Perception and Landscape:
Conceptions and Misconceptions[1]

Stephen Kaplan[2/]

Abstract: The focus here is on a functional approach
to landscape aesthetics. People's reactions are viewed in
terms of what sense they are able to make of the scene and
what interest they are able to find in it. This analysis
applies first to the two-dimensional space of the "picture
plane," where the assessment is in terms of coherence and
complexity.

In addition to this "surface" analysis, there is a
rapid and unconscious assessment of what one would experience
if one were to proceed "deeper" into the scene. In this way
inferences about the nature of the three-dimensional environ-
ment lead to conclusions concerning how legible it is likely
to be and how much additional information is likely to be
provided. These four informational elements -- coherence,
complexity, legibility, and mystery -- provide means of
assessing landscape quality that are empirically based while
at the same time intuitively meaningful.

INTRODUCTION

It would seem that the psychology of
perception should have something useful to
contribute to landscape aesthetics. Certainly
students of landscape aesthetics make assump-
tions about the nature of perception. While
certain of these favorite assumptions are
probably false, there was a time when it was
not obvious that the psychology of perception
had anything better to offer. Fortunately,
a number of recent developments sheds consid-
erable light on the significance and function-
ing of the aesthetic reaction to landscapes.

From the perspective of landscape
aesthetics, perhaps the single most salient
theme in recent work in perception is what
Gibson (1977) has labeled "affordances." An
affordance refers to what a perceived object
or scene has to offer as far as the individ-

ual perceiver is concerned. Perception is
viewed as not merely dealing with informa-
tion about the environment, but at the same
time yielding information about what the
possibilities are as far as human purposes
are concerned. In addition to Gibson's con-
tribution to this topic, this emphasis on
the function an object or environment might
serve for the perceiver has also appeared
in the work of Gregory (1969) and S. Kaplan
(1975).

One can go a step farther than the per-
ception of affordances per se. As Charles-
worth (1976) has pointed out, a species has
not only to be able to recognize the sorts of
environments it functions well in, it has to
prefer them. Animals have to like the sort
of settings in which they thrive. Ideally
they would not have to learn such an inclina-
tion. It could be costly for an animal to
spend years barely subsisting in unsatisfactory
environments in order to learn that such
environments were in fact unsatisfactory.
And to the extent that erroneously choosing
certain environments could be a fatal error,
such a bias would ideally be innate and immedi-
ate. Hence, one can view preference as an
outcome of a complex process that includes
perceiving things and spaces and reacting in

[2/] Professor of Psychology and of Computer and
Communication Sciences, University of Michigan,
Ann Arbor, Michigan.

terms of their potential usefulness and supportiveness. In this perspective aesthetics must, at least to some degree, reflect the functional appropriateness of spaces and things.

It should be noted, however, that this view of preference as an expression of bias towards adaptively suitable environments has no necessary connection to what is currently functional. What was functional during the evolution of the species is presumably what would be preferred, quite independent of what might be functional today.

SOME COMMENTS ON PREFERENCE

In the context of an evolutionary perspective, it is hardly surprising that human preference would have some relationship to those environments in which survival would be more likely. This context, however, does not appear to be characteristic of discussions of landscape preference. As a matter of fact, a significant number of students of landscape aesthetics views preference with alarm, or at the very least, distaste. There are many who feel that preference judgments are bound to be arbitrary, idiosyncratic at best, and perhaps even random. In part the distrust of preference judgments probably stems from the fear that aesthetics will be debased by stooping to a popular consensus. Hidden in this fear is a profound irony. It implies that there is no basic consistency, no underlying pattern characteristic of preference judgments. Without such an underlying basis, however, aesthetics becomes trivialized. If aesthetics is not an expression of some basic and underlying aspect of the human mind, then it is hard to see why it is of more than passing significance. It is reduced to mere decoration as opposed to being something with pervasive importance. In the concern to preserve aesthetics untarnished, it makes it at the same time inconsequential.

If indeed aesthetics had no deep underlying significance for our species, then one would expect preference judgments to vary randomly from one person to the next. But this is not a matter of opinion; it is an empirically testable hypothesis. This conjecture, as well as the others implicit in the rejection of preference is not only testable; it has been tested many times. These fears receive no support from many studies. (For a discussion of a number of such studies see S. Kaplan 1979.) Preference judgments are neither random nor highly idiosyncratic. Neither are they debasing; many of the rules that preference follows turn out to have correlates in the classic aesthetic and landscape architecture literature. At the same time their divergences are thought-provoking and instructive.

To summarize the ground covered so far, recent work on perception views the perceptual process as inextricably connected with human purposes, and perhaps with human preferences as well. Preference, in turn, is a far better-behaved measure than is often feared. The remainder of the paper is based on the premise that preference judgments are not antithetical to aesthetics. Rather, they are seen as providing a powerful tool for understanding the patterns underlying what we consider aesthetic. Such judgments may also point to the underlying significance of the aesthetic in the larger human scheme of things.

MAKING SENSE AND INVOLVEMENT

If people's reactions to things and spaces depend on people's purposes, then understanding preference requires that we first understand what these purposes are. Since different people pursue different purposes, and since the same individual will pursue different purposes at different times, an analysis in terms of purpose might appear to be at best unpromising. Fortunately for both science and practice, however, human purposes are by no means totally scattered and idiosyncratic. In fact our research on preference has over the years repeatedly pointed to two underlying purposes which people are concerned with throughout their waking hours. These two purposes probably had an important impact on the long-term survival potential of the individual. Their pervasive influence seems appropriate since they are necessarily vital to any specific purposes an individual may choose to pursue.

We have come to call these persisting purposes "making sense" and "involvement" (R. Kaplan 1977). Making sense refers to the concern to comprehend, to keep one's bearings, to understand what is going on in the immediate here and now, and often in some larger world as well. Involvement refers to the concern to figure out, to learn, to be stimulated. At first glance these two purposes may seem to be contradictory, or at least at opposite ends of a continuum. But upon closer examination this turns out to be a misconception. Certainly there are environments that one can comprehend and at the same time be

stimulated by. Likewise, there are environments that offer neither possibility. In fact, all combinations are possible; knowing that an environment makes sense tells one nothing about whether it will be involving or not.

While our realization of the centrality of these two purposes arose in the context of research on preference, there are sound theoretical grounds for believing that they would be necessary to the survival of an information-based organism. There are also parallels in the psychological literature -- order, security, closure, and the like on the one hand, and curiosity, challenge, stimulation, and so on, on the other. (Limitations of space permit only a brief mention of these themes here; for a more extensive discussion see Kaplan and Kaplan 1978).

If making sense and involvement are indeed pervasive purposes for humans, then environments that support these purposes should be preferred. "Support" here refers to whatever an environment might afford that makes that particular purpose more likely to be pursued to a successful conclusion. For making sense this refers to the perceived structure of the environment. It takes in anything that would make the environment easier to create a map of, easier to characterize, to summarize to oneself. It involves those affordances that increase one's sense of comprehension.

For involvement, on the other hand, the supportive environment is one rich in possibility. In a sense, the affordances for involvement entail the raw materials for thinking about and coming to understand. The issue here is having what is required to be challenged, to have to call on one's capacities in order to process the information successfully. Thus a poem or a landscape that is "simple-minded" or "obvious" fails to offer affordance for involvement. (It should be noted that the "raw material" that challenges one's capacities need not actually be present; it constitutes an effective challenge even if it is only implied or suggested.)

THE VISUAL ARRAY

In reacting to the visual environment, people seem to relate to the information they pick up in two quite different ways. They react both to the visual array, the two-dimensional pattern, as if the environment in front of them were a flat picture, as well as to the three-dimensional pattern of space that unfolds before them. The idea of the visual array is easiest to think of in terms of a photograph of any given landscape. The pattern of light and dark on the photograph, the organization of this "picture plane," constitutes the basis of this level of analysis.

As the surface of a photograph can have much or little to look at, scenes can vary in involvement at this level of analysis. Comparably, the pattern of information on the surface of a photograph can be easier or harder to organize, constituting the "making sense" aspect of the visual array. Let us examine each of these components in somewhat greater detail.

Complexity is the "involvement" component at this surface level of analysis. Perhaps more appropriately referred to as "diversity" or "richness," this component was at one time thought to be the sole or at least the primary determinant of aesthetic reactions in general. Loosely speaking it reflects how much is "going on" in a particular scene, how much there is to look at. If there is very little going on -- as, for example, a scene consisting of an undifferentiated open field with horizon in the background -- then preference is likely to be low.

Coherence is the "making sense" component at this surface level of analysis. It includes those factors which make the picture plane easier to organize, to comprehend, to structure. Coherence is strengthened by anything which makes it easier to organize the patterns of light and dark into a manageable number of major objects and/or areas. These include repeated elements and smooth textures that identify a "region" or area of the picture plane. Readily identifiable components aid in giving a sense of coherence. It is also important that a change in texture or brightness in the visual array is associated with something important going on in the scene. In other words, something that draws one's attention within the scene should turn out to be an important object or a boundary between regions or some other significant property. If what draws one's attention and what is worth looking at turn out to be different, then the scene lacks coherence.

People can only hold a certain amount of information in what is called their "working memory" at one time. Research on this phenomenon suggests that this limit in capacity is best understood in terms of a certain number of major units of information or "chunks." Thus, rather than being able to remember a certain number of individual details or facts,

people seem to be able to hold on to a few distinct larger groupings of information. The current evidence suggests that most people are able to hold approximately five such chunks or units in their working memory at once (Mandler 1967).

It follows from this that anything in the scene which helps divide it into approximately five major units will aid the comprehension process. The various factors that contribute to coherence all tend to do this. The greater the complexity of a scene, the more structure is required to organize it in this way, or in other words, for it to be coherent as well.

THREE-DIMENSIONAL SPACE

The analysis at the level of the visual array, of the picture plane itself, is important to the viewer but at the same time limited. Landscapes are three-dimensional configurations and it was in that third dimension that our ancestors functioned or failed to function, survived or perished. It is hardly surprising that people automatically interpret photographs of the environment in terms of the third dimension as well.

As we might expect given the evolutionary importance of space, humans are highly effective at perceiving depth. Perhaps the most central issue in analyzing a scene involves the three-dimensional space and its implications. As Appleton (1975) points out, there are implications both in terms of informational opportunities and in terms of informational dangers. The informational opportunities he calls "prospect." This idea of being able to gather new information has a kinship to the involvement side of our framework. In particular the opportunity to gather new information in the context of an inferred space is what we have come to call "mystery."

Mystery. One of the most striking aspects of people's reaction to landscapes that suggests a three-dimensional interpretation is their preference for scenes where it appears as if one could see more if one were to "walk into" the scene a ways. Strong as this "involvement" component of the spatial interpretation has been, it has been frustratingly difficult to find a name for. We have decided on mystery, a term long ago used in the context of landscape architecture to refer to an essentially similar idea (Hubbard and Kimball 1917).

Some investigators in this area have

assumed that we were referring to surprise or novelty. But "novelty" implies that one is perceiving something new, and a scene high in mystery may have nothing new present (and conversely, a novel object present in the scene in no way assures mystery.) Likewise "surprise" implies the presence of something unexpected. Mystery involves not the presence of new information, but its promise. Mystery embodies the attraction of the bend in the road, the view partially obscured by foliage, the temptation to follow the path, "just a little farther." While the "promise of more information" captures the essential flavor of this concept, there is actually more to it than that.

Scenes high in mystery are characterized by continuity; there is a connection between what is seen and what is anticipated. While there is indeed the suggestion of new information, the character of that new information is implied by the information that is available. Not only is the degree of novelty limited in this way; there is also a sense of control, a sense that the rate of exposure to novelty is at the discretion of the viewer. A scene high in mystery is one in which one could learn more if one were to proceed further into the scene. Thus one's rate and direction of travel would serve to limit the rate at which new information must be dealt with. For a creature readily bored with the familiar and yet fearful of the strange, such an arrangement must be close to ideal.

Another area of potential confusion should perhaps be mentioned. "Mystery" to some people connotes the ambiguous, even the incoherent or impossible to understand. While it is in some way true that anything that makes no sense is mysterious, the term is intended in a far more limited sense. Admittedly it implies uncertainty. But here the uncertainty is thoroughly constrained and bounded. It is of a limited degree and its rate of introduction is under control. It is by no means beyond comprehension; rather it is possible to anticipate to a reasonable degree. Mystery arouses curiosity. What it evokes is not a blank state of mind but a mind focused on a variety of possibilities, of hypotheses of what might be coming next. It may be the very opportunity to anticipate several possible alternatives that makes mystery so fascinating and mindfilling. The human capacity to respond to suggestion is profound.

Legibility. The other aspect of landscape stressed by Appleton concerns safety in the context of space. While he terms

this component "refuge," emphasizing being able to see without being seen, from an informational perspective safety encompasses considerably more than this. This broad conception of safety closely parallels the "making sense" side of our framework; we have chosen the term "legibility" to refer to the possibility of making sense within a three-dimensional space.

Like mystery, legibility entails a promise, a prediction, but in this case not of the opportunity to learn but to function. It is concerned with interpreting the space, with finding one's way, and not trivially, with finding one's way back. Hence it deals with the structuring of space, with its differentiation, with its readability. It is like coherence but instead of dealing with the organization of the "picture plane" it deals with the organization of the ground plane, of the space that extends out from the foreground to the horizon.

A highly legible scene is one that is easy to oversee and to form a cognitive map of. Hence legibility is greater when there is considerable apparent depth and a well-defined space. Smooth textures aid in this and so too do distinctive elements well distributed throughout the space that can serve as landmarks. Another aspect of legibility involves the ease with which one can perceive the space as divided up into subareas or regions. There is a strong parallel here to what makes a scene coherent, but coherence differs in referring to the organization of the visual array rather than to the three-dimensional space. Coherence concerns the conditions for perceiving while legibility concerns the conditions for moving within the space.

It must be emphasized that the interpretation of a scene in three dimensions is, like the analysis of the visual array or "picture plane," an automatic and generally nonconscious process. People tend not to know that they are doing this. It characteristically happens very rapidly and effortlessly. Although the basis for hypothesizing such a process comes from data on preference, on the other hand this is precisely the sort of processing of affordances, of what the environment offers, that one would expect of a far-ranging, spatially-oriented species.

Overview of Preference Matrix

These two large domains of human pref-

erence, considered in terms of the visual array and in terms of three-dimensional space, can be summarized by a 2 x 2 matrix:

Level of Interpretation	Making Sense	Involvement
The Visual Array	Coherence	Complexity
Three-Dimensional Space	Legibility	Mystery

The entries in the table should be thought of as broad concepts, each subsuming a variety of different components. Some of these specific components, in turn, influence more than one cell in the matrix. Smooth textures, for example, tend to enhance both coherence and legibility. Comparably the factors that tend to make a scene appear to have greater depth enhance both legibility and mystery.

Although both the surface and the three-dimensional levels of analysis are represented in the matrix, these two levels may not have comparable weight. While it is necessary for a scene to have at least a modicum of coherence and a modicum of complexity to be preferred, high values of these components do not necessarily lead to high preference. By contrast, legibility and especially mystery seem to influence preference throughout their entire range.

It should be reiterated in the context of the table that making sense and involvement are independent aspects of a scene. While a scene of high complexity can lack coherence, it can also, like the Taj Mahal, possess a great deal of coherence. Likewise the presence of high legibility as in a scene with a well-structured space, does not prevent the partial obscuring and opportunity for exploration that is characteristic of a scene rated high in mystery. In more general terms, one can think of these issues from the perspective of the kinds of information required for making sense and the kinds of information that enhance involvement.

On the making sense side of the ledger, structure is required in a scene both to comprehend what is where in the visual array and to interpret the larger spatial configuration. At the same time there may be few different things in the scene (low complexity) or many. The more complex scene increases

the possibilities for what one could look at, and hence, in a sense, increases the uncertainty. But the structure is not thereby decreased.

Likewise there may be much suggested or implied by the scene as being available but beyond one's present view. Here too, there is an increase in uncertainty that in no way contradicts or undermines whatever structure the scene possesses.

Readers familiar with an earlier version of this matrix (S. Kaplan 1975) might find the current configuration a bit disorienting at first glance. Note, however, that three of the four constructs (complexity, coherence, and mystery) have remained the same and have the same relationship to each other. The major additions, the making sense/involvement distinction and the two levels of interpretation, have a number of advantages over their predecessors, both intuitively and theoretically.

SOME COMMON MISCONCEPTIONS

Idiosyncracy in Perception

There is a great deal of concern and confusion over the problem of idiosyncracy · in perception; it becomes particularly acute when the issue of preference is included. After all, everyone knows how much taste differs from one person to the next. And if taste is purely personal, or if not personal, at the whim of culture, then decisions on preference will be at best arbitrary.

This concern, while understandable enough, is misguided. Perception, and preference for that matter, are no more variable than any other aspect of human experience and human behavior. As with everything else there is regularity and there is variability. As with anything else identifying and understanding that regularity is crucial to appropriate policy and decision-making. It has been the purpose of this paper to identify some of these regularities and to suggest some ways in which they might be understood.

While idiosyncracy per se turns out to be not that much of a problem either theoretically or empirically, some of the ways proposed to deal with it have created new problems that are rather more serious. One reaction involves relegating all the variability to some post-perceptual process. Thus it is asserted that "perception is the same for all people while interpretations vary." The difficulty with this solution is, as we

have seen, that perception and interpretation are inseparable. The perceptual process is itself influenced by all those cultural, experiential, and individual factors that are supposed to underlie interpretation.

A similar approach has been to create variables for people to judge that are "objective," so as to get around the subjectivity of preference. Sometimes the "objectivity" is achieved by having people rate scenes in terms of landscape features rather than in terms of preference. Agreement using such a procedure has not, however, been particularly impressive (R. Kaplan 1975). This is perhaps not surprising. People make judgments of preference quickly and easily. By contrast, judgment of the presence or absence of certain landscape features may seem to many people to be unnatural or forced. Unlike preference, it is not a judgment they make frequently and intuitively.

There is thus the temptation to dispense with ordinary people altogether, to rely on selected judges to make the ratings. And often what they are asked to do is to make "assessments of aesthetics" rather than to rate the scenes for preference. From a psychological perspective the distinction between these two kinds of judgments is difficult to justify.

Although perceptions are not all the same, there are some remarkable communalities, perhaps in part because of our common evolutionary heritage. And while there are indeed certain cultural differences, these may involve differential emphasis on the components of preference discussed earlier. Some of the most reliable differences between groups as far as preference is concerned turn out, interestingly enough, to be between experts and everyone else (R. Kaplan 1973; Anderson 1978). This makes good sense psychologically. There is now substantial evidence that experts perceive differently than do other people (S. Kaplan 1977; Posner 1973). This is restricted to their area of expertise and in fact constitutes an important facet of their expertise. But the fact remains that experts, often without realizing it, do not see their part of the world the way anyone else sees it. While experts are invaluable resources when used appropriately, they are a dubious source of "objective" judgment as to what people care about in the landscape.

What is REALLY Important in Landscape

There have been numerous efforts to

identify the crucial aspects of the human reaction to landscape, to get to the heart of the matter, as it were. One such approach is both impressive in its directness and disturbing in its implications. This approach is based on ferreting out the unique. It is argued that the more unusual the scenery, the more valuable it is. This is essentially an economic argument, relying exclusively on scarcity. While it is undoubtedly true in some limited sense, it is equally false in a larger sense and certainly a caricature of the multiplicity of factors influencing preference.

People's reaction to nature is an example of a noneconomic need (see Hendee and Stankey 1973, Kaplan and Kaplan 1978). It is not something to be exchanged for something else, but an intrinsic reaction. People value even rather common instances of nature (Kaplan, Kaplan and Wendt 1972, R. Kaplan 1978). At the same time certain rare, nonnatural elements (a unique statue, for example) are not valued at all.

There is a sense in which uniqueness is valued. That is when a place has a distinctiveness, a "sense of place," that makes it possible to know where one is whenever one visits that place. This is a rather special meaning of "uniqueness" that has little relation to the visual scarcity interpretation.

Another derivative of the uniqueness idea that might be worth studying is the uniqueness of a place in terms of access. Thus the only park one can get to for lunch within walking distance of downtown is unique in an important way although not in the traditional sense of "unique content."

Another influential scheme for landscape analysis focuses on the four factors of form, line, color, and texture. This approach conflicts with the realities of human perception in a number of respects.

First, these properties tend to emphasize the two-dimensional picture plane. Clearly this is not irrelevant to landscapes; they too can be analyzed as a visual array. But much more importantly a landscape is a three-dimensional space. Since a substantial portion of the human response to landscape turns out to depend upon the sort of space involved, and the way the individual envisions locomoting in that space, any approach which emphasizes the picture plane is bound to miss much of what matters most to people in landscapes.

Secondly, these four factors do not even provide an adequate sampling of the key properties of the picture plane. They are heavily weighted toward visual contours and toward discreteness. Recent work on visual functioning suggests that a far more global kind of processing may be at least as important, especially as far as spaces to walk in are concerned. An ancient component of the human visual system that has been referred to as the "location processing system" (S. Kaplan 1970) is so closely tied to the capacity to wander through three-dimensional space that it has also been identified as the system that makes possible "ambient vision" (Trevarthen 1978). For this system the size and rough spatial arrangement of elements on the picture plane interact with texture to provide a global overview of the situation. To the extent that this system plays a role in preference, it will be necessary to take a fresh look at the factors that are most salient at the level of the picture plane.

This paper has dealt with a variety of factors that play a role in human preference for landscapes. It has also attempted to deal with some widely held misconceptions about preference and about perception as well. But the purpose of the paper is not to propose a new set of factors to take the place of a traditional set. Rather the purpose is to describe a different way of thinking about people, a new way of conceptualizing what goes on in people's heads when they react to a landscape or other environment. What I would like to propose is a functional approach, a view of what people are trying to do. When people view a landscape they are making a judgment, however intuitive and unconscious this process may be. This judgment concerns the sorts of experiences they would have, the ease of locomoting, of moving, of exploring, in a word of functioning, in the environment they are viewing.

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