

A METHOD OF SEQUENCE DESIGN FOR URBAN STREETS  
EVALUATED IN CASE STUDIES

By

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ABSTRACT

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SUBMITTED TO THE DEPARTMENT OF CITY AND REGIONAL PLANNING ON MAY 17, 1963  
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This method of sequence design intends to fulfill the need for a systematic approach to large-scale urban design. The approach is concerned with the visual form of the city and the nature of experience produced perceptually while moving about and through the city.

The method of sequence design set forth here proposes the need for structuring the urban environment according to a hierarchical street system. The method identifies five categories of sequential form - path/observer motion, space/object motion, object form, color and light - to be used within a framework constructed of structural and congruence criteria, existing social institutions and legal controls. A notation system is developed to apply the concept to physical environments. The components of the framework are juxtaposed in such a manner as to guide sequential structure organization in producing a distinct, pleasant and meaningful experience.

The method was partially applied to a variety of urban situations in five case studies to test its validity and effectiveness. Experience gained in the case studies indicates observer speed or motion, the degree of space confinement and the size of objects to be the most critical determinants of visual form. In evaluating the case studies, recurring sequential weaknesses were identified in a lack of sequential continuity and theme and in a lack of congruence between the visual form and activity pattern. The case studies tend to support the initial premises, but additional studies and research are needed to perfect the notation system and to establish the utility and validity of the method in a wider range of urban situations.

Thesis Supervisor . . . . .

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Bobbie L. Abernathy

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## I. INTRODUCTION

### The Problem

The contemporary planning processes include many disciplines and many areas of concern. Many different factors are brought to bear in the processes. However, one factor, ultimately perhaps the most important factor, seems to go relatively unnoticed--the aesthetic aspect of the city. Certainly there are many functional, mechanical and perhaps political problems involved in planning which obviously must be solved. And, of course, in many cases when these problems are solved an attempt is made to make the city a pleasant, beautiful place in which to live. But this approach cannot be considered adequate. It can only lead to superficial embellishment, and the environment will lack any real or lasting vitality. This approach can only lead to fadism, styles and ultimate obsolescence and decay. The aesthetic concern must permeate the process, become an integral part of planning and of cities. Cities must be pleasing as well as functional.

### Requisites

To achieve the goal of pleasant cities, an approach to urban design must be developed. Such an approach must identify elements significant to the visual form and these elements must be established in appreciation of the scope and complexity inherent in the modern city. The approach must be developed with principles guiding the manipulation of these elements. Desired patterns must finally be capable of implementation. However, the mere possibility of implementation is not sufficient; implementation as well as manipulation must be consistent with broader social goals such as maintaining free enterprise and the concept of private property rights. And perhaps of greatest importance, the system must be effective and realizable within the context of current urban institutions.

## Proposals

The following sections attempt to establish such an approach. This approach proposes the necessity for structuring the urban environment through the manipulation of a hierarchical system of pathways. The sequential experiences presented along these pathways should be organized in such a manner as to be logical, meaningful and pleasant.

Through a study of perception and series of case studies the elements significant to visual form are identified and weighted according to their visual impact on the sequential experience. These elements provide the basis for design, analysis and control of the sequential visual form.

Principles of sequential structure are developed drawing from a study of music composition techniques, from other design disciplines and from general principles of aesthetics. The structural principles provide the guide lines governing sequential organization of the basic elements of the visual form. These principles point up various techniques to achieve the desired pleasant effects.

A section of criteria is developed to guide the evaluation of sequential forms. This section summarizes the methods of determining the experiential intensity of sequential form set forth in the section on elements of the visual form. It also summarizes the criteria used to evaluate the structural characteristics. In addition, to insure a meaningful environment, criteria of congruence are developed to evaluate the coincidence of the visual form with the activity pattern.

With the critical aspects of the method established, a notation system is developed which lends itself equally to description, evaluation or design of a sequence. The mapping system is intended to provide an impressionistic summary of the visual form and also of the relative intensity of the sequential experience.

Utilizing the criteria and the graphic presentation method for processing it, the approach is then tested in a real situation. Case studies are chosen. Characteristics of the various activity areas are assumed and several sequences are selected. The critical aspects of these sequences are then recorded and evaluated in terms of the structural and congruence criteria. Improvements to the visual form as well as design policies and suggested controls are then proposed.

Finally, the approach is evaluated in terms of the experience gained in the case studies. The evaluation points up problems with the approach as well as its valuable aspects. Suggested areas of future research are included.

## II. THE METHOD OF SEQUENCE DESIGN

## ELEMENTS OF SEQUENTIAL FORM

### Introduction

The city is composed of many parts which might be used to form an underlying structure. However, the most readily controlled, and perhaps the single most important element seems to be the pathways - the streets and spaces which they create. This element is a factor common to the complete urban environment, but nevertheless it does not exist in a vacuum. The physical elements which abut the path combine with it to produce its sequential form. If a total form is to result, and if the city is to be explored and experienced by the observer traveling along these pathways, their elements will have to be controlled and organized to produce logical, meaningful and pleasant sequential experiences.

The elements of sequential form, to be useful, must satisfy two requirements. They must serve as elements for design; and, owing to the planner's position and function, must be capable of translation into the form of legal controls.

The elements of sequential form as developed from a study of perception (see appendix p.73 ) and the case studies (see appendix p.93 ) may be grouped into five basic categories: (1) space, (2) motion, (3) form, (4) color and (5) light. Since motion exists in two forms, observer and object motion, and because of the manner in which space and objects affect motion, these categories are subdivided and combined to form the categories of Path/Observer Motion and Space/Object Motion.

### Path/Observer Motion

The pathway or street provides the basis for observer motion through the sequence. The street and speed laws determine to a large extent the actual speed of the observer along the sequence. However, the characteristics of the

path as well as the space and adjacent objects combine to produce the apparent motion of the observer. As the apparent speed increases, the intensity of experience also increases. Several factors, primarily imminent danger, space constriction, marking effects and descending motion, tend to increase the observer's apparent motion. Similarly, the converse of these factors tends to decrease apparent motion (see appendix p.81 ).

Apparent motion is increased as the observer senses danger. Danger in this case is primarily the result of congestion, of intersecting streets, of sharp turns, the probability of sudden stops and of difficult maneuvering requirements. A sense of danger may also result from passing over high bridges, mountainside roads, or any form of hazardous driving conditions where the possibility of an accident exists.

A constriction of the observer's space also increases his apparent motion. As adjacent objects increase in size, or closeness to the observer, he senses an apparent increase in speed and intensity of experience. Such confinement tends to increase the possibility of danger and the necessity to be in complete control of his movement. Space confinement normally takes the form in the urban environment of building heights and setbacks but exists in pronounced degrees in tunnels, bridges, etc.

Apparent speed increases also as the result of passing objects marking one's progress. As the number of markers within a given distance is increased, so is the apparent speed and intensity of experience. Since the marking effect is the determinant, objects articulated vertically tend to increase apparent speed while horizontal objects produce a slowing effect.

Similarly, descending motion tends to increase apparent speed. As the degree of incline is increased, so is the apparent speed. Here again, the observer's sense of danger is present. As the hill becomes steeper the

capacity to stop is decreased and therefore the sense of danger and apparent speed is increased, resulting in an intensified experience.

### Space/Object Motion

The observer's space is created by the objects of the environment--the buildings, trees, fences and terrain. The intensity of the observer's experience is affected by the nature of the space, the marking effect produced by the characteristics of objects and their location in space and by the manner in which the objects in space move or appear to move.

The degree of space confinement produced by the location of objects, namely buildings, along the urban pathways is most significant to the experiential form of the sequence. As this confinement is increased, so is the intensity of experience. The horizontal undulations of these walls, their heights and penetrations, determine to a large extent the intensity of experience.

The manner in which the objects forming these walls are presented also affects the intensity of experience. The closer these objects are to the observer and the faster they are presented, within limits, the more intense will be the experience. So long as the observer is able to perceive these objects separately, their increased presentation speed and nearness will result in increased intensity (see appendix p.81 ). However, if the objects are presented so rapidly that they tend to run together, the intensity of experience will not be so great.

In addition, the manner in which objects move or appear to move also affects the observer's intensity of experience. Objects moving in the environment such as cars, people, etc., increase the experiential intensity. The rapidity of movement of these objects increases the intensity of experience as does the amount of activity. Apparent movement of objects also affects the

intensity of experience. If objects are seen in the distance to the side they seem to follow the observer, requiring a greater amount of time to pass. Such an effect tends to reduce apparent motion and decrease the intensity of experience. Conversely, if objects appear to rotate as the observer passes close by, or if they seem to move back and forth across the path ahead as a result of a curving road, the intensity of experience is increased.

### Object Form

Probably the most dominant elements of most existing sequences are the adjacent forms - the buildings, their size, shape, location and internal articulation. The greater dominance of these characteristics increases the intensity of experience. (see appendix p.83 ).

Object dominance is increased as its size and nearness to the observer is increased. Dominance through shape is increased largely through contrast. Since the majority of urban structural shapes is rectilinear, the triangular and curvilinear shapes become most important. Perceptual studies, however, indicate that triangular shapes are apt to be dominant over other shapes in any case. (see appendix p.83 ). Complex shapes are apt to be of least importance unless organized into a simple, unified whole such as a tree or church. Intricate internal articulation of forms tends to increase their dominance. For instance, a rather plain rectilinear tower could be most important as a result of internal articulation through projecting balconies, window patterns, color patterns or shadow patterns. In addition, the duration or speed of object presentation determines to a large extent the dominance of an object. A simple structure presented rapidly can produce a more intense experience than a complex structure experienced over a long period of time.

## Color

Color, while one of the least utilized categories in existing environments, provides a potentially most expressive media. An increase in the dominance of color results in an increase in experiential intensity. The dominance of color is affected by its wave length or color, its intensity and its purity or brightness (see appendix p.81 ). The red end of the spectrum is visually more dominant than the shorter wave lengths. Consequently, reds and yellows tend to produce a more intense experience than do the blues and greens. The intensity of a color as well as its purity increases its dominance. The dominance of color is increased with its size and nearness to the observer. Probably more so than any of the other categories, color is capable of abstract symbolism both emotionally and conceptually. Coordinated symbolic colors could be used in harmonic support of area characteristics or particular activity intensity levels. Or contrarywise, color could be used contrapuntally to intensity levels - lively; existing commercial areas could be harmonically supported with patterns or accents of reds and yellows or conversely blues and greens could be used to reduce intensive excitement resulting from forceful form or motion patterns.

## Light

As one of the five categories, light (see appendix p.80 ) is perhaps most important at night but nevertheless may achieve effective daytime use, especially through the media of shade and silhouette. Shadows may be used to define and articulate forms. As a result of surface penetrations such as windows and doorways, shadow patterns are formed and may be utilized to affect apparent motion or to mark real motion. Light may be utilized by one of two contrasting methods. Shadow patterns may be formed against a brightly lit background - the normal daytime use, or by accenting a generally dark back-

ground with light patterns - the night-time use. Of course, all sorts of intermediate possibilities exist, such as backlit buildings presented in silhouette. In this case the general background is intensively lit, but the building masses present a dark background which may in turn be accented with light patterns. Light may therefore be used in its normal daytime capacity merely as a supporting element for other thematic arrangements or may, as it does at night, provide the predominant thematic feature.

Each of the categories of object characteristics - Path/Observer Motion, Space/Object Motion, Object Form, Color and Light - is directly usable either for descriptions of existing situations or for specific sequential design. The categories are such that once a design solution is produced, they may be translated into existing control mechanisms - primarily zoning controls - in the form of height, bulk and setback limitations as well as roof shape, landscaping, sign illumination and other similar concepts of nuisance control.

## PRINCIPLES OF SEQUENTIAL STRUCTURE

### Introduction

Any design process is necessarily concerned with the total end product. However, in the process of urban sequence design the techniques or principles governing the total form are relatively inarticulate. Sequence design is concerned with designing a form to be experienced through time at predetermined speeds. Pathways, however, may be experienced usually in at least two directions. They may be traversed at various speeds in various modes. Each activity area, whether it be residential, commercial, industrial or whatever, constitutes a potential goal or trip terminal. Each building or object within each of the activity categories is a more detailed goal or terminal. Each trip may originate at any location along the sequence and terminate at any other point. Each trip may be repeated any number of times by observers who possess various levels of intelligence as well as familiarity with the sequence.

The sequence, therefore, may be experienced at various levels. The designer, if he wishes the sequence to be pleasant, must concern himself with the implications of these levels. He must create a sequence, any portion of which is capable of being experienced as a singular entity. Such an objective suggests the need for a hierarchical structural system. The total unit would be composed of systems of lesser units, each possessing its own structural simplicity and unity. As the unit of concern becomes smaller, a greater degree of detail and understanding would be available. For instance, the pedestrian does not and should not rely upon the structural level utilized by the freeway driver. The size of the structure as well as its significant elements shift as a result of variables stated above.

The principles of sequence design developed here draw largely from the principles of music composition (see appendix p.87 ), as well as from other design disciplines and general principles of aesthetics. The major concerns

of these principles are to insure the clarity and the pleasantness of the structure. The principles of sequential structure may be classified and grouped into four fundamental categories: (1) legibility, (2) multi-level interest, (3) development and (4) identity. The categories need not assume any particular sequential order in the actual process but for purposes of clarity will be presented and analyzed in the above order.

### Legibility

The effectiveness of the structure depends to a large extent on the clarity or legibility of its form. Sequential structures result from the combination of the diverse parts of the urban environment. The manner in which these parts are related tends to determine the structure's legibility.

### SIMPLICITY

In order for the structure to be more easily perceived, its form should be simple. The parts of the structure may be infinite in number and complexity so long as they may be classified and grouped into larger units of various orders allowing structural simplicity at the various levels of observer contact. For instance, a commercial area might be ordered by having a section for shoes, clothes, jewelry, etc. At a larger scale the areas might be classified as commercial, residential, industrial, etc. Any area regardless of size may achieve simplicity providing its contained elements may be grouped into a manageable number of categories.

### CONTINUITY

Legibility of the structure is further improved by maintaining a sense of continuity as the various areas combine to form the sequence. Continuity between structural parts could be achieved with any element which is separable from specific activity characteristics. Coordinated color schemes along

sequences might be used to generate a sense of continuity. Sidewalks, fences, street lights, trees and building forms could be used to provide or increase structural continuity. The street itself constitutes an element of sequential continuity.

## CONTRAST

By establishing a background of continuity, the major structural parts are left free to be juxtaposed in contrast to each other and to the background, thereby increasing the structure's legibility. Through contrast, structural continuity avoids monotony. However, contrast without continuity is apt to produce chaos, decreasing the structure's clarity.

### Multi-Level Interest

The sequential form should either be interesting enough to elicit exploration or should be unified to the point of stimulating casual attentiveness. Attention is exploratory but restless.<sup>1</sup> Consequently, once attention is gained, the sequence should contain a richness of detail and various structural levels to warrant its further exploration. The sequence should allow the observer to investigate and rest; it should allow various, perhaps endless levels of exploration. It should permit a sense of completeness at various levels. This quality will allow the sequence to be comprehended by persons with various intellectual capacities or with varying degrees of effort depending on the amount the observer wishes to expend. This quality also allows interest to be maintained in the event of continuous contact. Owing to his adaptability, an observer becomes accustomed to a street's environment very rapidly. Unless the sequence possesses various structural levels, the observer will soon grow tired and be bored with its continuous experience.

<sup>1</sup> Eliseo Vivas and Murray Krieger, ed., The Problem of Aesthetics, (New York, 1953), p. 210.

## Development

The structure should be adequately developed to support its total form. Structural development is concerned with the pleasantness of the sequential experience through the progressive relationships of the structural parts, their tempo, internal transitions and their intensity fluctuations.

The pace or tempo of the sequence as well as its structural unity can be clarified by organizing the elements according to rhythmic patterns. Building heights could be controlled in repetitious patterns to set the tempo for the sequence. Certain elements along the sequence could be accented to give a sense of sequential rhythm. Block sizes, street lights or furniture or occasional unique structural types such as service stations or churches could be used to provide internal rhythmic patterns.

Internal structural transitions should receive considerable design attention. To produce a pleasant sequential experience, abrupt shifts in structural intensity should generally be avoided. For instance, the transition from a commercial area to a residential area will be more pleasant if the change in intensity levels is effected gradually, allowing the observer an opportunity to adapt to the shifting pattern.

Periodic, progressive climax points improve structural form and assist in sustaining observer interest. Urban streets typically contain a series of nodal points or activity concentrations which progressively increase in intensity level culminating normally in the city center. These nodal points constitute typical trip goals and climactic points. These climactic points are desirable in the sequential structure either as a single occurrence or as a progressive series. These points add richness and variety to the structure while determining in a dynamic sense its experiential and cyclical balance. In addition, the progressive peaks enhance the structure with areas of stimulus and challenge as well as areas of rest and relaxation. The observer is stimulated with the

intensity of activity upon entering a commercial area. Upon leaving the activity subsides, relaxing the excitement and tension briefly before entering another such area. These intensity fluctuations can be used to support the structural development and to sustain observer interest.

### Identity

To be pleasant and effective the sequential structure should have an identifiable character. This requirement is best satisfied through a simple, unified structure built from a basic theme. Themes might be developed using brick sidewalks, iron grill fences or some unique roof shape. Any identifiable element creating a differentiated identity for the sequence and capable of repetition to give a sense of continuity constitutes a potential thematic element. For instance, on Beacon Street (see appendix p.101 ) a theme is created through the continuous usage of bay windows. The Beacon Street bay window theme continues along the entire distance without once becoming monotonous. Along the street, materials are varied from brick and stone; many different colors and types of materials are used; the building heights vary; the plan shape of the bays are varied and the detailed facade and window designs are modified continuously. Even so, the bay window theme remains continuous and easily identifiable.

## CRITERIA FOR SEQUENCE EVALUATION

### Introduction

The designer must ultimately evaluate the sequential form to determine its effectiveness. To do this he must first determine the experiential intensity of the sequence's visual form. With the existing form established he must then evaluate its structural characteristics in terms of the principles developed for sequence structure. Finally, the designer, to insure a meaningful environment, must evaluate and effect the congruence or coincidence of the visual form with the activity pattern. By applying these criteria the designer should be able to propose logical, meaningful and pleasant sequential experiences.

### Determination of Visual Form Experiential Intensity

The experiential intensity of the visual form is determined by evaluating each of the five categories of sequential form. After the experiential intensity for each category is determined, they are combined to produce the total experiential intensity of sequential structure. The intensity of these elements is determined by the criteria set forth in the section on elements of the sequential form. (p. 11 to 16 ).

PATH/OBSERVER MOTION (see also p. 11 to 13 )

Experiential intensity of the visual form increases with apparent motion as a result of:

- (1) increased imminent danger to the observer
- (2) increased constriction of the observer's space
- (3) increased marking effect
- (4) increased descending motion

SPACE/OBJECT MOTION (see also p.13 to 14 )

Intensity of experience increases in the space/object motion category as a result of:

- (1) increased space confinement
- (2) increased object presentation speed
- (3) increased object motion

OBJECT FORM (see also p.14 to 15 )

Experiential intensity of object form increases as a result of:

- (1) increased size
- (2) increased shape dominance
- (3) increased nearness to the observer
- (4) increased internal articulation
- (5) increased presentation speed
- (6) increased contrast

COLOR (see also p.15 )

Increases in the intensity of experience of color occur as a result of:

- (1) increased wave length of color
- (2) increased intensity of color
- (3) increased purity or brightness of color
- (4) increased contrast
- (5) increased size
- (6) increased nearness to the observer

LIGHT (see also p.15 to 16 )

The intensity of experience of light is increased as a result of:

- (1) increased contrast
- (2) increased intensity
- (3) increased articulation
- (4) increased size
- (5) increased nearness to the observer

## Evaluation of Structural Characteristics

The desirability and effectiveness of the sequential structure is determined through its evaluation directed by the previously developed structural principles, (p.17 to 21 ). The prime concern of the structure is with its clarity and pleasantness. These characteristics depend upon its:

LEGIBILITY (see also p.18 )

The legibility of the structure is determined by its:

- (1) simplicity
- (2) continuity
- (3) contrast

MULTI-LEVEL INTEREST (see also p.19 )

DEVELOPMENT (see also p.20 )

IDENTITY (see also p.21 )

## Congruence Evaluation

ACTIVITY CHARACTERISTICS

### Importance

Before the designer sets about his task of structuring the city to create identifiable, pleasant forms, he must appreciate the functional nature of the structural elements. These functional requirements as related to form must be satisfied in such a manner as to produce a pleasing but meaningful environment. The importance of meaning in the urban environment cannot be overlooked. However, the role of meaning at the city scale has received very little attention. The urban designer must necessarily be concerned with generalities, abstractions and systems of elements as they affect urban form. It therefore seems that the most effective way of achieving environmental meaning focuses on achieving congruence of physical forms and activity patterns - the manner

in which the form expresses the function. Unless congruence is achieved, the urban environment becomes meaningless, possessing no logical structure. In the absence of congruence, the observer is apt to display an inability to order his environment and consequently becomes confused and frustrated. Meaning, of course, exists more specifically at lower levels, but concern with these levels should occur at the project level rather than at the city level.

#### Method of Classification

In achieving a congruent environment the various activities might be grouped into categories of varying levels of activity intensity such as commercial, industrial, office, residential, etc. These categories could then be subdivided, classifying each type according to its internal diversity, density and intensity of activity. Each category might include segments of the other categories. Each type might be auto, transit or pedestrian oriented. Any category might be specialized. It might cater to a particular social or ethnic group. It might specialize in serving the old or young, the rich or poor, individuals or families. A category might specialize in certain types of services such as shoes or jewelry, efficiency apartments or spacious units. Any category might be characterized by intensive or extensive development. An area might be further characterized by the relative segregation or integration of these traits. The combined effect of activity type and internal diversity tends to establish the activity intensity level.

By using such a classification system, criteria for congruence are established. With the possibility of interaction between activity and physical form, neither aspect need be satisfied at the expense of the other. Due to the nature of urban environments, particular activity patterns are apt to change through time while major circulation routes tend to remain relatively fixed. Because of these tendencies and because forms exhibit certain more or less

desirable characteristics, it would seem the most appropriate environmental solution would result from incorporating appropriate activities within a structural system of pleasant sequential forms. Since formal pleasantness may be produced in a multiplicity of manners, this approach does not apparently imply the provision of pleasant forms at the expense of functional activity arrangements.

## NOTATION SYSTEM

With the basic criteria for sequential design development, all that remains is the development of a technique for recording. This technique, in order to be useful, must provide a method of description - either of the designer's ideas or an existing sequence. The system must be capable of recording the elements of sequential form and at the same time lend itself to analysis in terms of the structural and congruence criteria. Because of the similarities which exist between musical composition and the design of sequences and because the system of music notation is so highly developed, the sequential notation system proposed here borrows heavily from the language of music. In addition, the system adopts many of its techniques from the language developed by Professors Appleyard, Lynch and Myer in their book View From the Road. Inasmuch as each category of visual characteristics developed is capable of being utilized singularly for thematic patterns, a method for recording each category separately was devised, and finally a method for combining all categories was developed since their combination provides the basis for the sequential experience. Such a method allows each category to be studied, recorded or proposed separately as well as provides a plan for direct control when implementation is to be effected. Similarly, the method for combining the categories allows each system to be studied in relation to the other while providing the basis for assessment of the total effect of their combinations.

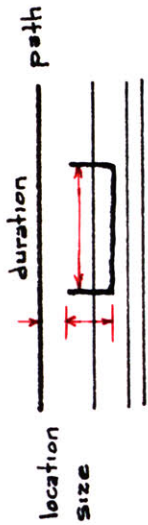
Unfortunately, any new system of communication will be alien to the reader or user initially. However, the system was developed to combat this disadvantage as far as possible. Since abstractions are required, symbols conveying visual impressions of the elements symbolized are used. Where sensations rather than physical properties are recorded, symbols have again been developed to convey visual impression using wherever possible familiar notations or

symbols. Finally, the form of the system was developed in an attempt to make its reading as simple as possible and to permit the notations to form visual patterns so that the reading of the notations will be similar to the reading of a music score or a graph. The layman should, even though he probably will not, be capable of assessing the aesthetic success of a sequence, gain an impression from the notation of the intensity fluctuations and their relative locations along the path simply by their graphical patterns. The system should also convey to the layman a sense of the sequential tempo or rhythmic pattern. Upon somewhat closer inspection repetitious elements should be apparent. Beyond this, the reader will probably have to familiarize himself with the system.

#### General Notation Characteristics

The notations are arranged in a vertical staff on either side of a central line signifying the pathway. The sequence is read vertically along the staff from the bottom to the top. The staff is divided vertically into equal units of time. Notations in the columns to the right or left of the pathway signify object characteristics occurring along the sides of the road. Notations along the central line record occurrences within the road or elements sighted straight ahead. Each column adjacent to the path line is divided into three columns diminishing in width from the path side. The largest of these columns is closest to the path and indicates the foreground. The other two in diminishing order denote the middleground and the background. The diminishing scale attempts to record the order of dominance of an object as it diminishes, moving from the foreground to the background. The vertical dimension allows characteristics to be noted





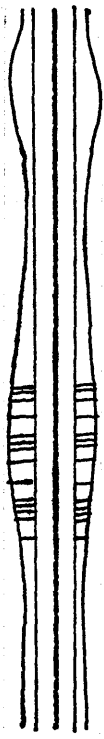
according to their duration. The perpendicular distance from the path denotes the object's location or relative distance from the observer, while the horizontal dimension of the notation records the object's size or intensity relative to its distance from the observer. Consequently, objects recorded in the foreground are much larger than the same objects recorded in the background. Objects noted along the central path line are items such as cars, bridges, tunnels, curves and objects sighted straight ahead.

### Path/Observer Motion Notation

#### PATH NOTATIONS



- Path of the observer or street is traced by a single central vertical line. This line is placed in the center of a central path column so that events occurring along, under, over or within the path may be noted as well as significant characteristics of the path.
- Minor intersections are noted with a circle and a line showing the direction of the intersecting street.
- Major intersections are shown in a similar manner except a double circle is used.
- Objects across or within the path, such as cars, traffic islands and the like are noted with lines extending across the path line.
- Objects over the path, such as a tunnel, bridge structure, trees, signs and such are shown with lines across and interrupting the path line.
- Path over objects, such as a bridge or other similar occurrences are shown with broken lines extending across the path.
- Objects oblique to path - all of the above notations may show the relationship of the objects to the path by noting them directionally.
- Path direction, curve or turns in the path are shown by adjacent arrows on the right side of the path noting the direction of the curve.



-Vertical alignment is shown by symmetrical undulations of a pair of lines on either side of the path line. As the two lines spread relative to the center line, the path is rising. As the lines become closer together, the path is descending. As the lines move parallel to each other, the road is level, but its relative height is determined by the distance between the two lines. Each half of the undulating line might be thought of as a vertical cross-section of the road.

#### OBSERVER MOTION

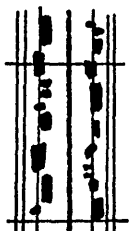
-Real observer motion - the actual sequential progress of the observer is recorded by incorporating a distance scale along the pathway within the equally spaced time units. As the speed increases the distance markings become closer together, as they spread the speed decreases.

-Apparent observer motion is noted alongside the adjacent column by "V" shaped markings. If the "V" converges in the direction of motion, there is an apparent decrease in motion. If the "V" diverges in the direction of motion, there is an apparent increase in motion.

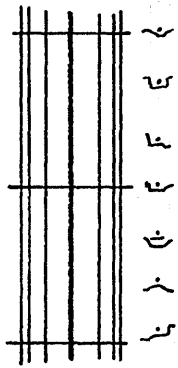
#### Space/Object Motion Notation

The location of objects is recorded only if they seem to confine the observer's sense of visual space. For instance, trees, chain-link fences and the like may be located very closely to the observer, but they do not restrict him visually. He sees through, over or under them. Consequently, objects such as these are not significant to this category. But objects such as buildings form walls to enclose the observer within a definite space. The manner in which these walls undulate, the degree to which they confine the observer, becomes very significant in determining the intensity of his experience. As they confine the observer more and more, his experience becomes more intense.

#### SPACE NOTATIONS

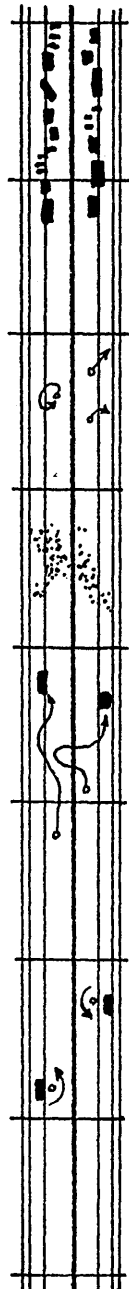


-Space confinement is noted by the closeness of notations in the adjacent columns on either side of the observer. It may be helpful to think of the confinement as a line drawn along the facades of buildings fronting on the path. While this is not always true, it is generally the case. Exceptions might be fences, tunnels, cuts through hills, etc.



-Cross-sections through the space are recorded along the sequence to the side of the staff to further define the observer's space. The sections intend to record the scale and character, as well as the position of the observer within the space. The sections show the alignment of the floor and walls as well as their horizontal and vertical extent. The position of the observer is recorded by the location of the dot. These sections are provided at equal time intervals to facilitate their reading as a sequence. Unfortunately, certain significant sections may be omitted. However, the time intervals used are so small that the possibility of significant omissions is slight.

### OBJECT MOTION



-Object presentation speed - If the apparent motion of the observer is a result of presentation speed of objects marking his progress, their effect is recorded by a series of horizontal lines spaced according to their presentation speed. As the frequency of lines increases, objects are being presented more rapidly to the observer, resulting in an apparent increase of motion.

-Directional object motion - If objects such as animated signs, windmills, automobiles and the like are moving in definite patterns, their motion is recorded with a small circle in the observed location and an attached arrow tracing the direction.

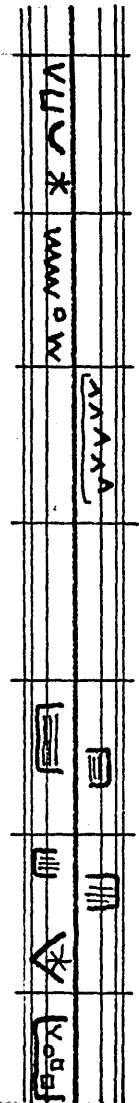
-Non-directional motion - If objects are moving but not in definite patterns, such as in an intense commercial area with clusters of people and cars apparently moving in all directions at once, their motion is noted simply with a cluster of dots in their observed location.

-Apparent object motion - If, as a result of a curving path, objects seem to move changing their location, the point where they are first sighted along with their location relative to the observer is noted with a small circle, and the path of movement is traced with an extended line terminating at the point the observer passes the object or the point where the object passes out of view.

-Turning objects - Many times stationary objects are seen from the side and as they are passed they appear to turn around and the observer then sees the front. Another common turning movement is observed if the side of a building is initially hidden from the observer by another structure close to him. He sees the front of the distant building and as he passes the taller building, the side of the second building is progressively exposed. The direction of rotation in this case is the reverse of the first case. Motion of this sort is shown by locating the stationary object with a circle and noting the direction of its rotation with a detached arrow.

## Notation of Object Form

The notation of form is developed to record objects according to their predominant shape, size, location, duration and internal articulation. Through combinations of these notations, continuity, contrast and groupings can be recorded. Shifts within these characteristics are noted by a method borrowed from the motion category. The size, location and duration of a form is recorded in the manner discussed at the first of this section.



Shape - four types of shapes are recorded:

- Triangular shape
- Rectangular shape
- Circular shape
- Complex shape

-Continuity is recorded simply by repetition of the dominant forms.

-Contrast is simply the result of contrasting characteristics.

-Grouping - objective grouping occurs if many separate but similar characteristics are presented, such as the monotonous repetition of similar houses in a residential suburb. This effect is noted with a bracket denoting the extent of the grouping.

Articulation - when forms are internally articulated, this effect is noted according to its special characteristic:

-Horizontal articulation is noted with a series of vertical lines.

-Vertical articulation is noted with a series of horizontal lines.

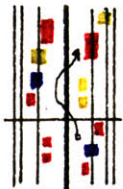
-Complex articulation is noted with a symbol similar to the one used for complex forms.

-Other forms of articulation may be noted by using the symbols for shape.

## Color Notation

The notation of color is relatively simple in that it conforms to the techniques developed for the previous categories, especially those for form.

A problem with its notation does, however, exist in the realm of reproduction. If the system is to be reproduced and the use of color is not possible, then symbols for colors must be developed. Of course, symbols could be used, but they could not be read as easily as the actual colors nor could they produce the contradictory effects inherent in the use of color. For example, although red is the most dominant color, after its sustained presentation its complimentary color becomes visually dominant. A notation system employing symbols in an attempt to record these complex effects would be most difficult to read. The technique proposed here therefore uses color but uses a limited number of colors. The colors chosen represent not only the basic colors but the colors most common to the typical U. S. urban environment. In other environments where other colors are more typical, the palette would have to be rearranged.

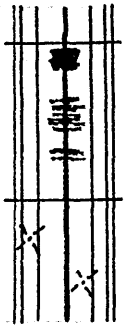


-Color is recorded according to its location, duration, apparent size, intensity, the manner in which it shifts, and of course, its actual color. The shape of the colored object is also recorded when it becomes significant.

#### Notation of Light

Light is recorded relative to its general background. If it is recorded at night, the patterns of light are recorded. If it is recorded during the day, the play of shadows and silhouettes becomes significant. The concern here is with the daytime situation and the symbols are developed in terms of shadows. However, the same symbols can be used for night-time notation, the only difference being a reversal of the names. Light, or rather its absence, is recorded as it fluctuates within the immediate pathway and in the role it plays alongside the observer. Its characteristics are noted according to their location, size, duration and shifting nature. General levels of light are recorded as well as its function in defining and articulating forms. Form

definition and articulation as the result of shadows is shown in the manner developed for form notation.



-Path lighting - The light level along the path is recorded by shading the section of the path in shade. If the shadow is uniform as the shadow from a tall building, the notation is bold. If the shadow forms complex patterns as might result from adjacent trees, the notation is a series of lines.

-Intermittent sources - resulting from flashing lights, beacons or perhaps the flicking of the sun as the observer passes through a group of trees is noted with a dot in the source location surrounded by radiating dashes.


#### Summary Notation

Finally, to be comprehensive, the combined effect of the categories must be studied. Such a summary may serve as the basis for design or as the final evaluation of described existing sequences.

Originally, the summary form was intended to serve as a record of the experience in both directions by simply reading the notations from both directions. The record could be used in this manner, but since some objects seen in one direction are not seen in the other direction, and since the movement and shift of objects is directionally dependent, the pattern would be more difficult to read. The person using the record would have to mentally eliminate certain aspects of the record which were not applicable for that direction. For the initial use, this sort of complexity does not seem desirable. However, after one becomes familiar with the system and its use, the possibility of using it for both directions seems particularly desirable for at least two reasons. First, the recording of the various categories is time-consuming and relatively difficult especially in field surveys. Therefore, the more uses a single record may serve results in considerable savings of time and effort. Second and perhaps the most significant defense of a two directional record stems from the fact that both directions are experientially related. Design

proposals suggested to improve one direction will more than likely affect the reversed experience. Consequently, both directions must be approached simultaneously. Proposals should be investigated as they affect each direction rather than just one direction. Having a single record which serves this dual purpose therefore seems most desirable even if it becomes somewhat confusing or difficult to the less sophisticated user. The major problem inherent in such a dual use seems to be the scale. The sequence is scaled to a uniform time scale in one direction. Since the times are likely to be different in the opposite direction, the only reasonable solution would require scaling the sequence to distance rather than time intervals. Such a scale would greatly simplify the recording, especially descriptive recording, but would render the system ineffectual. Consequently, the dual use of a single record seems, at least at this crude stage, to require more study before it may be effectively employed.

Because of the categorical, notation format, the determination of the total experience is relatively simple. Each staff may be thought of and reduced to a simple graph. The time dimension of the sequence becomes the time scale of the graph. The order of dominance and frequency of notations determine the intensity scale of the graph. A graph is produced for each individual staff, the base lines of graphs of each identical category are then joined to produce a graphical expression of the total intensity of each category as well as its manner of right-left fluctuation. This method is used to produce graphs for each category and finally all the graphs or categories are combined to produce a single graph depicting the total experiential contour as it fluctuates through time and intensity to the right and left



of the path. This summarized experiential contour can then be scaled to a base line to study the form of the contour in terms of the structural principles. The summary contour provides the basis for final analyses in descriptive situations or for the first stage in the design process.

### III. METHOD APPLICATION - CASE STUDIES

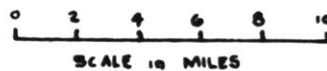
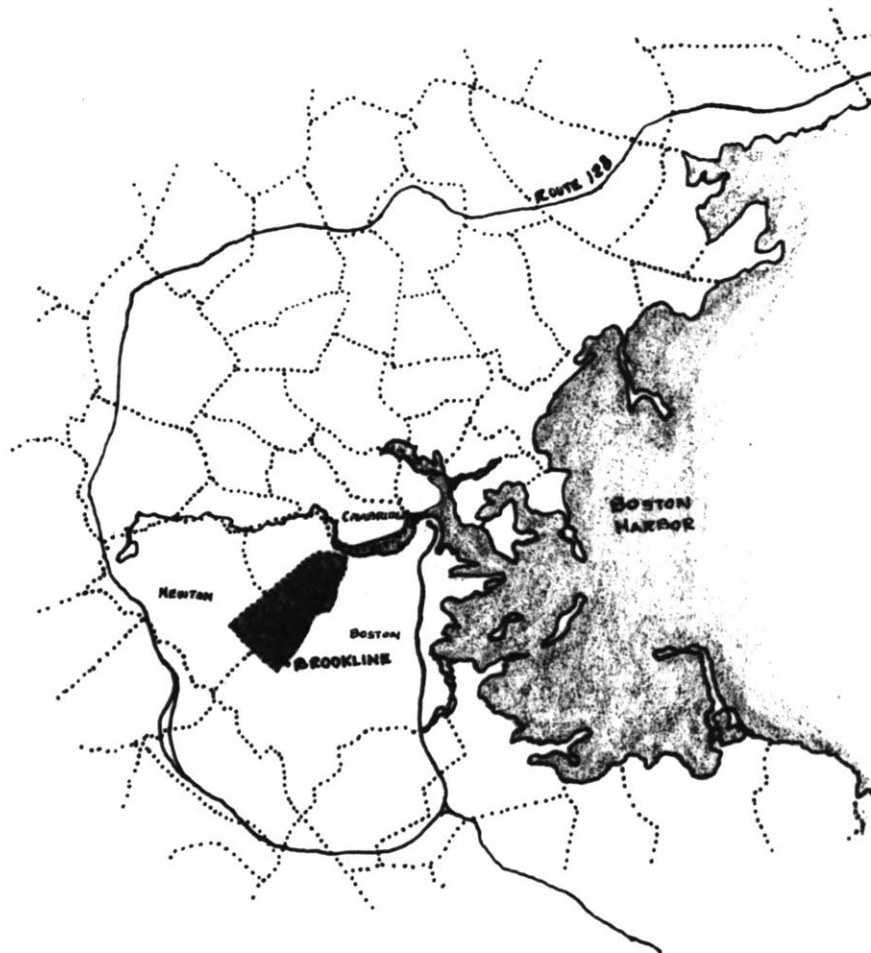
## AREA DESCRIPTION

### Requirements

For a design approach to be useful, it must be capable of effective application in the variety of urban situations. It must be usable in the highly dense core areas as well as the rural suburbs. It should be applicable to regional connectors as well as local service links. The approach must be capable of application at any hierarchical level or at various levels sequentially. It must be equally effective in various use or activity areas. It must provide a comparable means of study, design, description and analysis consistently and effectively to the many activity use types and levels.

### Area Chosen

A case study was therefore chosen which would determine the effectiveness of the system in as many of these respects as possible. The Town of Brookline, Massachusetts was selected. Brookline is located in the inner reaches of the Boston Metropolitan area about three miles from the Boston central business district (see fig. 1 , p.39 ). Brookline was chosen primarily as a result of its extensive range of urban activities and physical forms extending from the intensively urban to extensive rural. Residential densities range from multi-level elevator structures to quite extensive rural estates. Commercial areas range from the corner grocery through the contemporary regional shopping center, to the intensively serviced central business district type. Owing to its location and internal characteristics, Brookline's circulation system ranges from limited access regional highways to inter-community arterials, through major local and shopping streets to pleasure drives and local neighborhood feeder and collector streets. Each of these connector types passes through a wide variety of the local uses and activities.



**BROOKLINE**  
**IN**  
**THE BOSTON**  
**METROPOLITAN AREA**

**FIGURE 1**

## ACTIVITY CHARACTERISTICS

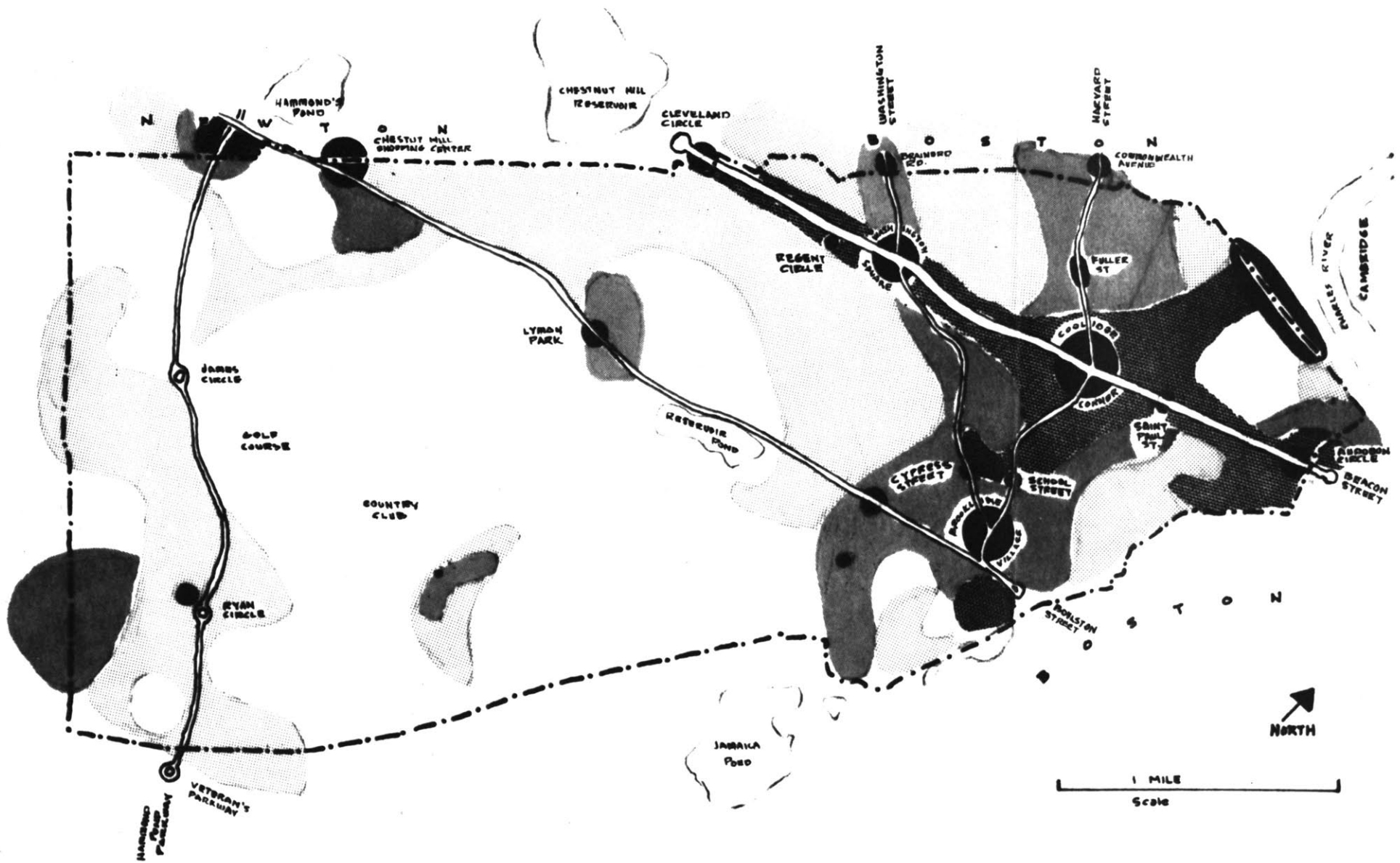
Since the characteristics of activities are important only as congruence criteria for the design approach, they simply are assumed and are further assumed to be desirable. In an actual planning process the characteristics would, of course, require development and support from broad community goals. The characteristics in this case are not prime objectives and therefore are not questionable in themselves but form the basis for congruence judgment of the final design suggestions (see p.24 to 26 ).

In the study area of Brookline, the significant activities may be grouped into the following five categories according to activity intensity level:

- (1) commercial
- (2) office
- (3) institutional
- (4) industrial
- (5) residential

These categories are further subdivided according to internal diversity.

The intensity classification of Brookline's various areas is shown graphically in figure 2 , p. 41 . The obvious apex of activity focuses on the commercial area at Coolidge Corner. Lesser activity peaks in descending order occur at the commercial areas at Brookline Village, Washington Square, Chestnut Hill, Cleveland Circle and at Audubon Circle. The lowest levels of activity are reached generally in the estate areas adjacent to and northeast of the golf course and country club. The intensity of activity generally decreases in gradient fashion from the commercial areas and increases from the estate area.



**BROOKLINE**  
**GENERALIZED**  
**ACTIVITY INTENSITY**

## SELECTED SEQUENCES

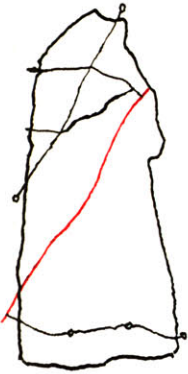
### Considerations

To actually test the effectiveness of the proposed design approach, five sequences or streets within Brookline were chosen. Several factors were considered as the approach is intended to be an extension of a total structural system. The major streets are therefore of greater design significance both in terms of the metropolitan and local patterns. More than one sequence was chosen so that the approach might be tested in as many different environmental situations as possible. Aside from their intensity levels and unique characters, the streets were considered in their relation to each other. The streets chosen are all connected, intersecting each other at various points in various types of areas. This relationship seems particularly desirable from a structural point of view as well as the sequential implications resulting from interconnection. These connections allow observers to travel along one of the streets enjoying a certain sequential experience and then enter one of the other streets at its intersection. These connections allow the sequential experiences to be studied both in terms of their individual traits and the manner of transition from one to the other. The sequences chosen are therefore all interconnected. They are characterized by a wide range of use types and intensity levels as well as specific street types, each with various attendant characteristics. The specific streets chosen, the extent of their study area and their particular use, type and level are listed below according to their hierarchical order. (see fig. 2 p.41 and fig. 3 p.45)

### Streets Chosen

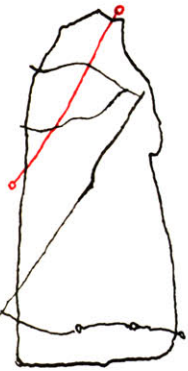
#### BOYLSTON STREET

Boylston Street or Route 9 is a major limited-access divided highway originating south of Brookline Village and connecting



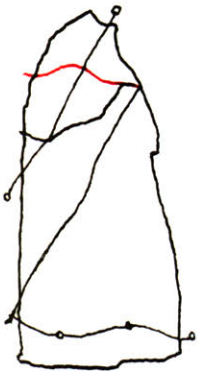
Boston with New York. Boylston Street, the most major street within the Brookline area, has speed limits ranging from 30 miles per hour at Brookline Village to 45 miles per hour at Chestnut Hill. The study area of Boylston Street extends from its point of origin at the Village to its point of intersection with Hammond Pond Parkway slightly past the Chestnut Hill shopping area.

#### BEACON STREET



Beacon Street, the next most important Brookline street, is a divided boulevard type of street serving as a major connector to the central Boston area. Beacon Street is heavily lined with trees on both sides as well as along the median strip. The median strip, about 50 feet in width, contains two MTA tracks in addition to almost continuous angle parking. The MTA line surfaces as it enters Brookline just past Audubon Circle and terminates at Cleveland Circle. The stretch of Beacon Street considered in the study extends from Audubon Circle to Cleveland Circle.

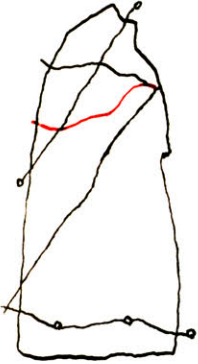
#### HARVARD STREET



Harvard Street acts as an intercommunity street connecting Brookline with Brighton. Harvard Street possesses no unique roadway feature but serves along most of its length as a shopping street. Harvard Street originates in Brookline Village in its connection with Boylston Street. It continues northwesterly to intersect with Beacon Street at Coolidge Corner and on across Commonwealth Avenue as it leaves Brookline entering Brighton. Harvard Street is studied from its inception at Boylston Street in the Village to its intersection with Commonwealth just outside Brookline.

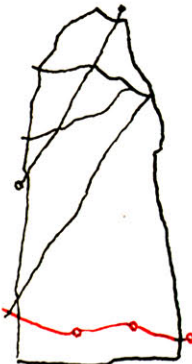
## WASHINGTON STREET

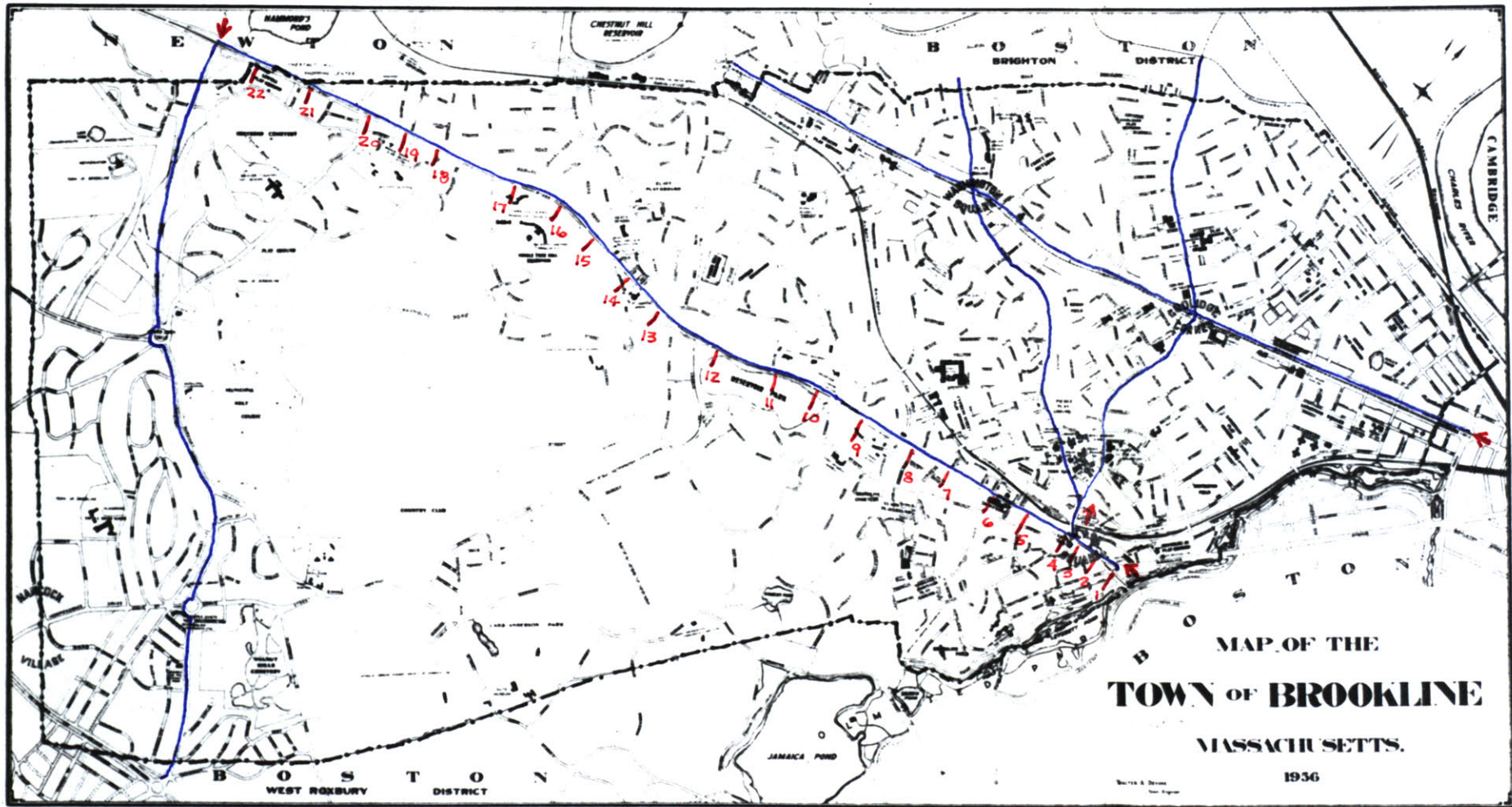
Washington Street also acts as an intercommunity connector with Brighton, comparable in level with Harvard but less intense owing to its residential rather than commercial nature. Washington Street joins Harvard Street at Brookline Village to connect and originate at Boylston Street. Washington, however, splits from Harvard at the Village to wind in a westerly direction to its intersection with Beacon Street at Washington Square. Washington then continues westerly to leave Brookline and intersect with Commonwealth Avenue in Brighton. The portion of Washington studied begins at Boylston in the Village and runs to its intersection with Brainerd Road at the edge of Brighton.



## HAMMOND POND PARKWAY

Hammond Pond Parkway, while also serving as an intercommunity connector with both Roxbury and Newton is quite unique in its character. Penetrating the southern low density residential area, the parkway is bounded along the majority of its length by heavy planting and rolling hills. The parkway serves as a functional connection and as a pleasure drive. It is interrupted in three places with lushly planted traffic circles. Hammond Pond Parkway is studied from its point of intersection with Boylston Street in the edge of Newton through Brookline to its point of intersection with the Veterans of Foreign Wars Parkway in Roxbury.





(SEE FIGURE 4 p. 57 FOR PHOTOGRAPHS)

1 MILE  
Scale

— SELECTED SEQUENCES  
 & — LOCATION OF PHOTOGRAPHS

## DESCRIPTION OF SEQUENCES

### Conditions

The experiential nature of any particular sequence, owing to cyclical changes in its perceptual content, necessarily changes. The daytime differs from the night-time experience. Activity patterns shift from weekdays to weekends. Seasonal changes affect the perceptual content. Climatic fluctuations influence the sequential experience. Because of these variations, the conditions under which the survey was conducted must be stated. As far as possible, typical or the most normal conditions were used. The survey was conducted on weekdays, during the daytime from 10:00 A.M. to 4:00 P.M. on sunny days in the first of March. Since the trees were barren, another survey conducted when the trees are covered with leaves would be desirable. However, the pressures of time make this an impossibility. Owing to the difficulty of field surveys, the limited amount of available time and the number of selected sequences, the sequences were recorded in only one direction. Upon consideration, the variety offered by selection of the five sequences appeared more important for the case study purposes than did recording a smaller range of variables in both directions. Of course, in an actual design situation both directions would necessarily be considered.

### Method

In recording the sequential events, the roadway was originally translated into a straight line through the use of a base map. The location of buildings relative to the roadway was also noted through the use of a base map showing building locations. These locations were noted simply by drawing a line along their facades. Intersecting streets and street names were also located on the field sheet. With this information reference points in the field were easily established and the recording proceeded fairly quickly. Physical objects

appearing in the field but not on the base sheet could be easily located in relation to the location of buildings. Characteristics of buildings as well as other objects could be noted in their correct locational relationship to the road. A single base sheet was used to record the characteristics of location, form and color. By overlaying this data with tracing paper, the additional categories of light and motion were easily recorded. Finally the sequences were timed, recording the location of five-second intervals by using the original base sheets then abundant with reference points. The vertical alignment of the roadway was determined from topographic maps. Finally, all of the information, originally scaled by distance, was re-scaled according to uniform time intervals.

## SAMPLE ANALYSIS - BOYLSTON STREET

### Description

The Boylston Street sequence (see fig.5 p.58 ) commences a short distance from Brookline Village at the intersection of Brookline and Huntington Avenues. See appendix p.97 to 137 for additional case studies. The road is level with very little activity or confinement on the left. On the right the level of activity progressively increases to the intersection of Washington Street at the Village. The color pattern is predominantly red with a fine grain mixture of yellows and blues on the right resulting from an abundance of signs. While the actual movement through this area is slow, the apparent motion increases as the activity or abundance of cars and people increases.

Passing this intersection, the apparent motion again increases as the confinement on both sides of the roadway becomes greater. While the buildings remain about the same height, they are much narrower, producing a fine grain marking effect as well as an intricate color pattern. As the activity node at the Cypress Street intersection is approached, the confinement lessens as the structures become more bulky. As the activity increases toward the intersection and as the dangers of the intersection become more imminent, the apparent speed is again increased.

As the intersection is passed, the intensity drops very rapidly. The road goes up a hill; the houses move further back from the road and higher up the two adjacent hills; the visual dominance of the structures is lessened as trees become more common. This section is also predominantly red becoming mixed with greens and browns as planting increases, terminating suddenly with a change to ochre at the intersection of Sargent Street.

At this point the intensity of the sequence drops abruptly as the space becomes extremely wide. To the left and below the level of the road is a large reservoir or pond. To the right is a hill and large estate area. The

road passes through this space, reaching a high point about the middle of the pond, and continues down to the intersection of Chestnut Hill Avenue where the trees converge to terminate the space.

From this point the road veers to the right through a level section confined on both sides by a fine grain of houses, gray on the right, red on the left, terminating at a small activity node of offices.

Beyond the offices, the road continues curving to the left around a fairly steep hill. Trees contain the left side of the space while a high solid fence follows the road on the immediate right. At the high point the roadway curves back to the right and down to the activity node at the intersection of Hammond Street. Halfway down the hill the left side is lined with brown houses, while the right side opens to a large flat space. The roadway is in shade from the adjacent trees along its length as it continues around the hill.

Ochre becomes the predominant color as the activity area is entered. Small shops line the left side while the bulky buildings of Chestnut Hill shopping center are seen across a sea of parked cars. Here again, the color scheme is dotted with a variety of color spotted signs. As the activity builds up beyond the intersection, the observer motion apparently increases, reaching a final abrupt increase as the sequence ends going over the bridge at Hammond Pond Parkway.

### Evaluation

#### LEGIBILITY, MULTI-LEVEL INTEREST AND DEVELOPMENT

Structural development along the Boylston Street sequence is adequate in many respects but in others suffers serious problems. The structure is easily legible as a result of the contrast existing between its parts. The commercial areas abruptly terminate the development of residential areas. Upon entering the commercial areas, the residential building types, their size,

shape and form of articulation suddenly shift to the commercial building type. These contrasts improve the legibility of the structure but exclude its continuity and interrupt its tempo. Since a sequential theme does not exist, the break in continuity of building form and activity types tends to divide the sequence into a series of unrelated residential and commercial areas.

In Brookline Village the variation and contrast in the form on the right coupled with the lack of development on the left hinder the continuity and interest of the area's experience. Upon leaving the Village the continuity is again destroyed through change in building types and the extreme degree of contrast existing in the color and form patterns.

At the entrance to the Cypress Street commercial area the sudden shift in building types, sizes and materials, as well as activity type, again increases the contrast and legibility of the areas or structural parts but all the same weakens the sense of internal continuity. Within the commercial area the tempo is increased through the activity while interest levels are developed through increased color and articulation patterns.

In the residential area beyond, development seems adequate. Legibility and interest are achieved through contrast and gradual variations in the tempo. Continuity is maintained, in spite of intensity and frequency variation, through the continuous activity and building types.

Upon entering the Lyman Park office area, legibility is improved at the expense of continuity through the contrast of building types. Tempo and interest, however, suffer owing to the extreme setback of the office structures. ~~also~~ The residential area between Lyman Park and Chestnut Hill shopping area is generally lacking in structural development. The trees on the left provide some interest, but the fence on the right excludes the possibility of interest added by the view and houses beyond. Monotony through continuity exists in this section owing to its lack of contrast or variation.

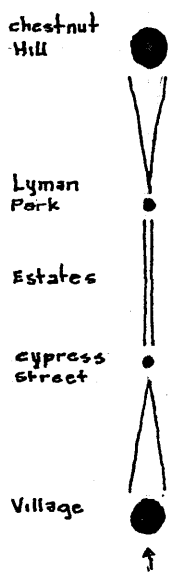
Again at the Chestnut Hill shopping area an abrupt change in building and activity types improves the legibility of structural parts while destroying their continuity. Interest in the area is maintained primarily by contrast and variation in the structures to the left. The horizontal character of the shopping center on the right and its hidden activity tend to minimize its interest and intensity.

#### IDENTITY

The major weakness of the sequence, (see fig. 9 p.62 ) at least in terms of structural principles, is the lack of any basic theme and its subsequent development. The only elements which might be cited as themes would be the recurring similarities in commercial areas such as the accumulation of people, signs, etc. Perhaps a theme might be identified in characteristics such as roof shapes, as the pattern moves from flat roofs, mixes with triangular shapes briefly before becoming completely triangular, mixes again, then returns to flat roofs. Each of these patterns might constitute a theme at a larger scale but at the scale considered here are much too gross. Owing to the nature of private development and the lack of any sensitive sequence control mechanisms, a continuous thematic pattern could only be accidental. Nevertheless, emphasis must be placed on thematic development if a rich, pleasant experience is to be effected.

#### CONGRUENCE

The Boylston Street sequence, according to its activity characteristics, possesses four nodal points or activity peaks. These points approximately divide the length of the sequence into three equal parts. The most intense of these nodes, Brookline Village, is located at the beginning of the sequence, while Chestnut Hill shopping area, the next most intense node, is



situated at the end. Two minor nodes of about the same importance divide the length into its three parts. Between the two small nodes, the activity level is constantly at its lowest as an estate area is traversed. From Brookline Village to the first small node, residential development forms a gradient from the intense activity level of the Village to the lesser level of intensity at the first small nodal point. A similar gradient is formed by residential development, increasing the activity level from the second small nodal point to the higher level existing at the Chestnut Hill area.

The sequential experience, however, does not reflect such a concise contour pattern. A peak is reached at the Village, but its support rests almost completely on the activity level resulting from merging traffic and the chaotic intersection with Washington Street. The actual speed of the observer is very slight. The space is open on the left; shadow patterns are not intense. Apparent motion is fairly great, but object presentation speed is very low. Color is varied on the right, but the left side lacks any clear articulation. Structural forms do reach a very brief climax owing to their size at the Washington Street intersection. However, beyond the intersection, as activity intensity subsides, the experiential intensity continues to increase. This increased intensity is the result of developments in all five visual categories. The space converges to a high degree of confinement. Structural grain becomes very fine as does the color pattern. Actual, as well as apparent speed increases. Object presentation speed is very rapid. Structures are intricately articulated with shadow patterns.

The low point of the gradient contour is clearly marked with a school on the left and a playground on the right. Beyond this point the experience follows the activity pattern fairly closely, rising again to the small activity node at Cypress Street. This node and its peaks are clearly marked visually with the

activity pattern, structural buildup and color climax. The climax of the node occurs clearly at the Cypress Street intersection.

Experiential intensity subsides, in congruence with the activity pattern until reaching the intersection of Sargent Street. At this point a massive apartment building occurs on the right, contradicting the established color scheme. Its importance is decreased by its duration; but its location, size and color are completely opposed to the activity intensity. Beyond, the experience level again coincides with the activity pattern to maintain a uniformly low level through the estate area. Immediately after the reservoir, beginning at the Chestnut Hill Avenue intersection, the intensity level of experience begins rising, reaching its climax slightly before arriving at the Lyman Park office area. The expected peak at the office area fails to materialize since the structures are located well back from the road.

Immediately beyond Lyman Park, experiential intensity drops sharply, maintained only by the twisting of the road as it passes over a hill. Intensity is also maintained by the relatively fast actual speed and the continuous right side confinement effected by a tall fence. Intensity of experience begins rising, congruent with the activity pattern, as the roadway begins its descent from the hilltop. Apparent motion increases as does confinement, while the structural grain and color patterns become increasingly more intricate. As the Hammond Street intersection is approached, the intensity gradient is supported and increased almost completely on the left side. Beyond the intersection this same left side supporting pattern continues, even though the activity peak occurs on the right at Chestnut Hill shopping area. This paradox is the result of congestion and many small shops located directly on the left street line. The large, very active components of the shopping center on the right are simple in form and uniform in color, set considerably back from the

road. As a result, the peak apparently occurs on the left instead of the right and does not seem as intense as the actual activity level.

#### SUMMARY EVALUATION

In general, the experiential form, its various peaks, their levels of intensity and the internal transitions are quite acceptable insofar as the structural principles apply. The form is simple and unified. The various commercial areas provide goals for structural development and generate areas of stimulus and challenge to contrast the relaxing nature of the residential areas. The various area types, their intensity and complexity levels, provide adequate material for multi-level structural interest. The contour does, however, suffer from ineffectual internal continuity.

The major weaknesses of the sequence appear in its lack of theme, its general lack of continuity between its major parts, its lack of contrast and interest in the section between Lyman Park and Chestnut Hill shopping area, its lack of color congruence in the latter portion and in its isolated cases of congruence misfits. The delayed experience peak at Brookline Village, as well as the premature and misplaced peaks at Lyman Park and Chestnut Hill, deserve special attention for congruence correction.

#### Proposals

The Boylston Street sequence could be significantly improved with only a few minor changes (see fig.10 p.63 ). The Village area needs considerable strengthening of its visual form. By increasing the building heights and masses on the left as well as the intensity of color, the visual form could be significantly improved. The large open space to the left destroying the apparent intensity of activity could be closed off by a screen of heavy planting, preferably of intense color. Such a screen would tend to diminish the space and increase the apparent intensity. The climactic peak of the

Village should be clearly marked preferably by a tall structure intensely articulated on the right located at or very near the Washington Street intersection.

Beyond the Village, the existing experiential intensity should be reduced. Since the structures are very old and delapidated, the area has been scheduled for eventual redevelopment. However, in the meantime, intensity could be reduced by simplifying the color patterns and by using less intense colors. Restricting curb parking within this area would also significantly lessen the intensity of experience.

At the Sargent Street intersection, the large apartment building on the right simply should be eliminated. Its location is undesirable not only in terms of design but from many other points of view, both public and private. With the apartment structure removed, a pleasant congruent transition would be effected from the medium density residential area to the estate area. The sequence is reasonably effective until reaching the Lyman Park office area where the experiential climax fails to occur. This failure could be slightly improved by intensifying the color scheme within the area or by providing some sort of increased road-edge intensity. Perhaps a transparent screen such as a group of red oaks or intensely articulated, brightly colored solar screen. If the building setbacks are to be maintained, a series of towers of varying heights located on both sides of the road would intensify the experience and mark the climactic point.

Immediately past Lyman Park around and over the hill, the experience is again frustrated by the tall fence along the right side hiding the houses and view beyond. Elimination of the fence would correct this condition, increasing the experiential intensity to coincide with the activity pattern.

The lack of congruence resulting from the location of the Longwood Cricket Club at Hammond Street could be significantly improved by replacing

the stockade fence with a substantial masonry fence intensely colored and articulated and reinforced by a dense screen of trees, preferably of various colors.

Finally, the apparently underdeveloped climax at Chestnut Hill shopping center could be improved by the addition of a few carefully placed towers. In addition, heavily planted strips of trees along both sides of the road would reduce the dominance of the left side and increase the dominance by decreasing the space on the right side.

In addition to these specific proposals, the use of color along the entire sequence needs improvement according to the general objectives. The lack of theme along Boylston warrants considerable attention. Owing to the diversity of activities and building types contained in the sequence and the limited possibility of changing these elements, perhaps a more fruitful approach might be concerned with the road or street furniture. A theme could be constructed with distinctive and frequently placed street lights. At night they would be dominant and if adequately designed would continue their visual function during the daytime. In addition, the street light theme might be reinforced with distinctive sidewalks and street pavings. The walks might be of brick, cobblestone, flagstone or some other distinctive material. A small stone fence or curb might line the road and sidewalks. The median strip might be widened slightly and filled with low planting. Any number of themes might be developed within the right of way, but the most effective and realizable seems to be the street light theme, reinforced if possible with a planted median strip and distinctive walk materials.



8



15



22



7



14



21



6



13



20



5



12



19



4



11



18



3



10



17



2



9



16



1



BOYLSTON STREET  
PHOTOGRAPHS OF SEQUENCE

(see Figure 3 for Photograph locations)

FIGURE 4



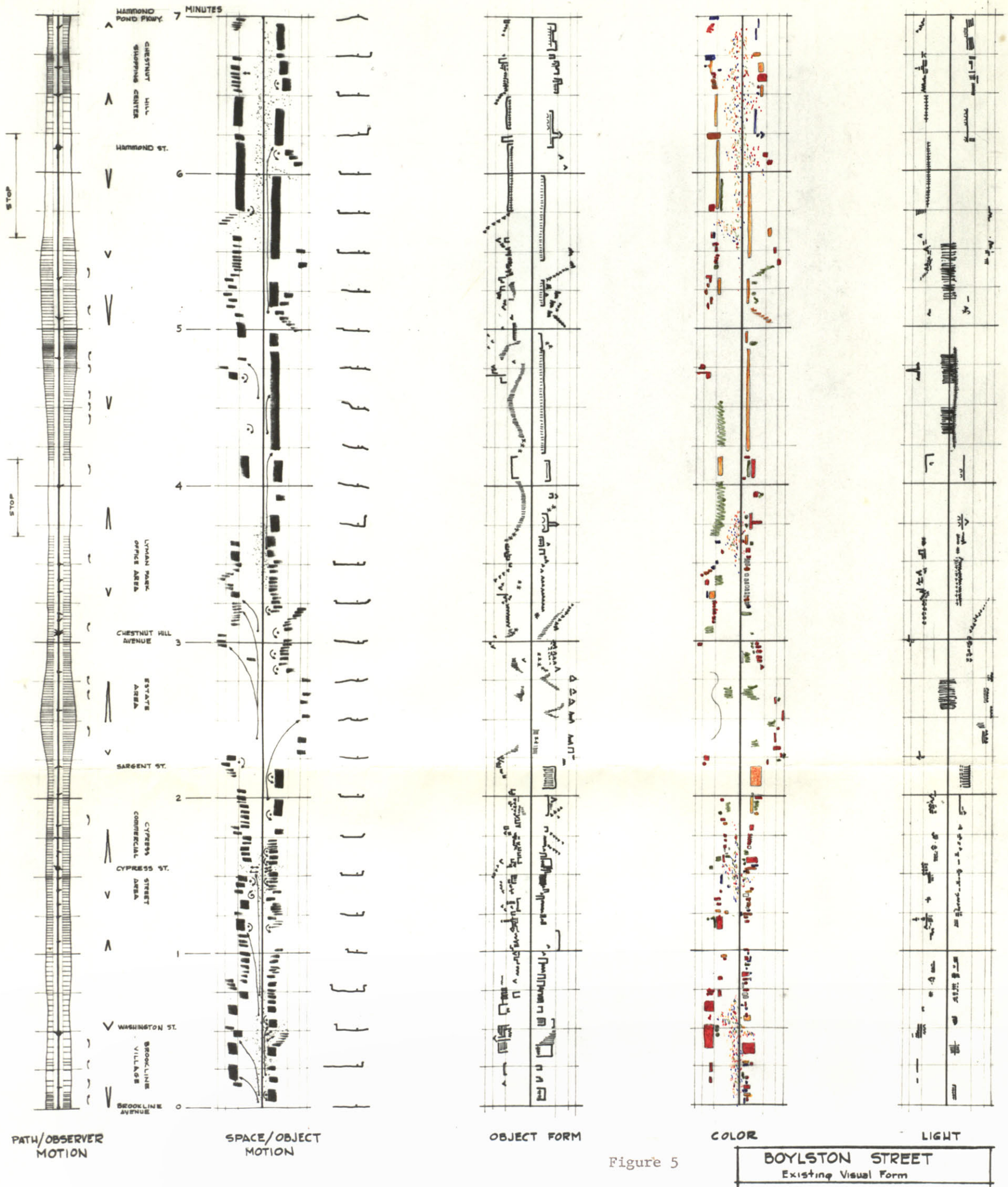
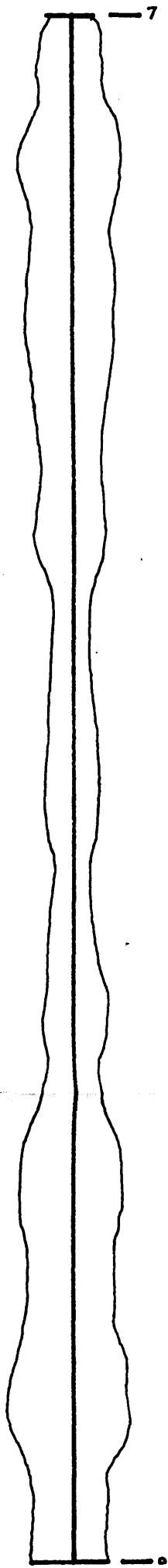
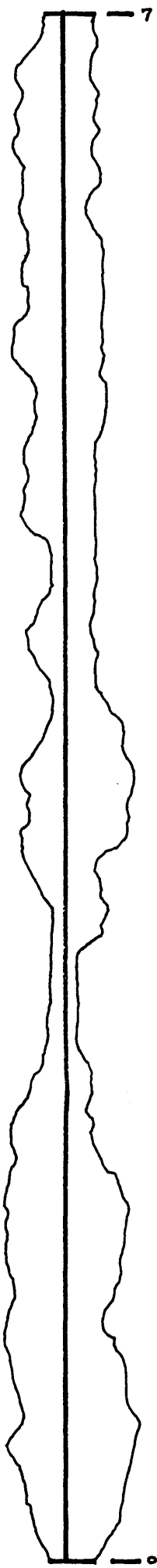


Figure 5

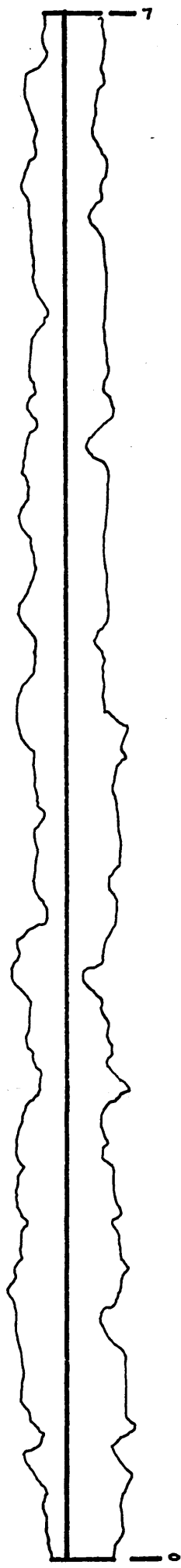
**BOYLSTON STREET**  
Existing Visual Form



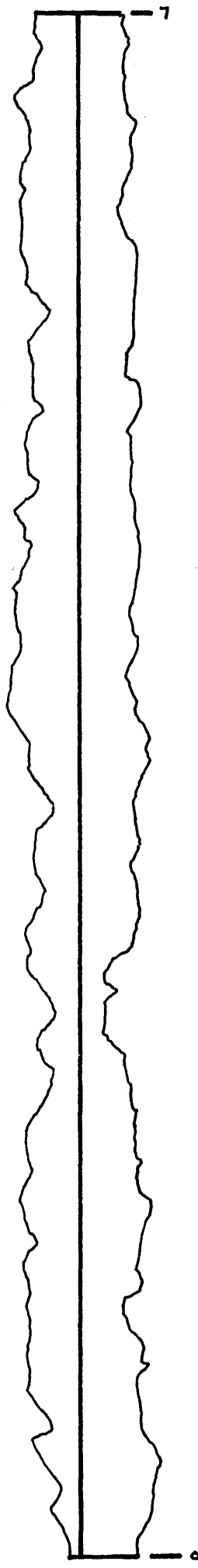
PATH/OBSERVER  
MOTION



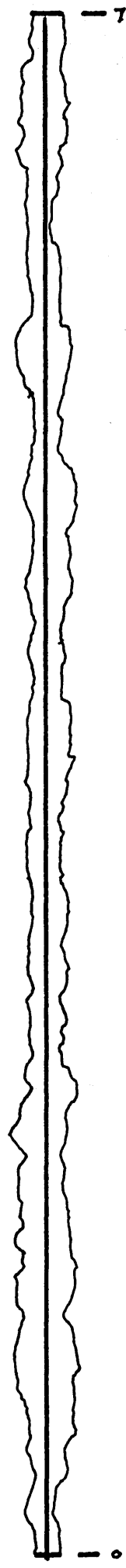
SPACE/OBJECT  
MOTION



OBJECT FORM



COLOR



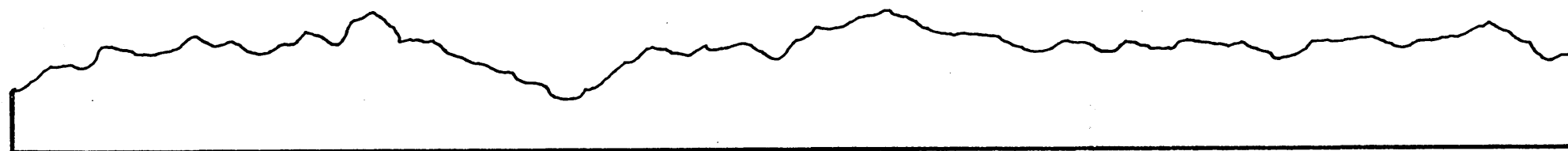
LIGHT

BOYLSTON STREET  
INTENSITY OF VISUAL FORM CATEGORIES

Figure 6



LIGHT



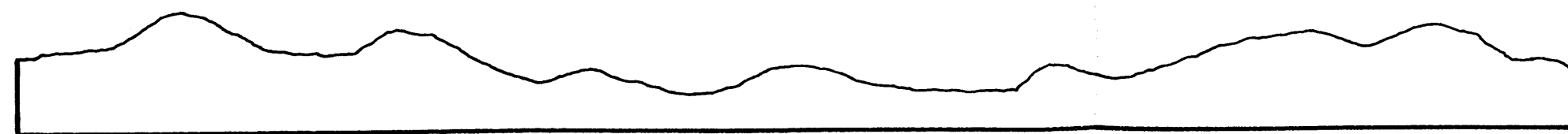
COLOR



OBJECT FORM



SPACE/OBJECT MOTION

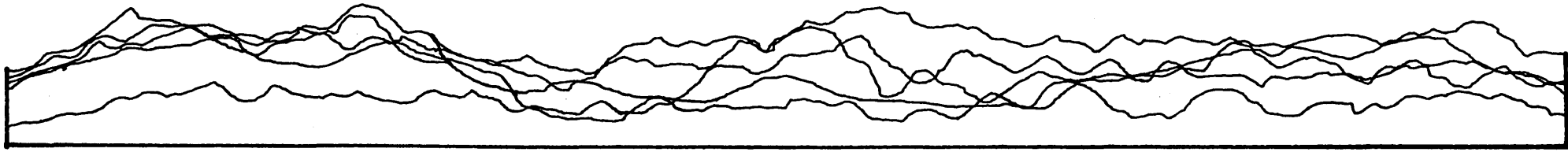


PATH/OBSERVER MOTION

0 1 2 3 4 5 6 7

Figure 7

BOYLSTON STREET  
INTENSITY SUMMARY OF  
VISUAL FORM CATEGORIES



COMBINED CATEGORIES

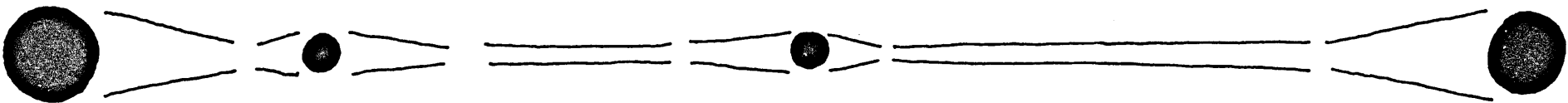


SUMMARY CONTOUR



ACTIVITY CONTOUR

BROOKLINE VILLAGE      CYPRESS ST.      ESTATES      LYMAN PARK      CHESTNUT HILL



ACTIVITY PATTERN



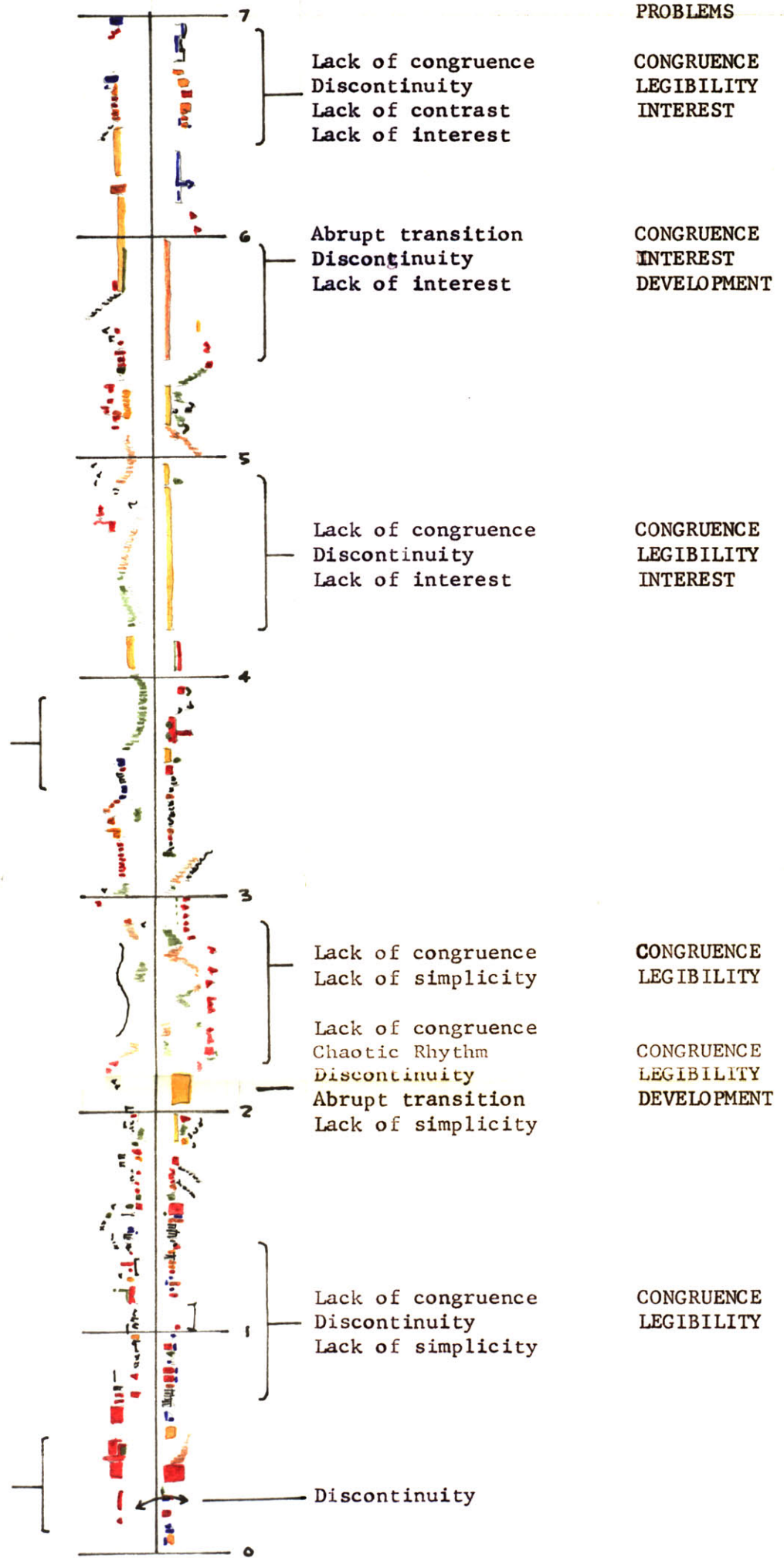
DESIRED CONTOUR

Figure 8

BOYLSTON STREET  
 INTENSITY SUMMARY OF  
 COMBINED VISUAL FORM

CONGRUENCE  
LEGIBILITY  
INTEREST

Lack of congruence  
Discontinuity  
Lack of contrast  
Lack of interest



CONGRUENCE  
LEGIBILITY  
INTEREST

Lack of congruence  
Discontinuity  
Lack of contrast  
Lack of interest

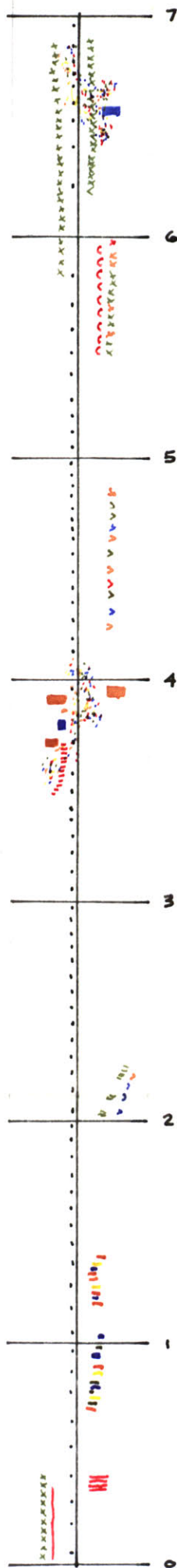
Figure 9

**BOYLSTON STREET**  
VISUAL FORM PROBLEMS

Mark climax with tall structures both sides  
 Increase space confinement with articulated intensely colored screen

Provide theme of intricately articulated street lights with median strip planting where possible

Increase space confinement with masonry fence  
 Support with plant screen



Increase space confinement with plant screen both sides  
 Mark climax with tall structure

Replace stockade fence with articulated masonry fence  
 Support with multi-colored plant screen

Remove stockade fence to allow view of houses and beyond

Replace apartment structure with single houses  
 diminishing space confinement

Simplify color patterns  
 Reduce color intensity  
 Restrict curb parking

Increase articulation of existing building

Figure 10

## GENERAL SEQUENCE DESIGN POLICIES

To direct the planner's efforts in achieving the goal of an aesthetically pleasing environment, sequence design policies relative to the specific situation must be developed. These policies fall into two categories: objectives and implementation methods.

### Objectives

The basic design objectives are those previously developed in the initial sections. The major goal is to achieve an aesthetically pleasing environment. The approach proposes to achieve this goal through structuring the city into a perceptually coherent object. Such a structural system seems best achieved through the manipulation of the urban street hierarchy. Beyond this level the approach proposes to structure the individual streets to provide coherent, pleasant sequences. Sequential structure is effected through manipulation of the five categories of visual form characteristics according to the structural and congruence criteria. It is at this level that design objectives relative to the specific situation must be adopted.

Based upon the prevailing existing conditions within Brookline and upon the previously developed criteria, the following general sequential design objectives are suggested as guide lines for future Town action.

Brookline should strive to produce and strengthen thematic developments within the major sequences. These themes are best expressed visually through physical forms. Building types, roof shapes and other form characteristics provide effective thematic material. Themes developed from the form category are capable of infinite variation and support through the use of all the categories. To strengthen the experiential contour, as many categories as possible should be simultaneously employed harmonically. In addition, the most dominant or intense visual characteristics should be employed to express the most intense

activity areas while less important characteristics should be used in less active areas. To enrich the experiential contour, the principles of structural development should be used whenever possible.

#### Implementation Methods

Since it is not the interest of this approach to upset current social institutions, the most critical problem arises in implementing the design policies and proposals. This difficulty is compounded by the fact that Brookline is already developed, reducing the possibility of effecting proposals through control of new development. At best it would be a very gradual, piecemeal process. Even so, the policies and proposals, if they are to be identified as community objectives, should be expressed in the existing controls such as zoning, subdivision control, building codes and especially in the comprehensive plan. These policies should then be reflected in all Town projects and departmental efforts. Special concern should be developed in the Highway and Park Departments, since these departments are directly concerned with the streets, their design, maintenance and corrections as well as the adjacent planting schemes. In lieu of structural themes, planting can be used most effectively to establish themes and can be provided within the right of way limits completely at the Town's discretion. Finally, an extensive education program should be initiated to stimulate and encourage private action in effecting the design objectives.

#### IV. CONCLUSIONS

## APPROACH EVALUATION

The approach to sequence design, its concept, its elements of concern, the attendant framework of guiding principles, the notation system and the method of application as applied to the five case studies lead to certain conclusions concerning its validity, utility and imperfections.

### Validity

The validity of the approach tends to be supported by its application and evaluation in the case studies. The five categories of visual form proved to be capable of describing the sequential intensity of experience. The various structural and congruence criteria demonstrated their ability to identify sequential weaknesses and to guide corrective efforts.

### Utility

Evaluation of the method through the case studies substantiates the fundamental utility of the method in the following respects:

1. It is capable of application in a variety of situations at various hierarchical levels. A uniform time interval determines the scale of the notation system. Any level of sequence can apparently be used allowing the scale to determine the amount of possible detail and as a result, the significant elements.
2. In the majority of situations it can be translated into existing legal controls maintaining current concepts and practices of private enterprise.
3. It deals with the visual form at a general level allowing concern with systems of elements rather than specific objects; consequently, the method appears applicable at the city scale.
4. It is equally effective for purposes of design, description or evaluation of existing sequences.
5. A minimum amount of time, effort and expense is required in application. No special tools are required, but the design and evaluation is best executed by persons trained in aesthetics.

6. The notation system is developed in such a manner as to allow its presentation to and comprehension by non-technical persons. It appears able to convey a sense of the sequence as experienced in reality. This seems particularly desirable as other existing notation systems require a high degree of technical ability and familiarity for understanding owing to extremely tenuous symbolic relations with physical realities.
7. It allows each of the five categories of visual form to be studied and developed as separate systems or in combination as an integrated total system.
8. It apparently can effectively produce pleasant sequential experiences without radically changing the existing environment or present institutions.
9. In addition, it tends to increase the clarity and meaning of the physical environment.

#### Weaknesses

The system has, however, by no means been perfected. Several weaknesses were encountered in the case studies, while other imperfections were identified in considering possible applications. The majority of the weaknesses were found to exist in the notation system.

1. It lacks the ability to describe the position of objects in the possible 180 degree visual field.
2. It is incapable of expressing the sequence in both directions simultaneously. Such expression is possible if a distance rather than time scale is used, but the distance scale renders the system useless by failing to report object duration and presentation speeds.
3. It fails to describe the intensity of experience encountered when the road is artificially or otherwise elevated; nor does it describe the intensity of experience resulting from views and vistas or from passing, viewing and traversing large bodies of water.
4. The summary form does not allow each category to be sufficiently studied in relation to each of the other categories and to the total experience.
5. Finally, control of certain aspects of the visual form, such as roof shapes and color control does not exist in current control mechanisms.

## IMPLICATIONS

The application of the method in the case studies pointed up certain critical aspects of sequential form and identified several recurring sequential weaknesses. The experience gained in the case studies indicated the most critical determinants of the intensity of visual form to be observer speed or motion, the degree of space confinement - the nearness of objects to the observer, and the size of objects - their height and length. These characteristics tend to affect the intensity of visual form through all of its categories and are therefore basic to its complete experience. The major weaknesses were: (1) lack of sequential theme, and (2) lack of congruence between intensity of visual form and level of activity. Consequently, certain environmental and legal implications result.

### Environmental

Environmentally, the corrections would result in changes primarily within the visual form categories of space confinement, object form and color. These categories would simply be refined to express themes and to effect congruence, resulting in no radical environmental change.

Since commercial areas express the most intense experience, they would be most affected by the corrections. There is a greater possibility of the need for correction in a complex high activity area than in a relatively simple activity area.

### Legal

Legally, the corrections would require a slight extension of existing control mechanisms. Most of the aspects of visual form are capable of translation into existing controls, especially zoning. However, control of such items as roof shapes, building types, color and form articulation fail to exist in most current mechanisms. These items possibly could come under the realm of nuisance

control and could therefore be included in the police power providing the aesthetic objectives were clearly stated and supported by cognizance of structural principles.

## SUGGESTIONS

Additional study for the purpose of perfecting the design method should be addressed to the following areas of concern:

1. Further research is needed to actually prove the validity of the system. To assess the system's validity, observer responses should actually be measured as he travels through the sequence. This might be done with a device similar to a "lie detector." In this manner the possibility of inaccuracies resulting from speed or inability of the observer to report his complete experience would be minimized. The results could then be compared with the system's evaluation of the sequence to determine its effectiveness. Similar tests should be employed to determine the variation of experience between driver and passenger as well as the effect of various levels of sophistication or preoccupation of observers.
2. Controlled experiments are needed to measure observer responses to each of the categories of sequential form in an effort to determine the relative weight of the various categories.
3. Further case studies are needed to determine the validity and utility of the system in various situations and in a wide range of scales. Additional studies should attempt to determine the effect of seasonal, night-time and speed variations on the sequential experience.
4. Exploration through further case studies is needed to improve the notation system's effectiveness and clarity of presentation. Attention should be focused on the possibility of developing a notation system expressing both directions simultaneously.
5. Pilot projects are needed to determine the actual effectiveness of the system. Only through trial and error and actual application will the sequential method of design be sophisticated and sensitized as a valuable additional tool in the planning process.
6. Instigation of effective legal controls is needed to adequately express design objectives through the categories of visual form and structural principles.
7. Pilot projects are needed to assess the effectiveness of alternate methods and materials for developing sequential themes with particular emphasis on public action.

**APPENDICES**

APPENDIX A

ELEMENTS OF THE PERCEPTUAL PROCESS

## ELEMENTS OF THE PERCEPTUAL PROCESS

### Introduction

The phenomenon of perception has stimulated interest since the era of the Greek society. Through the ages many different schools of thought have developed in an attempt to explain and define the perceptual process. Some of the attempts have sought to modify and extend the earlier theories, while others have attempted completely different and conflicting explanations. As a result, much disagreement revolves around the concept of perception. However, most of the disagreement is based on the interpretation of observations. Most of the experiments concerning perception have been carefully designed and described, enabling them to be repeated with similar results obtained. Therefore, while the effects of various experiments in perception are not disputed, the explanation of these effects enjoys very little consensus. While in psychological circles this may be a major impasse, it provides little difficulty for the purpose here.

The process of perception has been defined in many ways. It certainly may utilize all of the senses through various levels of consciousness and sophistication. However, for the purpose here, the concern is primarily with visual perception. What generally transpires during the process? What is the role of the observer? What is the role of the object? How do these elements interact? In exploring these various elements the concern will be with the general or normal occurrence. This approach does not attempt to imply there are no variations to the norm, but the variations may be classified as special cases and are therefore not of paramount concern here.

## The Process

### STIMULATION

In order for the visual process of perception to take place, the eye must be stimulated. This stimulation results in the acquisition of immediate knowledge of the size, shape, color and spatial relations of objects in our environment.<sup>2</sup> However, this sensory experience is only a necessary condition and not a sufficient condition for the identification of objects.<sup>3</sup> At first there is only an awareness of an object in the visual field. This phase has been called the stage of the generic object.<sup>4</sup> This information is then processed; the object is classified and identified. Once the object is identified the process has reached the stage of the specific object.<sup>5</sup> At this point the process of conscious reception is complete, but the perceptual process is not complete. Once the object is classified and identified, the information is then interpreted to establish the meaning of the object.<sup>6</sup> At this point the process may be complete or the observer may utilize this information to direct his action. Various orders of feedback may occur if insufficient information is gathered. The process of perception, therefore, involves the reception of stimuli, the classification, identification and interpretation of the stimuli.

### LEVELS

The process described does not always occur in totality; therefore, various levels of perception are possible. It is generally conceded that in

2 D. M. Armstrong, Perception and the Physical World, (New York, 1961), p. 191.

3 D. W. Hamlyn, Sensation and Perception, (New York, 1961), p. 194.

4 M. D. Vernon, A Further Study of Visual Perception, (Cambridge, 1954), p. 21.

5 Ibid.

6 Ibid., p. 22.

order for perception to be possible, the observer must be consciously aware of his surroundings even though they may not be the center of his attention.<sup>7</sup>

There may be various levels of conscious awareness which can result in various levels of perception.<sup>8</sup> Levels of perception may be the result of many conditions. The process may be concluded at any one of its phases, or by selection and experience the observer may obtain more or less information from the perceptual situation. Physical conditions also influence the level of perception. Because of their importance in the perceptual process, the role of the object and of the observer will be explored more fully.

### The Observer

The role of the observer in a perceptual situation obviously is very complex. The observer receives the stimuli, classifies it, identifies it and interprets it. For an observer to perceive an object as possessing certain characteristics presupposes the exercise of these functions. These functions in turn require a certain ability, or more specifically, experience.<sup>9</sup>

### EXPERIENCE

Experience or level of sophistication then is the crux of personal perception. Interpretation, for example, includes adjustments based on experience.<sup>10</sup> If the observer knows from experience that a coin is circular, when he sees the coin in perspective turned at a slight angle, even though the stimuli present an elliptical object, he perceives the coin as being circular. The apparent elliptical shape does not lead him to believe that coins are some-

<sup>7</sup> Armstrong, op. cit., p. 192.

<sup>8</sup> R. J. Hirst, The Problems of Perception, (New York, 1961), p. 308.

<sup>9</sup> D. W. Hamlyn, The Psychology of Perception, (New York, 1957), p. 113.

<sup>10</sup> Hamlyn, Psychology of Perception, op. cit., p. 19.

times circular and sometimes elliptical. However, if the observer is unable to identify the object as a coin and is unable to change his vantage point, then it will appear elliptical if he cannot detect a depth variation.

Similarly, experience enables the observer to utilize cues for perception. It is not necessary for the observer to "see" the complete object in order for him to perceive it completely. This occurrence, visual or sensory imagery, depends on the observer's experience.<sup>11</sup> For instance, if a building is seen with a tree in the foreground, the parts behind the tree are obviously not visible. However, since the observer knows those parts of the building are there they may be supplied in a mental image. This phenomenon also allows cues to be utilized in perceiving complex objects. Again, the process requires a certain level of familiarity of experience.

Experience has been shown to influence perception in still another way. The ability of the observer to name the perceived objects also increases perception. The more familiar objects with familiar names are the most perceptible.<sup>12</sup> Familiarity of this sort also increases the observer's ability to utilize visual imagery and his skill in reproducing or recalling the objects.

Another perceptual influence of experience has been noted in experiments with children of various ages. The experiments show an increase in the ability of the observer to structure and classify objects with experience or maturity.<sup>13</sup> The younger children perceive details separately without relating them to each other while the older children with more experience tend to perceive more of the total structure. It may therefore be stated that as the experience of the observer increases and as his ability to mentally structure the visual field

<sup>11</sup> Vernon, op. cit., p. 26.

<sup>12</sup> Ibid., p. 24.

<sup>13</sup> Ibid., p. 35.

increases, the amount of perceptual content must similarly increase. This is simply an extension of the principle that a person is capable of dealing with a limited number of things simultaneously.

Experience, however, must be related to learning. If past experience is not classified it can be of little use. The observer must be able to utilize his experience to gain insight into the structural inter-relatedness of perceptual elements or it can be of no value.<sup>14</sup>

#### ATTITUDES

The attitudes or expectancies of the observer also act as a major determinant in perception. These factors condition the observer to a state of readiness for certain features.<sup>15</sup> For example, if the observer is angry he will most readily select the distasteful features of the objects. Habits of attention act similarly in the perceptual process. Successful discrimination of detail is particularly dependent on past experience and interest. Preoccupation and emotional states of the observer significantly bias his perception. If the observer has advance knowledge of what to expect he will tend to be extremely selective in his perception.<sup>16</sup> All these factors may be voluntary or involuntary. They are factors of attention or a "set." While these factors are personal and to a great extent uncontrollable, they may be valuable since they may be manipulated externally in a given situation.

#### MEANING

The last but certainly not the least stage of the perceptual process is that of identification and understanding of meaning.<sup>17</sup> The meaning of an

<sup>14</sup> Ibid., p. 231.

<sup>15</sup> Hirst, op. cit., p. 248.

<sup>16</sup> Vernon, op. cit., p. 214.

<sup>17</sup> Ibid., p. 22.

object must necessarily be established by the observer; and, as a result, is dependent on the observer's level of experience, his attitudes as well as the particular qualities of the object. In establishing the meaning of an object, experiments show that the observer requires an answer to several basic questions.<sup>18</sup> He must know the object's use and what it is made of. He usually wishes to know if it is good for its purpose or efficient and if it is or could be useful to him. Of course, meaning attribution does not end with these four questions but beyond this point the questions become concerned with unique interests and experience and are therefore of little use generally.

### The Object

The role of the object in a perceptual situation is extremely complex and since it is the variable most readily manipulated its role will be discussed more fully. Because of the basic purposes, the concern here is with the aspects of an object or group of objects which tend to make them more or less perceptible. For simplicity these aspects have been grouped into six categories which seem to include the most significant elements relative to the perceptual dominance of an object. These categories are the illumination of the object, its location, its color, its exposure time and motion, its form and the group or total structure. In evaluating these aspects of form, the perceptual threshold appears to be the most effective method of determining their order of dominance. In experiments dealing with thresholds the lower thresholds were interpreted as characterizing the object with greater dominance. Since all the experiments did not use the same unit of measure and since many experiments reported only an order of dominance beyond the most fundamental qualities, comparative information is less substantial. However, the experimental results do give a general idea through a very wide range of detailed aspects of objects

<sup>18</sup> Ibid., p. 29.

of their relative order of dominance. Of course, an absolute weighting of each characteristic of the object is the most desirable situation since this would allow any combination of qualities to be computed, resulting in an order of dominance comparable to any other set of combinations. However, in the absence of such complete information, the data available will provide a substantial basis for reasonable comparative judgments.

#### LIGHT

In carefully controlled experiments, it was found that the threshold for light was lower than for just barely perceived shapes. It required twice as much light to perceive shape in a vague way and about 25 times as much light to recognize form correctly.<sup>19</sup> Some forms or geometric shapes required less light than others. The brighter the object the more readily it was perceived; or, conversely, the brighter the field or background, the more readily the object was perceived.<sup>20</sup> The intensity of illumination also greatly influences perception.<sup>21</sup> Contrast between the levels of illumination of the field and the object tend to increase significantly the dominance of the object.<sup>22</sup>

#### LOCATION

The location of the object in the visual field exerts considerable influences on its perceptual dominance. With respect to the two dimensional plane, the greater the centrality of an object, the greater its dominance. Similarly, in consideration of depth, the shorter the distance between the observer and the object, up to the least distance of distinct vision, the

<sup>19</sup> S. H. Bartley, Principles of Perception, (New York, 1958), p. 92.

<sup>20</sup> Vernon, op. cit., p. 204.

<sup>21</sup> Ibid., p. 203.

<sup>22</sup> Ibid., p. 204.

greater the dominance of the object.<sup>23</sup> However, an object perceived in a contoured field will exert dominance over an object perceived in a plain field irrespective of distance within the limits of distinct vision.<sup>24</sup>

## COLOR

Color has been found to be more important in producing dominance than either form or size.<sup>25</sup> Color may be perceived in several ways. The modes of perceiving color are generally the aperture, the illuminant, the illumination, the film and the object modes of surface and volume.<sup>26</sup> The major variables involved in the actual radiation are wave length, total energy content and spectral purity.<sup>27</sup> An increase in any one of the qualities tends to increase the dominance of the color and consequently of the object. Within the spectrum the longer wave lengths or reds and yellows tend to dominate over the shorter wave lengths, the blues and greens. White tends to dominate black.<sup>28</sup> Color perception, however, is very unique in that the eye grows tired very rapidly in perceiving color. Due to the nature of its rods and cones, after perceiving a color for a certain period the eye becomes most receptive to that color's spectral complement. This occurrence therefore may complicate the order of dominance of colors during a sequential effect.

## MOTION

When an object is set in motion or presented at successive time intervals, its dominance is also increased. If fixed objects are presented at timed

<sup>23</sup> Ibid., p. 47.

<sup>24</sup> Ibid., p. 204.

<sup>25</sup> Ibid., p. 207.

<sup>26</sup> Bartley, op. cit., p. 162.

<sup>27</sup> Ibid., p. 154.

<sup>28</sup> Vernon, op. cit., p. 205.

intervals, a certain minimum interval is required if the observer is to be capable of separating these objects. A very low threshold can be obtained under carefully controlled conditions using fixed luminous stimuli of highly contrasted shapes. Under these conditions the threshold can approach a time interval of about one-twelve hundredth of a second with extremely capable and alert subjects. However, under more normal conditions but nevertheless favorable conditions, using more normal subjects and more common stimuli, the interval threshold for separation is about one tenth of a second.<sup>29</sup> The same threshold applies to the minimum exposure time for normal stimulus or form to be perceived. The apparent velocity of moving objects within a homogeneous field is primarily dependent on the size of the field as well as object illumination.<sup>30</sup> Therefore, if the size of the field and of the objects moving in it are doubled, the apparent velocity is halved. Likewise, an increase in the illumination decreases the apparent velocity of the objects. Other factors can affect the apparent velocity of objects as well as influence the amount of content perceived relative to objects in motion. For instance, if the visual field is heterogeneous, the apparent velocity of objects moving through it will be greatly increased, especially if the moving object is passing very near stationary objects. As the number of stationary background objects within a given distance increases, the apparent velocity of an object moving through the field also increases. The amount of content which the observer is capable of obtaining from a group of objects moving may be significantly increased if the objects are presented according to a uniform frequency.<sup>31</sup> This sort of manipulation tends to aid the observer in structuring the objects and allows

29 Henri Pieron, The Sensations - Their Functions, Processes and Mechanisms, (New Haven, 1952), p. 297.

30 Hamlyn, Psychology of Perception, op. cit., p. 63.

31 Pieron, op. cit., p. 305.

him a certain degree of predictability or expectancy. Objects presented in accordance with a frequency are reproduced by observers more readily and more correctly. The perceptual content of moving objects can be further increased if the frequency concept is varied to form a rhythm. However, the maximum rhythm must not exceed the exposure time threshold of one tenth of a second which seems to be the maximum psychological cadence.<sup>32</sup> Again, the increase in content obtained from the visual situation is a result of aiding the observer to structure the field, to group the objects into broader categories and to anticipate coming events.

#### FORM

In object discrimination several factors tend to influence dominance. Initially, however, several levels of discrimination are apparent. If a group of objects is presented simultaneously, the first thing perceived is the total structure or pattern. This pattern is perceived as flat or two dimensional and without any meaning or logic.<sup>33</sup> The next level involves the discrimination of separate objects and their size and finally their shape or form. Of two figures, the same shape but unequal in size, the smaller figure tends to be the most dominant. In experiments concerned with shape perception many useful results have been obtained. Of the many shapes studied, the geometric or regular shapes were the most dominant. Of the geometric shapes studied, an order of dominance was found which ranged from the triangle down through the circle, the hexagon, the rectangle and finally the square.<sup>34</sup> This order can, however, be upset by contrast. If, for instance, a square is presented in a field of

<sup>32</sup> Ibid., p. 308.

<sup>33</sup> Vernon, op. cit., p. 20.

<sup>34</sup> M. H. Mowatt, "Configurational Properties Considered 'Good' by Naive Subjects," In D. C. Beardslee and Michael Wertheimer, ed., Readings in Perception, (New York, 1958), p. 174.

triangles, the square will tend to be the dominant shape. Many other factors characterizing form may be utilized to increase their dominance. The forms are more dominant if they are closed, symmetrical, singular, regular, balanced and parallel or perpendicular to each other.<sup>35</sup> Orientation of forms exerts a particularly strong influence on their dominance. Symmetrical figures oriented with respect to either the horizontal, vertical or main axis of the background are significantly more dominant than the same figures oriented in a different way. There is a strong tendency to utilize the horizontal and vertical axis in structuring the visual field. The perception of an object is clearer, more accurate and more detailed the greater (within certain limits) the intensity, size and clear definition of the stimulus.<sup>36</sup> Also, objects of greater brightness, clearness and contrast tend to be more dominant than objects possessing less of these qualities.<sup>37</sup> Articulation of an object is particularly important in establishing its dominance. Simple forms, continuous forms and inclusive forms tend to increase an object's dominance.<sup>38</sup>

#### STRUCTURE

Perhaps the single most important element influencing perception is the relationships of the stimulus qualities or more specifically their structure.<sup>39</sup> For example, a man just learning the Morse Code hears each dit and dah separately. Soon he is capable of organizing these sounds into letters which are then heard separately. The letters are then organized into words and soon

36 Ibid., p. 47.

37 Ibid., p. 204.

38 Ibid., p. 58.

39 Ibid., p. 48.

the words into sentences. Later, he is able to group the sentences into phrases and the phrases into still larger groups.<sup>40</sup> This example is intended to point up the manner in which a person learns to perceive a structure and because of this ability is capable of receiving, processing and understanding greater amounts of information from the same situation.

There are many ways by which a visual situation may be structured perceptually and there are also many ways by which the visual situation may be manipulated to aid its structuring. Structuring tends to occur on the basis of location or nearness. Objects close to each other or at a certain distance from the observer tend to be grouped together and related to each other. Structuring is normally influenced by habit or experience. Perceptual organization tends to occur from above to below owing probably to experience in reading.<sup>41</sup>

Structures tend to be reinforced by an increase in or inclusion of several characteristics.<sup>42</sup> Groups tend to form structures and disconnected units tend to become connected. A form tends to be a figure set upon a ground. Articulation of form increases its perceptual dominance. Strong forms resist disintegration into parts or fusion with another form. Closed forms tend to have equilibrium. Dynamic forms are more dominant than static forms. The recurrence of part of a previously perceived form tends to reinstate the whole. Symmetry and balance produce dominance in forms. Similar or adjacent forms tend to be integrated. The more meaningful the form the greater its dominance. Two forms may fuse giving rise to a completely new form. A form exists independently of

<sup>40</sup> G. A. Miller, "Some Limits on Our Capacity for Processing Information," in Beardslee and Wertheimer, op. cit., p. 198.

<sup>41</sup> Max Wertheimer, "Principles of Perceptual Organization," Ibid., p. 134.

<sup>42</sup> E. G. Boring, Sensation and Perception in the History of Experiential Psychology, (New York, 1942), p. 253-254.

its parts and may thus be transposed without changing the original form. This phenomenon may be exemplified by a tune which is a form composed of a sequence of notes in a certain relationship. The notes may be changed, and if their relationships are held constant, the tune or form will remain unchanged. As a result of this occurrence, various forms could be perceptually reproduced by using only certain cues and omitting the detailed elements which originally composed the structure.<sup>43</sup>

<sup>43</sup> F. H. Allport, Theories of Perception and the Concept of Structure, (New York, 1955), p. 42.

APPENDIX B

PRINCIPLES OF MUSIC COMPOSITION

## PRINCIPLES OF MUSIC COMPOSITION

The urban designer may draw from many design disciplines to supplement his currently underdeveloped art. Many arts deal specifically with the design of various types of sequences. The art of dance, photography, writing and music are only a few of the design disciplines concerned with sequences. Although music is concerned with sound rather than vision, it presents one of the richest sources from which urban sequence design may draw since its graphic language as well as its principles are so thoroughly developed. For this reason a short study of the principles and language of music composition was conducted to develop a greater insight into the significant aspects of sequential design.

The aspects of music composition may be classified and grouped into three fundamental categories: the basic elements, theme development and form or total experience. These categories need not assume any particular sequential order in the actual process, but for purposes of clarity will be presented and analyzed in the above order.

### Basic Elements

Before any design can exist there must be vehicles of conveyance through which the designer communicates his ideas. In the instance of music the basic vehicle is sound. However, it is the characteristics of the vehicle, rather than the vehicle itself, which permit its use as a communicating device. A basic characteristic of sound is its source. In music this source normally is either a human voice or some kind of instrument. Each source in turn also possesses certain characteristics which influence the nature of any given pitch. Aside from its source, sound is characterized by its frequency or pitch as well as its intensity. Sounds also occur in time and therefore are expressed in this dimension by their duration. Similarly, the time dimension is utilized

to determine the speed of presentation of sounds. This dimension provides the very foundation for music. The potential use of the time dimension provides the basis for still another characteristic of sound. This characteristic, known as the beat, is utilized in a multitude of ways to enhance the continuity and legibility of the sequential development. Just as elementary as the occurrence of sounds is the interval or the occurrence of spaces between sounds, whether they be horizontal or vertical.

The composer may add other basic characteristics to his list by combining two or more voices to produce another voice which does not exist in itself. Similarly, various of these elements may be altered by accents or by progressively increasing or decreasing any one of the various elements mentioned above. These then might be thought of as a list of the basic elements at the disposal of the composer. But how does he use these elements? What rules aid him in their use?

#### Thematic Development

Of course, in order to compose, the artist must have a basic idea he wishes to express. But even with an idea the complexities of music are such that in the absence of guiding principles the composer would be hopelessly lost. These principles may be grouped together into a category called theme development. Theme development consists primarily of utilizing various techniques of grouping, repetition and variation. Most musical forms consist of a very small basic theme repeated through variation to produce the desired melodic contour or experience.<sup>44</sup> The theme normally consists of a small group of notes, usually not more than six, arranged in some pattern so that the group forms a complete whole which is easily remembered. Every theme has inherently

<sup>44</sup> Gordon Jacob, The Composer and His Art, (New York, 1955), p. 7.

four basic forms: the original, its inverse, its retrograde and its inversed retrograde.<sup>45</sup> The theme is formed by utilizing the horizontal dimension of music. The vertical dimension forms the basis for harmony. The horizontal dimension or duration forms the basis for rhythm.<sup>46</sup>

#### RHYTHM

Rhythm is the aptitude for grouping repeated sounds and intervals.<sup>47</sup> The rhythmic principles may also be utilized at various scales. A group of beats form a rhythm. Rhythmic groupings produce meter. This expansion continues until the largest groups form the whole. However, to avoid monotony and in order to produce the desired total experience, the basic theme is repeated in a multitude of variations. For example, any one of the basic characteristics could be held constant while the others are alternately varied. Usually, the first beat in a measure is accented. However, much variation can be achieved by stressing the normally unaccented portions of a measure. Accents which shift in relation to the beat but conform to certain line characteristics provide an intricate rhythm.<sup>48</sup> Rhythmic patterns may be altered systematically by increasing or decreasing the note values by a constant ratio.<sup>49</sup> For instance, a theme which is repeated exactly in every respect except for a constant increase in its speed will produce a most exciting experience. Similarly, by extending a note's duration from a light pulsation through a heavy pulsation, the rhythmic effect of syncopation is produced.<sup>50</sup> If the total form or

<sup>45</sup> Leon Dallin, Techniques of 20th Century Composition, (Dubuque, 1957), p. 162.

<sup>46</sup> Frederick Dorian, The Musical Workshop, (New York, 1947), p. 128.

<sup>47</sup> A. I. Mchose, Basic Principles of the Technique of 18th and 19th Century Composition, (New York, 1951), p. 23.

<sup>48</sup> Dallin, op. cit., p. 108.

<sup>49</sup> Ibid., p. 164.

<sup>50</sup> Mchose, op. cit., p. 36.

experience is complex, characterized for instance with a series of progressive climactic points, the rhythm may be interrupted to provide a "breathing place," a place of momentary rest which refreshes the listener without causing a loss of interest.<sup>51</sup> In general, rhythm aids in the grouping of objects. It tends to ease the strain of attention and gives a feeling of balance, of freedom, of luxury and expanse. Rhythm produces a sense of power, an ability to cope with the future. It stimulates and lulls. Pronounced rhythm produces elation resulting frequently in a loss of consciousness of the environment. Rhythm indirectly affects one's circulation and is therefore the foundation of emotion.<sup>52</sup>

#### HARMONY

Aside from the richness provided by rhythmic principles, theme development is also enriched through harmony. Harmony is the counterpart of thematic development or melody. However, the prime function of harmony is not in its progression but rather in its enrichment of the melodic theme.<sup>53</sup>

Harmony is produced by simultaneous production of two or more pitches. Harmony therefore is primarily concerned with the vertical relationships of tones.<sup>54</sup> Even so, the linear aspect of harmony cannot be completely ignored. Melodic figures can be pleasantly suggested by harmonic progression.<sup>55</sup>

#### COUNTERPOINT

The technique of counterpoint is also utilized in thematic development. Counterpoint essentially is the art of producing a given tone through the use

<sup>51</sup> Dallin, op. cit., p. 15.

<sup>52</sup> C. E. Seashore, Psychology of Music, (New York, 1939), p. 140.

<sup>53</sup> G. G. Nivers, Treatise on the Composition of Music, (New York, 1961), p. 8.

<sup>54</sup> Dorian, op. cit., p. 155.

<sup>55</sup> Jacob, op. cit., p. 10.

of two or more simultaneous voices separated in the vertical dimension, but which combine to create the desired tonal frequency or pitch.<sup>56</sup> This effect is the same phenomenon which occurs if two different colors are projected simultaneously onto a screen. If red and yellow are projected together, the perceived result is orange. Through the device of counterpoint a basically simple melodic theme can be developed into an extremely rich and full experience. Counterpoint can be utilized in either melody or harmony or in both.

## FUGUE

An additional technique utilized in theme development is that of fugue. Fugue is a melodic imitation or answer of one part by another.<sup>57</sup> A fugue may be utilized in a single theme development by allowing characteristically different voices usually at different levels to enter one after another making the same thematic statement. The fugue, however, gains its significance when two or more basic themes are employed. These themes are woven together in a fugal pattern which tends to create continuity and unity in the total form. However, when multiple themes are used, each should be distinguished from the other both rhythmically and melodically so that their individual movements may be more easily understood. The themes do not, however, always have to be presented in their entirety and should not end together. After their initial exposition it is not necessary that the sequential order of the themes remain the same.<sup>58</sup> This freedom provides a whole new set of variables to be explored under the direction of the composer.

<sup>56</sup> Dorian, op. cit., p. 155.

<sup>57</sup> Nivers, op. cit., p. 41.

<sup>58</sup> Alfred Mann, The Study of Fugue, (New Brunswick, 1958), p. 191.

## VARIATION

Theme development therefore might be summarized as a study of variation writing. The variations, however, must be logically developed relative to the desired melodic contour. The variations must find reason in the vital characteristics of the theme and must form a sequential continuity capable of conveying the desired total experience.<sup>59</sup> To achieve coherence, most melodies use some form of repetition enriched and altered to provide the necessary variety.<sup>60</sup> Of the possible changes, the closest to exact repetition but capable of providing variety is transposition. A slight rhythmic shift as well as a change in the relationship between the thematic parts tends to add interest to the sequential motive.<sup>61</sup> Exact repetition generally is undesirable since the experience becomes redundant and therefore is less interesting.<sup>62</sup> Various effects may be achieved through any number of ways. For instance, high notes, those with short wave lengths, tend to produce excitement and result in a climactic effect. The strong voices tend to be more exciting than the more delicate ones. The faster the speed or rhythm, the greater will be the excitement.<sup>63</sup> And, of course, the converse of these principles produces the more tranquil moods. Tension may be produced by dissonance or two conflicting elements. This effect may then be resolved by a relatively rapid movement to a point of consonance or at least to a point of less acute discord.<sup>64</sup> A striking or dramatic effect may be produced by producing the unexpected.<sup>65</sup>

<sup>59</sup> Jacob, op. cit., p. 20.

<sup>60</sup> Dallin, op. cit., p. 15.

<sup>61</sup> Ibid., p. 160-161.

<sup>62</sup> Jacob, op. cit., p. 21.

<sup>63</sup> Dorian, op. cit., p. 191.

<sup>64</sup> Jacob, op. cit., p. 11.

<sup>65</sup> Ibid.

This, of course, is the result of altering an established pattern. By combinations of these techniques an infinite number of effects is possible. For instance, by utilizing the delicate voices in an exciting pitch or rhythmic pattern, the result is the creation of a light, playful effect.<sup>66</sup> Similarly, if the strong voices are used in tranquil patterns, the result is a serious mood. Once these techniques are mastered, the composer is then ready to manipulate the elements so as to convey the desired total experience or form.

#### Form - Experiential Contour

And finally, the composer uses all of these techniques in developing the theme into a melodic contour. The contour might be called the graph of the total thematic development. The contour is characterized by both the vertical and horizontal motion of the melody. It is a device by which the composer may map the total exposition without becoming involved in the technical details of implementation. The contour in effect is a summary of the total experience. Various principles are utilized in developing the contour, but the basic aspects are concerned with avoiding monotony and with insuring legibility. For these reasons it is recommended that the melody never be allowed to continue stepwise in the same direction for more than five or six notes of different pitch. Where it is possible, a contour should have one high note and one low note which are not exceeded or repeated. These notes can then be clearly identified as the climax and anticlimax respectively.<sup>67</sup>

Many musical forms have been tried through the centuries, but the successful ones are the most basic and simple. A musical form normally has a "center of gravity" which decides the distribution of tonal balance as well as the cycle of the entire work. Frequently, there is a diminution of the expansive forces

<sup>66</sup> Dorian, op. cit., p. 73.

<sup>67</sup> Mchose, op. cit., p. 193.

in the cycle from the beginning to the end. Most often the expression moves from the serious or problematic to the light, playful moods.<sup>68</sup> Melody and harmony are usually developed in such a manner as to create and maintain a mental background of continuity, against which the separate events appear clearly and distinctly, and become the logical elements of an integrated, united whole.<sup>69</sup>

Of the basic forms the most prevalent presents a contour of ascending climactic points culminating in the final climax near the end of the melody. In this typical form the climax constitutes the predominant feature.<sup>70</sup>

Another typical form is basically symmetrical with the center as either the high point or low point of the contour.<sup>71</sup> This form is altered slightly in many ways. The central point may be shifted either slightly forward or more toward the end. The ascending or descending motion may be characterized by a series of lesser peaks or depressions. The form is frequently modified on only one side of the central extreme so that it appears to be asymmetrical.

A less popular form but nevertheless effective form is characterized with a three-part contour.<sup>72</sup> Again, this form is basically symmetrical usually with the highest peak in the center. However, the climax or low point may be equally effective when shifted to either the first or the last. Many slight modifications of the pure form are also typical.

A more intricate and more interesting but more difficult form is produced by combining a series of contours into an overlapping structure.<sup>73</sup> In its

<sup>68</sup> Dorian, op. cit., p. 249.

<sup>69</sup> Mchese, op. cit., p. 97.

<sup>70</sup> Dallin, op. cit., p. 8.

<sup>71</sup> Ibid., p. 7-8.

<sup>72</sup> Ibid., p. 9.

<sup>73</sup> Ibid., p. 10.

most simple pattern this form is composed by repeating one basic contour. This contour is then overlapped with the next and the next overlaps its successor even more. This progressive overlapping continues until the cycle is complete and the last contour is presented without overlap. This form lends itself to infinite variations but is most difficult since each overlap means the combination of different tones.

Another basic form is a two-part form, but because of its limitations either the single or three-part form is preferred.<sup>74</sup> The three-part form is popularly extended or modified to embrace the development of two or more themes. In this form the parts are characteristically the exposition, the development and the recapitulation.<sup>75</sup> In this form each part or division is normally about the same length.

Various other more complex forms have been tried, but the more basic and simple forms described above have met with the greatest success. While the basic forms are extremely simple they are capable through internal variation of supporting many patterns of complex experiences. The above point is more salient if one realizes that the majority of the many pieces of music in existence conforms to one of the above basic musical forms. The concept of music form or the map of the total experience provides the composer with a simple device with which he may summarize the experience he wishes to express. This device allows him to summarize the experience graphically in both the horizontal and vertical dimension. With this summary the composer may then begin the detailed and technical exposition of a basic theme and its harmonic counterpart according to the principles set forth in the prior discussions.

<sup>74</sup> Ibid., p. 202-204.

<sup>75</sup> Ibid., p. 206.

**APPENDIX C**

**ADDITIONAL CASE STUDIES**

## BEACON STREET

### Description

The Beacon Street sequence (see fig.11 p.109 ) with a few exceptions is a continuous experience with little internal variation. Beacon Street is a divided boulevard type roadway lined on both sides and on the median with trees. Both sides of the roadway are walled with four-story continuous bay window type apartment structures. The road is primarily straight and level.

The sequence begins at Audubon Circle with four story, red apartment structures lining both sides. At Saint Mary's Street the structures on the right drop to a one-story height, are ochre in color and house a series of small shops. The activity level increases as does the intricate color pattern of dotted signs. The structures return to four-story apartments in the next block, still red on the left but alternating between red and ochre on the right. The apartment pattern is suddenly interrupted with a brief series of single-family houses on the right and low "U" shaped apartments surrounding courtyards on the left. The original pattern then returns briefly only to terminate in a long, low motel structure on the right articulated with red, blue and ochre. Activity increases to its terminal at Saint Paul Street.

Beyond Saint Paul, a brief interlude of houses is presented on both sides before the apartment theme returns in ochre on both sides. The roadway continues up a slight hill to become level just before reaching Coolidge Corner. A block before reaching Coolidge Corner the structures again drop to one and two-story heights, ochre in color but embellished with intricate color spots of signs, cars and people. Activity increases, reaching its peak at the intersection of Harvard Street but continuing at a fairly high level for another two blocks. Beyond Harvard Street, the commercial area continues, but the structures increase in height to three and four stories. Trees continue to line the median strip but are discontinued in the commercial area along the

sides. Upon leaving the commercial area, activity drops abruptly and apparent motion decreases as the right roadway, shaded by the trees, separates from the left to continue up the side of a hill on the right. Apartment structures continue but not in the original form. The structures are bulky and twice the height of the bay window type with flat facades. Below, lining the left roadway, apartment structures give way to single small houses. At the top of the hill on the right the space opens to a large clearing terminated in the distance with houses on the hillside.

The roadway then turns to the right and back to the left as it descends to the commercial area at Washington Square. Trees block the view to the left while the structural wall on the right grows to terminate with a tall apartment structure. Beyond the structure, the building height drops to one and two-story shops a block before the Washington Street intersection. Red predominates at the intersection but immediately gives way to ochre. Signs and mobile objects present intricate patterns of color within the commercial area. Activity, color and apparent motion decrease as the road continues its ascent, leaving the commercial area. Ochre-colored apartment structures return briefly to line both sides. A brief section of single houses occur to the right followed by a block of town houses with gabled parapets on the left. A similar group of town houses follows on the right, as the predominant color shifts to red on both sides. This fugal pattern terminates with the original apartment form on both sides leading to the terminating commercial area at Cleveland Circle. While passing through this apartment area the adjacent trees extend over the road to form a tunnel effect.

Upon leaving the tunnel, the trees and apartments terminate as activity suddenly increases. The right side is ochre colored, lined with shops, while the left side is progressively white, blue and red. Both sides are dotted with diverse colors, but the activity is concentrated to the right. The sequence

terminates at the end of this block at Cleveland Circle where all structures end, terminating in a great expanse of cleared open space.

### Evaluation

#### LEGIBILITY, MULTI-LEVEL INTEREST AND DEVELOPMENT

The development of the Beacon Street sequential structure suffers primarily from legibility problems created by a lack of contrast and variation in the visual form and tempo structure. Since the building types, their heights, setback and color are almost constant along the sequence, variations in the structure are slight, resulting in reduced legibility and sequential interest.

At the Audubon Circle commercial area the sudden contrast resulting from the drop in building height and the intricate color patterns from the signs and activity increases the legibility of the area as an activity node, but the abruptness of the change, its lack of transition, tends to interrupt the sequential continuity. The same effect exists as the commercial area terminates.

A similar criticism is applicable to the hotel node at Saint Paul Street. A sudden drop on the right in height coupled with a definite change in building type, shape, colors and materials tend to increase the node's legibility at the expense of sequential continuity. The interest added by the color pattern is unfortunately combated by the horizontal articulation of the building's form.

The same problem exists as the commercial area at Coolidge Corner commences. Internal variation and contrast also increase the legibility and interest of Coolidge Corner while hindering even further sequential continuity.

Midway between Coolidge Corner and Washington Square, the discontinuance of the apartment theme and the increased variation and contrast of building types as well as the variations of the roadway tend to confuse the legibility of the area as well as destroy the continuity of the bay window keynote.

At Washington Square the drop in building height and shift in structural and activity type again serve to increase the area's legibility through contrast but at the same time destroy the sequential theme and sense of continuity. Beyond, the transition back to residential activity is effected satisfactorily by a gradual buildup and change in structural types.

However, the abrupt change from residential to commercial uses occurs again at the Cleveland Circle commercial area. The sudden drop in building height along with the increase in activity and color intricacy again improve the area's legibility and interest by contrast at the expense of sequential continuity.

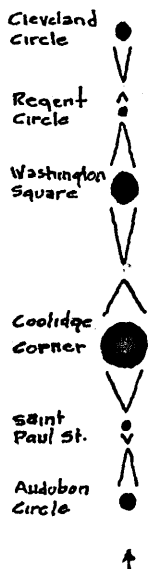
#### IDENTITY

Beacon Street, as differentiated from the other sequences, does possess a basic theme which has been quite effectively and pleasantly developed through intricate variations. The major weaknesses of the Beacon Street sequence appear at the activity peaks in the commercial areas. The theme is not employed in these areas, but the major fault lies in the discontinuance of structural dominance.

The Beacon Street theme is expressed as a structural type. This type is typically Boston, block long, four story, bay window apartment structures. The theme is varied through color, height, duration and various details such as roof, entrance and bay window treatment. The theme, however, fails to appear at the most significant points, namely the commercial areas. Of course, two related themes could be used, one for the residential areas and one for the commercial areas. In this case, the activity and color patterns would constitute the basis for a commercial area theme, but they are not presently presented in any discernible thematic pattern.

## CONGRUENCE

Beacon Street activity reaches its climax at the Coolidge Corner commercial area. The sequence, however, contains one other major nodal point at Washington Square, two smaller nodes of equal size at Audubon Circle and at Cleveland Circle and two minor nodes focused at the hotel areas at Saint Paul Street and near Regent Circle. Coolidge Corner and Washington Square divide the sequence into three approximately equal sections, located respectively



between the first and second and second and third segments. The commercial area at Audubon Circle begins the sequence while Cleveland Circle is the terminal node. The first small hotel node approximately divides the first section between Audubon Circle and Coolidge Corner, while the second hotel area divides the last section between Washington Square and Cleveland Circle. Residential areas are situated along the remainder of the sequence. These areas form an activity gradient decreasing from Audubon Circle, rising to the hotel area at Saint Paul Street and rising then to the Coolidge Corner level. Beyond Coolidge Corner, the gradient drops to its low at the top of the hill then rises again to peak at Washington Square. Intensity then drops to peak again briefly at the hotel area, continues to drop, reaching its low point halfway to Cleveland Circle, then rises again to its terminal peak at Cleveland Circle.

Again, the experience contour deviates somewhat from this simple activity pattern. The activity node at Audubon Circle is supported almost entirely by the mobile activity of vehicular congestion and the accumulation of pedestrian shoppers with their attendant fine grain color patterns. Signs are fairly abundant adding to the significance of color, but the structural pattern

subsides from the four-story structures to a one-story strip of shops. Overall building color shifts from red to less intense ochre. Red is resumed as an increase in structural height occurs immediately beyond the commercial area. This weakness in structural form and color is destined to plague each of the Beacon Street commercial areas, reducing visual importance.

The low point in the contour between Audubon Circle and the hotel area at Saint Paul Street is clearly marked visually as the apartment structures give way to a brief section of single, detached houses. Experiential intensity then rises as a church appears on the left and structures increase in height on the right. Activity increases at the hotel node as the structural height on the right again drops, changing to ochre to support a strong horizontally articulated form, embellished with a variety of active colors. While the activity and color patterns become more intense, the structural intensity decreases considerably.

Structural forms return to their four-story height briefly as color alternates between ochre and red. Activity increases as Coolidge Corner is approached, but structural forms decrease again to the one-story height. Color becomes intense as signs and activity become more abundant. Beyond the Harvard Street intersection, structures return again to four stories as the commercial area continues. The activity peak of the sequence is clearly marked by the S. S. Pierce building. The building is located at the Harvard Street intersection, coinciding with the activity peak. The structure is the tallest structure. It is irregular in shape with turrets, gable roofs, balconies, cross half-timber internal articulation, sharply contrasted with dark and light colors as well as deep shadow patterns.

Experiential intensity then subsides as the commercial area fades into a residential section. While structural heights increase on the right, the intensity continues to diminish as the right roadway separates from the left

and moves up the side of a hill. Increased open space to the left allows the intensity to continue to diminish as the structural grain on the right shifts from coarse to fine. Finally, intensity reaches its low point at the top of the hill as a large open space appears on the right. The experiential contour continues to coincide with activity levels as the structural form begins a buildup, both in height and duration, toward Washington Square. Structural forms, however, reach their climax a block before the Square, then drop suddenly to the one and two-level heights, changing again to ochre as the two roadways again join on the same level. Color patterns as well as activity levels increase to peak slightly past the Washington Street intersection. Again, the peak does not reach its potential level owing to the reduced structural heights.

Intensity subsides toward the hotel area as structural grains and color patterns become more intricate. Beyond the hotel node, structural grains increase in coarseness. Intensity decreases through a brief interlude of town houses, reaching its low during a section of small, detached houses before rising again toward Cleveland Circle.

Again at the Cleveland Circle commercial area, activity increases as does the intricacy of the color pattern. However, the structural height again drops to one story, curtailing the potential experience level.

#### SUMMARY EVALUATION

The total contoured pattern of peaks and gradients, their levels of intensity and potential transitions, while rather complex, form a most interesting structure. The pattern, owing to its symmetrical form, is unified and simple enough to be comprehended. Multi-level structural interest is adequately developed while the commercial areas constitute sufficient goals for structural

developments of stimulus and release. Even so, the contour suffers transition and continuity weaknesses primarily at the points where activity types change.

The major weaknesses of the sequence focus at the commercial areas on their lack of structural dominance, resulting in theme discontinuances, and in a lack of sequential continuity and lack of congruence. Continuation of the sequential theme as well as improved transitions between the activity types warrant special corrective concern.

### Proposals

Improvements along Beacon Street should focus primarily on the commercial areas. The Audubon Circle commercial area could be improved simply by increasing the building heights. Such a change is most feasible as the upper levels could be developed as apartments or offices, while the lower levels could be maintained for commercial uses. Intense and contrasting colors could be used to increase the apparent intensity of the area. The next weakness occurs in the hotel node at Saint Paul Street. The new motel is completely out of character with the area, and because of its diminutive height the climax is again frustrated. Since the apartment structure on the right across Saint Paul Street continues around the corner and up Saint Paul, the motel structure should have been set back a greater distance from Beacon and built as a motor hotel at least five stories in height and preferably taller. Had this been done, the space would open at the node, defined peripherally with a strongly articulated ring of buildings. Again, the building should have maintained the predominant bay window theme. Even though the motel is relatively new, the possibility of replacing the structure is far from remote. The structure is only two stories in height and represents a minimal investment. The use has been extremely successful, and with a profit incentive the owner would likely consider the proposed expansion.

A similar climactic weakness appears at Coolidge Corner, as the structures again reduce to one and two-story heights discontinuing the bay window theme. This weakness could be considerably strengthened by redevelopment of the marginal shops and offices on both sides of Beacon north of Harvard Street. These areas could best be redeveloped by setting back a greater distance Beacon and developing as a series of isolated towers housing offices and apartments at the upper levels and commercial facilities at the lower levels opening onto open plazas fronting on Beacon Street. The median strip near Harvard Street could then be reconstructed allowing the MTA tracks to submerge, passing under and stopping at an underground station near Harvard. This construction would allow the adjacent commercial areas to be connected underground across Beacon Street with shops opening to the lower level MTA station. The median strip could then be retained as open space at grade level and developed as a small park or shopping area plaza. With these new developments, as Beacon Street approaches the Harvard Street intersection, the space would suddenly open on both sides converging again to focus on the S. S. Pierce building at Harvard Street. The space at the intersection which disintegrates at the present would be reinforced with continuous planting along the median strip plaza. Fountains, pools, walks, benches or other architectural events within the median plaza would strengthen the focus on the Harvard Street climax. Again, the bay window theme should be retained in the new development.

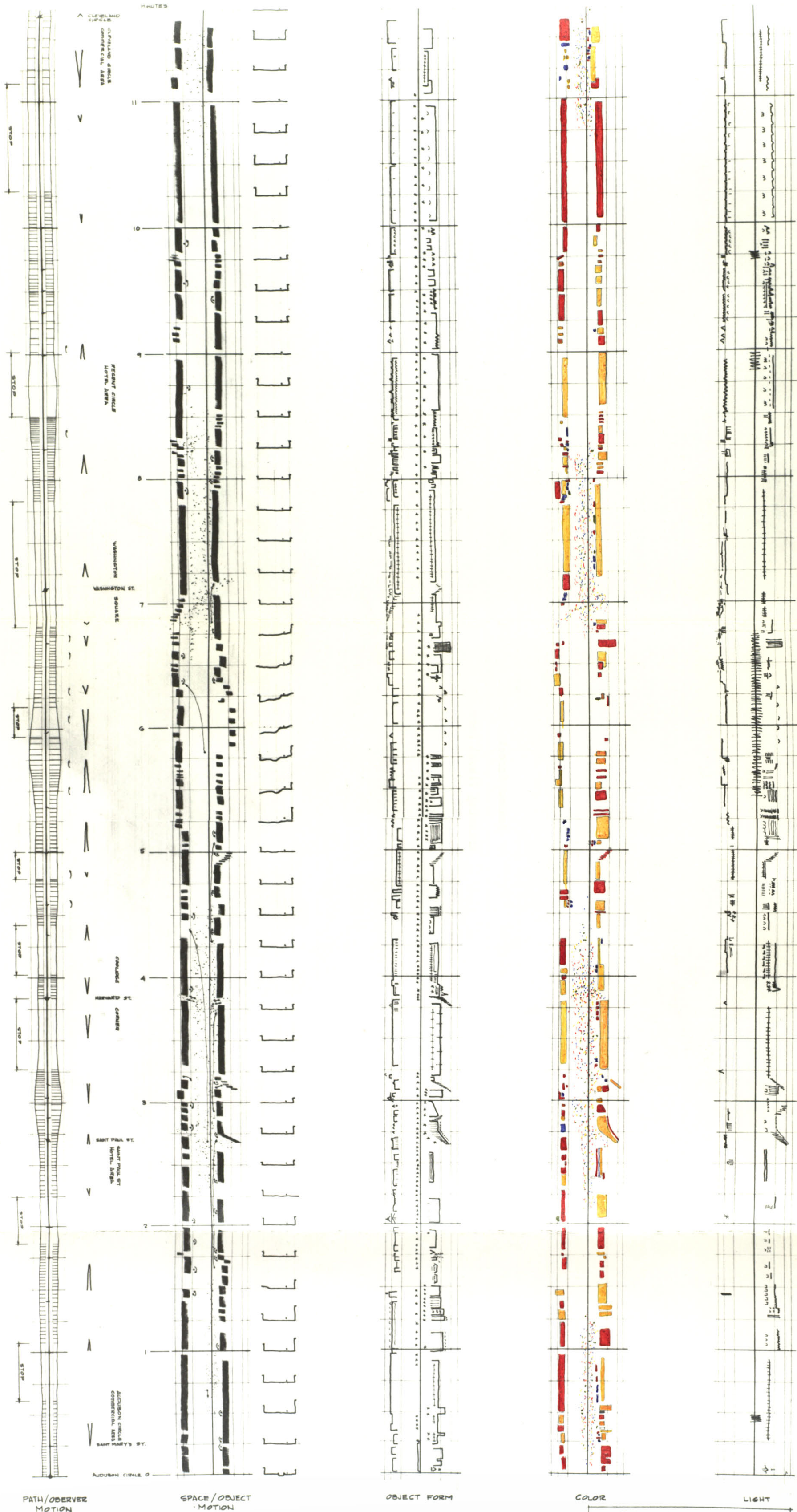
Beyond Coolidge Corner the sequence develops acceptably until reaching the approach to Washington Square. A block before reaching the Square, a long, most undesirable apartment structure occurs on the right. The structure is new, completely out of character with the area, representing a considerable investment and is therefore likely to remain, as is, for many years. Its prominence could, however, be reduced somewhat by increasing the density of trees along the sides and median strip to eliminate as much as possible its

view. At Washington Square, the commercial area weakness recurs. Structures drop in height while shifting their color and architectural type. Trees are also discontinued within the area. Due to the market and character of this area its redevelopment should be in the form of an auto-oriented shopping area mixed with apartment development. The commercial area at present stretches along Beacon Street for a quarter of a mile. New development should concentrate at the Washington Street intersection. The steep topography on the left is best suited for residential development, while the level area on the right seems perfect for the shopping area. With ample parking provided off-street in conjunction with the shopping area, curb and median strip parking could then be eliminated, freeing the median strip within the area for development as a small plaza. Planting could then be continued through, becoming more elaborate within the reclaimed median strip near the Washington Street intersection. The shopping area could be reinforced by two new apartment slabs, one behind the area parallel with Beacon, and the other at the side perpendicular to Beacon. The vacated area on the left along Beacon Street and on the hill would be free to develop as town houses along the street and as terrace housing on the hill.

The next major weakness occurs at the Cleveland Circle commercial area. Here again, the structures are reduced in height and shift in color. At the end of the commercial area somewhat of a shock is experienced. The structures are suddenly discontinued as a vast open space is entered. The lack of transition results in a frustrated climax in the commercial area. If the commercial area on the right were redeveloped in a "U" shape with the terminal side of the "U" on stilts and at least four stories high, the expanse of the open space would be introduced both with the larger space in the commercial "U" and by the visual connection under the raised building. In addition, the Cleveland Circle traffic island should be planted to terminate the view from

Beacon Street and at the same time allow glimpses of the space beyond. Again, the bay window theme should be maintained in the new development.

Aside from the specific proposals for Beacon Street, the general design policies should be applied, improving the visual form wherever possible. Color schemes should also be corrected to improve sequential congruence. Beacon Street is most fortunate in possessing the existing bay window thematic elements. The bays and the continuous rows of trees lining the sidewalks and median strip combine to provide a most delightful and interesting theme for the sequence. The absence of the theme and the climactic difficulties experienced in the commercial areas constitute the bulk of the Beacon Street proposals. With the help of economic pressures and opportunities, redevelopment in these areas should not be difficult to achieve. These pressures and opportunities can be created as a result of zoning changes since the proposals encourage a higher or more intensive use of the land. When higher uses are allowed through zoning, the market price of the land will increase, resulting in a similar increase in the area's tax responsibility. Hopefully this chain of events will result in redevelopment. The commercial area proposals intend to strengthen the visual form of the sequence by introducing an additional thematic variation by increasing the observer's space within the areas to mark the climactic point. The enlarged space is outlined with taller buildings continuing the bay thematic element. The space serves several purposes. Of course, it has many functional purposes, but visually it tends to contrast the general confinement pattern resulting in increased experiential intensity. In addition, the space tends to act as a collection and circulation area for pedestrian shoppers. The spaces, therefore, expose larger quantities of shoppers to the observer's view, resulting in an increase of apparent or visible activity and motion.



PATH/OBSERVER  
MOTION

SPACE/OBJECT  
MOTION

OBJECT FORM

COLOR

LIGHT

Figure 11

BEACON STREET  
Existing Visual Form

## HARVARD STREET

### Description

The Harvard Street sequence (see fig. 12 p.119 ) begins at its Boylston Street intersection in Brookline Village. The sequence begins as the road ascends, turning to the right to pass over the MTA tracks. At this point the road is severely confined by tall red brick buildings extending above the small street-level shops. Activity builds to a climax at the Washington Street intersection, subsiding continuously for the next two blocks along the shops on the right. The roadway reaches its high point and begins its descent as it passes first a church on the left and then a towering church on the right, then continues downward past large bulky red structures on either side with street-level shops to a small activity node at School Street. Beyond the intersection the confinement is lessened as is the height of the buildings. The red pattern continues as the roadway again climbs, curving to the right. Toward the top of the hill, the buildings become taller and more bulky. Suddenly at the top a church appears on the left and the tall structures change to one-story shops on the right. Activity increases as signs and mobile objects produce a colorful pattern on the right.

The road turns suddenly to the left, activity increases sharply and ochre becomes dominant with an abrupt increase in apparent motion. Shops line the road on the left leading to the Beacon Street intersection at Coolidge Corner. The commercial area continues for two more blocks with low buildings, a high level of activity and a wide range of color against an ochre background.

Beyond the commercial area, ochre continues its dominance but is interrupted periodically with reds. Between Coolidge Corner and the Fuller Street commercial strip, the area is mixed with apartments, houses, an occasional shop or office, a church on the left and a large school on the right. As

Fuller Street is approached activity increases, colors are more varied, apparent motion increases and the structures become one story in height.

Upon leaving the commercial area the structural grain briefly becomes very fine before changing to long low buildings on the left and opening on a large supermarket on the right leading to a commercial strip extending to Commonwealth Avenue. Beyond the supermarket the roadway becomes confined between tall red buildings on both sides. Activities and apparent motion increase progressively towards Commonwealth where the confinement and sequence terminate in the huge space created by the width of Commonwealth Avenue.

### Evaluation

#### LEGIBILITY, MULTI-LEVEL INTEREST AND DEVELOPMENT

The Harvard Street structural development suffers primarily from a lack of sequential continuity. Internal contrast and variation exist to such a degree as to hinder the legibility of the total structure and to cause a chaotic temporal experience.

In Brookline Village the structures are not significantly contrasted but neither do they express a sense of continuity. The area achieves an adequate degree of legibility primarily through its activity level. Interest is minimized by the degree of confinement and lack of articulation.

Beyond the Village interest is maintained through building and activity contrast and variation. At the School Street activity node interest is again minimized by the lack of form articulation and contrast. The legibility of the area is increased at the expense of continuity as a result of the abrupt terminal of building type and height at School Street.

The area between School Street and Coolidge Corner is plagued with legibility and continuity weaknesses resulting from extreme contrast and variations in activity types and all categories of visual form.

Continuity is again minimized upon approaching Coolidge Corner as the structural types, materials and color suddenly change with activity type at Sewall Avenue. Through this contrast the area is made more legible. Across Beacon Street the area's internal legibility, interest, continuity and contrast are increased through the continuous shops, intricately articulated with color and activity. However, area transition and continuity suffer as the low commercial structures terminate abruptly giving way to taller apartment structures. Again this intense contrast increases the legibility of both areas but destroys the sense of sequential continuity.

In the area between Coolidge Corner and the Fuller Street commercial area continuity continues to suffer at the expense of contrast. The internal contrast is again so extensive that the structural legibility also suffers while interest flourishes.

The transition to the Fuller Street commercial area is gradual, allowing an imperfect sense of continuity to be maintained while interest, legibility and internal contrast are increased.

The area between Fuller Street and Commonwealth Avenue is extremely chaotic owing to intensive internal contrast. Legibility suffers as do interest and continuity. However, at the Commonwealth node continuity, interest and legibility are again restored even while contrast and variation are maintained.

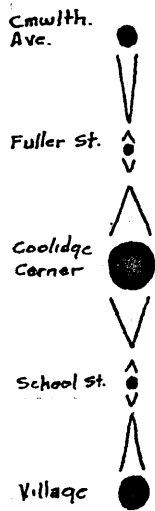
## IDENTITY

The major criticism of the Harvard Street sequence, as might be expected, focuses on its lack of theme. The sequence is bisected by Coolidge Corner into two distinctly different halves. The first half is composed of large, old red brick structures, while the second half is mostly ochre in color, relatively new and without any predominant building type or activity type. The first section twists through the various areas over a series of small hills while

the last section is relatively flat and straight. Perhaps two themes could be developed through the use of color, using reds in the first section and ochres in the second. However, at the present, the colors are not applied according to any discernible thematic pattern.

## CONGRUENCE

The Harvard Street sequence contains five activity nodes of three levels symmetrically distributed about its central point. Coolidge Corner, the most intense node, is situated at the midpoint of the sequence. The next most important areas, Brookline Village and the commercial area at Commonwealth Avenue, are located respectively at the beginning and the end of the sequence. The two halves are in turn divided by the two nodes at the third and lowest level. The nodal points are separated with residential development forming internal activity gradients.



The intensity gradient decreases from Brookline Village, ebbing slightly before reaching its small peak at School Street. Activity then diminishes briefly only to rise again to its Coolidge Corner climax. Beyond, the gradient falls again, rises slightly to meet the peak at the Fuller Street nodal point, drops again, then increases to terminate in the final peak at Commonwealth Avenue.

Experiential intensity follows the activity contour very closely, reaching its peak at the Village as Washington Street and Harvard Street separate. The intensity of experience then subsides congruent with the activity to reach its low point at the hilltop as the space opens to the left and commercial activity terminates on the right. Down the hill confinement increases, as does activity and color diversity, while structural form increases in size and duration.

The peak is clearly marked at the School Street intersection. Beyond, the intensity of experience rapidly decreases to reach its low point during a section of single detached houses combined with a large open space to the right. Intensity begins rising then as forms become more intense, activity increases and color patterns become more intricate. This rise reaches its peak at Coolidge Corner immediately beyond the Beacon Street intersection. The experiential gradient is interrupted immediately before reaching Beacon Street as structural forms drop in height on the left and as an apartment and bank structure appear on the right. Color patterns shift from red to less intense ochre.

Beyond Beacon Street, ochre continues as does the lower structural forms. However, color, in the form of signs, cars and people, becomes most diverse and abundant. The experiential level of intensity does fail to reach its potential climactic peak as a result of the predominant ochre color and particularly owing to the diminutive structural forms within the commercial area.

Past Coolidge Corner experiential intensity subsides as the space opens while passing through a brief section of single detached houses. Intensity then increases congruent with the activity pattern to peak at the Fuller Street commercial area. Once again, however, structural forms diminish in size within the area to curtail the potential level of experience.

Intensity drops rapidly upon leaving the commercial area as the space opens. Structural grains become fine, object presentation more rapid, while color patterns subside through interludes of green and blue to stabilize briefly in ochre. Intensity then increases with activity as the space becomes more constricted, structural forms increase in size and duration and color becomes more diverse, active and intense. This increase reaches its terminal peak at the Commonwealth Avenue commercial node.

## SUMMARY EVALUATION

Generally, the sequential contour is simple and most desirable structurally with a central climax at Coolidge Corner. The various commercial nodes enhance the contour with symmetrical balance providing goals for structural development and basis for areas of stimulus and release. The diversity of activity types and levels along the sequence provide the necessary internal contrast and interest but generally at the expense of sequential continuity.

The major sequential weaknesses occur internally, primarily in its lack of theme and in continuity interruptions and congruence problems existing at the Coolidge Corner and Fuller Street nodal points. Additional congruence and continuity problems exist in the interim areas as a result of over-confinement, illogical use of dominant colors and in some cases inappropriate uses of dominant structural forms. The major weakness of the sequence, however, is its lack of theme and its clear but illogical division into two distinct parts.

### Proposals

Harvard Street proposals intend firstly to create a Harvard Street theme, thereby linking the two halves through a common element. Secondly, proposals attempt to strengthen the climactic points at the commercial areas. Finally, the proposals intend to increase the clarity and meaning of the sequence by improving its congruence. In addition many more subtle improvements are proposed as a result of applying the general design objectives.

The first Harvard Street weakness occurs at Brookline Village. Drab colors as well as deep shadows cast by adjacent buildings tend to leave the area in semi-darkness. Since a portion of the Village is scheduled for redevelopment, these weaknesses might be corrected in conjunction with the project. The intersection confusion at Harvard Square could be eliminated by re-aligning

Washington Street to connect with Kent Street. This improvement would clearly mark the Village climax at the Washington-Harvard intersection. At the intersection the space should be increased using light, bright colors on the buildings as well as the floor surface. By increasing the space at the intersection a greater amount of visible activity would be exposed, thereby increasing the intensity and clarity of the Village climax.

Beyond the Village, the string of shops on the right would be considerably improved visually if they were moved back and unified with a continuous arcade treatment. Harvard could then be linked on both sides with a row of trees expressing the decreased intensity.

The experiential contour fails again at the School Street intersection as the building heights drop immediately past the intersection. This condition could be improved by reducing the confinement at the intersection, especially on the left, and increasing structural heights but decreasing structural grain. The confinement should then gradually increase as structural heights and grain decrease. Color schemes should also diminish in intensity away from School Street. These improvements would tend not only to increase the School Street climactic clarity but also to introduce the lower activity levels to follow.

A major confusion point occurs at the forked intersection of Harvard Street and Sewall Avenue. By closing the section of Sewall Avenue between Stearns Road and Longwood Avenue this confusion is easily eliminated. Nearer to Beacon the commercial area climax again suffers from lack of structural and color dominance. To correct this condition internal vertical articulation should be increased. Articulation through intense shadows should be encouraged. Color intensity should increase toward the Beacon Street climax. With the Coolidge Corner proposals set forth in the Beacon Street improvements, the Harvard Street climactic point would clearly focus at the S. S. Pierce building on the left across Beacon Street. Following the Beacon Street intersection,

the structural proposals on the right of Harvard, suggested for the Beacon sequence, would strengthen the climax as well as the transition to the smaller shops beyond. The shop area could be improved by coordinating and intensifying the color scheme as well as allowing the degree of confinement to fluctuate, gradually decreasing to introduce the following lower activity levels. Shadow patterns should be intensified as should vertical articulation. Structural heights should also be increased to gain additional visual intensity. The Coolidge Corner area is the activity peak of the entire Town and should therefore be intensified visually in every manner possible.

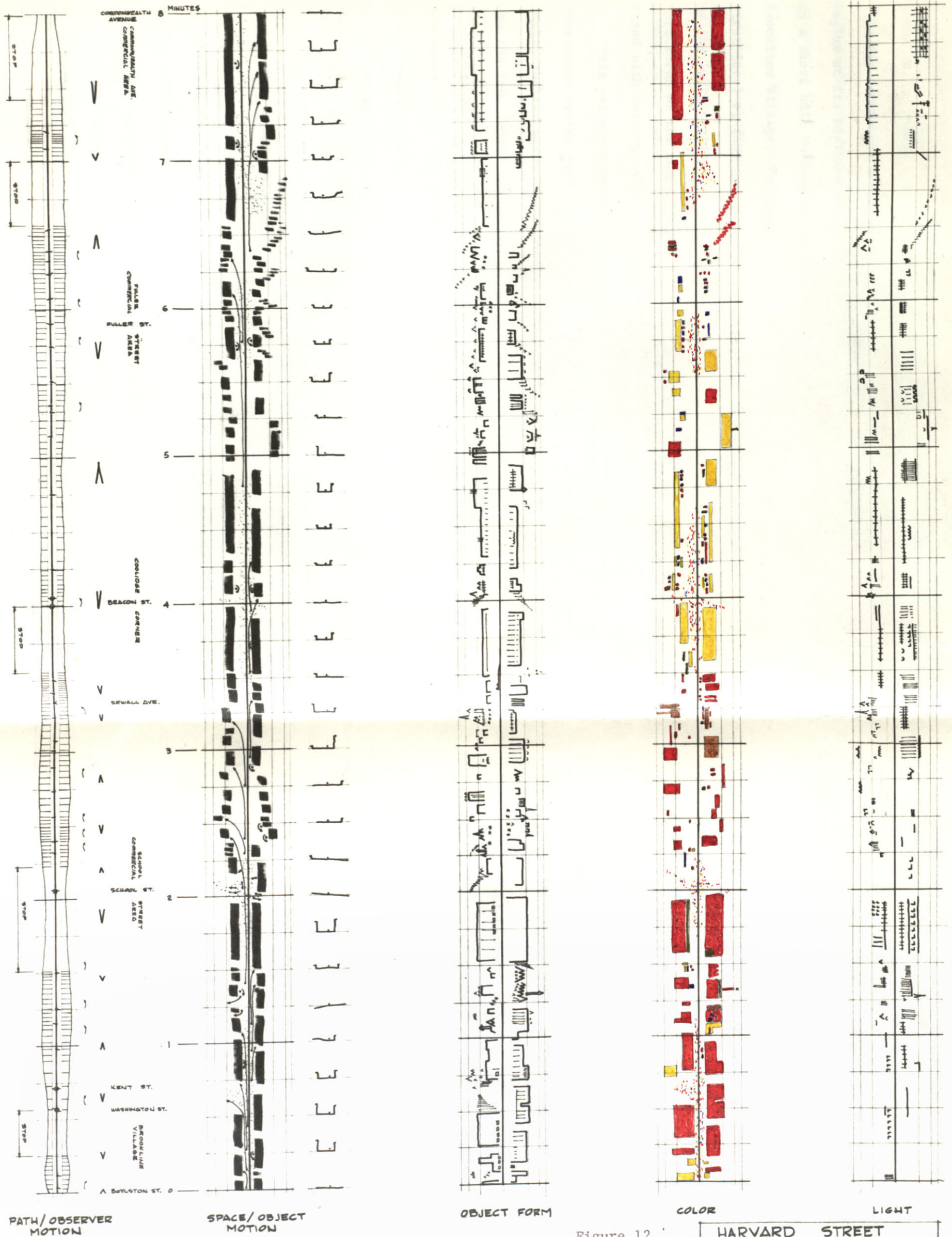
The next difficulty is encountered at the Fuller Street commercial area. Again the building heights drop as the color shifts to ochre. The shops could be improved visually by increasing their vertical articulation. Here again the signs should be controlled to coordinate the color scheme and to insure the use of bright, intense colors.

Slight alterations at the Commonwealth commercial area could eliminate the chaotic appearance of the structures to the right of Harvard. The buildings as they exist tend to compete as separate entities with little regard for area continuity or harmony. The structures could be unified visually by a screen of trees lining the side of the street.

Finally, the problem of theme must be addressed. The major basis for a theme exists in the almost continuous commercial character of Harvard Street. Since structural types and colors divide the sequence at Coolidge Corner into two parts, perhaps a theme could be developed allowing character differences to remain yet unifying the sequence on the basis of a common element. Such a unification might be most successfully achieved through coordination of signs. The signs, their type and colors could be coordinated, producing thematic continuity while fluctuating in intensity to express the various types and levels of Harvard Street activity. Perhaps the Harvard Street theme could be

developed by allowing and encouraging animated neon signs or backlit molded plastic signs. Any number of sign themes could be effectively developed so long as the thematic element is distinctive.

Additional sequential improvements, especially as regarding color, would result from the application of the general design objectives.



PATH/OBSERVER  
MOTION

SPACE/OBJECT  
MOTION

OBJECT FORM

COLOR

LIGHT

Figure 12

HARVARD STREET  
Existing Visual Form

## WASHINGTON STREET

### Description

The section of Washington Street (see fig.13 p.128 ) under study also begins at its Boylston Street intersection. The road leaves Boylston going up a short hill turning to the right as it passes over the MTA tracks to enter Brookline Village. Both sides of the street are lined with small shops on the first level of five and six-story red brick buildings. The road turns sharply to the left, continues past tall red buildings on the left and one-story structures on the right, both containing shops. Both sides are abundantly lined with colorful signs. Intense activity prevails.

This pattern comes to an abrupt halt as the roadway passes through the government center with the cathedral-like, ochre colored Town Hall on the right, the red brick fire and police stations and court house on the left, and the red, formal library on the right. The civic complex then terminates in a small activity node at Cypress Street. The tempo diminishes as the roadway moves into a residential area, first past apartment structures undulating about central courts and then into an area of mixed detached house types of various colors, shapes, sizes and styles. Trees become more common as the road turns first to the right, then to the left, passing a tall ochre colored apartment building on the left, then back to the right through more small houses and on to Washington Square. As the road approaches the Square, a hill rises on the left exposing rings of housing on its side. The houses on the left slowly form the transition to shops, while the structures on the right become progressively larger towards the Beacon Street intersection. Red is predominant near the corner, but the left side is dotted with color spots of activity and signs. Activity increases as does apparent motion, reaching its peak as Beacon Street is crossed.

Immediately past Beacon Street the activity subsides as the roadway space opens to the right onto a large playground backed by a hill ringed with rows of housing. The road then turns slightly to the right as it goes up a hill past fine grain housing of diverse colors. Suddenly toward the top of the hill a commercial strip develops, increasing apparent motion and size of structures. The sequence terminates at the activity peak at Brainerd Road between prominent red brick buildings.

### Evaluation

#### LEGIBILITY, MULTI-LEVEL INTEREST AND DEVELOPMENT

Washington Street structural development suffers primarily from a lack of sequential continuity and from isolated legibility problems.

In Brookline Village up to Harvard Square, legibility suffers from intense space confinement and a general lack of form articulation. However, beyond Harvard Square the shops on both sides are intensely articulated, resulting in increased area legibility. As the commercial area terminates at the Town Hall an abrupt change through contrast is experienced in building and activity type, resulting in increased legibility but decreased continuity. This effect continues through the series of contrasting civic buildings.

At the Cypress Street commercial node, multi-level interest increases as does the legibility owing to an increase in the structural tempo. As the commercial area terminates, a sudden shift in building type and height causes an increase in contrast and legibility but a decrease in sequential continuity. The large simple structures minimize the interest, but only briefly until the transition to single detached houses is effected. In the detached house section interest is increased as is legibility, contrast and continuity. Contrast as well as interest and continuity decrease as Washington Square is approached.

At Washington Square as the shift to commercial structures is effected, interest and continuity are reduced as legibility and contrast are increased.

Beyond Washington Square, continuity is again destroyed in the abrupt shift to the residential area. Through this area interest thrives through intense building form contrast, resulting in reduced legibility and continuity. At the Brainerd Road commercial area continuity and contrast are lacking while legibility and interest flourish.

### IDENTITY

Washington Street, as Harvard and Boylston Streets, suffers from the lack of a basic theme. Red predominates along the sequence but forms no thematic pattern. The central section of the sequence is characterized by "U" shaped apartment structures, but their absence at the beginning and end of the sequence eliminates their thematic value. The use of a color theme seems to be most feasible but would require extensive change to produce effective results.

### CONGRUENCE



The activity pattern along Washington Street organizes the sequence about two major and two minor nodal points. Brookline Village, the most intense node, is located at the beginning of the sequence, while Washington Square, the second most important area, is located about the three fourths mark. The minor node at Cypress Street is situated between the first and second fourth, while the second minor node terminates the sequence at Brainerd Road. The division of the second and third fourth is marked by a prominent apartment structure. Residential areas between these points form gradients to support internal activity transitions. The activity level of the Village subsides through the government complex only

to rise again slightly to peak at the Cypress Street node. Beyond, activity decreases through an apartment area, maintains a low level through a single detached house section, then rises again through apartments and shops to peak at the Beacon Street intersection marking Washington Square. Past Washington Square the intensity drops rapidly, reaching its low point at the school and playground on the left, and begins a long slow rise to the terminal commercial area peak at Brainerd Road.

Experiential intensity generally conforms to the levels of intensity of the activity pattern, but a few deviations are conspicuous. Through the Village intensity increases to peak at the Washington-Harvard Street intersection. This intensity level is supported through severe confinement by tall red brick structures, intense activity and apparently rapid observer motion. Beyond the Village intensity drops as confinement and activity are reduced through the government complex. Structural grain decreases, ebbs, then rises again to the Cypress Street node. Activity, confinement and color patterns increase in intensity to peak at the nodal point; however, structural forms decrease in size at the node.

Immediately beyond the node structural forms increase as undulating apartment buildings alternate in color. The forms diminish in size but increase in duration, resulting in a continuous decrease of intensity. Intensity is suddenly increased as the roadway begins turning to the left and a large apartment building occurs mystically on the left among a group of single detached houses. Confinement decreases, structural grains become very fine, activity is low and color patterns are most intricate. The structural grain increases in coarseness, confinement increases as does the intensity of activity and color as Washington Square is approached. However, just before the Square is reached, structural forms decrease abruptly in size, color patterns shift to whites and

grays with intensity supported almost completely by the visible activity and its attendant color and motion characteristics.

Upon leaving the Square, confinement lessens opening to a large space on the right. Intensity drops immediately to its low at this point and begins rising again congruent with the activity pattern through a section of single houses of subordinate colors to an apartment section of larger structures, more intense in color, located closer to the road with an increasing level of visible activity. The experience finally peaks at the Brainerd Road commercial area as structural form reaches its peak in size, color and confinement simultaneously with a peak in activity.

#### SUMMARY EVALUATION

The sequential contour, although rather intricate, is sufficiently simple to be acceptable structurally. Its repetitive pattern allows the structure a sense of unity through its dynamic balance. The commercial areas provide sufficient goals for structural development and at the same time supply material for multi-level interest and areas of stimulus and release. While the potential exists, the contour suffers from continuity and contrast weaknesses.

The major sequential weakness is the lack of a basic theme and its subsequent development. Internal weaknesses appear through problems of continuity and congruence first at Cypress Street with the diminutive structural forms, then at the middle of the following residential section with the misplaced prominent apartment structure on the left. The major continuity and congruence weakness occurs at Washington Square in the subordinated structural and color patterns. A slight congruence weakness occurs at Brainerd Road on the right as the small service station fails to lend adequate visual support to the intense activity level.

## Proposals

Washington Street improvements focus on its commercial areas, but weaknesses in residential areas also warrant corrective attention. The first experiential weakness occurs at the Brookline Village commercial area. However, since Washington Street and Harvard Street are one and the same to Kent Street, proposals for this segment are set forth in the Harvard Street suggestions. Beyond the Kent Street intersection the major weakness results from the chaotic use of signs to the left of Harvard. This condition could easily be corrected by coordinated control of the location, size and color of the signs. The shops on the right add to the visual confusion by increasing in height away from the Village. This condition might possibly be corrected in conjunction with the government center redevelopment proposals affecting the area behind the shops.

The next visual weakness is encountered at the Cypress Street commercial area in the form of reduced building heights. To improve the visual form of this area, building heights should be increased, internal vertical articulation should be emphasized and color schemes should be coordinated stressing dominant colors. With these improvements, the intensity of experience would be increased as a result of increased dominance of form, color and space as well as an apparent increase in motion.

Perhaps the most unfortunate element within the sequence occurs at the mid-point between Cypress Street and Beacon Street. At this point to the left is located an impressive new apartment building which is very tall and very close to the street. The building is intensely articulated internally. Unfortunately, the building is surrounded by single family houses and therefore completely contradicts the prevalent character and activity level of the area. Since the building is new and represents a substantial investment, there seems to be little possibility of its elimination or even of reduction of its visual importance owing to its closeness to the street. However, its elimination

should be encouraged. In the meantime, a heavy screen of planting both in front of the structure and along Washington Street wherever the structure is visible would tend to reduce its apparent intensity.

Visual weaknesses existing in Washington Square at Beacon Street have been partially treated in connection with the Beacon Street sequence. However, the Washington Street approach and exit to the area warrant further attention. The approach could be intensified by increasing the vertical articulation of adjacent forms. In addition, color schemes should be coordinated and intensified. If the left side is redeveloped for residential use as proposed in the Beacon Street improvements, the intensity of shadow patterns might be increased in the terrace and town houses through balconies, roofs, etc. The Beacon Street proposal for median strip planting would tend to maintain the experiential intensity while crossing Beacon. Beyond Beacon the transition to the residential area could be improved by a gradual decrease in roadway confinement together with a decrease in structural height and grain as well as intensity of color.

The Brainerd Road weakness, encountered to the right of Washington as a result of small low structures, might be improved by encouraging an increase in structural height and grain simultaneously with an increase in confinement of roadway space. Intense color patterns should be maintained within the area to effect the desired climactic level of experience.

Washington Street suffers as do the other streets, from the lack of a sequential thematic element. Since Washington Street is primarily a residential street interrupted occasionally with commercial nodes, a theme should be developed which would be capable of continuous expression within both activity types. Such requirements tend to eliminate the possibility of a structural form or color theme. Thematic possibilities consequently focus on the immediate roadway space. Perhaps the most successful theme could be developed with planting since the residential areas already possess an abundance of plant life.

Trees could be used, but since distinction would be difficult, a theme of small evergreens would be more successful, reinforced with the use of trees. Such a theme would allow sequential distinction and at the same time would be capable of application in the existing highly confined commercial and apartment areas.

In addition to specific proposals, the entire sequence should be improved visually through the application of the general design objectives. Color coordination especially should be encouraged to improve congruence through its intensity of expression. Color controls should be most effective in the Washington Street sequence since the majority of structures are of wood, requiring frequent painting.



## HAMMOND POND PARKWAY

### Description

The Parkway sequence (see fig.14 p.137 ) begins at its intersection with Boylston Street. The sequence begins by bursting from beneath the Boylston viaduct into a large space bounded on the left by garden apartments and on the right by a tall, intricately articulated apartment structure. Both sides are predominantly red from this point to the Heath Street intersection. As the roadway approaches the intersection, building heights decrease as detached houses converge to increase the confinement. Motion apparently increases as the road rises to the intersection.

Suddenly at the intersection the road is bounded on both sides by heavily planted buffer strips. The planting continues to James Circle where it is abruptly interrupted by small, detached mostly red houses lining the right side of the circle. The left side continues with planting. Once through the circle, the road rises sharply, turning to the right, leaving the left roadway parallel but considerably below its level. Beyond to the left, still lower, stretches the open golf course. To the right but above, small red houses continue. The road drops past some large old intricate ochre colored houses on the right before rising abruptly past the forking intersection on the left. The road rises to the top of the hill. Motion appears to increase sharply at the top where a street intersects, confinement increases and the color pattern changes from ochre to red. At this point the large old houses are replaced by small new houses as the road begins its descent to the activity node at Ryan Circle. Motion seems to increase down the hill, reaching its peak upon entering the traffic circle. Again, the left side of the circle is planted, but the right side is lined with shops and a community center. Activity is moderate and color is added by signs and mobile objects.

The road turns sharply to the right as it leaves the circle, passing a strongly articulated red brick library on the left. Beyond the library the road is lined again with houses, mostly red in color. Briefly, the houses are large and set back a good distance from the road. The road mounts a small hill, and as it begins its descent the houses become smaller and closer to the road; consequently, apparent motion increases. The road continues to descend and bears right towards the traffic circle and terminal at Veteran's Parkway.

### Evaluation

#### LEGIBILITY, MULTI-LEVEL INTEREST AND DEVELOPMENT

The Hammond Pond Parkway structural development suffers primarily from isolated continuity interruption owing to an excess in nodal contrast and in some cases slight monotony due to a lack of contrast.

In the apartment area, especially on the right, legibility is increased through contrast at the expense of continuity. As the apartments terminate, the transition to single houses is abrupt, improving clarity, but again destroying continuity.

In the area between Heath Street and James Circle, continuity is maximized with the continuous trees on either side. The extreme continuity in this section improves its legibility as an area but owing to a lack of internal contrast, interest is minimized. At the Circle, the sudden variations in the roadway improve the interest but decrease the legibility owing to the many intersections.

Continuity suffers in the section between James Circle and Newton Street as the left side suddenly opens to the golf course, discontinuing the residential structures. At the intersection of Newton Street the sudden shift back to residential structures again hinders sequential continuity while the confusion

of the intersection reduces structural legibility. Beyond the intersection, continuity, contrast, interest and legibility are restored through the residential area.

At Ryan Circle the sudden shift in structural types in the commercial area increases interest and legibility through contrast but at the expense of continuity.

Beyond the circle, legibility is again maximized through the sudden return to residential structures. Interest fluctuates through the area being maximized by the old intricately articulated houses. Continuity and contrast are maintained through the section. At the circle at Veteran's Parkway the abrupt terminal of residential structures coupled with the variations in the roadway serve to increase the legibility of the terminal node through contrast.

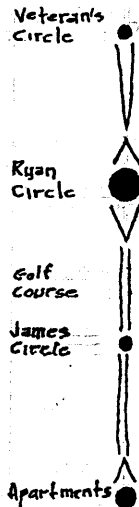
#### IDENTITY

The Hammond Pond Parkway sequence does possess an existing theme in its basic structural type. The house might be thought of as the theme, but the triangular roof shape is the real theme. This theme continues throughout the sequence, but monotony is rarely experienced due to infinite variation within the theme without destroying its identity. The theme is interrupted briefly at the commercial area, an unfortunate and unnecessary development. The apartment building on the right at the sequence origin also deviates from the thematic pattern.

#### CONGRUENCE

Hammond Pond Parkway is rather unique in that it contains only one commercial node but supports three other nodal points, one identified by apartments, the other two resulting from traffic circles. The sequence begins with the apartment node, second in intensity to the commercial area. The commercial area node is

located approximately at the two-thirds point of the sequence situated on one side of a traffic circle. The two traffic circle nodes are of the lowest level occurring at the one-third mark and at the sequence terminal. Residential and planted areas separate these nodal points to form internal transition gradients. Activity drops immediately after the apartment node, reaches its low and continues at this stabilized level to the first traffic circle and its inherent peak. Beyond, intensity drops again to stabilize passing the golf course, rises to a small peak as a hill is passed over at the end of the course, drops going down the hill, then rises to peak at the second traffic circle and adjacent commercial area. Past the commercial area activity drops abruptly, stabilizes but continues to diminish slowly to the last traffic circle.



Immediately before reaching the circle, activity increases slightly to its terminal peak at the circle.

The sequential experience generally is congruent with the activity pattern but possesses several internal inconsistencies and abrupt transition points. The experiential intensity drops, congruent with the activity pattern from the apartment node. However, a slight peak is experienced prior to entering the planted section. This peak results from a slight hill and the blind intersection with Heath Street. Beyond the intersection experiential intensity returns to the activity level, stabilizing until rising slightly to peak at the first traffic circle. Beyond the traffic circle another imaginary peak is experienced as the road turns sharply to the right and rises, separating from the left roadway. Experience then drops to conform again with the activity level briefly while passing the golf course. Immediately past the golf course another illusory peak occurs resulting from a confusing forked intersection followed by a right turn and short, steep hill with a blind intersection at

the top. Past the intersection the experiential level again becomes congruent with the activity level as it increases toward the commercial node to rise sharply to its climactic peak at the traffic circle. Leaving the node, experience subsides briefly only to rise to another imaginary peak caused by passing over a small hill and the subsequent abrupt confinement effected by houses sited suddenly very close to the road. Beyond this peak, experience returns to conform with the activity level, rising slowly with the approach to the final traffic circle. Again, however, the traffic circle peak begins prematurely owing to a brief series of large old houses in contrast to the prevalent small new houses. This effect does not alter the experience of the activity pattern; rather it simply extends the terminal peak an instant longer than it actually should be.

#### SUMMARY EVALUATION

Structurally, the form of the Parkway sequential contour is acceptable. It would, however, be much more interesting if it possessed more variety and articulation in the first two sections or if the climax at Ryan Circle was more intense to warrant such initial subtlety. The form is simple, unified about its Ryan Circle climax. It possesses adequate interest but contains potential for additional articulation. The various nodal points provide sufficient goals for structural development as well as provide adequate material for areas of stimulus and release. The internal contrast and continuity is excellent relative to the other sequences.

Major weaknesses appear frequently in the form of illusory peaks and in confusion at the traffic circles. A major weakness occurs at the forked intersection with Newton Street at the end of the golf course. Not only is this a confusing intersection, but the abrupt change from extensive open space to strict confinement mixed with a turn, sharp hill and blind intersection combine

to produce a most disconcerting, illogically intense experience. Due to the generally low level of intensity the several hills along the sequence become experientially very important; but their lack of integration with the activity pattern provides a puzzling experience for the observer. Finally, the lack of congruence in the structural form at the commercial area and in the color patterns within the residential areas point up additional weaknesses.

### Proposals

Hammond Pond Parkway as opposed to the other streets contains only one, most insignificant, commercial area and one brief apartment area. The remaining and major portion of the sequence is within a single-family residential area. Since the activity level of the sequence is at such a low level, incidental conditions which would go unnoticed in the other sequences significantly affect the observer's experience.

The first such condition is encountered at the Heath Street intersection. To eliminate the superficial peak experienced at this intersection roadway space could be increased by removing some of the trees confining the road near the intersection. In addition, the traffic light could be replaced by stop signs on Heath Street thereby reducing the apparent importance of the intersection from the Parkway. Color intensity should also be reduced near the intersection.

Immediately beyond James Circle, the superfluous intensity level results primarily from the sharp right turn and steep incline of the roadway. This condition could be significantly reduced by decreasing the rise to a more gradual incline and planting the left side of the roadway heavily with trees, gradually decreasing their frequency to introduce more casually the golf course view to the left. Toward the end of the golf course the frequency of trees should again be increased to decrease the abruptness of experience encountered

at the Newton Street intersection. The confusion resulting from the forked intersection could be eliminated by effecting a right angle connection between the Parkway and Newton Street. With the intersection redesign and the increased frequency of trees to the left, Newton Street would then be subordinated in importance and the confusion eliminated as the Parkway path would be clearly defined. The sudden incline of the Parkway after the intersection should be reduced preferably by raising the approaching level of the Parkway. Such action would result in a gradual, continuous rise from James Circle to the hilltop beyond the Newton Street intersection. These changes would result in a gradual decrease in experiential intensity, ebbing at the central point along the golf course then rising again gradually toward the commercial area at Ryan Circle.

The poverty stricken peak at Ryan Circle generates from the size and setback of the commercial structure. This weakness could be rectified by increasing the confinement upon roadway space, by increasing the dominance of the structural form, by emphasizing internal vertical articulation and by increasing the intensity of the color scheme. Apparent motion is already at a moderate level but would be increased through these suggested improvements.

Beyond the Circle another small superfluous peak occurs caused by a brief incline simultaneously with a sudden increase in space confinement. This peak might be eliminated partially by reducing the pitch of the road. In addition, the larger space previous to the incline could be reduced, eliminating the abrupt restriction by planting rows of trees on both sides of the Parkway. The space would then appear to remain the same, thereby suppressing the artificial peak. From this point the sequential experience is satisfactorily executed.

The Parkway theme of triangular roof shapes is sufficiently executed along the sequence with the exception of the apartment area and the commercial area.

The theme might be developed in the apartment area in the form of a folded plate, covered walkway along the front of the apartment building. In the commercial area since the proposals suggest redevelopment of the commercial structure, the theme should be encouraged in the actual roof shapes of new structures.

In addition, sequential color correction should be stressed in applying the general design objectives. Controls should also be developed to insure the future maintenance of the triangular roof shape thematic element.

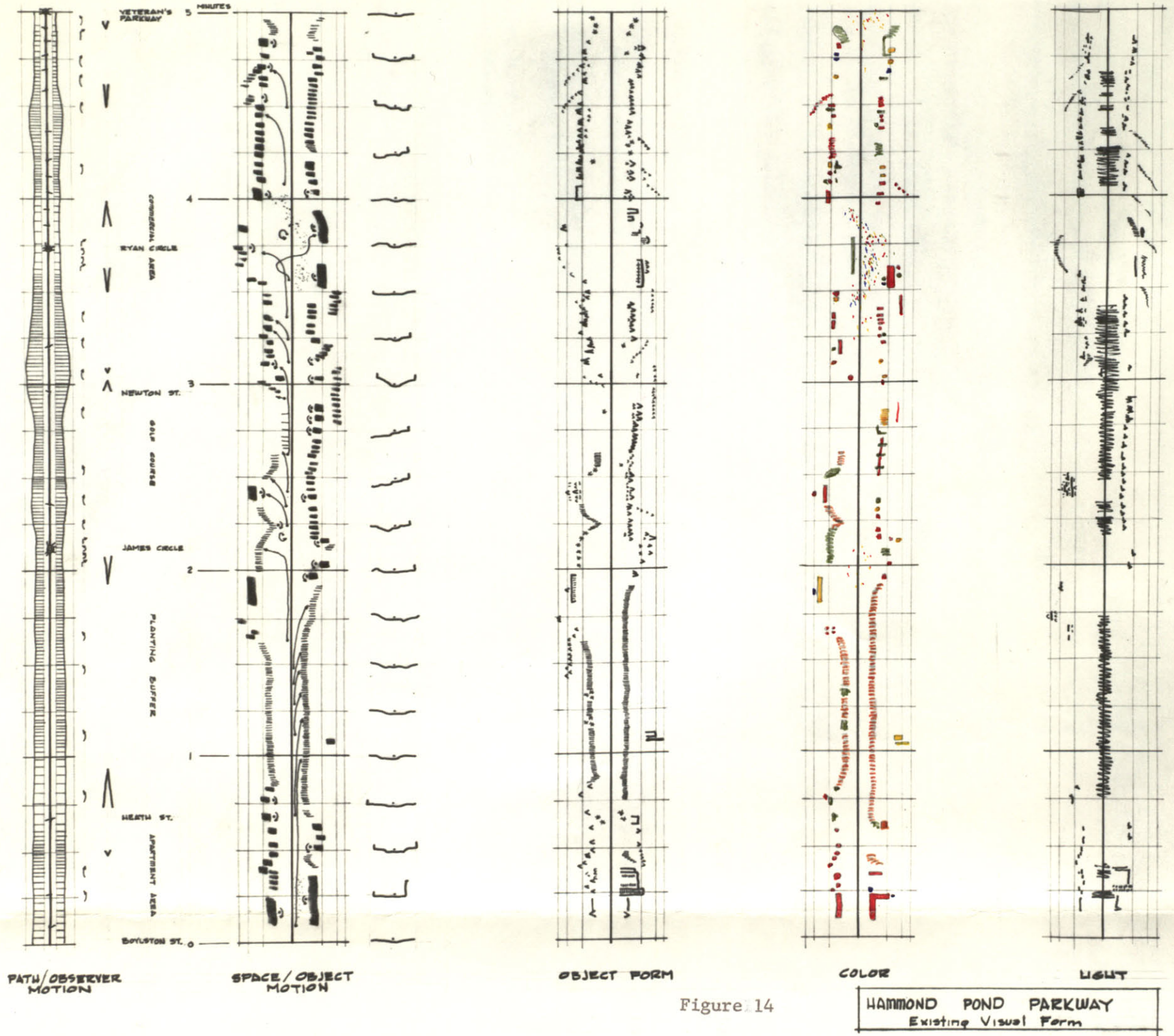


Figure 14

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