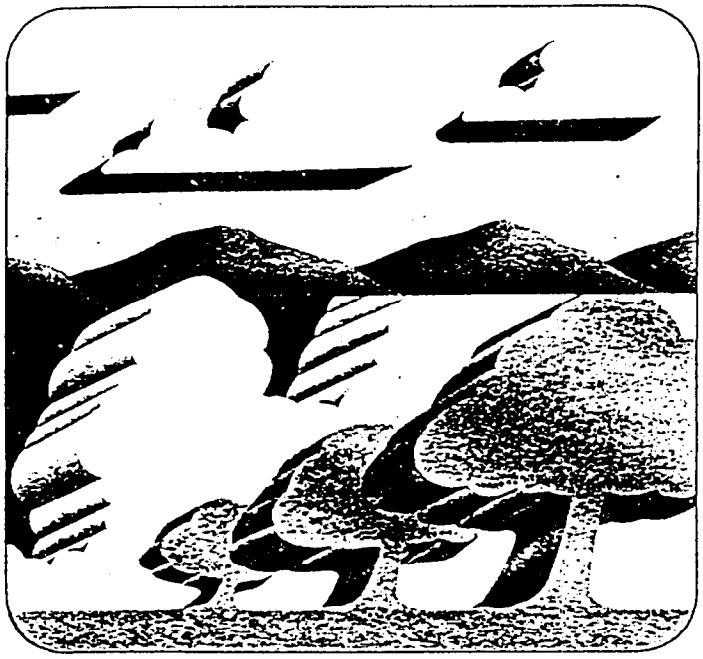
2 Environmental Perception



We learned in Chapter 1 that the activities that comprise our daily lives are intertwined with the physical environments in which we live and work. Many of our daily activities—relaxing, eating, studying, sleeping—are influenced by the architecture and interior design of our home environment. The physical design of the setting where students attend college plays a role in shaping the learning experiences, extracurricular activities, and social friendships that comprise college life. In this chapter we shall discover that all of these diverse daily activities are dependent on our ability to perceive accurately the varied environments that are a part of our lives.

Environmental perception is the bedrock on which environmental behavior is founded. In order to understand, navigate, and effectively use the physical environment, we must first perceive it clearly and accurately. Yet, while environmental perception is essential to our ability to conduct the affairs of daily life, we tend generally to take this process for granted. In fact, environmental psychologists have found that one way to study the important role

of environmental perception in people's lives is to put them in novel environments with which they are unfamiliar. In this way, researchers have been able to observe at firsthand the perceptual processes that have become second nature in more familiar settings.

Environmental psychologists have discovered that the process of perceiving the physical environment is complex and dynamic. Environmental perception is an active process, not a passive one. We shall discover that by better understanding the process of environmental perception, we can learn to design settings that are more congruent with people's psychological needs. We shall see also that an understanding of environmental perception may enable us to help people cope with the threats of natural hazards, such as floods or earthquakes. Let us turn now to a consideration of the remarkable, though often neglected, process by which people perceive the physical environments that make up daily life.

THE NATURE OF ENVIRONMENTAL PERCEPTION

Environmental perception is a marvelous and unique psychological process. Through environmental perception, the diversity of stimulation from the environment that impinges on us from all sides is organized to form a coherent and integrated picture of our world. Before we discuss environmental perception, however, we must distinguish it from environmental cognition and environmental attitudes, which will be examined in Chapters 3 and 4, respectively. Environmental perception involves the process of apprehending through sensory input the physical environment that is immediately present. Environmental cognition concerns the storage, organization, reconstruction, and recall of images of environmental features that are not immediately present. Environmental attitudes are the favorable or unfavorable feelings that people have toward features of the physical environment.

環境感知與環境認知的差別

These three processes do not operate in isolation from one another. In fact, the psychological processes by which people cope with the physical environment are interrelated (see Ittelson, 1976; Lowenthal, 1972). Our perception of the environment provides information that is essential to our ideas about the environment and our attitudes toward it. Environmental cognitions and attitudes, in turn, form a set of expectations about the environment that shape our perceptions of it. Consider a tourist who is visiting Boston for the first time. His or her initial perceptions of the city may be somewhat confusing and disorienting. Continued perception of a variety of aspects of the city, however, may eventually offer a basis for a clear and well-organized mental image of it. This clearer image may then enable the tourist to get around Boston more effectively, thus contributing to a more positive attitude toward it. The combination of a clearer image of the city and a more favorable attitude toward it may in turn help the visitor to perceive new areas of Boston more effectively and efficiently. Here and in following chapters we shall discuss psychological processes in the environment separately because this approach facilitates learning about each process. In real life, however, these psycho-

logical processes never operate in isolation, but occur in interaction with one another and constantly influence each other.

THE UNIQUENESS OF ENVIRONMENTAL PERCEPTION

Object perception A valuable discussion of the unique nature of environmental perception has been provided by William Ittelson (Ittelson, 1970, 1973, 1976; Ittelson, Franck, and O'Hanlon, 1976). Ittelson explains that psychologists have historically tended to ignore the process by which people perceive the large-scale, or molar, physical environment. While psychologists have devoted considerable attention to the study of perception, they have typically studied the way people perceive isolated *objects* rather than the way they perceive the environment, which consists of a complex array of many objects. For example, traditional psychological studies of perception have generally examined perceptual processes, such as the ways people perceive size, distance, and movement, as they relate to isolated objects.

傳統心理學家和環境心理學家研究的角度很不同

Ittelson explains that environmental psychologists are interested in learning how people perceive complex, molar environments, such as a living room, an office setting, or even a neighborhood. This is not to suggest that environmental psychologists cannot learn from earlier research on object perception. Rather, the environmental psychologist must go beyond object perception to consider some of the ways the unique demands of the large-scale physical environment shape the nature of the perceptual process.

Irving Biederman (1972) conducted an intriguing laboratory experiment designed to demonstrate how the perception of objects in the real world is affected by the overall environmental context in which the object is embedded. Subjects briefly viewed slides of various environmental scenes, such as a university campus, a street, or a kitchen. Each scene was presented in two versions, one coherent and one jumbled (Figure 2-1). Subjects were asked to identify particular objects in the scenes, such as a dog. The object to be identified was the same in both the coherent and jumbled versions of the scene, and the section of the scene in which it was located always remained in its original position.

Biederman found that subjects were able to identify the object more accurately in the coherent scene than in the jumbled scene—even when the subjects were told where to look on the slide. He concluded that an object's meaningful context enhances its perceptual recognition. He emphasized that this finding is especially relevant to our understanding of how objects are perceived in real-world settings, because—in sharp contrast to the isolated objects used in traditional laboratory studies—real-world objects are always perceived in a meaningful setting or context.

Environments surround Ittelson points out that environments are large in relation to people, surrounding those who perceive them. Since people are surrounded by the environment, they have to move about in order to perceive all aspects of it. Unlike an object that can often be adequately perceived from a single vantage

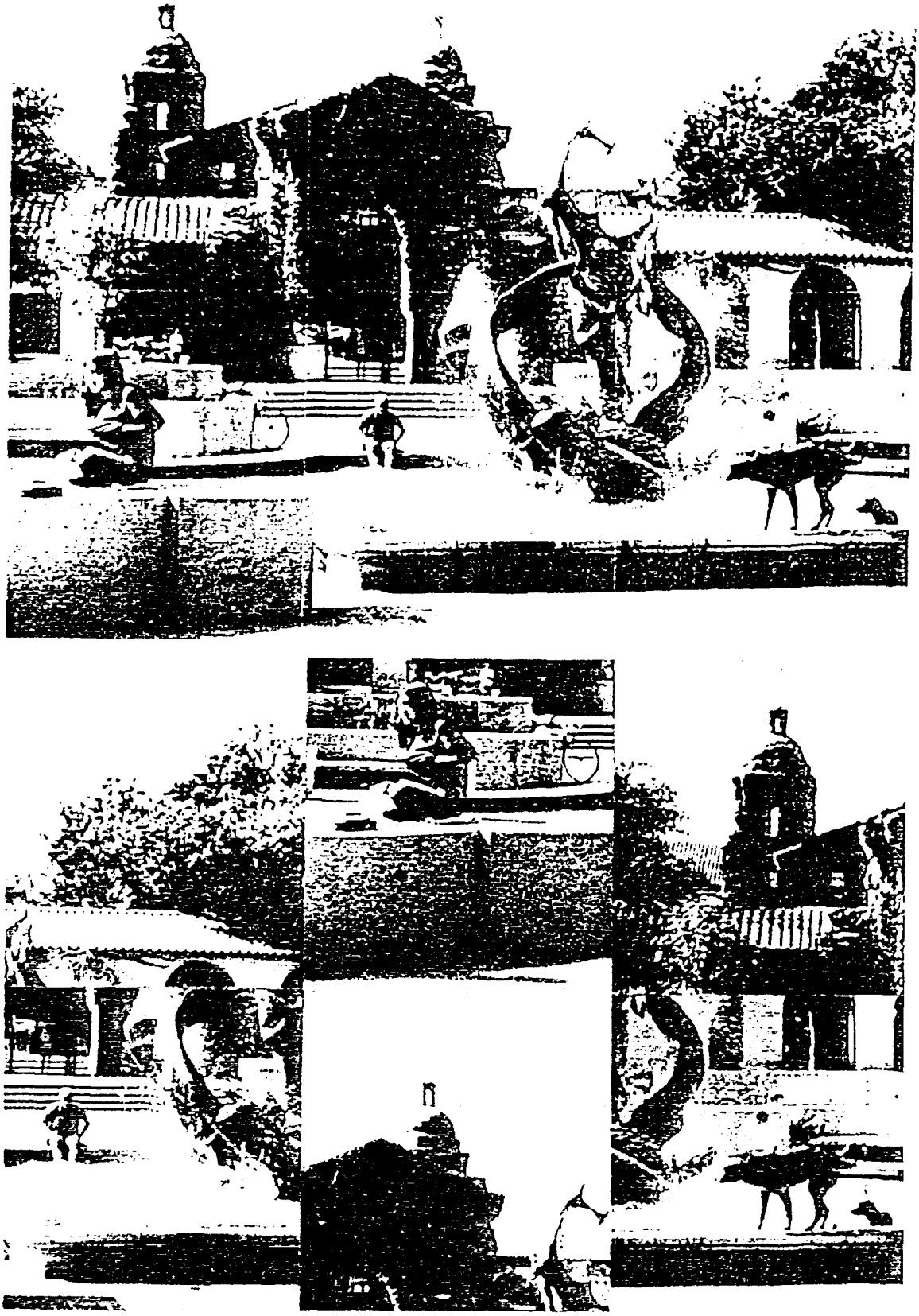


Figure 2-1

People are better able to identify the dog in this campus scene when it is shown in a coherent picture (*top*) than when the picture is jumbled (*bottom*).

From I. Beiderman, "Perceiving Real-World Scenes," Science, July 7, 1972, 177:77–80. Copyright 1972 by the American Association for the Advancement of Science. Reprinted by permission.

point, the environment must be experienced from multiple perspectives to be fully perceived. For example, a person who moves to a new apartment may walk through the new setting a number of times, experiencing its unique features, such as the "feel" of different rooms, areas for special decoration or storage, and contrasting views from different windows. Ittelson points out that the surrounding quality of the environment makes environmental perception more like *exploration* than simple observation. Thus an important aspect of environmental perception involves *motoric experience*—an active, physical interchange with the environment. Action in and toward the environment provides the individual with a variety of sensory cues or *feedback* (e.g., visual, auditory, and tactile sensations) about the nature of the environment.

Environments provide an abundance of information Environments provide people with such an abundance of perceptual information that they cannot possibly process all of it at once. For example, our tourist exploring a neighborhood of Boston for the first time may feel overwhelmed by perceptual information that is often ambiguous and occasionally contradictory. Ittelson points out that the abundance of perceptual information provided by the environment arrives simultaneously through a variety of sensory modalities. Our tourist will be confronted simultaneously with the novel sights, sounds, and smells of the unfamiliar neighborhood. Ittelson notes also that because the perceptual information provided by environments is so abundant, we are presented at any given time with both central and peripheral information. When we direct our attention toward one part of the environment, we simultaneously receive additional perceptual information from areas outside of our central focus.

Environmental perception involves purposive actions Ittelson emphasizes that environmental perception involves purposive action. The scale and complexity of environments make it impossible for us to perceive them passively. We must actively explore, sort, and categorize the vast array of sensory inputs from the environment. Environments also provide *messages* that help to direct our actions in them. In this sense, Ittelson points out, our actions in regard to the environment are never blind or purposeless. Our Boston visitor must have some plan for exploring; even if a guidebook is not consulted, he or she will at least note street signs and other distinctive features of the setting.

DIMENSIONS OF ENVIRONMENTAL STIMULATION

In order to study environmental perception, environmental psychologists need to identify the dimensions of environmental stimulation that are appropriate to research in this area. Donald Berlyne (1960) proposed several *collative* variables of environmental stimulation that are especially relevant to this task. Collative variables, which include the *novelty, complexity, surprisingness,* and *incongruity* of stimulation, generate a degree of perceptual conflict that leads the perceiver to draw comparisons between the present stimulus and other stimuli. Joachim Wohlwill (1966) further developed the relevance of these collative variables to the study of environmental perception. He found that the manner in which an individual explores

a setting will be affected by the novelty of its features. For example, San Francisco's famed cable cars contribute to the city's attractiveness and interest to sightseers. People's differential perceptions of urban and rural settings may be partially influenced by the quite different levels of stimulus complexity in the two environments. Urban settings are composed of a much greater variety of environmental elements than are rural areas. Surprising and unexpected environmental features, Wohlwill points out, can have a pleasing effect on the perceiver. Finally, while excessive incongruity, as when structures that bear no relationship to one another are placed together, can be jarring to an observer, an optimal level of incongruity might constructively heighten an observer's attention.

MEASURING ENVIRONMENTAL PERCEPTION

Psychologists interested in studying how people perceive the large-scale physical environment have faced a formidable methodological challenge. Wohlwill (1966) points out that studies of environmental perception in real-world settings cannot achieve the experimental control over environmental stimulation that is possible in a laboratory setting. Psychologists who study perception in naturalistic settings must use "ready-made" stimuli such as an urban scene or a natural landscape. Because, as Ittelson (1970, 1973, 1976) explains, real-world environments are highly complex, the environmental psychologist is faced with unique challenges in defining and operationalizing environmental stimulation. While it is possible to use photographs or small scale models of real-world environments in controlled laboratory settings, we shall see that such environmental simulations often present a threat to external validity. It is equally difficult to measure the complex activities in which people engage in the process of perceiving the physical environment. Let us look at some of the ways in which environmental psychologists have attempted to cope methodologically with the environmental and response sides of environmental perception.

Environmental stimulation Because the real-world settings that environmental psychologists study do not allow for controlled manipulation of independent variables, it is difficult to provide an objective index of the stimulus dimensions under study. Wohlwill (1966) explains that one way environmental psychologists have dealt with this issue is by obtaining subjective ratings of particular stimulus dimensions from trained judges. Wohlwill reports a study (Leckart and Bakan, 1965) that used judges' ratings of the stimulus complexity of landscape scenes to demonstrate a positive relationship between the complexity of scenes and the amount of time subjects spend looking at them. A related approach is to collect perceptual judgments from a large number of "naive" or untrained observers. By employing statistical methods, such as multidimensional scaling (Green and Rao, 1972), that are able to describe the interrelationships of complex sources of data, investigators have been able to identify those environmental characteristics (e.g., diversity, warmth, size, complexity, and familiarity) that are common to many people's perception of a setting (see Betak, Brummell, and Swingle, 1974; Hall, Purcell, Thorne, and Metcalfe, 1976; Nasar, 1980).

Another research strategy employed by environmental psychologists to cope

with the lack of control available in real-world settings is the use of *simulations* of real-world settings. Gary Winkel and Robert Sasanoff (1976) designed a "simulation booth" to study how people move through and view the various features of an environmental setting. The booth was outfitted with three projectors arranged to show a series of color photographs of the setting being explored. A subject, seated in front of three display screens, could tour the setting—in this case a museum of history and industry—by informing the projector operators of the direction in which he or she wished to proceed. Another richly detailed simulation has been developed by Donald Appleyard and Kenneth Craik (1974, 1978) at the Environmental Simulation Laboratory at the University of California, Berkeley (see box, "An Environmental Simulation Laboratory").

Some investigators (Danford and Willems, 1975; Lowenthal, 1972) have cautioned, however, that while environmental simulation permits experimental control and better measures of statistical reliability than does research in naturalistic contexts (i.e., internal validity is strengthened), it is useful only to the extent that investigators can be certain that the behavioral responses generated are similar to those elicited by real-world settings (i.e., external validity must be adequate). Carl Greenberg and his associates (Firestone, Karuza, Greenberg, and Kingma, 1978; Greenberg and Chambers, 1979) demonstrated, for instance, that the model room simulation used in some crowding studies (see Desor, 1972) may not provide a valid index of reactions to crowding in real-world settings. One problem with simulations relying on small-scale models and photographs is that they do not allow the motoric experience that is essential to perception in real-world settings (Evans, 1980). Clearly, it is important for investigators who use simulation techniques to try to evaluate the relevance of simulation results to human behavior in naturalistic contexts.

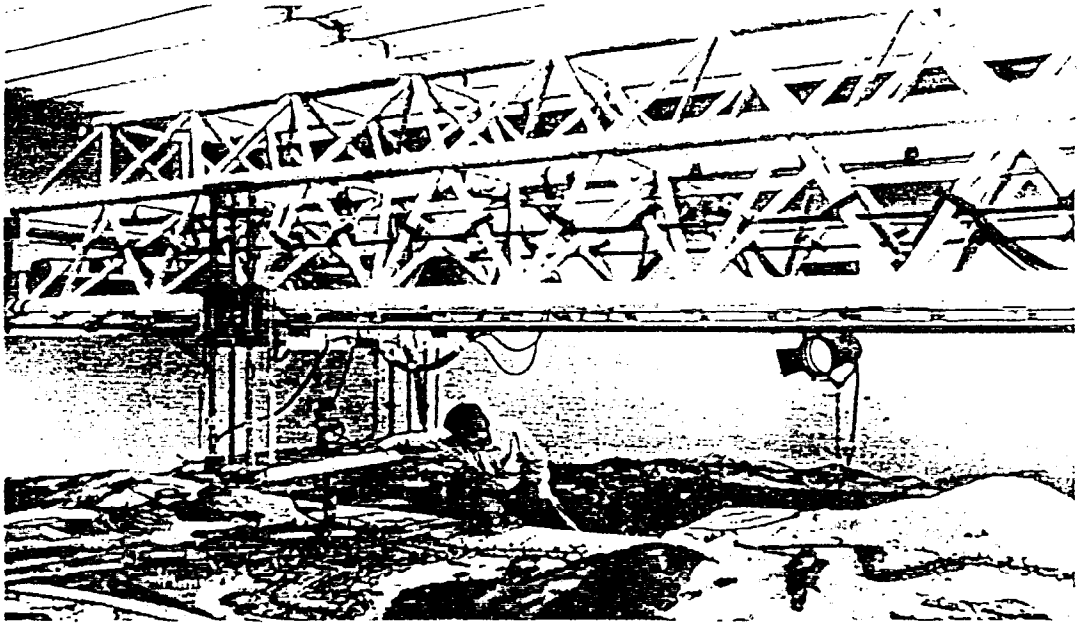
Winkel and Sasanoff (1976) did, in fact, compare people's reactions in their simulation booth to the behavior of visitors in the actual museum of history and industry. They found many similarities between people's responses in the simulated and real museum environments. Some differences were also apparent, however, such as a tendency for people to view more of the museum in the comfort of the simulator than when they were actually walking about the museum. Similarly, Kenneth Craik (1978) and George McKechnie (1977a) have described a systematic effort to evaluate the external validity of the Berkeley Environmental Simulation Laboratory. Responses of subjects who viewed films and videotapes of a simulated tour through the scale model environment were compared with those of persons who were driven along the identical tour in the real environment or who viewed a film of the real-world town. Craik and McKechnie's preliminary findings indicated that correlations between individuals' responses to the simulated and real environments were uniformly high on a variety of measures.

Perceptual responses Psychologists studying environmental perception have also been challenged to develop measures of perceptual responses that are able to reflect the richness of the perceptual process. Many studies of environmental perception have used questionnaires or interviews in which subjects can describe verbally the way they perceive various environmental settings. David Lowenthal (1972) has pointed out, however, that such "semantic" measures are able to cap-

An Environmental Simulation Laboratory

Donald Appleyard and Kenneth Craik (1974, 1978) have designed a unique environmental simulation at the Berkeley Environmental Simulation Laboratory. The simulation consists of a physical scale model of an environmental region and a remotely guided periscope with a tiny lens (1/100-inch radius). The periscope is supported by a gantry system that can move it through the simulated environment at the "eye level" of a perceiver. During the journey through the scale model the periscope can follow various routes, look in any direction, and proceed at variable speeds. It can be made to "walk" through a residential environment or to "drive" through a highway environment. In addition, it can project the environmental scenes it "perceives" on closed-circuit television, videotape, or super-8 or 16-mm colored movie film. The periscope can also take color slides or still photographs from a variety of viewpoints and in multiple sequences.

The films, videotapes, slides, and photographs taken in the simulated environment can be used for a range of scientific or practical purposes. The simulation allows environmental psychologists to study the ways people perceive and comprehend a variety of environmental features in a controlled laboratory setting, where the presentation of environmental stimuli can be systematically manipulated. It may also be used to permit members of a community group or advisory committee to "tour" an envisioned project, so that they may participate in environmental design decisions.



This scale model of a suburban environment with a movable optical probe allows researchers to prepare a richly detailed movie tour through a simulated environment.

Photo courtesy of Kenneth Craik.

ture only those aspects of environmental perception that can be filtered through language. He suggests that there may be benefits to research that relies on both semantic and nonlinguistic responses. For example, as Edward Hall (1966) has explained, the physical distance maintained between two people is closely linked to differences in the way they perceive each other.

One measurement strategy that permits us to glimpse the richness of nonlinguistic perceptual responses is the recording of eye movements. Stephen Carr and Dale Schissler (1969) used an eye-movement recorder to investigate how subjects perceived the urban scene as they approached the center of Boston while driving along an elevated expressway. The apparatus was attached to each subject's head by means of plastic bands and a bite bar. Mounted on the apparatus was a 16-mm movie camera attached to two fiber-optic cables that simultaneously recorded where the subject looked and the exact movements of the eyes as the subject viewed the scene. The investigators found a remarkably high level of agreement on where subjects looked as they drove along the expressway. They concluded that the physical form of the environment visible from the expressway structured the way in which people scanned the environment visually, and determined the physical features they selected for close attention. Environmental features that were looked at by a great many subjects included the city skyline, houses and buildings, overpasses, and billboards.

PSYCHOLOGICAL FUNCTIONS OF ENVIRONMENTAL PERCEPTION

Since we generally take environmental perception for granted, it may be surprising to discover that our perception of the physical environment is one of the most essential psychological processes by which we adapt to it. In fact, environmental perception provides the foundation for all of our knowledge about the world around us and for all of our activities in the environment. One of the chief psychological functions of environmental perception is to direct and manage the many activities that make up our daily lives. Ittelson (1970, 1973, 1976; Ittelson, Franck, and O'Hanlon, 1976) contends that human survival itself would be impossible without our ability to perceive the environment around us. Environmental perception provides the basis for our knowledge about the world in which we live, and this knowledge is essential to our ability to function adaptively in the world. For instance, our perception of the world around us helps us to manage our communication and social interaction with other persons, to identify important features of our everyday environment, and to enjoy a range of aesthetic experiences.

DIRECTING ENVIRONMENTAL ACTIVITY

One important way in which environmental perception helps to direct our daily activity is by providing information necessary to orient ourselves in the environment. Orientation involves establishing a place or series of places in the physical environment from which we can direct our activities (Ittelson, Franck, and O'Hanlon, 1976). Without this ability to orient ourselves in the environment we would be