Urban Structuring Techniques

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ABSTRACT

This paper is an overview of techniques being used currently for studying and designing urban environments. It is a condensation of a much longer work. The attempt here is to describe and analyze the relative merits of these techniques as objectively as possible.

Introduction

The practice, process, profession, art, or theory of urban design as described by any of Sherman's categories (aesthetes, analysis, empiricists, architect ordered controllers, organicalists, economists, or accumulativists)[1] involves some degree of the application of order, structure, or framework to the urban fabric.

Unfortunately, there is little agreement between theorists and practitioners on any scale or range of orders which may be applied to a set of urban problems. Other disciplines, notably the social sciences and engineering, are producing objective ordering systems for specific problems. Even architecture, a close relative on the design side of urban design's family, is now wrestling with a number of ways in which to organize complex problems for design solutions.

The urban design process is emerging now with some sets of "rules." Many theorists, such as Vigier,[2] Lynch,[3] and Alexander,[4] are proposing ways to collect information, synthesize it, thereby testing systems of order in application to the urban form context. Often, however, these "rules" are couched only in intuitive terms, substantiated only by subjective interpretations of data, and plagued by preconceived notions of order.

PURPOSE

In light of the preceding discussion, the purpose of this paper is to examine the prevalent group of urban structuring techniques in terms of their completeness as "systems" for design and how they fit the criteria of planning/problem-solving processes. Urban design as a process of ordering urban form learns necessarily from unselfconscious, form-producing orders (social, economic, psychological, etc.). This paper seeks to consolidate information gleaned in urban design applications of these orders. By comparing and evaluating the contemporary state of urban structuring techniques, it is hoped that needs for further research will be made clear, and areas of practical application will indicate particular aptitudes of certain techniques for certain problem contexts.

THE METHOD

In seeking a consistent comparison between the various urban structuring techniques under consideration, it is necessary to develop a fairly rigorous method of approach. Initially, it is absolutely mandatory to provide a complete set of definitions of terms and concepts to be used in the discussion. These terms and concepts will provide an important point of reference for the comparisons of techniques.

Secondly, the roles which urban structuring systems play within the design and planning process need to be looked at to set up a list of criteria that must be met by any system for it to be usable in planning/design.

Once the concepts of systems *as systems* and the role of urban design ordering systems within the planning process are defined, it will be possible to examine and evaluate the systems themselves. This will be done in terms of the literature available, comments of the theorists or practitioners, and references to specific applications. The general format will be the following:

1. The apparent philosophical argument behind the system will be discussed.
2. The "fit" of the particular system in the defined *concept* of system will be sought.
3. How well the system fulfills the criteria for urban planning/design will be analyzed.
4. Finally, hierarchies of systems, how various systems supplement each other, and directions for further research will be looked at.

Definitions and Concepts

The concept of "order" within the scope of this paper may be considered on two levels, the higher level to be discussed here and the

lower to be discussed later. The higher level of order or "law of arrangement," as defined by Webster,[5] has to do with a professional or moral/ethical way of doing things based on some particular philosophy or tradition. This type of order transcends, indeed initiates, the more specifically operational levels of problem-solving orders. Many things contribute to the formulation of any philosophical concept of order Influencing factors like education, exposure to others, experiencing natural phenomena, and evolving concepts of reality all tend to influence any design philosophy.[6] Urban designers are particularly susceptible to this phenomenon because the nature of the profession attracts persons of divergent backgrounds and interests. Architecture, city planning, engineering, sociology, psychology, and other fields provide potential training grounds for urban designers. Inevitably, then, the urban designer's approach to any problem is likely to be biased regardless of the integrity on any particular ordering system he may use to solve it.

ORDERING SYSTEMS

The primary emphasis of this paper will deal with the lower level of order or "ordering systems" for urban structuring. These systems are "kits of parts" or rules based on the philosophical level becoming pragmatic problem-solving techniques for city-building. Functioning from impulses via his psychological, educational, and social background, the designer organizes a problem into a series of lower-level decisions which can be studied and resolved relatively independently of each other. In doing this, he relies on "conventions." Conventions are essentially "pre-made" decisions which have been proven workable by application for normal cases and which can shorten the time involved with problem fragments.[7]

An ordering system is here defined as two things:

1. it is a way of looking at a problem, and
2. it is a kit of parts with combinatory rules which may be used to organize a problem solution.

These two definitions are very close on first inspection; and one might take issue that two such interrelated statements should not be factored apart. However, Alexander makes a convincing argument that:

> These two views, though superficially similar, are logically quite different. In the first case the word "system" refers to a particular holistic view of a single thing. In the second case, the word "system" does not refer to a single thing at all, but to a kit of parts and combinatory rules capable of generating many things.[8]

The definition of an ordering system as a way of looking holistically at phenomena which can only be understood as a product of interaction among parts is extremely useful in light of the need for the designer/

planner to be able to describe the environmental problems under his consideration. An example of such techniques is notation systems. These are ways of abstractly describing environments in terms of simplified vocabularies of symbols.

Once the function of an ordering system as a way of looking holistically at phenomena has been applied to the problem, it is then necessary that the system be able to meet the test of the second definition. It must have within itself a set of rules which will provide an organizing pattern for the manipulation of the environmental factors described above. These rules originate from many points. They will be hard and fast criteria involving the functioning of urban "hardware" such as sewers, street lighting, topography limitations, or curbs and gutters. They will involve the design conventions mentioned earlier. These provide low-level decision shortcuts by eliminating alternative variables which can be discounted early in the "stacking" of decision hierarchy. Each problem a designer faces is different from the rest, and these differences are the reason why the designer innovates new rules to adapt the generating system to his needs. Herein lies the heart of the designer's contribution.

> Our axiom means this: To ensure the holistic system properties of buildings and cities, we must invent generating systems, whose parts and rules will create the necessary holistic system properties of their own accord.
>
> This is a radical step in the conception of design ... The designer becomes a designer of generating system—each capable of generating many objects—rather than a designer of individual objects.[8]

The generating system is a way of changing the course or pattern of the functioning of an environment within some set of predetermined bounds. The designer, in understanding the existing stability of the environment, its parts and their interactions, and the way in which the interactions cause the stability, can then set up ways to manipulate the parts and the interactions. This will initiate a process aimed at a different, and hopefully, improved kind of stability. Stability is here defined as a state of dynamic equilibrium as opposed to a static condition in which there is no change.

The catalyst in this process is the goals and objectives given the designer by his clients, based on their needs and wants. These are the criteria or descriptions of the desired sense of stability sought.

The emphasis of this discussion of ordering techniques as they are used in urban structuring has been to clarify the criteria necessary for them to be systems. Obviously, there is much more to be accounted for before a complete definition is approached, but the importance of systems as systems was felt to be worthy of underlining here. As mentioned before, the danger in using systems for solving urban design problems lies in oversimplification. There are so many variables to be considered that too

strict an application of a purely systems approach is likely to overlook a great many critical factors.

Urban Design and the Search for Order Within the Urban Planning Process

The range of opinions relating to the "place" of urban design within the urban planning process is wide. Some planning thought defines the urban design "plan" as an element of the total comprehensive plan in the same way as it defines the circulation plan, park plan, land-use plan, etc. This rigid limitation of the urban design process has often led to its preoccupation with urban aesthetics.[9]

The question of how much of urban design is a concern for the enhancement of urban aesthetics is raised by many writers.[3] Lynch and other analytical urban design theorists have been responsible for the interest in describing objectively the elements of urban form in order for aesthetic design to be accomplished within some kind of framework responsive to human wants and needs. Such persons are also deeply concerned with the exposition of the symbolic aspects of urban form so as to make the city more comprehensible.[10]

For the designer to keep himself from overintellectualizing about the problem and place himself in the true context of the urban environment, he must receive a set of criteria from outside his own specialized interests and the specialized interest of the small group of decision-makers with whom he has overt contact.

Lynch has been an important voice in outlining and calling for the urban designer's role in the goal-setting process. Traditionally, the goals which are handed to the urban designer are very vague in the sense of the city as a whole, and very detailed in the case of specific projects which are based on easily quantifiable economic terms. This has caused criticism by many socially-oriented writers who decry the designer's overprofessionalism. The designer must seek out the users or substantive clients and not base his work solely on the context of the nominal or decision-making clients.[11]

For the designer to have a set of criteria based on the wants of the users which is as "hard" as the set he gets from the decision-makers, he must necessarily work closely with the planner early in the planning process. The two professions must become familiar with each other's processes by undertaking mutual basic analytic studies in the existing urban form. These studies should provide an initial framework of understanding against which the goal-setting tests may be measured and through which the refined goals and objectives may be expressed in terms of quantifiable or described components and systems.[12]

For the benefit of this discussion, the following distinctions are stated: the planner seeks on a larger spatial scale to optimize the use of existing and potential resources of the environment within the basic construct of the more generalized goals; but the designer needs more detailed information in order to function, because design is not an optimizing process. It is not meeting a set of requirements in the best possible way, but instead it is satisfying the requirements in a way which prevents misfit between form and context in the least arbitrary way.[4] Clear definition of the user's objectives and the existing environment are then necessary to understand both the context and the need which the forms must satisfy.

The morphology of the design process examined here is expressed by the model on the next page as an accurate enough description. The various steps are distinctly articulated and the cyclical flow from step to step is shown to "dip" into each step formally, when in fact at times steps may be skipped or only lightly engaged. Finally, the spiral of the cycle is shown to be decreasing the "size" of the problem, assuming that a solution is achieved when the inner field is shrunken to an infinitely small set of unsatisfied form-context criteria.

Assuming that resources for designing and analysis are united and not all form-context criteria *can* be satisfied, a best possible solution is said to be reached when the largest number of form-context criteria are satisfied based on priority and feasibility within available resources.

The distinctive function of the urban designer lies in the "proposing" stage. As described earlier, the urban designer and urban planner work closely together in the early recognition and specification stages to appropriately define the parameters of the problems. Likewise, it is assumed that the two will collaborate on the evaluation, decision-making, and implementation phases.[9] (See Figure 1.)

Whether or not the urban designer participates throughout the entire planning process, the planner must consider a variety of ordering systems to be used in structuring his plans and for implementation purposes. These may be classified loosely in three sets of systems by virtue of their uses to the planner.

1. Positive ordering concepts are philosophically-biased notions of how order should be. These determine the directions ordering *should* take within a moral construct.[16]

2. Theories of order are documented normative investigations which begin to show how people behave, communicate, interact, and trade. These furnish guidelines for measuring the goals in terms of the context of the planning problem. They also prescribe relationships between specific components of the plan.
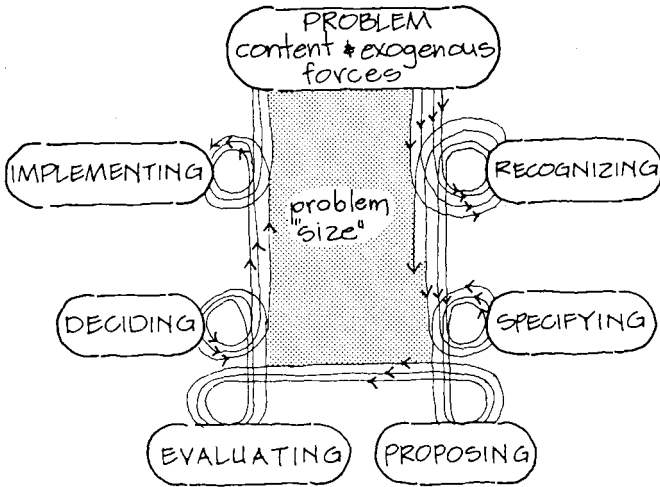
Figure 1. The Cyclical Design Process [14,15]

3. Strategic ordering systems provide tools which the planner may use to get his proposals into operation. These are specific/operational sets of rules which planners generalize from one context to another with little attempt to fit them to the specifics of each problem. (See also the adherence to "conventions" under **Ordering Systems**.)

It is apparent that to use these theories in real planning contexts, planners must become more aware of the form implications of such use and designers must begin to define such form implications within systematic frameworks which may be easily communicated across professional and lay boundary lines.

Later in the course of this paper, these ordering systems will be discussed in more detail in relation to their impact on urban design methodology.

In the organizing of human activity and interrelationships in urban space and form, ordering systems play important roles as organizational aids to rational decision-making. At times, the complexity of planning problems and the factor of time require planners and designers to reach for decisions without full countenance of the information available through analysis of environmental systems. When this happens the practitioner depends on experience and and his professional sense of order and gambles that his intuition will carry him through.

Within the planning and design processes described previously, urban ordering systems may be identified with five tasks which distinguish them

as ways of looking at urban problems and ways of generating or changing existing states of stability in the environment. Some techniques in use today are weighted more in favor of one or several steps rather than equal emphasis on all. Any true ordering system should have within itself the *ability* to be applied in all five tasks, however.

The *first task* an ordering system must be able to fulfill is to provide a means for the reconnoitering and analysis of the existing environment of the area under study. This will take shape as a series of studies of activity, circulation, physical characteristics, social, political, and economic factors and public attitudes aimed at describing as completely as possible the problems and potentials of the planning area. The value of an ordering systems approach in doing these preliminary studies is that a central homogeneous vocabulary is developed which ties all the separate bits of information together. This will aid the persons involved in getting more complete understanding of the problem at hand and allow for more efficient planning of subsequent tasks.

Task two. At the same time the existing environment is being studied or immediately after, the planning team must solicit and interpret the wants and needs of the clients to come up with direction for the planning and manipulation of resources at hand. The developing vocabulary of the ordering system must take this phase into account because worthwhile dialogue between professionals and laymen about these criteria will set the stage for future decisions. Only if both parties understand each other's viewpoints of existing orders can the basis for the invention of new generating systems be found.

Task three is the true test of the usefulness of the ordering system and of the designer's ability to use it properly. It is here that the synthesis of problems, potentials, wants, and needs takes place and where this cross-fertilization of information stirs the designer to propose alternative solutions for the problems. It is here also that the designer's philosophical sense of order gives him the impetus for the transition from a package of bits and pieces of information to an urban structure of activity and interrelationship. This is usually a process of much trial and error, both consciously and subconsciously which fits the abstract concept of a logical ordering system to a pragmatic application or order.

Task four. The vocabulary of the ordering system which has described the problem, analyzed the resources, defined the goals, and provided the impetus for design is now called upon to be the device for testing and evaluation of the proposed solutions. The system has provided a structure for the listing and cross-referencing of criteria for proposing and now this

same structure should be used in examining the proposals in light of the criteria. Understanding of the logic of the system by all agents involved should permit an easy flow of communication in criticizing and refining the proposals.

The *fifth task* that the ordering system should be able to do within the urban planning/design processes is that of predicting. Given the planning criteria, the state of the existing environment, and the sense of the alternative proposals, the designer should be able to predict the impact of his schemes upon the city within the scope of the system's contribution to the problem-solving process. The success of the proposal in realigning the stability of the existing environment and the client's awareness of it is a function of the designer's awareness of the totality of the problem. This is a function of the logic of the deductive solutions implied through the strict manipulation of the systems approach. And this is a function of the real implementation properties of the environment and its inhabitants which is a function of the properties of the existing environment and the understanding of the client group.

The State of Order-Seeking
In the Urban Design Process

Much of current urban design theory is quite abstract. Only very recently have theorists undertaken to present models which may be used to describe the city, test the goals for planning, and demonstrate how designers should apply the theories to the real world. Maki, Kahn, and the Smithsons are among this small group of "applied theorists" who also practice urban design.[17] Also, Okamoto's work in the Manhattan Study[18] is significant in showing applications of ordering and form-making in a specific case.

The approaches of these theorists are primarily in the contexts of urban form, movement systems, urban space, and human activity. Planning theory, social science, and design methodologies are often used rigorously in the approaches, but synthesized into the respective vocabularies.

Although the importance of these theories must not be underestimated, it is necessary here to qualify them in relation to the hypothesis of this paper. The case for the use of any ordering system has been built here based on its applicability and understanding by planners, decision-makers, and users as well as designers. These theories, discussed below (except where related to infrastructure in particular), are difficult to transpose into terms familiar to other orders, whether existing structures or proposed strategies.

The following discussion is a survey of some presently significant urban design thought dealing with various human and urban orders. These are taken to be influential topics within the scope of urban design practice which are manipulated and interpreted for use in specific problem contexts. The various ordering systems will be discussed first in a general manner relative to the development of the fields of theory pertaining to each technique. Here the disagreements between theorists on specific items will be discussed. The recurring theme of order versus complexity is heard here time and time again.

Following these general statements and reflections about the theories, more specific analyses will examine them in terms of the criteria for ordering systems developed in earlier chapters. Each area of concern will be discussed relative to the definitions of systems and also relative to the necessary functions of a system within the planning/design process.

Comparative summaries of each and all systems should point out where incompleteness exists, where systems complement each other, where possibilities of hierarchical relationships between systems may occur, and trends for new approaches to urban structuring.

AESTHETICS

The physical form of the city has often been described, designed, and evaluated in relation to its beauty. The "City Beautiful" and "Townscape" movements of urban design were direct manifestations of the desire to produce visually pleasing urban environments.[19] A familiar quotation used by aestheticians is Justice Douglas' ruling in the Berman *vs.* Parker case of 1954, where he states that "it is within the power of the legislature to determine that the community should be beautiful. . . ." This is representative of the fact that the need for beauty is recognized universally for the enhancement of human and spiritual values.[20]

But if designers are to design introspectly and experts are to define beauty judgmentally, there seems to be a need for some kind of rationale or framework within which aesthetic design and opinion can be produced based on some common assumptions.

To describe aesthetics as a pragmatic ordering system for use in urban structuring, then, would be somewhat misleading. Certainly urban design has been practiced on practically purely aesthetic grounds. The "City Beautiful" movement practiced in this country early in this century is an example of urban design with definite aesthetic overtones. Similarly the "Townscape" approach of urban design grew out of the writings of Camillo Sitte and landscape-oriented designers such as Gordon Cullen.[21]

If aesthetical ordering systems fall short of being systems for understanding the urban phenomena, they are more useful in functioning as

design aids or generating systems. The understanding of an urban design problem from the aesthetic point of view remains principally the province of the designer's intuition. How well he communicates his feelings is more a function of his own personal manner than his method of analysis. However, certain ground rules for design have been found to be reliably accurate in terms of human movement, perception, and psychology.

Ordering systems based on aesthetics are not particularly successful in terms of the criteria developed for use in the urban planning process. The intense intuitive nature of aesthetics and design for aesthetics precludes much of the critical necessary involvement of both nominal and substantive clients in goal-setting. As mentioned before, the personal interpretations of the designer are often the only way of synthesizing desired ends on the basis of problems and public needs.

It would appear then that the success of any aesthetic ordering system used in the urban design process is probably only as good as the native intuition of its users. Consequently, designers and design theorists have turned their attentions to series of investigations into the scientific mental and physical factors which make up much of aesthetics. These studies take the stand that it is in fact impossible to quantity beauty as such,[20] but it is possible to be more rigorous in identifying the sensual and psychological effects which the environment has on man.

PSYCHOLOGY AND PERCEPTION

For its use in the context of this discussion, the perceptual process will be taken to mean the psychological activity of actively organizing configurations, or pattern-making.[22] Such a definition implies a preoccupation with visual characteristics. This is apparently a realistic approach since the human response to the urban environment is affected to a very large degree by the sensual effects of visual characteristics.[23] Other senses should not be discounted in a thorough examination of perception and definitely not in the design process, but for the sake of this paper most weight will be given the concern for visual perception.

The confusion in the perceptual design theories is most characterized by the decisive split in the science over the question of complexity and ambiguity in the environment and its effect on the human user. Psychologists agree that perceptual "taste" varies, and that exposure to ever richer environments is a learning process enabling the mind to comprehend more and more of his surroundings.[23]

The distinction between the end of complexity and visual enrichment and the beginnings of ugliness and psychic fatigue is ill-defined. The Gestalt definition of ambiguity as a quality of uncertainty, vagueness, is being hedged by a new definition tending toward a more permissive expression of

the complexity of urban life. Rappaport and Kantor[24] propose "ambiguity" as any visual nuance, however slight, which gives alternative reactions to the same building or urban group, arising from language admitting more than one interpretation, duplicity of meaning rather than doubtfulness or hesitation.

Out of the recent investigations of perception relating to complexity and ambiguity are coming a series of design proposals which suggest that an essential element in urban design is visual variety within a pattern.[24] The pattern itself may be very inconspicuous at times when the visual variety takes top priority as in strip development or other very active centers of interchange.

Maki maintains that:

> The human quality which determines form has to do with the way of life, movement, and relation to persons in society. If the function of urban design is the pattern of human activities as they express being alive in cities, then the functional patterns are crystallized activity patterns.[25]

In collecting the preceding remarks on perception and psychology as the bases for ordering systems into the comparative format of this paper, it became apparent that these approaches do have much more promise for urban structuring than aesthetics. The groundings in science possible here make documentation, research, and analysis more objective. Prediction of behavior based on perception is possible, or will be soon, and this may well be generalized into design methodology.

As systems, the psycho-perceptual approaches fit quite well. Lynch's work in developing notation systems for describing urban environments has been mentioned earlier.

Within the urban planning/design process, ordering systems based on psychology and perception show promise once the communication problems can be simplified so that client involvement in goal-setting can be made easier. Also, the conflict centering over the order-complexity issue needs much clarification.

SOCIO-ECONOMIC AND BEHAVIORAL ACTIVITY PATTERNS

The actions and interactions of humans and groups of humans have much potential impact on urban design methodology as do the perceptual qualities of the environment outlined above. Indeed, the two concerns are often considered synonymously, and it is often difficult to separate out comments or data pertinent to one without involving the other.

Meier's communication theory appears to be a valuable tool in predicting urban growth and evolution based on the social relationships at

play. He looks at the possible types of human communication necessary in a given context, correlates it with existing channels, spaces, and activities, and indicates how technology and the spatial arrangement of the city must be reordered to provide smooth flow of people, goods, and information.[13]

Webber's theory is even more refined in terms of urban form. He is likewise concerned with communications and interaction analysis and prediction. He has developed a cross-classification system for describing urban spatial structure. Once described in terms of the flow of information and spatial linkages, Webber proposes to order the environment in terms of locational patterns of establishments.[16]

If, indeed, spatial structure can be explained in terms of these variables, then the expertise of the urban designer in organizing human activities with relation to communication and form can elevate such a model to a highly effective design tool.

By setting up a scheme adapting and interpreting this economic model of spatial structure into the vocabulary of form, the designer can relate back and forth between other professionals, laymen, decision-makers, the goals, and the existing environment in a much more explicit manner. With this in mind, the exposition of this information is given heavy emphasis here.

Another important aspect of spatial economics is its "fresh" way of looking at the more traditional concept of planning and urban design. Webber's assertions below indicate how planning/design methods must change as society does.

1. The visual symbols of urbanism are *mistakenly* taken to be the marks of important qualities of urban society.
2. We are experiencing a whole new set of *emerging orders* of urban society.
3. The spatial aspects of the city must be considered continuous with and defined by the processes of the society within it.
4. Human interaction is more important than land.
5. The unique quality of the metropolitan settlement is lower communication costs.[26]

As a generating system for designing, the approach needs further provision of social and psychological elements. Most needed is a solid component of understanding of urban form related to the linkage and infrastructure elements. Okamoto's and William's study of Manhattan[18] is a good indication of how an urban designer can synthesize activity analysis with form implications. Granted, this particular study is probably more movement-oriented than anything else.

The past discussion has sought to indicate how studies of economic

activity structures have gone far to document the relationships of activities to each other and to the city as a whole. Although these models are not concerned with urban form per se, they have been well integrated into urban design processes in specific instances. And they show much promise for further use in urban structuring.

The recent work of behavioral psychologists like Edward Hall[27] and Robert Sommer[28] is bringing to light new information about how people use environmental settings.

There is coming into being a certain amount of empirical data dealing with predictable human behavior under certain conditions.[29] Such information will be useful in correlating the functionality of proposed designs to goals and, indeed, for testing the validity of goals in terms of actual human activity. This type of information can be used to formulate design orders at theoretical levels which can show how satisfying one set of criteria will affect the form of the city in a way different from its present form.

MOVEMENT

Perhaps the most popular type of ordering system used by urban designers today is movement in the city. Certainly the presentations of urban design studies of cities often elevates circulation systems to primary importance.[18] Most urban design theorists agree that the form of the city is mostly a factor of access, linkages, and lines of communication. The strategy of using the movement infrastructure to shape the city is obviously considered a very valuable one.[30]

The importance of these considerations is not whether they are newly discovered truths, but that they indicate a structural approach to ordering the urban form based on physical "hardware" which is familiar to everyone, i.e., furnishing a common ground for discussion and testing of goals and implementation strategies.

The increasing complexity of the urban environment and also the spatial dispersion of cities causes a disparity in scale association between the observer (user) and the larger environment. The individual must be "big" enough and powerful enough to somehow "identify" with the environment. The automobile begins to neutralize the disparity by allowing individual movement and expression throughout the city quickly.

There is no one definite systems approach for urban structuring based on movement because the multiplicity of types of movement and the complex combinations of them possibly makes it necessary for the urban designer to formulate a system particular to his problem. Basic understanding of how each mode functions is necessary before an over-all approach to systems design is possible. The most concrete information available about movement has to do with the physical hardware used. Such

information, along with design conventions setting basic relationships between movement systems and the environment, is the beginning for any ordering system involving movement.

Ordering systems, based on movement, function in all of the necessary steps outlined in the planning/design process. This is probably due in some part to the great use of them, and the preponderance of discussion about them. They are perhaps strongest in the reconnoitering and proposing stages and weakest in the predicting stage where so many more variables influence possible outcomes.

As used in the Manhattan study by Okamoto and Williams, movement ordering systems were the spine of the network of studies involved in the planning/design process. Activity, form, and communication elements are couched in the basic reference vocabulary of movement. This permits one to follow through the entire study with a basic understanding of the process and its goal.

Summary and Conclusions

If urban design is to fill its role in the urban planning process, and this role is the study of urban structure morphology and the application of design to urban structure, then urban designers need a background of empirical information which can be used to interpret the planning goals in terms of existing urban systems, assess the viability of urban systems in the city, and creatively enhance or change these systems to better serve the city.

To approach this subject, this paper sought to study order-searching in urban design in the following manner:

1. The role of urban design in the urban planning process as a form-conscious, order-seeking process was defined.
2. An inventory of available information dealing with urban ordering systems which is used in urban design was undertaken.
3. The conflicts inherent in these systems as applied to urban design were discussed, as were the dichotomous opinions voiced by urban designers relating to these systems.

The techniques of psychological-perceptual, social-behavioral, and movement ordering were examined in considerable detail. These are the three primary categories of interest involving urban design theory today. All of these areas exhibit the problem of ambiguity-simplicity conflicts.

At the present time, designers apparently understand movement and its correlative physical infrastructure best. The more elegant theories and practices are applications of urban structuring using movement systems as

Table 1. Types of Ordering Systems Plotted Against Criteria of Ordering System

Type Criteria	Aesthetics	Psychology and Perception	Activity	Movement
as a way of looking at a phenomenon	unsuccessful; cannot describe social, political or economic aspects	very successful; show great promise for rational understanding at both professional and lay levels, particularly notation systems	very successful; establishment-linkage analysis of activity patterns is very promising for systematic understanding of stability	moderately successful; multiplicity of trials shows wide range of success depending upon individual understanding of modes involved
as a kit of parts for the generation of new states of stability	moderately successful; certain systems involving design standards based on sensory factors can be used well for low-level decisions	moderately to very successful; vocabulary of descriptive systems appear to be readily adaptable to generating functions	moderately successful; needs social, psychological, and urban form elements although individual experiments of combinations with other systems	moderately to very successful; again depending on comprehensive understanding of very wide range of variables
as a framework for studying and describing the environment for problem definition	un- to moderately successful; the *physical* state of the problem area can be assessed in aesthetic terms	moderately to very successful; if client-groups are well couched in the language from the beginning in order to perceive the problem from professional's viewpoint	very successful; with the qualification of need for sociological and physical form elements	moderately to very successful; as a result of wide use the processes and language have been quite well refined

as a language for setting public wants, problems and potentials into goals & objectives	unsuccessful; goals result from implications from testing models or the personal interpretations of the designer but no common objective vocabulary	un- to moderately successful; the communication of wants and needs are too complex for the vocabulary of the systems to cope with yet	un- to moderately successful; has not yet been well tested outside the realm of professional discussion	moderately successful; public can be made to express itself in terms of movement and communications goals.
as a design methodology for proposing problem solutions	moderately successful; a wide variety of design conventions, which can be easily overused with stylistic results	un- to moderately successful; problems of integrating functional criteria of physical planning not yet resolved	moderately to very successful; in specific instances where goals and objectives were assumed or adopted	very successful; structure and form of urban environment is very "designable" using movement patterns as armature
as a means of testing proposals based on goal criteria	unsuccessful; lack of objective means of understanding existing stability and clients' goals precludes valid judgment of design	moderately unsuccessful; proposals can be evaluated to the extent that existing problems and potentials can be described	un- to moderately successful; not sufficient knowledge of public criteria to truly assess proposals in user's terms	moderately to very successful
as predictive device for looking at the impact of proposals on existing stability	unsuccessful; same reasons as immediately above	un- to moderately successful; future results can be forecast only to the extent that the order-complexity issue can be resolved initially.	moderately to very successful; in certain instances shows great promise of forecasting form·implications of activity-generating systems	un- to moderately successful; profusion of other variables influencing future outcomes sway forecasting

the major strategies. This will probably continue to be important in urban design, even in connection with other ordering systems.

Presently, designers are not using the establishment-linkage technique developed in market analysis to the extent that they might. This type of ordering system shows great promise for urban structuring. Development of correlative form awareness in the economic approach may provide the designer/planner with a comprehensive approach to understanding and structuring the urban environment with full cognizance of human activity.

Table 1 is a matrix-synthesis of the preceding discussions. It provides a summary for the comparison of the types of ordering systems considered based on the essential criteria outlined in this paper.

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