TOWARD OBJECTIVE ASSESSMENT OF THE URBAN VISUAL ENVIRONMENT: A COMPREHENSIVE PERCEPTUAL APPROACH

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ABSTRACT

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The visual pollution and chaos in most urban areas contribute to dysfunctional states of human orientation to the urban environment. Even superficial reconnaissance of most urban areas reveals the inadequacy with which the visual environment is being handled. The urban visual environment as it relates to human perceptual needs, uses and desires is being neglected by planners, and urban planning and design are the only professions whose scope and scale of operation are sufficiently large enough to assess and design this environment.

This thesis undertakes a brief analysis of the traditional planning and design approaches to the urban visual environment, and the approaches are discovered to include primarily only esthetic concerns based on intuitive analysis and subjective criteria. Because vision is a part of the ecological functioning of human beings and is utilized for much more than the perception of beauty, it is necessary

that a broader approach to the assessment and design of the urban visual environment be considered.

After scanning various fields of study that have given consideration either to human visual perception as design criteria or to objective design methods, this thesis undertakes an exploration into the possibility of establishing human visual perception criteria as an objective approach to the assessment of the urban visual environment. Because understanding human visual perception includes many areas of original research beyond the abilities of urban planners and designers, this thesis utilizes the findings available from other disciplines, primarily psychology, but many others as well.

The knowledge concerning visual perception from other fields is rarely in a form readily adaptable to planning for assessing and manipulating the spatial environment. It is necessary to make this knowledge more directly applicable. The concrete connections between human visual perception and the urban environment must be more explicitly delineated.

To establish a general theoretical schema for discovering these connections this thesis attempts a synthesis of the concepts of visual perception and urban environment. The product of the synthesis reveals a systemic structure of urban environmental levels and perceptual meanings of visual space, which indicate the general human perceptual requirements of the visual environment.

The concrete, spatial connections between the levels of environment and the perceptual spatial meanings can be progressively detailed. Objective criteria structured on an organized, systemic framework begins to become available for the assessment of the urban visual environment through the identification of functional and dysfunctional states in the spatial connections, which are termed "counterpoints".

For the purposes of planning applications, the theoretical schema developed in this thesis is termed a comprehensive perceptual approach for assessing the urban visual environment. In the theoretical schema is discovered a few seemingly inherent qualities which tend to imply certain policy considerations, and suggest some planning application. Although certain planning implications and applications are suggested in this thesis, the theoretical concerns of this work cannot be made fully applicable for planning the urban visual environment until further research is conducted. Much of this research is either underway or being considered, and the outlook is optimistic if the planning and design professions can establish workable collaboration with the various fields doing significant visual and environmental research.

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INTRODUCTION

It is the visual sense through which most of man's perceptions of the world are received.[1] Vision probably receives more stimuli and cues for processing than all the other senses combined.[2] The spatial counterpart of the visual sense is the visual environment which is the locus of visual stimuli.[3] An urban area is one of the most intense visual environments, and one in which many decisions based on visual information often must be made quickly and correctly.

Because of these factors alone, urban planning and related design professions should take care to analyze the urban visual environment, and attempt to provide optimally for the mundane human operations that must occur daily within this milieu. This thesis is concerned with the relationships that do, or can, exist between man's visual sense and visual needs, and the urban environment of visual stimuli.

The approach here is relatively new. It is based on man's visual needs and capabilities as they can be facilitated by the manipulation of what is visible in the urban environment. By exploring the component structure of the dynamically organized visual mosaic of the urban environment

and by examining the human visual mechanisms and perceptual structuring as revealed through studies in various disciplines, causal or correllative relationships are revealed that can be exploited by urban planners as criteria and guidelines for assessing and designing the visual aspects of cities.

This approach is in contrast to the type of assessment generally intended with the planner's visual reconnaissance or survey, during which the visual process is used to glean other, often non-visual information.[5] This also differs in approach from the visual survey done by planners, designers, architects and landscape architects when they seek to identify esthetic features in the urban environment which are of relevance to their particular studies or projects.[6] The contention of this thesis is that the usual surveys do not assign a broad enough importance to the visual environment, especially as it relates to human beings and their use of it.

The purpose of this thesis is essentially twofold: (1) to establish the criteria and a framework for study with which planners can effectively assess the visual aspects of particular urban environments, and (2) to establish the criteria and guidelines from which planners can effectively design new, or rearrange existent, visual environments.

At this point it is important to establish the tentative definitions of two key terms which are discussed and defined on a continuing bases throughout this work; visual environment and urban design.

The visual environment in context of this thesis, and with the general definition offered here, is nearly non-existent without the presence of the human sense of sight and all the visual orientations of human beings to the world around them. Thus, the visual environment includes all the phenomena of physics necessary for human vision, and all the human uses of the visual aspects of the urban spatial environment.

Urban design here has the broad meaning of planning or designing the manipulation and arrangement of space-displacing urban elements. In contrast to the usual urban design, which is basically project oriented, the scale considerations in context of this thesis are much more general and varying.

A further definition of urban design for the purposes of this thesis needs to include urban visual design. This is the theme of this work, and in contrast to the breadth of urban design, this includes only planning, designing, and otherwise controlling or manipulating the visual aspects of the urban environment. Urban visual design includes only appearances and that which is seen, as opposed to the

manipulation of spatial forms in general, with which there are nonvisual or little seen elements.

During the daily functioning of planners with the established framework and tools of operation, planners are responsible for considerable control and design of the visual environment; perhaps more than is often recognized.[7] Zoning regulations, site plan review, sign ordinances, architectural review, and other mechamisms, along with the various restrictive codes and standards, when implemented and enforced, can cause much change in the visual environment.[8] Ordinarily human use of the visual milieu, based on their visual needs and capabilities, is not considered seriously, and certainly with little thoroughness. Quite nebulous goals based on health, safety and welfare, and more recently even beauty, are the stated purposes of controls. This study intends to reveal visual criteria in a much more explicit manner.

Currently, it is only the planner's scope of operation that is broad enough to encompass the design and control of the visual environment.[9] Architects. landscape architects, and urban designers do not often work at the city-wide scale, or include such a broad range of criteria; such as modes of social interaction, education and employment, and cultural variety. Human perception is active on several levels from receiving concrete visual impressions to symbolic perception and the urban visual environment provides

the immediate stimuli from which the perception stems.[10] As urban residents utilize and function within the city, they find myriad stimuli for response, and many cues for action, in the visual environment.

This work attempts to identify and describe the different levels of human visual perception, and to discuss how the urban visual environment can, or does, include stimuli or patterns of stimuli that have at least a correlative functional relationship with the levels of human perception. Only those aspects of the visual environment that do correspond to human perception and are manipulatable by the planner are of interest to this study. Also, only those relationships between human perception and the visual stimuli that can be verified to have concrete connection are considered of value here. Thus, the approach to visual design and assessment in this thesis is intended to be objective.

The term objective here takes on a dual meaning.[11] First, it refers to the artifact world of objects that is most readily manipulatable and controllable by the planner. It is basically the artifacts and their arrangements that planners have the legal and, as deemed here, ethical right to handle. Second, objective means the use of evidence and information of a verifiable nature, and is not based on the subjectivity or intuition of the assessor to the degree that it evades corroboration.

discussion here, therefore vacillates back and forth between the structure and patterns in the visual environment, and the modes and structure of human visual perception. This analytical approach is in substantial contrast to the analysis and design of objective space, based on arbitrary and subjective design principles, which is often the case.[13]

There is often discussion in planning and design literature concerning the effects that varying spatial arrangements have on people, but it is the contention here that such endeavors are often based purely on introspection and subjectivity, and are usually applied in an intuitive manner without a distinctly structured schema of criteria.[14] The considerations are admirable, but the analytical approach is quite inadequate in complex urban situations. Such endeavors amount to guessing, and even if best guesses or educated approximations, they are nonetheless guesses with little objective basis. Also, it is usually at least implied that the visual environment is indeed capable of exerting certain specific influences on observers; a point often found generally objectionable by sociologists and psychologists.[15] These objections are discussed further in Chapter III.

The intuitive-subjective-introspective approach to visual assessment has not been completely unsuccessful because many of the persons involved in it have been

Objectivity is not necessarily based on truth or reality, or on the attainment of quantifiable results. An objective approach should at least utilize an explicit set of relevant controlling criteria, and the designer should be aware of the rational framework or schema upon which the criteria are structured. The view of objectivity in this work readily accepts a broad definition, but emphasizes the need for explicit and cognitive criteria.

With some levels of human visual perception as they relate to objective stimuli, the relationships are complex and the connection can be detected and expressed only with great difficulty. Because of this, and because the research in various fields concerning vision has not been concluded, and also because this thesis is somewhat related to new pursuits by others toward making explicit the man-built environment interaction,[12] this thesis must be viewed as introductory, exploratory, and at the beginning of planning's efforts to seriously study and to attempt understanding of the various factors of man's connection to environment. The intention of this work is an attempt to increase the body of knowledge in one area of this broad pursuit, while expanding the objective criteria base of urban planning.

The focus of this thesis deals with the stimuli in the objective visual environment as they relate to human visual perception. The thesis research, and subsequent

intelligent and experienced.[16] But neither has the approach been particularly successful. The broad range of criteria possible for use, and the many alternatives available, even for very specific and small design projects, tends to indicate slight possibility for correct or successful urban design results toward creating visual environments in which human beings can function well. In many areas of planning this complexity has been recognized. For example, observe the considerations over traffic generation and attraction regarding proposed shopping centers. However, concerning the assessment, design, and control of the visual aspects of the urban environment, a different planning concept is applied which is often centered in intuitive and artistic judgment.

Intuitive judgments are very often necessary, especially when applying specific criteria schema to particular environments or projects, and when making some purely artistic decisions. These artistic decisions might include some specific decorations for a downtown mall or shopping center. Beyond noting specific visual criteria and offering a schema for applying them in planning, no simple formula or method is here proposed for decision-making. As with most endeavors, it is assumed that the most successful can be obtained by trained and experienced persons.

The method of accomplishing this thesis includes four areas of consideration which coincide with the chapters, and they are as follows:

1. A review of the traditional approaches to the visual environment by planners and related professionals.

2. A discussion of some relevant attempts toward objective assessment and design of the visual environment.

3. Rational synthesis of findings about visual perception and environment, and the development of a theoretical schema.

4. Assessing and designing the urban visual environment and applying the schema.

There are a number of points which should be mentioned here in order to clarify what this work is not. There is no dearth of written material concerning visual esthetics or the visual aspects of cities. However, much of this material, whether descriptive or theoretical, discusses only esthetic norms and values, the overall layout or form of cities, or what should or should not be visible in cities.[17] Except in the broad sense of esthetics being composed of that which meets all requirements for human vision, this work is not any sort of general esthetic manifesto. But, it does include visual esthetics. There is little concern for the overall form of cities here; and in terms of objects or space representing only themselves, there is little discussion.

It should also be pointed out that this is not an attempt to establish a visual approach to general planning. There are entirely too many factors which are nonvisual in the urban area, to consider a comprehensive approach to planning based on the visual.[18] The study of the visual environment is only one part of the overall planning discipline, and although the visual aspects of the city can reveal much information to the visually aware planner, the visual elements cannot be read to gain specific information about income, sex, economic conditions, employment, transportation needs, etc. However, proper assessment and design of the visual aspects of the urban environment can affect the overall quality.

As briefly mentioned previously, there is little concern here with the functioning of the planner's subjective judgment or exercise of intuition in handling the urban visual environment. The only concern with the subjective response, is that of the urban dwellers and commuters, and then only as those responses can be connected with the presence of stimulus objects.

Further, this thesis is not concerned with the cultural or social aspects, or the personal idiosyncracies, involved in visual perception, except as they can be related to, or are manifested in, stimulus objects or stimulus properties.

Finally, this thesis is not a study toward the development of general planning or design theories or methods, but rather toward the accomplishment of further knowledge of the visual environment, and a theoretical framework with which planners might handle the visual aspects of the urban environment.

Adolf Portmann in an essay entitled "The Seeing Eye", indicates that the human visual abilities are suffering in ignorance and apathy.[19] He asserts that the increasing human dependence on illustrated books, magazines, TV, etc., and on greater cognitive and abstract concepts is leading people away from the direct perception of things around them.

Seemingly, the many planning endeavors are becoming increasingly nonvisual and nonperceptual, and the planners are possibly beginning to suffer from the same lack of direct visual involvement as discussed by Portmann. Planning is becoming more involved in PPBS, PERT, and the like, as well as in conceptual studies and model building of varying sorts.

These newer concerns of planning can work to assist planning in many ways, but planners should not forget that their primary area of competence is broad scale urban design, in which spatial forms are to be assessed, designed, controlled and guided. The nonvisual elements must be related back to a basis in manipulatable forms and the

arrangements of spatial form, or the more nonvisual and nonspatial planning elements will be to little avail.

Portmann indicates that the developing fear for trusting what the eyes relate to people, can lead to the danger of providing a false perspective and actually remove people from the full dimensionality of life.[20] Planners, seemingly, should not abandon concern for the visual environment, and one purpose of this thesis is the attempt to retain some visual concerns in urban planning, by trying to discover theoretical, visual concepts that can correspond to planning operations.

It has been necessary, both with the conception of this topic and the research and writing of this thesis, to be aware of the lurking hazards involved in crossing discipline lines as freely as has been done in this study. However, today these lines are not so rigid, especially for planning, and in the more recent searches for answers to the man-built environment interaction questions, it has been quite necessary to draw upon research from other fields.[21] Had not this writer been previously introduced to and interested in the wide range of research necessary for understanding the visual aspects of the urban environment, this topic would not have been undertaken.

Notes

1. The dominance of the visual sense relative to the other senses has been noted many times, and among other works is reported in, James J. Gibson, Perception of the Visual World (Boston: Houghton-Mifflin, 1950), p. 10; Edward T. Hall. The Hidden Dimension (Garden City, NY: Anchor-Doubleday, 1969); Adolph Portmann, "The Seeing Eye", in Paul Shepard and Daniel McKinley (eds), The Subversive Science (NY: Houghton-Mifflin, 1969), p. 115; and Jonas F. Soltis. Seeing, Knowing and Believing (London, Allen and Unwin, 1966), p. 16.

2. Ibid.

3. Gibson, preface.

4. Conrad G. Mueller and Mae Rudolph. Light and Vision. (NY: Time, Inc., 1966), p. 9.

5. F. Stuart Chapin. Urban Land Use Planning. (Urbana: University of Illinois Press, 1970), Chapter 3.

6. Ibid., also Kevin Lynch, Site Planning. (Cambridge: MIT Press, 1962), Chapter 2, and Paul D. Spreiregen. Urban Design: The Architecture of Towns and Cities. (NY: McGraw-Hill, 1965), Chapter 3.

7. Kevin Lynch, "City Design and City Appearance", in William I. Goodman and Eric C. Freund (eds). Principles and Practices of Urban Planning. (Washington: International City Manager's Association, 1968), p. 273; and M.R. Wolfe and R.D. Shinn, Urban Design Within the Comprehensive Planning Process (Seattle: University of Washington, 1970), preface.

8. Ibid.

9. Hans Blumenfeld, "Scale in Civic Design", Town Planning Review, Vol. XXIV, (April 1958), p. 35; also, Robert C. Weinberg, "Urban Design", Planning 1958 (Chicago: American Society of Planning Officials, 1958), p. 23; and Koichi Mera, "Consumer Sovereignty in Urban Design" in The Town Planning Review, Vol. 37 (January 1967), p. 305.

10. Gibson, p. 198.

11. The definitions to follow are separate meanings which are found in most any dictionary. These meanings, however, in relation to the planner both refer to that with which he can work directly.

12. These other works and disciplinary areas are considered at length later. In general they include the sub-disciplines of Environmental Design, Environmental Psychology and Architectural Psychology.

13. This is discussed further in Chapter One.

14. Again, this is discussed in Chapter One.

15. For example, Maurice Broady. Planning for People. (London: The Beford Square Press, 1968).

16. Charles M. Eastman, "On the Analysis of Intuitive Design Processes", in Gary T. Moore (ed). Emerging Methods in Environmental Design and Planning (Cambridge: MIT Press, 1970), p. 21.

17. This is not meant in any derogatory sense, these works include among others, Theo Crosby, Architecture: City Sense (NY: Reinhold, 1965); Gordon Cullen, Townscape (NY: Reinhold, 1961); Frederick Gibbard. Town Design (NY: Reinhold, 1959); Lawrence Halprin, Cities (NY: Reinhold, 1963); Fran P. Hoske. The Language of Cities (NY: Macmillan, 1968), and Ian Nairn. The American Landscape (NY: Random House, 1965).

18. However, on a limited scale, such as the design of a relatively isolated downtown pedestrian mall, this visual approach to planning might have exciting results. For an example of one attempt at such an approach see, Thomas J. Kachel. Anatomy of the Visual Environment: A Visual Approach to Planning. (Carbondale, Illinois: New Man Publications, 1971).

19. See Portmann, pp. 120-121.

20. Ibid.

21. See note 12.

CHAPTER I

ANALYSIS AND DISCUSSION OF TRADITIONAL APPROACHES TO THE VISUAL ENVIRONMENT

Background

Since the inception of modern American urban planning, which occurred in the decades following the Columbian Exposition of 1893 in Chicago,[1] there has been a continuing interest in the urban visual environment. Although at the beginning of modern planning, civic art and urban visual aspects were the major concerns, emphasis on visual planning generally declined in the years between the City Beautiful Movement and Post-WWII when urban design began to develop as a discipline.[2]

Regarding early planning efforts, John Reps states, "At first this was limited to considerations of the impact of monumental groupings of public buildings on the visual sensibilities of the beholders."[3] Mel Scott includes in the early attempts, the design of "parks and boulevards, or areawide park systems, or the streets of outlying, undeveloped sections of cities".[4] Reps further states,

> Inevitably there was a reaction from this approach that emphasized the appearance of the city almost to the exclusion of other matters. During the 1920's and 1930's a shift in emphasis

> occurred. The City Efficient replaced the City Beautiful as the main goal of planners. Today planners are beginning to rediscover the merits of the earlier position...and are attempting to combine the two approaches without sacrificing the interests of either. 5

Planning and the Development of the Visual Environment

Based on these accounts,[6] the impression is that visual aspects of planning ceased to exist between the fall of City Beautiful and the rise of urban design in the early 1950's. The emphasis did shift away from the visual aspects of planning, more toward economic concerns, but the visual environment seen today is a cumulative result, part of which developed through these middle years. A number of factors indicate that the visual environment was planned in various ways during this time.

First, zoning met with wide acceptance when it was realized it could serve as an instrument to help protect property values by legally separating land uses and functions.[7] Part of this was due to resultant visual appearances. The residential area values, for example, were somewhat maintained by the exclusion of certain nuisance and unsightly structures, such as those of industry. This had a rather prodigious effect on the development of the visual environment in urban areas. Later subdivision regulations created some of the same general effects.

Second, up to around 1930 it was rare for city plans not to include sections on city appearance.[8] In one form or another this practice continued. Too, the implementation of many parts of plans had some resulting consequence in the visual environment.

Third, civic centers and many other public buildings continued to be built.[9]

Fourth, street building necessarily persisted after City Beautiful, and some of it was of a decorative nature, such as the boulevards and parkways. But whether or not street building was a conscious effort toward beauty, the automobile use widened remarkably during the 1920's, 1930's and 1940's, and its effect on street building and the shape of the visual environment was a major factor.[10] Multiple lane highways and overpasses began to develop, and became the forerunners of today's expressway systems.

Fifth, parks of various forms and sizes continued to be composed and built. Again, this added to the cumulative picture of the developing visual environment.

Sixth, along with the erection of public buildings, there was also construction of many other buildings. This basically concerned the private development of offices, commercial structures, factories and housing. During this period technology and economic need so developed that skyscrapers could be built in larger cities with relative ease;[11] the Empire State Building is an example of this.

Also during the years between City Beautiful and 1950, America continued to urbanize with the migrating rural and the growing general population. During this time the suburban phenomenon developed substantially.[12]

These factors, only some of which were directly commanded by professional planners, created significant development of the urban visual environment. Planning was formal and informal, private and public, controlled and uncontrolled. Essentially the urban visual development was little directed by planners, and social and cultural values acted as the main determinants of appearance.

Incipience of Urban Design

It is generally recognized that a building boom occurred a few years after the end of WWII. This was due to a number of factors, including an increased housing market, the availability of public and private financing, new public housing measures, and urban renewal.[13] The visual aspects of the urban environment began to change radically in many urban areas.[14] Suburban growth flourished. Older or delapidated areas were torn down. New streets were built; new facilities of various kinds were erected. New offices, factories and commercial buildings were constructed.

According to Michael Cunningham, the planning profession by this time had practically abandoned physical planning and concerns for the appearance of the city.[15] Engineers

in various city departments were handling the development of physical facilities such as sewerage and water lines, and planners were almost exclusively dealing with social concerns such as population study, employment surveys, economic reports and housing studies. City appearance was being ignored.

Cunningham states that some planners, architects and landscape architects moved to develop the new professional area of urban design which began to occupy "the place evacuated when the planning pendulum swung back to socio-economic concerns...and thereby left physical planning an unwanted orphan."[16] During the 1950's urban design curricula began to appear at universities and, for example, in 1958 a portion of ASPO's Planning 1958 was devoted to urban design.[17] The authors were Robert Weinberg, Kevin Lynch and Edmund Bacon; three men who had been some of the earliest advocates of the developing new urban design discipline which still had no coherent and distinct body in reality.

Urban Design and Environmental Design

The discussion here has been applying the term urban design in reference to the professional area dealing with the design of urban spatial and visual form. In recent years the term environmental design has been introduced. In many ways this term reflects the value changes toward a

more seriously comprehensive approach to the assessment, control and design of the artifact world in general.

However, the term environmental design does not well suit the purposes here. It is simply too general. Urban design is more specific because it keeps a constant reference to the scale and scope with which professional planners work.

Environmental design can easily encompass many scales from interior design to that of very large regions or more. It implies a broad range or scale and scope from micro to macro, while the concern here is mainly at the outdoor urban scale.

However, the concept of environmental design does mean more than a variety of scales. It often connotes the relationship of man to environment,[18] which is a major concern in this thesis. The choice of the term urban design is for convenience in referring to scale and scope.

Urban Design Ideology

Urban design has not yet clearly developed into a coherent profession and work in the field is presently conducted by planners, architects, landscape architects,[19] and some people with the actual title of urban designer. None of these fields has developed clear methods or a theoretical framework for assessing or designing the urban visual environment. Urban design has been defined as the

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architecture of towns and cities,[20] and it has most often been the ideologies of architectural design that urban designers have adopted.

Object-Orientation and Simplicity in Design

Harry Rodman has stated the prevalent thought behind architectural design in a rather capsulated and clear form:

> Habit, history and methods of education have led us to view architecture almost exclusively as an object art--a kind of sculpture--where the value lies in the object forms, is fixed by these forms, and is predominantly visual. 21

Robert Goodman in his rather poignant book, After the Planners, has made a similar observation. He says,

> ...buildings are described metaphorically as physical objects in relation to each other rather than as containers for human activity. Architects often criticize each others buildings by describing whether one building appears to be visually good or bad next to another. The people who use the buildings are presumably also "spectators" to this phenomenon and pass similar judgments on what is happening... 22

It seems the architectural approach has been visual and object oriented. The "visual", however, refers to the subjective visual evaluation and design; the object orientation functionally relates the object only to other objects, and to people essentially as spectators. This is necessary and likely desirable in the creation of some visual art--painting, prints, sculpture and even some aspects of architecture--but the design of cities should involve a more functional approach. As Jane Jacobs has said,

> When we deal with cities we are dealing with life at its most complex and intense. Because this is so, there is a basic esthetic limitation on what can be done with cities: a city cannot be a work of art. 23

Although esthetic design and value is important in cities, the central and major aspects of design cannot be with the city as a work of art. Unfortunately, the role of urban design has too often been perpetuated on the architectural tradition, and premised on the artistic approach to visual design.

Jacobs reference to the "complex and intense" life in cities introduces another poorly conceived aspect of architectural and urban design: the irrational pursuit toward simplicity. Amos Rapoport and Robert Kantor address the concept of simplicity when they observe,

> Simplicity has been the aim of contemporary architecture and, implicitly, that of much urban design. The call is for clarity, lucidity, and simplicity. While striving for simplicity has always tended to distinguish the designed from the vernacular which has been more complex, it has been more typical of recent works than of the past. 24

Schemes and plans for urban renewal or other projects of architects, landscape architects and urban designers often readily illustrate the concept of simplicity. Materials are similar within a project, there are often large expanses of empty space, and complexity of form is infrequently present. There is apparently some misconception about designing with simplicity as a major principle as opposed

to simplifying in order to solve problems and express certain aspects. The latter is important to most design problems, including those of visual design, but the principle of simplicity leads to Robert Venturi's statement in reply to the "less is more" paradox of Ludwig Mies van der Rohe; Venturi says, "less is a bore."[25]

Reliance on Intuition in Design

In many respects architects and their critics have long considered architecture as fine art, at least regarding the visual aspects, as reading most current architectural periodicals indicates. Relating architecture to large scale sculpture is not completely an exaggeration.

However, architecture has been firmly tied to both engineering concerns and the client's building program as practical matters. The building should stand and it should meet the functional requirements dictated by the client. The appearance, however, has been left largely to artistic or stylistic considerations, and visual decisions have rarely been other than intuitive, introspective, subjective, and esoteric matters.

The term intuitive basically means apprehension or cognition of something without the aid of rational thought, or without inferring from an explicit set of criteria.[26] In reality this is probably rarely exercized in pure form; any attention to the building program at hand precludes this. However, the functioning of intuitive judgment does

seem to dominate after the unique features of a particular program are discerned. The designer falls back on visual solutions, designs, or methods experienced in the past while incorporating most of the new features.

The intuitive method implies that a design can be produced without all the facts or criteria pertinent to the particular case. Christopher Alexander in his Notes on the Synthesis of Form says,

> ...although ideally a form should reflect all known facts relevant to its design, in fact the average designer scans whatever information he happens on, consults a consultant now and then when faced by extra-special difficulties, and introduces this randomly selected information into forms otherwise dreamt up in the artist's studio of his mind. 27

Too often, seemingly, this is the approach of urban visual design. Careful selection of the relevant data, subjected to systematic analysis, is ignored. At the scale of urban design and with the highly complex sets of variables involved, the design should include relevant criteria inferred from a carefully systematized framework or schema. Only after these rigid initial phases should the aid of intuition begin. Without a coherent structure to the problem and a schema with which to organize data, successful manipulation of visual elements can hardly be planned. The intuitive approach based on subjective experience and introspection tends to break down. Concerning this point Alexander says,

> At the same time that the problems increase in quantity, complexity, and difficulty, they also change faster than before...In the past... the individual designer would stand to some extent upon the shoulders of his predecessors... there was always still some tradition which made his decisions easier. Now the last shreds of tradition are being torn from him...He has to make clearly conceived forms without the possibility of trial and error over time... The intuitive resolution of contemporary design problems simply lies beyond a single individual's integrative grasp. 28

Alexander's observations indicate the designer needs help because the intuitive process is much less functional in face of the complexity of today's design problems. But there is great reluctance toward relinquishing the more purely intuitive methods to objective and systematic approaches. Again, Alexander says, "there is a great deal of superstition among designers as to the deathly effect of analysis on their intuitions--with the unfortunate result that very few designers have tried to understand the process of design analytically."[29]

Alexander's observations have become somewhat less true for general design since he made his remarks in 1964.[30] However, the statement is still very accurate concerning the visual aspects of design, and an analytical process for urban visual design is still very much needed.

Because matters of designing visual elements inevitably invoke thoughts of artistic endeavor and esthetic concerns, the intuitive approach can be presumed justified on this basis. However, visual design, like all design, has

underlying elements of a nonartistic nature, as well as those of esthetic appearances. Thus there has been a general insufficiency in the separation of art and science matters in visual design.

Edmund Bacon, a leading and self-admitted proponent of the use of intuition in urban design, exemplifies some of the thinking behind intuitive urban design. He has chastised attempts toward scientific solution to design,[31] has lauded the architectural approaches,[32] and refers to the design of cities as if it were kinetic sculpture.[33]

Within the context of his defined scope,[34] Bacon has made good proposals and his descriptions of artistic design principles are admirable, but he does not seem to recognize the essential dichotomy of art and science in urban design and has apparently given little recognition to the fundamental needs and activities of human beings in his designs.

Visual Mechanisms in Planning

Urban visual design within the context of urban planning relates to a more general and dynamic process of design, as well as the utilization of some of the tools of planning. In reality planners probably have more influence on shaping the visual environment than even they realize. Planning for land use, facilities and services, transportation and circulation and housing densities, for examples, all act to change the visual city in varying degrees.[35] There are

two planning mechanisms involved with the visual environment that warrant examination: the visual survey and regulations for visual control.

Visual Survey

The visual survey is mainly a loose procedure of reconnaissance for gleaning information in a visual manner. By various means of notation different categories of information are collected. The purposes are diverse, and the visual survey is only a means, not clearly a method with defined objectives or set procedures.

The visual survey frequently is nonobjective and gathers impressions, general characteristics, and varying degrees of detail. Yet, toward the actual assessment of the visual environment visual surveys rarely establish more than a subjective comment about existing esthetics.[37]

It is difficult to discern visual ends sought with some visual surveys. Land use surveys clearly desire to establish the locations and relationships between the various functions and activities occurring in buildings or on the land. Although these do contribute to the makeup of the visual environment, such classifications express no clear visual distinctions.

Even visual surveys toward assessing structural or environmental quality have little meaning in terms of urban visual aspects.[38] There is expression of economic conditions,

structural conditions of artifacts, and some evaluation of natural features, but the classification of these is clearly to be done in nonvisual categories.[39]

It is the visual survey related directly to esthetics and urban design studies that most obviously functions to assess the visual elements and perceptual aspects of the urban environment.[40] The survey in this context also relates in part to the function of site analysis.[41] Beginning either with or without a design program which might assist data selection, distinctive features and their relationships are noted. Paul Spreiregen says of this process,

> A visual survey in urban design is an examination of the form, appearance, and composition of a city--an evaluation of its assets and liabilities...The process of making a visual survey is not complicated, nor need it be done with a high degree of precision. [42]

Regulations for Visual Control

Regulations, codes, and ordinances which are aimed at the control of visual appearance or in various ways accomplish control are growing in number and exert considerable effect on the visual environment.[43] Although there has been considerable legal difficulty involved, these approaches have developed in various forms. In 1958 Robert Weinberg and Henry Fagin identified six different approaches to appearance regulations.[44] They were: (1) look-alike

regulations for neighborhood uniformity, (2) no-look-alike regulations for diversity and variety, (3) open space regulations, (4) historic preservation clauses in zoning ordinances, (5) architectural-design review boards, and (6) regulations promoting esthetics related to a conscious plan for community appearance (considered rare). The various zoning additions dealing with bonuses and incentives for improving community appearance should be attached to this list.[45]

The overall effectiveness of these regulations is well appraised by Fagin and Weinberg:

> When the Joint Committee began to review these alternative approaches, it soon realized that their underlying premises tend to be narrow and shallow. The regulations studied cover only parts of the everyday outdoor environment; their esthetic assumptions may be based more on artistic prejudice than on any deep understanding of beauty and how it is created. 46

Thus, according to Weinberg and Fagin the visual environment is handled by non-objective considerations with incomplete structuring of the criteria for control, and the visual concerns have changed very little since their study in 1958.

Reluctance to Consult the Social and Behavioral Sciences

There is reluctance by urban designers to yield their intuitive grasp of knowledge to the inclusion of more

information from the social and behavioral sciences. This is of special significance considering the importance of these sciences to the design of spatial forms for human use. In an article addressing this subject, Christopher Alexander says planners fallaciously believe "that the physical form of the environment has very little effect on behavior...that psychological insights, while no doubt interesting, are as yet too vaguely formulated to have any serious bearing on urban form."[47] He sites these beliefs as the main reason some planners are turning away from planning toward more obviously social fields.[48]

Constance Perin in her book With Man In Mind discusses some of the problems creating the reluctance to turn to social and behavioral science for design criteria and knowledge. She says,

> Some working designers--and most especially students of architecture, landscape architects, and city planning--will welcome a more vital collaboration with clients, laymen and human scientists. But because of differences in traditions and education, collaboration will come uneasily on all sides even if strong measures are taken soon in design education, in the practice of large architectural firms, in the conduct of public planning and citizen participation programs, and in the systems of incentives and career reward in the human sciences. 49

She also comments, "within the last thirty years or so the pendulum has swung from belief to disbelief that the social and behavioral sciences could be the source of wisdom for environmental designers."[50]

It is the realm of the social and behavioral sciences with the addition of objective information from the humanities that should provide the important knowledge necessary for planners and designers to deal with the visual environment, and relate it to people so they can use it in their daily urban endeavors. There is also certain important information, often ignored, from the fields of engineering and other applied sciences that might prove useful in attending the visual environment. These areas have all been consulted in the course of planning's history, but they have not been adequately researched and applied by planners and designers. These areas have most often been used by consultation, and otherwise, for the design of individual buildings, and streets and highways.[51] Other discussion of some of the ignored aspects of these sciences are incorporated at later points in this thesis.

The keys to the inadequate handling of the urban visual environment by urban designers seems to hinge not on intentions, but on the lack of knowledge, inattention to findings in other fields, and a lack of concern for actively seeking more objective information to serve as controlling and guiding criteria. The reasons for much of this seems to be based on tradition or convention which identifies the visual aspects of design often as little more than decoration to be handled with pure artistic license.

Kevin Lynch has discussed this misconception directly; "appearance and esthetic quality are not final touches; they are fundamental considerations that enter into the design of a thing from the beginning."[52] Lynch refers to such afterthoughts, or visual dressings, as "cosmetics".[53] These cosmetics, while not necessarily bad art, have been much of the visual consideration in urban design when much more is needed.

It is often recognized that the space-displacing form of city's artifacts should be more than intuitive fancies, but the visual appearances have rarely gone beyond this. When they have, the purposes and reasons have often been based in unsubstantiated cliches about what certain spatial formations do to people.[54] Urban designers have in large part ignored many aspects of vision and the many viable human visual perception elements. Except for the subjective and introspective considerations, urban designers have not considered the role of the human visual sense related to the visual environment.

An example of this is illustrated well in Paul Spreiregen's book Urban Design: The Architecture of Towns and Cities in a section entitled "A Human Approach" in his chapter on urban esthetics.[55] He says that although urban design esthetics concentrate on "physical aspects", the human element is "the social and cultural bases of it."[56] He continues, "the latter factors are implicit--as implicit

as in architecture."[57] Evidently these factors are as implicit in the design process as they are in expression for he does not suggest that the urban designer find out objective criteria, nor does he indicate the use of such in the design process. His major instruction is,

> This procedure of conceiving the physical environment in such real terms, with beauty as the ultimate goal, must now be extended to the design and creation of our towns and cities--a task which we must never be reluctant to approach with a sense of poetry. 58

Spreiregen's comment is true, but to consider this the major input for visual design, even visual esthetics, is not enough. Similar to Spreiregen's approach is that of Benjamin Thompson who, although aware of the need to design with human criteria, nullifies his seriousness by stating, "...we must design for people. But if we stop to analyze people, we'll never make it. The process of understanding and empathy must be as instinctive as understanding ourselves."[59] Thus, Thompson advocates the inclusion of human criteria in design, but with no intention of abandoning the same intuitive and subjective approach that makes his proposal impossible.

Neither the Speiregen nor the Thompson considerations are unusual, and eventhough some of their concerns are quite laudable, the approaches stop short of the objectivity necessary for accomplishing effective methods for handling the urban visual environment. Although not discussing the quality of product or process for the design of space-

displacing form, this chapter has pointed out much of the attitude and work process involved in the traditional handling of the visual aspects of urban design. Fortunately, some attempts in urban design have involved more objective and systematic approaches to visual design, and Chapter II is a discussion of them.

Notes

1. See John W. Reps, Making of Urban America (Princeton: Princeton University Press, 1965), and Mel Scott. American City Planning Since 1890 (Berkeley: University of California Press, 1969).

2. Michael C. Cunningham, "Framework for Historical Explanation in Urban Design", Ekistics, Vol. XXXIV (November 1972), p. 310.

3. Reps, p. 525.

4. Scott, p. 1.

5. Reps, p. 524.

6. Reps, Chapter 5, Scott, Chapters 1 and 2, and Cunningham, p. 310.

7. James G. Coke, "Antecedents of Local Planning," in William I. Goodman and Eric C. Freund (eds), Principles and Practices of Urban Planning. (Washington: International City Manager's Association, 1968), p. 24.

8. Ibid.

9. James Marston Fitch. American Building: The Forces that Shaped It. (Boston: Houghton Mifflin, 1948), Chapter Seven.

10. This fact is quite common knowledge reported in many sources; see Ibid.

11. Fitch, Chapter Nine.

12. Gregory H. Singleton, "Genesis of Suburbia: A Complex of Historical Trends", in Louis H. Masotti and Jeffrey K. Hadden (eds). The Urbanization of the Suburbs. Vol. 7 Urban Affairs Annual Review (Beverly Hills: Sage Publications, 1973), p. 30.

13. Norval D. Glenn, "Suburbanization of the United States Since WWII," in Ibid., p. 55.

14. Ibid.

15. Cunningham, p. 310.

16. Ibid.

17. Robert C. Weinberg, Kevin Lynch and Edmund N. Bacon, "Urban Design" (three papers), in Planning 1958 (Chicago: American Society of Planning Officials, 1958), pp. 19-31.

18. See Constance Perin, With Man In Mind (Cambridge: MIT Press, 1970), p. 2.

19. Ibid., p. 8.

20. Paul D. Spreiregen. Urban Design: The Architecture of Towns and Cities (NY: McGraw-Hill, 1965).

21. Harry E. Rodman, "Designing for the Whole Man," American Institute of Architects Journal, Vol. II, (January 1969), p. 38.

22. Robert Goodman, After the Planners (NY: Simon and Schuster, 1971), p. 109.

23. Jane Jacobs. Death and Life of Great American Cities (NY: Random House, 1961), p. 372.

24. Amos Rapoport and Robert C. Kantor, "Complexity and Ambiguity in Environmental Design," Journal of The American Institute of Planners, Vol. XXXIII (July 1967), p. 210.

25. Robert Venturi. Complexity and Contradiction in Architecture (NY: Museum of Modern Art, 1966), p. 25.

26. This definition essentially follows that found in most modern dictionaries.

27. Christopher Alexander. Notes on the Synthesis of Form (Cambridge: Harvard University Press, paperback, 1971), p. 4.

28. Ibid., pp. 4-5.

29. Ibid., p. 6.

30. See for example the analytical methods described in Gary T. Moore (ed.), Emerging Methods in Environmental Design and Planning (Cambridge: MIT Press, 1970).

31. Edmund N. Bacon. Design of Cities (NY: The Viking Press, 1967), p. 13.

32. Ibid., pp. 13-21.

33. Ibid., p. 20.

34. Ibid., p. 17.

35. M.R. Wolfe and R.D. Shinn. Urban Design Within the Planning Process (Seattle: University of Washington, 1970), p. 24.

36. Visual surveys are explicitly discussed in F. Stuart Chapin. Urban Land Use Planning (Urbana: University of Illinois Press, 1970), Chapter 7; Henry Fagin and Robert C. Weinberg. Planning and Community Appearance (NY: Regional Plan Association, 1958), p. 28; Paul D. Spreiregen. Urban Design: The Architecture of Towns and Cities (NY: McGraw-Hill, 1965), Chapter 3; and Kevin Lynch. Site Planning (Cambridge: MIT Press, 1962), p. 21.

37. Chapin. p. 333.

38. Ibid., p. 309.

39. Ibid., p. 310.

40. Ibid., p. 333.

41. Lynch, Site Planning, p. 21.

42. Spreiregen, p. 49.

43. Kevin Lynch, "City Design and City Appearance" in Principles and Practices of Urban Design edited by William I. Goodman and Eric C. Freund, (Washington: International City Manager's Association, 1968), p. 273.

44. Henry Fagin and Robert C. Weinberg. Planning and Community Appearance (NY: Regional Plan Association, 1958), p. 5.

45. These measures are described by Sharon A. Bond in A New Zoning With Alternatives, Master of Urban Planning Thesis, Michigan State University, 1972.

46. Fagin and Weinberg, p. 6.

47. Christopher Alexander, "Major Changes in Environmental Form Required by Social and Psychological Demands," Ekistics, Vol. XXVIII (August 1969), p. 78.

48. Ibid., p. 79.

49. Perin, p. 3.

50. Ibid.

51. Refer to the architectural design standards publications, such as American Institute of Architects, Architectural Graphic Standards (various editions), and the many publications of the Highway Research Board.

52. Kevin Lynch, "City Design and City Appearance," p. 249.

53. Ibid., Note 1.

54. This refers to such things as "space that creates interaction," etc. often stated in the various architectural and design publications.

55. Spreiregen, p. 119.

56. Ibid.

57. Ibid.

58. Spreiregen, p. 120.

59. Benjamin Thompson, "The World Around Us: Toward An Architecture of Joy and Human Sensibility," Architectural Record, Vol. 142 (September, 1967), p. 158.

CHAPTER II

TOWARD OBJECTIVE APPROACHES FOR URBAN VISUAL ASSESSMENT AND DESIGN

Some of the failures and pitfalls of urban visual assessment and design mentioned in Chapter I have been addressed by various individuals in planning or the related design professions. Of especial importance in the considerations of these people are the concerns for objective design approaches, a better understanding of the visual environment, and human factors. Rarely has any one of these individuals examined all of these concerns, but most of them have pointed out the problems of haphazard and purely subjective approaches to design.

The purpose of Chapter II is to discuss some of the more objective approaches to visual assessment and design that have been proposed or utilized by selected planners, designers, and some individuals working in other fields. These people include professionals working in the fields of planning, architecture, landscape architecture, urban design, and environmental design, and some persons from the disciplines of psychology, sociology, anthropology, engineering and others. In some cases the concepts from general research areas are presented and in other instances the ideas of specific individuals are discussed.

There has been much literature published on objective design methods and approaches, however, this material is highly fragmented and often only small parts of design theory or methodology are analyzed. The discussion in this chapter is an attempt toward including a broad range of approaches rather than a thorough analysis of the research and experimentation presented. The intention is to present representative samples of work being done in various areas and levels of design, as well as to discuss the proposals of most importance to urban visual assessment and design which relate most directly to the concerns of this thesis.

Discussed first are some of the general ideas of individuals toward recognizing the necessity for objective approaches to design, special approaches to visual concerns, and the consideration of visual perception as design criteria. Second, the relevant contributions of several disciplines toward discerning objective links between people and their environment are presented. Finally, an introductory discussion of visual notation systems is presented. These notation systems or schemas are important for both the assessment of the urban visual environment and the collection of data for designing. Several notation ideas are presented, and some considerations for expanding and objectifying notation methods are proposed.

Recognition of Necessity for Objective Approaches

The main concern here is for objective approaches directly used or usable in urban visual assessment or design, and specifically for those approaches that include human factors and the visual as integral parts. There are significant contributions of individuals, some directly and explicitly discussing these areas and some who do so more subtly. Both types of approaches can be of importance to urban visual assessment.

General Design Objectivity

Christopher Alexander. As mentioned previously, Alexander is quite interested in more objective and analytical environmental design approaches. In his Notes on the Synthesis of Form, Alexander utilizes what he calls "logic" and introduces something of a closed objective design system wherein the criteria and problem-solving structure are to be explicitly stated.[1] Assumptions are made clear and biases are also explicitly stated. The design process is viewed more clearly than in the subjective and intuitive methods with which assumptions remain vague and biases obscured.[2]

With the statement of biases in the design process, it becomes much more objective and is likely to lead to more effective results because the integrity and honesty of

the process clearly indicate the methods and the value system employed.

Alexander asserts that "once what we do intuitively can be described and compared with nonintuitive ways of doing the same things, we cannot go on accepting the intuitive method innocently."[3] Designers are simply too knowledgeable now, even if through a sort of osmotic process, to profess innocence or ignorance of the complexity of problems, which makes the intuitive approach nearly impossible for effective design.

The acceptance of the necessity for objective methods immediately gives the designer "the insecurity of self-consciousness" as they can no longer "maintain the security of innocence."[4] Although artistic visual elements are important in the design of new forms in urban areas, even the visual concerns must relinquish the intuitive and artistic grasp to some fundamental, underlying objective elements.

Alexander presents the idea that design is fundamentally toward the creation of form and that good design provides good-fitting form relationships.[5] While there may be a number of "fitting" relationships among forms and more importantly between forms and their designated contexts; the design process, the relevant material forms, and the functional context can be established and defined explicitly for the problem. The approach, the relevant criteria, and the problem structuring can be made clear.

These form-context factors are often complexly structured in the urban milieu. Alexander indicates there are often very complex relationships among the various urban forms and the contexts to which they contribute.[6] The complexity is inherent in either the urban setting or the design problem and cannot be ignored if a good-fit result is expected.

Thus, Alexander discusses the problems of nonobjective and nonanalytical approaches to design and indicates some of the reasons for the reluctance to abandon intuitive design methods. He also points out the need for explicit criteria structures.

Bertram Berenson. Another architect, Berenson, has made observations similar to Alexander, but Berenson is more interested in human concerns and empirical approaches. He observes,

> Since we have been dependent upon our intuitive responses...not enough thought has been given to a more empirical approach to design methodology concerned with the visual manipulation of the environment...this age of technical competence and fluxuating aspirations must be equated, somehow, through the insight of the designers aided by art and science, with the substantive needs of those for whom we practice our craft. 7

The chief interests of Berenson are not with methods, but criteria. He proposes a "sensory architecture" that is designed with a basis in the empirical knowledge gained from the behavioral and social sciences. Berenson asserts,

> Many of us would state without qualification that it is possible with the mechanisms now available to prove that there is a relationship between human behavior and physical environment...it is necessary to investigate sensory development, both as to its medical implications and also as to its psychological aspects on growth. 8

Berenson has been involved in the design of several environments for handicapped people, such as the blind. From his experiences he has determined that when sensory elements are made objective criteria in the design process, it is possible to design environments in which people can more easily maneuver. Further, Berenson is concerned with perception and how it might be facilitated in design. He states,

> Perception is a flexible instrument. Because of this flexibility, one is able to entertain simultaneously many ideas and events. To make these ideas and events more meaningful, however, an order must be imposed--even though only fragments of this order have thus far been determined. Each time an hypothesis is formed and an objective measure proves it to be correct, the line between understanding and intuition shifts its position. 9

As the possibility of more inclusive objective data is realized, according to Berenson, it is neither possible nor desirable to go back to unaided intuitive design. Included in the broad concerns of Berenson are the factors of visual perception. 10

Toward Objective Visual Approaches

Rudolf Arnheim. A psychologist, Arnheim has been active in drawing attention to the importance of the visual sense.

About the general underuse of vision Arnheim has said,

> We are neglecting the gift of comprehending things by what our senses tell us about them. Concept is split from percept, and thought moves among abstractions... Naturally we feel lost in the presence of objects that make sense only to undiluted vision, and we look for help to the more familiar medium of words. 11

A good understanding and use of the visual sense, according to Arnheim, is important for people to acquire so they can broaden their experiential and intellectual scope, but it is quite difficult to discuss the purely visual experiences with words. Arnheim claims "the reason for our failure is not that we use words but that our eyes and thoughts do not succeed in discovering generalities able to do the job." Words, says Arnheim, "fail us when and because visual analysis breaks down."[12]

Thus, the visual can be of broader importance than just seeing if the visual sense is properly trained, and it can reveal generalities in the environment which can be discussed with words. The real importance of vision, that could apply to planners and urban citizens, is summarized by Arnheim:

> My contention is that the cognitive operations called thinking are not the privilege of mental processes above and beyond perception but the essential ingredients of perception itself...By "cognitive" I mean all mental operations involved in receiving, storing and processing of information: sensory perception, memory, thinking, learning. 13

Arnheim makes the point, then, that vision is much more important than is usually considered. Although much of Arnheim's study has been directed toward art and its presentation, he is addressing the more general use of vision by people. His studies draw attention to the need for facilitating human vision in planning.

A.E. Parr. Interested in the psychiatric, psychological and sociological aspects of the man-environment relationship, Parr has investigated some of the visual aspects associated with architecture and urban design.[14]

Parr has questioned some of the forms of visual impact resultant from spatial arrangements. He has indicated that designers have not sufficiently explored the general visual effects their designs create. He has said,

> These sins of omission seem to stem from a combination of negligence and arrogant assumption that knowledge needed for proper environmental care and feeding of men's souls is already at the designer's command by virtue of his intuition...it is difficult to find any evidence of encouragement, promotion or sponsorship of investigations into the stresses of the mind that their own designs might create or alleviate. 15

Parr has further stated,

> A special chapter in the study of psychosomatic fatigue might be devoted to an investigation of the psychological effects of the presence of visible objects, such as columns, which restrict the abstract freedom of movement without interferring with any concrete, practical need of such freedom...If visible obstruction may produce tension, there is also reason to suggest that landmarks, directional topographic design, and redundancies in the perceptual

> inventory of our surroundings, may have relaxing and reassuring properties. But the claims made for the faults or merits of such features are not backed by sufficient, and sufficiently objective research. 16

The directions for study proposed by Parr are toward establishing at least a "quasi-quantitative" understanding of the relationship between the perceptual inventory of the environment and the responses generally evoked in man. He is concerned with attempting to measure perceptual inventory based on the human reaction to environment.[17]

Gary Winkel. Winkel, along with Philip Thiel, Roger Malek and others, has been involved in research that is aimed at increasing the objective visual information available to decision makers. In a rather lengthy publication entitled Response to the Roadside Environment, Winkel and his associates published one study they did toward discovering people's attitudes and evaluations of the visual environment.[18]

Winkel, a psychologist, worked with architects to devise a study that tested people's responses to various visual conditions in roadside environments. By showing retouched photographic slides of a roadside environment, Winkel utilized the semantic differential scale in measuring verbal responses and various physiological response-measurement instruments to find the actual responses of people to various visual situations on streets. In the measurements galvanic skin response, heartbeat, respiration,

etc. were recorded. Synthesis of responses was done in order to establish generalizations.

While such studies do involve problems concerning the exact stimuli which create the responses and have limited uses in actual designs other than for tested areas, they can be significant studies with intersubjective and objective verification if corroborated by other studies extended over other environments.

Winkel has conducted other visual studies, and one of interest because it involved simulation as a method for evaluating people's abilities to utilize visual cues for manuevering through somewhat complex environments.[19] He says,

> Architects continue to rely upon intuitive design concepts evolved from individual experience even though increasing environmental complexity and rapid technological change place severe restrictions upon the human being's ability to encode this complexity and utilize it in a rational manner... This report concerns one step in a continuing series of related studies seeking to provide a laboratory tool for experimental study of behavior in architectural environment.[20]

In this visual study Winkel simulated an interior environment with photographic slides and had subjects attempt to move through the space. The implications are toward testing visual environments prior to their construction. This particular experiment could be conducted just as easily with outdoor environments as indoor, and there is cause to think that while such simulations cannot

present all phases of the actual environment, it can lend considerable validity to anticipated visual schemes.

Visual Perception as Design Criteria

Constance Perin.[21] In her book, With Man In Mind, Perin gives some discussion to the area of visual perception as a viable criterion for environmental design. Perin is interested in much more than the visual aspects of design, but she is most interested in design solutions that facilitate people behavior. Visual perception, she says, is behavior.[22] Perin comments,

> The outlook coming closest to a theory of human nature for environmental design is embodied in perception: the variables that mediate between the person and the external world are visual, leading to moods, preferences, directional orientation, learning, esthetic pleasure. 23

In fact Perin's appraisal of her own ideas includes the observation that there is "overlap between what the resources in an environment mean in my terms and those criteria used for visual and perceptual satisfactions."[24] However, "visual" to Perin is closely related to purely esthetic concerns, and in this regard she does not view visual perception as a viable means for explaining the relationship between human nature and the environment.

Speaking to what she thinks is the prime concern of designers in working for people she says,

> The direction I propose is toward discovering a means for filling the conceptual gap between what we do to make and change the environment and what people require from it. 25

In terms of visual planning and design, the facilitation of human visual perception does exactly what Perin seeks for a broader design scope.

Christian Norberg-Schulz. This architect works and teaches in Norway, and in his endeavors toward devising an architectural theory he has been quite interested in human perception. In his book Intentions in Architecture[26] Norberg-Schulz devotes an entire chapter to perception, and he states,

> Our immediate awareness of the phenomenal world is given through perception. We are highly dependent upon seeing our surroundings in a satisfactory manner. Not only do we have to find our way through the multitude of things, but we also "understand" or "judge" the things to make them servicable to us. 27

Norberg-Schulz, however, notes that visual perception can be faulty and fooled, and that the environment is apprehended by people through manifestations revealed about objects. The objects should reveal the necessary visual information for correct perceptions.[28]

Objects are usually represented to the perceiver by "diffuse totality-phenomena or by particularly pronounced properties",[29] according to Norberg-Schulz. Often these are manifestations that reveal various levels of the object from the physical through cultural. However, it is usually

neither of these extremes that is perceived, but rather an intermediate level. It is only with some analytical effort that the lower or higher levels are perceivable.

The point that Norberg-Schulz emphasizes is that the physical world can be described in scientific terms, but the perception of it reveals something very different. In terms of designing space-displacing form the scientific and perceptual descriptions must both be involved.[30]

W.R.G. Hillier. A British psychologist often working with architects, Hillier is involved in studying the man-built environment interaction. He says "the result of the whole exercise should enable architects to make decisions less on intuition and more on objective data."[31]

Hillier sees the factors of man and the built environment as something of a system whose interaction is based on the factors of the objective environment and human perceptual experiences. He emphasizes the "...human experience of environment in itself tends to move towards life enhancement on its own."[32]

The entire man-environment interaction to Hillier is predicated on man's perceptual orientations to the environment, and he suggests there are several different perceptual levels with the lower ones representing physiological and psychological stress.[33] Hillier continues by identifying social and cultural levels of human visual perception and

proposes the uppermost levels (particularly cultural) are the ones needing the most study.

One of the most remarkable aspects of Hillier's approach that is of particular importance to planning studies, is that he is interested in "studying people through objects which can be measured without affecting them, and learn how and why people modify and change their environment" based on their perception of it.[34]

Some Environmental Planning and Design Considerations

It is of some necessity at this point to discuss some of the work in environmental planning and design as it relates to urban visual assessment and design. There are several people doing relevant work in the area; the following discussion includes some of the best, if perhaps somewhat controversial, of the individual efforts.

Henry Sanoff. The design interests of Sanoff are with the socio-psychological aspects of the visual environment, and predictive and evaluative techniques for the measurement of visual design performance. His major concerns are with human visual perception of designed spatial environments.[35] Sanoff summarizes his concerns thus,

> Perceptual "goodness" is largely haphazard rather than intentional, since few attempts have been made toward developing a theoretical framework based on the visual impact of the environment. Designers of man's environment have little more to rely upon than their own intuition and their own response to the environment...The rational design of visual impact of the environment has not been based on a systematic analysis of the user's perception... 36

The approach of Sanoff is defined by him as "...predicated on the notion that physical forms are no longer ends in themselves, but means employed to bring the designed environments into equilibrium with human systems."[37] Sanoff utilizes the semantic differential scale and has several designers view retouched photographs of residential areas. The adjectival pairs used by Sanoff are very extensive, and after the designers judge the environments presented the evaluations are correlated by computer (Figure 1).

It is obvious that Sanoff has utilized a rather sophisticated normative client in his study, because he uses fellow designers. While his methods are exploratory and possibly somewhat suspect, his concerns and aspirations are sound.

Raymond Studer. The environmental design studies of Studer do not directly address the visual aspects of the urban environment, but his proposals have some elements of possible valuable relevance.

Studer presents what he calls a behavior-contingent method.[38] By quite elaborate means and with schematic models, Studer attempts to locate the most important junctures between human behavior and the spatial environment, and proposes that design be based on these points. In effect Studer tries to discover counterpoints between human behavior and the environment. When the counterpoints can

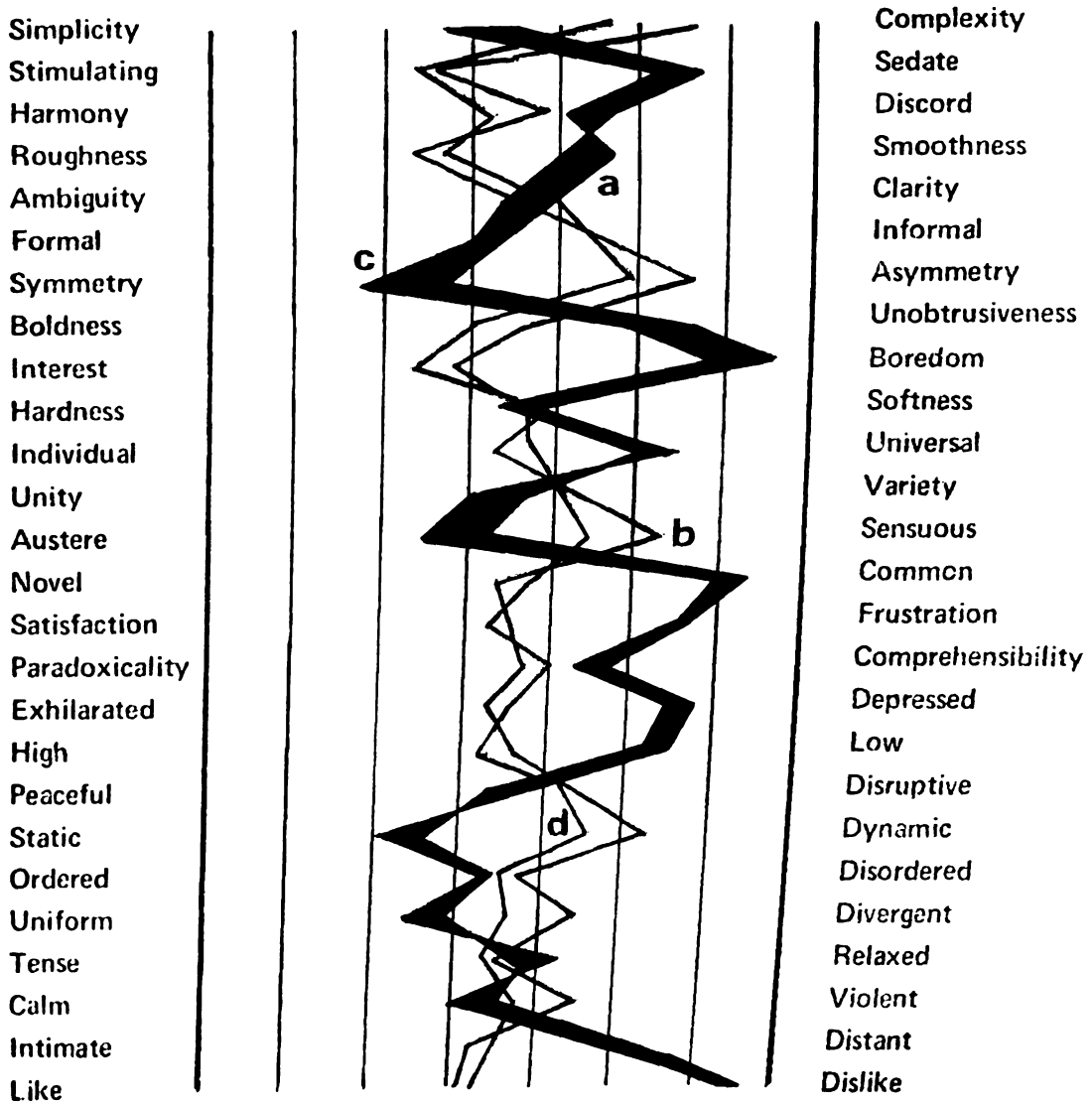


FIGURE 1.
Sanoff's Adjectival Pairs for Semantic Differential (with computer determined mean distribution for specific environments: a,b,c & d).

Source: Henry Sanoff, "Visual Attributes of the Physical Environment" in Response to Environment edited by Gary J. Coater and Kenneth M. Moffett (Raleigh, N.C.: Student Publications of the School of Design, North Carolina State University, Vol. 18, 1969).

be identified as a system they establish rather firm ground upon which design can build. In the visual environment this counterpoint might be attempted with human visual perception modes. This possibility is explored later in this thesis.

Serge Boutourline. The proposals of Boutourline are more related to visual environmental assessment and the operations of urban planning, than to the actual design of new segments of the urban environment. His ideas present an interesting contrast to those of most individuals working in environmental design.

In an essay, Boutourline explains his "concept of environmental management."[39] He says,

> The concept of environmental design has... grave limitations. Design proceeds over time, not all at once, with many decisions made early in time which act to work against objectives which are later found desirable. Designers are rarely the only ones making decisions, and group decision-making is more often a political negotiation process than a rational one. 40

From these observations Boutourline continues to discuss his proposal as the management of the environment by public officials and organizations with the help of designers who work to maximize the utilization of existing environments. This environmental management approach to urban design is of particular interest for the assessment of the urban visual environment, because both are oriented toward a monitor role for the planner or designer. The active

design role is only for specific changes or new facilities that become necessary. Visual environmental management possibilities are to be further discussed in Chapter IV.

Relevant Contributions of Various Fields of Study

The following discussion presents some of the work being conducted in various disciplines, that is directly concerned with architectural, environmental or urban design, or from which relevant knowledge can be drawn. In any case the work from the various fields should be in the awareness of planners for general planning, the design of spatial form, and the assessment and design of the urban visual environment.

Psychology

The broad field of psychology and its subdisciplinary areas have been involved in much study and research relevant to the design of the urban visual environment. Experimental psychology, which encompasses most areas of the field, is constantly conducting work that further elucidates the needs and desires of human beings within a variety of environmental circumstances and through a variety of orientations. Experimental research has revealed much about the human visual processes and needs from the purely physiological functioning of neurons to the complex personal and social orientations of man.

Roger Barker has spent years studying the behavior of man in natural settings and his observations have led to the beginnings for the formulation of an ecological psychology.[41] Visual or otherwise this kind of study is of special meaning to planning which works daily in natural human settings. The ongoing research of Barker and others toward the understanding of the human ecological setting has constantly fed information into other areas of psychology.

In recent years the subdiscipline of environmental psychology has taken form. Through field and laboratory study environmental psychology is carefully studying the interaction and interrelationships between the human being and the environment, especially the man-made environment.[42] Many of the environmental psychologists have tried working either directly with designers or with design problems. These psychologists include Kenneth Craik,[43] Edward Ostrander,[44] Terrence Lee,[45] and others. It is probably in this area of psychological study, which recognizes planning and design problems, that will be most productive toward supplying information for the planning and designing of the urban environment.

A special area of environmental psychology has started to develop, especially in Britain, which is called architectural psychology and works directly with architectural

problems as they relate to man. Some of the leaders in this area of study are David Canter,[46] W.R.G. Hillier and Terrence Lee.

Although something of a special psychologist, Robert Sommer might be considered as working in the area of environmental or architectural psychology. In his book Personal Space he discusses human behavioral orientation to some specific architectural environments.[47]

The environmental and architectural psychologists could be construed as working in applied psychology, and there are a number of other psychologists who have contributed to applied psychology for a number of years. These psychologists have supplied much of the information for the engineering fields, such as industrial, lighting or highway engineering. One such psychologist working in this area is the Englishman, E.C. Poulton who has presented his work in an informative book, Environment and Human Efficiency,[48] which has a chapter on vision.

Sociology

There are many areas of sociology from which knowledge can be borrowed for urban design. Although very little study has been directed to visual perception by sociologists, there has been some work conducted toward supplying information for architecture and urban design.

The sociologist, Robert Gutman, has been one of the most involved with the concerns of designers. Although

Gutman is reluctant to admit the existence of concrete sociological knowledge for designers, he has served in consultant capacities, and has published on the social aspects of environmental design. His most thorough work in this area is People and Buildings, a book in which he compiled a number of relevant articles, some of which relate to the visual environment.[49]

Another sociologist who has contributed to environmental design as consultant and researcher, is Maurice Broady. In his book, Planning for People, Broady suggests some viable contributions of social theory to design and planning.[50]

Sociologist William Michelson, in his book Man and His Urban Environment,[51] has considered such broad concerns in the man-environment interaction, that his work is difficult to categorize. More than most sociologists, Michelson has made some specific proposals which relate directly to urban planning.

Dutch sociologist Derk De Jonge has also contributed to the direct concerns of urban planning, and has conducted research into the city images that people form.[52]

Geography

The field of geography has long been interested in urban form and the forces that shape it. More recently David Lowenthal has expressed concern for the human

perception of the environment, basically in terms of gross cultural and behavioral orientation. A book edited by Lowenthal, Environmental Perception and Behavior includes several essays dealing with people's perceptual attitudes toward a variety of geographic and cultural environments.

Anthropology

The field of anthropology and its general scope has provided some study directly related to the cultural aspects of urban planning and design concerns, and specifically to the visual aspects.

In both books written by anthropologist Edward Hall, The Silent Language[53] and The Hidden Dimension,[54] there is discussion of the human uses and perceptual orientations of vision, and especially the marked cultural differences. These studies draw specific attention to the cultural level of visual perception as being a very meaningful and integral part of human orientation to the urban environment.

A mixture of psychological and anthropological visual study was conducted by Marshall Segall, Donald Campbell and Melville Herskovits, and published in their The Influence of Culture on Visual Perception.[55] By using simple line drawings these investigators discovered some clear cultural differences in the inferences people make in different environments.

Amos Rapoport, although an architect and not an anthropologist, has done some clearly anthropological research which is relevant to urban visual assessment and design. In his House Form and Culture, Rapoport presents his historical and cross-cultural study of the spatial form of houses.[56] By noting that social and cultural factors are very influential on the house forms, Rapoport points out the possibility of acultural study of the visual aspects of the urban environment toward making more objective assessments and indicates that in many ways designers are limited by their cultural indoctrination and context.

This study and other work by Rapoport draw attention to the aspects of culture in spatial form which are often not given in immediate perception, but rather must be read over much longer periods of time in order to grasp the symbolic patterns.

Other Fields

There are contributions toward the objective assessment and design of the urban visual environment, which come from some other fields of study, and more specifically from individuals working in these fields.

Rene Dubos, for example, is actually a microbiologist, but his work has encompassed such a broad scope and has such a wide application that it is difficult to identify specific knowledge gleaned from his publications.[58] His Man Adapting

includes discussions of the pathological implications at various levels including the physiological, chemical, social, psychological and cultural. The mere awareness of the comprehensiveness necessary for dealing with human problems makes the approach considerably more objective and generally effective.

The many works of Pitirim Sorokin on a more philosophical level present simultaneously more information and more confusion, as broader areas for consideration becomes evident. Sorokin has carefully examined the structuring of human culture, and many of his ideas are presented in his Society, Culture and Personality.[59]

Merrill Allen, an optometrist, has applied his research on vision to the highway environment. This is expanding research in a quite limited area of applied science to a more inclusive area of application.[60]

Suzanne Langer's analyses of art and esthetics in a rather objective manner are applicable to urban visual esthetics. Langer attempts a limited application of her studies to the larger designed environment in her Feeling and Form,[61] and in her essay "The Social Influence of Design".[62]

There is research and other study in many areas of endeavor that have implications for the objective assessment and design of the urban visual environment. This material is highly fragmented and little organized, and it

is apparent that planning and the related professions have compiled and utilized only a small portion of the relevant objective information available which could prove useful for visual design.

The Work of Kevin Lynch

Kevin Lynch, and much of his work in planning, landscape architecture and urban design, is well-known. In many ways, it seems, Lynch is popular to the point of obscuring the importance of some of his work. There appears to be little question that Lynch has produced more toward the objective assessment and design of the urban visual environment than any other single design professional. Because of this his work necessitates special attention.

However, the achievements and ideas of Lynch in this area are quite fragmented and are not organized or presented in any one of his many publications. In various publications Lynch seemingly addresses most of the important aspects of visual design, but there has been little published development of much of Lynch's observation, either by him or others.

The following discussion contains many of the important ideas of Lynch which are of relevance to visual design. There is no attempt to summarize Lynch's work except as it directly relates to these visual concerns.

Image of the City

In 1954 Sidney Williams published an article entitled "Urban Aesthetics"[63] which outlined a method for studying the esthetic characteristics of the overall city form. With this method Williams proposed studying the city by dissecting it in terms of the gross urban forms. Williams included provision for approaching the overall city according to how it is perceived by people.[64] Apparently, this proposal by Williams was a direct forerunner to the schema devised by Lynch and Gyorgy Kepes, and published by Lynch as The Image of the City in 1960.[65]

Lynch's approach to the overall image of the city is concerned with human perceptual orientation to the city based on people's use of large form cues derived from elements in the city. The specific visual cues identified by Lynch are paths, districts, nodes, edges and landmarks.[66] Further, he proposes several constituent visual qualities which are usable to either assess or design the urban visual environment. These include figure-ground clarity, form simplicity, continuity of form, form dominance, clarity of joints, differentiation of directional forces, visual scope and range, the awareness of motion and time sequences.[67] These elements, according to Lynch, are the qualities which people can perceive with certain ease if these qualities are well designed.

The images of cities formed by people are observed by Lynch to be products of physiological, idiosyncratic, social and cultural forces.[68] The images are as stable and durable as possible based on these forces.

Objective Design Criteria and Human Factors

Some of the concerns of Kevin Lynch have included the quest for urban design criteria that can assist the designer in objective ways based on human factors. Lynch has said,

> The principle concern of the physical planner is to understand the physical environment and to help shape it to serve the community's purposes. An outsider from some other discipline would ordinarily assume that such a profession had developed some ideas concerning the diverse effects of different forms of the physical environment (not to mention the reverse effects of nonphysical forces on the environment itself). And he might be equally justified in expecting that intellectual leaders in the profession had been assidously gathering evidence to check and reformulate these ideas so that they might better serve the practitioners in the field. A systematic consideration of the interrelationships between urban forms and human objectives would seem to be at the theoretical heart of city planning work. 69

Addressing the use of architectural design principles for urban design, Lynch has commented,

> Please note that a city is quite different, as a visual object, from a building (or even a group of buildings) or from a piece of sculpture. It is far more complex and so large that we only see it from the "inside", piecemeal...The whole fabric is constantly changing, constantly in process. 70

Lynch has long favored devising design and assessment systems that apply specifically to the city scale and scope,

and that apply to the many concerns of urban citizens and city planners. He has been quite concerned with developing objective theories by which to do this, instead of the continuing piecemeal and haphazard approaches.[71] Lynch has been especially interested in the establishment of theories for specifying objectives and policies for urban planning and design which reflect the needs and desires of the people residing in the communities to be designed.[72]

Vision and Visual Perception

Lynch has been one of the few design professionals to recognize human vision and visual perception as an aspect for central focus in urban design. Part of these concerns dealing with the perception of gross city forms has already been mentioned here, but Lynch has focused more specifically on human visual perception.

The interests of Lynch for vision and visual perception seem best presented in his essay "City Design and City Appearance".[73] In this essay he specifically discusses "perceptual criteria", and proposes that such an area can be used as a design checklist, and that further research should be conducted.[74]

Lynch indicates that visual sensation information can serve as parameters for a comfort range. This includes light brightness and perceptual overload or deprivation. He says:

> The acceptable range has a partly biological, partly cultural basis, and will vary for different people doing different tasks. But in any one group there will be large areas of agreement as to what is unpleasant and intolerable. We have some specific information...and these data could be expanded. 75

These perceptual concerns are expanded by Lynch to include diversity of sensation to enhance human pleasure and cognitive development. He feels arrangements of visual form should allow human orientation to the specific time and space; visual aspects of urban form should relate with meaning to the other aspects of human life. As Lynch states it, "the city is an enormous communication device--people read its landscape, they seek practical information, they are curious, they are moved by what they see."[76]

Therefore, according to Lynch, the urban visual environment can serve many purposes for citizens, most important of which are perceptual diversity, form and activity legibility, and diverse meanings. He not only introduces these uses of vision, but he also proposes some means by which vision and visual perception can be incorporated into city planning and design.

Lynch specifically discusses the importance of placing some people with visual design abilities and understanding among the top planning decision-makers, so that the visual form of cities can become more viable in the lives of urban citizens.[77] He proposes specific organized approaches to

upgrading the visual appearance and relevance of city form. This includes educating as many planners as possible with visual capabilities, providing "visual intelligence sections" for planning staffs, integrating project and system designs among agencies by means of liaison designers, and initiating "design task forces" for specific projects.[78]

Lynch is concerned that while small or closed projects are usually considered in terms of visual appearances, there has been little attention to citywide visual design and appearances. A coherent set of criteria and operational methodology should be formulated. Many of Lynch's general ideas are further explored and developed throughout this thesis.

Visual Notation Systems

The visual condition of most urban areas is quite confused and possesses little coherent form. There is little reason to suspect that cities should be easily read or understood in simple visual terms; in fact there is much reason to doubt the desirability of this, even if it were possible. However, if there is to be assessment, design and control of the visual aspects of cities, then it is important that some methodology be directed toward means by which visual information can be recorded.

Serious urban visual study can include such recording and notation devices as still and motion cameras, and

sketch and note methods. Film records visual information without designer comment beyond selectivity, and is expensive. Sketch and note methods can be very cumbersome, awkward and time consuming, besides demanding considerable drawing skill.

If collected visual information is to be used for assessment and design purposes, then there is need for notation methods or systems which are quick, accurate, inexpensive, and of a form usable for making and remembering specific comments about the perception of visual scenes. The systems should be effective, efficient, interpretive, and as objective as possible.

In recent years several individuals have done some work toward developing graphic symbol systems which meet some of the above requirements. The following discussion concerns some of this work and proposes some possible directions for further development.

Theodore Walker

In a small publication entitled, Perception and Environmental Design, Theodore Walker, a landscape architecture professor at Purdue University, has explored some of the visual notation systems devised in recent years and proposes a system of his own called "omnitation".[79] Walker's system attempts the inclusion of the entire perceptual realm of man, and the visual portion is handled

basically with the motion-picture camera and tape recorded notes--both expensive and cumbersome. The main relevance of Walker's book is his discussion of other systems which are concentrated in his one source. The following discussion is based on Walker's work, and includes considerable expansion of his remarks.

Pioneers: Goldfinger and Williams

In the early 1940's Erno Goldfinger indicated an awareness of the interrelationships among visual sensations which are experienced in the environment, and he began to develop a system for recording these.[80] By means of a series of sketches Goldfinger attempted to show the relationship of man to the objects and spaces that elicited responses and created sensations in man. This notation approach, he discovered, allowed the sensations experienced in the visual environment to be transported to the studio for use as design criteria. According to Goldfinger, the actual notation system utilized by him could not be generalized well for use by others because it was a very personal method, but his attempt was significant toward recording perception-environment relationships.

Sidney Williams included in his "Urban Aesthetics" article in 1954[81] a number of sketches that attempted the portrayal of the ways in which cities are perceived. His concepts of perceptual notation and his sketches, however,

were very static and there was little generalization which could be adopted from Williams' presentation. However, Williams was aware of visual perception as an element of significance for designing urban form, although his view of perception was limited more to what the city environment presented than to how the individual might actually perceive the city.[82] His basic observations seem to be a distant forerunner of several notation or symbol systems devised in more recent years.

Kevin Lynch

In a sense the symbols and notation systems devised by Lynch for The Image of the City study can be construed as pioneering. His symbols (samples in Figure 2) have been used repeatedly by many people since his publication in 1960.[83] This is not surprising because the symbols are relatively simple and can easily be applied on maps. Lynch's image symbols were utilized by him to indicate major elements of form that occur in most cities, and although there are few symbols they have wide application.

R. Burton Litton

Litton's notation system (samples in Figure 3) is similar to Lynch's, except the Litton symbols are more extensive and were devised primarily for use in the natural environment.[84] Also, as with Lynch's system, Litton's could be utilized on a map or diagram. However, the

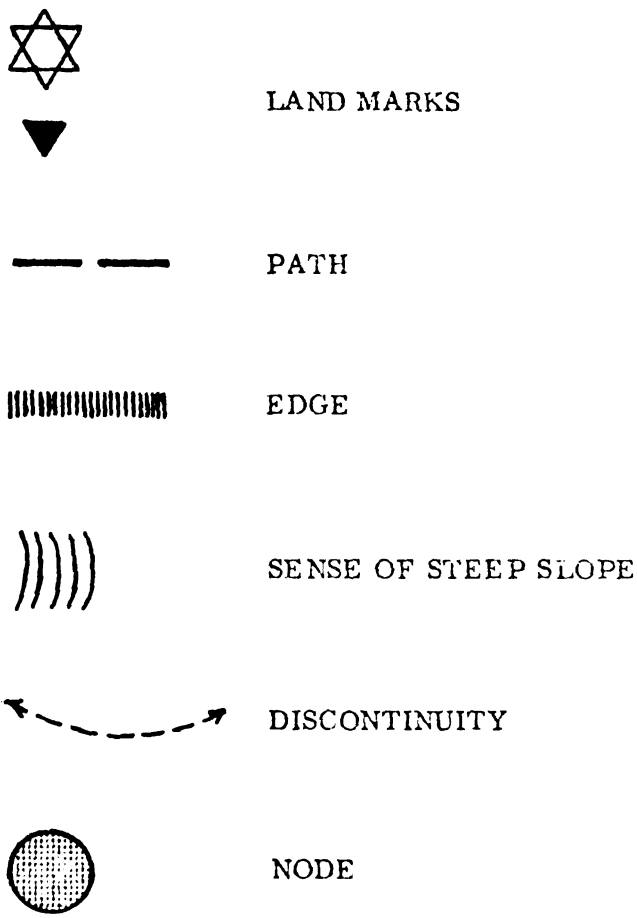


FIGURE 2.

LYNCH SYMBOLS

Source: Kevin Lynch. The Image of the City (Cambridge: MIT Press, 1960).

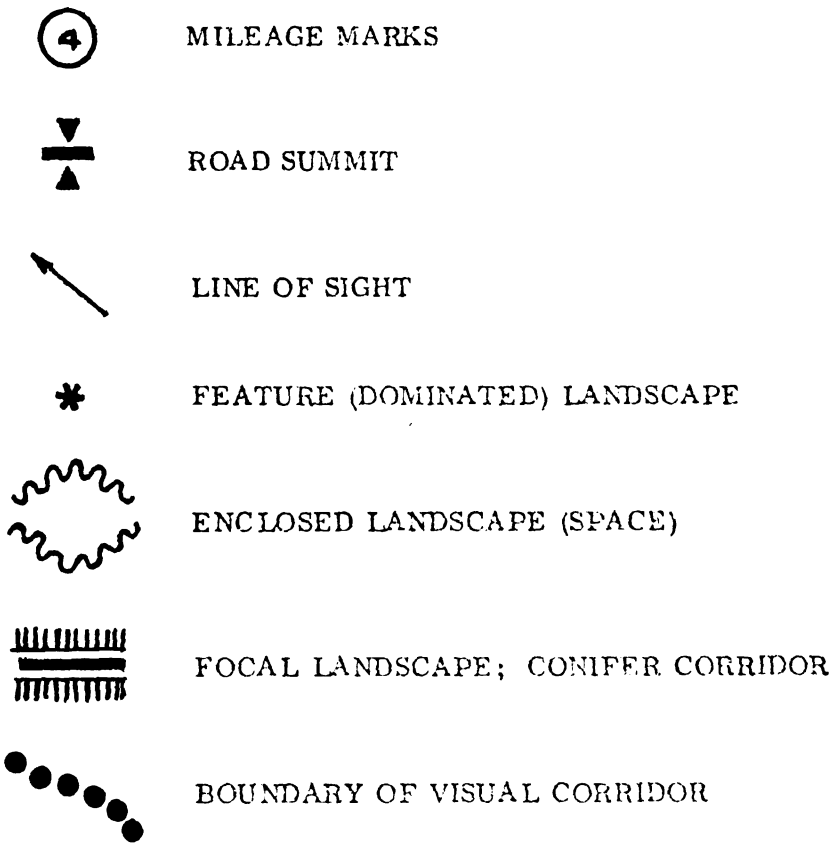


FIGURE 3.

LITTON SYMBOLS

Source: R. Burton Litton. Forest Landscape Description and Inventories--A Basis for Land Planning and Design (Berkeley: Pacific SW Forest and Range Experimentation Station, 1968).

Litton symbols are completely static, whereas some of the notation symbols devised by Lynch do indicate both dynamic and some perceptual qualities.

John O. Simonds

In his book Landscape Architecture,[85] Simonds illustrates many shorthand graphic representations (samples in Figure 4) that can be utilized for recording visual aspects of the urban environment. Actually Simonds was not particularly attempting to establish a system of notation symbols, and was primarily illustrating concepts of various spatial arrangements. Nevertheless, the symbols created by Simonds could be useful for indicating either spatial representations or perceptual meanings. As with Lynch's notation symbols, Simonds' could be placed on maps, sketches or diagrams. The open ended quality of the Simonds' notations makes his system very versatile.

Appleyard, Lynch and Myer

Figure 5 illustrates some of the symbols used by Donald Appleyard, Kevin Lynch and John Myer in a study they did dealing with views and perception in motion from the orientation of the urban expressway.[86] These symbols were used in conjunction with a base road drawing to indicate features and views along the expressway. Represented in the study were "space motion" and "orientation".

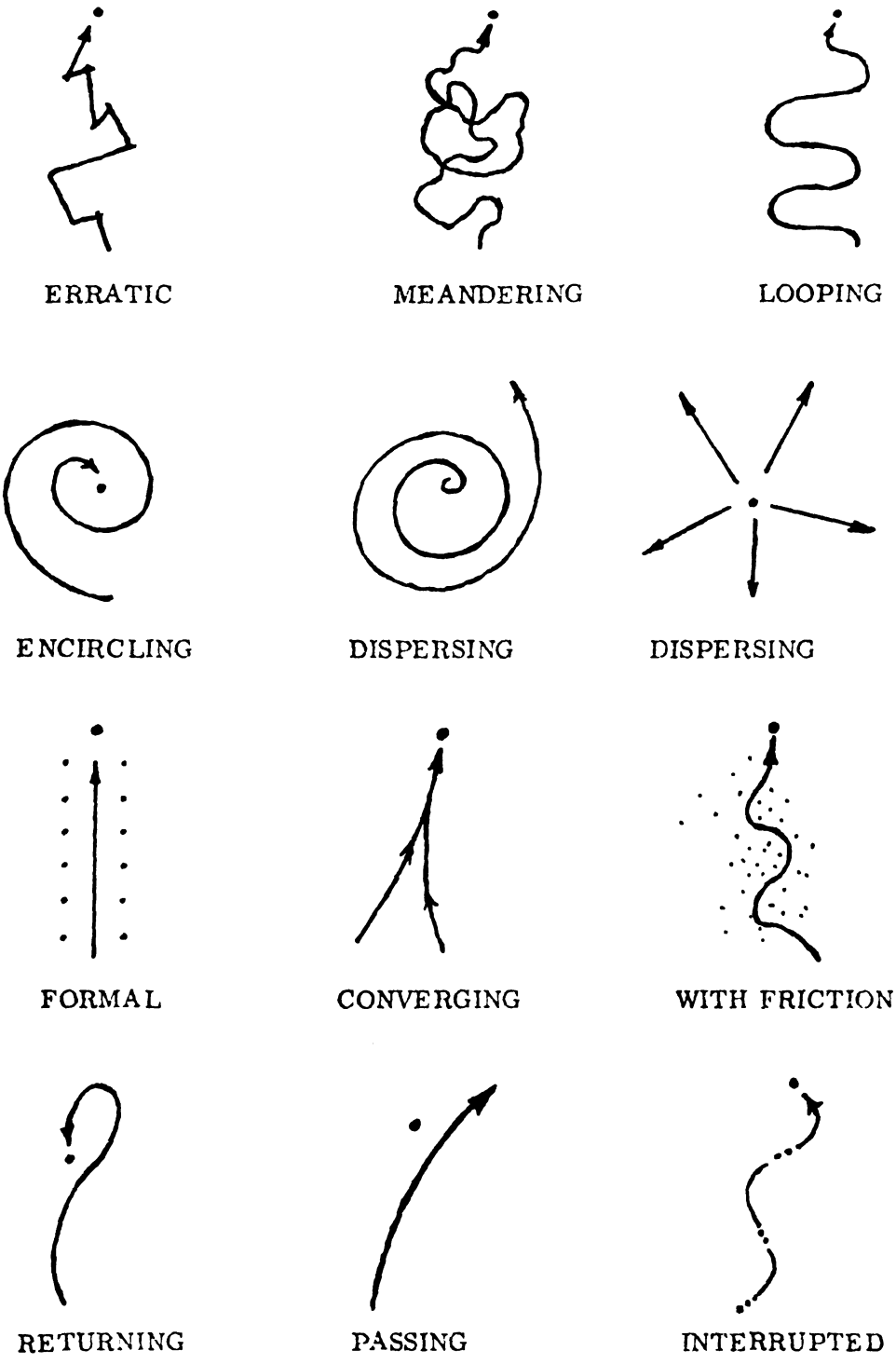


FIGURE 4.

SIMONDS SYMBOLS

Source: John O. Simonds. Landscape Architecture (NY: F.W. Dodge Corp., 1961).

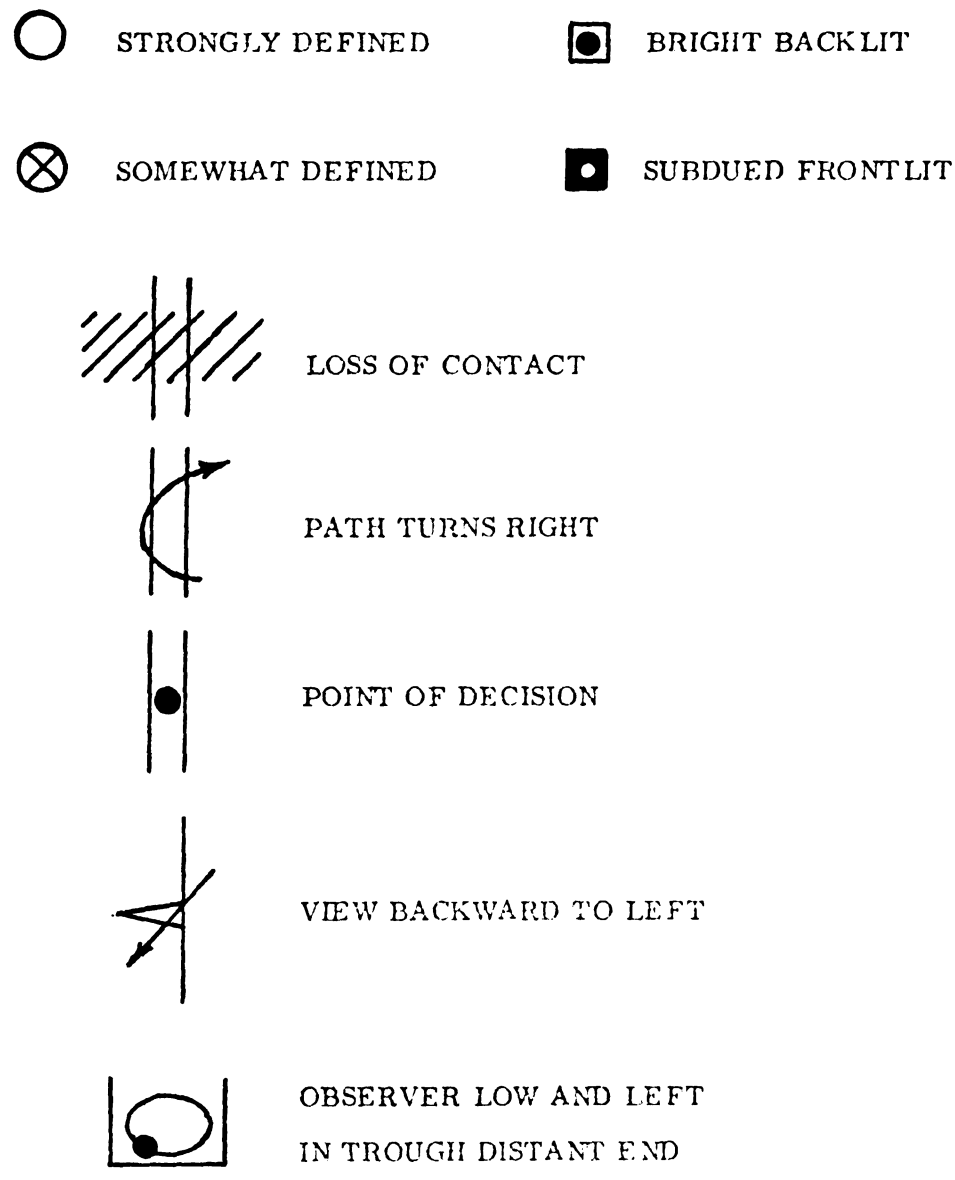


FIGURE 5.
APPLEYARD-LYNCH-MYER SYMBOLS

Source: Donald Appleyard, Kevin Lynch and John R. Myer. The View From the Road (Cambridge: MIT Press, 1964).

This study and notation system fulfills the need to record the visual environment as it is, or might be, viewed from a moving automobile. The motion aspect in notation of the urban visual environment is a significant addition and allows the designer to indicate the possible visual effects of motion.

Lawrence Halprin

Utilizing a method named "motation",[87] Halprin has devised a notation system, similar to the Appleyard-Lynch-Myer approach, in which he places the symbols (samples in Figure 6) in frames to indicate time sequence and speed. The Halprin notation system attempts to record more than visual perception, however, and his general scheme includes kinesthetics as well.

The entire Halprin system is similar to choreography notation, and it is likely Halprin is consciously borrowing ideas from his wife, Ann Halprin, who is a choreographer and dancer.[88] The real importance of this choreographic approach is that it allows the designer to record a wide range of experience data of movement through the environment, and this could be either vehicular or pedestrian.

Philip Thiel

Thiel, an architect, is essentially interested in visual notation possibilities from a pedestrian movement standpoint. He has been interested in these aspects about

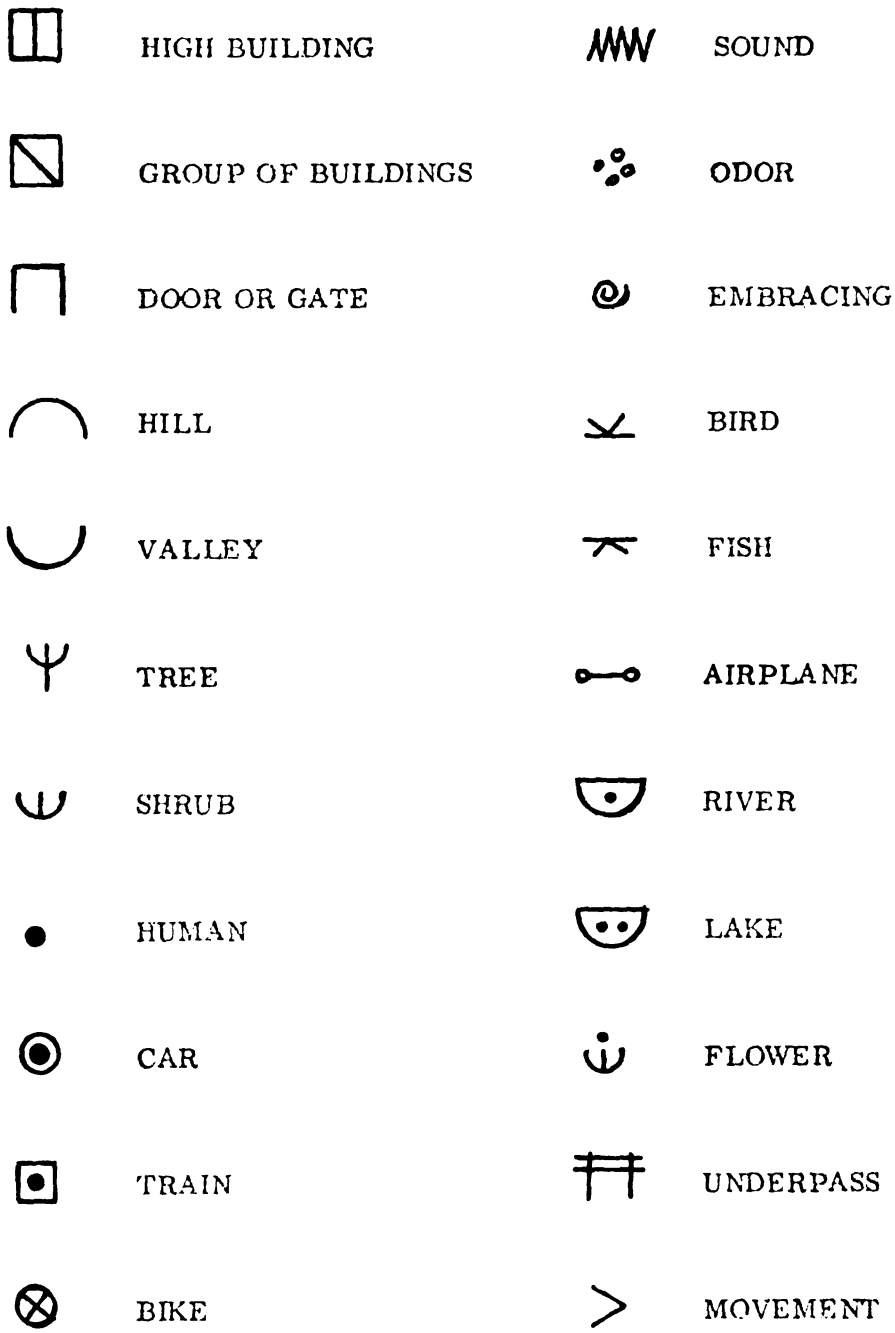


FIGURE 6.
HALPRIN SYMBOLS

Source: Lawrence Halprin, "Motation", Progressive Architecture, Vol. 46 (July 1965), pp. 126-133.

Japanese gardens for a number of years.[89] In his notation system Thiel attempts to record the entire visual-spatial sequence of the walker.[90] Figure 7 includes only a few of the many symbols devised by Thiel for this purpose. These symbols are placed on a variety of diagrammatic maps, the base of which is designed in accordance with the situation.

Basically, Thiel records the space in which perception takes place as it might reflect the position of the viewer. For examples, Thiel might illustrate the surfaces, screens and crosswalks encountered on a trip and further note the orientations of the elements to the person, such as over, side or under. The notation can also indicate the rise and fall of the topography of the surface on which a person is moving.

Robert Beck

As opposed to the individuals discussed above, Beck is not a designer of any sort; he is a psychologist. Beck has developed a set of notation symbols (samples in Figure 8) for the purpose of testing individuals' perceptions of probable spatial significances.[91] These relate to spatial meanings in relation to properties of the environment.

The studies of Beck and his notation system might be adapted for recording the visual environment, and thus some concrete psychological links of man with the visual

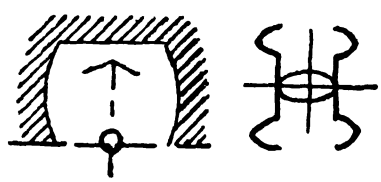
EDGE CROSSED

EDGE FOLLOWED

NODE ENTERED

EDGE AS LANDMARK

NODE AS LANDMARK



A SIDE POSITION

CONJUNCTION

FIGURE 7.
THIEL SYMBOLS

Source: Philip Thiel, "A Sequence-Experience Notation", Town Planning Review, Vol. 32 (April 1961), pp. 33-52.

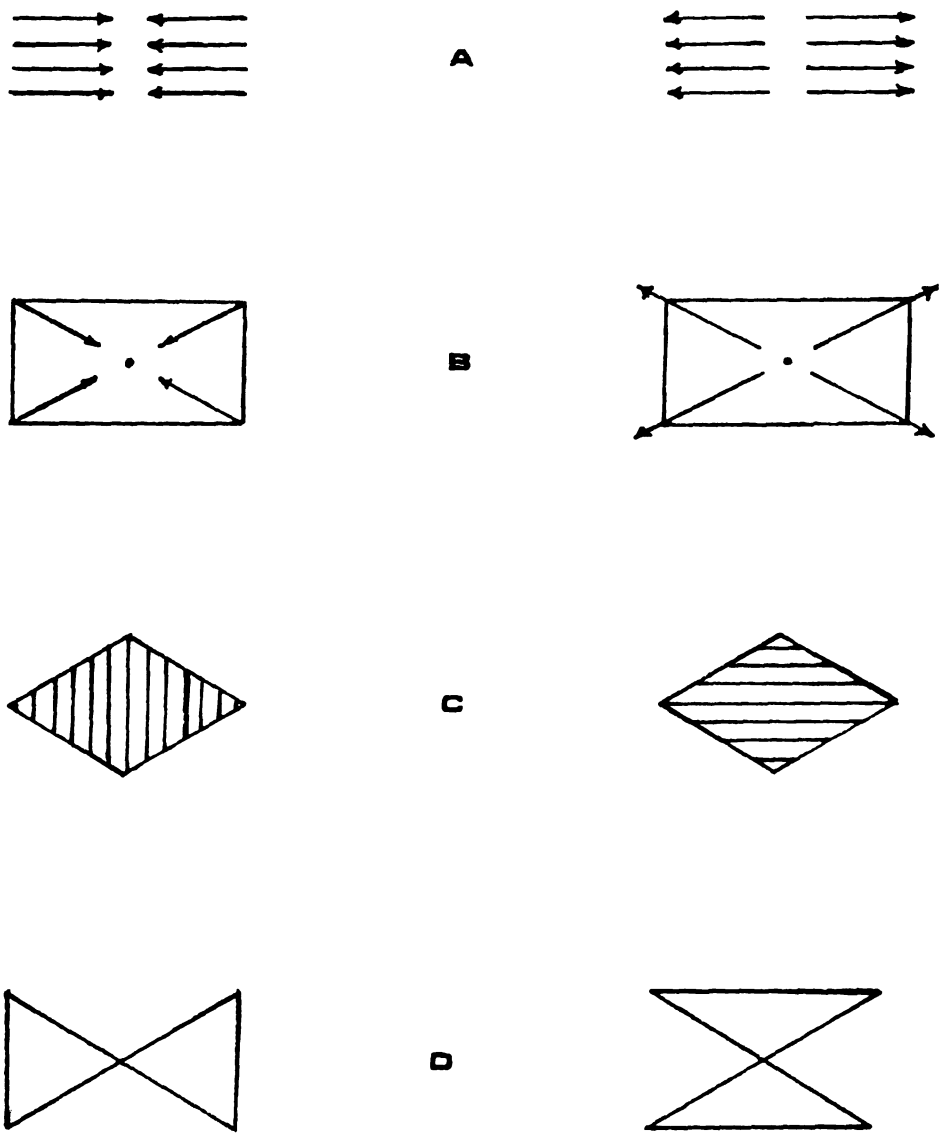


FIGURE 8.
BECK SYMBOLS

Source: David Lowenthal (ed). Environmental Perception and Behavior (Research Paper No. 109, Chicago: Dept. of Geography, University of Chicago, 1967).

environment could be transferred to the designer's studio. Beck's symbols can be utilized to note some basic interpretations of the physical and social components of the stimulus field.[92]

Edward T. Hall

An anthropologist, Hall has devised a notation system to record his "proxemics"--the general use of space by man as an elaboration of his culture.[93] The notation system of Hall is not confined to recording human visual orientations, and the symbols or codes are numerical rather than graphically pictorial.[94]

Hall's notation system is solely for use in recording behavior and human to human orientations. As such the system might be supplementary to notations of environmental perception or orientation. Figure 9 illustrates the symbol or code system devised by Hall, and Figure 10 is an example of a situation recorded by Hall's method.

Stuart Rose

Rose has been interested in evaluating a wide variety of environments, and his primary concerns for notation systems have been toward recording human visual sensations and spatial relationships to the environment. He reports some of his ideas for notation in his publication, A Notation/Simulation Process for Composers of Space,[95] in which he describes his system for simulating and recording the urban spatial environment.

Postural code

male:	1	laying
	3	sitting
	5	standing
female:	2	laying
	4	sitting
	6	standing

Touch code

caressing & holding	0
feeling or caressing	1
prolonged holding	2
holding or pressing against	3
spot touching	4
accidental brushing	5
no contact	6

Thermal code

contact heat	1
radiant heat	2
probable heat	3
no heat	8

Visual code

foveal	1
macular (clear)	2
peripheral	3
no contact	8

Voice loudness scale

silence	0
very soft	1
soft	2
normal	3
normal+	4
loud	5
very loud	6

Olfaction code

differentiated body odors detectable	1
undifferentiated body odors detectable	2
breath detectable	3
olfaction probably present	4
olfaction not present	8

FIGURE 9.
HALL SYMBOLS

Source: Edward T. Hall, "A System for Notation of Proxemic Behavior", American Anthropologist. Vol. 65 (October 1963) pp. 1003-26.

Postural code [1]	Orientation of bodies [2]	Kinesthetic factors [3]	Touch code [4]	Visual code [5]	Thermal code [6]	Olfaction code [7]	Voice loudness scale [8]
55	0	101	0	23	2	2	1

[1] Two men standing

[2] facing each other directly

[3] close enough so that hands can reach almost any part of the trunk

[4] touch does not play any part

[5] man speaking, looking at, but not in the eye, partner only viewing speaker peripherally

[6] close enough so that radiant heat would have been detected

[7] body odor but not breath detectable

[8] voice very soft

FIGURE 10.
HALL: SAMPLE NOTATION WITH KEY

The notation system of Rose utilizes a standard sheet (see Figure 11) with parallel vertical lines and horizontal divisions that very much resembles a stave and bars for musical notation; the symbols are similar to musical notes as well. Rose is well aware of these similarities and makes a useful adaptation of the musical notation process.

Rose's system is prepared essentially for computer simulation of the urban environment, but it suggests some interesting possibilities of visual notation for recording of the urban visual environment.

Some Possible Directions for Visual Notation

The notation system devised by Stuart Rose with the inclusion of some of the symbols from the other methods discussed here, suggests a possible notation system that could be devised for the future.

Lawrence Halprin has proposed a loose design method that he calls "scoring" which is part of a larger schema of his, "RSVP cycles".[96] R=resources, S=scores, V=valuaction, and P=performance. The resources are the inventory, the scores are the non-goal directed design processes, the valuaction is the judgment, and the performance is the design. Halprin's scoring is predicated upon the constant generation and feedback of data and criteria; an ever-changing process that stops or slows

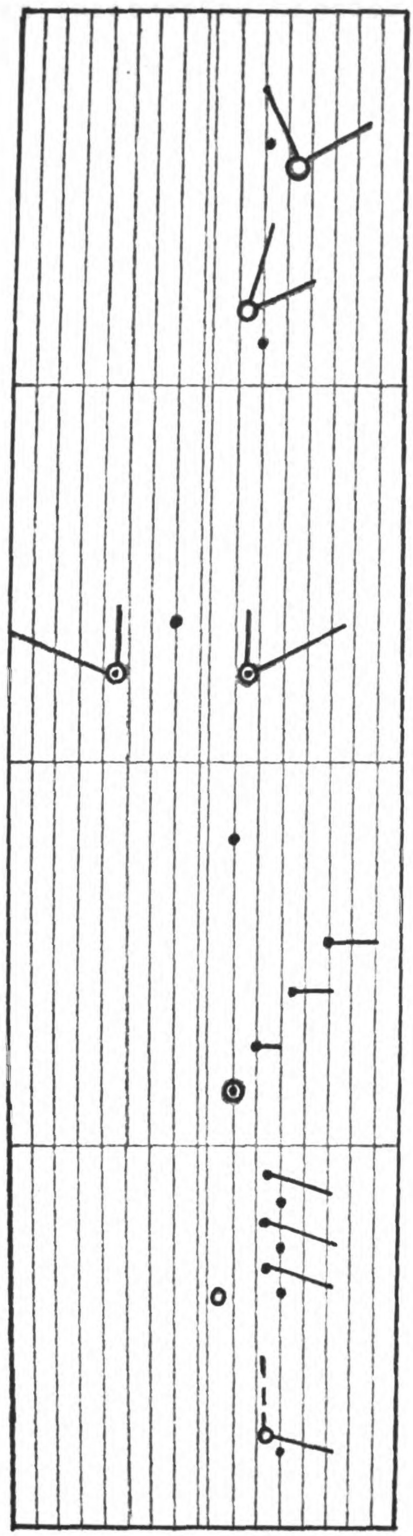


FIGURE 11.

ROSE

SYMBOLS

Source: Stuart W. Rose. A Notation/Simulation Process for Composers of Space (East Lansing: Dept. of Administration and Higher Education, Michigan State University, 1968).

only when judgments and decisions are made. This might provide an interesting process for visual designing which might be recorded by Rose's method.

As more and more knowledge is learned about the visual environment, especially as it relates to human visual perception, perhaps specific notation methods similar to music and Rose's proposal could serve for recording visual data in environmental assessment and design. With fixed symbols or signs learned, whole visual scores might be written.

While a notation system of this sort seems to be in the distant future, there is significant research being conducted in various sciences that could provide findings to make such a system possible.

Conclusions

The discussion in this chapter tends to indicate that, although some research and theory formulation toward objective visual assessment and design has been done, the attempts are fragmented, disorganized, and very rarely applied. There is, however, enough work in progress, both directly concerning the visual and indirectly related to it, to give cause for some optimism for the future.

An overview of the visual study being done indicates, more than anything, that there is much need for attempts toward assembling and organizing the knowledge concerning

visual perception and the urban visual environment. The following chapters propose to do this, and in a manner that attempts to make the knowledge available for use in urban planning and design.

Notes

1. Christopher Alexander, Notes on the Synthesis of Form (Cambridge: a Harvard Paperback, 1971), p. 8; also see Note 12 on page 194.
2. Ibid., p. 8.
3. Ibid.
4. Ibid., p. 10.
5. Ibid., p. 15.
6. Ibid., p. 18.
7. Bertram Berenson. "Sensory Architecture: An Approach to Total Design", Landscape, Vol. 17 (Winter 1967-68), p. 19.
8. Ibid.
9. Ibid., p. 21.
10. Ibid., p. 20.
11. Rudolf Arnheim, Art and Visual Perception (Berkeley: University of California Press, 1971), p. v.
12. Ibid., p. vi.
13. Rudolf Arnheim, Visual Thinking. (Berkeley: University of California Press, 1969), p. 13.
14. A.E. Parr, "In Search of Theory" in Environmental Psychology: Man and His Physical Setting edited by Harold M. Proshansky, William H. Ittelson and Leanne G. Rivlin (NY: Holt, Rinehart and Winston, 1970), p. 11.
15. Ibid.
16. Ibid., pp. 14-15.
17. Ibid., p. 15.
18. Gary Winkel, et al. Response to the Roadside Environment. (Washington: The Outdoor Advertising Assn. of America, 1968), p. ii.

19. Gary H. Winkel and Robert Sasanoff, "An Approach to an Objective Analysis of Behavior in Architectural Space", in Environmental Psychology edited by Proshansky, Ittelson and Rivlin, pp. 619-631.

20. Ibid., pp. 619-620.

21. Constance Perin, With Man In Mind (Cambridge: MIT Press, 1970).

22. Ibid., p. 111.

23. Ibid., p. 39.

24. Ibid., p. 112.

25. Ibid., p. 2.

26. Christian Norberg-Schulz, Intentions in Architecture (Cambridge: MIT Press, 1968), pp. 27-51.

27. Ibid., p. 27.

28. Ibid., p. 28.

29. Ibid., p. 29.

30. Ibid., see especially pages 50-51.

31. W.R.G. Hillier, "Psychology and the Subject Matter of Architectural Research" in Architectural Psychology edited by David V. Canter (London: RIBA Publications Ltd., 1970), p. 26.

32. Ibid., p. 28.

33. Ibid., pp. 28-29.

34. Ibid., p. 29.

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CHAPTER III

SYNTHESIZING THE CONCEPTS OF PERCEPTION AND ENVIRONMENT TOWARD A THEORETICAL SCHEMA FOR ASSESSING THE URBAN VISUAL ENVIRONMENT

The previous chapters have attempted to indicate that planners and designers have been interested in the visual aspects of the urban environment, but it was noted that many elements in the visual environment have developed independently of formal planning and designing action. It has also been pointed out here that the scope of visual considerations and the amount of objectively determined criteria has been quite limited in traditional approaches to the assessment and design of the urban visual environment. Chapter I included a discussion of some of the inadequacies of traditional approaches; Chapter II outlined some of the more objective and comprehensive approaches.

Visual assessment and design data in traditional approaches have often been based on subjective selection and intuitive analysis with little regard for thoroughness. Unfortunately, few planners and designers have been involved in handling the urban visual environment with extensive concerns for human visual perception or objective criteria. However, as Chapter II has indicated, some planners and other individuals have been interested in broad visual

concerns and objective design methods. It is based upon the work of these people, with the addition of further research, that this chapter proceeds.

The Search

One possible approach is explored here for assessing the urban visual environment and for collecting meaningful data on a more thorough and objective basis. The approach is based on establishing a systemic framework around which the visual environment can be assessed for quality in terms of its relative satisfaction of human visual needs and uses of that environment. Because these human needs and uses are primarily based in visual perception, the visual environment is viewed as it relates to perception and the criteria sought are the perceptual connections of man to the visual environment.

The search in this chapter is toward synthesizing the conceptual knowledge about visual perception and the urban environment into a schema capable of providing criteria and a framework for objective assessment of the urban visual environment. To do this requires establishing the perceptual modes of human vision and the structure of the urban environment. Information from various fields must be consulted in order to determine the perception-environment relation based upon the composition and structuring of each, and upon known or empirically hypothesized connections between the two.

This approach, in contrast to others attempted in the past or presently utilized, is little concerned with perceptual notions of overall city scale. Rather, it is deemed more important to identify or create a criteria framework for objective visual planning decisions, than to attempt to discover concepts which are functional at the broad city scale. Urban form at the macroscale is generally beyond immediate human visual perception,[1] and therefore questions of general scale are not as relevant to the systems framework, as are those of scope regarding human visual usefulness. However, the problems of implementation for any system devised to function for city planning must deal with concepts of scale in application, and these will be considered in the next chapter. This chapter is essentially concerned with theory.

Some Problematic Considerations

The factors involved in the interaction between the visual environment and human visual perception are extremely complex, and from the standpoint of human physiology and psychology there are still many questions left unresolved. Sociology and anthropology are even farther from the goal of understanding the interaction, and for the most part are only beginning to approach the visual problems relative to their fields of interests.

Involving the entire area of the man-environment, or the man-build environment enigma, the research has involved many fields over recent years, and the literature has accumulated considerably. Strangely, however, it has been noted that planners and designers have been the ones taking the real initiative.[2] Less strangely, the accolades stop abruptly when the quality of the work in this area by planners and designers is discussed. One of the most vocal has been the English sociologist, Maurice Broady. Discussing the use of social theory by architects and planners, Broady has said,

> One does not have to talk with architects and town-planners for very long to discover that they are interested in social theory... For my part, I greatly enjoy these encounters with people who are convinced of the importance of their work and bubbling over with the desire to create new and better environments...And yet, at times, one stands aghast at the naivety, the sheer lack of intellectual discipline... Perhaps one ought not worry about all this hot air: for it may not be taken seriously even by its exponents. Indeed, it sometimes seems to be used not so much to guide design as to bolster morale and to add a patina of words to ideas intuitively conceived. 3

It is mainly architectural determinism that Broady considers naive and possibly dangerous; he continues,

> It (architectural determinism) implies a one-way process in which the physical environment is the independent, and the human behavior the dependent variable. It suggests that those human beings for whom architects and planners create the designs are simply moulded by the environment which is provided for them. 4

This, Broady says tongue-in-cheek, acts to "save the layman the trouble and worry of observing accurately and thinking clearly."[5]

However, the deterministic approach is rather popular and much of the designer considerations of the environmental psychology information seem to promote such in one form or another. David Lowenthal has commented that the man-environment concerns of designers and planners are frequently too simplistic, and he notes that the one-way process of determinism is often all that is considered.[6] However, Lowenthal and others have pointed out that the man-environment and especially the human perception-environment interaction should be more clearly delineated in order to consider man in the design of the environment.[7]

Kenneth Craik has been quite involved in researching man's perception of the environment, and his appraisal of the abilities of the sciences to provide useful information for planners and designers has been quite directly stated;

> Even with the most generously financed, large-scale, crash program of research imaginable, the magnitude of the methodological and empirical groundwork that must be established as the basis for a mature branch of research makes it imperative to think in terms of decades rather than months or years, and makes it incumbent upon behavioral scientists in the field to be humble in their advice and proclamations as well as incumbent upon environmental planners and designers to be patient in their expectations. [8]

It appears that Craik is right in regard to the concrete, applicable knowledge about perception which is available

from the behavioral sciences in a form that is organized or readily transferable as criteria for assessment or design of the environment. Planners and designers should remain patient, but they should also work hard to guide the direction of the related sciences' research and to glean all relevant information possible from the knowledge that is, and becomes, available. Designing and related decision making must continue and it is imperative in the increasingly complex urban environment that they be done as competently and as well-informed as possible.

There is considerable information about the visual perception-environment relation already available, even though it must be ferreted out, translated and organized for use as criteria by planners and designers. The task is not impossible and the risks of possibly misinterpreting the existing scientific knowledge are worth chancing, given the importance of potential results.

Validity of Visual Perception Study

Visual perception, broadly defined, is man's only means of direct orientation to the visual aspects of the spatial environment. Dealing with the man-visual environment problem it seems logical to base visual planning and design on the human visual perception processes, rather than to make spurious attempts at design based on some possible influences or effects that specific designs might

exert on human perception. The latter has too often been the case, and is a form of environmental determinism which can be only partially valid at best.

Though difficult and complex, the need is to identify possible areas for planner action on the visual environment based on the visual perception processes. Successes in this direction can be planning that is directly relevant for people. The results can be quietly efficient facilitation of human needs and uses of the visual environment, far beyond the decorative urban design projects which are often the only specifically visual plans.[9]

Establishing a human visual perception criteria-framework as a viable part of planning requires the identification of the perceptual modes, the environmental counterparts, and some of the likely states of function and dysfunction in the interaction between the two. Assessing, designing or controlling the urban visual environment is basically important only for the satisfaction of human needs and uses of that environment, and the relationships of human beings to the visual aspects of the urban environment can be established only through a basis in visual perception knowledge. Therefore, it is essentially only the perceptual relationships of man to the visual environment that can logically serve as the central focus for visual planning study.

It is with this understanding that the approach here is undertaken. It is deemed an important and necessary step for establishing a comprehensive approach for planning the visual aspects of the urban environment.

Intentions

The visual perception approach here is not necessarily intended to replace the existing methods of visual planning and design. The intention is more to provide a theoretical basis for existing approaches and to supplement them in terms of more relevant and complete data, and to provide a framework for structuring criteria. As specific methodology is required for applying the theoretical schema proposed, the discussion in Chapter IV will cover some of these aspects. The search here is chiefly heuristic and the results are exploratory, but hopefully the assessment powers (and thus the predictive powers) in one area of planning will be improved.

Objectives

The specific objectives in this approach to the assessment of the urban visual environment involve the discovery of connections between human uses of the visual environment and the visual environmental forms which are subject to planner and designer analysis, manipulation and control. These man-visual environment connections, if substantially established, should reveal a meaningful counterpoint between

the two that would indicate the area for visual planning focus. That is, the essential and important connections which should be maintained would indicate something of the optimum functional states in human visual perception of the urban visual environment. Accordingly, criteria would be established which could allow evaluation of the functional-dysfunctional states of the urban visual environment based on man's perceptual use of it.

Beginning the Synthesis

The processes of visual perception related to corresponding environmental elements, when analyzed according to general human functional considerations, must begin with man as the central measure. Human visual perception relates to the environment as an integral part of man's ecological functioning in the environment,[10] and thus the conceptual synthesis must begin with a middleground that relates to the general functioning of man.

Systems Theory and Ontological Structure

The real essence of the importance of general systems theory is its process. Beginning with the problem, hopefully stated in operationally solvable terms, an inventory of known important variables operative in the problem is made, and the largest possible context in which the problem can be situated is identified. This process, according to

R. Buckminster Fuller, is then continued by progressively subdividing the established system.[11]

The central problem here can be stated: how can the visual aspects of assessing and designing the visual environment be analyzed, founded on the human perceptual needs and uses of the urban visual environment. The operant parts of the process toward solution become the human perceptual needs and uses as independent variables and the assessment and design approaches as the dependent variables.[12] The independent variables become the system on which to focus, and at which planning solutions must be aimed.

The largest possible context into which human perceptual needs and uses of the visual environment can be fitted would appear to be human existence itself: the human modes of being. Utilizing a syncopated version of the ontological systems structure presented by Professor Sanford Farness, the human modes of being can be identified;[13] at the same time Fuller's requirement for subdividing the system begins to become satisfied. The simple structural identification established contains the physiological, social, psychological, cultural and ego modes. The fundamental hierarchy is illustrated in Figure 12.

The mesh of the modes of being as presented by Farness and the modes or levels of human visual perception is an easy and viable one. The identification of visual perception levels practically identical to the above system

EGO

CULTURAL

PSYCHOLOGICAL

SOCIAL

PHYSIOLOGICAL

FIGURE 12.

HUMAN MODES OF BEING

structure was identified by psychologist James J. Gibson in 1950 in his book The Perception of the Visual World,[14] and has subsequently been confirmed by many other psychologists.[15]

It has been discovered by Gibson and others that visual sensations produced from light stimulation, and probably even the reception of visual patterns and objects, occur as the result of human physiological makeup.[16] From that point through various processes of learning, visual perception occurs on ever higher levels of mental process up to the creation of highly personal meanings.[17] Even the highest levels of mental process in visual perception rely to some extent on the presence of objective environmental counterparts.[18]

Referring, again, to systems theory it might be expected that each level of perception has its own independent form and function. Also, the content of any one level is constituted by the perceptual processes of the levels below it. The purpose of the perceptual process at any given level is derived from the forces of the levels above. That is, any given level of visual perception (one of the mode levels) is made up of the processes of lower levels and serves the purpose of the higher level; the mission of the level is carried out by means of its own distinct form and functioning.

Thus, for example, the process of physiological optics which functions through the sense organs, nerve chains, and chemical action to receive light stimulation does so for a higher purpose, namely a human use in negotiating and orienting to the environment. This purpose is ultimately social interaction. This is born out in empirical research; the physiological reception recognizes and classifies received stimulation as information that is useful.[19] Other sensations are indeed received and may even be processed to memory or utilized otherwise, but the reception that surfaces to selfconsciousness is highly selective based on socially determined usefulness that has been learned by the individual. The determination may or may not be volitional.[20]

In similar manner it can be discerned that psychological characteristics collectively determine the social mode of perception. Also, it is the cultural level of values and norms that shape the psychological mode. The connection between the ego and cultural is more tenuously understood, because the energies of the ego level are basically beyond general perception.

Professor Farness has related that environmental quality should be considered at several different levels of environment. In this context he has identified these as human, natural, artifact, social and cultural environments.[21] These are presented by Farness from a detached, analytical

point of view. From the perspective of human visual perception these environments, which become distilled through human perception, can be described in terms of the human modes of being: physiological, social, psychological, cultural and ego.

It is on the basis of the ontological (or modes of being) structure, then, that the initial framework for analysis and synthesis is established. Because the actual visual environment is resultant from the human perceptual orientation to urban environmental forms, it is necessary to first analyze visual perception and then relate the findings to the spatial form of the urban environment which is the locus of visual stimuli. Specifically to be identified are the (1) perception processes, (2) environmental stimuli levels, and (3) the perceptual concepts of visual space, which lead to (4) the meanings of visual space as they relate to human needs and uses of the visual environment.

Elements of Analytical Complexity

The analytical procedure which is necessary to accomplish the synthesis of the concepts of perception and environment contains elements of complexity that prove to be intricate and sometimes evasive.

The essential ingredients of this analysis are visual perception, the urban visual environment, and city planning

and design. These can be related to the human levels of existence--physiological, social, psychological, cultural and ego--but they relate in different ways and to different levels (see Figure 13).

Professional urban planning and design are mainly social endeavors. This work involves the public sector and the products are available to public scrutiny; the work involves the interaction of numerous people. The urban visual environment generally exists as a social milieu for people, but it also has personal and cultural territories, such as homes and churches. As a product of visual perception, the urban visual environment includes physiological and psychological levels as well.

Essentially, visual perception is a personal and psychological process, but it has various orientations: the entire modes of being hierarchy.

Thus, the approach to visual perception and environmental analysis and synthesis involves various orientations that shift depending upon which of the analytical ingredients is under discussion. This manifold operation requires interpretation each time the analysis moves from one level of orientation to another, and requires extreme care in its application.

Perception Processes

Following the general systems structuring, and based on the knowledge of the perceptual characteristics, the

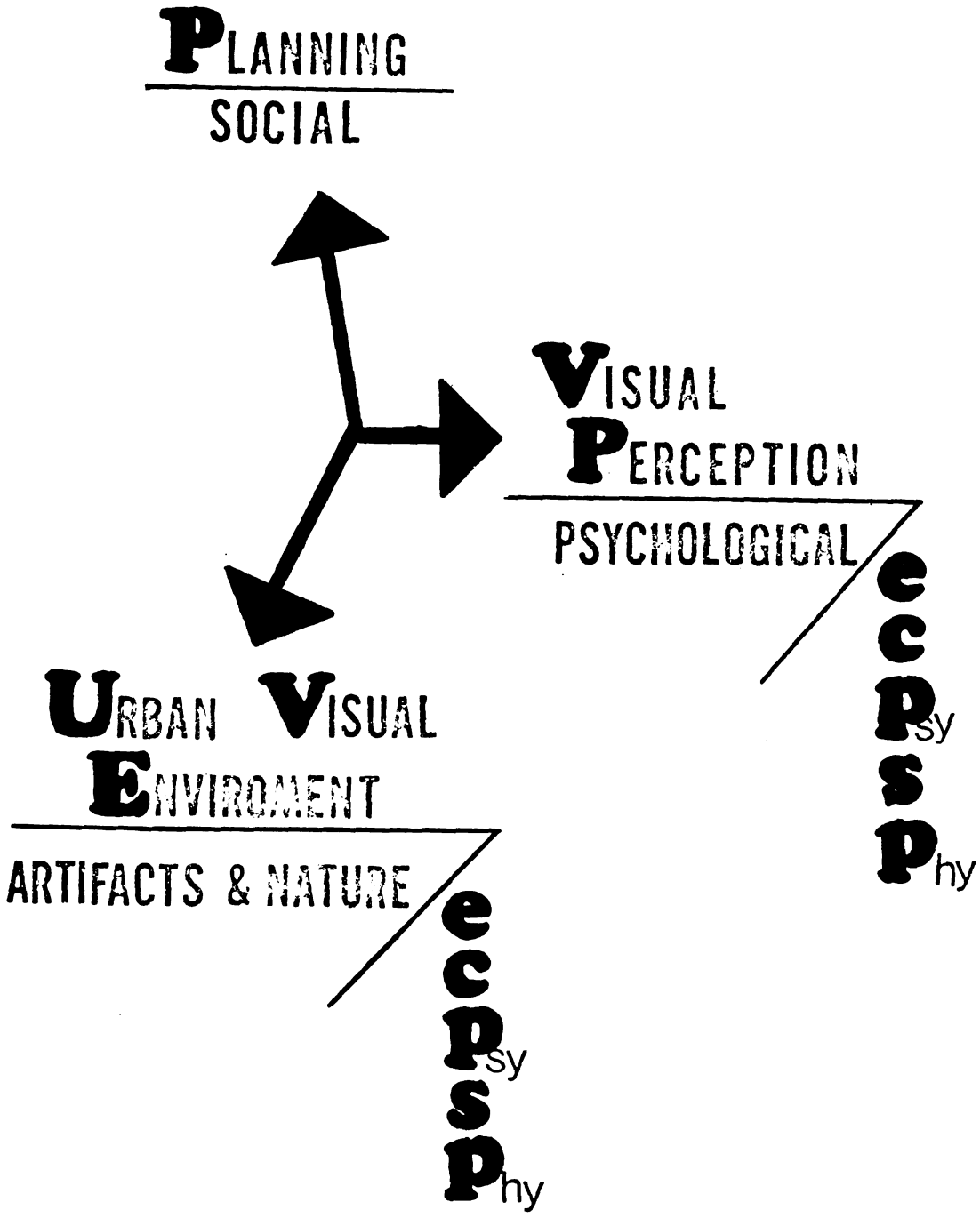


FIGURE 13.
ELEMENTS OF ANALYSIS

human visual perception processes can be structured corresponding to the human modes of being. Illustrated in Figure 14, the visual perception processes include reception and subception (physiological), apperception (social), conception (psychological), supraliminal perception (cultural), and an unknown process (ego).

For purposes of clarity in this work, the terms designating the perception processes are somewhat contrived here, and some of them are not necessarily the scientific terms in popular usage by psychologists and other scientists. However, the terms are used for semantic clarity rather than using the ubiquitous and somewhat ambiguous term "perception".

The term reception (which means the simple act of receiving) is used here to connote simple awareness of receiving light stimulation.[22] However, much receiving of stimulation and resultant effect are often unnoticed by the perceiving individual, and the term subception is used to indicate this circumstance which is actually more usual than reception.[23]

The term apperception (which means understanding a perception in terms of previous experience) here connotes the receipt and operational awareness of stimulation in a form that can be utilized for specific action. Apperception functions at the social interaction level and learned visual cues for functional action are revealed through its processes.[24]

MODES OF BEING	PERCEPTION PROCESSES
EGO	UNKNOWN
CULTURAL	SUPRALIMINAL
PSYCHOLOGICAL	CONCEPTION
SOCIAL	APPERCEPTION
PHYSIOLOGICAL	RECEPTION & SUBCEPTION

FIGURE 14.
PERCEPTION PROCESSES

Conception (which means the process of forming ideas or abstractions) is used at the psychological level of human existence and visual perception, because it is at this level that the individual records and abstracts information from various experiences into personal schemata.[25]

The term supraliminal perception (supraliminal means existing above the selfconscious, sensory threshold) is utilized for the perception process at the cultural level. This process operates in a manner similar to physiological subception, wherein perceptual response occurs out of self-conscious awareness. However, in supraliminal perception responses occur at a mental level just beyond sensory perceptual awareness, and is a result of the pervasive quality of culture rather than a physiological process.

Supraliminal perception relates quite closely to what is called "informal awareness" by Edward T. Hall in his book The Silent Language. Informal awareness refers to the types and patterns of knowledge acquired by the individual in a manner that is so much a part of life that they go unseen, and are considered as parts of the fundamental truths in life, while in fact they are just the norms of the particular culture.[26] Hall says,

> The term informal awareness is paradoxical because it describes a situation in which much of what goes on exists almost entirely out-of-awareness. Nothing, however, is hidden in any sense of the word. In fact, it is doubtful if there is any part of culture which is really hidden once we know how to go about looking for the eloquent signs. 27

However, supraliminal cultural perception is part of the daily functioning of man and, as such, man does not selfconsciously analyze the perceptions. It is deemed here that usually when cultural percepts appear to selfconscious awareness, there is likelihood the identified cultural pattern is no longer functionally operant. It is more liekly that people perceive only some aspects of culture, rather than comprehend its form and function.[28]

It is sometimes remarked that perception cannot be readily used as criteria because each stimulus situation elicits highly different responses in different people. Supposedly, generalization is therefore impossible. Rarely do such remarks come from modern psychologists. The highly individual aspects of visual perception seem to lie at the ego level. Psychologists know that even though there is considerable idiosyncratic perception also at the psychological level, it is subject to certain generalization. It is the ego level that prompts remarks by laymen about the impossibility of perceptual generalization, and indeed the perception process at the ego level must remain unidentified.

The ego level of human existence appears to approximate the level discussed by Gaston Bachelard in his Poetics of Space as the source of "the sudden image, the flare-up of being in the imagination."[29] It seems logical to assume that perception is operative at the human ego level, and

the sensitive planner should keep the idea in mind, but certainly there is little in planning the visual aspects of the urban environment that can reach this level. Therefore, although the ego level is not to be analyzed here, it is included in the initial systems hierarchy as a reference to the highly idiosyncratic aspects of human visual perception.

Perception as Transaction

The perception processes, as briefly described above, should be viewed as loosely fixed; the present state of research in the sciences does not provide for precise definitions at this time. One of the primary reasons the definitions cannot be precisely fixed is because perception is a highly transactional affair.

John Platt has pointed out that sometimes in perception there is even a problem of distinguishing between the concepts of "self" and "world".[30] Platt speaks of "reafferent stimulation" with which the perceiving individual generates new information into perception with each response to the environment, and the brain's state of readiness for response is thus constantly in an adaptive and changing process.[31] There is usually a fairly clear boundary between the perceiving individual and environment in visual perception, but there are flow-processes in which awareness and action constantly require contributions from both.

In these perceptual transactions the elements of time and space become integral components of visual perception. What is seen, when it is seen, and the general ordering of events and objects can at times be confusing for individuals. Movement, activities, and judgments which might be involved in the perception further compound perceptual elements.

Developing schemata for almost any planning endeavor requires a certain amount of reducing dynamic and interactive systems to more static components. Thus, while these transactional characteristics of perception must be understood as active in the perception processes defined here, the systems structure does not need to include the transactional elements.

Adjustment for Perceptual Equilibrium

The proper functioning of human visual perception requires a certain optimal range of stimulation.[32] It is known that a part of this optimal range includes the brain's need for diversity and order.[33] These requirements relate to the transactional operation of perception, and there are processes at work in perception that attempt to establish an equilibrium for the optimal stimulation range.

It is known that the biological processes work constantly with the environment toward an equilibrium, through the homeostatic adjustment process.[34] Within the broader interaction of man with environment at the various perceptual

levels, there is also an equilibrium process at work called adaptation-level adjustment.[35]

Homeostatic Adjustment. The physiological subception and reception processes of visual perception are subject to homeostatic adjustment. The most obvious functioning of this is the dilation and contraction of the eye's pupil that regulates the gross quantities of light that enters the eye. There are a number of other such adjustments made in the physiological functioning of the eye; the lens focuses light from different distances, the cones and rods are activated respectively for brightness and color vision, and dim light and peripheral vision, etc.[36] In its simplest terms homeostatic adjustment works over periods of short and long duration to maintain a somewhat optimal interaction state between vision and the environment of physical stimuli.

Adaptation-Level Adjustment. The levels of visual perception above the physiological--the social, psychological, and cultural--are involved in a different adjustment process. Adaptation-level adjustment involves the many factors that influence the visual perception of stimuli.

One consideration in this adjustment process involves the brain adapting to continued adverse stimulation. For example, in an environment of constant, yet not intolerable, glare the brain will slide the entire equilibrium scale up. The optimum level will rise and past acceptable limits of

dimness will no longer be bright enough; conversely the brightness upper-threshold will rise. This process which actually overrides the normal physiological functioning is nevertheless limited to certain physiological bounds.

Another example of adaptation-level adjustment at the opposite extreme involves esthetic surroundings. Individuals, groups, and even cultures can adapt to different optimal levels of beauty. Just as with the process described above, the whole perceptual scale of beauty can slide up or down. Although it is difficult to imagine an environment that is too beautiful, certainly the middle range and lower levels can change and different norms be established. The upper level of adjustment might include qualities normally associated with beauty (for examples, cleanliness or symmetry).

Simply stated, adaptation-level adjustment involves an adaptation-level which determines the evaluative response to a given stimulus in a given dimension.[37] Deviations from the adaptation-level, either above or below, within a certain range are considered good. Beyond the range, the stimuli are considered unpleasant. The adaptation-level itself might be considered neutral, and in relation to design would probably be considered boring.

States of Perceptual Response

There must always be some stimulus and some response for a perception to occur. The stimulus properties are to

be discussed further later; the responses that comprise visual perception can essentially occur in one of two general states: selfconscious and unselfconscious. Each of these states is important to the human visual perception processes. Both must be considered in the determination of criteria for assessing the visual environment.

Selfconscious perception is simply that which is in the immediate awareness of the perceiving individual. Visual perception that is unselfconscious occurs out of the perceiving individual's immediate knowledge and is ordinarily relegated either to the physiological response mechanisms or to quite high levels of mental abstraction.

Seemingly, it is the visual apperception (social) process which manifests the clearest and most overt, and thus the most selfconscious response for most people.[38] Temporally and spatially, it appears the social level response is the one which most directly confronts the perceiving individual. The response is readily precipitated by the social stimulus situation, because the response is socially agreed-upon[39] and is readily reinforcable by the social group. Success or failure in seeing the necessary cues for action is readily verifiable either by other people or the situation.[40]

Moving toward the extremes of the systemic structure of visual perception, it becomes increasingly difficult, and finally impossible, for the individual to selfconsciously

discern the occurrence of the response or to distinguish the cause and effect or correlative stimulus-response characteristics in perception. The cultural level response (supraliminal) is difficult to recognize, and the physiological level response (subception) is internalized in the response mechanisms of the optic system.

Although selfconscious visual perception is more difficult at the physiological (essentially subception) and cultural (supraliminal perception) levels, and occurs most frequently at the social (apperception) and psychological (conception) levels, it should be understood that to varying degrees each visual perception process can be pushed into selfconscious awareness. For example, it is possible to become aware of bright sunlight or glare, color, and pure form in the physiological reception process.

Whether or not the perceiving individual is self-consciously aware of the functioning of the various visual perception processes, they do occur. In order to consider these human visual orientations to the environment and subsequently provide for the facilitation of them, it is important that the planner be aware of the various perceptual occurrences, even though their manifestations may not be totally salient. Figure 15 indicates in simple form the general functioning of selfconscious response in the various visual perception processes.

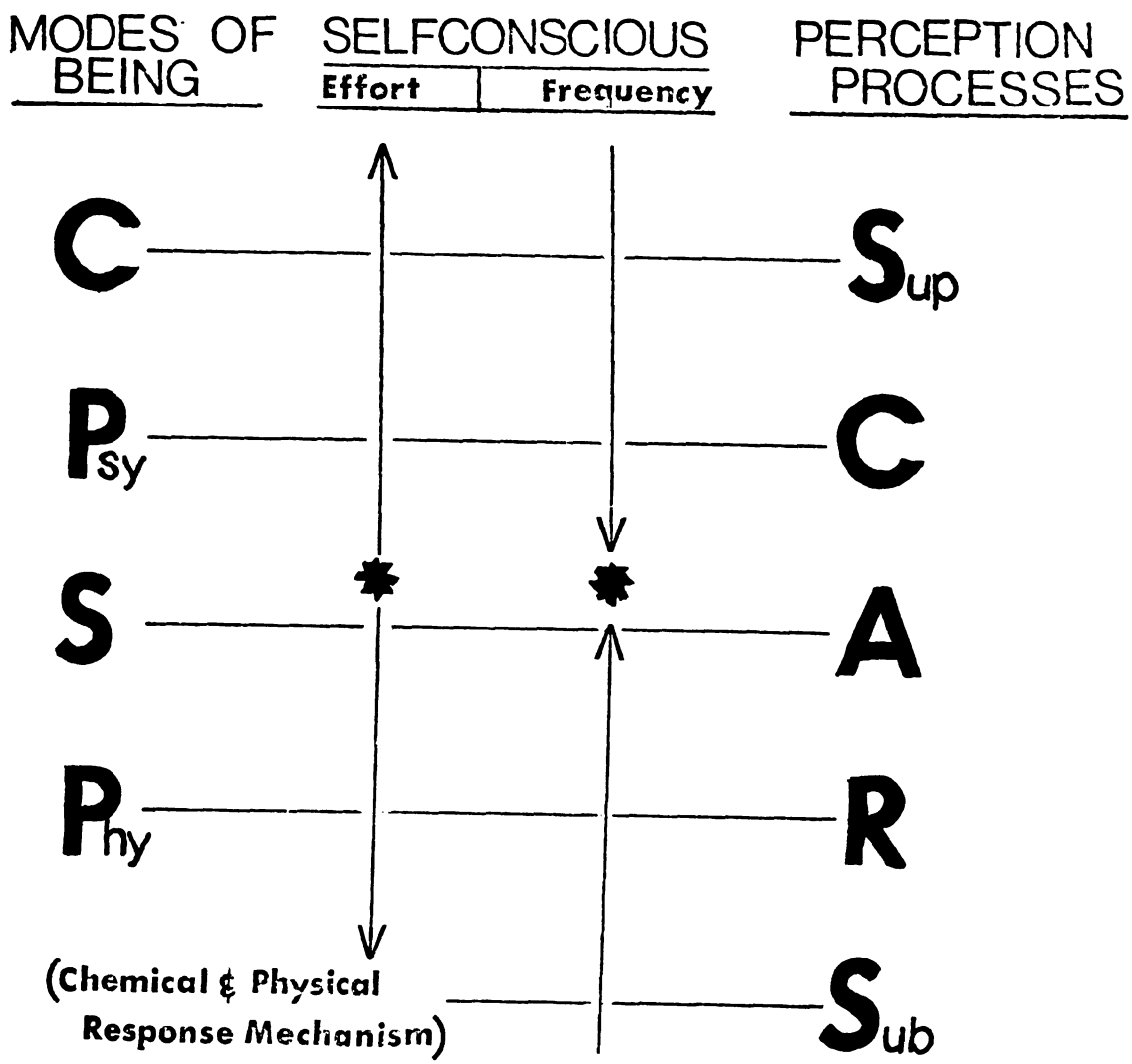


FIGURE 15.
SELFCONSCIOUS RESPONSE

Relative Stability of Perception Processes

Another characteristic of visual perception which should be remembered in general terms is the relative stability of the various processes. Awareness of these characteristics can make monitoring changes in the visual environmental assessment process easier.

Visual apperception at the social level is probably the least stable. The apparent reason for this seems to be because there are more changes in the immediate social stimuli and less opposition to change by individuals. Social apperception is the most selfconscious process and, as such, it is more open to change and can be adapted more quickly as environmental stimuli change. This can be noted empirically in the relative quickness and ease of adaptation to changes in such features as fashion and fad in relation to architectural form (or clothes at the microscale).

Both visual subception and reception at the physiological level basically develop through evolution and homeostatic adjustment and are thus relatively stable, although subject to problems from eye disease, injury and deterioration.[41] This perceptual level is probably the most stable. The psychological level of visual conception varies in its stability. It has certain resistence to change, even when the experiences, physiology, and culture that comprise it indicate it should modify. However,

properly functioning, the psychological visual orientation to the urban environment alters to maintain a stable image.[42] Evolution is the major means through which culture changes, and thus in the supraliminal visual perception of it there is great stability.[43]

Resultant Levels of Information

Successful visual perception with the various processes results in the perceiving individual obtaining certain information. This information is both visual and non-visual, but is of course received visually. The general levels of information obtained by the individual through visual perception are seeing, knowing, believing and being. Refer to Figure 16.

From both visual subception and reception it is possible to describe the resultant information as simple seeing. Seeing is the function of the optic capability and is the recording of visual stimuli. The visual apperception information contributes to the individual knowing what to do in the social milieu. This means the recognition of recurrent stimuli which have been experienced previously as cues to specific actions.

Information resulting from the psychological, visual conception can be described as believing. The visual beliefs are dependent upon coherent understanding of the environment, which derives from the individual's past experiences, cultural learning and idiosyncratic intentions,

PERCEPTION PROCESSES	INFORMATION LEVELS
SUPRALIMINAL (cultural)	BEING
CONCEPTION (psychological)	BELIEVING
APPERCEPTION (social)	KNOWING
RECEPTION & SUBCEPTION (physiological)	SEEING

FIGURE 16.

RESULTANT INFORMATION FROM VISUAL PERCEPTION

attitudes, and concepts abstracted from visual experiences. This constitutes a stable and believable image of environment for the individual.

The cultural level which involves supraliminal and thus highly abstracted and out-of-awareness perception, results in information which constantly reaffirms the very core of an individual's being. This information constitutes a certain image of the environment which is the individual's unselfconscious value structure.[44]

The designations of informational levels appear to reinforce the above observations regarding the stability of the perception processes. The physiological "seeing" and the cultural "being" are fundamental to the capability of human visual perception, and thus these relate to the high stability of the perception processes at these levels.

"Believing" is the essential core of the stable mental images with which people selfconsciously conceive of the environment, and thus this psychological level information indicates greater permanence than simple "knowing" at the social level which is subject to relatively easy change as the social environment fluctuates and the contextual knowledge becomes obsolete.

Visual Perception-Environment Synthesis

The previous discussion in this chapter has outlined and briefly analyzed the general concept of visual perception, and identified the perception processes. This juncture

of the discussion requires including the objective spatial environment in the synthesis, and some of the original qualifiers of this thesis need to be recalled: urban environmental aspects included must be of a type manipulatable by planners and, further, these must be in the visible world of objects.

Logically, these original qualifiers mean the environmental components of the proposed visual planning schema should be the material elements of man's total urban environment. The visual environment in this respect would include all aspects of the urban environment that reflect or emit light which can subsequently be perceived by the optic organs and visual perception processes of man. Two categories that together include the satisfaction of all of these requirements are artifacts and nature.[45]

The first step in including the material environment in the synthesis here is the realization that the human modes of being and the visual perception processes can be oriented toward artifacts and nature. This can be simply expressed as in Figure 17.

It is important to note that these human perceptual orientations are not concretely fixed, nor are the boundaries precisely established. In fact, there is not only overlap among orientations, but they may also exist concurrently or superimposed in the same artifacts or natural forms. The material environment serves purposes which are

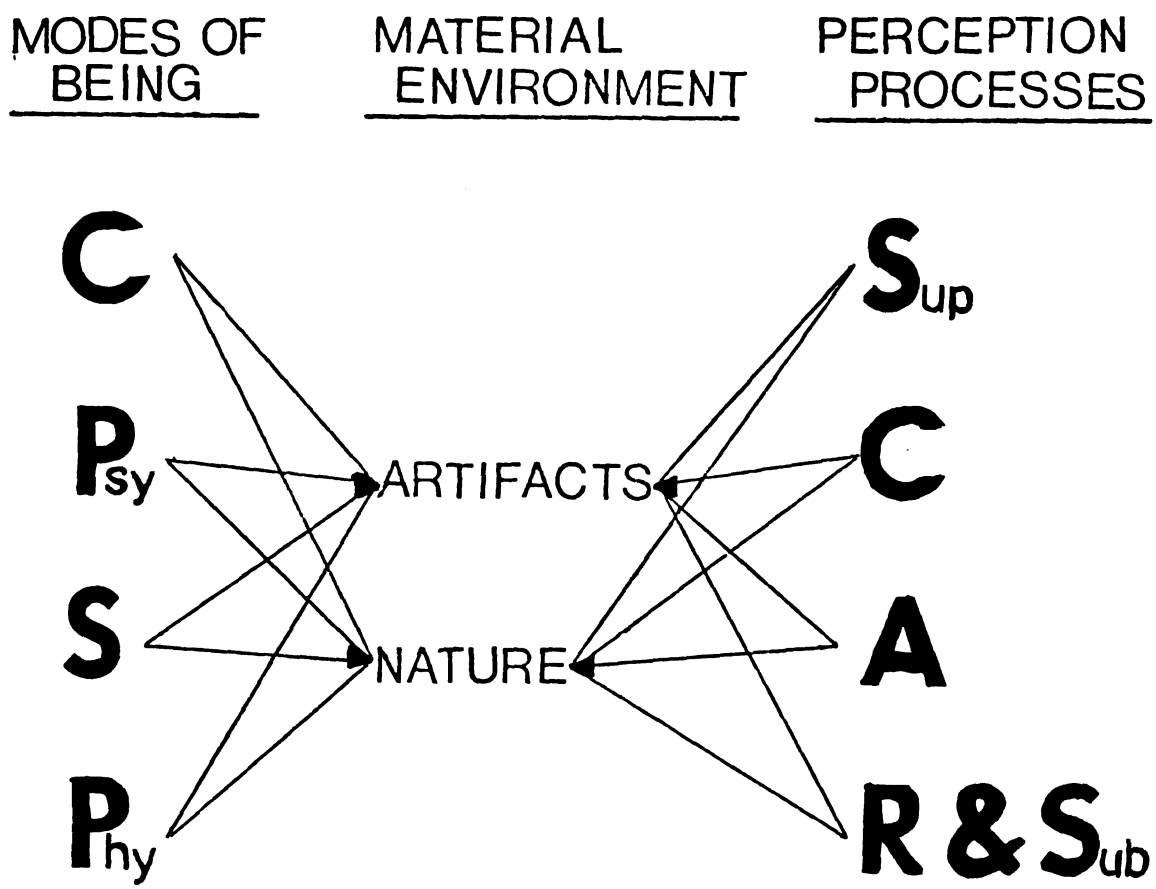


FIGURE 17.

HUMAN ORIENTATION TO ENVIRONMENT (environmental levels)

man's, and man's purposes are complex, overlapping, diverse and temporally multiple. However, planning for human visual perception through environmental manipulation can handle the urban material environment as if the perceptual orientations to it existed as isolates, as long as their relationships are also understood and considered as fully as possible.

Environmental Levels as Stimuli

The fundamental human perceptual orientations to the material environment, as a part of the analysis here, makes it possible to consider the artifactual and natural forms as they serve as stimuli for visual perception, and the forms can be classified as separate visual environmental levels. Logically, and for convenience, these can be designated as physiological, social, psychological, and cultural environments. Refer to Figure 18.

With the establishment of the environmental levels the stimulus sources for visual perception are also presented. At the physiological level through either subception or reception response is elicited directly by the physical properties of the natural and artifactual forms, and specifically the properties of the surfaces for reflecting or emitting light. Usually the stimulus is presented to the optical system in patterns as established by the physical properties of the stimulus objects, the

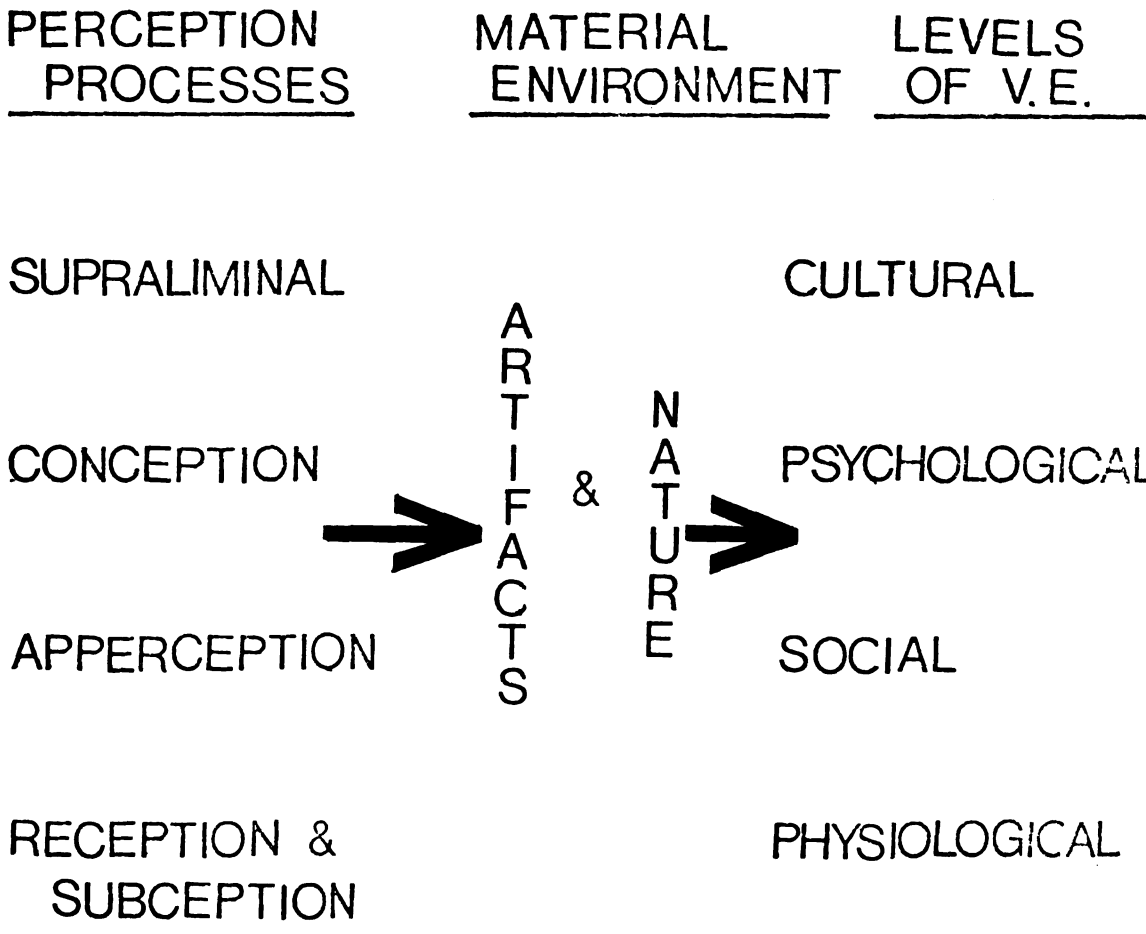


FIGURE 18.

LEVELS OF VISUAL ENVIRONMENT

succession of stimulus transmittal, and the capability of the eye structure for reception. Thus, the stimulation is straightforward and ordinal.[46]

Simple reception encounters little problem as long as the stimulus provides the proper light wave length range, luminance intensity range, and duration.[47] The light wave length is of little direct importance to planning, but both luminance intensity and duration are frequently manipulated in the urban environment. Luminance relates to natural and artificial lighting, and to brightness contrast. The sun and street lighting, the juxtaposition of lighting sources, and any form of shading all effect luminance. Stimulus duration is manipulated through such forms as traffic signal lights and is also affected greatly by the speed of the observer's movement, such as in a moving automobile.

The accomplishment of receiving light stimulation in reception and subception is fundamental to all levels of perception. However, any visual perception process beyond this surpasses mere "sensing" which becomes only a constituent part of the higher process which has its own form and function. But as James Gibson has said, "Things must be substantial before they can be significant or symbolic. A man must find a place to sit before he can sit down to think."[48]

When visual perception reaches the social level of environment the stimulus is no longer ordinal in itself. Based on stimulation in the physiological process, apperception requires the input of past experiential information. This requires inferring from past experience and thus the stimulus is synthetic.[49] Apperception (occuring at the social level) nearly always relates to artifacts. Even percepts derived from natural forms when a result of social orientation view the forms for their functional use. The understanding or information received from viewing these artifacts is not intrinsic; the meanings must be learned, and relearned or modified as change occurs.

Some of the information through vision from the social environment is in the somewhat straightforward and relatively enduring signs. For example, a street stands for transportation which is a social institution and interaction mode. However, the complexity is revealed when it becomes apparent that other signs mean the same thing, and also that a sign for one thing may be more symbolic of something even more complex, such as the street as a symbol for human street life.

Carl Steinitz has revealed some of the social visual stimuli; he says,

> Meanings may include the knowledge latent in environmental forms and activities to which people are exposed; the knowledge gained as people learn the characteristics of their environment; and the knowledge upon which are based the plans of action used by people to

> satisfy their various individual and social purposes...the diversity must be encompassed within a framework which clearly transmits, and permits acquisition of, that public knowledge necessary for common social behavior.[50]

Steinitz continues to define the visual cues for social apperception and interaction as activity type and intensity. He indicates that "What goes on here?" is neither a trivial question nor should it be difficult to answer if the objective social level of environment is designed conducive to the human perceptual nature.[51] Based on experience in a given social environment, the activity type and intensity would immediately reveal the meaning of the social situation.

Understanding apperception of the social level of the visual environment and the stimuli present is somewhat difficult. However, the primary stimuli are in the form of cues which function to indicate and direct action. These relate generally to the several social institutions which according to James Feibleman are family, transportation, communication, economics, practical technology, education, government, military, law, religion, philosophy, art and science.[52]

It is important, as Steinitz remarked, that social cues refer to "common social behavior". Thus, because the social behavior related to institutions is generally easy to learn and frequently confronted, the main necessary cues are for identification purposes. Objects perceived in the social environment act only to mediate pronounced functional properties, which in turn become the essence of the object.[53]

Visual conception at the psychological level of environment, again, is through synthetic stimulation, and is even less dependent upon immediate and surrounding stimuli and environmental interaction. The main constituent elements of a person's psychological being are from their own social and personal experiences, but visual conception derives force from the culture which provides the normative mode of perception.

Thus, the psychological environment is developed in concepts and abstractions. Through concepts formed the individual applies personal attitudes and intentions to the situations that occur.[54] This is especially true for the individual's confrontation with the social situation in which the social role is interpreted by the individual. These intentions, interpretations and concepts are such an integral part of visual conception that they can often dominate socially recognized stimuli.

The cultural level of visual environment lies at even higher levels of abstraction. Culture is so much a part of the total perceptual environment that its manifestations are always in view. As the gross organizational force of societal norms, values and behavior, culture is instrumental in establishing the patterns and forms of the material environment, as well as creating the prevailing norms and values in visual orientation. Although culture is quite pervasive in daily life, the cultural level of the urban

environment is manifested in the gross organizational patterns that are not selfconsciously perceived in an easy manner. In fact, the cultural level of visual perception, which has been termed supraliminal here, receives symbolic visual percepts which are not rasily verbalized. As Christian Norberg-Schulz puts it: "In daily life we generally act on the basis of our spontaneous perceptions, without trying to classify or analyze our impressions."[55]

The question of what the cultural stimuli are for visual perception becomes difficult to answer because cultural percepts are nearly out of reach. Culture is complex and evolutionary. Its spatial dimension rests only in intermediary objects which subtly reflect cultural existence through expression.[56] The stimuli are easiest read over time in historic forms--as culture evolves the expressions of it leave a trail in objects. Artwork and various dimensions of other artifactual objects tend to mirror culture, and the human response to them is through feeling and is supraliminal--above direct sensory apprehension.

A detached, analytical point of view, as opposed to everyday perception, can discern cultural stimuli. These can be recognized in our approach to graphic street and advertising signs, the patterns and types of land use, the visual hierarchy of social activity and architectural forms, the historic buildings which still exist, and many other visible forms. The discussion of visible cultural

elements can be complex and difficult, but they can be identified and culture is subject to some analysis.[57] However, while immersed in a given culture, the stimuli appear to be hidden or even nonexistent in visual perception.

Perceptual Concepts of Visual Space

Christian Norberg-Schulz has noted that space is just one aspect of man's orientation to environment, but that most of human actions do comprise a spatial aspect.[58] The primary means of perceiving space is visual, although there are other ways, such as through the haptic sense, the kinesthetic sense and man's gravitational sensitivity, that tend to bolster visual impressions of space.

It is important to note that spatial concepts can be established by means other than perception. Max Jammer discusses several concepts, for example, which have been established in science in his book, Concepts of Space.[59] Norberg-Schulz discerns various spatial concepts in relation to the production of architecture. His scheme includes a concrete element of objective space which is independent of perception, and relates to the spatial existence of objects which is present regardless of whether or not the objects are experienced.[60]

However, the concern here is with the concepts of space which are actually created through visual perception. Because the concern here is only for dilineating a framework

for criteria relevant for assessing the visual and perceptual aspects of the environment, the concrete element of space drops out.

Concepts of space are established here for the purpose of identifying the space to which people orient visually. This begins to form a view of the kinds of human functions in the environment based on visual perception. Before specific kinds of spatial meaning can be delineated, it is first necessary to present these intermediate concepts of spatial orientation which are based on the perception processes and the environment as stimuli.

The perceptual concepts of visual space delineated here are some of those presented by Norberg-Schulz in his book, Existence, Space and Architecture. That the concepts correspond with some established by Norberg-Schulz is not coincidental. Norberg-Schulz's ideas are intentionally adapted here to fit the purposes of this thesis.

The visual perception of the various levels of the material artifactual and natural environments result in corresponding concepts of visual space. The concepts include pragmatic (physiological level), existential (social level), cognitive (psychological level), and expressive (cultural) space. These are simply diagrammed in Figure 19.

Pragmatic Space. This spatial concept is defined by Norberg-Schulz as the space of physical action.[61] This fits well the type of space derived from visual perception

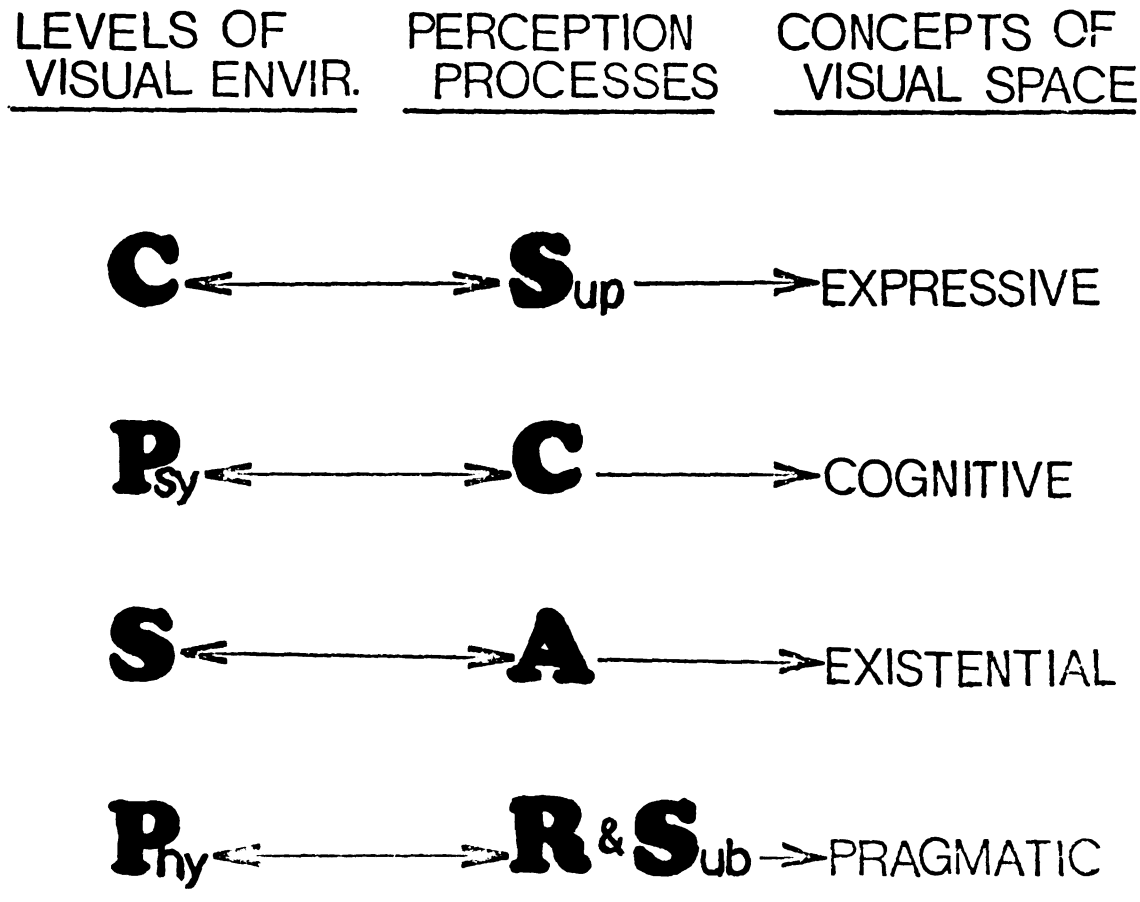


FIGURE 19.
CONCEPTS OF VISUAL SPACE

at the physiological level of man's being. The reasoning is that through the basic reception and subception processes, information is revealed that makes spatial decisions immediately available. Up-down, near-far, etc. and the discovery of objects in relation to each other, while not labeled at this level, are essentially perceived by the basic physiological processes.[62]

As described earlier, much of physiological perception is not selfconscious to the individual. Pragmatic space is important to man's physical negotiation of the environment, but it is not essential to his higher mental processes except as content. Most of this content for higher mental processes is provided through subception as an integral part of the higher level process.

Existential Space. This concept of space represents the space perceived through apperception from the stimuli at the social level of environment. Existential space relates to the earlier observation here that the social mode is seemingly the most prominent in visual perception. People are most often in social situations and most frequently respond to stimuli manifested in spatial forms of social interaction and institutions. This is their primary orientation; their most immediate and pervasive temporal image of the environment. Relatively, this is their existential space, especially as a link to spatial meaning. The immediate situation and previous experience combines to dictate

what to do, where to go, and how to use what is before the individual in the interaction situation.

It is with apperception--responding to the social level stimuli--that the internal image most nearly approximates external expectations. Stimuli are generally simple signs or cues for what to do. This does not mean that response failure cannot, or rarely, occurs. It does mean that the channels are straightforward and most nearly "alive"--existential.[63]

Cognitive Space. This is the space formed mentally by the individual and contains the personal understanding of the objective visual aspects of nature and artifacts. The perception process, visual conception, acting at the psychological level of environment does not necessarily require immediate and situational environmental stimuli, except in a development process that occurs over time.

Cognitive space requires concept formation and abstraction which is based on past experience and formulative judgment. This space represents the stable images of environment for the individual. Stimulus objects tend to be perceived as what the individual thinks they are.

Norberg-Schulz clearly confirms the above description of cognitive space, although he tends to confine it to physicalistic concepts rather than perceptual.[64] Norberg-Schulz defines cognitive space relative to specific historic concepts of space, specifically that of Euclidean Geometry.

As such he is correct in observing that this concept of space should be expanded to include "affective" aspects.[65] The cognitive space here includes these affective aspects when it is noted that individual attitudes and intentions significantly help to define the space.

Expressive Space. This concept of space is resultant from supraliminal visual perception at the cultural level of environment. Expressive space relates to the earlier discussion here under "Environmental Levels as Stimuli", where it was noted that stimulus properties of the cultural level of environment are expressive. The perception process is supraliminal--above selfconscious sensory perception--and the environmental correspondent is expressed in gross organizational symbols that are comprehended in something of an osmotic process, such as emotional feeling which is often generated without selfconscious understanding.

The Meaning of Visual Space

The discussion of the visual perception-environment synthesis to this point has included the visual perception processes corresponding to the human modes of being, the resultant levels of visual information from the various visual perception processes, the environmental levels of visible artifacts and nature based on human perceptual orientation, and the concepts of visual space resulting from visual perception.

These analytical steps have begun to indicate the complexity of revealing meaningful assessment information about the urban visual environment based on visual perception. The processes of visual perception had to be revealed, the products of actual perception had to be outlined, the levels of environment in which the visual stimuli lie had to be delineated, and the visual space as determined through visual perception had to be indicated. This has only begun to create a synthesis capable of revealing planner manipulatable visual data. The actual functional link of man to environment which is provided by visual perception has yet to be determined here. This functional link is the meaning of the visual space perceived by human beings.

Again, the meaning of visual space to people can be described in terms of the systemic framework. Based essentially upon the levels of visual environment and the perceptual concepts of visual space, the resultant spatial meanings are ordinal-literal, use-function, coherence, and symbolic. The simple relationships between the environmental levels and concepts of space, and the meanings of visual space, are expressed in Figure 20.

The perceptual concepts of visual space in the urban environment actually determine the spatial meanings. At the cultural level of visual environment the space is expressive, and thus the meaning of that space is symbolic. The psychological level has cognitive space which determines

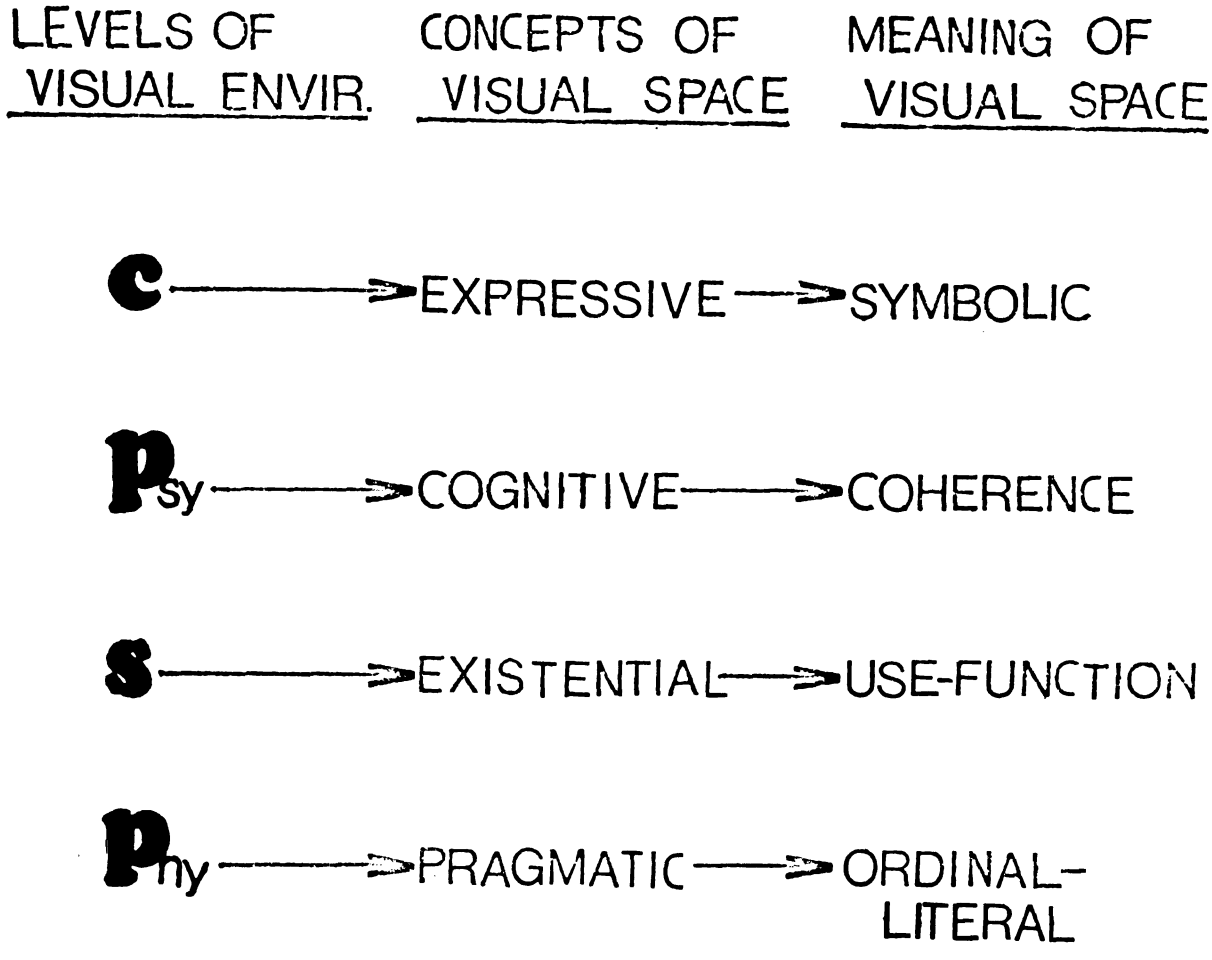


FIGURE 20.

MEANINGS OF VISUAL SPACE

an individuals stable environmental image, and thus the spatial meaning must represent spatial coherence.[66] The social environmental level is the individual's existential level of daily interaction, and thus the spatial meaning represents use-function cues to action. The physiological level of environment is the pragmatic space whose form is perceived visually in a direct manner, and thus the spatial meaning is (as it is recorded by the optic system) ordinal and literal.

These meanings are those resultant from human perception of the visual environment as manifested in artifacts and nature. It should be remembered that the stimuli at the physiological level are basically straightforward and ordinal, and are perceived with only sporadic need for any higher mental processing. Beyond the physiological level, the stimuli are synthetic,--pulling together immediate, learned, conditioned, etc., elements.

Spatial meanings which are determined at any of the synthetic stimulus levels--social, psychological, cultural--involve the assimilation of content from lower levels into forms created by higher level forces. These levels are relatively defiant of easy meaning classification.

Symbolic meaning can arise from any of the synthetic levels, depending on the definition of the word "symbol".[67] At the cultural level the expressive space requires that meaning be symbolic even under the most regimented definition

of symbol. If symbol is essentially to connote that which encompasses a concept, then clearly cognitive space can produce symbolic meaning. The word symbol can be extended to the social level by defining the term as grouping "chunks" of functional information to form a category of activities.[68]

It might be considered that "...culture consists in patterned, ordered systems of symbols",[69] encompassing language, religion, art, science and ethics. Cultural meanings through visually perceived space are certainly symbolic. Artifacts or elements of nature can give the only spatial form to culture and in doing so become the intermediaries, the symbols for the higher meanings.

Theoretical Schema for Visual Assessment and Design

It is apparent that through the links of perception, environment, and the consequent perceived space, the artifacts and natural forms cannot have their meanings stripped from them by the perceiving individual. The meanings are too much a part of the visually perceived material environment. It is only through the detached and analytical observation of the objective and material environment and perceived meanings, such as attempted here, that the separation process can occur.

The human modes of being (physiological, social, psychological, cultural and ego) have evolved in man over time as a product of man's reason, time and space. Today

the urban environment is a parallel evolutionary product which has been built by human beings as extensions of their ecological functioning and development. Perception acts to interpret and coordinate the elements of the environment in relation to the human needs for information and their purposes in environmental negotiation. The meanings of visual space which are used for visual environmental orientation have evolved directly from the human ability to perceive. The essence of the planner's and designer's job in this process is to set apart the elements described here as levels of visual environment and meanings of visual space, dissect and analyze them, and accordingly assure that the requirements of human visual perception are satisfied.

The dissection and analysis of the levels and meanings can reveal the important functional visual connections of man to the urban environment and provide the framework and criteria for both urban visual assessment and design. Visual assessment can become a process for revealing the functional and dysfunctional states of the probability for human achievement of the necessary meanings of visual space. The theoretical schema offered here sets forth the criteria and guidelines for assessment and design of the urban visual environment by providing the framework upon which each can be effectuated. In simple terms the framework can be structured as in Figure 21 which illustrates the fundamental

Levels of Visual Environment	Perceptual Meanings of Visual Space
Cultural	Symbolic
Psychological	Coherence
Social	Use-Function
Physiological	Ordinal-Literal

Figure 21.
Framework for Criteria

visual elements capable of providing the necessary ingredients for visual assessment and design; the environmental levels and the meanings of space.

Significance of Schema

The theoretical schema for the assessment of the urban visual environment has been established here through a synthesis of the concepts of visual perception and environment. The significance of the schema, which is essentially the criteria framework illustrated in Figure 21, is that it provides the framework on which human visual needs and uses of the urban visual environment can be described and detailed in an objective manner which is conducive to planner action. This significance becomes more obvious when the environmental levels and spatial meanings are further detailed.

Detailing the Levels of Environment and the Perceptual Meanings of Visual Space

Vision is a system that senses only certain fixed and limited aspects about the objective environment. It can be delusory in that only surface properties and relationships among surfaces are sensed; vision receives only manifestations of objects and does not reach out and grasp; it is not tactile. Vision can also produce varying impressions, and as a product of higher perceptual processes and available stimuli, vision can create quite satisfying and esthetic impressions, as well as satisfactory information.

Primarily, vision is a tool in the general processes of human existence and works in the ecological functioning of the human beings.[70] Vision has evolved as an integral part of man[71] and as man's ecological system has expanded to include social, psychological and cultural modes of being, as well as the physiological, vision has widened similarly. Vision is ultimately tied to the functioning of the brain for its complete accomplishment and as the brain adapts to the environment and evolves to encompass the various modes of existence and thought, vision must parallel the changes.

In the sense of the above observations, the functioning of visual perception as an interpreter and creator of environment, and the spatial meanings revealed through visual perception come more into cognizant focus. The spatial meanings revealed to people in their visual perceptions are the targets of visual planning action and the factors that become the criteria for assessment. However, planning for spatial meanings is not an operational goal unless the spatial meanings are connected in an objective and solid manner to the material environment with which planners can work to assess, design and control. It is deemed here that such connections can be revealed progressively and more completely over time, and with continued and diligent research. The following discussion details some of these connections which are contained in the body of presently

existent scientific and other research knowledge. This discussion exemplifies some of the available evidence that should be further compiled, and is suggestive of further research that might be conducted to reveal even more information.

The Physiological Level and the Ordinal-Literal Meaning

The spatial meaning of the environment at physiological level is literal and ordinal. It is literal because the stimulus impressions are received, channeled, and recorded in a direct manner without the necessity of higher mental processes. Ordinal meaning goes beyond this and occurs in organized patterns of spatial variation and temporal succession. In life, literal and ordinal meanings work together and the visual perception occurs in spatial flows around the human being.[72]

In the everyday environment the ordinal-literal spatial meaning works in vision toward certain purposes. James J. Gibson in his unique book The Senses Considered As Perceptual Systems delineates the purposes of vision at this level as "(1) detecting the layout of the surroundings, (2) detecting changes, and (3) detecting and controlling locomotion."[73]

The urban visual environment is constituted by many space-displacing forms which reflect light for reception by the human visual system. Most of the stimulation at the literal level of meaning is unselfconscious, but can and

does rise to selfconsciousness on occasion. One of these occasions is when stress levels intensify to the point of interfering with normal and everyday visual functioning.

Visual Stress. Literal visual stress generally relates to three factors: luminosity, visual contrast, and visual noise. It is well known that a certain minimal light intensity is required for vision (see Figure 22). When this intensity level is not met, vision for environmental negotiation is little or none. These visual problems have been well researched by physiological and psychophysical psychologists, optometrists, and lighting engineers. There is abundant information on the basic light requirements and problems as they relate to the spatial environment. These are presented in psychology books and journals, optometry periodicals, human factors periodicals, and also in the various publications of the Highway Research Board.

As the luminous intensity level approaches the upper limits of human visual tolerance, glare problems occur (see Figure 22). The eye can adapt over a short period of time and within limits, but adaptation surety and speed can be insufficient, and works poorly if compromised by fatigue, illness or sustained overloading.[74] Temporary blindness (or near-blindness) occuring on a busy street can be an immediate hazard.

Lighting intensity solutions simply include maintaining optimal light levels for seeing. Artificial lighting is needed at night, generally the more the better, and to

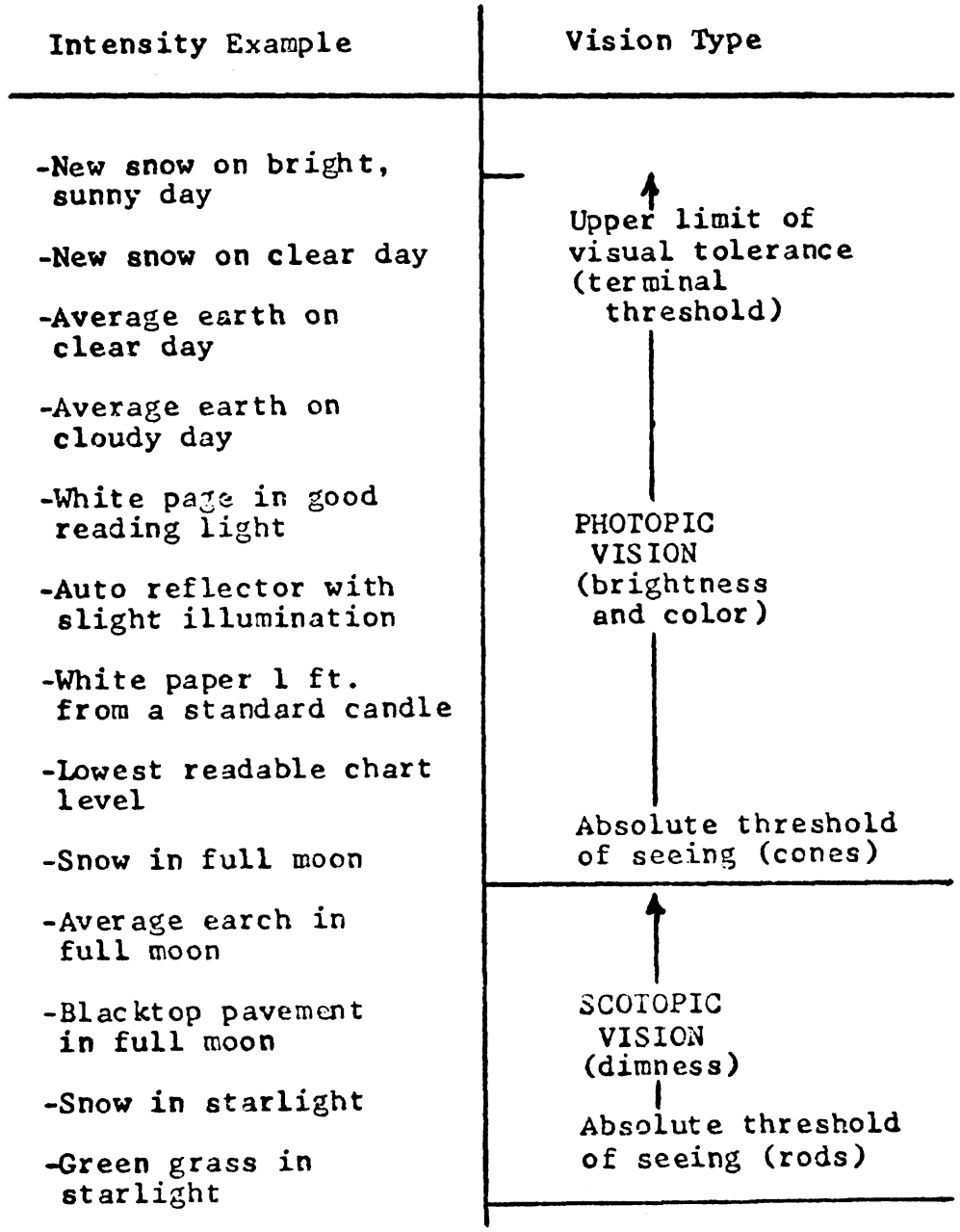


Figure 22.
Range of Light Intensities

Source: John Corso. Psychology of Sensory Behavior (NY: Holt, Rinehart and Winston, 1967).

obtain optimum lighting the lamps should be very high; 200 or 300 feet has been suggested.[75] A problem as simple as light intensity appears, is nonetheless not sufficiently solved considering the available information.

Visual Noise and Contrast. These two factors are related in that they can confuse the visual perception process. Seemingly, these are little discussed or considered in designs at the urban level. However, considerable information is available for criteria.

Visual noise is the erratic and unpatterned visual stimulation that interferes with normal vision. It can come from a multitude of sources in the urban environment, such as sun reflection and orientation, weather conditions, mixture of overlapping signs, dirt, and obstructions in path. Related to visual noise are the problems of reading signs or seeing traffic lights, or persons and other objects. In visual subception involving literal meaning this also relates to visual contrast; reading signs usually involves higher mental processes and thus a higher perceptual meaning, but a confused, and poorly contrasted, mosaic of signs prohibiting the perception of needed or sought information or cues is a physiological problem.

The gestalt principles take effect and colors, shapes, light intensities, etc. tend to read in larger, confusing patterns.[76] Adequate contrast among important urban visual forms should be required by planning controls, but empirical evidence from city streets indicates this has not been done.

The proper design and use of street signs has been carefully considered. Theodore Forbes, a psychology professor at Michigan State University, has done much research with signs, related to the human use and perception of them. In his numerous articles he has published results of his research concerning sign color, brightness, lettering and other attributes.[77] Although some of the knowledge discovered has been utilized at federal and state levels, its use is not readily considered in planning at the urban level which also has to consider the visual impact of many signs other than traffic signs. There is currently a very good source of information for sign assessment and control: Street Graphics[78] by William Ewald, Jr. and Daniel Mandelker. This book outlines an excellent system for sign control based on objective assessment and legal criteria.

The knowledge available concerning literal visual meaning at the physiological level of environment has been used to varying extents for a number of years, mainly by engineers. However, it is also important that planners acquire this knowledge for visual environmental assessment purposes, and that urban design pursuits include the literal visual meaning knowledge in a criteria checklist. The list should include luminance, visual contrast, and visual noise knowledge as minimal criteria at this level.

Scanning. One means by which ordinal meaning is obtained is scanning.[79] The visual system works to detect surroundings through a simple scanning process; one simply

looks around. But even this can become more involved as the observer moves about the environment.

Ambient light. This is another way through which ordinal meaning is perceived from the visual environment. The area immediately within the visual field of a person directs light off particular objects to the eye (see Figure 23). The light converges at the eye as different sets of light arrays which have originated from specific objects, and thus are revealed "relations" among objects through a "boundary, margin, border, contour, or transition."[80] This process includes facets and surfaces of all sorts and sizes, and not just gross form, such as texture. The surface composition of objects determine the direction and wavelength of light to the eye, and thus are perceived different colors, shades, etc.[81]

Movement. The above stimulus situations involved in visual reception hold accurate for a moving stimulus field and moving person as well as for when both are stationary. As man is continually scanning, he is simultaneously searching for variances which provide visual cues to the spatial environment.[82] This is done by constant eye movement for reading the fine detail and by larger head and body movements to record visual elements in the grosser scene.

Physiological stimulation does not come simply to the individual in tiny bits, but rather in patterns which result from light reflecting off specific objects. However,

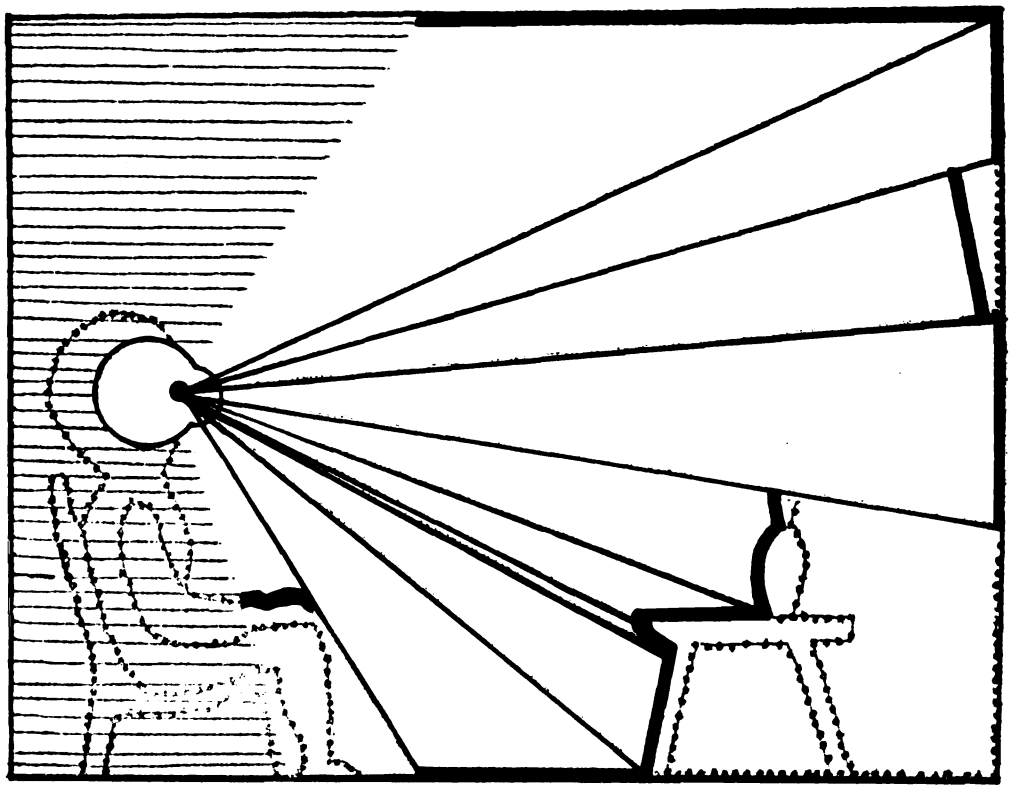


Figure 23.
Simple Example of Ambient Light

Source: James J. Gibson. The Perception of the Visual World (Boston: Houghton-Mifflin, 1950).

the ordinal-literal meaning includes even more detailed information. For example, experiment has shown that an individual's own movement and direction is perceived from specific information.[83] Moving toward something means the foreward scene expands, the peripheral images seem to curve around, and the images farthest behind appear to shrink.[84] Moving backwards, the process reverses. In either case, as well as in more complex movements, the information results immediately in the visual reception of the physiological environmental level.

Feedback. During the movements through the environment constant environmental and internal feedback serves as continuing stimulation for action. Feedback is largely an unselfconscious process; if complete attention to it were necessary, little time would be available for other pursuits. Constant environmental reinforcement and subject readjustment is always necessary in negotiating the spatial environment.[85]

Other Implications. The practical considerations for planning that involve the ordinal-literal meaning simply relate to facillitating sense-data reception and ordinal stimulation. Some of the assessment toward planning can be done by instruments such as the photometer which registers light intensity and other assessment can be carried out through subjective planner reconnaissance based on known objective criteria.

Much of the visual planning implications from ordinal-literal spatial meaning has already been interpreted through experiment. For example, the expansion of the foreward visual scene in movement and the basic cues offered in this process have been elucidated as factors of speed (see Figure 24). At 30 miles per hour the environment that expands before a motorist encompasses a visual angle of 90°, the peripheral vision continues from the points produced to the right and left, and the balance of the vision shrinks and begins to wrap around behind the individual.[86] At 60 miles per hour it has been found that the width of the expanding environment shrinks to 40°.

It has also been discovered that directly proportional to speed the visual field raises or lowers as a result of perceptual reactions. The field extends to about 600 feet at 25 miles per hour, but increases up and out to 1200 feet at 45 miles per hour. Simultaneously, as a result of speed, the distance of focal clarity also changes and the angle of vision significantly narrows.

More important in this process, as a result of speed and the human visual capability, stimulus duration becomes critical in perception. Once an object is located, it takes 1/3 second for the eye to focus when both observer and object are at rest. It also requires time for change

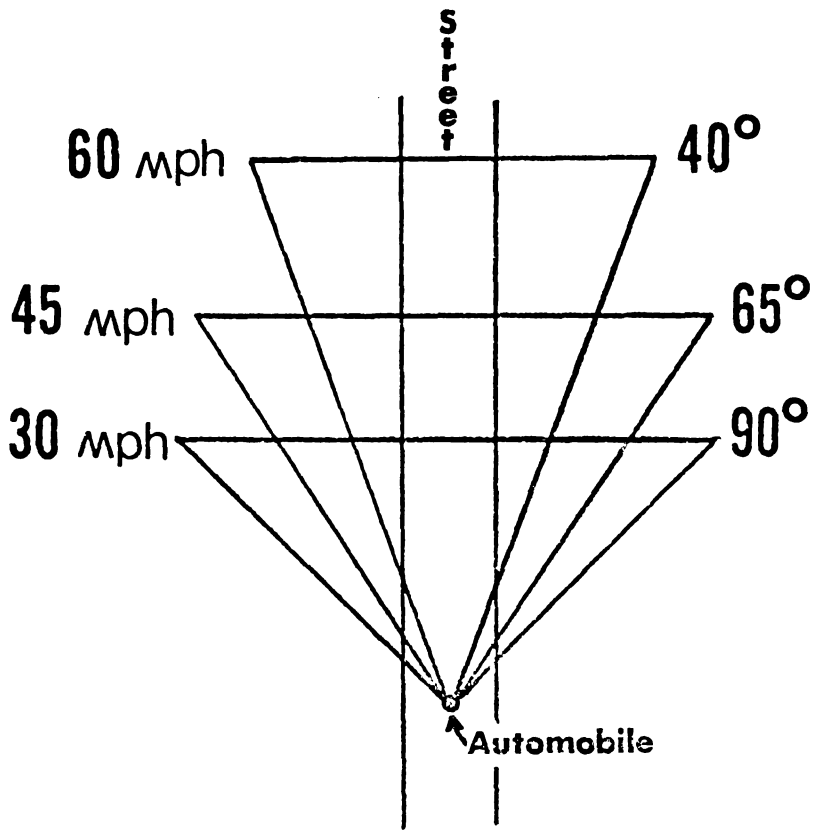


Figure 24.
Speed-Angle of Forward Vision.

Source: William Ewald, Jr. and Daniel R. Mandelker. Street Graphics (Washington: The American Society of Landscape Architects Foundation, 1971).

of focus from near to far (or the reverse). Perceiving the multitude of necessary objects in an intense urban environment, especially in a moving vehicle, considerably compounds the duration factor. Little or none of this information appears in planning or design manuals and little is applied to specific urban environmental situations.

The above are only some examples of available information which has been interpreted from the knowledge about the ordinal-literal visual meaning at the physiological level. However, it is obvious that much of this type of information is available for the assessment of the urban visual environment. The essential factor upon which to focus is the provision of an urban visual environment conducive to people obtaining the necessary ordinal-literal spatial meanings. Some of the initial trouble spots might be obtained from police accident records, but accidents are indications of extremes and it is important that the visual environment provide much more for people than the avoidance of hazards. Based on available information, assessment should proceed to the level of providing for ease, comfort and competence in environmental negotiation based on visual needs. This is a real measure of visual planning competence.

The Social Environment Level and the Use-Function Meaning

Beyond physiological level considerations and the related ordinal-literal spatial meaning, the intentional and

organized research into the visual perception processes and resultant meanings is sparse. Studies toward manipulation of the objective environmental elements that correllate with visual perception and meaning are practically non-existant. However, for the social environment level and the use-function spatial meaning there is certain information that can be gleaned from sources oriented to other purposes.

Actual focus on the social spatial environment, as it relates to the use-function perceptual meaning, needs to be preceded by some elucidation of what "social" means in this context. The purposes of the social aspects of the urban environment are ultimately toward the facilitation of individual activities of a sort which are common to a number of individuals, and thus provision can be made for the activities by means of common facilities or channels. Some simple social interaction is not done in common or public facilities, but rather in private or quasi-public ones. Planning the visual environment need not be concerned directly with these aspects, especially in general assessment and urban design activities. The more micro-level concerns are, however, architectural and should be factors in building or housing codes. The concern here is with the more public aspects of the visual environment.

The social factors of concern here are those of rather public nature that include people interaction--they must also relate to the objective manipulatable environment.

The use of vision in the larger, more public, social environment is toward maneuvering in the social milieu. As vision is based upon stimulation or feedback from the objective environment, and planning functions primarily to manipulate the objective environment, the social visual environment is constituted by social elements with material form. The urban spatial form is a social product, primarily constructed or implanted to serve functions that people have in common.

The individual acting within the social milieu does so through a series of constant, overlapping and successive visual perceptions in a manner similar to that described as a physiological process, but the analogy stops there. Based on experience, the individual proceeds through the social environment reading cues to action. The visual apperception process is carried out by pedestrians and motorists in many daily activities, and the primary social modes of activity dependent on vision are probably transportation and physical communication from place to place. In these activities many spatial, visual forms are encountered which lead to action, reaction, or continuity of action. Moving on streets, sidewalks, or in buildings; signs, entrances, etc. are encountered which provide needed information. The cues are either associated with past knowledge of what a particular sight informs, as familiarity with building locations, etc. would dictate, or the information is read on the spot, such as from street signs.

Form Cues. In the sense of these gross locational recognition cues,[87] the monograph The Image of the City by Kevin Lynch is a major work of direct importance to visual planning. Lynch's study was conducted in Boston, Jersey City, and Los Angeles as tests for his theory about human perceptual images of cities.[88] The study was basically an interview procedure that requested some citizens to draw maps and answer questions about their image of the particular city. The images were compared against an image map previously prepared by "trained observers", according to Lynch, and synthesized into a general and common city image.[89]

The image reported by individuals was actually a map of the major form cues upon which the individuals depended to aid their movement around the cities, to help them locate specific environments, or for reference to other functions in the social environment. Certainly some of the purposes and uses of the cues were personal, but the resulting synthesized image of Lynch's intention was a social and functional product.

Lynch identifies the major cues as paths, edges, districts, nodes and landmarks.[90] These more gross cues are built upon a number of specific qualitative spatial configurations which, according to Lynch, are the factors that make the larger forms more identifiable, and on which the designer can build for future image maintenance and creation.[91]

As stated here previously, the process of perception at the social level, apperception, is resultant of immediate stimuli and experience. Also, the perceptual concept of visual space is existential and the spatial meaning is use-function. Lynch makes a similar observation about his city image: "The image is the product of both immediate sensation and of the memory of past experience, and it is used to interpret information and to guide action."[92] Christian Norberg-Schulz says of Lynch's Image of the City; "...he tries to interpret the environment (city) in relation to an existential space."[93] Thus, Lynch's study is a major work concerning visual apperception and the social level of visual environment as they have been defined in this chapter, and his work can be used as an instrument of visual assessment based on forms as cues. The information presented by Lynch can easily be lifted from his book for application in planning either as criteria data or as a method for part of the assessment.[94]

However, there are some problems involved in Lynch's study, some of which he openly admits. Because he depends on intersubjective verification, it is important that all the proper techniques of implementation and measurement be utilized. Also, given the changeable nature of the social environment, there may be some question as to how much investment of time and resources would be justified. It is possible that Lynch's method should be abbreviated and

occasionally repeated to monitor the gross social uses of these environmental cues.

Beyond the specifics of Lynch's investigation of city image, however, is the clearer overall message that he delivers. There are important elements in the larger-scale city environment that people use visually to orient themselves for various purposes. It would be wise to examine these before rearranging large pieces of the environment, such as has occasionally been done with urban renewal.

Activity Cues. Carl Steinitz has discussed visual environmental properties similar to those noted by Lynch, but Steinitz more clearly addresses the importance of urban spatial forms to specific dimensions of social activities. Summing up his general ideas on the subject, he has stated,

> Activity meanings are among the most generally needed, if not the most needed, meanings to be derived from the physical environment. In order to satisfy action-plans, which often involve decisions to go somewhere or to do something, people must share a knowledge of what is happening, and where. The environments should communicate the type of activity in a particular location so that a person can find, identify, and describe activity-places. Relative activity intensity is also important information, enabling one to identify the busiest places and direct someone else to them. Accurate evaluation of the comparative significance of places is necessary for location and description of the most important activities. Armed with these three aspects of environmental knowledge--type, intensity, and significance--individuals and groups should find it easier to satisfy their needs in urban areas. 95

Steinitz conducted a study in central Boston, similar to Lynch's interview method, in which a sample of citizens was questioned about the meaning revealed in the consistency of the relationship between a place's activity and spatial form.[96] He found that in varying degrees the following hypotheses were true:

> There is a high overall level of congruence between form and activity...The more a form type is common, intense, and highly exposed, the more often will form characteristics be known...The more an activity type is common, busy, and important, the more often will activity characteristics be known...Meanings tend to be reversible--ability to describe form characteristics of a place is highly related to the ability to identify its activity attributes, and vice versa...For any (of the above-mentioned) meanings, the higher the level of congruence of a place, the greater will be a person's knowledge of a place. 97

Although the factors and relationships involved in Steinitz's study are complex, the findings are quite predictable. The test is whether or not people perceive constant relationships between the form of a place and the activity occuring there. Many of the correlations were weak, probably because the congruence was not that obviously existent for any given form or activity over a number of places. Seemingly, this would be very dependent on the activity, such as the consistent forms of place for such activities as quick-stop hamburger establishments or auto service stations. These are social activities that readily reveal the activities involved through functional visual cues based on common form.

Steinitz's study implies that planning should try to establish or maintain specific spatial forms for given activities in order to best facilitate successful visual perception of the social environment. Somewhat by accident, some planning controls have fostered just such relationships, but is is apparent that a certain monotony can result if relationships are too tightly fixed. Steinitz recognizes this and expresses concern that congruence should be construed to mean a set of general relationships and not a dictate for specific forms.[98]

Social visual cues revealed in the Steinitz study implies that the activity of a place can furnish information. This can have implications for planning. Most activities are much more readily perceived than static spatial forms, and can thus be important visual cues, especially to a motorist who often needs easily perceived potential stimuli. An example of this sort is visible moving cars designating a major street or an exit ramp.

Discovering Cues. Visual cues to social action based on forms and activities are the most obvious, and these are found in the urban environment in tremendous variety. There may be other cue types that can be discovered and expanded. The key to the research should probably be similar to Steinitz's study in which perceptual veridicality, and form and activity interrelationship congruence were examined.

Kenneth Craik is not optimistic about the time and degree of difficulty that might be involved in discovering how people perceive in the social milieu, or as Craik terms it, "the everyday physical environment."[99] Craik, a psychologist, makes clear that the field of psychology is becoming interested in problems of interest to planners, related to human perception of the social environment, but he indicates the two fields act with two different theoretical approaches:

> The selection of problems for study, and the sequence and timing of attack on them, move according to quite different criteria in research and practice. In research, strategy tends to be guided by the conceptual framework and techniques already at hand...In professional practice, the structure of problems is seen in the context of social purposes, of the relative desirability that solutions be attained... 100

The psychological study procedures outlined by Craik seem sound, and there is reason for optimism about eventual knowledge of connection between manipulatable form and the visual use-function meaning. However, the public social environment is huge, and ever-changing--it is known that perceptual failures do occur as individuals are removed from experiencing the social environment on a daily basis. Adequate and constant experience is necessary to maintain success in apperception.

Other Considerations. Planners work in and with the social milieu daily, but the experiencing of it and its many facets may not be nearly as thorough as it should be. Sociologists make it clear that on the social level there

are many currents of experience--at different age groups, classes, sexes, and cultural orientation. Subjective and introspective planning thought can provide well only for the particular categories of experience in which the particular planners are involved. It is therefore imperative that further objective criteria be compiled as it becomes available. In this sense and based on this type of objective knowledge, planners can quite possible assess many non-visual meanings from the social level of the visual environment, as well as trying to facilitate the visual apperceptual functions.

In his essay "The City of the Mind", Stephen Carr mentions some criteria that might be included in assessing the social level of the urban visual environment.[101] He says, "in very general terms, we might conclude that a good environment should at least support socially desirable planful behavior and facilitate man's effort after meaning."[102]

Carr proposes some specific operational criteria which he feels can be utilized on the basis of present knowledge. According to Carr, criteria might include the "perceptual assessibility of city form" based on known connections; "unique qualities of environmental settings", or place character; "relative exposure of city elements and settings of highest common significance, both functional and social"; the "plasticity and manipulability of city form to the actions of small groups and individuals" that might let

them reveal their own perceptual needs; and "rhythm of behavioral and perceptual constraint and release in the organization of environmental settings" that might allow "connections between objects and events."[103]

As more and more of the correct questions are asked about visual apperception of the social environment, such as those of Carr, the solutions can be systemically researched. Criteria checklists can be compiled and utilized in visual environmental assessment.

The Psychological Level and the Coherence Meaning

Visual conception is a result of the individual thinking about past experience and coming to sufficient conclusion about spatial meaning to develop perceptual expectations. This is sometimes called "schematic" perception.[104] It is especially important with the psychological level of visual environment to understand that visual conception acts in a unified or ecological process wherein the levels interact to allow the individual to carry out and maintain a functionally workable visual link with the overall environment. Similarly, vision works with other human perceptual systems to maintain the general link of man with environment.

Generally, the human psychological dimension is the individual's mental development based upon past personal and social experiences, culturally based thought avenues, and the physiological limitation and potentiality.[105] At

any particular point in a persons development, specific sets of selfconscious and unselfconscious concepts are based on these factors working in synthesis.

In many ways an individual's psychological level or existence simply refers to the personality, and in this respect is the social self.[106] However, in respect to visual perception the psychological dimension relates to the general conceptions a person develops about seeing things. The human psychological dimension intended here is more toward the area of self-conception or self-interpretation of the spatial environment which is not in conflict with social, perceptual veridicality.

Satisfaction, Competence and Stress. Individuals go about the mundane daily chores and other regular activities in the city, and the scenes before their eyes cause personal reaction. The forms and activities they see begin to distill in their minds as various coherent wholes, and not as disjointed bits or chunks of visual material. Success in the establishment of coherent wholes that coincide with previously established concepts, or fit into the schemata possessed by the individual, can create a personal sense of competence and satisfaction. Failure to discern this conceptual agreement can cause feelings of incompetence, confusion or irritability.

At a fairly basic level psychological stress can result from the simple inability to clearly discern meaning

from objects. For example, a motorist could have great difficulty deriving information from traffic or commercial signs in situations where certain juxtaposition or overlap of signs made comprehension impossible. The lettering, wording, or color or light contrast could cause this.

At a higher level an individual might expect or require certain spatial arrangements for esthetic satisfaction. Spatial environments not containing these arrangements would be inconsistent with the specific concept of beauty, and the visually perceived arrangement could be seen as ugly, dissatisfying, etc. A find old building might be pleasurable to an individual, but a flashing neon sign on its facade would be inconsistent with the person's concept of historic purity.

Idiosyncratic visual schemata exist in practically infinite degrees and variations. One task for planning could be to provide sufficient generalization or nonspecificity of visual arrangements to facilitate multiple understandings of the visual environment without jeopardizing the common functional aspects. Flexibility for necessary response should be included in designs, either esthetic or purely functional visual designs. An individual should be allowed personal reactions without the fear, or the actuality, or adverse consequences.

As personal coherence of the visual environment is developed over time, the perceptions enact over varying

periods and are constantly changing while maintaining some core of security. This might well indicate that changes in the urban visual environment should occur gradually.

Images. It is at the psychological level that human beings develop their stable image of the urban environment. This is the source of the synthetic "image of the city" that Kevin Lynch describes, and this is verified by examining Lynch's methodology toward identifying the public image. Sample subjects were questioned in Lynch's study, and the composite or synthetic image was derived from several individual images.[107] The study indicates that sufficient common elements exist in persons' images, so the common image can emerge.

However, the individual's image contains personal identity, orientation, achievement, and sense of competence.[108] Changing environmental forms can undermine these in varying degrees. For example, the pre-ring road era in cities provided a considerably different repertoire of visual material than the present does. Many resultant images and concepts are formed with visual material, quite without the observers awareness,[109] and dissatisfaction may be felt without clear knowledge of the source.

Continuity. The sense of personal continuity can be maintained through visual spatial form. Buildings, streets, natural forms, and other objects can be symbols of sets of

memories, or concepts and ideas, with which people identify and against which they can measure their place in time. "What time is this place?" is a question which when answered might serve to increase the probability of the sense of historical continuity.

This question is asked by Kevin Lynch in his recent book by the same name, What Time Is This Place?[110] Lynch extends the image established in his Image of the City to include the human sense and image of time and continuity. The arguments by Lynch for facilitating this sense include historic preservation, time signals, renewal, time perception and more; all of which are directly interpretable from visual objects in the urban environment.

Simplicity, Complexity and Ambiguity. Spatial form that provides for many reference possibilities for people can follow several general concepts. Simple forms that give relatively little specific meaning or require no particular behavioral reaction can serve as sufficiently general stimulation to allow the individual to orient to them in their own way.

Highly complex forms, districts, or activity areas can provide something for everyone. Ambiguity of forms in places where there is no interference with functional use, can serve as material for personal interpretations.

Amos Rapoport has co-authored two articles that directly address the concepts of simplicity, complexity and

ambiguity.[111] He generally rejects the idea of simplicity, because for the most part it is weak, and extremely simple visual arrangements often carry very little information.[112]

Rapoport contends that complex arrangements (and the urban visual environment in general) can provide something of an optimal "rate of usable information" which relates to information received and processed in an organized pattern that fits individuals' perceptual schemata.[113] Rapoport specifically refers to the process as psychological rather than physiological.

Based on the perceptual hierarchy proposed by Gibson in 1950,[114] Rapoport and Ron Hawkes apply information theory to the perception processes and determine that complexity is a highly desirable quality for the urban environment.[115] The rate of usable information, they say, is dependent upon environmental complexity values that lie just beyond the contemporary ideals in a community, and thus a constant flow of information can be achieved because the rates of complexity are maintained just beyond requirements.[116]

Before Rapoport's system could be used it would be of some necessity to know the threshold levels of complexity required by the local population. However, the proposal assumes that "...while personal and cultural factors affect perception of the urban scene, they can only modify the information the physical environment provides to everyone".[117] The process is realted to individual expectancies (their

intentional perceptual poles) and thus the system would tend to maintain satisfaction for people by keeping the complexity level just beyond their expectations, and would thus create the optimal rate of usable information.

Personal Space. Both Robert Sommer and Edward T. Hall have made comment on the personal space requirements and uses. Hall's system of cultural Proxemics includes intimate and personal distance in close and far phases.[118] The total distance is only four feet in which certain personal sorts of human interaction occur. According to Hall, the specific behavior which occurs in this space is culturally dependent, and he also describes social and public distances.

Robert Sommer in the book, Personal Space, discusses "the emotionally charged zone around each person...which helps to regulate the spacing of individuals," and "the processes by which people mark out and personalize the spaces they inhabit."[119] In fact, this is very similar to Hall's described distance, and Sommer credits his intellectual debt to Hall.

The subtitle of Sommer's book is "The Behavioral Basis to Design", and generally this personal space relates to the behavior of individuals inside buildings. However, it also relates to the external urban space in that individuals also "mark out" space for themselves in parks, malls, sidewalks. According to Sommer, people are very aware of their own personal space and when it is violated the situation becomes uneasy.

The Cultural Level and the Symbolic Meaning

The nature of culture makes it difficult to understand and explain the cultural aspects of visual perception and of the urban visual environment. Apparently the field of planning has rarely attempted to consider the cultural levels of either man or his urban environment. Usually culture is considered only as certain amenity aspects, such as the so-called "cultural" and civic centers which include performing arts buildings, museums, libraries, etc.[120] These facilities are important to urban centers, but the cultural emphasis is not sufficiently comprehensive.

Because the cultural level of visual perception and environment, and the symbolic meaning, is somewhat difficult to analyze, the discussion here does not attempt to be definitive of the possible connections between the material, cultural environment and the symbolic meaning. Rather, the discussion is suggestive of possible approaches that might lead to the further detailing of the connections.

Culture. The immaterial forces of culture might be briefly defined as the gross and systemic organization of a people's values, meaning-structure, norms, etc. superimposed on their thought, behavioral and artifactual modes. As Pitirim Sorokin has written, culture is "the central principle (the 'reason') which permeates all the components, given sense and significance to each of them, and in this way makes cosmos of a chaos of unintegrated fragments."[121]

Worldwide, there are many cultures and through cross-cultural analyses, such as those conducted by Sorokin and Edward T. Hall, many distinctions can be determined among the various values and norms which create differences in thought, behavior and artifacts.[122] The concern of the immediate discussion here is not to point out differences among cultures, but rather to consider the connections between the visual environment and symbolic meaning in the visual perception of culture by individuals while they are immersed in it.

Perceiving Culture. Culture can best and easiest be perceived by either comparison with other cultures or over time, but in the daily functioning of most people, there is hardly opportunity for either of these. In normal, daily behavior visual perception of the cultural environment is nearly incapable of achieving selfconscious response. The symbolic meaning, as here defined, is practically synonomous with the "informal awareness" presented by Edward T. Hall in The Silent Language.[123] Hall describes the nature of the direct, everyday influences and patterns of culture as "out-of-awareness". The organizational forces of culture and the pervasive character of its influence, simply makes it difficult to see while immersed in it.

The visually perceived material forms of culture are the artifacts and natural forms of the urban environment. Actually, as natural forms are "utilized" in the urban

environment, they too might be considered as artifacts. From the symbolic aspects of these forms and the patterns they exhibit, it is possible for urban dwellers to "get a feeling" of the cultural level of the urban environment.

Forming Symbols in Perception. It has been noted by various persons that the tendency to symbolize is an inherent human trait, and possibly a need.[124] The symbolization trait makes possible the visual perception of the cultural level of the urban environment by articulating the material pieces that constitute an abstraction reflecting the culture. The general process of symbolization as the articulation and unification of pieces is aptly described by Amos Rapoport and Ron Hawkes;

> The ability to group "bits" into "chunks" and then into symbols--to group even larger numbers of elementary perceptions into single higher level percepts--reduces the number of units of information to be handled by increasing the amount of information in each unit and enables us to perceive much more quickly in terms of wholes. In this sense, symbols are one way of reducing the bewildering amount of information. [125]

Clearly, Rapoport and Hawkes are describing symbolization of a very utilitarian sort, but their description gives an account of how the symbolization process functions.

Articulation of Cultural Symbols. It should be noted that urban designers cannot simply create cultural symbols from the environment of urban artifacts. The symbols evolve over time, just as cultures do. In fact, it seems reasonable to suspect a somewhat direct and parallel development of

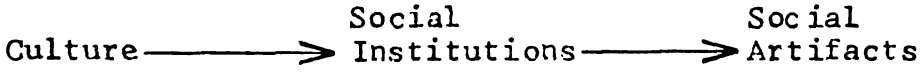
the two. Symbolic meaning in artifacts derives from the cultural ordering, whether that ordering be reflected in artifacts as neatness or near chaos, and the artifacts that serve as the intermediate symbols tend to embody the cultural order. Cultural order applies to the thought, behavior, and artifact modes of man and is reflected thus in science, social interaction and institutions, and building forms, as well as many other material and immaterial items. Thus, even though the focus here is upon the material symbols, there are immaterial symbols as well.

Suzanne K. Langer indicates that cultural symbols can be created, not through pure creation, but from the arrangement of the somewhat salient and pervasive forms in the cultural environment to which many people can relate.[126] Langer says that the arts related to functional forms, such as architecture and urban design, come closest to being articulated in symbols capable of being perceived on a day to day basis.[127] The symbols created in and presented by architecture, for example, are the forms least estranged from the public, and are daily in view to great numbers of people.[128] Langer refers to architecture as the created space of ethnic (cultural) domain, which is thus a place of culture. She says,

> ...like any other plastic symbol, it is primarily an illusion of self-contained, self-sufficient, perceptual space...and articulates the "ethnic domain" or "virtual place" by treatment of an actual place. 129

While this might be an achievable goal at the architectural scale, it would be difficult to accomplish at the scale of the city with which the articulation would need to be continuous over large expanses and distances in space viewable by people. For assessment possibilities, however, there may be some means for articulating the ethnic domain--cultural--symbols of the urban environment.

The actual visual perception of a material cultural environment is predicated upon witnessing the larger, pervasive organization of the spatial forms of society. The pieces for articulation are essentially the material forms of social institutions; their artifacts. Thus the articulation of the symbols might be viewed as a synthetic chain:



The cultural forces determine the immaterial institutional forms, which in turn develop the artifacts and use the natural forms. The social artifacts are thus formed indirectly by the cultural forces. For example, a bank building might be analyzed for its cultural, symbolic value by evaluating its esthetic value. Esthetic values are cultural, but the accepted building methods, materials, and arrangements are social, and thus the artifactual product (the bank building) reflects the cultural, esthetic values formed by social means.

There are many instances where the link between cultural forces and artifacts are, or should be, direct. For example, at the urban scale, large outdoor sculptures are not restricted by many social methods. Also, natural forms should be respected for their intrinsic values--either esthetic or just natural values.[130] The articulation chain for symbols would thus be read:

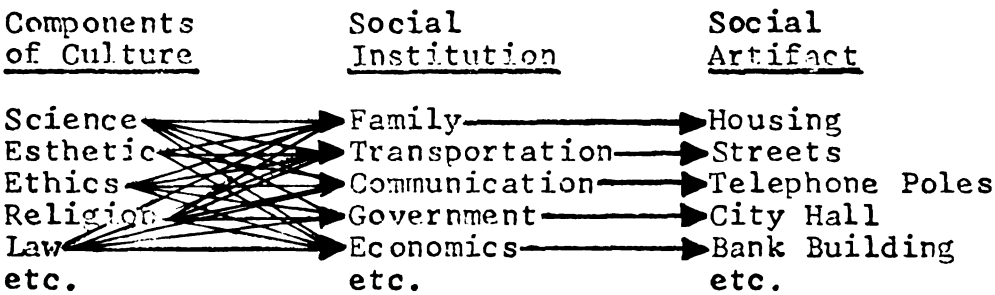
Culture ——————→ Artifacts

or

Culture ——————→ Nature

A number of social institutions have material forms. For examples, family, transportation, communication, education, economics and government, have visible spatial form in housing, streets and autos, telephone cables, school buildings, stores and factories, city hall, and variations of some of these. By viewing the material forms of the social institutions, it might be possible to analyze something of the symbolic meaning by relating the range of cultural factors, such as ethics, esthetics, scientific modes, etc. to the institutions to see if the cultural values, norms and meanings could be read. If so, then some of the fabric and elements of meaningful symbols could be subjected to analysis.

The above observations have not been developed in regard to actual connections and it is difficult to describe specific examples in the direct relationships among cultural categories, social institutions and social artifacts, as the relationships form symbolic meaning. The diagram below however, exemplifies the general relationships that might be considered.



Some Symbol Examples and Qualitative Judgments. In regard to all the above observations, a number of symbol examples can be discussed. Most of these examples necessarily involve qualitative judgments of the cultural values.

Some specific examples of material forms in the urban visual environment which might exhibit symbolic, cultural meaning have been suggested by Denise Scott Brown in her essay "The Meaningful City".[131] Brown, however, makes it clear that although symbolic "messages" are conveyed, they do not form imageable wholes and their symbol potential is presently only a latent factor. This latent factor she claims is forming in the relationships "...between parts

of the city as a result of the social and technological changes of the twentieth century".[132]

The general factors listed by Brown that exhibit the symbolic messages are the heraldry systems of cities, the urban physiognomy, and location patterns. Heraldry is defined as the written and graphic signs in cities. Brown suggests that today pictorial imagery is usually neglected for signs in favor of lettered signs. Seemingly, the heraldry in most cities can be read as a whole as symbolic of cultural values, such as the esthetics of signage which approaches anarchy.[133] The difficulty or impossibility of reading many signs in strip commercial developments, for example, suggests that sign exhibition might be more a custom than functional intention.

Urban physiognomy is defined by Brown as "...the sizes and shapes of buildings and the spaces around them; their architecture; the texture and patterns of their surfaces, indoors and outdoors."[134] Brown notes that our society has tended to isolate important buildings, suggesting the functions of the buildings so situated can reveal the values related to the institutions responsible for the structure. The same meaning might be exhibited with size hierarchy which could reflect value-hierarchy.

Location patterns of buildings, activities, etc. can also serve as symbols. The usual central location of government might reflect the relative dominance of regulatory values; commercial locations along major streets

might symbolize the relative importance of economic values.[135]

The symbols presented by Brown are relationship or hierarchial types; it is possible to observe single symbols which give meaning in themselves. For examples, it seems that three very strong cultural symbols in most urban environments today are shopping centers, strip commercial developments, and urban freeways. These tend to stand alone and symbolize much more than is immediately given, or is capable of easy verbal articulation.

Shopping centers (malls) in the suburban areas today instantly communicate the death or decay of the neighborhood and downtown shopping areas. They communicate changes in street systems, travel patterns and modes and they reveal changes from the personal attention of the small shop to the anonymity of shopper and shopkeeper in the large shopping centers. Many more of the observations can be noted, but more relevant is the immediacy with which the feeling of all these types of changes and patterns are exhibited to individuals as they approach the parking lot of, or just see or think about, the shopping center. The shopping center is a symbol of many changes in the culture of America, and of the current economic interaction mode.

The commercial strips seen along many major streets in most American cities act similarly as a symbol of the values, norms and changes in American culture. The urban

freeway works as a symbol in a similar way. Many elements of the symbolic meaning of these urban items can easily be detailed.

Necessity of Symbolic Meaning. Even though many of the component elements of the meaning is presented by the above mentioned urban forms, it is generally only the large and encompassing feeling that is given in the everyday visual perception of them. The perceptions are supraliminal and do not ordinarily reach the selfconscious response level. Moreover, in qualitative terms few of these or other symbol examples that might be discussed, tend to exhibit the power to elicit favorable or positive feelings. This is not an intrinsic trait in the general concept of culture, but rather the product of the values in our culture.

Empirical evidence seems to thwart most attempts to find existant symbols that elicit feelings other than alienation, and to promote making the symbols more visible seems a dubious enterprise. It is thus evident that the process of attempting to make cultural symbols more visible probably should include qualitative judgments by planners (or other decision-makers) in order that less foreboding meanings might be perceived.

George Banz in his book, Elements of Urban Form, discusses urban symbolism in a manner which clearly elucidates much of the analytic discussion presented above, and he points out some of the necessity of symbolic meaning. Banz says,

> Every human decision grows out of past experience. Thus the sum of urban artifacts represents an accumulation of individual decisions and acts, sanctioned at one time or another by the urban community; it symbolizes the community's tradition. In removing any part of the built environment, an element of this tradition is publicly discarded. The deliberate retention of urban artifacts, on the other hand, particularly in the face of emerging forces symbolizes a reaffirmation of traditional values--symbolizes an assertion of the continuing relevance of earlier generations' beliefs, opinions, and customs.
>
> Urban symbolism is inherent in the major communal structures in which a collective will to form has found valid expression. In such buildings widely different subcommunities may recognize their common roots, and dominant artifacts may continue to condition the urban environment and, through it, collective attitudes. This relationship roots individuals in the past, permits them to draw on the collective values of former times, and offers them orientation in time. 136

Kevin Lynch has made similar observations, especially in his latest book, What Time Is This Place?[137] Lynch indicates that various visual elements and procedures can be utilized to enhance the cultural, symbolic meanings. In these he includes historic (cultural) preservation, forms in the urban scene which act as time signals, and careful renewal that does not destroy past and emerging new symbols. Both Lynch and Banz indicate that it is important to people to be able to perceive, or "feel", higher meanings from urban artifacts. It seems there has been certain disregard for attempting to embody symbolic feelings in artifacts, and such should be promoted.

Conclusion

For the purposes of identification and general reference, the theoretical schema and the visual assessment framework proposed in this chapter might be called a comprehensive perceptual approach for assessing the urban visual environment. The attempt in this chapter has been to present in general terms all the human perceptual needs and uses of the urban visual environment, and thus the product can be termed comprehensive.

The discussion here has intended to promote the idea that knowledge of the human needs and uses of the visual environment should be developed to serve as criteria for assessing the quality of the urban visual environment. In such assessment, the concrete or empirically verified links between the meanings obtained in visual perception and the elements of the urban visual environment can serve as the major indicator points of function and dysfunction, and suggest areas for the focus of planner action.

A synthesis of the concepts of visual perception and urban environment has been attempted here in order to produce a theoretical schema for assessing the urban environment. Through a number of analytical steps, two elements have been developed here that can serve as a framework for the future structuring of the human visual criteria, such as the examples presented in the last part of this chapter. The two elements for the framework are simply, (1) the

levels of the urban visual environment, and (2) the perceptual meanings of visual space.

The levels of urban visual environment, determined on the basis of human perceptual orientation to the urban environment, include physiological, social, psychological and cultural. These levels are to be viewed as they provide the stimuli for human visual perception, and thus as they satisfy the needs and uses to which people put the urban visual environment, selfconsciously or unselfconsciously.

The perceptual meanings of visual space were developed from the visual perception products, and these meanings reflect what the human needs and uses of the urban visual environment are.

The latter portion of this chapter has attempted the beginning of the detailing process of the spatial aspects of the visual environmental levels and the connections of the spatial meanings to that milieu. This detailing process is likely to be one requiring considerable time and effort to develop, and as new knowledge is revealed concerning these connections, revision of the material in the framework will necessitate modification or replacement.

The next chapter shall attempt to outline some of the planning implications and applications that might be involved in the proposed comprehensive perceptual approach for assessing the urban visual environment.

Notes

1. George Banz. Elements of Urban Form (NY: McGraw-Hill, 1970), p. 101.

2. Kenneth Craik, "The Comprehension of the Everyday Physical Environment", Journal of the American Institute of Planners, Vol. 34 (January 1968), p. 29.

3. Maurice Broady. Planning for People (London: The Bedford Square Press, 1968), p. 11.

4. Ibid., p. 14.

5. Ibid.

6. David Lowenthal, "Environmental Influence: Some Implications of Opposing Views", in Planning 1970, (Chicago: American Society of Planning Officials, 1970), p. 255.

7. See David Lowenthal (ed). Environmental Perception and Behavior, Research Paper No. 109 (Chicago: Department of Geography, University of Chicago, 1967).

8. Craik, p. 36.

9. Kevin Lynch, "Quality in City Design", in Who Designs America? edited by Laurence B. Holland (NY: Anchor Books, 1966), p. 145.

10. James J. Gibson. The Senses Considered as Perceptual Systems (Boston: Houghton Mifflin, 1966), Chapter I.

11. R. Buckminster Fuller. Operating Manual for Spaceship Earth (NY: Pocket Books, 1970), Chapter t.

12. Note that this is exactly opposite the approach of environmental determinism, and is in essence the direction proposed by Constance Perin in With Man in Mind (Cambridge: MIT Press, 1970), see especially Chapter 2.

13. Besides the obvious influence of Professor Farness' thinking on this structuring, it must also be pointed out that the independent research led to nearly identical conclusions, which lends considerable reinforcement to the original schema. Also, the whole line of thought here, in obvious and subtle ways, is

greatly indebted to Rene Dubos' ideas presented in Man Adapting (New Haven: Yale University Press, 1965); and to Pitirim Sorokin's work, especially as presented in his Society, Culture and Personality (NY: Cooper Square, 1962), and his Social and Cultural Dynamics, revised and abridged one volume edition (Boston: Porter Sargent Publisher, 1957).

14. James J. Gibson. The Perception of the Visual World (Boston: Houghton Mifflin, 1950). Gibson specifically identifies a perceptual level for each above mode of being, except "ego" which he implies. He does so in a running discussion from page 190 to 213.

15. See for examples, Julian Hochberg, Perception (Englewood Cliffs, NJ: Prentice-Hall, 1964); William H. Ittelson, Visual Space Perception (NY: Springer, 1960); Floyd Allport, Theories of Perception and the Concept of Structure (NY: John Wiley & Sons, 1955); Magdalen D. Vernon, The Psychology of Perception (Baltimore: Penguin Books, 1962); Eleanor J. Gibson, Principles of Perceptual Learning and Development (NY: Appleton-Century-Crofts, 1969); and in James J. Gibson's own later, The Senses Considered As Perceptual Systems (Boston: Houghton Mifflin, 1966).

16. Regarding physiological perception of isolated stimuli, patterns and objects see E.L.J. Leeuwenberg, Structural Information of Visual Patterns (The Hague: Moriton and Co., 1968); and John C. Baird, Psychophysical Analysis of Visual Space (Oxford: Pergamon Press, 1970). Part of the research on pattern perception was begun by the Gestalt psychologists; see the various sources on their work; for an example, Wolfgang Kohler, Gestalt Psychology (NY: H. Liveright, 1929).

17. James J. Gibson. The Perception of the Visual World, p. 206.

18. Ibid., p. viii.

19. This is noted in many references, for example, see Robert M. Boyton, "The Psychophysics of Vision" in Contemporary Theory and Research in Visual Perception edited by Ralph Haber (NY: Holt, Rinehart & Winston, 1968), p. 11.

20. Hochberg, pp. 101-102.

21. This classification of environments for qualitative analysis was presented by Professor Farness in planning theory class.

22. This distinction has been made by Rudolf Arnheim in his book Visual Thinking (Berkeley: University of California Press, 1969).

23. Peter F. Smith, "The Pros and Cons of Subliminal Perception in the Built Environment", Ekistics, Vol. 34 (November 1972), p. 368. The term "subception" is used here to mean what Smith calls "subliminal perception". "Subception" is frequently used by psychologists as synonomous with Smith's term, and the use here avoids confusion with the term "supraliminal" which refers to the cultural level. See Hochberg, p. 102.

24. Allport, p. 63.

25. Edward T. Hall. The Hidden Dimension (Garden City, NY: Doubleday, 1969), p. 66; also, Arnheim. Visual Thinking, p. 13; and Christian Norberg-Schulz. Intentions in Architecture (Cambridge: MIT Press, 1968), p. 31.

26. As these aspects are difficult to explain and understand, see in general Edward T. Hall. The Silent Language (Greenwich, Connecticut: Fawcett Premier Books, 1966), especially pages 37-41 and 70-83; and also Hall's The Hidden Dimension, pp. 111-112.

27. Hall, The Silent Language, p. 73.

28. Ibid., pp. 38-39. Also see Marshall H. Segall, Donald T. Campbell and Melville J. Herskovits. The Influence of Culture on Visual Perception (Indianapolis: Bobbs-Merrill, 1966) especially page 15.

29. Gaston Bachelard. The Poetics of Space translated by Maria Jolas (NY: The Orion Press, 1964), p. xiv.

30. John Platt. Perception and Change (Ann Arbor: University of Michigan Press, 1970), p. 44.

31. Ibid., p. 34.

32. See Joachim F. Wohlwill, "The Physical Environment: A Problem for a Psychology of Stimulation," in People and Buildings edited by Robert Gutman (NY: Basic Books, 1972), p. 89; also refer to Amos Rapoport and Robert E. Kantor, "Complexity and Ambiguity in Environmental Design," Journal of the American Institute of Planners, Vol. 33 (July 1967), pp. 210-221.

33. Platt, p. 85.

34. Rene Dubos. Man Adapting, Chapter 10.

35. H. Helson. Adaptation-Level Theory (NY: Harper and Row, 1964).

36. John F. Corso. The Experimental Psychology of Sensory Behavior (NY: Holt, Rinehart and Winston, 1967), p. 266.

37. Wohlwill, p. 89.

38. This is rarely explicitly stated in references, but the implications of such seem somewhat clearly demonstrated by Carl Steinitz in "Meaning and Congruence of Urban Form and Activity", Journal of the Institute of Planners, Vol. 34 (July 1968), see especially page 243.

39. James J. Gibson. The Perception of the Visual World, p. 202.

40. Steinitz, p. 246.

41. Dubos, Chapter 10.

42. Allport, p. 44.

43. There have been exceptions to this, such as revolutions, but even these were previously portended.

44. The designation of "being" as the visual result of the cultural level of perception is a formulation which seems most logical based on the results of the other perception processes. The other terms--seeing, knowing and believing--are derived from Jonas F. Soltis, Seeing, Knowing and Believing (London: Allen and Unwin, 1966).

45. Again, this is an observation presented by Professor Farness as the material aspects of human settlement. This conclusion is seemingly rather logical and obvious, and, again, in the course of the thesis research these categories were reached independently according to the nature of the findings.

46. James J. Gibson. The Perception of the Visual World, p. 63.

47. This is simplifying the process considerably relative to the knowledge available, but for the purposes at this point, this is sufficient. For a more complete explanation see Lorrin A. Riggs "Light as a Stimulus for Vision" in Vision and Visual Perception edited by Clarence Graham (NY: John Wiley and Sons, 1965), pp. 1-38.

48. James J. Gibson. The Perception of the Visual World, p. 1991.

49. Ibid., p. 34.

50. Steinitz, p. 233.

51. Ibid.

52. James K. Feibleman. The Institutions of Society (London: Allen & Unwin, 1956).

53. Norberg-Schulz, Intentions in Architecture, p. 29.

54. Ibid., p. 31.

55. Ibid., p. 27.

56. Ibid., p. 32.

57. For good discussions and attempts at cultural analysis see Edward T. Hall's The Silent Language and The Hidden Dimension; Pitirim Sorokin, Society, Culture and Personality; Marshall H. Segall, Donald T. Campbell and Melville Herskovits, The Influence of Culture on Visual Perception; and James Feibleman, The Theory of Human Culture (NY: Duell, Sloan and Pierce, 1948).

58. Christian Norberg-Schulz. Existence, Space and Architecture (NY: Praeger, 1971), p. 9.

59. Max Jammer. Concepts of Space (NY: Harper Books, 1960).

60. Norberg-Schulz. Existence, Space and Architecture, p. 13.

61. Ibid., p. 9 and 11.

62. James J. Gibson. The Perception of the Visual World, p. 78.

63. Although this is somewhat difficult to explain, and rarely attempted, many persons confirm this, usually indirectly. The essential core to man's perceptual orientation to environment, at least temporally, is the knowledge of appropriate channels of social interaction through the various institutions. It is interesting to note that the city "institutions" mentioned by Louis Kahn, and the urban level of Norberg-Schulz's existential space have common elements. See John W. Cook and Heinrich Klotz, Conversations with Architects (NY: Praeger, 1973), Chapter 6 "Louis Kahn", p. 183; and Christian Norberg-Schulz, Existence, Space and Architecture, p. 29.

64. Christian Norberg-Schulz. Existence, Space and Architecture, p. 10.

65. Ibid.

66. Christian Norberg-Schulz. Intentions in Architecture, p. 50.

67. "Symbol" has been used in a wide variety of ways, and defined in many ways. The definition here is not fixed except in the sense that little meaning other than symbolic can be established at the cultural level. See Christian Norberg-Schulz, Intentions in Architecture, Chapter 2; Suzanne K. Langer, Feeling and Form (NY: Charles Scribner's Sons, 1953); and Ernst Cassirer, The Philosophy of Symbolic Form, Vol. III (New Haven: Yale University Press, 1963).

68. The concept of "chunking" together assorted "bits" is a form of symbolization established in information theory. See George A. Miller, "The Magic Number Seven, Plus or Minus Two..." The Psychological Review, Vol. 63 (1956), pp. 81-97.

69. T. Parsons, The Social Systems (Glencoe, 1951), p. 327 quoted in Christian Norberg-Schulz, Intentions in Architecture, p. 79.

70. James J. Gibson. The Senses Considered as Perceptual Systems, Chapter IX.

71. Ibid.

72. Ibid.

73. Ibid., p. 156.

74. Merrill J. Allen. Vision and Highway Safety (Philadelphia: Chilton Book Co., 1970), p. 6.

75. Ibid., p. 178.

76. For capsule discussions of the many gestalt principles see Rudolf Arnheim, "Gestalt Psychology and Artistic Form" in Aspects of Form edited by L.L. Whyte (Bloomington: Indiana University Press, 1966), pp. 196-208; or Floyd H. Allport. Theories of Perception and the Concept of Structure (NY: John Wiley & Sons, 1955), pp. 112-117.

77. See for examples, Theodore W. Forbes, T.E. Snyder and R.F. Pain, "Traffic Sign Requirements", Highway Research Board Bulletin 70 (1963 and 1964); and Theodore W. Forbes, et. al., "Color and Brightness Factors in Simulated and Full-Scale Traffic Sign Visibility", Highway Research Board Bulletin 216, (1968).

78. William Ewald, Jr. and Daniel Mandelker. Street Graphics (Washington, D.C.: The American Society of Landscape Architects Foundation, 1971).

79. Abraham Moles. Information Theory and Esthetic Perception (Urbana: University of Illinois Press, 1966) p. 57; and Gibson, The Senses Considered as Perceptual Systems, Chapter XII.

80. Gibson, The Senses Considered as Perceptual Systems, p. 193.

81. Ibid., p. 194.

82. John C. Baird. Psychophysical Analysis of Visual Space (Oxford: Pergamon Press, 1970, p. 2).

83. Gibson, The Senses Considered as Perceptual Systems, p. 196.

84. Ibid., p. 161.

85. Ibid., p. 163.

86. This and the immediately subsequent observations are reported in Christopher Tunnard and Boris Pusharev's Man-Made America: Chaos or Control (New Haven: Yale University Press, 1963), pp. 171-175.

87. Kevin Lynch. The Image of the City (Cambridge: MIT Press, 1960).

88. Ibid., p. 7. It is interesting to note that Lynch's book was introduced, pre-publication, with the title The Perceptual Form of Cities, see S.W. Jacobs and B.G. Jones. City Design Through Conservation, Vol. 1 (Berkeley: University of California, 1960), unpublished photocopy, p. 171.

89. Lynch, The Image of the City, p. 15.

90. Ibid., pp. 47-49.

91. Ibid., pp. 105-108.

92. Ibid., p. 4.

93. Christian Norberg-Schulz. Existence, Space and Architecture, p. 15.

94. An example of the Lynch methodology being applied to a specific city environment is Jackson City Planning Board, City Form and Visual Analysis (Jackson, Mississippi, 1970).

95. Carl Steinitz, "Meaning and Congruence of Urban Form and Activity". Journal of the American Institute of Planners, Vol. 34 (July, 1968), p. 233.

96. Ibid.

97. Ibid., pp. 234-235.

98. Ibid., p. 247.

99. Kenneth Craik, "The Comprehension of the Everyday Physical Environment", The Journal of the American Institute of Planners, Vol. 34 (January 1968), pp. 29-37.

100. Ibid., p. 30.

101. Stephen Carr, "The City of the Mind" in Environment for Man edited by William Ewald, Jr. (Bloomington: Indiana University Press, 1967), pp. 197-226.

102. Ibid., p. 219.

103. Ibid., pp. 221-223.

104. This is discussed as "schematic" in many sources, see James J. Gibson, The Perception of the Visual World p. 10; Christian Norberg-Schulz, Intentions in Architecture, p. 41; and Christian Norberg-Schulz, Existence, Space and Architecture, p. 10.

105. Kurt W. Bach and Kenneth J. Gergen. "The Self Through the Latter Span of Life", inThe Self in Social Interaction edited by Chad Gordon and Kenneth J. Gergen (NY: John Wiley & Sons, 1969), p. 241.

106. The term "social self" has been used by Professor Sanford Farness to describe the personality. A similar observation has been made by Petirim Sorokin in his Social and Cultural Dynamics (Boston: Porter Sargent,

1957), p. 436. Also see Edward A. Tiryakian, "The Existential Self and the Person", in The Self in Social Interaction.

107. Lynch, The Image of the City, pp. 140-143.

108. Talcott Parsons, "The Position of Identity in the General Theory of Action", in The Self in Social Interaction, p. 23.

109. Charles Morris. Signs, Language and Behavior (NY: Prentice-Hall, 1946), p. 111.

110. Kevin Lynch. What Time Is This Place? (Cambridge: MIT Press, 1972).

111. Amos Rapoport and Robert E. Kantor, "Complexity and Ambiguity in Environmental Design", pp. 210-221; and Amos Rapoport and Ron Hawkes, "The Perception of Urban Complexity", Journal of the American Institute of Planners, Vol. 36 (March 1970), pp. 106-111.

112. Rapoport and Hawkes, "The Perception of Urban Complexity", p. 109.

113. Ibid., p. 106.

114. James J. Gibson. The Perception of the Visual World (Boston: Houghton Mifflin, 1950), pp. 190-213.

115. Rapoport and Hawkes, p. 108.

116. Ibid.

117. Ibid., p. 110.

118. Edward T. Hall, The Hidden Dimension, pp. 116-120.

119. Robert Sommer. Personal Space (Englewood Cliffs, NJ: Prentice-Hall, 1969), p. viii.

120. Jane Jacobs. The Death and Life of Great American Cities (NY: Random House, 1961), pp. 168-174.

121. Pitirim Sorokim, Social and Cultural Dynamics, p. 14.

122. Ibid.; and Hall, The Silent Language and The Hidden Dimension.

123. Hall, The Silent Language, p. 73.

124. See for examples, George A. Miller, "The Magic Number Seven, Plus or Minus Two...", pp. 81-97; and Rapoport and Hawkes, "The Perception of Urban Complexity," pp. 106-111.

125. Rapoport and Hawkes, p. 107.

126. Suzanne K. Langer. Feeling and Form (NY: Charles Scribner's Sons, 1953), p. 248.

127. Ibid., p. 93.

128. Ibid., p. 403-404.

129. Ibid., p. 95.

130. See the essay, Ian L. McHarg, "Values, Process and Form" in The Fitness of Man's Environment, papers delivered at the Smithsonian Institution Annual Symposium, 1967 (NY: Harper and Row, 1968), pp. 209-227.

131. Denise Scott Brown, "The Meaningful City", American Institute of Architects Journal, (January 1965), p. 27-32.

132. Ibid., p. 30.

133. Ibid.

134. Ibid.

135. Ibid.

136. George Banz. Elements of Urban Forms (NY: McGraw-Hill, 1970), pp. 111-112.

137. Kevin Lynch. What Time Is This Place? (Cambridge: MIT Press, 1972).

CHAPTER IV

PLANNING IMPLICATIONS AND APPLICATIONS RELATED TO THE COMPREHENSIVE PERCEPTUAL APPROACH

A comprehensive understanding of the perception-environment relationship is far from being complete, and some of the scholars pursuing this goal indicate that it might be decades before the various sciences are able to provide much concrete and ready-to-use information for the planning and design professions.[1] Because of this state of affairs, there is little reason to expect that planners and designers should have already utilized the information as assessment and design criteria, or that many studies toward actual planning applications of this material have been conducted as yet.

There is, however, considerable information available concerning the human visual perception of the urban environment, as has been noted in Chapter III, and there are various planning implications and applications related to this information that should be considered. Unquestionably, however, because the use of this information by planning is still very much in its infancy, proposals toward specific planner action can only be suggestive.

A viable area for planning that can fully utilize the knowledge from the various sciences for visual assessment can be established only over time and with diligent research. The discussion in this chapter concerns some possible related planning methodology, and is toward establishing a niche in planning for inclusion of the proposed comprehensive perceptual approach for assessing the urban visual environment.

Unfortunately, the present state of available information and the neophyte position of planning relative to the perception-environment field of study precludes the possibility of establishing detailed or fully comprehensive planning applications. Thus, this chapter addresses in a general manner three major areas of planning consideration for the visual perception criteria; these include (1) policy implications, (2) suggested studies and plans, and (3) some considerations for recording and measuring data from the urban visual environment.

Policy Implications

The proposed comprehensive perceptual approach for the objective assessment of the urban visual environment possesses certain inherent features which tend to dictate some visual planning and design policy implications. The following discussion is a brief identification and explanation of each of these inherent features.

Comprehensiveness

The perceptual approach proposed here does not include every factor relevant to the assessment and design of the urban visual environment. Specifically, it does not refer to any of the commonly recognized esthetic or design principles, such as symmetry-asymmetry, openness-enclosure, balance-imbalance, etc.,[2] but it does not necessarily attempt to replace or exclude them.

The theoretical schema established here does attempt to include the complete scope of factors relevant to the human perceptual needs and uses, both selfconscious and unselfconscious, of the urban environment. Thus, in the sense of planning for the facilitation of human visual perception this approach is intended to be comprehensive.

In regard to the esthetic and design principles this visual approach can provide for the evaluation of them, and can actually enhance the principles by supplementing them with relevant criteria and providing a framework for structuring visual esthetic and design data.

The essential type of comprehensiveness provided by this theoretical schema is the broad approach to visual perception which is intended to cover all aspects of visual perception as it relates to human existence and the ecological functioning of human beings. Based on a broad research effort into physiology, sociology, psychology, anthropology, the humanities, and various other disciplines,

and many of the findings of Professor Farness' years of study, the theoretical schema has established as a systems framework the physiological, social, psychological and cultural orientations of vision.

The implications of this comprehensive approach to visual perception for planning policy considerations simply mean that the assessment of the urban visual environment can be established on the same general framework as a variety of other planning areas. All human considerations in planning can be related to the systemic human modes of being structure.

Relevance of Approach for People

As already portended above, the comprehensive perceptual approach to urban visual assessment is of direct relevance to people. The basis of the approach is the orientation structure of human beings to life. The physiological, social, psychological, and cultural (and ego) modes of human existence have evolved over human history into their primary areas of ecological functioning. The ecological settings in which people live contain spatial, environmental correspondents which relate to the primary existence orientations. The discovery of the links between the various visual perception modes and the various levels of spatial setting makes planning the visual aspects of the environment, based on these links, directly relevant to people.

Recent years have seen attempts in planning to make the professional work increasingly relevant to people in meaningful ways. Policy considerations have started to include these concerns. Much of the reaction of planners toward including people more solidly in planning action has been in the form of direct citizen participation of various sorts.

Direct citizen participation in visual assessment and design can amount to little more than momentary statements of visual preference, which can prove quite fickle. Thus, the primary area for the relevant consideration of people in the policy considerations of planning the visual environment, is deemed here to be concrete and meaningful research into the fundamental visual needs of human beings. Particular projects can then include preference information with the solid basis of primary human visual needs already established.

Systems Approach

The comprehensive perceptual approach proposed here is structured on the systems approach and includes the essential ingredients of general systems theory. This approach provides for the examination of the parts of a whole system while regarding the integrity of the whole system. Systems levels are dependent upon each other in various ways.

In human vision there is essentially one whole ecological visual process, but its functioning is very difficult to utilize in visual planning. Breaking down the whole visual system into its interacting component parts provides a method for analyzing the whole visual system by examination of the parts. The discussion in Chapter III of the various dynamic components of general visual perception--transaction, adjustment for equilibrium, consciousness states of response, relative process stability, etc.--provided the systems levels relationship and interaction factors. The systems dissection and analyses allow the visual perception knowledge to be corresponded in analysis to environmental levels, and thus to the concrete areas of planning competence.

This systems approach considerably enhances the methodology and eases the problems involved in analyzing the spatial components of the urban visual environment. The policy implications of the systems approach simply involve a planning methodology capable of effectively handling the problems in solvable ways.

Revealing Criteria

The nature of the comprehensive perceptual approach for visual assessment automatically reveals the relevant criteria for its effectuation in its process. At the basis of this criteria is the framework for structuring data, and on this framework the data can be structured in logical

categories. In the process of establishing and expanding the theoretical schema, more and more criteria for assessment and design of the urban visual environment are simultaneously established.

The comprehensive perceptual approach has as its core the counterpoints or links between the perceptual meanings of visual space and the levels of the urban visual environment. As the links are revealed the critical points for planner action are automatically presented. As a matter of policy it is important that the meaning-environmental levels research be conducted on a continuing basis.

Necessity of Continual Study and Research

As mentioned immediately above, it is necessary that the study process related to the theoretical schema of the comprehensive perceptual approach for visual assessment be established as a continuing institution in planning. The analysis in Chapter III pointed out the nature of visual perception and of the urban visual environment to be constantly changing and adjusting pheonomena. Because of this, the necessity of continued study and research should be a matter of planning policy related to visual assessment and design.

Environmental Order with Diversity

There is one specific observation that becomes revealed as an inherent implication from the comprehensive perceptual

approach. The overall process of visual perception indicates in its nature that there is a necessity for maintaining considerable diversity of visual environmental stimuli, but that the diversity should be structured with perceivable order.

At the basic level of visual perception, the physiological reception and subception processes, the essential procedures of the brain in processing information tned to dictate environmental order with diversity. It is known that the brain's functioning becomes quite insensitive (bored) during only short periods of redundant stimulation.[3] It is also known that the brain works constantly to seek out or create order in the received stimulation; if this cannot be accomplished the brain often gives up after some attempts to adapt. The exact functioning of these processes is not known, but that it exists is a fact, and thus is a rudimentary consideration in planning for the facilitation of human visual perception.

As indicated in the discussion in Chapter III, there are similar perceptual requisites for the other levels of visual perception. The visual apperception of social cues needs considerable clarity of environmental stimuli for correct response. The visual concepts formed at the psychological level of visual perception require a wide diversity of environmental stimuli in order to facilitate success by a broad range of individuals.

Because there is considerable proof that order and diversity of visual stimulation are required by individuals for competent visual perception, then, even though these are quite specific factors, they should be considered as fundamental elements for policy considerations concerning visual assessment and design.

General Policy Considerations

The above particular implications for visual assessment and design policy considerations are seemingly inherent in the comprehensive perceptual approach proposed here. These implications should be considered in any planning or political decisions that have an effect on the urban visual environment. A large number of decisions could inadvertantly create situations in the visual environment that might have deleterious effects for human visual perception.

Certain decisions concerning urban affairs have direct or indirect influences on the visual environment. These might include zoning decisions, site plan reviews, code enforcement, street and intersection design, sign regulation decisions, architectural review, and very many more. The information provided from the proposed comprehensive perceptual approach to visual concerns should be included in the basic policy considerations of any areas of urban decision-making thtat can influence or change the urban visual environment.

Related Studies and Plans

Beyond the need for the continuing active research and study to progressively reveal further concrete links between the perceptual meanings of visual space and the levels of visual environment, a number of general studies and probable needed plans can be suggested. These suggested studies and plans can be undertaken independent of the progressive detailing of the meaning-environment links. Of course, the more knowledge of the links that is held, the more relevant the visual assessment studies and plans can be, but the actions proposed here are more directly concerned with the application of the comprehensive perceptual approach in the planning process.

The following discussion covers the suggested studies and plans separately, but the relationship between them is strong, and the plans are certainly dependent upon the studies having been previously conducted.

The studies and plans toward the inclusion of the comprehensive perceptual approach for assessing the urban visual environment in urban planning are essentially in four major areas. They are: (1) a visual environmental impact study, (2) assessment through visual intelligence, (3) the considerations of visual perspectives and scale, and (4) the plan approaches.

Visual Environmental Impact Study

This study mainly involves applying the criteria established at each of the systems levels of the comprehensive perceptual approach to the assessment of the urban visual environment in particular urban areas. This includes collecting data in particular urban areas based on the known links between the spatial meaning and environmental levels--the study includes the physiological, social, psychological and cultural levels.

There is no attempt here to detail all the specific aspects of the study, and only the general areas of planning application as they correspond to each of the systems levels are suggested.

Physiological Level. This level of the environmental impact study involves establishing the quality of the visual environment in regard to its inclusion of stimuli and patterns of stimuli capable of providing for the successful achievement of ordinal-literal spatial meaning by urban dwellers and commuters.

Discovering these qualitative aspects requires, especially, the examination of the urban streets and intersections to assess the probability of successful visual negotiation of the street in a moving automobile. Quite possibly this examination should begin with the study of police accident records and the causes of various accidents, to note those mishaps that were reportedly caused by visual

problems. This initial study would indicate obvious visual trouble spots; the particular spots could then be assessed in detail. General visual reconnaissance with subjective assessment by a trained planner could also act to ferret out trouble spots, such as intersections, areas with many signs or bright lights, and various other possible obvious and more subtle situations.

Because the primary stimulus for vision is light, a general lighting evaluation study should be conducted. This would include both artificial and natural light. Sun orientation in relation to street layout, building heights, tree locations, etc. should be carefully determined. Areas of excessive glare or shading should be noted.

The general areas for study are based on the fundamental physiological operation of the human visual system. The planners conducting the assessments should be well informed of the basic needs of vision at this level, and know what to seek in the study. Specific areas in the city that function well for this level of vision should be noted, as well as those which are in states of dysfunction. All of the known criteria for the satisfaction of the physiological operation of human vision should be applied in assessment, especially in locations of the most critical need for quick and accurate vision.

The study at this basic level of visual facilitation can be as general or as detailed as deemed necessary by the

planning staff, or as is dictated by the environmental situation. Certainly, the study should be conducted city-wide, and specific locations where it is known that good vision is necessary could be determined prior to the field survey.

Social Level. This level of the visual environmental impact study should essentially be focused on surveying the visibility of social interaction cues. This relates to the cues that might indicate visually what to do, where to go, etc. A study similar to Kevin Lynch's "Image" study could be conducted, and both field surveys and interviews would be necessary to find out what forms, landmarks, edges, etc. visible in the urban environment are used by the urban citizens to find their way around the city and to locate various activity areas in the city.[4]

Also to be considered along these general lines is the study of possible congruences between specific forms and activities which are visible in the city, such as the study by Carl Steinitz discussed in Chapter III,[5] This relates to all types of activities usually called land-uses such as commercial, industrial and residential. These categories should further be detailed according to specific activities, such as shopping, entering specific entrances, finding freeway ramps and going to the theatre.

In these studies there should be an identification of the relative clarity of the street hierarchy--major,

secondary, etc.--and the probability of the visible hierarchy actually acting as cues to where the street leads (direction), how fast the traffic moves, etc., should be determined. It should also be noted whether or not there are visual sequences or series of cues which give continued identification of direction, hierarchy, place and destination, including street signs which should continually inform and guide.[6]

The social level of visual assessment should also include the relative visibility of various services, public and private, to which urban dwellers may wish to travel. This could be correlated with the general types of social studies which indicate the location and types of various social groups (such as age-groups and education levels) to determine whether or not the services they ordinarily need are visible to them. Also, in regard to these common social studies it might be possible to determine the visibility of the groups, such as the identification of specific group territories that might be reflected in status-housing, slum areas, and other visually identifiable spatial environments.

Psychological Level. Considering this level of the visual environmental impact study, it is particularly difficult to direct assessment actions. Certainly, as much information as possible concerning the various ways individuals relate visually to the spatial environment should be collected. The specific spatial elements commonly used for personal orientation should be noted. Perhaps much of

this could be determined from psychology literature, but in specific urban areas no doubt interviews should be conducted. Not only should the "public image" of the city be determined, but the various different images should also be noted. There have been image studies done, similar to Lynch's,[7] that indicate there can be mutually exclusive images. In such cases, it is obvious that it would be of necessity not to exclude some of the elements that go into various visual images.

Sociologist William Michelson indicates that he favors the approach to environmental design that considers the various concepts of orientation that individuals exhibit relative to the spatial environment, rather than essentially working with a "public image" or group membership.[8] Michelson's concerns, then, are basically at the psychological level, but he also states that the personal considerations should not be in conflict with the more social concerns.[9] It seems that the psychological level of visual study should proceed on this idea.

In regard to the above general observations the study at the psychological level could proceed to assess visible areas in public space that might be sought out and used by individuals. Such spaces should include an understanding of "personal space" requirements revealed by such scholars as Robert Sommer and Edward T. Hall.[10] These men assert that individuals possess a personal-space "bubble" around themselves that fluctuates in various social situations.

The visual study at this level should locate and note areas of social activity where interference with the personal space might occur.

In the study for visual assessment at the psychological level there should be consideration for diverse opportunities of personal, intellectual orientation and curiosity, especially for children in pedestrian areas.[11] Related to this, there might also be diverse opportunities for emotional relationships. These intellectual, curiosity and emotional aspects may be in the urban visual environment, and visual assessment can determine their existence.

There is a possibility that even the informative and regulative street signs in some urban areas do not provide information sufficient to provide each urban citizen with needed information. The recent move toward pictorial signs, as opposed to written ones, might serve to make signage more relevant to all people.

Implications for the visual assessment of the psychological level have been indicated by Kenneth Craik in regard to individual understanding, thought, qualitative judgment, and expectations determined from the spatial environment.[12] Craik suggests that studies in the urban visual environment might include assessing specific "environmental displays", such as shopping centers, theatres and vestpocket parks, and through interview methods find out what the perceptual orientations to these specific developments are.[13] Robert

Sommer has made similar suggestions, and he further includes playgrounds, museums, and several different building types.[14]

Cultural Level. At this final level of the visual environmental impact study, the essential objective in the visual assessment field survey is determining the existence of symbols in the urban environment which visually convey cultural reference or reflection.

It would be essential to assessment at the cultural level to conduct the cultural preservation study. Any buildings, districts, neighborhoods and sites that reflect important and especially pleasing cultural values should be noted. This study would not necessarily regard age as the fundamental ingredient for cultural value. A Frank Lloyd Wright building or the birthplace of Martin Luther King might be just as culturally important as a colonial period mansion or the birthplace of Abraham Lincoln.

However, another element of the preservation study should include elements of time reference--a sense of position in time or of the continuation of important cultural values. This study would essentially be an historic preservation study, but it too should consider visible environmental components of recent time reference, as well as to the distant past.[15]

Related to the cultural and historic preservation assessment studies at the cultural level is the consideration for dominant or particularly striking esthetic elements

of the environment, which might serve as symbolic of cultural esthetic values. It might be well to note that some factories can convey just as much beauty as some of the new civic centers.

The esthetic assessment should focus on the building forms, landforms, and any other spatial elements that tend to reflect beauty. It has been suggested that such forms should be considered for their sensory, expressive, and sequence qualities,[16] and that possibly art consultants could serve planning staffs in helping choose the major esthetic forms.

Another area for assessment of the urban visual environment at the cultural level involves the possible patterns, styles, and forms related to social institutions.[17] For example, the locations of banking facilities may form patterns reflective of cultural norms or values. Similarly, there may be particular architectural styles common to banking or other institutional buildings. It might be possible to discern forms frequently associated with various institutions, such as the building-to-site forms of schools, hospitals, or other such institutions.

In the entire visual assessment process of the cultural level of the visual environmental impact study, care should be taken to note subjectively observed or devised ways for symbol enhancement. Arrangements should be noted that tend to make certain pleasing symbols more visible.

One final and important area for study at the cultural level is the visual identification of subcultural groups in a particular urban environment. Research should be conducted into the values, norms, and meaning-structures of any subcultural or minority groups of different heritage than the dominant culture (this is of course assuming study is also conducted into the values, norms, and meaning-structure of the dominant culture as well). If there is a specific territory in the city that is recognized as a particular minority ethnic domain, it should be noted whether or not that domain has a visual identification.

It is believed that the above discussion has covered the major points for assessment in the urban visual environment based on perceptual criteria, but there is likelihood that many more factors for consideration can be established. There is one other general area of consideration that should be included in the visual environmental impact study; that is, the consideration of level interrelationships, or an interlevel congruence model.

Interlevel Congruence Model.[19] This model would be based on discerning the area where the physiological, social, psychological and cultural levels of perceptual, visual environment are superimposed in the same spatial forms, and consequently the relative proportions of the perceptual meanings of visual space could be determined in a specific urban form.

Presently, it is considered that the knowledge necessary for establishing the model is not sufficient. A much more complete distinction of the links between the levels of environment and the spatial meanings would be necessary. However, it seems obvious that to varying degrees all the levels of environment, and all the perceptual meanings of the visual space would be present in all spatial forms.

Although a difficult model to devise, once established it could be quite functional and serve to significantly ease the difficulties involved in assessing the urban visual environment for meaningful perceptual data. Figure 25 illustrates in general and conceptual terms how the inter-level congruence model might work. The following factors should be involved: (1) the major system level in the form could be assessed, (2) the relative proportion of the levels in a form could be determined, and (3) the base area of congruence around which the functional-dysfunctional states could be assessed, could be discerned.

Visual Intelligence

Under the general category of visual intelligence, the major premise is that city, regional, metropolitan, and even all project visual design or assessment cannot be handled on a piecemeal or a one-time-design basis. Thus, visual intelligence refers to a comprehensive and at least partially on-going process of visual assessment and design of the urban visual environment.

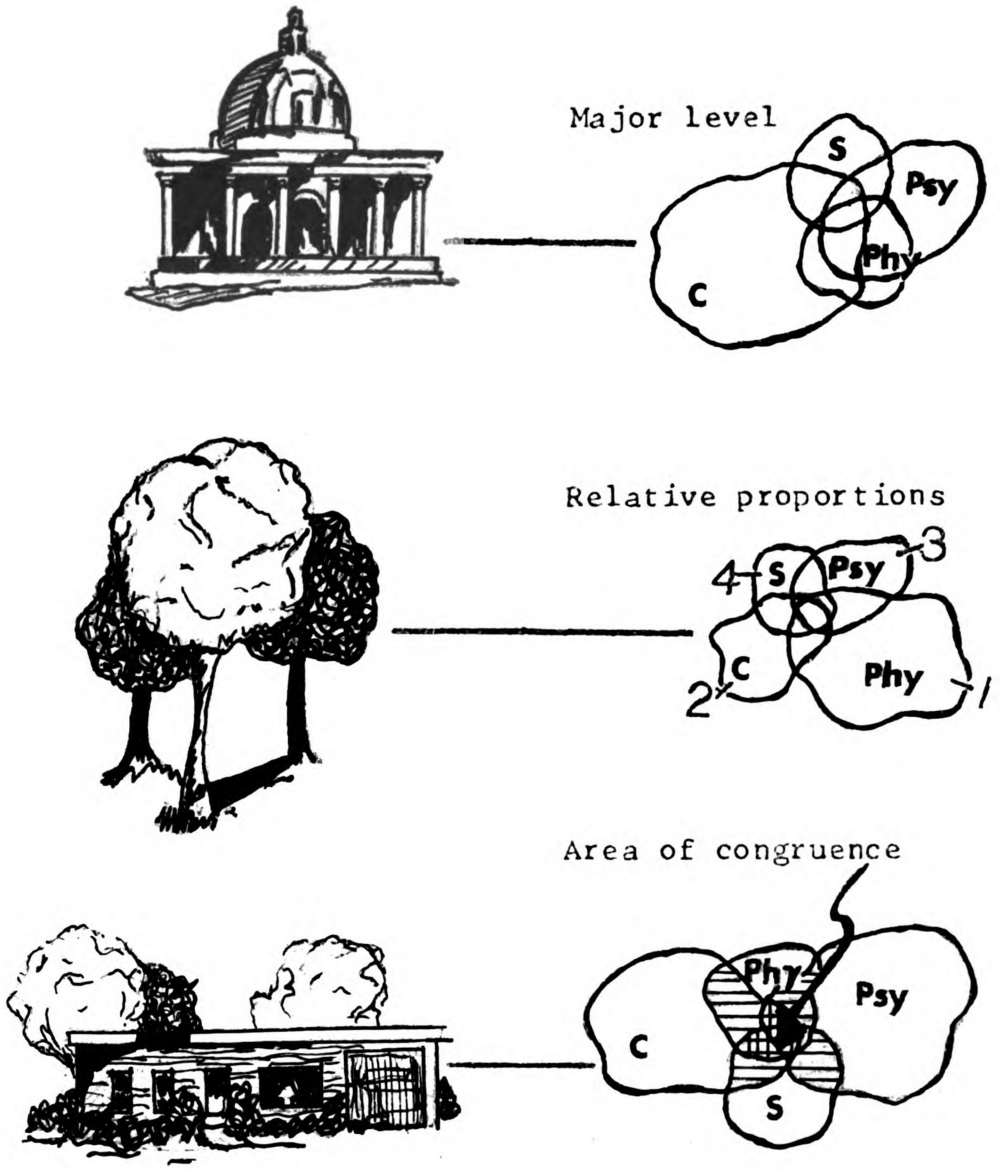


Figure 25.
Possible Analytical Functioning of an Interlevel Congruence Model.

The fundamental process of the comprehensive perceptual approach for visual assessment proposed in this thesis indicates that the visual environment and its related importance is not simply confined to esthetic beauty or other appearance concerns. It is therefore important at the outset of the description of visual intelligence to point out that the handling of the visual assessment of the urban environment should unquestionably be done in concert with all other planning and design concerns. Even the previously discussed "visual environmental impact study" should be conducted as an integral part of other planning studies when possible.

The above point has been addressed by Kevin Lynch, and he aptly states the primary reason that visual study should accompany other planning concerns to the advantage of both;

> Sensuous intelligence will have to fit in with other data collection, so that questions must be found which can be employed in an origin and destination survey, or data compiled on an area basis compatible with other statistics. In the past, visual information has been gathered as though it were something special and remote from all other concerns, and the result is often that the information is in a form which cannot be applied in making comprehensive decisions. On the contrary, sensuous data are relevant to many other questions. The quality of visual sequences bears on traffic flow and safety; visual identity affects market value; stimulus load has a meaning for health; and so on. 20

Thus, as Lynch indicates, there can be considerable correspondence between visual and other planning endeavors, and to a significant extent the visual intelligence (or

monitoring) study can join or at least parallel the other studies as they are conducted.

The following discussion suggests a number of probable elements that should be considered in the establishment and operation of visual intelligence. The areas include (1) the visual monitoring system, (2) the regulatory approach, and (3) orientation and scale considerations. These refer to the manner in which visual assessment studies should be conducted.

Visual Monitoring System.[21] The central concern for this system is its place in the general planning endeavor. Although visual assessment should be carried out primarily in relation to other planning work, there should be a visual section in the planning department, or depending on the staff size at least a visual specialist on the staff.

Ideally all members of the planning staff would have considerable understanding of visual concerns and specifically of the proposed comprehensive perceptual approach. In lieu of this training a special visual section or person could deal with the visual aspects that might be involved in any planning work. This section or specialist would work at testing the visual aspects of all plans, evaluate development proposals and serve as advisor to the general staff, planning commission, review boards, city council, and any other city agency or department or private citizens desiring information on visual appearances or design. The job done competently would be a highly busy one.

The visual section or specialist could also serve as a liaison among various agencies and departments in coordinating the visual impact of common projects, common geographic areas of concern, and other common points of interaction. Any projects including visible elements should be subjected to visual assessment. At various times it might be necessary to assign a visual task force to dwell on the assessment and design of special projects for other agencies.

The visual monitoring system and the special staff section could also be directed toward specific work in the visual assessment and design. The previously discussed "visual environmental impact study", as it has to be done either in league with other studies or independently, should be handled by the special section.

The visual monitoring section would work to collect, evaluate, and store visual data for future use. This storage might be done with films, photos, sketches, special notation systems, and could possibly even be prepared for computer storage.[22]

It would be quite possible for the visual monitoring section to work with designs on a regular basis. Specifically, the section should conduct visual assessment and design of some city systems. For examples, these systems could include signs, artificial lighting, plantings, streets, transit system, signal lights, recreation, open space, utility fixtures, pedestrian areas, movement ways, and others. These systems could be visually assessed according

to the comprehensive perceptual approach presented in this thesis, and the visual monitoring section could recommend specific design action on the systems to make them as visually functional as possible.

One fundamental duty of the visual monitoring section would be to further research the perceptual needs and uses of people, and to further determine the concrete links between the levels of urban environment and the perceptual meanings of visual space, as presented here in Chapter III. This information, much of which can be determined from research into literature, should also be analyzed from the specific urban visual environment in field surveys and interviews conducted with local citizens. Established criteria and specific local information should be incorporated into planning manuals and preliminary studies.

In general the visual monitoring system would be structured so it could have access to all developments, special projects, ordinance and code preparation in order to monitor all actions in the city which might affect the form of the urban visual environment.

Regulatory Approach. This approach to the assessment of the urban visual environment is included under the "visual intelligence" heading because the various mechanisms for urban environmental control can serve, and be served by, the implementation of the comprehensive perceptual approach. It has been noted by several persons that the visual

environment is subject to influences from the various control measures, as was noted previously in Chapter I. As these controls affect the urban visual scene, they should partially be established on the criteria provided by the comprehensive perceptual approach proposed in this thesis.

The chief concern related to regulatory implementation of the comprehensive perceptual approach, is that the information from this approach should serve as the primary criteria for visual regulation. The environment, spatial meaning, and perception information should be considered in zoning ordinances, subdivision regulations, site plan review, bonus or incentive regulatory measures, building and related codes, architectural review regulations, and historic and cultural preservation ordinances.

Some of the specific elements ordinarily controlled that are components of the visual environment include; density considerations, building locations and dimensions, open space requirements, street layouts, lot size and configuration, block design, signs, parking space and location, landscaping, fences, building-site arrangement, and a number of other features. As controls for these and other elements are devised, they should carefully consider the visual impact based on the comprehensive perceptual criteria.

If the perceptual criteria are considered in controls, the specific regulation of esthetics can be considerably relaxed, and remain simple and flexible. When the perceptual criteria are considered in reference to their optimal states, only esthetic minimums would be necessary, except for special historic areas such as described in Mary Hommann's Wooster Square.[23]

Also, it may be possible to relate the visual information to controls on urban forms and patterns, and actually avoid the necessity of some visual controls. For example, lot size, height, and similar dimensional concerns can be devised for the general forms or patterns they produce, and these forms and patterns can be meaningful when based on the objective perceptual criteria. The visual impact of the regulatory specifications can be predicted, especially if the regulations are geared to specific areas or zones.

Any review procedures connected to regulations in which the visual aspects are based on the objective and comprehensive perceptual criteria, can remain flexible in regard to other visual concerns (such as esthetic design specs). Likely, the other specific visual regulations could nearly be confined to only special areas, locations, or special development types, as defined by the special purposes involved. The comprehensive perceptual criteria would cover almost any other general eventualities.

Finally, the perceptual criteria proposed here, when well developed, could serve as objective evidence in judicial proceedings. Seemingly, visual controls based on the objective and comprehensive perceptual criteria, could at least be easier defended than controls determined on an arbitrary or subjective esthetic basis. Ordinarily, visual controls are difficult to defend in court, if the control attempts to go beyond the traditional health, safety, welfare and morals basis--the perceptual criteria can fit into this established mold without invoking esthetic arguments.

Visual Perspectives and Assessment Scales

All assessment studies and any visual plans that might be formed should be carried out with certain regard for the human visual perspectives and assessment scales. The fundamental concepts involved in both the comprehensive scope and the perceptual approach for the assessment of the urban visual environment tend to imply certain notions about the levels of visual perspectives from which assessment should be considered, and about the scales at which assessment of the visual environment should be conducted.

Comprehensiveness implies an inclusive approach, both in regard to the levels of visual perspective, from pedestrian to motorist, and in regard to the scale of assessment operations which should be quite extensive. The perceptual approach tends to imply the inherent multiple perspectives

from which a city might be perceived, and also to indicate that scale considerations should include whatever might be fitting to the human needs and uses of the urban visual environment. Thus, the levels of visual perspective and the notions of scale included here are somewhat dictated by the nature of the theoretical schema, which is both comprehensive in nature and based on human visual perception.

The visual perspectives and the idea of assessment scale are quite related in the comprehensive perceptual approach to urban visual assessment. In part, the scale concerns are implied by the perspectives from which people perceive the visual environment.

Visual Perspectives. Visual perception is a personal process and necessarily operates from the orientation of both human perspectives and human scale. In terms of size and size relationships, an individual cannot see a region, a whole city, a neighborhood, or even an entire block (except from special positions, such as on a hill or out of an airplane window). From the initial point of the perceiving individual the notions of scale are somewhat insufficient in their usual theoretical terms of reference.

However, once the different levels of visual perspective are enumerated, the scales come somewhat more into focus. The human visual perspectives in an urban area basically include four levels: (1) pedestrian, (2) from

buildings, (3) transit rider, and (4) motorist. At various times each of these can be either moving or at rest.

The pedestrian level includes either the walking or immobile person on the sidewalk, on a lawn, in a park, crossing a street, etc. The walking pedestrian moves quite slowly, frequently stops, and often scans the immediate area. Tremendous amounts of detail can be perceived by the pedestrian and there is much opportunity for unstressful vision.

However, at points of pedestrian-motorist conflict, such as intersections, the situation can elicit both physiological and psychological stress. Problems in discerning the directions to move, the information needed or the proper timing for the crossing can cause these stresses. On the other hand, well designed pedestrian-motorist interaction points, well marked with good visibility, can aid the pedestrian and motorist as well.

Knowledge about the needs of individuals for "personal space" can assist the planner in making visual assessments for the pedestrian visual persepctive. Field reconnaissance utilizing the subjective response can furnish considerable information for the pedestrian-level visual facilitation, especially if the objective perceptual and "person space" criteria are utilized as references.

The visual perspective of persons looking out of buildings which vary in heights and direction-orientation, is perhaps not a major concern of the planner, and is more in the realm of the architect. However, with the psychological (coherence) and the cultural (symbolic) meanings of visual space as criteria certain pleasant views might be considered in assessment. Quite frequently office workers and residents of high-rise apartment buildings look out their windows and down onto the unsightly tops of shorter buildings.

The transit rider perspective is mainly a concern of the social, use-function meaning criteria. The riders need to have sufficient visibility to know where they are going, where they are, and where their stop is. They also need satisfaction of higher visual meanings from the urban environment.

The motorist visual perspective is probably the most critical, and the perspective from which the most careful assessment of the functional-dysfunctional visual states should be conducted. The primary concern, of course, is applying all the levels of perceptual and spatial meaning criteria and evaluating the relative safety involved in environmental negotiation by auto. Although the physiological level of environment and the ordinal-literal meanings are the key areas to focus upon in assessment, the social concerns of finding locations and identifying places,

and the psychological image-coherence needs should also be considered. In the most relaxed motoring situations cultural symbols might be considered as they are seen from the street or urban freeway.

All levels of human visual perspective have their own special areas for assessment focus, especially as revealed in a particular urban visual environment. The objective criteria structured on the comprehensive perceptual framework proposed in this thesis should be the key factors on which the visual assessment is based.

Assessment Scales. The approach to the proper scales at which to assess the urban visual environment should keep the visual perspective levels in constant reference. At a specific location in a visual environment, the particular perspectives involved can be easily identified, and assessment conducted accordingly based on the comprehensive perceptual framework.

In general, because the urban citizen can vary the perspective from an immobile pedestrian to the motorist moving at 60-70 miles per hour, four fundamental and yet flexible scales should be utilized in visual assessment: (1) project, (2) sector, (3) city, and (4) region. Although the primary determinants of scale are the human visual perspectives, the four scales are for practical implementation purposes as well as being related closely to the scale needs of visual perception.[24]

The project scale includes the practical concerns of monitoring and carefully assessing the visual quality of proposals for new developments of varying sizes. This scale can assure the application of all the comprehensive perceptual criteria and within the scope of the particular project, the presence or absence of the various perceptual meanings of visual space can be determined. The project scale, particularly, is open to a broad range of actual spatial sizes from vestpocket park to new town and there is considerable opportunity for varying levels of visual environment and various spatial meanings.

The sector scale can vary in actual size, but has a more definite size reference; essentially that of block, neighborhood, district, subdivision, etc. These sectors generally would possess rather clear identities, and as such might serve the functions of Lynch's "city image".

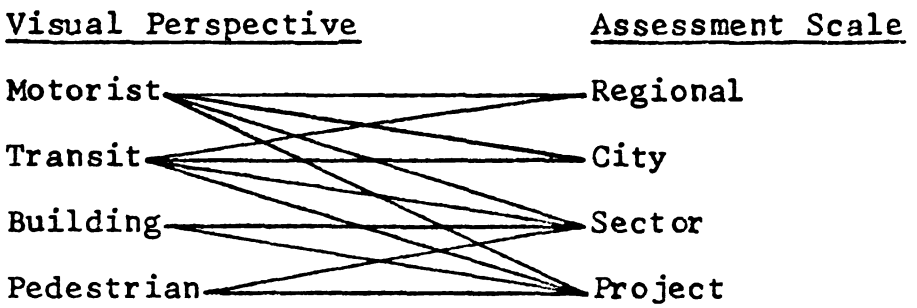
Within a specific sector, for example a neighborhood, the visual assessment could be confined within spatial limits and systematically carried out within specific boundaries. The streets, natural forms, lighting, signs, etc. within the neighborhood could be assessed for their visual quality relative to the satisfaction of the human needs and uses of the urban visual environment. Inter-sector assessment should always be considered because there might be some features in one sector that could serve surrounding sectors. This might be a dominant landmark (cue) or an old building (symbol).

The city scale can serve to facilitate some of the inter-sector relationship assessment. The city scale could provide for the assessment of visual links between sectors and among various other parts in an urban area. The city scale is not directly perceivable by the individual, but the continuity factor keeps the visual perspective constantly relevant for the person.

The regional scale of visual assessment serves essentially the same functions as the city scale, except it is larger and usually encompasses more diverse elements. For example, the regional scale ordinarily includes areas of undeveloped nature, very low density settlement, and such specific features as drive-in movies which are usually not in in the immediate limits of an incorporated city. Many other forms and activities are present at the regional scale, but not the city scale. Also, at the regional scale there may be more eventuality for assessing inadequate or low-level stimulation, where the other scales are more likely to possess high-level stimulation and perceptual overload.

These scale considerations are suggestive, and the major concern for scale is to make certain the adequate assessment of the urban visual environment, as it serves diverse human perceptual purposes and does or does not satisfy the various perceptual meanings of visual space.

Perspective-Scale Relationships. The relationships among the various visual perspectives and assessment scales are neither direct nor fixed. However, the possible mixes of the two should be kept in mind, and the primary relationships can be diagrammed as below.



Plan Approaches

It was noted in Chapter III that visual perception tends to permeate almost all of human behavior. Although many planners and researchers do not think that planning sufficiently considers human behavior as criteria for plan preparation, as it does, the visual perception criteria should be an integral part of the behavioral concerns. Also, in regard to most regular planning endeavors the comprehensive perceptual approach to the urban visual environment should be considered as a part of regular studies.

The above proposal relates directly to the earlier quote here by Kevin Lynch under the "visual intelligence"

heading, which asserted that visual concerns are essential parts of many areas of planning. Because of this, few plans need actually be prepared in conjunction with the proposed comprehensive perceptual approach to urban visual assessment. As was also noted previously under the "visual intelligence" heading, the primary importance of this proposed approach is its capability for providing criteria.

Thus, to propose a plan such as a "visual design plan" would necessarily be based on many other areas of planning and design, and really could not effectively stand as a "plan" on its own. It is deemed much more important here, that the systemic framework of perceptual environmental levels and perceptual meanings of visual space can much better serve planning in a supportive role, rather than the reverse. This supportive role, seemingly, could best serve city planning as a "visual section" in the comprehensive or other plan such as transportation, land use, recreation and open sapce. Besides the practical value of the comprehensive visual perception criteria, the "visual design" function for a city might well be served at little or no added cost if the visual considerations were integral parts of other plans and attached to the budgeting of the consequent implementation programs.

In regard to the supportive role of comprehensive perceptual approach, however, it might be advantageous to develop a separate but parallel program related to the

specific parent plan. For example, as Lynch has noted, a visual program could be developed for transportation and circulation plans, whereby the visual criteria would be utilized to increase circulation efficiency.[25]

Visual Policy Plan. This is seemingly the only general and complete plan that should be prepared in relation to the comprehensive perceptual approach to the urban visual environment, as proposed in this thesis. Related to the earlier discussion in this chapter under "policy implications" and to the entire theoretical schema discussed in Chapter III, a clear and complete statement of visual assessment and design policy should be formulated for the particular city.

The general visual policy could be determined in regard to the major situational considerations of a specific urban area. For example, San Antonio could state as a matter of policy that its River Walk should especially serve visual perception needs at the psychological and cultural levels, and provide for the full range of perceptual meanings of visual space. Therefore, the visual aspects of the River Walk would be thereafter enhanced accordingly, and never encroached upon.[26]

The preamble to the visual assessment and design policy plan should state the major premises behind the ordinal-literal, use-function, coherence and symbolic perceptual meanings of visual space, and note the different environmental

levels corresponding to the visual perception processes. From the preamble stated in brief and general terms, the specific policies toward public development and the controls on private development in the particular city could be stated. The specific elements included in the policy plan could be determined almost completely by the situations in the particular city.

System Plans. These visual plans should be developed on the basis of the nature of a particular city's visual systems.

Visual systems are of a wide variety of types; these include signs, signal systems, intersections, commercial developments, industrial areas, circulation networks, sidewalks, lakeshores, bike paths, and many more. Generally, it should be possible to devise visual assessment and design plans for specific parts of the larger systems, if the parts constitute systems. For examples, bus stops, transit lines, landscaping, boat docks and street lighting systems in many cities could be assessed for visual quality and be subsequently designed for future visual performance.

The system plan should be prepared on a selective basis, as it is determined that a particular visual system does not easily fit into a more general plan. Again, the special River Walk in San Antonio is a specific example of a system not easily categorized into a broader planning area. In order for a visual system to qualify for

a plan of its own, it need not possess reference to all levels of the comprehensive perceptual approach. The main criterion governing whether or not a specific plan is developed, is the relative independence of the particular visual system.

Sub-Plans. These plans simply relate to special visual areas of larger plans that might need elucidation or a special development approach for implementation. The visual aspects of historic or cultural preservation, landmark development, and park construction are examples of sub-plan items which might need their own development programs as well. Unlike the visual system plans, the sub-plan would not necessarily be chosen on a highly selective basis, and the nature of the particular plan element would dictate whether or not the sub-plan was needed.

Recording and Measuring Visual Data

Both visual and perceptual qualities in general are very difficult to record or measure. It has been relatively easy for physiological and psychophysical psychologists to determine and measure the basic physiological functioning of human vision in regard to light, color, patterns, etc.[27] However, even this basic level of research frequently makes new and updating discoveries. Most of the physiological level research has been conducted in the laboratory,

and efficient methods for dealing with vision in the environmental setting have not been established.

Beyond the physiological level of vision, there is practically no available research knowledge concerning how to record or measure the visual or perceptual qualities in the environment. The disciplines of sociology, psychology, and anthropology for examples, do not offer any concrete methods that could be adapted to planner action for determining and assessing the objective spatial forms possessing qualities for eliciting the perceptual meanings of visual space.

Although it is not presently feasible to establish a method for recording or measuring the visual data related to the proposed comprehensive perceptual approach, there are two elements in the theoretical schema which could serve as catalysts for future recording and measurement methods. The following discussion briefly explains these elements.

Designating the Counterpoint

"Counterpoint" is essentially a music term, which according to one definition is the "combination of two or more related independent melodies into a simple harmonious texture."[28] Although this term does not perfectly denote the spatial connection between the levels of urban environment (physiological, social, psychological, cultural) and the perceptual meanings of visual space (ordinal-literal,

use-function, coherence, symbolic), it does express much of the functioning of that spatial connection. The "counterpoint" intended here is the material and artifact locus in which the environment level and the spatial meaning tend to harmonize into a given whole percept. For the purposes of recording and possible measurement there is a need for a way to objectively and definitely designate the existence of the counterpoint.

The levels of environment are basically established as they provide the stimuli for visual perception. The perceptual meanings of visual space are the products of visual perception as they provide usable information to the perceiving individual. These concepts are both essentially immaterial; the first is a conceptual categorization, the second a mental state. The sought counterpoint is the harmonic fusion of these two immaterial concepts in spatial form. Some essential parts of the immaterial concepts are locked into (perhaps tenuously) spatial form, and give the objective link to visual perception. This might be expressed as in Figure 26.

Counterpoint Congruence

Previously in this chapter the concept of an "inter-level congruence model" was introduced. If developed, this model would indicate the blend of the different environmental levels and the different spatial meanings in specific urban spatial forms. This model could be applied to the

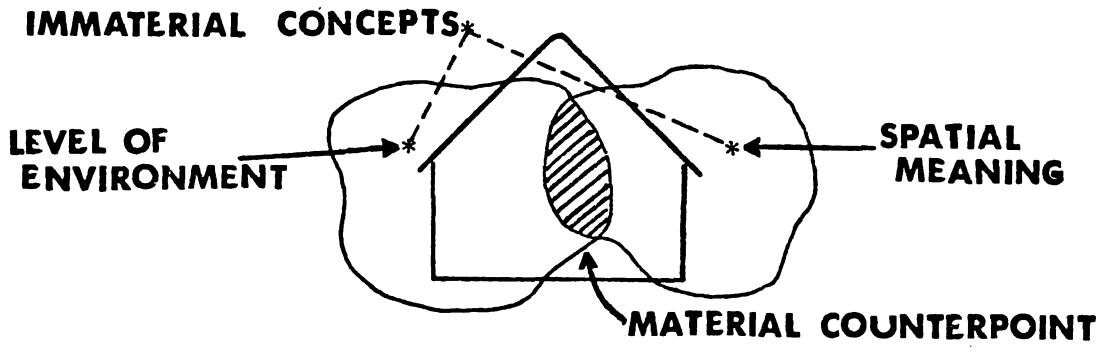


Figure 26.

Designating The Counterpoint

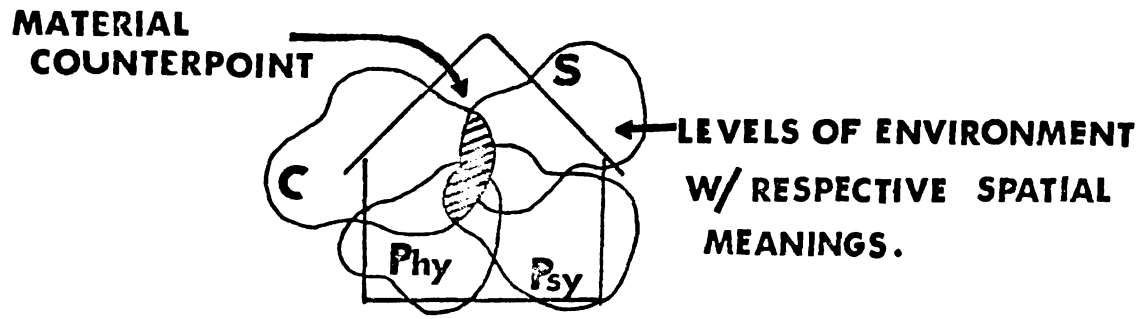


Figure 27.

Counterpoint Congruence

"counterpoint" and further define it. The counterpoint would then be represented as in Figure 27.

Notes

1. See for examples, Kenneth H. Craik, "The Comprehension of the Everyday Physical Environment" Journal of the American Institute of Planners, Vol. 34 (January 1968), p. 36; Joachim F. Wohlwill and Daniel H. Carson (eds). Environment and the Social Sciences (Washington: American Psychological Association, 1972), Introduction; Robert Sommer, Design Awareness (San Francisco: Rinehart Press, 1972), p. 27; and William Michelson. Man and His Urban Environment (Reading, Massachusetts: Addison-Wesley, 1970), p. 196.

2. For numerous examples of these principles for the urban environment see, John O. Simonds. Landscape Architecture (NY: F.W. Dodge Corp., 1961); Paul D. Spreiregen. Urban Design: The Architecture of Towns and Cities (NY: McGraw-Hill, 1965); and Garrett Eckbo. Urban Landscape Design (NY: McGraw-Hill, 1964).

3. This and the immediately following points are stated, both implicitly and explicitly, by many sources concerned especially with sensory deprivation and sensory overload. For a capsule discussion of these see especially John Platt. Perception and Change (Ann Arbor: University of Michigan Press, 1970), pp. 87-90. For more thorough explanations of the needs for order and diversity, see D.E. Berlyne. Conflict, Arousal, and Curiosity (NY: McGraw-Hill, 1960); M.R. Rosenzweiz, "Environmental Complexity, Cerebral Change and Behavior", American Psychologist, Vol. 21 (1966), pp. 321-322; and Philip Solomon, et. al. Sensory Deprivation (Cambridge: Harvard University Press, 1961).

4. Kevin Lynch, Image of the City (Cambridge: MIT Press, 1960).

5. Carl Steinitz, "Meaning and The Congruence of Urban Forms and Activity" Journal of the American Institute of Planners (Vol. 34 (July 1968), pp. 233-248.

6. On this point of street and advertising signs, it would be well to consider the concepts offered by William Ewald, Jr. and Daniel Mandelker in their Street Graphics (Washington: The American Society of Landscape Architecture Foundations, 1971).

7. Such observations were made by Peter Orleans and reported in "Urban Experimentation and Urban Sociology" Annual Meeting of the National Academy of Sciences, Washington, D.C., April 27, 1967. This is discussed in William Michelson. Man and His Urban Environment. (Reading, Massachusetts: Addison-Wesley, 1970), p. 45.

8. Michelson, p. 45.

9. Ibid.

10. See Robert Sommer, Personal Space (Englewood Cliffs, NJ: Prentice-Hall, 1969); and Edward T. Hall. The Hidden Dimension (Garden City, NY: Doubleday, 1969), pp. 119-120.

11. See Kevin Lynch, "City Design and City Appearance" in Principles and Practices of Urban Planning (Washington: International City Manager's Association, 1968), p. 255.

12. Craik, p. 36.

13. Ibid.

14. Sommer, Design Awareness, Chapter Nine.

15. See Kevin Lynch, What Time Is This Place? (Cambridge: MIT Press, 1972).

16. See Stephen Jacobs and Barclay Jones. City Design Through Conservation, Vol. I (Berkeley: University of California, unpublished photocopy, 1960).

17. See Richard S. Latham, "The Artifact As A Cultural Cipher" in Who Designs America? edited by Laurence B. Holland(Garden City, NY: Anchor-Doubleday, 1966), p. 276.

18. See Pitirim Sorokin. Social and Cultural Dynamics, abridged one volume edition (Boston: Porter Sargent Publisher, 1957), p. 10.

19. This model is based on an "intersystem congruence model" whereby the human levels of personality, social and culture, and the physical environment could co-exist well. This model is suggested by Willia Michelson in his Man and His Urban Environment, see especially page 26.

20. Kevin Lynch, "City Design and City Appearance", p. 264.

21. Many of the proposals described in this section are derived from the ideas of Kevin Lynch, see Ibid.

22. For one possible approach to general and computer data collection, and implications for storage, see Stuart W. Rose. A Notation/Simulation Process for Composers of Space (East Lansing: Department of Administration and Higher Education, College of Education, Michigan State University, 1968).

23. This is a special historic district; see Mary Hommann, Wooster Square (New Haven: New Haven Redevelopment Agency, 1965).

24. See M.R. Wolfe and R.D. Shinn. Urban Design Within the Comprehensive Planning Process (Seattle: University of Washington, 1970), p. 70.

25. Lynch, "City Design and City Appearance", p. 256, also see p. 265.

26. While in fact no such policy statement is made, see The River Walk Commission. San Antonio River Walk Policy Manual (San Antonio, Texas: City Planning Department, undated).

27. The "relative ease" involved in studying the physiological requirements of vision, of course, has covered many years of work, but much of the knowledge has been established. See Robert M. Boyton, "The Psychophysics of Vision" in Contemporary Theory and Research in Visual Perception edited by Ralph N. Haber (NY: Holt, Rinehart and Winston, 1968), pp. 8-25.

28. Webster's Seventh New Collegiate Dictionary (Springfield, Massachusetts: G & C. Merriam Co., 1971).

CHAPTER V

SUMMARY AND CONCLUSIONS

Two significant revelations have appeared in the development of this thesis that had not been anticipated with the original proposal. First, the developmental status of objective assessment and design of the urban visual environment by planning and the related design professions is at an even lower ebb than was originally presumed. Second, the cross-disciplinary research has revealed significantly more information toward establishing an organized approach for the furtherance of objective assessment and design than had been expected.

While the first surprise lent considerable support to the contentions of this work, the discovery was not a pleasant one. There were many hints in the planning and design literature that research into other disciplines might possibly reveal some usable knowledge about vision, but there was little reason to suspect that such a broad range of knowledge might be available from so many different fields.

Summary

The initial contentions of this thesis, stated in the Introduction, included the assertion that the urban planning and design fields were not utilizing sufficiently objective, comprehensive, or human-oriented approaches to the assessment, design and control of the urban visual environment. It was also noted that apparently planners are becoming increasingly nonvisual in their approach to the visual environment.

In the Introduction and Chapter I, it was deemed that (except for some rather general engineering concerns) only the narrow artistic concerns were being actively pursued in the urban visual environment and that such was insufficient consideration of the importance of the visual environment to people. There was an implicit denial of the possibility for utilizing visual information toward a broader application.

It was asserted in the Introduction that the major area of planning competence was supposed to be the design and control of the space-displacing forms of the city. Even though a broad range of sophisticated non-visual knowledge and methodology concerning the urban environment had been developed over the years by planning, if these could not be related back to the spatial environment through visual links, the information would be little applicable in the major area of planning concern.

It was contended in Chapter I that the complexity of the urban environment, and specifically the visual aspects, precluded effective assessment and design based on the dominant intuitive and subjective approaches. There was no denial of the important uses of intuition and subjective experience as a basis for many visual and especially artistic decisions. It was contended, however, that many important aspects of vision were being ignored which could be handled effectively only with the possession of more explicit and objective criteria.

Chapter I revealed the urban visual environment in the United States as a cumulative product of many years of rather haphazard visual development. Aside from the general and often nonhuman-oriented engineering and design principles and standards it was discovered that the major design approaches to urban visual form included little more than arranging objects in relation to each other based on the artistic and architectural design ideology. Also noted in Chapter I was the lack of objective human perception knowledge as criteria for planning controls on the visual aspects of cities. Chapter I also mentioned some of the reluctance of planners toward consulting the social and behavioral sciences for visual design knowledge.

The discussion in Chapter II pointed out some of the significant work toward establishing objective methods for designing the urban visual environment. Although there was

a conspicuous absence of planning involvement in this work, a broad range of general ideas and some experimental concepts were noted among individuals in other design professions and other fields interested in the man-environment relationships.

In Chapter III, this thesis introduced a theoretical approach toward objective assessment of the urban visual environment which was based on human visual perception knowledge. Because it was necessary that criteria for planning be in manipulatable form, the concepts of visual perception and urban environment were subjected to an analysis which attempted a synthesis of the two concepts. Research from many areas of study was drawn upon, and it was discovered that visual perception and the development of the man-made environment is founded upon the physiological, social, psychological, cultural and ego levels of human existence.

From the analytical synthesis in Chapter III various levels of the perceptual meanings of visual space were produced--the core of the human needs and uses of the urban visual environment was noted to lie in the meanings. The synthesis also produced the concept of environmental levels which corresponded with the spatial meanings, and thus the core of visual stimuli was introduced. The theoretical schema for a criteria framework for the assessment of the urban visual environment was thus proposed--founded on the

systemic and corresponding frameworks of the perceptual meanings of visual space and the environmental levels wherein the stimuli for perception lie.

Chapter III proceeded to detail what the concrete connections between the spatial meanings and environmental levels are in theoretical terms, as well as in some concrete examples. Thus, the points for planning focus in visual assessment became somewhat clearer. In general, these points were termed "counterpoints" and the theoretical schema was termed a comprehensive perceptual approach to the assessment of the urban visual environment.

The discussion in Chapter III stated that the proposed theoretical schema was exploratory, basically because the current knowledge was just too insufficient. Because of the exploratory and introductory nature of the proposed comprehensive perceptual approach and its relative state of development, the discussion in Chapter IV could not present conclusive planning applications. However, a number of planning implications and applications related to the theoretical schema were suggested.

The discussion in Chapter IV included the rather inherent qualities of the comprehensive perceptual approach, that seemingly tended to dictate some rudimentary policy implications. Also suggested in Chapter IV were the general approaches to field studies and plan making that would result form the application of the theoretical schema

of the proposed comprehensive perceptual approach to the assessment of the urban visual environment.

It was suggested in Chapter IV that the main importance of the comprehensive perceptual approach was its usability as a framework for collecting, storing, and using visual data in a systematic manner. Thus, the approach could better serve in assessment studies than in actual plans. However, as the theoretical approach included the fundamental visual requirements of human beings, it would likely serve an important part in the visual portions of plans.

The primary utilization of the comprehensive perceptual approach for visual assessment, however, would be in monitoring the visual environmental states, and toward this purpose the planning staff should include some people or a person with considerable visual training.

Conclusion

This conclusion shall be relatively brief and simple as compared to the process which has led to it. Much of the conclusion is presented in the summary above. The research and development in this thesis seem to indicate the apparent existence of various levels of visual concerns that demand attention if comprehensive and effective assessment and design of the urban visual environment is expected. These levels indicate the existence of several different visual environments from which people receive information

which they can utilize to serve many of their daily functions in the urban environment.

The identified levels of visual environment, which serve as the bases of orientation for human visual endeavors, are identified in this thesis as physiological, social, psychological and cultural. Much knowledge exists in the research findings of numerous fields of study that indicates the presence of these specific visual environments in the urban visual environment. Man has biological existence, social existence, personal existence, and existence in the larger cultural milieu. There is little reason to suspect that man has not evolved visual purposes and means for sustaining these different levels of existence.

Detached analytical study on a progressive basis over time can reveal more and more of the specific visual connections of people to the urban environment and their visual uses of the actual spatial forms in the urban environment. People relate visually to the environment in an ecological transaction process, and empirical study can reveal much of the perception-environment connection by observing people in the urban environment. This can especially be done related to their relative success or failure in negotiating the city, and in the satisfaction or disappointment they express.

The perceptual spatial meanings revealed in this thesis present the human requirements of the various levels.

The physiological level requires that the urban visual environment be both simple and clear enough, and complex enough to allow the simple spatial environment to be revealed for use in physical environmental negotiation. The social level necessitates enough visual clarity of the social institutional forms and activities that individuals can read the environment and decide what actions are required of them. The psychological level simply requires clarity and diversity sufficient to allow many different individuals to form stable images, uses, and understandings of the urban visual environment. Because the cultural level is so pervasive as to be incomprehensible to daily visual perception, it probably requires the greatest concentrated and conscious design effort to assure the clarity sufficient for individuals to perceive the dominant elements of the prevailing evaluative and normative systems.

It is deemed here that the intentions of this thesis have been fulfilled. The proposed scope was toward the discovery of increased objective knowledge of the urban visual environment so that such knowledge could contribute to more objective criteria for the assessment and design of the urban visual environment. The establishment of an overall theoretical and organizational schema, and the beginnings toward detailing the perceptual and environmental levels can serve as a criteria structure and provide some

of the actual criteria toward the objective handling of the visual aspects of the urban environment.

However, as indicated in Chapter III, detailing the levels will be a task of major proportions and an ever-continuing process. Many of the disciplines from which the necessary knowledge must originate, such as environmental psychology, are probably decades away from even organizing properly to establish objective information for planners to utilize. In the meantime planners and designers with assistance from the many fields of study have the task of deciphering and compiling the information already available.

Visual design based on human visual perception criteria is probably one of the last hopes for retaining an urban environment in which human beings can maneuver with the freedom of their own control. If the complexity, density and pace toward which many large cities are currently moving continues, and the visual environment develops in the misunderstood and haphazard manner that it presently is, people are going to find it increasingly impossible to function in cities, and find their way around according to their own will and unassisted. For example, a drive on the Cross-Bronx Expressway in New York City in the early evening--with all the autos, trucks, buildings, bridges, lights, signs, distortion, poor contrast, visual noise and general confusion--almost surpasses the visual abilities of man.

If this type of visual intensity continues, there is likelihood that some of the visual orientations of man will atrophy, and be forced to the subsistance, physiological level. Even now, in such situations as the Cross-Bronx example, one is likely quite willing to surrender all the social, psychological, and cultural visual desires, just to be able to get safely through. In this process of compromise there is ample reason to suspect significant pressures on the evolution of vision. A broader understanding of the visual process in the urban environment, such as proposed in this thesis, can lead to visual planning that will facilitate vision rather than destroy it.

GLOSSARY OF RELEVANT TERMS

The following glossary is offered as an integral part of this thesis. It is to serve both the needs of defining some of the more difficult or ambiguous word meanings in this thesis and the function of an introductory reference for urban planners and designers working with the visual aspects of cities.

The definitions here are generally short, and hopefully concise, and it should be understood that serious application of these words will require further knowledge of them. Part of the terms are defined specifically for their application in this thesis, and some are interpretations that might be done differently by others.

ART, CITY AS - Urban design which considers designing the city as the arrangement of objects, i.e., buildings, trees, street furniture, etc. This might also be termed "city as sculpture".

ARTIFACT - Basically objects or things with spatial form, or capable of having spatial form, that are made or viewed by man as items which serve as means to his ends. Artifacts reveal meanings through visual perception. 1

ARTISTIC - The point of view or type of thinking which is toward the creation or expression of beauty in form.

ASSESSMENT - Utilized here basically in its conventional meaning, except that the quantative connotations are not necessarily applied. Means essentially to determine the importance, value, or state of the visual environment.

COLOR - An attribute of visual perception defined in terms of hue (red, yellow, etc.), brightness (shade), and saturation (relative amount of hue). Perceived by eye from different visible wavelengths and mixtures of visible wave lengths. Color of objects results from rays created by light reflecting off objects. 2

COMPOSITION, COMPOSE - Composition refers to the arrangement of elements in the environment (objects, colors, buildings, benches, emphasis, etc.). Compose refers to the designing of these elements. Both relate to the possibility of composing the visual environment similar to musical composition.

CONCEPTS OF VISUAL SPACE - Used here to mean the resulting descriptive views of space from the visual perception of artifacts and nature. These concepts provide the link between human perceptual processes and what the spaces mean to people.

> PRAGMATIC SPACE - The space of the physiological level of visual perception. The space revealed is simply that of basic spatial orientation which vision establishes by scouting the environment.
>
> EXISTENTIAL SPACE - That perceived space of the environment determined by visual perception at the social level. The term refers to the social environment as the one of primary orientation for human beings. Existential space is perceived as a result of immediate environmental reference and experiential information.
>
> COGNITIVE SPACE - That view of the environment determined by visual perception at the psychological level. The view is determined by the concepts formed by the individual, and by the intentions carried to the perception. The result is based on past experience and formulative judgment of the individual.
>
> EXPRESSIVE SPACE - Perceived space determined by visual perception at the cultural (and possibly ego) level. Elements and images of the culture are mainly perceived supraliminally through cultural symbols which are expressions of the culture.

CONDITIONING - This term here relates to the socialization process of a developing person during childhood and beyond, wherein the culture is infused into the stimulus receiving and response mentality of individuals.

COSMETIC - Refers to superficial beautification or decoration placed on objects after initial design. 3

CUE (or Clue) - Relates to perceiving something as a signal or indication to initiate a particular action.

CONSCIOUSNESS STATES OF PERCEPTION

SELFCONSCIOUS - Simply refers to the percepts of which the perceiving individual is aware.

UNSELFCONSCIOUS - The perceiving individual is being stimulated and is responding, but is unaware of the process and consequent percept.

DESIGN - Creating or rearranging some whole by arranging the parts so they fit well for the function of the whole.

URBAN DESIGN - In general accomplishing design at the city scale. Specifically, urban design refers to large-scale design projects.

URBAN VISUAL DESIGN - Limited to designing the visual aspects of the urban environment.

ENVIRONMENTAL DETERMINISM - Derived from the doctrine of determinism. Relates to the reasoning that believes there are direct and causal influences or effects from the environment, especially the built-environment, on human beings and their behavior. In design, thus, it is believed that specific arrangements of objects will cause specific behaviors.

ENVIRONMENTAL LEVELS - Used in this thesis to designate the areas of planner manipulation and control. Considered here to be defined by human perceptual orientations to artifacts and nature, and thus are termed physiological, social, psychological, and cultural.

ENVIRONMENTAL PSYCHOLOGY - A subdisciplinary branch of psychology which is still very much in formulation stage. Basically the study is around the relevance of the built environment to human behavior.

ESTHETIC - Basically a cultural subsystem which deals with the norm and mode of beauty, its expression and logic.

FORM - Has many meanings; used here primarily to connote the three-dimensional, spatial form.

GESTALT - Deals with properties of objects and spatial arrangements whereby wholes are perceived, and the parts are arranged according to the perceptual function of the whole. However, the parts may also function on their own. Gestalt is an organizational property. 4

GLARE - Harsh and uncomfortably intense light, usually the most intense and least obviously predictable when resulting from reflected sunlight.

ILLUMINANCE - The amount of light in a given place or on a given surface.

INDICATORS - Mean elements visible in the environment which can serve to exhibit assessment evidence. That is, elements which can indicate functional and dysfunctional states.

INFORMATION THEORY - In its entirety is very complex and highly quantitative. Used here for its general implication for visual perception; that is, a perception carries information when the individual's output (what they know) is less than the environmental input (what they receive); then information will be communicated. More specifically, the portion of stimulation carried by the input that is also lacking in the output is information. 5

> BITS - From information theory, is an item of information drawn from the environment. These "bits" can be considered in visual perception or assessment as units for measurement. The term is general and can serve as units in varying categories.
>
> CHUNKS - Also relates to information theory, is grouping of related bits to create a larger whole. "Dealing with fleets instead of boats." 6

INTERMEDIARY OBJECT - Objects representing or symbolizing more than their objective, spatial features. Thus, they serve as intermediaries for meanings or features other than those immediately present. Perceived thoroughly the objects reveal at least parts of the other elements; superficial perception attains only the intermediary object.

INTROSPECTION - Investigation based solely on examining the experiences and thoughts of one's self.

INTUITION - Apprehension or cognitive awareness of something without the aid of rational thought, or without inferring from an explicit set of criteria.

LIGHT - Is a form of electromagnetic radiation which is manifested as particles of energy and waves propogated through a medium. 7 Visible light is the external stimulus for vision, and is about 1/70 of the total known electromagnetic spectrum. 8

LIGHTING ENGINEERING - Branch of engineering concerned with the study of lighting, and calculating its proper application in specific situations.

LUMINANCE - As opposed to illuminance is not the light existing in a place or on a surface, but rather is the light emitted by a generating source.

MODES OF BEING - Used here to mean "human" modes of being, especially relative to visual perception. Means the different levels of existence in which man actually participates. As utilized in this thesis, they are:

> PHYSIOLOGICAL - Man's biological functioning; relates to the internal mechanisms of vision as they react to stimulation.
>
> SOCIAL - Relating to individuals or groups interacting with other individuals or groups.
>
> PSYCHOLOGICAL - Man's mental functioning; relates to the personal behavior modes of which visual perception is one.
>
> CULTURAL - Man's overall patterning of behavior and thought as a member in a larger society holding same patterns.
>
> EGO - Used here as the level of individual human existence which is supercultural. It is not seen here in terms of Freud's "ego" or "superego", and is basically a nonconscious level. The ego here approximates the level discussed by Gaston Bachelard as the source of "the sudden image, the flare-up of being in the imagination..." 9

NATURE - The physical, chemical and biological properties of existence, including the physiological being of man.

NORMS (Cultural) - Here connotes the standards of action, procedure and achievement in gross terms that are established at the cultural level, and viewed as <u>the</u> norms.

NOTATION (Notes and notation systems) - Refers to the possibility of devising special note-taking procedures, methods or systems for recording visual elements (notes) in assessment of urban environment. This also relates to "composition" by notation for visual design. The latter relates to possibilities similar to musical notation.

OBJECT - Simply refers to any space-displacing thing in the environment. Close in meaning to "Form", but object connotes a thing of particular form.

OBJECTIVITY (Objective) - No simple definition serves to explain the usage here of this term. However, in general it relates to "objects" which can be spatially manipulated, and also the status of being verifiable. See Introduction.

ONTOLOGY - Basically refers to having a theory about the nature of existence and kinds of being.

OPTIC (Optical) - Means relating to vision.

OPTOMETRIC - Refers to the profession that examines eyes for problems of light refraction (light deflection through eye), and prescribes lenses or exercises for correction. This field has conducted some profitable research in physiological vision of the eye. 10

ORDINAL STIMULI - Because of the close or direct relationship, this is almost the same as ordinal meaning. At this point in perception stimuli, response, and meaning are practically synonymous terms.

PERCEPTION (Visual) - Used here in the very general manner of attaining awareness of the environment or its aspects through processes initiated in the visual sense.

PERCEPTION PROCESSES - Used specifically here, and broken down into different processes, to indicate the fact that several processes are active in "seeing" instead of one, which is usually designated "visual perception".

SUBCEPTION - Refers to the reception of stimuli below the selfconscious level in physiological perception. Effect of varying sorts does occur, however,

RECEPTION - This term is utilized here to mean selfconscious perception at the physiological level which is the direct "viewing" of stimulus.

APPERCEPTION - The term applied here for the visual perception process active in the social interaction situation. Apperception reacts in the situation based on immediate cues and past experience.

CONCEPTION - The term used here to mean the process involved in visual perception at the psychological level. Deals both with understanding through and creating by abstractions and ideas. These are an integral part of the perceptual process at this level.

SUPRALIMINAL PERCEPTION - Used here to connote the perception of culturally expressed symbols, which primarily are perceived unselfconsciously by higher mental processes.

PERCEPTUAL MEANINGS OF VISUAL SPACE - Here connotes the meanings of space as a product of perception. Specifically, this refers to what the perceived space means to human beings. They are as follows:

LITERAL MEANING - That meaning obtained by a person receiving stimulation direct at the physiological level. The meaning is only what is there. This is rarely done selfconsciously, and only with intentional and carefully focused perception is is possible. 11

ORDINAL MEANING - Meaning obtained by a person receiving stimulation direct at the physiological level. Relates to "literal" meaning but further connotes the simultaneous variation and ordered succession of stimuli reception in the eye. 12

USE-FUNCTION MEANING - The meaning from visual perception at the social level. In the process of apperception--the perception assisted by prior knowledge--cues are perceived which indicate and guide action necessary in the social milieu. Meaning derived from this perception is the apprehension of the cues.

COHERENCE MEANING - The meaning from visual perception at the psychological level. The perception process is conception, and through the concepts, abstraction, ideas, intentions, etc. brought to the perceptual situation the process gives the coherent meaning of the environment to a person.

SYMBOLIC MEANING - That meaning obtained by a person through visual perception at the cultural level. As the perception process is considered supraliminal, the meaning is not readily cognitive, and is perceived as feeling, even though the symbol involved spatially

articulates concepts, ideas, values, etc. that may partially be revealed in analysis. Essentially, symbolic meaning is through symbols which themselves are at a lower level of abstraction than are the things they portray. 13

PERCEPTUAL EQUILIBRIUM PROCESSES

ADAPTATION-LEVEL ADJUSTMENT - Working both over periods of short and long duration, the perceptual sensitivity of persons adapts within limits to changing stimulation intensity of the environment. This works on a sliding basis whereby a framework is established for given environments with an optimum level developed in relation to the particular deprivation situations, and is less sensitive with perceptual overload. 14.

HOMEOSTATIC ADJUSTMENT - Considered here with adaptation-level adjustment. Homeostatic adjustment is more purely physiological reaction to environment. Adaptation-level adjustment can include psychological stimulation, and social as well. 15.

PHYSIOGNOMIC - Used here to connote the examination of surface manifestations to attempt urban visual assessment. Basically it is the surface that superficial vision perceives, but the term here implies a more thorough perceptual examination utilizing all perception processes.

PREFERENCE - This term refers to the concensus approach to design, or the establishment of norms based on polling, interviewing, and surveying.

PROXEMICS - Term coined by anthropologist Edward T. Hall as, "the interrelated observations and theories of man's use of space as a specialized elaboration of culture." 16

PSYCHOPHYSICS (Visual) - "...Is an interdisciplinary area of scientific investigation relating the reactions of human observers to physically measurable aspects of the visual environment in which they live." 17

RESPONSE - Means behavior resulting from stimulation. Relatively archaic term in visual perception.

SCHEMATIC PERCEPTION (Visual) - It is the general perceptual effect resulting from all of an individual's perceptual orientations over time. Can be referred to as an individual's accumulated, reinforced perceptions which result in "habits of perception". 18

SCORE (Scoring) - Relates to "composition" and "notation" in that it is basically a musical term. Means to do a composition for a specific medium, or the result of such. Scoring is a design method, related to music, which has been explored by Lawrence Halprin; "Score: describes process leading to performance". 19

SEMANTIC DIFFERENTIAL - Is the use of a bi-polar adjectival checklist utilized as intersubjective measurement method.

SHAPE - This term is used here primarily to mean the two-dimensional aspect of a perception.

SIGN - Used here generally to mean something that stands for some other particular thing on a rather one-to-one basis. 20

SIGNAL - Used here to mean something that draws attention or notice to some other particular thing. 21

SYMBOL - Used here to mean something that expresses a concept, idea, value, etc. by the articulation and presentation of it. 22

SOCIAL INSTITUTIONS - Public and private with degrees in between, are essentially the interaction modes with which social interaction is carried out. The modes have been "instituted", and have varying durations.

SPACE - Used here as a product of visual perception of the environment. Jean Piaget's definition of space well fits the use here: "...the product of an interaction between the organism and environment in which it is impossible to dissociate the organization of the universe perceived from that of the activity itself". 23

SPACE-DISPLACING - Having three-dimensional form.

STIMULI - This term serves several meanings in science. Stimuli can connote the source of stimulation, such as an object and its reflection of light. They can also mean available stimuli of which only some are actually received by the individual, and what received may not be used. Beyond the physiological level where the basic stimuli reception process occurs for all levels, the physical stimuli become absorbed in higher mental processes, but no matter how indirect, the perception can be traced to visible forms and shapes. 24

STREET GRAPHICS - A term coined by William Ewald which includes street signs, markings, etc. which convey information in verbal form. 25

SUBJECTIVITY - Relates to the determination of something according to one's own mind rather than inferring from external and independent data or information.

SYNTHETIC STIMULI - Refers to the type of stimulation that is involved in levels of perception above the physiological level. Various other factors are of concern; past experience, cognitive formulations, and expressive factors which are synthesized with the basic physiological reception of stimuli.

TRANSCENDENTAL - Is that which goes beyond, or transcends, sensory experience but not human intelligence.

VALUES (Cultural) - Used here to connote the measures of relative importance concerning personal and social activity types. These values are established at the cultural level, and generally are considered as the values.

VERIDICALITY - Related to visual perception means the correctness of a perception related to the actual or real situation.

VISION

SCOTOPIC VISION - Basically night, or dim light vision. It does not perceive color and is dependent on activation of the rods of the eye. It is primarily peripheral vision.

PHOTOPIC VISION - Basically is daylight vision. It begins at the point of luminance which is intense enough to activate the cones of the eye for color and bright light vision.

VISUAL NOISE - Is similar to auditory noise; refers to the erratic and unpatterned visual stimulation, cues or information that interfere with a person perceiving what is needed or desired.

VISUAL PERSPECTIVES - Refer to the general perspectives from which people usually perceive the urban visual environment. Specifically, they are pedestrian, building, transit, and motorist.

Notes

1. Richard S. Latham, "The Artifact As A Cultural Cipher" in Who Designs America? edited by Laurence B. Holland (Garden City, NY: Anchor Books, 1966).

2. C.H. Brown, "Color: Data and Theories", in Vision and Visual Perception edited by Clarence H. Graham (NY: John Wiley & Sons, 1965), pp. 414-451.

3. Kevin Lynch, "City Design and City Appearance" in Principles and Practices of Urban Planning edited by William J. Goodman and Eric D. Freund (Washington: International City Manager's Association, 1968), p. 249.

4. Rudolf Arnheim, "Gestalt Psychology and Artistic Form" in Aspects of Form edited by Lancelot Law White (Bloomington: Indiana University Press, 1966), pp. 196-208.

5. George A. Miller, "The Magic Number Seven, Plus or Minus Two..." Psychological Review, Vol. 63 (March 1956), pp. 81-97; and F.D. Attneave, "Some Informational Aspects of Visual Perception", Psychological Review, Vol. 61 (1954), pp. 183-193.

6. John Platt and J.G. Miller, "Handling Information Overload", Ekistics, Vol. 28, (October 1969), p. 296.

7. Lorin A. Riggs, "Light as the Stimulus for Vision" in Vision and Visual Perception edited by Clarence H. Graham (NY: John Wiley and Sons, 1965), pp. 1-38.

8. John F. Corso. The Experimental Psychology of Sensory Behavior (NY: Holt, Rinehart and Winston, 1964), p. 55.

9. Gaston Bachelard. The Poetics of Space, translated by Maria Jolas (NY: The Orion Press, 1964), p. xiv.

10. See Merrill J. Allen. Vision and Highway Safety (Philadelphia: Chilton Book Co., 1970), and any of several good articles from field of optometry.

11. James J. Gibson. The Perception of the Visual World (Boston: Houghton Mifflin, 1950), p. 211.

12. Ibid., p. 63.

13. Rudolf Arnheim. Visual Thinking (Berkeley: University of California Press, 1969), p. 138.

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