LANDSCAPE ASSESSMENT IN THE PRAIRIE STATES: DESIGN ELEMENTS AND LANDSCAPE DIMENSIONS

by

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B.A., University of Kansas, 1974

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF LANDSCAPE ARCHITECTURE

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KANSAS STATE UNIVERSITY
Manhattan, Kansas

1978

Approved by:

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ACKNOWLEDGEMENTS

Appreciation is expressed to Gerry Weisman, Robert Melnick, and Dr. Paul Windley for their time, patience, and advising of this research. The researcher also wishes to thank Richard Harris for his helpful suggestions and quidance during the development of the experiment; Dr. Kent Kemp for his help with the statistical analysis; Chris Arheart for his suggestions and expertise with computer analysis; and Katie Blessiner, Russell Hultgren, and Madi McArthur for editing this work.

Special gratitude is extended to the researcher's wife, Billie, for her unfailing support and patience.

Funds for computer analysis were provided by the College of Architecture and Design at Kansas State University.

CHAPTER I

INTRODUCTION AND BACKGROUND

Overview

This thesis deals with landscape assessment as an answer to the question, "What is it that we like about landscape and why do we like it?" (Appleton, 1975:1) Landscape assessment, according to Stephen Kaplan, "can be viewed as the procedure of identifying landscapes likely to be preferred by humans" (S. Kaplan, 1975:92). Previous work reveals two approaches to landscape assessment concerning aesthetics and theory, respectively. The aesthetic approach was first to evolve and deals with the evaluation of beauty or scenic quality using descriptive terms of aesthetics and elements in the landscape. This approach developed through historical traditions of beauty in the fine arts and therefore became the standard means for the evaluation of landscape quality. However, this approach does not address theoretical issues concerning the psychology of perception and the observer. The theoretical approach, on the other hand, establishes a psychological basis or reason for the phenomena of scenic quality but generally fails to provide a method of application in the landscape. Ideally, a blend of the two approaches would create a more precise method of landscape assessment.

Purpose

The purpose of this thesis is to integrate aesthetic and theoretical approaches to landscape assessment using design related elements developed from aesthetics to operationally define four landscape dimensions (complexity, mystery, coherence, and identifiability) from the theoretical research of Stephen Kaplan. Using these operational definitions, an experiment was developed to answer several research questions concerning--

1. the verification and accuracy of the operational definitions for each landscape dimension;
2. the relationships and interaction of the four landscape dimensions with each other;
3. the interaction and effects of each landscape dimension on preference;
4. the influence of time of viewing on each landscape dimension on preference;
5. the role of regionality and description of preference in the prairie landscape.

The more general objectives of this study are (1) to develop a means of landscape assessment for the prairie environment, integrating previous aesthetic and theoretical research; (2) to establish design related elements that operationally define the four theoretical dimensions; and (3) to develop criteria of preference for use in design of a prairie landscape based on the relationships of the landscape dimensions to preference, using the design related elements from each dimension.

Prairie

The prairie is a landscape of long, open vistas. It is flat or contains rolling hills, usually grass-covered, with few trees. Trees, when present, generally grow in gullies or valleys out of the wind and closer to water. It is an environment whose scenic quality and attractiveness have not been adequately studied. Initially, it was realized that people experience and perceive a landscape in accordance with their values, cultural background, and the type of landscape they are accustomed to. It is likely that people unfamiliar with the prairie landscape will have different reactions toward it. To avoid mixing values and preferences from other areas of the country, this research will use only scenes of the prairie landscape and only residents of the prairie to judge preference. In doing so, an understanding of preference can be gained concerning the prairie landscape and its inhabitants.

General Applications

Using this research, it is possible to determine what is preferred, its theoretical construction, and the effect of addition and subtraction of design related elements associated with each landscape dimension. Hence, a landscape architect can employ this research to select landscapes preferred by people and as a tool or aid in design to affect or incorporate preference in a landscape. Influencing preference can be accomplished using the operational definitions for each landscape dimension. By fulfilling the requirements of each dimension as dictated by the definition, preference will be greater. With this in mind, preference can be designed into or improved in a landscape. Knowing what is preferred will indicate what should be conserved and maintained to preserve preference and scenic quality of a landscape.

Background

This section reviews representative studies from aesthetic and theoretical approaches to landscape assessment. This is done (1) to establish design related elements from aesthetics for use in operationally defining complexity, mystery, coherence, and identifiability; (2) to construct the theoretical framework of this thesis; and (3) to review issues, assumptions, and techniques useful to this research. This discussion begins with a review of several aesthetic approaches to assessment followed by the theoretical studies. The next section, titled "Integration," blends these two approaches by taking the design related elements from aesthetics to define the four landscape dimensions from the theoretical research.

Aesthetic Approach

Based on the review of the aesthetic literature, five general categories of information seemed in common and have some relationship to scenic quality and preference among the authors. These categories are landscape elements, landscape characteristics, relationships of landscape elements and characteristics, issues influencing preference or scenic quality, and aesthetic criteria. Landscape elements are the physical objects in a landscape. Landscape characteristics are the qualities of the landscape elements or of the landscape as a whole. Relationships of landscape elements and characteristics refer to the interaction of elements or characteristics with each other. Issues influencing preference deal with other influences concerning observer position, distance or viewing time. Aesthetic criteria are abstract terms that when demonstrated in a landscape can suggest the presence of scenic quality. Contributors to these are R. Burton Litton (1972), Ian Laurie (1975), and Ervin Zube (1975).

R. Burton Litton

Litton believes that to understand scenic quality in a landscape, one must become aware of the elements and relationships in the landscape. To become aware of the landscape in this sense, Litton states the primary and secondary recognition factors. His primary recognition factors are form, space, and time variability describing elements and characteristics. Secondary factors, including observer position and distance from a landscape, describe issues influencing perception and scenic quality.

The primary factor of form, as demonstrated in Figure 1, relates to the convex elements in a landscape such as topography or vegetation massings. Litton mentions isolation, size or scale, contour distinction, and surface variance as elements which accentuate landform. These are demonstrated in Figures 2, 3, and 4.

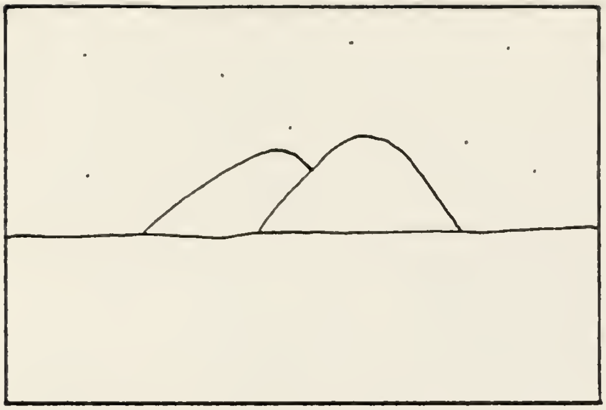
The next element, illustrated in Figure 5, is displayed by the concave elements in the landscape such as valleys, basins, canyons, or swales.

Distinction of space will cause an observer to be more aware of a scene, which according to Litton is the first step to recognition of scenic quality. Spacial distinctions are portrayed through differences in the proportions of sides to the ground, differences in slope, material make-up (constitution) or in the configuration of a space.

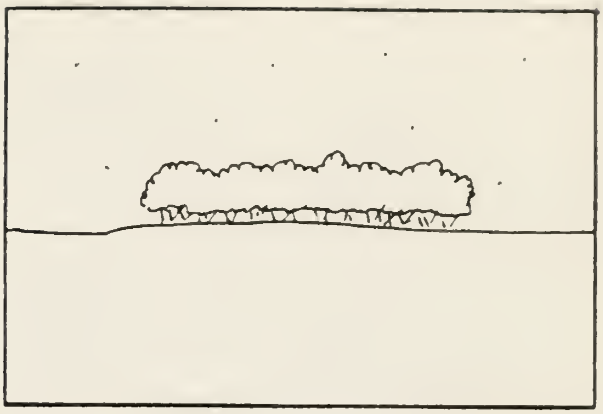
Proportionally higher walls than ground extent will yield a greater spacial distinction. The greater the extent of floor compared to walls, the less the spacial distinction. Figure 6 demonstrates this.

When the constitution (the material make-up of a space or slope) of an area compels attention, the spacial distinction will be enhanced. For example, a solid rock wall may cause a greater spacial distinction than a wall of shrubbery.

Another element deals with the arrangement of spaces. A complex space provides more spacial distinction because of a higher interest level than a simple configuration. Figure 7 illustrates Litton's ideas on configuration.



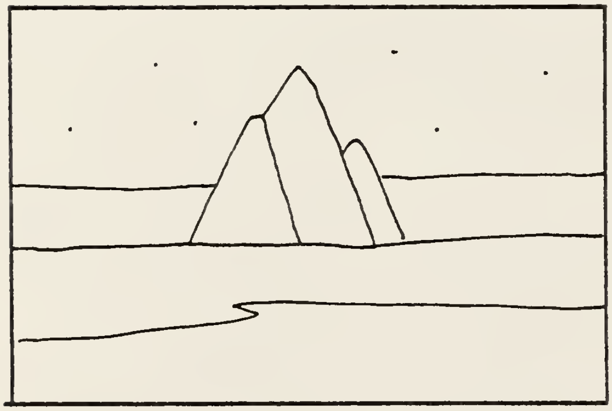
Topographic Form



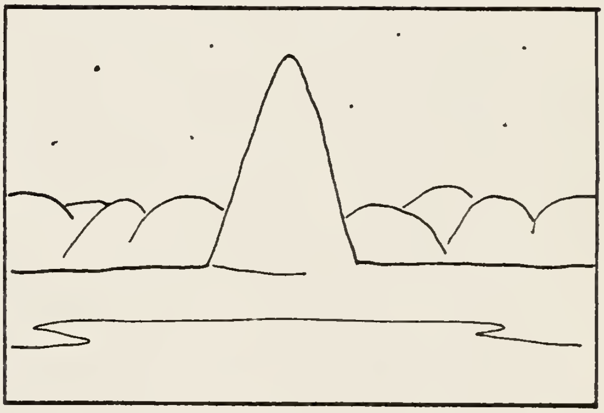
Vegetative Form

Figure 1

Examples of Form



A single element of unusual nature will be distinct in a landscape of neutral quality.



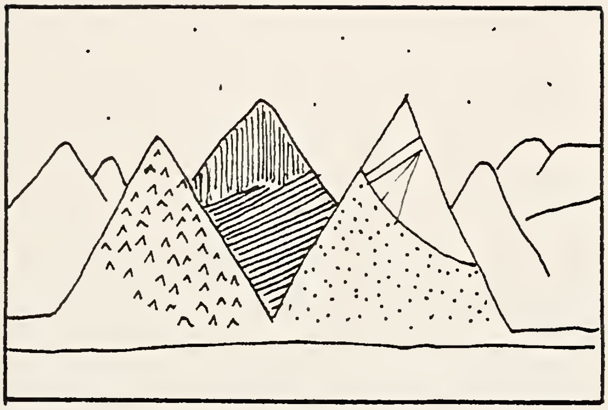
Scale concerns the relationship of a dominant feature to the surroundings. Distinction can be developed with differences in size.

Figure 2

Isolation of Form

Figure 3

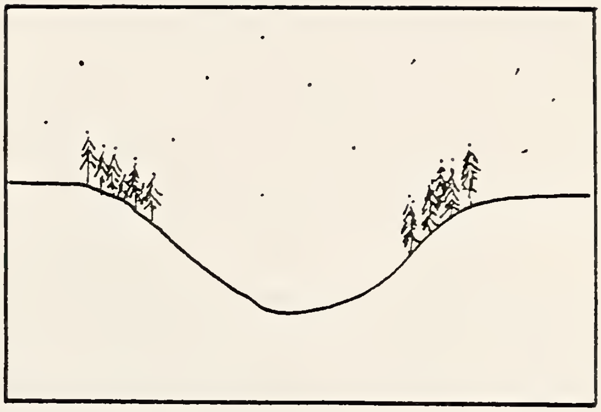
Scale and Size of Form



Elements of texture and contrasts of edges can cause elements of form to become distinct.

Figure 4

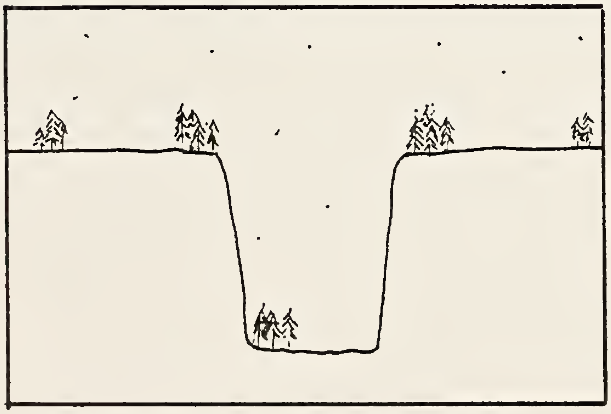
Surface Variation of Form



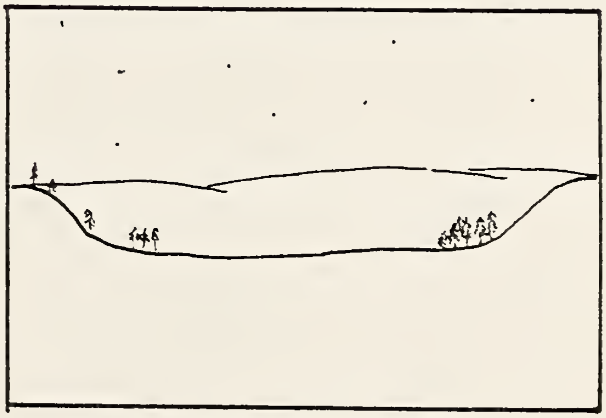
Space is demonstrated by concave landform.

Figure 5

Space in Landscape



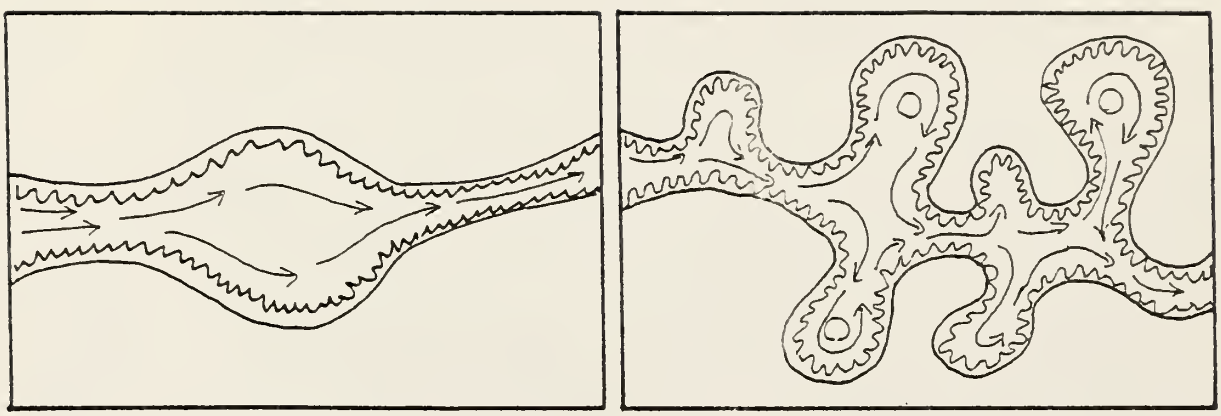
Higher walls than floor space yields a greater spacial distinction.



Greater extent of floor will yield a less spacial distinction.

Figure 6

Spatial Distinction with Proportion



Simple Configuration Complex Configuration

Figure 7

Spacial Distinction with Configuration of Space

The primary factor of time variability refers to changes in landscape as a result of the seasons, the weather, or time of day. Included in this factor are changes in the intensity and directions of light, color and ephemeral influences. Ephemeral influences are the transitory changes in the landscape, such as animal occupancy, reflected light, or changes in vegetation.

In his discussion of the secondary recognition factors, Litton recognizes three observer positions: superior (above), normal (eye level), and inferior (below). Each position allows a different perspective of the landscape, thereby influencing scenic quality by providing a good or bad view of the landscape. Distance to a landscape depends upon the viewer's perception of background, midground, and foreground.

To judge scenic quality, Litton describes the aesthetic criteria of unity, vividness, and variety.

"Unity is that quality of wholeness in which all parts cohere, not merely as an assembly but as a single harmonious unit" (1972:284). Unity is the organization of elements such as shapes, edges, lines, colors, textures, and objects in a harmonious manner. The aesthetic quality of a landscape depends upon its unity.

Vividness "is that quality in the landscape which gives distinction and makes it visually striking" (1972:285). This criterion causes an observer to notice a particular landscape or elements in the landscape. It is the clarity, novelty, or "imagibility" of a landscape. Vividness is the ingredient which makes a unified landscape distinct.

Variety "can be defined as an index to how many different objects and relationships are found present in a landscape" (1972:286). It can also be described as the richness and diversity of a landscape. Variety is discovered through the characteristics, elements, and relationships of those elements in the landscape. Generally, Litton suggests that the presence of variety is an indication of higher aesthetic quality, but only if the other criteria of unity and vividness are present.

Ian Laurie

Laurie provides similar reasoning and ideas for the five general categories. He says that the relationship of elements in a landscape must be classified and understood to perceive beauty. He discusses uniformity, richness, absence of incongruities, spacial interest and diversity as elements that might be considered as aesthetic criteria. Each of these qualities can be found in arrangements of landscape elements such as landform, vegetation, presence of water, and landscape characteristics such as color, texture, contrasts, shape, etc. Laurie mentions several relationships, among them being edge quality, elevation profile, scale and proportion, compatibility of elements, and arrangement. He also discusses the issue of observer position and questions the existing techniques of landscape assessment. He says that present techniques do not employ aesthetic terminology, do not involve the expertise of artists or persons trained in aesthetic perception, and do not separate aesthetic attraction from use attraction.

Ervin Zube

Zube undertook a series of studies, using a combination of aesthetic and theoretical assumptions (1975:152). His research reveals the following: mountainous backgrounds are preferred over landscapes with opposite counterparts, landscapes with open land and some forests are preferred over landscapes of all forest or all open land, water scenes are preferred over non-water scenes, and natural scenes are preferred over manmade scenes (in agreement with Kaplan et al. [1972], but in disagreement over the use of complexity as a predictor of preference within either domain; see page 14 under S. Kaplan).

He also discovered the following:

1. The more rugged the landform, the greater the scenic resource value
2. As landuse diversity and landuse variety increase, scenic resource value decreases
3. As a landscape becomes more natural or more tree covered, scenic resource value increases
4. As adjacent landuse becomes more compatible, scenic resource value increases
5. As height contrast increases, scenic resource value increases
6. As water area or water edge increases, scenic resource value increases
7. As area or length of view increases, scenic resource value increases
8. An observer inferior position is more beneficial to scenic quality than a superior position

His study showed that photographs can be used as a simulation of real experience, that aesthetic evaluation of a landscape and preference for a landscape are highly correlated, and that expert and non-expert ratings agreed.

Zube, in obtaining these results, recognizes the landscape elements of water, landform, topography, and vegetation, and the landscape characteristics of texture, color, form, contrast, grain, and spacing. In the category concerning issues influencing perception, Zube mentions observer position, distance from a landscape, expert ratings versus non-expert, aesthetic judgement versus preference, and regional context of the research. Aesthetic criteria were not explicitly stated; however, they are implicitly utilized in the research.

Summary of Aesthetic Studies

Table 1 summarizes all of the information presented in the reviews of the aesthetic literature. Each of these categories can be considered elements related to design and used to define the four landscape dimensions.

Theoretical Approach

Basic to the theoretical framework of this research are the studies of Joachim Wohlwill, Stephen Kaplan, and Racheal Kaplan. Wohlwill began research of this nature with research on complexity as a determinant of preference with Stephen Kaplan finding five other similar influences on preference. Racheal Kaplan continued this research with studies on several of Stephen Kaplan's landscape dimensions.

Joachim Wohlwill

Wohlwill's research concerns complexity of abstract and realistic variations of stimuli. His study deals with complexity as a determinant of preference for an environment. The study used fourteen slides representing seven levels of complexity. Ratings of preference indicated "that responses to photographic slides of the physical environment vary as a function of judged complexity of these scenes in much the same fashion as do responses to artificially constructed stimuli varying in complexity" (1968:305).

Landscape Elements

- topography/landform
- vegetation
- water
- structures
- landmarks

Landscape Characteristics

- color
- texture
- contrasts

Relationships of Elements and Characteristics

- proportion
- scale
- isolation
- surface variance
- size
- configuration
- constitution
- arrangement/organization

Issues

- observer position
- distance from a landscape
- time of viewing
- photo versus real experience
- expert versus non-expert
- aesthetic judgement versus preference

Aesthetic Criteria

- unity
- vividness
- variety

Table 1

Information Summary of the Aesthetic Approaches
to Landscape Assessment

Stephen Kaplan

Kaplan's (1972, 1973, 1975) research develops a theory concerning human preference with respect to presence of environmental information in a setting. He feels that today's humans are the result of evolutionary history where one's survival depended upon making sense of the surroundings. "Comprehension of large areas was vital for early man to locate prey, to find desirable plant food in season, and to find his way home again" (1975:93). Humans without this skill were unable to find basic necessities for life and hence were selected out. With this in mind, Kaplan states that presence of environmental information as well as the possibility of gaining new information spurs humans to comprehend their environment. This need to determine location is therefore highly valued and influences preference.

Obviously, people have evolved beyond the point where the ability to understand environmental information or "make sense of the environment" directly affects survival. However, it can be suggested that in order to adjust to the world, this ability must still be active in the human. It is assumed that the presence of environmental information that makes a scene easier to understand and provides the possibility of gaining new information will be preferred. Based upon this premise and previous work on complexity (Wohlwill, 1968), Kaplan, Kaplan and Wendt (1972) studied "the relationship between complexity and preference for slides of the physical environment and to test the hypothesis that the content of slides (in particular, nature and urban) will influence preference, independent of the rating of complexity" (1972:354). Kaplan et al. suggests that the Wohlwill study is inconclusive in its findings because of an inadequate sampling of photographic slides.

The Kaplan et al. research used fifty-six slides representing basically two domains of the environment--nature and urban. The elements present in the slides range from busy traffic streets and tall buildings, demonstrating the urban material, to open, grassy land, meadows, dense vegetation, woodlands, presence of water, and unpaved roads, demonstrating the natural material. Ratings of preference indicated that (1) nature slides were preferred over urban slides, (2) complexity predicted preference within each domain, and that (3) complexity did not account for the preference of nature slides over urban slides. The results also suggest the possibility for the existence of a U relationship between preference and complexity.

Using this and other research (1975:96), Kaplan proposed several other landscape dimensions aside from complexity under categories of legibility and promise of new information.

"Legibility," a term borrowed from Lynch (1960), refers to the clarity of the environmental information present in a landscape. Kaplan sees coherence and identifiability as dimensions of this category of information. These contribute to understanding an environment and therefore influence preference.

Coherence is recognized as a dimension seen more immediately requiring lesser amounts of inference. Kaplan characterizes this dimension as how well a scene "hangs together," related to organization and composition.

Identifiability, according to Kaplan, is a dimension dependent upon inference requiring some amount of thought and decision to decipher. He defines it as the degree to which a scene can be made sense of.

The category of promised new information deals with information that appears to be available or could be available with a change in observer position or increased viewing time. Kaplan includes complexity and mystery.

Interpreting Kaplan's discussion of complexity, this concept appears to relate to scenes with greater numbers or quantities of landscape elements and characteristics. Information of this nature available to the observer is less inferential and more likely to be seen immediately similar to the legibility category of coherence.

Mystery is described as information suggested but hidden from view. In this case, by going deeper into a scene, more information can be gained, allowing a better understanding of the environment and its contents. Mystery, like identifiability, requires inference and some degree of decision to perceive.

In a joint project with Roger Ulrick (1975:96), while testing several of these dimensions, Kaplan discovered two other possible dimensions, texture and spaciousness. Texture was determined as a variable requiring less inference, like coherence. It appears that fineness of texture influences preference. Spaciousness was suggested as the "visual options for locomotion, of places to go" (1973:9). Kaplan suggests that spaciousness might be considered a more specific kind of identifiability.

Kaplan summarizes all of the dimensions and inference levels in a matrix shown in Table 2.

Upon preliminary analysis, Kaplan discovered "that a scene had to have a modicum of complexity, coherence, and spaciousness to be liked. Items rated low on these factors are not preferred. But it appears to make little difference whether there is a little or a lot of any of these. In other words, they form the necessary condition for preference" (1973:8). Mystery, on the other hand, followed a more typical regression pattern: the more myster, the better.

Source of Information	Degree of Inference	
	Less	More
present legibility	coherence texture	identifiability spaciousness
future information promised	complexity	mystery

Table 2

Stephen Kaplan's Table of Landscape Dimensions

Racheal Kaplan

Racheal Kaplan provides research (1973:265-274) on coherence, mystery, and preference using three different groups of students in separate curriculums. It was found that mystery and coherence are important factors in understanding preference. Ratings of coherence and coherence among the three groups were similar. However, there are strong differences in preference attributable to the individual's field of study.

Generally, Racheal Kaplan's research concerning these dimensions utilized the same basic theory of Stephen Kaplan and employed similar measuring techniques.

Integration

To best indicate how the various aesthetic and theoretical approaches to landscape assessment can be integrated, a matrix is provided in Table 3. This matrix utilizes the categories of design related elements from aesthetics across from the four landscape dimensions. An 'X' in the matrix indicates that the aesthetic element can be employed to operationally define the landscape dimension.

In two cases, a true operational definition could not be achieved because of the abstractness of the dimension. In these cases, a usable definition was found using descriptive terms from the aesthetic literature. This is best demonstrated in the discussion on coherence and identifiability.

It appears from the matrix that the landscape dimensions are related to each other. Many of the design related elements are utilized in several of the landscape dimensions. It must be considered, though, that each landscape dimension by definition utilizes the elements of each category differently. This is discussed more fully in the sections following on each landscape dimension.

AESTHETIC DESIGN ELEMENTS	THEORETICAL LANDSCAPE DIMENSIONS			
	Complexity	Mystery	Coherence	Identifiability
Landscape Elements				
topography/landform	X	X		X
vegetation	X	X		
water	X	X		
structures	X			X
landmarks	X			X
Landscape Characteristics				
color	X			
texture	X			
contrasts	X		X	X
Relationships				
proportion	X		X	
scale	X		X	X
isolation of form	X			X
surface variance	X			X
size	X		X	X
configuration	X			X
constitution	X			X
arrangement	X	X	X	
emotions	X			
compatibility			X	
Aesthetic Criteria				
unity			X	
vividness				X
variety	X			

Table 3

Integration Table of Aesthetic and Theoretical Research

Complexity

Complexity, from Kaplan's research, is exhibited by the quantity of environmental information present in a landscape. A landscape presenting a low quantity of information is less complex, while a scene with high amounts of information is more complex. A landscape of higher complexity will provide the observer with a promise of new information. Landscapes with information are preferred by the observer, according to Kaplan, and therefore are of a higher scenic quality than those exhibiting lesser amounts of environmental information.

From the aesthetic studies and the composite table, environmental information defining complexity might include (1) landscape elements, (2) landscape characteristics, (3) diversity of landuse types, and (4) landscape relationships of elements and characteristics. By increasing the presence of one or all of these categories, presence of complexity can be increased in a landscape.

Landscape Elements

Landscape elements refer to the physical components of a landscape. They include landform, vegetation, presence of water and presence of landmarks or structures.

Topography can be divided into three categories including convex, flat, and concave landform (Litton, 1972). A convex or concave element in a landscape probably would be perceived as more complex than flat landform. This is because convex or concave elements present more surface area to the observer corresponding to more environmental information. Some evidence has been found in support of this (Zube, 1975).

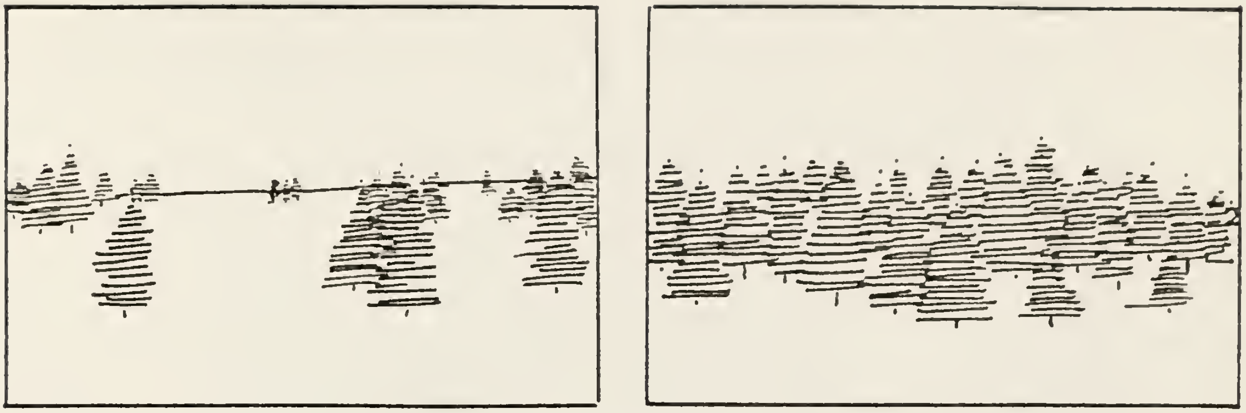
Vegetation is a component in the landscape that affects the presence of complexity in the environment. In a flat landscape, complexity is increased when forest and open space are combined in comparison to an all forest or all open land (Zube, 1975). This is understandable, because a forested scene covers the element of flat topography, while a part forest, part open land does not. More information can be obtained from the combination forest/open land relating to a higher complexity. This is demonstrated in Figure 8.

A convex or concave element covered by vegetation will still reveal the nature of the landform to the observer. Landscapes such as this will be more complex than landscapes without vegetation.

The presence of water also contributes to the complexity of a scene. In addition, it must be noted that several authors (Zube, 1975; S. Kaplan, 1975) provide research stating that presence of water is a separate influence on preference aside from its influence on complexity.

Landscape Characteristics

Landscape characteristics, recognized by several authors (Litton, 1972; Laurie, 1975; Kaplan, 1975; Zube, 1975) as an influence on scenic quality, can also affect the complexity of a scene. A landscape that contains outstanding characteristics, such as texture, color, contrasts, etc., is seen as more complex than the environment with fewer of these. For example, a forest in early spring could be seen as more complex if many trees were flowering compared to that same forest in early August. In this case, the spots of color and texture would provide the viewer with a little more information than the same scene without such attributes. Such a scene could be judged as more preferred as a result. Figure 9 illustrates this. Textures, colors, contrasts, and other element characteristics will add to a scene's complexity.



Vegetation does not cover up the flat topography. Complexity may be greater in this case.

Vegetation covers the land making it less apparent to the observer.

Figure 8

Complexity Using Vegetation

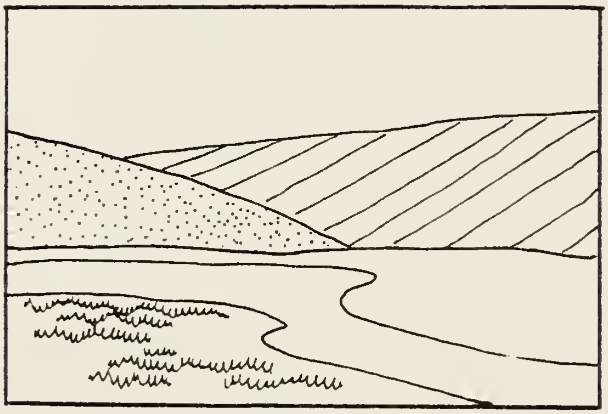


Figure 9

Complexity of Landscape Characteristics

Landuse Types

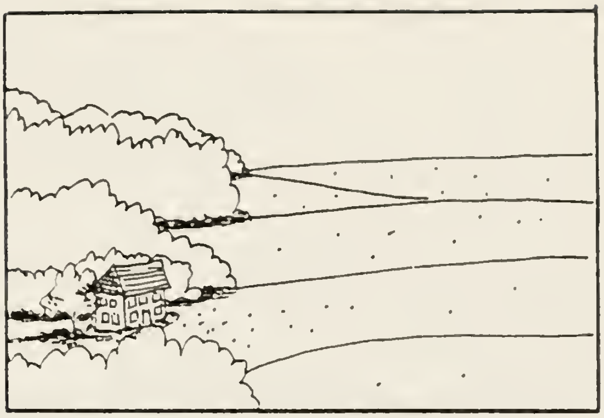
Landuse types mentioned by Zube (1975) and Polankowski (1975) might also be considered as part of perceiving complexity. Landuse types refer to the uses or activities placed upon the landscape by humans. Polankowski proposes several general landuse patterns or types. These are wildland or wilderness areas; farmland forest or a mixture of farmland and forests; forests; wetlands; farmlands; developed lands such as towns, cities, residential areas; and extractive lands such as industrial areas. Presence of these in the landscape will make it more complex. Figure 10 demonstrates complexity of landuse types.

Relationship of Landscape Elements and Characteristics

The relationship of landscape elements and characteristics in a landscape might also be hypothesized to increase complexity. In this case, an array or arrangement of landscape elements and characteristics creates aesthetic virtues such as a sense of proportion, scale or isolation of landform. The presence of such situations may increase the presence of complexity. This type of complexity is somewhat abstract and involves the interpretation of the observer. It may also involve the development of emotion in a scene. Terms such as "surprise," "gloomy" or "mystery" may demonstrate this aspect of complexity. Scenes which create emotions like these may seem more complex than scenes without. Complexity of this nature does not deal directly with the quantity of landscape elements or characteristics but with that of relationships or compositions of landscape components.

Mystery

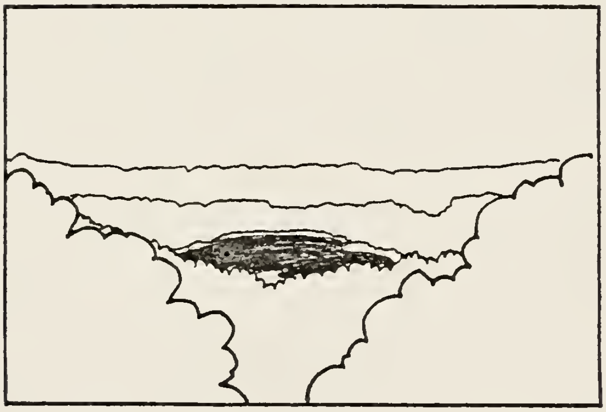
Mystery is defined as information suggested by hidden from view. An observer should feel that more information could be gained by changing



Presence of diverse landuse types
will increase complexity of a scene.

Figure 10

Complexity Using Landuse Types



The water feature in the center
of the drawing is partially hidden
view. This may cause an observer to
move closer to learn more.

Figure 11

Mystery in the Landscape

his vantage point. Like complexity, mystery entices the observer with the promise of new information. This landscape will be preferred, because solving its mystery may increase the observer's understanding of the environment.

Mystery, according to the matrix, is related to an arrangement of landscape elements and characteristics, as well as relationships of elements and characteristics which suggest information but conceal it from view. It appears that mystery employs many of the same elements of other landscape dimensions to define it; however, these elements are utilized differently.

To increase mystery using landscape elements, one must arrange by removal or placement such components as landform, vegetation, or water, such that information is concealed but suggested to the viewer. Figure 11 shows mystery in the landscape.

The presence of mystery might also be increased using the landscape characteristics of color and texture. The presence of an unusual texture or color in a landscape may make an observer want to go deeper into a scene to learn more about it. In this same way, the relationship of elements and characteristics may cause an observer to explore a scene.

At this point, it appears that mystery can to some extent be defined in terms of complexity in that without some amount of complexity in a scene, information cannot be concealed and still suggested. Landscape elements must be present to hide other elements from the view of the observer. If this is not the case, the definition of mystery has not been met.

Coherence

Coherence is the ability of a landscape scene to "hang together." This is judged by how readily an observer can interpret or understand the information present in an environment. Such information is more preferred, thereby influencing the scenic quality of a landscape.

Coherence is a dimension that is difficult to operationally define without using abstract aesthetic terms, such as composition or unity (Litton, 1972; Laurie, 1975) as the matrix indicates. With these terms, however, an understandable definition can be stated. A coherent scene is necessarily unified. This entails an arrangement and relationship of landscape elements, characteristics and landuse types. In other words, a landscape with a high coherence will contain an organized arrangement of landscape elements. It will blend colors or textures and combine culturally compatible landuse types and proportionate elements or scale. Landscape scenes with opposing elements will be less cohesive.

Identifiability

Identifiability is the ability of the observer to make sense of the environment. This dimension may be drawn from Lynch's (1960) concept of "imagibility" or "legibility." Litton's (1972) "vividness" and elements discussing distinction of form and space can also describe identifiability. The ease with which an observer can understand and interpret the information presented in an environment is its degree of identifiability. Clarity of information, as mentioned previously, is adaptive to survival and therefore is preferred, according to Kaplan.

The matrix provides several indications of how identifiability might be defined. These generally concern making a landscape more readable or outstanding. This can be accomplished using proportion, scale, isolation of form, surface variance, contour distinction, or with various edge contrasts to emphasize elements in a landscape scene (Litton, 1972; Laurie, 1975; Zube, 1975). Treating the landscape in this manner would create greater observer awareness of the environmental information present.

Another aspect of identifiability is the presence of landmarks (Laurie, 1975). Landmarks, in this case, could allow an observer to gain a better sense of the surroundings.

Influence of Issues upon the Landscape Dimensions

Each of the landscape dimensions will be influenced by familiarity, observer position, distance from a landscape, and the time of viewing.

An observer familiar with a landscape will probably perceive complexity and mystery as lower because the "promise of new information" is less. However, "legibility," identifiability and coherence may be judged as higher because an observer already understands and is familiar with the composition of that scene.

In this same respect, the time of viewing may affect ratings of the landscape dimension. Increasing the time of viewing allows a viewer (1) to observe more of the complexity in a scene, (2) to notice suggested information responding to a higher presence of mystery, (3) to analyze the composition of a scene corresponding to the rating of coherence, and (4) to become more acquainted with a landscape corresponding to a higher identifiability. The influence of time on ratings depends entirely upon the actual content of a scene. For example, increasing the time of viewing for a landscape with culturally incompatible landuse types may decrease the presence of coherence, since the observer has more time to realize the actual content of the scene.

Observer position and distance from a landscape are issues that will influence each of the landscape dimensions in some way. However, these issues have been controlled for in this research. This is discussed in Chapter 2.

CHAPTER II

METHODS AND PROCEDURES

General

This chapter outlines an experiment developed to answer research questions concerning (1) the verification and accuracy of these operational definitions for each landscape dimension, (2) the relationships and interaction of the four landscape dimensions to each other, (3) the interaction and effects of each landscape dimension preference, (4) the influence of time of viewing on each dimension and on preference, and (5) the role of preference in the prairie landscape. The basic methodology of this research consists of a two-part experiment.

Part 1 utilizes ninety-six slides of landscape scenes varying each dimension by altering the presence of environmental information. Four panels of experts participated in the experiment, each judging a different landscape dimension.

Part 2 consists of seventy participants rating preference for the same group of slides shown to the experts in Part 1.

Before entering into an in-depth discussion of methods and procedures, the issues of landscape dimension groupings, landscape selection and photography, setting, slide order and time sequence will be considered.

Dimension Groupings

An initial step towards this research was made in the selection of landscape scenes for study. It was realized that any landscape scene will contain design elements that necessarily influence all of the landscape dimensions to different degrees, depending on the definition for each landscape dimension. This indicates that any landscape scene will contain different levels of each landscape dimension.

With this in mind, eight dimension groupings were created. Each grouping varies the presence of one or more of the dimensions. Table 4 demonstrates this action. Identifiability was left out of the table and made a variable of time. This was done because of the difficulty in finding landscape scenes that consistently demonstrated identifiability. The time of viewing is discussed in more detail later in this section.

Grouping these dimensions in this manner organized efforts to photograph scenes demonstrating a different combination of high or low dimensions. In addition, because all landscape dimensions are always present in some degree in a landscape scene, it was impossible to control out the extraneous ones. To solve this problem, extraneous dimensions were incorporated by maximizing their presence and minimizing the presence of the landscape dimensions in question.

Landscape Selection, Photographs, and Setting

Representative scenes for each landscape dimension grouping were selected and photographed using the design related elements and definitions previously outlined. In order to represent each grouping, the "low" dimensions were achieved by minimizing the quantities of the defining design elements present and the "high" dimensions by maximizing their presence. This was done because of the abundance of elements in a landscape and the impossibility of finding a landscape scene with only one of the defining elements of a particular dimension.

	HIGH	LOW
Group One	Complexity Coherence Mystery	
Group Two	Complexity Mystery	Coherence
Group Three	Complexity Coherence	Mystery
Group Four	Complexity	Coherence Mystery
Group Five	Coherence Mystery	Complexity
Group Six	Mystery	Complexity Coherence
Group Seven	Coherence	Complexity Mystery
Group Eight		Complexity Coherence Mystery

"High" represents a high presence of the dimension and "Low" a low presence.

Table 4

Dimension Groupings Table

Twelve different slides were taken of different scenes for each dimension grouping. All photographs were taken on sunny to partly cloudy days between the hours of 9:00 a.m. and 5:00 p.m., using the same camera and standard film type. The issue of distance from the landscape was dealt with by requiring all scenes to exhibit a depth of at least a quarter of a mile. The observer position was kept generally constant, at a normal (eye level) perspective, except where it was more advantageous to change the position somewhat to gain a better photograph or view of a scene. All slides were taken within the prairie states region. This represents Kansas, Nebraska, Oklahoma, Iowa, and parts of Missouri.

Slide Order and Time Sequence

After photographing all necessary scenes, slides were made and placed into slide trays in random order with ten introductory slides at the beginning. The slides were pretested to determine two separate viewing times and the length of time required for participant's response. From the pretest, a two-second viewing time with five seconds' response time and an eight-second viewing time were chosen. Each slide was then assigned a viewing time in such a way that half of each dimension grouping was shown for two seconds with a five-second response time, and half were shown for eight seconds.

Random slide order and viewing time for each dimension group made it impossible for the participants to foretell which slides were to be shown next and for how long. Timing slides in this manner made it possible to determine if the time of viewing influenced ratings of any of the dimensions or preference.

Introductory slides were intended only as practice for the participants to get a feel for what was being asked. Though these slides were rated by the participants, the ratings were not included in the data analysis.

Part One--Experimental Procedures

Part One, as described briefly before, consists of four groups of ten fourth and fifth year students in landscape architecture at Kansas State University rating ninety-six slides and several introductory slides on the appropriate response sheet. Response sheets were adapted from previous research (S. Kaplan, 1973; R. Kaplan, 1973), using a one to five point scale and similar definitions of the landscape dimensions. The response sheets were pretested using junior students of landscape architecture at Kansas State University (see the appendices on page 92 for samples of response sheets).

These four groups of participants made up a panel of experts that were used to determine the actual content of the landscape slides, judging complexity, mystery, coherence, and identifiability.

Upon the distribution of the response sheets, verbal instructions were given asking students to rate each of the slides using the definitions of the landscape dimensions supplied on the response sheet. The ten introductory practice slides were then shown and rated on the response sheet. Upon completion of this, a brief period of time was spent to clarify or answer questions that the participants might have concerning their responses. The rest of the slides were then shown and rated by the participants. Response sheets were collected and the participants were allowed to leave.

Part Two--Experimental Procedures

Part Two slide order and time sequence were identical to those used in Part One. Seventy students from introductory psychology classes were given response sheets with a questionnaire (see appendices on page 92 for sample) attached to the back. Participants were given verbal instructions to rate each landscape scene as to their preference. Again ten introductory slides were shown and rated by the participants with a short break before starting into the other ninety-six slides. After rating each of the ninety-six slides, the participants were instructed to fill out the questionnaire and hand in their response sheets.

The questionnaires attached to the back of the response sheets were designed to screen for residents of the prairie environment. Of the seventy participants, 30% were from rural areas of Kansas, 21% were from larger towns in Kansas, 17% from suburban areas of Kansas, 14% from Kansas City, Topeka, or Wichita, 8-9% live in Kansas but have lived in other places, and 7% were completely nonresidents. The city residents were left in as participants because it was thought that these persons, even though from a city environment, would have experienced the prairie environment that surrounds each of these cities.

CHAPTER III

ANALYSIS AND RESULTS

This chapter discusses the analytical methods and results of the study considering the four research questions previously stated.

Verification of the Operational Definitions

Verification of the operational definitions was dealt with through direct observation of the slides. Mean scores of the ratings for each landscape dimension were calculated and compared to the actual slides. If the operational definitions are correct, a high presence of dimensions should exhibit more of the defining elements. Low presence will exhibit a proportionately lesser amount. Upon inspection of the slides and calculation of the mean ratings, this was generally found to be the case.

Evidence supporting these findings was found in part with a factor analysis. This technique of analysis provides content groupings of all ninety-six slides, making it possible to determine points in common among the slides. It must be noted that an insufficient number of ratings may have caused some amount of error. Results indicate four main factor groupings. The mean scores of the dimensions, preference ratings, and the factor analysis eigen values are provided in Table 5.

Factor One revealed points in common in eighteen slides. These were generally rated low in complexity, moderately high in coherence, moderately low in mystery and with an average amount of identifiability.

Factor Group	Mean Comp	Mean Myst	Mean Cohr	Mean Iden	Mean Pref	Eigen Value
One	1.8	2.6	3.4	3.1	3.1	23.0061
Two	3.5	3.1	2.0	2.5	1.9	10.6347
Three	2.9	3.4	3.6	3.4	3.6	5.56548
Four	3.1	3.7	3.5	3.7	3.5	3.92512

Table 5

Mean Ratings of the Four Landscape Dimensions and Preference Including Eigen Values of Four Factor Groupings of Slides

Most of these scenes were open, spacious, relatively treeless, and moderately preferred. Figure 12 demonstrates this grouping.

Factor Two portrays scenes of a moderately high level of complexity, with an average presence of mystery, and lower levels of coherence and identifiability. These scenes contained distracting or unusual elements in the settings, such as power plants, trash, or oil storage tanks. Scenes of this nature were least preferred of the factor groupings. Figure 13 demonstrates this grouping.

Factor Three slides demonstrate moderate to moderately high levels of all the landscape dimensions and preference. Scenes usually were of a country scene with trees, grasses, wild flowers, and either a hidden farm house or a water feature partially hidden in the distance. A scene of this nature is provided in Figure 14.

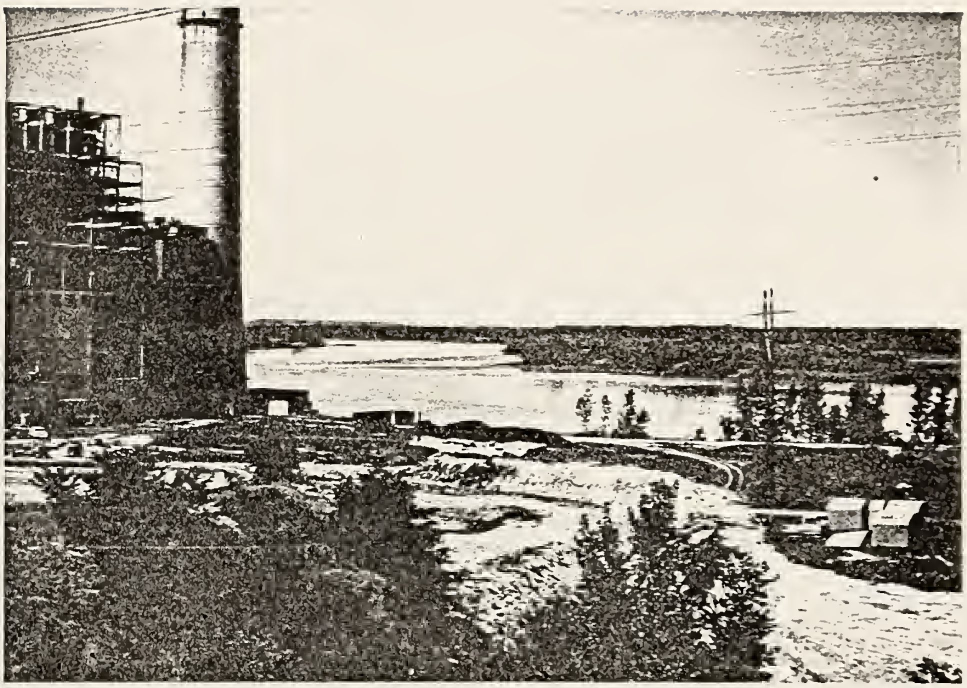
With Factor Four, it was more difficult to determine common features. Each slide showed different environments, some with open-panoramic views and some with lesser amounts of openness.

Generally, from the factor analysis, groupings of slides found agreement with the operational definitions for each landscape dimension. Scenes of lower complexity, as in Factor Group One, contained fewer of the defining design related elements. A higher complexity revealed more of these elements, as in the Factor Grouping Two. Slides with a low presence of coherence, demonstrated in Factor Group Two, are seen with either culturally incompatible elements, characteristics, and landuse types or are of a disorganized and un-unified nature. A higher rating of coherence in Factor Group Three shows a relatively unified scene with few distracting objects. The presence of mystery in this grouping seemed dependent upon the presence of complexity. The lower mystery rating in

This group typically demonstrates landscapes of open, spacious, and treeless settings. This scene had mean ratings of 1.6 for complexity, 3.7 for coherence, 2.6 for mystery, 3.1 for identifiability, and 3.1 for preference.

Figure 12

Factor Analysis Group One



Distracting elements were usually present in these scenes. This scene had mean ratings of 4.1 for complexity, 1.8 for coherence, 3.3 for mystery, 2.3 for identifiability, and 1.6 for preference.

Figure 13

Factor Grouping Two

These scenes contained trees, grasses, wild flowers, and a farm house or water feature. This scene had mean ratings of 3.4 for complexity, 4.0 for coherence, 3.7 for mystery, 3.3 for identifiability, and 3.9 for preference.

Figure 14

Factor Grouping Three

Factor One may be a result of this. As the presence of mystery increased to the level of Factor Three, more landscape elements were found suggesting information but concealing it from view. Low presence of identifiability appeared to respond to the lack of clarity of the scene or with the presence of distracting elements. Slides of Factor Group Three generally were clearer in nature, exhibiting more definable edge boundaries, landscape elements and characteristics.

Validation of the Dimension Groupings

The validation of the dimension groupings was accomplished by changing the numeric rating scale used by the participants into the "high-low" scale used in the dimension groupings Table 4. The participants' ratings from 1 to 2.9 were converted to "low" and ratings of 3 and above were assigned to "high." The panel of experts' ratings were then compared to the assumed ratings for each dimension grouping. The results are provided in Table 6.

Mean ratings for each slide can be found in the appendices Part B under the Mean calculations for each slide on page 101. Group mean scores are provided to indicate the actual average rating for the group.

As indicated in the table, ratings of complexity and coherence were in agreement with the experimentor's ratings at least eight times out of twelve for each grouping except in group 8 where the ratings of coherence matched only four out of twelve. Ratings of mystery were in agreement in Groups 1, 2, 7, and 8. However, in Groups 3, 4, 5, and 6, four or less ratings were in agreement. These results might be explained in one of two ways. Either the experimentor biased the assumed ratings when collecting the photographs or else it is difficult to find scenes of high complexity with low mystery or scenes of low complexity with high

GROUP #1

Slide Number	Rating Assumed by Experimentor Comp	Cohr	Myst	Ratings Given by Panel of Experts Comp	Cohr	Myst	Pref
1	H	H	H	L	H	H	
2	H	H	H	L	H	H	
3	H	H	H	H	H	H	
4	H	H	H	L	H	H	
5	H	H	H	H	H	H	
6	H	H	H	H	H	H	
7	H	H	H	H	H	H	
8	H	H	H	H	H	H	
9	H	H	H	H	H	H	
10	H	H	H	H	L	H	
11	H	H	H	H	H	H	
12	H	H	H	H	H	H	
Mean Rating for Each Dimension				3.2	3.5	3.8	3.8
Range of Ratings for Each Dimension				2.8-4.1	2.6-4.5	3.0-4.6	3.2-4.5
Total Number of Each Dimension in Agreement				9	11	12	
Total Number of Ratings in Agreement				9 +	11 +	12 = 32	
Total Number of Slides in Agreement				8			

Table 6a

A Comparison of the Experimentor's Assumed Ratings
for Each Dimension Grouping to the Ratings of the Panel of Experts

GROUP #2

Slide Number	Rating Assumed by Experimentor Comp	Cohr	Myst	Ratings Given by Panel of Experts Comp	Cohr	Myst	Pref
13	H	L	H	H	L	H	
14	H	L	H	H	L	H	
15	H	L	H	L	L	H	
16	H	L	H	L	L	L	
17	H	L	H	H	L	H	
18	H	L	H	H	L	H	
19	H	L	H	L	L	H	
20	H	L	H	L	L	L	
21	H	L	H	H	H	H	
22	H	L	H	H	H	H	
23	H	L	H	H	L	H	
24	H	L	H	H	L	H	
Mean Rating for Each Dimension				3.4	2.4	3.5	3.0
Range of Ratings for Each Dimension				2.7-4.7	1.9-3.2	2.8-4.9	2.3-3.9
Total Number of Each Dimension in Agreement				8	10	10	
Total Number of Ratings in Agreement				8 +	10 +	10 =	28
Total Number of Slides in Agreement				6			

Table 6b

A Comparison of the Experimentor's Assumed Ratings for Each Dimension Grouping to the Ratings of the Panel of Experts

GROUP #3

Slide Number	Rating Assumed by Experimentor Comp	Cohr	Myst	Ratings Given by Panel of Experts Comp		Cohr		Myst		Pref
25	H	H	L	H		H		H		
26	H	H	L	H		H		H		
27	H	H	L	L		H		H		
28	H	H	L	H		H		H		
29	H	H	L	L		H		H		
30	H	H	L	L		H		L		
31	H	H	L	H		H		H		
32	H	H	L	H		H		H		
33	H	H	L	H		H		H		
34	H	H	L	H		H		H		
35	H	H	L	H		H		H		
36	H	H	L	L		H		H		
Mean rating for Each Dimension				2.9		3.6		3.6		3.7
Range of Ratings for Each Dimension				2.2-3.4		3.2-4.2		2.9-4.4		3.1-4.4
Total Number of Each Dimension in Agreement				8		12		1		
Total Number of Ratings in Agreement				8	+	12	+	1	=	21
Total Number of Slides in Agreement				0						

Table 6c

A Comparison of the Experimentor's Assumed Ratings for Each Dimension Grouping to the Ratings of the Panel of Experts

GROUP #4

Slide Number	Rating Assumed by Experimentor Comp	Cohr	Myst	Ratings Given by Panel of Experts Comp	Cohr	Myst	Pref
37	H	L	L	H	L	L	
38	H	L	L	L	L	H	
39	H	L	L	H	L	H	
40	H	L	L	L	L	H	
41	H	L	L	H	L	H	
42	H	L	L	H	L	H	
43	H	L	L	H	L	H	
44	H	L	L	H	L	H	
45	H	L	L	L	L	L	
46	H	L	L	H	L	H	
47	H	L	L	H	L	L	
48	H	L	L	H	L	L	
Mean Rating for Each Dimension				3.4	2.1	3.3	2.2
Range of Ratings for Each Dimension				2.6-4.3	1.7-2.7	2.4-3.9	1.2-3.6
Total Number of Each Dimension in Agreement				9	12	4	
Total Number of Ratings in Agreement				9 +	12 +	4 = 25	
Total Number of Slides in Agreement				3			

Table 6d

A Comparison of the Experimentor's Assumed Ratings for Each Dimension Grouping to the Ratings of the Panel of Experts

GROUP #5

Slide Number	Rating Assumed by Experimentor Comp	Cohr	Myst	Ratings Given by Panel of Experts Comp	Cohr	Myst	Pref
49	L	H	H	L	H	H	
50	L	H	H	L	L	L	
51	L	H	H	L	H	L	
52	L	H	H	L	H	L	
53	L	H	H	L	H	L	
54	L	H	H	L	H	L	
55	L	H	H	L	H	L	
56	L	H	H	L	H	H	
57	L	H	H	L	H	H	
58	L	H	H	L	H	L	
59	L	H	H	L	L	H	
60	L	H	H	L	H	L	
Mean Rating for Each Dimension				2.1	3.3	2.9	3.3
Range of Ratings for Each Dimension				1.8-2.6	2.7-3.9	2.3-3.5	2.9-3.8
Total Number of Each Dimension in Agreement				12	10	4	
Total Number of Ratings in Agreement				12 +	10 +	4 = 26	
Total Number of Slides in Agreement				3			

Table 6e

A Comparison of the Experimentor's Assumed Ratings for Each Dimension Grouping to the Ratings of the Panel of Experts

GROUP #6

Slide Number	Rating Assumed by Experimentor Comp	Cohr	Myst	Ratings Given by Panel of Experts Comp		Cohr		Myst			Pref
61	L	L	H	L		L		H			
62	L	L	H	L		L		L			
63	L	L	H	L		L		L			
64	L	L	H	L		H		L			
65	L	L	H	L		L		L			
66	L	L	H	L		L		L			
67	L	L	H	L		L		H			
68	L	L	H	L		H		L			
69	L	L	H	L		H		H			
70	L	L	H	L		H		L			
71	L	L	H	L		L		L			
72	L	L	H	L		L		L			
Mean Ratings for Each Dimension				2.5		2.7		2.9			2.5
Range of Ratings for Each Dimension				1.9-3.0		1.9-3.5		2.4-4.1			1.9-3.7
Total Number of Each Dimension in Agreement				12		8		3			
Total Number of Ratings in Agreement				12	+	8	+	3	=	23	
Total Number of Slides in Agreement				2							

Table 6f

A Comparison of the Experimentor's Assumed Ratings for Each Dimension Grouping to the Ratings of the Panel of Experts

GROUP #7

Slide Number	Rating Assumed by Experimentor Comp	Cohr	Myst	Ratings Given by Panel of Experts Comp	Cohr	Myst	Pref
73	L	H	L	L	H	L	
74	L	H	L	L	H	L	
75	L	H	L	L	H	L	
76	L	H	L	L	H	L	
77	L	H	L	L	H	L	
78	L	H	L	L	H	L	
79	L	H	L	L	H	L	
80	L	H	L	L	H	L	
81	L	H	L	L	L	L	
82	L	H	L	L	H	L	
83	L	H	L	L	H	L	
84	L	H	L	L	H	L	
Mean Ratings for Each Dimension				1.6	3.4	2.4	3.1
Range of Ratings for Each Dimension				1.1-2.2	2.8-3.7	2.1-2.8	2.6-3.2
Total Number of Each Dimension in Agreement				12	11	12	
Total Number of Ratings in Agreement				12 +	11 +	12 = 35	
Total Number of Slides in Agreement				11			

Table 6g

A Comparison of the Experimentor's Assumed Ratings for Each Dimension Grouping to the Ratings of the Panel of Experts

GROUP #8

Slide Number	Rating Assumed by Experimentor Comp	Cohr	Myst	Ratings Given by Panel of Experts Comp	Cohr	Myst	Pref
85	L	L	L	L	L	L	
86	L	L	L	L	L	L	
87	L	L	L	L	H	L	
88	L	L	L	L	H	L	
89	L	L	L	L	H	L	
90	L	L	L	L	H	L	
91	L	L	L	L	H	L	
92	L	L	L	L	H	L	
93	L	L	L	L	H	H	
94	L	L	L	L	L	L	
95	L	L	L	L	H	L	
96	L	L	L	L	L	L	
Mean Rating for Each Dimension				1.6	3.1	2.4	2.3
Range of Ratings for Each Dimension				1.1-2.3	2.3-4.1	1.8-3.7	1.3-3.0
Total Number of Each Dimension in Agreement				12	4	11	
Total Number of Ratings in Agreement				12 +	4 +	11 =	27
Total Number of Slides in Agreement				4			

Table 6h

A Comparison of the Experimentor's Assumed Ratings for Each Dimension Grouping to the Ratings of the Panel of Experts

mystery. The latter conclusion is supported to some extent with evidence from the landscape dimension correlations, next to be discussed.

Landscape Dimensions Correlation

A correlation was done for all ninety-six slides to answer the research question concerning the effects of each dimension on the other. Correlations of this nature were done using computer programs from the SPSS Handbook (Niev, 1975). Table 7 summarizes these correlations.

The correlations matrix suggests weak significant correlations between complexity and identifiability and negatively between complexity and coherence. Thus, as ratings of complexity increase, ratings of identifiability increase and ratings of coherence decrease.

Stronger correlations were achieved between identifiability and coherence, identifiability and mystery, and complexity and mystery. Hence, as ratings of identifiability increase, ratings of coherence and mystery increase; and as ratings of complexity increase, ratings of mystery increase.

Interaction and Effects of Each Landscape Dimension upon Preference

To answer the research question concerning the effects of the landscape dimensions upon ratings of preference, three different methods of analysis were employed. The first attempted an analysis of variance. The second created another correlation matrix including preference. The third used multiple regression analysis. The results of each method are provided in the text and tables following.

Analysis of Variance

A 3 x 3 x 3 x 2 fifty-four cell analysis of variance was attempted to answer this research question. However, this was not feasible using

	Ident	Compl	Cohr	Myst
Ident				
Compl	.28105			
Cohr	.61414	-.28496		
Myst	.55681	.78440	.07765	

Note: .205 is significant at the .05 level of significance.

Table 7

Correlation Matrix Using Participant Ratings of
Complexity, Mystery, Coherence, and Identifiability

	Pref	Ident	Compl	Cohr	Myst
Pref					
Ident	.82710				
Compl	.20039	.28105			
Cohr	.70544	.61414	-.28496		
Myst	.57230	.07627	.78440	.07765	

Note: .205 is significant at the .05 level of significance.

Table 8

Correlation Matrix Using Participant Ratings of
Complexity, Mystery, Coherence, Identifiability, and Preference

existing computer programs on the Kansas State University campus, due to a large number of empty cells and an unequal number of slides in each cell in the table. The other methods of analysis were then relied upon to answer this question.

Correlation of the Landscape Dimension Including Preference

Correlations of the dimensions with preference were done in a similar fashion as in Table 7. Results of this analysis are provided in Table 8.

Findings show that a significant correlation exists between preference and identifiability, coherence, and mystery. This suggests that as ratings of identifiability, coherence, and mystery increase, ratings of preference also increase. Evidence in agreement with these findings is provided in the multiple regression analysis.

Multiple Regression Analysis

The multiple regression analysis offers an alternative method of answering the question on how each landscape dimension affects and interacts with preference.

This analysis utilizes the correlation matrix of all landscape dimensions and preference to develop a predictive equation. Variables of identifiability, coherence, mystery, and complexity were randomly entered into the equation. The end product provides a cumulative R^2 value and list of the variables (dimensions) for prediction in descending order of importance. The "F" is a ratio of variances used to determine the significance of the dimension. Table 9 indicates these findings.

Results of this analysis indicate that identifiability was the strongest predictor of preference, with coherence and mystery following.

Variable	r	r^2	F
Identifiability	.82710	.68409	24.363
Coherence	.70544	.74671	31.838
Mystery	.57230	.81291	24.287
Complexity	.20039	.81731	2.193

Note: R^2 is a cumulative value as each dimension is added to the equation. The dimensions are listed in the order of importance as calculated by the computer. Significance for "F" at .05 level is equal to 6.90.

Table 9

Multiple Regression Analysis Using Correlation Values of Identifiability, Coherence, Mystery, and Complexity

Ratings of complexity were not a significant influence on preference. Identifiability, coherence, and mystery account for 81% of the variance. Using the constants and error values, the following predictive equation can be stated:

Preference = (.455 x rating of identifiability) + (.459 x rating of coherence) + (.481 x rating of mystery) - (.113 x rating of complexity) - 1.01

Because the error values in parentheses for each dimension (aside from complexity) are approximately equal, this equation indicates that increasing ratings of identifiability, coherence, or mystery have a similar impact and increase a rating of preference. Complexity, on the other hand, has a mildly negative influence on preference.

Influence of Time on the Landscape Dimensions

To test the influence of viewing time on the landscape dimensions, a T-Test analysis was done between slides shown for two seconds and those shown for eight seconds. The results are summarized in Table 10.

Results reveal significant differences of viewing time for ratings of coherence and mystery. A possible explanation why time did not influence any other dimensions could be that two seconds was too long a viewing time for complexity and identifiability. Shorter viewing times may have influenced these dimensions more significantly. This is explained in more detail and with respect to S. Kaplan's model of preference in the next chapter under Viewing Time.

Influence of Time on Ratings of Preference

It was not possible to include preference in the T-Test with the the dimensions because of the difference in the number of participants in

Variable	T-Stat	DF	Mean-1	Mean-2
Complexity	-1.430	958	2.527	2.627
Coherence	-2.557	958	2.952	3.135
Mystery	-2.514	958	3.002	3.194
Identifiability	-1.671	958	3.087	3.210

Note: Significance is reached at 1.960 for the .05 level of significance.

Table 10

T-Test Using All Slides Testing the Influence of Viewing Time on Complexity, Coherence, Mystery, and Identifiability

Parts One and Two of the experiment. Thus, tests for the influence of viewing time on preference were done by including it as a variable in the correlation matrix and the multiple regression analysis. Results show that viewing time does not significantly influence a rating of preference in the prairie. (See Appendix 2, page 105.)

CHAPTER IV

CONCLUSIONS AND DISCUSSION

This chapter discusses the results and conclusions of the experiment. It begins with the conclusions on verification of the operational definitions and the validation of dimension groupings. This is followed with conclusions drawn from correlations of the dimensions to each other and to preference and then those from the multiple regression analysis and the tests for viewing time. Finally, these results will be compared to the research of Stephen Kaplan.

Operational Definition Verification

From the calculation of the mean ratings for each dimension and direct observation of the slides, it was concluded in the last chapter that generally the operational definitions were accurate. At this point, a more thorough discussion of them and their design related elements will occur.

Identifiability

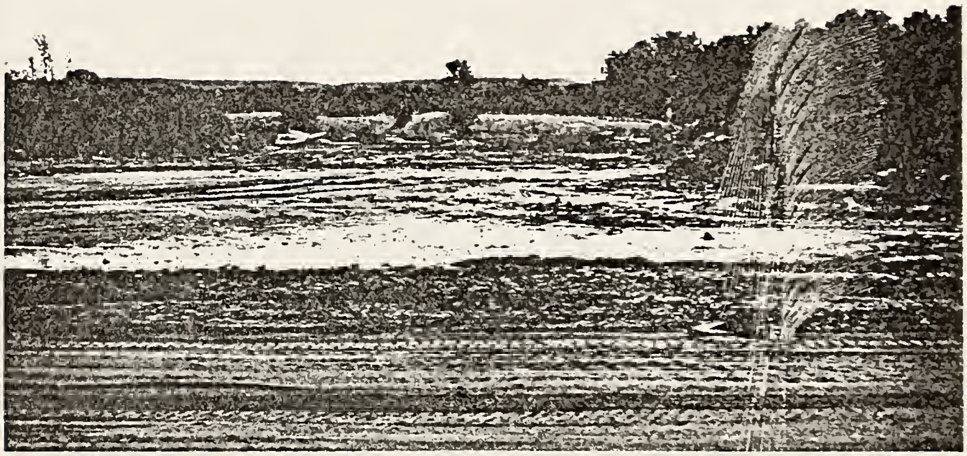
Several conclusions can be drawn from the observation of the slides and results concerning identifiability. The photographs in Figures 15 and 16 demonstrate scenes rated high and low in identifiability.

Figure 15 exemplifies scenes rated high in identifiability. These were outstanding in the legible and clear presentation of environmental information and contained elements that were always easily understood. This was the result of strong lines of contrasts and edge quality,

Scenes rated high in identifiability reflect a clear presentation of environmental information. This slide had mean ratings of 3.2 for complexity, 3.7 for coherence, 4.3 for mystery, 4.1 for identifiability, and 4.1 for preference.

Figure 15

An Example of a Scene Rated High in Identifiability



Scenes of low identifiability did not present a clear image of the landscape and its contents. This slide had mean ratings of 3.4 for complexity, 1.9 for coherence, 2.7 for mystery, 1.7 for identifiability, and 1.2 for preference.

Figure 16

An Example of a Scene Rated Low in Identifiability which created emphasis and vividness of the components in the scene. In some cases, several slides revealed distinct changes in texture and material corresponding to Litton's contour distinction and surface variance. Directions of sunlight casting shadows and differences in color were also present, creating more definitions of the landscape qualities.

Contrary to the high identifiability slides, those rated low in identifiability were generally not as legible. These slides often contained elements that were either not quite clear because of indistinct emphasis or contained elements unusual to the prairie. Distance also seemed to be a determining factor. That which hindered the presence of identifiability most was the scene's lack of clarity. As shown in Figure 16, elements in the background are not quite distinct enough to be clearly distinguished.

The unclear presentation of information in these instances was the result of a lack of edge quality, distinction, and element definition using the emphasizing characteristics of color, texture, scale, and material. There also appears to be a high correlation between identifiability and coherence. A disorganized scene was generally a scene of indistinction. This conclusion is supported by the correlation matrix. This result is logical, since both of these dimensions are in the category of "legibility" and therefore have overlapping domains.

Coherence

The photographs in Figures 17 and 18 demonstrate scenes rated high and low in coherence. The scenes of high coherence in Figure 17 are based on the degree of organization and composition present in the landscape. These were scenes of a visually-culturally unified composition with few or no distracting or unusual elements. Colors and textures compliment each other and landuse types are culturally compatible.

Scenes of high coherence demonstrate a visually culturally unified composition. This scene had mean ratings of 3.7 for complexity, 4.5 for coherence, 4.1 for mystery, 4.2 for identifiability, and 4.4 for preference.

Figure 17

An Example of High Coherence

Scenes of low coherence demonstrated a disorganized nature and elements unusual to the prairie. This scene had mean ratings of 3.0 for complexity, 2.2 for coherence, 3.6 for mystery, 2.4 for identifiability, and 2.5 for preference.

Figure 18

An Example of Low Coherence

The scenes of low coherence contained distracting objects, culturally incompatible landuse types, and were disorganized. Figure 18 illustrates such a scene. It is cluttered-looking with bare patches of ground and an unusual pile of earth in the background. Such a scene is not a unified composition.

Mystery

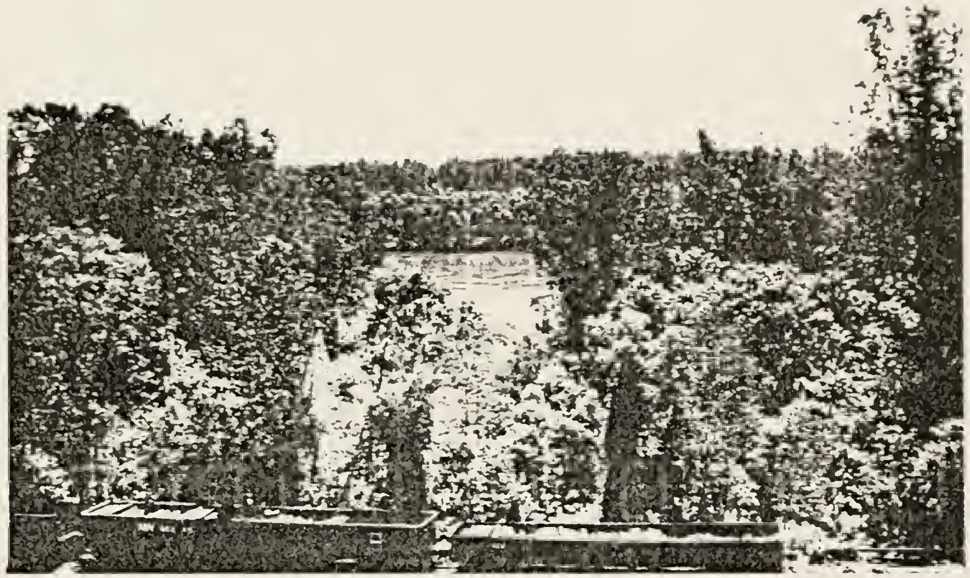
Figures 19 and 20 exemplify scenes rated high and low in mystery.

The placement or arrangement of landscape elements to suggest information in a scene is the most significant factor influencing high mystery. Scenes of high mystery often contained water elements or farm structures partially hidden from view, as shown in Figure 19. The presence of roads or perspective elements that lead the eye into the distance were also quite frequent.

A low presence of mystery in Figure 20 contained fewer landscape elements. It appears that mystery is largely dependent upon elements capable of concealing others from view. Because of this, scenes with a decided lack of landscape elements are, in turn, lower in mystery. The presence of a road or perspective line of site seemed to influence the ratings of mystery only a small amount. However, in scenes of higher complexity, the presence of these components added much to the mystery of a landscape.

Complexity

The photographs in Figures 21 and 22 demonstrate high and low complexity.



Scenes of high mystery contained elements concealed or partially hidden that suggest information to the observer. This scene had mean ratings of 4.2 for complexity, 3.1 for coherence, 4.9 for mystery, 4.2 for identifiability, and 3.9 for preference.

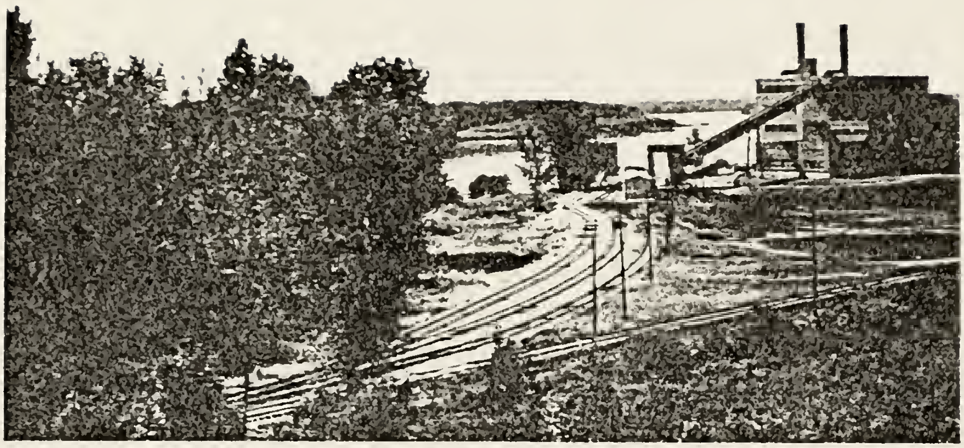
Figure 19

An Example of a Scene Rated High in Mystery

Scenes of low mystery always contained fewer landscape elements corresponding to a low complexity. This scene had mean ratings of 1.2 for complexity, 3.7 for coherence, 2.1 for mystery, 3.1 for identifiability, and 3.0 for preference.

Figure 20

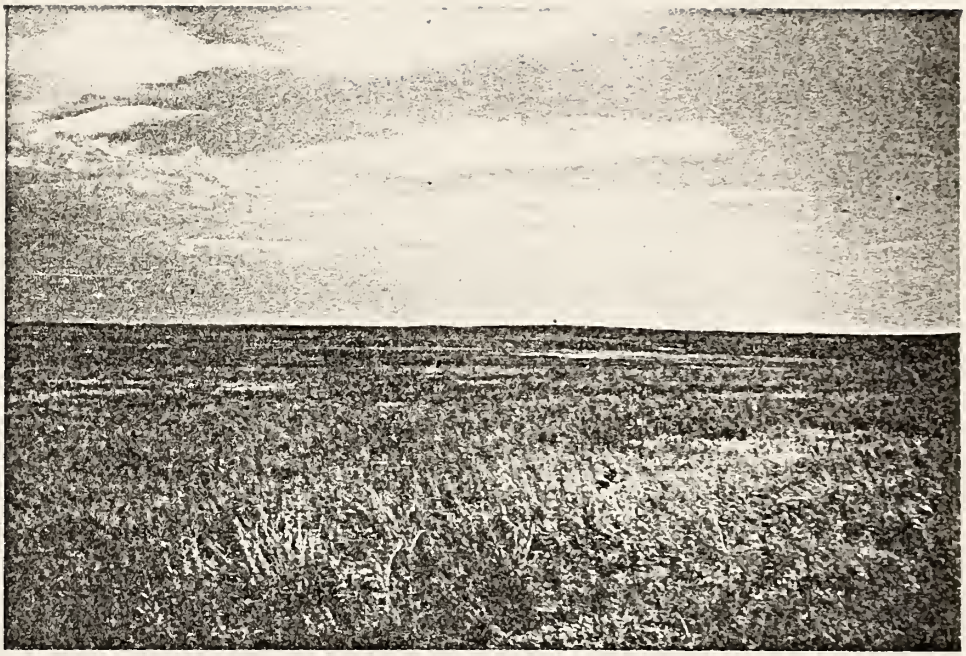
An Example of Scenes Rated Low in Mystery



Scenes of high complexity contained more landscape elements, characteristics, relationships, and landuses. This scene had mean ratings of 4.7 for complexity, 2.3 for coherence, 3.7 for mystery, 3.3 for identifiability, and 2.3 for preference.

Figure 21

A Scene Rated High in Complexity



Fewer elements were present in scenes of low complexity. This scene had mean ratings of 1.1 for complexity, 3.7 for coherence, 2.1 for mystery, 2.9 for identifiability, and 3.0 for preference.

Figure 22

A Scene Rated Low in Complexity

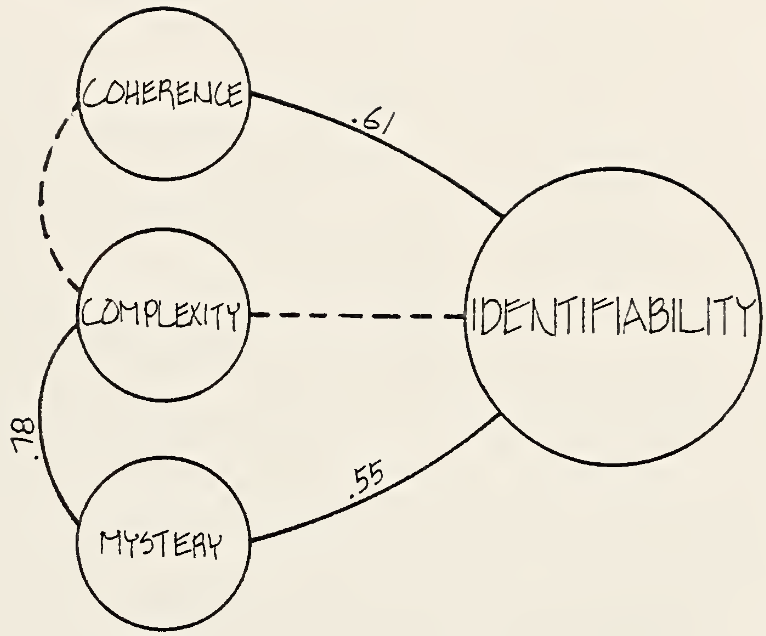
Landscapes rated high in complexity always contained a greater quantity of elements and characteristics with corresponding relationships between the two and landuse types as well. Low complexity landscapes, such as Figure 22, always contained fewer of these qualities. As complexity increases, so does the presence of any of the influencing design related elements.

Validation of Dimension Groupings

The major conclusion is that low mystery is difficult to procure in landscape scenes of high complexity. Likewise, high mystery could not be found in scenes of low complexity. This was drawn from the results of the analysis comparing the experimentor's assumed ratings to those of the panel of experts. These results might be explained by the fact that both complexity and mystery are contained in Kaplan's category of "promised new information" and therefore would be related. In fact, mystery was suggested in the operational definitions as part of complexity under "relationships of landscape elements and characteristics." Evidence of these conclusions is found in the observations of slides and in the correlations of the dimensions.

Dimension Correlations

From the correlations matrix and diagram in Figure 23, it was concluded that identifiability significantly correlated with complexity, coherence, and mystery, indicating that as ratings of identifiability increase, so do ratings of complexity, coherence, and mystery, and vice versa. This can be explained in the fact that each of these four landscape dimensions demonstrates at least one different type of available environmental information. The most concrete and perceivable type of information



The doted line indicates a weaker significant relationship.
The solid line indicates a strong significant relationship.
The numbers above each line are the correlation coefficients from the correlation matrix from Table 6.

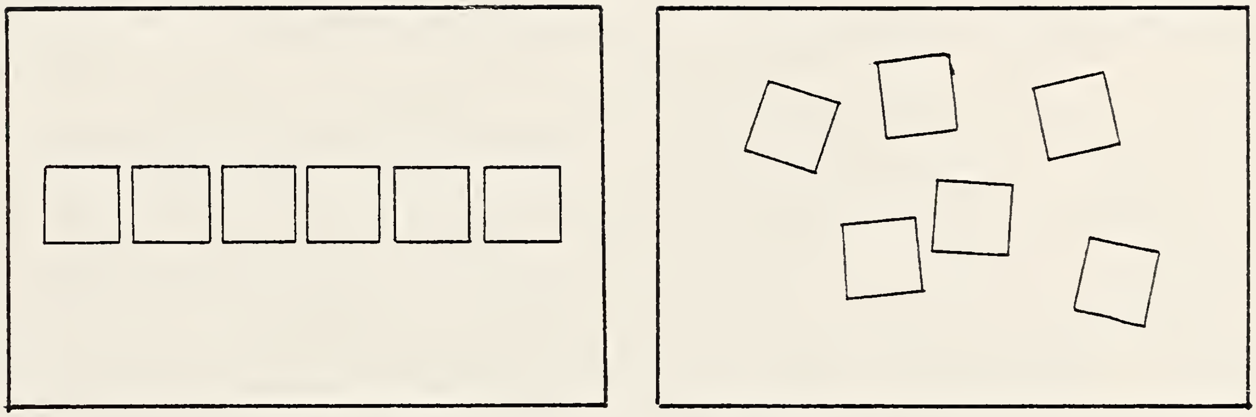
Figure 23

Diagram Showing the Relationships of the Landscape Dimensions to Each Other might be the physical elements in the landscape, such as vegetation, presence of water, topography or structures. Colors, textures, and shapes might characterize another type of information. A third type might be considered the relationships of elements. Awareness of more information in a scene corresponds to the recognition of complexity, coherence, and mystery, since each of these exemplifies a type or types of information in the environment. Perception of identifiability uses this awareness of information to comprehend the environment. When identifiability is perceived in a setting, the observer must be aware of the information present. Hence, it might be postulated that identifiability may consist of the recognition of complexity, coherence, and mystery in a landscape. This explains the correlation between identifiability and complexity, coherence and myster.

Another distinct conclusion to be drawn concerns the significant negative correlation of complexity and coherence. This indicated that high levels of complexity may decrease ratings of coherence and vice versa. This seems logical, since a level of complexity may be so high that coherence may not be as perceivable, resulting in a lower rating of this attribute. This is demonstrated in Figure 24.

In the figure, diagram A demonstrates high coherence while B demonstrates a lack of it. Both examples contain the same amount of information but in different orders. To this experimentor and several colleagues, B appears more complex. Perhaps the same type of relationship exists in the perception of landscape scenes where the more ordered the information appears, the less complex it seems to be, and vice versa.

It was also seen that complexity significantly correlated with mystery, suggesting that as ratings of complexity increase, so do those



(a) High Coherence/Low Complexity (b) Low Coherence/High Complexity

Figure 24

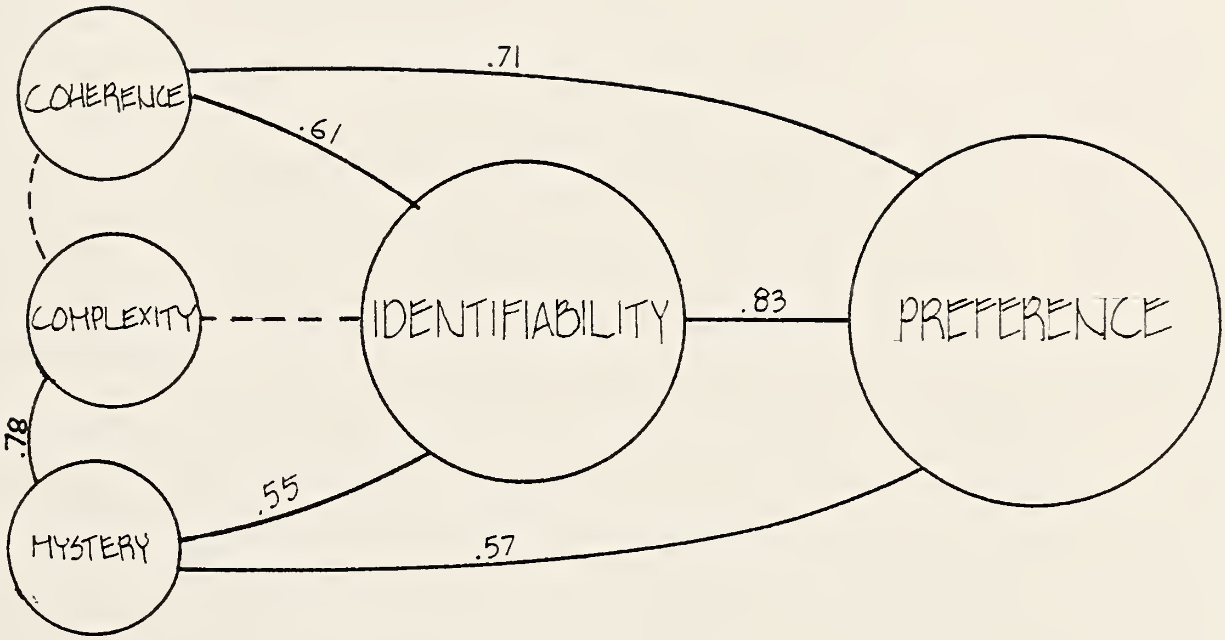
A Demonstration of the Correlation
Between Complexity and Coherence

of mystery. Such a relationship seems logical. Mystery, by definition, requires some element to be partially obscured from the view of the observer, holding the promise of new information. To obscure an element in a landscape, one must position it in such a way that information is suggested by hidden from view. The addition of vegetation or topography to a scene to obscure other elements from view will also make it more complex. In the same sense, mystery could influence a rating of complexity. The definition of complexity hinges upon the effects of relationships between landscape elements and characteristics. Mystery in a scene would present another piece of information about the environment, which would relate directly to the complexity of the scene.

Landscape Dimension's Influence on Preference

Employing Figure 23, preference can be included showing how it interacts with each dimension in the prairie. As indicated in Figure 25, the results from both the correlation matrix and the multiple regression indicate strong significant correlations of identifiability, coherence, and mystery with preference. Thus, in the prairie environment, it is concluded that these three landscape dimensions are strongest in influencing ratings of preference. Increasing ratings of these dimensions will increase ratings of preference.

In addition, it was found as each landscape dimensions was placed in the multiple regression equation that identifiability was strongest in predicting preference (R^2 = .68). Coherence came next (identifiability + coherence R^2 = .74) with mystery following (identifiability + coherence + mystery R^2 = .80). It is interesting to note that identifiability and coherence entered into the equation first, with mystery and complexity categories of promised new information) entering later. From this it is



The dotted lines indicate weaker significant relationships while the solid line shows a strong correlation. The numbers above each line are the correlation coefficients obtained from the correlation matrix.

Figure 25

Diagram Showing the Interaction of the Landscape Dimensions with Preference concluded that, to the prairie resident, the prairie environment is more likely to be legible and readable than to promise new information. The prairie consists of subtler amounts of complexity, corresponding to decreases in promised new information. This being the case, observers of the prairie would have to rely on different aspects of environmental information, such as the presence of identifiability and coherence, to comprehend the landscape.

Viewing Time

The results of the analysis for viewing time might be explained by the type of landscape and the familiarity of the participants. The prairie could be considered less complex than other environments, and therefore the viewing time was sufficient for comprehending the amount of complexity present in prairie scenes. If this is so, then the time would have to be shortened to less than two seconds for a significant difference in complexity ratings to occur. These results correspond to Kaplan's notion of inference, meaning that additional time is required to comprehend some scenes. Complexity, according to Kaplan, requires less inference and time for decision, while identifiability requires more. This is especially true in the prairie environment, where complexity is more easily distinguished. Identifiability, in this case, is influenced by the nature of the landscape. At two seconds, a prairie landscape can be easily identified, while other environments may take longer.

Kaplan's concept of inference can be used to explain why time influences mystery and coherence. Mystery is a dimension requiring inference, because it demands some amount of decision to be appreciated.

In the prairie, mystery may be lower to begin with, and therefore perception in the prairie requires even more time.

Coherence, according to Kaplan, should require less inference. This experiment found otherwise and might be explained by realizing the nature of the prairie. If a scene exhibits fewer physical elements, then an observer must extract information on subtler levels of perception, such as color, textures, or relationships. This type of information is not as noticeable as the physical elements and therefore would require more time to perceive.

Another possible explanation of these results is the issue of familiarity. If an observer is already familiar with the prairie environment, then it is likely that a prairie scene would take less time to understand. Persons unfamiliar with the prairie demand more time for comprehension. Complexity and identifiability may have been influenced by this familiarity. Coherence and mystery, on the other hand, are dimensions which might be considered specific to a particular scene. Familiarity may not be an aid in this case, since the coherence of the scene and the presence of mystery would be something new to the observer. However, an observer perceiving the same scene for a second time may already have some idea of the coherence and mystery of it. A second viewing of these slides may reveal differences in the ratings of coherence and mystery.

Conclusions on Theoretical Framework and Context

In agreement with Stephen Kaplan's theoretical basis (1972a, 1972b, 1975) employed in this research, it is concluded that the four landscape dimensions do have a relationship in the prediction of preference.

However, some disagreement exists between Kaplan's results and these experimental findings. Kaplan's study (1975) with Roger Ulrick says that moderate levels of complexity, coherence, and spaciousness have to be present for a scene to be liked and that these dimensions form the condition for preference. The present research concludes that the greater the rating of identifiability, coherence, and mystery, the greater the rating of preference. In explanation of these conflicts, it can be postulated that this research utilized a set of landscape scenes different from those used in the Kaplan study. In addition, participants were drawn from a pool of primarily prairie residents. These differences could conceivably change the results. Thus, the four landscape dimensions may have different relationships in different parts of the country. This does not invalidate the original theoretical basis of these dimensions, only their applicability to different environments. This concept of regionality and context is also questioned in the works of Litton (1972) and Zube (1975).

Summary

At this point, using these data, it is possible to develop a list of criteria for preference in the prairie environment. This is done in Table 11. Using these criteria of preference, several applications to landscape architecture can be realized. The next chapter will enumerate these.

A. Increasing identifiability will amplify ratings of preference. 1. Presence of identifiability can be heightened by making a landscape or elements contained in a landscape more distinct, emphasizing components of color, texture, contrasts, isolation of form, contour distinction, or surface variance. 2. Presence of identifiability can be heightened by amplifying the presence of coherence and mystery (see coherence, B-1, 2, 3, and mystery, C-1 2, 3). 3. Presence of identifiability can be increased by amplifying the presence of complexity. Complexity of a scene is increased with a greater quantity of landscape elements, characteristics, relationships, and landuse types.
B. Increasing the presence of coherence will amplify ratings of preference. 1. Presence of coherence can be amplified by providing a culturally unified composition of landscape elements, characteristics, relationships, and landuse types. 2. Presence of coherence can be amplified by providing elements, characteristics, and landuse types that are culturally-visually compatible. 3. A longer viewing time will increase coherence if the above criteria have been met. 4. Presence of coherence can be amplified by lowering the presence of complexity in the prairie.
C. Increasing the presence of mystery will amplify ratings of preference. 1. Presence of mystery can be heightened by arranging landscape elements, characteristics, and relationships in such a way that information is suggested but hidden from view. 2. Presence of mystery can be raised by increasing the presence of complexity (see identifiability, A-3).

Table 11

Criteria for Preference

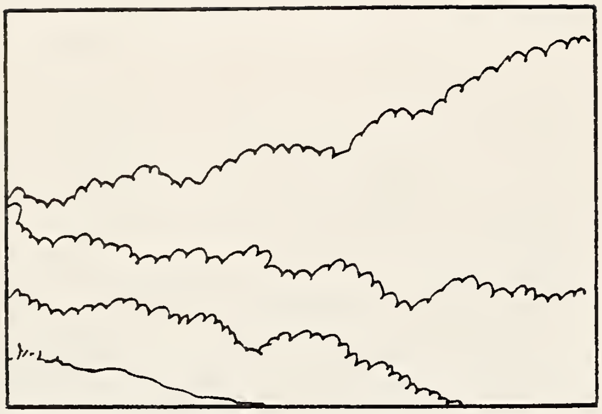
CHAPTER V

APPLICATION TO LANDSCAPE ARCHITECTURE

Using the criteria for preference as a design tool, a landscape architect can influence preference. These criteria can be employed to improve mediocre settings, damaged environments, newly constructed landscapes; to increase preference; and to identify and select landscapes with scenic quality.

To improve the preferability of a setting, a landscape architect need only apply the operational definitions for each landscape dimension to a setting. In the case of identifiability, this dimension can be increased by making a landscape more distinct, legible, understandable, or by providing more definition. Definition of a landscape can be accomplished using landscape elements, characteristics, relationships, or landuse types to accent, separate, and distinguish qualities of the landscape. Figure 26 demonstrates a landscape with a lack of distinguishing qualities. The grass, shrubbery, and trees blend together, making it difficult to identify the elements as separate pieces of information. By making a clearer separation of information with the addition of elements that emphasize edges and differentiate environmental information, the presence of identifiability can be increased. Figure 27 demonstrates the same scene with the addition of an element that helps distinguish and separate spaces, form, and landscape elements.

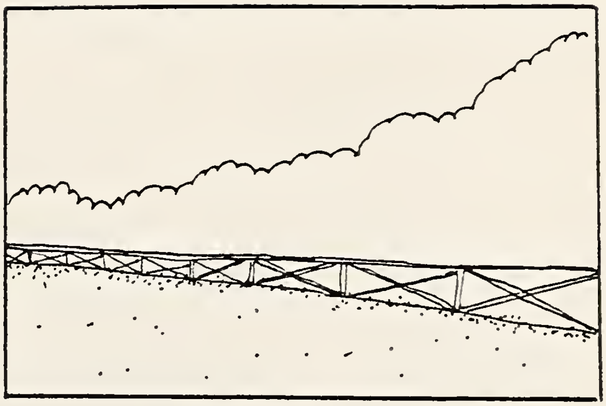
Elements of topography, vegetation, structures, water, roads, etc., can be employed in this manner, thereby creating strong edge quality and definition in the landscape.



It is more difficult to identify and understand a scene with an unclear separation of environmental information.

Figure 26

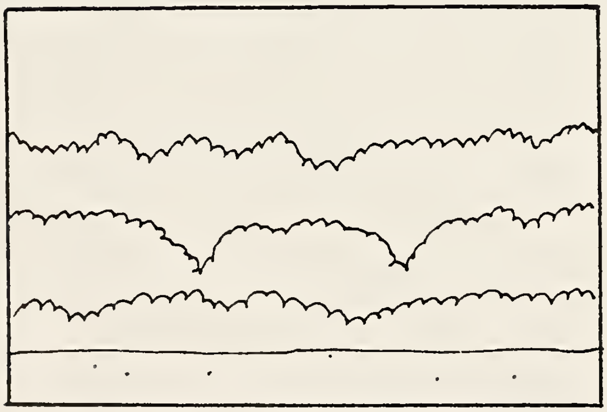
A Demonstration of a Landscape with a Lack of Distinguishing Qualities



Various elements can be utilized to separate and distinguish landscape elements, form, spaces, etc.

Figure 27

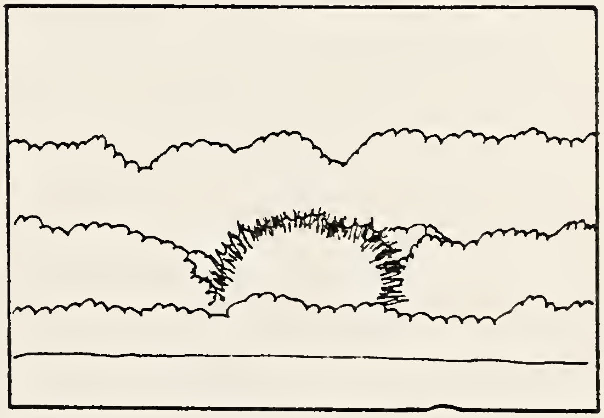
An Example of a Landscape Scene with Separation of Environmental Information



Similar textures in a landscape may make a scene less identifiable.

Figure 28

A Scene of Similar Textures



Contrasting textures in a landscape will make a scene more distinguishable to an observer.

Figure 29

Contrasting Textures in a Landscape

The use of landscape characteristics accomplishes much the same thing in relation to identifiability. Color and texture can be employed to accent and contrast various qualities in a landscape, making them more legible to the observer. Scenes containing elements with similar textures, as in Figure 28, are not as legible and identifiable as contrasting textures.

In this case, vegetative elements do not stand out to an observer. Changing textures (or color) will cause more distinction to occur. Figure 29 exemplifies this. The variation of textures provides distinction, making aspects of environmental information more legible to the observer.

The design elements related to landscape relationships, such as proportion, size or scale, can also be employed to increase identifiability. Figure 30 shows a scene of little variation in proportion, size or scale.

A landscape architect can accent a scene of this nature by providing a greater variation of size and scale. Figure 31 indicates how this can be done. The addition of differences in size or scale will cause distinction in the landscape and create interest to the observer. Changes of this nature will accent a landscape more effectively than scenes without this variation.

Coherence in a scene can be manipulated in much the same way as identifiability. In this case, a scene must exhibit a unified composition. This can be done by organizing or arranging the landscape elements or characteristics. It can also be accomplished by deleting, removing, or concealing objects that are visually distracting. Figure 32 demonstrates a scene with a low presence of coherence. The level of coherence can be increased in the figure either by removing the junk in the middleground or by hiding it from the observer. Figure 33 shows the scene upon removal

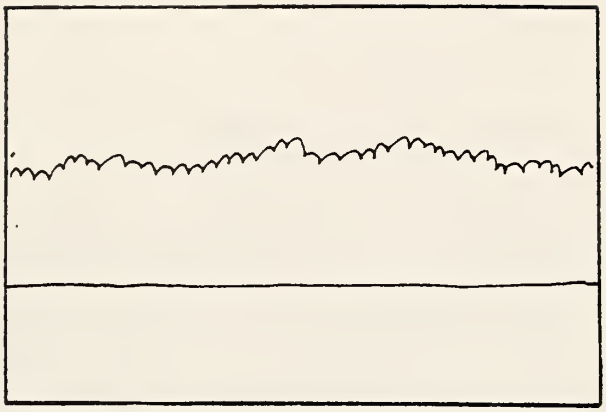
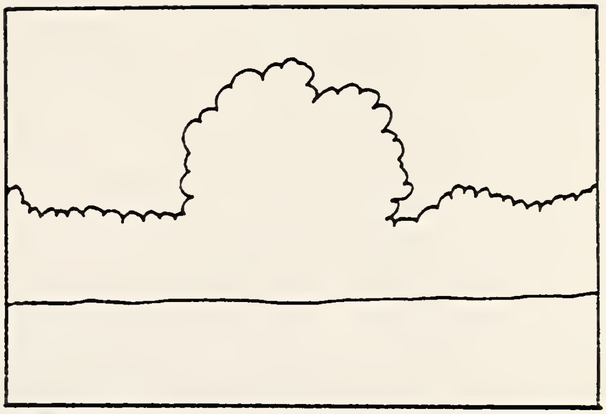


Figure 30

A Scene of Little Variation in Proportion, Size, or Scale



Variations of size and scale of elements will cause a scene to be more identifiable.

Figure 31

A Scene with Variations in Size of Elements

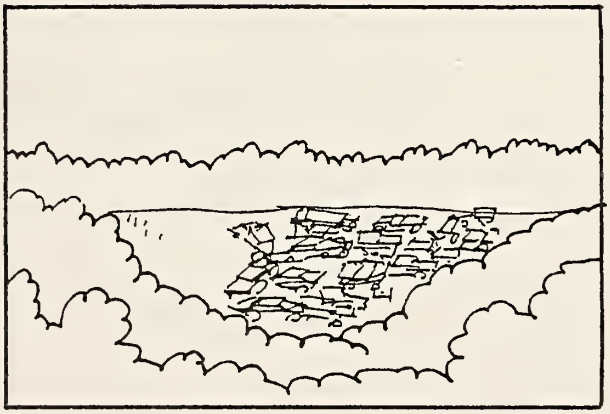
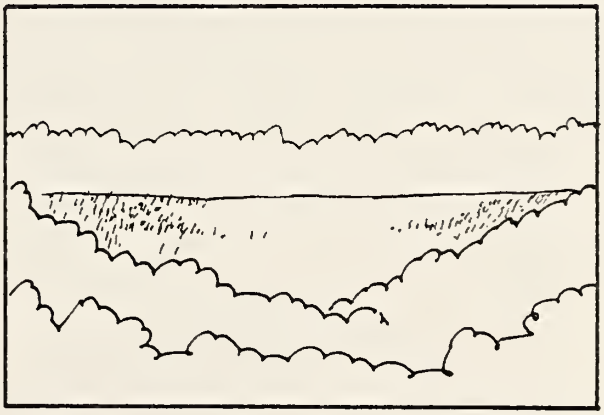


Figure 32

A Scene of Low Coherence



Coherence is improved with the removal of distracting or culturally unattractive elements.

Figure 33

A Scene of High Coherence

of the distracting elements present in it. The presence of coherence in Figure 33 has been increased. In cases of damaged landscapes, a landscape architect must either remove or disguise distracting elements. If a designer can manipulate cohesiveness from the start, coherence can be designed into a scene by selective placement of elements, creating a culturally unified composition.

Mystery, similar to coherence, can be influenced by the selective placement or arrangement of landscape elements or by removal of particular elements. Arrangements of landscape elements must be done in such a way that information is suggested but concealed from view. In Figure 34, the presence of mystery is lower than in Figure 35.

The higher presence of mystery in Figure 35 is due to the selective removal of vegetation to hint of information. Figure 34 does not suggest information to the observer. A landscape architect can also create mystery in a landscape by planting vegetation or placing various landscape elements to accomplish this same thing.

Using these operational definitions and design related elements to increase the presence of each landscape dimension, preference can be systematically improved or designed into a landscape. This provides an extremely valuable design tool for the landscape architect that can offer proof of preference and reason for design of a site in a particular way.

Besides practical applications of the design related elements for each landscape dimension, this research can be employed to determine landscape scenic quality for use in situations where concrete evidence is needed. For example, in a recent conflict (Carruth, 1977) in New York, attorneys for the Long Island Lighting Company contended that the scenic quality of the landscape proposed for the siting of a new power transmission

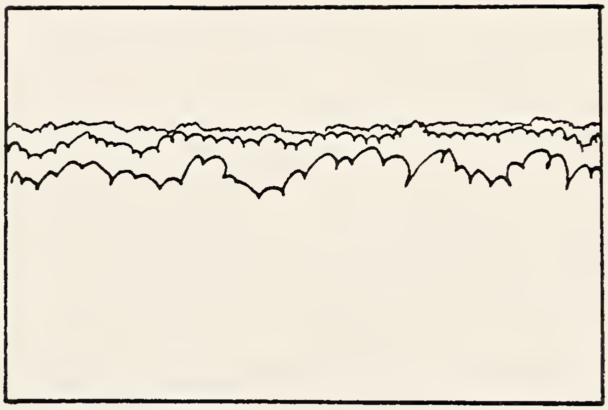
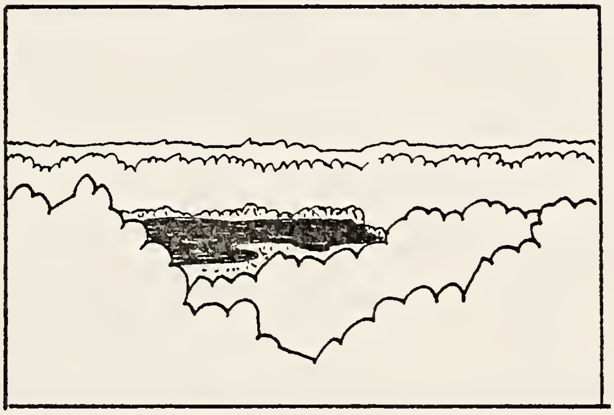


Figure 34

A Scene of Low Mystery



Removal of vegetation from the
foreground increases mystery
by suggesting information but
still concealing it from the
view of the observer.

Figure 35

A Scene of High Mystery

line was not great enough to warrant modification of the existing plans for location. Lawyers representing the county and towns of the area believed otherwise and requested that the power line be placed underground to maintain the scenic quality of the landscape. Other examples of such conflicts may be seen with the Consolidated Edison Power Plant proposal for Storm King Mountain (Tucker, 1977) on the Hudson River, or with the creation of a Prairie National Park in Kansas. These examples are just a few of many instances where conflicts over scenic quality have developed. The basic problem concerns the inability to define scenic quality. From the research of Zube (1975), scenic quality can be equated with preference. By knowing the elements of preference, scenic quality can be determined as well as what contributes to it. The present research explores exactly this. A landscape architect could employ this research directly to the prairie. A particular landscape could be surveyed and analyzed in terms of the quantity of each landscape dimension present, using the same five-point rating scale in the research. When dimensions have been rated high, preference and scenic quality will be high, and so on. This provides evidence of scenic quality for use in making decisions and solving conflicts of this nature. In addition, with the understanding of the experimental findings, the design related elements for each dimension can be utilized, as previously described, to decide upon compromises of technological needs, such as power line and scenic quality. The use of vegetation, topography, or other landscape components can be adapted to blend or conceal unusual or distracting elements of technology from the view of the observer, thereby increasing the preference for a scene. This compromise would allow both sides of the issue to be satisfied to an extent.

One other important by-product of this research lies in the development of guidelines for scenic quality to be used in the creation of legislation protecting, maintaining, and restoring the landscape. Using the research and rating the landscape dimensions to calculate preference, landscapes of high scenic quality could be identified and legislatively protected.

Understanding the operational definitions and the experimental data affords the comprehension of how the design related elements influence each of the landscape dimensions and how these in turn influence preference. To maintain scenic quality, the existing levels of each landscape dimension must be maintained by protecting the existing design related elements. To restore scenic quality, each landscape dimension must be increased by incorporating more of the design related elements of each landscape dimension in a scene. Employing the research in this manner could direct legislative procedure to accomplish such endeavors.

As technology continues to prosper with the growth of the country and the world, natural landscape scenic quality becomes more and more of an endangered species. What was once a peaceful countryside, typical of this country's past, is now a paved parking lot or shopping center. The country's heritage is slowly being lost, with few precise controls for the preservation, restoration, and enhancement of scenic quality. This research strives to develop a technique of landscape assessment that blends theoretical explanations of human preference with design related elements from aesthetic studies, having the potential to deal with these problems effectively.

Future Research

Obviously, the present research barely taps the possible knowledge to be gained on human preference and behavior in the landscape. Many other studies can be done continuing this one. The most logical next step would be to study the regionality of this research. Specifically, the study could be repeated using nonresident participants. Another study could be done using prairie residents viewing non-prairie photographs and a third repeating the entire process in different parts of the country.

Other studies could be done testing the conclusions on how to improve the identifiability, coherence, and mystery of a scene. These studies could then be tested for regional influences.

Research on issues of "observer position" and "distance from a landscape" could be done to further understand the influence of these variables on perception and preference. The findings of all these studies could then be applied to actual situations and tested for the applicability of these data in a landscape. Also, the ability of a designer to create preference using this information could be more fully explored.

The list of possible studies is virtually endless. Each would provide more information on the complicated interaction of human behavior in the environment and supply the landscape architect information with the potential of improving the quality of human life. Applying such information would undoubtedly have a beneficial effect on the survival of present and future generations of people and the landscapes in which they live.

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APPENDIXES

APPENDIX 1

SAMPLE RESPONSE FORMS AND QUESTIONNAIRE

Complexity in the Landscape

Definition

Complexity in a landscape can be defined as the quantity or amount of elements, components, or objects present in a scene. It can also be described as the intricacy of the scene.

Instructions

You will be shown a series of slides. For each slide, rate the degree that you think the scene is "complex" on the 1 to 5 point scale provided on the response sheet.

Identifiability in the Landscape

Definition

Identifiability is defined as the ability of the observer to "make sense of" the landscape. This concerns the legibility of a landscape scene or how well an observer can recognize and understand it and the elements, components, objects, etc., within it.

Instructions

You will be shown a series of slides. For each slide, rate how well you can "make sense of" the scene on the 1 to 5 point scale provided on the response sheet.

Coherence in the Landscape

Definition

Coherence in the landscape can be defined as how well a scene "hangs together." This might deal with a number of things concerning the organization of a scene or with the visual compatibility of elements, objects, components, etc., with each other in a scene.

Instructions

You will be shown a series of slides. For each slide, rate to what degree you think the scene "hangs together" on the 1 to 5 scale provided on the response sheet.

Mystery in the Landscape

Definition

Mystery in the landscape can be defined as the degree to which an observer feels that by walking deeper into a scene more could be learned.

Instructions

You will be shown a series of slides. For each slide, rate the degree you think you would learn more if you could walk deeper into the scene, on the 1 to 5 point scale provided on the response sheet.

Preference for the Landscape

Instructions

You will be shown a series of slides. For each slide, rate "how pleasing you find the scene or how well you like it" on the 1 to 5 point scale provided on the response sheet.

TITLE (typical)

	not at all				a great deal
1.	1	2	3	4	5
2.	1	2	3	4	5
3.	1	2	3	4	5
4.	1	2	3	4	5
5.	1	2	3	4	5
6.	1	2	3	4	5
7.	1	2	3	4	5
8.	1	2	3	4	5
9.	1	2	3	4	5
10.	1	2	3	4	5
11.	1	2	3	4	5
12.	1	2	3	4	5
13.	1	2	3	4	5
14.	1	2	3	4	5
15.	1	2	3	4	5
16.	1	2	3	4	5
17.	1	2	3	4	5
18.	1	2	3	4	5
19.	1	2	3	4	5
20.	1	2	3	4	5
21.	1	2	3	4	5
22.	1	2	3	4	5
23.	1	2	3	4	5
24.	1	2	3	4	5
25.	1	2	3	4	5
26.	1	2	3	4	5

INFORMATION QUESTIONNAIRE

Indicate the appropriate answer.

1. What year in school are you?

   freshman   sophomore   junior   senior   other

2. How old are you?

   under 18   18-20   21-24   25-30   over 30

3. How many courses in architecture or landscape architecture have you had?

   none   1-3   over 3   arch. major   land. arch. major

4. Have you ever been employed in a field related to architecture or landscape architecture?

   YES   NO

5. Where are you from? (town or city)________________ (state)________

   What type of environment is this? (circle one)

   urban   suburban   rural   small town

   What is the population of this area? (circle one)

   under 200   200-1,000   1,000-3,000   3,000-10,000

   10,000-30,000   30,000-70,000   70,000-250,000   above 250,000

   How long did you live there? ____________________

6. Where else have you lived and for how long?

	town or city	state	how long	type environment	population
a.					
b.					
c.					
d.					
e.					
f.					

APPENDIX 2

TEST RESULTS OF ANALYSES

A. Mean Calculation of Each Landscape Dimension and Preference for Each Slide

B. Correlation Matrix Including Complexity, Coherence, Mystery, Identifiability, Preference, and Viewing Time

C. Multiple Regression Analysis

D. Factor Analysis

A. Mean Calculations of Each Landscape Dimension and Preference for Each Slide

Slide No.	Slide Order	Comp.	Cohr.	Myst.	Ident.	Time	Pref.
1	86	2.900	3.100	3.000	3.100	2.000	3.157
2	88	2.900	3.200	3.800	3.900	2.000	3.943
3	69	3.100	3.900	3.500	3.900	2.000	3.929
4	94	2.800	3.300	3.800	4.000	2.000	3.571
5	83	3.000	3.500	3.500	3.500	2.000	3.957
6	66	3.700	4.500	4.100	4.200	2.000	4.429
7	20	3.000	3.100	3.600	3.700	8.000	3.386
8	4	3.200	3.700	4.300	4.100	8.000	4.057
9	44	4.100	4.400	4.600	4.700	8.000	4.514
10	6	3.400	2.600	4.200	2.900	8.000	3.314
11	38	3.100	3.000	3.200	3.600	8.000	3.571
12	25	3.500	3.500	4.000	4.100	8.000	4.057
13	46	3.100	2.900	3.000	2.900	2.000	3.043
14	37	3.200	2.200	3.700	3.200	2.000	3.157
15	27	2.900	2.200	3.500	2.600	2.000	2.714
16	48	2.700	2.300	2.800	3.300	2.000	2.886
17	30	3.200	2.600	3.100	2.500	2.000	2.514
18	45	4.700	2.300	3.700	3.300	2.000	2.286
19	82	2.700	2.400	3.500	3.400	8.000	2.771
20	95	2.900	1.900	2.900	3.100	8.000	2.743
21	50	4.700	3.200	4.200	3.700	8.000	3.914
22	96	4.200	3.100	4.900	4.200	8.000	3.943
23	56	4.000	2.400	4.200	3.600	8.000	3.529
24	91	3.200	2.400	3.100	3.200	8.000	2.671
25	87	3.200	3.400	3.700	3.500	2.000	4.043
26	55	3.200	3.700	4.400	4.800	2.000	4.471
27	90	2.900	3.400	3.200	3.300	2.000	3.371
28	68	3.000	3.200	3.700	3.300	2.000	3.400

A. Continued

Slide No.	Slide Order	Comp.	Cohr.	Myst.	Ident.	Time	Pref.
29	70	2.800	3.200	3.500	3.600	2.000	3.700
30	52	2.600	3.500	2.900	3.200	2.000	3.500
31	22	3.100	4.200	3.700	4.300	8.000	3.686
32	23	3.100	3.500	3.400	4.200	8.000	3.857
33	33	3.000	3.700	3.500	4.100	8.000	3.814
34	5	3.200	3.700	4.100	3.700	8.000	3.700
35	8	3.400	4.000	3.700	3.300	8.000	3.886
36	26	2.200	3.400	3.500	3.500	8.000	3.143
37	24	4.300	2.100	2.700	2.600	2.000	1.471
38	12	2.900	1.800	2.100	2.600	2.000	2.071
39	2	3.500	2.700	3.900	3.500	2.000	3.557
40	10	3.000	2.200	3.600	2.400	2.000	2.486
41	32	3.600	2.300	3.300	3.700	2.000	2.629
42	7	4.100	1.800	3.300	2.300	2.000	1.643
43	80	3.700	2.600	3.800	3.800	8.000	3.043
44	89	3.600	1.700	3.600	2.200	8.000	2.200
45	92	2.600	2.200	3.000	2.700	8.000	2.429
46	72	3.400	2.000	3.800	2.200	8.000	2.457
47	72	3.400	1.900	2.700	1.700	8.000	1.186
48	84	3.100	1.700	2.400	2.400	8.000	1.229
49	71	2.600	3.300	3.500	3.000	2.000	3.500
50	81	1.900	2.900	2.500	2.800	2.000	2.914
51	54	2.000	3.300	2.600	3.200	2.000	3.214
52	93	1.900	3.500	2.300	3.800	2.000	3.171
53	76	1.900	3.300	2.600	3.000	2.000	3.142
54	62	1.900	3.000	2.800	3.000	2.000	3.200
55	19	1.800	3.900	2.800	3.300	8.000	3.443
56	3	2.300	3.700	3.300	3.300	8.000	3.500
57	11	2.600	3.300	3.300	3.400	8.000	3.800
58	42	1.800	3.700	2.700	3.000	8.000	3.186
59	36	2.500	2.700	3.000	3.400	8.000	2.900

A. Continued

Slide No.	Slide Order	Comp.	Cohr.	Myst.	Ident.	Time	Pref.
60	14	2.100	3.500	2.900	3.200	8.000	3.557
61	17	3.000	1.900	3.300	2.200	2.000	1.871
62	28	2.100	2.200	2.700	2.700	2.000	2.186
63	9	2.200	2.400	2.400	2.800	2.000	2.271
64	15	1.900	3.200	2.800	3.000	2.000	2.843
65	29	2.400	2.200	2.700	2.400	2.000	2.529
66	13	2.800	2.200	2.800	2.200	2.000	2.529
67	65	2.900	2.600	3.100	1.800	8.000	2.029
68	51	2.000	3.800	2.700	3.500	8.000	3.743
69	78	2.800	3.000	4.100	2.700	8.000	3.057
70	67	2.500	3.500	2.900	3.000	8.000	2.857
71	58	2.900	2.600	2.500	2.400	8.000	1.914
72	73	2.200	2.800	2.400	2.600	8.000	2.700
73	57	1.900	3.000	2.900	3.400	2.000	2.600
74	85	1.800	3.200	2.200	3.100	2.000	3.114
75	60	1.500	3.400	2.300	2.900	2.000	3.071
76	49	1.100	3.700	2.100	2.900	2.000	3.043
77	64	1.200	3.300	2.100	3.100	2.000	3.014
78	77	1.300	3.700	2.600	3.100	2.000	3.271
79	16	1.600	3.700	2.600	3.100	8.000	3.057
80	41	1.400	3.400	2.400	3.200	8.000	3.114
81	47	2.200	2.800	2.800	3.200	8.000	3.314
82	40	1.400	3.700	2.200	2.800	8.000	3.214
83	31	1.600	3.300	2.500	3.000	8.000	3.014
84	1	1.700	3.700	2.600	3.100	8.000	3.114
85	35	1.500	2.800	2.100	2.400	2.000	1.657
86	39	1.600	2.800	2.900	3.000	2.000	2.457
87	18	1.200	3.000	2.000	2.600	2.000	1.343
88	34	1.300	4.100	2.000	3.300	2.000	2.986
89	21	1.900	3.200	2.400	2.700	2.000	2.514
90	43	1.100	3.400	2.600	2.600	2.000	2.071

A. Continued

Slide No.	Slide Order	Comp.	Cohr.	Myst.	Ident.	Time	Pref.
91	53	1.200	3.100	1.800	2.800	8.000	1.471
92	59	1.500	3.200	2.300	2.800	8.000	2.700
93	79	2.300	4.000	3.700	3.400	8.000	3.671
94	61	1.500	2.800	2.400	2.500	8.000	2.400
95	75	1.500	3.000	2.100	2.400	8.000	2.429
96	63	2.200	2.300	2.400	2.500	8.000	2.286

B. Correlation Matrix Using Preference, Identifiability, Complexity, Coherence, Mystery, and Viewing Time

	Pref	Ident	Compl	Cohr	Myst	Time
Pref						
Ident	.82710					
Compl	.20039	.28105				
Cohr	.70544	.61414	-.28496			
Myst	.57230	.55681	.78440	.07765		
Time	.10074	.07627	.08717	.09733	.14637	

Significance reached at .205 for the .05 level of significance

C. Multiple Regression Analysis

STAATS MEANS OF IND VARS   01/17/78   PAGE 4

FILE NONAME (CREATION DATE = 01/17/78)

* M U L T I P L E   R E G R E S S I O N * * * * * * * * * * * * *   VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. RATE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. IDENT

MULTIPLE R	0.82710	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
R SQUARE	0.68409	REGRESSION	1.	35.68417	35.68417	203.55712
ADJUSTED R SQUARE	0.68073	RESIDUAL	94.	16.47848	0.17530	
STANDARD ERROR	0.41869					

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
IDENT	1.014594	0.82710	0.07111	203.557
(CONSTANT)	-0.1831391			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
COMPX	-0.03482	-0.05946	0.92101	0.330
COHR	0.31708	0.44522	0.62283	22.992
MYST	0.16198	0.23938	0.68996	5.653

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. COHR

MULTIPLE R	0.86413	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
R SQUARE	0.74671	REGRESSION	2.	38.95053	19.47527	137.08633
ADJUSTED R SQUARE	0.74127	RESIDUAL	93.	13.21211	0.14207	
STANDARD ERROR	0.37692					

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
IDENT	0.7757175	0.63237	0.08112	91.448
COHR	0.3580244	0.31708	0.07467	22.992
(CONSTANT)	-0.5178063			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
COMPX	0.19324	0.29363	0.58485	8.681
MYST	0.33847	0.51121	0.57779	32.549

STAATS MEANS CF IND VARS 01/17/78 PAGE 5

FILE NCNAME (CREATICN CATE = 01/17/78)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSICN LIST 1

DEPENDENT VARIABLE.. RATE

VARIABLE(S) ENTERED CN STEP NUMBER 3.. MYST

MULTIPLE R	0.90161	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
R SQUARE	0.81291	REGRESSION	3.	42.40331	14.13444	133.24347
ADJUSTED R SQUARE	0.80680	RESIDUAL	92.	9.75934	0.10608	
STANDARD ERROR	0.32570					

---------------- VARIABLES IN THE EQUATION ----------------

VARIABLE	B	BETA	STD ERROR B	F
IDENT	0.4363209	0.35569	0.09194	22.524
CCHR	0.5202079	0.46072	0.07051	54.439
MYST	0.3729645	0.33847	0.06537	32.549
(CCNSTANT)	-1.099475			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
COMPX	-0.13032	-0.15341	0.25927	2.193

* *

VARIABLE(S) ENTERED CN STEP NUMBER 4.. CCMPX

MULTIPLE R	0.90405	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
R SQUARE	0.81731	REGRESSICN	4.	42.63300	10.65825	101.77720
ADJUSTED R SQUARE	0.80928	RESIDUAL	91.	9.52965	0.10472	
STANDARD ERROR	0.32361					

---------------- VARIABLES IN THE EQUATION ----------------

VARIABLE	B	BETA	STD ERROR B	F
IDENT	0.4552837	0.37115	0.09224	24.363
COHR	0.4589784	0.40649	0.08134	31.838
MYST	0.4807628	0.43630	0.09755	24.287
COMPX	-0.1132207	-0.13032	0.07645	2.193
(CCNSTANT)	-1.013018			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

MAXIMUM STEP REACHED

STAATS MEANS OF IND VARS 01/17/78 PAGE 6

FILE NONAME (CREATION DATE = 01/17/78)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. RATE

SUMMARY TABLE

VARIABLE	MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
IDENT	0.82710	0.68409	0.68409	0.82710	0.4552837	0.37115
COHR	0.86413	0.74671	0.06262	0.70544	0.4589784	0.40649
MYST	0.90161	0.81291	0.06619	0.57230	0.4807628	0.43630
COMPX	0.90405	0.81731	0.00440	0.20039	-0.1132207	-0.13032
(CONSTANT)					-1.013018	

D. Factor Analysis

STAATS FACTOR ANALYSIS

FILE NONAME (CREATION DATE = 01/24/78)

AFTER ROTATION WITH KAISER NORMALIZATION

FACTOR PATTERN

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
S1	0.61049	0.00608	0.14203	-0.00930
S2	-0.07716	0.23279	-0.02837	0.06992
S3	0.21261	0.01730	0.02022	-0.06318
S4	-0.11184	-0.07293	0.15609	0.09451
S5	0.11745	-0.18023	0.37320	-0.08852
S6	0.13736	0.10183	0.14387	0.01158
S7	-0.01478	0.73812	-0.00932	0.06644
S8	0.00680	-0.03126	0.60929	-0.08300
S9	0.28338	0.15401	0.06257	-0.37204
S10	0.10894	0.23269	0.17839	0.04443
S11	0.28672	-0.15914	-0.25473	-0.01750
S12	0.08810	0.34562	0.00120	-0.05305
S13	0.04236	-0.09853	0.03755	0.07918
S14	0.39304	-0.06796	-0.00532	0.03551
S15	0.07212	0.06997	0.01231	-0.11928
S16	0.12602	-0.01856	0.06581	-0.03324
S17	0.14213	-0.00019	0.08017	0.05596
S18	0.07067	0.02156	-0.05872	0.06138
S19	0.31261	-0.13934	0.05309	0.00107
S20	0.15638	-0.14532	-0.07521	-0.10961
S21	0.18569	-0.04305	0.01734	0.00422
S22	0.10168	-0.11694	0.10226	0.13635
S23	-0.11444	-0.01945	0.06960	0.19409
S24	-0.02770	0.58584	0.01348	-0.14340
S25	0.15269	-0.14672	0.03990	0.21666
S26	0.58189	-0.09203	0.20931	-0.11059
S27	-0.06953	0.24621	0.10809	-0.03989
S28	0.08870	0.06922	-0.07298	-0.01517
S29	0.11947	0.11891	-0.23207	0.12757
S30	0.26171	-0.01344	-0.04479	-0.02979
S31	0.57803	0.03830	-0.03241	0.11633
S32	0.04427	0.77760	-0.10292	0.20965
S33	0.02205	-0.00507	-0.01715	0.11207
S34	0.05964	-0.08902	-0.02793	-0.29326
S35	0.05877	-0.07733	0.05413	0.05633
S36	0.18030	-0.19904	-0.08237	0.12453
S37	-0.08101	0.16715	0.05879	0.06324
S38	0.21600	0.00889	0.07297	0.21950
S39	0.05909	0.10038	-0.00520	-0.14911
S40	0.85082	-0.15948	0.00371	0.19050
S41	0.87995	0.02717	0.12268	-0.09444

STAATS FACTOR ANALYSIS

FILE NONAME (CREATION DATE = 01/24/78)

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
S42	0.27770	-0.28396	0.16021	-0.07182
S43	0.17009	0.28474	0.03641	0.01830
S44	-0.05262	-0.10854	-0.00038	0.68161
S45	-0.06255	0.57274	-0.02519	-0.23123
S46	0.22102	0.06558	-0.08529	0.10471
S47	0.87770	0.06316	-0.24464	-0.01710
S48	0.42191	0.07934	-0.28785	0.05474
S49	0.57208	-0.13003	-0.08715	-0.15563
S50	-0.11224	0.12401	0.02041	0.39257
S51	0.09038	0.03443	0.01774	-0.04864
S52	0.02056	-0.02780	0.12874	-0.11089
S53	-0.04021	0.17130	0.04651	-0.34204
S54	0.40166	-0.07784	0.21456	0.18118
S55	0.03553	0.16994	0.11049	0.73782
S56	0.09162	0.11217	0.09070	0.04556
S57	0.21866	-0.08544	0.21710	-0.11992
S58	0.07770	0.79480	-0.00134	0.00696
S59	0.27627	0.18738	-0.02854	0.05695
S60	0.35555	0.10592	0.19311	0.04718
S61	0.49087	0.16774	0.00406	-0.04697
S62	-0.02116	-0.08133	0.05705	0.16188
S63	-0.03539	0.12529	0.06039	0.10206
S64	0.30696	0.03632	-0.00835	0.24073
S65	-0.12704	0.50628	0.01842	0.00842
S66	0.07800	0.00191	0.11471	0.35500
S67	0.20532	0.13228	0.24669	-0.22527
S68	0.20322	-0.03980	0.62865	0.19935
S69	-0.05685	-0.21649	0.49563	0.25902
S70	0.02976	-0.09538	0.04832	0.06119
S71	0.01572	-0.09567	0.03519	-0.13557
S72	-0.23651	0.40047	0.09482	0.11649
S73	0.08514	0.05286	-0.06399	0.00061
S74	0.02109	0.71708	0.09100	-0.15007
S75	0.02939	-0.00505	0.07660	0.06286
S76	0.37170	-0.20119	0.00530	-0.06797
S77	0.55636	0.06152	0.09598	0.03927
S78	0.26868	0.19064	-0.22940	0.33884
S79	0.58763	0.09198	0.00945	0.01034
S80	0.01890	0.24169	0.08334	-0.07084
S81	0.01670	-0.07801	0.04782	-0.06655
S82	-0.14183	0.10377	0.12404	0.11218
S83	-0.09426	0.03196	0.46305	0.11400
S84	0.02645	0.32046	0.07988	-0.01359
S85	0.44378	-0.09581	0.30484	0.03984
S86	0.00093	-0.16050	0.15382	-0.02309
S87	0.25606	0.14210	0.26988	0.23104

STAATS FACTOR ANALYSIS

FILE NCNAME (CREATION DATE = 01/24/78)

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
S88	-0.00450	0.06131	0.05261	0.05274
S89	-0.16441	0.54536	-0.13600	0.19245
S90	-0.08473	0.03827	0.68971	0.07067
S91	-0.11476	0.14967	0.00563	0.13296
S92	-0.09286	0.14327	-0.03564	-0.07939
S93	0.15831	-0.22806	-0.00583	0.04872
S94	-0.14110	-0.03722	-0.11017	0.02561
S95	0.07838	0.04227	-0.12270	-0.23504
S96	-0.23895	0.10754	-0.04191	0.14170

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	23.00610	30.3	30.3
2	10.63470	14.0	44.3
3	5.56548	7.3	51.7
4	3.92512	5.2	56.8
5	3.58825	4.7	61.6
6	2.93722	3.9	65.4
7	2.57409	3.4	68.8
8	2.30198	3.0	71.8
9	2.16056	2.8	74.7
10	2.12332	2.8	77.5
11	1.92009	2.5	80.0
12	1.73430	2.3	82.3
13	1.58613	2.1	84.4
14	1.43009	1.9	86.3
15	1.33055	1.8	88.0
16	1.21508	1.6	89.6
17	1.15587	1.5	91.2
18	1.06762	1.4	92.6
19	1.06215	1.4	94.0
20	1.04493	1.4	95.3
21	0.97806	1.3	96.6
22	0.89193	1.2	97.8
23	0.84950	1.1	98.9
24	0.81836	1.1	100.0

LANDSCAPE ASSESSMENT IN THE PRAIRIE STATES:
LANDSCAPE DIMENSIONS AND DESIGN ELEMENTS

by

Dana Hathaway Staats

B.A., University of Kansas, 1974

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1978

ABSTRACT

This thesis deals with two basic considerations: (1) those things about the landscape which appeal to us and (2) the reasons for such appeal. Previous research in landscape assessment has attempted to shed light on these considerations through aesthetic and theoretical approaches. The first approach is based on aesthetic philosophy from the fine arts, using elements of the landscape to determine its attractiveness. The theoretical approach offers hypotheses to explain phenomena of scenic quality. Neither approach, however, offers the landscape architect a precise tool for landscape assessment. The aesthetic approach neglects a theoretical basis concerning psychological aspects of perception and the observer, while the theoretical approach does not consider the design related elements of aesthetics.

The purpose of this thesis is to integrate these approaches using the design related elements of aesthetics to operationally define four theoretical landscape dimensions from the research of Stephen Kaplan. These dimensions are complexity, mystery, coherence, and identifiability. Complexity is the quantity of environmental information present in a landscape. Mystery is an arrangement of landscape elements which suggests information but conceals it from view. Coherence is an arrangement of landscape elements which create a culturally unified composition. Identifiability is the presence of landscape elements or characteristics which make a landscape more easily read and understood. Using variations of these definitions, a research experiment tests several research questions concerning the

following: (1) the verification and accuracy of the operational definitions, (2) the relationships and interactions of each landscape dimension to the others, (3) the interaction and effects of each landscape dimension on preference, (4) the influence of the time of viewing on each dimension and on preference, and (5) the regionality and essence of preference in the prairie landscape.

Ninety-six photographic slides were taken of the prairie region, varying the presence of each dimension in each landscape scene. These slides were rated on each dimension by a panel of experts made up of students in landscape architecture. These slides were then rated for preference by psychology students.

Results indicate that the operational definitions are fairly accurate for each dimension. Computer analysis reveals several meaningful interactions among the four landscape dimensions and significant correlations of three of them with preference. The time of viewing test indicates outstanding differences with ratings of two of the landscape dimensions.

With these data, several conclusions are drawn concerning the issues of preference in the prairie environment and the regionality of such research. It appears that the prairie exhibits a unique set of relationships and interactions of landscape dimensions and preference.

The final section is devoted to investigating the utility and application of such research in landscape architecture. Applications of this nature are demonstrated by translating each landscape dimension into its design related elements. Using these, a practical and realistic application of aesthetic and theoretical research is developed.