

COGNITIVE PROCESSES IN THE PERCEPTION OF THE ENVIRONMENT:  
A Framework for study of legibility in small urban spaces

by

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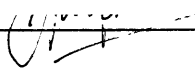
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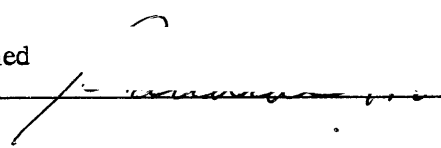
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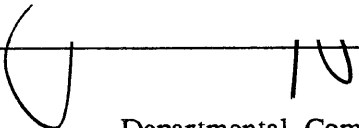
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A Framework for study of legibility in small urban spaces

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Anil Khullar

Submitted to the Department of Architecture on May 8th, 1985 in partial fulfillment of the requirements for the degree of Master of Science in Architecture Studies.

ABSTRACT

This study is on development of a method for investigating the relationship between the legibility in the urban environment and various components of the visual environment, as perceived, and remembered by the people. The focus of the study are small urban spaces in Boston.

The study developed a series of experimental protocols to study the response of the people to the various squares, around Boston. The emphasis of the study being to explore the possible approaches to collecting information related to perception of the urban environment. The phenomena of perception relating to small urban spaces, was discussed within the framework of theories in cognitive psychology.

The study proposes that people are able to discriminate and distinguish squares based on the *salient* qualities, but are unable to distinguish between the various *expectant* elements such as window types, street lights and benches. The absence of salient qualities in small spaces, make them illegible. The role of schema, in developing a very vivid image of a place, was an important basis for proposing the existence of *saliency* and *expectancy* as dimensions of legibility.

The domain of the research is restricted to issues relating to various ways in which information relating to the visual quality of the environment could be extracted from the people using the techniques often used by psychologists.

Some of the findings from this research indicate, that each technique used in study, gave different type of information relating to the physical features of the squares.

The thesis finally argues for the development of a standard methodology to identify, and establish *salient* and *expectant* features about a place, and cities within a cultural context. The coherent vocabulary of design elements that would develop through this, would enhance the chances of a better fit, between the users of the space, and the professionals.

Sandra C Howell,  
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It is difficult to sit and write down words for all the people that have seen this thesis through stages of genesis, and eventual culmination into a readable entity.....

The foremost that comes to my mind, is Late Prof. Kevin Lynch as the person who encouraged me to carry on despite a lot that had been done and investigated in this area. In three discussions, he posed enough questions; to answer them would take a journey beyond the Ph.D. dissertation.

Prof. Sandra C. Howell, my thesis advisor, for the patience and hours of annotating my clumsy ideas, who still thinks that it is still worthwhile to ask difficult questions regarding cognition, and environmental design.

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Anil Khullar,  
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# ASSUMPTIONS AND BASIS OF THE THESIS

## SOME ISSUES

This thesis is about issues that relate to design of urban form, and open spaces, from the perspective of theories in visual perception of the environment. The thesis will show that:

- \* There is a basic difference in the approach to designing open places as opposed to architectural or large city scale projects.
- \* Why there is a dicotomy between the theories in perception of the environment and practice, and the role of various types of research in this area.
- \* The basic theories in perception, and its relationship to design attitudes in research and implementation, through design.
- \* The impact of theories of cognition on research relating to perception of the environment.
- \* The thesis will argue that the scale and emphasis of Imageability, and remembrance of cities and building respectively, is insufficient to develop into strategies in environmental design.
- \* It will focus on the need to a better understanding of legibility of places, as an important aspect of designing the places (meso-scaled environments).
- \* That legibility in the environment is dependent on a collective schema of places, which is the basic building block to translate the programs and goals of most urban design projects, and that salient features are more easily remembered than expectant elements in the schema.
- \* The methodology and the theoritical framework to study saliency as a crucial component of legibility, shall be based on visual information-processing theories outlined by Haber, and Sperling.
- \* A preliminary investigation for a empirical validation of the above hypothesis shall be outlined.

\* A small study shall be undertaken, and some of the related research findings shall be discussed. Possible variations within the same research framework, and different paradigms will be suggested.

## **LIMITATIONS**

There are many limitations in this thesis which may have affected the specific conclusions.

The lack of ample data for making a more rigorous analysis of the responses people have to various places

The absence of all the tools to successfully explore the mental representations of small urban environment.

The difficulty in identifying a wide variety of places within the city which could be used as a reference for discussions with Subjects.

The findings are based on a very small target group; namely the student community in a small institute.

# PERCEPTION AND ENVIRONMENTAL DESIGN

## INTRODUCTION

Perception of our day-to-day environment has been a very important aspect of all the designs that are visualized on the drawing boards and in office environments of Urban Designers and physical planners in the world. The importance and emphasis on visual thinking has been the mainstream in Architecture for a very long time. The role of visual analysis of the built and natural environment has been central to design thinking. Thus it is important to know what are the theories that capture the attention of most designers and also whether these so-called theories are in reality the way in which most of the people perceive their environment.

## PRACTICE IN URBAN DESIGN

Many projects of large magnitude involve a constant redefining of goals and objectives. The development of a program, in many cases, is a process (Lang, 1974) that reflects the various interest groups and multi-level goals. Here, redefining the program goals does not stem from a lack of knowledge about the requirements, but from an absence of clear-cut aims and objectives of the project.

The designing of open plazas and urban spaces for public congregation was always based on intuitive knowledge of the social and cultural groups for whom it was meant. The issues relating to visual experience and aesthetics were largely the matter of architectural style of the time. Designing today has become more complex, with needs and aspirations of each social, cultural and economic group being different in many ways. Studies in the perception and meaning of built environment indicate that social and cultural values are attached to various architectural elements.

Cuidad de Guayana (Appleyard, 1969,1970) and its planning, attempted to translate the images of the people and their relationship to their city. Appleyard states that the findings of the field studies had revealed that the factors that professionals choose as important in remembering parts of a city and its prominent building is different from that of the non-professionals.

Donald Appleyard found that there are five features which were most frequently recalled by people in describing the buildings that they identified. They were

movement, contour, size, shape and surface. His study, conducted in Venezuela, in the city of Ciudad de Guayana, asked people to freely recall the buildings that they named to describe a path or a route to a path. However, he chose the questions such that there were goal-oriented activities that formed the basis of the questionnaire (eg. the description of route from work to home). Movement along the portion of the city that people were familiar with, ranked very high on the scale. Similarly, he found that the signs and quality of the building did not rank very high in recall.

Appleyard's study revealed that quality of the building, and other features, rank very low in making buildings known. He argues that signs that are displayed prominently in various parts of the city attract only the momentary attention of the passerby about the goods and the location. The findings of Appleyard's research and that of others, tend, unintentionally, to become prescriptive, which is to an extent desired, within a given cultural context.

In Environmental Design, validation through praxis happens when the professionals agree that the theory has substantial groundings in empirical studies. Thus it seems natural that a theory of collective memory and schema has priority and importance over the trained but value-laden notions of the professionals in which image and memory develops from the 'expected' and 'style'. In the real-estate world, market forces dictate the optimum fit. In Environmental Design, and large urban scale management, the users and the promoters are not necessarily the same. The users (citizens) are more crucial to the well being of the project, the neighborhood, and also the city.

It has been assumed by many that it is difficult to translate the notion of legibility into visual design rules. Many of the studies on the image of different cities have been done in the recent past. Planners and development agencies (in San Francisco, Boston, Kansas City, Jersey City, Los Angeles) have begun to adopt comprehensive visual maps of their city based on Lynch's studies on Imageability. Lynch's image maps and his classification of parts of a city into coherent wholes are commonly used in planning offices in nearly every city. His technique of asking citizens to recall various parts of the city, drawing maps for strangers and developing routes through which these citizens normally travel during their daily life cycle, and finally superimposing to get a coherent graphic image, which indicates the strong and weakly imageable parts of the city, has become a standard practice. Lynch noted that many



planners have used the outcome of this research to implement changes in their own city. Based on imageability, changes in the city become meaningless if there is no input by the people.

Imageability studies carried out in other countries in the world have also been revealing, and have reaffirmed Lynch's classification of parts of a city. But what these studies fail to emphasize is the valuable input by the citizens. Lynch mentions that the main purpose of conducting his research was to emphasize the need to consult the citizens of the city in decision making. The application of his theory without asking the ultimate users negates the basis of his beliefs. It is here that one sets out the clear distinction between the values of the planner/architect, and values of the citizens, both in terms of the structure of the city's various parts, and also for future development.

"What is not foreseen, however was that this study, whose principle aim was to educate the *designers* the necessity of consulting those who live in a place, had first a diametrically opposite result. . . . There was no attempt to reach out to the actual inhabitants. . . . professionals were imposing their views and values on those they served." (Lynch, 1984, p. 156).

In shaping urban areas as a piece of the environment, many designers treat it as an architectural project, requiring craftsmanship, and manipulations similar to the relationship of services and interiors to the building. This is the biggest error of such an approach, because urban design projects become more complex as they increase in scale. Moreover, many urban design projects have many actors who have to play major roles in deciding various issues relating to distributions of mix of uses and impact of the project economically, socially, as well as politically. The review board normally consists of representatives from the citizen action group and from business organizations. It is in this light that the designer has to try to use his skills in developing an acceptable design solution.

It is mandatory in many instances to submit results from various tests to ensure that environmental standards have been satisfied. Many projects in the city are also funded by public monies, which the mayor commits to ensure that the project would bring in the desired social and economic benefits to a larger community (Copley Place, proposed International Place).

Many cities across the nation and elsewhere have strong laws that favor reuse and renovation of major areas of the city. The Preservation movement, which became visible and active after the bicentennial celebration of the American Independence in 1976, made it mandatory for developers to submit documents pertaining to the building's historical value before redeveloping the place. Many local and state governments offer tax benefits, and federal monies are given to projects that are sympathetic to historical buildings.

In light of all the above factors, it becomes important to understand the significance of the users in the process of decision making. Also it is necessary to emphasize that the citizen groups that are now on decision-making boards are unable to judge the relative merits of many architectonic solutions for a given socio-economic goal and program objectives. There is hardly any knowledge apart from post-occupancy evaluation studies, and some specific economic and cost-benefit scales. We are unable to predict the success and impact of a project which attempts to pull together a whole district into a visually coherent entity.

Legibility of the environment, which deals on a smaller scale, mainly within a block or so, has a similar dilemma. Urban design schemes developed in the past have depended mainly on the values and impressions of the designer. Squares and parts of a district are, in terms of scale, similar to a Lynch's node. Legibility of the square, within the framework of a city could be understood without major reference to the imageable quality of the city, because it has to be understood as a place. This does not imply that the nature of the city's imageable features and structure have no role to play. What is emphasized is the ability of a place to become legible, despite the reference to the city.

The squares that are to be studied in this research are all situated in the Boston/Cambridge area. Places such as Harvard Square or Downtown Crossing are smaller entities which do not require an understanding of the whole city to be legible.

There is then a need to develop a coherent framework to incorporate into the design process the inputs of the citizens. There have been some attempts to use the citizens' surveys to develop design solutions. Participatory process in the design review has been accomplished in the West Broadway project in Boston, and in the Copley Place redevelopment. Designers state that there is hardly any time or funds to accomplish

the voluminous task of conducting surveys. Also it has been criticized that the research into citizens' opinion is time consuming and does not get supported by the clients. Thus it becomes important to develop clearer knowledge about the nature of legibility and the aspects that are crucial in understanding how people remember places and what kind of places have salient features and unique qualities. The methodology that would address this issue of small scale urban development and design could become an important tool for future research and applications.

Thw West Broadway Housing redevelopment (Prog. Arch., Jan 1983) in Boston, as a case method, illustrates that the issues that engaged the Boston Housing Authorities, West Broadway Task Force, and the Consultants, were not unique to the profession. The insistence of the tenants to certain changes in the layout, and restoration of the urban fabric to reflect the surroundings, were a major part of the discussions<sup>1</sup> Also the visual communication of the issues, the financial implication of the issues relating to removal of the tenants, and the relocation of the tenants so as to restore a sense of belonging, had to do with the image and its associated meanings. The solutions called for changes which were sympathetic to the surroundings. The case illustrated that the use of images (verbal and social) had to be translated through a participatory process, that depended mostly on the set of values, not dictated by the consultants, but rather by shared expression of the tenants.

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<sup>1</sup> J.Lane, 1984. *oral communications.*

## PERCEPTION OF THE ENVIRONMENT.

To date, the emphasis of research in perception of the environment has been on two levels. First, by planners and architectural historians, who have focused on the visual quality of various open spaces, in terms of experiential reactions (Cullen 1960, Tuan 1977, Rasmussen 1957). Second, by social scientists related to the field of architecture and planning. This group includes psychologists, geographers, anthropologists and finally architects. The research in perception has also differed in terms of the emphasis. On one hand, the practice-oriented people have clearly tried to answer issues from the perspective of application; on other hand, there has been over emphasis on the techniques and the methodology for investigating visual environment (Moore, 1979; Evans, 1980). Finally there has been a major debate in the field of cognitive psychology on the merits of cognitive maps, and how visual pictures are stored in the mind (Block 1981). This is a very important issue to resolve in any research relating to cognition of the natural environment, because there is a very strong case made by some experimental psychologists that, information of the environment is not stored as pictures in the mind.<sup>1</sup>

If theories asserting the propositional representation of visual pictures are true, then their implication in Environmental Design could in simplistic terms be that predications and verbal labels are the primary mechanisms of storing images. However, it is also pointed out by pictorialists that mental representation of pictures have a very strong component of visual images. The present study is based on the contentions of the latter. It is also assumed that cognition of large environment (such as every day seeing) is not solely a function of any one of the systems (propositional and analogous/imaginal).

### Emphasis of research

The questions related to storage of images, the capacity of visual storage, retrieval rate for information, issues in rotation and problem solving strategies that theory-oriented people have emphasized have little or no immediate translation for professionals in design. The reasons could be many. For one they have never tried to explain the direct impact of such findings to application, either in terms of a better process

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<sup>1</sup> *Spoehr and Lehmkuhle. Visual Information Processing. pp.237, 240.*

(easier method for analysis or decision making), or a better product (design solution). The other major reason might be the lack of conviction on the part of professionals that such research or analysis could lead to a better judgement. The need to conduct research in perception that involves a large amount of people participation or field studies is also avoided for lack of time or financial resources<sup>1</sup>

### Competing Theories

Early works by art historians and gestalt psychologists dealt with some theoretical issues relating to perception which were based on the assumptions that visual stimulus was grouped in wholes or *Gestalts*. The Gestalt psychologists were interested in perceptual organisation of parts into wholes. The principles of Proximity, similarity, closure and good figures or *Pragnanz* were of specific interests to architects who wanted to find a rationale for their appreciation of classical architectural monuments.

Rudolf Arnheim in his critiques emphasised the relationship between esthetic content and visual perception. Knowledge of the subject in interpretation of the art was assumed in relation to the object. Gibson (1956, 1966, 1979), in his study of perception, minimized the importance of memory and previous knowledge of the environment. His *PsychoPhysics* of perception dealt with the direct relation between the ambient array of light and its contact with the retina. He argued that whatever happened in viewing the environment did so because of the changes in the patterns of light intensity that hit the eye. He later put forth the theory of "affordance" or the potential of the environment to dictate or manipulate the kind of activities that could possibly take place in the environment. He argued that if an activity occurred in a place, contrary to the expectation of the designers, it was because the place afforded an opportunity for such a thing to occur. (Gibson 1979).

An alternative position that has taken shape in cognitive psychology, which is analogous to computers, is the **Information-processing theory**. This theory of visual perception suggests that there are certain cognitive processes that occur after information from the environment is picked up. The transformation and manipulation of the information that the environment offers is largely dependent also on various stages of memory and the personality of the person. The role of memory in

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<sup>1</sup> *Environment & Behaviour* Nov 1984.

recognition, detection, along with aspects of attention, are included in their models. (Neisser, 1967).

### **Implications in research**

Gibson's research had a large impact on theories of perception in architecture, its charm lay in the importance it placed on the change of quality of light on a space, and immediate perception of the environment. There is no denying the fact that change in light does alter ones perception of a space, but we must ask whether the quality of light is sufficient and adequate to process information about the world. To predicate perception as a single step action is insufficient to account for why human beings are able to perceive some aspects of the visual stimuli faster and easier than the rest, or why is it easy to tell a picture from thousands even after having been seen them for a very short while. Some images are very vivid in our mind and some are immediately forgotten.

The work of Louis I. Kahn and Takio Ando, among others, was influenced by the fact that quality of a space changes with the change in the quality of light that falls on it. The change in the quality of light, location of the entrances, sighting and visibility, as factors in behaviour of people, who use or vandalize the space, can be shown to be effected by manipulation of the physical environment (Oscar Newman 1970). Though the concept of Defensibility is based on factors other than what Gibson suggests, yet the assumption is that physical change, leading to perceptual change, finally would actually modify behaviour.

### **Environmental Cognition Research**

The seminal work in the area of perception of large scale environments was conducted by Kevin Lynch. *Image of the City* (Lynch 1960) focused on residents' perceptions of Boston and its suburbs. It revealed that the way people organized information about the environment in their mind depended largely on certain features that were distinguishable and easily identified through orientation, in the course of daily activities. Lynch used a very simple method to obtain his information from people: he asked them to explain through their own sketches and maps, the surroundings to people who were not familiar with the surroundings. He noted that areas that were most easily remembered were the ones that were often used by the residents. On the other scale of the environment, Appleyard (1969) applied a similar

methodology to study specific buildings. His conclusions were different from and additive to those of Lynch's. He noted that form, color, shape and potency were the important factors in easily identifying a building.

These two studies raise certain important questions crucial to the present study. Lynch's work and his later explorations were on a city scale. His interests were to understand how people perceived their city. He was concerned with the mental image and information people needed to organize themselves in way finding. The scale of the environment (City, Region) is a very crucial part of one's life in negotiating and moving around the urban environment. Studies in orientation and theories in cognitive structuring (Reed, 1983) indicate that people store information to solve problems in their daily life by seeking previous knowledge, and develop strategies to understand the objects that they encounter. There is more likelihood that people explore new places in a manner derived from their past experiences.

In the city, a newcomer would also use similar strategies as he had used in previous cities that he had visited. Canter (1976) notes that we use the first important object or location in the city as a reference point and explore the city based on it. Until the time that he structures the majority of important locations into another reference plane it is difficult for the newcomer to have a cartographically coherent image of the whole city.

To a person who has been to a city for a few days, the hotel or his business office will become the center of the city as far as his reference system is concerned. This was noted by Lynch too. He found the dominance of certain routes and places (eg. nodes) in the maps that people drew of their city. Lynch argues that predominance of certain areas in determining imageability was based on the five physical features that organised their image maps of a city.

Appleyard noted that people remember a building, if they are in some way connected to it either functionally or as an important junction in their daily journey to and from work. Thus it was more likely that a major public building like a City Hall or a State House or a Church would figure as a frequently remembered building in a city even though the people who respond to the questions themselves may not have visited it. The people may have heard, seen pictures, or read about it, and added the information associated to it, with a very strong image.

Appleyard's study focused on recall (he termed it *remembering* ); the scale of his objects were buildings, which in Lynch's city construct are *landmarks*. However "imageability" was the keyword in Lynch's work, and "recall" or remembering was the keyword in Appleyard's work.

Appleyard's study of recall of the buildings was in the strict sense a method for understanding what people remember about buildings and why, which is not the same as the image of the building. The people did not have to locate, or give directions to the various buildings in the different areas of the city. It was obvious that this could not have been possible and was not the objective of Appleyard's study. Such a study would help in answering only issues relating to association of an area or a region with separate or specific buildings. Moreover, the study by Lynch had revealed that Landmarks were in fact predominantly buildings or objects that were either easily visible or recognisable for their distinct features, and acted as anchors or reference points for the surrounding area.

Appleyard's study extended Lynch's work, but in different directions. In certain respects, it was a further elaboration of the physical aspects of 'landmarks'. What Appleyard proposed in fact described the imagery of a building. The reasons that the buildings are "known" has the same underlying string of reasoning as why certain parts of a city are "imageable".

Shape, Color, Location and Size are the elements that determine *rememberability* of a building. Organization of Landmarks, Nodes, Districts, Paths and Edges, in a particular manner, are important to enhance the imageability of parts of a city.

### **Framework of this thesis, and Lynch's and Appleyard's research**

The emphasis of this study is on a small part of the larger question, that of cognitive issues in the perception of medium scaled environments. At the very onset one would argue that theories in environmental perception are independent of the scale of the environment that we choose to study. We shall argue that it is not so, that scale does play a large role in the nature of perception. The perception of a place or a space within a city is a different domain than that of a whole city or a single building, in terms of scale collection of elements.

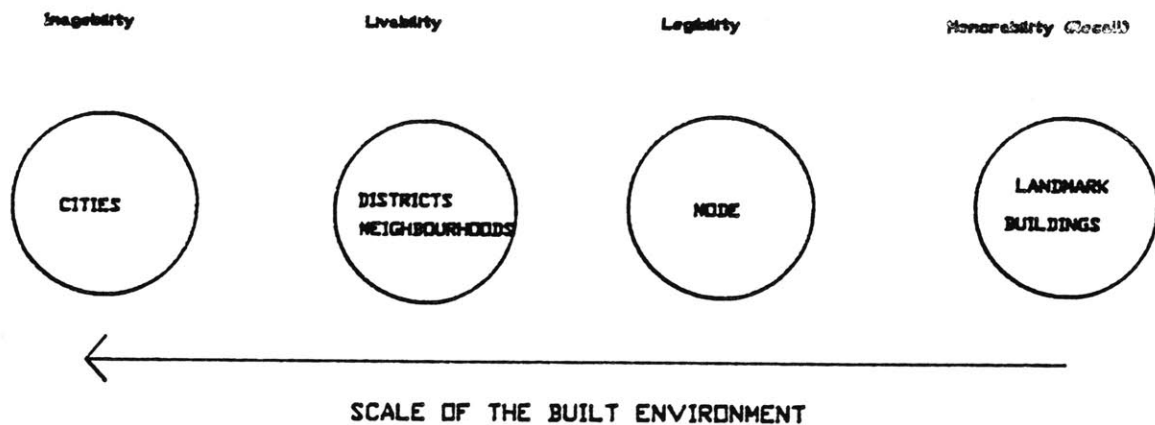


A *place* is in the Lynchian scale similar to a *node*. Lynch defined *Nodes* as points of interest, or strategic spots in the city. Nodes are internal points which can be entered. A square, a street corner, are examples of nodes. Also, nodes are the intensive *foci* or concentration points. A place is also a collection of buildings around a geographical or metaphorical focal point. The place that we refer to in this study could be easily surveyed from any vantage point within the space. Squares and neighbourhood street corners fall within the frame of reference that we are going to address in this study. (Ref. Diagram below.)

Location of place and its relationship to the city is not important in the sense of overall legibility. Thus the crucial question in Lynch's work was "Imageability" and in Appleyard's work was "Remembrance" or "Knowing". This study will focus on "Legibility". The most important aspect of this study is which features in a square or a place are noticed, and which are noticed but not remembered or distinguished. It will address the notion that some features in the place are *salient* enough to be easily remembered and some are *expectant* that we notice, but cannot easily recall them.

The imageability of various parts of a city is organised by a loosely structured set of information which is schematic in nature. Lee (1956) reported the existence of a schema for particular parts of a neighbourhood around which various pieces of relevant bits of information are tied to make coherent sense.

**SCALE AND CONCERNS OF THIS RESEARCH**



Bartlett (1932) and later Piaget developed the notion of schema as the structure for remembering various associated information about a person, figure, event or a place. It could be hypothesised that places, and environmental information, are also similarly organised in the human mind. Organization of the image of a particular place is a subset of a larger schema of the generic qualities of similar places. Malls in Cold Climates and Bazaars in Mediterranean Cities evoke a certain set of images. We expect certain types of physical as well as non-physical elements in those cities to make those places what they are. It is necessary to investigate the nature of such images and to understand what are the prototypical elements that we associate with places, and the features that we associate with one particular place.

# LEGIBILITY AND SCHEMA

## INTRODUCTION

This chapter deals with legibility as a construct for defining various aspects of the visual environment. It ties the development of schema to legibility and develops the theory of *saliency*

## LEGIBILITY

Legibility. *n*: The quality or state of being legible. Legible *adj*: capable of being read or decipherable. It is also defined as a clear and readable text. For a text to be legible, it has to have all the words and letters, in a written format with well formed elements. Legibility, though, does not necessarily imply understanding.

Legibility of an environment has meant many things to different planners and social scientists. Lynch (1960) defined legibility of cityscape as the ease with which parts could be recognised and organised. To him, a legible city would have districts, landmarks and pathways which are easily *identifiable* and grouped into an overall pattern. Kaplan & Kaplan (1981) identify legible environments as those that easily *make sense*. Legibility in their context is in relation to exploration. The Kaplans further expanded this concept to include exploration without getting lost. Lynch used "clarity" interchangeably to depict legible environments, and suggested that *legibility*, *viability* and *clarity* are part of *imageability*.

The Kaplans linked "sameness" and "intent of order" to *legibility*. "Sameness" of the built environment suggested *low legibility* and "intent to order" suggested making coherent sense through structuring a variety of visual changes. They claimed that order varied with environmental context. Shopping Malls, College Campuses and Rural English landscapes were some of those examples. Within the context of environmental image, Lynch postulated three components: "identity", "structure" and "meaning".

The Kaplans emphasized "simplification" as the mechanism for "making sense", and thereby implying *high legibility*, whereas Kevin Lynch discussed visibility of landmarks as a precondition for them to be *legible*.

## Defining Legibility for Places

Legibility of a place depends on an understanding of the various uses and functions of that particular place. It also depends on "clarity" of the place, to people of the same culture. For urban open places order is not as important as it is for cities. Exploration of the environment is not a necessary pre condition for legibility of a place. Legibility of a place depends upon "identity" and "uniqueness". It should contain some universal symbols that are recognised, and some special qualities that create constant awareness in the citizens. Dynamism and mobility in a place along with distinctly clear boundaries add to the legibility. Water fountains and crowds create a dynamism that are of joy to people, and are perceived as making sense of the place. Association of a particular place with different functions of the surrounding districts also add to the legible character of that place.

A place is normally within a few measured steps of panoramic vision for the eye. A typical scale of a place would allow people to survey the space from vantage points or within a few seconds of walking around the block. Visibility in our context, means paying attention to, rather than recognising from afar, as in case of images of the city. Thus *Legibility of a place* is dependent on attention to various objects in space, their sequence and the recognition of certain features that could be recalled at a later date.

## SCHEMA

Schema: *n: sing:* a diagrammatic presentation, an outline, a plan. According to Information processing theories, "schema" is a basic mental building block by which we store information about many related objects in a meaningful whole; these are structured in a manner which helps in understanding the urban environment.

Schema is developed based upon the familiarity we have about the nature of the objects. Through the process of development we learn to put diverse information into groups and use various strategies such as "labels", "scripts" or "frames" to store series of information. Most of Bartlett's work described the formation of schema of the face and the structure of the various parts and transformations within the object.

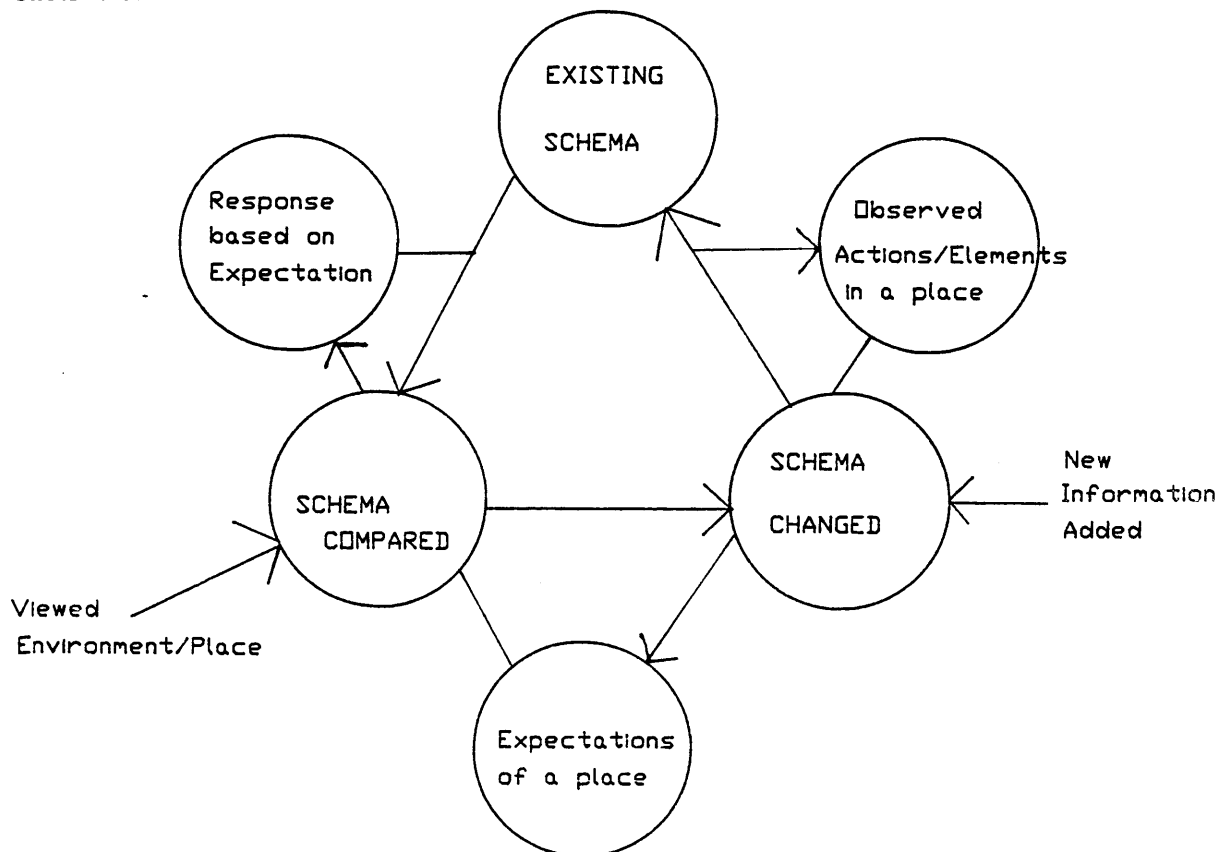
Bartlett (1932), in his studies of descriptions of human faces, noted that changes took place as subjects recounted what they had seen after a period of time. He quoted Henry Head, in defining the concept of "schema":

"Every recognisable change enters into the consciousness already changed with its relationship to something that has already changed with its relation to something that has already gone before"

Schema refers to active organization and alteration of past reactions, perceptions or experiences. By means of these alterations, which add to the already existing information of a concept, schema refreshes and stores knowledge about the concept.

Information bits are stored in a schematic form to be retrieved, selectively transformed, and developed into a new understanding of the environment. Once a schema is fairly developed, then the details are filled in to refine the edges of the definition.

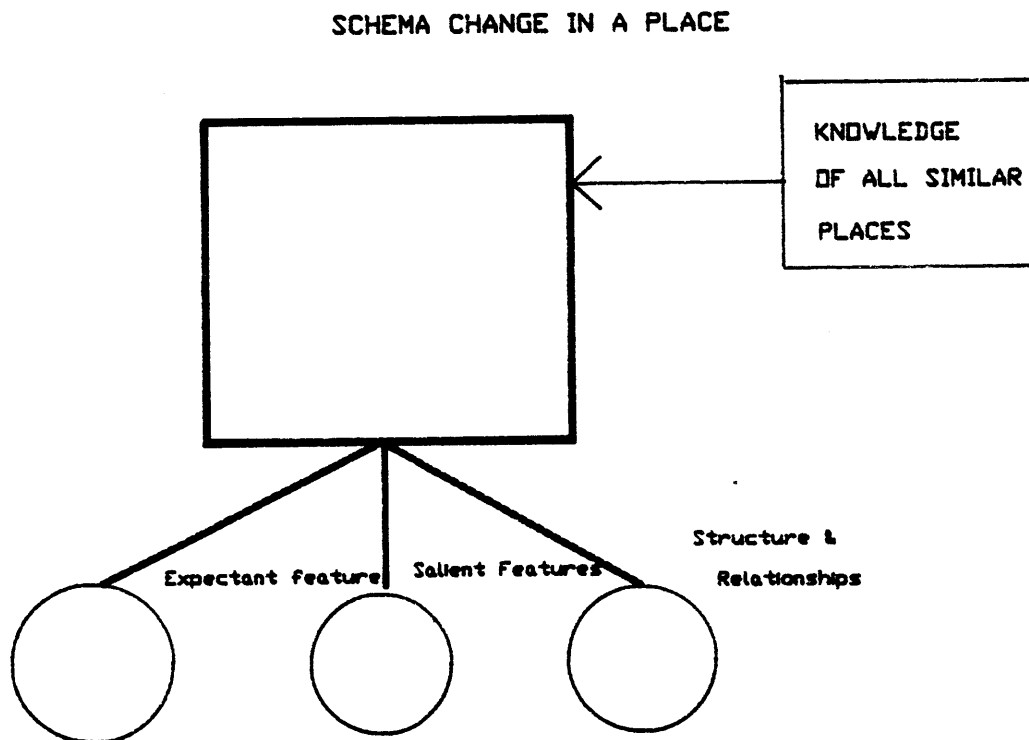
Schema is an ever changing building block which gets modified, refined (added or subtracted) as new information is accumulated.



## Schema for places

Schemata are mental representations of prototypical places or groups of buildings, that are related through meaning and verbal constructs. The mental images associated with one "word" or "phrase" labels are schematic in nature and help in recognising new places or a place, from a family of similar places.

Schema of the physical environment is probably different from the schema put forth by Bartlett, in the sense that schema for neighborhoods would contain a variety of information about the social cultural and behavioural features. Settings of the physical environment which are unfamiliar are arranged by people into smaller familiar schemata of known constructs until the time that there is a structure that ties them into a separate distinct schema. (*Ref. Fig.*)



Schema, here, has various levels of structure. At the first level, we add visual information and structural information about size, shape, orientation, color, texture and proportions; at other levels, we add information about the people who were seen there and other behavioral and use patterns. Finally, we add information regarding social and cultural variables which differentiate or discriminate one member of a class from another.

### **Forming of a Schema**

After many examples of Suburban Shopping Mall are seen, a distinct schema begins to be formed. Each schema has two major definers which are instrument in shaping the boundaries. These are *salient* and *Expectant* features. all the objects in the environment which are seen in the Suburban Shopping Mall are distinguished based on these two definers. We will elaborate upon them in detail.

In the schema are stored various information about the people who frequent the mall the activities that are seen to occur and the behavioral information about their use of the Mall. Many bits of information are rejected outright based on redundancy or misfit of the activity. Information that does not add anything new is also ignored. Information bits that are added depend largely on the sufficiency needed to distinguish the schema as different from the schemas that first started to help shape it (Lee, 1973).

# SALIENCY & EXPECTANCY

## INTRODUCTION

The central argument of this research is that perception of a place is based on a set of rules, concerning saliency and expectation, which govern cognition and aid in the development of a legible environment. These rules are used in organizing knowledge about a place and in distinguishing it from places similar in nature. Certain types of visual information about a place are stored generically and certain others by the special distinguishable features that are specific to a particular place.

*Saliency* and *Expectancy* are determinants for classifying places. The role of "previous knowledge," "schemata theory," and the "physical characteristics" of the various elements in a place are important for understanding the phenomena of perception of place.

## SALIENCY

*Saliency n:* of the adjective "Salient," according to the American Dictionary means a feature out of the line, plane or surface, or very prominent. Salient also means standing out conspicuously. In psychology, it is used to signify those aspects of the visual stimuli that are prominent or striking, and attract immediate attention. In terms of the day-to-day visual environment, saliency relates to various elements and physical features or organizational structure that are noticed and remembered by people long after having left that place.

*Saliency* in an environment could be of elements (buildings, signs, statues, street furniture, color etc.), organization of elements (relationship of open spaces and buildings, vistas, or arrangement of windows and building elements facing squares etc.) or features of the place relating to an abundance of a similar visual experience (repetition of flags, repeated openings, signs, ornamentation, variety or consistency of color or massing of buildings, etc.).

*Salient* features are those aspects of a place that serve two important visual locatory purposes. First, they are easily noticed (catch attention); second, they are easily associated to a particular place. The concept of *saliency* denotes attention, identification and subsequent remembering of features when that place is required to be recalled.



Environments that are very imageable and distinguishable in their character have many *salient* qualities. (see diagram below). Many of the things that are remembered about a place depend upon certain episodic events that are either individual or shared (Bahrick & Karis, 1982). There is more likelihood of persons remembering certain parts of a typical city depending upon the occurrence of a ritual, celebration or other event.

"Many one time visitors, who watch annual or bi-decade coronations of religious effigies, images of God and Goddesses; Citizens who witness ticker-tape or victory parades, have recounted details in very fine details"

Work in individual episodic memory (WaldFogel, 1948), has used a simple technique of asking people to relate an experience of one's own eighth birthday. He carried out this experiment at different time intervals. He found out that more than fifty percent of the details in the second recall (a month after the first recall) were different from those of the first, but the total number of details did not increase considerably. This probably suggests that various details about a particular place may be stored differently than others. Also, it raises a few questions regarding the levels and layering of information related to a particular place that an individual stores in his/her mind.

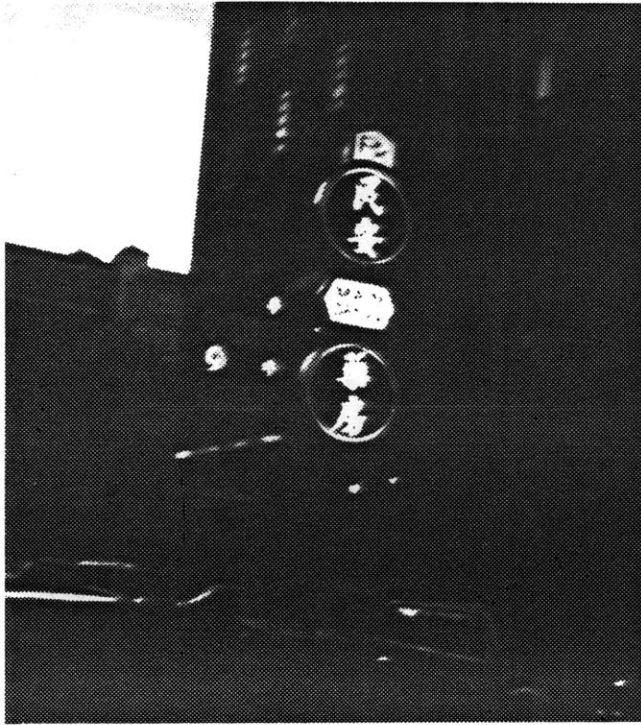
## DIMENSIONS OF SALIENCY

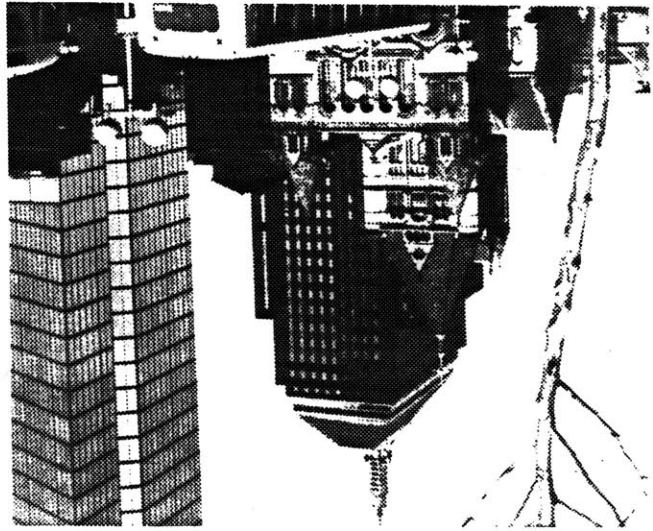
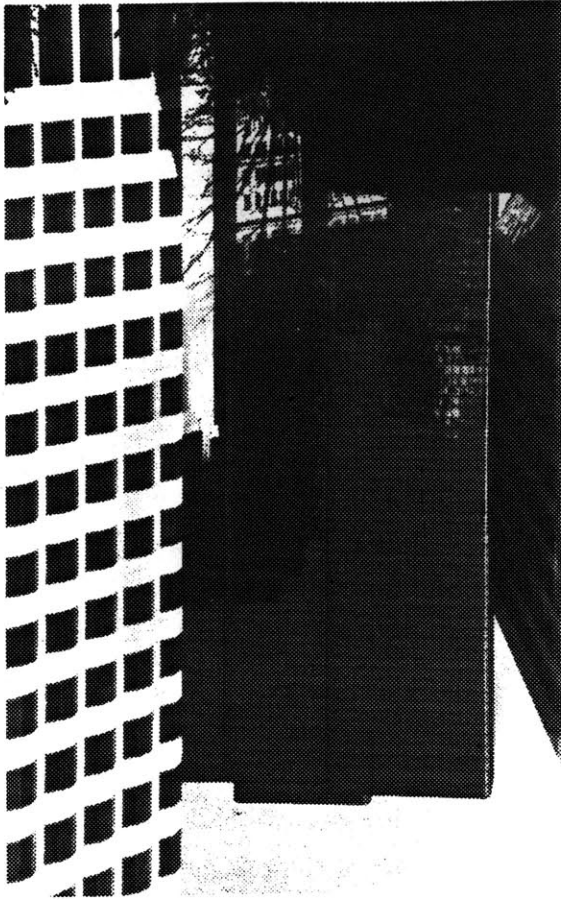
The environmental qualities that could be classified as *salient* may be attributed to the factors noted below:

1. **Contrast to surrounding**
2. **Novelty in shape/color**
3. **Dominating the landscape**
4. **Repetition of features**
5. **Position and locational violation**
6. **Distortion in shape and size**
7. **Use and functional dominance**
8. **Patterns of daily movement in the space**  
(both pedestrian and vehicular)

## Contrast

The major aspect of the environment which people notice is the contrast of one or two building within the panorama of vision, within the place. The case could be made for Trinity Church within Copley Place, Guggenheim Museum on its block, or a typical colored stone townhouse inserted in a row of brick faced buildings. The use of color in terms of neon signs in a dull street and the existence of many dynamic signs (signs that change or flicker at intervals) are a contrast within a nightscape of an urban street.





## Novelty

Most examples of salient elements that are found in the environment are usually novel in nature. The predominant use of an architectural material or element that has been used in a novel manner usually tends to get noticed.

The novelty of elements, as opposed to contrast, does not imply that using any street furniture, or sculpture, or sign would become novel! However, when a waterfront related object, such as a boat, is used in the centre of Copley Square, then it becomes *novel*. To be novel, the object or a relationship has to be used *out of context*.

One might note buildings which use plants or creepers or have landscape as in the example of SITE's design for BEST Inc. (Ref. Fig.). The use of a colossal milk bottle as a vendor's booth in the Museum Wharf ( Ref. Fig. below ), is a prime example of a salient feature that is novel in character. Post-Modern examples are also novel. Their novelty lies in the use of colors. The shape, in Post-Modern architectural work may not be novel (with the exception of some). The reason for this is that the motifs and proportions are easily understood to be related to styles of past architectural buildings



## **Dominating the landscape**

Attention over time relates to objects or relationships that over a long period of contact become very noticeable. Students on the look-out for bargains easily spot notices on the bulletin boards near the elevators. People who work on a particular block, notice instinctively a slight displacement of a mailbox, or the position of a new newspaper vending machine. This is because the time rhythm of movement along these networks of objects in space gets disturbed by the movement or displacement of any one of the objects that is near a person's path.

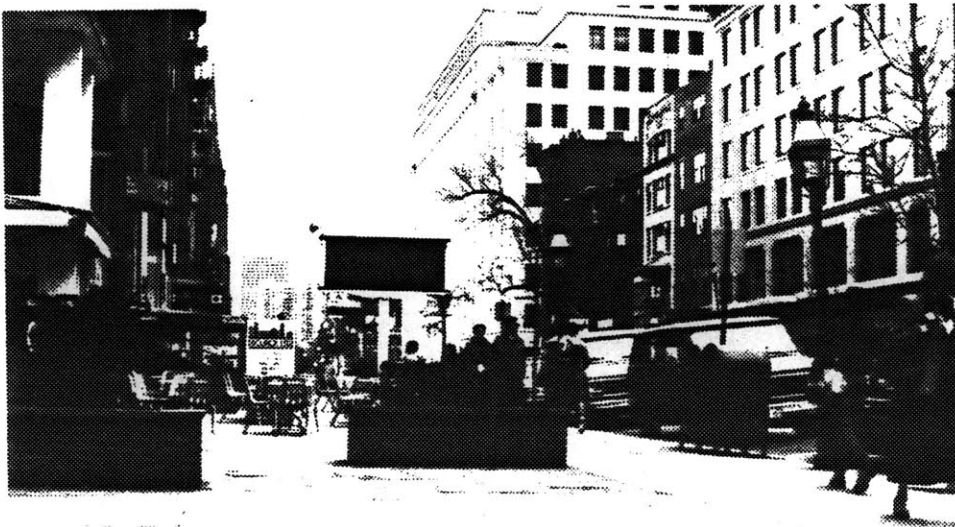
Attention is drawn to many features in another way. A feature in the environment becomes significantly noticeable when the person devotes time to looking at it. Examples would be: staring at the signs on top of a building while waiting at the bus stop, sitting on a bench and staring at the scene in front, or while drinking coffee, noticing some of the street elements, such as patterns on the roofs.

### Repetition of features

Elements like street lamps and furniture that are abundant in a typical open park or square become *salient* when a person recalls spaces of similar nature, and notes the abundance of a particular element. Absence of features, such as trees, lights etc., that one expects (*Expectancy*) in a place may make that place unique. Such a case is the vast open plaza in the Boston City Hall. *Saliency* in the case of the city hall plaza is through the absence of expected features.

### Positional and locational violations

Most of the elements in the street or on building signs become *salient* when they are out of position from the norm. One may never expect to find a vending or bookstore in the middle of a square. Such is true also for positions of signs that are placed in the middle of the pavements. Restaurants and cafes that spill out onto the street and into the center of pathways are *salient* too. "Out Of Town News" in Harvard Square is at the intersection of two major streets. It is very noticeable and has come to be identified with the square. Other examples are Travis Restaurant in Newbury Street, and street cafes. (Ref. figs. below ).





### Distortion of shape or size

The presence of oversized windows and entries in a shopping mall, the oblique shaped window elements in high rise buildings in Downtowns, or the oblique shape of the external form of buildings through distortion may cause it to become *salient*. Example of such features in Boston's financial district (*shown below*), are distorted in shape at the viewers' eye level, and are easily noticed. The view of the photograph below indicates that the shape of the building in the foreground is *salient* because of its shape. We may also note the use of oversized features such as staircases projecting out as in Museum Wharf where the the elevator shaft is projecting out of the building.



## Use and functional dominance

The importance of a place within a community is also responsible for creating *saliency*. Symbols of a community are often used in creating *salient* structures. The importance of symbols of power and institutions normally have such a property. They are easy to give prominence to a place. Places that have social taboo associated with them call forth a similar response.

The presence of "MacDonald" restaurants are easily remembered by people for a variety of reasons: television and other advertisements add to the meaning attached to it as national fast food chain. Most of the signs in the Combat Zone are normally very dominant for the reasons of its associated meaning within the environment. The location of churches and government buildings are also very *salient*. Town halls are very easily remembered too. The presence of the "Information Booth" at the Boston Common is known for the purpose it serves to visitors. Citizens who never use the place still remember it, because of the function it serves.



### Daily movement patterns in space

Elements that are seen on the route to work or around the workplace are noticed through daily contact with it (Lynch, 1960). To office-goers around the Financial district, places they regularly frequent may become very *salient*.

## EXPECTANCY IN THE ENVIRONMENT

*Expectancy* is very central to our lives; it is also central to norms in a social group. In our day-to-day living we move about with the knowledge that certain events and things are going to occur, or exist, or happen the way we all expect it to be. Many of our daily actions are based on previous knowledge about events or tasks or settings. In a classroom, we expect students to be present, and the faculty to conduct the class. We expect chairs, tables, chalkboard and other objects to be present too.

*Expectant* elements, features, organizations, and structures are essential in defining a place. They constitute obvious structures in the way in which we internalize the environment. *Expectant* elements are never very clearly distinguishable. They are a set of generalized verbal and visual labels that we store in our mind and with which we have no specific place association.

Do we associate windows to a particular place? Or do we associate a lamp-post with a specific place? Given a simple task of imagining a typical object that we encounter in our daily outdoor life, and if we were to ask whether a window or any other common feature of a large environment was specific to a place that we had seen, we would hesitate. Thus in essence, *expectancy* is all about common things that are taken for granted but never paid particular attention to or discriminated in details from a family of like elements.

The examples of various elements and structures that are defined as *expectant* and occur in the urban environment without our paying close attention or major scrutiny are illustrated below.

## Defining expectancy

*Expectancy* in the environment is related to elements, organizations and knowledge of spatial arrangements. This is necessary to describe a place which is typical of similar places. *Expectant* qualities of a place help in developing a schema of places lying within the same domain.

## Illustrations

There are two examples, one of the indoor environment, and one of the outdoor environment that illustrate the *expectant* qualities in the place. The examples are adapted from the the theoretical discussions of Marvin Minsky, at M.I.T. He suggests that knowledge exists in frames. Information relating to a room would exist in various frames, and each frame would be related to specific set of attributes (Minsky, 1975).

In the two illustrations described below, the search for elements, features, and organizational relationships would be determined by previous knowledge about the schema of similar places. For a space the following checklist would have to be applied:

What is known about the place.

What is expected in the place.

What may be there.

The following set of propositions describing the two examples are developed by the researcher to explain *expectancy* in the environment:

What are the things out of place?

What are the qualities that you would recall easily at a later date?

## Office space in colleges

We begin with what features are *expected* in such an environment, or a place. The initial information given is "office spaces in colleges". We begin with that to develop the necessary schema of the above environment by pulling out the related frames discussed by Minsky. The level of details in offices that a person could call upon from memory would be either large or small, depending upon the previous familiarity with the prototypical space.

*What is known:* It is an office space, it is in an academic environment, and it belongs to a faculty member.

*What do we expect:* It will have four walls, at least one door, contain chairs, tables, book racks, books, stationery, filing cabinets, pictures hanging on the walls, a telephone and various other furniture pieces.

*What may be there:* In today's world, we could expect plants, sofas, couches, and even computer terminals.

If we had previous knowledge that it was a room of a Chemistry professor, then models of chemical bonding and other things related to chemistry could also come up as *expectant* elements.

This room is that of an architectural faculty member. It contains nearly all the features that any office may contain within an academic environment. What one probably would also have expected to be present were elements such as drawing boards, models, drawings and perspectives. But the supposedly critical things that were needed to develop an image are probably present.

## **An urban open space**

*This is a photograph of a public square in Boston.*

*What do we expect:* that it should have open space, that it should be enclosed by buildings, that there be some buildings with entrances facing the square, that there be some signs, and that there be roads leading to it or enclosing it.

*What we may expect:* that there be some benches, there be some trees, that there be some signs, some statues, or sculpture, that there be some activities, that there be people around, etc.

# METHODOLOGY

## FRAMEWORK

Research in environmental perception has traditionally centered around meanings and predominantly used semantic differentials as an important tool. Works in environmental studies on mental representation of images, unlike those in Cognitive Psychology, have focused on cognitive tasks, drawing abilities, and verbal reports (Lynch, 1960; Canter, 1977; Downs & Stea, 1973). An often used paradigm developed by Sperling (1960), and Haber (1970), has been that of visual discrimination and a partial report methodology.

Sperling presented letters in groups of four and five and asked his subjects to report on only a row of letters. In his method, the major issue under investigation was the storage capacity for visual images. He, and later others, argued that if the task of the research was to investigate how much information is stored for a short term in the human memory, then the best way to study this phenomenon was through partial reporting tasks. This is particularly true in research relating to the every day environment where the information content of each slide/stimulus is very large and complex.

The methodology that we are going to develop is a composite of various works done in the past. The issues are:

1. *To understand how places are remembered.*
2. *To ascertain which place features are remembered.*
3. *To understand why certain features are more likely to be remembered than others.*
4. *To differentiate between features remembered in verbal recall and visual recall.*
5. *To discover the minimal information that a person requires to identify a place from the schema of all such places.*

## QUESTIONNAIRES

There are many ways in which researchers have extracted information regarding the features and elements that people remember about a place, or many places. The most important and effective have been interviews, which had both structured as well as



free recall (open-ended conversation) as a part of the method. The other has been that of a questionnaire, where a large number of people are needed to get a perspective on the question.

The major factors in development of a strong image and memory have been identified by Appleyard and others as relating to the use of the place, and to associative memory. We have to probe deeper into other factors such as visits to a place and time spent in a place. Importantly, the questionnaire was intended to discover whether a large degree of verbalization was possible about a place. The description and identification of the importance of certain physical features was to be studied.

The questionnaire was also intended to relate verbal labels with places. Many people may hardly know the name of a place but can easily discriminate it. It was believed that people who respond to questions in the present study would abstract the features of a place based on a theme or reasons associated with physical qualities, e.g. it was unique, or that place was full of flowers or was very lively. Thus, within the same classification of "square" or "place," people have varying levels of schemata.

#### ISSUES RELATING TO USE OF SLIDES

In Environmental Design research, models, perspectives, photographs, and other graphic means have been very important in conveying an idea. Professionals have always simulated the physical environment through these techniques. Some planners and landscape architects have developed techniques to represent the environment that they experience, or which they wish to recreate in a variety of manners. In the absence of any standard technique, or of a language that could be easily used to convey all the information the planners and clients need for making decisions on design, a methodology which addresses the major issues is very important. Professionals have used the above mentioned methods for conveying their ideas, and also used them as a medium for soliciting reviews and questions regarding the project.

Many taxonomies have been developed (Lynch, 1960; Myer, Lynch & Appleyard, 1964; Halprin, 1965; Thiel, 1962), to represent the environment. Lynch's study was based on questionnaires and the drawing of maps by people to give directions to a stranger, etc. Myer, Lynch & Appleyard used a graphic taxonomy to represent the number of pieces of visual information that a person sees while driving a car. Halprin used a notation system to record the visual and auditory qualities of movement of water along a

space, in terms of time. They formulated a conceptual diagrammatic language to give geographic orientation to all the objects that could be seen. Unfortunately most of these methods do not give a coherent idea of the environment. They are abstractions of certain aspects of the environmental knowledge which are of importance to research investigations but of little importance to the people who are supposed to be applying them (Walker, 1974).

The need for representing an image of a place in great detail has often been provided by slides and photographs and, recently, by the use of digital video (Mohl '81). The loss of the various attributes of a three-dimensional environment in the fourth dimension (time) and its translation into a two dimensional representation has many problems. The use of slides as opposed to other media such as models or perspectives has been criticized for being inadequate both in design presentations and also in the conveyance of certain design ideas (Sims, 1974). However, the use of slides and photographs have been the best representation of the every day urban environment. Slides form a very critical component in works of nearly everyone in the field of Environmental Design.

The emphasis on photographic representation through slides as a design tool, and the frequent and varied use of slides and sketches in perception research in Architecture and Planning (Sanoff, Wineman, Appleyard, and Hershberger) and in Cognitive Psychology (Haber, Potter, Intraub and Beidermann) justify their use in the current study.

## RESEARCH DESIGN

### PHASE ONE

The purpose of the first phase of this study was to explore the responses of people to various specific urban places in Boston. The mode of transportation to these places, the frequency of visiting and the labels people use to classify and remember the places were the foci of the questionnaire. The second issue that the questionnaire intended to check was related to the familiarity of the places.

The Subjects for this phase were students from M.I.T., and were chosen from the list of those currently registered, maintained in the information office in the Institute. The selection was based on random distribution, and a total of eighty-five students

were sent the questionnaire through Interdepartmental mail, or dropped in the mailboxes of those living near the researcher's apartment block. Twenty-five complete responses were received.

## PHASE TWO

The aim of the second phase was to understand HOW and WHY people organise and classify squares in the manner that they report they do. The questions were designed so that the respondents were asked to cluster, rearrange or classify the squares, mentioned in the previous questionnaire, in any manner they chose as best representative of those places. The questions were intended to understand the structure and various reasons for formation of SCHEMA of places.

The same students who had completed the first phase were given the second questionnaire, which dealt with issues regarding the schema of a place. Twenty-five students were mailed the questionnaire, in the same manner as in the earlier phase. Sixteen satisfactory responses were received.

## PHASE THREE

The third phase of the study focused on visual recognition and discrimination. In this phase, two methods were adopted, one a checklist of verbal labels or various elements, and second, a graphic checklist.

The students in the second phase and the following phases were chosen from among those who had responded to the first questionnaire. The sample consisted of eight such students, who were called on a weekend or in spare time to participate in the further explorations.

**INSTRUMENTS:** The instruments used in the third phase consisted of twenty slides (Refer Appendix E) that illustrated five places/squares in the Boston-Cambridge area, and a paper checklist developed to identify the various physical elements. The slides consisted of two squares that were reported as very familiar and the others as unfamiliar. The slides were displayed for approximately half a minute to less than a minute (30-45 seconds) each through a Kodak Slide projector, and the approximate image size when projected on a screen was 2'-0" x 2'-0". The slides were taken by the experimenter using a 35 mm SLR camera, with a normal (50 mm) lens.

PROCEDURE: The students were previously instructed about the nature of the research, and told about the places that they would see in the slides which would follow.

"You are going to see slides of Harvard Square, Quincy Market, Downtown Crossing/Filene's Jordan Marsh, Kenmore Square, and Museum Wharf. The slides are grouped together, so that five of each place will be presented. The sequence has no bearing on the nature of the test. You will, further, complete a checklist, which will be about one of the places that you just saw."

The Subjects were given checklists containing various elements, such as street furniture, building details, and signs etc. from which they were to tick off those they thought existed in the slides of the place under consideration. Each student had two checklists, one which consisted of only verbal labels, and the other that consisted of only graphic elements and features. The verbal check list consisted of some features that were *expectant* such as the window shapes and locations, types of benches, and building heights (Refer Appendix C for the questionnaire), and also certain *salient* elements as defined by the respondents in the phase I. The graphic checklist consisted of features that are commonly seen in nearly all the places, and consisted of garbage bins, street lamps, window shapes and styles, street furniture and signs (Ref. Appendix D).

The aim of the third phase of the study was to determine which features and elements are recalled easily from the two different checklists. The graphic and verbal lists were assumed initially to represent different cognitive tasks which are performed in perception of the day-to-day urban environment. The percentage of correct reports in both would seemingly vary, because there are some aspects of the environment that are easily verbalized, and so stored, and others that are retained as visual information. Thus, visual images in one checklist would involve a discrimination task, and in the verbal recall, the Subjects would have to check only the verbal label of the objects that they recalled.

The task for the students was to correctly point out which types of lamp post, garbage bin, window, pattern, or other expectant feature were present in the slides of a particular place, as opposed to various other types of lamp posts, bins, benches and windows present only in the checklist. Also, they would be asked to discriminate "salient" features. These features might be important signs, or profile, or building form.

It is argued that the nature of information about a place is stored both verbally and visually. There has been some debate on how information is stored or recalled during short as well as long term tasks involving the use of images. We suspect that verbal information is expectant in nature, and that visual information reflects saliency. Though this has not been researched in relation to the natural environment, it has however been substantiated by studies in Cognitive Psychology, relating to the nature of Human memory (Spoehr & Lehmkuhle, 1982; Puff, 1982).

#### PHASE FOUR

This phase of the study focused on understanding the hierarchies that are used by people to describe a slide as it is presented. The experiment investigated the relationship between attention and verbalization of the various visual patterns.

The eight students who had gone through the previous phases of the study continued the process.

The stimulus material included eighteen slides, consisting of places that were previously shown, and some new slides were added. The instrument consisted of a slide projector, and a tape recording device, for recording the free oral description the Subjects gave of the various places presented.

PROCEDURE: The slides were arranged in a random manner, and each was followed by a blank. The slides were presented for a minute or less each. There were four trial slides in the beginning which were used to make the Subjects aware of the timing, and the recording methods.

Instructions were:

" You are going to see slides of places in and around Boston. Some of them are known to you and some may not be. The moment you see the slide you are to start giving a running commentary of all the things you think you are noticing and continue to do so. Each of the slides will be presented for about one minute, after that there will be a pause, and then the next slide. The experiment is not going to judge whether you know the places in the slide or not, so do not lay much importance on naming the place or locating it. The first three are trial slides; they check and prepare you for timings between the two slides and also for the manner of the presentation."

Also, the trial served to enable the researcher to make adjustments that might be required due to the pitch and loudness of the Subject's voice, before the actual presentation of the slides.

Each subject was individually shown the slides. The change of slides was followed by a small buzzer, which was used to record the breaks, in the tape. The tape counter was checked at the end of each session to note if there had been a consistency in the pause between the slide presentation and the initial spoken word.

Responses were recorded on tape and later analysed for the string of priorities, attention, and order in listing a place. The features that were described are presumed to be dependent on attention and *saliency*. The importance of such features would be evident in the way respondents structure their verbal reports. There is a direct relationship between order of eye fixation, and extraction of information from the saccades. There is a note of methodological caution here that one must mention. There is evidence from studies (Yarbus, 1967) that the extraction of information does not follow a similar and linear pattern. People fixate their eyes for a fraction of time, and do come to the same point many times to derive a concept that links the information to the verbal labels that he may choose to attach to that portion of eye movement. However the results are important because it gives us an indication what the verbalization of the visual attributes indicate, while the Subjects are watching the slides.

## PHASE FIVE

The purpose of the last phase, which employed a control group of Subjects, was to independently verify the legibility of a place in recall, and to check if the places were noted and recognised based upon the *salient* elements, structures and configurations.

The last aspect of the visual search paradigm relates to recognition and sufficiency of *salient* information in a place for its identification. Places that were very familiar to most of the people (Quincy Market, Harvard Square, Kenmore Square and Downtown Crossing), were drawn up by masking out many of the *salient* elements (eg. the windows of City Hall, and all the lights, and landscape and outdoor furniture). and presenting the Subjects with only those features that are normally *expectant*.

The Subjects were members of the M.I.T. community found in three public places at M.I.T.: the coffee shop, Lobby 7, and Rotch Library. The total number of tests given were thirteen. None of these Subjects had been involved in prior phases.

MATERIAL: The stimulus material was developed from the slides of the places that were used in the earlier slides. The material were drawings of places, sketched from the slides. The drawings consciously masked out all the identifiable *salient* elements and other features that were reported by the previous Subjects in the prior phases. The drawings of a place were in three categories: one were normal graphic sketches from the slide, one had all the *salient* elements excluded, and the third included all the *salient* features but excluded all the *expectant* elements in the background.

PROCEDURE: The drawings of the places were reduced and standardized into a 8.5" X 11" sheet, using xerox processes. The Subjects were asked to identify the places from drawings containing *expectant* features and structures, and then were shown drawings containing *salient* features only. The final set of drawings presented were graphic copies of the slide as it existed.

## FINDINGS

**INTRODUCTION** The questions in this research are exploratory in nature. They put emphasis on a systematic manner of understanding and of gathering information relating to the visual qualities of small urban spaces, such as squares and marketplaces. While the research in itself has important conclusions, it also, by its findings relating to questions often posed, fulfills the need of reaffirming intuitively held notions of design professionals. One such major problem that faces the professionals is to understand why certain squares and public spaces in a city are remembered more than the others.

It is necessary at this point to indicate that, in addition to addressing certain questions, it is equally important to develop a method for studying *saliency*, *expectancy* and *legibility* in urban spaces. A more rigorous and systematic study (one unfortunately beyond the scope of the present research) would obtain conclusive results on recall, discrimination, and other cognitive tasks relating to an understanding of *salient* and *expectant* features of squares and small urban spaces.

### ON SMALL URBAN PLACES

There are many reasons why some places are more popular or successful than others. Some of the reasons relate to the physical quality of the environment, and others to the locational advantages to major services and resources.

### PLACES THAT ARE MEMORABLE

Students listed twenty places in the metropolitan area of BOSTON as the ones that they would be most likely to remember. Seven places figured prominently among them. They were **Harvard Square, Central Square, M.I.T. Campus, Quincy Market, Copley Square, Chinatown and Combat Zone.** Of the seven places that were most often mentioned, M.I.T. and Central Square scored very high because the subjects for this study were drawn from the student community at M.I.T. Thus, in reality, one could state that only five of the places were truly memorable (more remembered). Table 1. below, gives an indication of the percentage of students who reported these places as one of the five most memorable places.



**TABLE 1**  
**Places likely to be remembered most**

HARVARD SQUARE	96 %	CENTRAL SQUARE	57 %
M.I.T. CAMPUS	50 %	QUINCY MARKET	50 %
COPLEY SQUARE	33 %	CHINATOWN	33 %
COMBAT ZONE	33 %		

Table 1: Percentage of Subjects, who indicated these as one of five places, likely to be remembered most.

Three of the seven places are located in Cambridge, and the rest are in Boston. Apart from the geographic proximity to M.I.T., there are other features in the two places (Harvard Square and Central Square) that would be explored in the later stages. Kendall Square, near M.I.T., is the closest square that comes to mind, when referring to proximity. However, Kendall Square was not mentioned at all, and neither did it figure in other experiments relating to verbal and visual reports on various slides. The first questionnaire also extracted the appropriate reasons for their memorability.

**Table II**  
**Reasons listed for remembering the five places.**  
 (Composite aggregate of all responses)

PLACES	Rank 1.	Rank 2.	Rank 3.
HARVARD SQUARE	Lively	Atmosphere	Different
CENTRAL SQUARE		Close Proximity	
M.I.T.	Workplace	Close Proximity	Different\$
QUINCY MARKET	Lively	Different	Clean
COPLEY SQUARE	Next to Lively	Unique Bldgs	
CHINATOWN	Different	Frequented	
COMBAT ZONE	Lively	Different	

## FAMILIARITY

Places listed as familiar by the students were also places that were among the five in the likely to be remembered most category. These places were chosen from the ones listed in the questionnaire 1. The places were rated on a five point bipolar scale of very familiar - very unfamiliar. Many places reported by students as familiar were not necessarily frequented very often. Though they might have been only seldom visited, the duration of the stay was long. Downtown Crossing and City Hall were the familiar places that were not among the earlier list of most memorable places.

An important finding is that there are some places that are quite familiar to the students and also similar to the other places in Boston with similar functions and physical features.

**Table III**  
**Familiarity Index for various places in Boston.**

HARVARD SQUARE:	4.8	CENTRAL SQUARE	4.1
QUINCY MARKET	3.6	COPLEY SQUARE	2.9
CHINATOWN	2.7	COMBAT ZONE	3.2
DOWNTOWN CROSSING	2.9	COPLEY PLACE	2.4
MUSEUM WHARF	2.1	CITY HALL	2.7
WATERFRONT	2.1	AQUARIUM	2.1
UNION PARK	1.5	PARK SQUARE	1.5
WINTHROP SQUARE	< 1.5	CUSTOM HOUSE	< 1.5
LIBERTY SQUARE	< 1.5	LAFAYETTE MALL	< 1.5

TABLE III: Average of the familiarity ratings of 25 responses on a five point scale.

There is a strong relationship between familiarity and frequency and time spent. The table below gives the frequency of visit to various places mentioned in table III.

**TABLE IV**  
**Frequency of visit**

PLACE	ONCE/TWICE	ONCE/MONTH	WEEKLY	DAILY
HARVARD SQUARE	--	26 %	66 %	8 %
CENTRAL SQUARE	--	11 %	34 %	55 %
QUINCY MARKET	13 %	62 %	25 %	--
COPLEY SQUARE	--	100 %	--	--
CHINATOWN	--	50 %	50 %	--
COMBAT ZONE	20 %	60 %	20 %	--
DOWNTOWN	20 %	60 %	20 %	--
CROSSING				

Table IV Percentage distribution of people  
who reported visiting these places.

The time spent in these places was also tabulated. This was important because it becomes critical to see what are the reasons for spending so much time, or, alternately, so little time, in a particular place. The design qualities in a place may be one of the components of the overall reason to stay in a place longer; if that is true, then the design features should play a large role in making a place more frequented. Table IV illustrates the average time spent by the students.

**Table V**  
**Distribution of people spending time at the places.**

PLACE	>2 HRS	1-2 HRS	1/2 HR	<1/2 HR
HARVARD SQUARE	73 %	72 %	--	--
QUINCY MARKET	41.6 %	25 %	33 %	--
COPLEY PLACE	36 %	21 %	43 %	--
DOWNTOWN	50 %	40 %	10 %	--
CROSSING				
WATERFRONT	60%	10 %	20 %	20 %

TABLE V: Number of people spending time, as percentage  
of the total number who reported visiting that particular place.

The frequency of time spent in the Waterfront area, is an interesting detail in the table, since the familiarity index for "Waterfront" was very low ( 2.1/5.0 ). This may be an important issue, since there exists ample evidence to indicate that memorable places are frequented often, and that people spend substantial time there.

### SALIENT FEATURES AND VERBALIZATION

Students were asked to list those qualities that they could easily remember and that were associated with the various places mentioned in the questionnaire. The intent was to develop a working list of features that could later be sorted out for *saliency*. Some very interesting observations could be made from the list that emerged by combining all the responses of the students.

Downtown Crossing had many explicit descriptions of elements. Also, some features very specific to Harvard Square were listed. Proper name of stores and shops figured very prominently in these two places. Most of the features and organizations were noted by the students too. In City Hall, the plaza and the brick facade was thought to be very prominent. The following table gives the complete list of all the words used by the students.

## TABLE VI

### Words that describe various places

HARVARD SQ:	Bookstores, Coop, Au Bon Pain, "T", brick pavement, Out of TownNews, shopfronts, Wordsworth, Harvard Square, brick buildings, Harvard Yard, Spires, People, Street singers, Flags, Canopies, Street vendors
CENTRAL SQ:	Purity Supreme, Bus stop, "T", dirty street, bars, modern buildings, small open square, Woolworths, Church spires, store
QUINCY MARKET:	Overhangs, Old buildings, Flags, Open Cafes, Street performers Food stalls, Signs, Glass corridors, benches, cobblestone Vendor carts,
COPLEY SQUARE:	Church, Old Church, Public library, Hancock Tower, Open plaza, Westin Hotel, Newbury Street, Fountain, Steps, People sitting, Bums, Trees.
CHINATOWN:	restaurants, signs, red and blue color, overhanging Chinese patterns, telephone booths, curio shops, old decaying building
COMBAT ZONE:	Neon signs, winos, bums, flickering signs, old dirty bldgs, Theatres, bright lights, traffic, nude posters, Naked l, bars
DOWNTOWN CRSNG:	Filene's Jordan Marsh, brick paving, Horse Cops, Flags, People, Old buildings, crowded streets, musicians, shopfronts. Lots of girls, handcarts, fashion stores, neon signs.
CITY HALL:	Plaza, Concrete building, Brick building, Vast open space, Brick floors, and steps. "T", Facade of the Hall, Steps, Bands,
WATERFRONT:	Sculpture, water fountain, Park, Sailboats, Aquarium, Brick Hotel
KENDALL SQ:	M.I.T., curved bldg, "T", old bldgs, bar, tracks, open space, Baybank, drugstores.
CUSTOM HSE:	Tall building, bars, clock, old stone buildings,

Table VI: Composite list of words that came into students' minds, when these places were mentioned.

Table VI shows the list of words that were used by the students to describe Quincy Market. It is surprising that many of these labels could not be said to be specific to Quincy Market, and may be found in many other places in Boston, at least in both Harvard Square and Downtown Crossing. Given the fact that Quincy Market was very high in the list of places that are apt to be remembered by the students years after they leave the city, it is likely that the words that are used to describe a place may not give a true picture; there might be a deeper structure that is used by people to store some set of information that is related to distinguishing the place from other places. Also, it is not clear from the table whether these are the only features and qualities that students pay attention to.

Earlier, we had defined *saliency* as those features which would be either noticed, or had qualities that distinguished them from the rest of the landscape (landscape refers to the panorama of vision). The features that were mentioned by the students which occur repeatedly are:

FLAG: Quincy Market, Harvard Square, Downtown Crossing

PAVEMENT: Quincy Market, Downtown Crossing, City Hall,  
Harvard Square

NEON SIGNS: Combat Zone, Downtown Crossing, Copley Place,  
Quincy Market.

VENDORS: Downtown Crossing, Quincy Market, Harvard Square.

At another level, that of the use of proper nouns as identifiers, students mentioned "Out of Town News", "Au Bon Pain," "Bay Bank," "Harvard Coop" in Harvard Square, and "Filenes" "Jordan Marsh" in Downtown Crossing.

There seem to be a group of elements that we found were repeated by the students in describing the qualities of a particular place. Thus, there may be a similar way in which people may associate a group of places to form a schema of places.

Now that we know that there are some common elements in many of the places in Boston, we have to investigate if there is a similar linking or grouping of places by the name itself, i.e. do people associate a group of places because they contain similar

(smaller scale) places, or do they group them according to *salient* elements, the classifiers mentioned above.

An experiment was conducted in which those students who had earlier completed the questionnaire took part. Out of the twenty-five students who were contacted for the followup, twenty-seven responses were received from sixteen students.

The major intent of the questionnaire was to elicit knowledge regarding mental constructs about places and how they are clustered. The respondents were given a list of twenty public places and were instructed to group them, and indicate their reasons for so grouping. Various reasons were given by the students for their clustering of the places. The composite list of the reasons was classified into six categories. **Function, density, visual texture, image, location, and activities.** The following table indicates the various reasons given by the respondents for the grouping.

**TABLE VII**  
**The reasons mentioned by the respondents.**

**FUNCTION/USE**

- Shopping
- Same type of uses
- Many people
- Leisure type
- Student area
- lively
- bookstores, and restaurants

**LOCATION**

- Near mass transit,
- Near river/water
- in a particular district
- Near a university
- Same city (Boston, Cambridge, etc.)

**TEXTURE**

- Similar buildings
- Highrises, etc.
- Old buildings/Modern
- Brick buildings/Stone, etc.

**IMAGE**

- Dangerous
- Similar situations
- Places of entertainment
- Places for ethnic food
- Slick area/well-maintained
- Sleezy area

**DENSITY**

- Too many people
- Too many high rises
- Too many automobiles

**ACTIVITIES**

- People moving around
- Eating, leisure walking etc.



Clusters in this study refers to *schema*. We shall be using them interchangeably. The cognitive task represented in this experiment indicated that the subjects associated places based on the similarities that they detected to be common among them. Contrary to common beliefs, people (students) do not place importance on the familiarity of a place to make judgements. Many of the students indicated that they were unfamiliar with *Museum Wharf, Waterfront Park, Aquarium, Winthrop Square* and others, yet they clustered them together. Most of the unfamiliar squares and "places" were assumed by the students to be either located in residential areas, or amid districts that were either not known to them or were thought of as uninteresting places for visitors, i.e. unidentifiable, nondescript parts of the city.

The following tables were developed by aggregating the responses according to the classified reasons, and are depicted as a composite representation of how the places are grouped together.

TABLE VIII a  
Clustering by Function  
( No. of Responses: 7 )

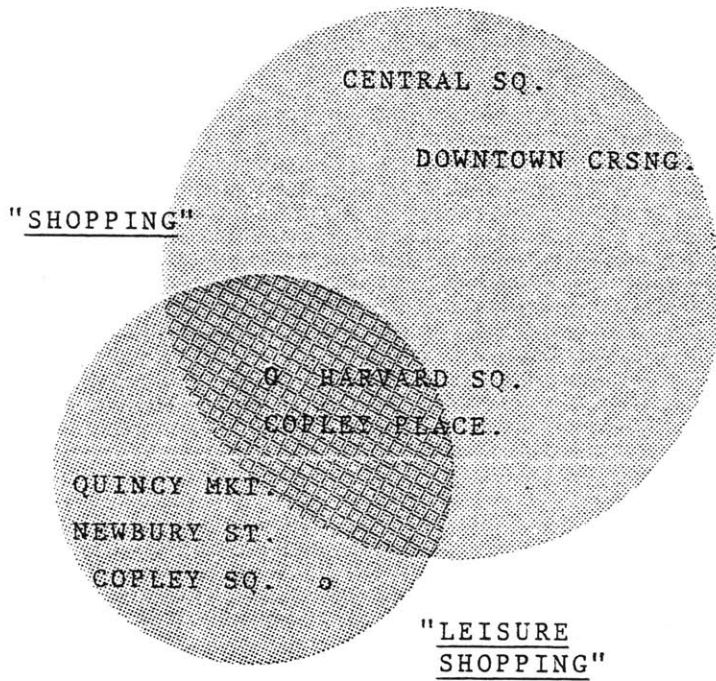


TABLE VIII b  
Clustering by Texture  
( No. of Responses: 4 )

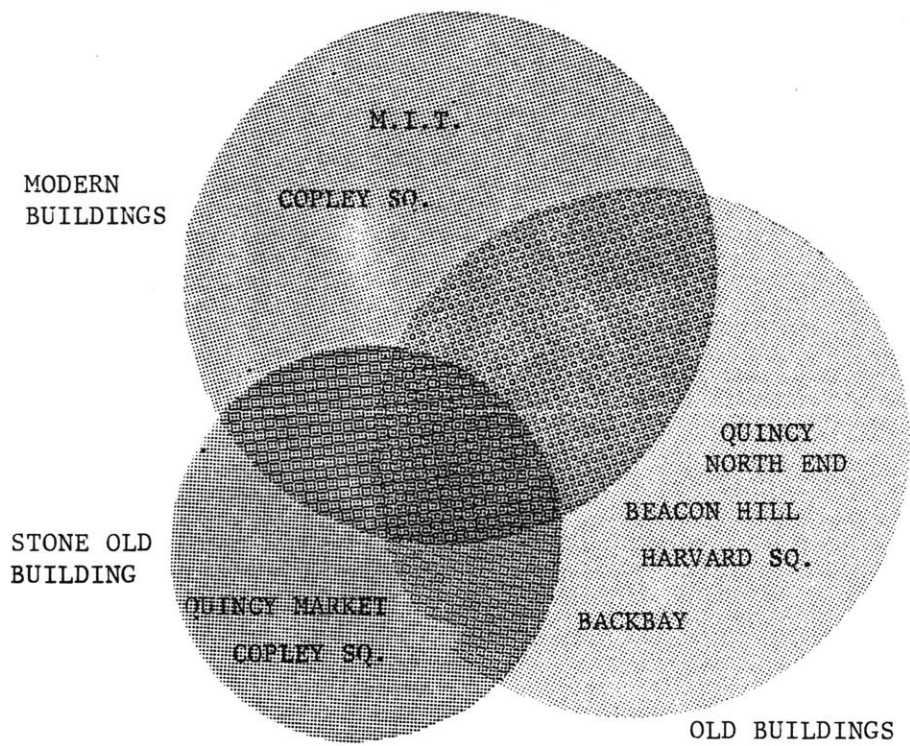


TABLE VIII c  
Clustering by Location  
( No. of Responses: 5 )

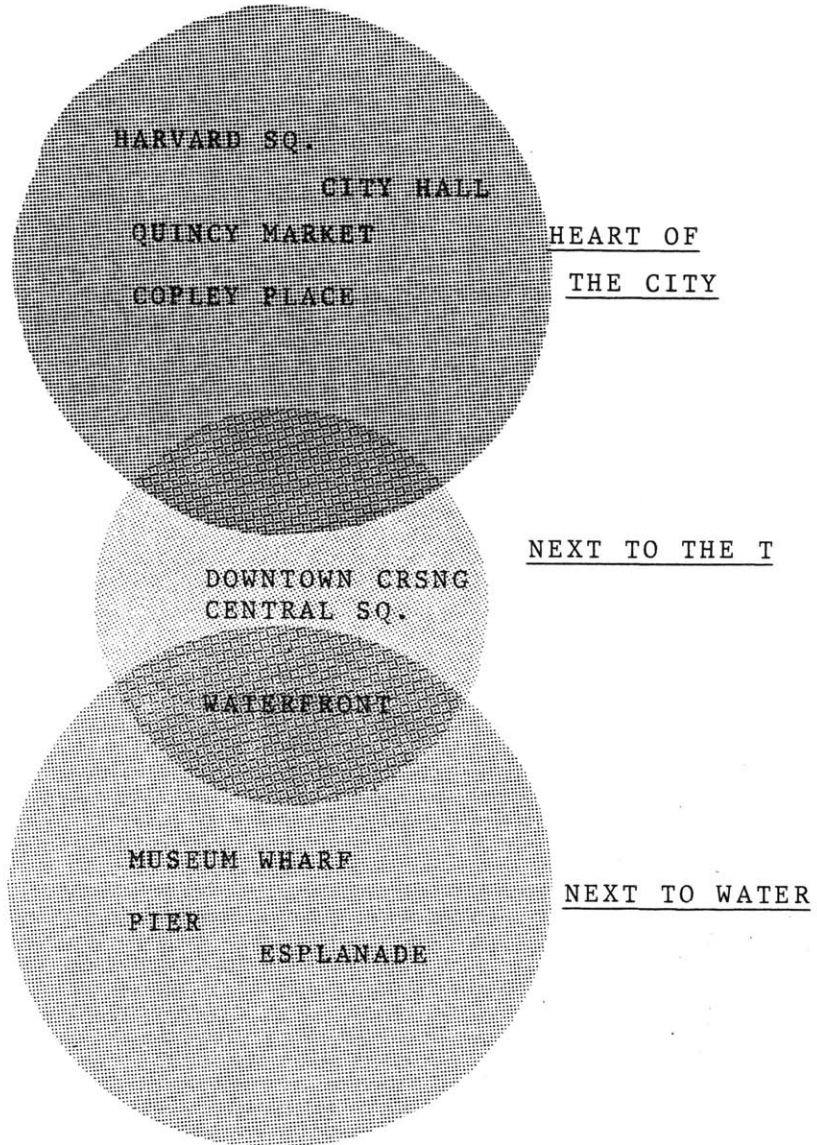


TABLE VIII d  
Clustering by Density  
( No. of Responses: 2 )

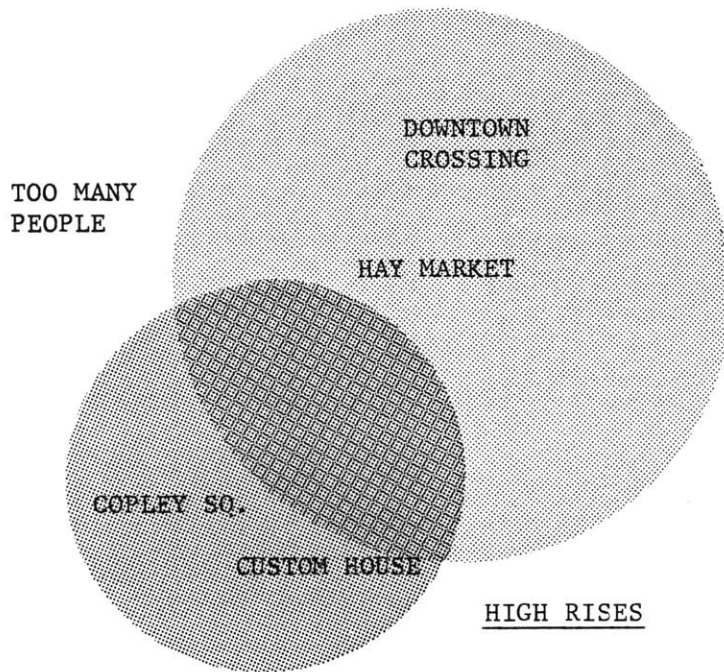


TABLE VIII e

Clustering by Activities

( No. of Responses: 4 )

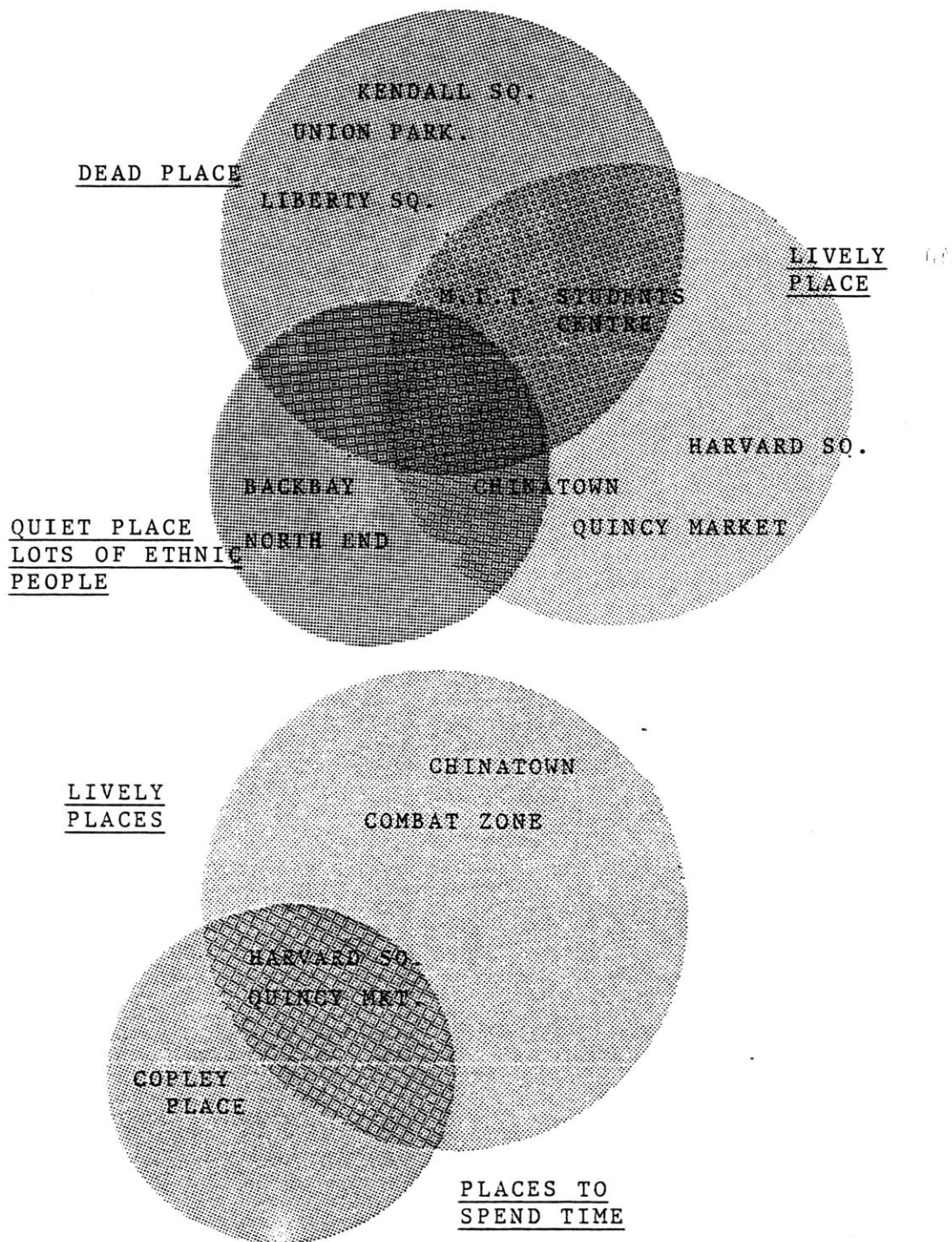
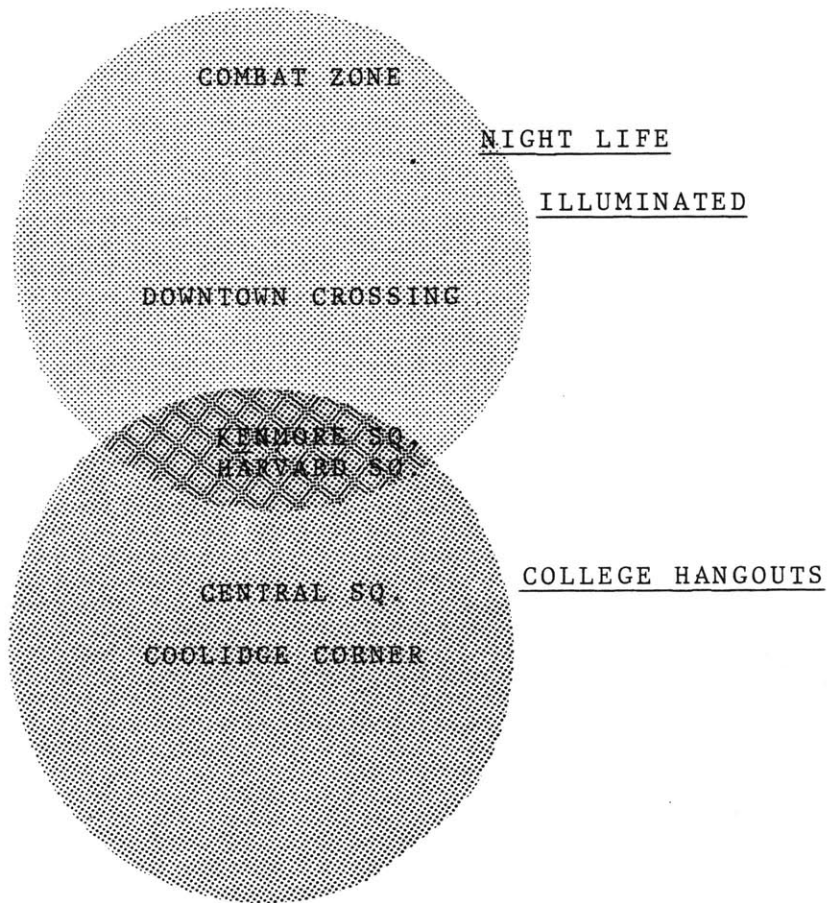


TABLE VIII f  
Clustering by Image  
( No. of Responses: 5 )



The diagrammatic representations indicate that the mental representations about places are mostly based on **Function, Use and image.**

Some students made more than one cluster. The words used to describe the reasons for forming a cluster varied. The tables and diagrams that were developed (Tables VIIIa, VIIIb,) reveal a wealth of information relating to schema formation of places in the urban environment. Seven out of sixteen respondents used variety of shops and their sizes in clustering the places together. They indicated that Harvard Square, Central Square, Downtown Crossing, Copley Square, Newbury Street, and Quincy Market were in the same category. There were, however, distinctions made among them. Shopping and leisure shopping were the terms used by two of the respondents. The other reasons cited for grouping by the students ranged from dazzling illumination at nights (**image or texture**) being near a university (**location**). Some of the classifications are as follows:

**Location:** "Heart of the city," "next to the water," "within walking distance of 'T'" and "college hangouts" were mentioned by two of the respondents. "Harvard Square," "Central Square," and "Kenmore Square" were the places that were linked as being college places or hangouts.

**Activities:** The most important reason for the clusters was similarities of activities. The responses that were analyzed noted that there were similarities in the places because the activities were of the same nature. This was based on the perception that students had of various parts of the city. One of the respondents mentioned in the questionnaire that he thought of both "Central Square" and "Waterfront" as a place of many bars which people frequented for a late night drink, or for some "fun time".

**Texture:** The places that were clustered by image were based on either the building materials, or the time period. The material classification meant whether there was a strong and overpowering dominance of a single material, such as glass, brick, or stone. The two classifications by period were old and modern. Harvard Square, Museum Wharf, Quincy Market, Newbury Street, all came under the category of old-styled buildings. Copley Place, City Hall, Central Square, and Kenmore Square were noted as being modern. Kenmore Square was mentioned in both categories.



**Image:** The notion of image is unique in clustering. Perception of a place, as well as perception of emotions and feelings, are found to be most important in developing images. "Dangerous," "slick," "sleezy" and "ethnic food places," were the words used to describe the places that were grouped by the respondents. "Chinatown," "Combat Zone," "Haymarket," and the "Piers" were termed as dangerous, sleezy, and messy.

Having probed their own notions, students elaborated their "schema" of the places and attempted to relate them in a meaningful way. One could argue that the questionnaire forced a judgement, and tried to elicit a "schema" which could not have been present. Another argument against this technique of schema formation could be that people do not have any association relating these places into a meaningful group. We found out from the earlier experiment, and Kampen (1982) also reports, that impressions are made about all public places based on the activities that occur in those places, on visual similarities or uniqueness about a place, based on places seen in the past. Indeed, most of the students in the first questionnaire had indicated remembering a place (Q1 & Q2; Appendix A) and mentioned *Lively place, Unique, Different*, as the features that best indicated the quality associated with them.

Further analysis of these clusters by overlapping the various places and their linkages and representing them as a network gave us an idea of an approximate model of the places in the minds of the students. There seems to be a conceptual relationship between the various places, based on the six categories. These supposedly are interlinked and could be retrieved by any one of the descriptors mentioned in the table above.

A Probable network of places or schema:

We have now got some idea of how schemata work, through the various diagrams that came out of the previous investigation. The schema of the places is probably a result of complex reasons such as: shopping, leisure, dangerous area, student areas, old neighborhood, proximity to river etc.

There must be some sort of qualifiers that are connecting the specific reasons into a visual image. The basis for this argument arose from the notion that visual images of places are mostly associated with the non-visual but important psychological actions and impressions based on social values. Rainwater notes, for example, that fear has a large impact on the people's perception of their own and other neighborhoods.

Changes in schema are linked to changes in expectations about the place. The expectations about a place, in turn, are formed from knowledge obtained developmentally. The information that is picked up during a short glance contains a systematic search for elements that are unexpected, or *salient*. To further explore this, we studied information extraction from the slides. A similar paradigm was investigated by Biedermann, in scene analysis. He modified the slides to include incongruences such as change in size of a man in a perspective drawing, or a fire hydrant that is out of position. Such examples are not to be found in every day situations and it may not be possible to have attention drawn to incongruences of the nature mentioned above.

#### SALIENCY AND EXPECTANCY IN SHORT PRESENTATIONS

Another experiment, which set out to explore which features or information were remembered easily by the students, employed an immediate recall task to discriminate from a given list of features (Appendix C). Only those features that the students felt they had noticed in an earlier set of slides were to be marked as being present in the slide. The checklist developed was based on the various physical features, objects and relationships that people use when they verbally describe a place.

We discovered that nearly all the elements in the slides were correctly mentioned by the students when they were presented with a checklist that contained all the combination of words that described the physical features of a particular place. The subjects noted a high degree of accuracy in reporting many of the objects and there was a consistent pattern noted in their reports.

There however some elements that were frequently reported wrong. The Subjects reported the descriptions of buildings wrong. They also reported the finer details related to buildings wrong. The slides that were presented and the typical answers to some of the elements in the verbal report are illustrated below.

SLIDES OF HARVARD SQUARE



In the slides, the verbal checklist scores for Harvard Square were as follows:

Table IX A  
Incorrect Reports

CATAGORY	ALWAYS INCORRECT	SOMETIMES INCORRECT
SIGN/SYMBOLS	Food Ads Posters Sale Signs	Billboards Parking Signs Banks
BUILDING FEATURES	Banners Traffic light	Accurate reporting
BUILDINGS	Parking Meters Vending box	--
LANDSCAPE	Trees Planters	
OUTSIDE	bollards	Iron railing:Modern Concrete benches

Always Incorrect indicates higher > 4 respondents reporting the element or feature incorrectly.

SLIDES OF DOWNTOWN CROSSING

The four slides which the respondents used for the checklist are in the appendix.



Table IX B  
Incorrect Reports of Features

CATAGORY	ALWAYS INCORRECT	SOMETIMES INCORRECT
SIGNS/SYMBOLS	Bars, Food Ads Sale signs	Neon Signs Chemists,
BUILDING FEATURES	T. Stop Traffic signs	Handcarts
BUILDINGS	---	---
LANDSCAPE	---	Trees/no leaves Plants Stub trees
OUTSIDE FEATURES	Conc./benches ---	-- ---
BUILDING TYPE:	There was no answer given that could be termed as incorrect.	

SLIDES OF QUINCY MARKET



Table IX C

Incorrect Reports of features.

CATEGORY	ALWAYS INCORRECT	SOMETIMES INCORRECT
SIGNS/SYMBOLS	Food Ads	--
BUILDING FEATURES	Stone Columns	--
BUILDING	--	--
LANDSCAPE	Trees/no leaves	--
OUTSIDE FEATURES	--	Old Clock
	--	Flower Kiosks
		Iron Railing:Modern
BUILDING	---	---

SLIDES OF KENMORE SQUARE

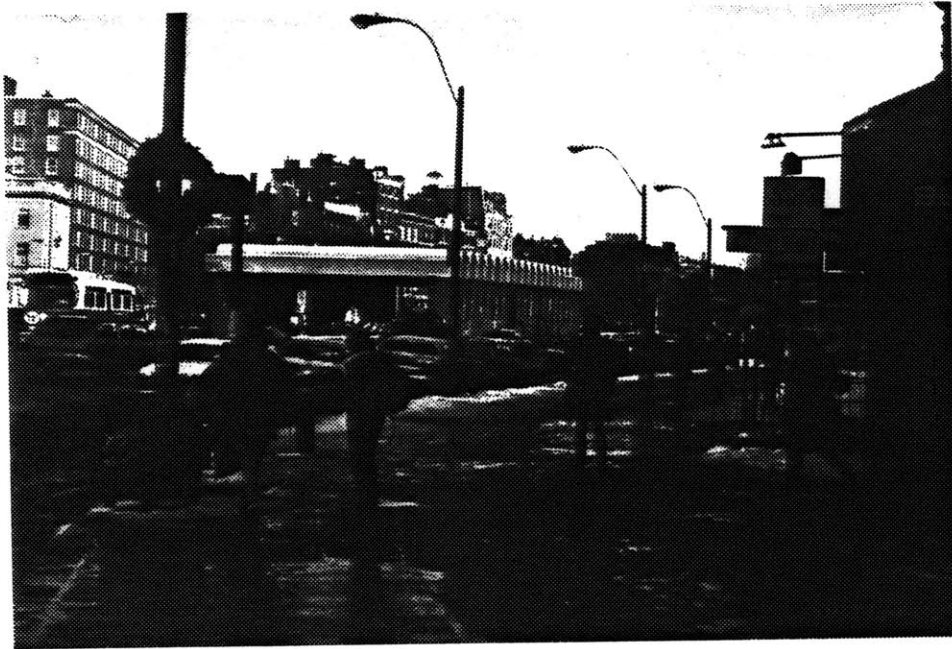
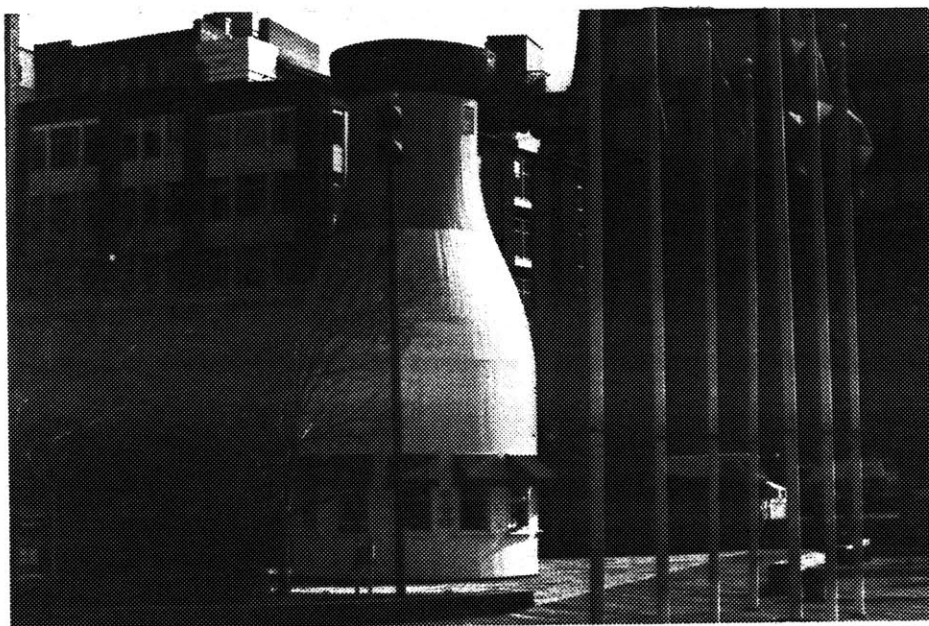


Table IX D  
Incorrect reports of features

CATAGORY	ALWAYS INCORRECT	SOMETIMES INCORRECT
SIGNS/SYMBOLS	Posters on the Wall	--
BUILDING FEATURES	--	Wooden doors
BUILDINGS	< 5 Stories	--
LANDSCAPE	--	Vending BoX
OUTSIDE	Old Clocks	Lawns\$Grass
BUILDING TYPE	--	--
		Bollards
		brick+stone

SLIDES OF MUSEUM WHARF



**Table IX E**  
Incorrect reports of features

CATAGORY	ALWAYS INCORRECT	SOMETIMES INCORRECT
SIGNS/SYMBOLS	--	--
BUILDING FEATURES	-- Railings	Wooden Doors --
BUILDINGS	< 5 Stories --	Brick & Stone Windows
LANDSCAPE	--	Plants\$Trees,
OUTSIDE	Benches Iron garbage	-- Bollards
BUILDING TYPE	--	wooden



A careful study of some of the reports from the verbal checklist indicates that there could be some elements such as benches, garbage bins, clocks, bollards, and railings which occur frequently in the table of misreporting. These misreportings suggest that certain street furniture and some aspects of buildings such as height and material texture are expected by people to normally exist in that particular type of a setting, and they therefore set out to look for other easily detectable elements and relationships between objects.

#### Visual content of elements.

In our earlier study we had obtained a list of words used by the subjects to describe various places in Boston (Table IV). We supposed that most of the words that described them would have to have *salient* qualities to have become associated with each of those places; if this were found to be true, we would then explore what aspects of those elements are actually unique, and also at what levels of detail the features are recognized. The visual checklist (Appendix D) contained four such elements. They were garbage bins, benches, street lights and windows. The respondents were to identify from the list those which they thought were present in the place that they had just seen in the slides.

Most of the Subjects were for the most part at a loss to correctly discriminate from the checklist the specific lamp posts that were present in Quincy Market. The same was true for Downtown Crossing where the lights were very *salient* but they could not be distinguished from Quincy Market. Out of the ten who checked lamp posts only three were able to correctly identify the lights in Quincy Market.

Window is an *expectant* element, and it has no specific quality that could be retained in great details. The garbage bins on the other hand were assumed to be *expectant*. The findings suggest that they were very difficult to distinguish, except in the case of Quincy Market, where the feature was prominent enough so that three Subjects who were asked to indicate which one was taken from that particular place reacted by giving correct answers. The bench, as mentioned earlier, was a *salient* feature, and received all correct responses.

At this stage, one would suggest that this result is not definitive for two reasons: because the variety of elements incorporated in the checklist were not exhaustive, and

because there was an absence of a sufficient number of trials to conclusively establish the reliability. However one could speculate a probable answer.

*Salient* features, such as street furniture, signs and flags taken in isolation from their context lose their *saliency* and are very difficult to distinguish from similar ones. Lights in Downtown Crossing and Quincy Market are very *salient* but the level of detail that we know about them does not extend beyond the overall shape and approximate material qualities. Benches, on the other hand, seem to evoke a different type of response from the people.

The tabular result of the responses is shown below.

**Table X**  
Responses to the slides

PLACES	WINDOWS	LIGHTS	BINS	BENCHES
HARVARD SQ.	6	5	6	3
DOWNTOWN CROSSING	6	5	2	2
KENMORE SQ.	5	7	6	1
QUINCY MKT.	3	7	3	0

Table X: Incorrect responses by whole number,  
out of eight responses.

### ATTENTION TO FEATURES AND ORAL REPORTS

Information processing theories suggest that people remember certain things about an event long after the event had taken place. Only those aspects of the event are retained which are particularly memorable. Also a lot of information is forgotten over a period of time. Eight subjects gave oral commentaries of what all they were seeing, while slides were being presented for a short period of time. Their commentaries were analyzed for the physical elements and possible organizations.

The following tables are analysis of one slide each of Harvard square, Downtown Crossing, Kenmore square and Quincy Market. The first four physical features mentioned by the Subjects were tabulated in the order in which they were reported.

## HARVARD SQUARE

SUBJECT	FIRST WORD	SECOND WORD	THIRD WORD	FOURTH
ONE	Bay Bank	Lights	Kiosk	Garbage bin
TWO	Bay Bank	Clock	NewsPaper Std'	Steps
THREE	Kiosk	Bay Bank	Sale Sign	Lights
FOUR	Lights	CO-OP	Bay Bank	Cover on T
FIVE	BaY Bank	Lights	Black Lights	Kiosk
SIX	Bay Bank	Sale sign	Kiosk	Lights
SEVEN	Lights	Bay Bank	Kiosk	Brick Bldg
EIGHT	Bay Bank	Brick Bldg	White Cover	Kiosk

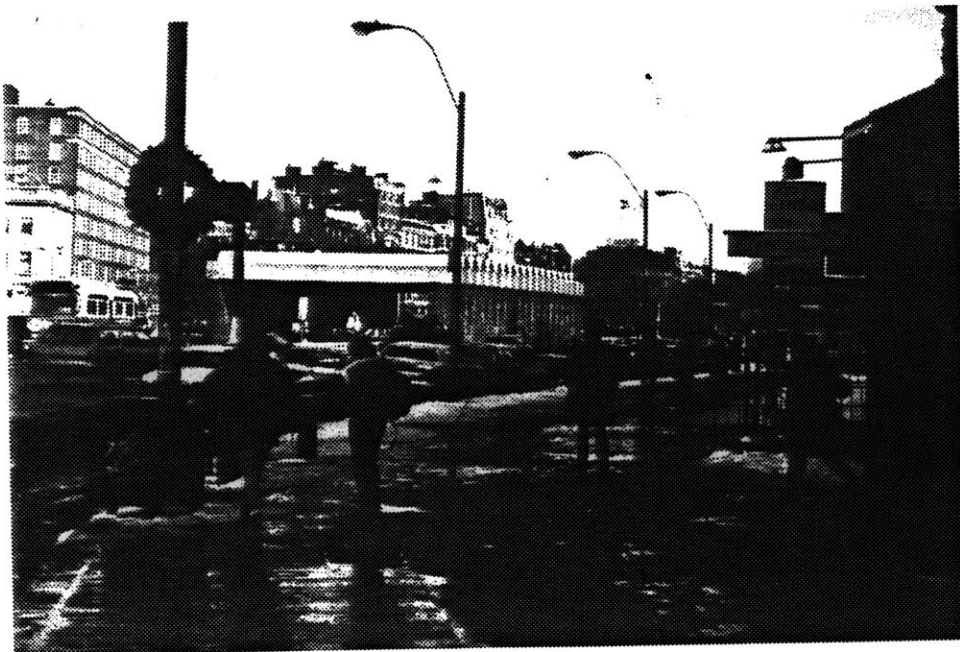
Slide of Harvard Square



KENMORE SQUARE

SUBJECT	FIRST WORD	SECOND WORD	THIRD WORD	FOURTH
ONE --	People	Building	Wreath on Pillar	Tall Red Brick Bldg
TWO --	Sidewalk with snow	Restaurant Sign	Trashbin Mailbox	Wreath
THREE	Wreath	Garbage bin	Sid's sign	Brick shed
FOUR	Bus shed	Lights	Sidewalk	Wreath
FIVE --	Lots of Brick Bldg	Bus shed	Wreath	Pizza Beef Sign
SIX	Brick Bldg	Shed	Lights	Wreath
SEVEN --	Brick Bldg	Wreath with Post	Lampost	Sidewalk Snow
EIGHT	Sidewalk	Wreath	Bus shed	Brick Bldg

Slide of Kenmore Square



## DOWNTOWN CROSSING

SUBJECT	FIRST WORD	SECOND WORD	THIRD WORD	FOURTH
ONE --	Flag	Red brick Bldg	Lights/ Globes	Pillars Chains
TWO --	Lampost with lamps	Clock	Tall Office Bldgs	Benches
THREE	Lights	Brk Paving	Tall Bldg	Clock
FOUR	Tall Bldg	Globes	Benches	Brick Bldg
FIVE	Globes	Clock	Red Paving	Pillars
SIX	Globes	Flag	Tall Bldg	Chain Post
SEVEN	Pavement	Globes	Benches	Clock
EIGHT --	Globes	Many Bldgs	Tall black Bldg	Brick Pavement

Slide of Downtown Crossing



## QUINCY MARKET

SUBJECT	FIRST WORD	SECOND WORD	THIRD WORD	FOURTH
ONE	Benches	Bldg left	Windows	Banners
--			and Archs	Color
TWO	Directory	bench	Yellow	Banner
--			Banner	
THREE	Benches	Flag		
FOUR	Globes	Color	Canopy	Telephone
--		Banner	Bldg	
FIVE	Globes	Directory	Banner	Curved
--	of Light			Windows
SIX	Color	Globes	Benches	Telephone
--	Banners	and Lights		
SEVEN	Color	Globes	Directory	Windows
--	Banners	of Light		Building
EIGHT	Color	Windows	Globes	Blue
--	Banner	& Benches		Canopy



Oral commentaries by the Subjects indicate that there is some degree of consistency in the first four physical elements that are noticed in the slides. Earlier in free recall of identifiers for the familiar places we had noticed that some of the features were common to few of the places. Tables and lists those physical elements. The transcripts (Appendix E) indicate that physical elements compete with people and cars etc. for attention during the oral commentaries. This was eliminated in the tables given above. We discover that the physical elements in all the slides are very salient and in distinctive positions.

A building with its color or material frequently figured in the first four physical elements. Most of the other physical features were either street furniture or landscape elements, which implies that they are very noticeable in the earlier stages of the information gathering. Also the tables suggest an order that is internal in these commentaries, which is the relationship of these salient soft design elements and a building position. People seem to be looking at these elements and try to position them in space by noticing position of the some surrounding buildings.

Finally the commentaries were found to fall into two categories. One which were very clipped and precise on other where the Subjects attempted to begin the commentary with a conceptual understanding of where or what the place was all about. The Subjects who tried to name or conceptualize the functions of the place depicted in the slide spent a lot of time in figuring out where or what were the elements in that slide.

The following table lists out the concepts that were mentioned by by two of the subjects for all the slides presented.



Table XI

List of Concepts mentioned by two Subjects during oral commentary.

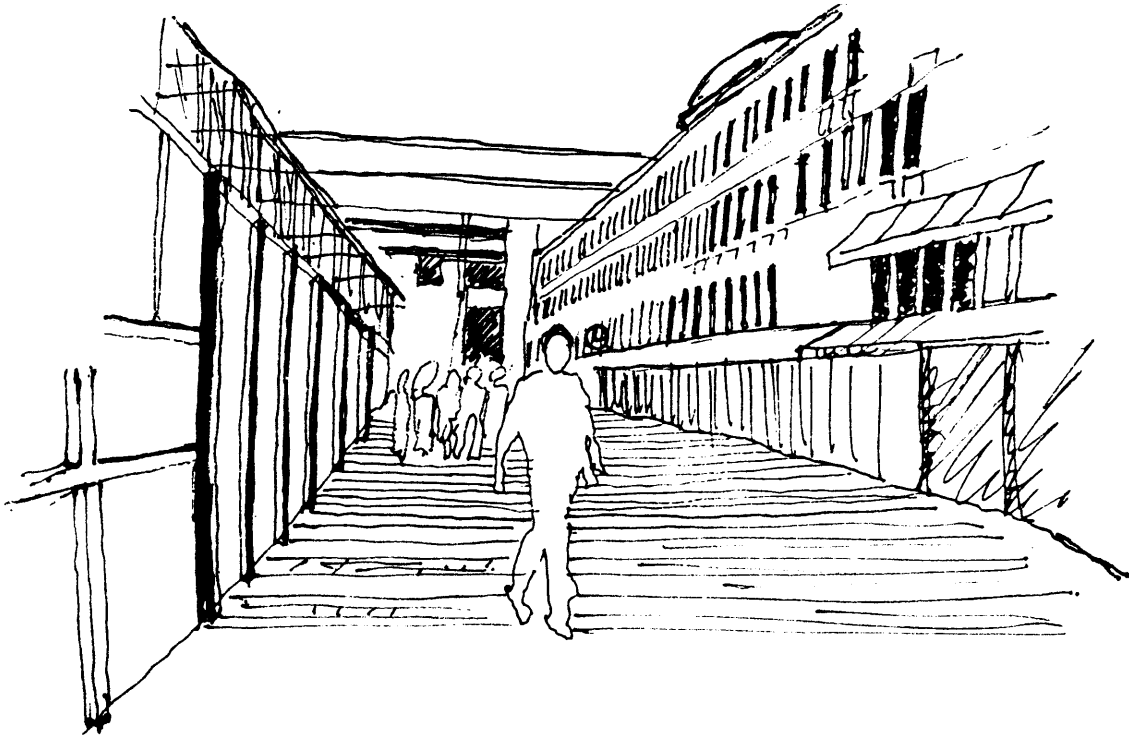
1.	Looks like a square	This is Harvard Sq.
2.	Some kind of Downtown	Edge of Harvard Yard
3.	This is same place	Different view of the Sq.
4.	-----	Again the same place
5.	-----	-----
6.	Some kind of a Sq.	-----
7.	Downtown area ?	Kenmore Square
8.	Apartment Bldg	Backbay area
9.	Downtown Area	like its near Kenmore
10.	-----	Kenmore Square
11.	Shopping Center	Near about Filene's
12.	Shopping Center	Summer Street.
13.	Shopping Center	Around Washington St.
14.	Pleasant Covered Place	----
15.	Shopping Center	Quincy Market
16.	Same place as before	Quincy Market, other View

## SALIENT DRAWINGS

The control group consisted of subjects from the M.I.T. community, who had not participated in the earlier phases. They were shown a set of drawings which were drafted to exclude various identifying objects and *salient* features and asked to identify the places from the drawings.

The drawings were in three categories. One was a near representation of the slides of Harvard Square, Downtown Crossing, Kenmore Square, and Quincy Market; the second had all *salient* features removed; and in the third category, there was a manipulation of background qualities that are *expectant* in nature. The results of the exploration are presented in the following discussion.

## QUINCY MARKET



QUINCY MARKET: The first drawing does not include any *salient* features, and the illustration provided minimal information related to the building envelopes that surrounded the place. Only three of the fifteen subjects were able to recognise the place.

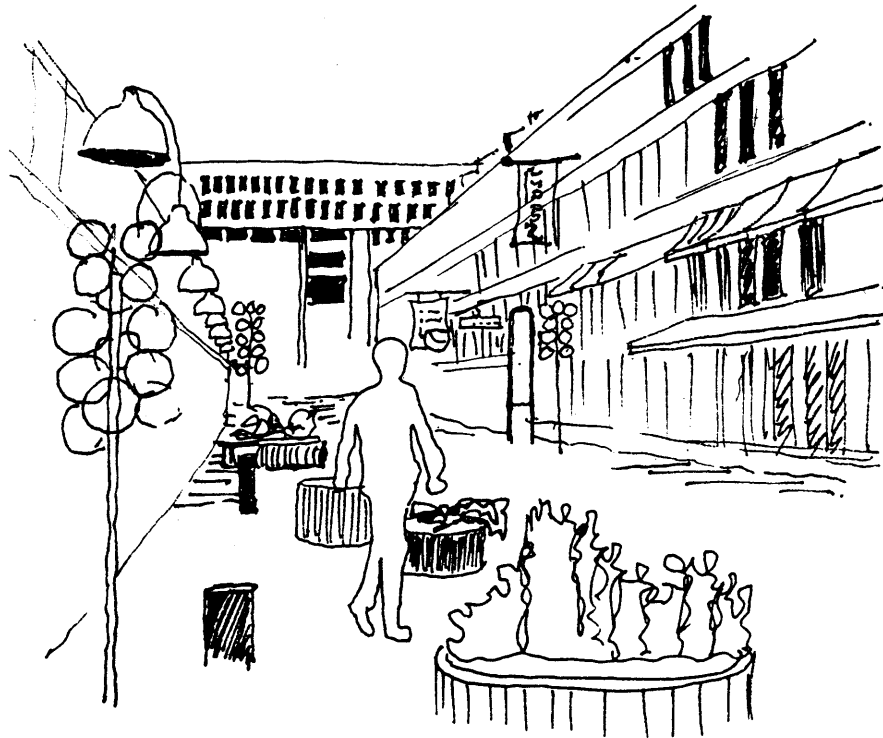
"I think this place is near Quincy Market. I have friend nearby who stays behind the Long Wharf, whom I visit often."

"Because I have been in Boston for over five years, and been to that place very often. The height of the buildings, and the rhythm of the windows seemed like that."

"I made an educated guess, based on your explanation that it was a known place, and the only known place that I knew was similar, was Quincy..."

Only three persons reported a failure in reporting the correct answer to the second more detailed illustration below. They were unable to do so because they said that they had not been around Boston enough to easily recognise the place, or as one stated: " I am very lousy in recognising my own neighborhood in photographs, so it is impossible for me to make even an educated guess."

#### QUINCY MARKET



DOWNTOWN CROSSING: The illustrations depict the most celebrated portion of the place, namely, Summer Street, between Filene's and Jordan Marsh. The first illustration was not recognized by anyone and the next by only two of the Subjects.

"The clock is a dead giveaway. I guess the opposite side has a smooth building with some hollow area, and that is only in this place".

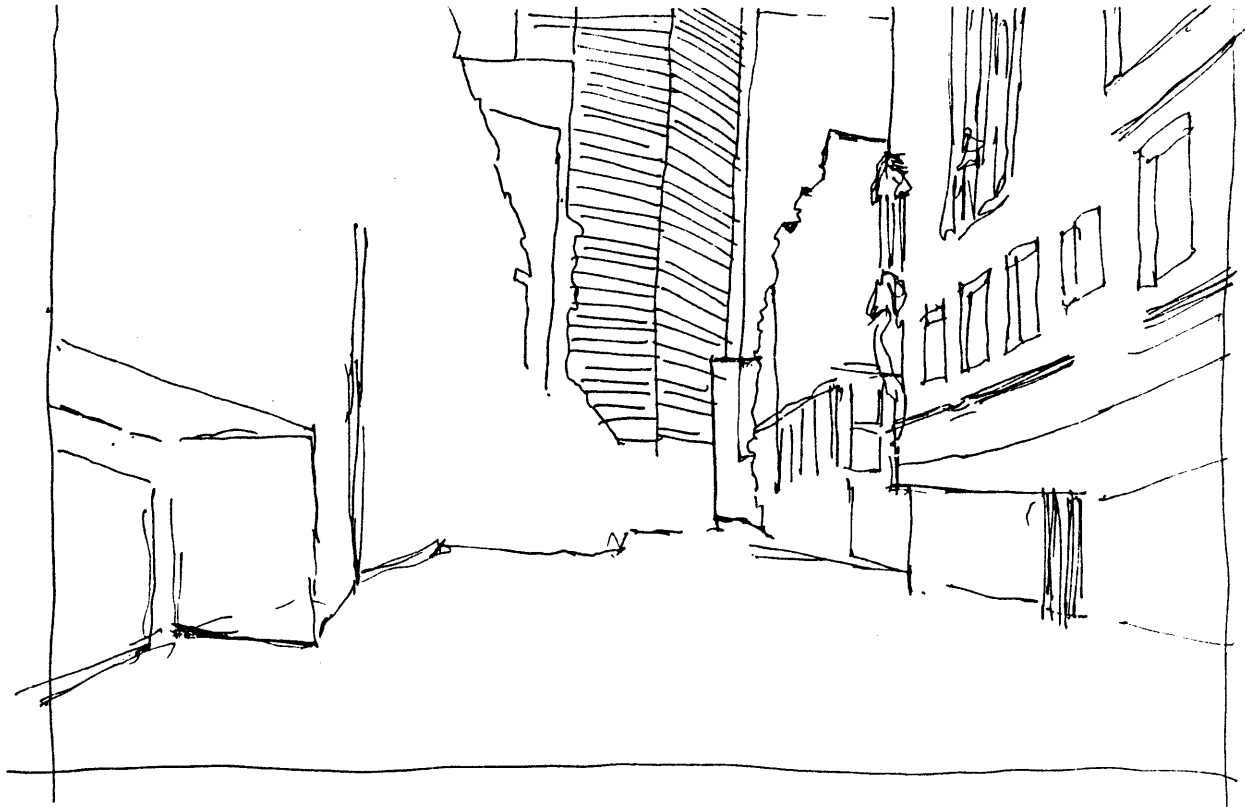
(*Researcher:* "Well what if I say that Park Street has this near the Old Church ? ")

"Then in that case, its probably the width of the street ! I hope you have not distorted the drawing to mislead me...?"

"The clock and the overhanging projection. I have been there once during rains, and watched that while I was outside Jordan Marsh entrance, waiting to get to the parking lot, near Commercial Street".

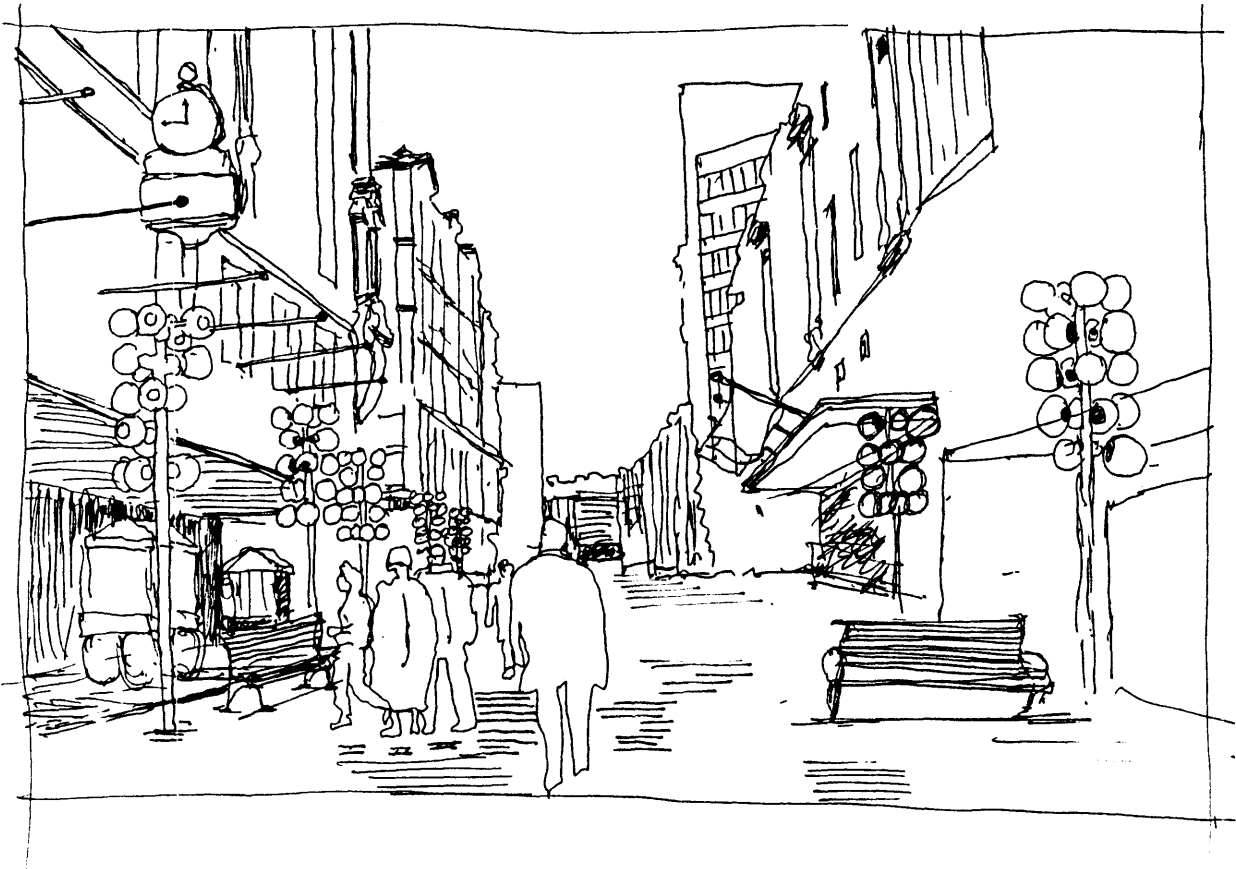
#### DOWNTOWN CROSSING





The last drawing was said by all to be explicit. The lights, bench and space distance was mentioned. One of the Subjects mentioned that the only place where the benches were in the middle of the street was the Filene's and Jordan Marsh area, though he added that the clock and the flags did confirm the place beyond doubt.

#### DOWNTOWN CROSSING



In this drawing all the respondents readily agreed that the place looked like Harvard Square. The most typical of the remarks were as follows:

"I can make out it is Harvard Square from the 'T' Stop."

"The lights, and the billboard on top confirmed that it was the 'T' stop in Harvard Square."

(Note: The actual words are not used for this drawing because the agreement was unanimous. The "T" stop was the most vital link.)

#### HARVARD SQUARE





HARVARD SQUARE: the illustration of Harvard Square, has been that the "T" entrance and Out of Town News were both excluded and so were some of the lights in the place. The illustration did place emphasis on the details of the buildings such as Harvard Coop, and the one next to it. This drawing lacked any identifying features so that it became impossible for the people to even judge correctly whether it was in the region at all. This was the only place that did not have a single correct guess, by any of the people who were asked.

#### HARVARD SQUARE

## FINAL WORDS

In the various phases the data collected was in fact insufficient for drawing any definitive conclusion. There were however, many important findings, that emerged from the research. Some of them relate to specific aspects of the places itself, and some deal with the cognitive process.

There is a need to establish a method which would include a few techniques which are useful in dealing with various stages of visual perception.

## FINAL WORDS

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## CONCLUSIONS IN RETROSPECT

The research has attempted to achieve two goals, a rather difficult task to address within a short span of time. The first aim was to develop a viable method for gathering information on the various components of small urban spaces; the second aim was to understand the role of *salient* and *expectant* qualities in the perception of the urban environment.

### A VIABLE METHODOLOGY

In the beginning of this research, we established through a review of the literature that design professionals should have a thorough understanding of the visual qualities of small urban parcels, to be able to design such places to make them more meaningful and legible so that the places could begin to exhibit individual identity. The need for a methodology was implied as a possible answer in that direction.

Using various phases of experimental explorations we have established some definite conclusions. Briefly they are:

What we remember about urban spaces involves specific goal - oriented probes such as discriminating visual elements from others in the same class and extracting physical attributes of an environment after it has been viewed, both recently and in the past.

To study what people know about a place in relation to places of similar nature requires an exploration both of what information is gathered initially during brief presentations and which type of physical features are retained over a long period of time. Slides presented for a short time are useful in gathering all the information relating to a place, and through free recall of various places we know about those physical attributes that are retained.

Places of similar nature are normally used as case studies by professionals while designing a particular piece of the urban environment. It becomes important for them to know if the similarity among them is based on visual qualities or rather on the non-physical attributes of those places. To understand this relationship between various urban spaces, specific tasks and cognitive structuring techniques such as clustering or organizing a group of places of similar scale within a geographic region are very useful.

It is necessary to examine a large variety of urban spaces to understand what people pay attention to, and how they organize these features to make sense of the place. Oral commentaries allow us to record some portion of the attention attracting process.

Finally, through the various techniques of using questionnaires, slides as representations of actual environments, and visual and verbal recall tasks, we tried to answer issues relating to

Memorable places of a city.

Familiarity of a variety of places.

Schema of places, and Schemata.

Salient and Expectant qualities of a place

## SALIENCY AND EXPECTANCY

*We began this research with the assumption that legible and memorable places have certain qualities to associated with them. Also, we assumed that with two definers or qualifiers, salient and expectant elements, we can develop an understanding of legibility of places.*

We conclude the following through our exploration and deductions:

**Salient elements in a particular place have two qualities.** Elements located in focal points of a particular place become salient. Also salient elements are meaningful only when their location is prominent. Salient elements occur in clusters, if their size is small. Benches, flags, lights, planter boxes and signs are noticed to be salient against a backdrop of expectant elements. In themselves these become similar to expectant elements. Thus all elements that are noticed in the various spaces of our study are salient to a large extent.

**Salient elements are remembered by people long after they have lost associations with that particular place.** Through our explorations we have noticed that the list of elements, objects and organizations that were associated to a particular place, occur repeatedly in time, as well as other places. The same elements are remembered after months and the same too are noticed in short presentations.

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## APPENDIX QUESTIONNAIRE I

## QUESTIONNAIRE

This questionnaire is a part of a research paper being done by the author. The objective of this questionnaire is to elicit information regarding various public places around Boston area. The questions are aimed gaining knowledge about things you remember about the areas named in the questionnaire

*Your assistance in terms of filling out this will be very useful, and this information shall be used for academic purposes only.*

*Please return this questionnaire through Interdepartmental mail to: Anil Khullar, Rm 10-485, or 23E3 Tang Hall.*

-----

Q 1. Supposing after being away from Boston for ten years you were asked to remember places in Boston, what are the 5 places/areas you would you recall easily with clarity ?

1. MIT
2. Harvard Sq.
3. Harvard Sq.
4. Harvard Sq.
5. Harvard Sq.

Q 2. What would be the probable reasons for your remembering them ?

- |  |    |    |    |    |    |
|--|----|----|----|----|----|
|  | 1. | 2. | 3. | 4. | 5. |
|--|----|----|----|----|----|
1. It was next to my place of work/residence
  2. It was frequented by me often
  3. It was lively place
  4. It had a different atmosphere
  5. It was on my route to work/home
  6. It was clean and well maintained
  7. It was safe
  8. I spent my spare time there
  9. It was different

10. It was unique in the  
kind of buildings that  
I had seen before

Q 3. The number of times you have visited these places ?  
(In terms of frequency )

	Once/ Twice,	Once/month	Weekly	Daily
Place 1.				✓
Place 2.				
Place 3.				
Place 4.				
Place 5.				

Q 4. What are the predominant mode of transport that you use while going to these places ?  
(Tick the relevant )

	Car	Bus/Walking	Tube/Walking	Cab	Bicycling
Place 1.			✓		
Place 2.			✓		
Place 3.			✓		
Place 4.					
Place 5.			✓		

Q. 5. What are the features physical or other aspects about the place that you associate or remember in connection with the places that you have just mentioned (The aim of this question is to know all the possible qualities objects, elements etc that come into your mind immediately without extra effort on your part to remember every thing possible )

Q 6. Which of these areas in Boston/Cambridge area are you familiar with ? ( Please rate it in a five point scale.)

	Very Familiar			Un familiar	
* Copley Square.	5	4	3	2	1
* Downtown Crossing	5	4	3	2	1
* Faneuil Hall/Quincy	5	4	3	2	1
* Copley Place/ Neiman Markus	5	4	3	2	1
* Harvard Square	5	4	3	2	1
* City Hall Plaza	5	4	3	2	1
* Waterfront/ Aquarium	5	4	3	2	1
* Museum Wharf	5	4	3	2	1
* Union Park Sq.	5	4	3	2	1
* Park Sq.	5	4	3	2	1
* Lafayette Mall	5	4	3	2	1
* Liberty Sq.	5	4	3	2	1
* Custom Hs/ State St.	5	4	3	2	1
* Winthrop Sq.	5	4	3	2	1

Q 7. How often or how many times have you visited these places ? ( Please tick the appropriate )

	Once/ Twice	Once/ month	Weekly
* Copley Square			
* Faneuil Hall/			
	Once/ Twice	Once/ month	Weekly
* Downtown Crossing/ Filene's			
* Copley Place/ Nieman Markus			

- \* Harvard Square
- \* City Hall Plaza
- \* Waterfront/ Aquarium
- \* Muesuem Wharf
- \* Union Park Sq.
- \* Park Sq.
- \* Lafayette Mall
- \* Liberty Sq.
- \* Custom Hs/ State St.
- \* Winthrop Sq.

Q 8. What are the following that best describe the purpose of your visits ? *(tick the appropriate)*

- \* place of Work
- \* Shopping
- \* For weekend visits
- \* Friends and casual window shopping
- \* To meet friends who live/work nearby
- \* Other (please specify )

Q 9. What was/were the mode of transport to get to the place ?

- \* Car
- \* Underground T
- \* Walking
- \* Bus
- \* Other

Q 10. The average time that you have spent in these places ? ( In minutes or hours per visit )

- \* Copley Place 1 hr
- \* Fanuil Hall 20 min
- \* Harvard Square 1 hr
- \* Downtown Crossing \_\_\_\_\_
- \* City Hall Plaza \_\_\_\_\_
- \* Waterfront/Aquarium \_\_\_\_\_
- \* Muesuem Wharf 2 hr
- \* Union Park Sq. \_\_\_\_\_
- \* Park Sq. 20 min
- \* Lafayette Mall \_\_\_\_\_
- \* Liberty Sq. \_\_\_\_\_
- \* Custom Hs/State St. \_\_\_\_\_
- \* Winthrop Sq. \_\_\_\_\_

Q 11. Please write down those features that you feel you easily remember about these places. we are interested in mostly physical features but You may also include other non-physical features, names of buildings, activities etc.

- \* City Hall Plaza
- \* Waterfront/Aquarium
- \* Muesuem Wharf
- \* Union Park Sq.
- \* Park Sq.
- \* Lafayette Mall
- \* Liberty Sq.
- \* Custom Hs/State St.
- \* Winthrop Sq.

Q 12. If you were to describe in a short to a stranger what distinctive features would you suggest he look for to identify that he is in the right place ? (eg. Statues, signs, symbols, or some sort of identification )

Q 13. Choose two of the most familiar places from above and list all the possible physical features and elements that come into your mind about them. (You may use proper nouns if you feel)

Harvard Sq. T. Stat. ...  
Copley Pl. ...

Q 14. What were the things that you saw in the places above that caught your attention ?

\* Copley Place

\* Harvard Square

\* Downtown Crossing

\* Copley Square

\* Faneuil Hall

\* City Hall  
Plaza

\* Waterfront/  
Aquarium

\* Muesuem Wharf

\* Union Park Sq.

\* Park Sq.

\* Lafayette Mall

\* Liberty Sq.

- \* Custom Hs/  
State St.
- \* Winthrop Sq.

Q 15. Was it because of the following ? (Write Y/N as appropriate )

	Place A Yes/No	Place B Yes/No
* They were unique	N	Y
* they were prominently placed	Y	Y
* They were different from the surrounding area	Y	
* They were newly built	N	
* they were larger in size from the rest	N	Y
* They were different in design from the rest you had seen so far	N	Y
* They were of different colour/texture.		
* Other reason (explain)		

A. How many months/years have you spent in Boston ? 2.5 yrs

B. What are the public places you have visited that are similar to the one's mentioned above ?  
(list them )

Thank You for your participation. Should we contact you for a short slide presentation and a short questionnaire during the weekends/ or your spare time ? Please write down Your Name and MIT extension or address for contact below. Please return this questionnaire through Interdepartmental mail to: Anil Khullar, Rm 10-485, or 23E3 Tang Hall.



## APPENDIX QUESTIONNAIRE II

This questionnaire is part of a research conducted by the author, about image of places in and around Boston. Your help in filling out this questionnaire will be very helpful.

You may be as explicit as possible about a place or area as you may choose.

Please return the questionnaire to **Anil Khullar, Rm 10-485, or Tang Hall, 23E3.** through interdepartmental mail, or drop it through in the mail box in the mail room of Tang Hall.

----- Q2. There few names of places in and around Boston/Cambridge area, You are to rearrange these places into groups or clusters, based on some commonalities that you may think exist between them. Not all may have the same factors that are common, some may be outside of the group. ( eg. NorthEnd, and Quincy Market are great place to have food, since many restaurants are locatd there.) *You may use similar or different criteria to group them. Keeping in mind that you state the reason clearly for your grouping.*

Harvard Sq. Quincy Market/Fanuiell Hall., Park Sq., Kendall Square, Downtown Crossing/Fielene's Jordan Marsh area., Public Garden, Kenmore Square Aquarium/Waterfront, Winthorp Sq. Central Sq., Copley Place, and Newbury Street. Copley Square, Laffyette Mall, NorthEnd, Museum Wharf, Fish Pier, Chinatown, Combat Zone, Commons,

Q.2 Of all the places listed above, Which are the ones that are clearly out of place, and do not belong to the group for any reason ( *Name them* ). Please write briefly What are your reasons for excluding these places from the list ?

## APPENDIX VERBAL CHECKLIST

This questionnaire is part of a research conducted by the author, about image of places in and around Boston. Your help in filling out this questionnaire will be very helpful. You may be as explicit as possible about a place or area as you may choose.

Please return the questionnaire to **Anil Khullar, Rm 10-485, or Tang Hall, 23E3.** through interdepartmental mail, or drop it through in the mail box in the mail room of Tang Hall.

-----  
Please look at the slides that are shown to you, and then tick the following in the questions given below.

Q1. \_\_\_\_\_ Square/ Place is  
V.familiar/Familiar/ Moderately familiar/Unfamiliar/V.Unfamiliar to me (  
*Tick one*)

Q2. Please check out all those features that you think you saw in  
the \_\_\_\_\_ following \_\_\_\_\_ slides \_\_\_\_\_ relating \_\_\_\_\_ to  
\_\_\_\_\_ Square/

The signs/symbols of the following were present

Restaurants	Bars	Night club
Discotheques	Offices	Dept'l Stores
Garment&Fashion St.	Chemist&Druggist	Hotels
Banks	Video Parlour	Music&T.V.
Furniture	Liquor	Street Signs
Parking Signs	Driving Signs	Billboards
Cigarette Ads	Airline Ads	posters on Walls
Beer Ads	Food Ads	Sale signs
		NeonSign of stores

## Outside features

Iron railing old styled

Iron railing: Modern

Wooden Railing

Railing: Other type of

Iron benches

wooden Benches

Concrete benches

Chairs and Tables

Garbage Bins

"You are Here Signs"

Maps of the Area

Statues

Clocks old

Electronic time clock

Food Sellers with carts

Flower kiosks

Kiosks of Gifts etc.

bollards

## Buildings types

There were two three buildings

They were mostly bricks

The buildings were of mostly stone (carved)

The buildings were mostly stone (plain)

The buildings were mostly brick + stone.

The buildings were steel + metal

The buildings were mostly wooden

**The following Building features**

Glass doors	Wooden doors	Old Style Window
Modern Window	Old Stone Columns	Canopies
Flag Staffs	Banners	Few cars
many cars	Cars on Road	Traffic light
Buses	Cycles	Trams
Modern Column	HandCarts	Fountains
Water Pools	Sculpture Old	
Statues	T. Stop	Truck&Delivery sign

**Buildings were**

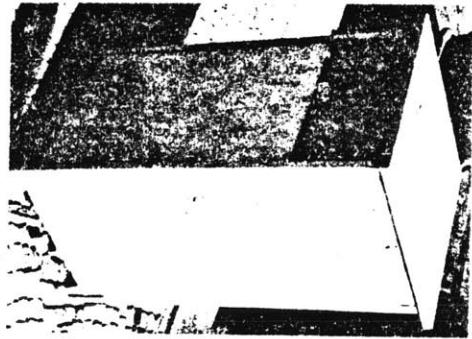
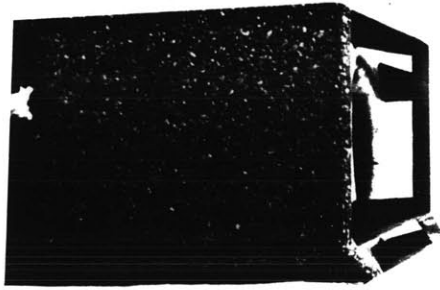
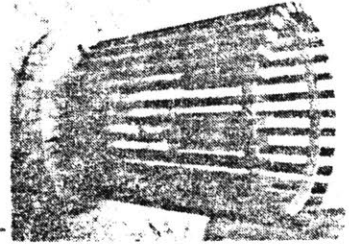
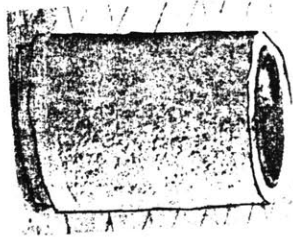
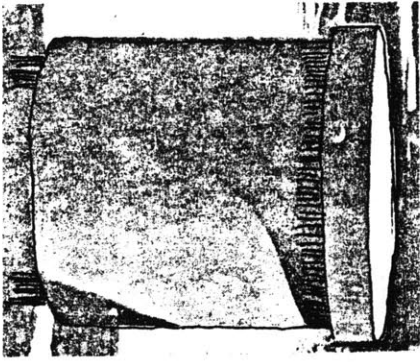
Mostly Old Style	Mostly New	Mostly Modern
Bldg.Heights>10	Signs of Clubs	News Vending Box
" " >5-10	Parking Meters	Bos. Globe Vending
" " <5 Stories	Church Spire	Talltower
Mech.Equipment		

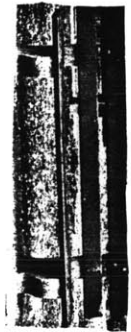
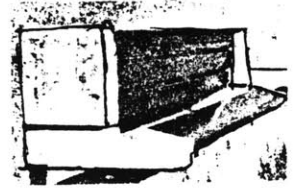
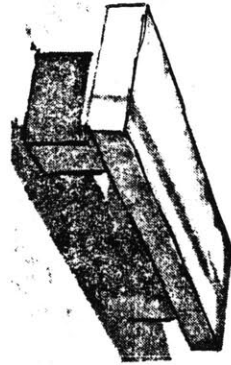
**Landscape Elements**

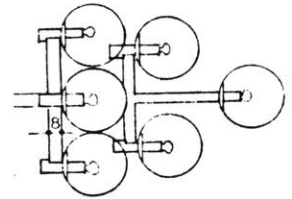
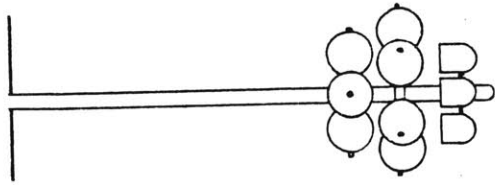
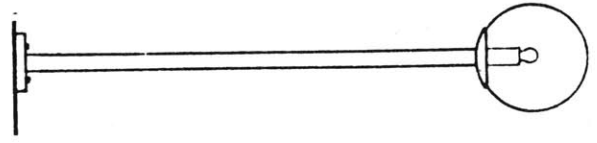
Tall trees	Stub trees	Trees with no leaves
Evergreens	Flowers	Creepers
Shrubs	Hedges	Plants
Grass	Lawns	Planters on windows

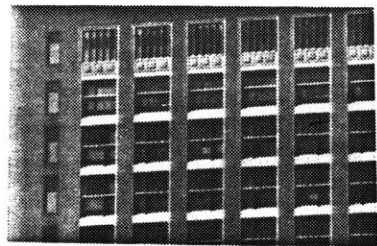
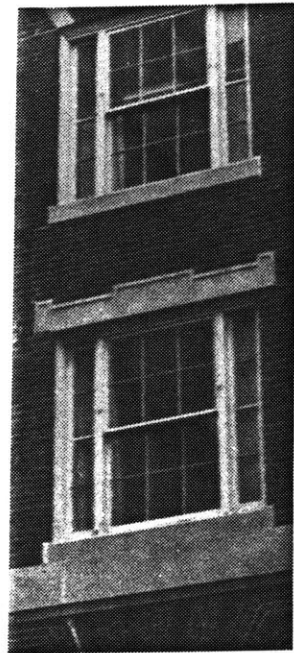
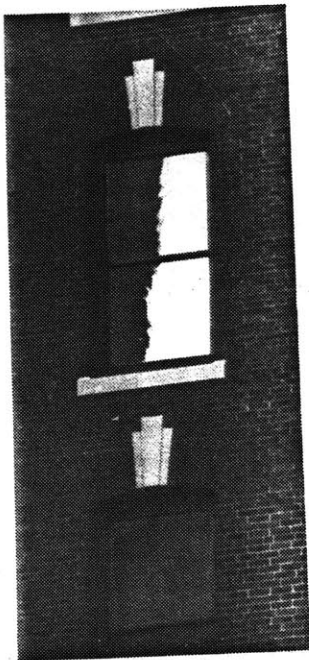
APPENDIX VISUAL CHECKLIST







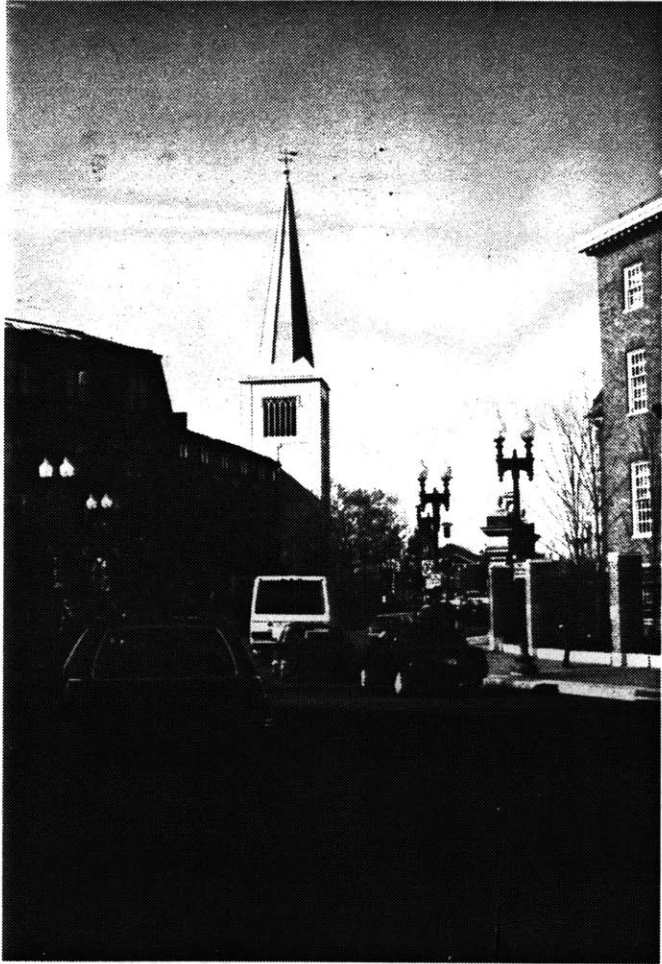




## APPENDIX SLIDES

















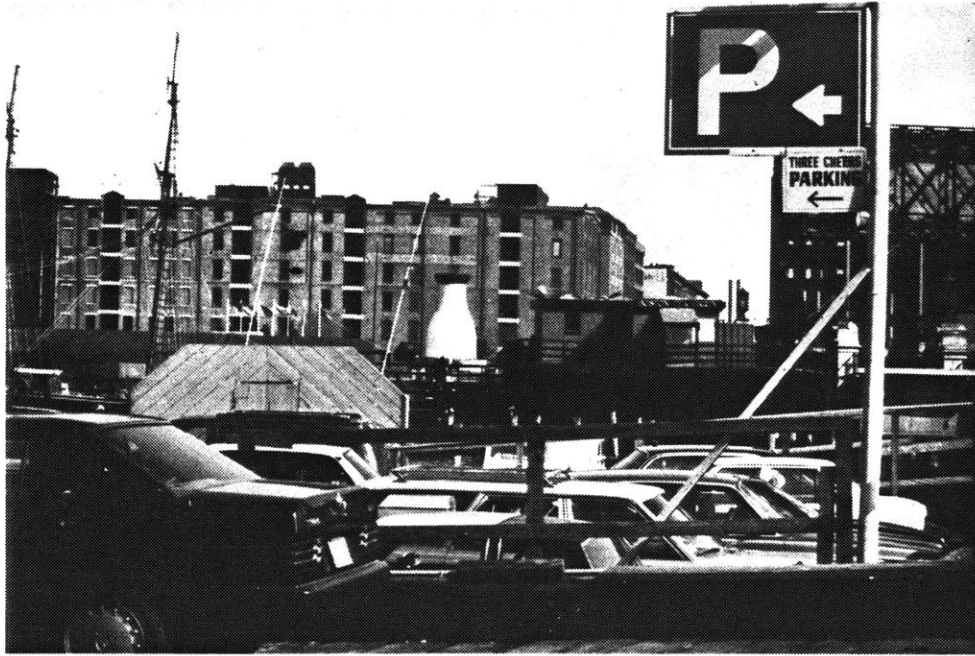


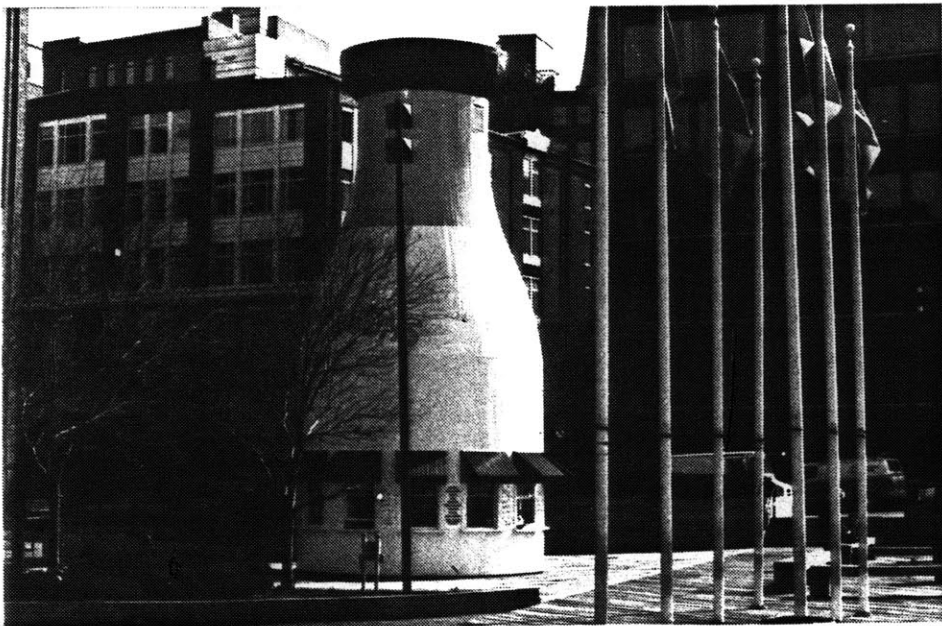
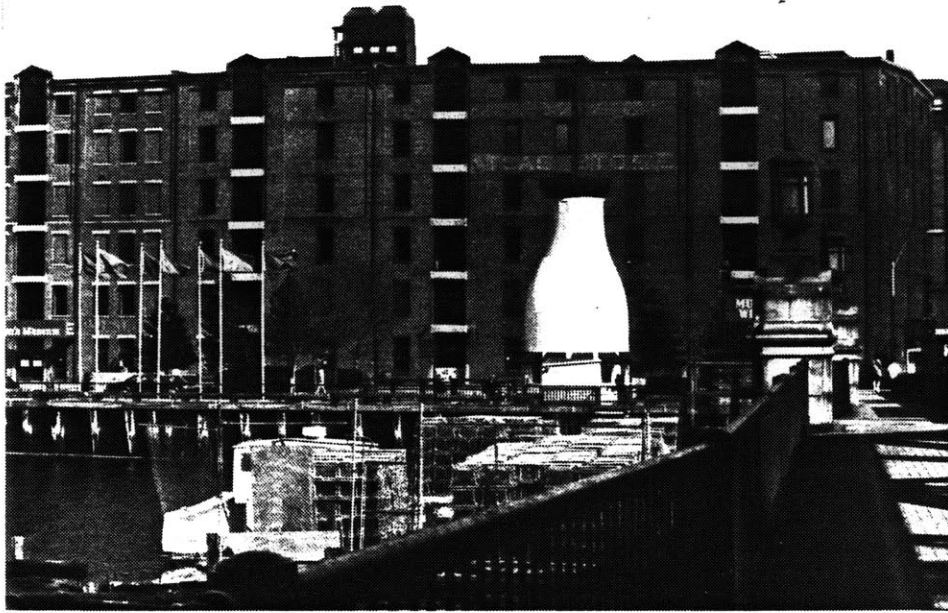












## APPENDIX TAPED INTERVIEWS

**Subject: Female**

*Experimenter:* So the next couple of them till the time I say ready, are test slides.....to get the hang of it Starting from the next slide

*Subject:* Right.

*Experimenter:* I wont include it in the tapes.

*Subject:* Its running....

*Experimenter:* Oops!! Start.

*Subject:* White truck/ lights/ fire on the right/ white windows on the left/ Brown brick building/ people on the streets/ cars on the right/ signs on the stores/ ....kiosk on the right/ red receptacle/ shadow on the pavement/ lights on the right/ clock/

(Change of slide)

Steeple/ red brick building to the left/ lights in the middle/ dark brick building/ lights/ cars, front on the right/ pavement/ gate on the left/ Person in the front/ trees in the back ground/ Yellow light

(Change of slide)

Sign on top, Baybank/ left, black lights on top/ White light and roof of kiosk/ people in the right/ garbage in the foreground/ brick building/ then there is a triangle roof in the left/ white covering on the top on right/ person in the foreground/ brick street/ cars/ lights in the back/ white truck in the back/ people sitting....( in comprehensible ) lights to the right/ white truck in the back/ CVS signs

(Change of slide)

Person in the foreground/ two cars/ white covering on top/ buildings in the back/ Holyoke Center/ signs on top/ lights on top/ brick building in the back/ lights in front of it/ people in the street/ brick pavement

(Change of slide)

Cars in the foreground/ White truck in the centre/ Holyoke center/ bank/ lights in the front of the bank/ kiosk down further/ then brickbuilding to the left/ cars on the right then the taxi sign/ person in the middle of the street/ subway/ gate/ ....in the top of the gate/ truck/ lights to the left of the truck/ background trees/ building behind the bank/ signs below the building on the right

(Change of slide)

Signs on the building/ white receptacle, covers/ building to the centre and left/ trees/ then the red brick building on the left/ more signs/ arcade covers/ flag on the right/ sunlit building on the right/ windows with red brick building on the centre and right/ foreground street/ white strip/ shrubbery in the foreground/ lamp-post in the front and back of the gray building/ round building in the middle/ two little trees here

(Change of slide)

Person in the foreground/ dark building on the left/ top portion sculptural things on top/ big sign to the right/ red bold stripes to the building on the left/ cars further down to the right/ buses/ two signs further up/ buildings on the back with chimney on top of it/ signs on the right/ white signs down/ further down on the right/ lamp-post/ cars in the back/ white building further back

(Change of slide )

Curved buildings all the way/ Fire escape/ green tree further up/ gates in the front/ trees/ windows with trim border on top end/ big building in a distance/ snow/ the road/ frame on the window/ screens/ white shades/ staircase/ stoops

(Change of slide)

Persons first/ rectangular building on the back in the centre/ cars/ wreath in the pillar/ tall red brick building on the left/ lamp-post/ Pizza sign on the right/ dark building/ lights overhanging the building/ SID'S sign/ snow and ice on the road/ cars to the left/ buses on the left/ White building to the left/ Red building further down

in the background to the left/ white building further down/ cars on the street/ red garbage receptacle

(Change of slide)

Trees on the left/ CITGO sign/ red stripes on the building/ and cars on the road/ and benches in the front/ cars on the left/ and dark building on the left/ and more details in the buildings/ windows on the red brick portion/ then the white portion on the window/ white roof in the back, centre/ trees to the right/ roof on the left/ circular sign on top of building to the left.

(Change of Slide)

Person with a bag in the middle/ flag/ BARNES & NOBLE sign/ arcades, circular ones on the right/ white building on the left/ lamp-post with globes on it to the left/ overhanging black roof on the left with a building over it.

(Change of slide)

Flag/ person in front of it/ red brick building to the front and back/ lights with many globes to the left, right/ foreground pillars black with chains/ people moving/ tall building further back/ benches to the right.

(Change of slide)

People in the center/ cars behind that/ skyscrapers behind that/ windows in the right/ glowing red sign/ red signs/ four mail boxes/ red chinese sort of a thing on the pole, up there/ red brick thing behind that/ red truck to the left/ chain around the post/ people around there/ four storied building there to the left/ a yellow truck further down.

(Change of slide)

Plants/ then the lamp/ lamps hanging down/ sign on the back/ person with white shirt in the front and center/ and wooden parts to the building to the right/ red umbrella/ and a little umbrella behind that/ people sitting to the left/ woman standing up with red shirt/ person in the foreground white and blue/ glass roof in the center.

(Change of slide)

Red banner to the right with light below it/ banner to the right/ signs in the middle/ lights in the foreground on the left/ benches below that/ other red thing to the left/ and building behind it/ lots of windows/ barrel below that/ street signs to the right down the bottom/ people in the foreground/ people further back.

(Change of slide)

Benches/ building to the left/ windows and arches/ banner with different colors/ people below that to the left/ bicycles/ telephones/ pavement/ buildings in the back in white/ trees/ interspread with benches.

(Change of slide)

First the directory/ people in the bench to the right/ people in the left/ yellow banner in the center then on the left/ and other banner on the back/ building with windows to the left/ and other building to the right/ road/ lamp-posts/ green plants in the center and back/ clock/ green overhanging thing.

(Change of the slide)

Parking sign with arrow/ another sign below that/ building to the left/ black windows with white arts in it/ posts going up to it/ then the white milk bottle ith red top/ yellow roof/ post in the front/ cars/ lamps with parking sign/ very tall thing with windows, on the left.

**Subject: male**

*Experimenter:* Yes

*Subject:* There is no light on

Yes its fine now

This looks like a square/ I see a brick building in the background with quite a number of windows in succession/ I read the sign BAY BANK/ Harvard Trust on the top/ the building next to it is a continuation of the same building/ but relatively less generous in terms of windows/ At the back I see something ejecting out/ it seems like...like a church/ with a cross on top/ the..a pyramidal shape/ I see a number of people..walking about/ and there is also a white car/ and also a van.

(Change of slide)

Now this looks like a narrow street in some kind of a downtown area/ I see a church very clearly, right at the back with a cross on top of that/ a dark brick building on the left and another brick building which is relatively lighter, on the right hand side of it/ I see a street in which cars are in motion/ There is a man on the right hand side on the sidewalk walking towards me/ and another man on the very end on the left hand side again walking towards me/ and there is also a car parked on the left hand side which is parked/ and lamp-post very interesting/ twin lamps in each of them/ very broad pavement or sidewalk on the left hand side

(Change of slide)

This looks like the same place I'd just seen/ I can read BAY BANK Harvard from the slide and there is another building visible next to it/ perhaps a continuation of the same building but in a different style/ there is a clock on top of the building on the extreme left/ I cannot read the time/ is a kind of a magazine or a newspaper shop in the middle like an island/ I see a number of steps leading up down/ and a trash bin with some papers in it/ there are some people at the newspaper shop, reading stuff or something.

(Change of slide)

this is/ a slide/ one woman quite distinctly walking on the right, left hand side/ there are two cars parked / and there is a building in the background/ both on the left and right/ there is a kind of a shed / a building, a room kind of a thing in the center/ of some area this little building seems to be under construction because I see some white cover on the roof/ there are some people also visible/ the far end right hand side/ I see a very modern lamp post with three lamps/ I see a tree on the right hand side back here.

(Change of Slide)

I see a street/ there is a taxi which is parked on the right hand side on the the very edge of the slide/ and a car is parked in front of it/ and to the diagonal opposite to the taxi there is a Datsun Van/ I can see a bus in the background, which has a light signs or a sign that can be lighted/ saying CAMBRIDGE SAVINGS BANK with an American flag on top of it/ next to it there is a big building with a number of windows relatively modern / and the left hand side is there is an old building / with traditional roof and a chimney ejects out from it.

(Change of Slide)

This looks like a modern construction/ I see some concrete posts and a kind of an island in the middle of the street/ this is some kind of a square/ there are payphones/ the pay phones post I see a man leaning/ there is a woman in the other payphone having a (illegible) / I see some stores on the right hand side/ I can read the name of one of them, it says Dickensons something..

(Change of slide)

This is a downtown area apparently/ there is a wide pavement, a sidewalk which seems to have been raised, from some level because I see stairs leading up to it/ Covered with snow, partly covered with snow, some snow seems to have melted/ there is a mailbox/ and some kind of a bus stop or a shed/ there are two women, or two persons on the right hand-left hand side/ towards the edge or the sidewalk and in the left hand side/ I see lampposts/ bus which is parked, partly yellow & partly White/ I see some flowers/ some plants..



(Change of slide)

This is a very interesting old apartment building/ looks quite big, made of stones or big brick/there a balconies/ I see a fence, an iron fence/ some plants inside the front yard of the parlour, that is the closest to me/ there seems to be snow,covered with snow right at the very end in a tiny corner I see a modern building, a huge modern building which is quite contrast from this apartment block/ I see some plants/ and some tall trees in the part in the top right hand side of the slide/ one of the apartment seems to have an airconditioner/ I can see it quite clearly

(Change of slide)

This is again a downtown area/ wide sidewalk with snow on it and snow is partly melted on the right hand side/ the is a restaurant, apparently because I can see the word PIZZA and BEEF written on it/ some person on the right walking/ there is a trashbin and a mailbox/ I also see a wreath/ which is on a lamp- post, apost/ there is a traffic sign, a some kind of a sign on that post, in the middle.

(Change of slide)

Most of this slide is rather dark, perhaps due to the extensive shadow that is cast, either by wall of some kind, or building/ I see in the darkness, a row of trees/ these trees are barren/ the ground has some snow onit/ and the dark portion I see a bench/ a that area that is bright, I see another bench/ There is a neon sign CITGO written on it/ and a red triangle/ there is a building in the right hand side/ on the far end/ which has red flag.

(Change of slide)

This looks like a shopping center to me/ in the middle of street a walkway which is made of bricks/ I see quite a number of people/ and I see a red flag, which I don't think belongs to a belong to a country but simply a decoration of a store/ there are stores..(incomprehensible.)/ interesting lampposts/ rather narrow street with big departmental store/ apparently there is a movie theatre/ because I can see the signs of the movie, but I cannot read the name/ there are some neon signs/ people all moving (incomprehensible)/ and some relatively older building in the background.

(Change of slide)

This again is a shopping center/ a very interesting one/ I see a against which there is a man or a woman leaning holding a camera leaning possible a tourist/interesting lamppost, with a number of lamps/there is a clock on the left hand side on top, which I think says nine O' clock/ and in the background there are rather far two tall office blocks, a modern building of some kind/ rather interesting, I see benches/ and at least one person, a woman sitting on the bench, eating something or opening a package of some kind.

(Change of slide)

This again is a shopping center/ it seems there is a trash bin which is chained to a post in case somebody runs away with it/ see a black man/ white people/ a man with a turban/ a sikh perhaps from India/ there are some mailboxes on the right hand side/ I can read the name of a store/ FAYVA, or something like that there name of shoe/ there are couple of cars/ and some neon signs.

(Change of slide)

This is a very pleasant place, apparently this is covered/ I see a kind of a glass ceiling with steel frame or some thing like that/ hanging plant pots/ this is a cafe of some kind/ I see sitting black man with his sunglasses or dark glasses/ and there is definitely a restaurant on the right hand side/ and definitely a wooden structure/ I see a lot of people.

(Change of slide)

This is a shopping center again/ I see at least two benches, maybe more than that/ because behind it I see a woman/ sitting or eating something/ perhaps on the right hand side there is a man running towards me/ quite a number of flags.

(Change of slide)

This looks like some place I have just seen/ I see quite umpteen number of benches, back to back/ very wide walking pavement/ there is a pigoen/ quite a number of people/ I see a payphone there/ interesting lamppost/ some trees/ not quite visible but in the..(uncomprehensible).

(Change of slide)

Shopping area again/ it seems a cultural season/ a number of flag like cloth pieces hanging.../ a faint picture of a clock in the background/ There is a woman on the right hand side wearing a red coat/ there is a kind of an index for public use/ maybe it is a street index of that nature/ there is an elderly lady with shopping bag in hand, it seems.

(Change of slide)

I see a parking sign, on the lampost/ It looks like some kind of a dock area/ there are Old buildings of some kind/ red brick and some black ones/ I see some white milk bottle kind of a thing, maybe its some advertisement of sorts/ There are a lot of cars/ and there are boats like things behind that/ there is to the far end some sort of a repair yard/ I can see some structure..