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A STUDY ON A GLOBAL LEXICON  
TO FIND A MEDIUM  
FOR URBAN SPACE DESIGN VARIABLES

CASE STUDY: DIMENSIONAL EXAMINATION OF CONSTANT AND  
UNIVERSAL URBAN VALUES

A MASTER THESIS  
in  
DEPARTMENT OF ARCHITECTURE  
MIDDLE EAST TECHNICAL UNIVERSITY

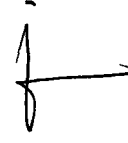
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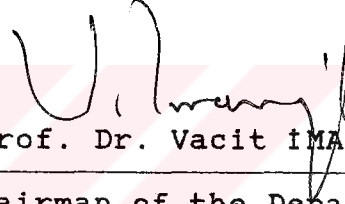
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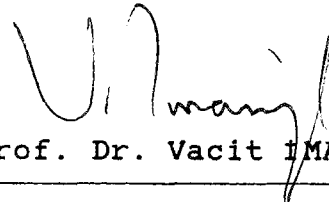
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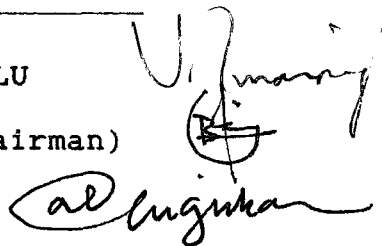
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## ABSTRACT

### A STUDY ON A GLOBAL LEXICON TO FIND A MEDIUM FOR URBAN SPACE DESIGN VARIABLES

Case Study: Dimensional Examination of  
Constant and Universal Urban Values

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M.S. in Architecture

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This study is a search on the constant and universal values of urban spaces which satisfy aesthetic, functional and psychological requirements of human beings. All of these values are considered as a silent language system hidden in urban space. In order to find out these values, a conceptual framework is introduced by using the nonverbal communication theories and this is adapted to architecture. Then the possible elements of nonverbal communication in architecture are observed in the actual urban spaces and surveyed in history to determine the constant and universal ones. Some polar oppositions of the determined concepts in the actual urban spaces and in history are discussed by referring to the conceptual framework. Finally, these oppositions of concepts are examined by a case study to find a medium for urban space design variables for future urban design problems.

Key words: Nonverbal communication, urban space, constancy, universality, closure, size, variety, greenery, transparency and spatial continuity.

Science Code: 601. 01. 03.



## ÖZET

KENTSEL UZAM TASARIM DEĞİŞKENLERİNE OPTİMUM  
BİR DEĞER BELİRLEMEK İÇİN GENEL BİR SÖZLÜK ÇALIŞMASI

Örnek Çalışma: Evrensel ve Kalıcı Kentsel Değerlerin  
Boyutsal Açıdan Test Edilmesi

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Bu çalışma, insanların estetik, psikolojik ve işlevsel gereksinimlerini karşılayan bir kentsel uzamın kalıcı ve evrensel değerleri üzerine bir araştırmadır. Çalışmada, tüm bu değerler kentsel uzamda saklı, sessiz bir dil olarak ele alınmaktadır. Bu değerleri ortaya koyabilmek için, sözsüz iletişim kuramları tartışılarak kavramsal bir çerçeve çizilmektedir. Daha sonra, mimarideki olası sözsüz iletişim öğeleri, kalıcı ve evrensel olanların saptanması için, var olan kentsel uzamlarda incelenmekte ve tarihsel gelişim içinde gözden geçirilmektedir. Belirlenen kavramların, kentte ve tarihte var olan bazı uç tutumları kavramsal çerçeveye dayanarak tartışılmaktadır. Çalışmanın sonunda, kavramlar için var olan uç tutumlar, gelecekteki kentsel uzam tasarım problemlerinde kullanılabilecek, ortalama kentsel uzam tasarım değerlerini saptamak için bir örnek çalışmayla test edilmiştir.

Anahtar Sözcükler: Sözsüz iletişim, kentsel uzam,  
kalıcılık, evrensellik, kapalılık,  
büyüklük, çeşitlilik, yeşillik,  
saydamlık ve uzamsal süreklilik.

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Dedicated to my Parents

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## 1. INTRODUCTION

### 1.1 INTRODUCTION

Understanding the environmental influences on the whole range of human nature and translating all findings into the environmental design seems as a potential method to improve the quality of life for a long time and many researchers have studied this subject. Although they followed different routes for this purpose, as Jon Lang (1987) mentioned, "The goal of all these people has been to understand what gives people pleasure and why." (p. 179).

Pleasure seems as a potential concept to understand the results of human-environment interaction in general terms. All of the constructional, functional, aesthetic, economic, material etc. qualities of a built environment may be influential on the feeling of pleasure, but they also "speak" to inhabitants. Because, all properties of the built environment have a meaning in them and as Rapoport (1982) said, "...people react to environments in terms of the meaning the environment has for them." (p. 13). As a result of this fact, the meaning of the environment or the "language of architecture" is employed as the key concept to structure and to evaluate

the design process by the researchers and the architects. It's the purpose of this study also to analyze this hidden language to find more effective solutions for the urban space design process.

## 1.2 GENERAL BACKGROUND OF THE STUDIES ON MEANING OF THE BUILT ENVIRONMENT

According to J. Lang (1987), the research about the meaning of the built environment has two broad approaches:

"The first involves the study of processes of perception, cognition and attitude formation, while the second involves the study of aesthetic philosophies and the creative processes." (p. 181).

This classification can be made much more clearer by referring to the place of the observer or user during the experience of aesthetic object. While the individual is considered as a participant in life and as a part of the built environment for the first approach, the second deals with the individual as a mere observer or contemplator. Most of the current researches have focused on the correlation of characteristics of the built environment with characteristics of the people concerned. This consideration causes an increasing interest in the study of meaning in several disciplines such as anthropology, psychology, phenomenology and architecture. As Rapoport (1982) mentioned "Meaning has

also been approached through particular methodologies." (p. 35). These may be collected under three main topics as the semiotic approach, the symbolic approach and the nonverbal communication approach.

(i) The semiotic approach is derived from linguistics. The approach is based on the writings of the linguist Ferdinand de Saussure (1915), and he stressed the importance of context for the study of meaning. The development of the second major trend which began with Peirce's (1960) seminal work *Collected Papers*. Conception of the signs as a relational element is the base of Peircean Semiotics. In 1955 Morris formulated this conception under three distinct branches as syntactics which deals with the organization of signs in relation to each other; semantics which deals with the meaning of signs; and pragmatics which deals with the origin, use and effects of signs.

On the other hand, it takes some negative criticism because of its unpractical usage. Rapoport (1982) stressed this situation as follows:

"...their usefulness is extremely limited and their use may even create problems. One such problem with semiotic analysis... is the extremely high level of abstraction and the rather difficult and esoteric vocabulary full of neologism, which makes much of it virtually unreadable." (p. 37).

Also, there is not enough attention to the pragmatics in this approach whereas the nature of the participants and the social setting is the inseparable part of the context.

(ii) The symbolic approach concentrates on structure rather than context. It's the result of appreciation of the associational meaning of the environment. Because of this, it seems more useful in traditional cultures. As Rapoport (1982) said "Today it's far more difficult, if not impossible, to design in the associational world, since symbols are neither fixed nor shared." (p. 45). The variability of the symbols, images and meanings are very obvious for modern society. Also, we can read the familiar information through the symbols, but how can we decode the unfamiliar information in the built environment? This is the result of the consideration of nonverbal dimensions of culture as verbal language. But we know that there is nonverbal communication between people and their built environment.

(iii) The nonverbal communication approach shows an important place in man-environment studies and some other related fields such as psychology, anthropology and architecture in recent years (see Hall, 1966, 1970; Rapoport, 1977, 1982). This approach will be discussed in detail later but it's helpful to give a summary for

the subject here to compare with others.

The concept of nonverbal communication may be used in two different ways. First one is the provision of cues in the environment for behaviour nonverbally; that's the sense of analogy or metaphor. As a result of these cues provided by the environment, people know how they behave in a setting and they behave differently in different settings. Second one is the effect of nonverbal cues to verbal and vocal communication. For all these act together: people communicate verbally, vocally and nonverbally. They may reinforce or weaken each other's meaning. For example, tone of voice, facial expression, body position of an individual during the communication qualify the verbal behaviour. Also, nonverbal behaviour is received by all human senses, while the verbal and vocal behaviour are received by the auditory sense. So, the built environment acts as a multichannel system which provides cues for behaviour and communicates with people. This is an advantage over verbal and vocal behaviour.

As a result of these, the nonverbal communication approach seems very potent and easy to use in environmental research, because it seems as a large framework which links many different theories constructively.

### 1.3 A CONCEPTUAL FRAMEWORK FOR NONVERBAL COMMUNICATION APPROACH

People have communicated with each other in some way since human being has existed. At the beginning, the forms of communication were very pragmatic according to today's enormous media. When there was not even any verbal communication between people, they could understand each other and the world through nonverbal means. There were no words and sentences. Today we have several verbal communication methods and sometimes they are very influential in our lives. Although the verbal communication methods are wide and powerful, this doesn't make the nonverbal forms of communication unimportant. On the contrary, the growing feeling of alienation in the society turns the human being more and more toward the nonverbal communication or communicative behaviour.

In general, either verbal or nonverbal communication structures the images of the world as some kind of language and as Heidegger (1971) claimed,

"The nature of the image is to let something be seen. By contrast, copies and imitations are mere variations on the genuine image...which lets the invisible be seen..." (p. 226).

On the other hand, they are different according to their codification systems. Verbal communication uses only the

words as being oral or nominal. But nonverbal forms of codification are wider than this. Ruesch (1956) summarizes these under three main topics as follows:

"Sign Language includes all those forms of codification in which words, numbers, and punctuation signs have been supplanted by gestures...

Action language embraces all movements that are not used exclusively as signals...

Object language comprises all intentional and nonintentional display of material things, such as implements, machines, art objects, architectural structures, and -last but not least- the human body and whatever clothes or covers it..." (p. 189).

So, architecture as a kind of object language is not only a simple geometric space organization, but it's a materialized image of the lived reality which communicates nonverbally.

The physical elements in this built environment which are materials, shapes and details, etc. are the words of this language and transmitted meaning by them is dependent on the usage of these word like elements as Ruesch (1956) said:

"The selection of objects and the nature of their grouping constitute nonverbal expression of thoughts, needs, conditions, or emotions." (p. 94).

On the other hand, we depend on some rules during the selection and grouping of these elements. Because, there is an order dictated by logic and depends largely upon physical reality. Firstly, construction methods of an



object is determined by the laws of physics. Secondly, its appearance and usage is determined by the material and lastly human needs determine the function and shape of that object. The environment which is organized under the light of these principles by considering the human being as the base can create a commonly shared meaning in the environment as Ruesch (1956) stated:

"Objects can become a kind of international language. In the last analysis, practical objects are relatively free of the limitations imposed by class, caste, and race; instead they are controlled by considerations of a more universal nature; the ability to serve men at a given time for a given purpose." (p. 95).

Under the light of these analyses, this study is dwelled upon urban spaces as architectural forms. Since urban structures communicate with different people who come from different classes, castes and races, the language which acts in urban spaces have to have a universal nature like being in the nonverbal communication. On the contrary, the verbal language which carries only some associational or traditional symbols can't be enough to communicate with all people in urban spaces without nonverbal communication.

The question which will be tried to be answered here is how this hidden language of architecture communicates with people and formulate their way of life.

#### 1.4 SENSATION, PERCEPTION AND EVALUATION

In order to understand how this hidden language of architecture communicates with people, firstly we have to find out how people are aware of them and then how they are able to understand and evaluate them. In other words, how people get information and react to it.

First of all, a human being perceives his physical environment by her/his senses. In order to sense a stimulus, the atmosphere and the power of the physical energy originated from stimulus must be proper to sense, because our sense organs have some limits to sense. After the physical energy of the stimulus comes into contact with sense organs, it's transmitted to brain and nervous system by nerves as an electro chemical impulse. This unconscious action may be summarized as **sensation**. We can sense visual form, colour, light, texture, tone, noise, speech sound, smell, taste, tactile surface, haptic form, kinesthetic field, movement and time simply by this way.

Although sensation is the basic process for the environmental experience, it doesn't mean anything alone. Because, all of the sensed things have meanings for us. When the stimulus is recognized as being something which have some meaning, that's called as

perception. For example, when an observer sees a brown cylindrical form standing on earth with several small green pieces on the extended parts, he/she recognizes that it's a tree. Then the observer may evaluate that tree aesthetically. Generally, this is done unconsciously and later, feelings and emotions become involved. This aesthetic judgement and collaboration of feelings and emotions may be summarized as evaluation.

During the processes of perception and evaluation, past experiences are employed. As a result of these past experiences, the observer can identify a cylindrical brown form with small green pieces on the extended parts as a tree and he/she evaluates it as beautiful or ugly. It's related with the some pre-loaded information in our minds to evaluate the command, that's the memory. We take some cues from the built environment and then we remember some past experiences which are related with the situation to decode the cues. This act is defined as "mnemonics" by Rapoport (1982):

"The environment can... be said to act as mnemonic ... reminding people of the behaviour expected of them, the linkages and separations in space and time - who does what, where, when, and with whom." (p. 80).

At this stage, our past experiences work as a modifying system. Then we can understand and evaluate our physical environment, react to it, and shape it. This may be

summarized as the environmental cognitive process which is the main virtue of man in comparison with other animals. So we have sensation, perception and evaluation in the cognitive process.

At this point, we can ask how our process of cognition is affected from past experiences or we can ask firstly what the environmental cognition is.

Environmental cognition is the sum total of perceptions, memories, attitudes, preferences and other psychological factors. Downs and Stea (1973) define it as follows:

"Environmental cognition is related with behaviour and it may be connected with that was passed (or is past) or what is going to happen in the future; it's problem solving and the organization of information and ideas." (p. 14).

As it's understood from this definition, cognitive process is affected from our past experiences and it is directed by the evaluation of present and future conditions. So it's related with memory, learning, thinking, reasoning, judging and imagining. As Downs and Stea (1977) emphasized,

"...those cognitive and mental abilities... enable us to collect, organize, store, recall, and manipulate information about the spatial environment." (p. 6).

These abilities and also our perspectives on the world changes with age, practice, familiarity, social group,

nationality, our sensory capacities and attitudes. In other words, cognitive process of everybody acts in a different way and a person's cognitive process may change with time. Because nobody lives definitely the same experiences with another person or learns the same things from these experiences and a person develops in time continuously. At this point we can ask how we can have a common meaning of physical qualities for everyone or how we can talk about a communicative urban space by referring a universal architectural language.

This inescapable variability of standards reflects the personal differences and preferences. But there are some common meanings which show small variations even between very different cultural groups and changes very slowly in time. As we said before, we can understand these meanings by nonverbal communication approach. If we determine these common meanings that change at a relatively slow rate or if we select personal differences from others, we can understand the most common and important physical qualities for people. That's the hidden language of architecture.

#### **1.5 DEFINITION OF THE FRAMEWORK FOR THE STUDY**

This is a study on nonverbal communication of urban spaces with people. The aim of the study is to find a

medium for urban space design variables to form a global lexicon. This lexicon will include and explain some commonly shared, communicative and constant - at least slowly changing urban space concepts.

In order to determine the constant and universal concepts, firstly a classification will be made for communicative urban space environmental elements as fixed-feature, semifixed-feature and nonfixed feature in the second chapter.

In the third chapter, urban space concepts in history will be surveyed to understand the degree of importance of meaning attached to them and the determined constant and universal concepts in the previous chapter will be discussed under the light of historical findings.

Then the determined urban concepts as constant and universal will be discussed with some dualities of them in the actual urban spaces and in history to understand their nature in the fourth chapter.

After these, there will be a case study in the fifth chapter. Dualities of the pre-defined urban space concepts of the lexicon will be examined into domains such as beautiful/ugly, illorganized/wellorganized, closed/open ... and so on.

## 2. CLASSIFICATION OF COMMUNICATIVE URBAN SPACE ELEMENTS

Urban space is a kind of extension of the world that we live in. This extension carries some organizations as being in the world. These are organization of space, organization of meaning, organization of time and organization of communication. As Rapoport (1977) mentioned "The built environment is partly the organization of meaning and communication." (p. 325).

There is really an organized and structured system of meaning and communication in urban space. These organizations determine the appropriate behaviours for that urban space. Because, space carries some cues and these are read by people. If people read these cues, they judge the situation under the light of their past experiences and when they get the message, they behave in this way.

These cues are variable and by using different cues or by using the cues in different ways, we can communicate different meanings in urban spaces. This is the situation really. People read the existing cues from space and behave in this way. Because of the different structuring of cues, they behave differently in

different spaces. On the other hand, the wrong organization of these cues or the absence of certain cues causes expression of wrong meaning and urban space can't communicate with people. Also, such an absence of certain cues in space may cause social conflict as Ruesh (1956) said:

"The presence of conflict is, however, not detected exclusively by means of cues indicating people's alarm. Stress is often diagnosed, not by the presence, but by the absence of certain cues that, if they were present, would tend to reassure people." (p. 163).

So, there are such important cues in the space that they affect and modify our life. At this stage, we can ask "how an expected communication can be organized and structured?". In order to answer this question, we have to know firstly the cues existed in the environment and the degree of importance of meaning attached to them. We can obtain these by observing the cues present in elements of the environment. Because the cues are expressed by the elements.

A set of distinctions, first proposed by Hall (1966) may be helpful at the beginning of this discussion. Hall uses the term proxemics to define the interrelated observations and theories of man's use of space and he differentiates it into three levels as infracultural, precultural and microcultural. Infracultural refers to behaviour on lower organizational levels that is related



with man's biological past. Precultural is shared by all human beings and refers to the physiological base and Hall (1966) defines microcultural level as "...the one on which most proxemic observations are made." (p. 95).

Then he discusses proxemics as a manifestation of microculture in three different aspects. These are fixed-feature, semifixed-feature and informal (it's used as nonfixed-feature elements in the text) elements.

Classification of the environmental elements as fixed-feature, semifixed-feature and nonfixed-feature is necessary to see the amount of constancy and universality of elements in the urban spaces.

## **2.1 ELEMENTS OF URBAN SPACE**

### **2.1.1 FIXED-FEATURE ELEMENTS**

Fixed-feature elements are generally fixed in the environment or change very slowly in time. Some basic components of the architecture as walls, ceilings and floors belong to this domain in building scale. If we consider the urban or city scale, these components comprise streets, squares and buildings.

The way of organization of these elements communicates meaning. Organization pattern of space, qualities as

size, location, shape, arrangement and so on communicate much more meaning than the individual parts. For example, we can't understand the style of living of a family by observing only one room in their house. On the other hand, if we observe the arrangement principles of the house totally, we can find out many information about their way of life and social interaction.

The situation is very similar in the case of urban scale. The important thing is not the individual buildings and their meanings, but the total order of urban space and the meaning which is communicated by it. Such a meaning reflects the need of large numbers of people in a city and show very few differences between individuals.

So, if we're able to determine the physical elements in an urban space which communicate positive meanings in general, we can answer the needs of the society in the future by structuring a communicative urban space. Because we know that, these elements change very slowly in time. On the other hand, we can't generalize these elements and the meaning expressed by them as universal, since there is not such a study at present time to generalize these elements as universal or culture specific.

### 2.1.2 SEMIFIXED-FEATURE ELEMENTS

These are furniture like elements which can be changed quickly and easily. In the building level it has a range from the arrangement and type of the furniture to curtains, plants and other furnishings. In the urban level, it comprises all the street furniture, advertising signs, window displays, garden layouts, screens, plants and arrangement of these.

If we remove the furnishings of buildings and urban spaces, they change as ordinary spaces. Even in some spaces, we can only communicate by means of semifixed-feature elements. There are examples of that kind of organizations in the history also. Rapoport (1982) gave the following example:

"..in Çatal Hüyük, one of the earliest urban settlements, the distinction between residential rooms and shrines or ritual chambers is indicated primarily (although not exclusively) through semifixed elements of various sorts -that is, they are "furnished" differently and lavishly than dwellings. If the "furnishings" were removed, they would convert back to "ordinary" rooms and dwellings." (p. 90).

As it's seen from this example, the type and arrangement of semifixed-feature elements are very essential to communicate meaning in space. On the other hand, they are much more under the control of user in comparison with fixed-feature elements. So, they tend to communicate more meaning than fixed-feature elements as

a result of personalization. Also, semifixed-feature elements change very rapidly in time and we don't have any study to answer the following question: Are they culture specific or universal ?

Consequently, although semifixed-feature elements are helping hands when the fixed-feature elements can't communicate adequately, they are necessary elements of the urban spaces independently.

### **2.1.3 NONFIXED-FEATURE ELEMENTS**

Human being is an inseparable part of the environment and form the nonfixed feature elements. Body positions, gestures, facial expressions, eye contact, head nodding, head and arm gestures etc. are the subject matter of this class. Nonfixed-feature elements form the subject of nonverbal communication studies in general. Human behaviour is observed to understand the ways of nonverbal communication and facial characteristics are used to judge personal identity.

## **2.2 A MODEL FOR PHYSICAL ELEMENTS OF URBAN SPACES AS THE SUBJECT MATTER OF THE LEXICON**

After the categorization of environmental elements as fixed-feature, semifixed-feature and nonfixed-feature,

we can make a second generalization as physical elements and social elements of the environment. While the physical elements contain fixed-feature and semifixed-feature elements, we can classify the nonfixed-feature elements as social.

So, this study will concentrate on fixed-feature and semifixed-feature elements as physical ones to find a medium for urban space design variables to form a global lexicon. On the other hand, we know that there is not any study at present time to generalize these elements as universal. However, this does not mean that they are all culture specific. We need much more historical and cross-cultural studies to determine this. However, we may modify Ekman's nonverbal communication model which is done for nonfixed-future elements to fixed-feature and semifixed-future elements in order to find constant and universal values.

According to this model, in the case of facial expression, the elements of expression which are facial muscles and movements in association with happiness, anger, surprise, fear, disgust, sadness, interests and so on are universal. The elicitors of these which are based on events, settings, situations, expectations, etc. are culturally variable. Also, display rules which are allowed where and when are culturally variable. The

facial displays as an outcome and behavioural consequences also vary culturally. Because, except the elements of expression, every components of the model are socially learned. Only the elements of expression are directed by the muscular movement. So, it's based on biological structure of human being and it has universality as a result of this. This differentiation of the model's components are shown in figure 1 by Rapoport (1982).

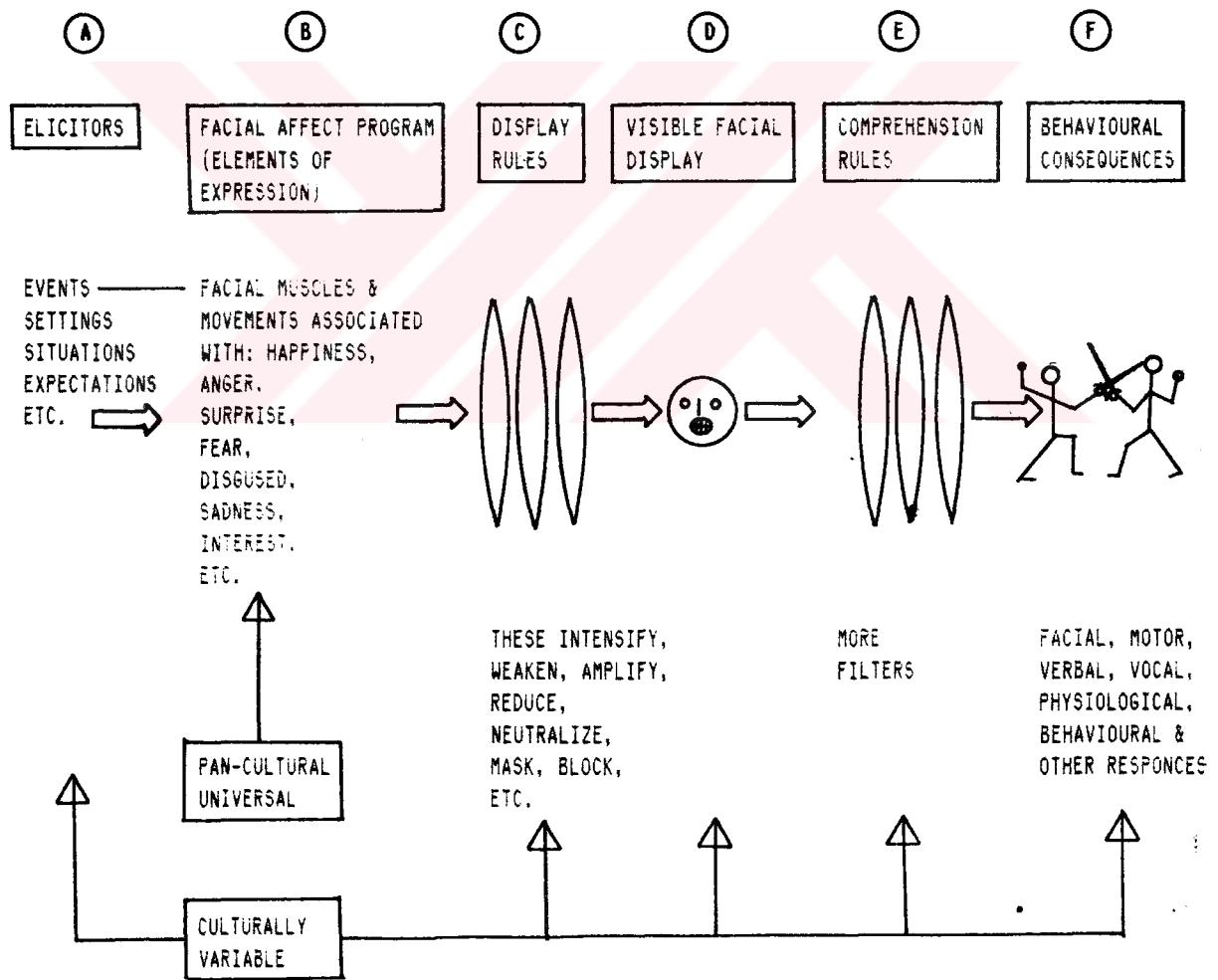
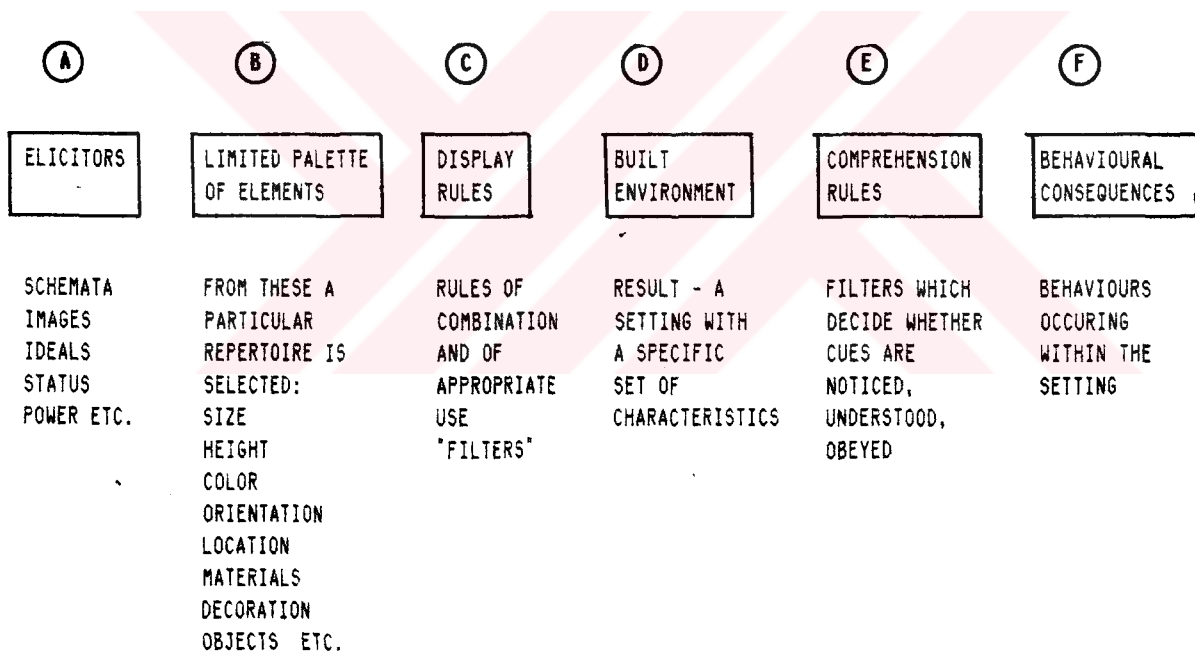


Figure 1 - Schema of non-verbal communication model by Rapoport.

When we modify this model to fixed-feature and semifixed-feature elements, universal or culturally least variable elements may be listed as size, height, color, orientation, location, materials, decoration and so on. Figure 2 shows the modified nonverbal communication model by Rapoport (1982) also.

The elements listed as universal or culturally least variable may be defined as the physical components of space quality. This list may be enlarged as size,



ALL ELEMENTS ARE CULTURALLY VARIABLE, BUT (B) MAY BE THE LEAST VARIABLE

Figure 2 - Schema of modified non-verbal communication model by Rapoport.

height, shape, enclosing elements, paving, barriers and links, color, orientation, location, materials, decoration, light quality, greenery, maintenance level, order, density, topography, view, sound, smells, etc. But we can't use all of them in the lexicon. Because, we need also constant, at least slowly changing standards for urban space design variables. In the following chapter, urban space concepts will be surveyed in the history to select the constant ones.





### 3. URBAN SPACE CONCEPTS

In the previous chapter, a framework were drawn to determine the constant and universal values of urban spaces. Now, we will try to find such a constancy and universality during the development of urban spaces.

If we want to make a general classification about the urban space development in the history, we see two obvious periods to discuss. These periods may be called as "before the industrial revolution" and "after the industrial revolution". On the other hand, some writers prefer to define them as "traditional" and "modern". There are some comparisons and definitions like these in the literature. For example, William Ellis (1986) calls these two periods as "structure of the spaces" for the traditional and "structure of solids" for the modern. Under the light of these names, presence of some basic differences between these two periods is very obvious. This does not mean that all of the urban space concepts and developments of the pre-industrial cities were abandoned abruptly as a result of industrial revolution caused to the sharpest changing in the urban history but these were independent from the existing and regular urban space development which continues from antiquity to pre-industrial city.

### 3.1 URBAN CONCEPTS OF PRE-INDUSTRIAL CITY

When we name the period as "pre-industrial", it's not only including the period which exists before the industrial revolution, because its sources extend till the antiquity. This seems as a long span to find some common and constant urban space concepts, but there are such concepts which are constant or changing very slowly in time and shared commonly even between very different cultures in the history.

The reason of this constancy and universality is the human oriented organization of urban spaces. Aristotle's ideas summarized by Sitte (1945) emphasize this understanding as follows :

"... a city must be so designed as to make its people at once secure and happy. In order to realize this, city planning should not be merely a technical matter, but should in the truest and most elevated sense be an artistic enterprise."(p. 3-4).

Till the industrial revolution, the urban space was considered as an "art" like a painting, sculpture, or individual work of architecture. This consideration of urban space as an art object was not merely related with the decorations, furniture and facade characteristics of the surrounding buildings. As Zucker (1966) said,

"The unique relationship between the open area of the square, the surrounding buildings, and the sky above creates a genuine emotional experience comparable to the impact of any other work of art." (p. 1).

The relationship of these three elements produces the final three dimensional effect of the space. The surrounding structures are influential on this effect by height and proportion. The floor as the open area of the square effects the general quality by its expansion, texture, level differences, etc. The sky is considered as the ceiling of the square and its effect is related with the height of the surrounding buildings again. All of these qualities are related with the body, movement and space perception of human being. So, as Zucker (1966) said,

"The correlation of these principal elements that confine a square is based on the focal point of all architecture and city planning: the constant awareness of the human scale." (p. 7).

### 3.2 URBAN CONCEPTS OF INDUSTRIAL CITY

Human scale considered as a design criteria for architecture and city planning in the traditional city was replaced with traffic which was considered as the main problem of industrial city in the nineteenth century.

This transformation was not realized suddenly. The first break from the tradition came out with the development of new military technology after the French Revolution. Fortification walls of the cities could not serve to

defensive purposes any more. Until that time, these walls were playing an important role as regulators of the urban space. There were definite limits of the city and this was creating a kind of discipline for its construction, rebuilding and expansion as a result of its limited character of the city, but after all these, there were no more limits and disciplines for the urban developments. Also, this development were followed by the industrial revolution and the break became deeper and the cities sprawled haphazardly as Rob Krier (1984) mentioned :

"The decline of the city wall coincided with the onset of industrial development, which forced cities into unprecedented growth. The spread of cities over the surrounding countryside now went on unchecked." (p. 64).

Beside the industrial revolution a social revolution also came out and these two prepared the decline of the old systems and values of the world, but a new system which can compensate the emptiness couldn't be improved for a long time. As Norberg-Schulz (1974) states, there were three symptoms which characterized the new situation of architectural settlements :

"...the loss of identity of the old integrated settlements; the creation of numerous new building tasks; and the arbitrary use of architectural forms borrowed from the styles of the past." (p. 322).

So, there were a great confusion and decline in cities. Without the city walls and with the uncontrolled play of

economic forces, the organic settlement of the past was replaced with new elements as factory, railroad, street and slum.

### 3.2.1 CONSIDERATION OF THE CITY AS A TECHNICAL PROBLEM

In that period, some projects were aiming to rise a new environmental image to finish this haphazard sprawl. On the other hand, the existing uncertainty and increasing of population rapidly caused to an approach of town planning as a mere technical problem. Project of Haussmann (1809-91) for Paris in the nineteenth century forms a good example for this approach (fig. 3).

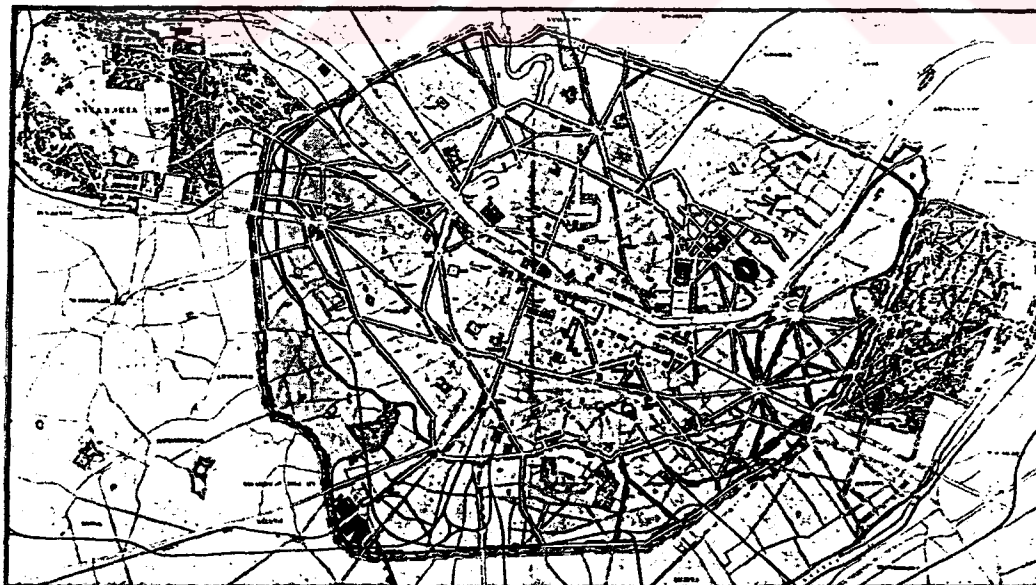


Figure 3 - Plan of Paris showing the transformation by Haussman

He was appointed by Napoleon III in 1853 for the transformation of Paris. The fundamental aims of Haussmann were concentrated on streets and street organization of the city in this transformation project. Giedion (1982) summarizes Haussmann's aims under four main points as follows:

"The first of these aims was "to disencumber the large buildings, palaces and barracks in such a way as to make them more pleasing to the eye, afford easier access on days of celebration, and a simplified defense on days of riot."

The second fundamental principle aimed at "the amelioration of the state of health of the town through the systematic destruction of infected alley ways and centers of epidemics..."

The third point was "to assure the public peace by the creation of large boulevards which will permit the circulation not only of air and light but also of troops. Thus by an ingenious combination the lot of the people will be improved, and they will be rendered less disposed to revolt..."

Haussmann's fourth principle was "to facilitate circulation to and from railway stations by means of penetrating lines which will lead travelers straight to the centers of commerce and pleasure, and will prevent delay, congestion, and accidents..." (p. 745-746)

For the realization of these purposes, many houses were pulled down. New large streets were organized like Boulevard Richard-Lenoir (fig. 4) all over the city. Such boulevards which were opened primarily for the organization of traffic and transportation couldn't solve the residential problems. The confusions and problems were hidden into the background of the facades of boulevards.



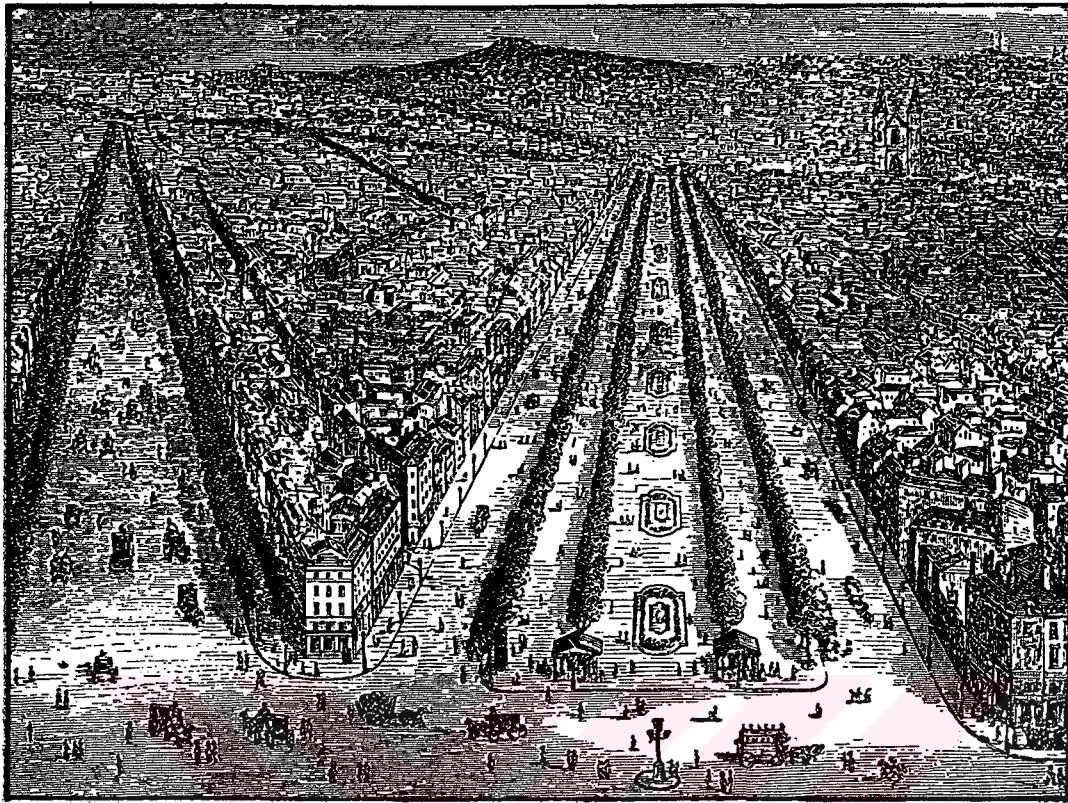


Figure 4 - Boulevard Richard-Lenoir, 1861-63.

In addition to this, with Haussmann's large-scale and rapid transformation project on Paris, the usual and continuous development of the city stopped. As Giedion (1982) said, "His boulevards dismembered the city." (p. 711).

On the other hand, he considered the technical aspects of town planning systematically and organized them precisely which had never been so before, but the consideration of city completely as a technical problem didn't solve any of the problems, but created new ones. Giedion stresses this by saying:

"Cities can not simply be discarded, like worn-out machinery; they play too large a part in our destiny." (p. 778).

Although the situation is like that, Haussmann's ideas and attempts influenced the development of many other cities very much. At least many big cities where industrialization developed later, have a main monumental street directed toward an important axis.

### 3.2.2 CONSIDERATION OF THE CITY AS A HUMAN PROBLEM

The consideration of cities like a worn out machine continued till the first reaction which was against the imitations of Haussmann's work came from Camillo Sitte (1843-1903). He felt that the laws of towns should prove the happiness and safety of its inhabitants at once. This was the first attempt to consider city planning as a human problem after the industrial revolution.

His aim was to structure an urban planning approach based on the historical analyses of the development of the city. He made many sensitive analyses of old European towns to find a solution for the organization of successful open spaces and he found out the organic growth of the medieval town as a way of humanizing the existing situation. He considered the city as a work of architecture which should be conceived three



dimensionally as a popular synthesizing of all the visual arts.

This may seem an ordinary determination for today as Giedion (1982) emphasized :

"Most of us nowadays share Sitte's further conviction that the artistic problems raised by urban development are fully as important as the technical ones." (p. 779).

Although he saw the defects of the situation very clearly, he couldn't develop feasible solutions for these defects and all of his proposals remained as superficial reforms in his book, *Stadtebau nach seinen kunstlerischen Grundsätzen* (1889).

#### 3.2.2.1 THE CONCEPT OF OPEN CITY

At that period, beside the book of Camillo Sitte, there were three more publications to structure a kind of method for town planning. Although these were aiming to find some methods to solve the existing defects of the towns like Sitte, they depart from him by their methods to reach the solution. One of them was *Garden Cities of Tomorrow* (1898) by Ebenezer Howard, the second one was including the notion of *Linear City* (1882) by Soria Y Mata, and the other one was the *Cite industrielle* (1904) by Tony Garnier.

The basic character of these three publications were displaying a kind of liberation from the past. This was the character of Enlightenment that's the movement of the age as Norberg-Schulz (1974) mentioned :

"Enlightenment philosophy opposed the power of convention and tradition and authority, and the centralized and the hierarchic systems of the baroque age way to a multitude interacting, equal elements." (p. 354).

So, the term "open space" reflects the limitless and continuous environment of the nineteenth century as an image of this liberation from every kind of dogmas of the past and the above-mentioned publications are concentrated on this term.

The idea of the garden city was developed by Ebenezer Howard in the late nineteenth century as an "open space" model. In this study the city was considered as a human problem also like being in the study of Camillo Sitte. As Rob Krier (1984) said,

"His study is based on sociological considerations and a concern for public health... His diagrams outline a self-sufficient community which on public health grounds provides for substantially greater areas of green space in the private and public zones, than were usual at the time." (p. 64-65).

The scheme of Howard's city which was formed as a set of concentric circles was a diagram only (fig. 5). It was possible to adapt his scheme into many different forms. Although it seems very useful on the paper to create a

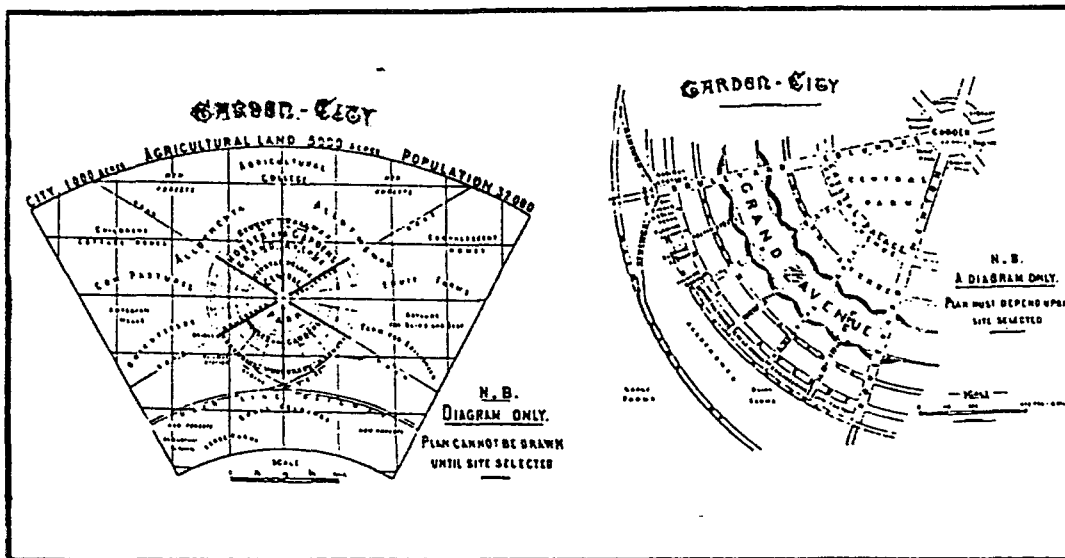


Figure 5 - Diagram of a garden city by Ebenezer Howard, 1898.

completely new town which is industrial, residential and agricultural under the light of Howard's ideas, it was condemned to failure. Giedion (1982) explains the reason of this failure as follows :

"No partial solution is possible; only preconceived and integrated planning on a scale embracing the whole structure of modern life in all its ramifications can accomplish the task which Ebenezer Howard had in mind." (p. 785).

The idea of open city guided the study of Soria Y Mata also. On the contrary to the radial scheme of Howard, he planned a linear city around Madrid (fig. 6). He was aiming an active interrelationship between settlement and nature. According to him, the idea of walled medieval city should be replaced by the idea of open and rural city. This replacement was causing to a sprawl of

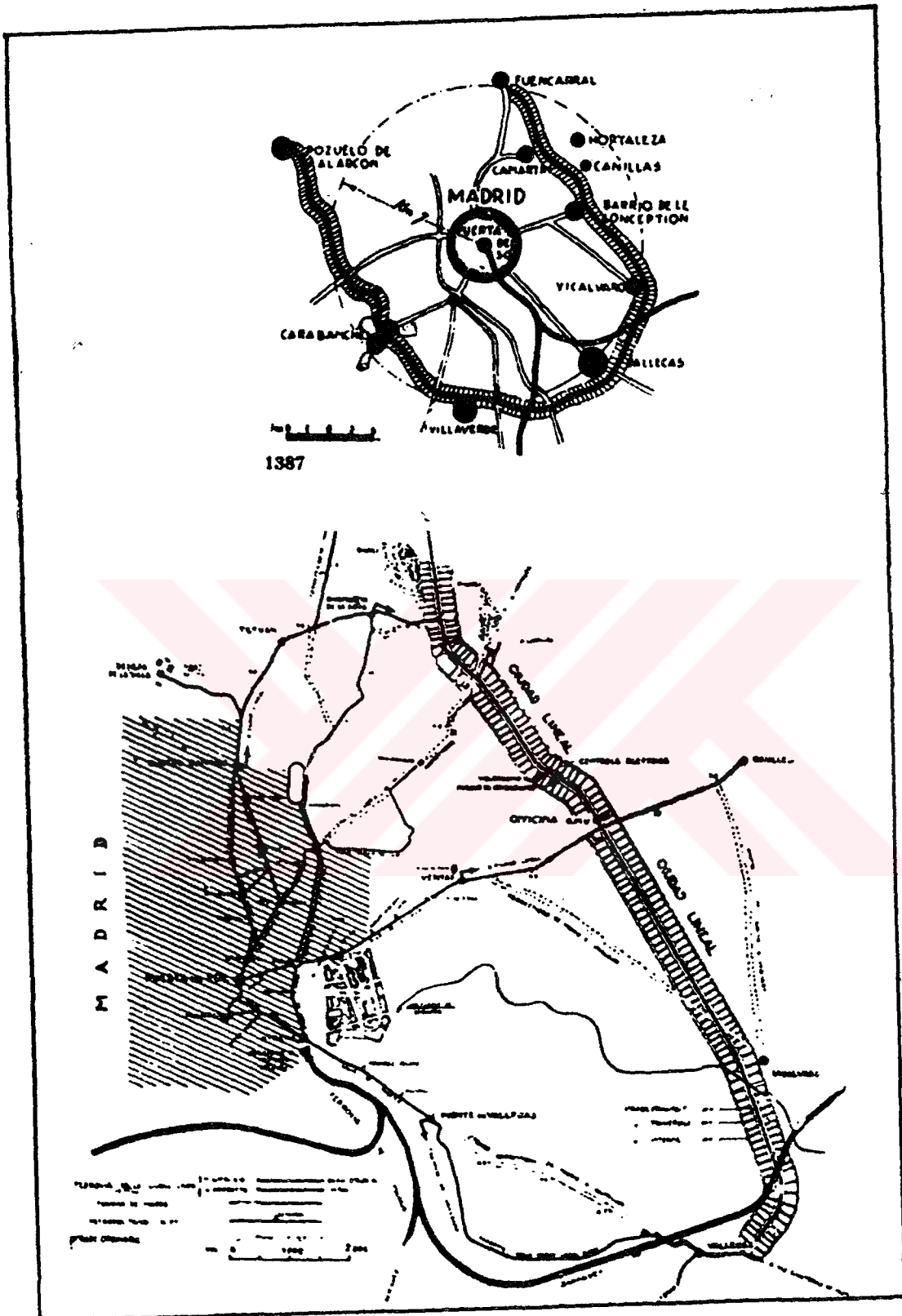


Figure 6 - Project for linear city by Soria Y Mata, 1882.

the settlements and transportation was gaining importance as a result of this. Soria Y Mata recognized this situation and he considered transportation as the backbone of the city. Industry and housing extended along both sides of this linear backbone. The old grid system was used as an organization pattern in this proposal, but by breaking the traditional urban form, this caused a kind of villa landscape.

Soria Y Mata realized this system in a suburb of Madrid. However, this system reached the intended point only in the 1960's with the development of very large and continuous urbanized areas like areas from Boston to Washington.

We see the work of Tony Garnier, *City Industrielle* as another example for "open city" understanding. There was not over concentration on single issues like Soria Y Mata's linear city, but he was searching for an organic interrelationship between all the functions like traffic, housing, etc. and he separated all the functions of the town clearly (fig. 7). Also the buildings were separated from each other. Because he preferred the open communal spaces between low housing blocks to the surrounded courtyards with periphery buildings (fig. 8). So, he also created a villa landscape like Soria Y Mata.



Figure 7 - Cite Industrielle by Tony Garnier, 1901-04.





Figure 8 - Cite Industrielle by Tony Garnier, 1901-04.

If we want to summarize this period created by the industrial and social revolutions, we can talk about a limitless flexibility and openness generally. This flexibility and openness was so limitless that this was causing confusion and meaninglessness. So, the basic problem for the settlements of this period was to attain a kind of identity and meaning within a special order. In order to achieve this, pioneers of the period followed different roads, but the main idea of each interpretation was guided with the concept of open city.

### 3.2.2.2 THE CONCEPT OF OPEN CITY FOR THE FUNCTIONALISTS

We see the concretization of the open space concept in a different manner by the functionalist movement in early twentieth century. In that period, the pressure for expansion of cities were forcing the planners to rapid and comprehensive decision making. Since the urban areas were growing with an uncontrollable speed, established urban policies were insufficient to solve the avalanche of problems.

Under the influence of this situation, the pioneers of the movement drew a new image of life on the urban level, they developed new planning policies and then, they realized this image in three dimensional projects.

The basic interest of the movement was the problems of the human settlements and the prominent aim was creating a sterile environment which have a rational and honest equality. For that reason, they realized some radical reforms comprising the administrative control of urban development and the organization of the building industry. As Rowe (1978) said, "He (20th century architect) was helping to establish and to celebrate an enlightened and a just society" (p. 11).

So, they changed the customary meaning of planning and



as Tafuri (1986) mentioned, it was a mean for them to solve the social problems:

"Planning, for them, was simply a means, based on foresight, that could "correct" the ills of a laissez-faire policy and that, within the established system of such public works as low-rent housing projects, was expected to carry out an equilibrating function that would discourage social conflicts." (p. 153).

Under the guide of this functionalist approach, the most effective and comprehensive response on the urban level was the separation of the various urban functions, in other words, a kind of parcellization of the city according to functional units like housing, recreation, work, etc. We know Le Corbusier's "Ville radieuse" as the first abstraction of this idea in 1930. The theoretical rule-book of the idea were manifested in the Charters of Athens in 1933 by including the other basic ideas of the functionalist architecture.

The importance of human scale for the architecture and town planning were stressed in this manifesto and separation of pedestrian movement and motor traffic was proposed as a humanistic decision.

On the other hand, the distinction between the public and private realms was denied. Economic forces of the time and the care for administrative control were the basic reasons for this refutation of private realms. So,

they began to confirm some standards for the future developments and believed in scientific analyses for this. For example, widely separated high slabs were spaced according to the angles of light to improve the daylighting and ground area (fig. 9).

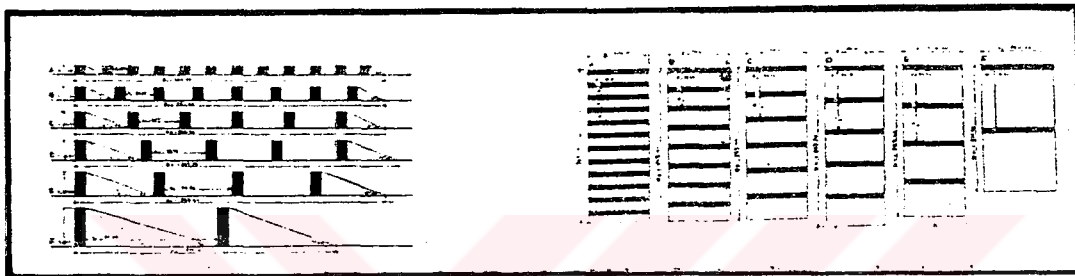


Figure 9 - Development of apartment blocks according to the angle of sunlight by Walter Gropius, 1929.

For the same purposes the periphery buildings around a central courtyard were evaluated into row housing (fig. 10).

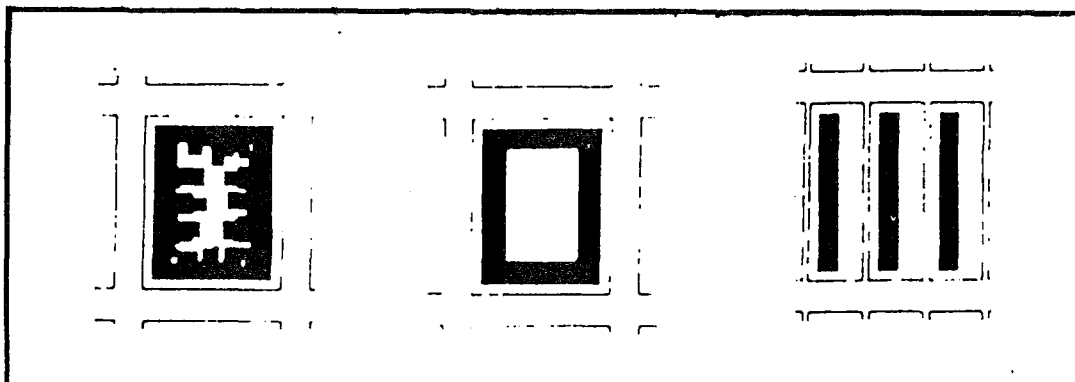


Figure 10 - Evolution of the block built around a central courtyard into row housing by Walter Gropius.

In addition to these, the concept of transparency and spatial continuity were developed as a support to the concept of open space for the image of new architecture. Also the dream of a "green city" was still keeping its actuality as a way of concretization of the open space concept.

In order to achieve such an appearance, the dense and continuous texture of the traditional city was replaced with high tower blocks isolated with wide green areas from each other. Rowe (1978) explains this situation as "The matrix of the city has become transformed from continuous solid to continuous void" (p. 56).

So, if we summarize the new urban image generally, separated functions of the city seem as a main attribute. After this, we see the separation of building blocks with a wide range from each other. In addition to this, these blocks display a kind of similarity with their heights, facade organizations, colors and they are generally row houses which are organized as series of parallel blocks or tower blocks separated from each other with a wide range. There are wide, open and green pedestrian areas around these blocks which are free from motor traffic and consequently, this new image were created only for the sake of humanism in view of the pioneers of the movement.

On the contrary to this view, there are some criticisms for the movement which find this image inadequate to define a humanized urban settlement or charge the movement with serving to some other purposes and authorities as being different from the humanism. Colquhoun (1989) is one of these critics and criticizes the movement as follows:

"It seems that what started as a utopian critique of the nineteenth-century housing conditions turned into nothing more than what was needed for the success of the twentieth-century economic centralism, whether in the form of monopoly capitalism or socialist bureaucracy." (p. 227).

Also, Rob Krier (1981) criticizes the situation as; "Functional, constructional and capital concerns were the order of the day. Architecture was a low priority." (p. 74).

In addition to these, the new image was condemned from the point of view of legibility and penetration of human needs in urban spaces. The lost of proximity and density, the use of common structures on a vast scale, the separation of functions to different zones and the mechanically arranged series of parallel blocks are the basic reason for this blame. The modern city with all these properties was considered as the cause of the identical incomplete spaces and the destroyed sense of orientation on the pedestrian level which are arouse during the twentieth century. All of these deficiencies

caused a collapse in communication as Rowe (1978) mentioned:

"The traditional city goes away; but even the parody of the city of modern architecture refuses to become established. The public realm has shrunk to an apologetic ghost but the private realm has not been significantly enriched; there are only no references -either historical or ideal; and in this atomized society, except for what is electronically supplied or is reluctantly sought in print, communication has either collapsed or reduced itself to impoverished interchange of ever more banal verbal formulae." (p. 65).

This fact is very interesting to determine the constant and universal communicative urban space elements for the lexicon. Because, the lack of identity and the collapse of communication came into scene as a problem during the modern movement. So, if the basic differences are determined between traditional and modern urban images, constant and universal urban space values for a communicative urban space may be found out.

As we see from several examples, one of the obvious differences is related with the concept of "closure" and the closed urban space of the traditional city was replaced with the open space during the modern movement, although the closure is very necessary for the urban identity as stressed by Norberg-Schulz (1971):

"The primary quality of the urban image, ... , is the single identifiable place to satisfy this condition, the settlement ought to have figural character in relation to the landscape. The principles of closure and proximity of the

constituent elements, therefore, are the prime importance." (p. 29).

Now, we know "closure" as an important property to have an identifiable and secure urban space, but we can't define a communicative urban space by only physical closure. If we examine modern urban space which has physical closure, we can find out other requirements also. Le Corbusier's project of "immeuble villas" may be a good example for this (fig. 11). In this project we have an inner courtyard which is enclosed with buildings in the shape of a physical enclosure. However there are two important disparity from traditional urban space.

One of them is the enormous dimensions of the court and the very high surrounding buildings. Such dimensions are perceived more difficult and they show a lack of harmony with human scale. Also the ratio of plain depth (D) to building height (H) is very different from traditional urban space. Whereas the D/H ratio is not more than 2 in traditional urban space, it seems bigger than this ratio in modern urban space.

The other one is the homogeneity of surrounding activities as a result of zoning principles. This causes a great monotony. On the other hand, people identify an urban space by means of variety and traditional urban space shows this character mostly. So, we have "size"

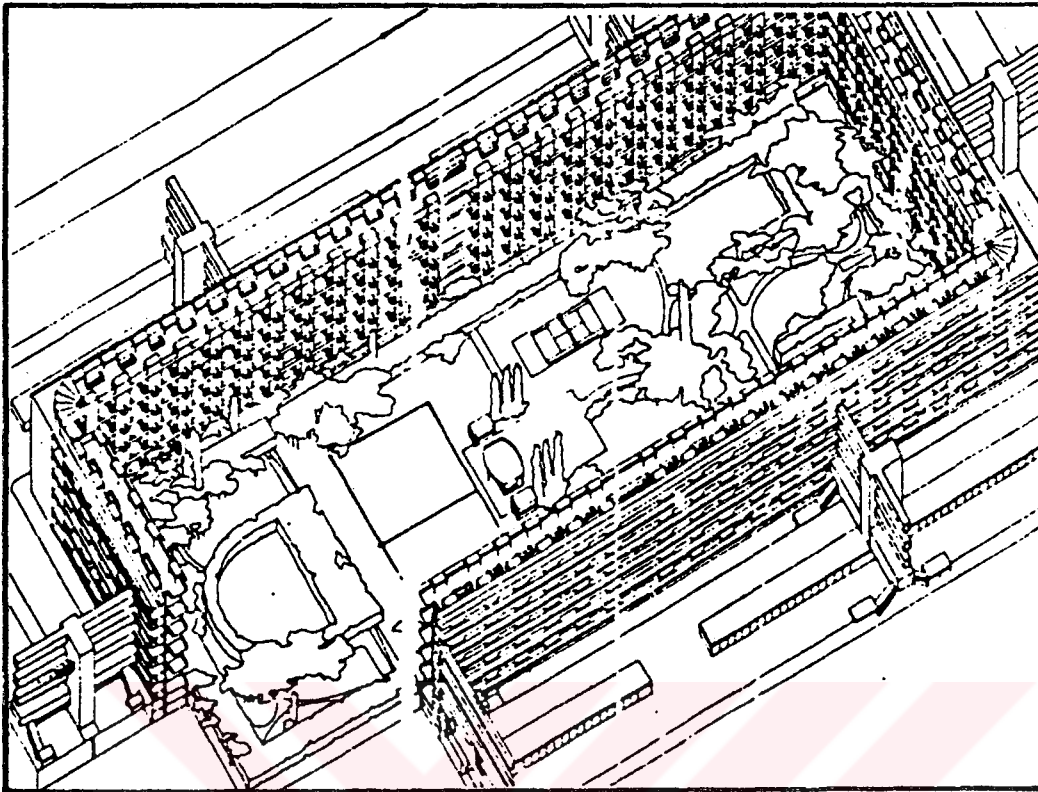


Figure 11 - Ville Contemporaine by Le Corbusier and Jeanneret, 1922.

and "variety" as two important differences between modern and traditional urban spaces in addition to "closure".

These are the main concepts which have polar oppositions between traditional and modern urban spaces, but not the whole. We know the concepts of "transparency and spatial continuity" and "greenery" determined by functionalists as essential properties for urban space. Originally, these are not new concepts discovered during the functionalist movement, but the way of treatment of

these concepts in modern cities are completely different from traditional understanding. In the traditional city, transparency and spatial continuity is achieved by creating vistas at the ground level within the solid and continuous matrix. On the contrary, the isolation of solids in largely unmanipulated voids is the way of structuring this in modern cities. Also, while the greenery is used generally as an important element within the urban space surrounded with solids in traditional city, the solids are distributed all over the large green areas individually in modern city.

As a consequence, "closure", "size", "variety", "greenery" and "transparency and spatial continuity" may be determined as main urban space concepts in the history in spite of existence of opposite treatments in different periods. These concepts of urban space will be discussed in detail with their dualities in the next chapter. Because, we know that "...the city requires continuity." (p. 5) as Barre (1980) said and refutation of all analyses and discoveries of functionalists causes same mistake done by them.



#### 4. DEFINITION OF URBAN SPACE BY RELYING ON CONSTANT AND UNIVERSAL URBAN SPACE CONCEPTS

##### 4.1 CONSTANT AND UNIVERSAL URBAN SPACE CONCEPTS

A realist urban space definition is closely related with the constant and universal urban space concepts. In order to make such a definition, these concepts determined as "closure", "size", "variety", "greenery" and "transparency and spatial continuity" in the previous chapter will be discussed with their polar opposites which exist in the history and in the actual city.

##### 4.1.1 CLOSURE

As it was discussed in the previous chapter, physical closure is one of the constant and universal concepts of the urban space and it's an essential feature to identify a place. It causes a kind of differentiation of horizontal space by vertical space defining elements. Cullen (1971) defines the concept as follows:

"Closure is the cutting up of the linear town system (streets, passages, etc.) into visually digestible a coherent amounts whilst relating the sense of progression." (p. 106).

Enclosure creates a meaningful inner space within the urban space with definite boundaries. This can be explained by the concepts of "something" and "nothing" of the Chinese philosopher Lao Tzu. This is related with "yin" and "yang" which have been part of Chinese thought since ancient times. Lao Tzu uses the vase as a symbol to explain the enclosure. Before the existence of vase, there is "nothing" in the space, that's the negative space, in other words meaningless space. According to him, vase makes a part of space meaningful by surrounding it with a definite boundary, but the exterior spaces are still negative (fig. 12a). On the other hand, if there are two vases, there will be a positive-negative exterior space between them, that's the first step to create a meaningful exterior space (fig. 12b). If we arrange a group of vases into a circle, we achieve "something" or positive space or meaningful space (fig. 12c).

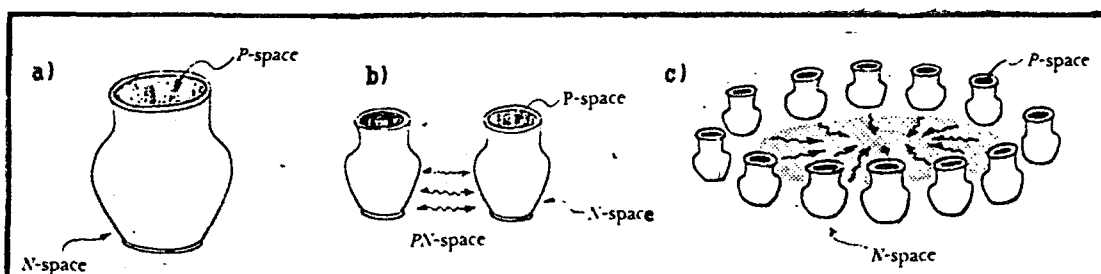


Figure 12 - Formation of positive space by surrounding entities by Lao Tzu.

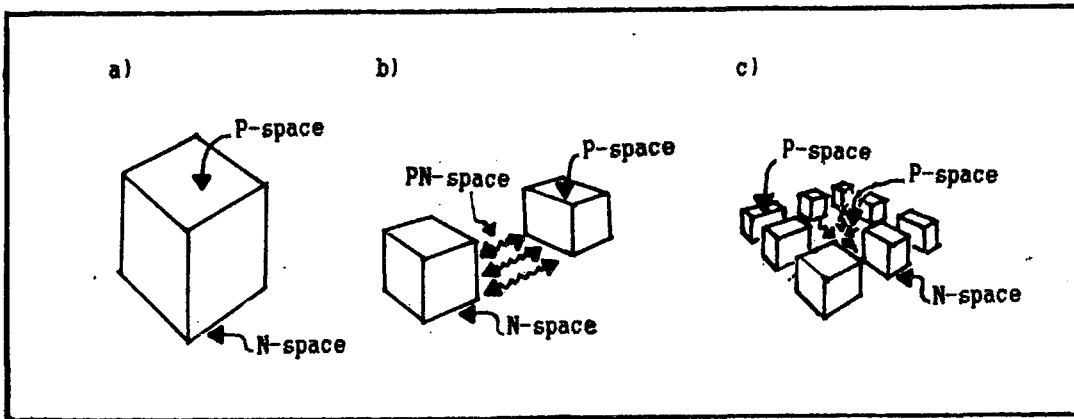


Figure 13 - Formation of positive space in architecture.

We can easily adapt this theory to architecture. When we construct a building, we create a meaningful space in it, but it can't create a meaningful exterior space by itself in an emptiness (fig. 13a). If we add one building to it, the area between them will carry some meanings, but this doesn't mean that the area is meaningful (fig. 13b). If we arrange several buildings around a square, we can create a meaningful space (fig. 13c). So, enclosure is a way to create meaningful urban spaces.

On the other hand, during the modern movement, the individual blocks were distributed all over the urban areas to create free and open spaces. Le Corbusier's Unite d'habitation (1947-1952) was one of them (fig.14). This building creates a meaningful space in it, but it stands alone in the emptiness. As a result of the lack of meaning at the exterior, its surrounding turns to "a

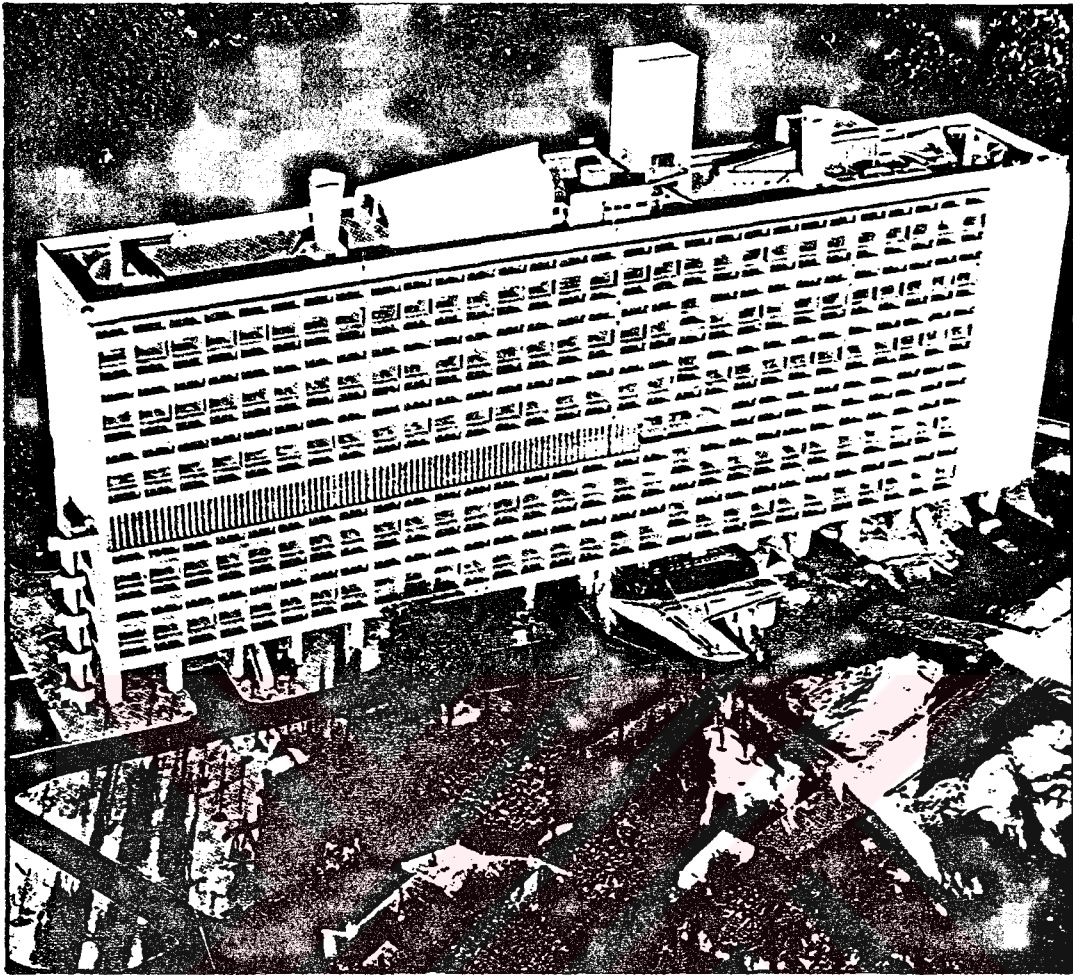


Figure 14 - Unite'de habitation by Le Corbusier, 1947-52.

no-man's land of open space" (p. 227) as Colquhoun said. On the other hand we see some endeavor to keep alive defined and meaningful urban spaces even after the modern movement. Jorn Utzon's residential project for Birkehoj (1960) is a good example of such a care (fig. 15).

Generally closure works with proximity which is defined by Piaget (1967) as "...the "nearby-ness" of elements belonging to the same perceptual field." (p. 6). This

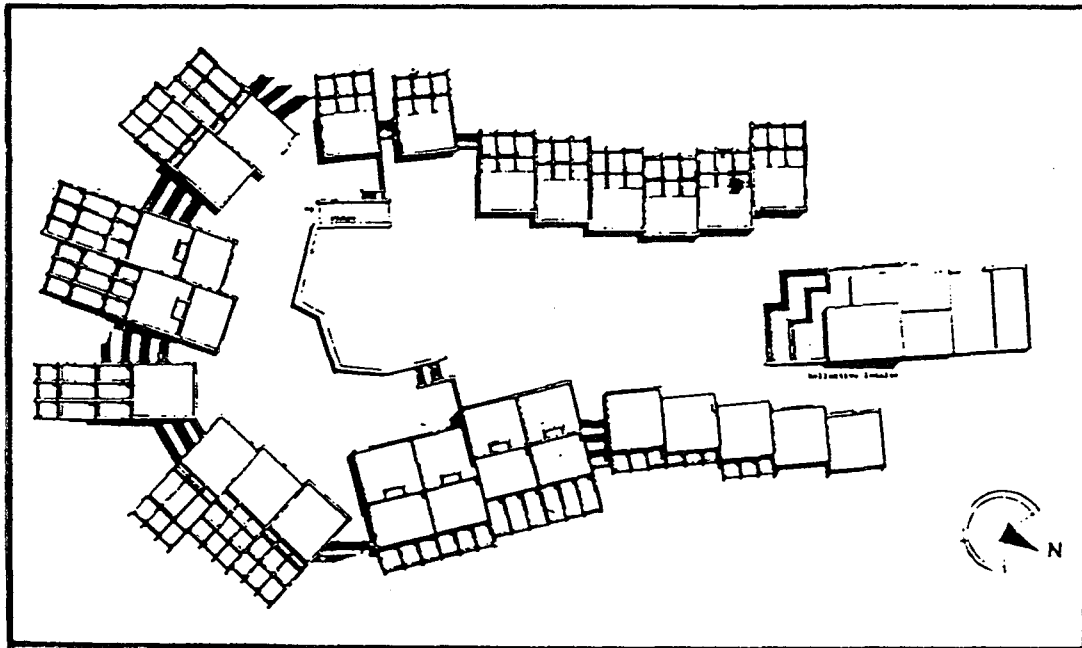


Figure 15 - Residential Project for Birkehoj by Utzon, 1960.

means a kind of concentration of masses (fig. 16). The amount of this concentration determine the degrees of enclosure and the degree of space definition.

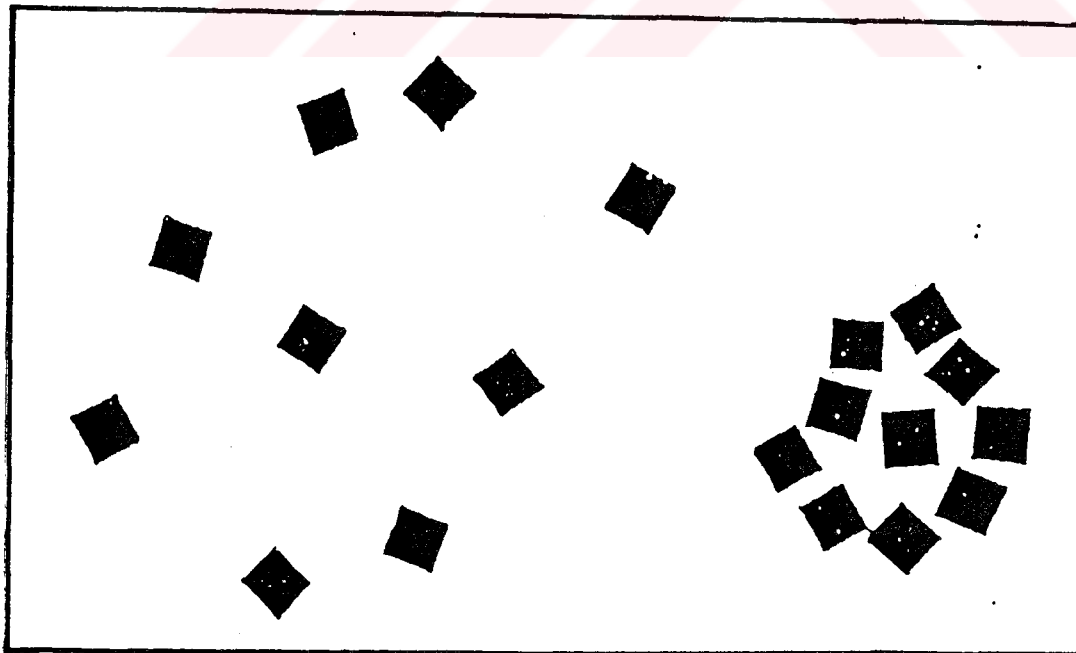


Figure 16 - Proximity as concentration of masses.

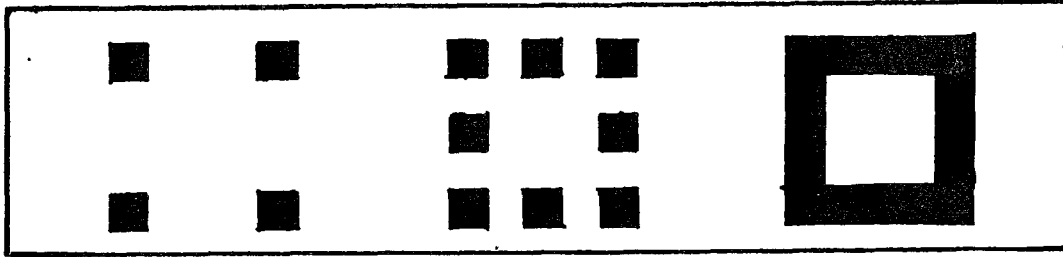


Figure 17 - Degrees of enclosure.

In figure 17 we can see the degrees of enclosure in an abstract way. So, although we have some architectural elements around a definite plane, we can't achieve a meaningful urban space, if we don't have a degree of



Figure 18 - Project for Saint-die by Le Corbusier, 1925, figure ground plan.

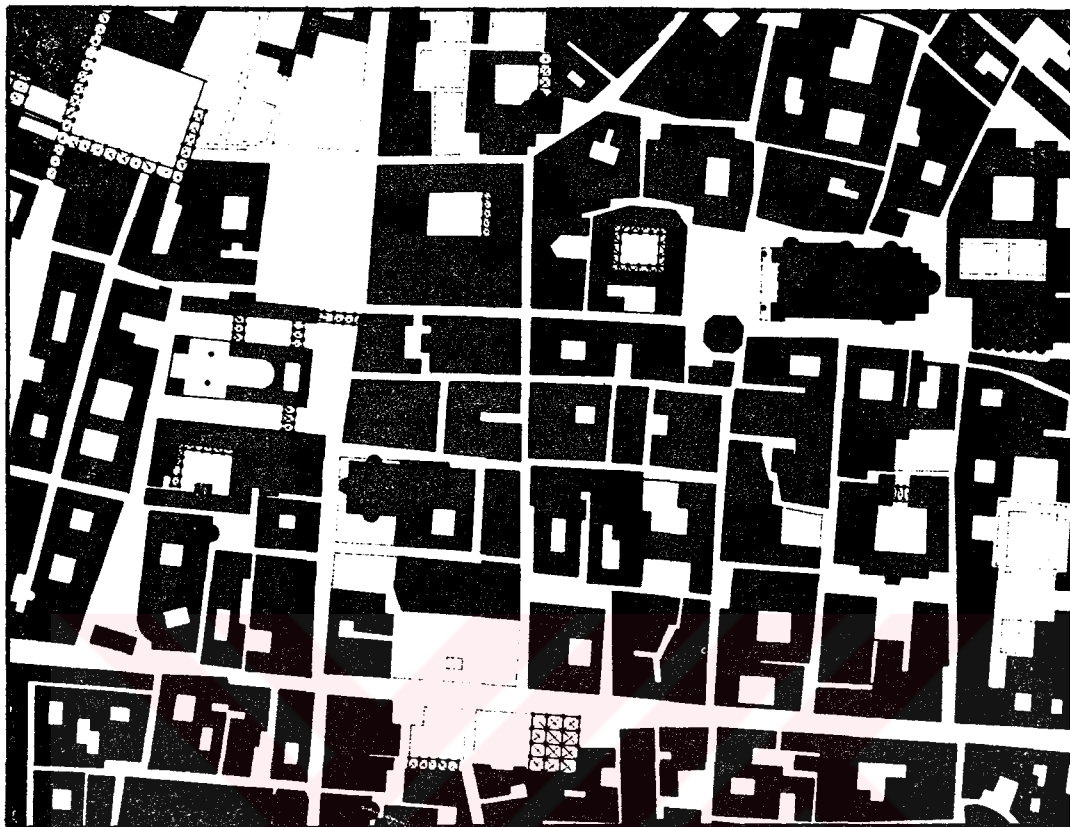


Figure 19 - Parma, figure ground plan.

concentration. When we compare the figure-ground plan of Le Corbusier's project for Saint-Die (fig. 18) and figure-ground plan of Parma (fig. 19), we can differentiate this easily. In the Parma example, the solids define some meaningful spaces like a room in the urban fabric by means of concentration. In the former example, although each building has an identity and meaning on its own, they can't define a meaningful urban space together. Rob Krier (1984) defines this situation as "nothing more than a jumble of buildings" (p. 81).

Enclosure and proximity affects the perceptual



performance also. According to the thesis of 3-dimensional perception, people perceive nearby elements more clearly and surrounded spaces with definite boundaries attract more attention. This is a result of the coherence system. Because, people tend to condition parts by the whole. So, a separated individual building doesn't mean so much thing as alone. It gains meaning within a whole and forms some part of a whole. Plaza Mayor in Spain exhibits a sample atmosphere for a coherence system (fig. 20). All of the individual buildings are perceived with the whole urban space, gain

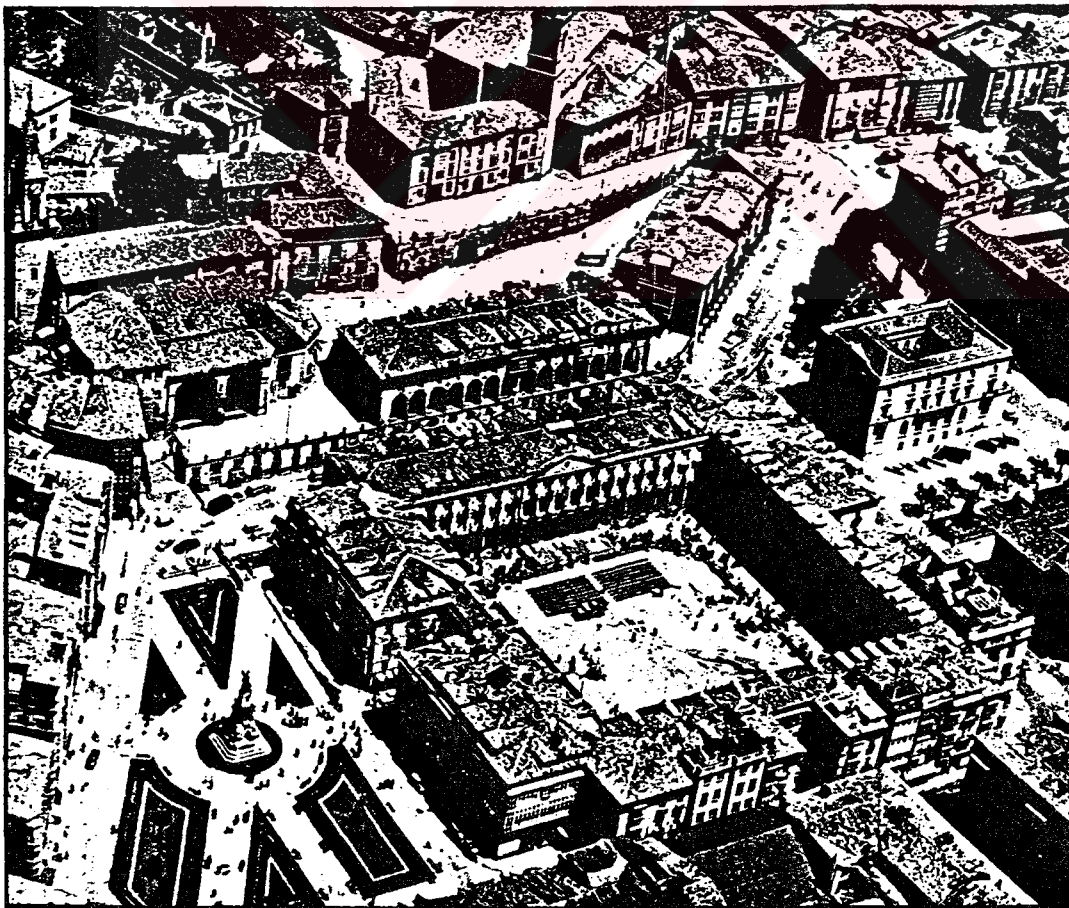


Figure 20 - Spain, Plaza Mayor.



meaning by it and also form it. Nevertheless, we can't talk about such a condition for modern city. The distributed individual blocks all over the large fields can't construct a whole and they can't be perceived within a whole. Le Corbusier's Plan Voisin (1925) seems confirmatory to these words (fig. 21). So, the existence or absence of one individual block in that field doesn't change anything perceptually and as Rowe (1978)



Figure 21 - Paris Plan Voisin by Le Corbusier, 1925.

mentioned , this damages the legibility of space:

"Certainly, in considering the modern city from the point of view of perceptual performance, by Gestalt criteria it can only be condemned. For, if the appreciation or perception of object or figure is assumed to require the presence of some sort of ground or field, if the recognition of some sort of however closed field is a prerequisite of all perceptual experience and, if consciousness of field precedes consciousness of figure, then, when figure is unsupported by any recognizable frame of reference, it can only become enfeebled and self-destructive." (p. 64).

There is another important thing which influences the character and amount of enclosure. That's the existence of well-defined inside corners. The mutual interpositions of four walls create a kind of enclosed space (fig. 22a), but we sense a lack of definition and clarity. Because the corners are open. On the other hand, when we enclosed the space with four angled walls at four corners, we achieve a well defined and strong enclosed space (fig. 22b).

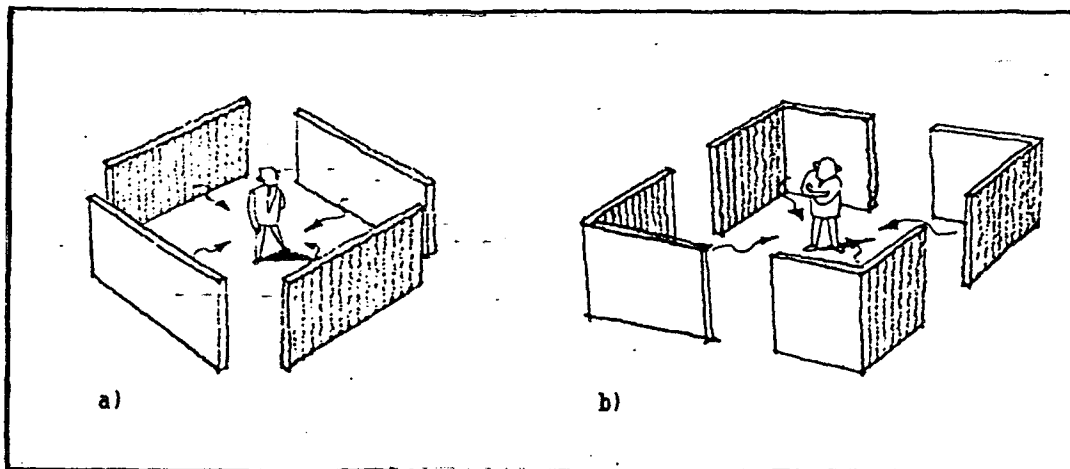


Figure 22 - Definition of enclosure by corners.

In addition to all of these, enclosure carries very strong social meanings. First of all, enclosure creates a feeling of psychic security. Norberg-Schulz (1971) explains this as follows:

"...the enclosure has strong social implications. Basically it expresses a coming together, the forming of a ring for a common purpose. Most cultures have such enclosures where rituals or theatrical performances take place. The essential architectural property is a clearly defined boundary, which secures physical as well as psychic protection." (p. 44).

In the previous chapters, it's mentioned that, this study aims to find urban space design variables which are constant, at least slowly changing in time, and universal. As we see, closure is one of them. We can find different kinds of furnitures, pavements, facade organizations, etc. in different urban spaces, or we may not have them. But as Sitte (1945) said, the essential thing is enclosure:

"However, just as there are furnished and empty rooms, so one might also speak of furnished and unfurnished plazas, since the main requirement for a plaza, as for a room, is the enclosed character of its space." (p. 32).

#### 4.1.2 SIZE

Size is an important aspect of the urban space as Norberg-Schulz (1971) said, "A place is characterized by a certain "size"". This is related with the behaviour

of territoriality. Because, the size of space defines the "personal space" also. According to the limits of this personal space, the urban space gains a character. As Rudolf Schwarz (1949) said:

"A domain can only become a home if it's small... The settlements must remain within an imaginable scale if they are to become a home." (p. 194).

The term "home" symbolizes the feeling of maximum security. So, size also is an important concept for the feeling of security as closure. For example, an urban space with its very high enclosing elements and with an imperceptible width can create anxiety (fig. 11). As Sitte (1945) said, we have such defects in the modern society:

"Agoraphobia is a very new and modern ailment... On our modern gigantic plazas, with their yawning emptiness and oppressive ennui, the inhabitants of snug old towns suffer attacks of this fashionable agoraphobia." (p. 45).

Beside the general scale of the urban space, the ratio of plain width to building height is another important aspect of urban space. Ashihara (1983) had an observation about the ratio between depth (D) and width (H) and developed some standards for different periods in Italian townscape (fig. 23). According to him  $D/H=1$  may be the optimum ratio. That's the ratio of Renaissance city. On the other hand, if  $D/H$  is smaller than 1, the space grows crowded and cramped and if  $D/H$  is bigger than 1, the space becomes more open (fig. 24).

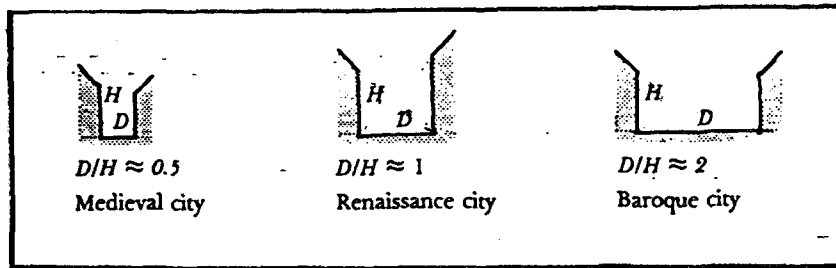


Figure 23 - D/H factor in different periods.

D/H ratio was calculated according to the sunlight in the modern movement. D/H ratio shows 1, 2 or 3 in this method, but as Ashihara (1983) said, "...Le Corbusier often employed a D/H of 5 and sometimes close to 10." (p. 46).

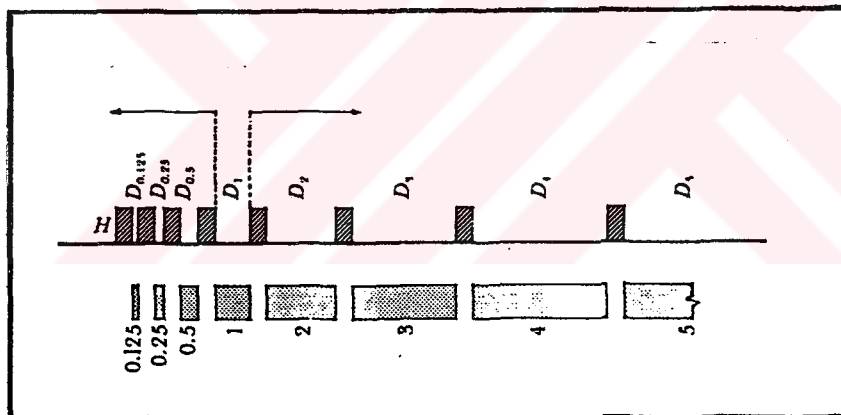


Figure 24 - D/H relationship in architecture.

Consequently we can create different meanings and atmospheres in an urban space by changing the scale of the space and by playing with the proportion of height of the buildings to depth of the plain. In figure 25, we see an urban space on three different scales by Rob Krier (1984).

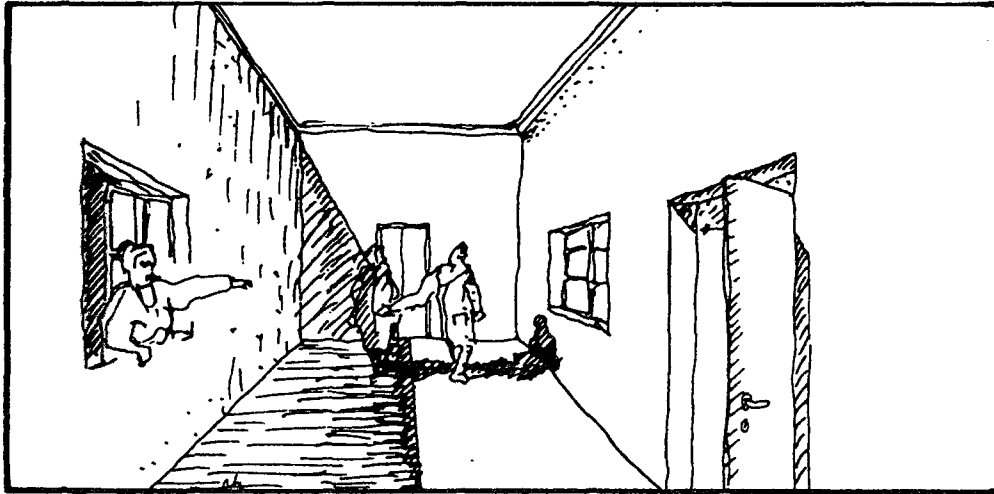


Figure 25 - Three different scales of urban space by Rob Krier

#### 4.1.3 VARIETY

Variety of space defining elements help people to identify an urban space. Existence of a variety in the urban space depends on the variety of the activities which take place in that area. For that reason, we can't find any variety in the modern city as a result of the separation of different functions to different places. This functional segregation also causes decomposition of the sensible world as Leon Krier said:

"The first imperative of zoning is to transform every part of the territory (city or countryside) in such a way that every citizen can finally only accomplish: only a single task; in a defined place; in a determined manner; at the exclusion of all other tasks." (p. 32).

This kind of segregation causes a social segregation also. Society is isolated in groups as "poor and rich", "children, adults, elderly", "men and women" etc.

In addition to this, in this segregated field, the repetition of a single type building is seen all over the area (fig. 26). This shows the denial of the public and private realms in the modern movement which causes such a monotony. This carries the meaning with the consideration of human beings as single type machines. This understanding can't be defined as a design for human beings. Because the city is built for great numbers of people of very different social, cultural, economic backgrounds and we can't reduce their different



needs and senses of taste to a single type building repeated everywhere. Also Norberg-Schulz (1975) determines this deficiency as follows:

"One class of spatial organization, however, is almost entirely lacking in Functionalist architecture: the topological orders. Topological properties are obviously closely related to meanings such as elementary enclosure, palpableness, environmental warmth, and the more general "variations on a theme". In the past these meanings were concretized in terms of urban squares and streets, bordered by continuous rows of related but varied buildings, and by intimate interior spaces. It should also be realized that the spatial aspect of many important human activities have a topological structure." (p. 386).

So, during the modern movement, many urban spaces were developed without identity (fig. 26). Whereas, identity is so important for a person to feel security.



Figure 26 - New York, public housing in lower Manhattan.



This topological structure of people may be reflected to urban spaces as a varied repetition of the same theme. The large units of today or the administratively determined certain dimensions for a district may be broken by this way. The buildings form a continuity around the space with the variation. If we add the functional variety to this scene, this facilitates the experience of several activities in a space also (fig. 27).

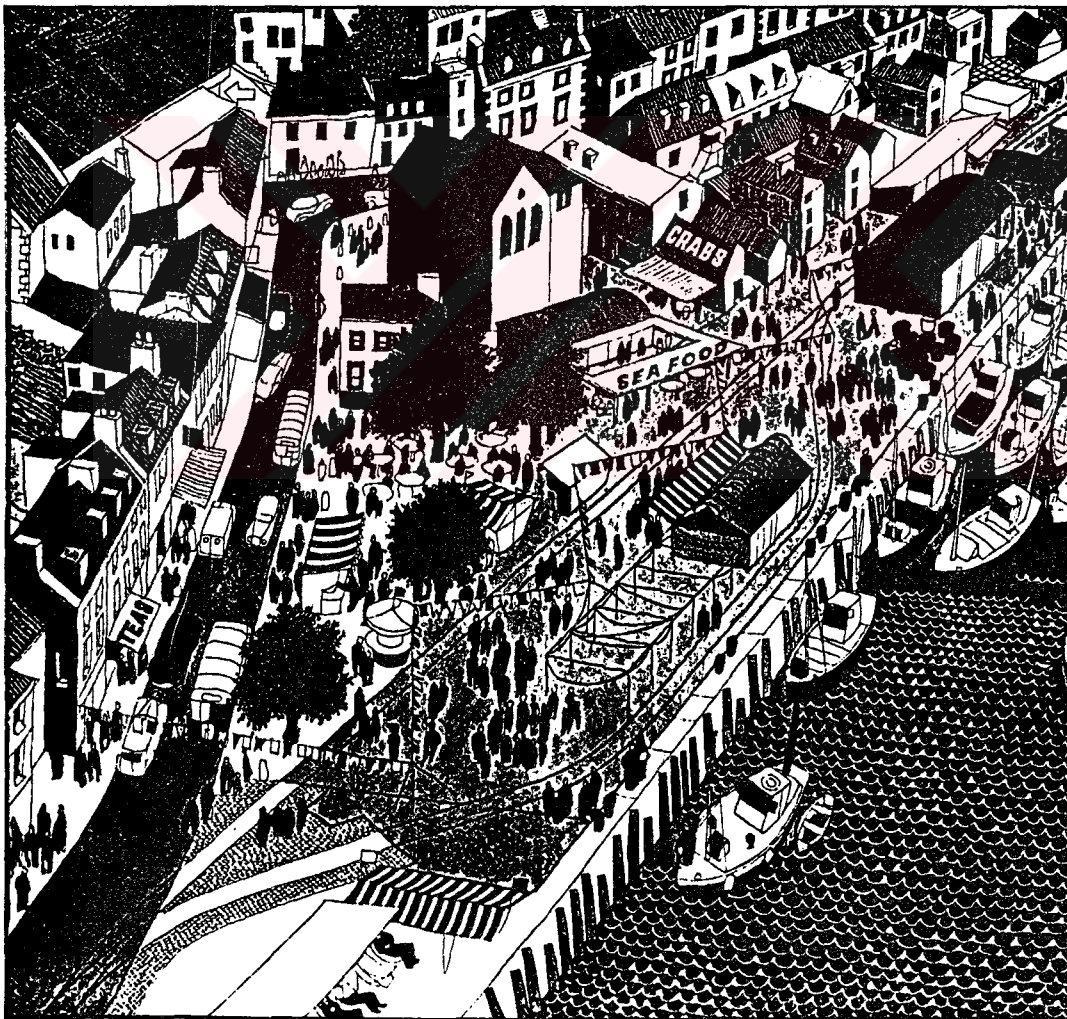


Figure 27 - Looe, a proposal by Gordon Cullen, 1961.

#### 4.1.4 GREENERY

Greenery seems an important concept in every period and in every culture. People try to give some meaning to buildings by means of greenery (fig. 28). Cullen (1971) explains this situation as follows:

"Trees and buildings have always borne a special relationship to each other because they provide the two standard and accepted ways of punctuating the landscape." (p. 168).

Beside the use of greenery for decorative purposes, it has some functions in the urban space. One of them is related with health. As we know, trees clean the air and make breathing easy in the city. Also, greenery can serve as a shelter. In every climate, it creates a good sense, but in hot climates, existence of tree is much more important and the organization of greenery is requires a care (fig. 29). Because, the urban space can live only by the shadow of a tree.

The other function of the greenery is the space definition. In some cases, an urban space is not surrounded by buildings, but by trees like being in the Versailles (fig. 30).

We can enlarge countless properties of greenery by the words of Sitte (1945):

"...freedom from dust, shelter from wind, a haven protected from all street noises, cool shade in summer." (p. 184).



Figure 28 - A building as verdant and non-verdant.

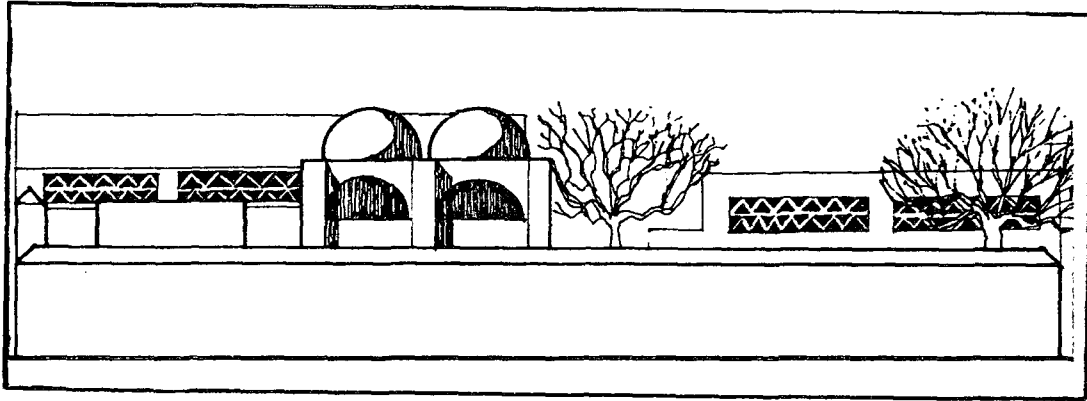


Figure 29 - Royal Society of Agriculture by Hassan Fathy, Egypt, 1941.

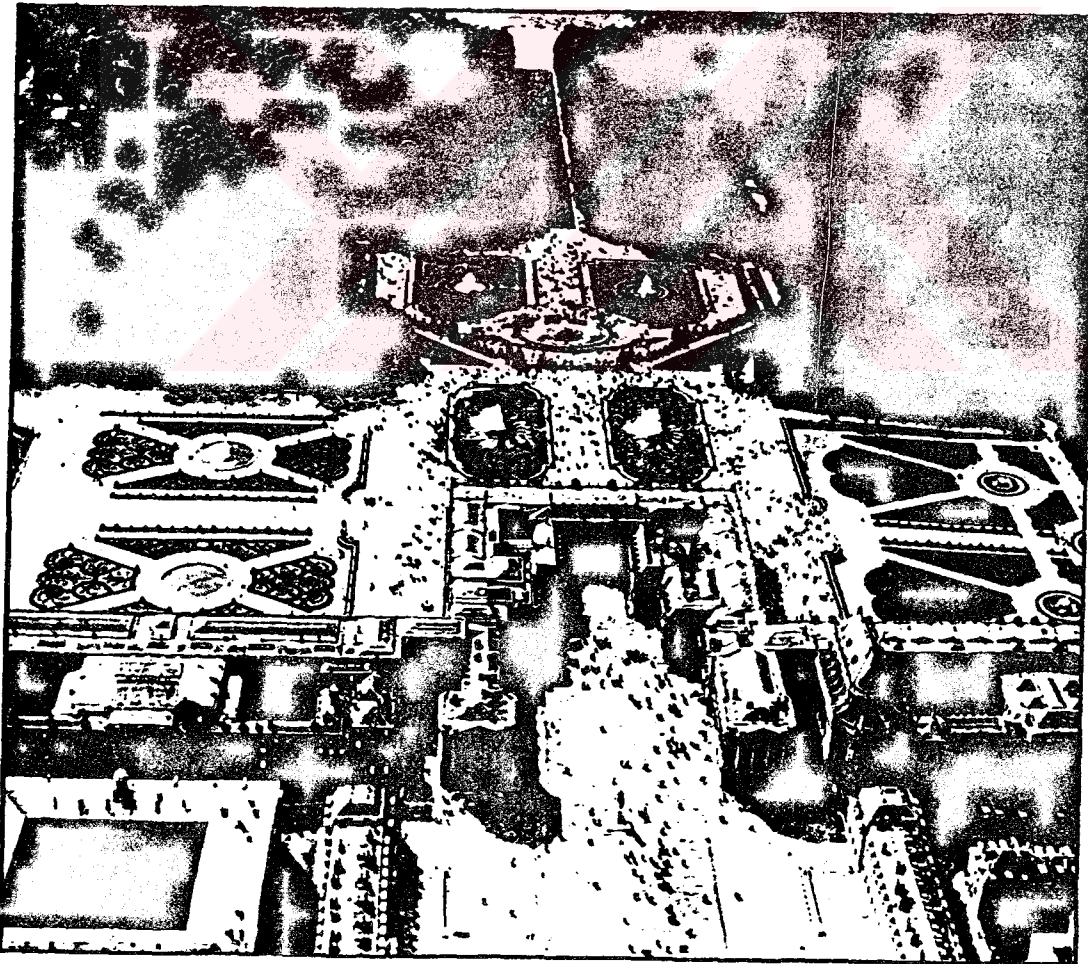


Figure 30 - Versailles.



So, greenery is very important for human life physically and psychologically. It has an essential place in urban life in every age, although it's treated differently in some periods. The most opposite treatments are seen between traditional and modern urban spaces. The oppositions may be summarized as "greenery within urban space" for traditional city and "buildings within greenery" for modern urban space (fig. 31).

In modern city, greenery seems as if it is much more important than being in traditional city, because "green city" is a dream of the movement. For that reason, individual blocks are located within wide green areas. The lack of definition and the lack of identity of these areas create lands without man. In addition to this, the physical continuity of the urban fabric is devastated to achieve this kind of greenery. So, greenery has a meaning only in well-defined, meaningful spaces. In a space which has not any activity and does not create feeling of security, the existence of greenery doesn't participate in urban life.

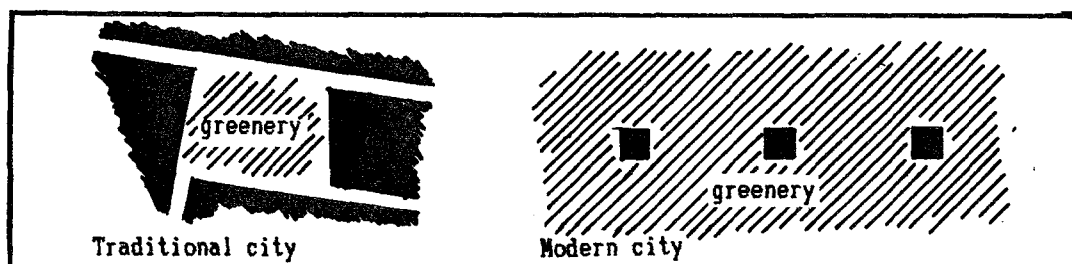


Figure 31 - Figure ground abstract plans of treatment of greenery in traditional and modern cities.

#### 4.1.5 TRANSPARENCY AND SPATIAL CONTINUITY

People like to know where they came from and where they'll go. They feel security when they see other side of the walls and the lack of orientation damages the feeling of security. That's one of the main functions of a city. Lynch (1986) explains this need of human being as follows:

"People tended to think of path destinations and origin point: they like to know where paths came from and where they led. Paths with clear and Well-known origins and destinations had stronger identities, helped tie the city together, and gave the observer a sense of his bearings whenever he crossed them. " (p. 54).

In order to achieve such a clear path destination, concept of "transparency and spatial continuity" was evaluated by functionalists as opposed to closed urban space understanding of traditional city. Then, dense and continuous urban fabric were replaced with individual blocks located with a wide range from each other, but this interference created a destructive effect on urban identity. Because, the closed periphery of urban spaces and the continuous urban fabric are very effective on feeling of orientation also.

So, the important thing is to obtain spatial continuity and transparency without destroying the continuous urban fabric and closure. Some partial openings at the ground level may be enough to see the back of the buildings

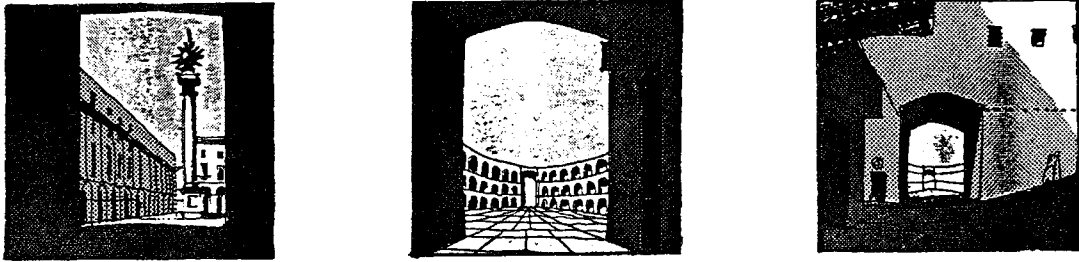


Figure 32 - Visual continuity in enclosed urban space.

(fig. 32). Cullen (1971) explains this situation as follows:

"The effect of infinity is not normally apparent in sky seen over rooftops. But if sky is suddenly seen where one might reasonably expect to walk, i.e. at ground level, then there is an effect of infinity or shock." (p. 186)

In figure 33, we can see the infinity of space by means of a small opening at the ground level.

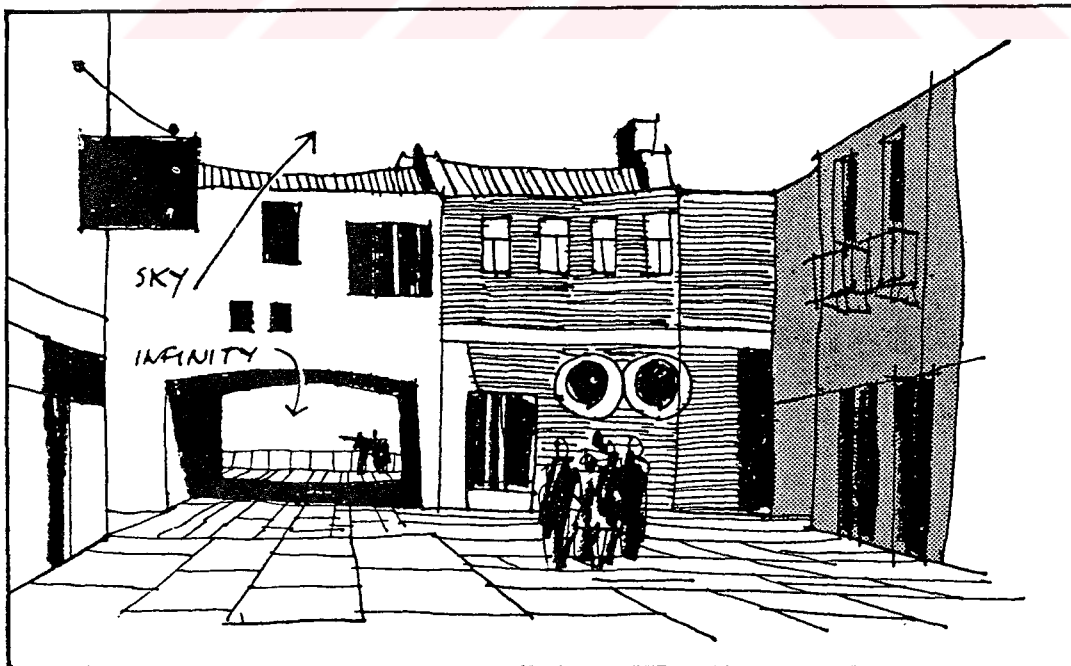


Figure 33 - Infinity of space.

#### 4.2 DEFINITION OF URBAN SPACE

Under the light of these discussions about "closure", "size", "variety", "greenery" and "transparency and spatial continuity", we may concentrate the definition of urban space on two terms. These are "closure" and "variety". Size, transparency and spatial continuity are related factors with closure. Also, we may talk about greenery within the scope of variety.

So, we may define an urban space as a space which is defined by variety of elevations geometrically in global terms. Nearbyness of the space definition elements and physical continuity of the fabric is required for an urban space. Then, the height of the enclosing elements is very important to achieve a harmonious and balanced urban space. This is essential both physically and aesthetically. In addition to this, with the openings at the ground level of an urban space, people can seize the infinity and they may determine the destination. In this case, they feel themselves secure.

As another important point, the space has to have variety of elements to have a legible urban space. Also, such a varied urban space may represent the complete human life and may communicate much more meaning with much more people.



## 5. AN EXPERIMENTAL STUDY TO INVESTIGATE THE MEANING OF CONSTANT AND UNIVERSAL VALUES OF URBAN SPACES FOR PEOPLE

### 5.1 AIM OF THE STUDY

The general aim of this study is to determine constant and universal values of urban spaces which confirm aesthetic, psychological and functional requirements of human beings in order to find a medium for urban space design variables. These values were determined as "closure", "size", "variety", "greenery" and "transparency and spatial continuity", in the previous chapter, but we also see that there are some dualities in each concept. These dualities exist in history and also in actual urban spaces. For example, "closed" urban space and "open" urban space are two main opposites for the concept of "closure". In the same way, "varying" urban space and "monotonous" urban space may be called as dualities of the concept of "variety". Also there are different depth and height ratios for urban spaces in different periods (e.g.  $D/H=1$  for Renaissance city,  $D/H=2$  for Baroque city and  $D/H>4$  for modern city) and in actual city. For the concept of "greenery", there are two opposite understandings within the urban context. The first is the existence of greenery in a closed urban space as a multifunctional

element and this understanding is called as traditional. The second is the use of greenery around individual blocks in an open city to create a green city and it's called as modern. If the second one is eliminated because of its "illegibility" and "lack of identity"

within an open city context, the existence or absence of greenery in a closed urban space comes out as dualities. Also, for the concept of "transparency and spatial continuity", creation of these values in a dense and closed urban space and having such a transparency and continuity in an open city context may be classified as two dualities. If the second condition is eliminated by relying on the same reasons proposed for "greenery" within an open city context, existence and absence of "transparency and spatial continuity" in a closed urban space may be defined as two polar oppositions.

After the determination of these concepts and their dualities in order to investigate the effect of them on the evaluation of aesthetic, psychological and functional estimations of urban spaces, a completely randomized experimental design was devised for each concept with opposite conditions. Thus, the aim of the experiment for each concept may be stated as follows:

(i) to determine the effect of "closure" on the

aesthetic, psychological and functional evaluation of urban spaces in the case of "closed" urban space and "open" urban space.

- (ii) to determine the effect of the different D/H values on the evaluation of size of urban spaces aesthetically, psychologically and functionally.
- (iii) to understand the effects of existence and absence of "variety" in an urban space on the aesthetic, psychological and functional evaluation of that space.
- (iv) to determine the effect of existence and absence of "greenery" on the aesthetic, psychological and functional evaluation of closed urban spaces.
- (v) to understand the effect of "transparency and spatial continuity" on the aesthetic, psychological and functional evaluation of closed urban spaces.

Also, we may understand empirically how polar opposites of the constant and universal urban space concepts communicate with people aesthetically, psychologically and functionally under the light of the results of this experiment.

## 5.2 METHOD

### 5.2.1 SUBJECTS

Sixty volunteer, male and female citizens (with a mean age of 32.91 years) from the city of Ankara were selected as subjects. Values of age, sex and level of education are given in Appendix A. All subjects participated in each of the conditions of the experiment.

### 5.2.2 STIMULI

In order to carry out the study, eleven eye-level perspective drawings of urban spaces were prepared by the author. The main reason for using the perspective drawing as simulation is familiarity of it to unskilled people on architecture who experience this simulation in cartoons, books and newspapers everyday. Also the reliability of this representation was tested by comparing the responses of subjects to the real-set and simulation by some studies and as Appleyard (1977) mentioned, "Sims (1974) claimed that responses to perspectives showed them to be the closest simulation among the media he tested against the real world"(p.74).

In order to understand the effects of polar oppositions of "closure", "size", "variety", "greenery" and

"transparency and spatial continuity" for the evaluation of urban space, five groups of perspective drawings were prepared to represent each concept and each group has one pair of drawings to represent the polar oppositions of that concept except the concept of "size" which has three drawings. Character of the simulated urban spaces varied to a considerable extent between the groups. However, within each group, the simulated urban space has been kept constant except one dimension. The varied dimensions for each concept are listed below:

Closure: A. closed      A'. open      (fig. 34)

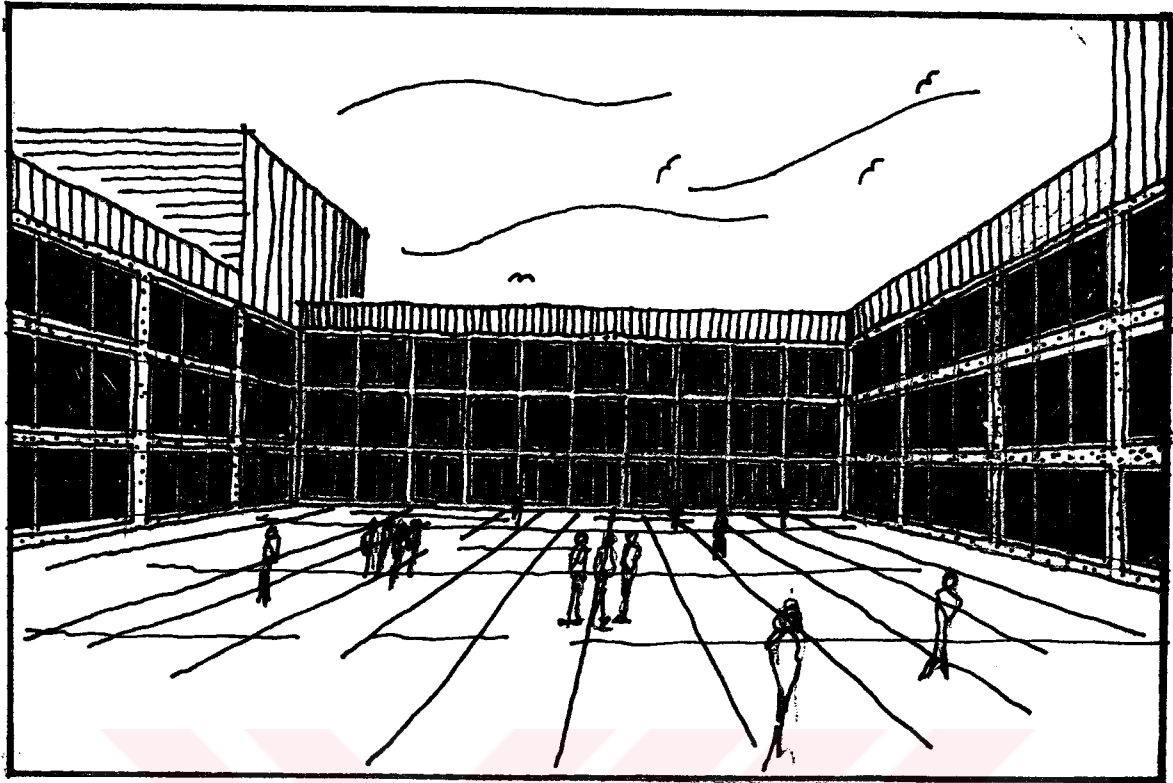
Size:      B.  $D/H=1$       B'.  $D/H=2$       B''.  $D/H=4$  (fig. 35)

Variety: C. varying      C'. monotonous      (fig. 36)

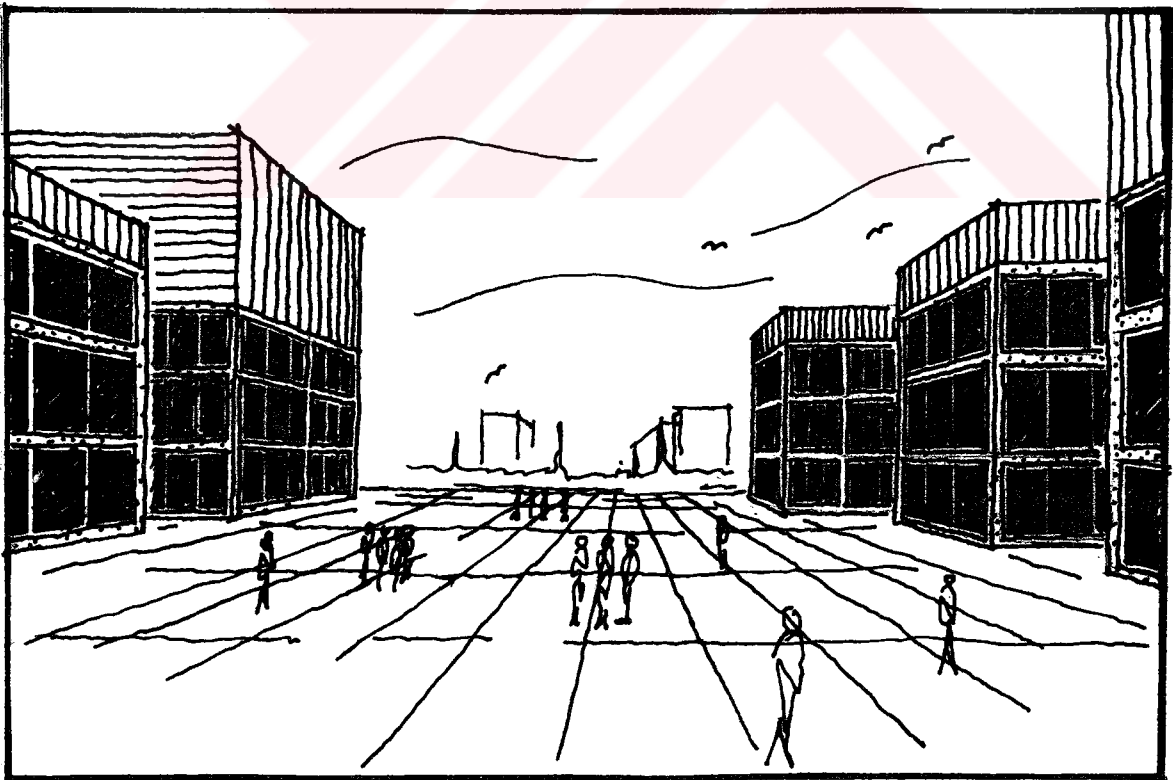
Greenery: D. verdant      D'. non-verdant      (fig. 37)

Trans. & Sp. Con.      E. open gr. floor      E'. closed ground floor      (fig. 38)

As it's seen, drawings from the same group are almost identical, differing only along one dimension. So, these simulations may be considered to work well to measure the effect of differing dimensions on people.

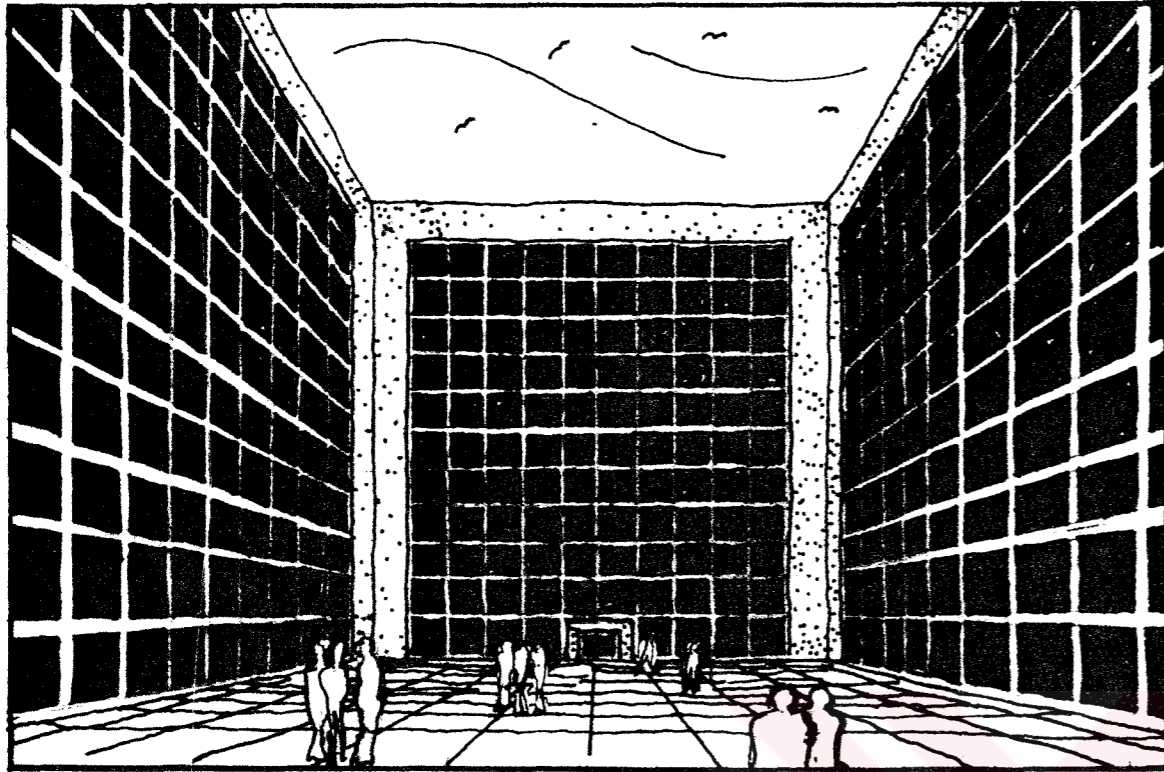


A - Closed

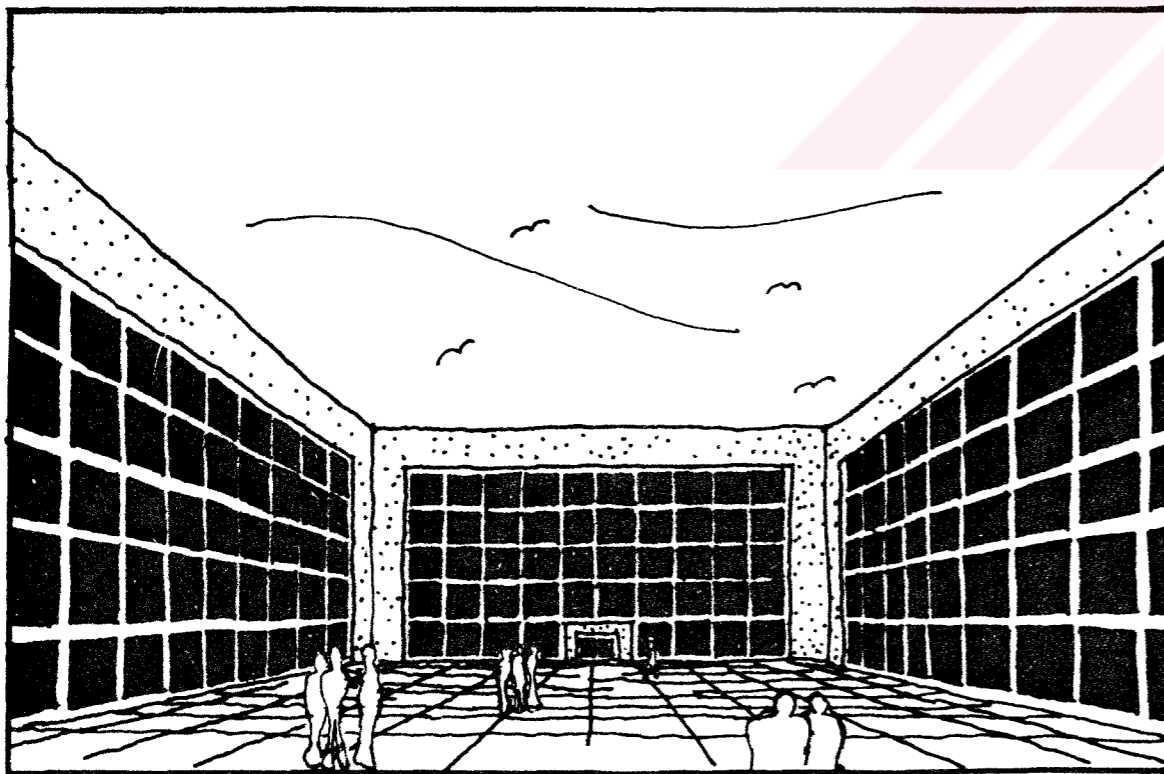


A' - Open

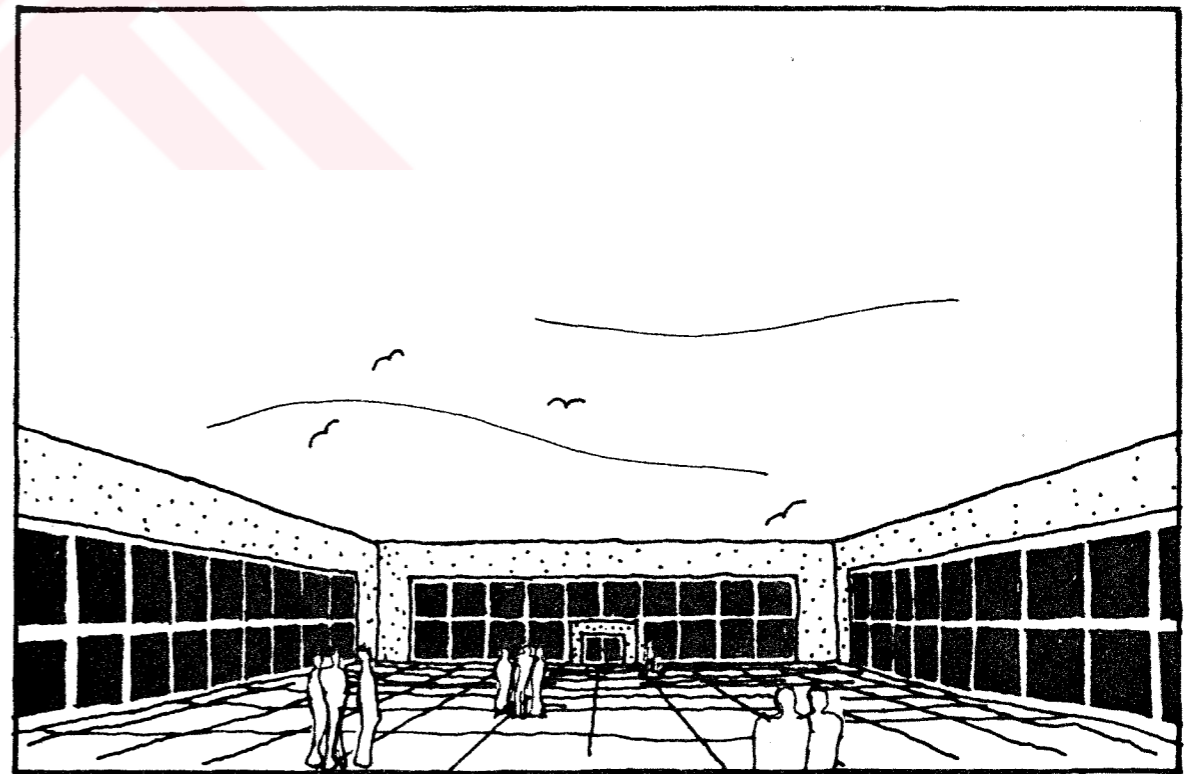
Figure 34 - Varied dimensions for "closure".



B -  $D/H=1$



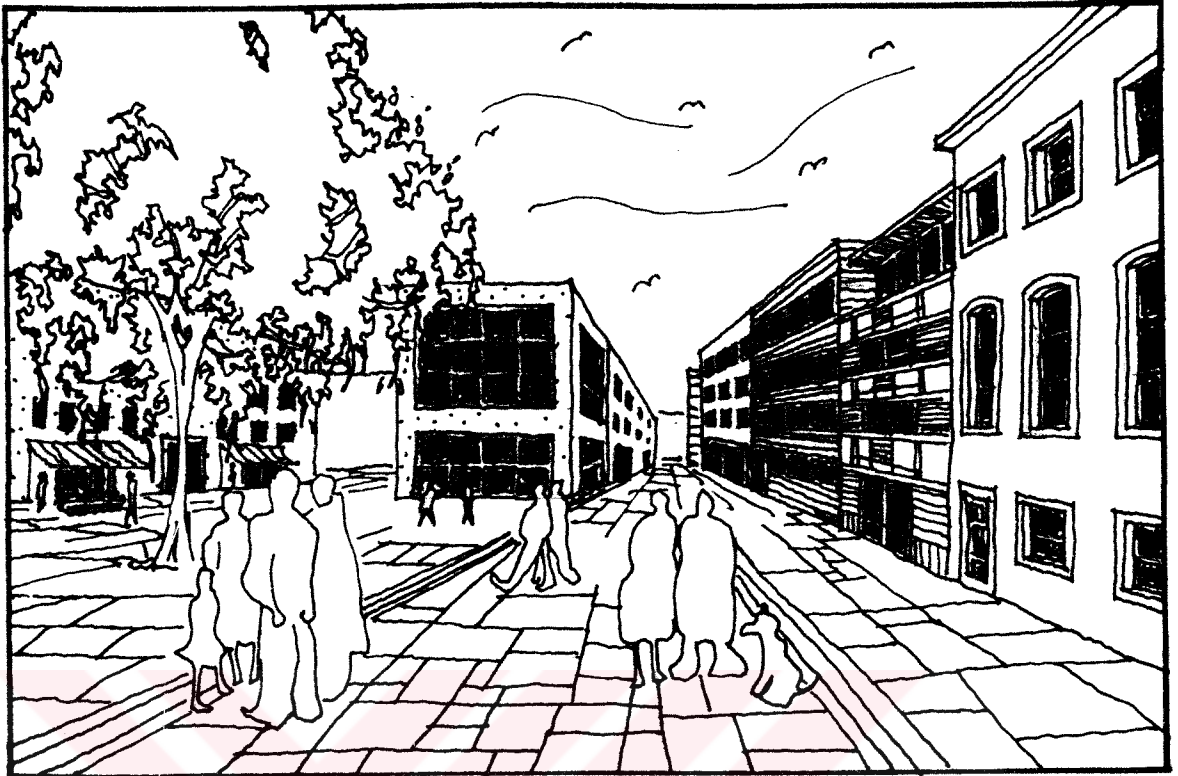
B' -  $D/H=2$



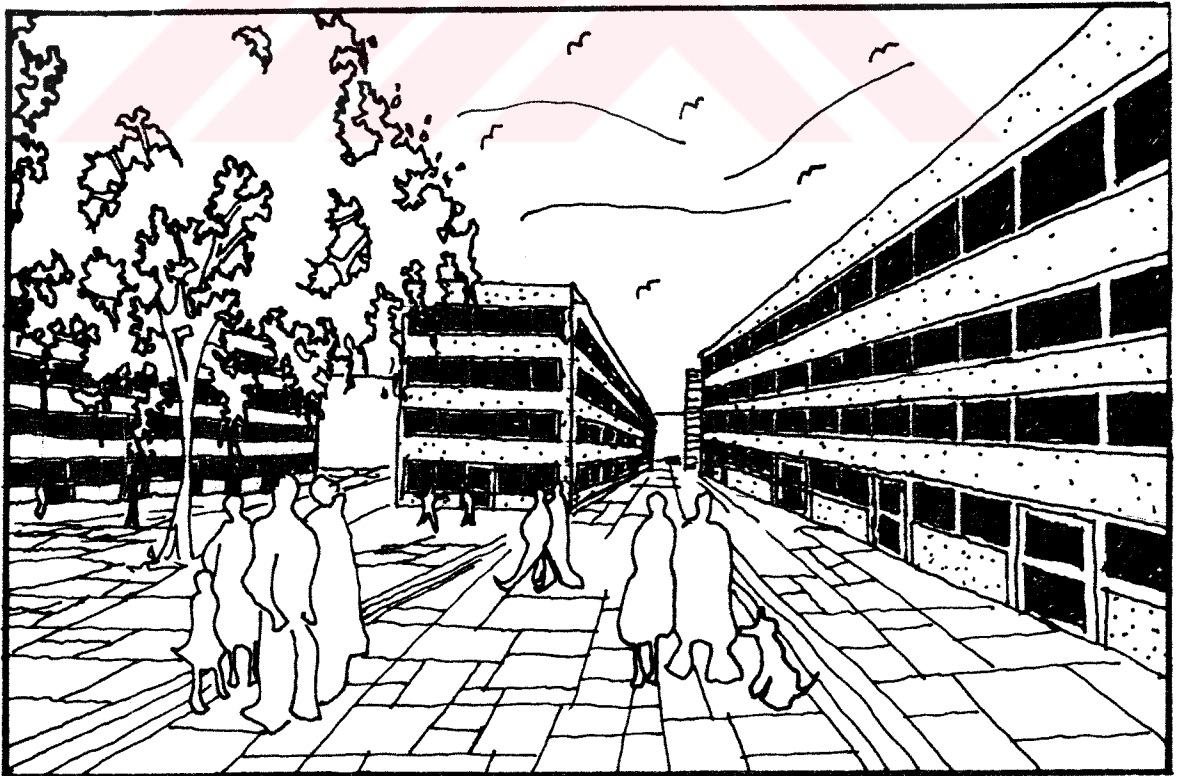
B'' -  $D/H=4$

Figure 35 - Varied dimensions for "size".





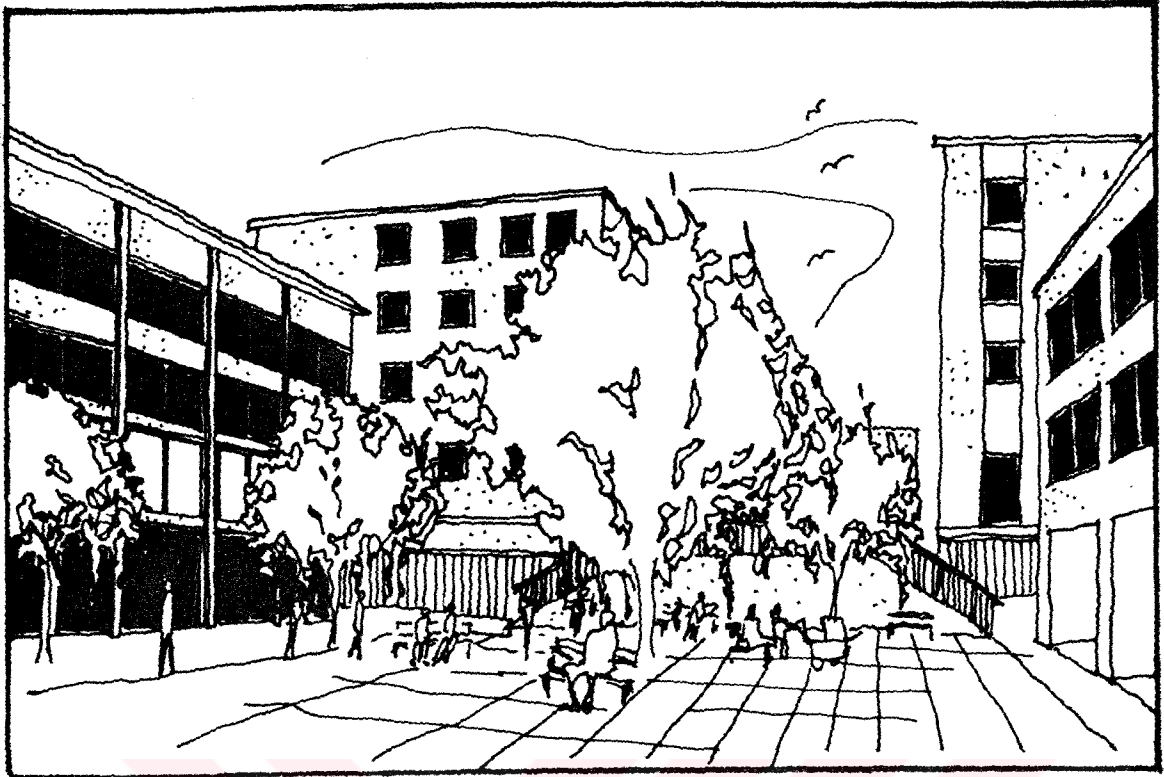
C - Varied



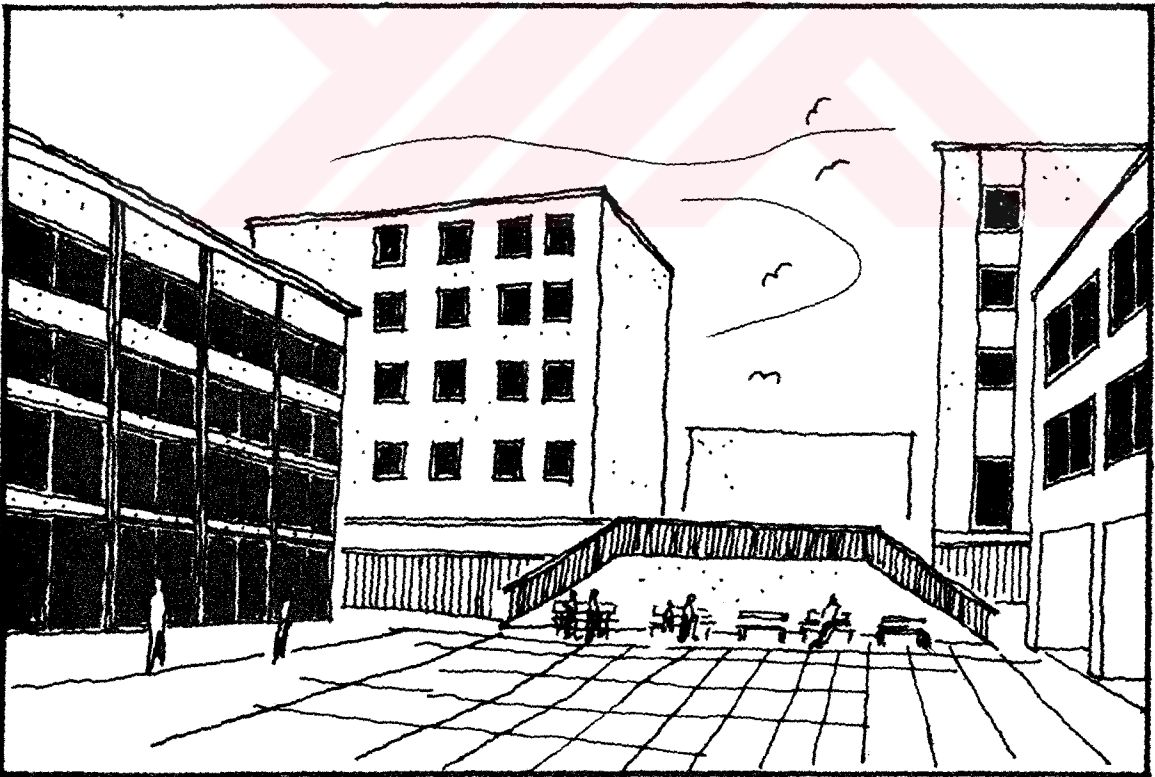
C' - Monotonous

Figure 36 - Varied dimensions for "variety".



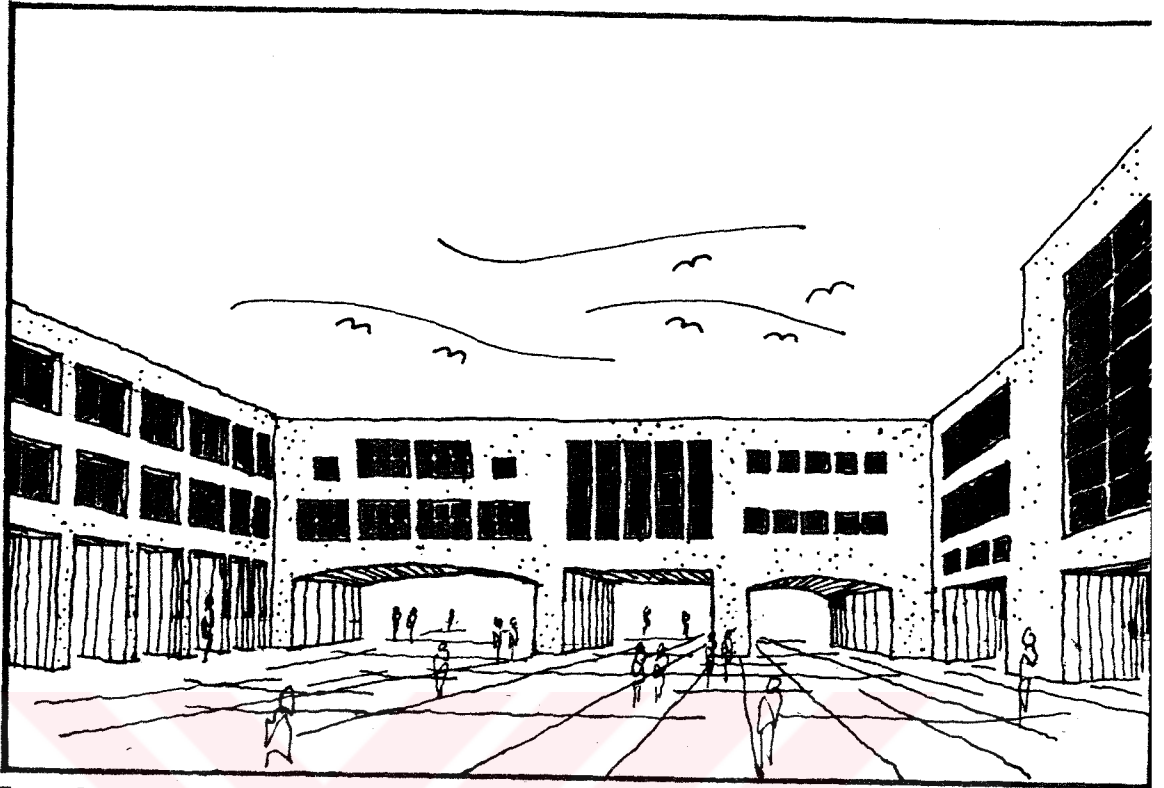


D - Verdant

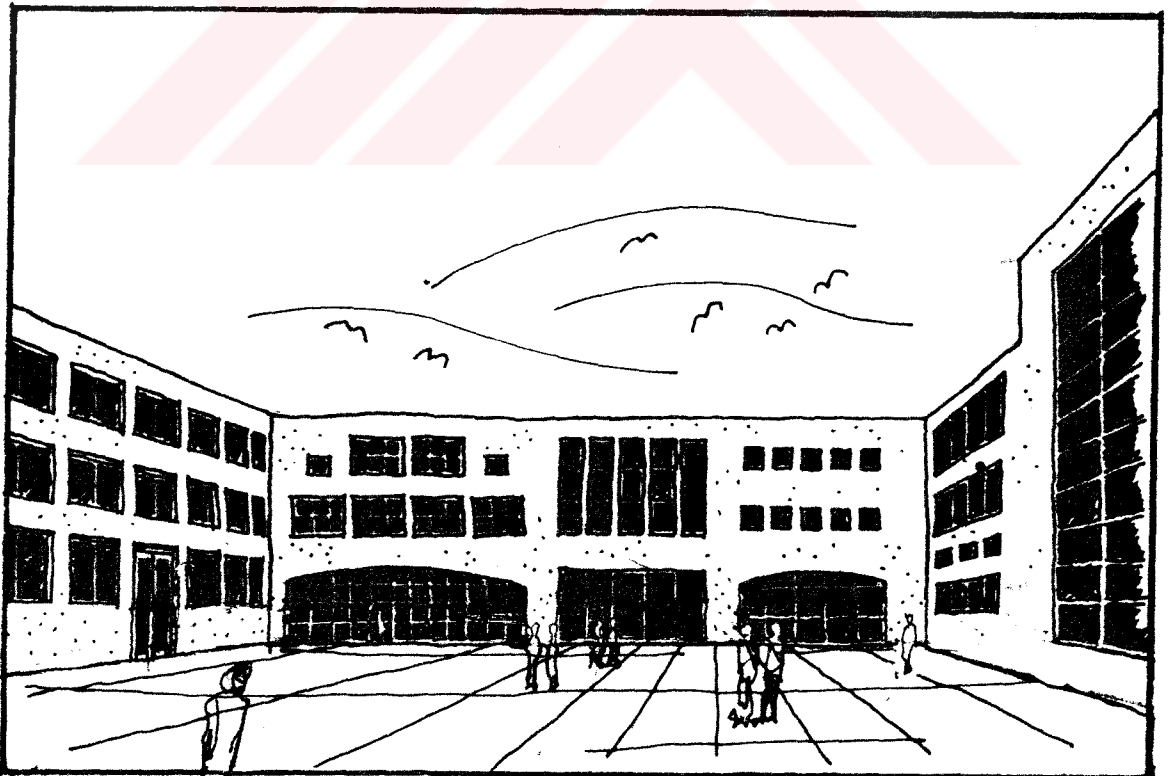


D' - Non-verdant

Figure 37 - Varied dimensions for "greenery".



E - Open ground floor



E' - Closed ground floor

Figure 38 - Varied dimensions for "transparency and spatial continuity".

### 5.2.3 PROCEDURE

The experiment was carried out with each subject individually and each subject has evaluated all the drawings which were represented with a random ordering.

As a method of rating the aesthetic, psychological and functional evaluation of the represented urban spaces, a five point semantic differential scale with ten bi-polar adjectives was employed. These adjectives reflect the factors of attractiveness for aesthetic evaluation, freedom for psychological evaluation and planning for functional evaluation (see Appendix B). In order to structure this, previous studies (Hershberger, 1980; Hesselgren, 1971; Imamoğlu, 1979) were utilized with reference of Roget's Thesaurus (1979). The adjectives were selected by considering their familiarity to unskilled people in architecture. Each pair of adjectives was translated into Turkish for the experiment (see Appendix C).

After a brief instruction to the usage of five-point scales, subjects were asked to check the appropriate degree for each adjective pair for the represented urban space.

### 5.3 RESULTS

Subjects' evaluations on the ten adjective pairs were converted into numerical scores of 1 to 5. In this order, 1 represents the undesirable one, e.g., ugly, unattractive, disturbing, dead, etc., and 5 refers to the desirable one, e.g., beautiful, attractive, restful, alive, etc. Results were represented by referring to this numerical system as first column for the most negative, the second column for the negative, the third column for the neutral, the fourth column for the positive and the fifth column for the most positive evaluations (Appendix D). Results were analyzed by mean scores and by analysis of variance.

#### 5.3.1 CLOSURE

The mean evaluation of "closed" and "open" urban spaces, are given in Table 1. Each mean represents the average value of the 60 subjects' evaluations for each adjective pair. According to this, mean of 60 subjects' aesthetic, psychological and functional evaluations for "closed" urban space are 2.97, 3.34, 3.10, respectively. The mean of aesthetic, psychological and functional evaluations of the "open" urban space are 2.58, 3.05, 2.82, respectively. Also, the overall mean score is obtained as 3.14 for "closed" urban space and 2.86 for "open"

Table 1 -Mean scores for "closed" and "open" conditions

	Adjectives	Means for "closed"	Means for "open"
A	ugly - beautiful	3.25	2.68
	unattractive - attractive	2.76	2.60
	disturbing - restful	2.85	2.48
	dead - alive	3.02	2.58
B	narrow - wide	3.68	3.56
	distressing - spacious	3.38	2.51
	limited space - free space	2.95	2.78
	closed - open	3.38	3.38
C	illorganized - wellorganized	3.15	2.80
	unharmonious - harmonious	3.05	2.85

A: Factors of attractiveness  
 B: Factors of freedom  
 C: Factors of planning

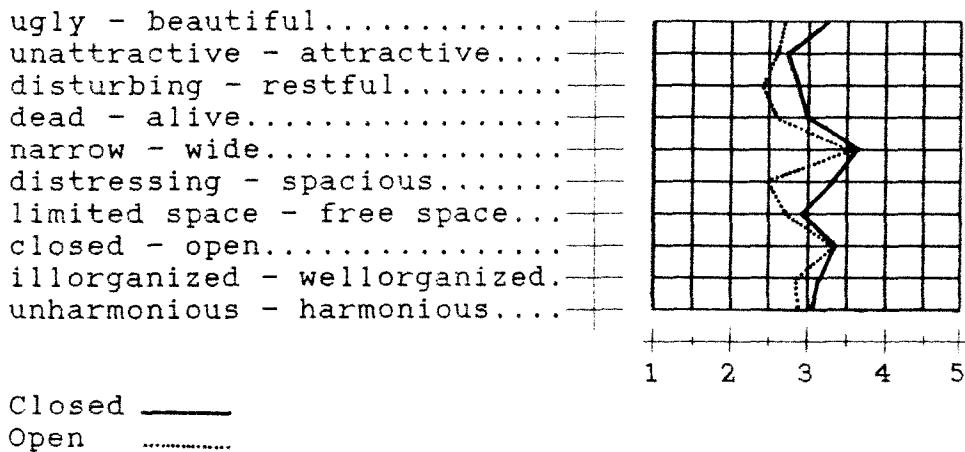


Figure 39 - Two different conditions for the same adjectives in the case of "closure".

one. So, there seems a difference between the evaluations of closed and open urban spaces and this is represented graphically for each adjective pair by mean scores in Figure 39.

Although such a difference is determined between evaluations of open and closed urban spaces, there is a need to know the significance of this difference. Because, this may be a fortuitous value for 60 subjects and such a result can't be used to make some judgements in a scientific study. For that reason, the significance of the overall difference between the means were analyzed by the analysis of variance for the factorial design as has been summarized in Table 2.

Table 2 - Summary table for analysis of variance.

SOURCE	SS	df	ms	F	p
TOTAL	81.64	119	—	—	—
Subjects	47.92	59	—	—	—
Treatments	2.29	1	2.29	4.32	< 0.05
Error	31.43	59	0.53	—	—

As it's shown in Table 2, the overall difference between evaluations of "closed" and "open" urban spaces is significant. It's concluded that, urban space evaluation is affected by its closure and people preferred closed urban space.

### 5.3.2 SIZE

The mean scores of the 60 subjects for each of the three urban space simulations which have different D/H values are shown in Table 3. Three levels of D/H evaluations are represented graphically in Figure 40. The overall mean scores for each group of adjectives for aesthetic, functional and psychological evaluations are 2.11, 2.00, 2.59, respectively, in the case of D/H=1. The respective means for D/H=2 are 2.35, 2.29, 2.82, and

Table 3 - Mean scores for different D/H values.

	Adjectives	Means for D/H=1	Means for D/H=2	Means for D/H=4
A	ugly - beautiful	1.91	2.30	2.03
	unattractive - attractive	2.26	2.48	2.10
	disturbing - restful	2.36	2.45	2.28
	dead - alive	1.91	2.18	2.03
B	narrow - wide	2.61	2.32	2.10
	distressing - spacious	1.88	2.25	2.13
	limited space - free space	1.81	2.06	2.08
	closed - open	1.70	2.55	2.25
C	illorganized - wellorganized	2.48	2.51	2.06
	unharmonious - harmonious	2.70	2.61	2.43

A: Factors of attractiveness  
 B: Factors of freedom  
 C: Factors of planning

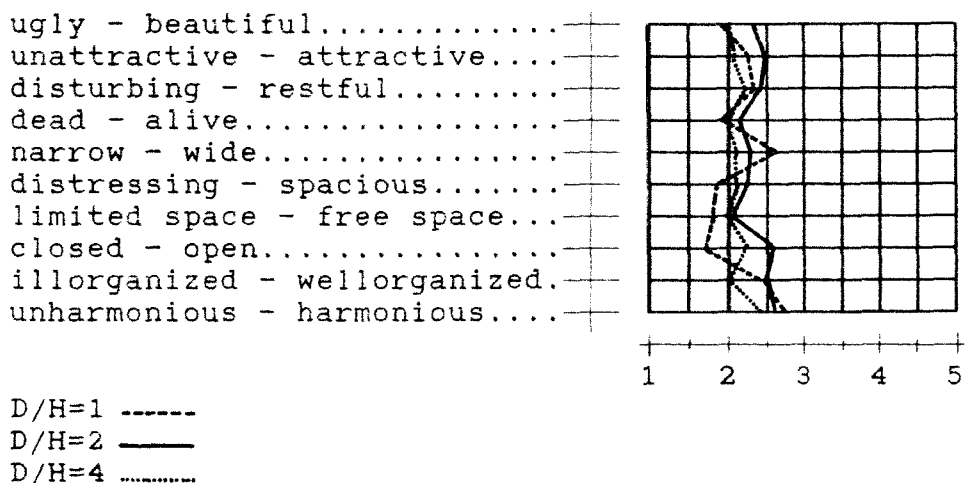


Figure 40 - Three different conditions for the same adjectives in the case of "size".

those of D/H=4 are 2.11, 2.14, 2.24, respectively. In addition to these, the overall mean score is obtained as 2.23 for D/H=1, 2.42 for D/H=2 and 2.18 for D/H=4. In order to determine the significance of these differences, the evaluations for the three different D/H values were analyzed by the analyses of variance for factorial design, the results of which have been summarized in Table 4. As it's seen in Table 4, the overall treatment effect has been found to be significant. In order to see the differences between each condition t-test were utilized. The test applied to the difference between D/H=1 and D/H=2 conditions was significant at 0.05 level ( $t=1.532$ ,  $df=59$ ). The difference between D/H=2 and D/H=4 was also significant ( $t=2.18$ ,  $df=59$ ,  $p<0.05$ ). The difference between D/H=1 and D/H=4, on the other hand was not significant ( $t=0.4$ ).



Table 4 - Summary table for analysis of variance.

SOURCE	SS	df	ms	F	p
TOTAL	123.73	179	—	—	—
Subjects	74.11	59	—	—	—
Treatments	1.85	2	0.925	2.289	< 0.20
Error	47.77	118	0.404	—	—

These results show that, urban space evaluation is affected by its D/H ratio and people preferred a "D/H=2" value for urban spaces.

### 5.3.3 VARIETY

In order to understand the space evaluations of subjects for "varying" and "monotonous" urban spaces subjects' responses on the five point semantic scale were converted into numerical scores of 1 to 5, respectively, for ten adjective pairs. The mean scores of the 60 subjects in different conditions of the same urban space are shown in Table 5. The relation of conditions for the same adjective pair are represented graphically by mean scores in Figure 41. As it's seen from this graphical representation, the mean scores of "varying" urban space appear at the positive side of the numerical scores and the mean scores of "monotonous" urban space exist at the negative side of the scores.

The mean evaluations of 60 subjects for aesthetic, psychological and functional evaluations for "varying"

Table 5 - Mean scores for "varying" and "monotonous" conditions

	Adjectives	Means for "vary."	Means for "monoto."
A	ugly - beautiful	4.05	3.48
	unattractive - attractive	3.26	2.98
	disturbing - restful	3.43	2.98
	dead - alive	3.53	3.15
B	narrow - wide	3.52	3.33
	distressing - spacious	3.78	3.36
	limited space - free space	3.50	3.06
	closed - open	3.62	3.30
C	illorganized - wellorganized	3.43	3.25
	unharmonious - harmonious	3.30	3.35

A: Factors of attractiveness  
 B: Factors of freedom  
 C: Factors of planning

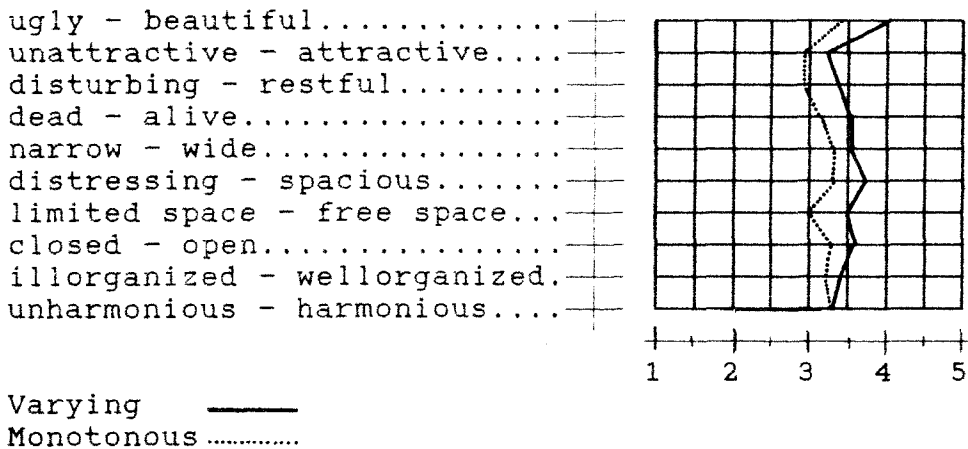


Figure 41 - Two different conditions for the same adjectives.

urban space are 3.56, 3.60, 3.36, respectively, and those for the "monotonous" urban space are 3.14, 3.26, 3.30, respectively. The overall mean score for varying urban space is 3.55 and 3.24 for monotonous urban space.

The differences between the evaluations for varying and monotonous urban spaces were analyzed by the analyses of variance for factorial design, the results of which have been summarized in Table 6. As it's seen in Table 6, the overall treatment effect has been found to be significant ( $p < 0.05$ ). These results indicate that, urban space evaluation is affected by variety and people prefer varying urban spaces.

Table 6 -Summary table for analysis of variance.

SOURCE	SS	df	ms	F	p
TOTAL	85.11	119	---	---	---
Subjects	45.05	59	---	---	---
Treatments	2.94	1	4.67	4.67	< 0.05
Error	37.12	59	0.63	---	---

#### 5.3.4 GREENERY

The mean scores of the 60 subjects in "verdant" and "non-verdant" urban space conditions of the same urban space are shown in Table 7. The mean evaluations of two conditions are represented graphically by mean scores in Figure 42. As it's seen from this graphical

Table 7 - Mean scores for "verdant" and "non-verdant" conditions.

	Adjectives	Means for "verdant"	Means for "non-ver"
A	ugly - beautiful	3.62	2.38
	unattractive - attractive	3.32	2.20
	disturbing - restful	3.15	2.43
	dead - alive	3.60	2.36
B	narrow - wide	3.30	2.72
	distressing - spacious	3.65	2.43
	limited space - free space	3.35	2.52
	closed - open	3.43	2.70
C	illorganized - wellorganized	3.40	2.21
	unharmonious - harmonious	3.33	2.50

A: Factors of attractiveness  
 B: Factors of freedom  
 C: Factors of planning

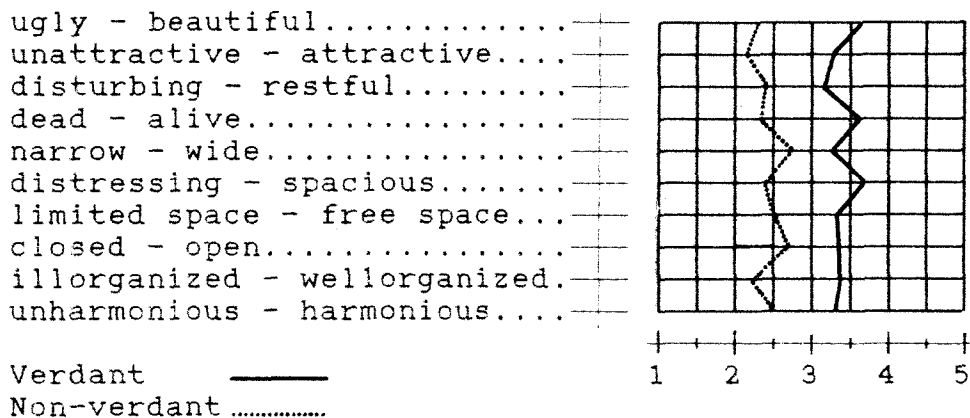


Figure 42 - Two different conditions for the same adjectives.

representation, the mean scores of "verdant" urban space are at the positive side of the numerical scores and that of the "non-verdant" at the negative side of the numerical scores.

According to these results, the mean scores for the aesthetic, psychological and functional evaluations of 60 subjects for the "verdant" urban space are 3.42, 3.43, 3.36, respectively, and those of the "non-verdant" urban space are 2.34, 2.59, 2.35, respectively. The overall mean score is 3.41 for verdant urban space and 2.48 for the non-verdant one.

The differences between the evaluations of verdant and non-verdant urban spaces were analyzed by the analyses of variance and the results have been summarized in Table 8. As it's seen from Table 8, the overall treatment effect has been found to be highly significant ( $p < 0.001$ ). These results show that, urban space evaluation is affected by the "greenery" and people prefer verdant urban spaces.

Table 8 - Summary table for analysis of variance.

SOURCE	SS	df	ms	F	p
TOTAL	107.44	119	—	—	—
Subjects	46.35	59	—	—	—
Treatments	10.80	1	10.80	12.70	< 0.001
Error	50.29	59	0.85	—	—

### 5.3.5 TRANSPARENCY AND SPATIAL CONTINUITY

The mean scores of the 60 subjects in "open ground floor" and "closed ground floor" conditions of the same urban space are shown in Table 9. The relation of conditions for the same adjective pair are also represented graphically by mean scores in Figure 43. As it's seen from this graphical representation, the mean scores of "open ground floor" condition are obtained at the positive side of the numerical scores and the mean

Table 9 - Mean scores for "open ground floor" and "closed ground floor".

	Adjectives	Means for "o.g.f."	Means for "c.g.f."
A	ugly - beautiful	2.93	1.90
	unattractive - attractive	2.88	2.02
	disturbing - restful	2.72	2.15
	dead - alive	2.88	1.95
B	narrow - wide	3.05	2.23
	distressing - spacious	3.28	1.75
	limited space - free space	2.80	2.05
	closed - open	3.05	2.28
C	illorganized - wellorganized	2.60	2.03
	unharmonious - harmonious	2.83	2.16

A: Factors of attractiveness  
 B: Factors of freedom  
 C: Factors of planning

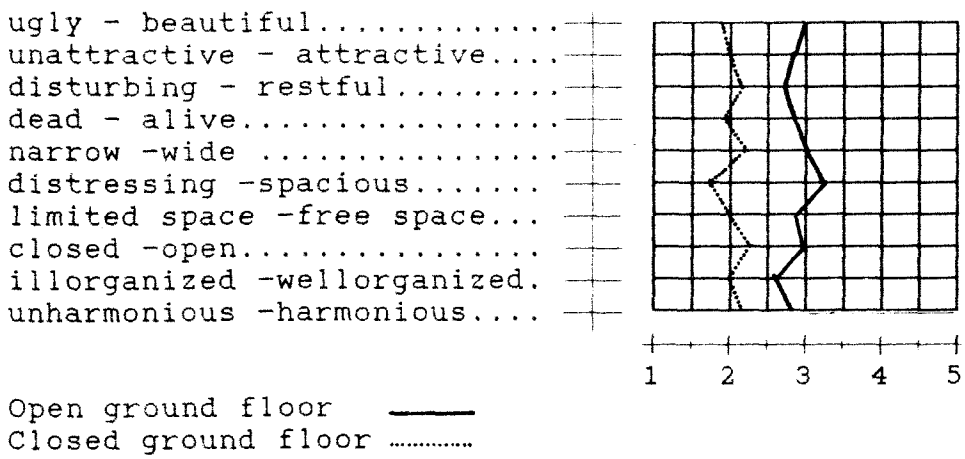


Figure 43 - Two different conditions for the same adjectives.

scores of "closed ground floor" condition at the negative side of the scores. According to these results, the mean scores for the aesthetic, psychological and functional evaluations of urban space which has "open ground floor" are 2.85, 3.04, 2.71, respectively, and those of the urban space which has "closed ground floor" are 2.00, 2.07, 2.09, respectively. Also the overall mean score is 2.98 for the urban space which has open ground floor and 2.13 for the urban space which has closed ground floor.

The differences between evaluations for the two conditions were analyzed by the analyses of variance and the results have been summarized in Table 10. As it's seen from Table 10, the overall treatment effect has been found to be highly significant ( $p < 0.001$ ). These results show that, people prefer open ground floors to closed ones in urban spaces.

Table 10 - Summary table for analysis of variance.

SOURCE	SS	df	ms	F	p
TOTAL	182.92	119	---	---	---
Subjects	62.60	59	---	---	---
Treatments	21.94	1	21.94	13.16	< 0.001
Error	98.36	59	1.66	---	---

#### 5.4 DISCUSSION

The results of the experiment indicated that;

- (i) Closed urban space with definite boundaries was evaluated more positively than open urban space.
- (ii) People preferred D/H=2 as a ratio in urban spaces, whereas urban spaces with D/H=1 and D/H=4 ratios were assessed to be negative.
- (iii) Varied urban space was assessed as the desirable one and monotonous urban space as the undesirable.
- (iv) Verdant urban space was evaluated with a high positivity than non-verdant urban space.
- (v) People preferred open ground floor in closed urban space while they disliked the closed ground floor in closed urban spaces.

For the sake of clarity, the results of "closure", "size", "variety", "greenery" and "transparency and spatial continuity" will be discussed separately followed by a general conclusion.



#### 5.4.1 CLOSURE

The results have suggested that the closed urban spaces are preferred to open ones. There is a significant difference between these dualities. The biggest difference between mean values was recorded for "distressing-spacious" adjectives with a difference of 0.87 between mean scores (Table 1). This suggests that people feel themselves psychologically more comfortable and more free in closed urban spaces, although they are bounded with facades. This may be a result of the feeling of psychic security as Norberg-Schulz (1971) mentioned "The essential architectural property is a clearly defined boundary, which secures physical as well as psychic protection." (p. 44).

In addition to this, closed and open urban spaces have the highest difference between aesthetic evaluations of them with 0.39 mean score difference. This shows that the closed urban spaces are more attractive for people and aesthetic evaluation of closed urban spaces are more positive than open ones. This may be explained by the thesis of Gestalt psychology. According to this, surrounded spaces with definite boundaries attract more attention and people perceive nearby elements more clearly. So, the aesthetic evaluation of closed urban spaces takes more positive ratings than open ones.

Also, the results have suggested that people evaluate closed urban spaces more positively in terms of functionality. The well defined boundaries of the closed urban space must have reflected a better planned urban space for people.

#### 5.4.2 SIZE

The results suggest that the relationship between urban spaces which have  $D/H=1$ ,  $D/H=2$ ,  $D/H=4$  and their aesthetic, psychological and functional evaluations to be of an inverted U-shape. Because, both an urban space with  $D/H=1$  and with  $D/H=4$  ratios are evaluated as being more negative than the one with a  $D/H=2$  ratio.

This shows that  $D/H=2$  has the optimal level for the ratio of plane depth to the closure height and when this ratio is increased or decreased, space is evaluated negatively.

#### 5.4.3 VARIETY

The results indicated that the varied environments by its appearance and surrounding activities are preferred. The most significant difference between varying and monotonous urban space evaluations was recorded for the

aesthetic evaluation of spaces. This finding has suggested that existence of variety in an urban space affects the aesthetic evaluation of people in a positive direction. On the contrary, people evaluate a monotonous urban space as ugly, unattractive, disturbing and dead.

The difference between varied and monotonous urban space evaluations are also significant for the psychological evaluations of spaces. This may be a result of the legibility of space in varied urban space. For, existence of variety in an urban space helps people to identify that place and people feel themselves secure.

#### **5.4.4 GREENERY**

The results have strongly supported that the existence of greenery in an urban space is very essential for people and people prefer verdant urban spaces. The most significant difference between verdant and non-verdant urban spaces was obtained for the aesthetic evaluation. It suggested that the greenery is evaluated as enhancing an aesthetic value to urban spaces.

Also the results indicated that verdant urban space was evaluated as well-organized and harmonious whereas

the non-verdant one as ill-organized and unharmonious. So, greenery is appreciated as a functionally necessary element.

In addition to these, the significant difference between verdant and non-verdant urban spaces for the psychological evaluation indicated that people find themselves more free, more comfortable and secure in verdant urban spaces. So, people prefer verdant urban spaces. This reminds us that the human being is also a part of the nature.

#### 5.4.5 TRANSPARENCY AND SPATIAL CONTINUITY

The results in general indicated that the transparency and spatial continuity of an urban space affects its aesthetic, psychological and functional evaluation significantly. The results of the aesthetic evaluation showed that there is a significant difference between an urban space which has an open ground floor and an urban space which has closed ground floor. So, openings at the ground floor of an enclosed urban space lead to more positive aesthetic evaluation of that space.

The results of the psychological evaluation indicated that the openness of the ground floor affects the space evaluation of people psychologically. Because, when

people feel the continuity of a space and when they estimate path destination and orient themselves, they feel more secure and they find that space freer. On the contrary, an urban space which has no openings at the ground level may cause a feeling of imprisonment with the lack of transparency and spatial continuity.

The comparison of these findings with those related to "closed" and "open" urban spaces, may seem contradictory, but they are not. People prefer a closed urban space to an open one because of its well defined boundaries which attract people with clear perceptibility, secures physical and psychic protection and offers a well planned character. On the other hand, as it's seen from the results taken from the comparison of "closed ground floor" and "open ground floor", people prefer open ground floor. This means that, both enclosed urban space and transparency and spatial continuity in urban space is a requirement for people aesthetically, psychologically and functionally. So, we have to provide both of the conditions. This may be possible by opening the ground floor of enclosed urban space, because, enclosure defines the third dimension and opening at the ground floor does not damage its effect.

#### 5.4.6 GENERAL CONCLUSION

In conclusion, when we consider the aesthetic, psychological and functional requirements of people, it's seen that, people prefer enclosed urban spaces to open ones, but they like to see some openings at the ground level of this enclosure. Also people prefer an enclosure height as half of the plane depth of the space. In addition to these, variety of structures and variety of functions in an urban space with the existence of greenery creates a pleasant urban atmosphere for people.

In this study, perspective drawings of different urban spaces and their definition as "closed", "open", "varying", "monotonous", etc. are some architectural classifications. Also, the classification of dualities of these concepts as positive or negative are the evaluations of architects. For example, "varying" urban space creates a positivity in architecture according to architects but "monotonous" urban space does not. In this experiment, user's thoughts about these classifications were tested also and the results indicated that, the conditions defined as negative by architects were evaluated in the same way by users. This shows that at the base level, of urban space design, architects and users think in the same way.

**V. C.**

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T.C. MİLLÎ EĞİTİM BAKANLIĞI

It's important to emphasize that, all of these results were taken in a specific setting, with specific and limited urban space simulations and with a limited group of subjects. Although the examined urban space concepts are accepted as constant and universal by relying on the nonverbal communication theory of Rapoport, they can't be thought as independent from impact of culture. Also, the perspective drawings used as simulation in experiment have culture specific effects on people. So, all of these findings are very global and basic for an urban space, but they must be discussed and evaluated in each specific setting differently. During the design process of urban spaces, these concepts may guide the study at the very beginning.

## 6. CONCLUSION

Architecture may be summarized as the expression of lived reality, because people built their environment under the guide of their life, according to their requirements and customs. On the other hand, the built environment affects their way of life aesthetically, psychologically, functionally, sociologically etc. An urban space which properly reflects the lived reality and sufficiently answer the needs of people affects the life of people in a positive way, but if the built environment can't reflect the true messages about life or it can't provide the actual needs of people, this affects life in a negative way. This may be summarized as the nonverbal communication of people and environment. The environment reflects some cues about the lived reality in that space, people observe these cues and evaluate them. If the built environment expresses wrong cues about the actual life, or it doesn't reflect cues sufficiently, this causes a lack of communication in that environment. In this study, nonverbal communication in urban spaces and some specific cues were analyzed to find out which are necessary to provide a proper base for a communicative urban space.



In the first chapter, constant and universal urban space concepts were discussed to achieve and define a communicative urban space.

In the second chapter of the study, communicative urban space elements were classified in a theoretical framework to find the constant and universal ones. This was a general outline to find primary concepts of the discussion, but a long list of possible constant and universal elements of urban spaces was obtained as size, height, shape, enclosing elements, paving, barriers and links, colour, orientation, location, materials, decoration, light quality, greenery, maintenance level, order, density, topography, sound, smell, etc.

In order to determine more specific concepts which may include some others also, the historical development of urban spaces was analyzed in the third chapter and basic concepts of the study which will be discussed later are determined as "closure", "size", "variety", "greenery" and "transparency and spatial continuity". These concepts have either constancy or universality, but there are also some dualities in them. So, these dualities were discussed in the fourth chapter to find a medium for these basic communicative variables of urban spaces. Then, these dualities were examined with a case study in the fifth chapter. As a result of this case

study, closed urban space for the concept of "closure",  $D/H=2$  as the proper ratio for the urban space "size", varied urban space for the concept of "variety", verdant urban space for the concept of "greenery" and open ground floor for the concept of "transparency and spatial continuity" were determined as the preferred values. These seem constant and universal values for urban spaces, but the properties of urban spaces can't be limited by these only. In addition to these, there are fixed and semifixed characteristics of urban spaces which reflect the national, regional, climatic, etc. differences and these characteristics are also very essential for nonverbal communication of urban spaces. If constant and universal values are appreciated as the only determinants for a well designed urban space, the same mistakes done by the functionalist architects may be repeated. Because such generalizations ignore the cultural impacts on urban life. In this study, closure, size, variety, greenery, transparency and spatial continuity were accepted as constant and universal values by relying on the nonverbal communication theory of Rapoport which was modified from Ekman's nonverbal communication model developed for nonfixed-feature elements. But it's known that, there is not any study at present time to generalize these values as universal and constant.

So, there is a need to study this subject further. If these values are examined in different cultural settings and the differences which have cultural origins were determined, constant and universal values may be defined more clearly. If some universal and constant urban concepts are determined this way, these concepts should be discussed and evaluated in each specific setting individually. Because, there are too many cultures and subcultures which may influence these concepts in different ways and it's very hard to reach all of these cultures and measure their impacts on these concepts. So, the urban concepts determined as constant and universal may only be a base for the urban space design process, but not the whole.

Under the light of these findings, we understand the importance of tradition as a perception of its presence. If every creation of the human being is based on a reason, it has to be considered and used but not repeated. As T. S. Eliot (1919) said;

"the past should be altered by the present as much as the present is directed by the past. And the poet who is aware of this will be aware of great difficulties and responsibilities." (p. 2).

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**APPENDICES**

APPENDIX A - Population Properties

FEMALE

LEVEL OF EDUC. AGE	GRAD. FR. PRIMARY SCHOOL	GRAD. FR. HIGH SCHOOL	GRAD. FR. UNIVER.	TOTAL
15 - 24	1	3	6	10
25 - 34	1	3	3	7
35 - 44	—	3	3	6
45 - 54	2	—	1	3
55 +	1	—	1	2
TOTAL	5	9	14	28

MALE

LEVEL OF EDUC. AGE	GRAD. FR. PRIMARY SCHOOL	GRAD. FR. HIGH SCHOOL	GRAD. FR. UNIVER.	TOTAL
15 - 24	2	10	1	13
25 - 34	1	3	4	8
35 - 44	2	1	1	4
45 - 54	2	1	1	4
55 +	1	—	2	3
TOTAL	8	15	9	32

APPENDIX B - Bi-polar Adjectives (This table was given  
in the order of experimented one)

Ugly	:	_	:	_	:	_	:	_	:	Beautiful
Narrow	:	_	:	_	:	_	:	_	:	Wide
Attractive	:	_	:	_	:	_	:	_	:	Unattractive
Distressing	:	_	:	_	:	_	:	_	:	Spacious
Restful	:	_	:	_	:	_	:	_	:	Disturbing
Limited Space	:	_	:	_	:	_	:	_	:	Free Space
Illorganized	:	_	:	_	:	_	:	_	:	Wellorganized
Open	:	_	:	_	:	_	:	_	:	Closed
Harmonious	:	_	:	_	:	_	:	_	:	Unharmonious
Dead	:	_	:	_	:	_	:	_	:	Alive

APPENDIX C - EXPERIMENTED BI-POLAR TURKISH ADJECTIVES  
(This table was given in the form of  
experimented one)

Çirkin	:	_	:	_	:	_	:	_	:	Güzel
Dar	:	_	:	_	:	_	:	_	:	Geniş
Çekici	:	_	:	_	:	_	:	_	:	Çekici Değil
Sıkıntı verici	:	_	:	_	:	_	:	_	:	Ferah
Dinlendirici	:	_	:	_	:	_	:	_	:	Tedirgin Edici
Kısıtlı Mekan	:	_	:	_	:	_	:	_	:	Özgür Bir Mekân
Kötü Düzenlenmiş	:	_	:	_	:	_	:	_	:	İyi Düzenlenmiş
Açık	:	_	:	_	:	_	:	_	:	Kapalı
Uyumlu	:	_	:	_	:	_	:	_	:	Uyumsuz
Ölü	:	_	:	_	:	_	:	_	:	Canlı

## APPENDIX D - RESULTS

These tables show the distribution of subjects' preferences for each adjective pair. For example, for the closed urban space, 5 of the 60 subjects evaluated the situation as very ugly and 9 of them evaluated it as ugly. 18 subjects are neutral while 22 of the 60 subjects evaluate this space as beautiful and 6 of them find it very beautiful.

### D.1 CLOSURE

#### D.1.1 CLOSED URBAN SPACE

Ugly	: 5	: 9	: 18	: 22	: 6	:	Beautiful
Unattractive	: 10	: 14	: 21	: 10	: 5	:	Attractive
Disturbing	: 10	: 15	: 14	: 16	: 5	:	Restful
Dead	: 11	: 10	: 14	: 17	: 8	:	Alive
Narrow	: 3	: 8	: 12	: 19	: 18	:	Wide
Distressing	: 8	: 9	: 8	: 22	: 13	:	Spacious
Limited Space	: 12	: 7	: 17	: 19	: 5	:	Free Space
Closed	: 7	: 7	: 18	: 14	: 14	:	Open
Illorganized	: 9	: 5	: 23	: 14	: 9	:	Wellorganized
Unharmonious	: 10	: 8	: 20	: 13	: 9	:	Harmonious

### D.1.2 OPEN URBAN SPACE

Ugly	: 13: 16: 12: 15: 4 :	Beautiful
Unattractive	: 14: 14: 19: 8 : 5 :	Attractive
Disturbing	: 13: 20: 17: 5 : 5 :	Restful
Dead	: 13: 12: 24: 9 : 2 :	Alive
Narrow	: 5 : 9 : 10: 19: 17:	Wide
Distressing	: 14: 19: 12: 12: 3 :	Spacious
Limited Space	: 12: 10: 20: 15: 3 :	Free Space
Closed	: 6 : 8 : 16: 17: 13:	Open
Illorganized	: 8 : 16: 19: 14: 3 :	Wellorganized
Unharmonious	: 10: 14: 18: 11: 7 :	Harmonious

### D.2 SIZE

#### D.2.1 D/H=1

Ugly	: 28: 14: 14: 3 : 1 :	Beautiful
Unattractive	: 22: 16: 10: 8 : 4 :	Attractive
Disturbing	: 21: 12: 15: 8 : 4 :	Restful
Dead	: 31: 11: 12: 4 : 2 :	Alive
Narrow	: 17: 13: 14: 8 : 8 :	Wide
Distressing	: 32: 14: 6 : 5 : 3 :	Spacious
Limited Space	: 32: 15: 7 : 4 : 2 :	Free Space
Closed	: 33: 14: 11: 2 : 0 :	Open
Illorganized	: 20: 9 : 19: 6 : 6 :	Wellorganized
Unharmonious	: 15: 14: 14: 8 : 9 :	Harmonious

D.2.2 D/H=2

Ugly	:	29:	16:	16:	6	:	1	:	Beautiful
Unattractive	:	18:	13:	15:	10:	4	:	Attractive	
Disturbing	:	16:	15:	18:	8	:	3	:	Restful
Dead	:	20:	16:	19:	3	:	2	:	Alive
Narrow	:	21:	13:	16:	6	:	4	:	Wide
Distressing	:	14:	26:	12:	7	:	1	:	Spacious
Limited Space	:	21:	18:	19:	0	:	2	:	Free Space
Closed	:	15:	19:	16:	8	:	2	:	Open
Illorganized	:	12:	15:	21:	8	:	4	:	Wellorganized
Unharmonious	:	12:	15:	21:	8	:	4	:	Harmonious c.

D.2.3 D/H=4

Ugly	:	30:	8	:	14:	6	:	2	:	Beautiful
Unattractive	:	26:	13:	13:	5	:	3	:	Attractive	
Disturbing	:	18:	17:	16:	8	:	1	:	Restful	
Dead	:	25:	16:	13:	4	:	2	:	Alive	
Narrow	:	26:	15:	9	:	7	:	3	:	Wide
Distressing	:	24:	16:	9	:	10:	1	:	Spacious	
Limited Space	:	25:	15:	11:	8	:	1	:	Free Space	
Closed	:	24:	15:	6	:	12:	3	:	Open	
Illorganized	:	27:	11:	13:	9	:	0	:	Wellorganized	
Unharmonious	:	18:	15:	13:	11:	3	:	Harmonious		

### D.3 VARIETY

#### D.3.1 VARYING URBAN SPACE

Ugly	:	2	:	3	:	9	:	22	:	24	:	Beautiful
Unattractive	:	6	:	15	:	9	:	17	:	13	:	Attractive
Disturbing	:	6	:	4	:	20	:	18	:	12	:	Restful
Dead	:	5	:	4	:	17	:	22	:	12	:	Alive
Narrow	:	4	:	9	:	14	:	18	:	15	:	Wide
Distressing	:	3	:	4	:	12	:	25	:	16	:	Spacious
Limited Space	:	2	:	11	:	14	:	21	:	12	:	Free Space
Closed	:	4	:	7	:	13	:	20	:	16	:	Open
Illorganized	:	6	:	9	:	12	:	19	:	14	:	Wellorganized
Unharmonious	:	7	:	8	:	15	:	20	:	10	:	Harmonious

#### D.3.2 MONOTONOUS URBAN SPACE

Ugly	:	5	:	6	:	17	:	19	:	13	:	Beautiful
Unattractive	:	7	:	12	:	21	:	15	:	5	:	Attractive
Disturbing	:	8	:	10	:	23	:	13	:	6	:	Restful
Dead	:	8	:	6	:	23	:	15	:	8	:	Alive
Narrow	:	6	:	6	:	20	:	18	:	10	:	Wide
Distressing	:	4	:	8	:	17	:	24	:	7	:	Spacious
Limited Space	:	7	:	11	:	18	:	19	:	5	:	Free Space
Closed	:	5	:	7	:	21	:	19	:	8	:	Open
Illorganized	:	5	:	10	:	19	:	17	:	9	:	Wellorganized
Unharmonious	:	4	:	10	:	15	:	23	:	8	:	Harmonious



#### D.4 GREENERY

##### D.4.1 VERDANT URBAN SPACE

Ugly	:	1	:	6	:	16	:	19	:	18	:	Beautiful
Unattractive	:	4	:	10	:	18	:	19	:	9	:	Attractive
Disturbing	:	5	:	10	:	12	:	17	:	12	:	Restful
Dead	:	1	:	7	:	19	:	21	:	12	:	Alive
Narrow	:	6	:	12	:	11	:	20	:	11	:	Wide
Distressing	:	1	:	7	:	15	:	26	:	11	:	Spacious
Limited Space	:	5	:	10	:	14	:	21	:	10	:	Free Space
Closed	:	1	:	16	:	11	:	20	:	12	:	Open
Illorganized	:	5	:	7	:	17	:	21	:	10	:	Wellorganized
Unharmonious	:	6	:	7	:	18	:	19	:	10	:	Harmonious

##### D.4.2 NON-VERDANT URBAN SPACE

Ugly	:	17	:	13	:	22	:	6	:	2	:	Beautiful
Unattractive	:	20	:	16	:	18	:	4	:	2	:	Attractive
Disturbing	:	14	:	19	:	17	:	8	:	2	:	Restful
Dead	:	14	:	15	:	27	:	3	:	1	:	Alive
Narrow	:	14	:	12	:	13	:	19	:	2	:	Wide
Distressing	:	17	:	11	:	23	:	7	:	2	:	Spacious
Limited Space	:	16	:	12	:	19	:	11	:	2	:	Free Space
Closed	:	13	:	11	:	19	:	15	:	2	:	Open
Illorganized	:	20	:	15	:	18	:	6	:	1	:	Wellorganized
Unharmonious	:	15	:	15	:	17	:	11	:	2	:	Harmonious

## D.5 TRANSPARENCY AND SPATIAL CONTINUITY

### D.5.1 OPEN GROUND FLOOR

Ugly	:	9	:	13	:	18	:	13	:	7	:	Beautiful
Unattractive	:	10	:	16	:	14	:	11	:	19	:	Attractive
Disturbing	:	9	:	19	:	17	:	10	:	5	:	Restful
Dead	:	12	:	13	:	14	:	12	:	9	:	Alive
Narrow	:	8	:	14	:	14	:	15	:	9	:	Wide
Distressing	:	12	:	13	:	14	:	12	:	9	:	Spacious
Limited Space	:	12	:	13	:	16	:	13	:	6	:	Free Space
Closed	:	8	:	12	:	15	:	19	:	6	:	Open
Illorganized	:	15	:	18	:	12	:	6	:	9	:	Wellorganized
Unharmonious	:	8	:	19	:	16	:	9	:	8	:	Harmonious

### D.5.2 CLOSED GROUND FLOOR

Ugly	:	33	:	10	:	9	:	6	:	2	:	Beautiful
Unattractive	:	28	:	14	:	9	:	7	:	2	:	Attractive
Disturbing	:	23	:	14	:	16	:	5	:	2	:	Restful
Dead	:	28	:	15	:	10	:	6	:	1	:	Alive
Narrow	:	24	:	16	:	7	:	8	:	5	:	Wide
Distressing	:	26	:	16	:	8	:	9	:	1	:	Spacious
Limited Space	:	26	:	16	:	13	:	5	:	2	:	Free Space
Closed	:	22	:	16	:	10	:	7	:	5	:	Open
Illorganized	:	26	:	13	:	15	:	5	:	1	:	Wellorganized
Unharmonious	:	24	:	17	:	8	:	7	:	4	:	Harmonious

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