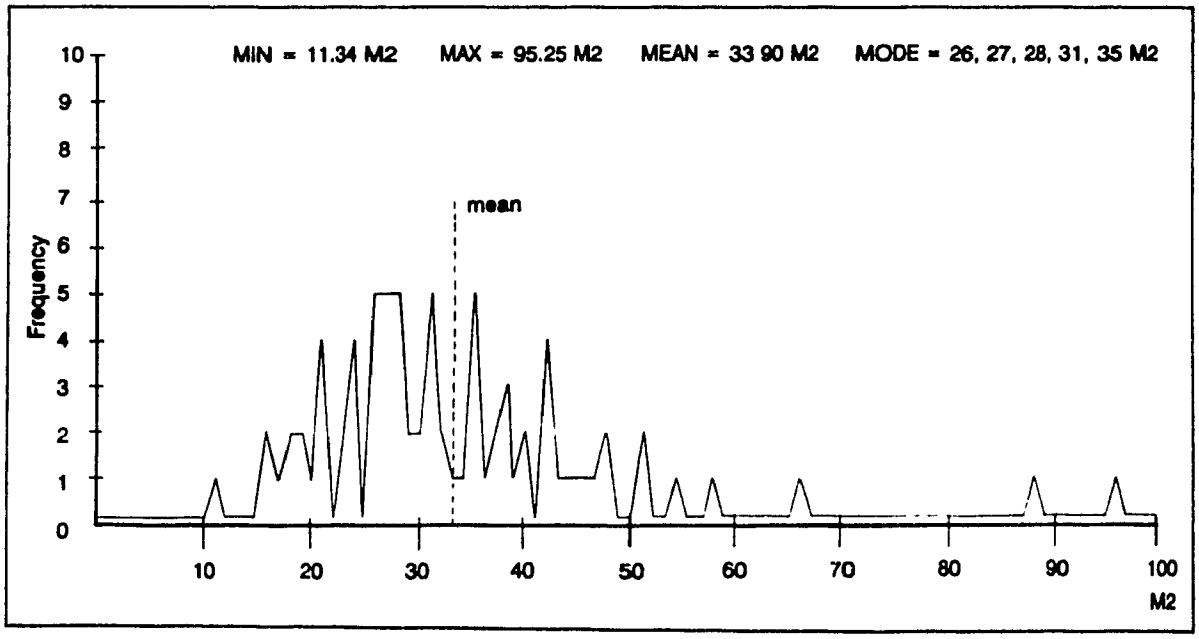
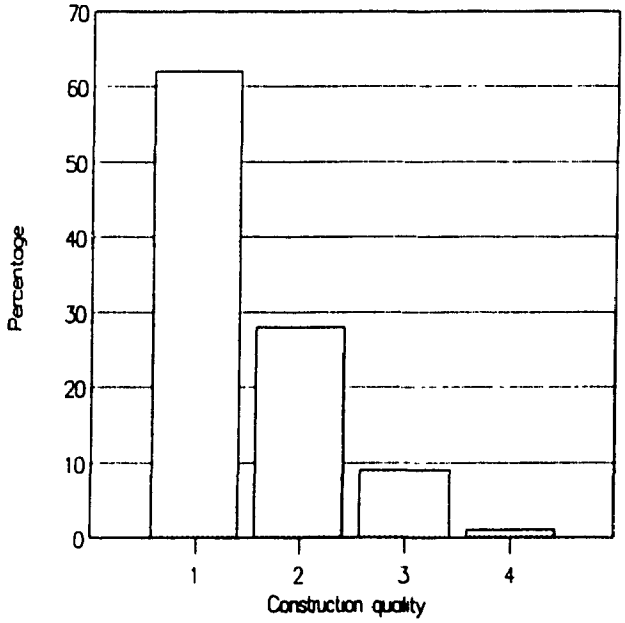



Fig. 11 Frequency distribution of built areas

As observed through the analysis of the random sample, the initial stage of the dwelling units is not characterized by a variety of small and large areas of built space, but by a fairly narrow range which represents an area sufficient to allow households to undertake their basic living activities. Scarce economic resources, accentuated by the considerable burden that the plot's down-payment represented, led most families to build their initial dwellings with areas within the range 16-45 M2. Upon a closer examination of the results, it is possible to estimate that areas of approximately 30 M2 were required to satisfy the household's basic housing needs.

### b) Construction quality

An overwhelming percentage (90%) of the sample demonstrated the use of non-permanent building materials at the initial stage of the house's development. The analysis (as shown in Fig. 12) reveals that 62% of the households built their initial dwellings using construction quality 1, while 28% used construction quality 2. On the other hand, the use of permanent building materials at this stage was considerably smaller. 9% of the sample used construction quality 3 and only one household was found using construction quality 4.




| Construction Quality | No. of Plots | % |
|---|---|---|
| 1 | 46 | 62% |
| 2 | 22 | 28% |
| 3 | 7 | 9% |
| 4 | 1 | 1% |
| Total | 79 | 100% |

Fig. 12. Percentages of houses according to construction quality

The wide difference in percentages between houses built initially with non-permanent and permanent materials suggests that the initial stage of the dwelling's development process is characterized by the use of cheap building materials. This is the result of scarce economic resources and allows the household to achieve its space requirements with little cash outlay. The specific materials used at this stage may be determined by the household's particular economic situation at the time of purchase of the plot. For instance, among the households building with non-permanent materials, many of them moved onto the plot immediately so as to avoid rental payments. Others did not occupy the plot straightaway since they had a more stable situation (e.g. living with relatives), enabling them to save extra money. Such a difference is perhaps reflected in the dwelling's initial physical state. While the former group built only enough to cover their basic shelter needs, the latter could afford a relatively better quality and more complete structure that incorporated other important housing aspects (e.g. privacy, security).

**c) Relationship between area and construction quality**

Table No. 3 shows the correspondence existing between structures built with smaller areas and cheaper building materials. Most of the houses were found concentrated within areas of 16-30 M2 and 31-45 M2 and construction qualities 1 and 2 (non-permanent). Of the houses with areas of 16-30 M2, 70 % used construction quality 1; while 22% used quality 2. On the other hand, of the houses with areas of 31-45 M2, 50% used construction quality 1; while 40% used quality 2. As observed, the highest concentration of houses was located within the 16-30 M2 range and construction quality 1. The correspondence tends to diminish as built structures became bigger or used better construction qualities.

Contrary to what might be expected, given the security of land tenure that the kind of settlement under analysis provides (sites and services), small house areas do not necessarily imply the use of better building materials, nor do larger house areas imply the use of cheaper building materials. Table 3 shows that the limited economic resources the household possessed at the time of the plot's occupancy have led it to build its initial dwelling according to its housing priorities. The results tend to suggest that size and construction quality are both depended on the economic

capabilities of the families. Among the houses that were built initially with non-permanent materials, smaller houses tended to be built with the minimum choice in terms of construction quality, which suggests less economic resources. Hence, it can be assumed that the household's main concern at this stage was to achieve its required habitable area, while the quality of building materials was of secondary interest.

| CONSTRUCTION QUALITY | BUILT AREA | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0-15 | 16-30 | 31-45 | 46-60 | 61-75 | 76-90 | over 90 |
| ① | 1 | 26 ● | 15 ◑ | 4 ○ | 1 | 1 | 1 |
| ② | | 8 ◑ | 11 ◑ | 3 ○ | | | |
| ③ | | 2 ○ | 4 ○ | 1 | | | |
| ④ | | 1 | | | | | |

Correspondence: ● strong ◑ medium ○ weak

Table 3. Correspondence between habitable area and construction quality.

**d) Nature of spaces**

In terms of the physical nature of the built structures at the initial stage, the analysis reveals that 61% of the sample built an enclosed space; the other 39% of the sample occupied the plot in a semi-enclosed structure (See Table 4). Relating these findings to the physical elements forming these spaces (roof and walls) it suggests that the entire sample considered the roof to be essential and the need for walls was felt by more than half of the sample.

| Nature of Spaces | No. of Plots | % |
|---|---|---|
| 1. SEMI-ENCLOSED (roof only) | 31 | 39% |
| 2. SEMI-ENCLOSED (walls only) | 0 | 0 |
| 3. ENCLOSED (roof-walls) | 48 | 61% |
| Total | 79 | 100% |

Table 4. Nature of built spaces

The evidence that more than half of the sample has built a fully enclosed structure - roof and walls - at the initial stage of the houses' development suggests that privacy and security are considered fairly important at this stage. The fact that a considerable 39% of the sample built only a roof slightly weakens the inference. This latter group is perhaps represented by former renters entering into home-ownership for the first time with very weak economic resources. For these, the erection of a roof was essential and it was sufficient to satisfy their basic housing requirements. The walls, on the other hand, were not considered indispensable.

**e) Location of the house**

The results reveal that more than half of the households (56%) built their initial dwelling at the back of their plots. 26% were located at the centre of the plot, while only 18% at the front of the plot. (See Table 5).

The analysis revealed that no correspondence existed between the location of the house on the plot and the quality of construction materials used. All qualities of construction materials were found proportionally distributed within the three different locations.

| Location on the Plot | No. of Plots | % |
|---|---|---|
| 1. ON THE STREET | 14 | 18% |
| 2. IN THE CENTER OF PLOT | 20 | 26% |
| 3. AT THE BACK OF PLOT | 44 | 56% |
| Total | 79 | 100% |

Table 5. Location of the house on the plot

The analysis also found no correspondence between the location of the house and the particular situation of the plot within the settlement (e.g. 'corner' or 'regular' location). Therefore, the fact that an overwhelming 82% of all households chose to locate their homes away from the street suggests that the household may consider security and privacy as important aspects, even at an early stage. Since the family is often unable to achieve these aspects through other means (e.g. building of the house's walls or boundary walls), this concern seems to influence the choice of location of the house on the plot (at the back or at the centre) in order to avoid complete exposure to the street.

### Summary of findings

The analysis of the initial stage of the development process has revealed that this stage is characterized by the construction of incomplete structures of a fairly consistent range of habitable areas, built primarily of non-permanent materials. This can be considered a reflection of the household's weak economic situation at the time of the plot's initial occupation; according to the progressive development theory, this situation would be expected to improve over time.

The analysis suggests that the family's main concern at this stage is the achievement of a sufficient habitable area to allow its members to undertake their basic housing activities. The basic

area required was observed to be approximately 30 M2. On the other hand, the quality of the construction materials used was evidently of secondary importance and no more than a means to accomplish the set objective. Most dwelling units were initially built with cheap materials and showed a non-permanent character.

The results also suggest that the roof was the only element constituting the house that was considered absolutely essential for the basic unit. The walls, and consequently, privacy and security, were considered by most - but not all - families as crucial elements. However, a concern for privacy and security has influenced the choice of the house's location on the plot. Since no boundary walls that could establish some privacy and security were built at this stage, a household tended to erect its house away from the street (at the back or at the centre of the plot) so as to avoid complete exposure to the street.

## 4.2.2 LATER STAGES

**a) Second stage**

Of the original sample, 78 plots (99%) carried out a second stage. Of this group, 56% added more habitable area to the initial structure; while 41% improved its construction quality. 8% of the sample, which is included within the two previous percentages, undertook both kinds of changes simultaneously. Another 8% carried out other kinds of alterations. (See Fig. 13)

A further analysis of the data shows that, of the plots that improved their building materials, an overwhelming 94% improved from quality 1 to quality 2. On the other hand, of the plots that increased their habitable area, 61% added 1-15 M2 and 34% added 16-30 M2. The most recurring added area (mode) was 12 M2. The mean increase was 15.74 M2. (See Fig. 14)

Although the percentage of plots that increased their habitable area during the second stage was high, it cannot be categorically stated that within the progressive development this kind of improvement represents the highest priority after the erection of the initial structure. There are several

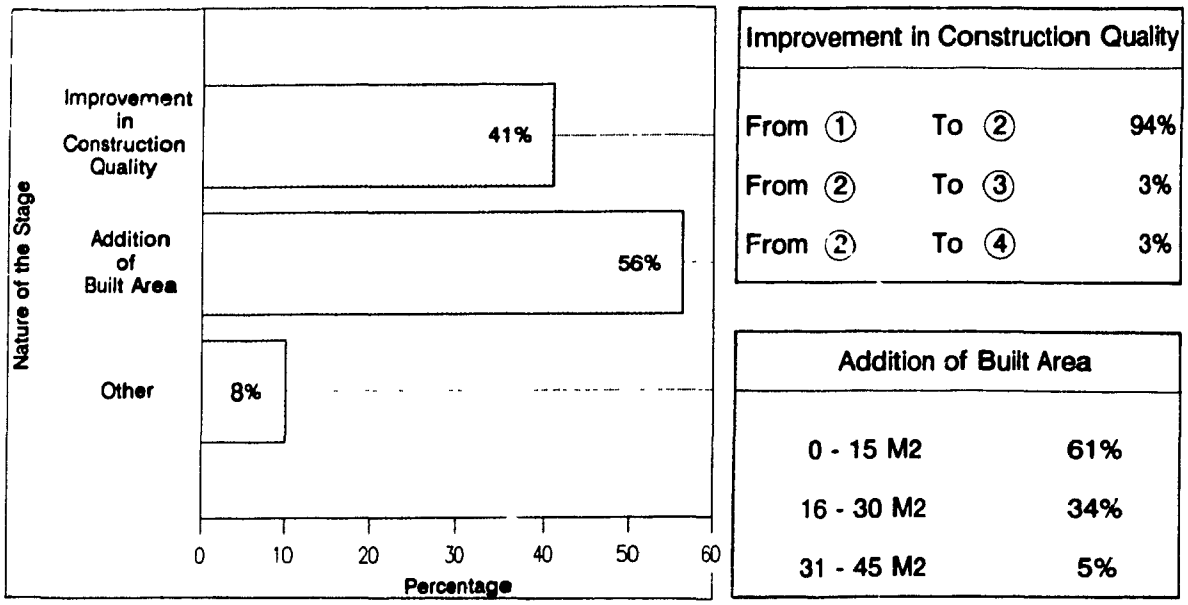



Fig. 13. Nature of the Second stage

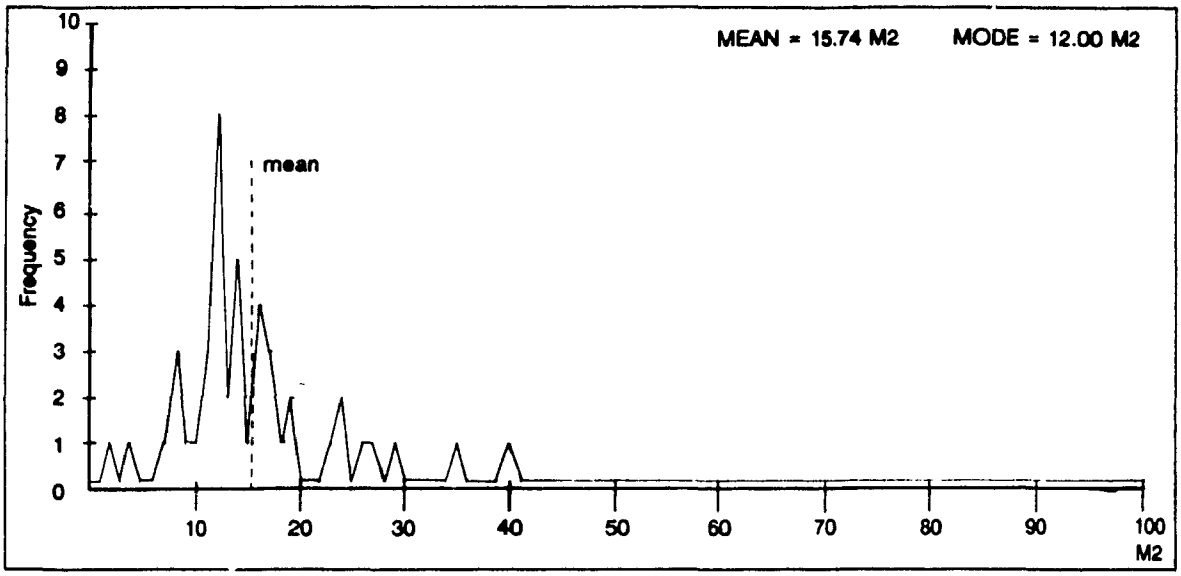



Fig. 14. Second stage: Frequency distribution of areas added

reasons. First, among the structures initially built almost one third were erected using construction quality 2. Second, three quarters of the plots that added area during the second stage belonged to the previous group (built with quality 2). Third, almost 40% of the households improved the construction quality from 1 to 2 during the second stage. And fourth, this last group of plots (the 40%)

represented an important percentage of the houses initially built with construction quality 1.

These four points suggest that the household which added area during the second stage did so only after its dwelling had reached construction quality 2. On the other hand, the household that had erected homes with building materials of quality 1, directed the second stage to the betterment of the construction quality.

An analysis of the nature of spaces after the second stage shows that all houses possessed at least one fully enclosed space within the plot. This suggests that the households that initially erected semi-enclosed spaces had oriented the second stage to the enclosure of these spaces. This seems to have occurred simultaneously as households carried out other major improvements to the house (e.g. increment of area and/or improvement to the construction quality).

The analysis of the second stage suggests that the basic upgrading of the initial dwelling represented the household's main concern. The erection of walls and a minimum improvement to the building materials (primarily in floors and walls) were observed as important priorities after the erection of the initial structure. These improvements seem to respond to the need to house the family properly by providing it with a safer and more hygienic living environment. The improvements also provide the home with a more permanent character. The addition of area, to satisfy any remaining and/or new space requirement, seems to appear as a priority only after the basic upgrading had been accomplished.

**b) Third stage**

Seventy three plots (92%) of the original sample undertook a third stage; this represents 94% of the plots that had undertaken the second stage. Of this group, 78% added more habitable area, while 32% improved the construction quality. 20% carried out both kinds of changes simultaneously. 11% undertook other kinds of alterations. (See Fig. 15)

A subsequent analysis of the data reveals that of the families that improved their building materials, 52% shifted from quality 2 to qualities 3 or 4, that is, from using non-permanent to permanent materials. 39% improved from quality 1 to 2. On the other hand, of the plots that added area as a second improvement, 61% added 1-15 M2 and 30% added 16-30 M2. Although the mean

added area was 13.95 M2, the most frequently recurring area (mode) was only 2.00 M2. This remarkable difference between the mode and the mean suggests the existence of two groups of added areas within the range 1-30 M2. Figure 16 illustrates both groups, which appear to be divided into smaller areas (less than 8 M2) and bigger areas (more than 8 M2).

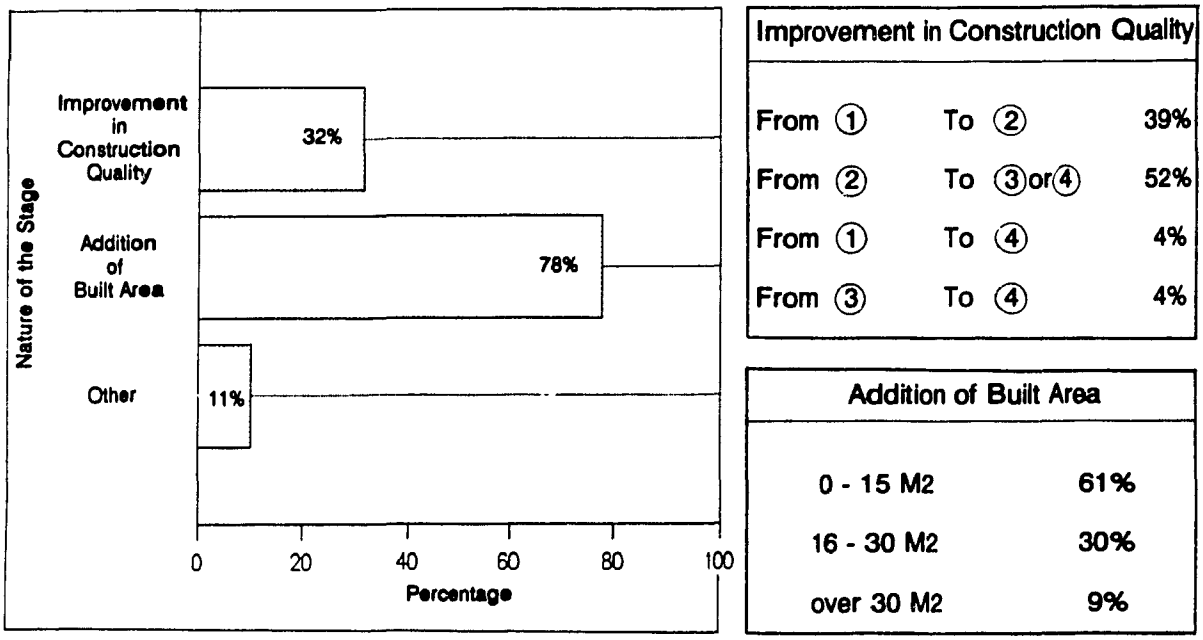



Fig. 15. Nature of the Third stage

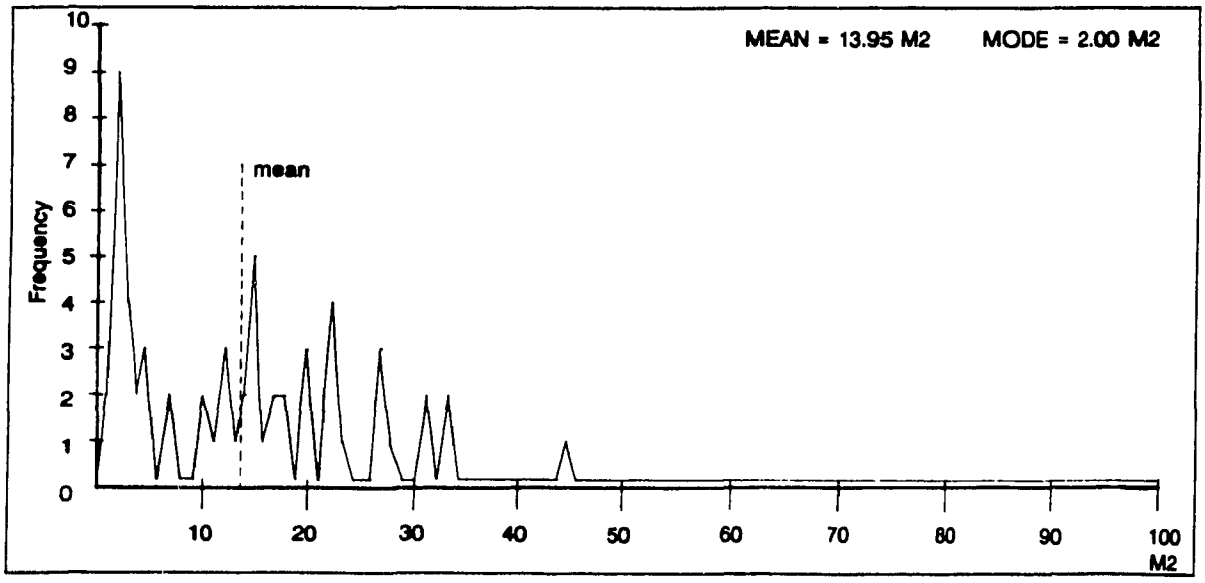



Fig. 16. Third stage: Frequency distribution of areas added

The previous speculations regarding the addition of habitable space as one of the important priorities within the development process is supported by the results of the analysis of the third stage. The high percentage of households that added habitable area further reinforces the important percentage of them that did this during the second stage.

The existence of two groups of added areas points to two different requirements for space, implying different uses and therefore, different priorities within the process. The high percentages of plots that added bigger areas during the second and third stage show that bigger spaces represented one of the first priorities during the development process. The addition of this space seems to respond to the household's demand for providing its members with enough space to undertake activities such as cooking or separate sleeping.

The analysis reveals that this medium-size-room addition - it averages 14 M2 - was generally attached to the initial house and built with cheap building materials. This emphasizes the household's overall concern in the early stages of the development process: the achievement of a minimum habitable area. This addition was observed to be built equally as a fully-enclosed (roof and walls) or semi-enclosed space (roof only). The erection of semi-enclosed structures at this stage may be explained by the climatic condition of the place of study, where a veranda-type space is a very common solution to provide shelter. The introduction of the bathroom seems to come immediately after as a priority, thus bringing about the fourth stage.

*c) Fourth stage*

Fifty two plots (67%) of the original sample undertook a fourth stage; this represents 71 % of the plots that had undertaken the third stage. Of this group, 87% added more habitable area; 38% improved the construction quality; and 32% undertook both kinds of changes at the same time. Only 4 plots (8%) carried out other kinds of alterations. (See Fig. 17)

The analysis of the data shows that of the households that improved their construction materials, 75% shifted from using non-permanent to permanent materials (65% moved from quality 2 to qualities 3 or 4, and 10% moved directly from 1 to 4). On the other hand, among the households that increased their habitable area, 71% added 1-15 M2 and 24% added 16-30 M2. Again, the most

frequently recurring area (mode) was only 2.00 M2, while the mean area added was 12.09 M2. (See Fig. 18).

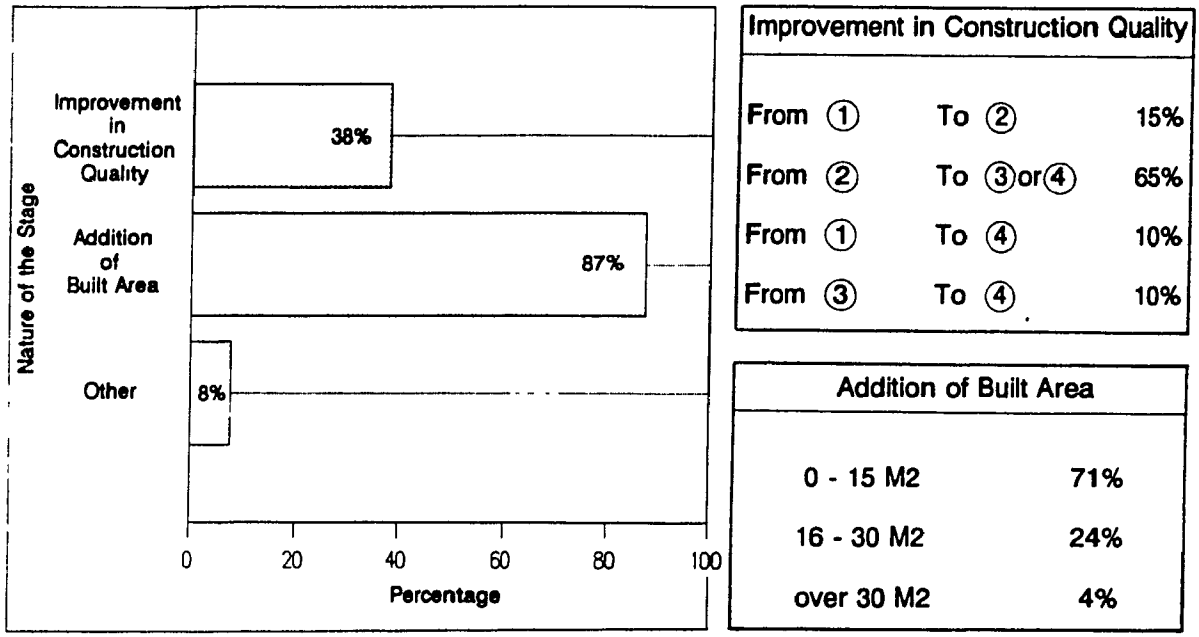



Fig. 17. Nature of the Fourth stage

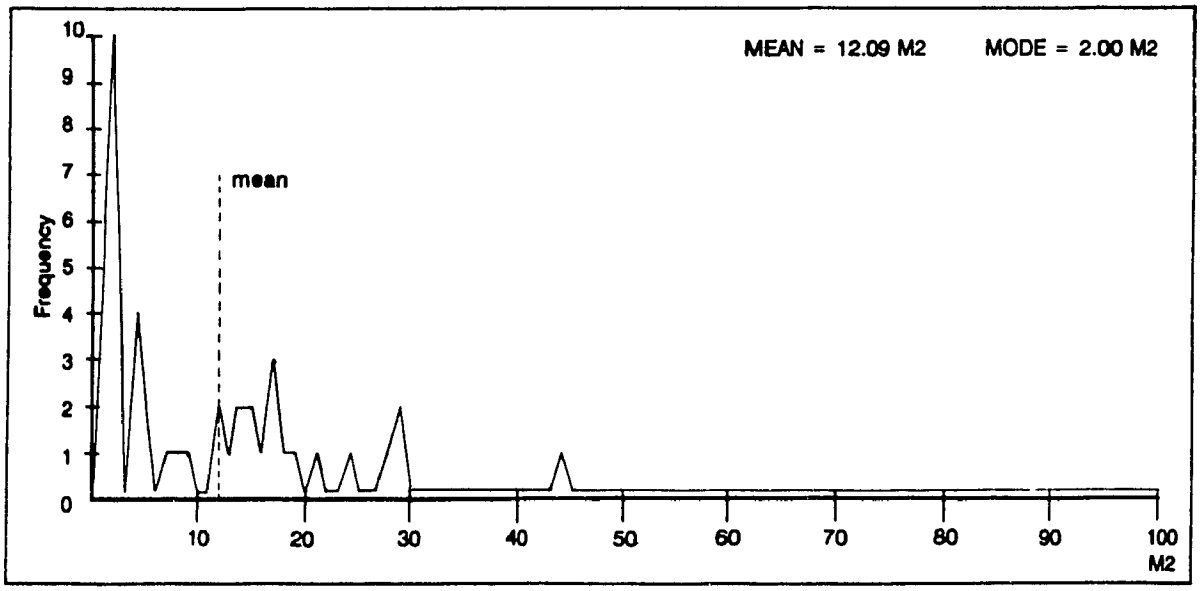



Fig. 18. Fourth stage: Frequency distribution of areas added

The analysis of the fourth stage suggests that this stage was predominantly oriented to the introduction of the bathroom. The important percentage of households that added smaller areas during the third and fourth stages suggests this. The bathrooms were located predominantly at the front of the plot and detached from the initial structure. Their location seems to have responded to economic concerns, since the closer to the street it was located, the cheaper the connection to the sewage system. The bathrooms were found to be built in equal percentages of non-permanent or permanent materials. A strong correspondence between the quality of construction materials used and the physical nature of the spaces built was also observed. Non-permanent materials were used to erect semi-enclosed spaces (walls only); while permanent materials were used to build fully enclosed ones, thus emphasizing the temporary character of the former and the permanent and definite character of the latter.

For an important percentage of households, the bathroom represented the first part of the house built using permanent materials and thus the beginning of the consolidation process. The reduced dimensions of the bathrooms, and in addition to its indispensable character, may explain the high percentage of households using permanent materials for their erection.

**Summary of findings**

The analysis of the different subsequent stages of the house suggests that during the early stages of the development process improvements are generally geared towards: a) the fulfilment of the household's space requirements and b) the minimum upgrading of the physical state of the initially-built structure, so as to provide a safer and more hygienic living environment for the household members.

The cycle of improvements carried out to the dwelling is begun by the basic upgrading of the house's original physical state. The erection of walls and the minimum improvement to the building materials on floors and existing walls were observed as important priorities. The nature of this improvement, although minimum in extent, underlines the household's concern for security and health. These improvements also provide the house with a more permanent character.

The addition of habitable space occurs in later stages. The first addition, an area of approximately 14 M2, responds to the demand for providing the family with enough space to undertake specific activities separately (e.g. cooking, sleeping). This medium-size room was generally erected as an attachment to the house with cheap building materials. This further emphasizes the household's concern for achieving the required habitable space in the early stages. The second addition of space, of smaller dimensions, represents the construction of the bathroom. It was generally located at the front of the plot and detached from the house, so as to reduce the cost of connection to the sewage system. For a considerable number of households, this particular space was the first part of the house built with permanent materials and represented the beginning of the consolidation process. The use of permanent materials to build the bathroom seems to be justified due to the indispensable character of this functional room which, because of its smaller dimensions, is consequently a relatively reduced money expenditure for the household.

# CHAPTER 5

# CONCLUSIONS

This chapter presents the final conclusions pertaining to the research undertaken. The chapter is divided into four sections. The first section presents a summary of the research along with its most relevant findings. The second section compares the findings of this study with those of earlier studies. The third section concentrates on the interpretation of the findings, specifically with reference to the research question: **"What is the relationship between the habitable area and the construction quality within the progressive development of houses in a sites and services project?"** Finally, the fourth section presents some general reflections on progressive development in the context of sites and services projects.

## 5.1 SUMMARY OF THE RESEARCH

This study - herein after referred to as the Zihuatanejo study - was aimed at investigating the process of progressive development as it takes place within a sites and services project. The study was oriented particularly towards inquiring into the dynamics of the process as a physical phenomenon. The analysis focused primarily on the relationship between two of the factors which shape the house development process: the habitable area and construction quality.

The study took the "Los Amuzgos" sites and services project implemented in the city of Zihuatanejo, Guerrero, Mexico, in early 1984, as a case for analysis. It analyzed the physical characteristics of the houses at the initial stage of development, and the nature and particular features

of their subsequent development stages.

The analysis revealed that the initial stage of the houses was basically characterized by the construction of incomplete structures, yet allowing the families to undertake their essential domestic activities, such as sleeping and cooking. Most of the structures enclosed habitable areas of 16-45 M2. Approximately 30 M2 represented the average built area at this stage. These structures were mostly erected with cheap and non-permanent building materials. They were characterized in particular by their semi-enclosed nature, the roof being the most common element. Nevertheless, housing aspects such as privacy and security were observed to be important considerations during the initial stage. A marked concern for achieving a certain degree of privacy and security was deduced from the location of the houses, which were predominantly located away from the street, as well as from the fact that a considerable number of households built walls during the initial stage.

The analysis of the subsequent stages revealed that those undertaken early in the process were geared primarily towards the basic upgrading of the physical state of the house and also towards the fulfilment of the household's remaining space requirements.

The second stage was directed at the completion and basic upgrading of the initial structure. The erection of the walls, along with the improvement of its original building materials, particularly those used for the floor and walls, were observed as the main concerns of the families. The nature of these improvements underlines the family's concern for housing its members properly by providing them with a safer living environment.

The third stage in the process was aimed at fulfilling the households' need for additional habitable area. The additional area - approximately 14 M2 in size - was most often built with cheap materials and attached to the initial structure, frequently as a veranda. Its erection responded to the household's demand for more living space to undertake housing activities such as cooking and/or sleeping separately.

The fourth stage was most commonly concerned with the introduction of the bathroom. The bathroom, which averaged about 4 M2, was frequently located at the front of the plot to facilitate sewage hook-up. For a considerable number of households the construction of the bathroom represented the introduction of permanent building materials into the process, and thus, the beginning

of the physical consolidation of the house. The consolidation process, which begins with the addition of the bathroom, could be expected to be continued in later stages.

## 5.2 COMPARISON WITH EARLIER STUDIES

The findings of this study tend to support some of the conclusions reached by previous studies investigating progressive development as a physical phenomenon. The phases of development, and the families' physical priorities for housing identified by such studies, which were reviewed in Section 2.2.2 and Section 2.2.3, are, in general, similar to the ones observed in the Zihuatanejo study.

In terms of phases of development, Section 2.2.2 stressed the similarities among the findings reached by the studies undertaken by Bazant, the World Bank, Vernez, and Ziss and Kotowski-Ziss. The housing developments analyzed by those studies - all of them in the context of illegal settlements - showed similar physical characteristics and tended to evolve similarly towards consolidation. The phases of development identified by those studies, thus, were consistent with each other.

Among these studies, Bazant provided the most complete description of the physical conditions of the houses during the three phases of development: formative, developmental, and consolidation. He defined the formative phase from the moment when families invade the land to the provision of legal tenure and the introduction of permanent building materials. The Zihuatanejo study observed progressive development up to the introduction of permanent building materials. Legal land tenure being provided from the beginning, the initial phase of development in the Zihuatanejo study has been considered to be up to the time of introduction of permanent building materials. According to Bazant's characterization of the phases of development, the Zihuatanejo study described only the formative phase.

The nature of the formative phase is confirmed by the findings of the Zihuatanejo study. Both studies identified the non-permanent character of the first phase of development, despite the difference in land-tenure status. The houses erected with cheap building materials observed in the

Zihuatanejo study, correspond to the houses built with second-hand and low-cost building materials described by Bazant.

Although the essential nature of the formative phases was found to correspond, some discrepancies with regard to the built habitable areas and the evolution of the houses within this phase of development, were also noticed. The basic habitable areas identified by both studies differ - in the Zihuatanejo study these areas were found to be slightly larger. The built habitable areas identified by Bazant ranged between 16-30 M2; the habitable areas identified by the Zihuatanejo study ranged between 16-45 M2.

In terms of the evolution of the houses within the formative phase, the studies also diverge. On the one hand, the description of the formative phase provided by Bazant (p. 15) seems to suggest that once the initial structure had been erected no improvements whatsoever would be observed until land tenure was provided, which encouraged the introduction of permanent building materials. The Zihuatanejo study, however, suggests that the formative phase in a sites and services project tends to display a more dynamic character, since improvements do occur during such a phase. The basic upgrading of the initial structure, and the addition of habitable area before the introduction of permanent materials - the end of the formative phase - demonstrate that point.

The two observed divergences between the Zihuatanejo study and Bazant's can be considered to be the result of the initial land tenure provided in the sites and services projects, and the consequent confidence that such legal tenure has provided to the families.

In terms of the families' physical priorities for housing, Section 2.2.3 stressed the discrepancies between the list of priorities inferred from studies undertaken in illegal and legal settlements. The corresponding lists inferred from the studies by Bazant and by Vernez - both undertaken in the context of illegal settlements - were found to differ to some extent with the list identified by the FSDVM, which was carried out in a sites and services project. The main discrepancy was found with the time of introduction of permanent materials, which in the latter seems to have taken place at an earlier stage. These differences tended to suggest that the status of the settled land is influential in establishing the people's priorities for housing.

The findings of the Zihuatanejo study suggest that, the previous observation is only partly

accurate. The list of priorities drawn from the findings of the Zihuatanejo study rather than supporting the findings of the FSDVM study, conform more to the findings of Bazant and Vernez studies. As did the latter two, this study found that the construction of a basic habitable space represented the first priority of the families. The incorporation of additional space, and the separation of spaces for cooking and/or sleeping were found to be secondary priorities. The introduction of services, in this case the bathroom, and the introduction of permanent materials, were found to come as third in the order of priorities.

The Zihuatanejo study, nevertheless, found that the basic upgrading of the house 's considered a relevant issue at the early stages. The presence of such an improvement, despite the fact that it was not observed by either Bazant or Vernez, does not represent a contradiction between the studies. While the priority list inferred from the latter two illustrates the process in illegal settlements, the Zihuatanejo study illustrates the process taking place in a legal settlement; the initial security of land tenure in the Zihuatanejo study is the most probable explanation for such an early and basic improvement.

As the list of priorities drawn from the Zihuatanejo study supports the list of priorities inferred from Bazant and Vernez, not surprisingly, it differs from the list of priorities identified by the FSDVM study. The differences between the findings of the Zihuatanejo study and the FSDVM's seems to be explained by the different physical standards initially provided in the two projects. The Zihuatanejo project provided only the land and two water taps as the unique infrastructure; the FSDVM project provided fully-serviced plots and on-plot structures, including a bathroom.

These differences in the initial physical standards seem to have led to differences as well in the development processes. First, the relatively high physical standards initially provided by the FSDVM project seem to have altered the order of the families' physical priorities for housing. The initially-provided on-plot structures, built with permanent materials, seems to have restricted the people's control over the building of the houses. Second, the projects appear to have been aimed at different economic groups with different financial capabilities to carry out the development process, and which was subsequently reflected in the dissimilar physical priorities for housing.

It is evident from the previous discussion that a similar course of progressive development

can take place regardless of the legal status of the settled land. The progressive development of the houses observed in the Zihuatanejo study was not significantly different from the developments observed in illegal settlements The physical evolution of the houses towards consolidation was found to correspond, which implies similarities in the owners' priorities for housing. This suggests that when differences between housing developments are observed, they are not necessarily the result of land tenure conditions, but more likely the result of the manner of implementation.

## 5.3 INTERPRETATION OF RESULTS

The Zihuatanejo study has focused on the early stages of the progressive development of houses. These stages include the period between the initial occupation of the plots by the households and the introduction of permanent building materials to the dwellings. These stages demonstrate the outcome of the trade-offs made by the users with regard to their needs and to the inherent constraints of a sites and services project.

The Zihuatanejo study suggests that habitable area and quality of construction - both significant aspects to the house consolidation and the fulfilment of the families' ultimate housing aspirations - are expanded and improved gradually in accordance with their needs. This is most probably the result of the economic condition of the project participants, which further deteriorated as a result of the expenditure in the form of land down-payments.

The results suggest that achieving the necessary habitable area represents the family's major concern at the early stages of the process. The patterns of development observed during the first three stages suggest that the efforts of the family are initially oriented towards the fulfilment of its habitable area requirements, not to high quality of construction. The primary focus of the initial stage is on the provision of basic shelter, while those of the second and third stages are on the completion of the initial core, and the provision of additional habitable area so as to satisfy the remaining habitable area requirement.

With little cash available, the construction quality is evidently a lesser priority during the early

stages of the process. No significant improvement in the construction quality was observed until the fourth stage, during which the bathroom was constructed with permanent building materials. The construction of the bathroom, nevertheless, suggests that improvements in the construction quality do occur, but only when it is fortuitous. That is, a household is likely to opt for improved construction quality only in the absence of needs of higher priority, i.e., shelter, food or health care, and of any other domestic crisis, such as unemployment or illness.

It is worth noticing that the findings of this study are consistent within themselves as, in general, during each of the stages of development, there was a strong tendency within the sample to form a particular pattern. This pattern was clearly exhibited by high percentages of the sample showing a specific tendency. This is particularly true for the pattern identified in the analysis of the initial stage, where these percentages were found to be above 80%. A definite pattern was also observed in the analysis of the house evolution within each of the subsequent stages. The patterns of development identified at the second, third, and fourth stages, commonly represented percentages higher than at least, half of the analyzed sample.

It becomes evident from these observations that **in the course of the early stages of the progressive development of houses in a sites and services project, space takes precedent over permanence as a housing priority.** The physical characteristics of the initial structures as well as the nature and features of the subsequent stages are evidence that priority is given to satisfying the families' space requirement. The quality of construction, on the other hand, does not represent a priority. The relationship between the two factors investigated - the habitable area and the construction quality - as observed through the Zihuatanejo study, suggest that the concept of progressive development, is in fact taking place.

## 5.4 GENERAL REFLECTIONS

As evidenced by the Zihuatanejo study, the concept of progressive development is a valid and viable model of low-income housing development. The initial houses at "Los Amuzgos", which

were erected enclosing basic habitable areas with a non-permanent character, are being expanded and evolved into stable dwellings through a dynamic, yet gradual process. Such a gradual development is evidence that the essential nature of the model is indeed present in the process.

The Zihuatanejo study demonstrates the high degree of control that individual families have over the development process. The sequence of events within the early stages - space first, permanence second - is evidence that the basic planning tasks are indeed in the hands of the families. Personal control has let the process take place gradually, allowing the project participants to build according to their aspirations, and to derive the benefits inherent in such a process. More important, the study has reaffirmed that personal control is a positive influence on the development process.

The Zihuatanejo study is an indication that a gradual progressive development process can take place within a sites and services project. The process documented evolved in a similar way to the processes observed in spontaneous settlements elsewhere.

The Zihuatanejo study suggests that the provision of a bare piece of land may lead in a positive direction towards such a natural progressive development. The "Los Amuzgos" project was implemented allowing a high degree of liberty. It initially provided only the basic infrastructure and did not impose any restriction on building materials. The lowering of initial physical standards in the implementation phase of the project seems to have positively affected the progressive development process. On one hand, it seems to have raised the ability of the project to reach the target group; the inability to do so has been appraised as one of the main problems in the implementing process of sites and services projects in Mexico. On the other hand, and most important, it seems to have raised the people's control over the housing process, providing the families with all the benefits that personal-control implies.

"Los Amuzgos" calls into question the appropriateness of sites and services projects presently being implemented in Mexico with higher physical standards, i.e., fully-serviced plots with sanitary units and/or core houses, which often tend to ignore the economic realities of the project participants. As demonstrated in the Zihuatanejo study, higher physical standards may not be necessary for the process to operate, and even be counter-productive. The imposition of unrealistic physical standards

and obstructive on-plot structures, which only lead the participants to indebtedness, may tend to force the pace of the process, with the subsequent mismatching of the people's physical priorities for housing, and the assumptions of the implementing agencies.

In light of these considerations, it appears vital for subsequent sites and services projects to provide circumstances that allow the development of houses to occur at the pace that the project participants wish, or are able to accomplish. As in the "Los Amuzgos" project, it is also crucial that standards recognize and reflect the economic realities of the project participants. Schemes which tend to force the pace of the process by ignoring the realities of the participants, may have to be reconsidered. Conversely, schemes in which the basic needs, resources, and limitations of the project participants remain as the main determinants for the pace of consolidation should be encouraged and supported.

This study has covered a brief part of the progressive development of the houses, yet it has provided some insight into the process and people's priorities during the course of improvements. As this study covered only the initial phase of the development process, there is a need for continuing the systematic study of later phases, so as to extend our understanding of these processes. This study was limited to the investigation of the physical features which shape the process (habitable area and quality of construction). Additional research may focus on other aspects of the process, for instance, the identifying of the socio-economic and cultural factors influencing the development process and their relevance in accelerating or delaying it. Finally, as this study considered a particular settlement, in a particular city, there exists room for comparative studies in different locations, so as to identify the constants in the process and whether the findings of this study have broader applications, regardless of regional forces.

## APPENDIX ONE: Interview Guide

# INTERVIEW GUIDE

## PART I

1. Plot number
2. Owner-occupier's name
3. Place of origin
4. Number of family members (adults - children)
5. Last place of residence
6. Status on former place (owner - renter - squatter)
7. Employment of family members
8. Place of employment
9. Monthly income (per family)
10. Loans for house-construction?
11. Sources of loans
12. Date of plot occupancy
13. Initial services
14. Present services
15. Relatives living in the project?

## PART II

A. Physical condition of the house at the time of plot occupancy

-building material used (roof, walls and floor)

-dimensions and use of built spaces

B. Alterations to the house after occupancy

-improvement or/and replacements of building materials

-additions of built areas

C. Present physical condition of the house

-building materials (roof, walls and floor)

-dimensions of built spaces

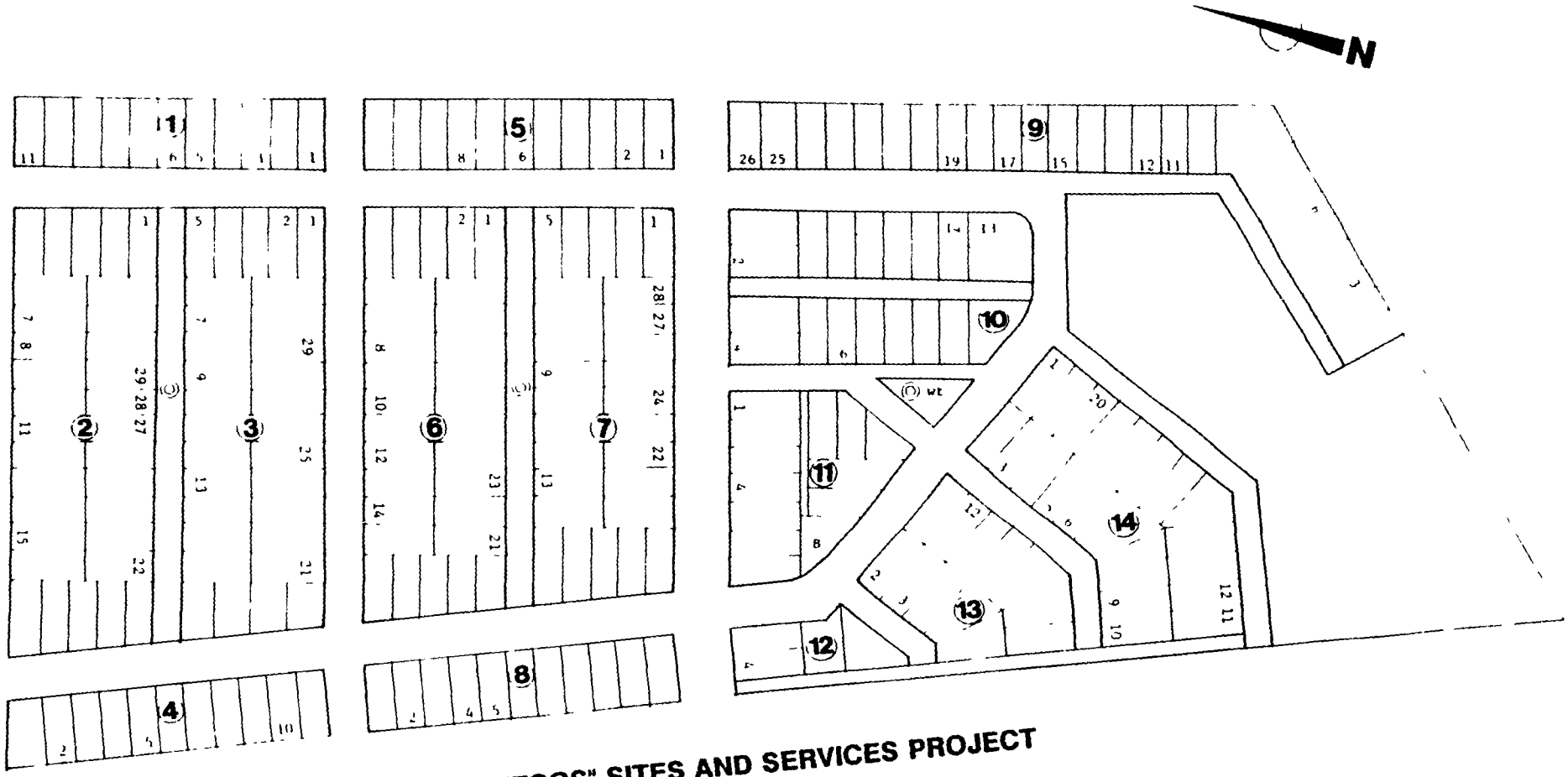
-use of internal spaces

-furnishing

-location of built structures on the plot

D. Plans for future changes

## APPENDIX TWO: Progressive Development of Houses Surveyed

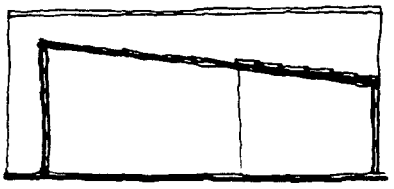



## "LOS AMUZGOS" SITES AND SERVICES PROJECT

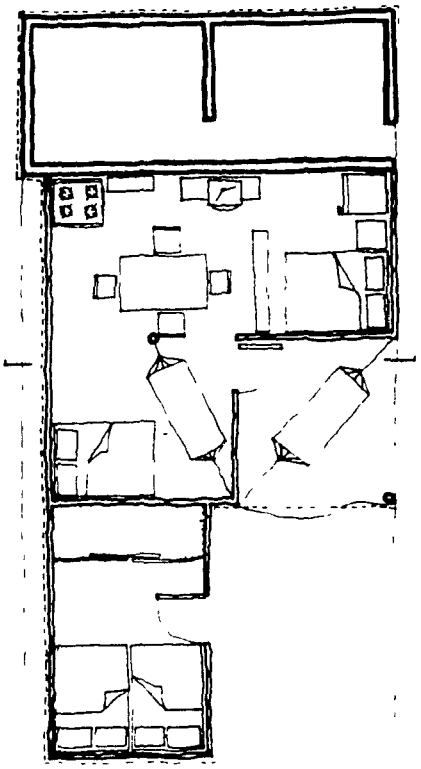
**FOR ALL PLOTS:**

1. The number within circles in each of the stages of progressive development indicate the construction quality of the built spaces.
2. The numbers at the bottom of each stage of progressive development indicate the total built areas on the plot.
3. The numbers at the bottom-left of the page indicate the plot number (block number and plot number within the block)

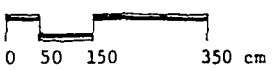
PRESENT SITUATION



section




plan



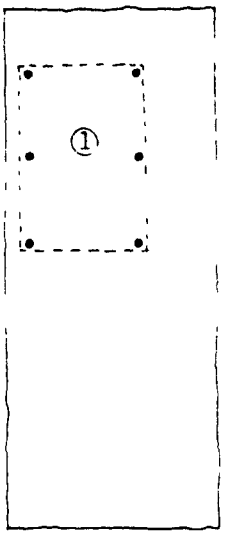

occupancy: August-84

family members: 10

**1-1**

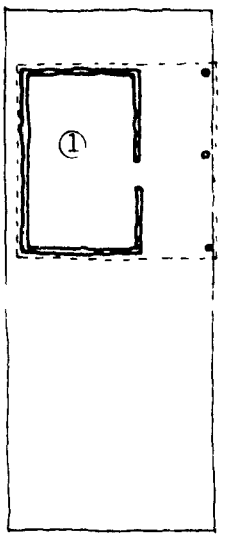
PROGRESSIVE DEVELOPMENT

**1**



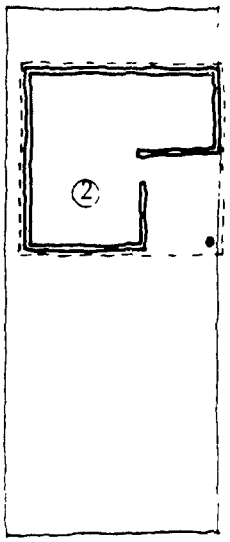

28.00 M2

**2**



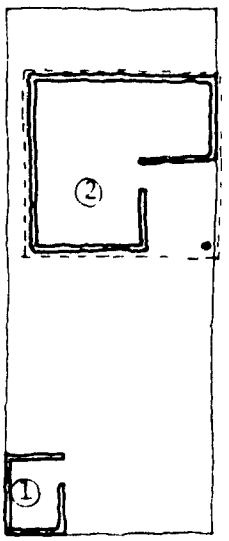

53.00 M2

**3**



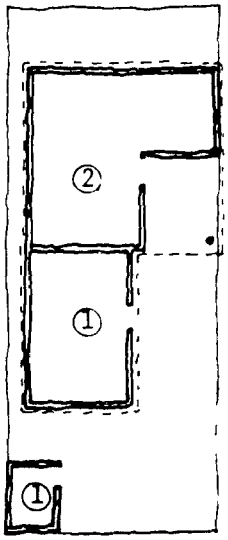

53.00 M2

**4**



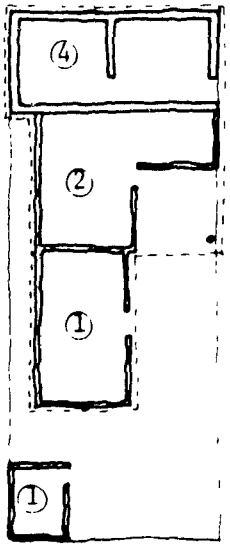

57.20 M2

**5**



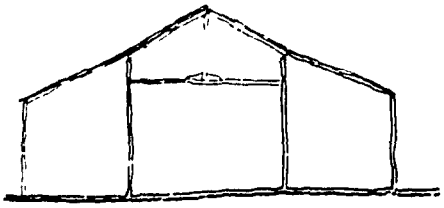

71.60 M2

**6**

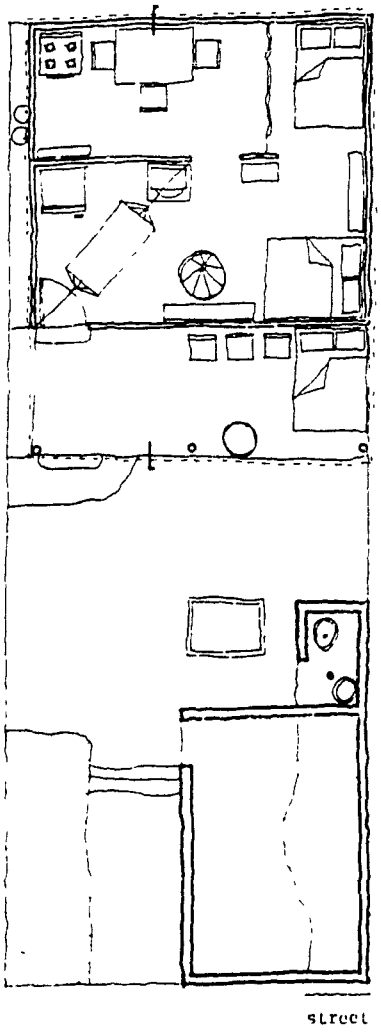



84.90 M2

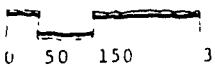
PRESENT SITUATION



section




plan

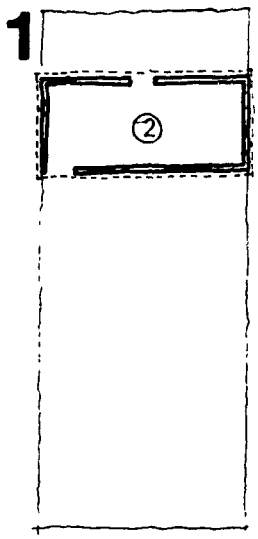



occupancy: Oct.-84

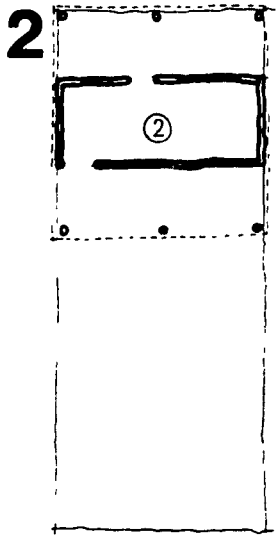
family members: 6

**1 - 3**

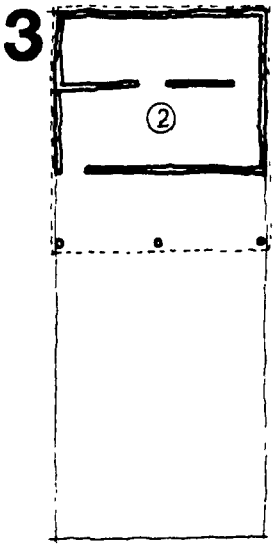
PROGRESSIVE DEVELOPMENT



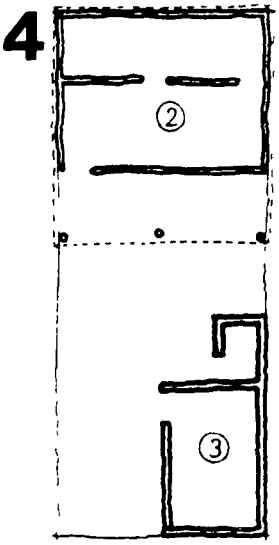

21.00 M2




50.40 M2

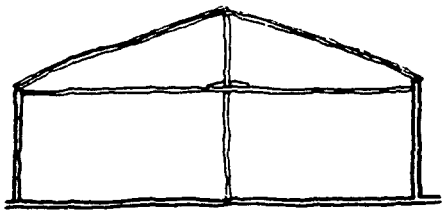



50.40 M2




69.84 M2

PRESENT SITUATION



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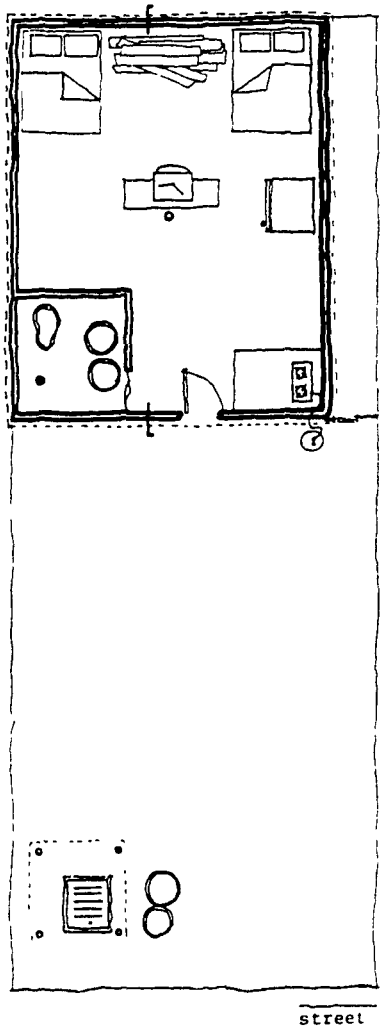
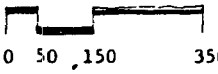



plan

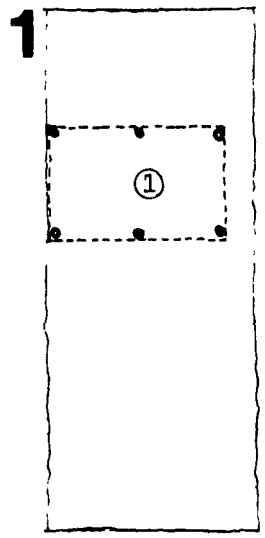



occupancy: April-86

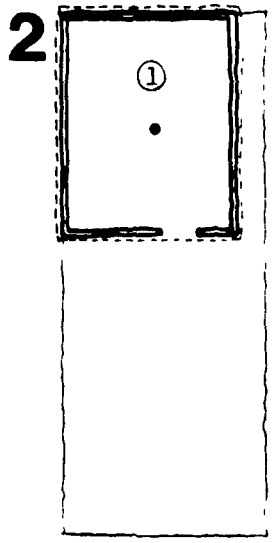
family members: 11

**1-5**

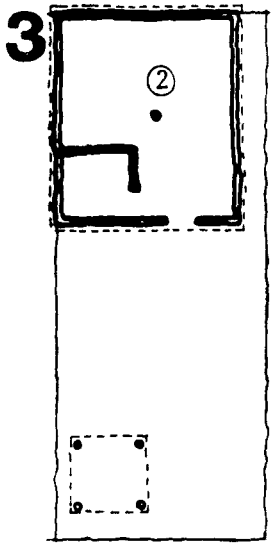
PROGRESSIVE DEVELOPMENT




24.26 M2

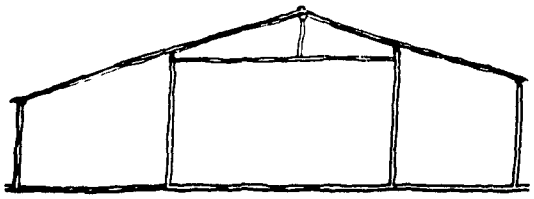



48.51 M2

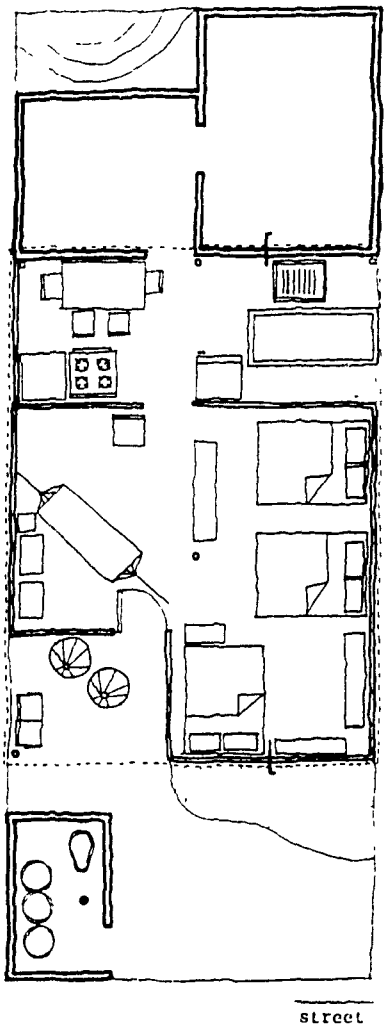



48.51 M2

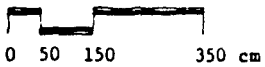
PRESENT SITUATION



section




plan

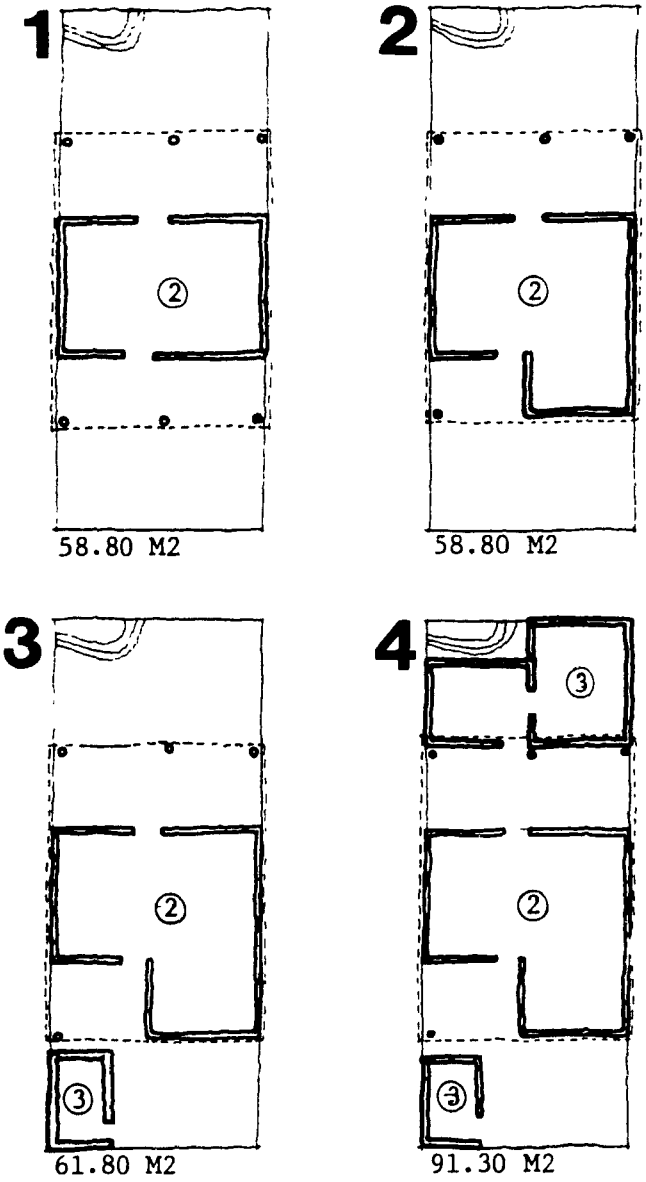



occupancy: Nov.-86

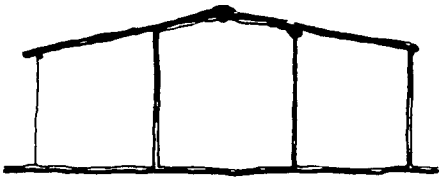
family members: 6

**1-6**

PROGRESSIVE DEVELOPMENT



PRESENT SITUATION



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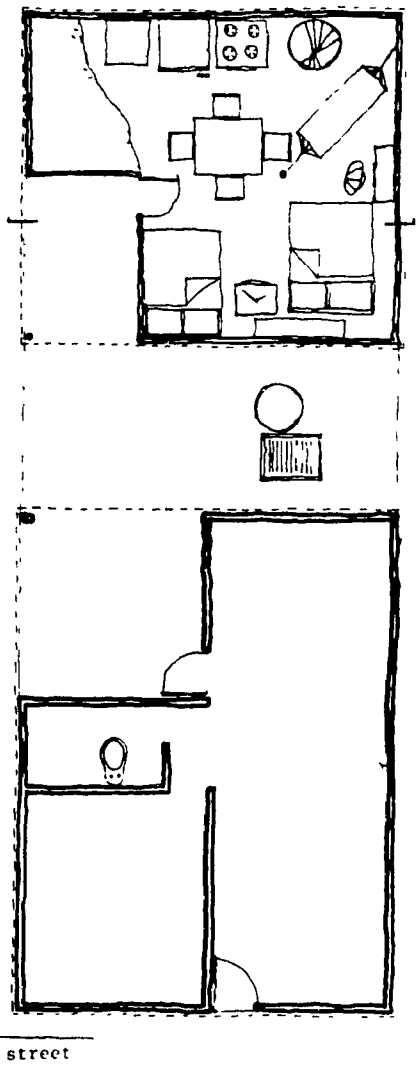
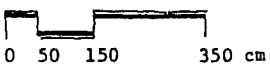
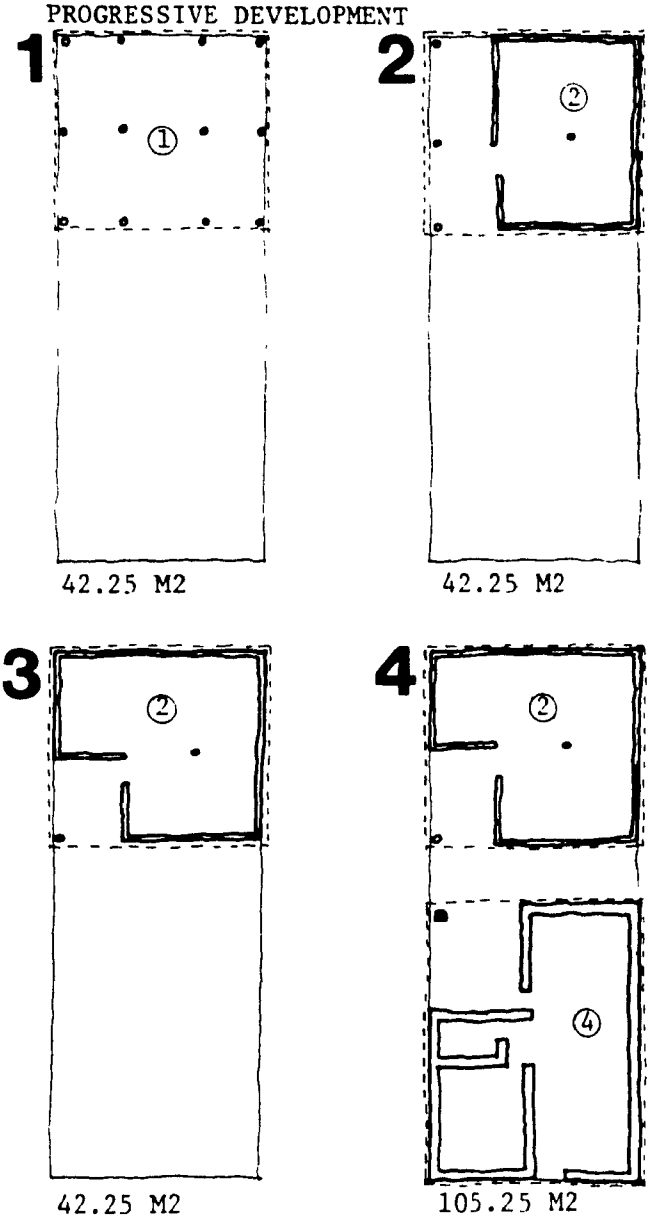



plan




PROGRESSIVE DEVELOPMENT

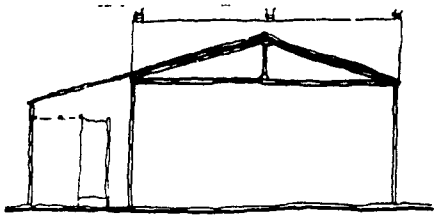



occupancy: Feb.-86

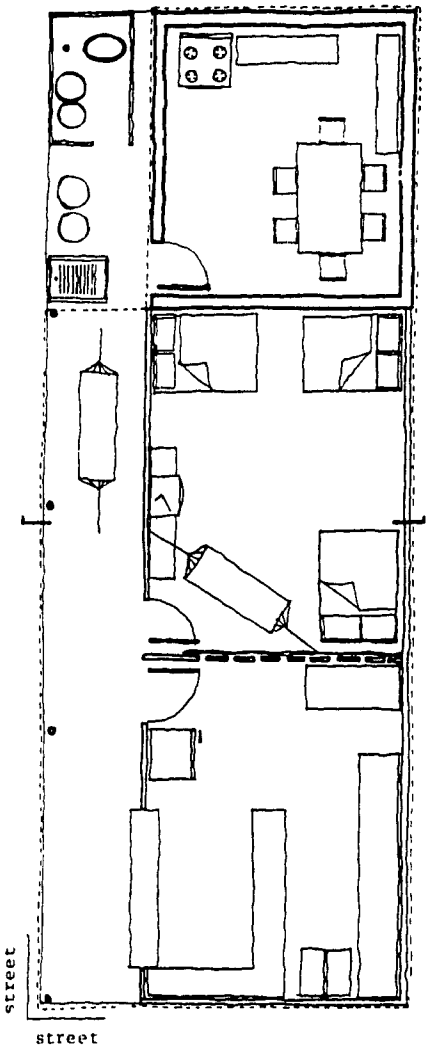
family members: 3

**1-11**

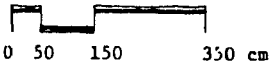
PRESENT SITUATION



section



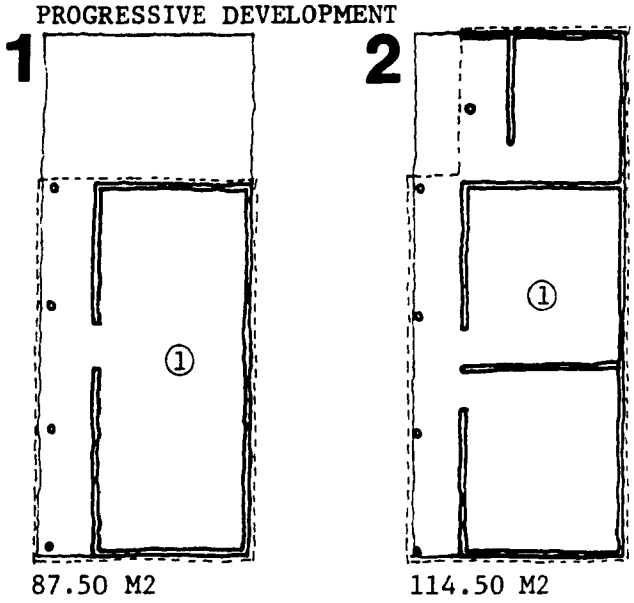

plan




occupancy: August-84

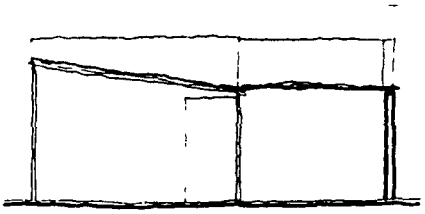
family members: 5

PROGRESSIVE DEVELOPMENT

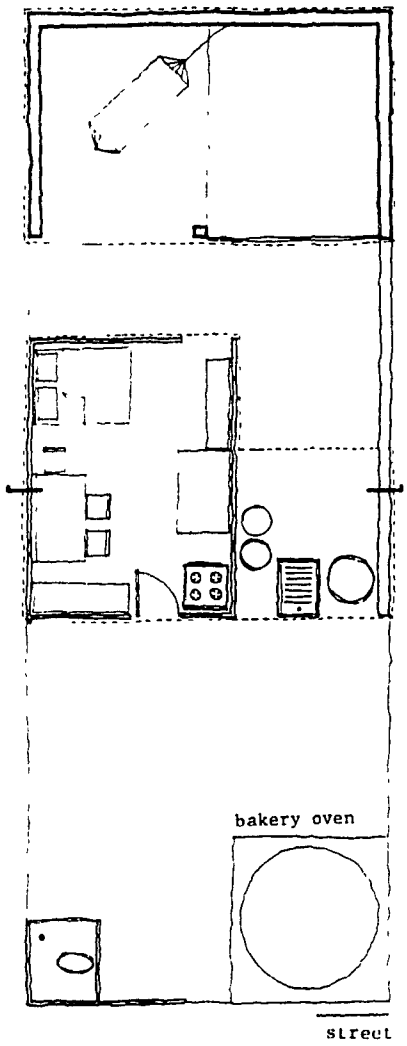



**2-1**

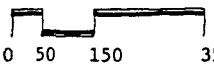
PRESENT SITUATION



section



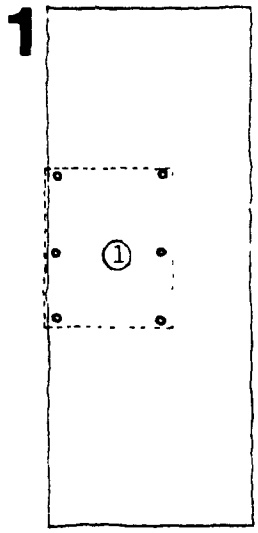

plan



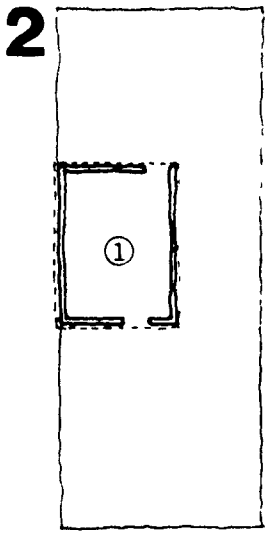

occupancy: Feb.-85

family members: 4

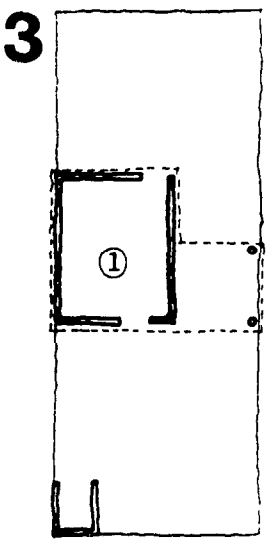
PROGRESSIVE DEVELOPMENT



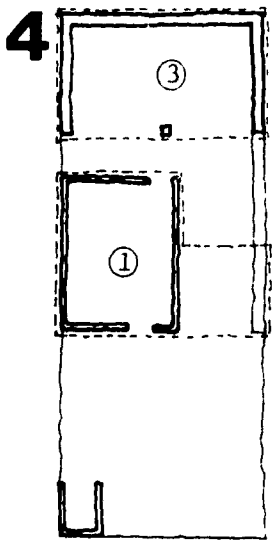

17.50 M2




17.50 M2



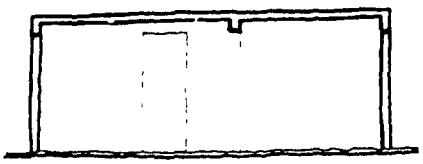

28.76 M2



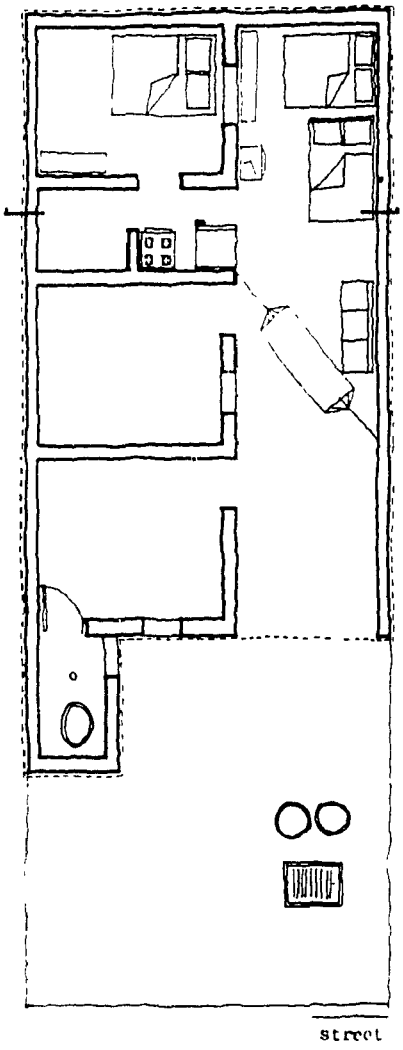

58.16 M2

**2-7**

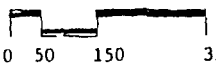
PRESENT SITUATION



section




plan



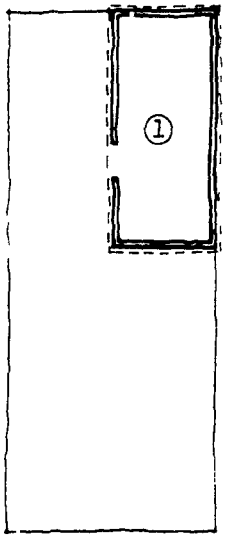

occupancy: April-86

family members: 5

**2-8**

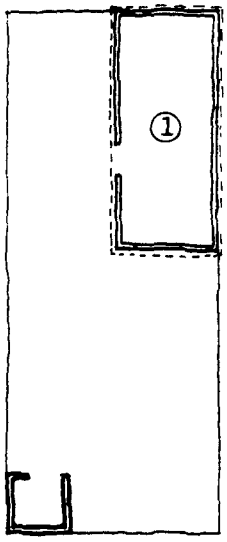
PROGRESSIVE DEVELOPMENT

**1**



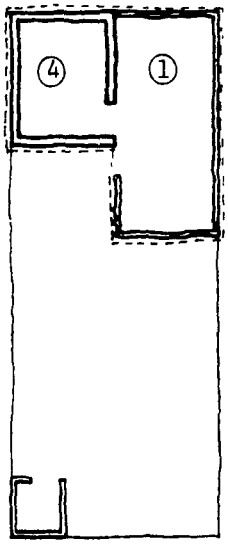

26.40 M2

**2**



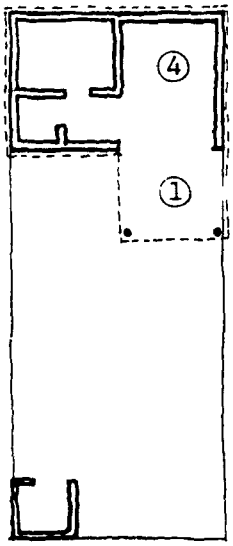

28.65 M2

**3**



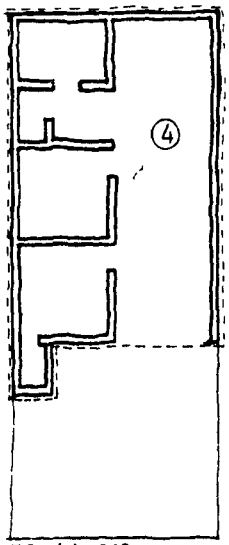

47.15 M2

**4**



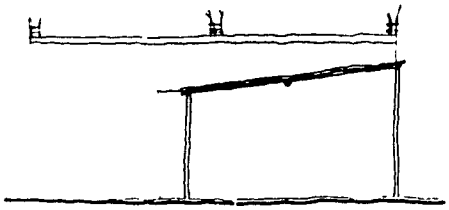

44.90 M2

**5**

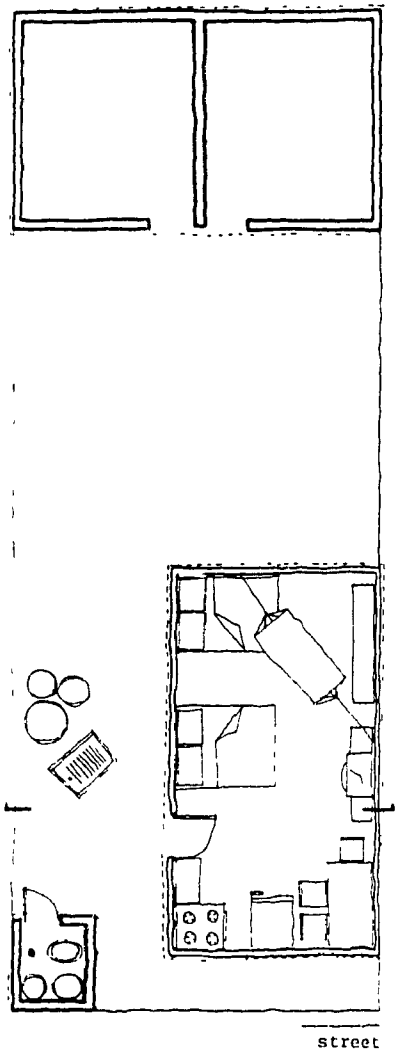



78.44 M2

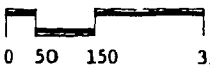
PRESENT SITUATION



section




plan

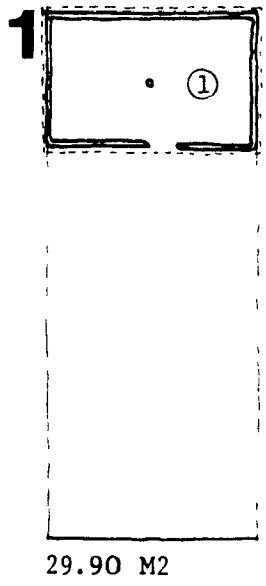


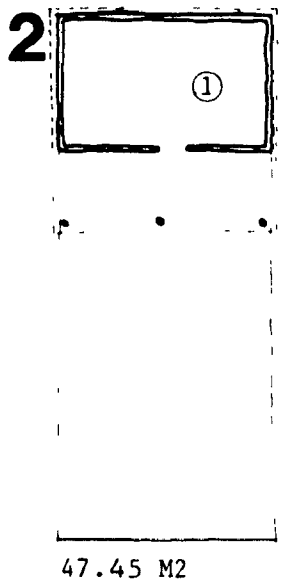

occupancy: Feb.-84

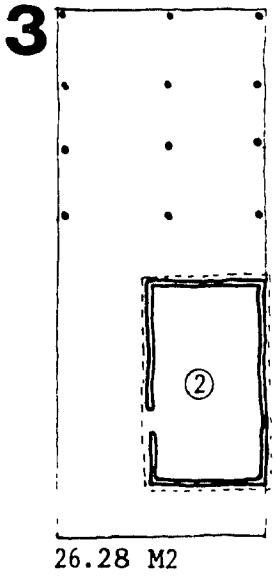
family members: 7

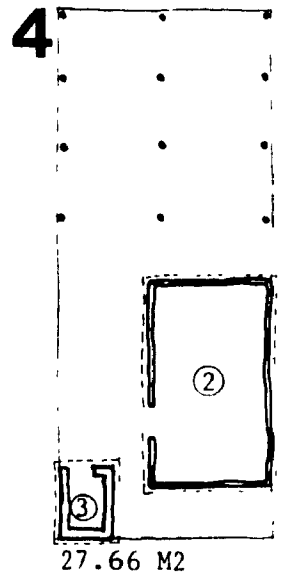
**2-11**

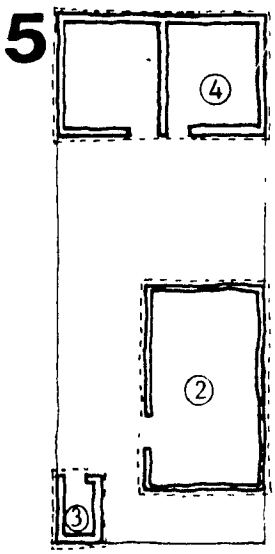
PROGRESSIVE DEVELOPMENT



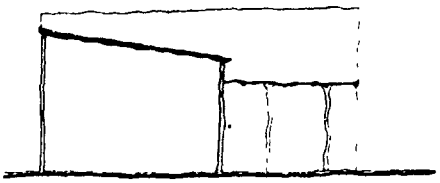



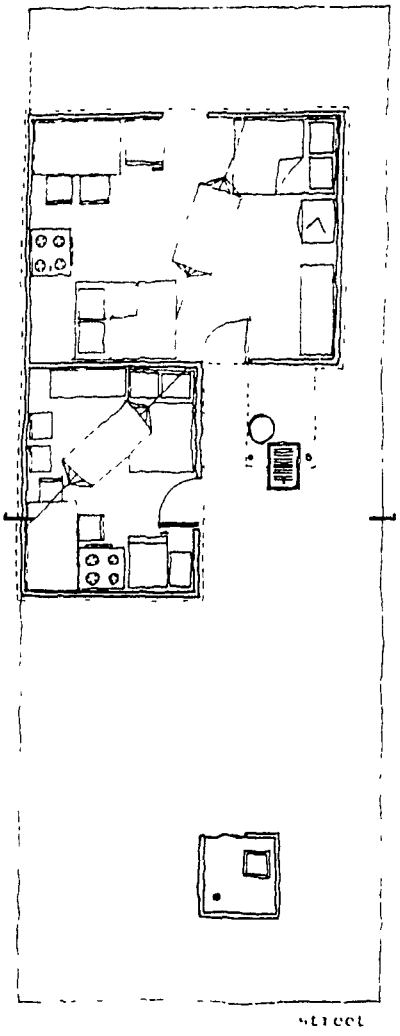



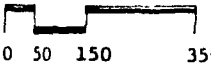
PRESENT SITUATION



section



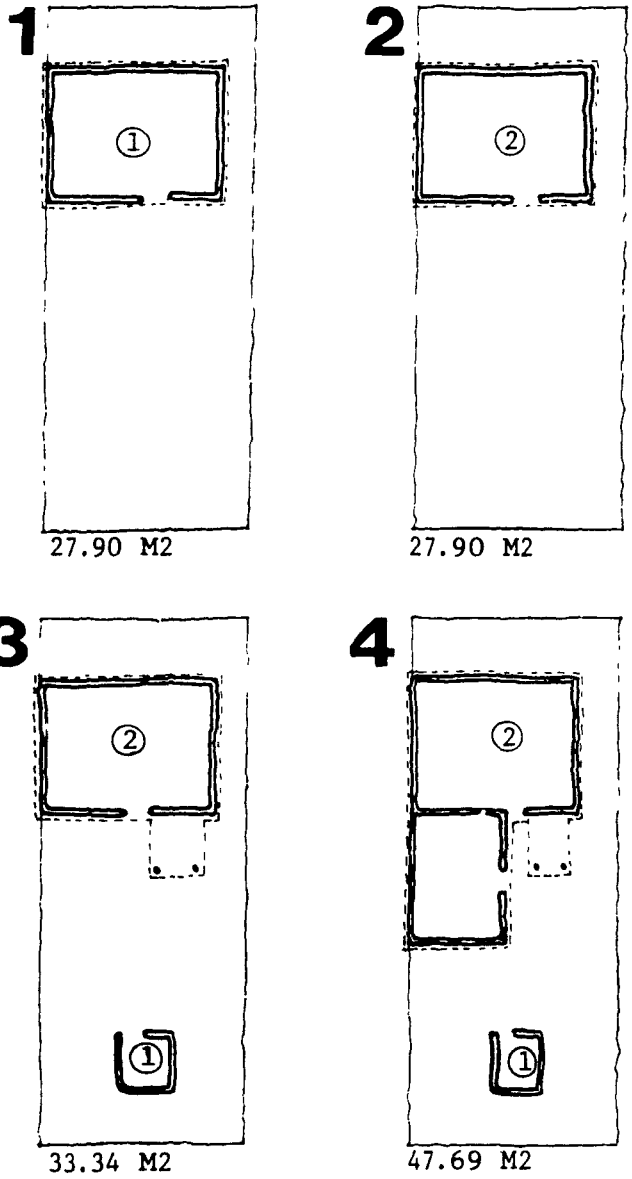

plan




occupancy: Jan.-84

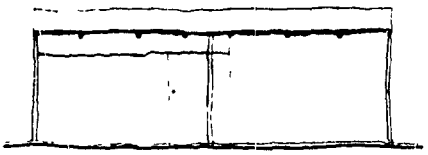
family members: 7

PROGRESSIVE DEVELOPMENT




**2-15**

PRESENT SITUATION



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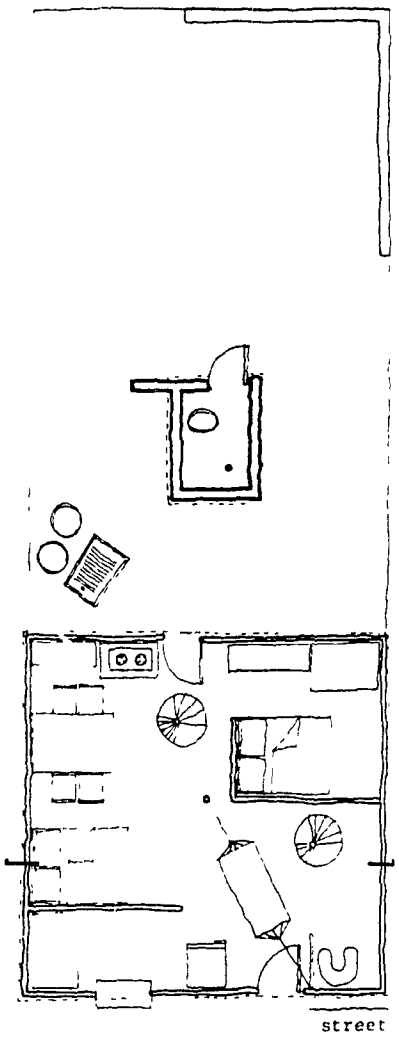
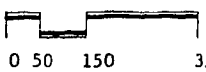


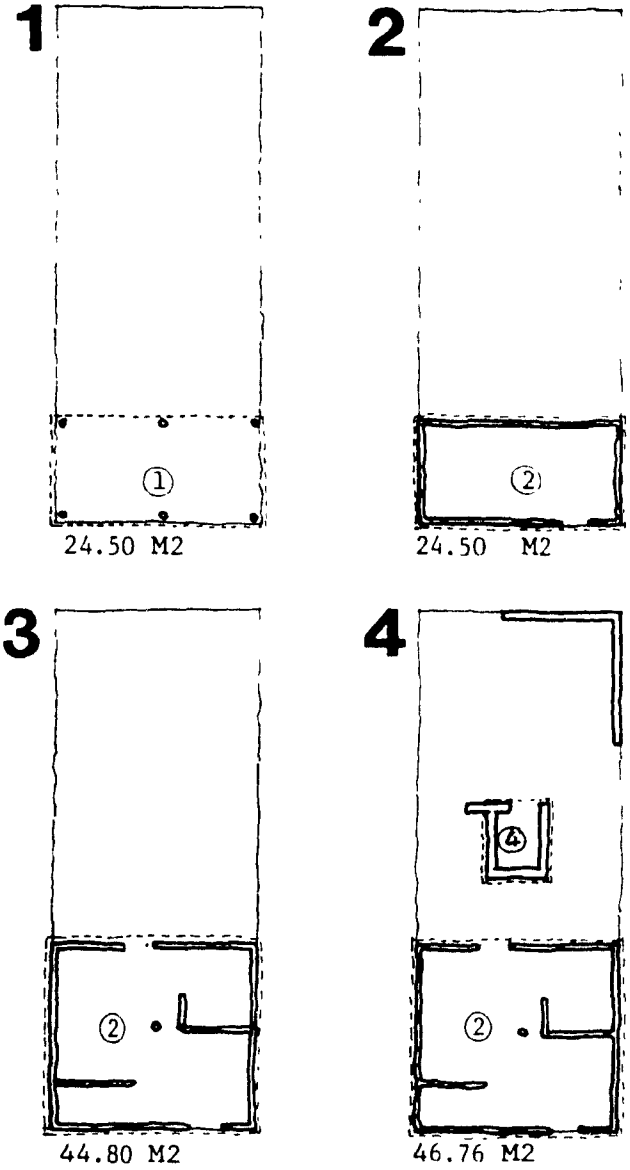

plan




occupancy: Dec.-84

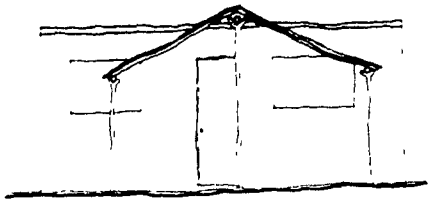
family members: 5

PROGRESSIVE DEVELOPMENT




**2-22**

PRESENT SITUATION



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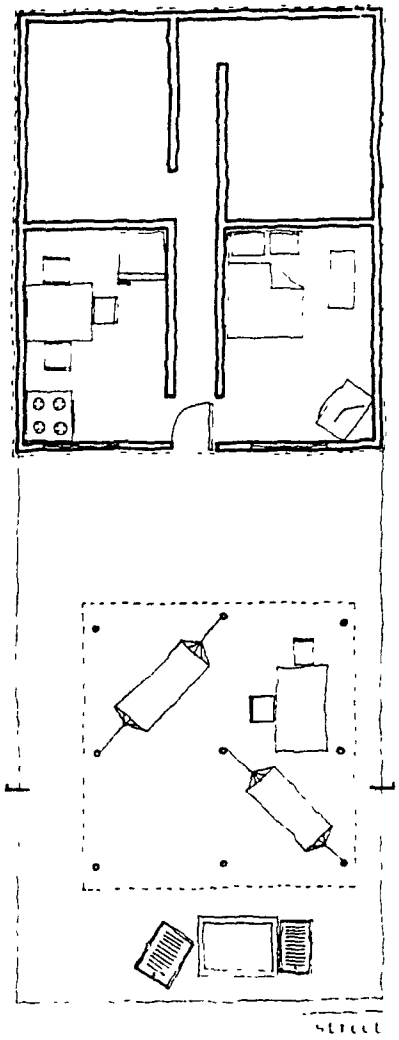
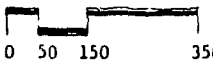


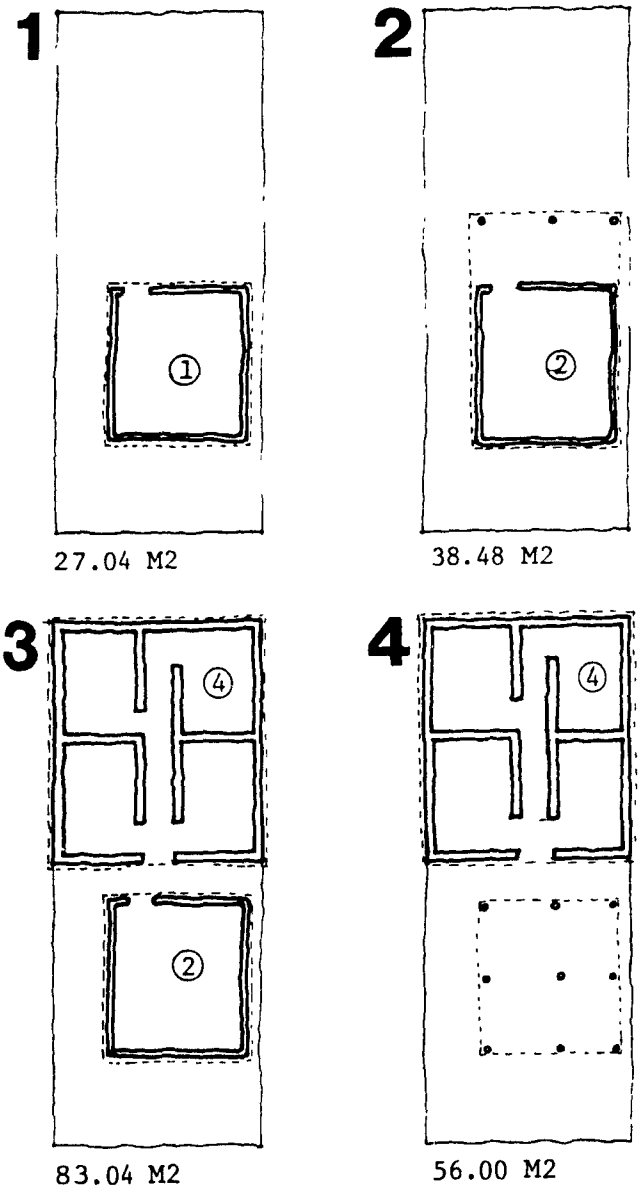

plan




occupancy: August-84

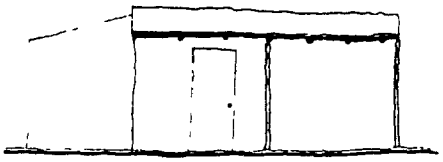
family members: 11

PROGRESSIVE DEVELOPMENT




**2-27**

PRESENT SITUATION



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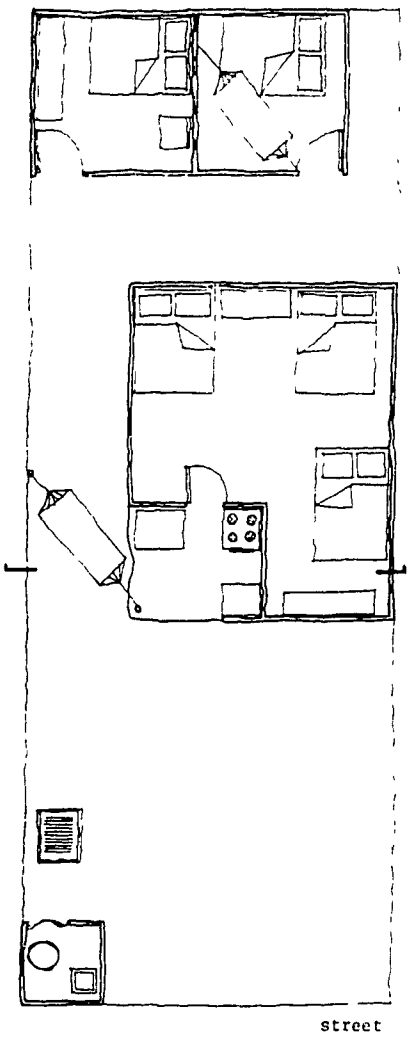
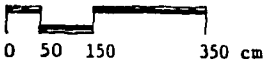
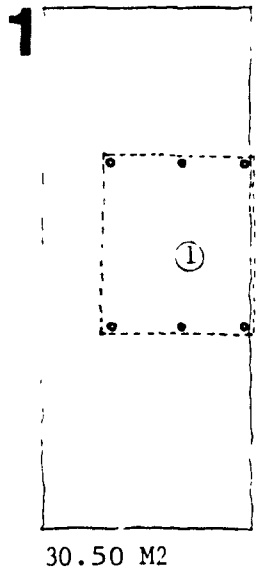
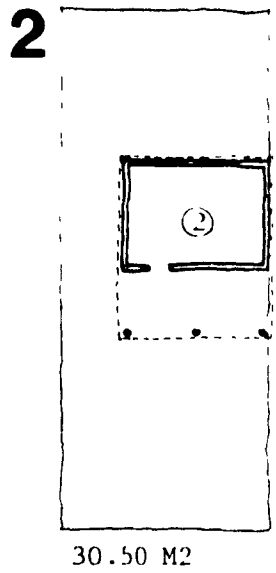


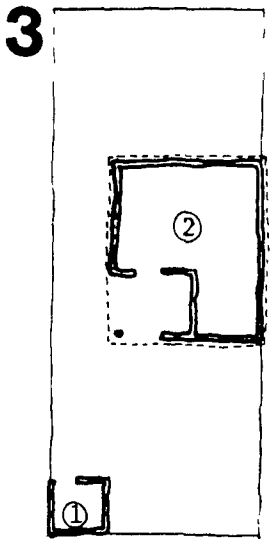

plan

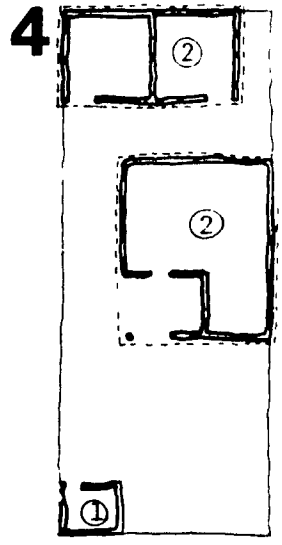



PROGRESSIVE DEVELOPMENT



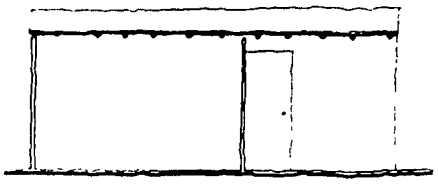




occupancy: Feb.-84

family members: 6

**2-28**

PRESENT SITUATION



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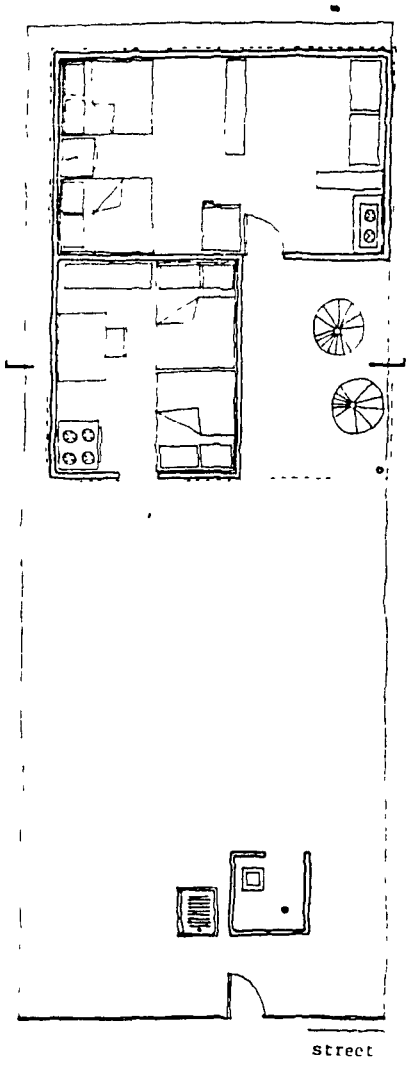
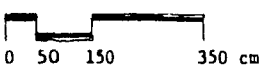


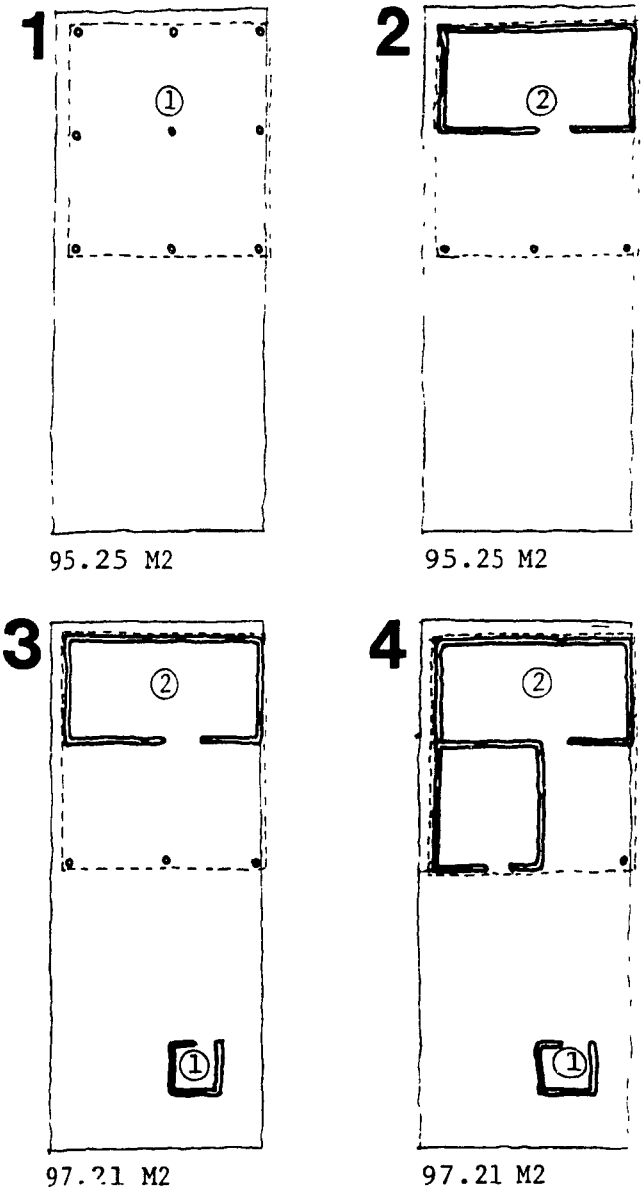

plan




occupancy: Oct.-84

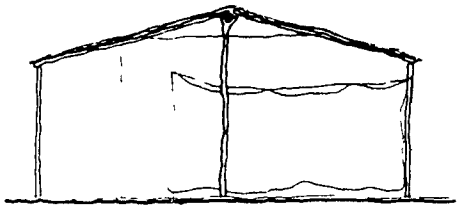
family members: 5

PROGRESSIVE DEVELOPMENT

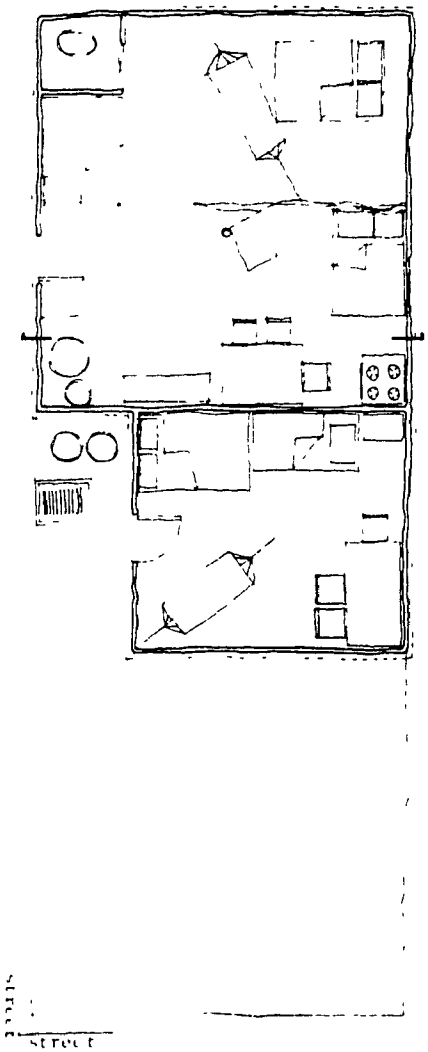



**2-29**

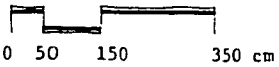
PRESENT SITUATION



section



plan

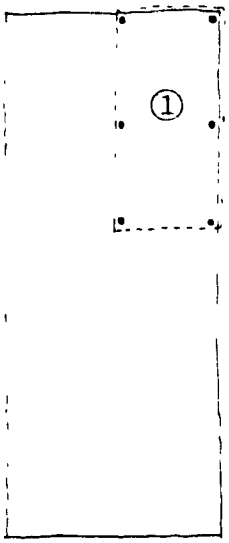



occupancy: June-86

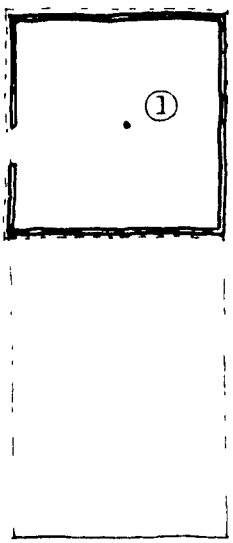
family members: 3

**3-1**

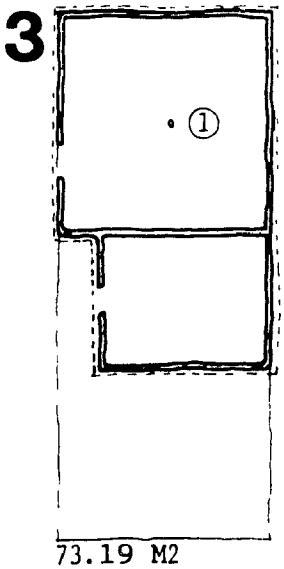
PROGRESSIVE DEVELOPMENT




26.00 M2

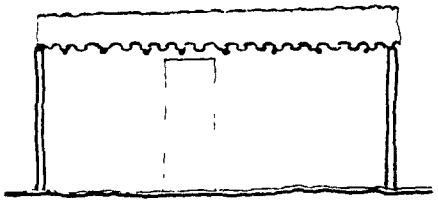



50.40 M2




73.19 M2

PRESENT SITUATION



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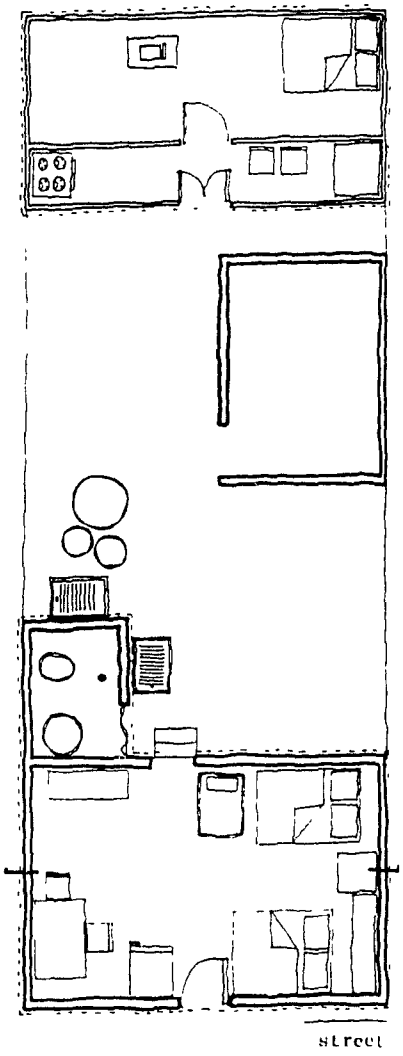
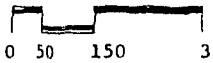



plan

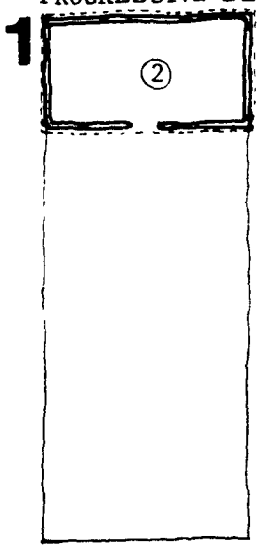



occupancy: Jan.-84

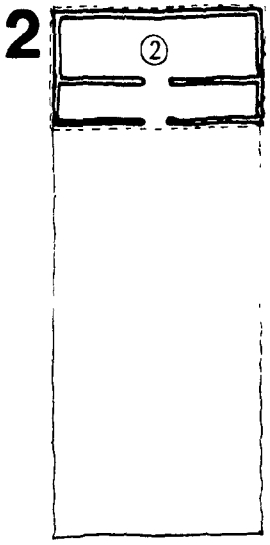
family members: 5

**3-2**

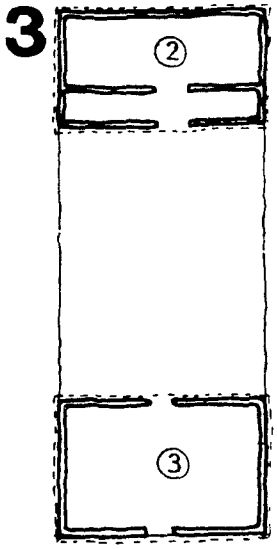
PROGRESSIVE DEVELOPMENT



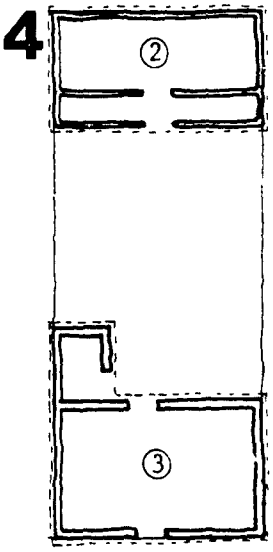

21.70 M2



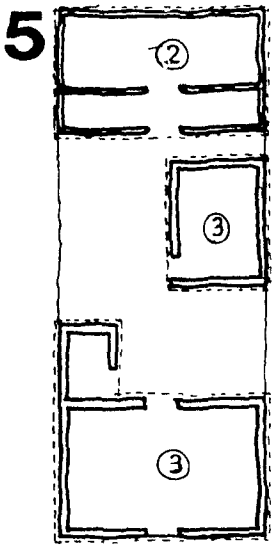

21.70 M2




53.20 M2

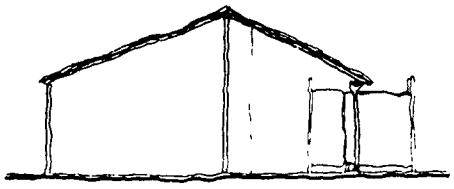



58.20 M2

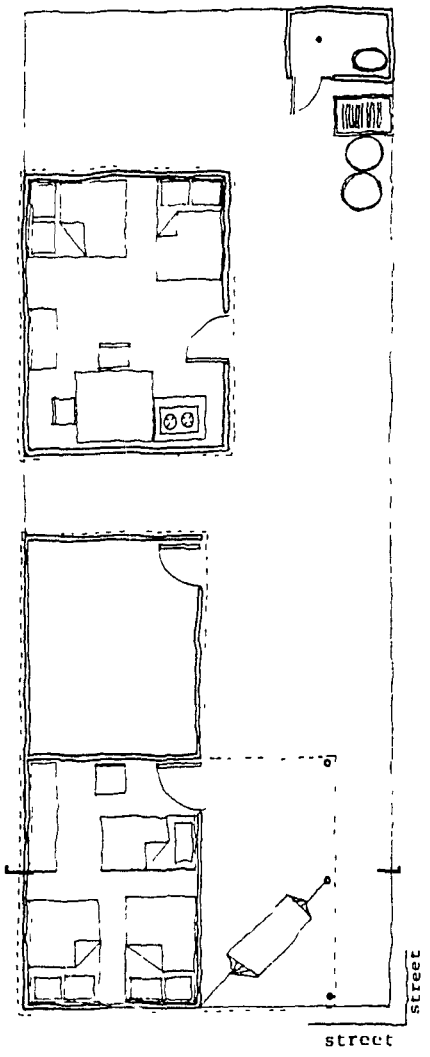



71.00 M2

PRESENT SITUATION



section




plan

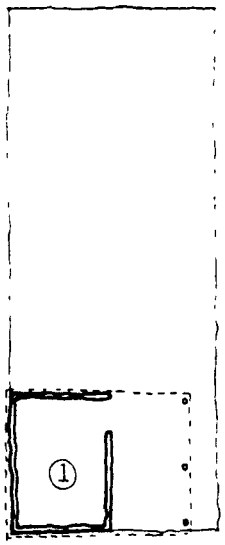

occupancy: Jan.-87

family members: 10

**3-5**

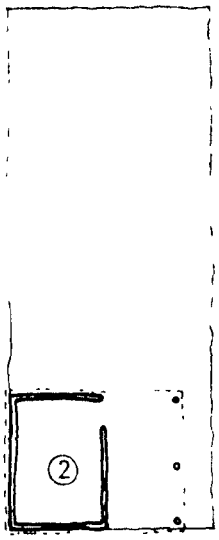
PROGRESSIVE DEVELOPMENT

**1**



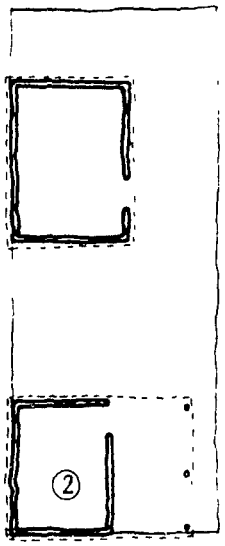

31.50 M2

**2**



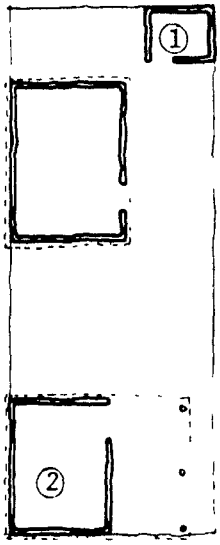

31.50 M2

**3**



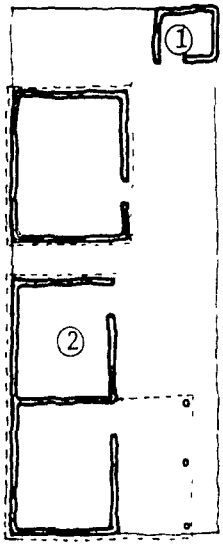

51.50 M2

**4**



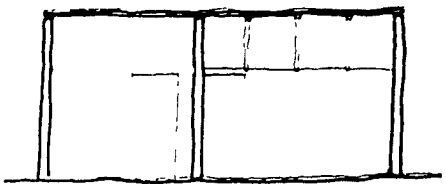

53.19 M2

**5**

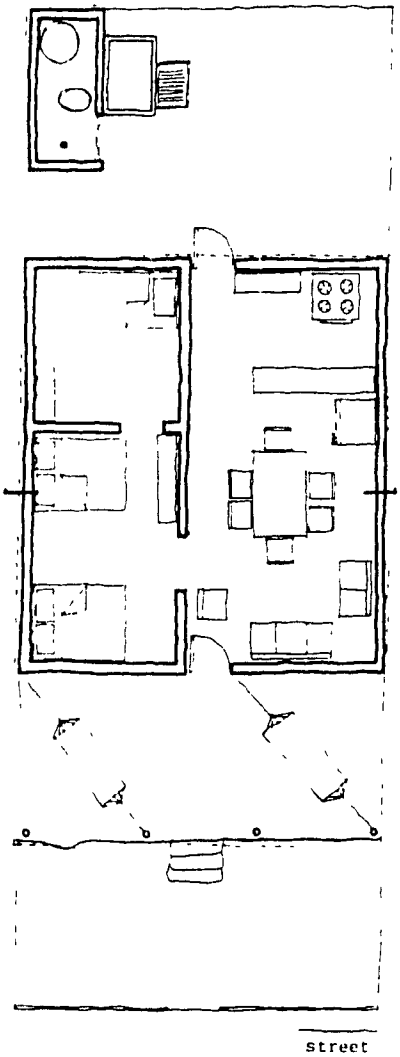



65.99 M2

PRESENT SITUATION



section

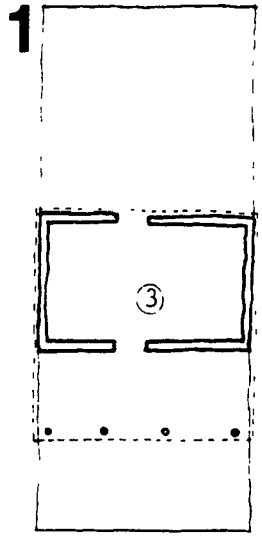



plan

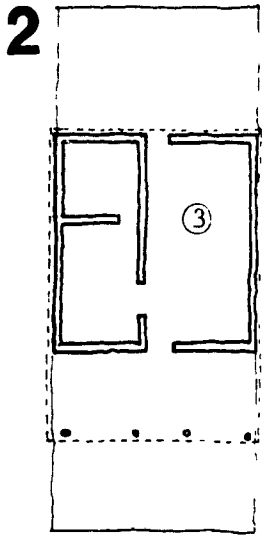

occupancy: April-86

family members: 5

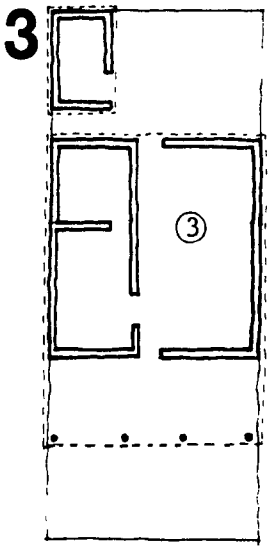
PROGRESSIVE DEVELOPMENT




51.80 M2



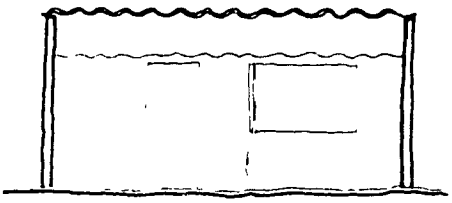

71.40 M2




76.65 M2

**3-7**

PRESENT SITUATION



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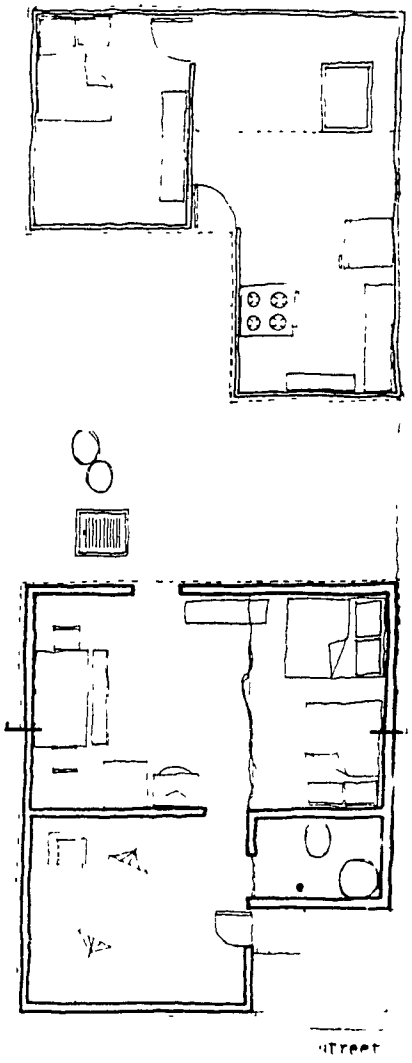
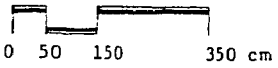


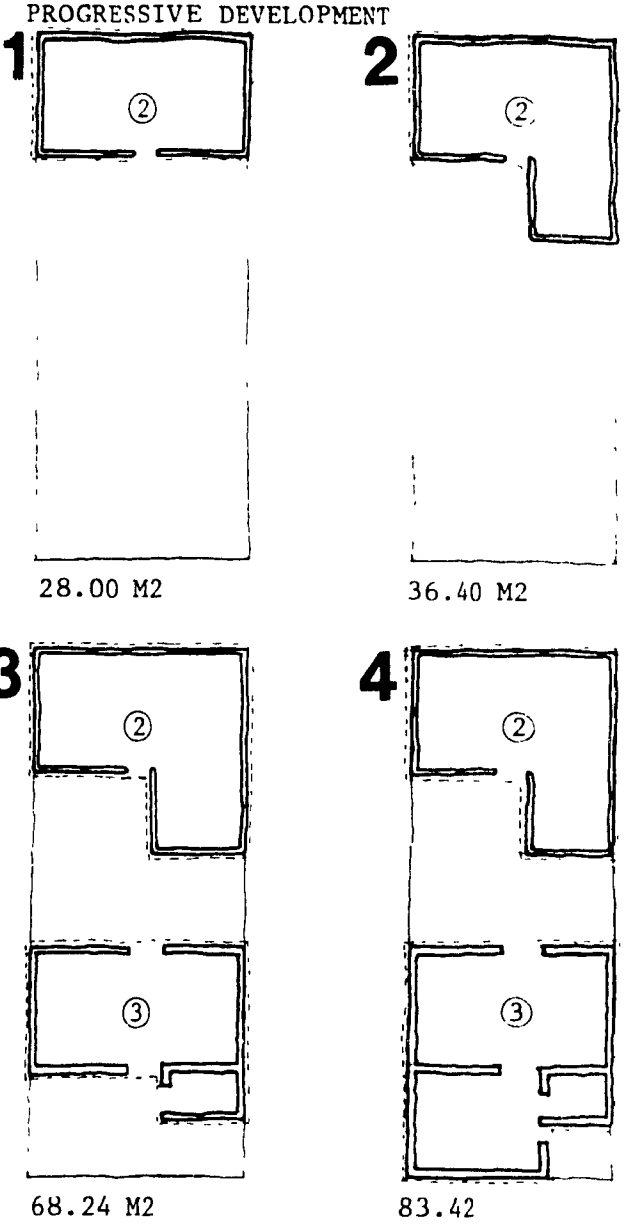

plan




occupancy: March-84

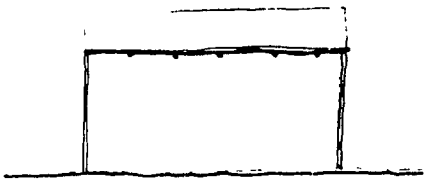
family members: 5

PROGRESSIVE DEVELOPMENT

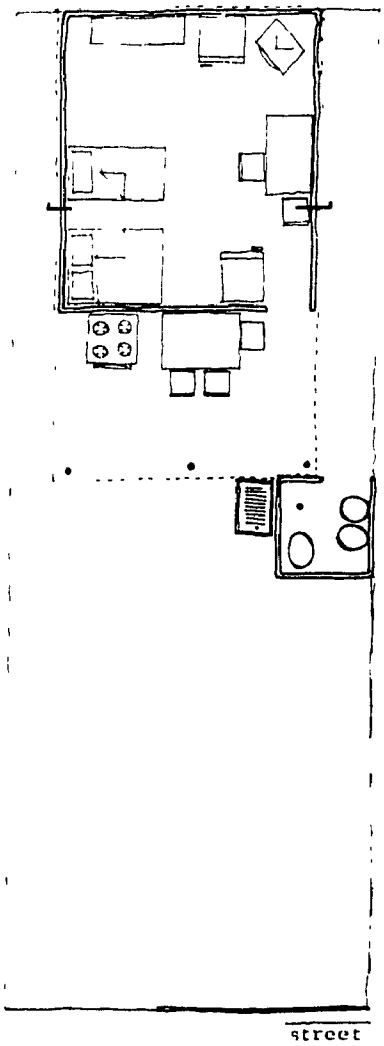



**3-9**

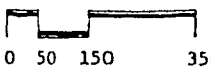
PRESENT SITUATION



section



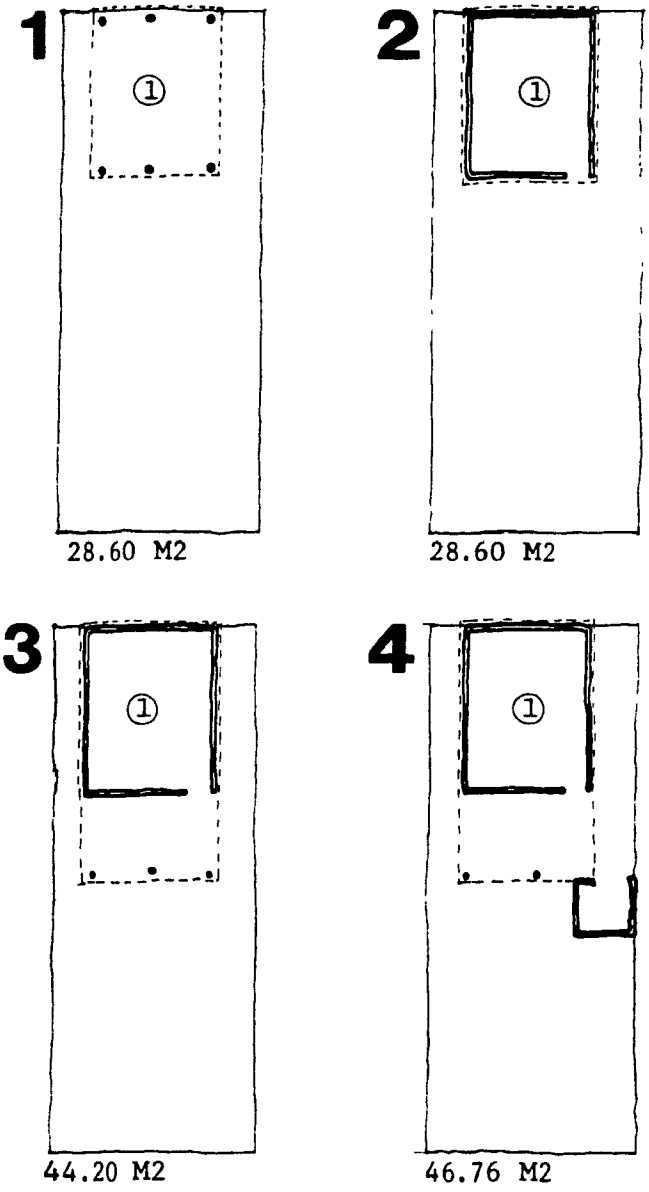

plan




occupancy: March-84

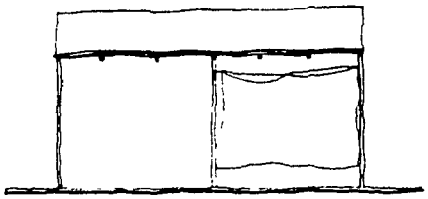
family members: 6

PROGRESSIVE DEVELOPMENT

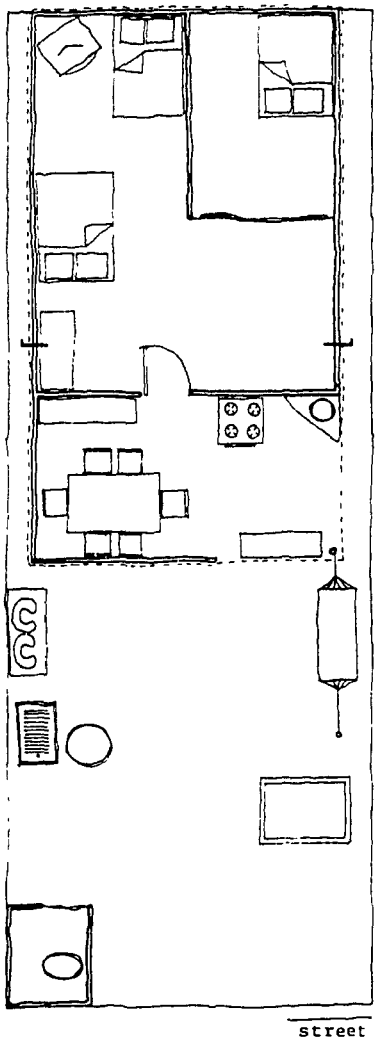



**3-13**

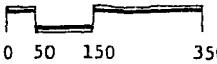
PRESENT SITUATION



section




plan

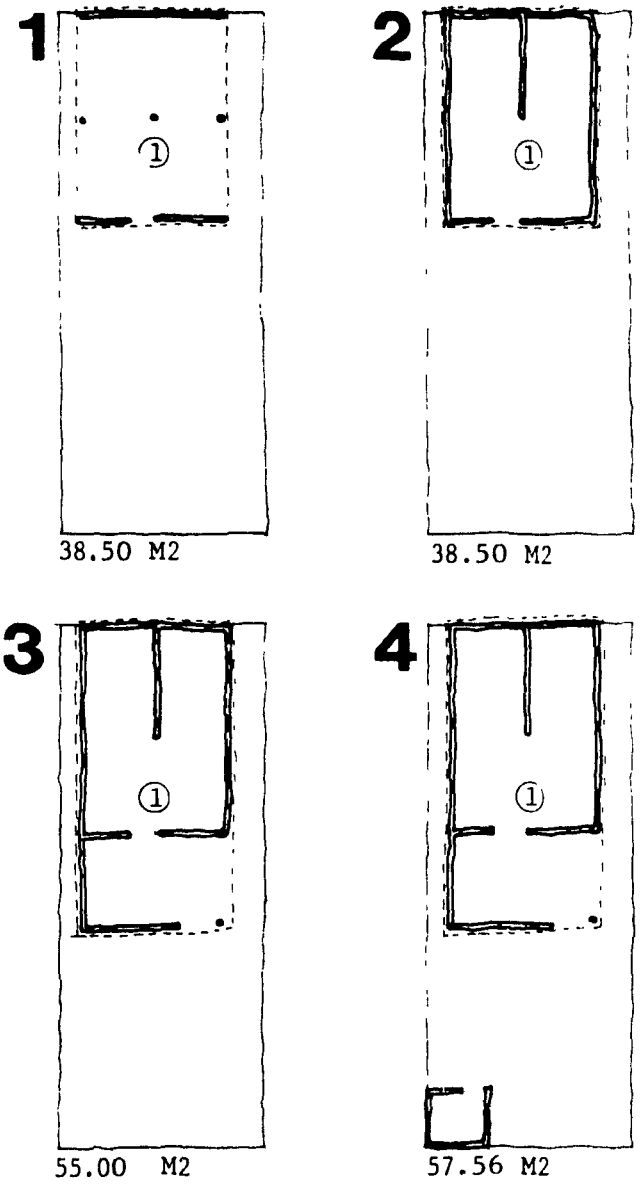



occupancy: JUne-84

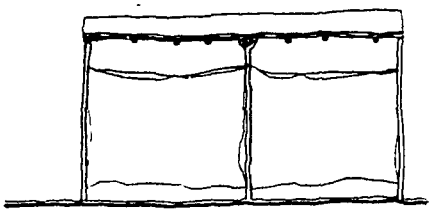
family members: 8

**3-21**

PROGRESSIVE DEVELOPMENT



PRESENT SITUATION



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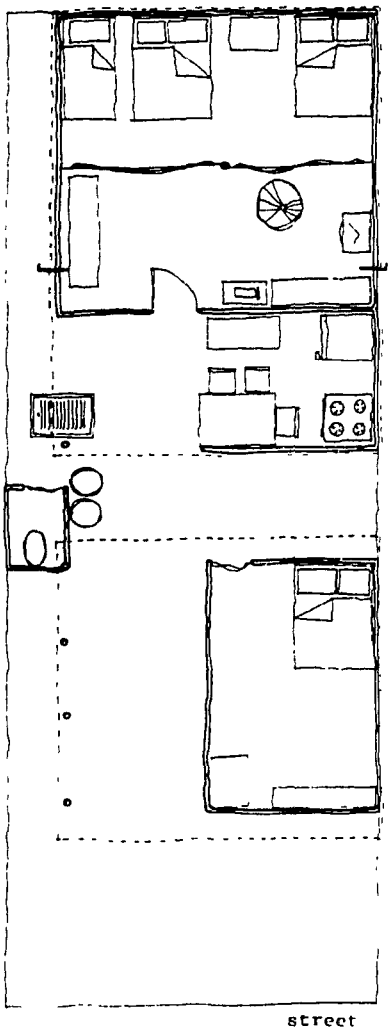
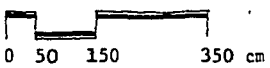


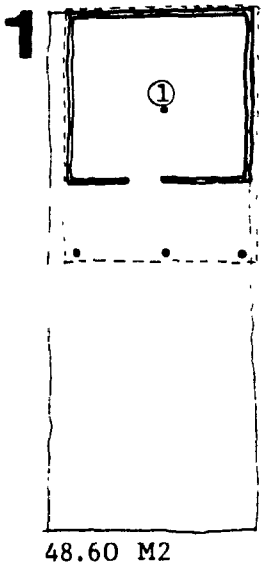

plan



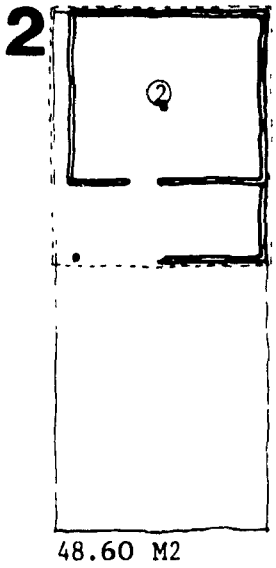

occupancy: Feb.-87

family members: 4

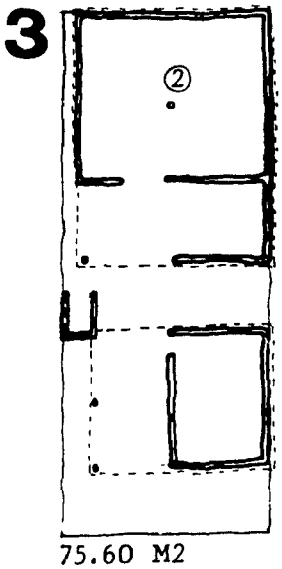
PROGRESSIVE DEVELOPMENT




48.60 M2



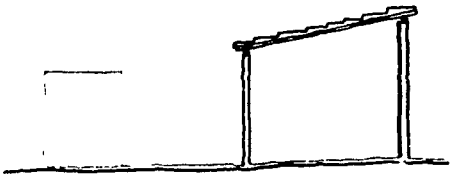

48.60 M2




75.60 M2

**3-25**

PRESENT SITUATION



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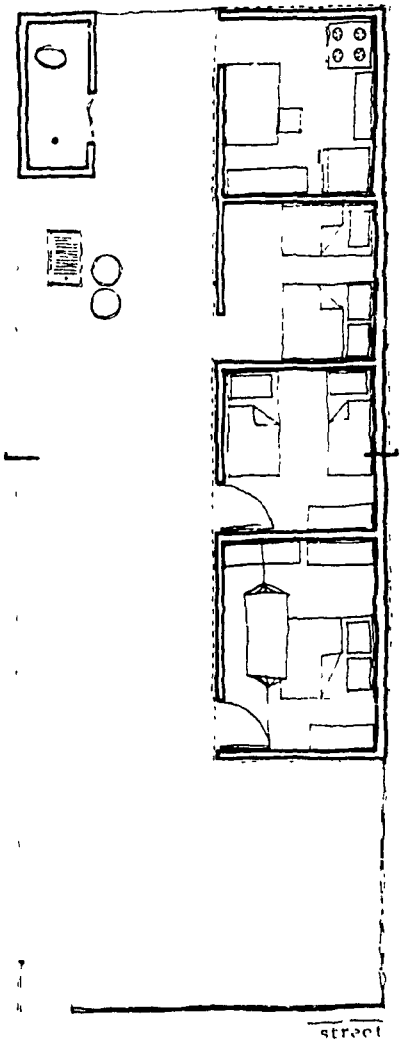
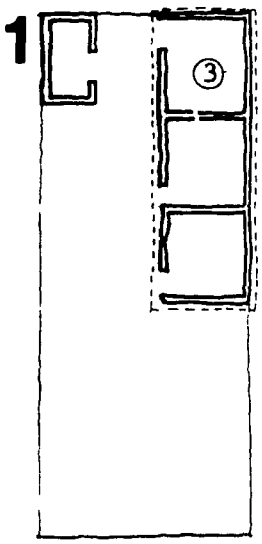



plan

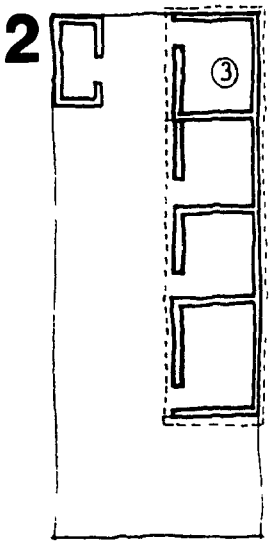

occupancy: Jan.-86

family members: 8

PROGRESSIVE DEVELOPMENT



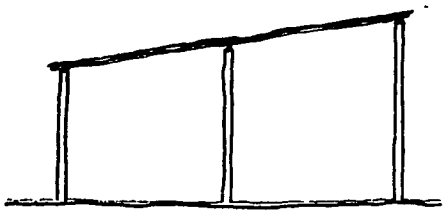

31.50 M2




43.50 M2

**3-29**

PRESENT SITUATION



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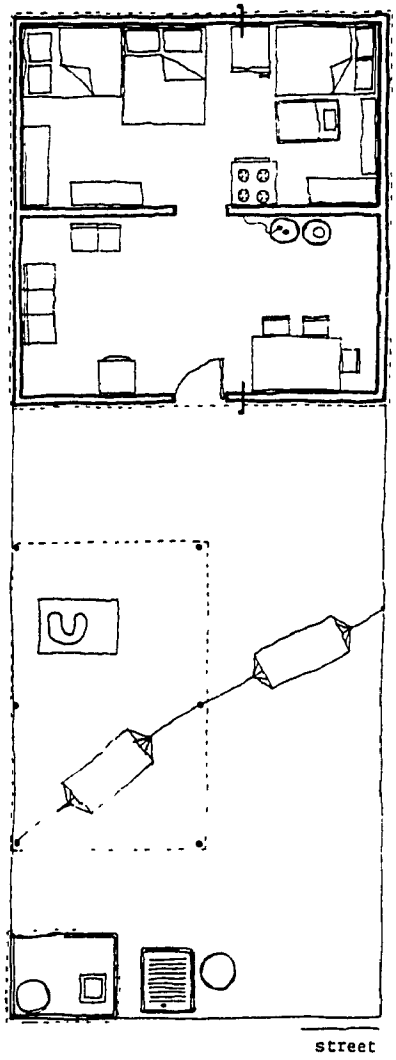
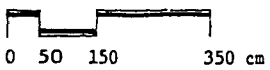


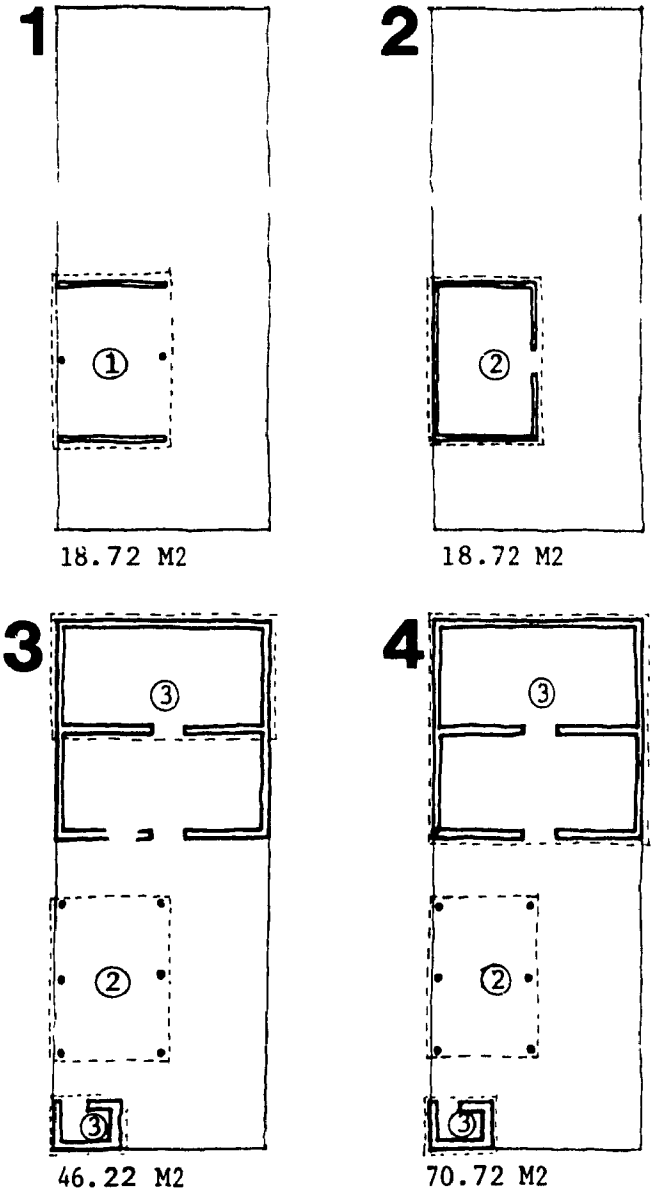

plan




occupancy: Feb.-87

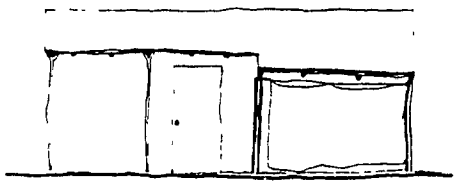
family members: 5

PROGRESSIVE DEVELOPMENT

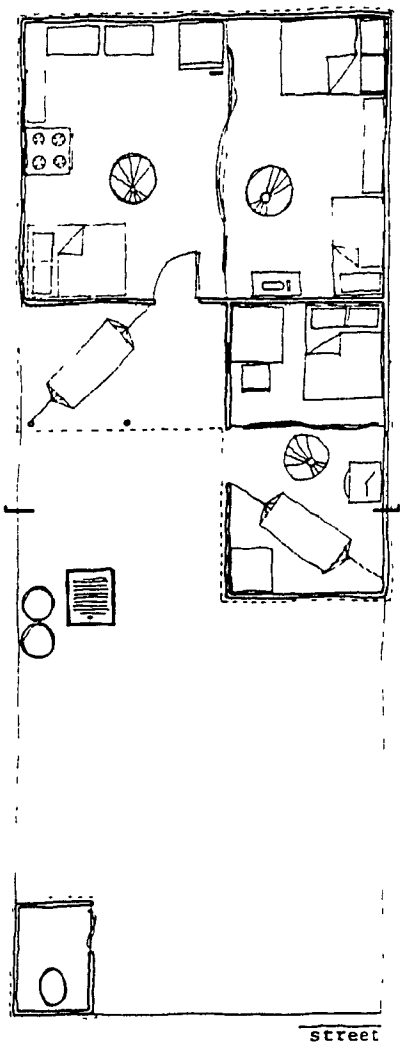



**4-2**

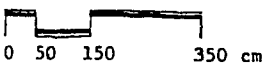
PRESENT SITUATION



section




plan

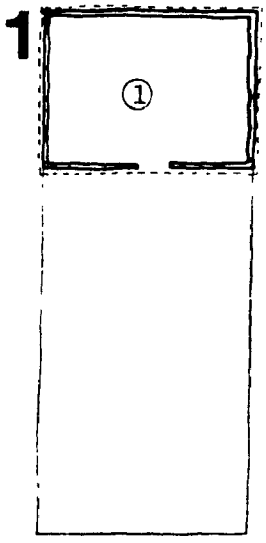



occupancy: Jan.-84

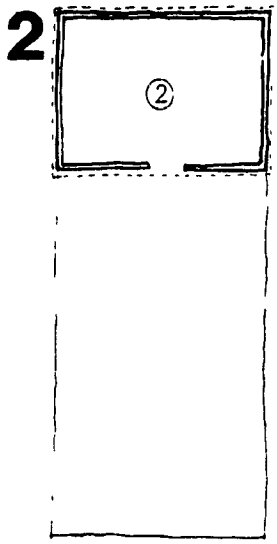
family members: 5

**4-5**

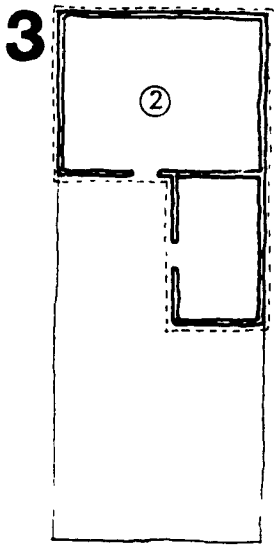
PROGRESSIVE DEVELOPMENT



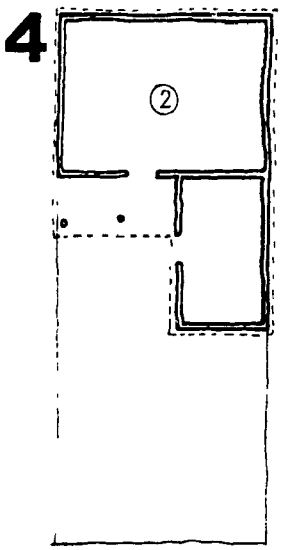

36.40 M2



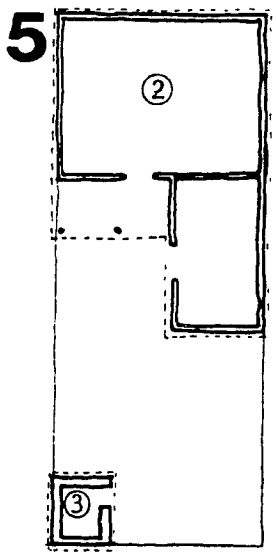

36.40 M2




51.40 M2

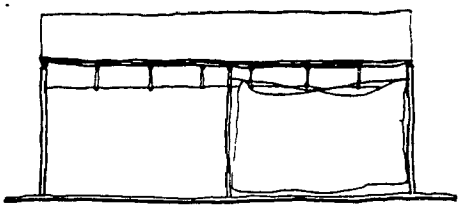



58.40 M2




61.64 M2

PRESENT SITUATION



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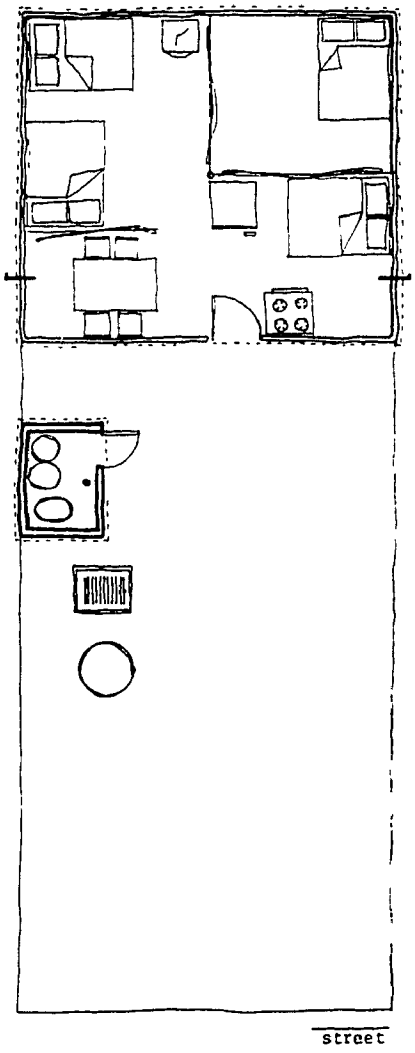
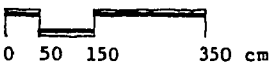


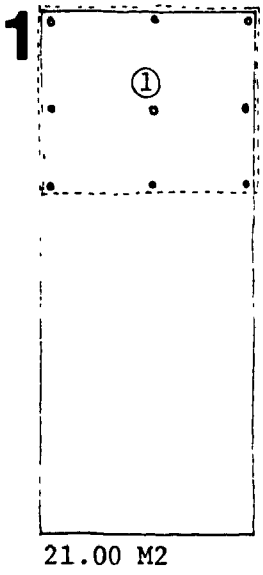

plan

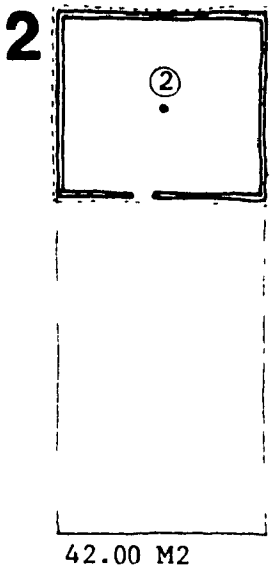


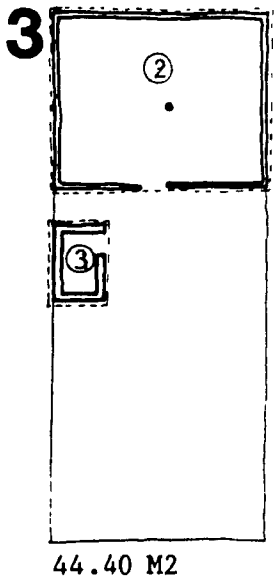

occupancy: Feb.-87

family members: 5

PROGRESSIVE DEVELOPMENT

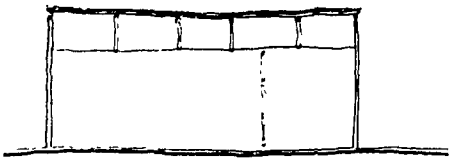



**4-10**

PRESENT SITUATION



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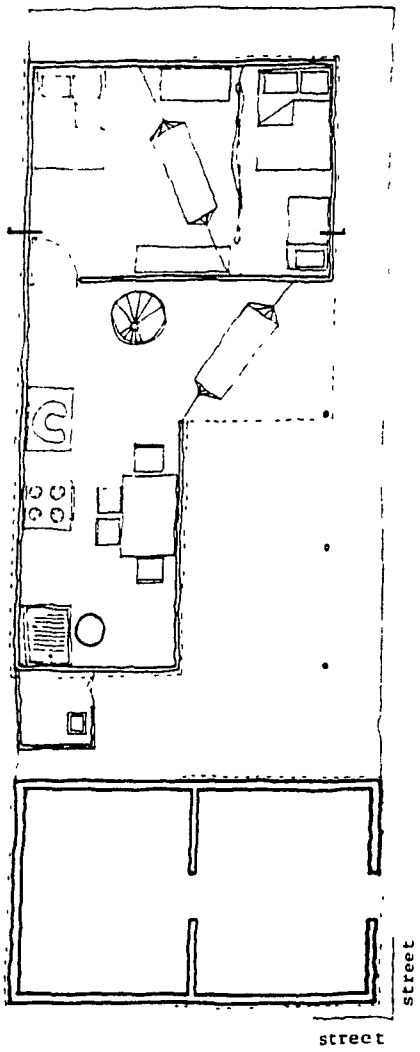


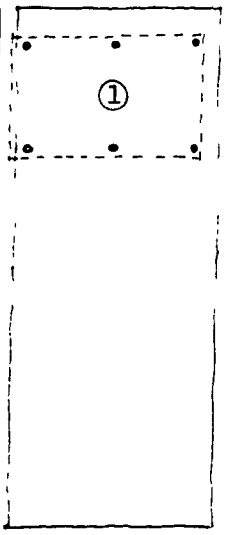

plan


occupancy: Sept.-84

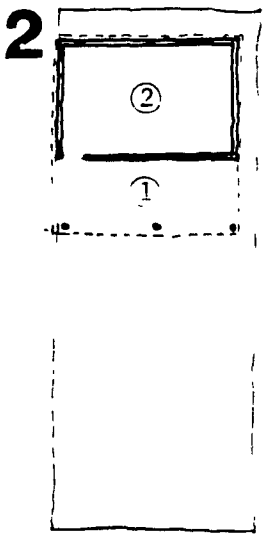
family members: 8

**5-1**

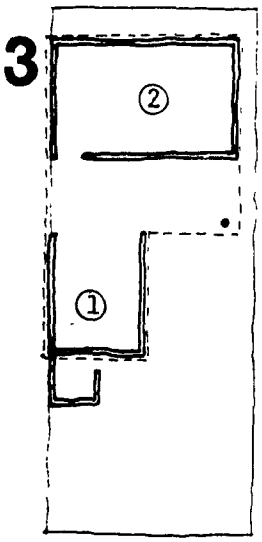
PROGRESSIVE DEVELOPMENT



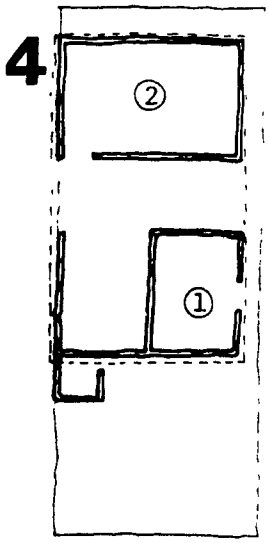

24.40 M2



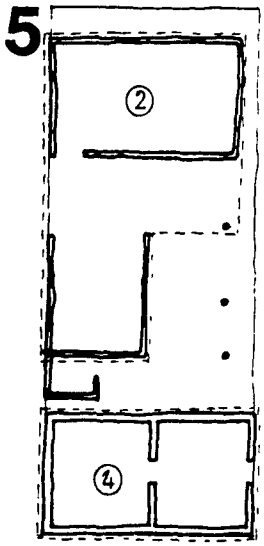

39.65 M2




55.04 M2

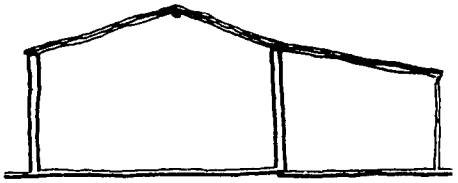



68.54 M2




68.54 M2

PRESENT SITUATION



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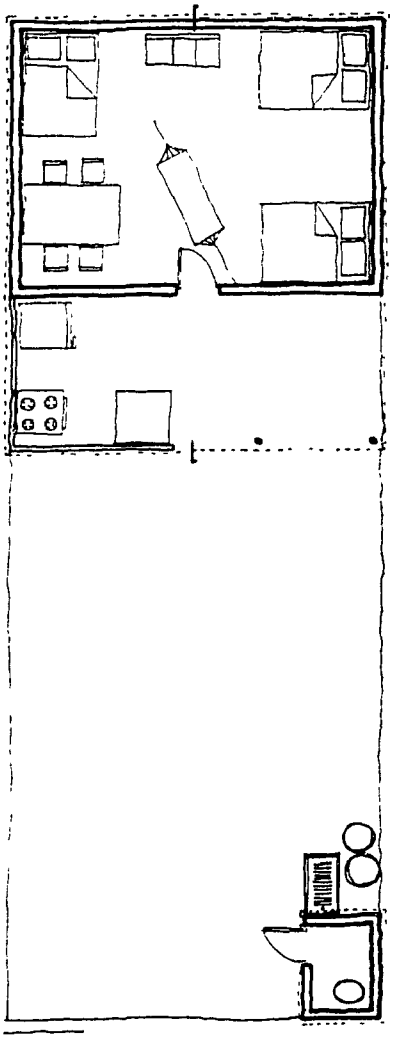
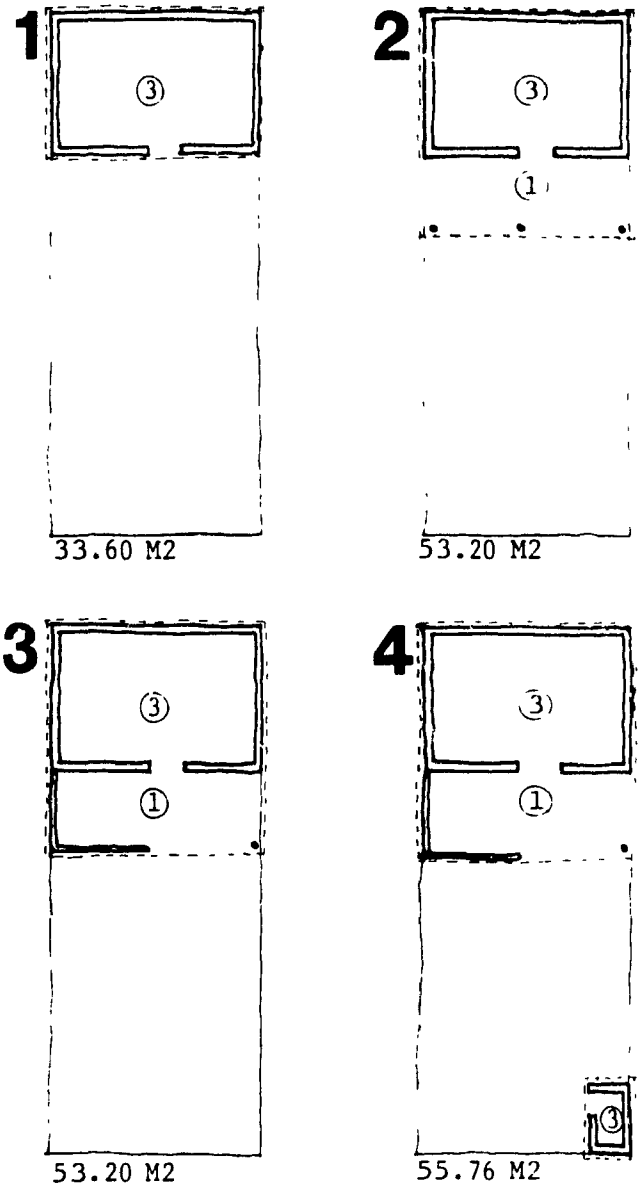



plan


occupancy: March-86

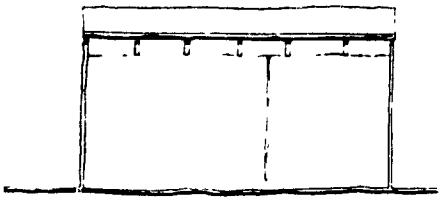
family members: 5

PROGRESSIVE DEVELOPMENT




**5-2**

PRESENT SITUATION



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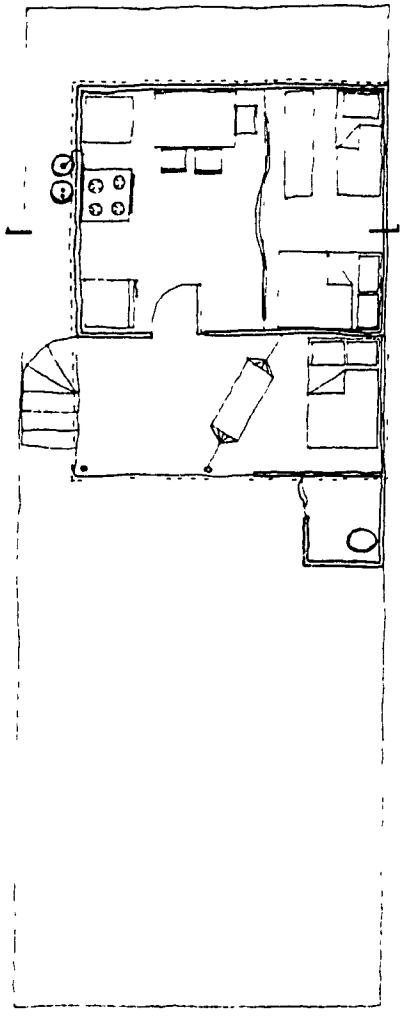
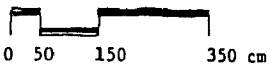


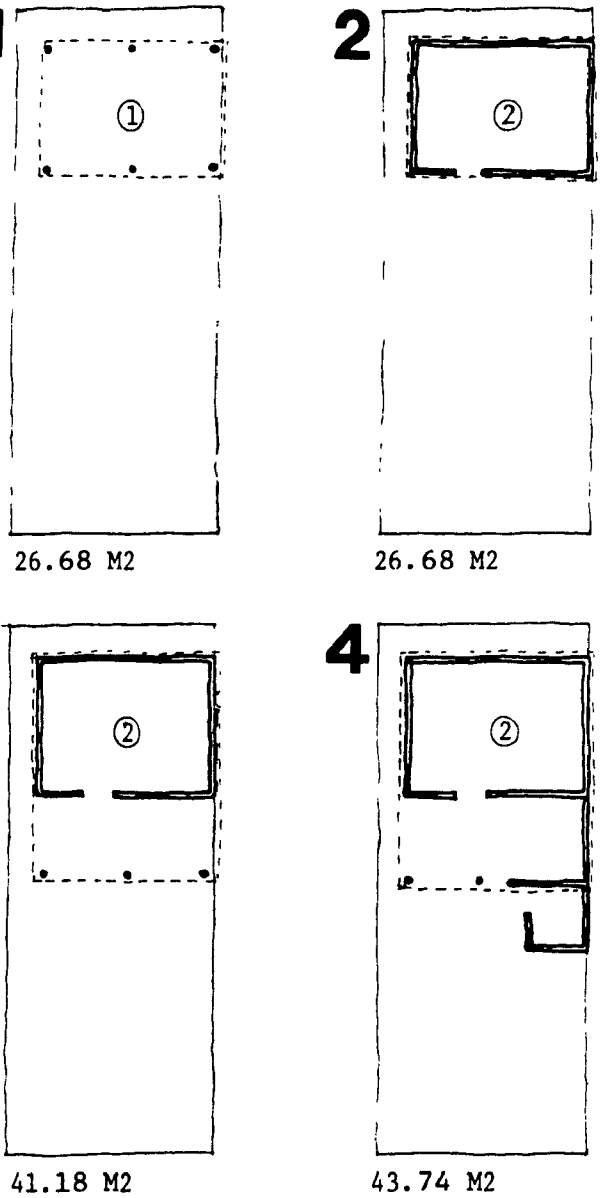

plan




occupancy: Dec.-84

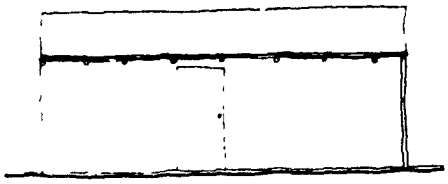
family members: 4

PROGRESSIVE DEVELOPMENT

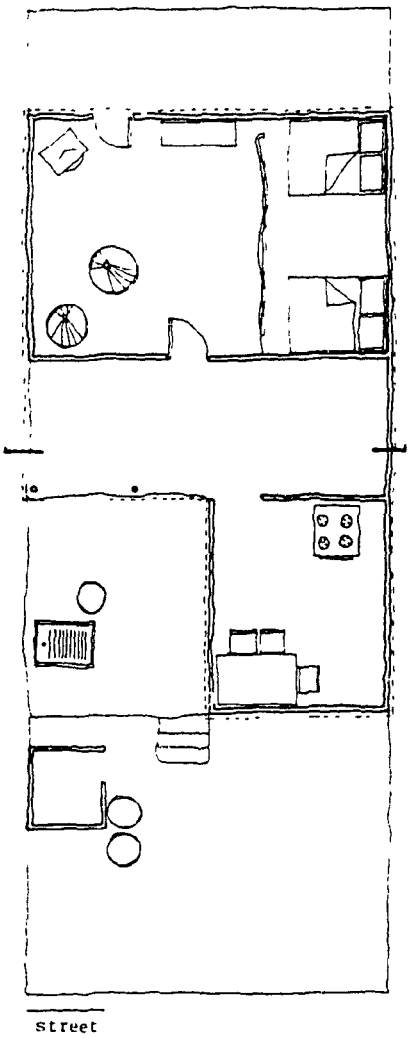



**5-6**

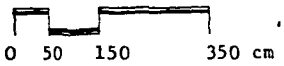
PRESENT SITUATION



section




plan

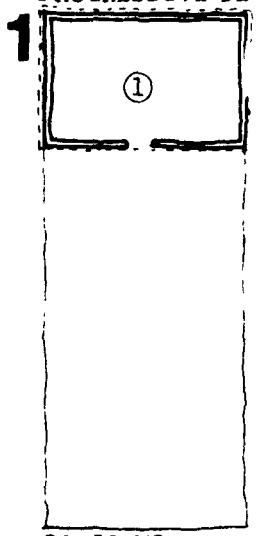



occupancy: Sept.-85

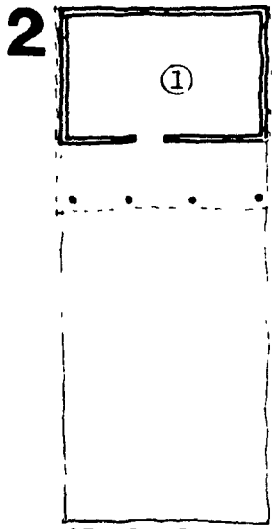
family members: 11

**5-8**

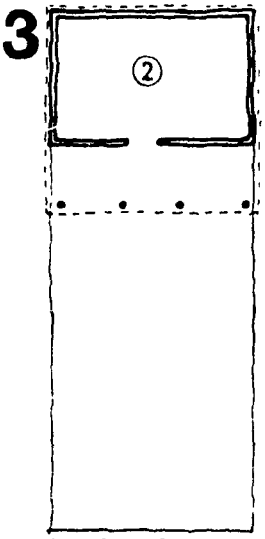
PROGRESSIVE DEVELOPMENT



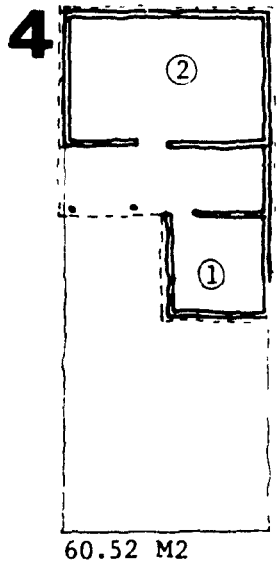

31.50 M2



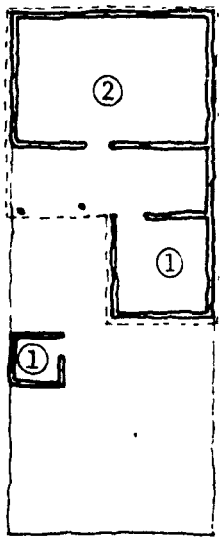

47.60 M2




47.60 M2

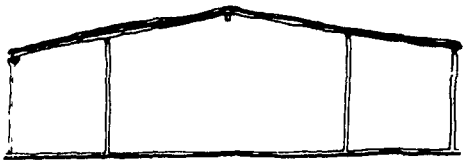



60.52 M2

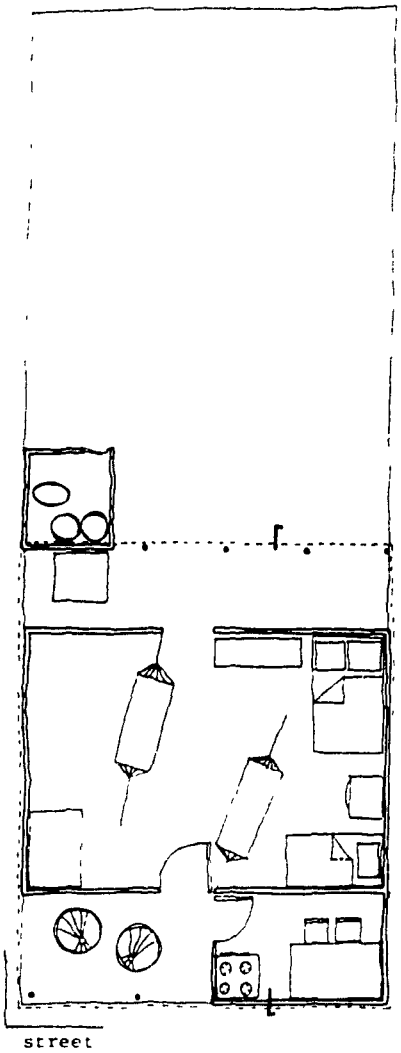



62.77 M2

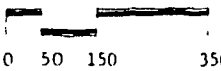
PRESENT SITUATION



section



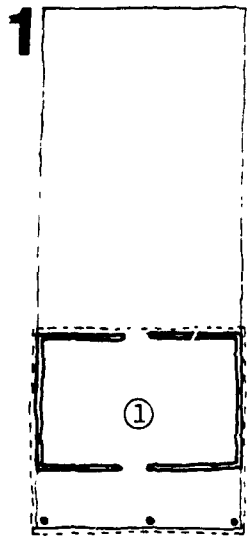

plan



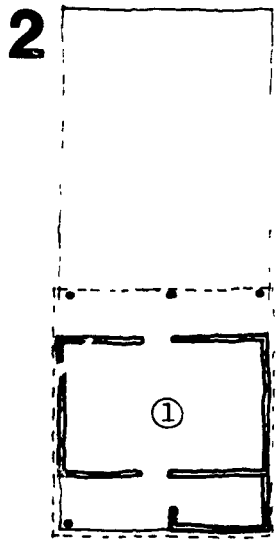

occupancy: June-87

family members: 4

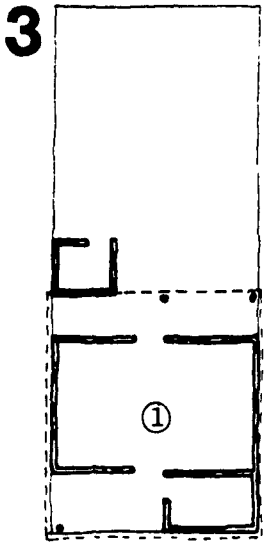
PROGRESSIVE DEVELOPMENT




46.40 M2



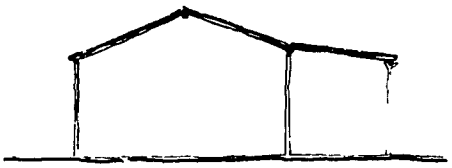

57.40 M2




59.65 M2

**6-1**

PRESENT SITUATION



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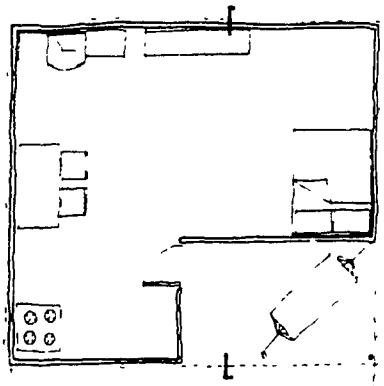
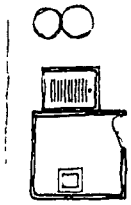
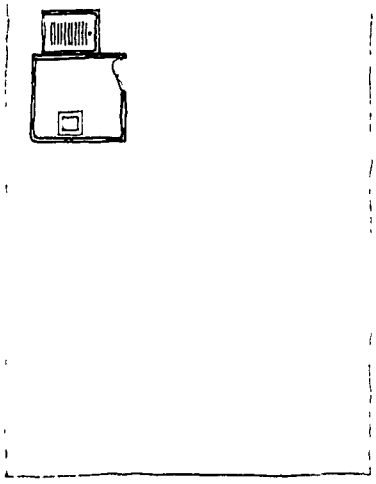
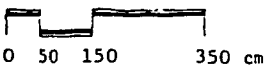







plan

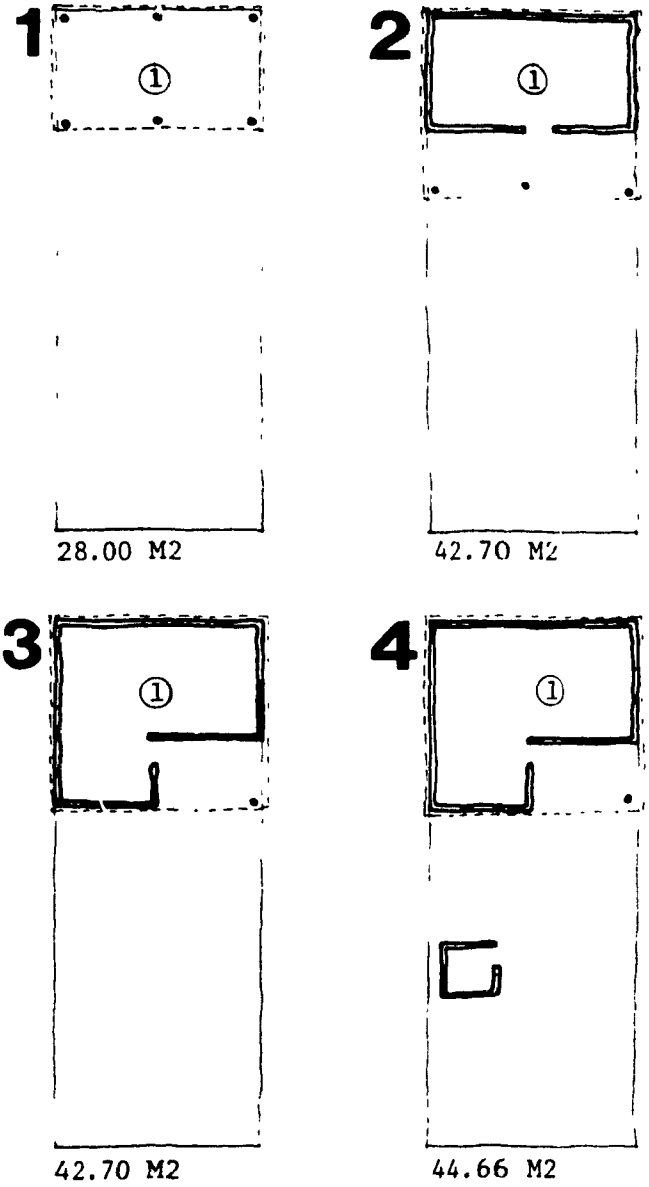



occupancy: Feb.-84

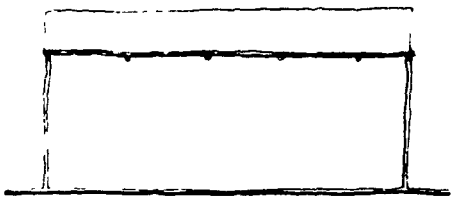
family members: 3

**6-2**

PROGRESSIVE DEVELOPMENT



PRESENT SITUATION



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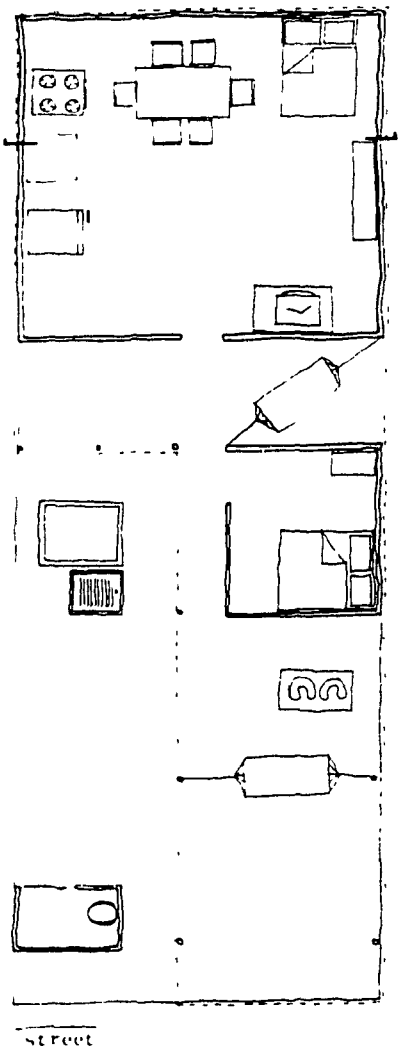
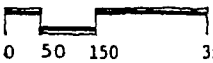


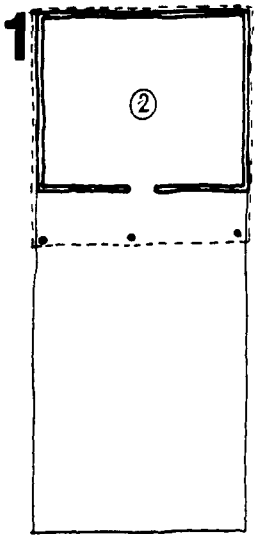

plan



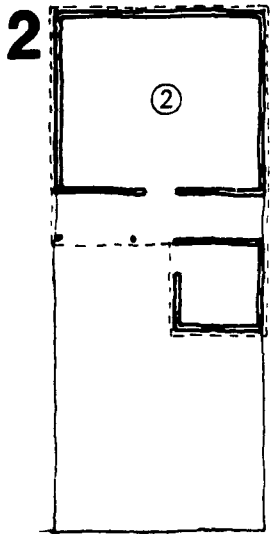

occupancy: Feb.-84

family members: 3

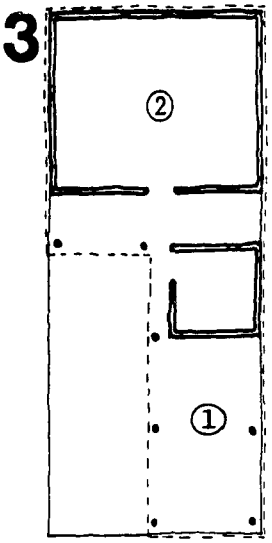
PROGRESSIVE DEVELOPMENT



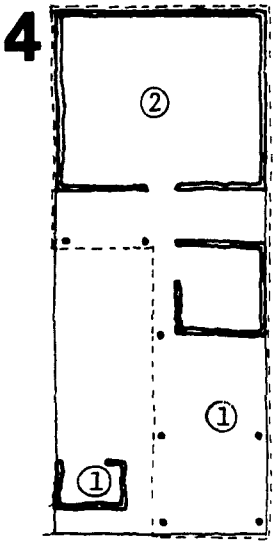

54.60 M2




63.60 M2



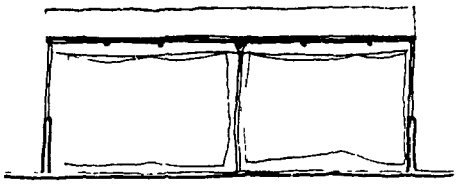

82.20 M2




83.41 M2

**6-8**

PRESENT SITUATION



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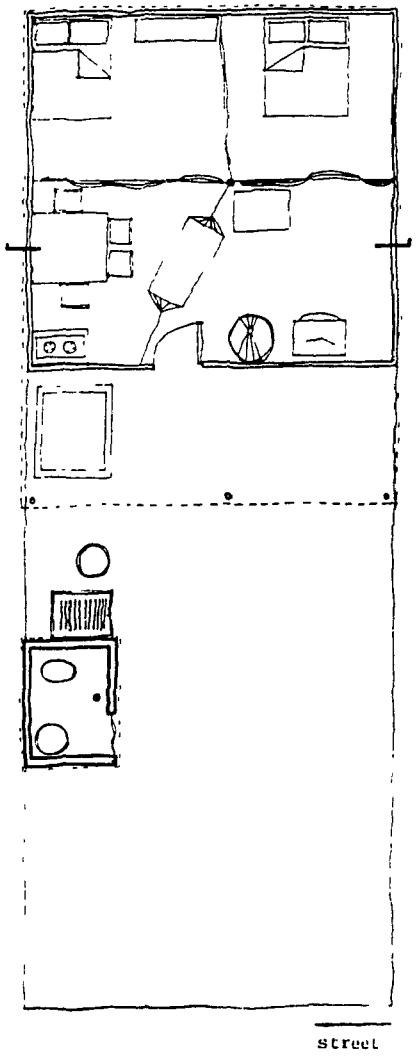
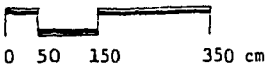


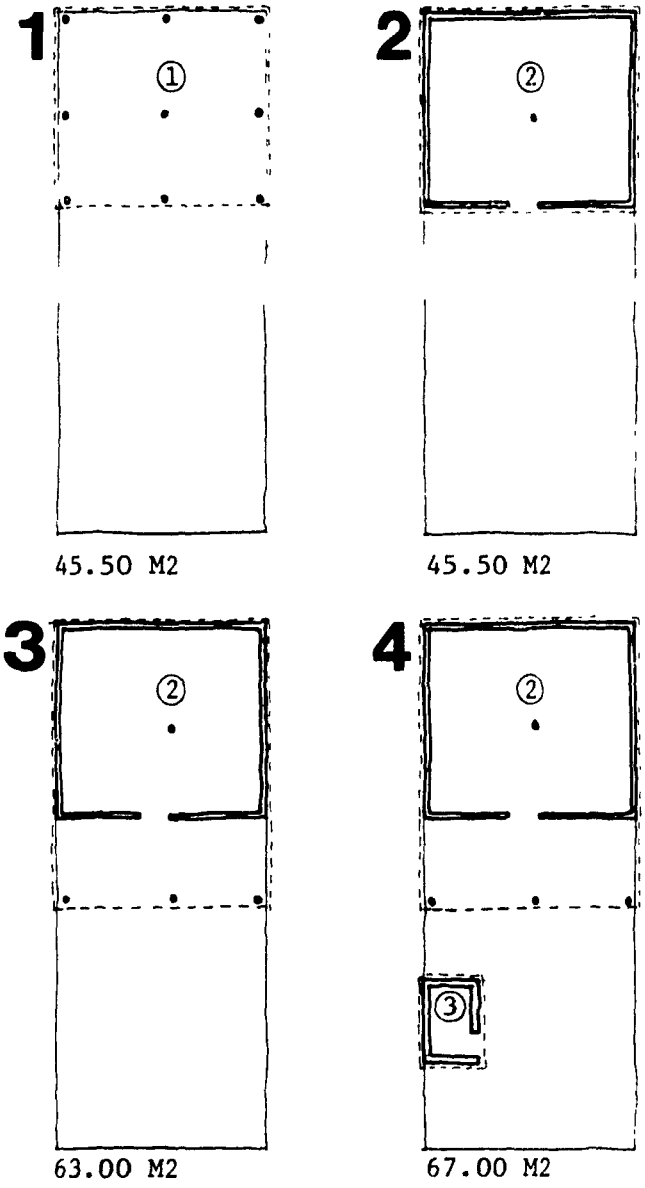

plan




occupancy: Sept.-84

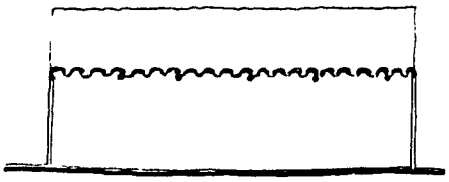
family members: 7

PROGRESSIVE DEVELOPMENT




**6-10**

PRESENT SITUATION



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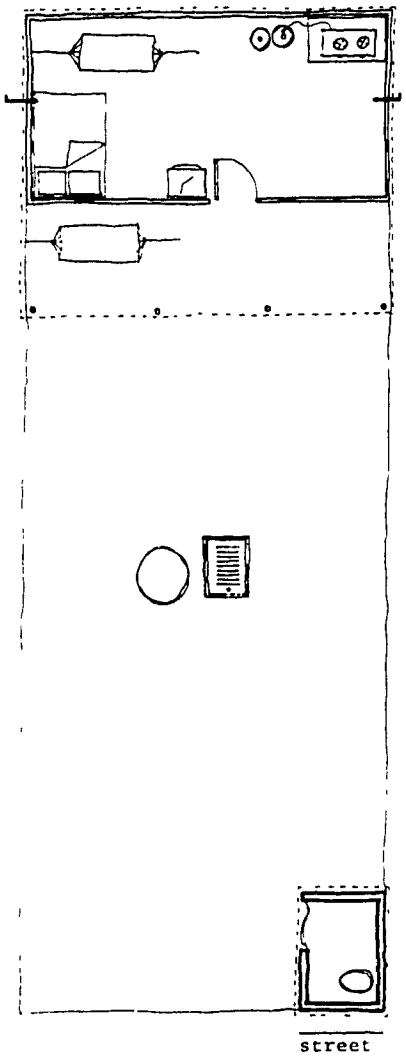
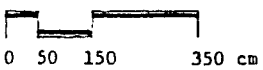


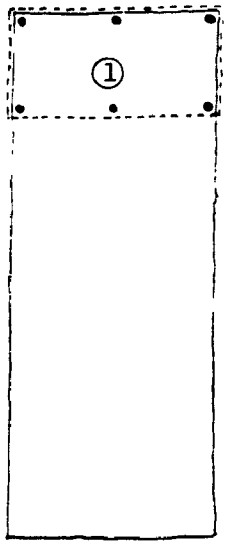

plan



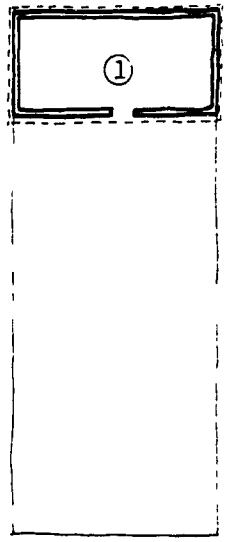

occupancy: April-84

family members: 9

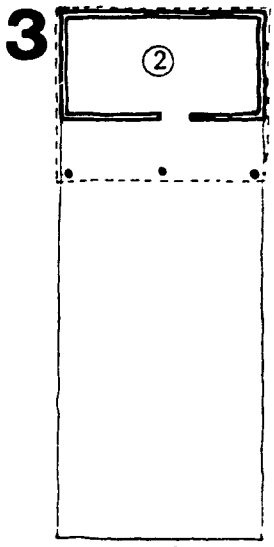
PROGRESSIVE DEVELOPMENT



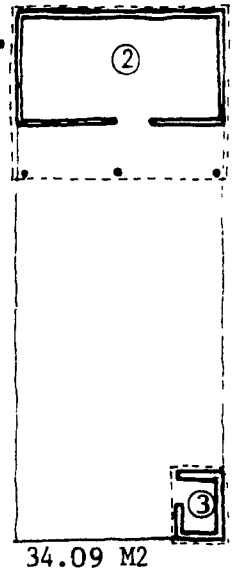

19.20 M2




19.20 M2



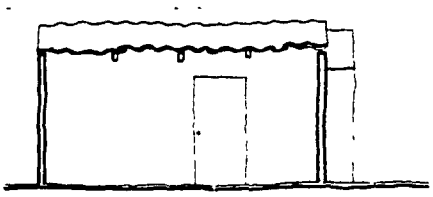

31.20 M2




34.09 M2

**6-12**

PRESENT SITUATION



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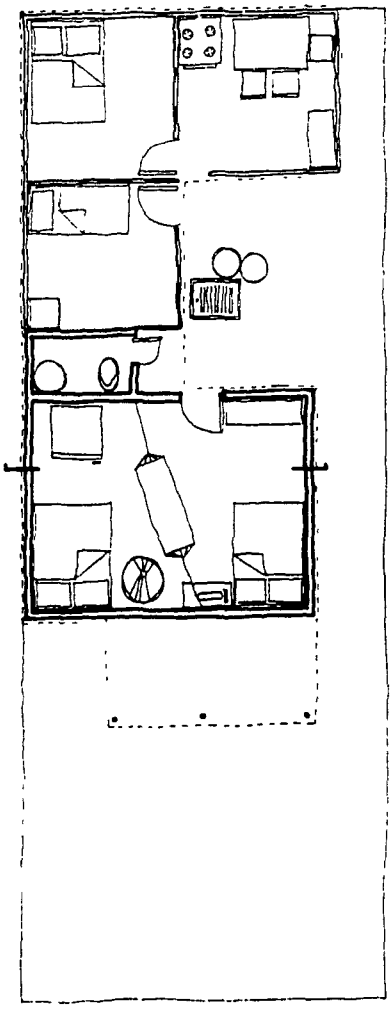
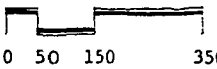



plan

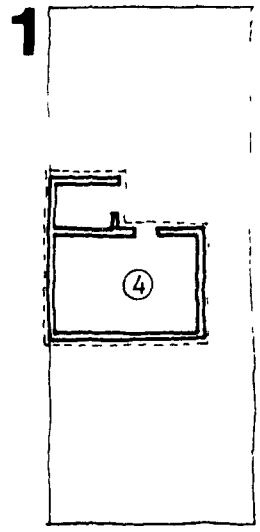



occupancy: Feb.-85

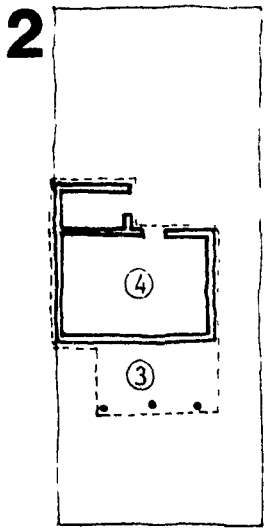
family members: 5

**6-14**

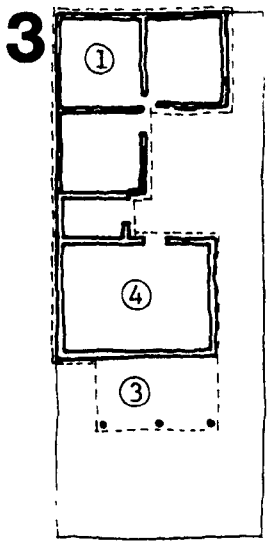
PROGRESSIVE DEVELOPMENT




21.77 M2

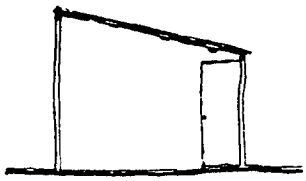



29.77 M2




56.77 M2

PRESENT SITUATION



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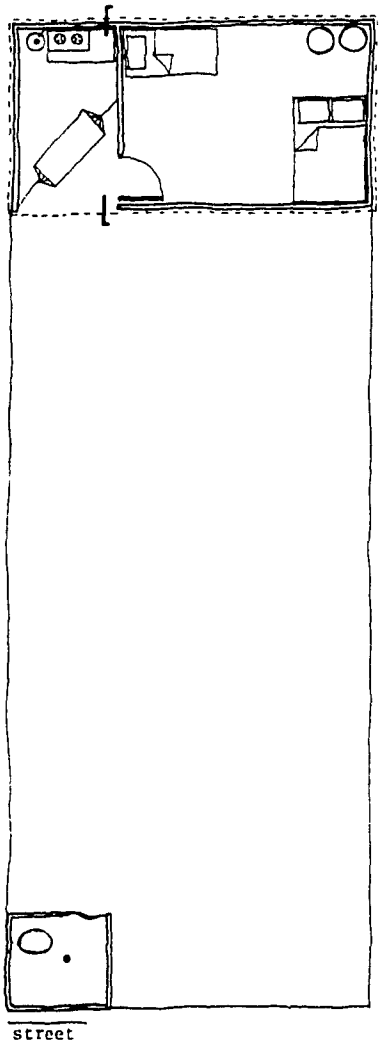
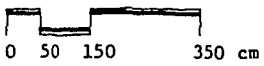


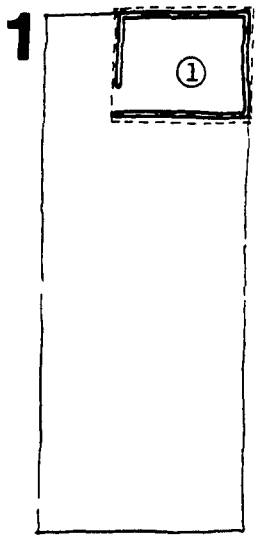

plan



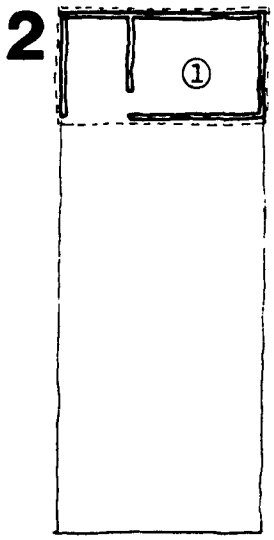

occupancy: Feb.-84

family members: 5

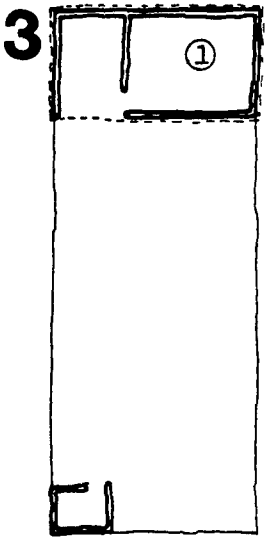
PROGRESSIVE DEVELOPMENT




16.80 M2



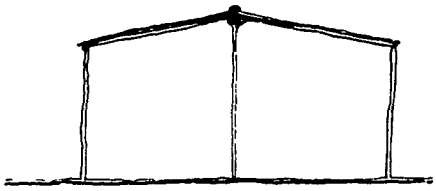

24.50 M2




27.06 M2

**6-21**

PRESENT SITUATION



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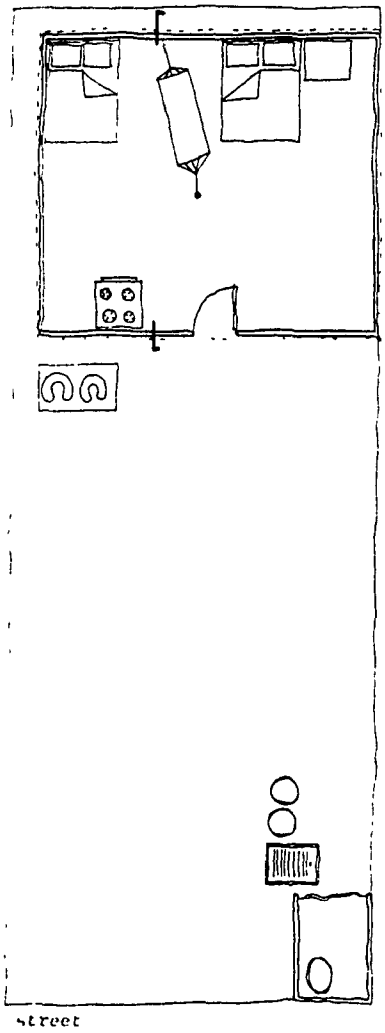
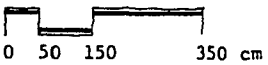


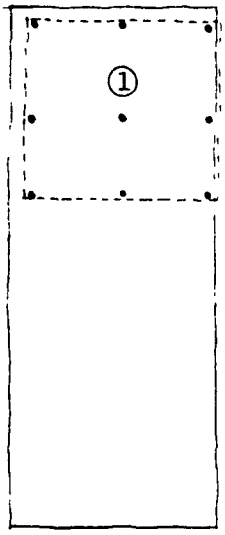

plan



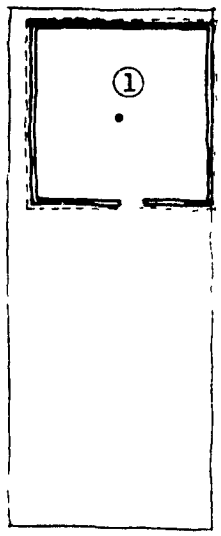

occupancy: May-85

family members: 4

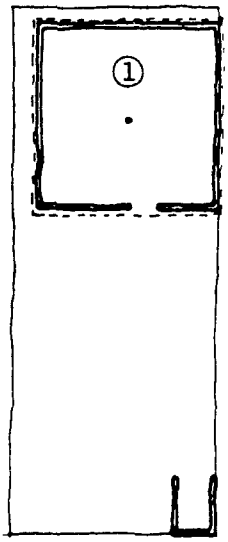
PROGRESSIVE DEVELOPMENT




39.00 M2



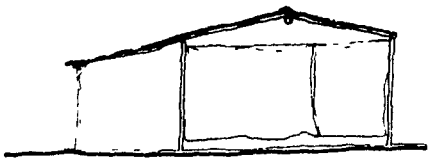

39.00 M2




42.24 M2

**6-23**

PRESENT SITUATION



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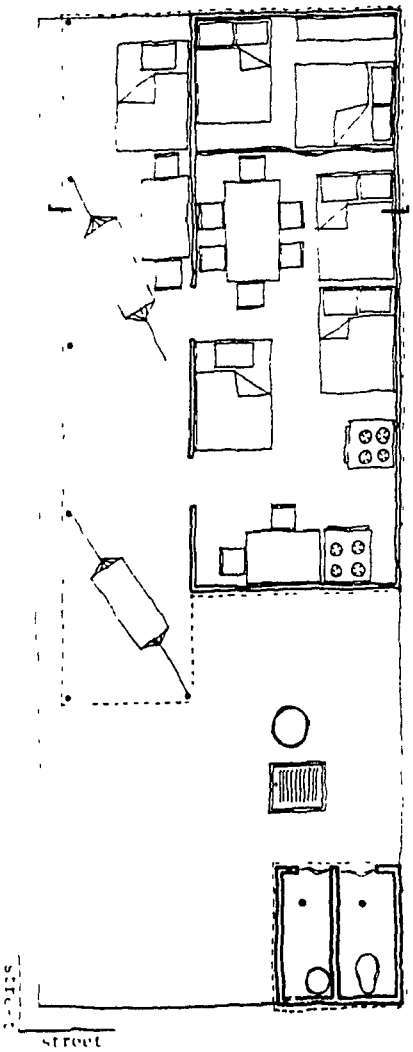
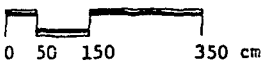


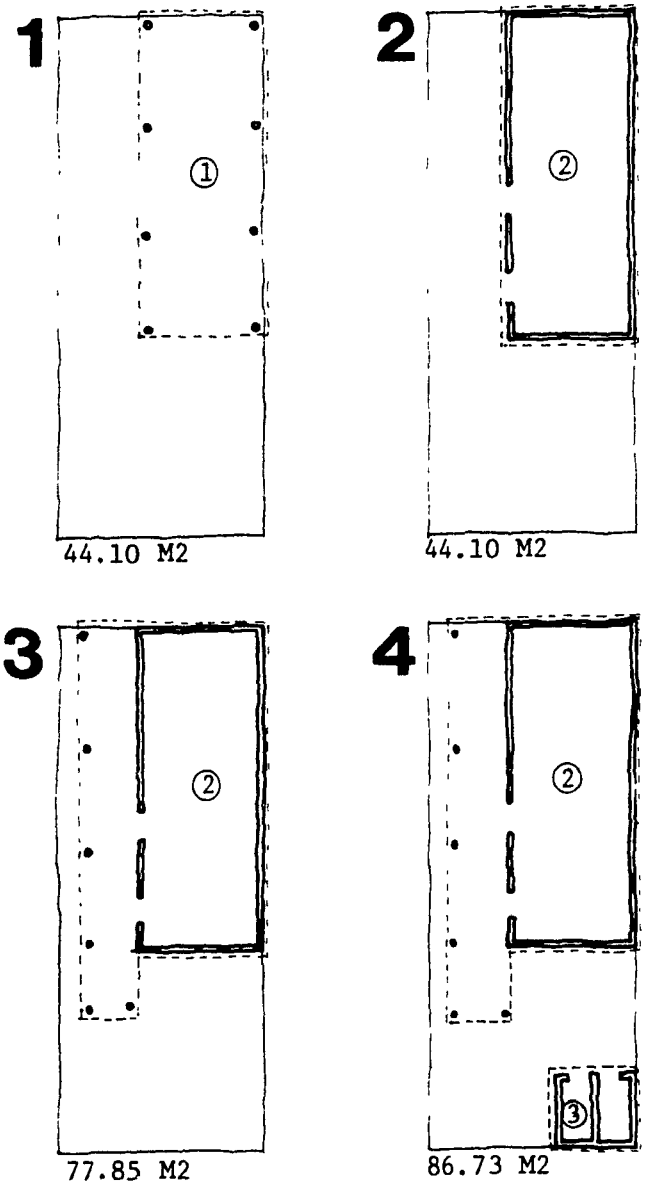

plan




occupancy: Feb.-84

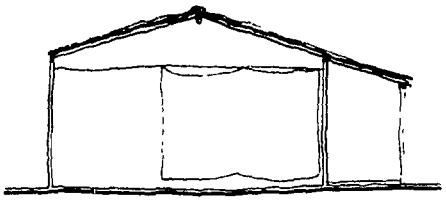
family members: 12

PROGRESSIVE DEVELOPMENT

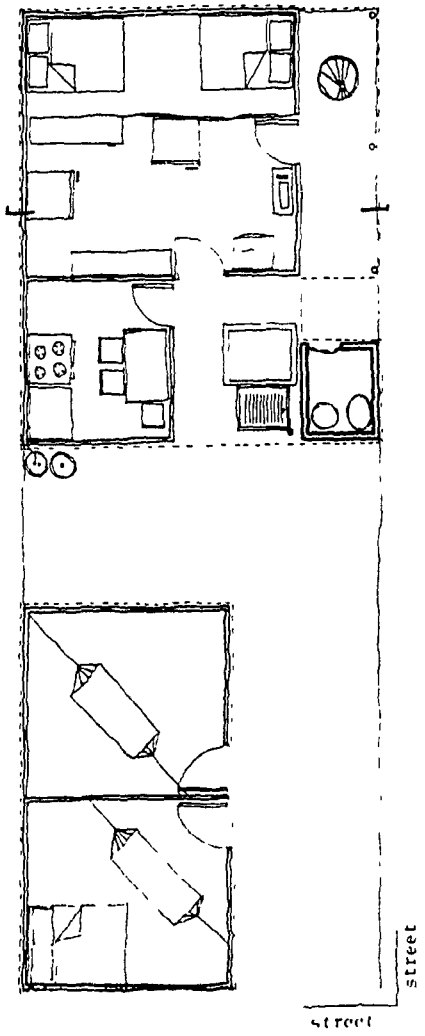



**7-1**

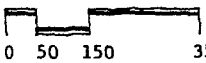
PRESENT SITUATION



section




plan

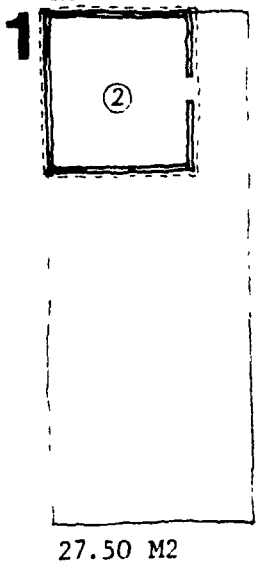



occupancy: Dec.-84

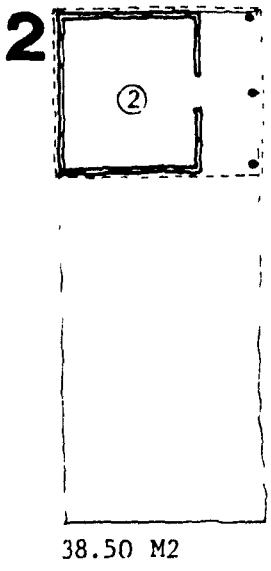
family members: 4

**7-5**

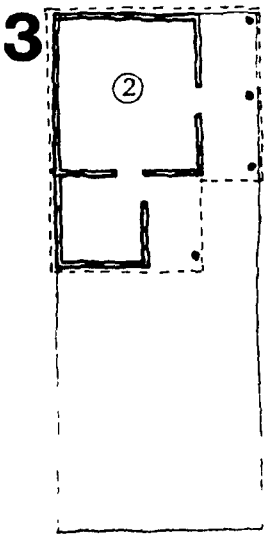
PROGRESSIVE DEVELOPMENT



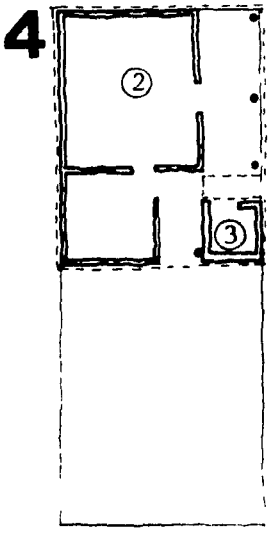

27.50 M2



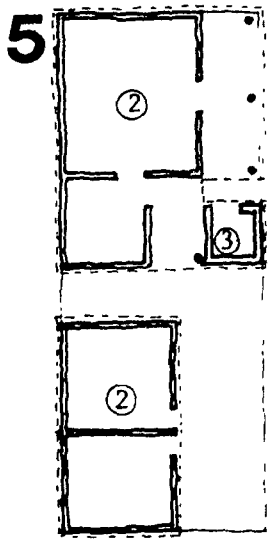

38.50 M2




53.50 M2

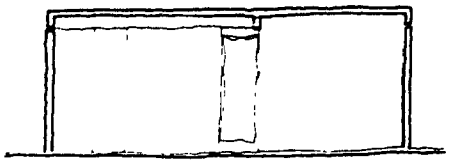



55.75 M2




90.75 M2

PRESENT SITUATION



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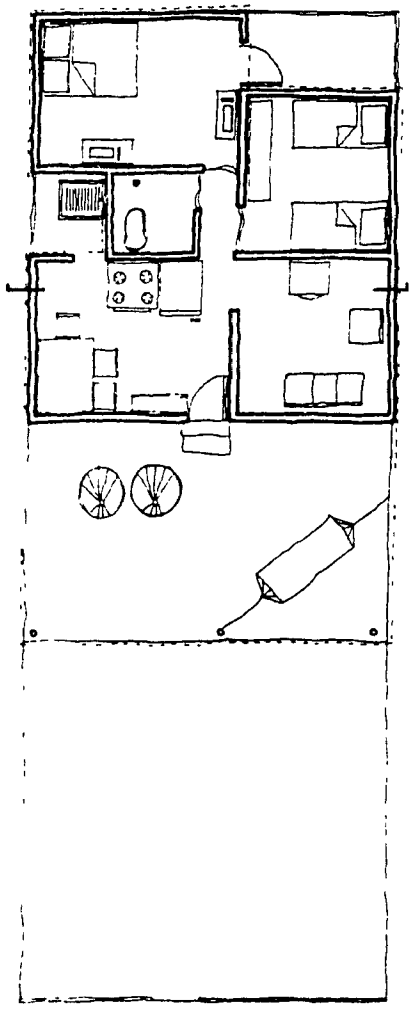


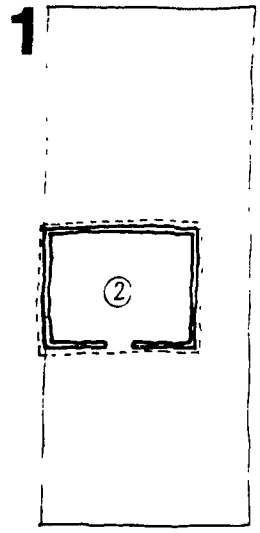

plan


occupancy: Oct.-84

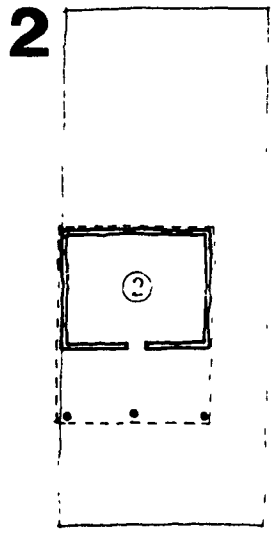
family members: 5

**7-9**

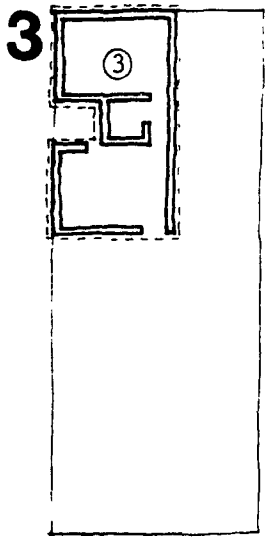
PROGRESSIVE DEVELOPMENT



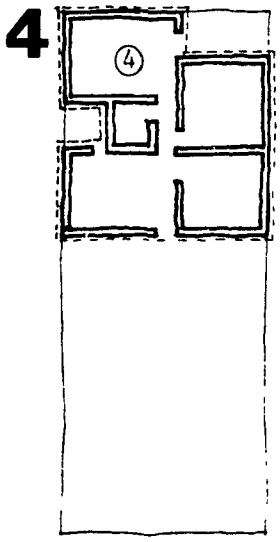

20.00 M2



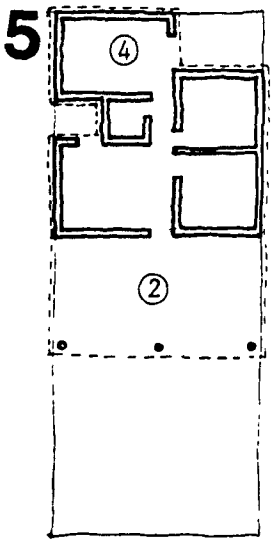

32.50 M2




25.50 M2

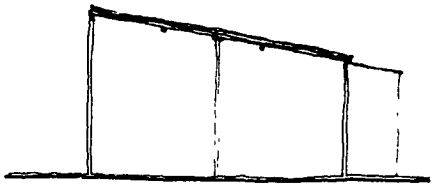



43.50 M2

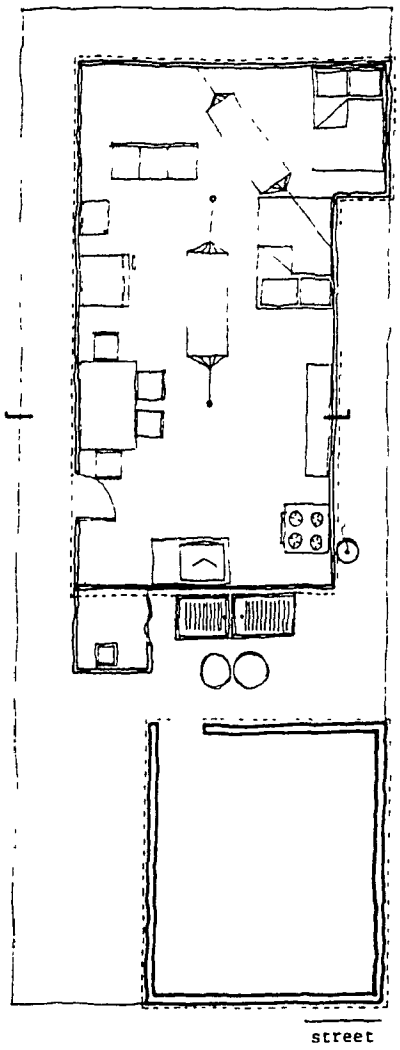



71.50 M2

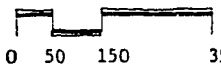
PRESENT SITUATION



section



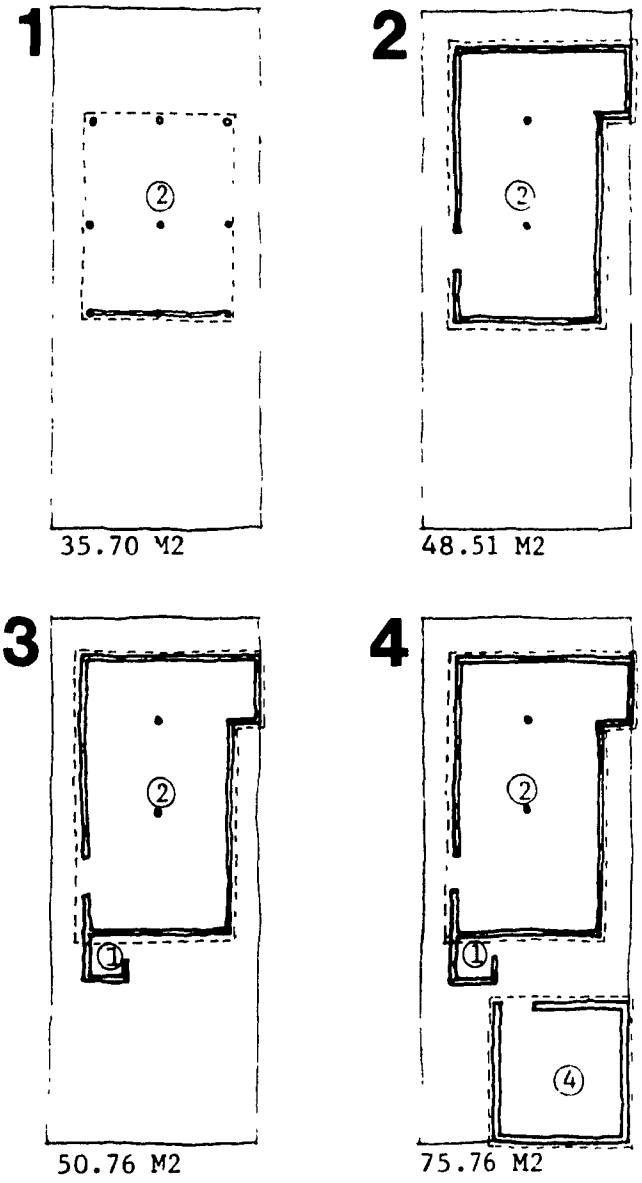

plan




occupancy: Oct.-85

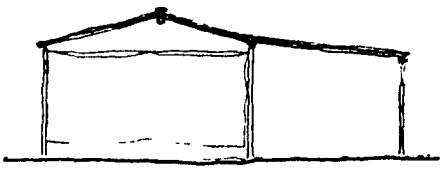
family members: 6

PROGRESSIVE DEVELOPMENT

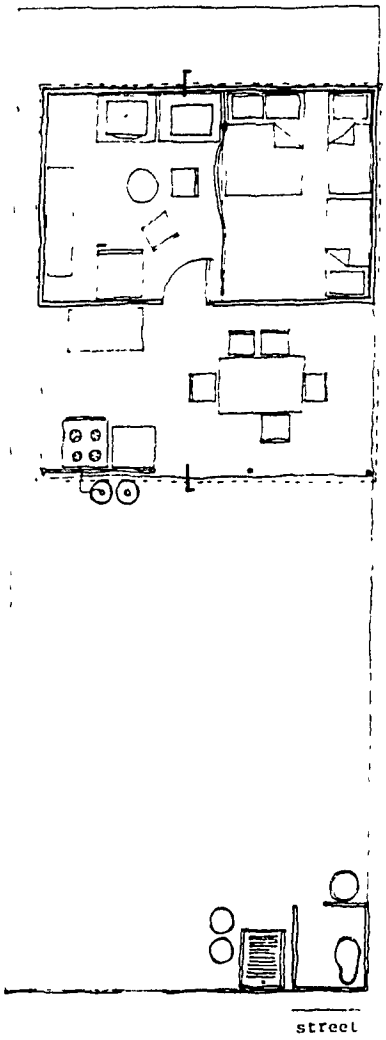



**7-13**

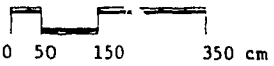
PRESENT SITUATION



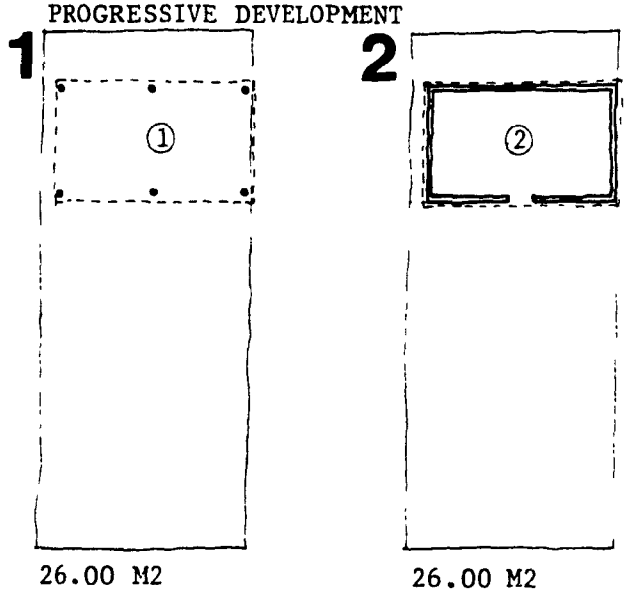
section

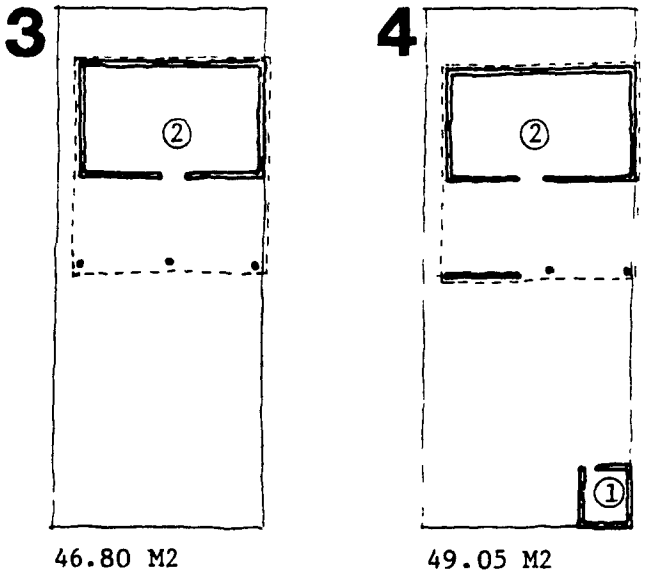



plan




PROGRESSIVE DEVELOPMENT



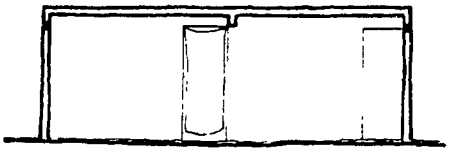




occupancy: August-86

family members: 5

**7-22**

PRESENT SITUATION



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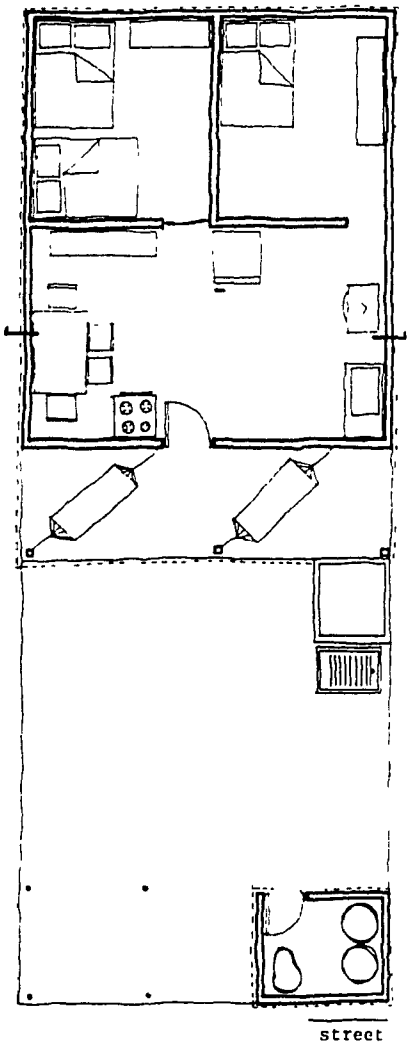
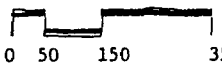


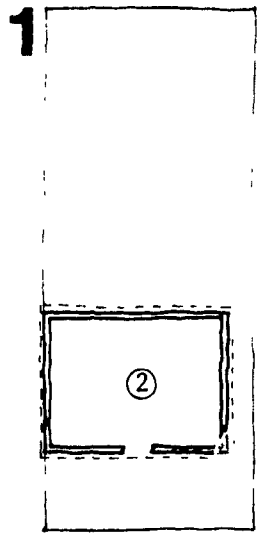

plan



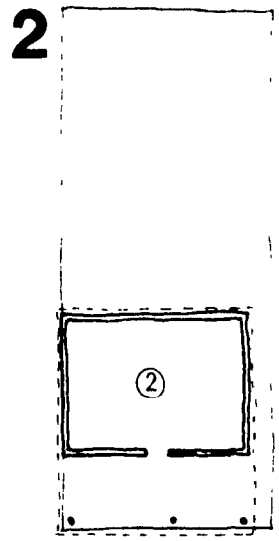

occupancy: Nov.-84

family members: 5

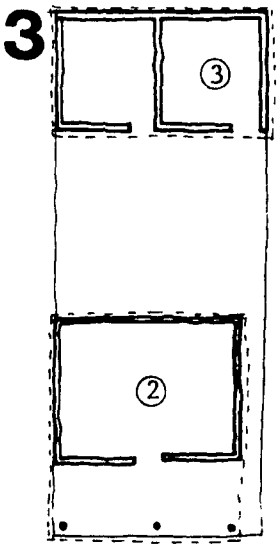
PROGRESSIVE DEVELOPMENT



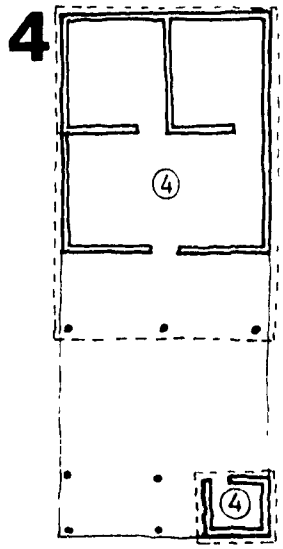

35.00 M2




52.50 M2



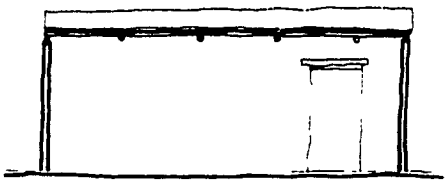

80.50 M2



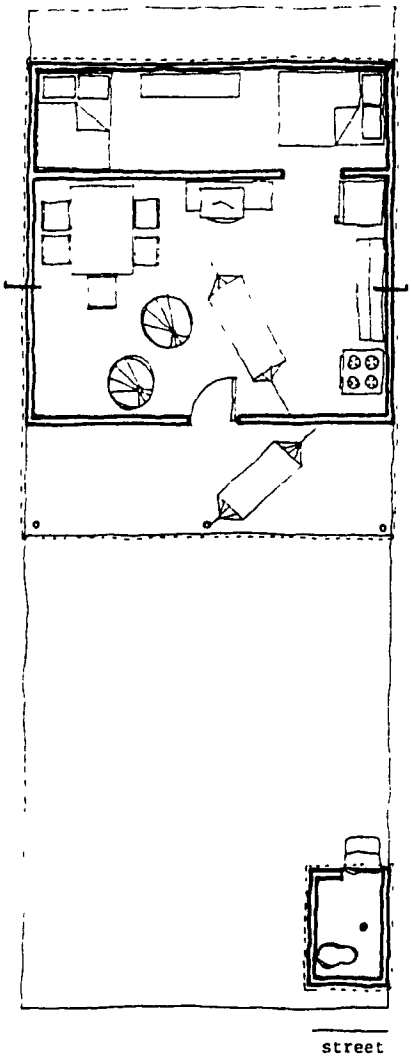

75.00 M2

**7-24**

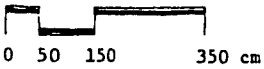
PRESENT SITUATION



section



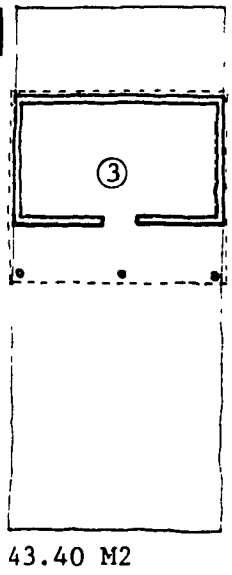

plan



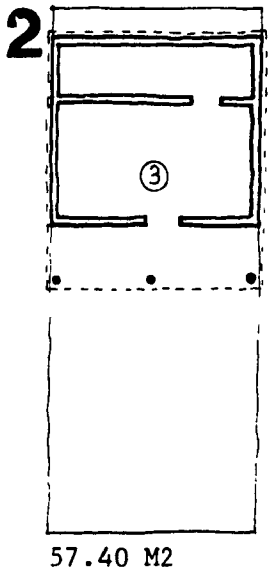

occupancy: March-85

family members: 5

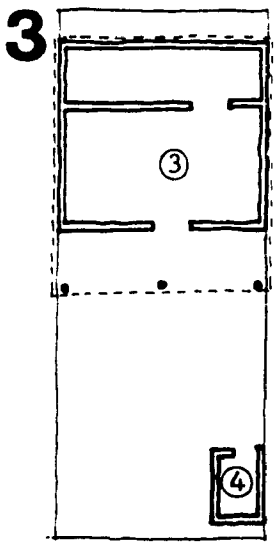
PROGRESSIVE DEVELOPMENT




43.40 M2



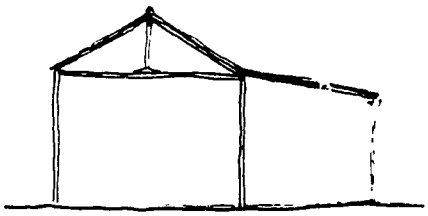

57.40 M2



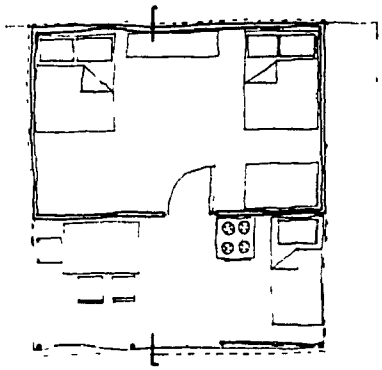

59.50 M2

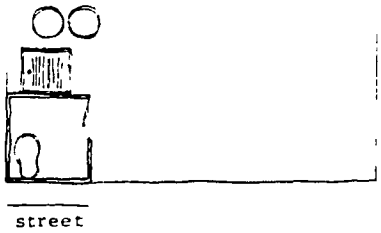
**7-27**

PRESENT SITUATION

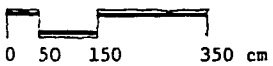


section





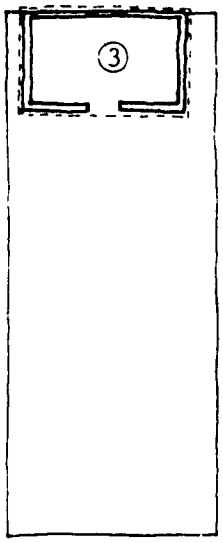

plan



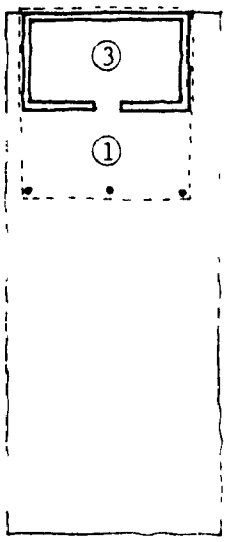

occupancy: Dec.-84

family members: 5

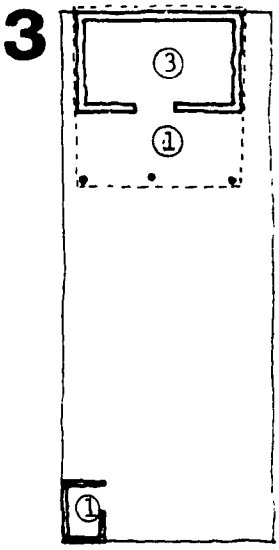
PROGRESSIVE DEVELOPMENT




16.16 M2



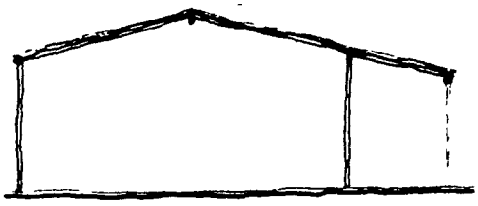

29.29 M2



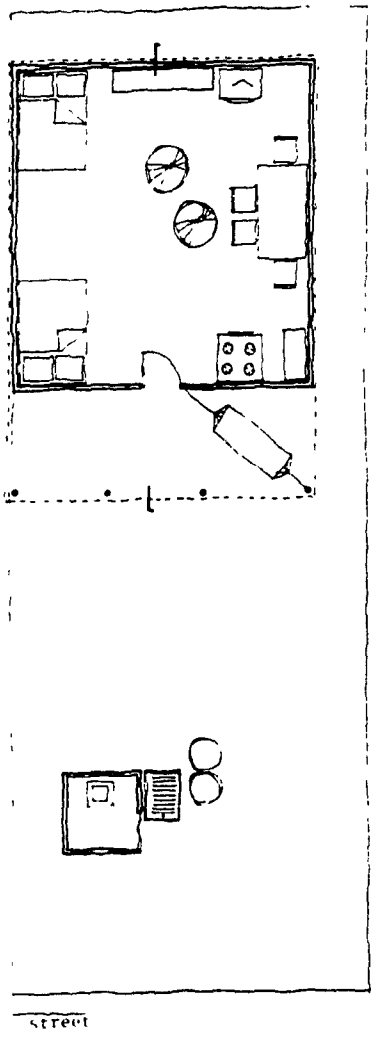

31.54 M2

**7-28**

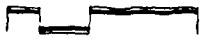
PRESENT SITUATION



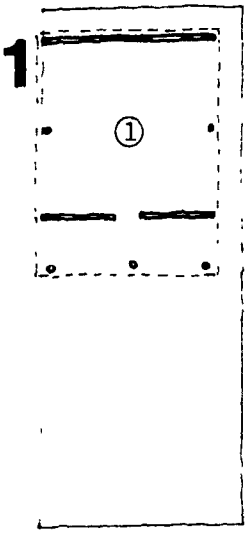
section



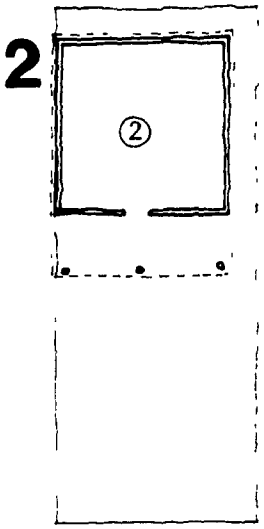

plan



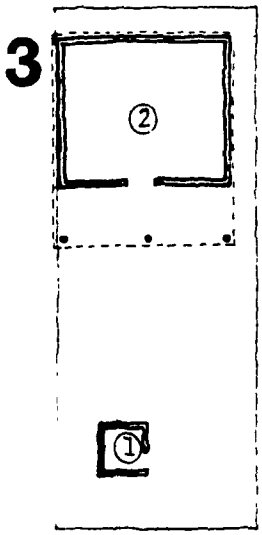

PROGRESSIVE DEVELOPMENT




48.00 M2




48.00 M2



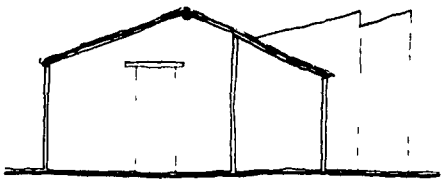

50.10 M2

occupancy: Sept.-85

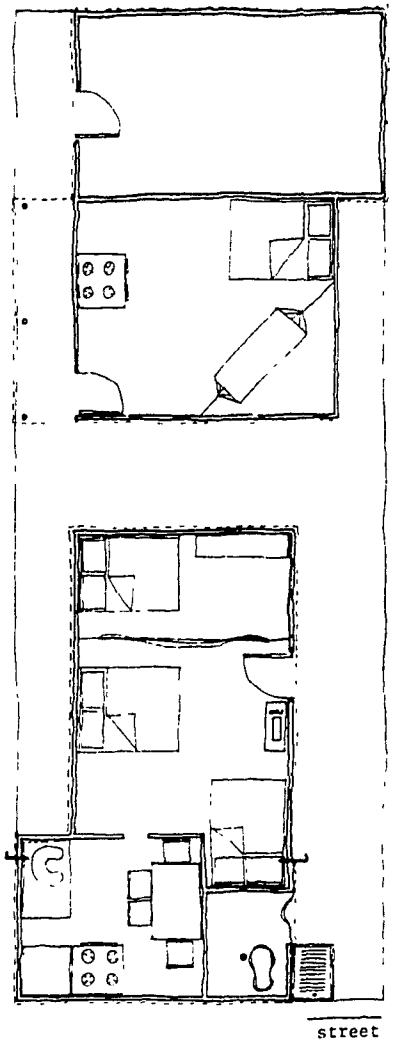
family members: 5

**8-2**

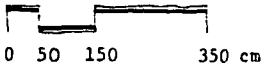
PRESENT SITUATION



section




plan

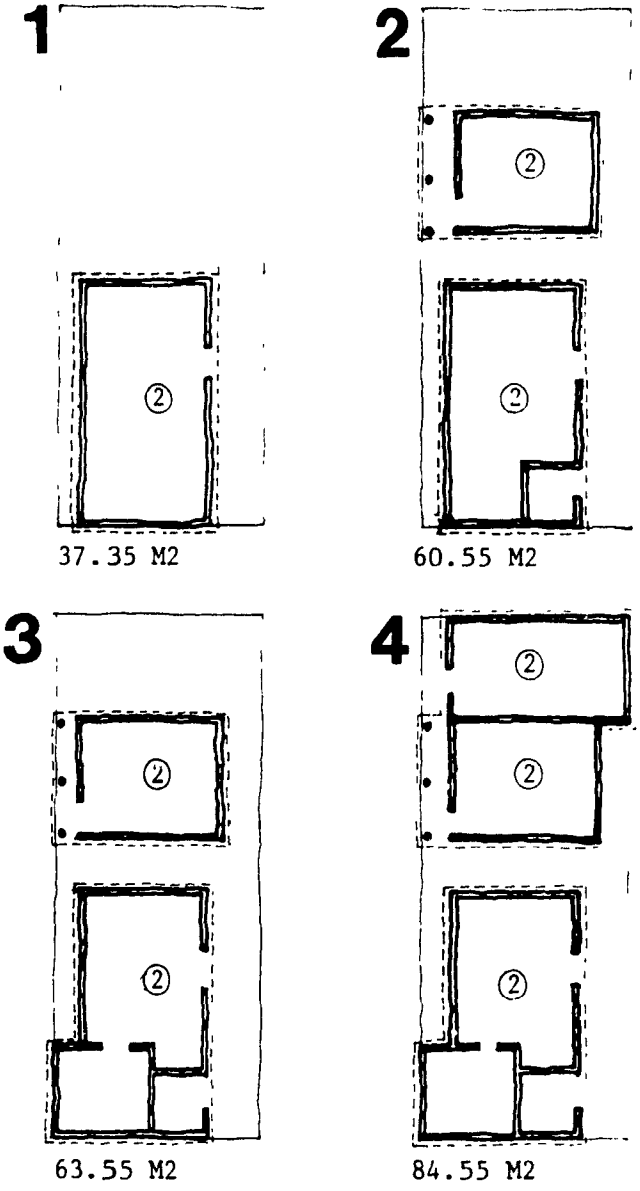



occupancy: Feb.-84

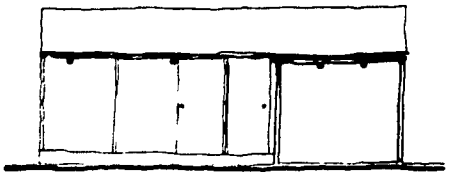
family members: 8

**8-4**

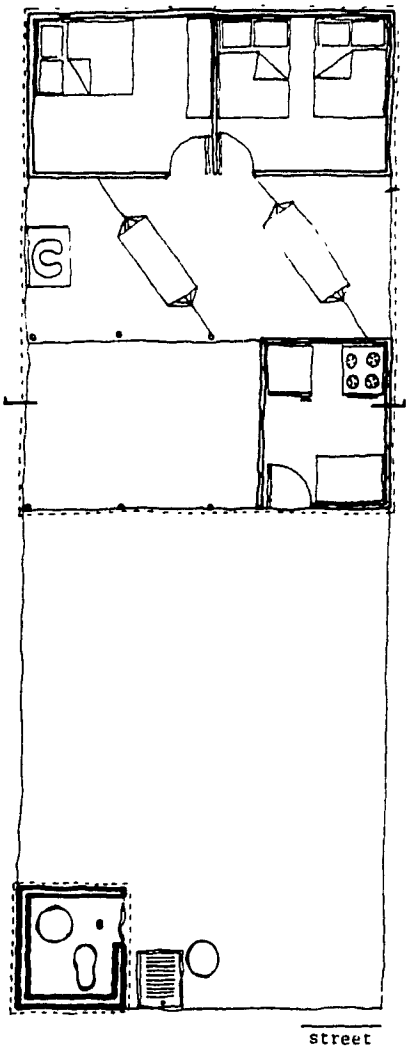
PROGRESSIVE DEVELOPMENT



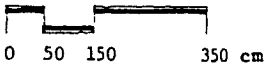
PRESENT SITUATION



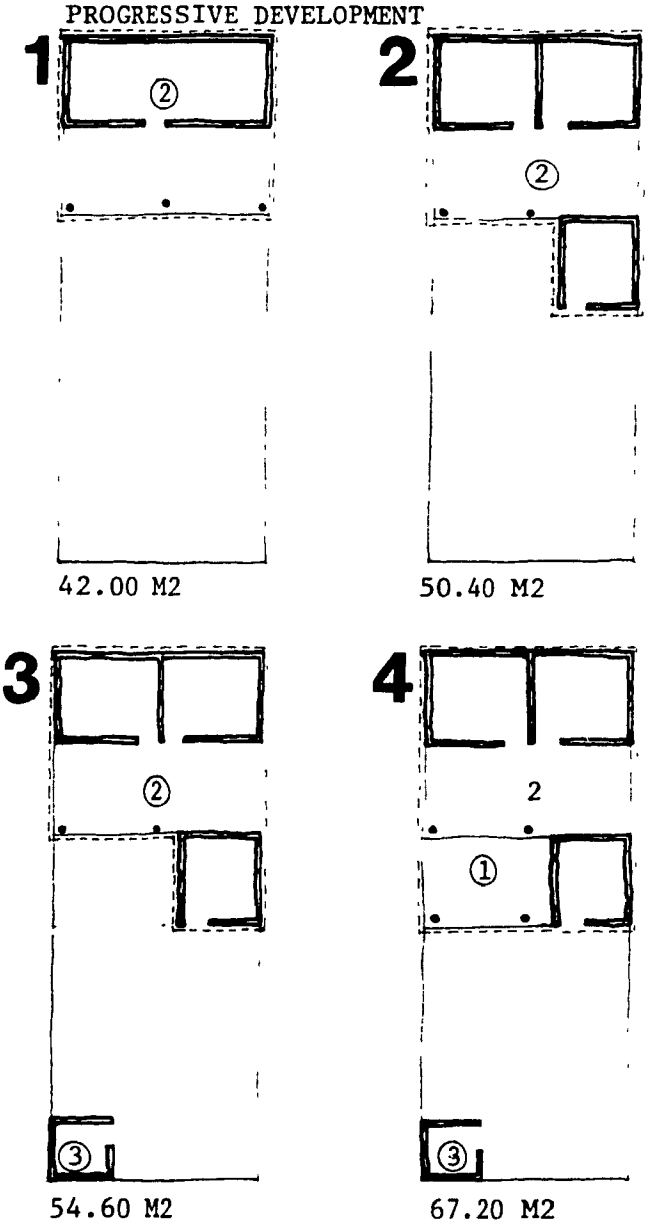
section




plan




PROGRESSIVE DEVELOPMENT

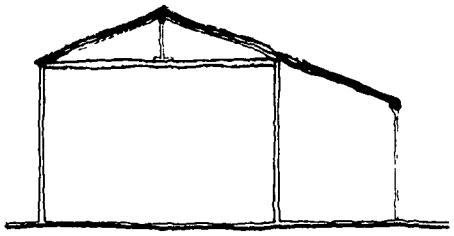



occupancy: Dec.-84

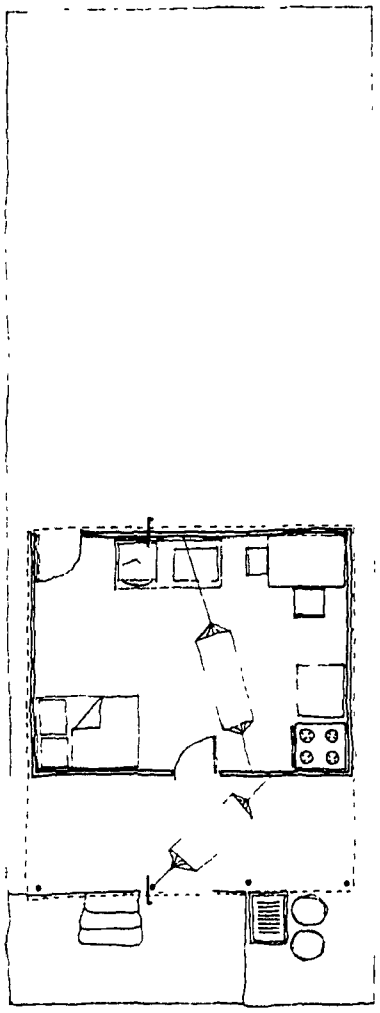
family members: 4

**8-5**

PRESENT SITUATION

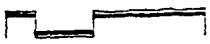


section



street

plan



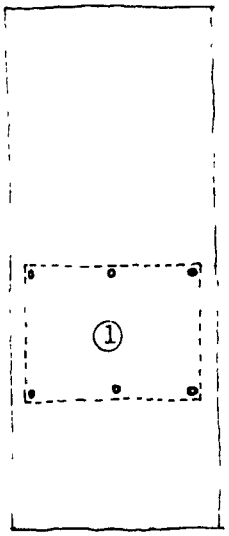

occupancy: Feb.-86

family members: 4

**9-3**

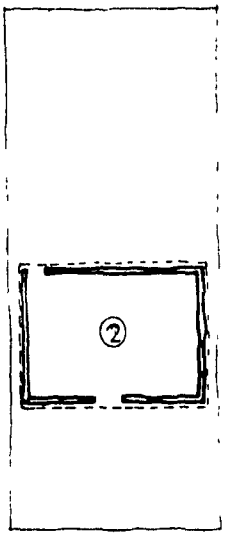
PROGRESSIVE DEVELOPMENT

**1**



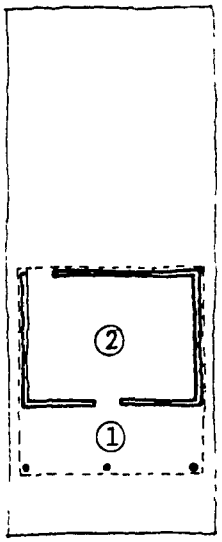

27.45 M2

**2**



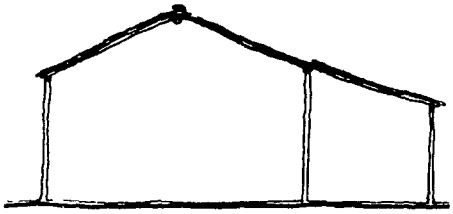

27.45 M2

**3**



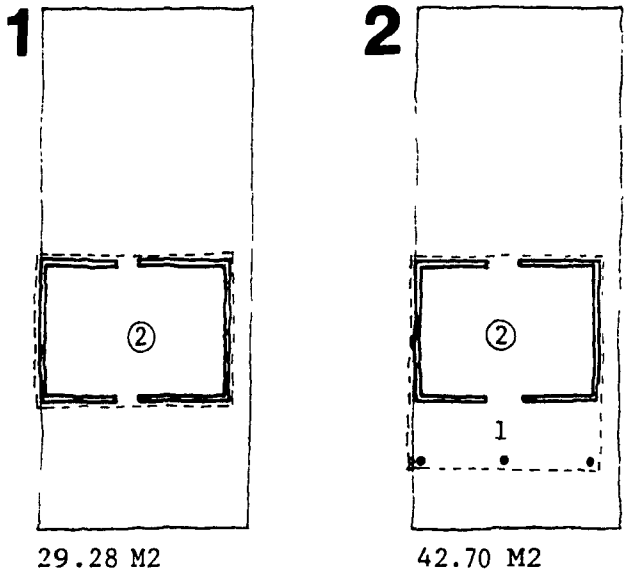

40.26 M2

PRESENT SITUATION



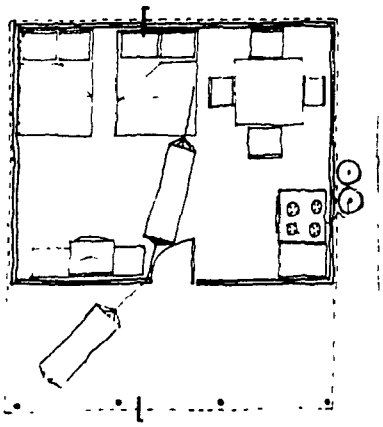
section

PROGRESSIVE DEVELOPMENT



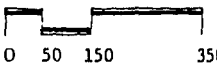

29.28 M2

42.70 M2



street

plan

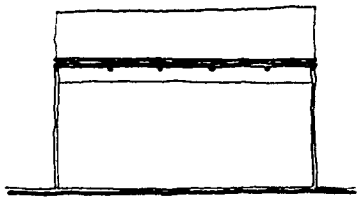



occupancy: Feb.-87

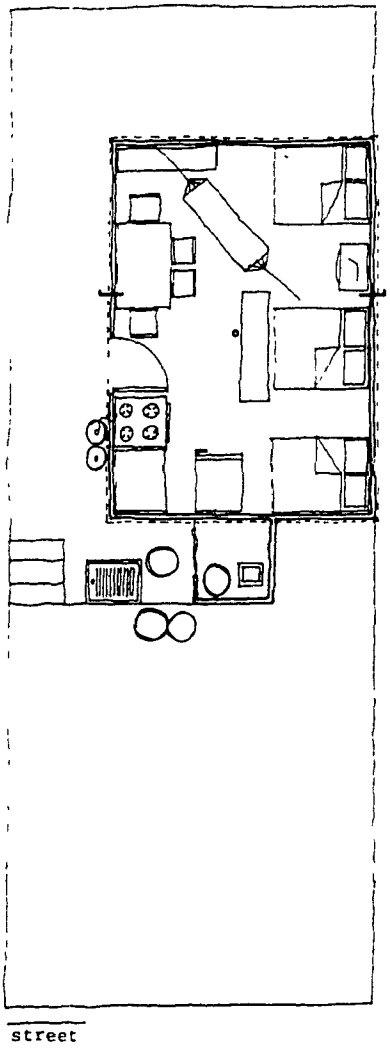
family members: 4

**9-6**

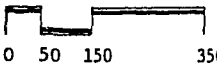
PRESENT SITUATION



section




plan

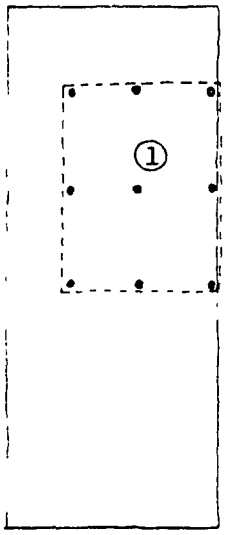



occupancy: Oct.-85

family members: 7

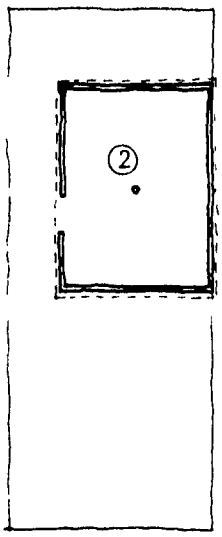
PROGRESSIVE DEVELOPMENT

1



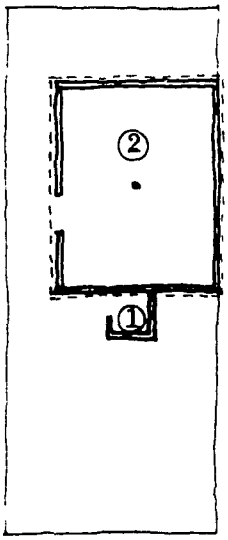

34.00 M2

2




34.00 M2

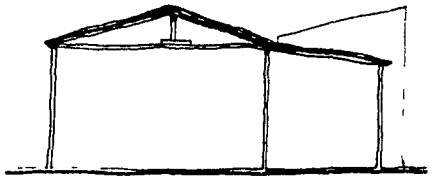
3




36.25 M2

**9-11**

PRESENT SITUATION



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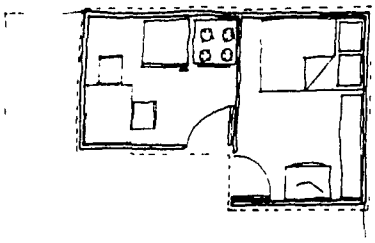
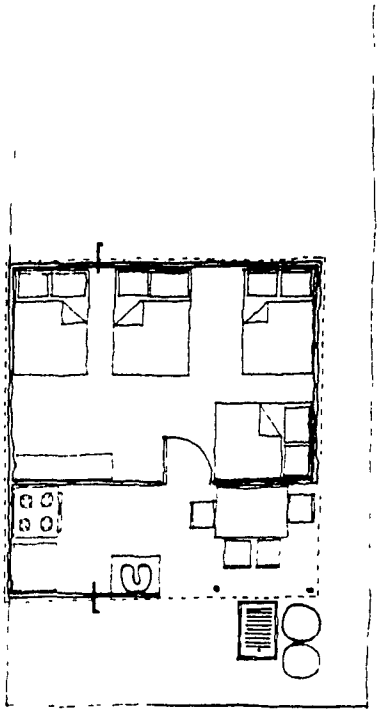
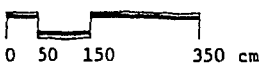




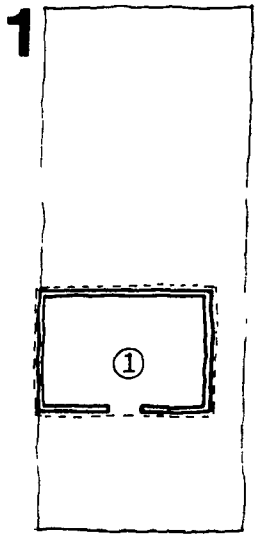

plan



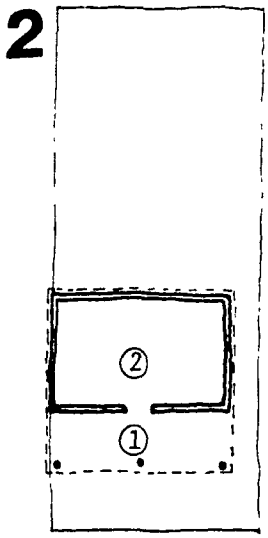

occupancy: Nov.-85

family members: 6

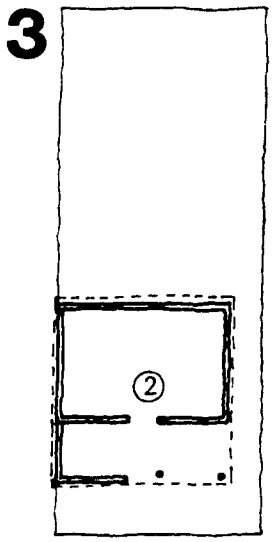
PROGRESSIVE DEVELOPMENT



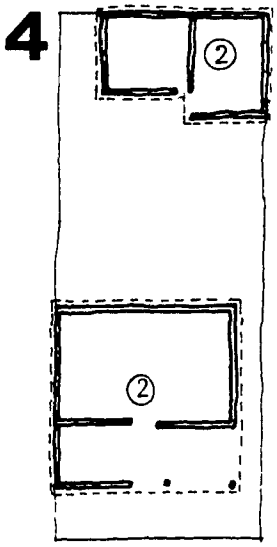

24.80 M2




37.20 M2



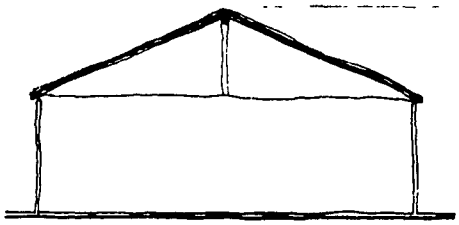

37.20 M2




53.45 M2

**9-12**

PRESENT SITUATION



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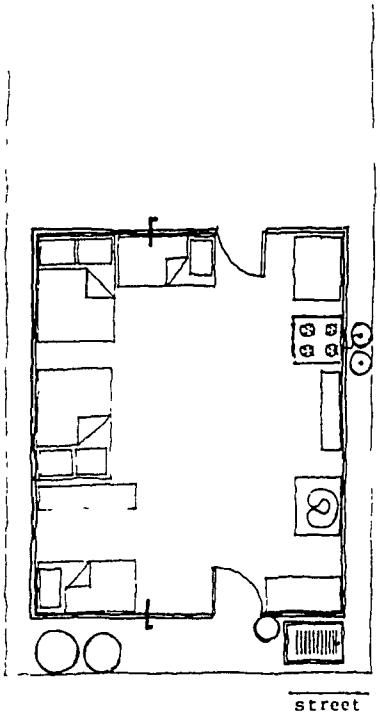
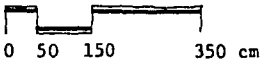


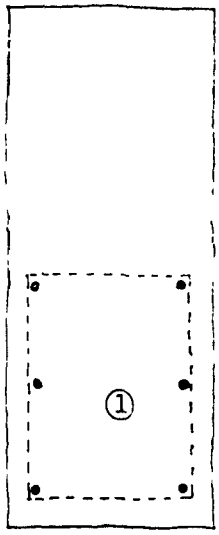

plan



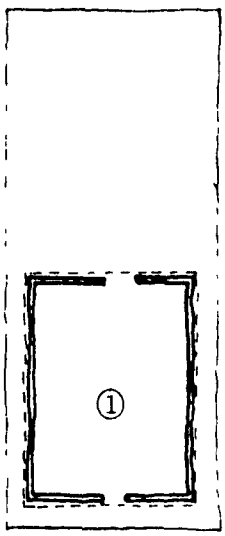

occupancy: August-87

family members: 10

PROGRESSIVE DEVELOPMENT



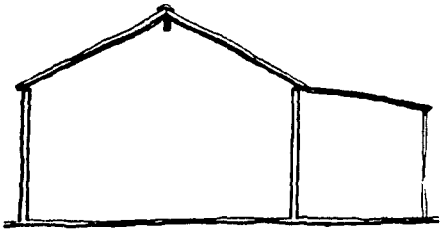

42.75 M2



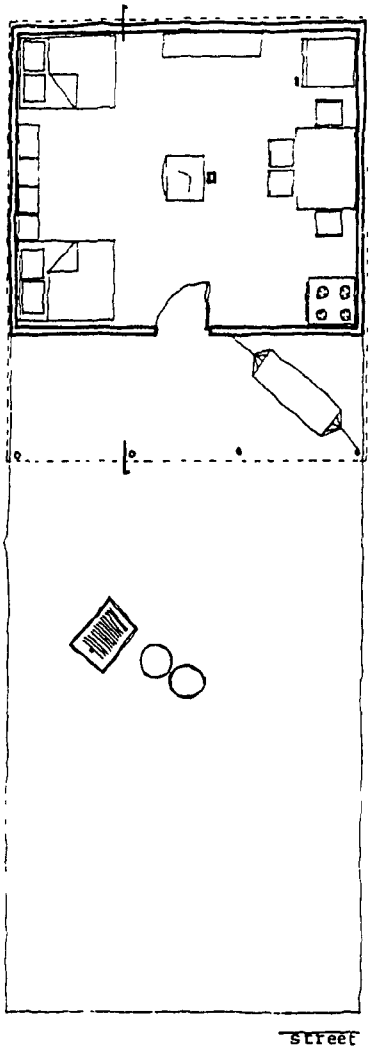

42.75 M2

**9-15**

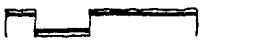
PRESENT SITUATION



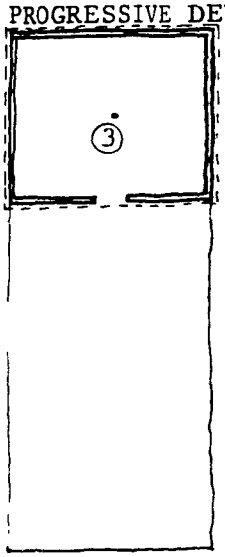
section



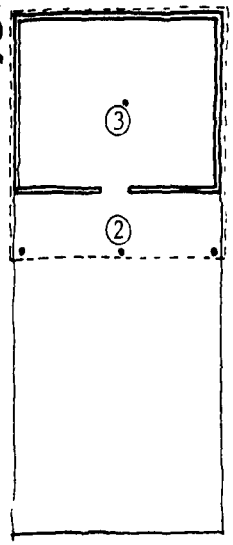

plan




PROGRESSIVE DEVELOPMENT




46.60 M2



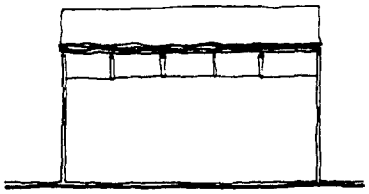

55.30 M2

occupancy: August-87

family members: 4

**9-17**

PRESENT SITUATION



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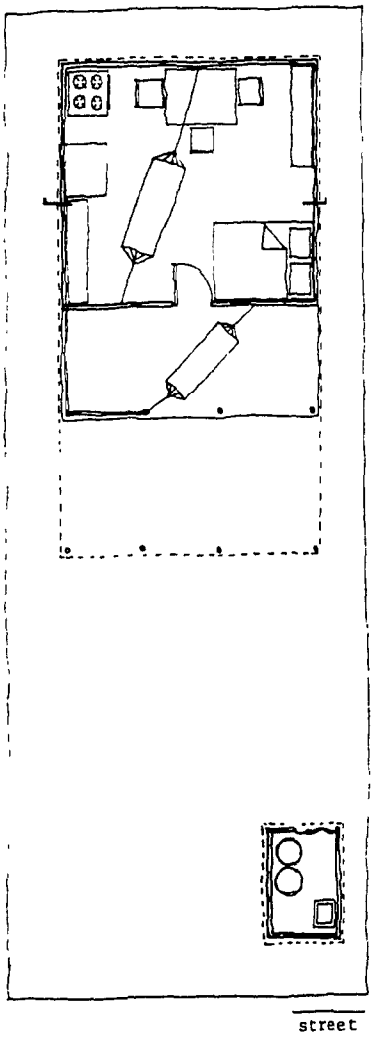
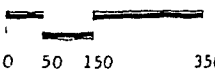



plan



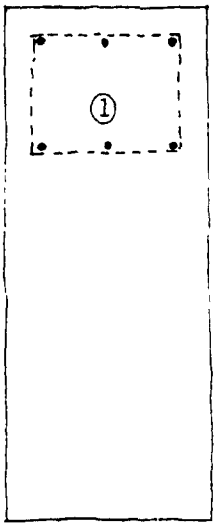

occupancy: August-85

family members: 6

**9-19**

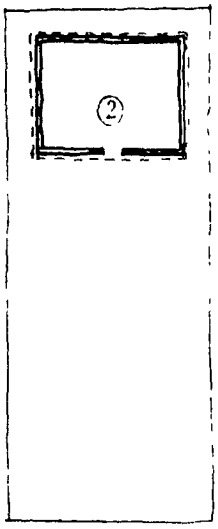
PROGRESSIVE DEVELOPMENT

**1**



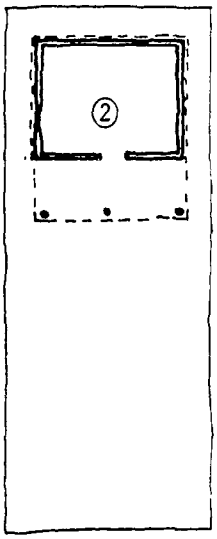

21.84 M2

**2**



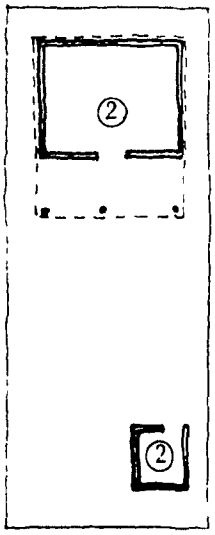

21.84 M2

**3**



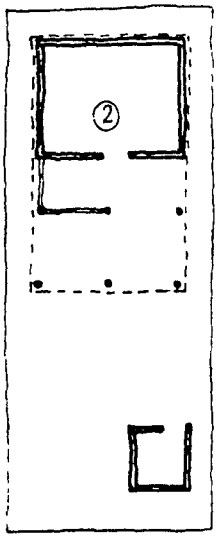

32.24 M2

**4**



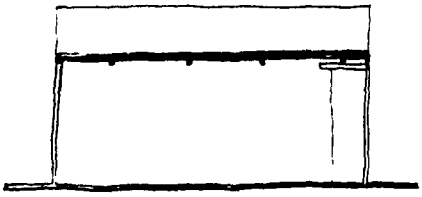

36.32 M2

**5**




49.24 M2

PRESENT SITUATION



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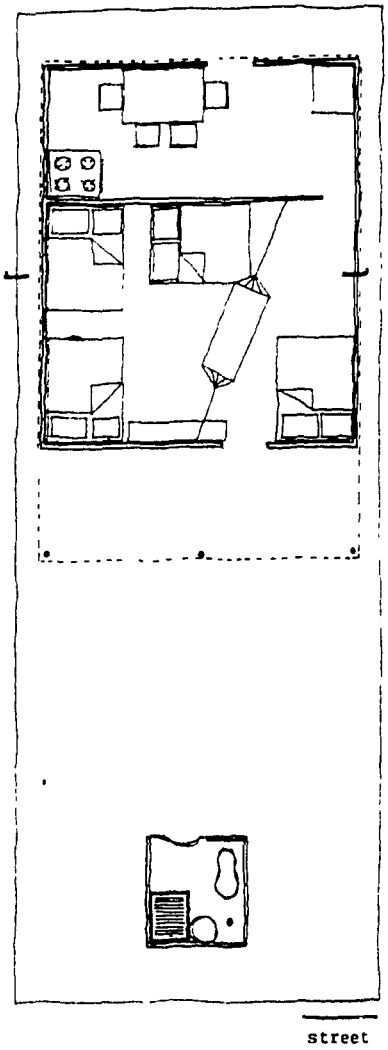
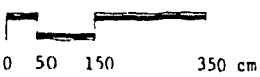



plan



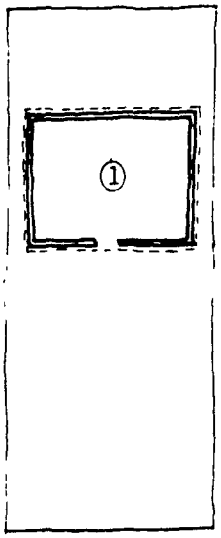

occupancy: Dec.-85

family members: 6

**9-25**

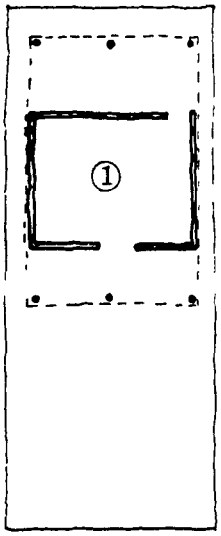
PROGRESSIVE DEVELOPMENT

**1**



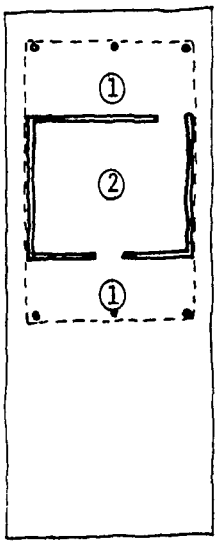

26.10 M2

**2**



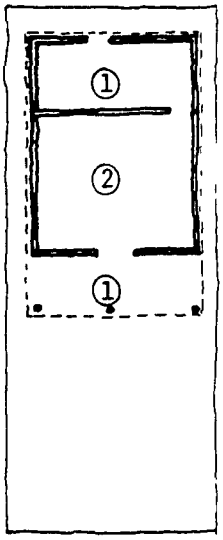

52.20 M2

**3**



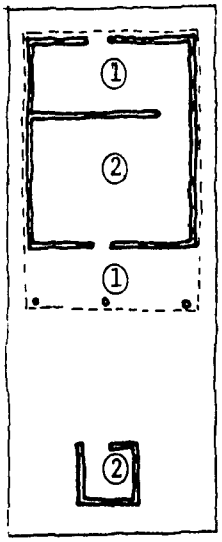

52.20 M2

**4**



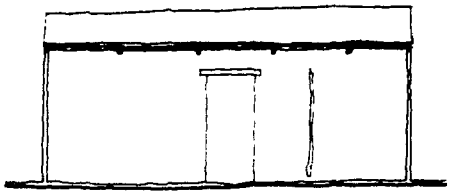

52.20 M2

**5**

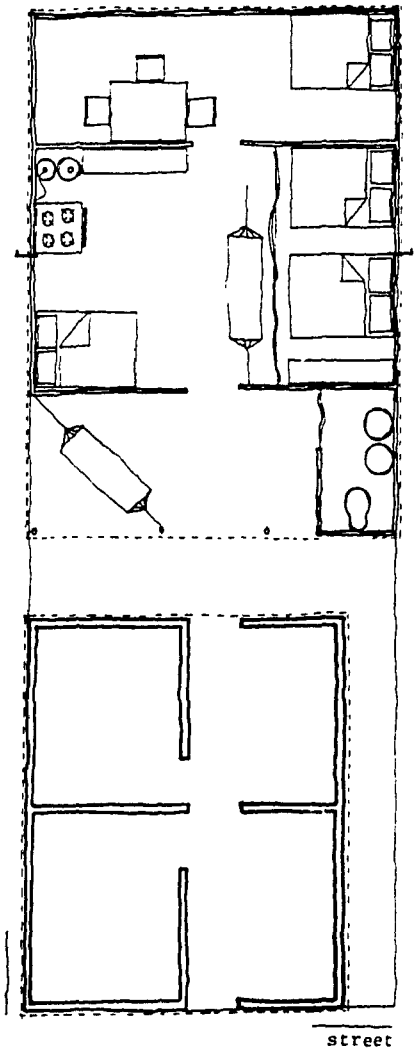



56.40 M2

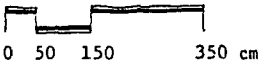
PRESENT SITUATION



section




plan

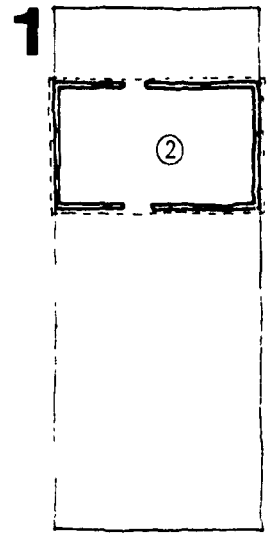



occupancy: May-84

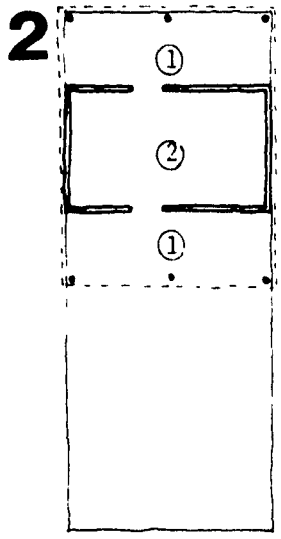
family members: 7

**9 - 26**

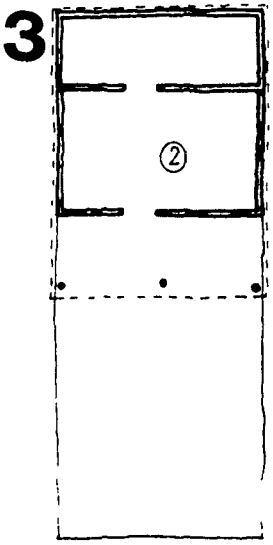
PROGRESSIVE DEVELOPMENT



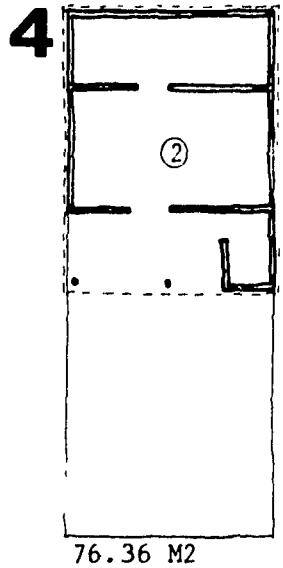

35.69 M2



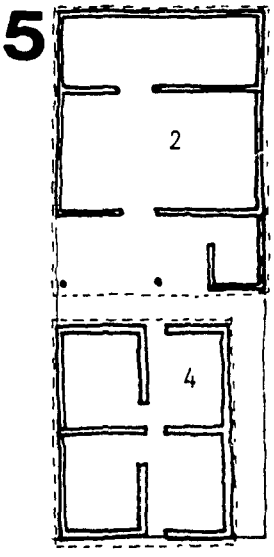

76.36 M2




76.36 M2

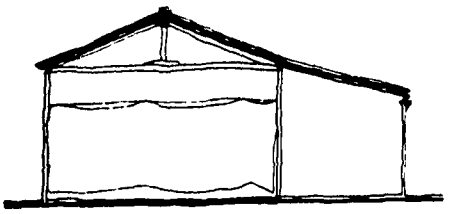



76.36 M2




127.46 M2

PRESENT SITUATION



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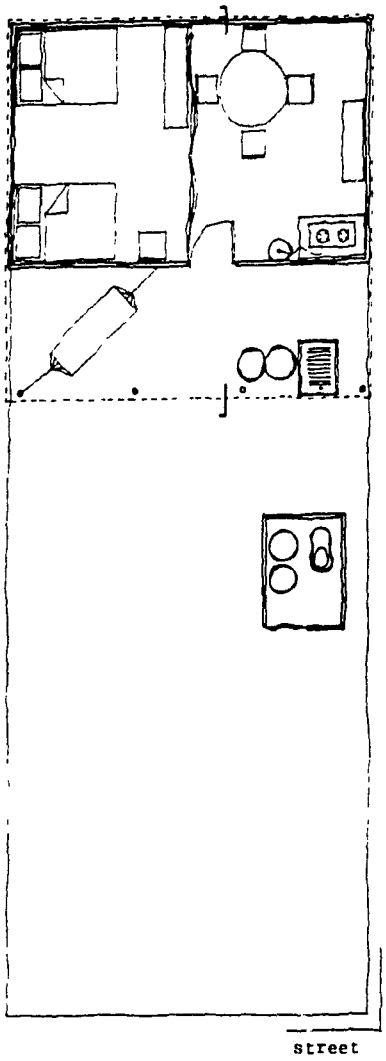
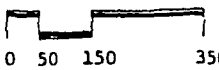


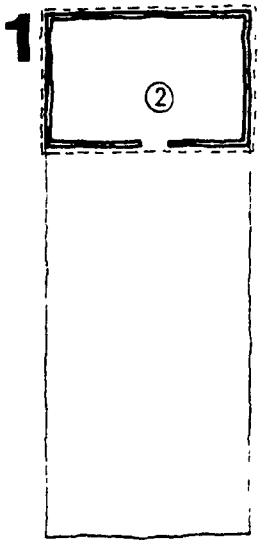

plan



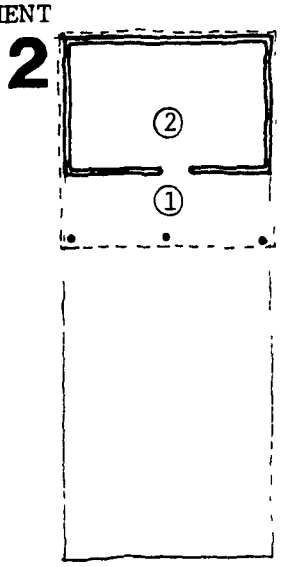

occupancy: Oct.-85

family members: 3

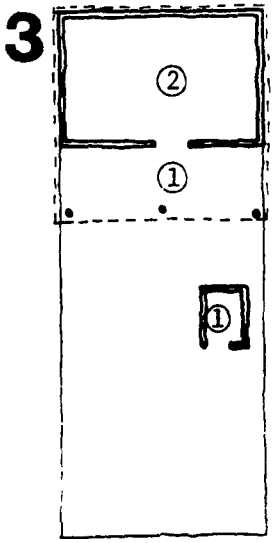
PROGRESSIVE DEVELOPMENT




31.50 M2



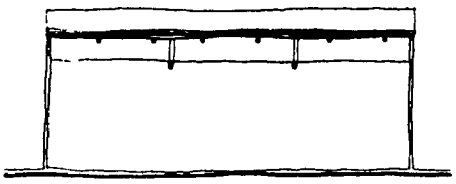

48.30 M2




50.55 M2

**10-2**

PRESENT SITUATION



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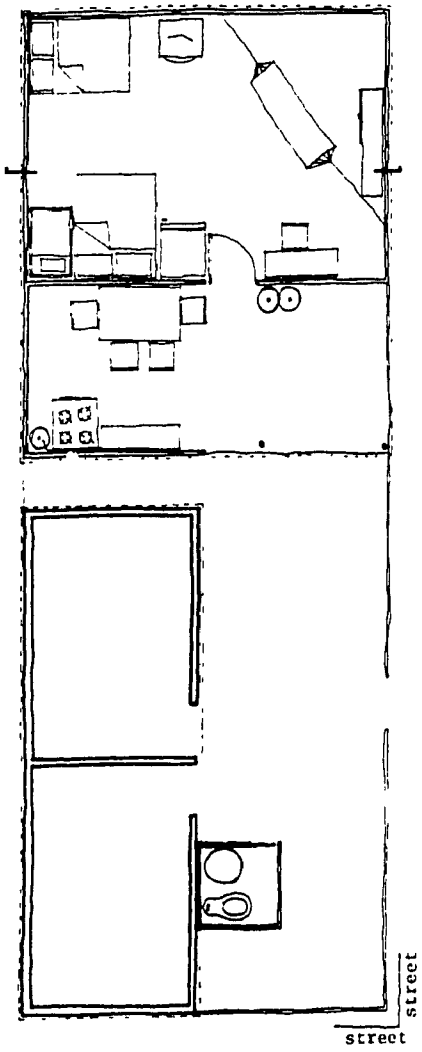
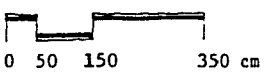


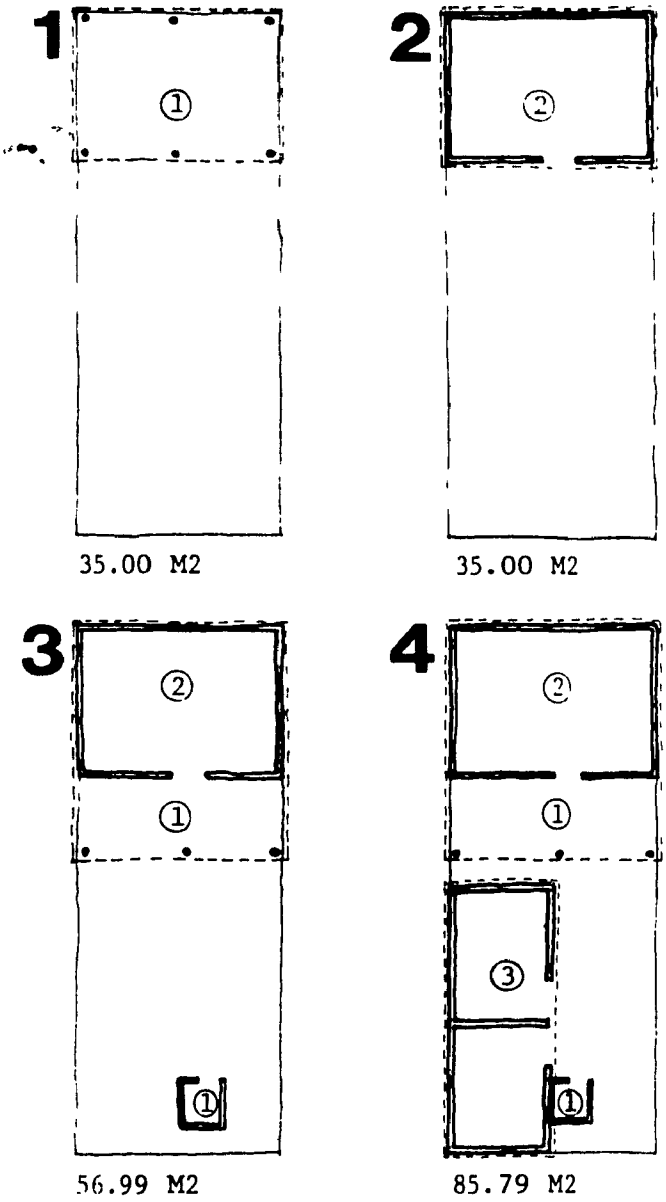

plan




occupancy: May-86

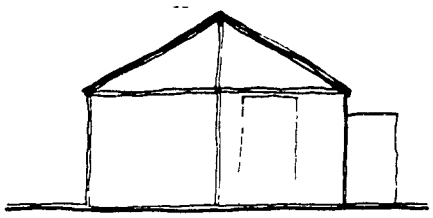
family members: 3

PROGRESSIVE DEVELOPMENT

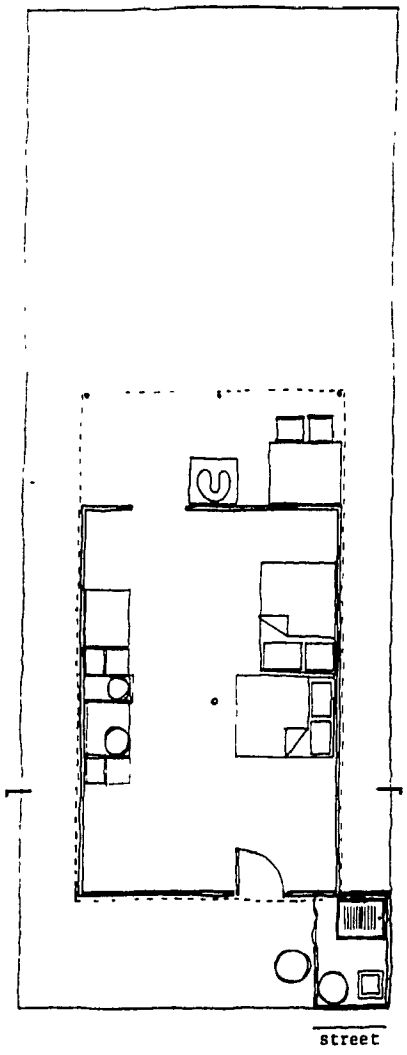



**10 - 4**

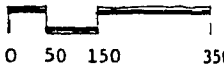
PRESENT SITUATION



section



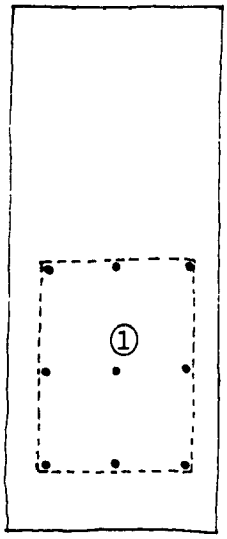

plan



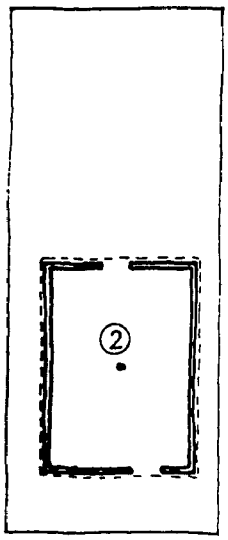

occupancy: June-84

family members: 5

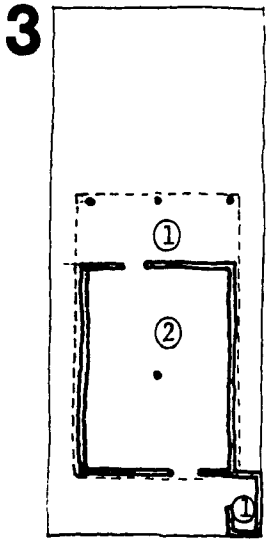
PROGRESSIVE DEVELOPMENT




35.00 M2



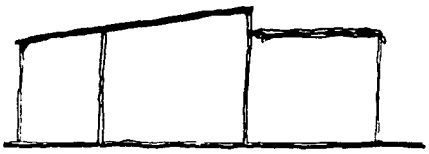

35.00 M2




47.00 M2

**10-6**

PRESENT SITUATION



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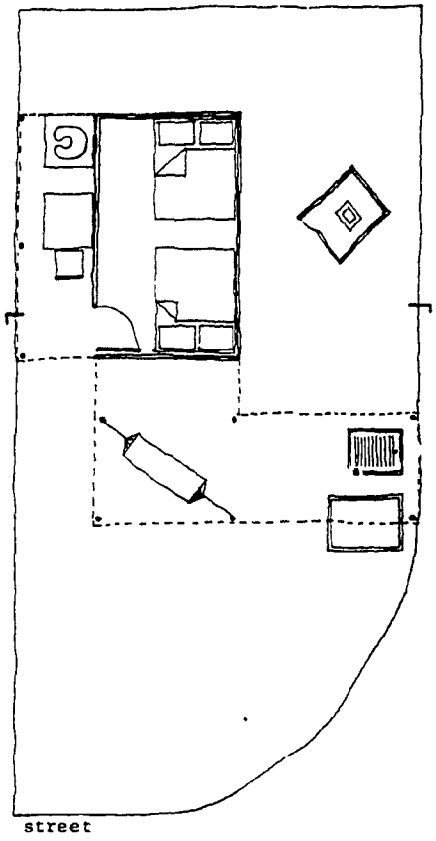
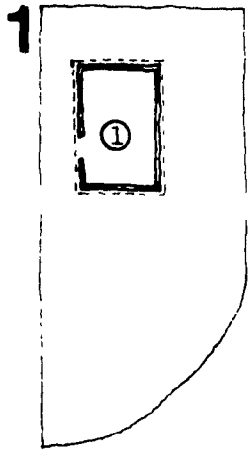
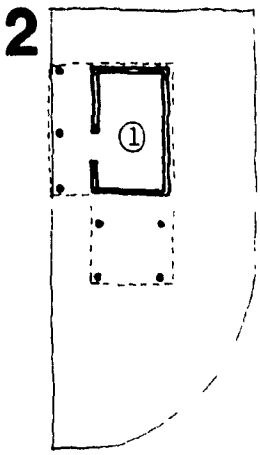


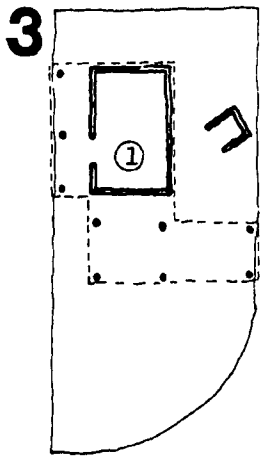

PROGRESSIVE DEVELOPMENT




11.34 M2

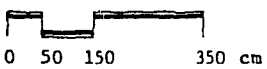



28.14 M2




38.39 M2

plan

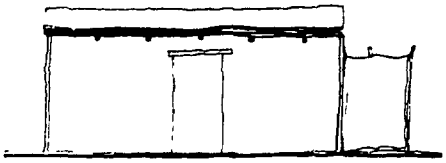



occupancy: August-86

family members: 4

**10-13**

PRESENT SITUATION



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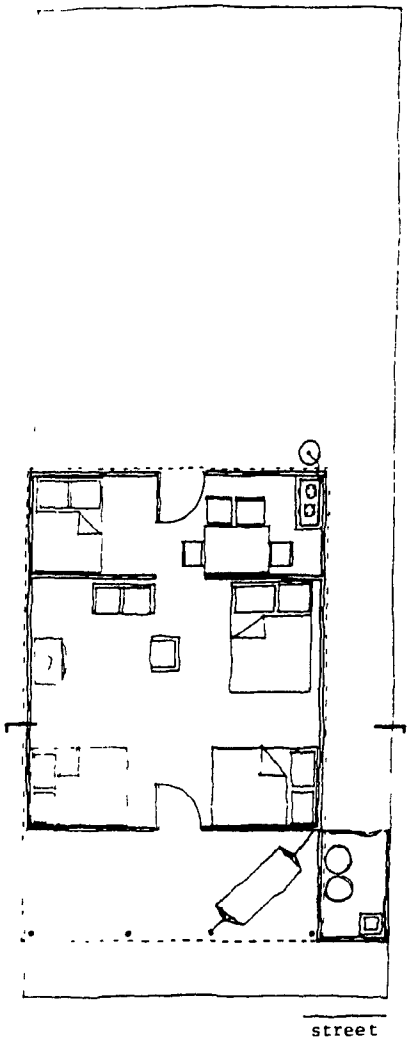
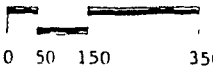


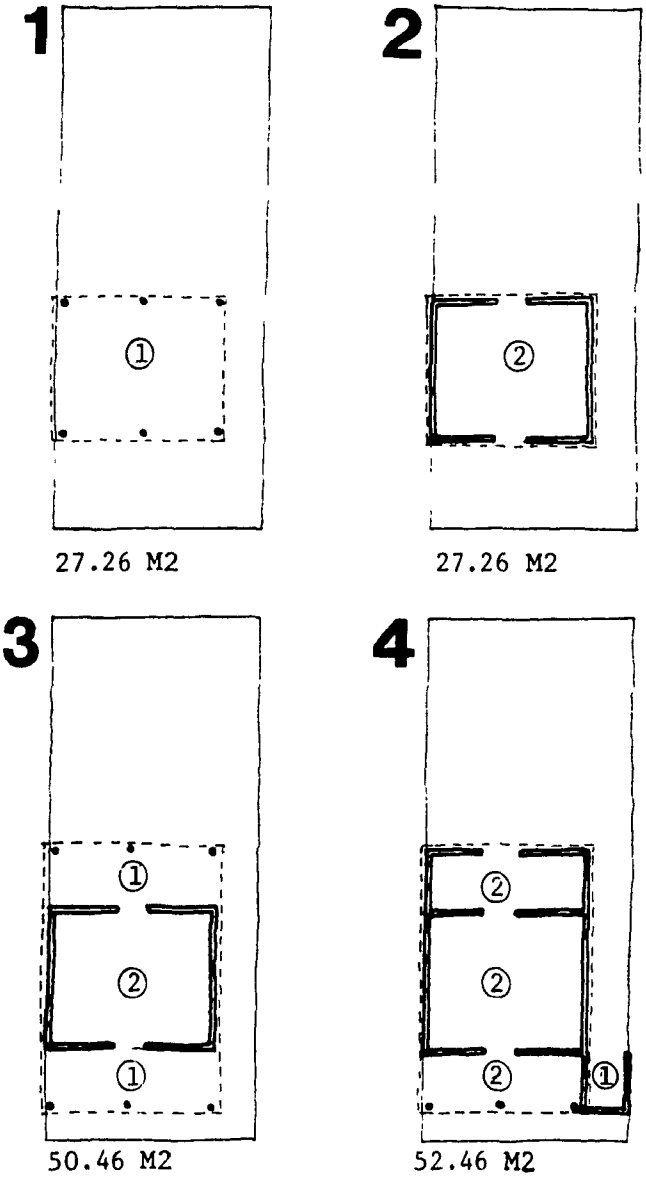

plan




occupancy: Nov.-84

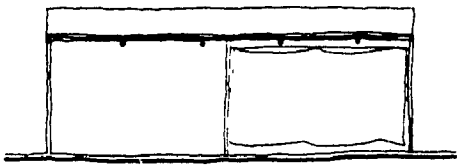
family members: 7

PROGRESSIVE DEVELOPMENT




**10 - 14**

PRESENT SITUATION



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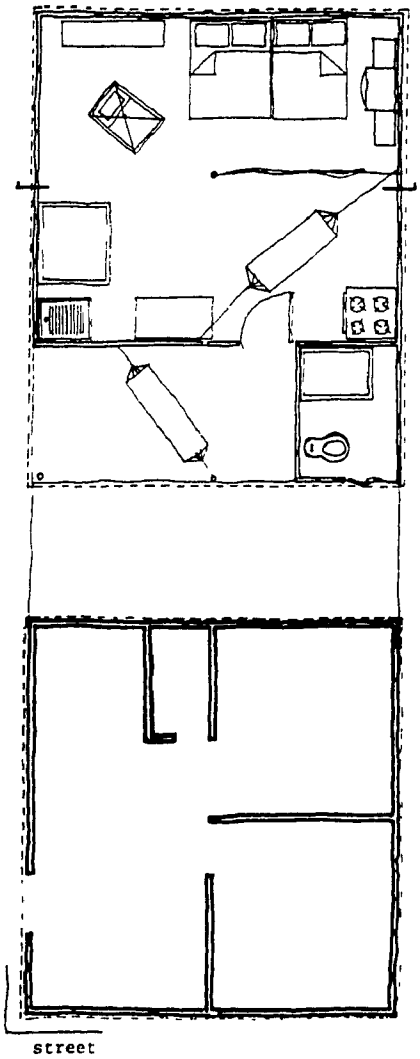
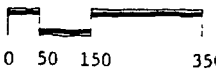



plan

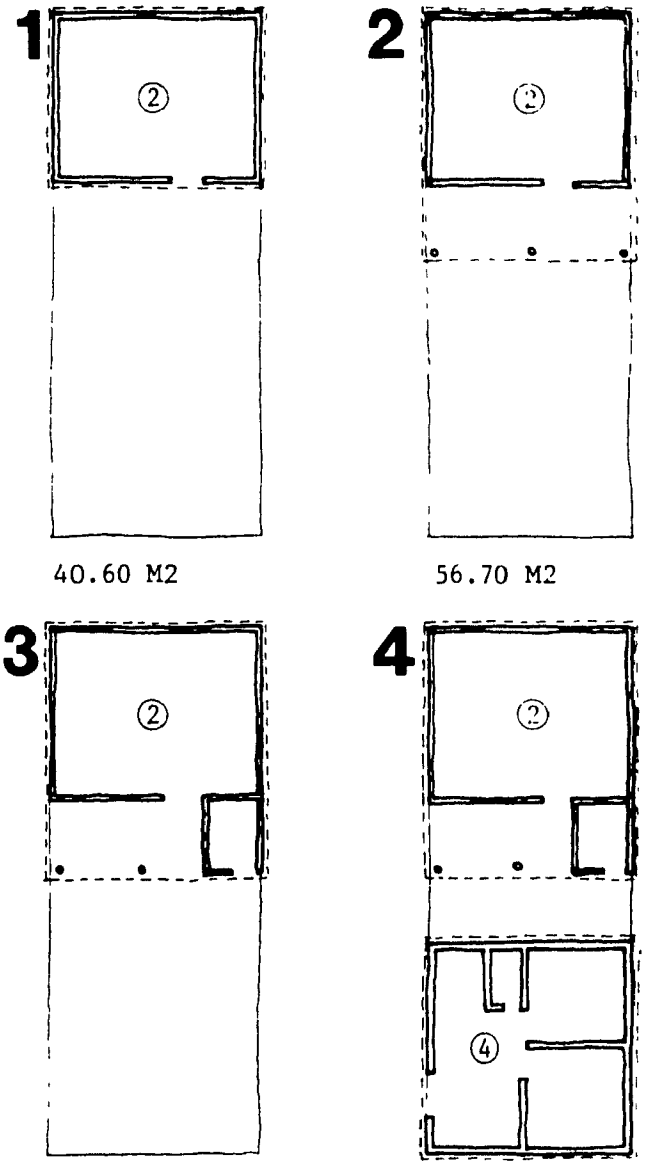



occupancy: April-86

family members: 5

**11-1**

PROGRESSIVE DEVELOPMENT



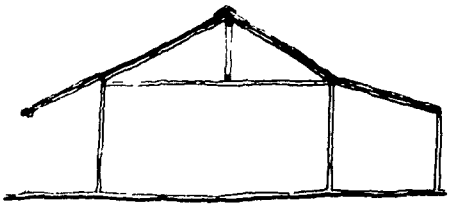

40.60 M2

56.70 M2

56.70 M2

105.70 M2

PRESENT SITUATION



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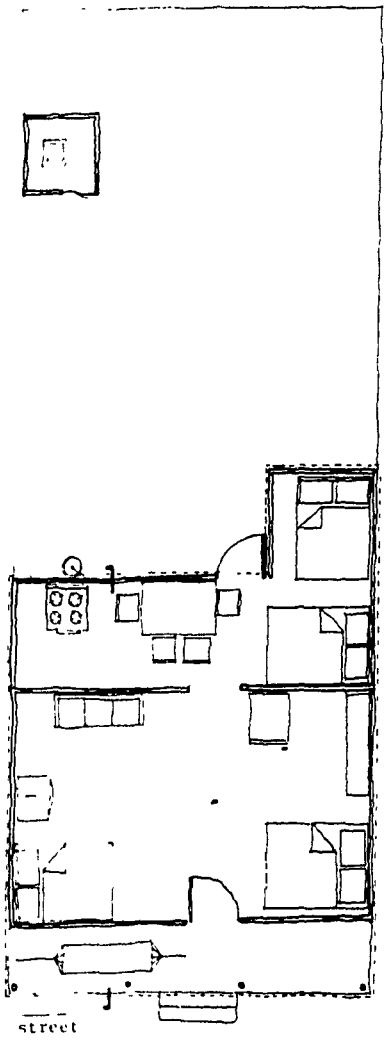
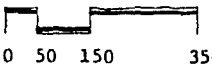


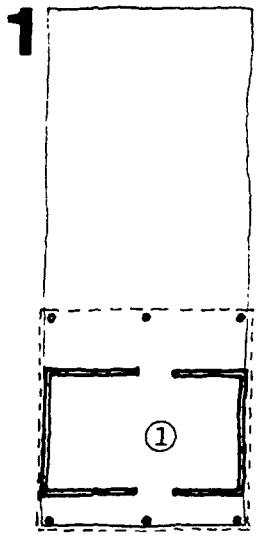

plan



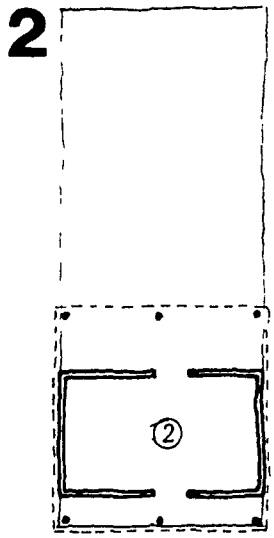

occupancy: Feb.-84

family members: 7

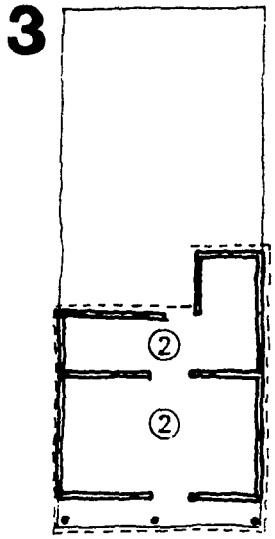
PROGRESSIVE DEVELOPMENT



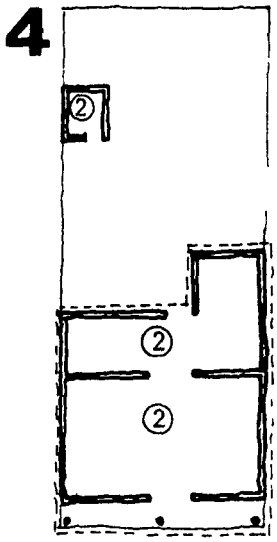

51.10 M2




51.10 M2



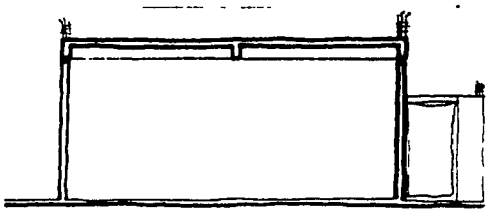

56.10 M2




58.35 M2

**11 - 4**

PRESENT SITUATION



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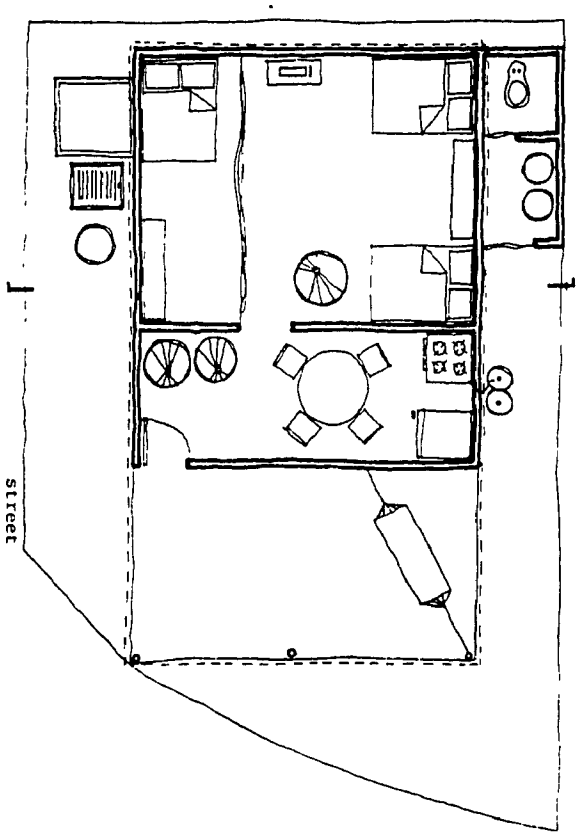
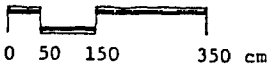
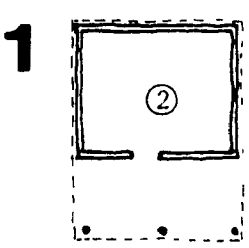


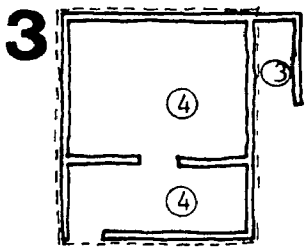

plan




PROGRESSIVE DEVELOPMENT

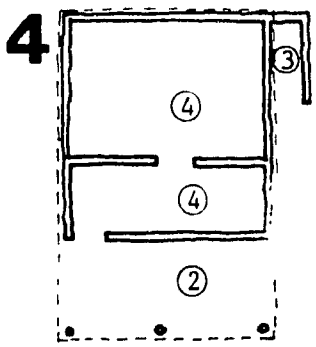



38.50 M2




55.00 M2

46.25 M2



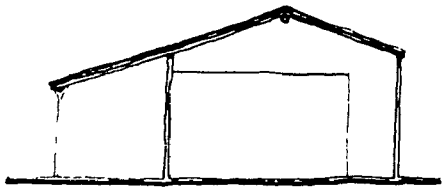

79.85 M2

occupancy: August-85

family members: 5

**11-8**

PRESENT SITUATION



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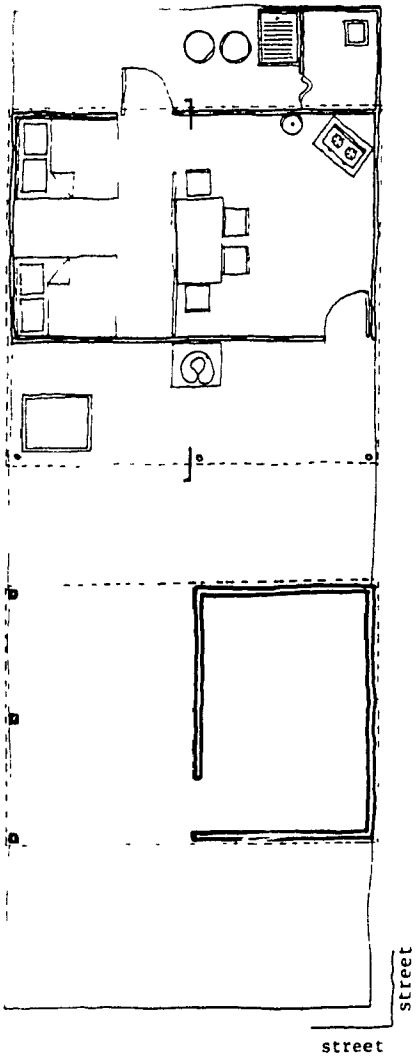
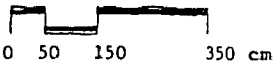


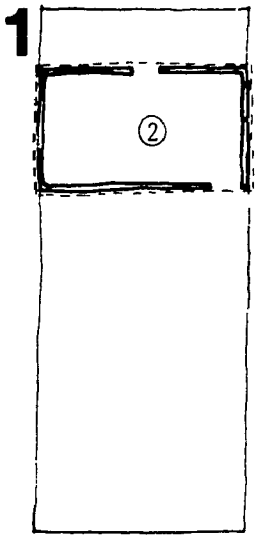

plan



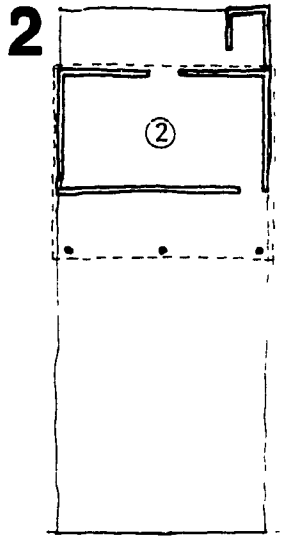

occupancy: April-84

family members: 4

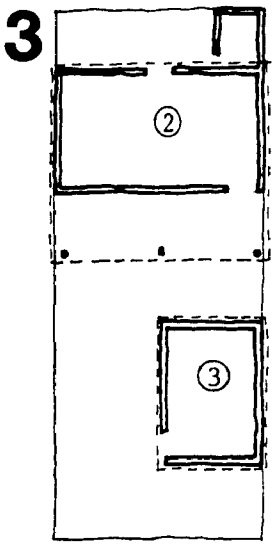
PROGRESSIVE DEVELOPMENT



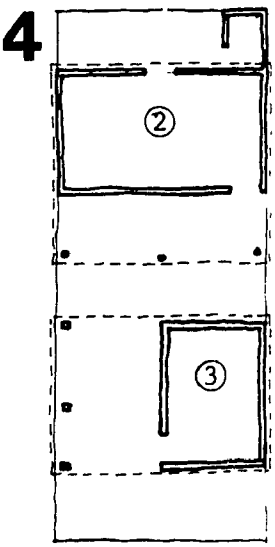

28.00 M2




45.96 M2



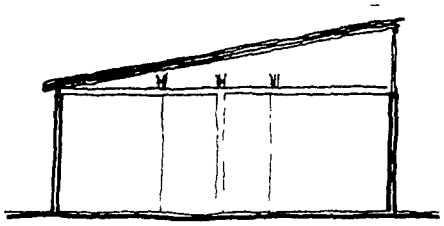

61.71 M2




77.46 M2

**12-4**

PRESENT SITUATION



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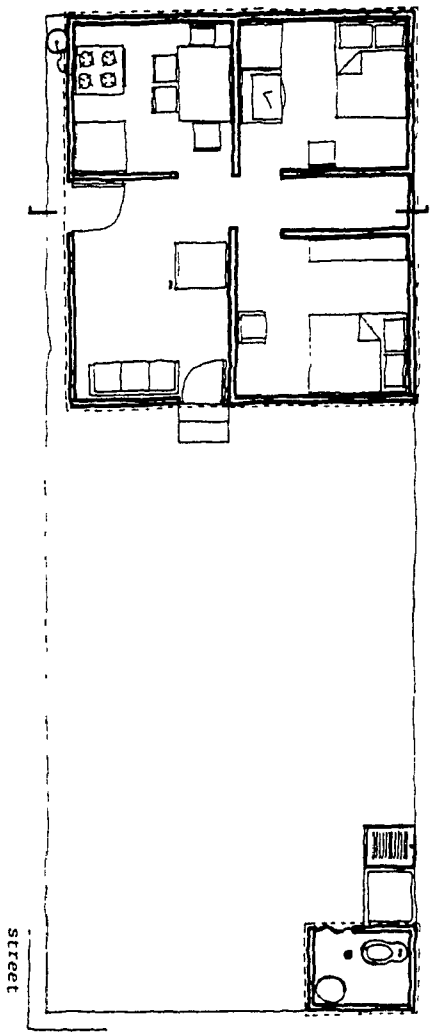
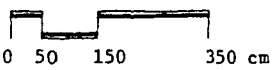


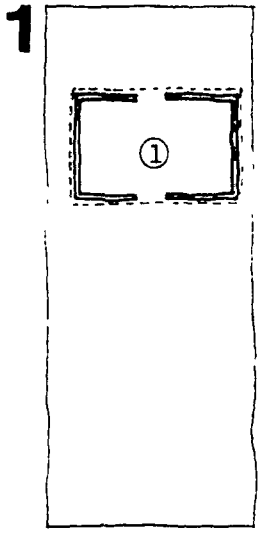

plan



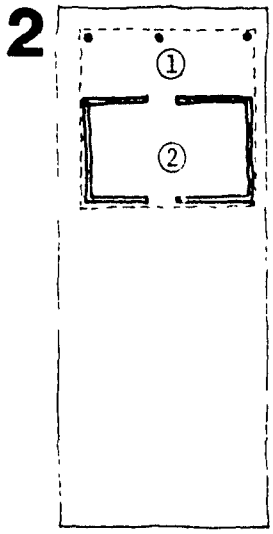

occupancy: August-85

family members: 5

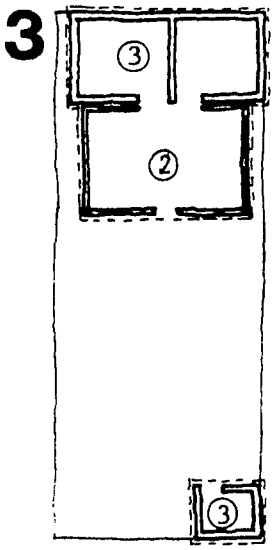
PROGRESSIVE DEVELOPMENT



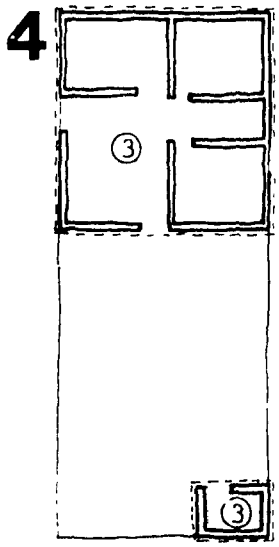

19.60 M2




30.80 M2



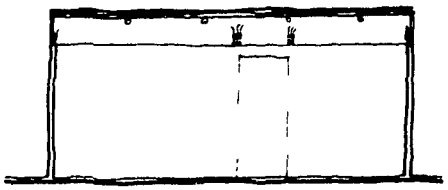

44.80 M2




47.10 M2

**13-2**

PRESENT SITUATION



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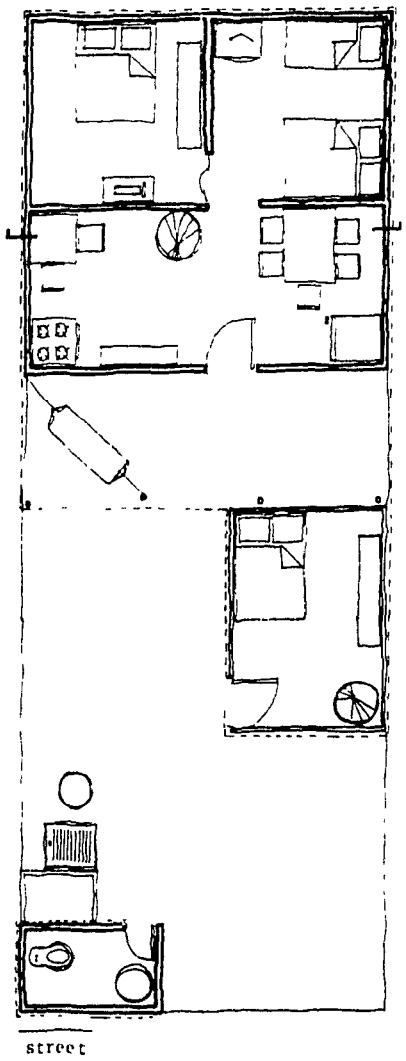
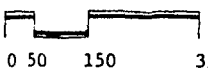



plan

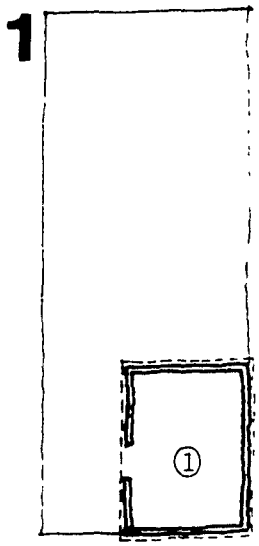



occupancy: June-86

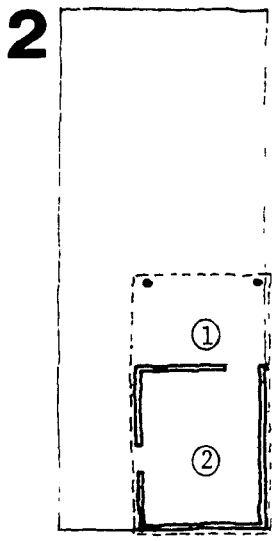
family members: 7

**13-3**

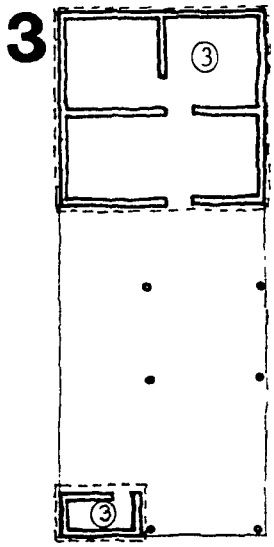
PROGRESSIVE DEVELOPMENT



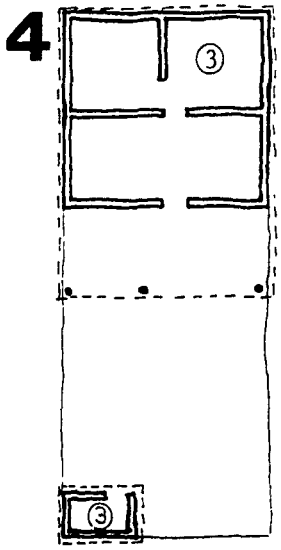

23.10 M2



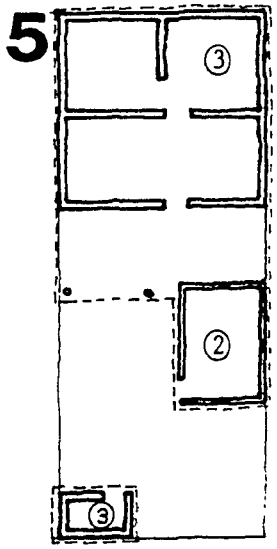

35.70 M2




49.00 M2

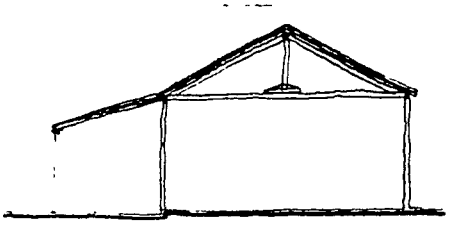



66.50 M2




79.50 M2

PRESENT SITUATION



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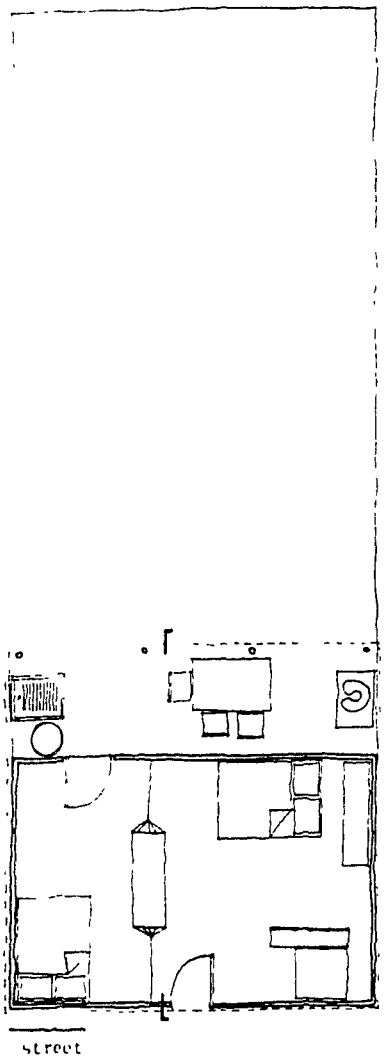
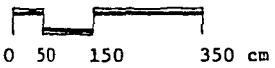


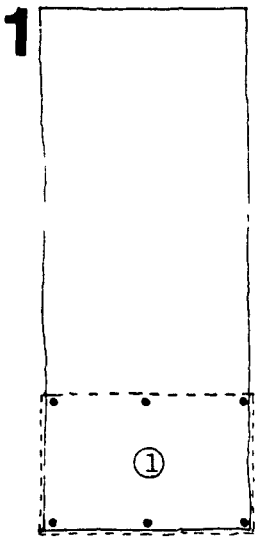

plan



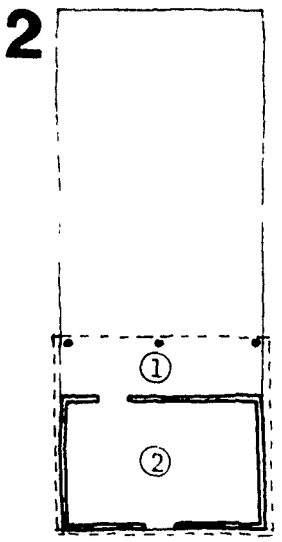

occupancy: Sept.-85

family members: 4

PROGRESSIVE DEVELOPMENT



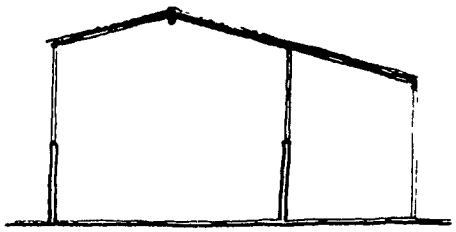

30.10 M2



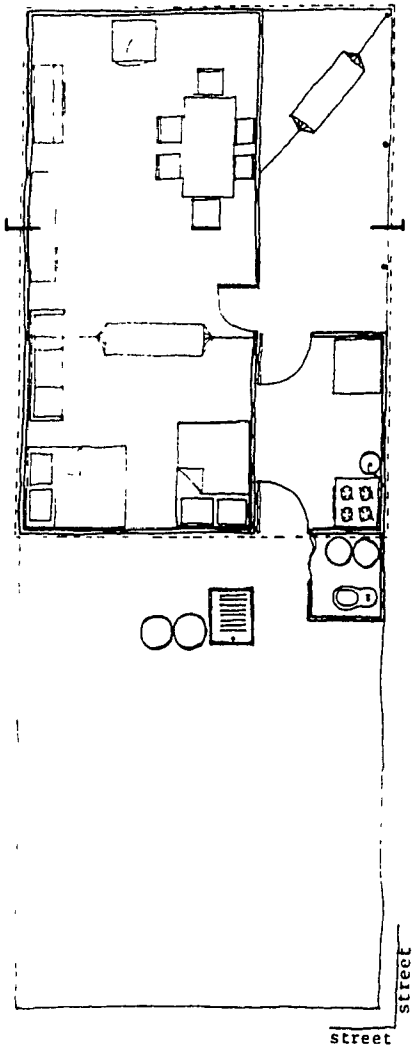

44.10 M2

**13 - 12**

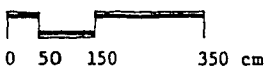
PRESENT SITUATION



section



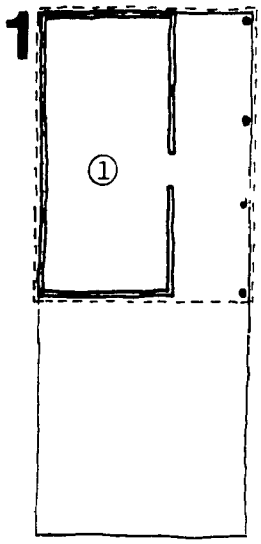

plan



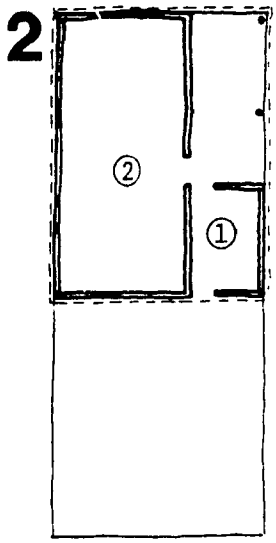

occupancy: Sept.-86

family members: 5

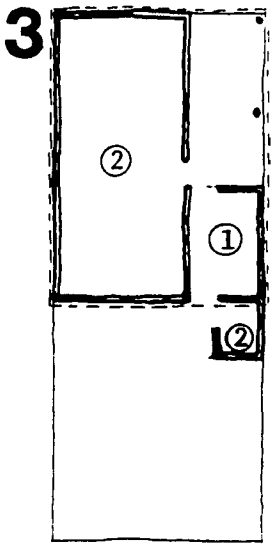
PROGRESSIVE DEVELOPMENT




66.50 M2



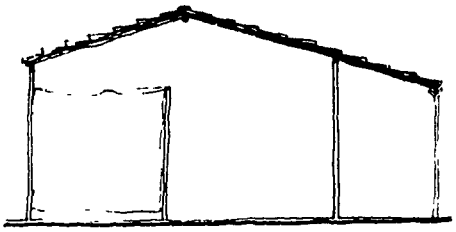

66.50 M2




68.00 M2

**14 - 1**

PRESENT SITUATION



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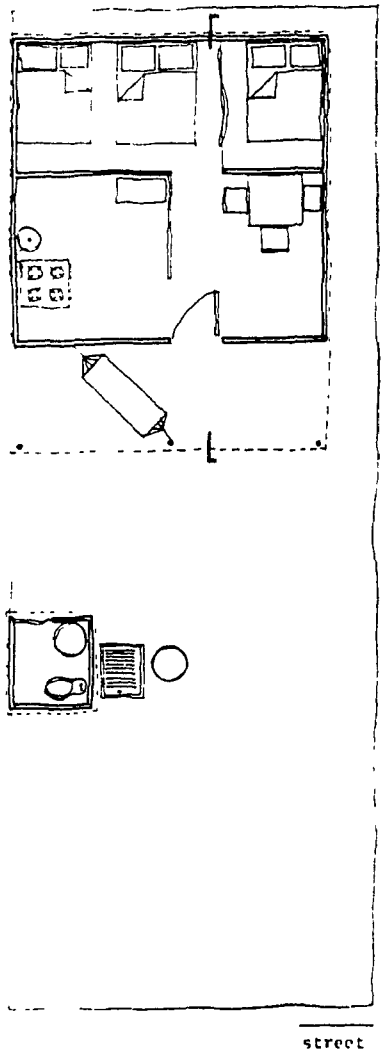
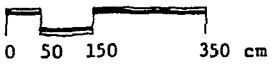


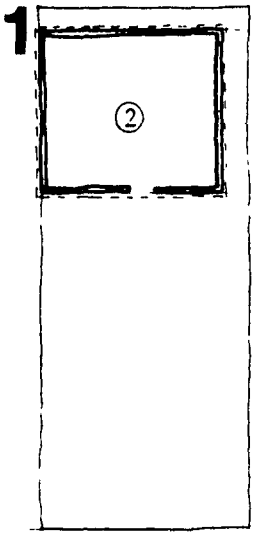

plan



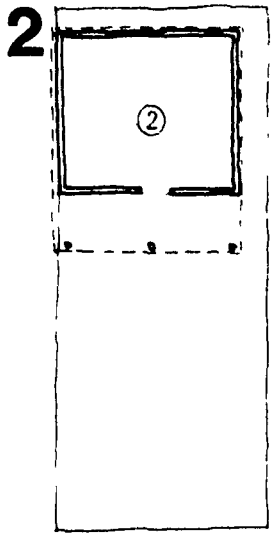

occupancy: Dec.-85

family members: 4

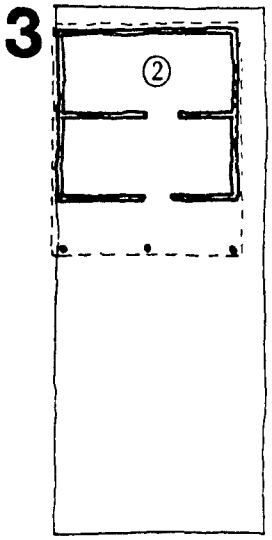
PROGRESSIVE DEVELOPMENT



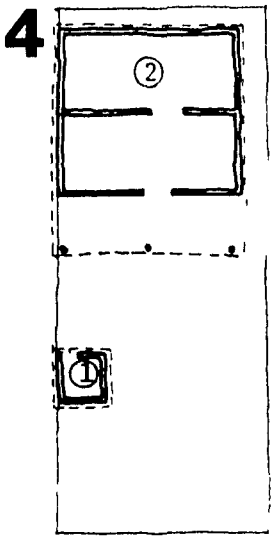

32.94 M2




45.14 M2



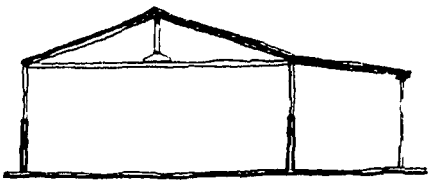

45.14 M2




46.94 M2

**14-3**

PRESENT SITUATION



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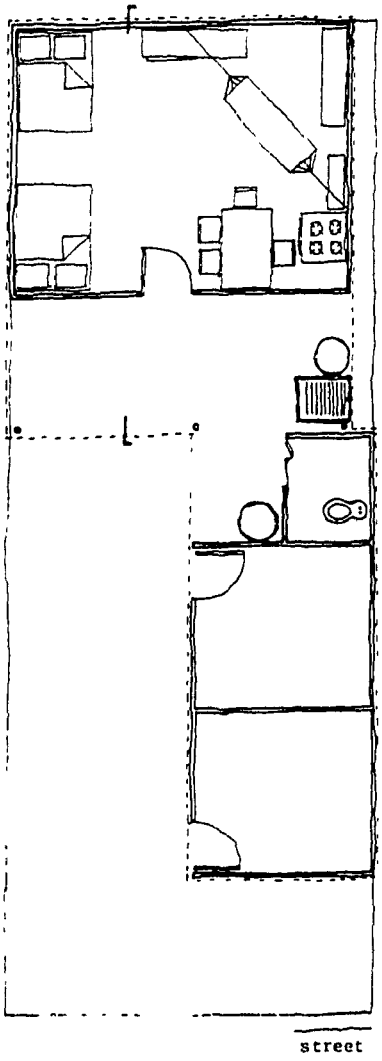
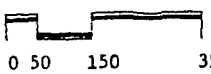


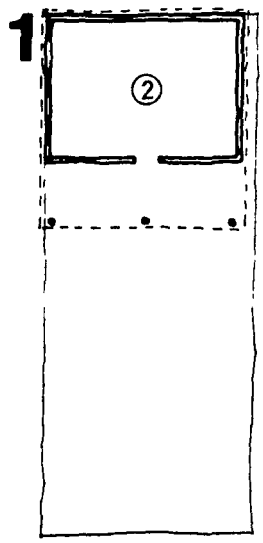

plan



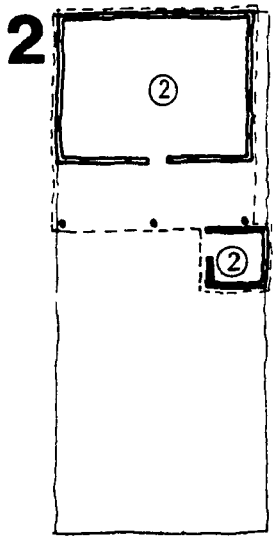

occupancy: May-86

family members: 4

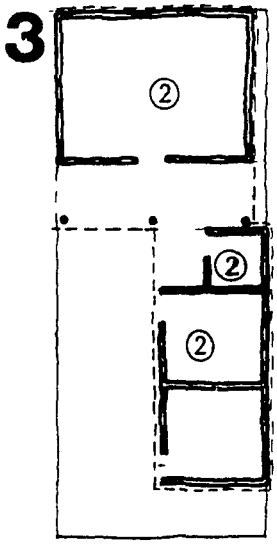
PROGRESSIVE DEVELOPMENT




47.52 M2



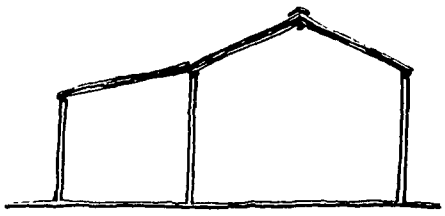

51.52 M2



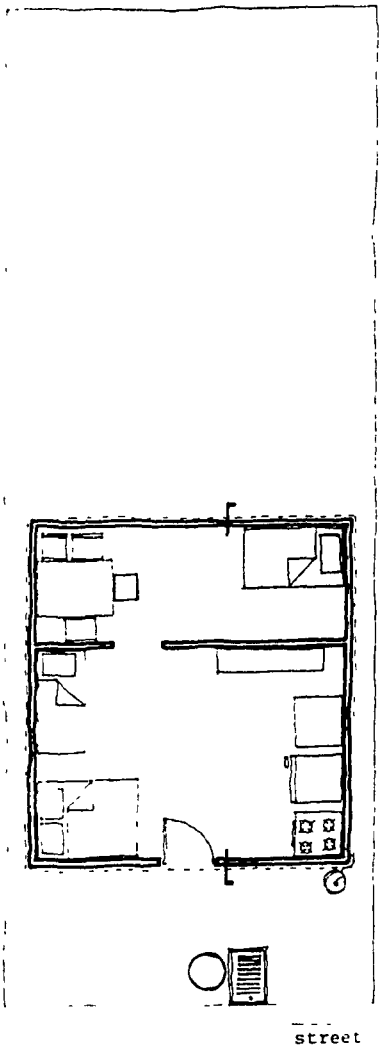

73.84 M2

**14 - 5**

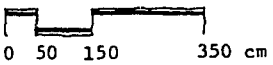
PRESENT SITUATION



section




plan

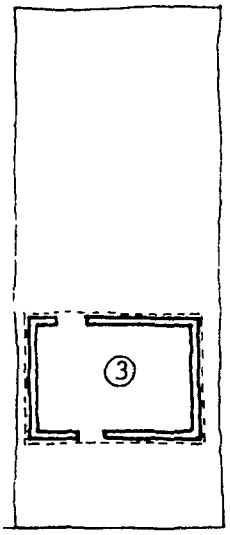



occupancy: March-87

family members: 3

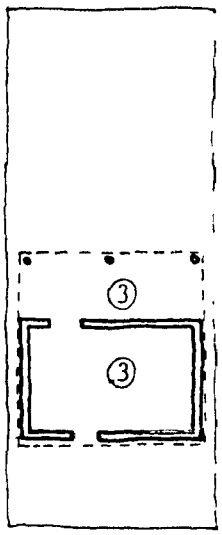
PROGRESSIVE DEVELOPMENT

1



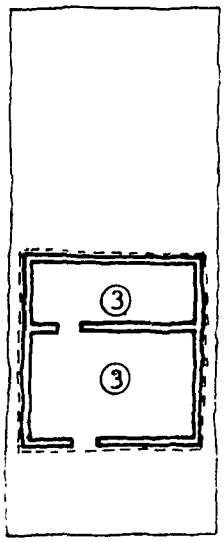

23.30 M2

2




35.58 M2

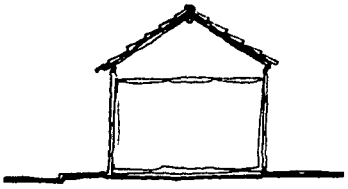
3



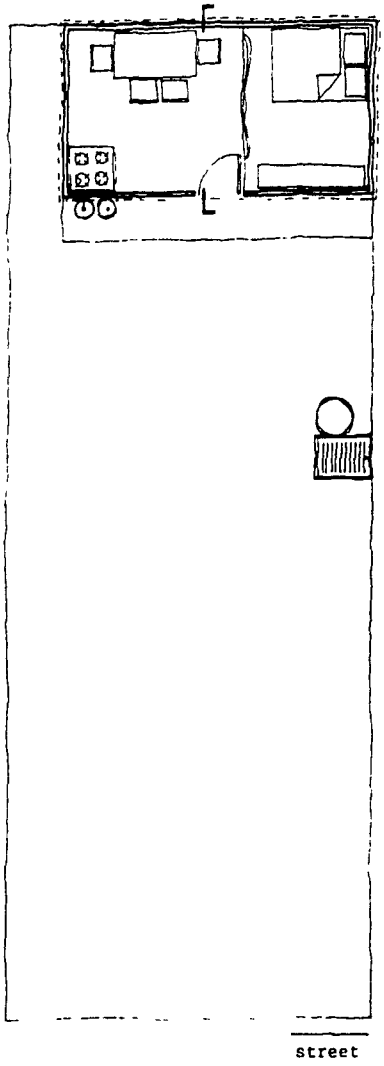

35.38 M2

**14-6**

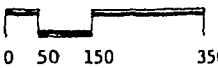
PRESENT SITUATION



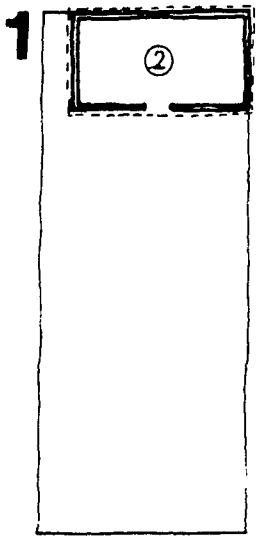
section




plan




PROGRESSIVE DEVELOPMENT



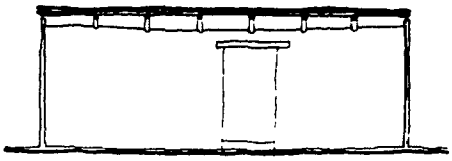

18.60 M2

occupancy: Sept.-87

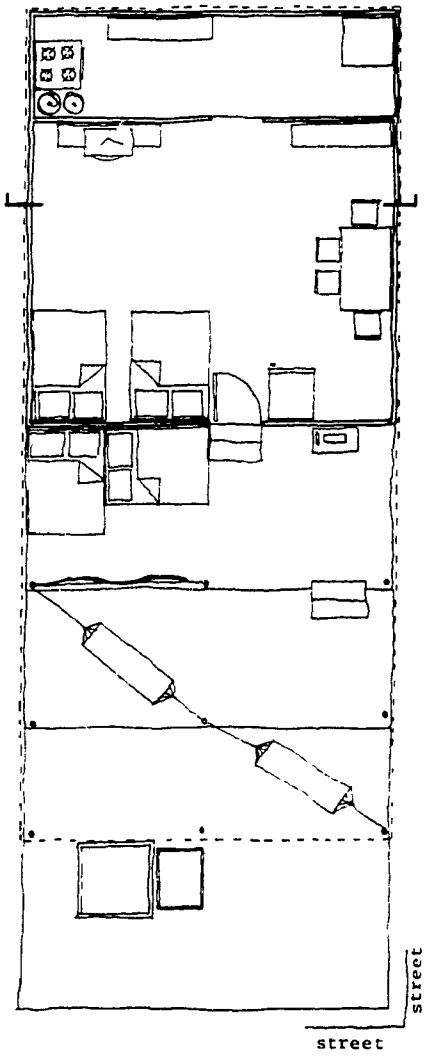
family members: 2

**14 - 9**

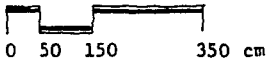
PRESENT SITUATION



section



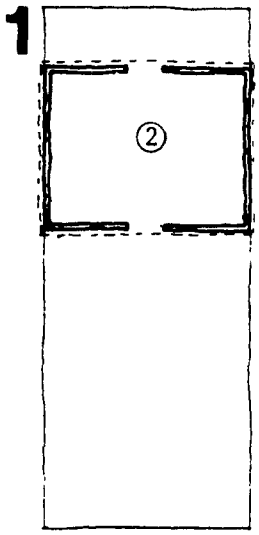

plan



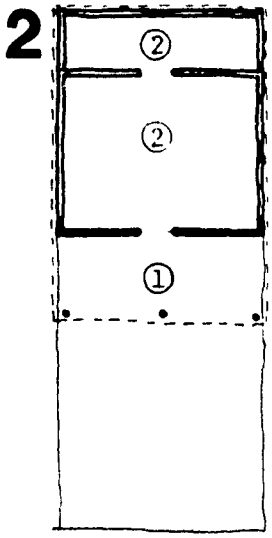

occupancy: Agu.-84

family members: 3

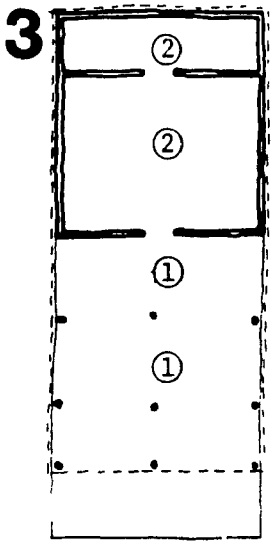
PROGRESSIVE DEVELOPMENT




37.10 M2



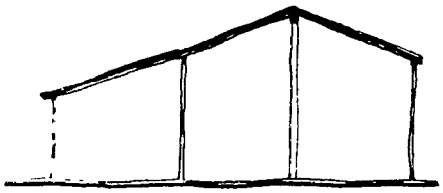

72.10 M2



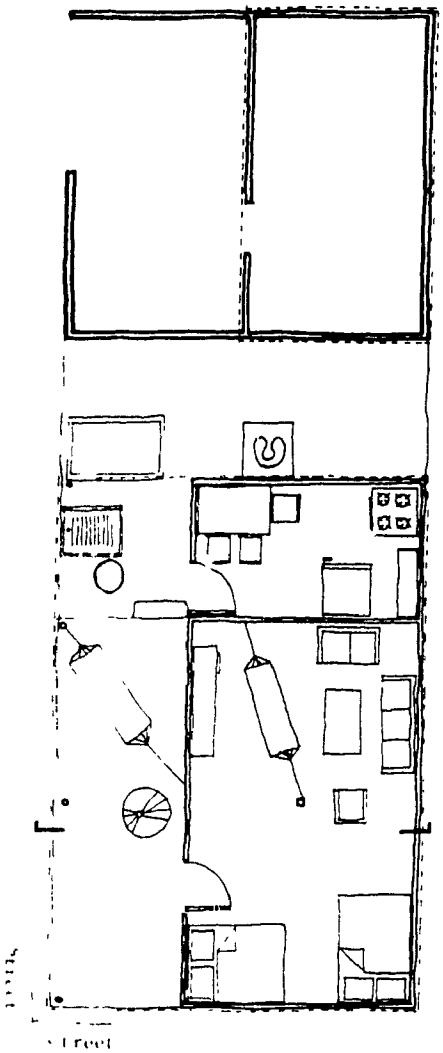

105.70 M2

**14 - 10**

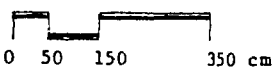
PRESENT SITUATION



section



plan



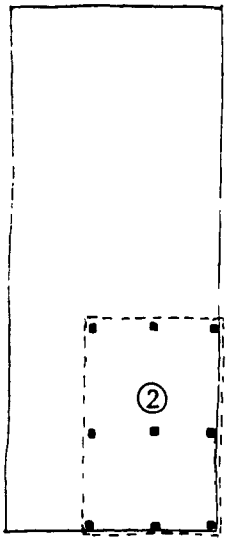

occupancy: Sept.- 85

family members: 6

**14-11**

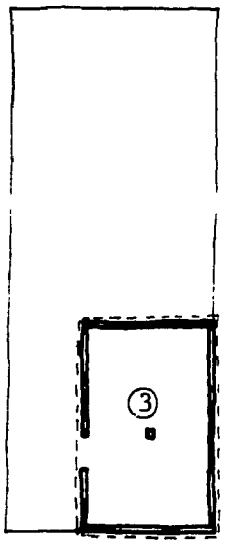
PROGRESSIVE DEVELOPMENT

**1**



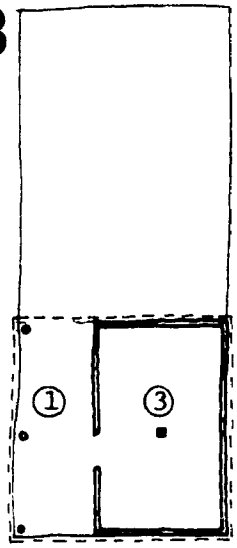

31.50 M2

**2**



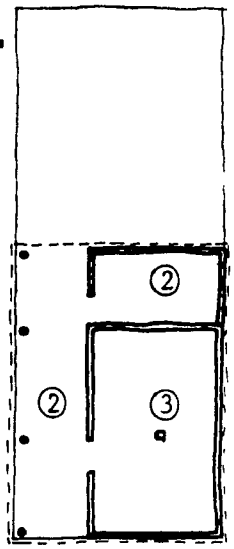

31.50 M2

**3**



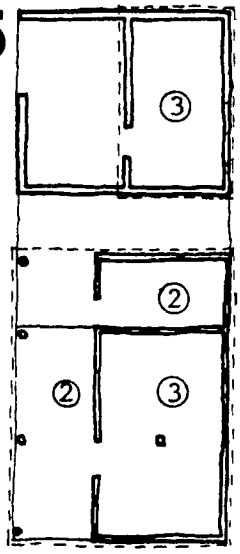

49.00 M2

**4**



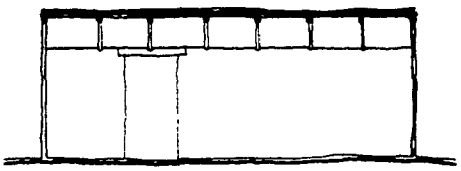

66.50 M2

**5**




97.50 M2

PRESENT SITUATION



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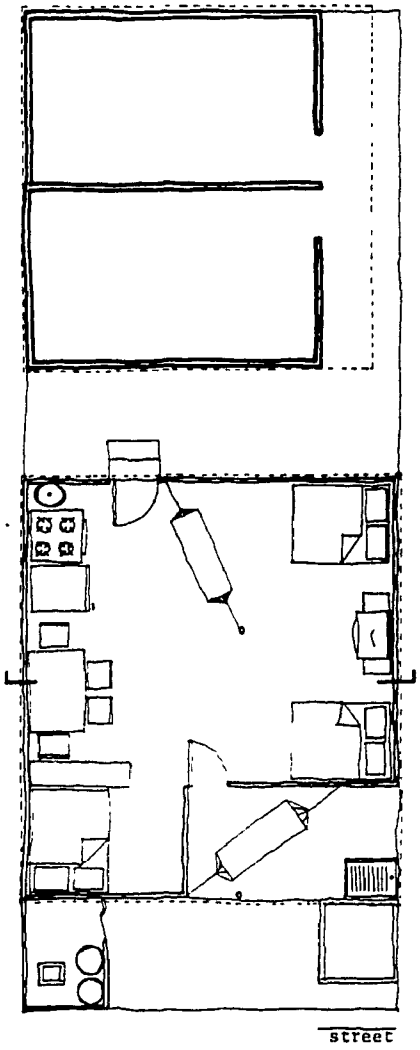
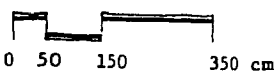



plan

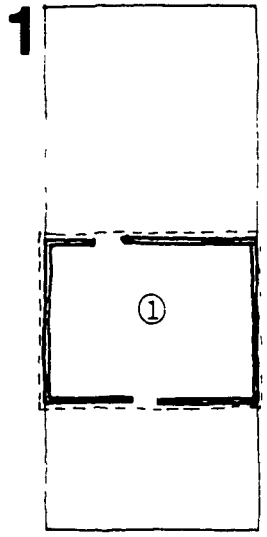



occupancy: Aug.- 86

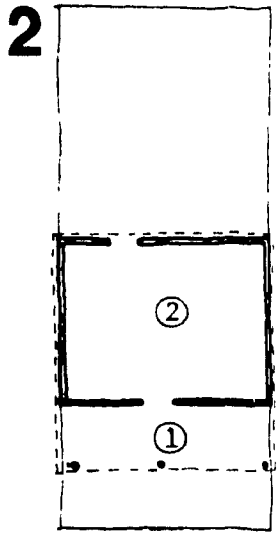
family members: 6

**14-12**

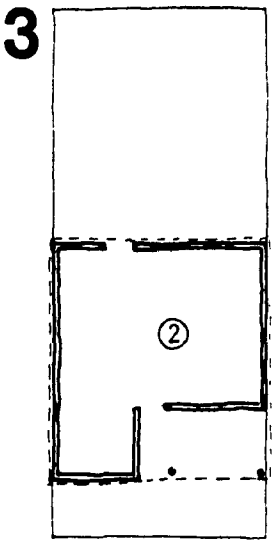
PROGRESSIVE DEVELOPMENT



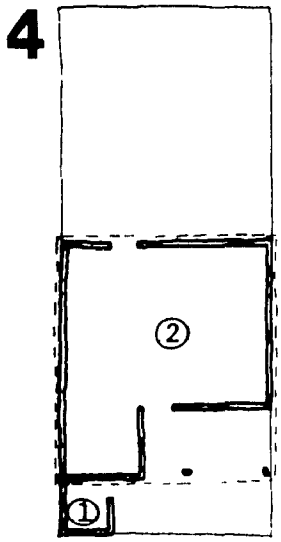

38.50 M2



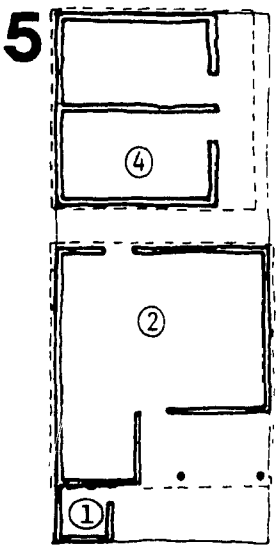

52.50 M2




52.50 M2

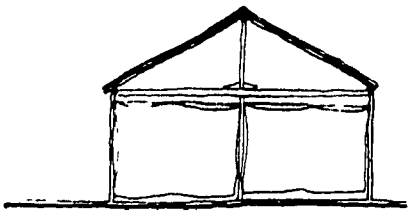



56.50 M2

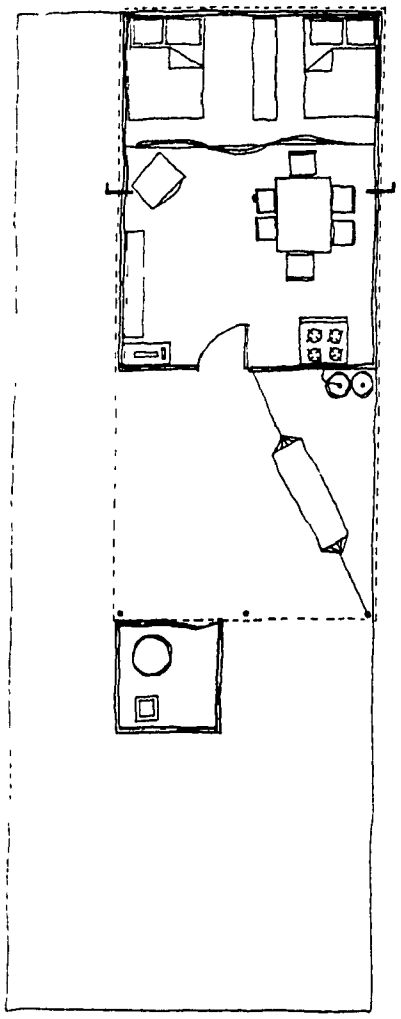



98.50 M2

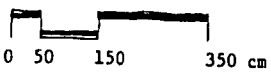
PRESENT SITUATION



section




plan

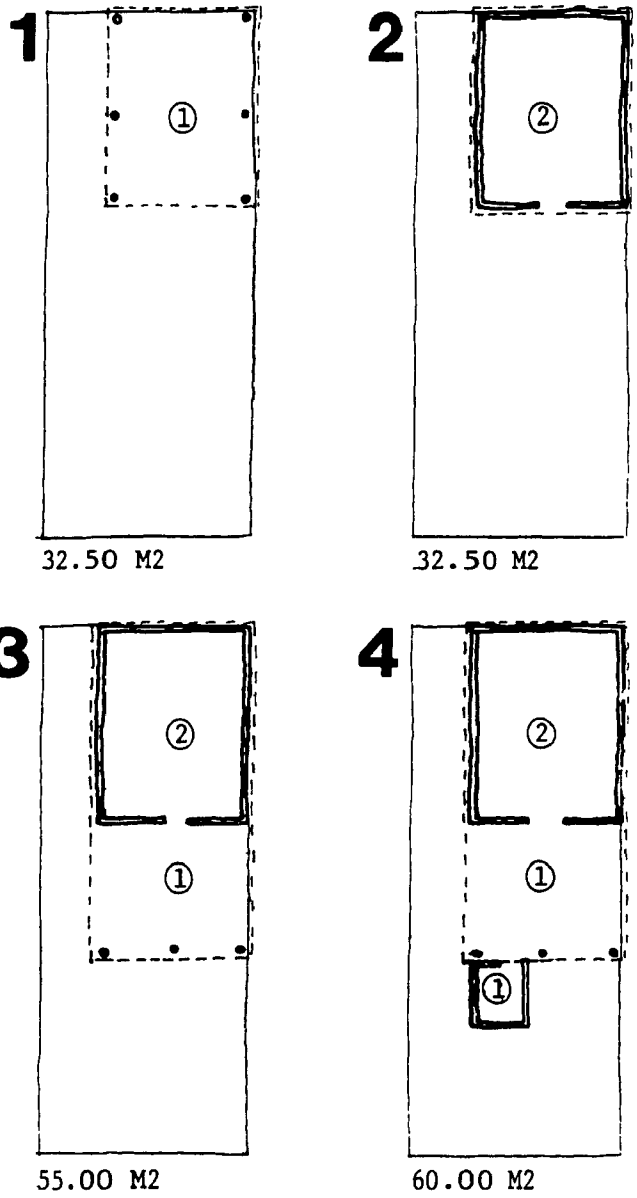



occupancy: oct.- 86

family members: 5

**14-20**

PROGRESSIVE DEVELOPMENT



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