HOUSING PRODUCTION PROCESS

Principles for a Process which Introduces Human, Organic and Personal Qualities in the Production of Housing

Ph.D. QUALIFYING EXAMINATION

University of California-Berkeley
Department of Architecture
June 1982

ARTEMIS ANNINOU

Ph.D. Qualifying Examination
for Artemis Anninou
Spring, 1982

In partial fulfillment of the requirements for the qualifying examination, your committee asks you to respond in writing to the following question:

> You have expressed an intention to deal with the problem of housing production on a large scale and under the circumstances which make the houses more human and more closely adapted to the needs of individual families. Please define a set of principles which will form the basis for the structuring of a production process which will be capable of introducing personal, organic, and human qualities in the production of housing in large volume. What are some obstacles, problems or limitations which may present themselves in implementing these principles?

Ph.D. Qualifying Examination
Committee

Professors

Sara Ishikawa, Chair

Christopher, Alexander
Roslyn Lindheim

Fernando Kusnetzoff
Michael Teitz

CONTENTS

Preface

Introduction

Part I: THE EXPRESSION OF WHOLENESS IN HOUSING PRODUCTION

1. On Wholeness

2. Principles for the Creation of Wholeness in Housing Production

Principle 1. The Search for the Unique and the Ordinary
Principle 2. The creation of Centers
Principle 3. Physical Planning as a Series of Structure Preserving Transformations
Principle 4. Piecemeal Growth and Structuring Wholes
Principle 5. Unification of Structuring Wholes through a Pattern Language
Principle 6. Differences in Similarities Generated within a Pattern Language
Principle 7. The Creation of Positive Urban Space
Principle 8. The Making of the House instead of the Design of the House
Principle 9. The Shaping of the House by the Users under the Guidance of a Pattern Language
Principle 10. Unification of the Architect's Activities in both Design and Construction
Principle 11. Building Production as a Sequence of Distinct Operations
Principle 12. Construction Techniques which Allow Personal Interventions
Principle 13. Flexible and Adaptable Building Materials.

Part II: OBSTACLES, PROBLEMS AND LIMITATIONS ON THE IMPLEMENTATION OF THE PRINCIPLES

- Additional Costs Induced by the Principles
- The Attitude of Government Agencies
- The Attitude of the Professional Architects
- The Structure of the Financing System
- Zoning Regulations
- Land Subdivision
- Land Ownership
- Building Permit Procedure
- The Orientation of Construction Industries

APPENDIX

BIBLIOGRAPHY

PREFACE

The topic I am going to deal with on my dissertation concerns the design and building of housing in the form of a neighborhood or a small community.

The outcome of this study will be the definition of a design and building procedure for housing which will guarantee the accomplishment of the following four things:

1. That a considerable amount of housing construction will be accomplished over a specific period of time, which will be defined according to the pressure of needs to be covered, but which will be limited to a maximum of 200 houses within one year.

2. That the cost of construction and maintenance of the houses will be compatible with the purchasing possibilities of the potential users, and it will be comparable with the existing prices of the given housing market.

3. That the housing environment to be created will be a human and healthy place to live, a place to be loved by its inhabitants, to be taken care of them.

4. That the building procedure which will generate the housing environment will be determined by the actual context and culture of the place; the values of the culture, its established way of everyday living, its traditional forms in art and building will unfold the path that has to be followed for the fulfillment of its goals.

These four points are the major guidelines which will shape the structure of the proposed design and building process for housing, and these will be the criteria according to which the appropriateness and the success of the proposed building process will be estimated.

This paper has to be viewed as an in-progress research work which will state problems in the form of principles which have to be clarified and solved so that a coherent and concrete basis for the formulation of the building process will be established.

The next step will be to test the validity of these principles within different concrete contexts so that their firm establishment will constitute the ground for the development of the building process.

The final step, which is the main part of my Ph.D. dissertation, will be the development of the building procedure which is capable of generating harmonious and human entities, and which covers the existing needs on the most real way. Although the first formulation of the building

procedure will not be related directly to any specific physical or cultural context, the final step will be to show how the proposed building procedure can accomplish its specific goals within different specific contexts and specific cultures.

INTRODUCTION

The recent practice of housing planning and construction has been proved incapable in its attempts to produce human houses which meet the personal needs of different families, though it has been proved capable of providing housing to large numbers of families in a reasonable amount of time.

The problem of housing is so imperative and crucial in some cases, not merely in human terms but also in terms of its political and social implications, that the attitude of planning authorities was shaped basically by quantitative criteria, focusing on cost and time efficiency; criteria concerning the quality of houses under production and the overall structure of the housing area as a healthy and human community were of secondary importance, which very rarely managed to play any role in housing production, because of the pressure of situations. Mass housing production has been proved according to their criteria as the best solution for providing housing. Although, as an idea it might be an acceptable solution that can cover very urgent needs for a short period of time, it cannot be used as the prevailing method of providing housing for all kinds of different cases, because it tends to change its character from mass production of housing to production of housing for undifferentiated masses of people. And I am saying this, because mass housing

production has proved its essential failure, since a long time ago, to produce houses which are pleasant for the people who are living there, which are part of their selves and their lives, and which respect their existence within their given social and economic context and their traditional links; and still the priorities of housing policies have not been reconsidered essentially, looking deeply into the seed that has caused their failure. Of course, the attitude of what else can happen in cases where there is pressure in terms of housing needs and limited financing sources does not contribute much toward finding better solutions for the problem, though valid for some specific cases.

In other cases, where money and urgent housing needs do not impose limitations and constraints, housing construction enters the realm of qualitative concerns, since there is enough room left for them, and since they will serve as the means for social assurance and imposition. Housing redevelopment projects, especially in the recent years are an accurate manifestation of this tendency. However, they lack any deep and true quality. And besides this, their cost has reached such heights that they are not even affordable by a large well-paid portion of the people.

In the process which will be defined here, housing quality, construction cost, appropriate timing or any other parameter will not be viewed in a fragmented way, as it usually happens today. However important each one of these

factors might be, none of them has either the power or the right to dominate the conducting of any housing project whose ultimate purpose is to heal an unhealthy situation. Experience has shown that any project approached from this point of view has failed as a whole, and as a means to generate harmony and order in the environment.

In the process that will be defined here, all different parameters, all of the same importance for the success of the project will be considered in their real dimensions, as supplementary to each other and as dependent on each other, operating cooperatively within a situation which unifies all fragmented aspects of the project into one major consideration.

This major consideration, which will guide the development of any project and which comprehends all different aspects to be taken into account, can be summarized in the following statement: "For any given situation, with all its specificities, its constraints and possibilities, where the need for the construction of some new housing has been realized, the most appropriate thing to be done is that which does not disturb the physical and human structure of the place, but that which respects it and takes it seriously into account, as the ultimate seed from which each single forthcoming transformation will emanate, and that which introduces more harmony in the world and enhances the wholeness of the existing physical and social structure."

The spirit under which the housing and building process will be developed asks for a presence of mind and feeling, of the whole inner self, who is ready to recognize the deep structure of the place under transformation in terms of the order it contains in all its dimensions (human, geometrical, functional), to appreciate and feel it as the essential and ultimate substance to be respected and celebrated, and who is consequently willing to conduct transformations of the existing situation and to advance the existing reality, within its given context, toward a state of wholeness where the new outcome will melt within this context and will connect with it into one whole.

This constitutes the basis for the unfolding of the building process for housing and, therefore, it needs clarification on what the nature of order is, on what we mean by wholeness and how this is manifested in space.

I will start the first part of the paper by giving a brief explanation of these issues under the title "On Wholeness," which is primarily based on the work of C. Alexander and on the research work I did with him during the last three years.

Consequently, on the rest of the first part, under the title, "Principles for the Creation of Wholeness in Housing Production," I will define the principles which will set the ground for the production of a human and healthy housing environment, and open the problems that have to be solved

before the housing production process to be proposed takes its definite form.

These principles have come about from observations about what was happening in traditional societies or in any other society which is or was whole in itself and which had managed to manifest itself through the creation of wholeness in art, in building and in life.

Also, some of these principles have been already tried in the design and building of some housing projects, either single houses or small groups of houses. Therefore, the status of these principles is like hypotheses; we know that they were valid in the past or in some specific cultures, and we know that some of them are valid in building procedures of limited numbers of houses.

The thing we want to find out is whether they will be helpful in building procedures capable of generating large numbers of houses.

The issues to be dealt with in each principle are:

1. What kind of existing problem the principle tries to solve;
2. How it can contribute to the creation of human and harmonious places, and why its contribution is necessary for the creation of wholeness;
3. What are the operational schemes that the principle has taken in cases where it was part of the building process;

4. How the principle can be helpful operationally in construction operations that comprise large numbers of houses; what are the constraints that have to be overcome, and how the principle has to be transformed in its operational aspect so that it can really work in compliance with the idea of wholeness and covering at the same time all practical needs.

In the second part of the paper, I am going to discuss the problems, obstacles and limitations that the existing situation poses in the implementation of the principles. I will focus on problems of public housing policies and their priorities, on the problems that the existing structure of housing financing generates, on issues of the architectural profession on problems of land subdivision and zoning regulations. While discussing these problems in relationship to the principles I will attempt to show the direction towards which solutions should be searched for, so that the principles could become more easily implementable.

PART I:

THE EXPRESSION OF WHOLENESS IN HOUSING PRODUCTION

ON WHOLENESS

The search for the creation of something whole, harmonious and beautiful is what the building process, that will be defined, is aiming at and is working for.

The concept of a whole is one of the fundamentals which will structure the overall approach to the issue of a building process for housing, and therefore, it needs some clarification.

A whole is an entity which is coherent and distinct in itself, but which, at the same time, is deeply connected to the world around it on the most profound way, so that it becomes an unseparated part of a larger whole. Therefore, there are two seemingly opposite characteristics inherent in a whole. Its distinctness and uniqueness as a thing in itself, and its connectedness with a larger whole and its melting within a larger contect.

These two opposite characteristics of a whole do not compete with each other; they supplement each other and cooperate together in the creation of wholeness.

Furthermore, it has to be understood that a whole is not the sum of its parts; a whole is not a totality. A whole has a distinct and powerful structure. It comprises smaller wholes in itself, which are distinct, self-sustained and

solid in themselves, and which embellish the whole they belong to and increase its centeredness. Also, a whole is an indispensable part of a larger whole; it is induced by it and it contributes to the connectedness that exists in it.

Beyond this a whole is something which is part of life, something which is real, alive and profound. A whole is a being or being-like, and it is increasing the amount of order in the world around it; it is the manifestation of its surrounding physical harmony; it respects its actual reality and the reality of the physical and/or human structure that surroundsit. A whole is full of feeling -it reflects the feeling it is made with.

Wholeness can be recognized in nature and in the way it generates itself; a leaf is a whole, a tree is a whole, a wave, on the way it is formed and it breaks, is a whole.

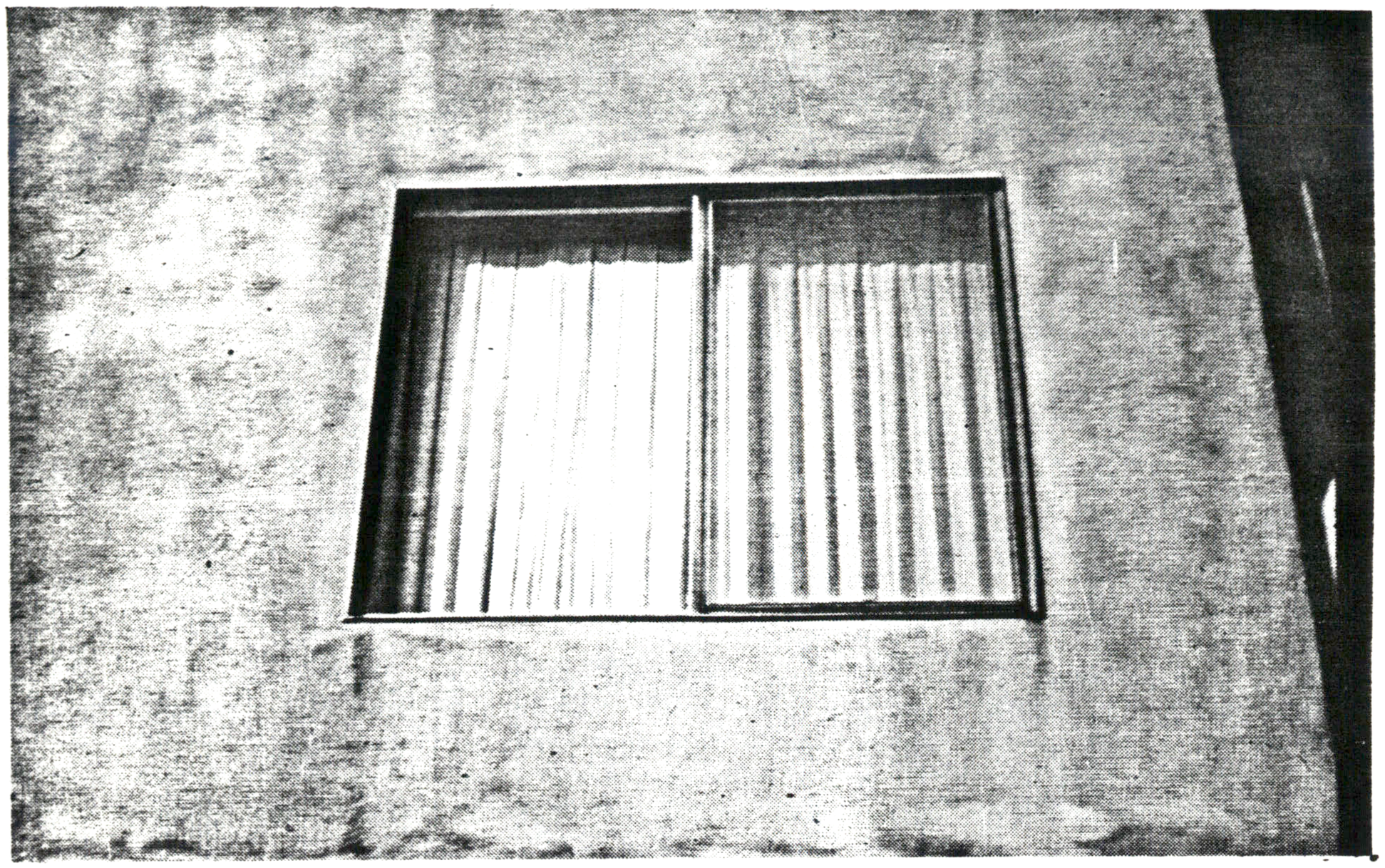
Wholeness can be seen in the towns and cities of the past, which were built with spirit and with a feeling of solidity.

Wholeness is inherent in vernacular and traditional architecture, where nothing was made with pretentiousness, but everything was guided by a simple and full-hearted concern, that of making only the thing that was needed, the simplest possible thing, the thing that was called for from the given context, and this was always made on the best way, with care and love.

Wholeness can also be recognized in traditional cultures, in all their aspects of everyday life. Their values are crystal clear and deeply assimilated within the whole culture in the form of ethics, beliefs, prejudices, goals. Every person is connected with these values; they provide them all with the ultimate basis for all their actions and their creative activities. . . . Wholeness in traditional cultures is a unity seeking process where fact and value have been melted into one thing, which, in all its different manifestations, determines the essence of the link between the man and the world around him.

In order to clarify more concretely what a whole is we can compare the following two windows: the first is from a building in Berkeley, which was recently built, the other is a window from a house, I don't know exactly from which place. The first window is a mere hole in the wall so that the room can get some natural light; it is made simply according to the prevailing rules of the construction market that asks for the cheapest and for the easiest, and for something that could be placed everywhere regardless of its context. Also, it is obvious that this window has no inherent quality in itself, no power to transcend time and place and to exist by itself as a beautiful object.

The second window is a whole. It is unique; we know that it won't be easy to find exactly the same window in any



other place, since it is made with care and love for that specific building. Also, it is very simple and ordinary; it has nothing more than what is really needed; a boundary around it which makes it one with the wall, a nicely painted frame, and two straightforward panels. This window, it is obvious, is made specifically for that particular place; however, it can stand by itself, it exists as something timeless. And when we look at this window we realize that it is full of feeling, that a part of the maker's heart is in it.

Wholeness is a deep property of things which have a timeless quality. It is the essence of things that, regardless of time, place and their actual context, become the source that generates not only order in the material world but also joy and peace in the human heart.

Cities, buildings, artifacts, things of everyday use which have wholeness inherent in them have been created in different places, in different eras. Wholeness is universal, and it is present cross-culturally in the makings of man.

However, it has to become clear that the universality of wholeness and the general validity of its properties does not place any constraints on the way it is expressed in different cases. Wholeness is manifesting itself in different forms; the actual physical context, and the structure of

the cultural context determine the way that wholeness manifests itself. It is clear that a window which is facing north is different from a window facing south, and that their actual orientation will influence the manifestation of wholeness in specific form and geometry. Wholeness presents itself in a Turkish bazaar on completely different forms and events from the way it is presented in an open market in one of the streets of Paris.

This is a very important observation that has to be deeply understood, respected and appreciated because this is one of the generating forces of wholeness. Therefore, when we want to create something in a specific place, and in a given time which is whole, we are not looking for adoption of forms from different places and from past eras which were wholes. What we are looking for is the generation of forms which respect the existing patterns of the place, both its patterns of space and its patterns of events and which are the manifestation of a wholeness which transcends actualities and specificities.

This is exactly the goal of the building process whose definition will be attempted: to be capable of creating and producing housing environments which are whole, human and harmonious and which manifest their wholeness in forms which spring out of the physical and cultural reality of the place.

In order to make clearer what exactly I mean by wholeness, I will give finally one personal experience I had of a place which was a whole, and which after some changes lost all of its quality and feeling.

The place is a small square, not far from the sea, in Alexandroupolis, my hometown in North Greece. The square had a rather irregular shape, half-roundish and half-squarish, with the round fountain in the middle and the cafes and the restaurants around it. I remember how crowded it was almost every night, especially during the summer; tables would take over what was supposed to be the street, and only a narrow way would be left for some cars and bikes to pass by; and passersby would stop and chat with their friends sitting at the tables. I can't forget the day I saw this small square without the fountain. I was disturbed for a little while and then, as everybody else, I started trying to find the advantages of the square without the fountain; that it is no more dangerous for people to sit there next to the moving cars, that children would play more safely now, that there is more space for the tables, not more congestion. And especially with the cobblestones being removed and being substituted with concrete, even walking would be more convenient.

But nobody thought that the whole square would lose its character. I realized it some days later when the square was rather empty, although everything was still the same but

not the fountain. We tried to explain and justify that event; the explanations we gave was that there were better restaurants along the road close to the sea, or in some, out of the town, hotels.

However, the fact was that the square without the round fountain, that was sprinkling water all over, and all over the tables sometimes because it was not properly controlled, became a dead place. And the reason was not that we suddenly discovered better restaurants but the loss of the fountain.

The square without the fountain was not anymore a place where you could enjoy yourself, feel happy and relaxed. The square was every single thing that was there -its irregular shape, its cafes and restaurants, the fountain in the middle, cars and people pressed together, congestion, noise. One thing -the fountain- was removed and everything disappeared simultaneously. The square was not any more a real, lively and whole place. The fountain contributed to its wholeness as any of its other elements, although it was not even extremely nice. It contributed to its character and to its uniqueness. It made it a distinct place in the town.

Now, this place is not whole anymore, it hasn't the quality it had before, I do not relate myself anymore with this place as I did before.

Wholeness is closely related with what the square with the fountain in the middle used to be. How one can always arrive at making things so dense and real as that square, where everything has its appropriate place, where everything is exactly what is needed -nothing more, nothing less- where everything is so simple that one does not even appreciate its importance when one has it, where nothing can be changed or removed but for the worse.

PRINCIPLES FOR THE CREATION OF WHOLENESS IN HOUSING PRODUCTION

The recognition and the appreciation of wholeness is the first step that leads to the creation of something that is profound, simple and beautiful.

However, the creation of something which is whole is guided by a definite process, not in terms of the sequential steps to be undertaken, but in terms of what has to be searched for, of what has to be respected, of what has to be paid attention to.

I will try to give the most important aspects of the process that leads to the creation of something whole in the form of the following principles:

Principle 1: The Search for the Unique and the Ordinary

Principle 2: The Creation of Centers

Principle 3: Physical Planning as a Series of Structure Preserving Transformations

Principle 4: Piecemeal Growth and Structuring Wholes

Principle 5: Unification of Structuring Wholes through a Pattern Language

Principle 6: Differences in Similarities Generated within a Pattern Language

Principle 7: The Creation of Positive Urban Space

Principle 8: The Making of the House instead of the Design of the House

Principle 9: The Shaping of the House by the Users under the Guidance of a Pattern Language

Principle 10: Unification of the Architect's Activities in both Design and Construction

Principle 11: Building Production as a Sequence of Distinct Operations

Principle 12: Construction Techniques which Allow Personal Intervention

Principle 13: Flexible and Adaptable Building Materials

The first seven principles will focus on the creation of wholes; they will describe what has to be done so that wholes are emerging out of design and building actions. These principles are the kernel of any creative action and without their deep assimilation and their proper application no wholeness can be generated. These principles, although not operational in a practical level, are operational on a much deeper level since they define what has to be searched for, what is the proper thing that has to be done, and how it can be revealed. In one word, they set the builder or the architect in the proper state of mind, so that he can ask himself the right questions and so that he knows in what direction to orient himself for the search of the needed, the proper and the correct solutions.

The following six principles are operational on a practical level and they will describe what has to be done during the design and building procedure of housing, so that the manifestation of the first seven principles will be facilitated and made possible all along the building process.

These principles deal with how actually a house should be made, how work should be organized, what the role of the participants in the process should be, how construction techniques and materials should be handled.

And as I have said before, some of the principles have the status of hypotheses, as far as their definite forms are concerned. At the level they are written in this paper they represent an intuitive truth which comes from observation of how things are being done and from thoughts of how things should be done.

Principle 1: The Search for the Unique and the Ordinary

Every time we make something, whatever it is, a bench, a stair, a building, a painting, or every time we try to create an image according to which a place could be developed, we have to know in what direction to orient ourselves, we have to know what we are looking for, what exactly we are trying to reveal.

The most important element that has to guide our attitude when we are making something is a deep respect for the thing that we are creating. This respect consists of the recognition of the purpose the thing we are making is going to accomplish in the world around it, as a thing, as an object by itself, and as the carrier of a meaning which emanates simply from the relationship of the thing with the world around it.

Our makings are not a means for transferring in our surroundings our ambitions, our preconceptions and our personal intentions. They are not part of ourselves in the sense that they exist in the world through us or in the sense that they can justify our existence. They can be, and they should be, part of our inner self in the sense that they represent an attempt of man to sustain the order in the

world around it, and that this is man's contribution to the creation of a physical environment which is whole, ordered and human.

In order to accomplish this, two elements have to be searched for in everything we are creating: its ordinariness and its uniqueness. The search for the ordinary seeks for that state of mind where the major concern is how to make things and buildings simple and appropriate for the people who will use them and which are not separated from their physical and socio-cultural context. The ordinary is made with no intention to transcend the purpose of its own existence.

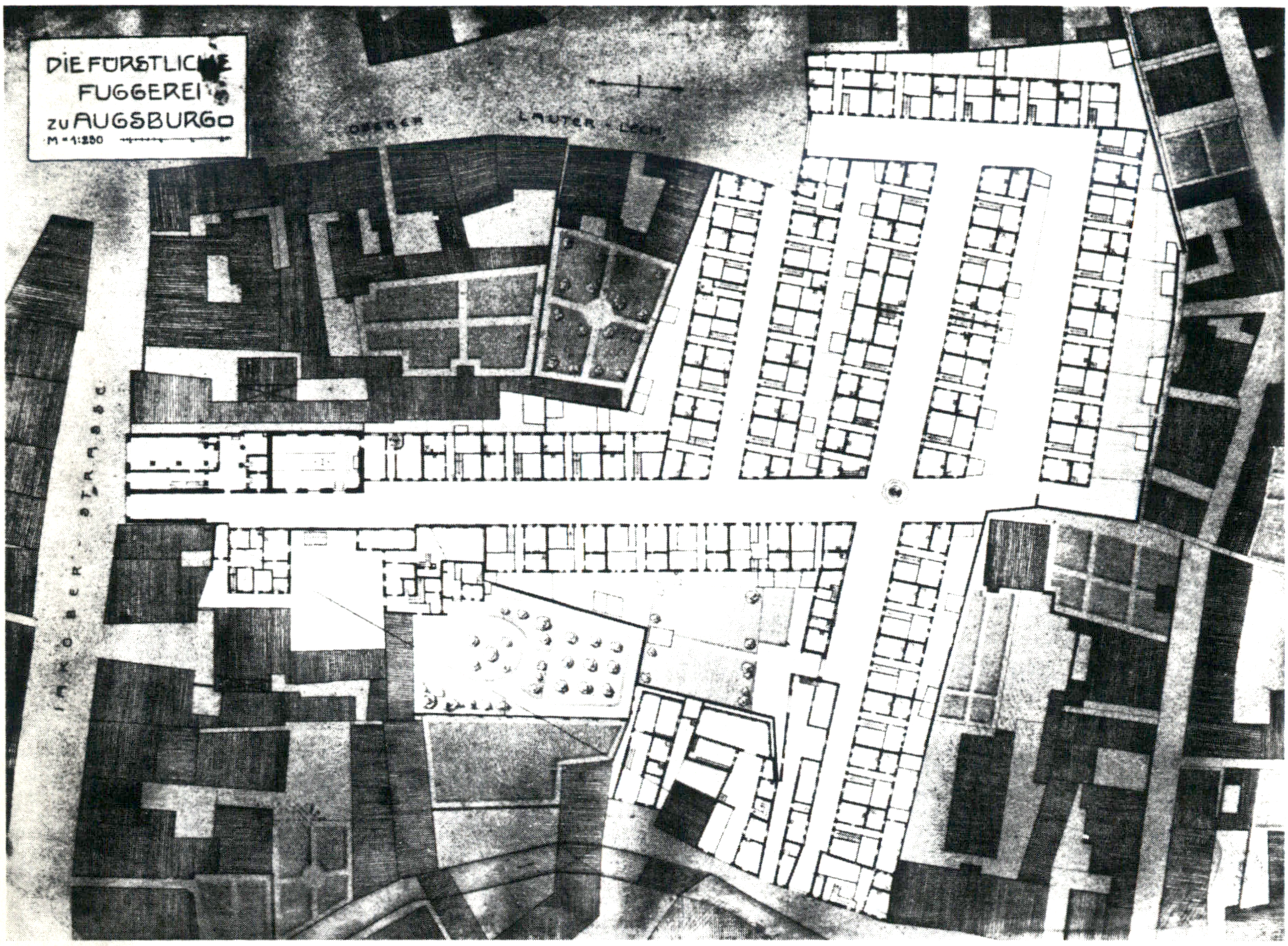
However, everything we are making should be unique in the sense that it reflects the specific conditions which generated it. The uniqueness of something does not rely upon an intentional and contrived differentiation from its surroundings but upon the revelation of the physical and human structure that defines the thing within its context.

For example, in a housing project that comprises the construction of ten houses, the intention to make something ordinary leads to a respect of the existing reality -in physical and human terms- of the surrounding areas, to adoption of the established patterns, and to a desire to make something, as a whole, which will fit within the existing context and which will not be separated by it. At the same time, the intention to make something unique, asks first

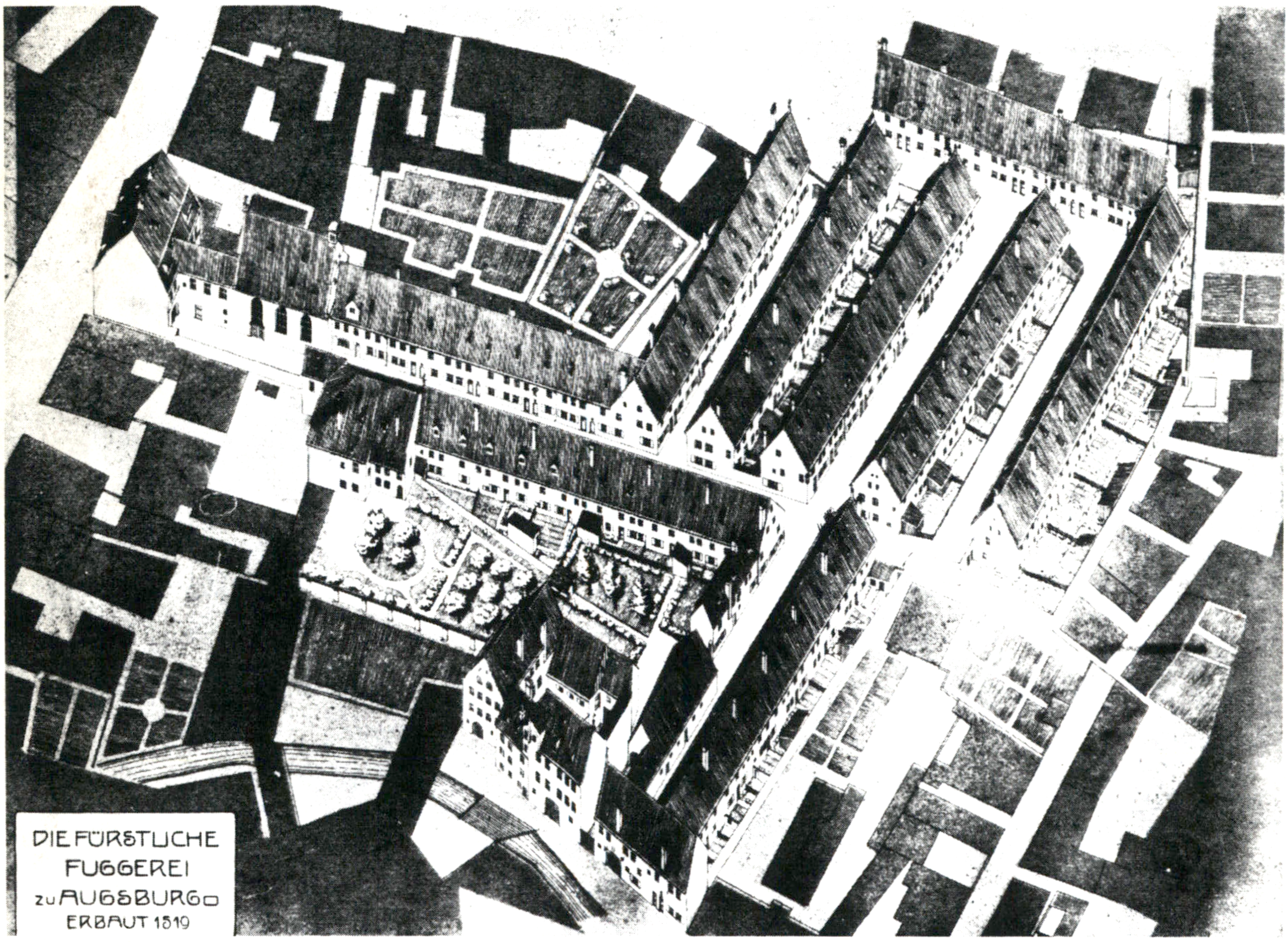
of all for a detailed recognition and for a careful appreciation of the existing physical and socio-cultural structure, in the sense that the structure that exists there is unique and therefore it needs such a kind of intervention which will respond to the specificities and the particularities of the situation. That means that the search for uniqueness will be expressed in the differentiation among the houses; each house will be unique in the sense that it has to respond to the specificities of the actual site it stands on, which are orientation, physical configuration, landscaping, views, immediate surrounding, and in the sense that it is made for particular people who have expressed specific needs and desires.

The search for the unique and the search for the ordinary, at the same time, dissolve finally into one thing which is the making of the simplest and the most profound thing which is also the most appropriate for the specific case and which fits the best in the given situation. Only when we manage to bring these two things into one, to erase their seemingly contradictory nature, and to transcend their deliberately defined territories, then we can make things which are whole.

a



a Gesamtgrundrißanlage der Fuggerei.



b Vogelschaubild der Fuggerei nach Dr. Weidenbacher.

Principle 2: The Creation of Centers

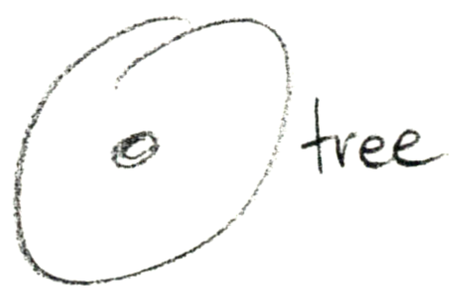
The definition of a center was clarified in the first part of the paper, "On Wholeness," when the explanation of what a whole is was given. A center is a whole.

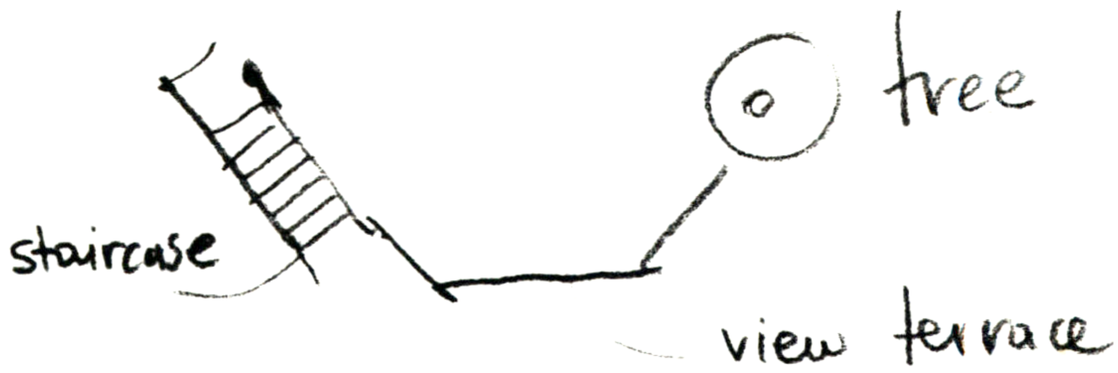
As it follows from the definition of a center, the process that creates centers has to accomplish the following things. First it is dealing repeatedly with the creation of a center as a coherent and complete entity. At the same time, it embellishes the center with the smaller centers that the entity comprises. Also, it creates another center of compatible size, next to the center under development, which is or has the potential to become a coherent entity in itself. And finally, it tries to embed this center into a larger center, which is the larger context of which this center is an unseparable part.

This is the first definition of the so-called centering process that C. Alexander has formulated. After that, through research and practical work this first definition was elabored more in order to attain more operational formulations.

On a more operational form we can say that when we want to put order through the creation of centers the first

step that we have to undertake is to recognize the latent centers of the given context, to be aware of all of them, and to attribute to them their relative importance. Then, the successive acts have to pay attention to only one center at a time. There is only one thing which is done full-hearted at each step, and which at the same time respects all the other latent centers. What is important during this operation is the precise recognition of the latent centers as concrete places which need something there in order to





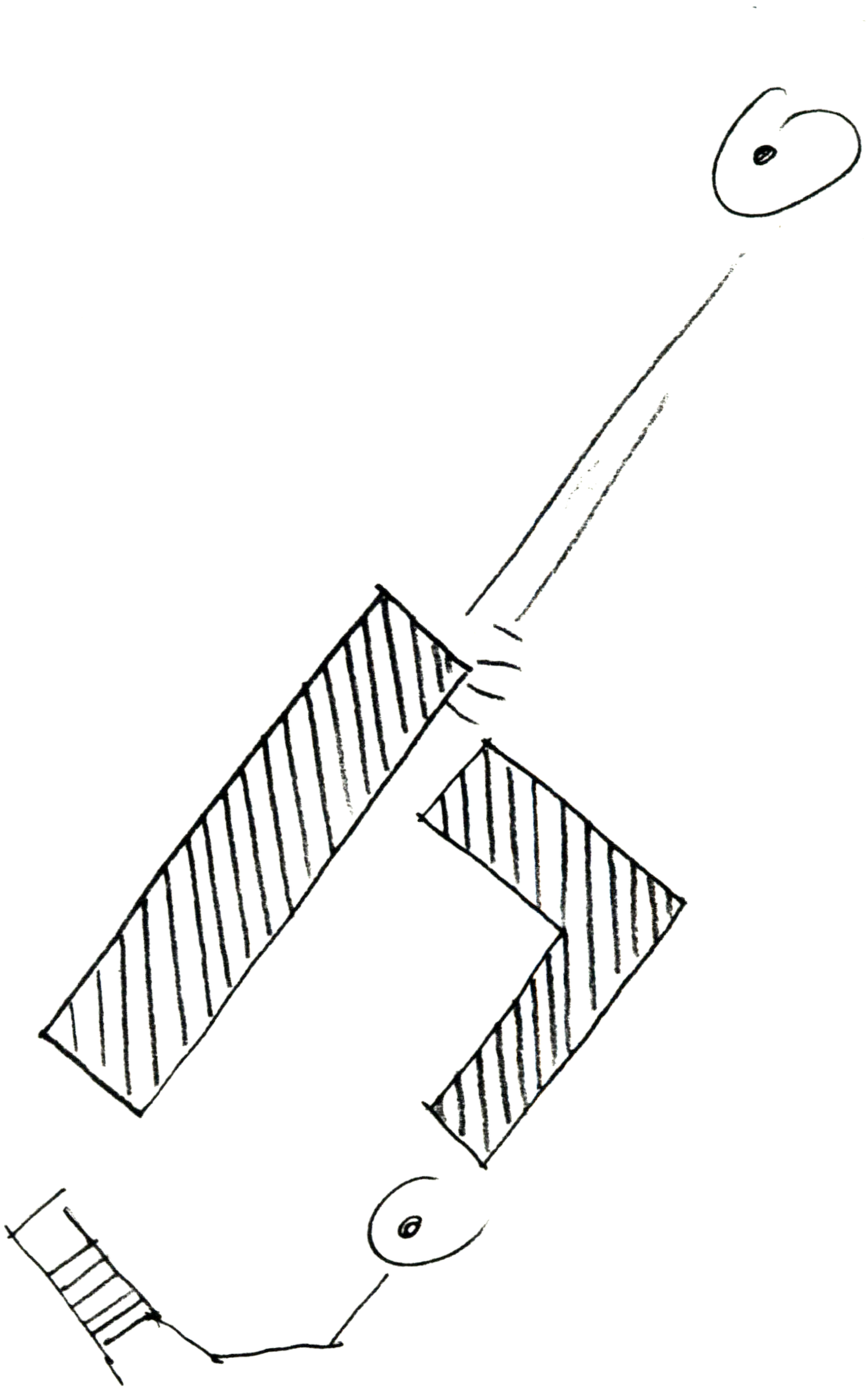
The existing situation:

become whole. And this is something which is introduced, is placed one at a time, and it is made with care and attention so that it can make the latent center whole.

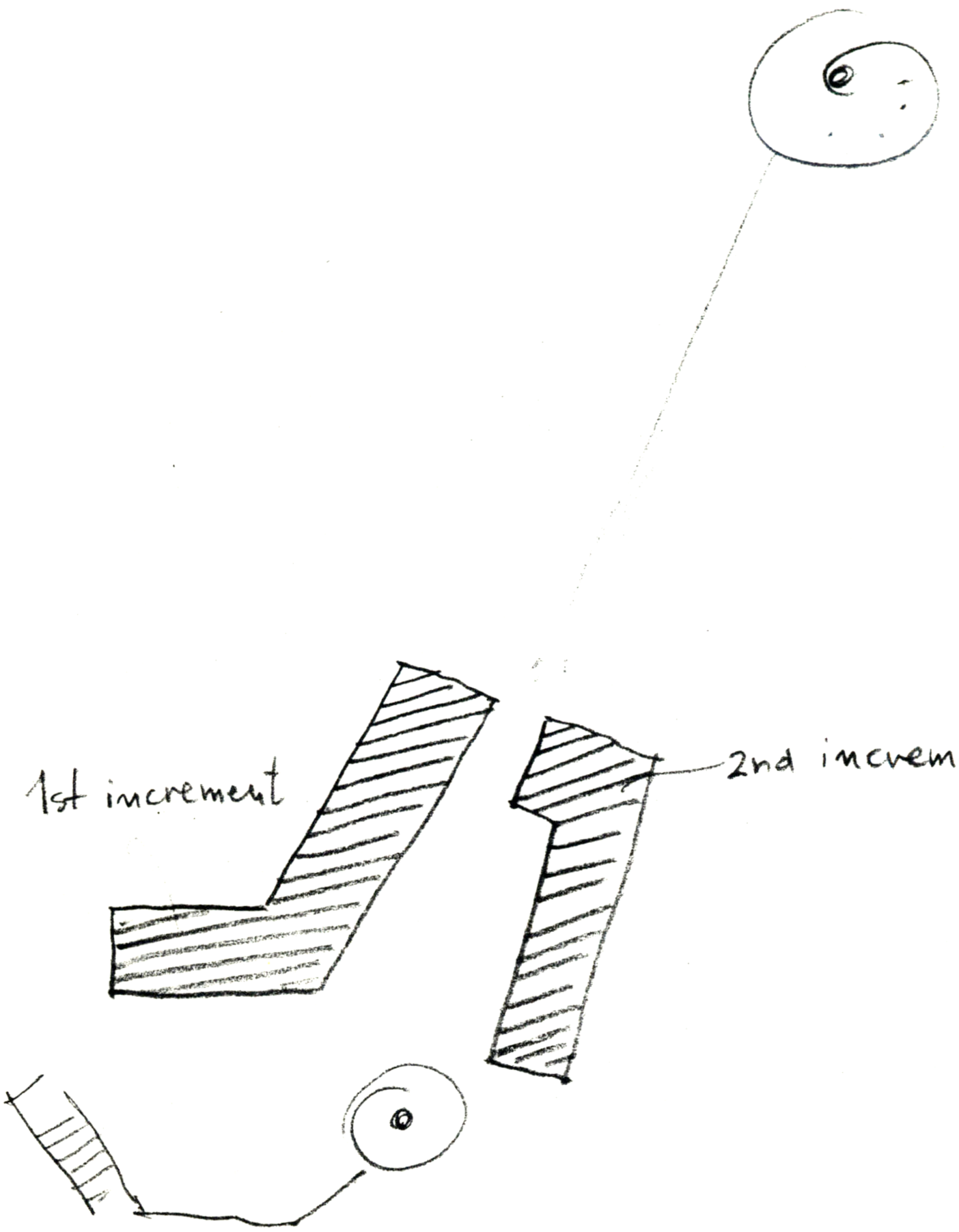
In the following example we can see how this process was at work. The given situation that had to be brought in a more whole state was the following, which is a real place. The latent centers are: the view terrace and the space behind it which is completely undefined, the two trees and the axis that the two trees define in relationship to the view terrace, which is also vague.

The problem we had was to place a building of 400 sq. met. approximately which would bring the latent centers in a whole state.

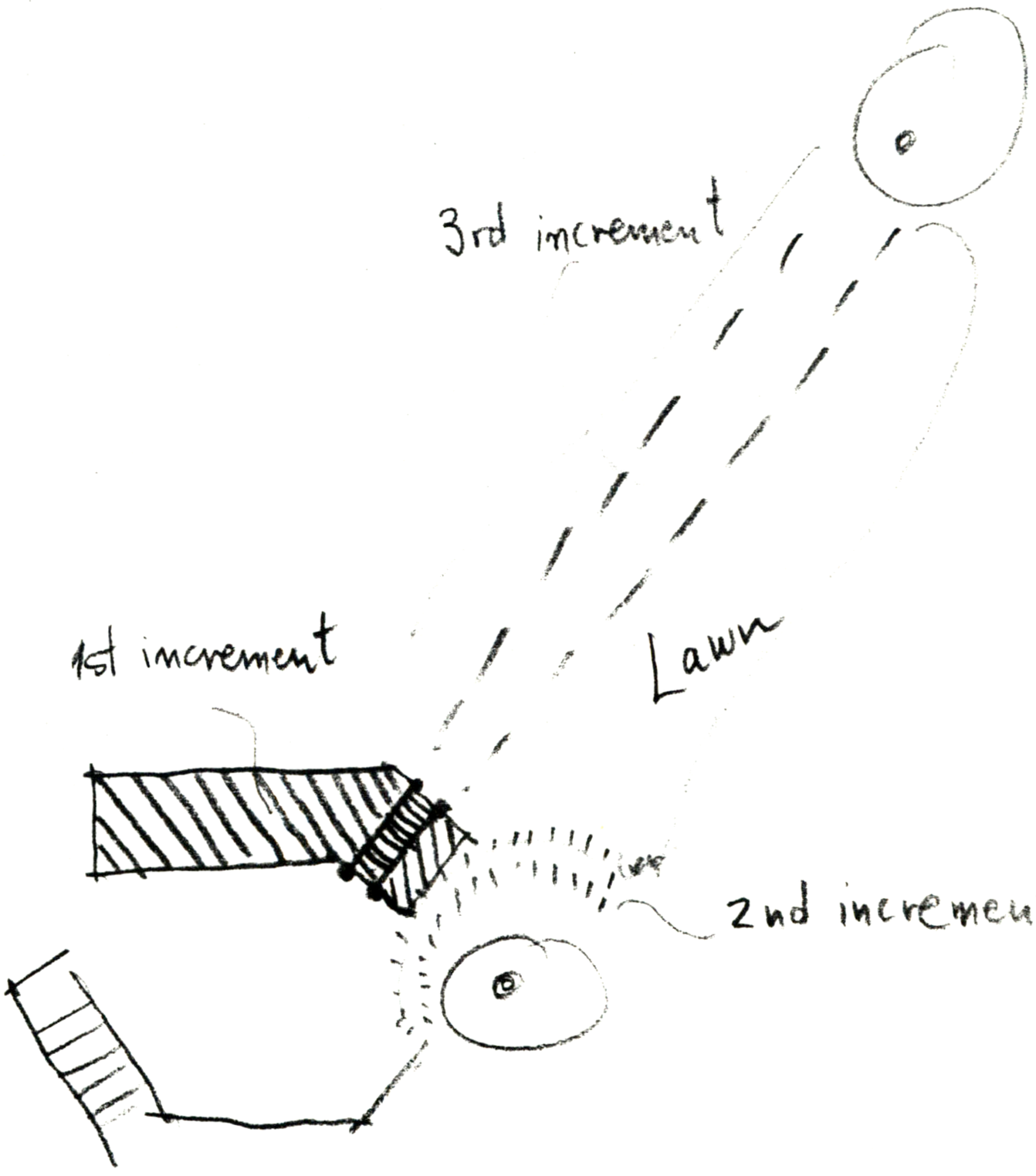
Some of the solutions that were proposed were the following:



1st solution



2nd solution



3rd solution

The first solution was a one-step act which paid more attention to the relationship between the latent centers than to the latent centers themselves. The result was that the view terrace was not defined as a coherent and solid place by itself; it seems that the view terrace and the square formed by the building are two separate places put together without any one of them being a center by itself.

The second solution was a two-step act. The first act comprised the placement of the part of the building parallel to the edge of the view terrace in order to give it its solidity and identity as a place, and this has followed almost immediately by the second act, which comprised the location of the rest of the building in such a way so that the tree of the view terrace is respected and forms the transitional point between the two distinct places and so that the axis between the two trees is pinned down in a definite way.

The third solution is a three-step process. The first act paid attention simply to the view terrace and therefore it ended on the placement of the building. The second act celebrated the tree and therefore it introduced a kind of trellis with a sitting place around the tree; and the third act paid attention to the other tree and to its relationship to the already established centers and consequently it created a lawn with a walk on its one side that leads from the tree to the view terrace.

In all of these three solutions the recognition of the latent centers and their consolidation as coherent entities was the guiding force. However, it is mostly in the third solution that the latent centers generate a clear sequence of distinct acts, each one of them consolidating and intensifying a specific latent center, always in relationship with the others.

Although the emphasis in the case that was explained above was on the recognition of the latent centers and on their consolidation through distinct acts, we have to understand what exactly each act consists of, what each act is attempting to reach.

Each act is introducing one thing in such a way so that it embellishes the larger center, latent on the field. That implies that no center can be introduced unless it is hung off a larger center, and unless the newly made increment embellishes the larger, latent center in a definite manner, by its placement, and geometry, and by inducing the creation of more centers.

The important thing that has to be understood is that the creation of centers has to guide any building or physical planning act. However, in order to make this more clear and more operational we have to understand how the introduction of a center relates with the existing structure of the space which needs consolidation and intensification of its structure in order to become a human and real place. This is what the next principle will try to clarify.

Principle 3: Physical Planning as a Series of Structure Preserving Transformations

The location and configuration of centers in any physical reality is induced and defined by the structure of the place. The introduction of centers will contribute to the wholeness of a place only if they emanate from transformations which do not violate the existing structure of the place, but on the contrary, from transformations which respect and enhance the existing structure.

By existing structure, in the case of physical planning, I refer first of all to the physical configuration of the area under development, and the way it relates to its surroundings. But beyond this, every site, because of its geometry and shape, because of its particular physical characteristics, and the existing connections with its surroundings has in it some latent major centers, towards which most of the energy is directed, and whose presence and relationships have to guide the physical planning procedure.

When we say that any creative act has to be a structure preserving transformation, we mean that each transformation should be guided by the strong feeling of avoiding anything which could possibly violate the deep structure of the given. Furthermore, each transformation has to respect the

elements which consist of the existing structure; but this does not imply a timid respect, that merely preserves the existing situation in a blunt way, but it asks for a respect that celebrates a simple in a simple and profound manner the existing elements of the actual context. This means that each transformation has to reveal something from what is already latent there, some of the virtual centers of the structure, and to bring them to a state of wholeness.

What has to be recognized before any physical planning action takes place, is that every place has its own specific structure. This specific structure, although describable and analyzable in terms of its constituent parts, can only be correctly recognized through somebody's feelings. This means that one cannot really claim that one knows the structure of a place with its latent centers, unless he has really lived in it, unless he has spent enough time on it trying to understand it deeply--what it really is, what its structure consists of in concrete and tangible terms, what it wants to be.

Consequently, one has to realize that a place cannot become whole unless the planning and building actions that take place in it respect its actual reality and its existing structure and latent centers, and unless they can then consider the actuality of the place as the starting point for any further actions, which will introduce these kinds of new elements which can contribute to the enhancement of its wholeness.

However, there is one additional element to be understood and recognized: the structure of one place does not remain unchangeable during the process of planning, and every new element which is being introduced through structure preserving transformations is changing considerably the existing structure; and these sequential changes of the structure of the place are not merely due to the fact that new elements are being introduced, but are heavily dependent on the actual characteristics and configurations of the new elements.

Therefore, a process which consists of a series of structure preserving transformations is grounded on the fact that the introduction of any new physical element or the repair of any old element in a place cannot contribute to its integrity, unless it happens at the time there is real need for this, and unless it is done with great care and respect for the existing structure of the place, at this specific time. A development process of structure preserving transformations can function properly only in cases where any decision that is made, regarding the physical configuration and development,is dictated by the actual reality of the place at the time of its realization. Physical planning, conducted under this way, demands a great sensibility as far as the recognition and the appreciation of the existing structure of a place is concerned, and a great deal of care and attention as far as the physical transformation of the place is concerned. This

way the new physical element that is introduced does not violate the existing structure of the place, but on the contrary it is respectful of this and it enhances its harmony and beauty.

Physical planning that consists of structure preserving transformations is essentially different from the way physical planning is exercised today. Physical planning in its present form is based on the notion that it is possible to define today the structure and the form that a place will have in the future, and consequently that it is possible to define in advance a set of structural and physical transformations that a place has to go through. This kind of approach bases its proposals on theoretical assumptions, and ignores the fact that it is impossible to define in advance the needed structure and form that a place should have in the future, and to predict is emerging centers since their appropriateness and correctness depend only on the actual reality, as it stands, with all its details and possibly new elements introduced up to the time a new building or physical planning activity takes place. Planning remains an intellectual construction of preconceived schemes based on assumptions of forthcoming events and not on the actual physical, economic and social reality of a place.

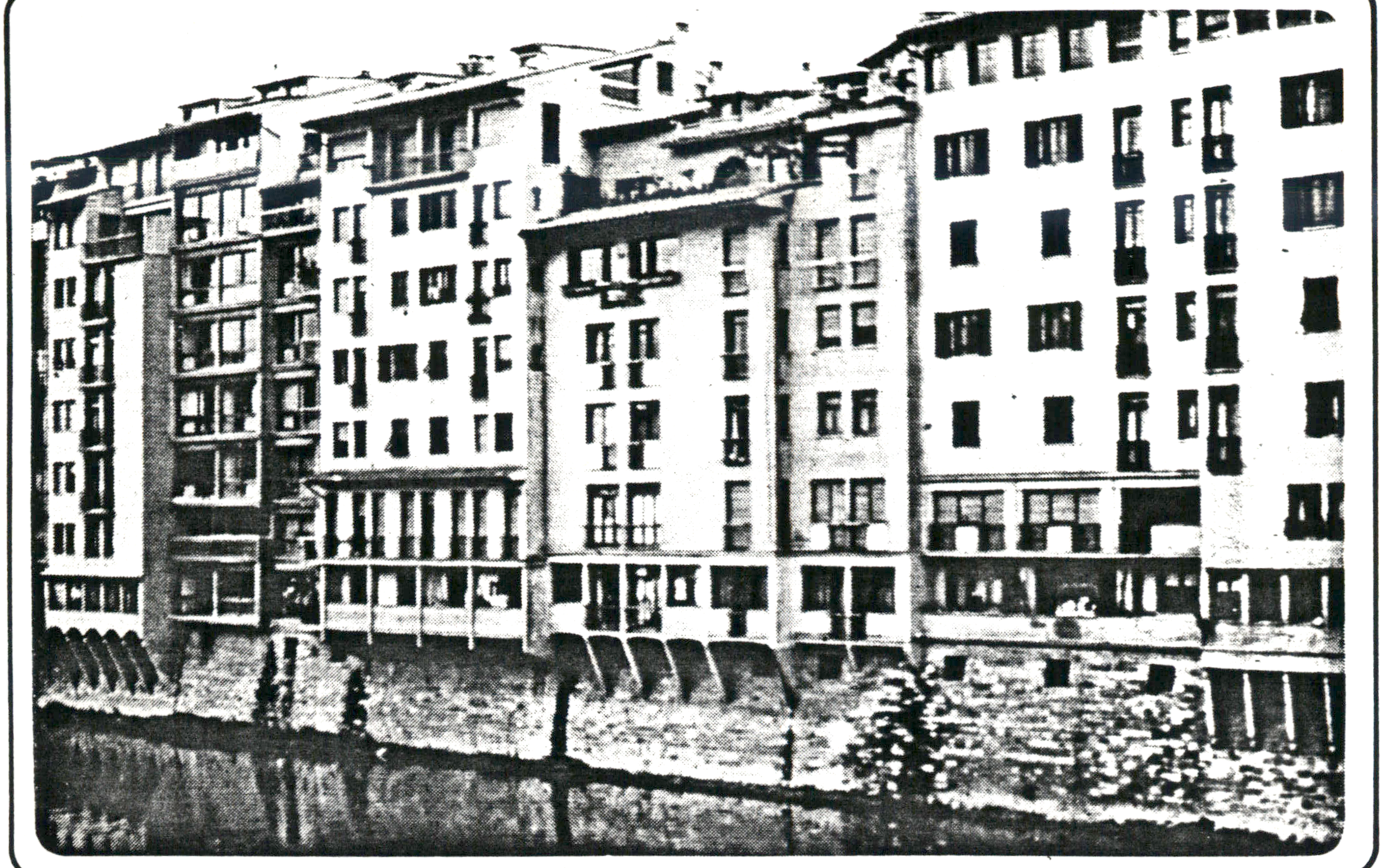
The implications of this analysis is that if we want to create human and harmonious places we have to introduce the notion of structure preserving transformations in the way physical planning is operating today.

The changes that the introduction of this notion asks for, though fundamental, are not structural changes. The first thing that has to be understood is that nothing can be done successfully unless the actual reality of the place under development is taken seriously in all its dimensions, fact that implies that the architect or the planner, the maker, in one word, have to spend a considerable amount of time on the site, trying to understand it deeply, letting the site speak to them, and that they have to see clearly how the site will be transformed when their proposal is realized.

When dealing with a larger scale, let's say, the development of a neighborhood or a community, the adoption of structure preserving transformations as a guiding principle implies that the planner will be unable to prepare a master plan which will define the development of the place in the time to follow, but instead he has to prepare a detailed process according to which the place can grow piecemeal adapting itself always to the actual context recently transformed and according to which the place under development can become whole and harmonious.

Island of Patmos-Greece. The structure of the monastery on the back, and the structure of the houses, though of different scale, have respected deeply each other's existence and features all along their development resulting in the creation of a coherent, solid and well-centered whole.

Island of Santorini-Greece. The new structure on the top, though tries to adapt itself to some features of the local architecture, fails completely to respect the existing structure of the village, mainly because of the crude way it imposes itself. It is a foreign and unconnected element with regard to the rest.



Florence. All the apartment buildings, made during a very long period of time, have managed very successfully to respect each other in terms of scale, feeling, details, though different from each other, and to enhance the existence of the river.

Boston. The intention of the architect, as it is claimed, to make an all glass high-rise building so that the church can be reflected on it, ignores the essence of the existence of the church and violates the structure of the square and the measure inherent in it.

Principle 4: Piecemeal Growth and Structuring Wholes

The adoption of the principle on structure preserving transformations in physical planning cannot be accomplished successfully unless physical planning takes the form of a step-by-step process, where each step reconsiders carefully the existing situation as a new thing and not something that once existed, and introduces a new increment which brings the overall situation closer to the state of completion and which makes the new given more whole.

Since each new step is introducing a new thing, it is altering the existing reality as a whole; it creates a new structure which is completely particular because of the new thing that has entered it; and therefore, before, it continues to be transformed it has to be studied carefully.

The immediate implications of this mode of growth is that it is impossible to create specific schemes and plans according to which areas, regardless of their size, will be shaped, given that we recognize and can accept the important role the existing structure plays as a major force that shapes the environment.

There is no one best incremental procedure to be applied everywhere. Depending on the size of the project under

development, on the time constraints, and on the existing situation, one can imagine that the increments which are introduced at each step can vary from one single building to a group of buildings. Also, one can imagine that, in a process of piecemeal growth, the development can have only one starting point which will generate further development or that it can begin from different points. Anyway, it is impossible to define in general terms what is the best that has to happen. Every situation has to be assessed by itself as a distinct case and has to find that scheme of piecemeal development that serves it most appropriately.

However, there are some rules that have to be followed always in any form of piecemeal development; the most important of them are the following:

1. Any new increment introduced in the existing structure is not merely a new increment to be added somewhere in an arbitrary way, but it is contributing to the coherency and not-separateness of the whole.

2. Any new transformation that takes place, beyond adding new increments, enhances and intensifies the structure of the whole place under development by pinning down latent centers and by hinting at some completely new.

3. Any new increment, beyond introducing itself in space, contributes to the definition of the public space.

DENSITY

PHYSICAL PATTERN

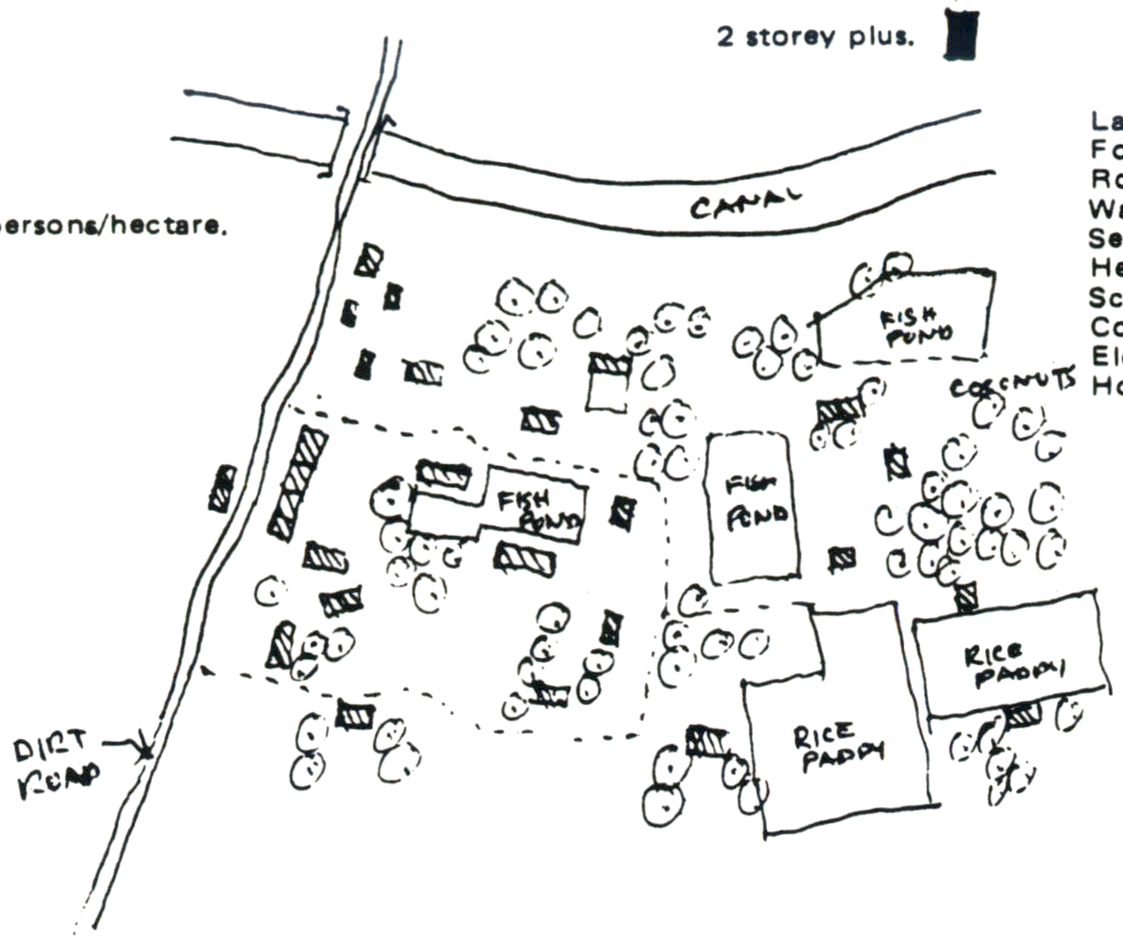
SERVICES

KEY:

Single-storey house in plot.

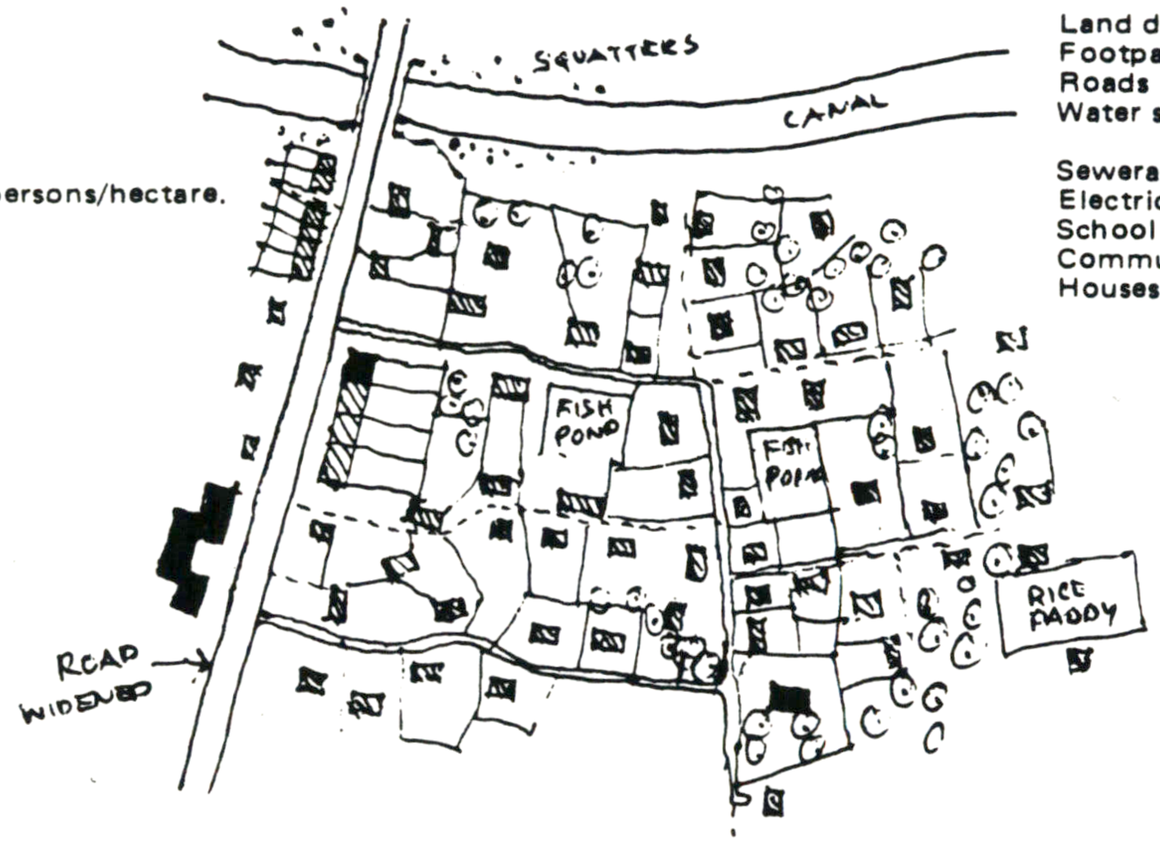
2 storey plus.

80 persons/hectare.



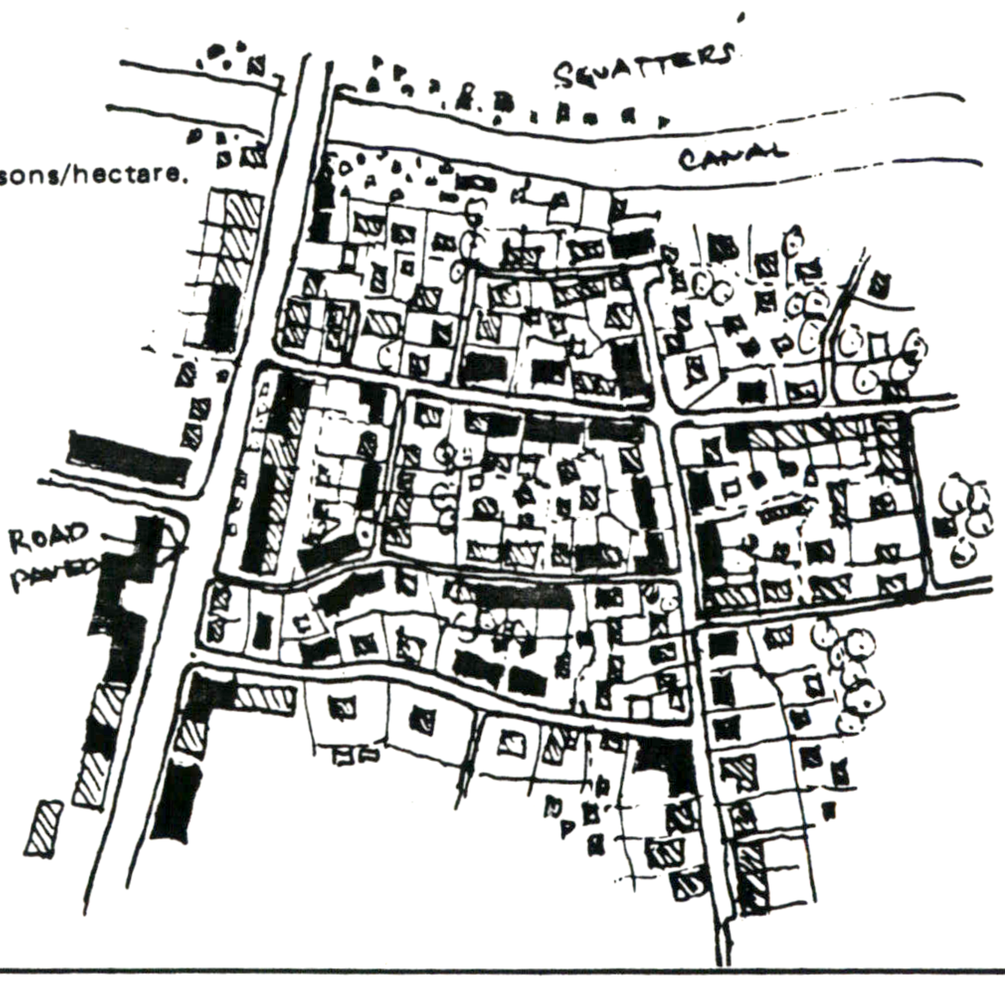
Land drainage — none.
Footpaths — dirt.
Roads — none.
Water supply — well.
Sewerage — none.
Health centre — none.
School — none.
Community hall — none.
Electricity — none.
Houses — bamboo/thatch.

150 persons/hectare.



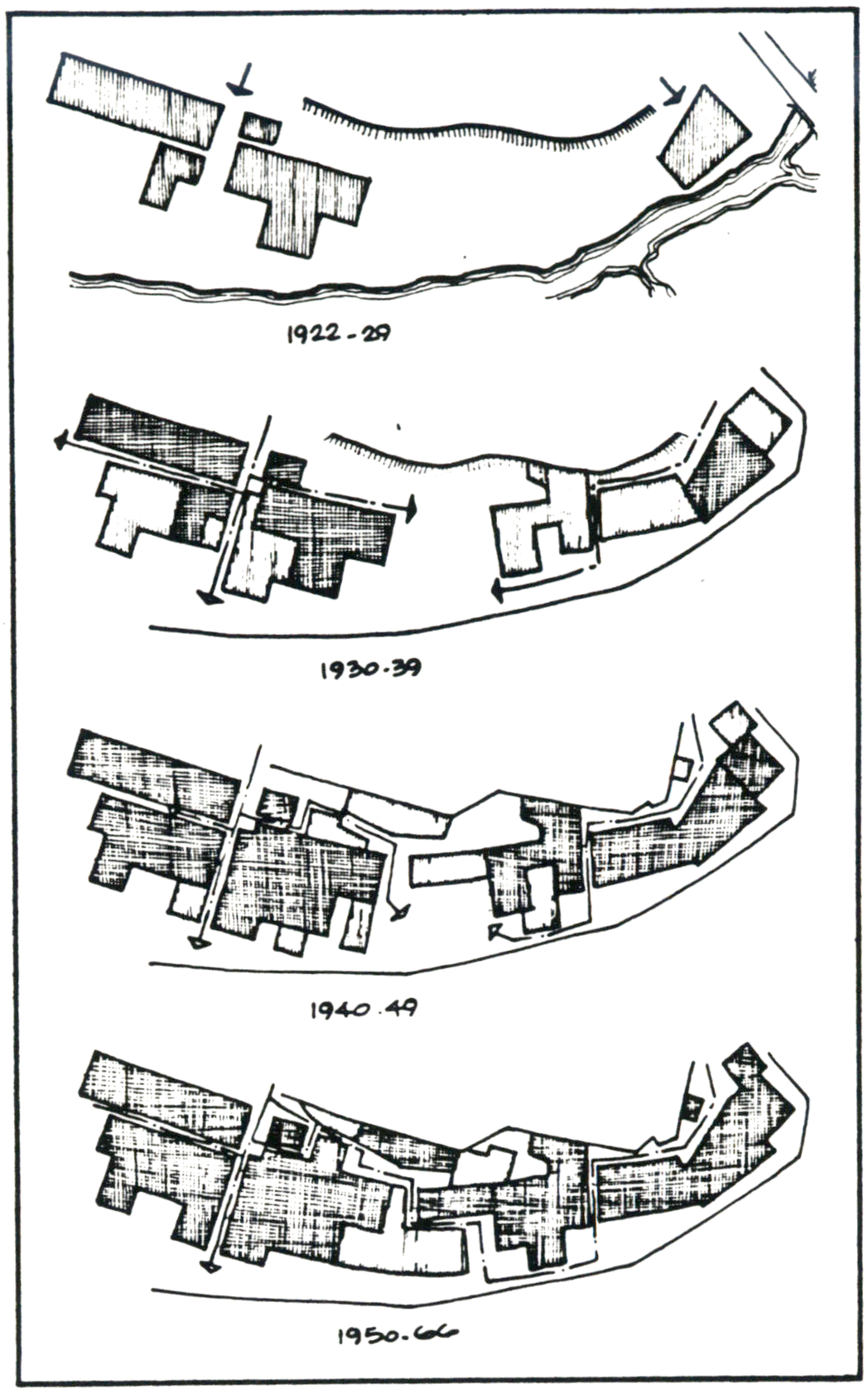
Land drainage — part.
Footpaths — dirt.
Roads — dirt.
Water supply — well & vendor.
Sewerage — none.
Electricity — none.
School — yes.
Community hall — yes.
Houses — bamboo/thatch & wood frame, brick fronts.

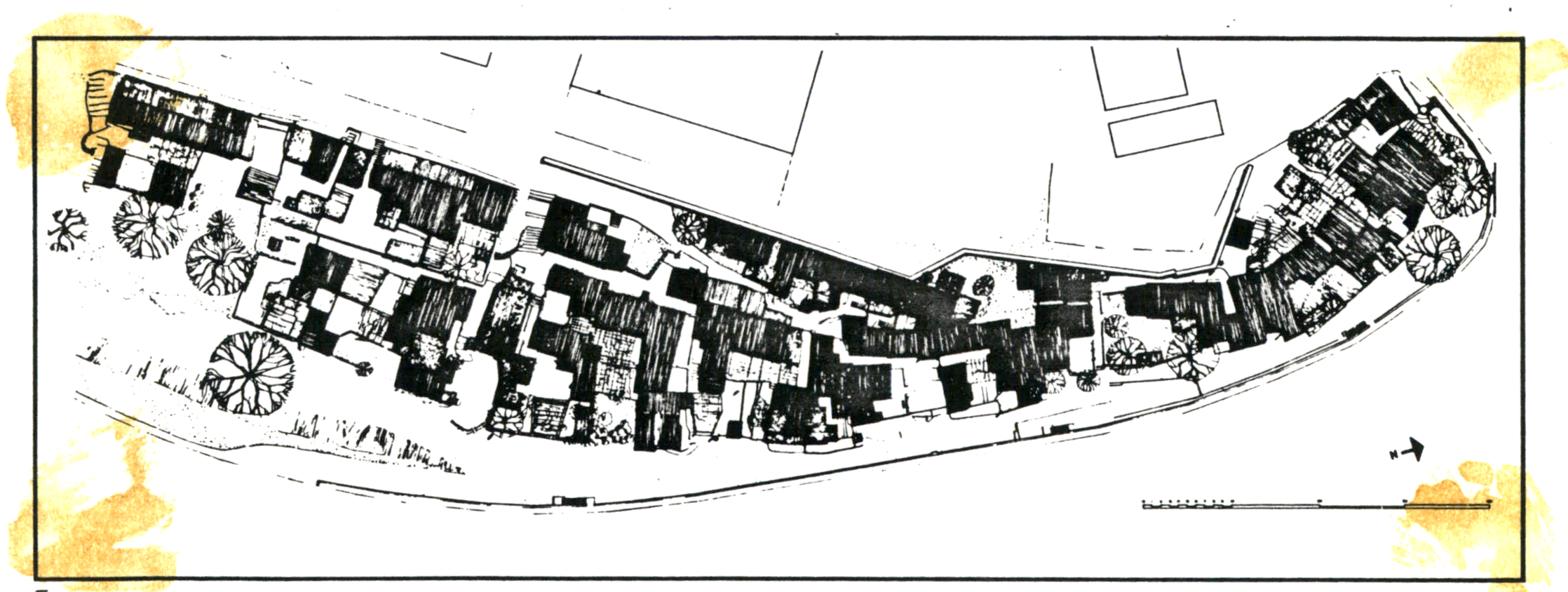
500 persons/hectare.



Land drainage — yes.
Footpaths — surfaced.
Roads — surfaced.
Water supply — public standpipes.
Sewerage — public toilet.
Electricity — part.
Health centre — yes.
School — yes.
Community hall — yes.
Houses — brick & wood frame, brick walls

Piecemeal growth of a squatter settlement in Indonesia





The incremental growth of a residential area in Athens

Principle 5: Unification of Structuring Wholes through a Pattern Language

Any traditional culture, according to its particular features, its physical context, its way of everyday living and the physical resources it has available has developed its own patterns for the shaping of its towns and buildings. The patterns, established through the repetition of configurations and relationships in space that seemed appropriate and helpful and not by explicit law, were respected and followed by everybody involved in the building process. And it happens, that what they have built is human and harmonious.

A step-by-step development process which is aiming at the creation of something coherent has to be guided by a pattern language which will establish the framework within which solutions have to be searched for. The establishment and the use of a pattern language, specific for the particular context and even for the particular project, will unify all the increments to be built over a period of time, since it will provide ways for solutions guided by the same spirit, and since it will specify the spatial relationships in any given problem that has to be dealt with in the same way. This sameness does not imply a blind repetition

of the same solution all over, but it asks for the attribution of the same essential features in spatial configurations which belong to the same family.

The identification of the essential features of a particular context or a particular case, which shape its identity and pin down its individual characteristics, is the main task on the formulation of a pattern language. A pattern language does not look for the creation of proto-type solutions of particular spatial problems which can be replicated; it wants to establish only the unchangeable part of a spatial formation which consists of smaller increments, and it is doing this by defining where the essence of this unchangeable features relies upon.

And this is why a pattern language has the power of unifying spatial configurations made by different people and at different times in a relaxed, solid and coherent way.

However, the problem that has to be dealt with is that today it is almost impossible to find the essence of the basis that used to generate pattern languages, which can be des-cribed, in some way, as coherency and consistency of the values that people shared. Pattern languages, not only in reference to building but also to all different manifestations of human expression, were never established as a law; they were the outcome of a deep and commonly shared understanding and feeling of what has to be done and what not, of what is beautiful and what not, of what fits them and what not.

The present structure of the society cannot allow the generation of such pattern languages since pluralism of values is one of its predominant features. Although pattern languages cannot be generated today as an outcome of a cultural and social procedure, they can be introduced and established as a means for the improvement and the consistent differentiation of the build environment. Also, although pattern languages today cannot be addressed to and accepted by whole societies, even as small as the society of a town, they could be developed in reference to specific developments, redevelopments and projects by gaining the acceptance of the people who are going to live there.

In places where there is still an active pattern language, as in the remaining traditional societies or in societies which have kept a strong link with their tradition, the already existing pattern language should be respected and used, and its importance should be emphasized to everyone involved with building production. In cases where there is no pattern language in use, a new pattern language could be formulated, even on a limited scale, or even just in relationship to a specific project; in this case, the development of the pattern language will be guided by respect for the physical context, by patterns of events, as they are observed in everyday life, by the availability of the physical resources useful for building, and by the culture of the people.

This discussion assumes that there should be some people who will be responsible for developing a pattern language. Of course, there is a contradiction in this assumption, since pattern languages used to be the outcome of experiences and practices and ways of life of many people united under common beliefs and values, and in this case we advocate the substitution of this generating social organism by some people attempting the achievement of similar results. The people mainly responsible for the establishment of this kind of a pattern language could be the local government of an area. As far as the formation of a pattern language is concerned, I can see the possibility of an architectural firm dealing with this issue, and trying to develop a pattern language for a specific project ; and surely, they can succeed on it if they try to look deeply into the generating forces of patterns. However, in cases where we talk about the formation of pattern languages referring to larger and more differentiated groups of people, such as the society of a small town, then the situation becomes more complicated; the establishment of a pattern language developed by one architect as one task will not necessarily guarantee its successful acceptance and use. In this case, a more coordinated and piecemeal formation is needed, in which, as many architects as possible working in the area, should participate through the development of their projects, working on them closely with the users and under the idea of a pattern

language. This will enable builders, architects and users to participate in the formation of a pattern language and to make it a useful instrument to guide every single one of their building operations.

The following illustrations represent a sequence of patterns according to which the town, the market, the neighborhood, and the house in the region of Bosnia-Yugoslavia were created, and are partly used today; they were studied by Grabrijan & Neidhart in their thorough analysis of Bosnian architecture.

THE CITY:

1) The Mahala is the residential, the Charshiya the business area.
2) The amphitheater-like city.
3) The ramification of streets.
4) Administrative-religious division of the city; one hundred Mahalas — one Charshiya.
5) On the slopes are the Mahalas, in the valley is the Charshiya.
6) The city of gardens and cemeteries.

THE CHARSHIYA:

7) The Charshiya — the heart of the city.
8) Dome beside dome, store beside store.
9) Twelve craftsmen fitted out a horse and rider.
10) Religious and cultural buildings: churches, divinity schools, etc.
11) Civic structures: inns, bathing establishments, covered market halls, shops, warehouses, etc.
12) Vertical pattern: clocktower, minarets, and poplars.

THE MAHALA:

13) The Mahala — a neighboard unit in the contemporary sense.
14) The mosque, cemetery, fountain, divinity school, bakery, greengrocery, and the forty to fifty houses constituting the Mahala.
15) The meander and the atrium, the two fundamental forms.
16) In order to obtain wide vistas a doksat had been developed.
17) Neighborliness. The Koran urges: Next to Allah thou shalt love thy neighbor best.
18) The right of view. (The unwritten law.)

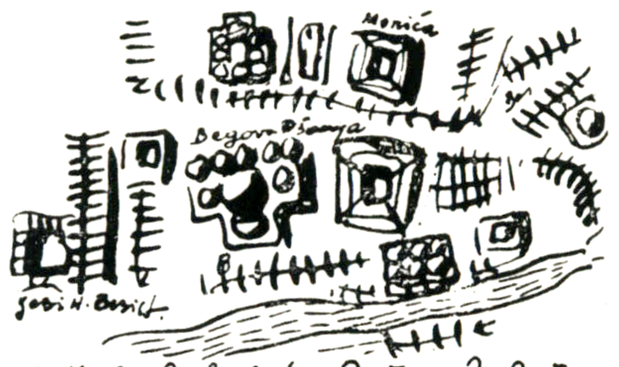
THE HOUSE:

19) The house — the yard — the garden. Three fundamental urbanistic elements.
20) A two-storied house with a hip roof
21) A structure built of earth and wood.
22) The outer and inner core of the house.
23) The life in the house: meals, visits, sleeping, etc.
24) The divhana (verandah) a symbol of a high housing standard wealth and comfort).

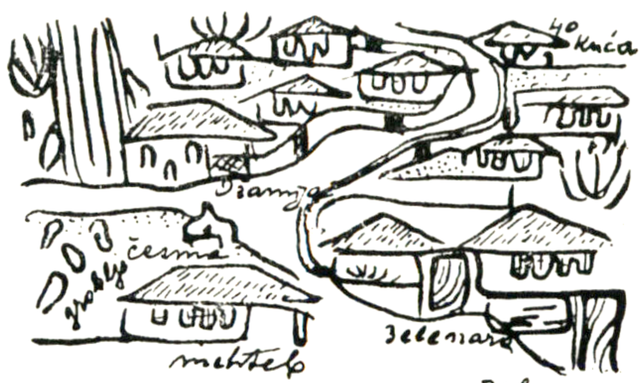
1 u mahali se stanuje u Čaršiji se radi

2 amfiteatar

7 srce grada

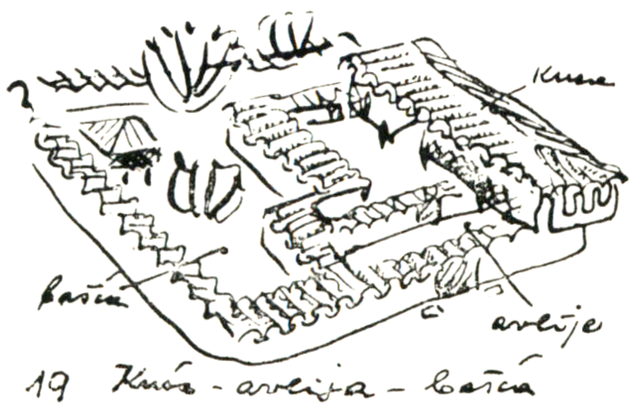


8 Kube do kubeta, Dućan do Dućana

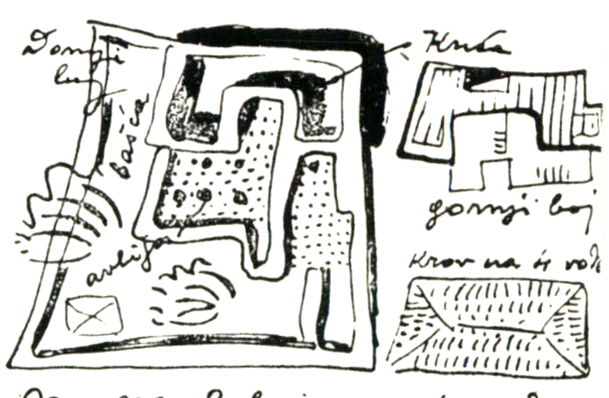


13 mikrorejon

14 40 kuća i mahala



19 Kuća - avlija - čardak

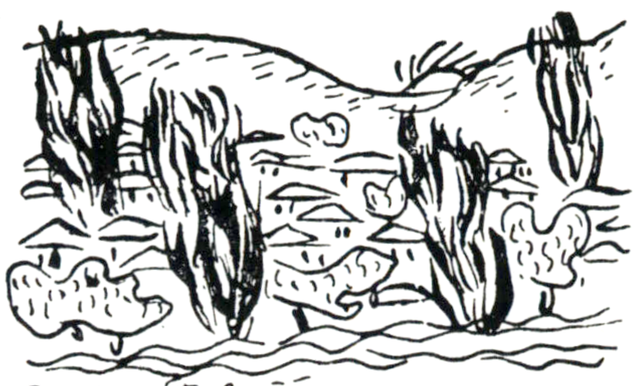


20 na 2 kata, na 4 vode

3 grananje cesta

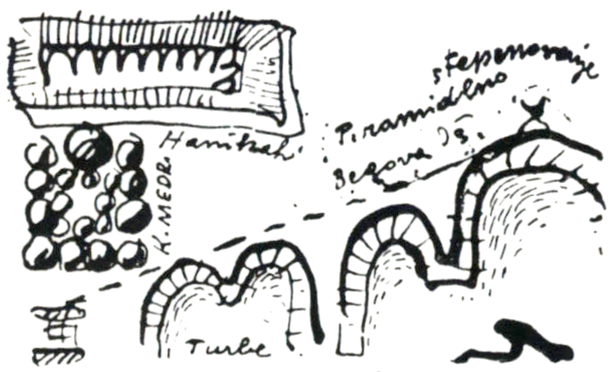
4 100 mahala 1 čaršija

5 napaćini materijale u Stolnim je čaršija

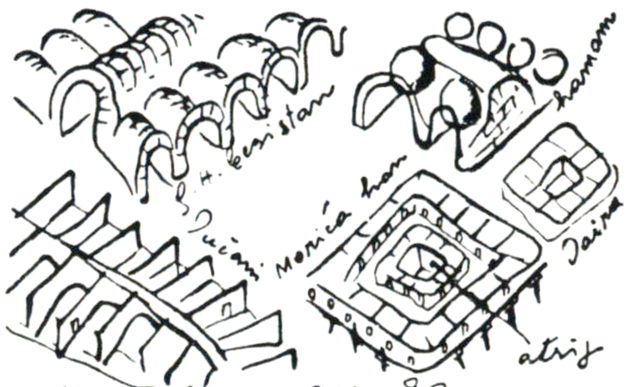


6 gradnja kuće

9 proizvodnja u vrtci

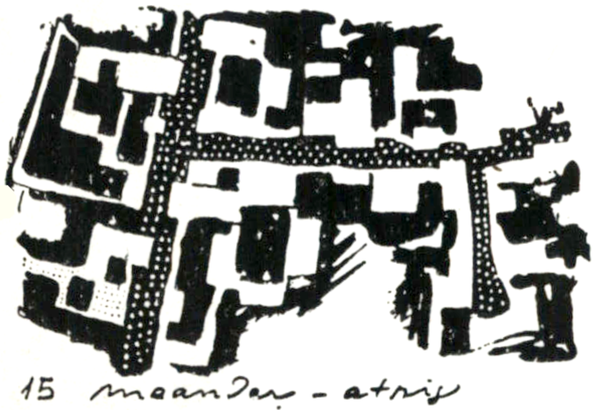


10 Kultura gradja



11 Arhitektura gradja

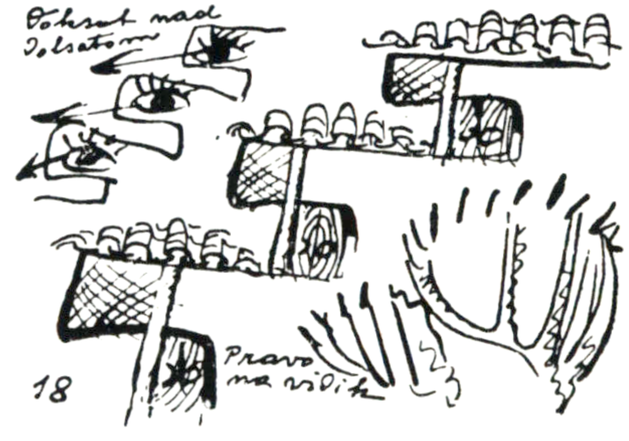
12 visinska akcenti



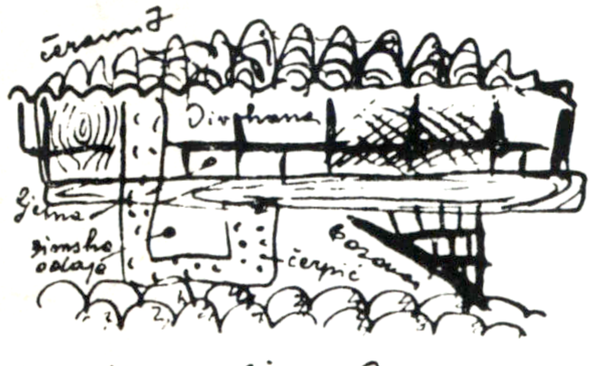
15 meander - atrij

16 smatišelja

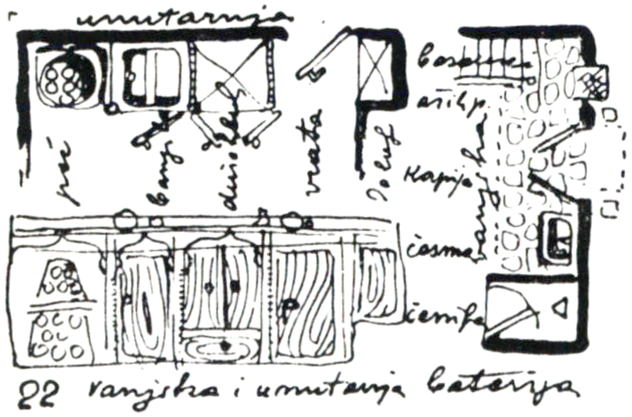
17 Poslije Alaha komšija



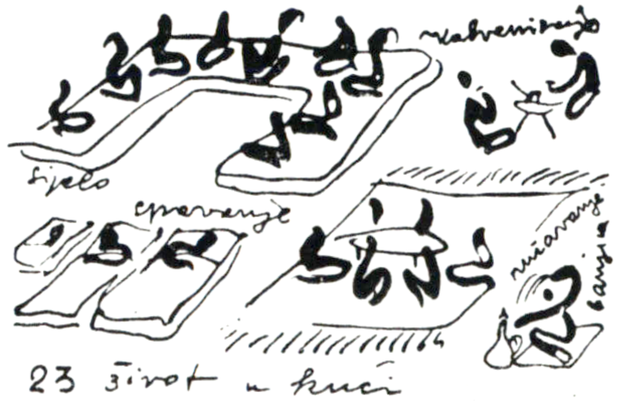
18



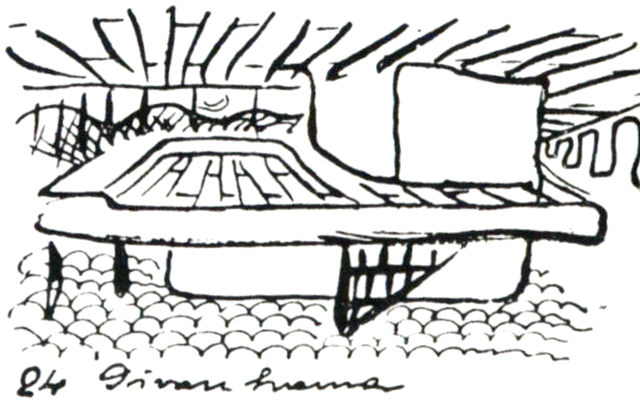
21 13 soneja i Irva



22 ranjska i umutarnja baterija



23 život u kući



24 Dnevna hrana

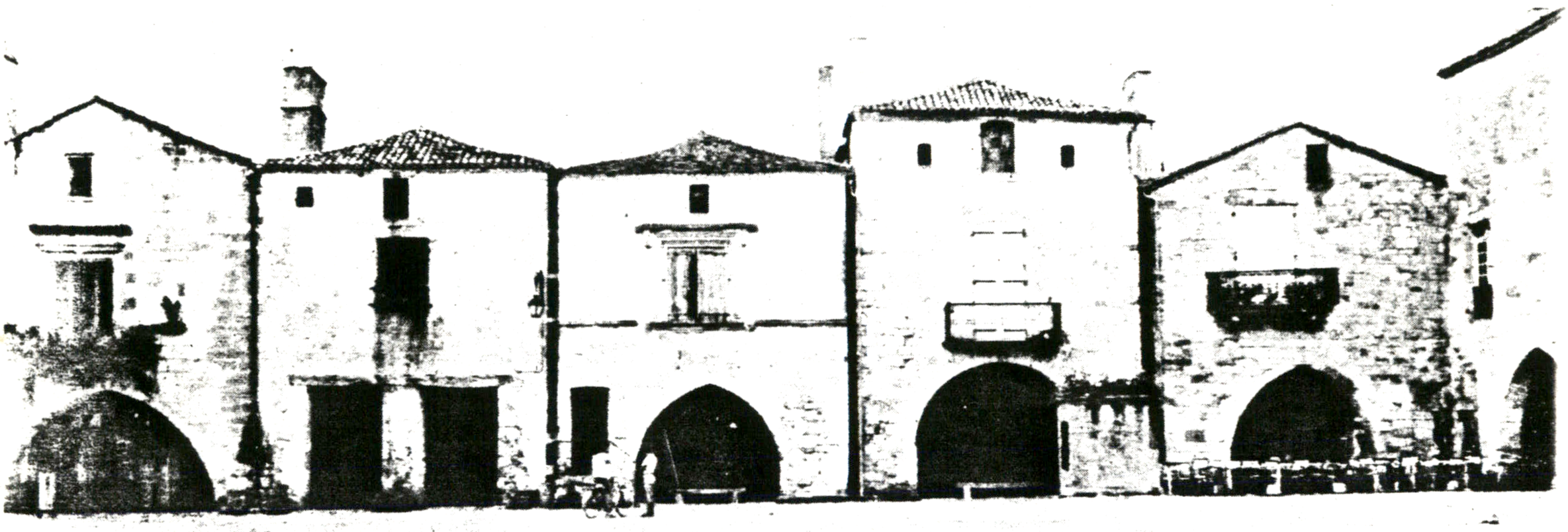
Principle 6: Differences in Similarities Generated Within a Pattern Language

The point that has to be made clear here is that the use of a pattern language as the guiding force for building operation within a context does not create a homogeneous and undifferentiated environment.

A pattern language generates similarities; however, the similarities that generates is the glue which ties different things together so that they can form a coherent and solid entity. The similarities that a pattern language defines are not similarities of form and shape but similarities of the essential properties of spatial relationships, of materials, of construction methods.

However, these fundamental similarities do not make the environment repetitive or homogeneous because they are apparent only on the deep structure of the place. On the level of spatial configurations and morphological expressions there is a wide range of differentiations and variations; they do not violate the fundamental similarities generated by the patterns, but they are mainly manifestations of the same theme. They express the particular features that a building or another increment has, and its effort to fit in the best way within its given physical context.

Therefore, in every place which is created according to a pattern language there is the right amount of similarities and the right amount of differentiation which unite its constituent parts together in a harmonious and ordered whole.



These five buildings are so similar with each other; also they are so different from each other.

Principle 7: The Creation of Positive Urban Space

Open urban space is not a physical residual to appear occasionally as a by-product of the shaping of buildings; neither is it the scheme imposed in advance of a particular development to help the definition of building lots and the provision of access into them.

Open urban space, streets, paths, squares, gardens, and parks are as important a component of the urban tissue as buildings themselves.

The shaping of open urban space has to be approached with the same care as the shaping of buildings themselves; and both of them have to be viewed as unseparated elements of the urban structure.

Any building increment generates both, building and outdoor space; and buildings have to be placed and shaped in such a way so that they contribute the maximum to the generation of livable and human streets, squares, parks. . . .

More specifically, any building increment when placed and shaped has to tackle among others two major problems that have to do with the creation of healthy outdoor space:

1. How to make the outdoor space that directly surrounds it a nice place, as nice as a room can be; and

2. How its placement and shape responds best to the urban structure, latent or hinted there, and helps to bring it to a more advanced stage of completion and order.

However, the structure of the urban space differs from place to place because of climatic conditions, because of land, because of the relationship people establish with open urban space, public or private, in their everyday activities, because of their culture and tradition. For example, we see that in Islamic cities the prevailing configuration of urban public space is narrow and winding paths and that of private open space is enclosed courtyards. On the contrary in most Italian cities the urban fabric is articulated as a succession of small piazzas and not very wide streets, while the private open spaces take the form of a garden, usually, when density permits.

The implications of this are that the rules that guide the formation of urban space are different in different places, although, at the same time, they should have, all of them, regardless of the context they refer to, one similar feature which is their attempt to try to create positive and healthy urban space.

In order to clarify more what the creation of healthy and positive urban space means and what it entails, I will try to give an explanation of the structure of a path in a Greek island village and a description of a probable procedure that led to its formation.

The Structure of a Path in a Village

Each path in a village is a continuous structure.

However, it is not a homogeneous, undifferentiated structure; it is made of continuous and overlapping "centers."

Each piece of the path is a "center."

Each "center" is a part of the path that has a concave shape; it narrows at the edges and widens at the middle.

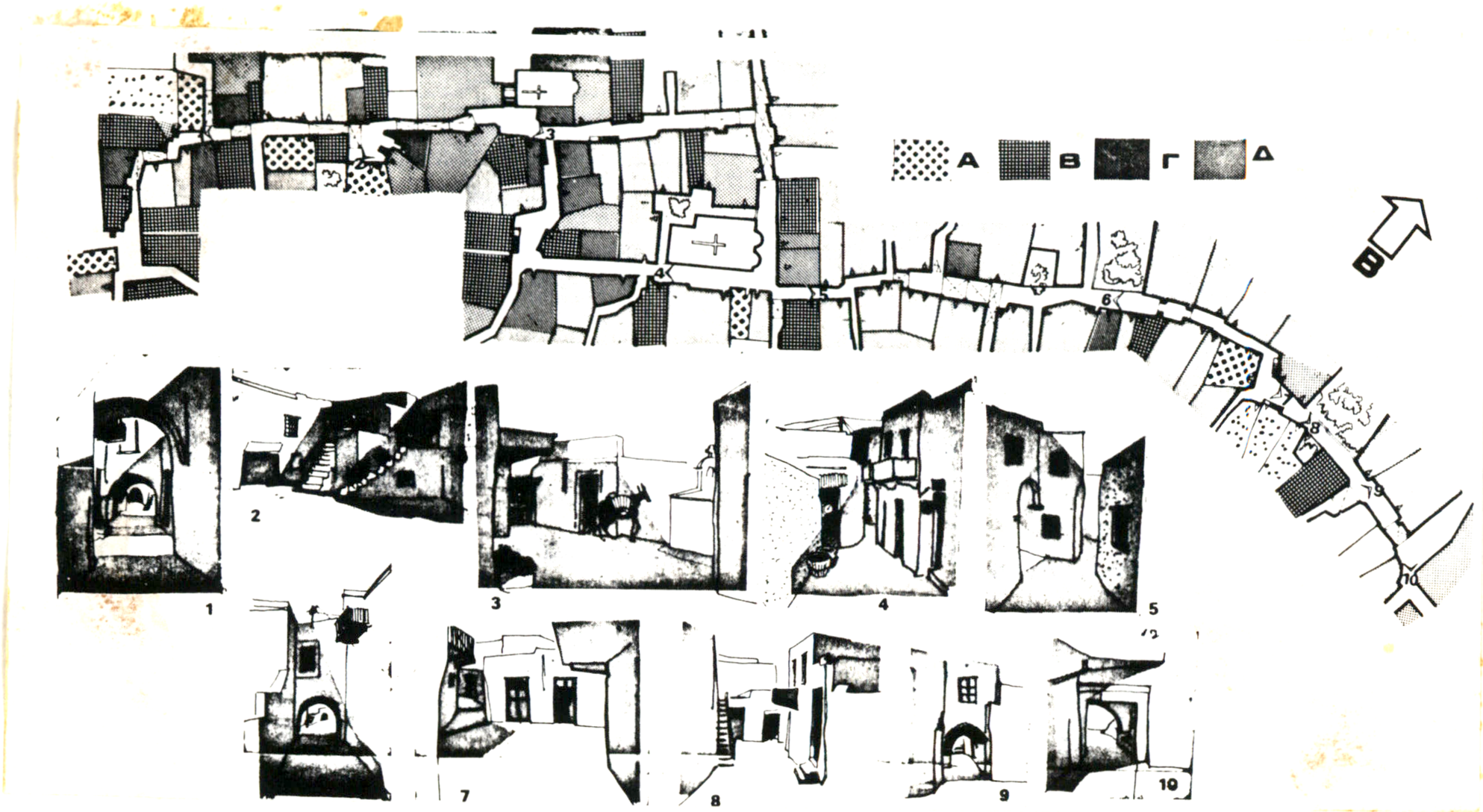
Therefore, "centers" along the path have a rather elongated shape that follows the course of the path.

There are about six to ten houses clustered along each "center"; the length of this "center" varies from approximately fifteen meters to about thirty meters, depending on the situation.

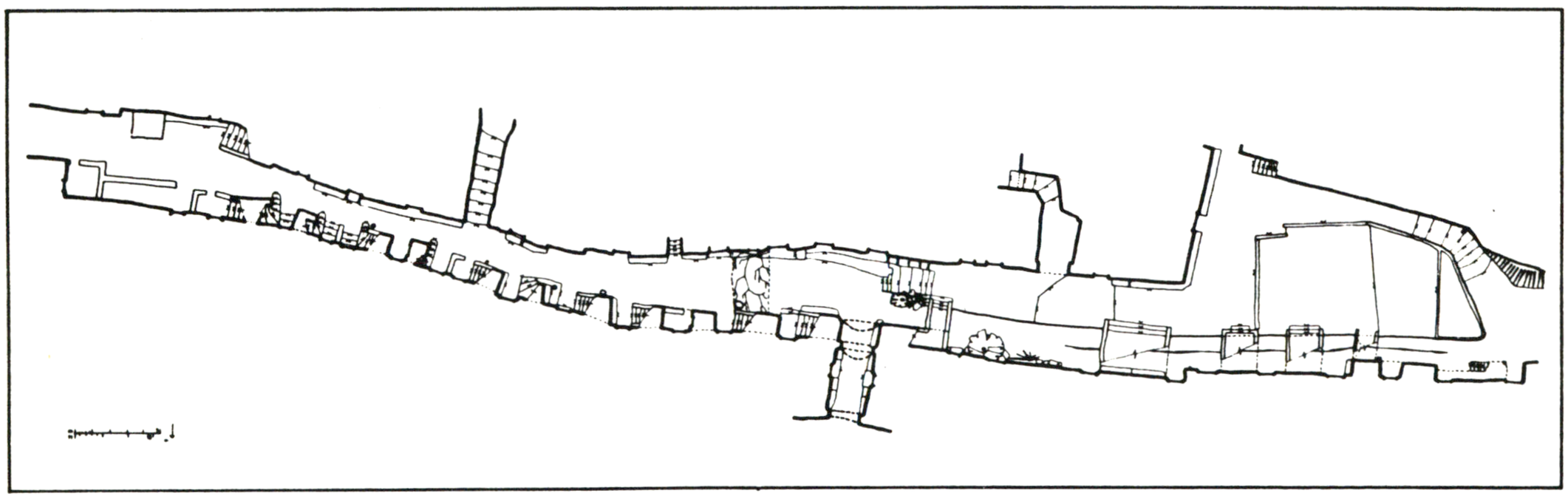
Each one of these pieces of the path is identified by the families clustered around it as their common outdoor space; so, they want to give it the feeling of a place to be and not merely the feeling of a place that one just goes through.

It is rare that distinct boundaries and complete separation can be delineated between two following "centers" of a path. There are areas of overlapping between two continuous "centers." These are areas of transition between them.

It seems that the rule followed was: "Wherever possible avoid a straight line of houses."



A path in a village on the island of Naxos



19

The main path in a small village on the island of Sifnos

How did this rule funcion operationally at the time a house was laid out?

It is certain that before the house was laid out there was a careful inspection of the area of the path around it by the person responsible for laying out the house, this being either the owner of the house or a builder hired specifically for this purpose.

The purpose of the inspection was to make a careful diagnosis of the structure of the area, paying attention to the feeling generated by it. He would look to his right and his left, studying carefully an area not more than twenty meters across. He knew what he was looking for. The question he would ask himself probably was the following: "Where shall I place exactly this house in connection with what is already existing there -one or two houses on the left and on the right and the houses across- so that the space that connects this house becomes a nice place like an elongated room where we would like to spend some time and feel like we are in a place that belongs to us."

There was already a narrowing on the path between the two previous houses which somehow enclosed the previous section of the path; he would pay attention to this, recognize it immediately, see how long this narrowing along the path was. Very quickly he would estimate if it was good enough as it was or if it needed more to be added there and then he would place his building having a clear intention in

mind; either to continue the narrowing, or to stop it and give more wide space to the path.

Whatever the details of the placement are, one thing is certain. He knows that beyond trying to make a house he has to make at the same time a nice outdoor space.

The rules that he probably follows are:

1. Before he makes any decision concerning his house he makes a diagnosis of the area around it.
2. When he makes the diagnosis he knows that he is looking for the exact place to place his house so that it makes a nice, gently enclosed place together with the other houses.
3. He limits the diagnosis of about an area of 30 meters long the maximum.
4. Then he concentrates his attention to the houses next to his and opposite to his. There is nothing that tells him that he has to place his house exactly parallel to the existing houses. Instead, he pays attention to the size and the shape of the space between the houses and then he makes his decision.
5. Although this outdoor space is a part of a long path he considers it to be a distinct place with its own identity, a center.

Principle 8: The Making of the House instead of the Design of the House

According to what has been analyzed in the first seven principles the actual situation of the existing structure which will undergo development plays the main role in the geometrical definition of the building to be erected. The importance of this notion was explained in detail in the principle on "Structure Preserving Transformations." This principle asks for a fundamental reconsideration of the way buildings are designed and built today.

The architecture practice today gives an immense role in the design of the building, since the configuration of the building is mostly defined on the drawing table, and since the construction system is worked out mainly on construction details drawn on a piece of paper. Although it is alleged that such a design procedure takes seriously into consideration the actual site and its particular features, it is certain that it cannot succeed in producing a building which respects fully the existing situation of the site in all its details.

This principle proposes a completely different design procedure. The first idea is that a building should be

staked out on the site and that its volumectric configuration should be made on the actual site; this does not imply that the site will be used merely as the inspirator of the generic idea, but that it has first of all to generate the ideas and then to receive them on it concretely. The building has to be staked roughly on the site, with emphasis on all its important centers, and then it has to be walked through so that it can be tested carefully according to the feeling it generates. All necessary changes and adaptations have to happen on the site with the method of staking out every place.

However, a rough layout is not enough to create a clear sense of the building and to permit a recording of the staked-on-the-site situation on paper in order to proceed for building permits. The next step that has to be followed is a carefully detailed layout of the building where the exact placement of every corner is of immense importance, the size of every room has to be sensed carefully, the outdoor spaces have to be taken seriously as if they were rooms. This task can be accomplished on its most rudimentary way by the careful placement of stakes on the corners, and by the stretching of strings between the stakes defining the edges of the rooms on their actual level. On a more concrete way this procedure can take the form of the placement of the top form-work boards, in cases where this is allowed by building departments.

Only after this stage is accomplished the recording of the layout made on the site can start by transferring it in drawings for the building permit.

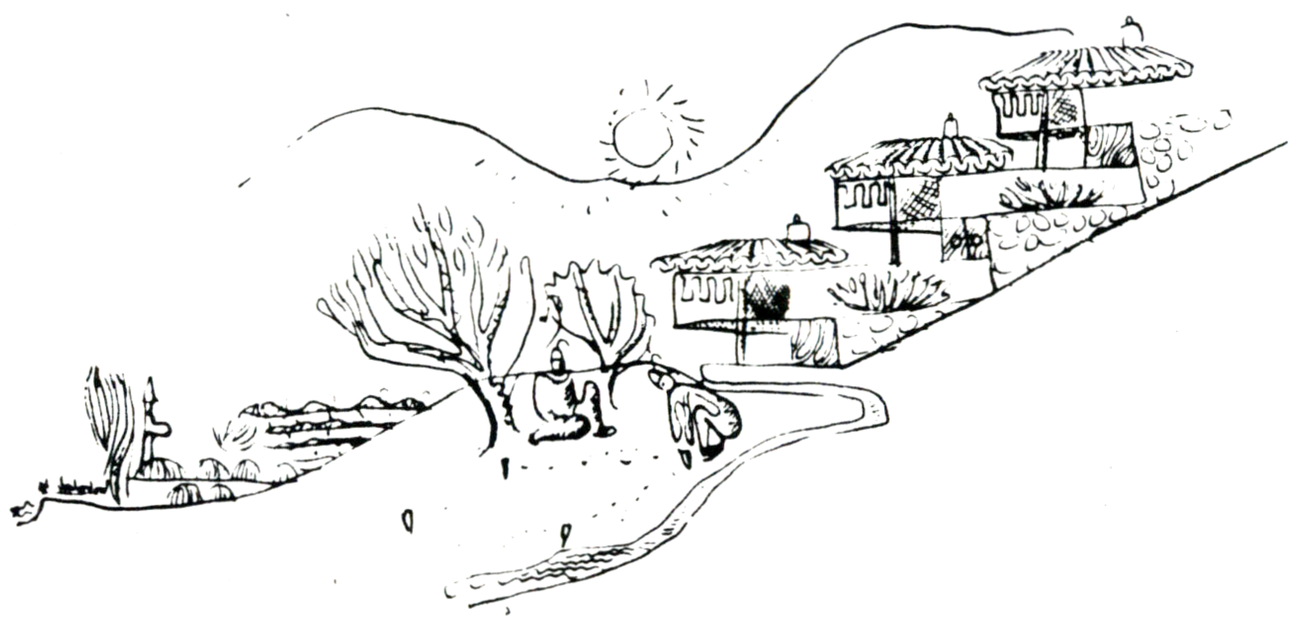
The making of the building does not rely only on the staking of the building on the site instead of its design. The same attitude is kept on the following stages of its construction. For example, the placement of the windows in the rooms is not dictated by what has been drawn but their precise location and the exact size is decided on the construction site after the basic frame of the building is up. Also this attitude that the building has to be made with care and feeling asks for a very careful treatment of the materials that have to be used and of the construction system. That means that the basic materials to be used and their connections have to be studied carefully either through observation of how they feel and behave in existing situations or through small experiments and full-scale mock-ups.

There are some specific procedures, already tested, which contribute to the making of a building as something that springs out of its physical context and as something which is built with materials and techniques that fit to it and enhance its beauty and solidity. It is apparent that these specific procedures described above are more appropriate and operate well in the building procedures for houses or small buildings. This same idea of

the making of a building instead of its design has to be exemplified and made concrete for the building of large buildings or for the production of a large amount of houses.

This way of building was the only way that traditional societies generated their space.

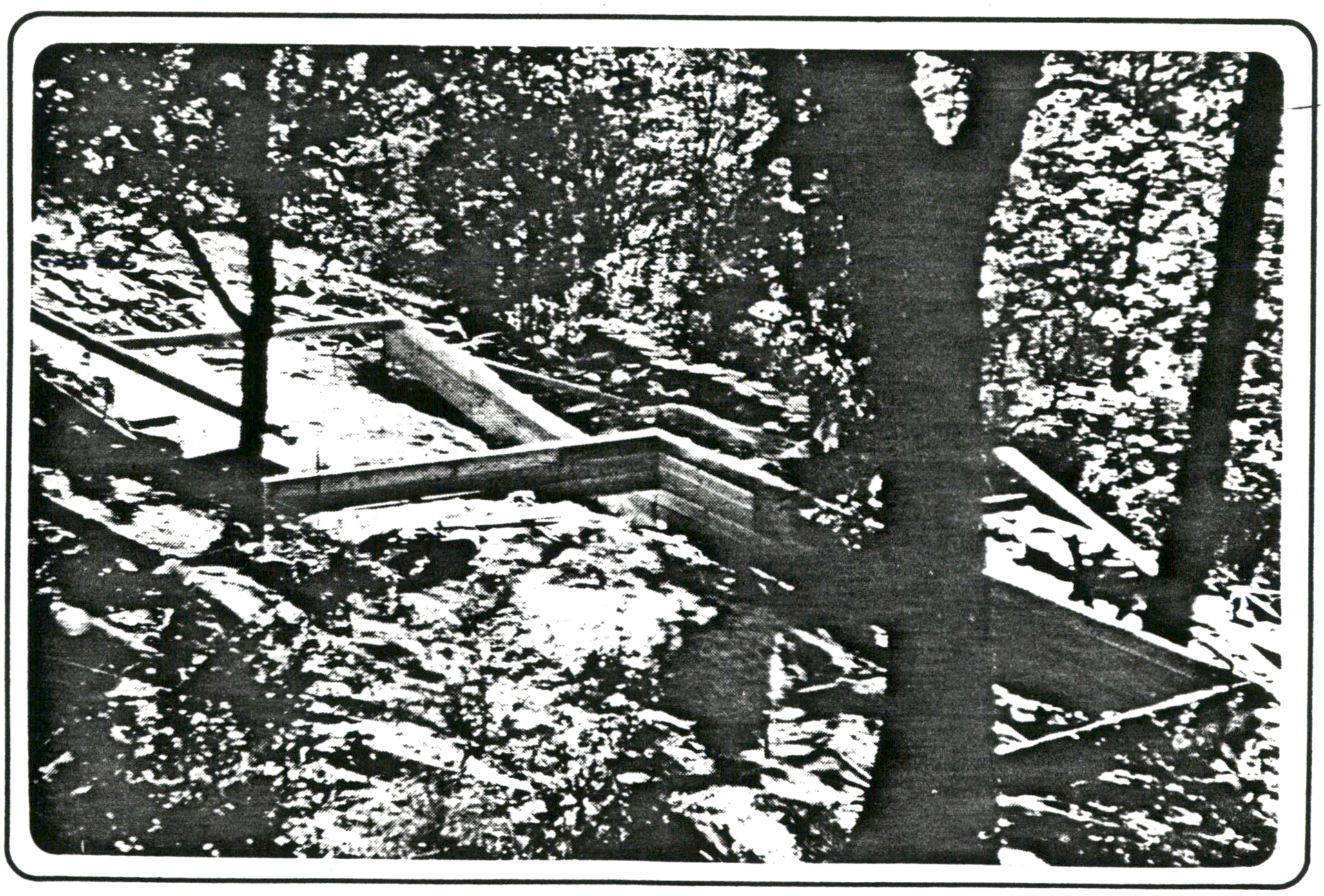
Grabrijan and Neidhardt in their study, Architecture of Bosnia," refer to and analyze this building activity.



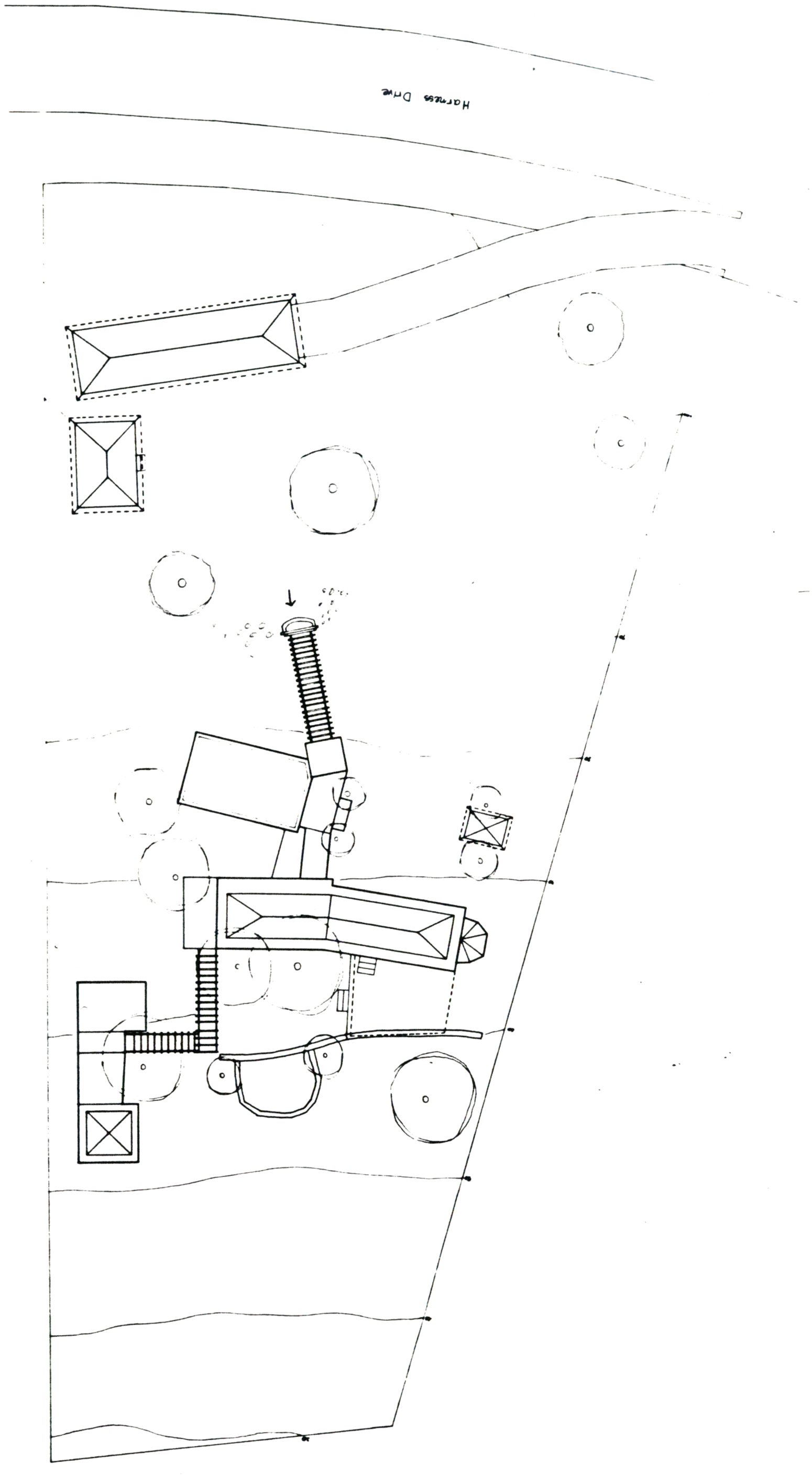
In the presence of the inmades the carpenter puts into earth the pales indicating the house limits.

The following photographs show instances from the procedure that we adopted, actually, the one described above, in the making of a house in Napa County by the Center for Environmental Structure, and the final layout of the house as it was recorded from the site.

Preparation and leveling of the ground happen at the same time with the layout of the house on the site.



The design of the house was finalized after the top boards of the foundation formwork were in place.



The final layout of the house as it was recorded after the foundation forms were in place.

Principle 9: The Shaping of the House by the Users under the Guidance of A Pattern Language

The importance of the existence of a pattern language for a specific context, and its use by all the participants in the building process has been analyzed in the fifth principle. This principle stretches the importance of a pattern language as a useful tool which can be used by the users in the shaping of their houses. Based on the notion of pattern languages, as they were developed in traditional societies, the principle will attempt to settle the framework within which pattern languages could be developed today.

The question is, how in recent times, when any pattern language has become obsolete,the establishment of a pattern language for a specific case can be introduced, and how it can be used by all the participants not on a superficial but in an essential way.

Although the answer I am going to give is tentative and does not solve the problem to its depth, it introduces a starting point that can be very helpful.

First of all, I will make the assumption that today it is almost impossible for a coherent pattern language to be generated as a whole by a society and to be assimilated within it. (The basic reasons why I suspect this is the case

were partly discussed in the fifth principle.) Today some pattern languages exist but they are fragmented and usually have a wrong basis.

Starting from this, the smallest step that can be made is an attempt to try to formulate new coherent pattern languages, which even in some cases can limit themselves in the solution of the spatial problems of a specific case. The formulation of such a pattern language has to be guided by people who are familiar first of all with the socio-cultural aspects of the place under development, and who, also have a deep sense of what a good and a bad structure in all levels of scale means, in other words, people who can feel the space and its properties.

The establishment of a pattern language by someone or by a group of people does not contribute much, if it does not advance on the level of being used by the users.

One step that can be taken towards this direction, and especially in cases where a pattern language aims at the improvement or development of a rather large area is its establishment as an authorized regulation, which even can take the form of legislation substituting parts of the building and zoning code.

In other cases, where its legislation is impossible, or in cases where the project is smaller and enables contact with all the users, the approach that can be taken is the formulation of the pattern as a set of rules which can be

understood and applied by the users in their involvement in the design of their houses. This set of rules, developed specifically for a particular group of buildings according to the patterns, will give instructions in a sequential order to the users on what decisions they have to make step-by-step in order to arrange by themselves the space they are going to inhabit.

We developed this idea for the design of twenty houses concretely and that was a major part of the design of a new settlement in Israel, prepared by the Center for Environmental Structure. Before the actual design procedure had started, and after we had obtained a good understanding of the basic needs of the families and of the actual site that the houses were going to be built on, we prepared a "Handbook for House Design." The handbook was specifically addressed to this project, and it comprises two parts: on the first part we tried to explain to the families the basic ideas on which they should base the design of their houses, and we gave emphasis mainly to the idea of "centers"; the second part of the handbook consists of a series of steps, in the form of rules, which have to be taken by the families on a sequential way so that they can accomplish the layout of their houses on the site.

The major ideas according to which this handbook were developed are the following:

1. There is a hierarchical structure in the sequence

of the rules, asking from the people to define in the initial steps of the process the relationship between their house and the cluster they belong to, by contributing on a clear way to the shaping of that part of the house cluster which is connected to their house. In the following steps the family was asked to define the major elements of the house, such as the garden, the volume of the house, the main room in respect to the previous decisions they had made. Only after these decisions were made definite, on the site, could the family then proceed in the placement of the other rooms and elements of the house.

Although this is not the only procedure to layout a house, in this specific case, it does guarantee a well-understood sequential process, easy enough to be conducted by different people; and beyond this, from the point of view of structure preserving transformations, it could make sure that on the first critical steps of the process the existing structure of the site is taken clearly into account, respected by the careful placement of the garden and the volume of the house and therefore reducing endless changes, possibly damaging, that concerns of a smaller order of magnitude could create.

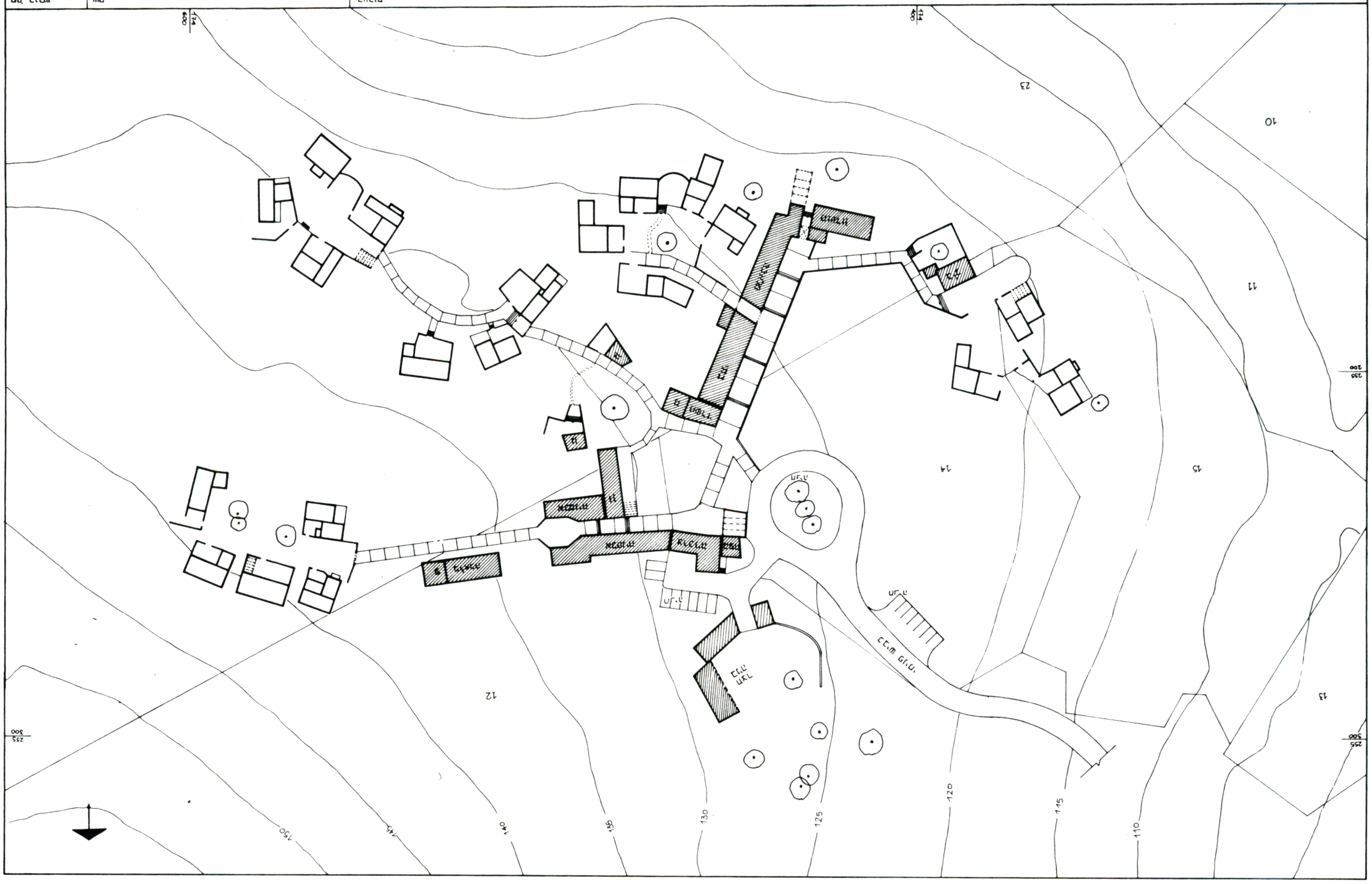
2. The rules were structured according to two criteria: first, that they should provide enough freedom to the families to express their needs and desires clearly during the layout, and, second, that they should guarantee a feeling

of solidity and unity in the whole settlement, regardless of the particular differences among the houses. For example, they were rather loose as far as the relationships between different spaces and rooms, but they were rather definite and explicit as far as the shapes of the major foundation pads, or the location and size of the main room.

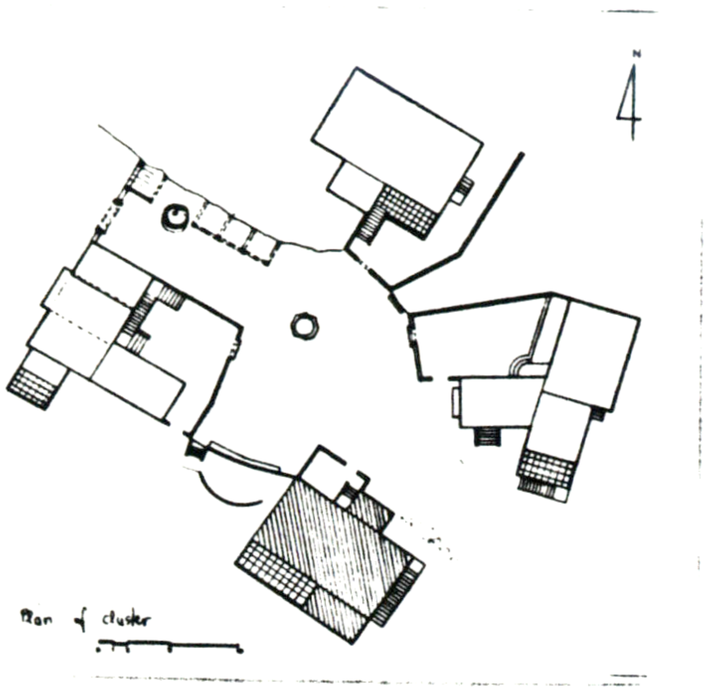
Although the attitude of the different families toward the rules was different, all of them took them into serious consideration while they were staking out their houses on the site. I worked with them for two weeks, each day assisting three families to complete the layout of their houses. Based on this experience, this whole procedure seems rather efficient and promising, though its success might be partly due to the specifications of the social and economic structure of that group of families. As far as the physical results of this process is concerned, in the following pages there is a site plan of the whole settlement with the cluster of houses, and the drawings of some houses, on the form of drawings for building permits, based exactly on the layout made on the site and in the development of the volume as specified by the families. Our involvement in the actual design of the houses dealt more precisely with the placement of the openings, with the relative relationship among the volumesof the house, with some small details of the house. We were guided by an intention to make each one nice and distinct, to respect the particular character of each one of

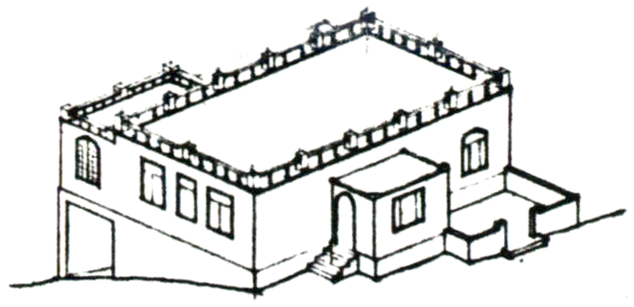
them, as it was talked about with the different families, and yet, to unite all of the houses under the same language.

מדינת ישראל משרד הבינוי והשיכון מינהל התכנון אגף התכנון	תכנית מפורטת מס' 2298/ב שינוי לתכנית מס' 1976 מחוז הצפון רמת הגולן, מג"ש
מרכז קהילתי אלוני יצחק	מגרש 2
מרחב תכנון מקומי גבעת אלונים	מס' תכנית 2
קנ"מ 1:500	תאריך 82 2 15

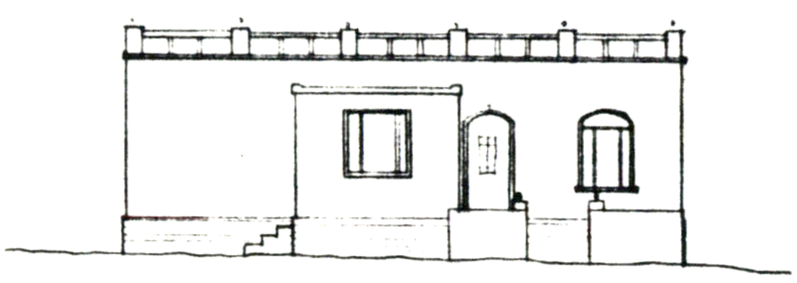

מבנה ציבור
מבנה ציבור
מבנה ציבור

NACHMAN & ELLEN ROSENBERG

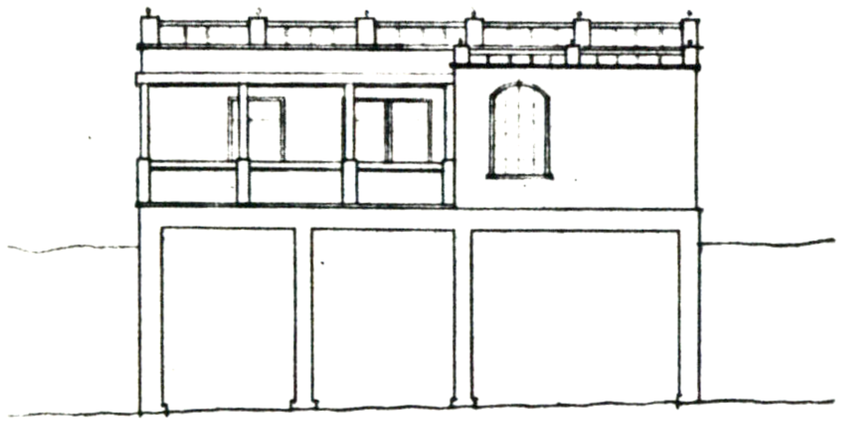




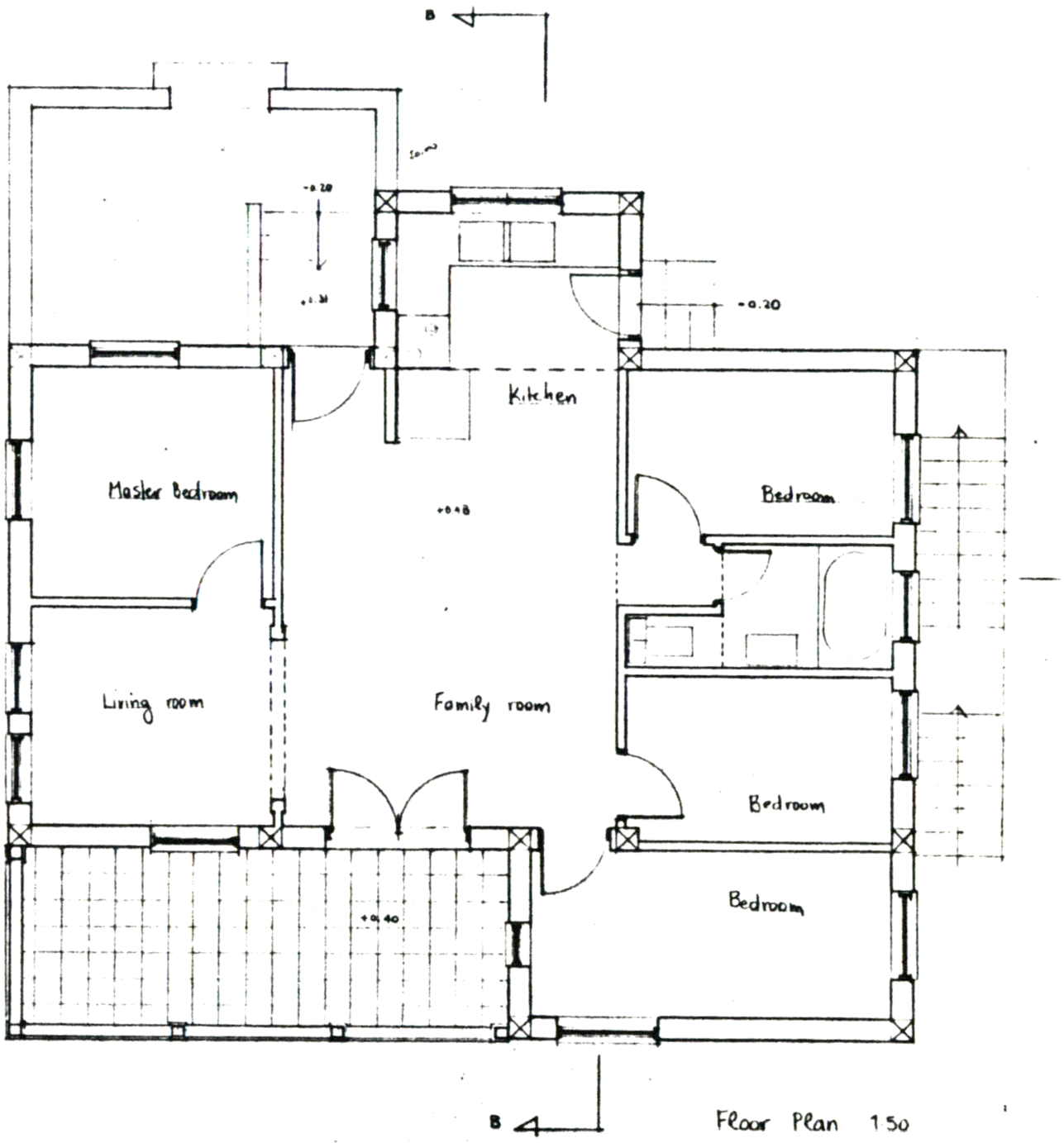
1:200



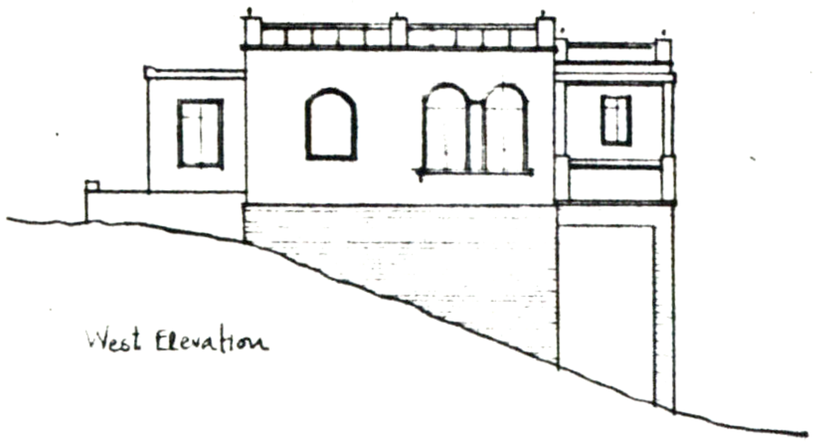
North Elevation



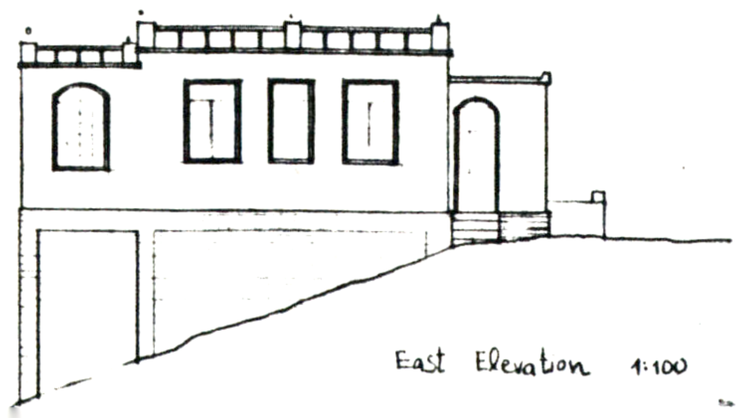
South Elevation



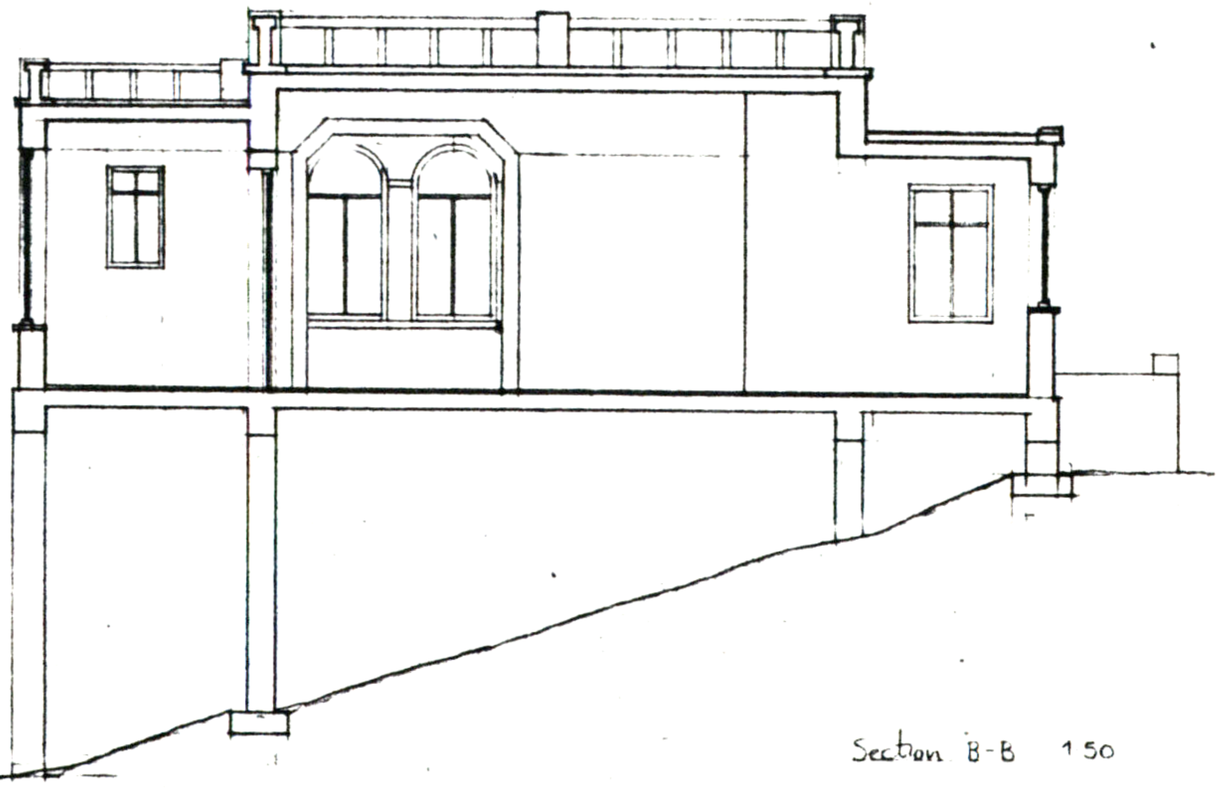
Floor Plan 1:50



West Elevation

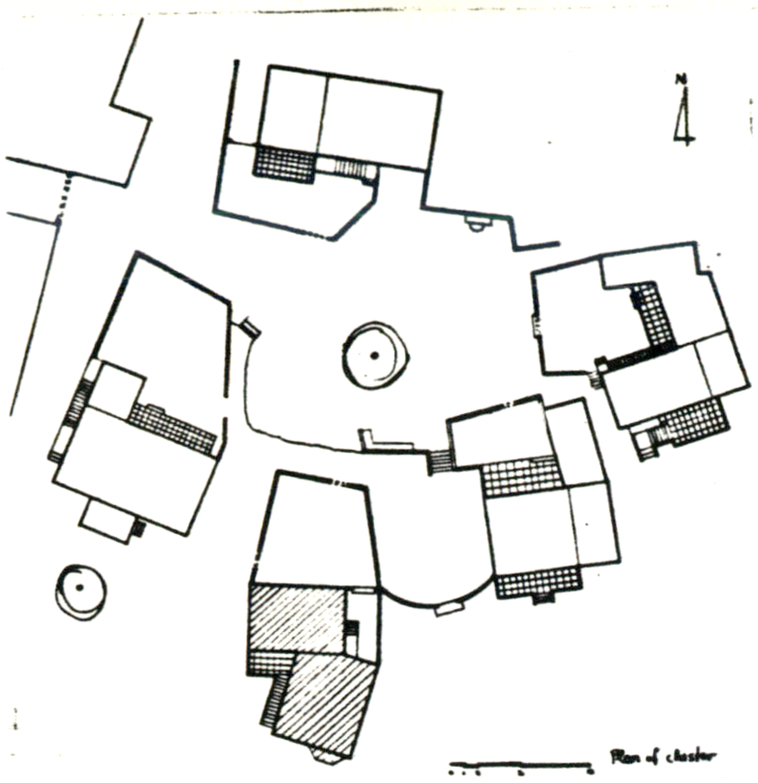


East Elevation 1:100

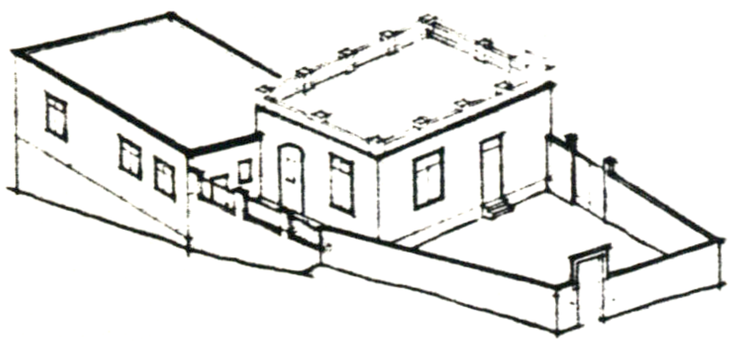


Section B-B 1:50

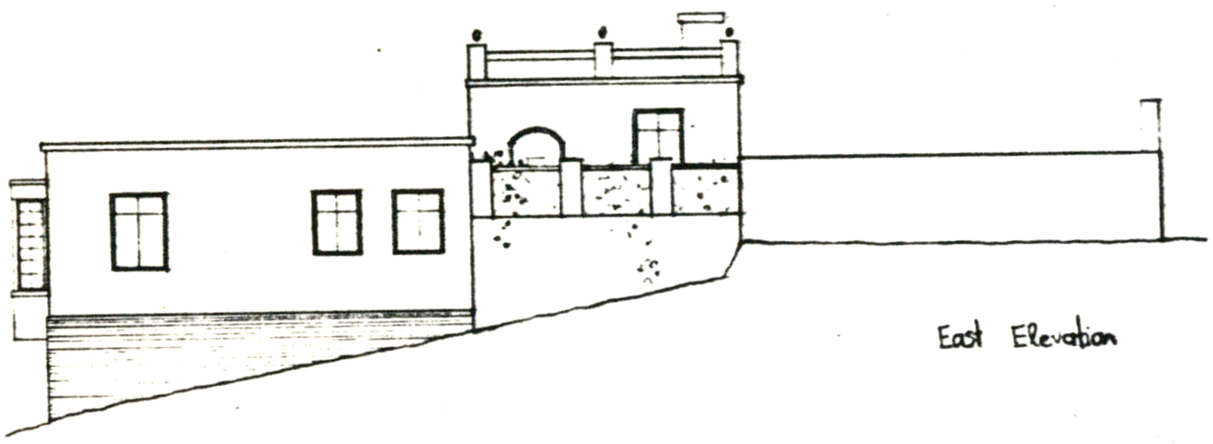
ROCHELE & DAVID SLYPER



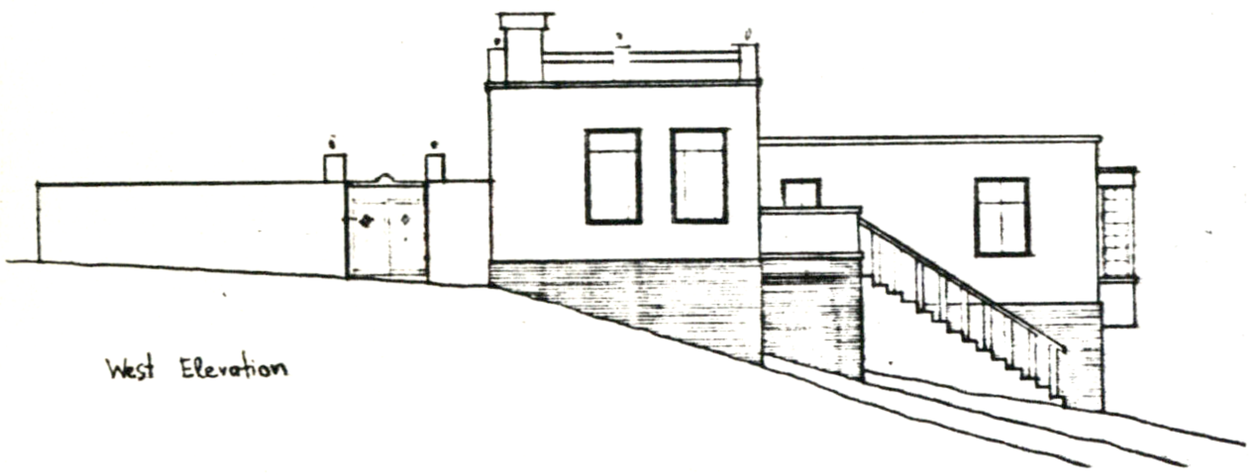
Plan of cluster



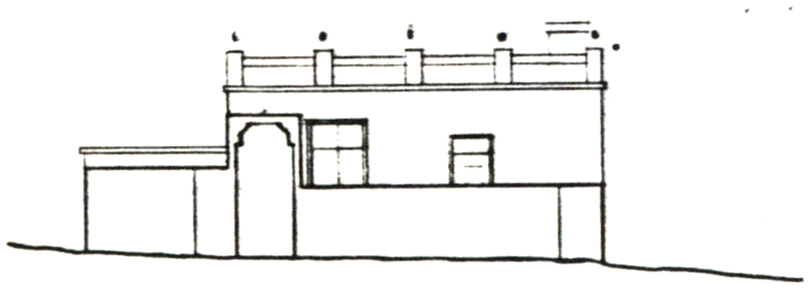
1:200



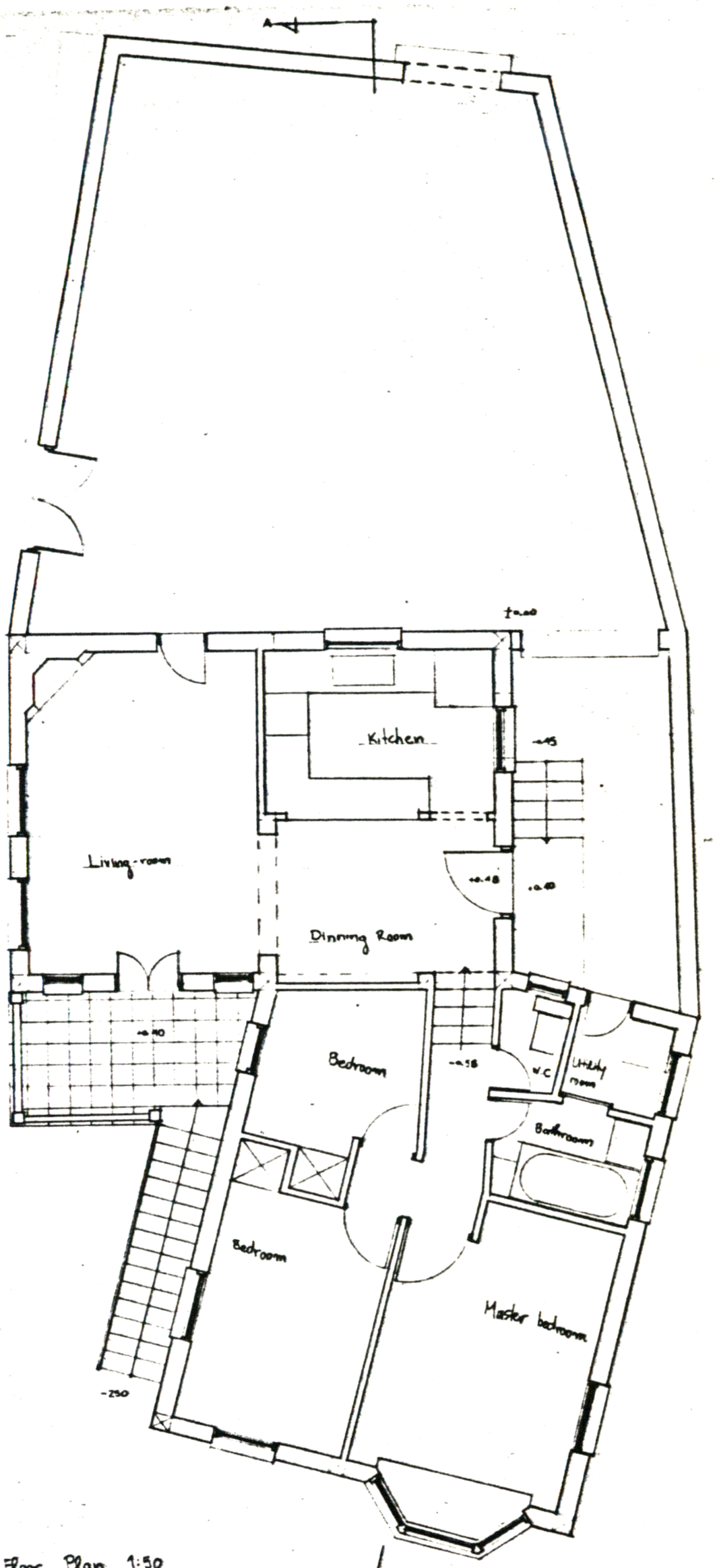
East Elevation



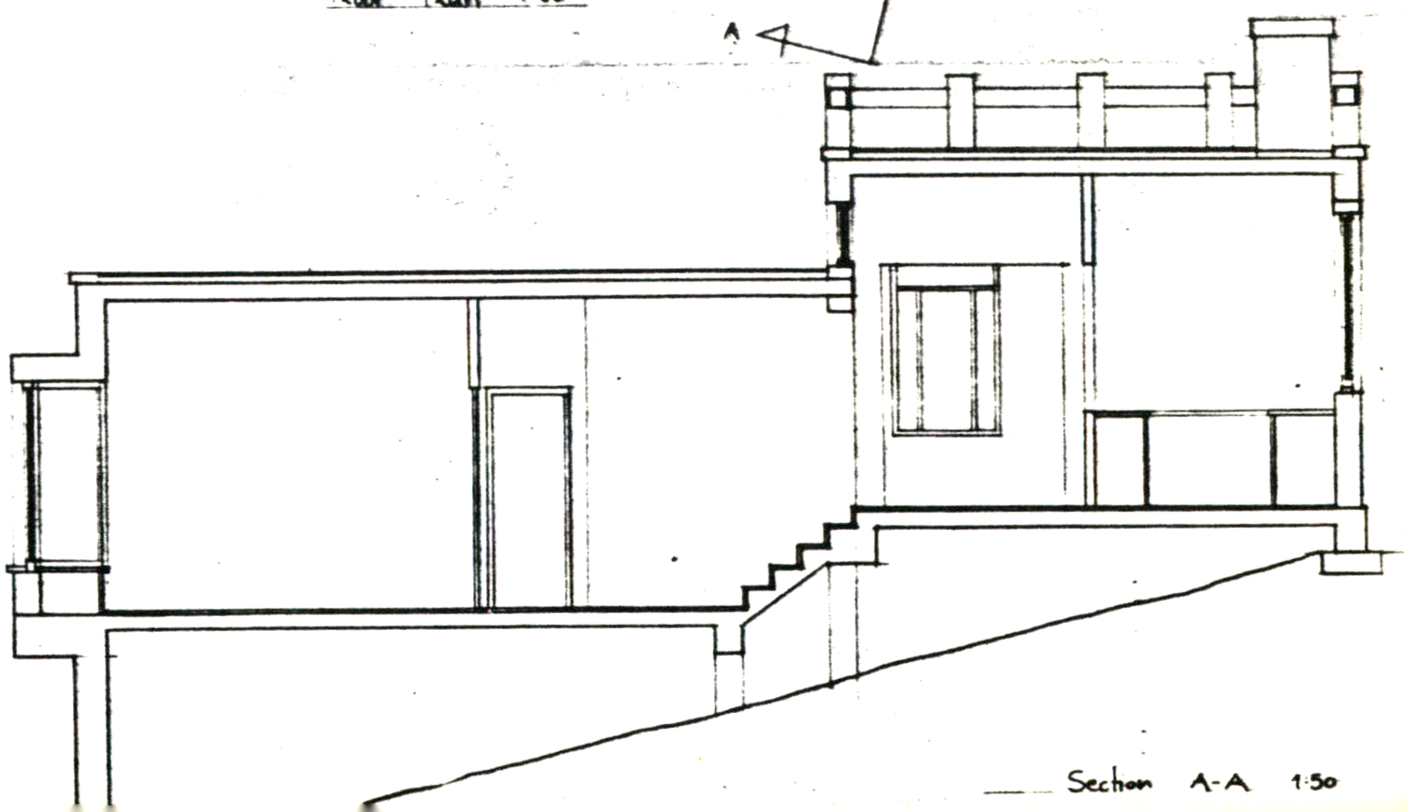
West Elevation



North Elevation

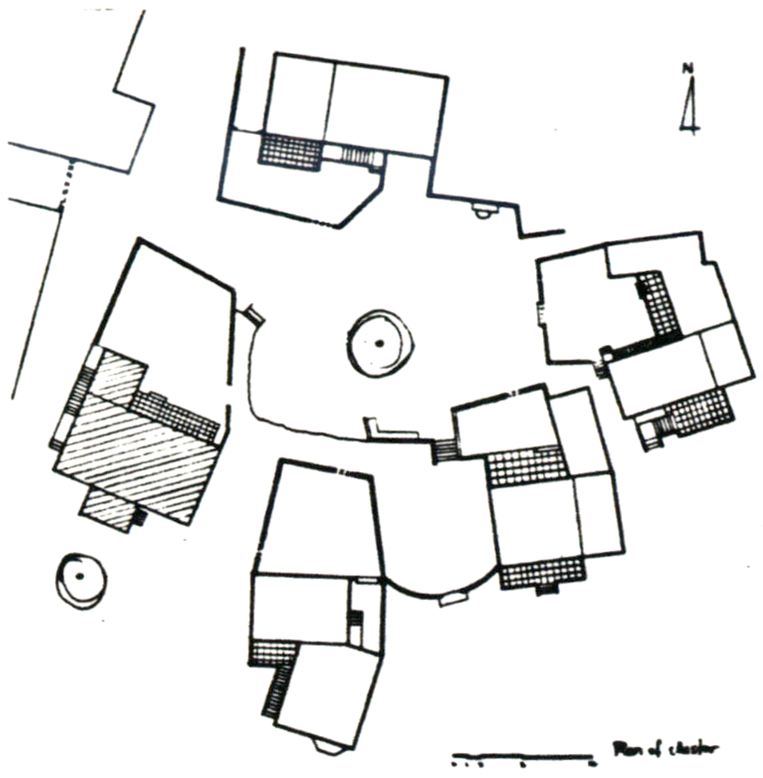


Floor Plan 1:50

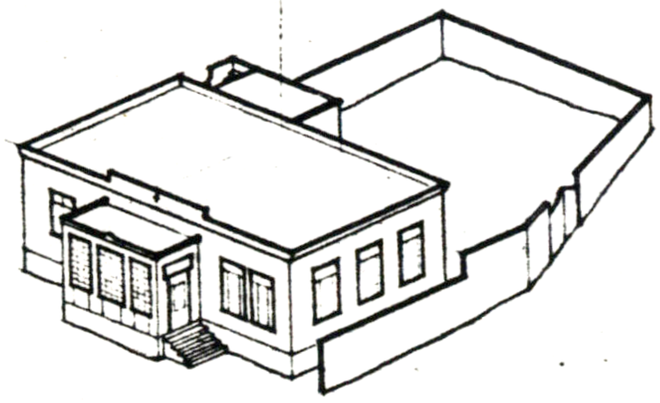


Section A-A 1:50

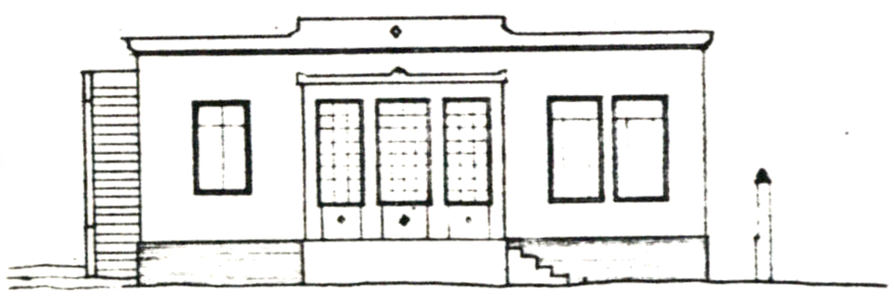
DITA & AVRAHAM ROUDMAN



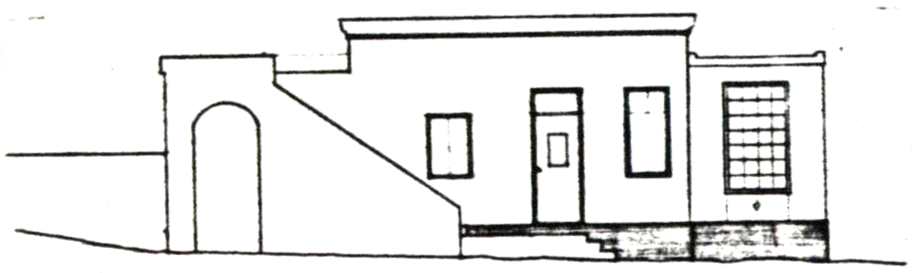
Plan of cluster



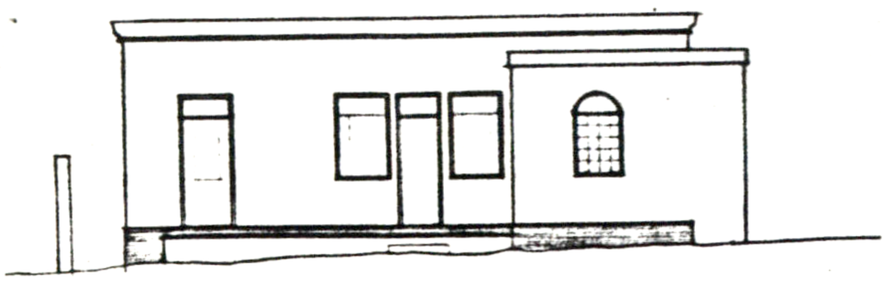
1:200



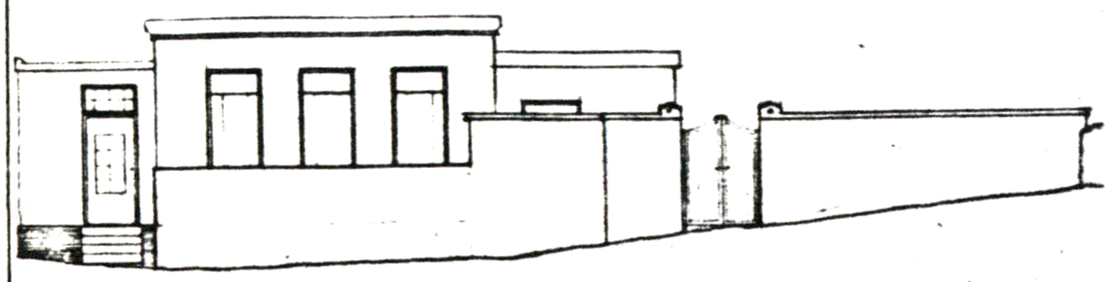
South Elevation



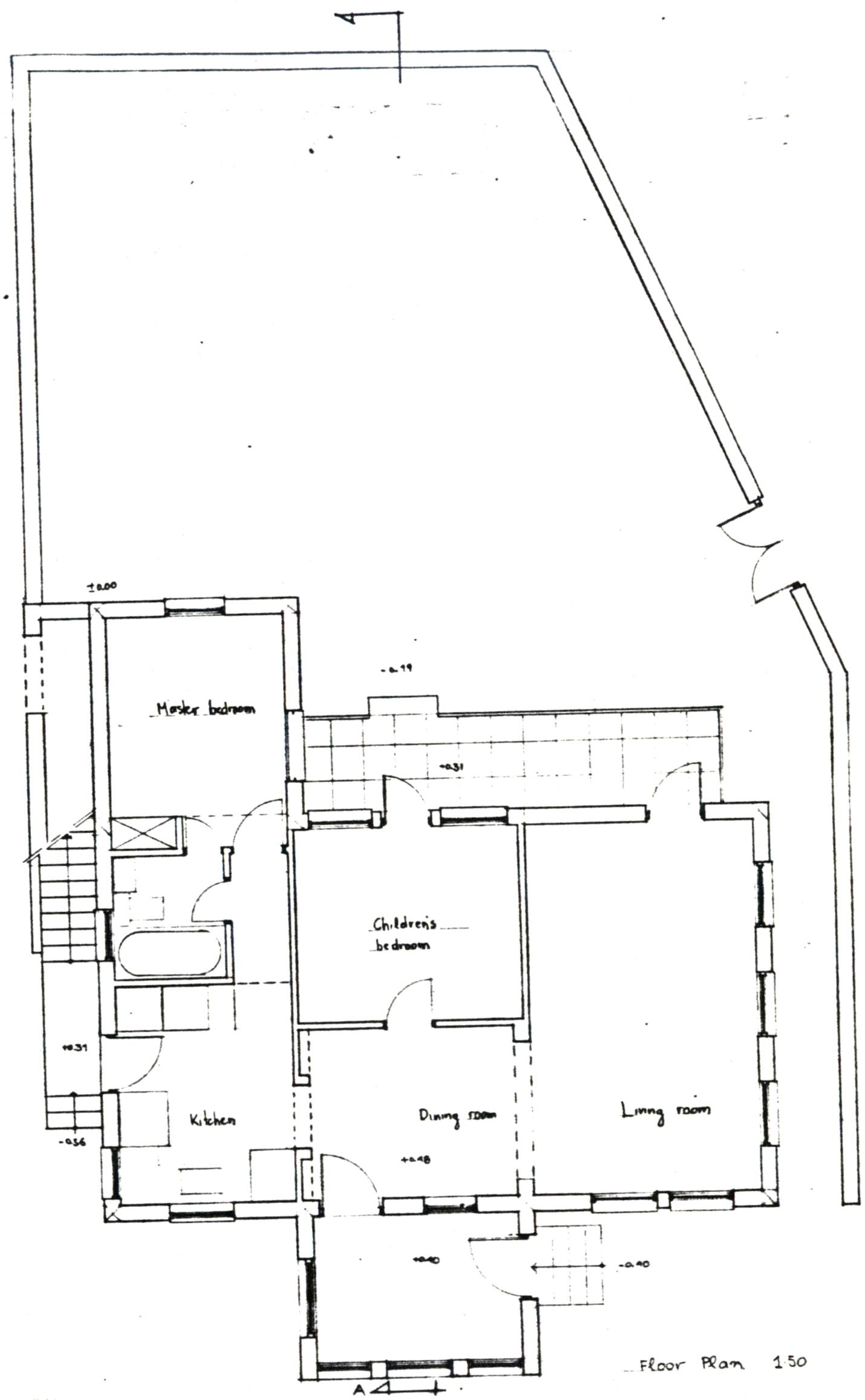
West Elevation



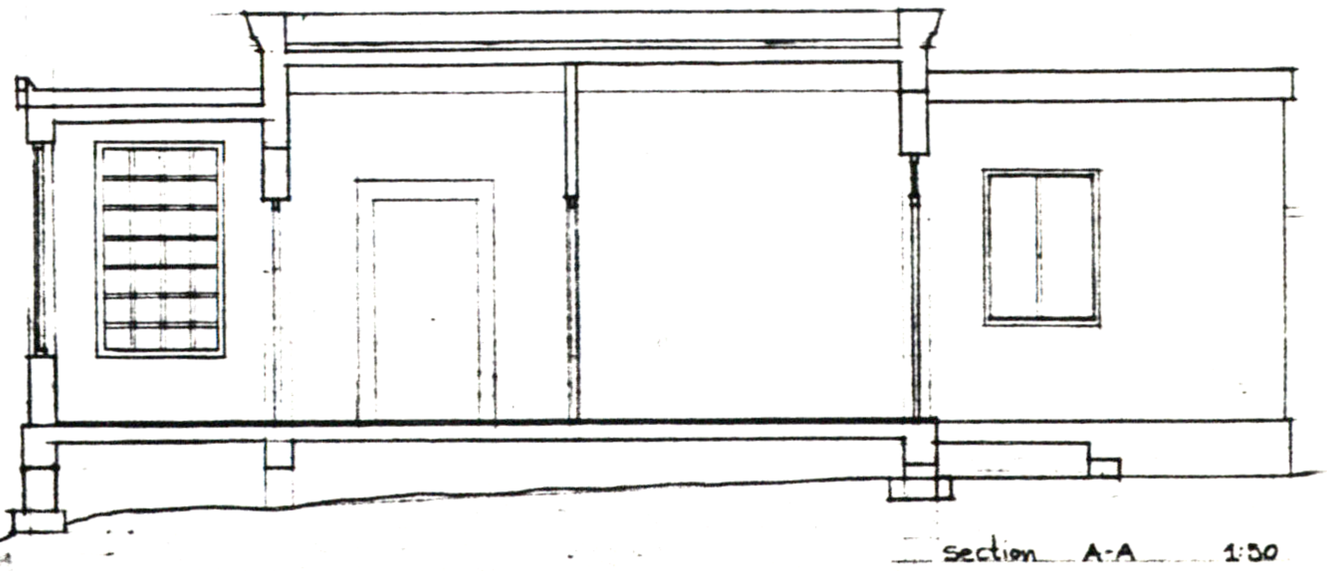
North Elevation



East Elevation 1:100

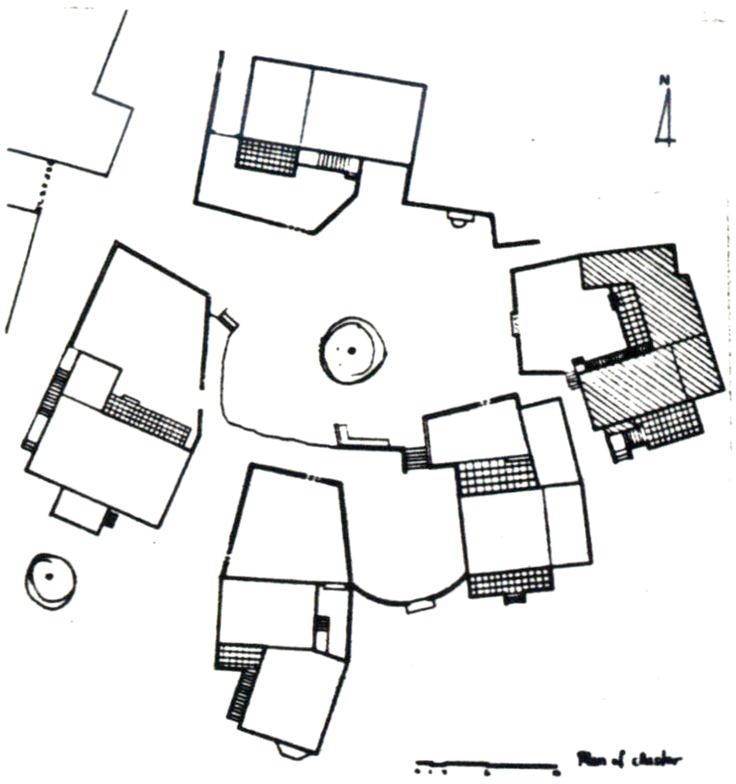


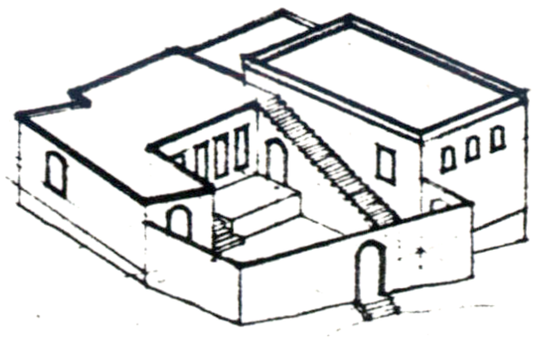
Floor Plan 1:50



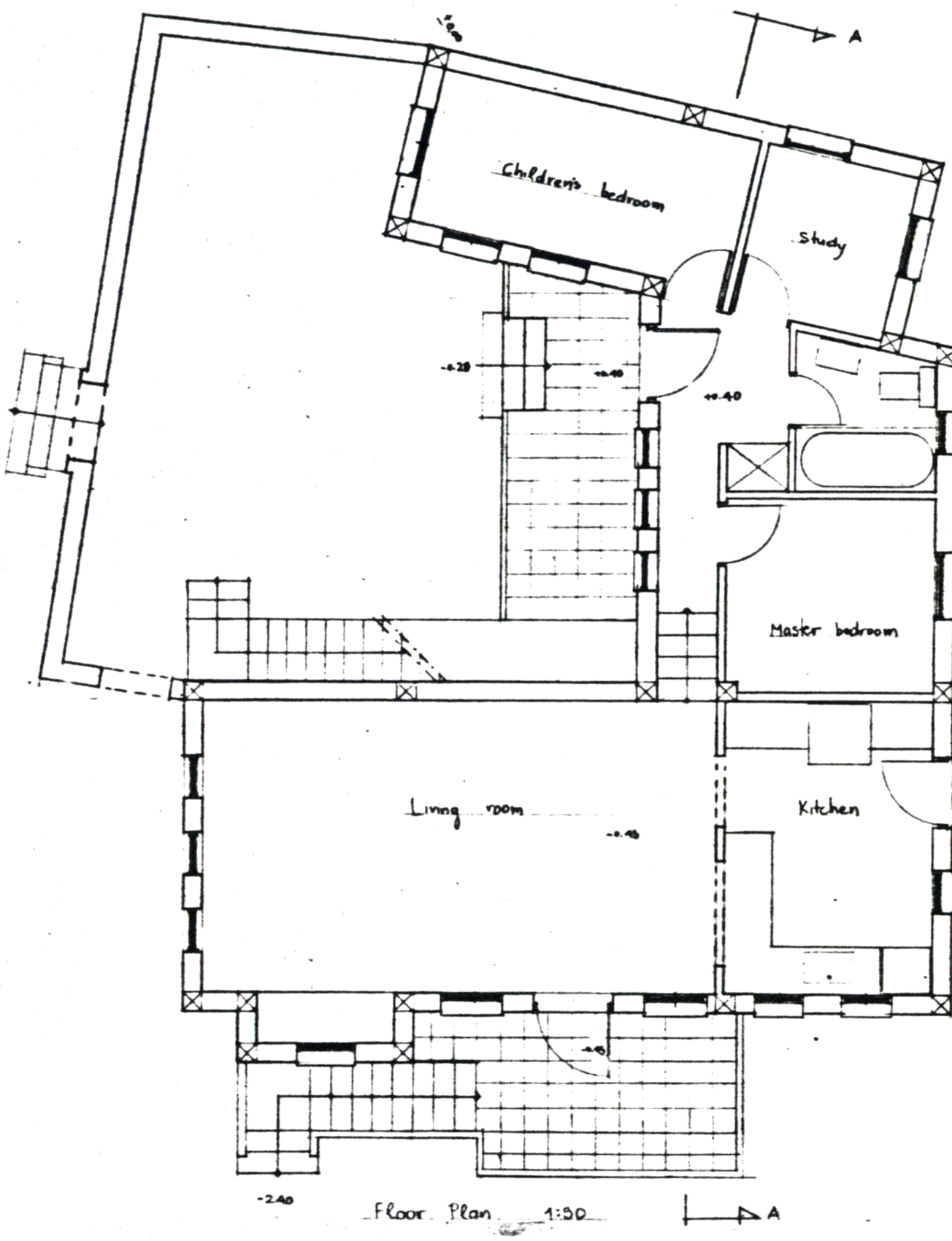
Section A-A 1:50

DANNY & ROBERTA BELL-KLIGLER

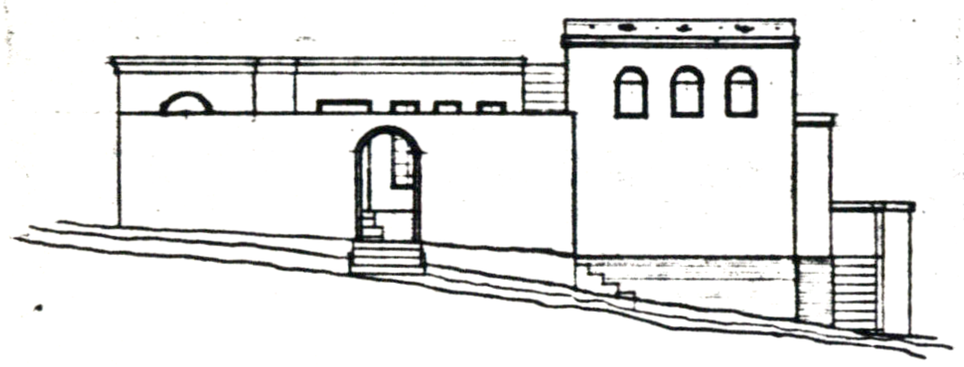




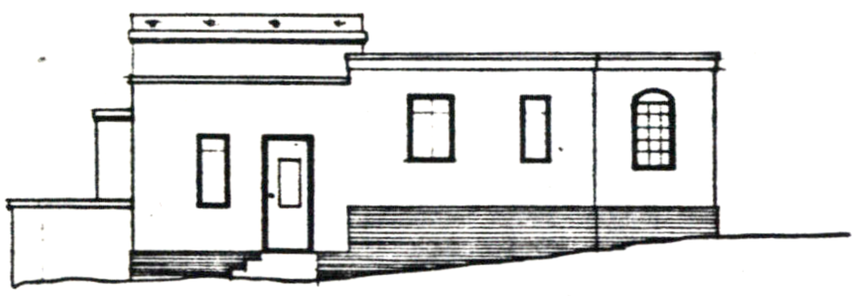
1:200



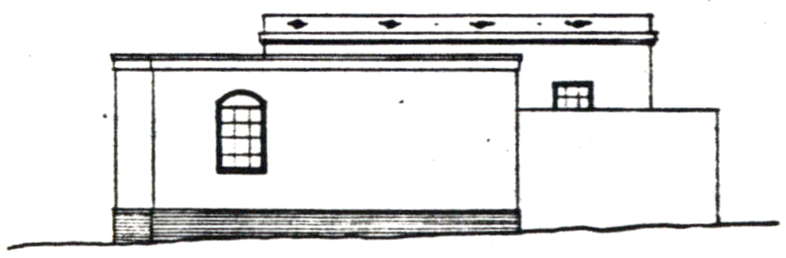
Floor Plan 1:50 A



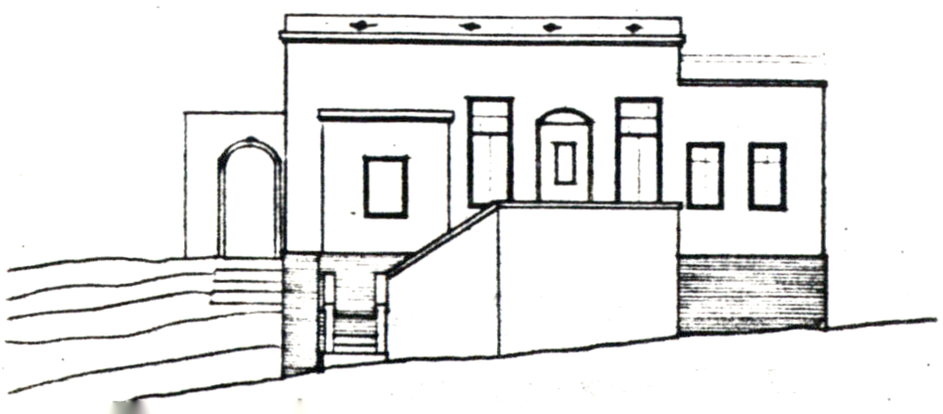
west Elevation

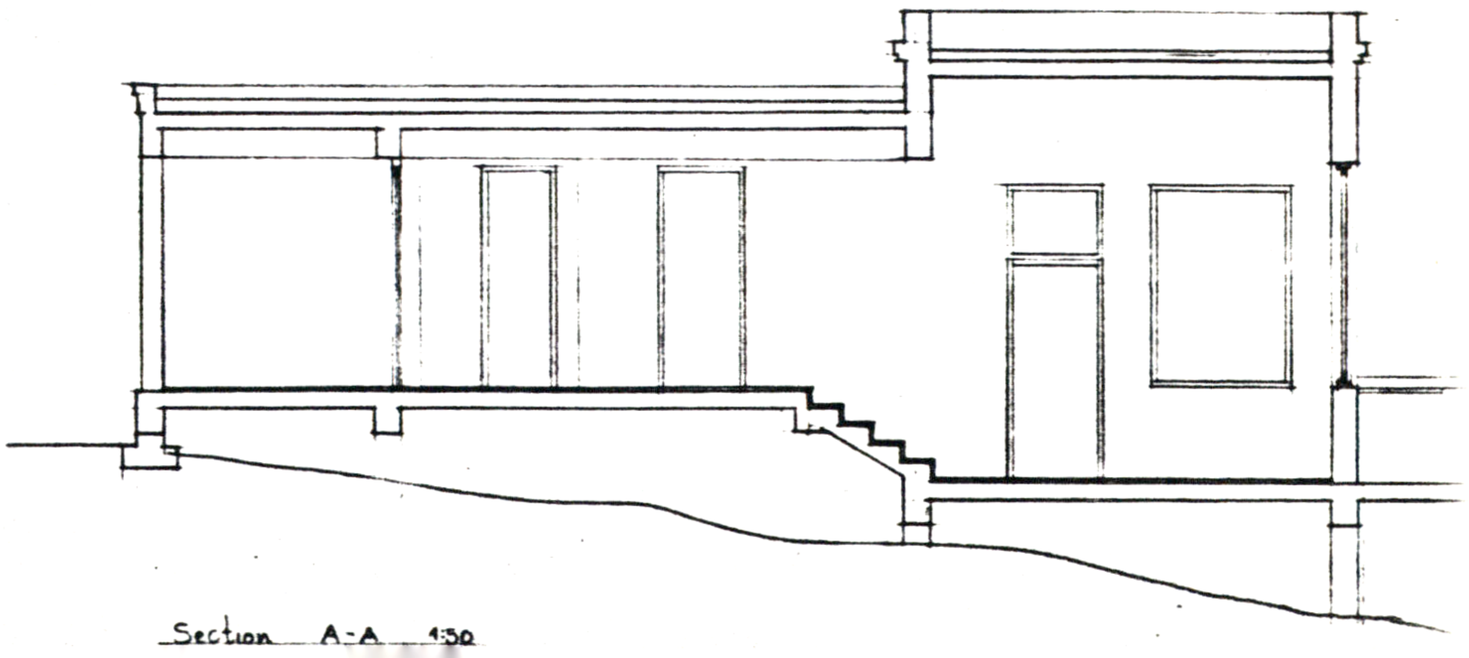


East Elevation



North Elevation





Section A-A 1:50

Principle 10: Unification of the Architect's Activities in both Design and Construction

The unification of the design and the construction of a building, two procedures which are fragmanted in architectural practice today, into one main activity aiming at the making of a building which is whole in all its aspects has been discussed previously (Principle 8).

The implications of this idea on the role of the architect are fundamental. On a rudimentary level they can be confined to the active involvement of the architect on every step of the construction process, extending the responsibilities beyond the level of a formal inspection to guarantee that construction conforms with the design, to an active and creative role according to which the architect shapes the building as its construction progresses. At every stage of the construction the architect has to decide about the exact location and size of the new elements to be introduced and on their construction details.

On a more advanced level the unification of the architect's role into one activity implies that the architect has to undertake the whole completion of the building starting from its conception and ending at the completion of its construction. The architect will act as a designer and as a

contractor, and when necessary will play an active role during the construction process. Only under such a scheme can the building evolve in a way which permits every decision to take its final and definite form at the time there is the necessary physical context that influences it, which is the main criterion for a correct judgment.

Principle 11: Building Production as a Sequence of Distinct Operations

Building production today, especially in mass production processes, takes the form of a blind repetition of the same thing again and again or the form of erecting prefabricated elements on the positions they are assigned to them.

A building production which emphasizes the making of the building with care and attention to each of its details asks for a production process which can accomplish the operations in a wholesome way which respects the thing to be made and which is efficient at the same time. The organization of the production process has to be based on the idea of how building operations can be completed in the most efficient way which can guarantee that everything that is made is right, thoughtful and full of feeling.

In order to achieve this, we have to understand that the people involved in the construction process -builders, users, architects- have to acquire a clear sense of what they want to accomplish, not simply in terms of what the thing they are doing is simply as an object, but in terms of its quality and its feeling. Also, the participants in the construction process have to understand that there is a best way for a given thing to be done, and therefore they have to seek for

this way when they are doing something, and not just do it in any possible way; and there is no one person assigned to make these kind of decisions, but every participant in the construction process has to be in this state of mind that searches for the best and most efficient way to handle construction details.

The success of the organization of a production process which enables the builders to come in real touch and create a deep relationship with what they are doing depends on the kind of responsibility they feel they have as far as the completion of the work is concerned. There is a huge difference between feeling responsible for the completion of a work because it has to be finished and to be conformed with some plans, and feeling responsible for the completion of something that has to be beautiful in all its aspects and details, fact that make a person creative and ready to put the best of himself into what he is doing. Although we can say that this is something which does not basically depend on organization schemes but on people's attitudes toward what they are doing, it is clear that the prevailing methods of building production have alienated builders from what they are doing. This fact gives some hints that different organization of the production process may improve the situation.

It is easy enough to think of a production scheme for a house or a building which can make the construction process

more human and the building much nicer. This could be the following: A group of people consisting of persons with different skills, a contractor, an architect, workers with different skills, possibly the users -the size of the group depending on the size of the project- in which all the participants carry equal responsibility for the completion of the project. The recognized skill of every person and the major task assigned to him does not limit his involvement in different operations and does not limit its responsibility in fragmented aspects of the work. The responsibility that every person carries consists of making what he has to accomplish on the best way that will make this specific thing beautiful and which will contribute to the wholeness of the overall work.

However, if we try to transfer the organization scheme in the production of 100 houses let's say, then there might be some problems as far as the efficiency of the production is concerned as well as the overall coordination. The transformation of this idea on the production process of large works which demand an extended working crew and greater efficiency and coordination of production is an issue that has to be studied thoroughly.

Principle 12: Construction Techniques which Allow Personal Interventions

The construction techniques which are used today are characterized by rigidity; there are some prevailing construction techniques, such as prefabricated construction elements, stud wall construction and steel frame construction covered with concrete, which are used in exactly the same way in all the buildings that are being built. And it is not only that the construction system is the same but that all the construction details are also the same regardless of the specificities of the project. The limited ways that these construction system are used is not due to the lack of interest or creativity of the architects or of the builders but to the rigidity of the construction systems themselves, which establish the relationships between the construction elements in the most neutral way so that they can be used in every possible case.

I will compare two construction systems both of which are used in large buildings. The first is the steel frame covered with concrete construction system, and the second is the reinforced concrete construction system, based on pouring into formwork. The first construction system does not leave any room for personal intervention for the

placement, shaping and connections of the structural elements. They are predetermined by the construction industry, and any addition to them, such as the shooting of the concrete, has to follow their configuration exactly. The other construction system, poured reinforced concrete, offers more flexibility and potential for the shaping of the construction elements according to the geometrical and functional needs of the building.

The evolution of building systems and techniques shows clearly a tendency to make obsolete construction systems which need intense and creative personal intervention for the configuration of their elements, and it favors the adoption of building systems and techniques which are based in prefabrication or in standardization of shapes and connections between the elements. The only reason for this outcome is the demands of the construction industry and the construction market which favors less labor intensive and cheaper construction techniques and does not pay any attention to the quality of the construction system and to the possibilities it entails for making human places.

The point that this principle wants to make is that the construction technique for a particular building or for a group of buildings has to be developed in its basic form with the idea of permitting the shaping of its elements and the connections between its elements by the participants in the construction process, so that the construction

system does not dictate the configuration of the building but it contributes to the shaping of the building in the best way.

Also, in some cases the developed construction techniques have to be simple enough, in the measure of man, so that they can be easily manageable by unskilled workers and by users, especially when they play an important role in the construction of their houses.

Principle 13: Flexible and Adaptable Building Materials

The previous principle on construction techniques has some specific implications as far as the properties and the appropriate use of building materials is concerned. Furthermore, it hints on the limitations of prefabricated materials if we want to use them creatively in production processes.

Building materials do not produce merely the envelope that encloses and shapes a space. Building materials attribute to a place its specific character; they give scale and texture to it. Also, when used properly, they contribute as much or even more than the actual size and shape of a place, to the creation of a nice room or a nice building. The materials which have these possibilities belong to a certain category; they can be adapted and they can follow the shape that a room or a window or any construction element wants to have; when prefabricated they have to be additive in the sense that their basic element or elements are small and flexible enough so that they can be arranged in different ways, appropriate for specific cases; they have the possibilities of creating different construction connections in different cases; they

attribute levels of scale in the place they enclose or define.

The properties that the materials which can contribute to he wholeness of a building have to have do not exclude prefabricated materials, but certainly they eliminate the use of prefabricated structural elements, walls, windows, etc.

In cases of extensive production where a building material will happen to be used on the same form again and again in a specific project, for example, a specific kind of brick or even a specific kind of wooden truss, the production of the materials can happen on the actual site, if this does not entail any dangers for the economic stability of the project.

PART II:

OBSTACLES, PROBLEMS AND LIMITATIONS IN THE IMPLEMENTATION OF THE PRINCIPLES

This set of principles has been primarily developed with the clear intention of improving the quality of housing built in large volume, to adapt their design to the needs of the individual families and to contribute to the creation of human and pleasant housing areas. However, given the existing situation of housing production, the structure of the mechanisms which are supporting it, and the predominant ideology which has established the existing forms of housing production, there comes an uneasiness whether or not these principles could be really implemented today in large volume housing production for the people who need shelter. The source of the problem, concerning the feasibility of the implementation of these principles in architectural practice comes to a large extent from the ascertainment that they advocate a hierarchy of priorities which is at odds with the prevailing notions about housing in large scale, adopted from public authorities, financing institutions, developers, local governments and architects. To another extent, the principles themselves seem to ignore the actual reality concerning the urgency for the production of large numbers of housing, especially for the very poor, and the existing structure of the rather intricate mechanism which generates housing in its present forms.

The recognition of the limitations of the principles and of the existing obstacles and problems, their critical discussion and analysis will contribute to the definition of the problem on specific terms, to the estimation of its order of magnitude, and possibly to clarification of the direction towardw which some solutions can be found.

The first problem to be discussed is the excess in costs that a housing production process structured according to these principles generates, when compared with a regular production process, especially when used for the construction of housing in large volume.

I am going to draw the sources of the excess in cost generated through this production process by comparing it with the cheapest possible way of mass housing production, where all the houses are identical, based on public standards, designed and built without the families being involved, where the sameness among all the houses permits a considerably high level of standardization and prefabrication during construction, and where the overall site plan that organizes the whole is based on the arrangement of houses in rows which follow the main road arteries that provide access within the site.

Compared with this we can easily identify the sources of the excess in cost as the following:

1. The differentiation among the houses, so that they are adapted to the needs, dreams and financial

situation of the families, seems to draw the cost of design higher.

2. The need for the lay-out of the houses on the site together with the architect and the families, so that the families get a good sense of the house and so that the house is best adjusted on the site in relationship to its physical context, adds two additional parameters as far as the increase in cost concerns: first, there is an unusual intense involvement of the architect on the site that will tend to add on the normal architectural fees, and second, the whole procedure of the involvement of the families on the site will extend the time of design, which indirectly could be counted as a contribution to additional cost.

3. The more costly construction system, since its level of standardization in terms of components will be such so that it can be adapted to the differences of the houses, and since it will be based on construction techniques which will allow personal intervention and therefore are more labor intense, which, however, are essential for the making of a human and pleasant housing environment.

4. The possibly more extended construction period, due to the construction techniques which could be more labor intense, to the absence of a definite master plan and to a probable need to proceed the construction in even large increments, contributes to the increase of the time-cost of money invested by lending institutions.

However, if we look at the sources of the additional costs on a more related way to each other, and in comparison with the costs of a regular mass production process the picture does not seem as discouraging. First of all, the actual lay-out of the houses by the families on the site, which will be the final house plan, reduces substantially the design period, since it is feasible for one architect to assist two to three families to complete the lay-out of their houses within one day, and since the additional design for the houses consists mainly of preparing the necessary drawing for the permit. Although the design period of the houses is substantially longer than that needed to design one house based on public standards, it is not as long as it might seem in the beginning, and it is definitely manageable. Second, although the houses are different, they are laid out and designed within some specific limits of differentiation established first of all because of the need for harmony and coherency of the housing development as a whole, and because of the necessary requirements of a simple and local structural system, which is decided before any design activities start. This kind of approach makes possible the use of the same materials, the same construction system and the same construction details for all the houses, fact that can reduce the construction cost substantially.

Beyond these points, there is the issue concerning the purposes for which money are spent in the two different processes under comparison and how they are spent. A mass production housing process aims at balancing the sterility of the environment and the sameness among all the houses with the provision of unnecessary for the specific case amenities in the house, like with well equipped kitchens with row of counters, or with the achievement of a seemingly high level of interior finish which resembles market housing. However, these money could be spent on the building of more human and personal houses, though of lower finish and equipment, which can be brought later to the desirable level of finish by the families depending on their needs and income. It is almost certain that a low-income family that wants its own house, would give a higher priority to the building of a house with low interior finish that they like, of a house that fits their needs and to whose creation they have contributed, than to the purchase of a house with no identity which has the image of a well finished and equipped house. Also, the mass production of identical houses to be purchased by low-income families creates another unjustified cost. The identical houses imply same size families, families with the same monthly income, and families which can afford the same monthly payments to the sponsoring agency (usually a public organization, a local gov't....) that has undertaken the financing of the houses. We know that this

kind of homogeneity does not exist. The result of this situation is that the sponsoring agency finds itself in a position where, though it has obtained the same loan for every house from a financing institution, it cannot collect the money to pay back, due to the diversity of the economic situation of the families, and therefore it has to subsidize them. The fact is that these kind of subsidies could be used more efficiently, if the families had the possibility to determine beforehand the size of the house they could afford and they needed to build.

This rudimentary analysis of the cost parameters, although it does not prove that the proposed housing production process is implementable costwise for low-income housing, it shows that there are still open some possible ways toward which solutions can be found. And beyond this, though a cost analysis is crucial for the success of a project, we have to recognize the fact that in order to achieve better quality housing a little bit more has to be paid, especially given the structure of the housing industry today.

Another obstacle for the implementation of these principles might emerge because of the reluctancy the government agencies will express as far as the application of these principles on the production of housing they are sponsoring concerns.

It is crucial to investigate the attitude of public housing authorities, non-profit organizations, big industries, local governments toward the implementation of these principles in the production of housing they are sponsoring, since the largest bulk of low-income housing and housing in large numbers is provided by them, and since without their participation on the production of housing according to these principles, they will find rather limited area of application.

The first reason for a possible negative reaction of public agencies towards these principles is that the housing production process they imply will seem risky to them in comparison with the established production methods. This feeling of riskiness will emerge from the understanding that this production process is introducing some new elements which seem to make the whole procedure much more complicated and intense, and also will tend to increase the overall cost of production. The ascertainment that the adoption of these new principles into the production of public housing demands some minor changes in the way housing production is administered and managed, and implies an essentially different relationship between the public housing authority and the families, which will be more personal and maybe more time consuming, will make them hesitant and thoughtful whether or not such a change will be worth the effort and the additional cost.

The second reason for the reluctancy to implement these new principles in public housing production is a matter of attitude that public agencies have towards low-income housing. Since public housing is a sensitive and important political and social issue, and since governments are held responsible for satisfying man's most basic needs, they spend large sums of money in order to cover the most urgent housing needs through means which are most easily available and convenient to them, resulting usually to the building of large housing projects. Experience and practice has showed that in most cases, governments do not consider carefully the repercussions of such an undertaking in a longer economic perspective, although the economic failure of these kind of housing projects is not unlikely, since they tend to deteriorate rather easily, their life is unusually short, and they are often abandoned by their inhabitants because of various social and economic reasons. Also, governments, because of the urgency of the different housing problems and because of efficiency, tend to provide the same housing solutions to all kind of different cases, regardless of whether the future tenants are previous squatters, or newcomers to an urban area, regardless of whether they have a regular job or they are employed on the informal sector of the urban economy on a rather unsteady basis.

These observations make clear that the priority of most governments, responsible for the provision of housing,

is to accomplish their task and promises on the most convenient, quickest, and seemingly cheapest way, especially in cases of political and social pressures. Issues of quality and fitness of the houses, and attempts to avoid the same mistake of creating a dehumanized and alienated environment are of secondary importance, and not a criterion of decisive importance for the character and structure of the housing policy that has to be followed, though usually part of it.

It is clear that these principles will have the chance to contribute to the shaping of housing policies and to the development of public housing projects only if they recognize the importance of time and cost efficiency, and if they are flexible enough to be adapted to specific cases and situations. However, nothing could be achieved if governments do not shift their housing policies to a new direction, where the need for human houses, adapted to the needs of the families, is not an essential goal.

The third problem that has to be tackled is <u>the attitude of the professional architects towards incorporating these principles into their regular practice</u>.

Architecture has been commercialized and, in most cases, serves needs formulated according to the rules and constraints of the market, represented mainly by developers, construction industries and banks. The architect, functioning within this framework, is adapting, to a large extent, his

criteria of what has to be done to the rules and values of his clients who are financing the project. Although he is trying his best within the specific given limits, the limits are usually not broad enough to allow him to consider seriously aspects of better quality in the design and the construction process. The intention here is not to justify the attitude of the professional architects, since this is usually a delibarate and conscious commitment which is expected to yield its fruits in terms of monetary profits and acceptance within the profession. From one point of view it might seem absurd to expect from the majority of the professionals to adopt these principles in their work, since in this case, they will take the risk of reducing their profits because of unexpected costs that could possibly arise, and since they will have to develop a different attitude with their work and to structure their priorities on a different manner; and these are changes which need a lot of thought, effort, persistance and time in order to become fruitful.

However, looking at the same issue from a different perspective a deontic question hinting on morals should be addressed: "Recognizing the fact that often architects find themselves in pressured economic conditions, up to what point should they give in to the economic or social pressures and adapt their work to the prevailing notions about architecture, recognized by them as of lower quality, and thus contributing to the creation of an alienating, unhealthy and

unpleasant environment." The problem is tough, there might be no general answer for it -I don't know- , it might be a highly personal problem for every architect; nevertheless, a lot concerning the the quality of buildings and cities, depends on finding a way to deal with it, and definining what is acceptable and what not.

The first thing that I read referring explicitly to this issue is by a greek poet, composer and singer who, contemplating on the impoverishment of the urban environment of his native city, said:*

> .....I was expecting these people [architecture students] to make good things, wonders. But look around you on what has happened! They are saying it is not to blame them since they are simply on the side of executing what is asked from them. But how does this logic differ from the logic of the bourgeois? Of course, you are going to tell me that they are people also who have financial needs in order to survive. I agree, but always, you know, I had the impression that some professions, on which not only our everyday happiness but also history and civilization depends, should be served by people with increased moral resistance. Examinations to enter these schools should be extremely difficult, and people should be trained in such a way during their studies so that they could withstand the inconsistency and the temptations of the society. You will say that it is utopia what I'm talking about. But look what "realisms" have contributed to. To the contemporary city of Thessaloniki! How it comes and we consider obvious the fact that paratroopers or commandos and divers are recuitted after very strict selection? Why can't we see the same thing happening with architects?

Though his position sounds extreme there is a lot of truth in it.

---

*D. Savvopoulos: "I Rezerva," Ithaki Publishers, Athens, 1981.

Another important obstacle, that impairs the implementation of these principles, lies <u>in the attitude of the commercial banks concerning housing and on the structure of the financing system</u>.

Commercial banks want to view housing as a secure investment. Also, working together with developers, they accept their notion of housing as a commodity, as a consumable good that has to be easily saleable in the market. The idea about housing, established both by commercial banks and developers because of their close collaboration, is that houses should be built on the basis of economic security, adaptability to different needs, cost efficiency, and possibilities for sequential changes of owners. In order to satisfy these criteria, the housing market is producing houses regardless of the specific people who will inhabit them, and it is basing its designs on an image for a stereotype family with stereotyped needs. Within this framework housing is viewed as an end product, capable to fit generic needs, and not as an activity that is expressing real needs and dreams.

Households operate within this situation, by adapting their needs to the availability of the market, which if not limited in terms of number, is characterized by sterility, homogeneity, lack of inspiration, and absence of any deep relationship with the house as part of somebody's life and existence. Families, when frustrated because of the incon-

veniency and low quality of the ready-made house they have purchased, they console themselves through the idea that the banking system and the housing market will provide them with the means to change their house later, and hopefully to find the house that will best fit them. Obviously, being on this state of mind, is difficult to establish any deep feeling with any house, and to sense it as your home.

It is clear that this way of housing production, established within the market is completely opposite from what has been described in the principles. The reason for this is that commercial banks work primarily under the criteria of economic security, administrative efficiency and convenience, rather high profit, and marketability, though quality stands somewhere in their list. Therefore, banks will be hesitant to issue loans for houses designed specifically for particular families, since they won't feel secure for the saleability of the house in the market, since its features won't correspond to the characteristics of the generic house. Also, banks won't commit to the issuance of loans for houses, unless they see and control the designs of the houses beforehand, fact that puts many obstacles to the involvement of the families in the design of their houses on an efficient way. Beyond this, banks will,very difficultly, agree in the case of a housing project, to issue different loans for the building of different houses, since this is going to increase the complexity of management and the

administrative cost. Furthermore, banks want to control both the design and construction of the projects they are financing; also, they will not issue the necessary draws of the construction loans, unless the construction process conforms to their standards and requirements, which are formulated according to the criterion of economic security. The reason for this attitude is that it is likely that they could become the owners of these structures in cases of default, and therefore they want to feel secure for their future marketability and value. These points make clear that commercial financing institutions are major determinants of the quality and form of housing, reducing to a considerable extent the possibilities of viewing the establishment of the form of housing as a result of the needs and inspirations of the people who are going to use them. Apparently, this is an essential difference between what the principles are claiming and what the banks are believing, and doing.

But even if these obstacles were to be overcome, still there is the problem that commercial bank policies in terms of housing finance are addressed to high-income households since the high interest rates have drawn the time-cost of money to extreme heights, resulting to the situation that a family has to pay back a total of about three times as much from what the loan actually was. Of course, given the existing rates of inflation this might be an affordable condition for a high-income or occasionally for moderate-income

household. This coupled with income tax regulations according to which interest payments are deductable, makes the situation even more favorable for this portion of households.

Although it might seem utopic to expect from commercial banks to adapt partly their policies to the possibilities of the low-income families, because of the economic risk it involves, the existing structure of the mortgage loans generates a considerable loss of money in the form of interest payments, which although are supposed to be spent for housing are mainly returning to the banks, partly as profit. This sum of money, which can be as high as two-thirds of the total cost of housing, flows out of the pockets of families in the form of interest, and is not contributing directly to the improvement of housing.

It is clear that the production of low-income housing cannot afford such a loss of money, and that should search for financing institutions which aim at lower profits, or for non-profit financing institutions, since in this case a more efficient use of money, channelled directly to the improvement and building of housing, can be achieved. Also, it is more likely that these kind of financing institutions would be more open to incorporate some form of these principles, since the issue of profit and security is not as critical to them.

Another direction towards which we can look for some kind of solution for a financing system that could incorporate, even partly, these principles, is by looking more carefully

to the reality of the situation today, of how people, who cannot afford mortgage loans -and this group is constantly increasing in size- try to solve their housing problem. They, either take small short-term loans, or they invest their saving into building their house incrementally, as much as they can afford at each time. The advantage of this kind of approach are obvious, and therefore I am not going to discuss them. The point here is how this model could be used more extensively in the production of housing, and how it could be organized efficiently, especially for low-income families, who cannot afford mortgage loans, so that they could be assisted in the investment of their, even limited, savings, in building their own house, either by themselves or by hiring small local contractors.

The next problem I am going to discuss is <u>zoning regulations in relationship to the principles, in terms of the limitations they impose on their essential implementation</u>.

Zoning , from one point of view, is beneficial to housing areas since it is protecting them from the intrusion of detrimental uses, like industries, or large complexes of offices. This issue of isolating housing, or even specific type of housing, in segregated areas, and thus depriving them from essential supportive and life-giving uses, like small shops, light manufacturers, etc., has often been discussed and criticized, and I think that, within the

given framework of zoning, specific cases can find ways to provide housing developments with the necessary supportive uses.

The zoning regulations on which I am going to focus are these ones dealing with the specification of house envelope, bulk and setbacks, and the limitations they set on creating space which has the feeling of positiveness and organicness, and is well adapted to the particularities of the physical environment. These regulations are specified according to requirements of light, sun, privacy that every type of housing has. The problem is that the differentiation that is given to them depends mainly on the type of housing and therefore they are set uniformily for large areas of housing regardless of the specificities of each particular house, and site. Also, they are established under the assumption that urban space preexists the location of buildings and that their contribution is not necessary for its formation and shaping.

There is an essential contradiction between these regulations and what the principles claim regarding the creation of positive urban space and the necessary respect that has to be given to the existing structure of a place, and between the ways space is produced in either case. I do not see any way to resolve this contradiction by trying to change zoning as a whole. However, within the given framework of zoning, I can see the possibility that specific cases under

development could be approached from a point of view that, respecting the essential priorities set by zoning regulations, like sunlight and privacy, could incorporate the ideas about positive urban space, and the necessary procedures to achieve this.

Zoning, with its present formulations in many places, offers the possibilities for an implementation of these ideas, though in partial form, through the Planned Unit Developments, or through variations. The major defect of the Planned Unit Developments is that the scheme of the development has to be based on a master plan that has to be implemented all at once, fact that does not allow the incremental development of the area, which in some cases might be crucial. The cases which seem to have the most problems in terms of the resolution of this issue, are developments which happen within an area that has zoning regulations already defined, which have been followed in its surroundings, and where land subdivision has already taken place.

Another problem of the same nature is the way land subdivisions are usually conducted and performed today.

Land parcelization in housing areas usually happens on the basis of availability of land, land price and convenient vehicular access, without thorough consideration of the appropriate design for the whole area, and of the siting

of each particular building. The guiding idea is that land subdivision proceeds any kind of essential design, and that it has to be adapted to the existing constraints.

The problem that arises from this situation is somehow of the same nature with what has been discussed on the issues about zoning; the predefinition of the streets and open spaces makes it almost impossible to attribute positiveness and quality to them, the siting of houses following the lot lines and the accompanying zoning regulations will hardly contribute to the formation of public space, and it will not happen under conditions which can allow the adaptation of the form of houses to their physical surrounding.

I am not sure if land subdivision per se is the actual source of problem, since in the past it was a common practice also, and it has produced results, which in many cases we admire. However, I think that the way land subdivision is performed entails most of the difficulties. If some major design aspects were to be taken seriously before land subdivision takes place, it is probable that it wouldn't be so restraining to the principles. Also, land subdivision could follow more closely the actual demand for land, and therefore happen in smaller increments, than being used as an instrument from the supply side of land economics. It is not completely clear to me what kinds of effects this kind of land subdivision policy would have on land prices, but I

think that it could make more feasible the adaptation of land parcelization to actual physical and design conditions.

However, a case where land subdivision could happen in parallel with the design process and the layout of houses is in cases of large developments where land is owned at first by a public agency or a non-profit organization which intends to sell the land to the future inhabitants of this area. Instead of land subdivision being the first thing to happen, a new model could be introduced which could delay the precise definition of lots without this necessarily implying a delay on the selling of land. I think that if households, which need land in an area, are given the necessary incentives and are presented with the proper information of what this new model means and the improvements it is going to generate in their built environment, they wouldn't hesitate to commit themselves in the form of an initial down payment in the purchase of a piece of land, without knowing its exact boundaries, though knowing its approximate location within a range of 500-1000 sq. mt. and its exact size.

The problem of land subdivision is closely related with an aspect of land ownership, which assumes a crude separation between private and public.

The distinction between private and public land, although it facilitates the production and financing of the production of space, it creates a big obstacle on attributing

to public space, especially in housing areas, a more human and intimate feeling, and to make open spaces, pedestrian streets and squares, to be felt and used as an extension of the private realm of people. If people could relate with the public space that surrounds their houses more closely, then they could involve themselves more to its creation, maintenance and repair, and make it livable and pleasant.

It might seem absurd to attribute the causes of the alienation of public space to a legal issue like land ownership, since in traditional societies this distinction existed very clearly in legal form, though it didn't manifest itself in the way of the life of the people by neglecting and not using intensively the public spaces. Although the main cause of the impoverishment of the public space lies on the design and production values and procedures, we cannot ignore another fact: that public agencies today assume a full responsibility for shaping, repairing and maintaining public spaces, which was not the case in traditional societies. The reasons for this situation are obvious, since pedestrians and traffic needs within some areas cannot be handled on another way because of technical, safety and hygiene requirements. However, in housing areas, and for open spaces of small scale closely related with houses, people could take more responsibility of both shaping and maintaining them. The reasons why people should enter such an undertaking and public agencies should accept it are clear.

Nevertheless, in some cases a form of legalization of this situation might be necessary -a kind of incentive- where a third form of land ownership, communal land ownership should be introduced. Anyway, the same form of ownership exists in relationship to built space, in condominiums and apartment buildings in Europe, which apparently are kept and maintained in a much better condition than public apartment buildings; why not in relationship to open space.

Another obstacle that has to be overcome for the proper implementation of the principles is the existing structure of the permit procedures that are required for the construction of any building.

Building permits are necessary, since they guarantee the conformity of the design to building regulations, and the structural soundness and safety of the building that is going to be constructed. Beyond this, there is an assumption made that the production process of a building consists of two parts: the first one, this one of thinking, studying and designing the building in all its details, and the second one, that of executing and implementing the decisions made in the previous state. Any deviation from this procedure usually generates bureaucratic hassles and loss of time.

The principles advocate a building production process in which design and construction is a highly interrelated and intermingled procedure with no clear boundaries. That means that in some cases the precise design of a house happens while the foundations are built, or that the position of opening is decided during construction, or that some changes might happen during construction, or that some of the construction details are not defined. This situation makes the preparation of working drawing with all dimensions,accompanied with construction details, an unnecessary task.

The existing procedures which have to be followed for the issuing of a building permit makes the implementation of this new way of designing and building almost impossible. Of course, some building departments would allow some site work and preparation of foundations before the issuing of the permit, fact that permits the incorporation of these principles to a large extent. However, the obligation to submit all of these drawings remains the same.

In cases of large housing projects, even an attitude like this could not solve the problem, since the loss of time would be immense to try to accommodate both the requirements of this building procedure and the requirements of the building departments. And, anyway,it does not make much sense to try to design something precisely, since you know that it is not the definite thing, and since there is a high chance that it might change later, during the construction

process, where things will become real. Also, in cases of large housing projects the delay between laying out the houses and starting construction is immense, because of this intermediate phase of preparing the permits and waiting for their issuance.

Though the abolishment of the building permits could create a building chaos, their simplification and adaptation to the needs of the principles could ease and make feasible the implementation of the principles. One initial step that could be taken towards this direction is for the building departments not to require working drawing and working details, but to consider sufficient for the issuance of a building permit the submission of preliminary drawing, which can be a recording of what has been laid out on the site, and the basic structural calculations that guarantee the safety of the building. Also, officials in the building departments, instead of spending time to check what is drawn on papers, could intensify their participation and visits on the building site, during the whole process of laying out and building. This way, their role and participation in the building production process will become more helpful and substantial.

The last point that I want to refer to is the limitations and obstacles that might be presented in the implementation of the principles related to construction, because of

the orientation of the construction industries towards production of standardized and prefabricated building materials.

A huge part of the production of construction industries is based on prefabricated and highly standardized materials, which have contributed immensely to the low quality of the built environment. Also, the main tendency is to orient production techniques toward the direction of less labor intense construction methods where the need of highly skilled workers is reduced to minimum. Of course, we have reached the point where building has become a cost-and-time efficient operation, by sacrificing the intensity of feelings and the beauty of making things which we really like.

Today, it is really hard to find in the construction market custom-made materials, and it will take a lot of effort to find skilled workers who practice building techniques not based on some kind of machinery. Although one approach to the problem would be to say that construction materials and techniques, implied by the principles, could be found, in most cases, among what is available in the market, the reality is that they are so expensive, because of their reduced demand, and they increase the cost of construction so much, that they are not easily affordable, especially in cases of limited financing. Of course, in cases of larger projects, a possible solution is the fabrication on the site of the specific needed materials. Though

this approach can ensure the quality and the appropriateness for the building materials, it bears the danger that it might be inefficient in terms of the costs involved, especially for the purchase of the necessary equipment and in terms of the extensive labor it demands. This kind of method can be used efficiently only in rather large housing projects, where the economic security of such an enterprise can be really guaranteed, and in cases where the needed labor could be provided by the future users, since,in this situation, it takes the form of a kind of capital investment of the families for their houses. Anyway, this kind of approach towards construction makes the procedure more risky and complicated, on the basis that an existing construction industry cannot provide the necessary and appropriate materials.

The intention here is not to condemn standardized and prefabricated materials, in general, since the production of most construction materials is based on a kind of standardization and prefabrication, but to control the measure and the extent of them. Nobody can deny the usefulness of bricks and concrete blocks, but the appropriateness of prefabricated structural members and walls can be doubtful. However, limitation and control of prefabrication and standardization by itself is not enough; it has to be followed by a development of custom-made construction materials. And this kind of development has to be supported up to such an

extent, so that its products are not going to be considered very expensive, and thus for a limited use.

The role of the construction industries is very critical as far as the extensive implementation of the principles concerns. We can see them being implemented to a limited extend without any changes in the construction industries, but they cannot play an important role in the development of construction techqniues and procedures, unless construction industries realize their importance.

After discussing all these problems and obstacles that existing structures pose on the implementation of these principles, I do not think that it is enough to say that some of the principles should take existing situations more seriously into consideration. Of course, they should be adapted as much as possible without giving up, anyway, their essence and the goal they are aiming at. But even in this case, some changes in the existing structure that is producing housing will be needed, so that they can applied extensively. However, I think it is almost impossible to find general solutions and to expect wide changes, which could incorporate the values inherent in the principles. I believe more to step by step adaptation and acceptance, which can happen only if each specific case of housing development is approached thoroughly and carefully trying to find the best solution for the specific case under the guidance of

the principles, and also trying to achieve the necessary changes that can make its successful implementation real.

APPENDIX

ONE POSSIBLE MODEL, IN THE FORM OF A SET OF CONDITIONS, FOR THE PRODUCTION OF LOW-INCOME HOUSING ACCORDING TO THE PRINCIPLES

Here I am going to describe a possible model for the implementation of the principles. This is not a proposal for a housing production process, neither it claims to be the solution to the problems discussed before. It is simply an example, in the form of a set of conditions which could contribute to the feasibility of the implementation of these principles in the production of low-income housing. It is, somehow, a first attempt to test the validity of some principles when put together.

The conditions which shape this possible model are the following:

1. that the public agency which is sponsoring and subsidizing housing will specify the size and location of the development of a new low-income housing project according to the specific demand for housing in the area. This approach beyond the other economic advantages it has, can also guarantee the expression of interest of the families who want to settle in this housing project, rather early in the development process, possibly before the design phase starts, so that favorable conditions for the involvement of the families in the development of their housing project could be created.

2. that the public housing agency will choose, among the possible forms of subsidies it has in its hands, to offer a direct

subsidy to the low-income families in the form of a low-interest loan, which can differ from family to family according to their financial situation.

3. that the land for the development, which is already been bought by the public housing agency,will be sold to the families on low-prices, and its selling will be subsidized in the form of an interest-free loan; one basic condition will be that the families won't know the exact location of the lot, but only the cluster of houses wherein their house will belong; this condition can postpone land subdivision from being one of the initial steps of the development and make it feasible to happen in parallel with the design process. However, it will guarantee a definite private territory which will comprise both built and open space.

4. that the public agency will accept that the houses which will be built won't be standardized and identical, but that they will be designed according to the needs of the families, to their financial situation in terms of what they can afford easily at this stage in their lives, and that their design will also be adapted and influenced from the actual physical context. However, the public housing agency can specify a maximum size for the houses, so that it can feel secure in economic terms.

5. that the architects' firm will have to prepare an initial phase of design of the whole area, in which they will have to define the major roads which connect the area under development with its surroundings and provide access within it, the pedestrian network and the major centers and open spaces of the site, as well as the areas where the different groups of houses will be built. After this the initial phase of the actual development of the site can start, with the placement of the main infrastructure and the construction of the main arteries.

6. that the architect will have to develop a set of rules and guidelines according to which the houses will have to be laid-out by the families. This set of rules will have to specify very carefully the degree of possible differentiations among the houses and the constraints that have to be followed by the families on the design of their houses, so that a simplicity and similarity in the construction system and supporting structure can be guaranteed beforehand.

7. that the design phase will be reduced to the minimum necessary. This implies that the emphasis regarding the design aspects will be given to the lay-out of the house, that will be done on the actual site by the families with the assistance of the architects, according to the developed guidelines. A major condition for the proper functioning of this activity is that the lay-out completed on the site will be the final design of the house, and therefore families have to accomplish

this task with a lot of care and attention. The lay-out phase will be followed by a short design phase, during which the volumes of the house will be defined, together with the major openings and the predominant features of the house.

8. that the subdivision of the land in lots of sizes agreed upon beforehand will happen in parallel with the lay-out of the houses, and it will be guided by the actual location of the houses as they are staked out.

9. that the public agency has to create favorable conditions for the proper conducting of these operations, since they are critical for the social and economic success of the project. This operation is a very important component of the whole procedure, since it can guarantee the personal identity of the house, and since it can reduce enough the design phase. It will be enough to give one day to the family to accomplish the lay-out of the house on the site, and at the same time it will be convenient and sufficient for one architect to assist two or three families per day on this task. In terms of concrete figures, this means that 200 houses can be laid out within 40 days with the assistance of two architects. The additional needed design, which will define precisely the volumes of the house, the load bearing structure, and the major openings and features of the house, will be in the form of preliminaries. This task does not demand more than one day per house, and therefore this task can be completed within 100 days by two architects. This design

procedure can succeed in completing the design of the 200 houses within 5 months.

10. the design phase has not necessarily to be completed totally during the first months of the development process so that the actual construction period can start. After the first twenty or thirty houses are laid out in the form of groups and clusters and designed in preliminary fashion, which nevertheless includes all the necessary information for the actual construction, the construction of the first groups of houses can start. It is important that the initial phase of construction includes at least twenty houses, so that there is efficiency in site management and construction. Meanwhile, the lay-out of other groups of housing is taking place, so that new construction can start. It is important that an increase in the size of the under construction increments happens as the construction proceeds, so that more efficiency can be reached. I can imagine that in a case of construction of 200 houses, if the first increment comprises 20 houses, the second should comprise about 30, the third about 60, and the last one about 90. In anyone of these increments the houses have to be located in groups, so that construction happens in concentrated areas. These figures, though not definite or thoroughly studied, show the need for an increase in the rate of construction, which is very important both for the completion of the necessary design phase in an early stage,

and for the efficiency on site management, construction, material supply, and administrative costs.

11. that the construction system for all the houses will be the same, and it will be based on the use of local materials and techniques, since construction workers of the area will be better acquainted with them. That means that the same construction details will be used for the building of all the houses, although occasionally a specific construction connection will have to be dealt with separately. What is important to be emphasized here is that the simplicity and efficiency of the construction system are critical, since the recovery of the excess in cost, because of the introduction of different houses, will basically depend on them.

12. that the level of prefabrication and standardization will be limited, though carefully considered. This condition excludes the use of large scale prefabricated structural elements, but it favors the use of the biggest additive prefabricated unit available in the market. That means for example that the biggest available concrete block will be preferable to bricks for the construction of the walls, or that the sections of the load bearing elements of the structure will be the same, so that the necessary level of standardization can be introduced in the preparation of the formwork, in cases of masonry construction.

13. that both the public housing agency and the building department will agree on the preparation of preliminary drawing of the houses, only on the basis of which the necessary permits

will be issued. The preliminary drawing will include all information concerning the floor plan, as it was laid out, the volumetric configuration of the building, and all the necessary structural calculations.

14. that a regular and intensive presence of the architects during the construction period is necessary on the construction site, since the design information available on the drawings, though enough for the advancement of the construction up to the point of the erection of its load bearing elements, is not enough for the whole completion of the project. Some decisions will have to be made on the site during construction, especially concerning the precise location of some openings, or of some minor interior walls. This situation makes the presence of the architect on the site imperative, and the presence of the family for one more time -when the location of he windows will be decided- desirable but not necessary.

15. that the finishing of the houses won't be as high as that provided in market housing. That means that after the basic floors, the openings and the necessary interior finishing are in place, the house will be delivered to the families who slowly can improve the interior finishing of their house up to the point they want and afford.

16. that the production procedure will offer the possibility to the families to complete their houses in stages, building

initially, only part of the house, as much as they can afford, however, providing them with the necessary land and infrastructure for future expansion.

17. that the public agency will agree to build and finance some houses to be sold in the housing market in regular market prices which will be addressed to moderate and low-moderate income people, as well as some shops which can generate some flow of money within the area for the low-income people. Although from a social point of view it might be said that the mixing of low-income and moderate-income families won't assure a definite success, the fact is that the quality of housing in the whole area will be higher than what is usually attached to low-income housing, and that the whole housing environment will achieve a human, safe, and pleasant feeling due mainly to the way this project will be conducted and designed. With respect to this, the chances for a successful accomplishment of this idea are rather high. These houses, which will be built for the market, will have a higher finishing and the profits from their selling will be invested in the improvement of the whole area under development or will be channeled as additional subsidies to the low-income families, depending on the situation.

BIBLIOGRAPHY

Alexander, Christopher. The Timeless Way of Building, Oxford University Press, New York, 1979.

Alexander, Christopher. The Nature of Order, unpublished mss., 1980.

Arnheim, Rudolf. The Dynamics of Architectural Form, University of California Press, Berkeley, 1977.

Benedict, Ruth. Patterns of Culture, Mentor Books, New York, 1946.

Bohm, David. Wholeness and the Implicate Order, Routledge and Kegan Paul, London, 1980.

Koehler, Wolfgang. The Place of Value in a World of Facts, Liveright, New York, 1966.

Koestler, A. The Art of Creation, Ch. XIII, On Partness and Wholeness, Hutchinson, London, 1969.

Kubler, George. The Shape of Time--Remarks on the History of Things, Yale University PRess, New Haven, 1962.

Levi-Strauss, Claude. Anthropologie Structurale, Plon, 1958.

Levi-Strauss, Claude. La Pensee Sauvage, Plon, Paris, 1962.

Piaget, Jean. Structuralism, Harper Torchbooks, New York, 1968.

Stevens, Peter. Patterns in Nature, Atlantic Monthly Preebook, Boston, 1974.

Thompson, D'Arcy Wentworth. On Growth and Form, Cambridge University Press, Cambridge, 1942.

Weyl, Herman. Symmetry, Princeton University Press, Princeton, 1952.

Whyte, Lancelot Law (ed.). Aspects of form, Lund Humphries, London, 1951.

Whyte, L.L., Wilson and Wilson. Hierarchical Structures, Elseviers, New York, 1969.

Alexander, Christopher, Ishikawa, Sara, et al. A Pattern Language, Oxford University Press, N.Y. 1977.

Alexander, Christopher. The Architect Builder, AIA Journal, San Francisco, Sep. 1977.

Alexander, Christopher, Silverstein, Murray, et al. The Oregon Experiment, Oxford University Press, N.Y. 1979.

Alexander, C., Anninou, A., Neis, H. A New Theorie of Urban Design, unpublished mss, Center for Environmental Design, Berkeley, 1981.

Alexander, C., Anninou, A, and Nastou, B. Handbook for House Design for Moshav Shorashim, Center for Environmental Design, Berkeley, 1981, draft.

Arthur, Eric and Witney, Dudley. The Barn, A&W Visual Library, Ontario, 1972.

Grabrijan, P. and Neidhardt, J. Architecture of Bosnia, Ljubljana: Drzavna Zalozba Slovenije, 1957.

Harvey, John. The Master Builders - Architecture in the Middle Ages, McGraw-Hill, N.Y. 1971.

Philippides, Dimitrios. The Autonomous Settlement of Ilissos in Athens, in Shelter in Greece, by O. Doumanis, P. Oliver, Athens, 1974.

Polyani, Michael. Planning and Spontaneous Order, in "The Manchester School of Economic and Social Studies," Vol. XVI, No. 3, Sept. 1948.

Rapoport, Amos. House, Form and Culture, Prentice Hall, N.J., 1969.

Rudofsky, Bernard. Architecture without Architects, Museum of Modern Art, Doubletday Dist. N.Y. 1964.

Sitte, Camille. The Art of Building Cities-City Building according to its Artistic Fundamentals, Reinhold Publishing Corporation, New York, 1945.

Yanagi, Soetsu. The Unknown Craftsman, Kodansha International LTD., San Francisco, 1972.

On Housing

Abrams, Charles. Man's Struggle for Shelter in an Urbanizing World, The MIT Press, Cambridge, Massachusetts, 1964.

Alexander, Christopher. The Grass Roots Housing Process, Center for Environmental Structure, draft, 1973.

Alexander, Christopher et al. Master Plan for Segev H., unpublished mss., Center for Environmental Structure, Berkeley, 1979.

Doumanis, Orestis and Oliver, Paul (eds.). Shelter in Greece, Architecture in Greece Press, Athens, 1974.

Fathy, Hassan. Architecture for the Poor, the University of Chicago Press, Chicago, 1973.

Grimes, Orville. Housing for Low-Income Urban Families, Economics and Policy in the Developing World, A World Bank Research Publication, Johns Hopkins University Press, Baltimore, 1976.

Habraken, Nicholas. Supports, an Alternative to Mass Housing, Praeger Publ. New York, 1972.

Harms, Harry. Limitations of Self-Help in"Architectural Design," London, April 1976, pp. 230-1.

McKean, John Marle. Self-Help Housing in, "Architectural Design," London, August, 1976, pp. 485-488.

Romanos, Aristidis. Unauthorized Settlements and the Housing Problem, in "Architektonika Themata," Athens, Vol. 4, 1970.

Turner, John. Housing by People - Towards Autonomy in Building Environments, Pantheon Books, New York, 1976.

Turner, John. Housing Priorities, Settlement Patterns and Urban Development in Modernizing Countries in "AIP Journal," Nov. 1968, pp. 354-411.

Turner, John and Richter, Robert. Freedom to Build, The Macmillan Company, N.Y. 1972.

On Housing Production and Issues Related With It

Angel, Shlomo and Phoativnogsacharn, Zilla. Building Together The Human Settlements Division, Asian Institute of Technology Working Paper 5, Bangkok, 1981.

Alexander, Christopher, Davis, Howard et al. The Production of Houses, on print, Oxford University Press, New York.

Barlett School of Architecture and Planning. The Production of the Built Environment, Proceedings of the Bartlett Summer School 1979, University College, London, May, 1980.

Babcock, Richard. The Zoning Game. The University of Wisconsin Press, Wisconsin, 1966.

Babcock, Richard and Weaver, Cliford. City Zoning - The Once and Future Frontier, Planners Press, Chicago, 1979.

Burns, L.S. and Mittlebach, F.G. Efficiency in the Housing Industry, Washington D.C., U.S. Government Printing Office.

Chalklin, C.W. The Provincial Towns of Georgian England - A Study of the Building Process, McGill-Queen's University Press, Montreal, 1974.

Doeble, William. The Private Market and Low Income Urbanization: The "Pirate" Subdivisions of Bogota in"The American Journal of Comparative Law,"Vol. 25, 1977, pp. 532-56.

Goodall, Brian. The Economics of Urban Areas, Pergamon Press, N.Y. 1972.

Grimes, Orville. Urban Land and Public Policy: Social Appropriation and Betterment, World Bank Working Paper, no. 179, May 1974.

Karst, Kenneth. Rights in Land and Housing in an Informal Legal System: The Barrios of Caracas, in "The American Journal of Comparative Law," vol. 19, 1971, pp. 551-574.

Lynch, Kelvin. Site Planning, the MIT Press, Cambridge, Massachusetts, 1971.

Sariyannis, Grigoris. Contemporary Urban Building Legislation, in "Architektonika Themata," vol. 12, 1978.

So, F., Stollman, I. Beal, F., Arnold, D. (eds). The Practice of Local Government Planning, International City Management Association, Washington, D.C., 1979.

Solomon, A.P. The Cost of Housing: An analysis of Trends, Incidence, and Causes, Federal Home Loan Bank, San Francisco, Conference Report, 1978.