From: Man, Space, and Environment: Concepts in Contemporary Human Geography, edited by P. W. English and R. C. Mayfield, Oxford U. Press, New York, 1972.

see in works of art, and the realms of imagination and fantasy each contribute to our images of nature and man. All types of experience, from those most closely linked with our everyday world to those which seem furthest removed, come together to make up our individual picture of reality.[93] The surface of the earth is shaped for each person by refraction through cultural and personal lenses of custom and fancy. We are all artists and landscape architects, creating order and organizing space, time, and causality in accordance with our apperceptions and predilections. The geography of the world is unified only by human logic and optics, by the light and color of artifice, by decorative arrangement, and by ideas of the good, the true, and the beautiful. As agreement on such subjects is never perfect nor permanent, geographers too can expect only partial and evanescent concordance. As Raleigh wrote, "It is not truth but opinion that can travel the world without a passport."[94]

93. As natives of places we acquire and assimilate information differently than we do as travelers; and personal observation, whether sustained or casual, yields impressions different in quality and impact from those we build out of lectures, books, pictures, or wholly imaginary visions. The climates of each of these modes of geographical experience, and the kind of information they tend to yield about the world, will be considered in a series of essays to which this one is meant to be introductory.

94. Quoted in C. V. Wedgwood, *Truth and Opinion: Historical Essays* (London: Collins, 1960), p. 11.

GEOGRAPHY, PERCEPTION, AND THE BEHAVIORAL ENVIRONMENT

Joseph Sonnenfeld

Environment is easy to describe but difficult to define, a characteristic which it shares with such terms as culture and behavior. One can enumerate elements of environment, just as one can characterize objects as cultural, and actions as behaviors. These terms are so broad in their implications, and so widely and so generally used, as to be capable of many meanings.

The problem of definition arises only when one attempts to restrict the concept or to quantify it or to otherwise impose bounds; to distinguish between such as higher and lower forms of behavior; or between what is cultural and non-cultural; or between what is natural and artificial in environment. In other words, it is not a lack of awareness of the problem of definition that makes many of us reticent to be more precise in our usage, but rather too clear an awareness of what problems must arise in defining and setting limits; and, perhaps, too, a conviction – or rationalization – that such definition is not really crucial, that the

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use of the broader term is adequate for comprehension.

Yet there is value in raising the issue of definition, since the environment from the standpoint of the behavioral scientist can be quite different from the environment that most geographers, and natural scientists as well, have been concerned with, or aware of, and assume to be *The Environment;* and, incidentally, assume others are aware of and cognizant of: viz, the natural/physical environment, or, as often called by non-geographers, the geographic environment. It is rather disconcerting, even to one familiar with the behavioral literature, to realize that environment for others in the social and behavioral sciences is usually only minimally the natural environment of topography, climate, and biota; that environment may encompass also the completely artificial environment of a psychiatric ward, at the one extreme, and the completely social environment of an interacting peer group at the other.

Such a range of usage of environment by social and behavioral scientists and the increased recent use of "space" as environment by geographers suggest that requests for definition and perhaps a re-evaluation of the concept of environment are not out of order. I am not convinced that such definition is necessary for viable research in the environmental sciences – natural or social – since I think most researchers are willing to accept the concept of environment at its broadest, or can define it to fit their purposes. But since such definition may help in the evaluation of what environmental research is and, in my own case, since the question of environmental behavior is also at issue, in which the term environment is used in a sense different from that which geographers on the one hand and behavioral scientists on the other normally use and understand it, the effort may be a worthwhile one.

The Environment of Behavior

Not all of environment is significant for the behaving organism. Not all of that behavior which is directed toward environment has its origins in environmental stimulation. Not all in environment that stimulates one individual or a group or culture is equally stimulating for other individuals or groups or cultures. In its objective dimensions the behavioral environment exists as a complex subset of the broader geographical environment, but in its subjective perceived dimensions it also exists as the individual's psychological environment, a mental projection of a kind which, conditioned as it is by personality and culture, may only in part be congruent with the real world. This dichotomy of location – an environment which exists in the one case in the real world and in the other case in the mind of the individual – provides a dilemma for geographers who require definition of an environment amenable to objective study, an environment which can be studied by multiple observers using their separate techniques of analysis, all of which are capable of being focused on the same elements of landscape or resource, location or distribution, with some certainty that they are dealing with the same environment. But we cannot ignore the fact that the behaving organism – man – is reacting only in part to what could be considered objective elements of the environment, whether these involve landscape, or resource, or spatial arrangement.

Classifying Environment

Traditional definitions of environment emphasize generally the social-nonsocial distinction or simply the human-nonhuman distinction: thus the natural environment of

vegetation or landform by contrast with the cultural environment of variably altered surfaces and atmospheres, with cities and houses and roads and field patterns and other compounds of man and nature (not always separable into their original components), which are the result of man's conscious or unconscious impact on the environment.

Yet distinctions such as these are irrelevant within the context of behavior: an organism responds to threat in environment whether these are natural or artificial, in ways not much different one from the other. He attempts to control environment or to alter it aesthetically in ways consistent with his technology and taste, and the fact of the environment being natural or artificial is irrelevant from the standpoint of his manipulative behavior. In other words, if there is a basis for distinguishing between environments which are natural and those which are artificial or cultural or man altered, as the Russians seem interested in proving,[1] there is no equivalent basis for distinguishing between behavior which is directed toward the natural environment and that which is directed toward the artificial.

Two issues are critical: First, what is to be excluded from the behavioral environment, since, if it includes everything, then we have difficulty in distingushing it from the broader geographical environment in the one case and from the non-geographical environment in the other. Second is the boundary problem, concerning the location of this behavioral environment: the extent to which the internal and external impinge on one another, and the nature of the interaction that results. The one helps to distinguish the geographic study of the behavioral environment from that studied both by other geographers and by behavioral scientists, while the other elaborates on ties between geography and the behavioral sciences: a function of our mutual interest in the mind-environment-behavior interaction. In this paper, I will elaborate on the first issue, distinguishing between the behavioral and geographical environment, and leave for a later paper the tackier issue of the interaction between internal and external environments.

A Behavioral Classification of Environment

The behavioral environment can perhaps be best understood by defining its relation to the broader geographical environment. In the scheme which follows I have attempted to define the behavioral environment as one of a nested set of environments each of which is differently inclusive of elements important for man. (See Fig. 1.) At the

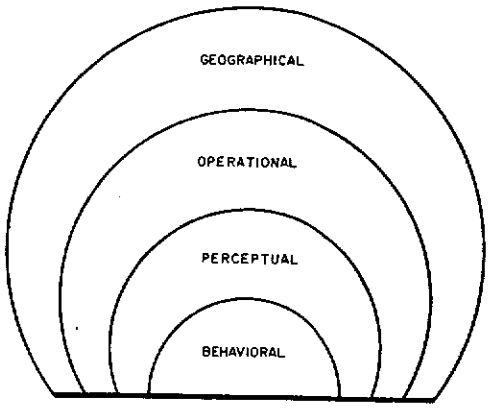

Figure 1. A behavioral classification of environment.

1. See Yu. G. Saushkin, "Concerning a certain controversy," *Soviet Geography* Vol. 7(2), 1966, pp. 9-14; and S. V. Kalesnik, "A few more words about the geographical environment," *Soviet Geography* Vol. 7(10), 1966, pp. 46-52. Also, M. M. Zhirmunskiy, "The interaction between nature and society and economic geography," *Soviet Geography* Vol. 7(7), 1966, pp. 19-27.

broadest level is the geographical environment, constituting both proximal and distal elements of man's universe. This is reduced in stages to the operating environment, which is that environment impinging on man with which in some way or another he is likely to be directly involved; to the perceptual environment, which is that environment of which man is aware; and finally to the behavioral environment, the environment which elicits a behavioral response from the individual.

The Geographical Environment. At the grossest level is the objective geographical environment. This is in effect the whole environment which is external to the organism: it is an environment which is measurable and quantifiable by some objective standard or scale; equivalent phenomena or energies, separated in space and time, have equivalent values when measured by equivalent instruments or sensors along equivalent scales. It is the most inclusive of environments, being the source of all that is objective of the operational, perceptual, and behavioral environments, but including in addition elements which as far as the individual is concerned do not exist or have no meaning. This does not mean that one can specify elements of the geographic environment to which all man is insensitive, unaware, and must necessarily remain so; only that for groups and especially for individuals there are many elements of the environment which do not "exist," i.e. are not part of the environment required by the individual for him to function normally. For an isolated tribe in the Amazon, unaware of the rest of the world, the rest of the world might as well not exist as far as any influence the rest of the world has on their environmental behaviors, even though what happens in the rest of the world may in fact influence the state of their isolation. One of the earliest references to the Polar Eskimo of Northwest Greenland, describing their discovery in the late 1800's by an Eskimo who crossed over from Baffinland, remarked on how surprised they seemed to be to learn of the existence of other people, especially people to the south of them, who lived in a country which by their own reasoning should have been uninhabitable. Since the icebergs which formed in their part of the world all seemed to flow south, the south was then a land of masses of accumulated icebergs, which made it unsuitable for the kind of existence the Polar Eskimo enjoyed, and therefore obviously uninhabitable for man.

Generally, the more isolated and less developed technologically a population is, the larger the portion of its geographical environment which is neutral or non-functional, though clearly there is no necessary relationship between the visual environment to which a people is sensitive, and the level of its technological sophistication.

The Operational Environment. The functional portion of the geographical environment, that which impinges on man as individual or group,[2] influencing behavior in some way or another, is the operational environment, the environment in which man operates. The exact makeup of the operational environment varies, according to physiology, sensory sensitivity, and behavioral orientation and inclination. Thus a basic distinction between the geographical environment and the operational environment is that while the former is the same for all of man, the operational environment differs as physiological, psychological, and cultural man differs, race from race, culture from culture, and individual from individual. The

2. This usage was suggested by the concept of "operational environment" developed more rigorously by ecologists for an organism-environment relationship in H. L. Mason, and J. H. Langenheim, "Language analysis and the concept environment," *Ecology* Vol 38(2), 1957, pp. 325-40.

biologist, geologist, physicist, chemist, and astronomer may study the geographical environment in the abstract whether or not it impinges on man or is important in his behavior. When the physiologist, anthropologist, historian, economist, and political scientist study environment, they study the operational environment, generally for the purpose of understanding man and his organic, cultural, economic, and political behaviors. The kind of environment that the human geographer studies is also the operational environment.

The Perceptual Environment. Nested within the operational environment is the perceptual environment, that portion of the operational environment of which man is conscious either because of an organic-sensory sensitivity that exists because of a lack of body adaptation – i.e. the elements lie outside the range of conditions to which the body can react "unconsciously" (e.g. temperature, atmospheric pressure, oxygen concentration of the atmosphere) – or instead because of a sensitivity that derives from man's learning and experience. That portion of the operational environment of which man is unaware, or to which he is insensitive, lies outside the perceptual environment.

While the operational and geographical environments are both objective environments, in the sense that the elements of both have objectively measurable or quantifiable elements, this is only in part the case with the perceptual environment; this is because the perceptual environment has both sensory and symbolic dimensions. The sensory portion of the perceptual environment involves a variety of objectively measurable energies capable of stimulating the individual, though awareness of these energies may differ from one to another person or population. Temperature and humidity and sound and brightness all may be variably sensed according to the sensitivity of sensory mechanisms, and according to the level of sensory adaptation. For the symbolic environment, however, the stimulus may or may not have its origin in environment. The geographic environment provides stimuli for the symbolic environment only in the sense that it provides landscape images to focus on. These images constitute reminders rather than sources of meaning. Unlike the sensory elements of environment (temperature, light, sound, odor) in which meaning is derived from the nature of the stimuli, landscape images as such have no inherent symbolic meaning. Homeland, for example, is made up of environmental elements which, if located elsewhere than in the home country, will not have the same meaning for even the same population, much less for a population differently identifying with place, even if its own place. The basic difference between the sensory environment of universal elements and the symbolic environment of idiosyncratic elements is that while the sensory elements have meaning derived from the nature of their composition or energy, the elements of the symbolic environment require a cultural and personality transformation before they achieve meaning. The special meanings or values attributed to the elements of the symbolic environment subsequently determine the sensitivity of the individual or group to their existence.

The aesthetic environment is part of the symbolic environment; so is the social or political environment; also the habitable environment, any objective measure of which requires a technologically determined value transformation. In none of these environments does the information necessary for meaning come from the environment, as is the case with the sensory environment of temperature, sound, and odor. And while one can measure the temperature, sound, and odor which make up the sensory envi-

ronment, there is no objective means for measuring the environmental elements whose values are symbolic ones. It may be extremely difficult to isolate the individual elements which make up the symbolic environment since, as suggested, sensitivity to these does not derive from the environment as such but rather from the individual. There may be a variety of environmental cues – energies of stimuli – which, as they occur or intensify or are extinguished, elicit the attention of the sensor-observer. But increasing awareness may as well derive from thought patterns internally stimulated, which cause the individual to become aware of and sensitive to his surroundings, which he then searches for elements prescribed by his culture, personality, and environmental experience.

The Behavioral Environment. Search involves behavior directed toward surrounding, and this requires the distinction of the last of the set of environments proposed. The behavioral environment can be defined as that part of the environment of which the individual is aware which also elicits a behavioral response or toward which a behavior is directed, such as results in a conscious utilization or transformation of environment. Respiration involves an unconscious use and alteration of environment; the effluents of man generally are not conscious products, but rather by-products of human activity, though the polluted environment may subsequently become the focus of a behavioral response. The behavioral response need not involve a use or alteration of environment, but may instead involve a change in the individual's relationship with or exposure to that environment, such as is often the case with behavior in the sensory environment of temperature and light, given the availability of clothing and sunglasses.

The residuum of the perceptual environment that is not subsumed by the behavioral environment is that of which the individual is aware, of which he has knowledge or an attitude, or concerning which he has a bias but toward which no overt or conscious action or behavior (adjustment, manipulation, etc.) is directed. This distinction between the two may seem tenuous, but it is basic to understanding the different responses of subjects to a questionnaire concerning their attitude toward a real or hypothetical environment, their likes, dislikes, and such, and the problem of extrapolating from these responses for predicting environmental behavior. There is no necessary relationship between that which one perceives to exist, that the individual is sensitive to in his environment, and the way in which he behaves toward that environment. One may value clear atmosphere and pure waters and still be guilty of gross negligence toward both; similarly one may be conscious of the need to preserve or conserve our valued landscapes, but vote down legislation on grounds of opposition to central government. In both cases, the environment which the individual perceives and behaves in response to is the same, but there is no necessary consistency between his perception of the environment in a symbolic – value-transformed – sense, and his behavior, such as would sustain or improve the environment which he is obviously aware of, sensitive to, and even concerned about.

The above suggests that the behavioral environment may really involve more than is contained in the perceptual environment, since it seems to include, as a prelude to behavior, a prediction (or a projection) as to what the effect of that behavior will be.

Summary. Here then we have defined a series of man-orientated environments, differing from the gross geographical environment only in the sense that elements can be isolated and specified operationally, perceptually, and behaviorally. We all live in a

geographical environment, but not all of this is operational; and only a part of that which is operational are we aware of; and only a part of that which we are aware of do we consciously adjust for or react to, or in some way accommodate for, manipulate, or attempt to control.

There is now the need for thinking in terms of behaviorally significant and behaviorally insignificant elements of our environment; for distinguishing between elements which are neutral and those which are operational; for distinguishing between that which we are aware of in environment which does not elicit a reaction, from that which does. There is also need to re-evaluate population achievement in environment. This will require us to distinguish between populations in terms of the level at which they differ one from the other in their relationship with environment: whether at the operational, perceptual, or behavioral level.

Geographical and Non-geographical Environments

One final issue: the behavioral environment has been defined as part of the geographical environment. But what is one reasonably to include as geographical environment? By reasonable I mean what is the environment that geographers can reasonably be expected to study? In question are the social elements of environment, and whether to include or exclude these as elements of the geographical environment.

Some social elements are not much different from nonsocial elements in terms of the behavior they elicit from the individual. It was suggested earlier that one may not be able to distinguish behaviors which are directed toward the natural environment from those which are directed toward the artificial environment. Similarly, it may be difficult to distinguish between behaviors that are directed toward a peopleless environment and those which are directed toward one with figures on the landscape, for example, farmers working in a field, or commuters rushing to and from work, and similar "people images," experienced in any of a variety of ways, but all anonymously. Yet other social entities are not quite so anonymous.

For the sociologist or psychologist, one's mother, teacher, minister, or friend may all be parts of a critical learning environment, e.g. such as influences the development and personality of the child. The concern of the sociologist and psychologist is primarily with behavior in a reacting environment. The concern of the geographer, however, is more often with behavior directed toward a *non-reacting environment.* I would distinguish between elements of the geographical and non-geographical social environment according to whether they are reacting or non-reacting elements, and according to whether interaction is involved or not.

The kind of interaction referred to is a social interaction. The individual interacts with other individuals in his environment who react or who are capable of reacting in like manner. The relationship involved in such interaction is a social relationship, and, according to how one wishes to define it, this may also represent an environmental relationship. But if all social interactions involve also the relationship of an individual with environment, not all man-environment relationships involve interaction. As sociologists Parsons and Shills point out,[3] interaction requires "objects" capable of behav-

3. T. Parsons, and E. A. Shills "Categories of the orientation and organization of action," part 2(1) of *Toward a General Theory of Action,* ed. by Talcott Parsons and Edward A. Shills, Harper and Row, New York; (Harper Torchbook Edition) 1962, pp. 53-109.

or adapting to each other; but an organism-physical environment interaction does not occur in the same sense. This is not to say that environmental reactions do not occur when man upsets an equilibrium in a physical or ecological system, but the adjustment that occurs is to the disequilibrium rather than to man as the source of disequilibrium. The same would seem to apply also to the anonymous social environment, which I would therefore see no reason for excluding as geographic environment.

So distinguishing between a geographical and a non-geographical social environment, however, I cannot really argue that geographers ought to ignore this social environment, for without question the social interactions we experience may very much influence our behaviors in the geographical environment. I would only caution that treating the interacting social system as environment raises questions of environmental influences and determinisms that can only confuse the issue of geographical influences and determinisms. As I have tried to suggest, the geographical environment and the interacting social environment are not really equivalent kinds of environment. Therefore the issue of environmental influences and determinisms is not the same for geographers as it is for sociologists and psychologists. The continuing controversy over the role of geographical environment in human development is sufficiently critical for geographers and other behavioral scientists to be aware of the difference between the environments on which their studies focus, and on which their judgments concerning the validity of an environmentalist position are based.

SPATIAL INVASION

Robert Sommer

Dear Abby: I have a pet peeve that sounds so petty and stupid that I'm almost ashamed to mention it. It is people who come and sit down beside me on the piano bench while I'm playing. I don't know why this bothers me so much, but it does. Now you know, Abby, you can't tell someone to get up and go sit somewhere else without hurting their feelings. But it would be a big relief to me if I could get them to move in a nice inoffensive way...

Lost Chord

Dear Lost: People want to sit beside you while you're playing because they are fascinated. Change your attitude and regard their presence as a compliment, and it might be easier to bear. P.S. You might also change your piano bench for a piano stool. (Abigail Van Buren, San Francisco Chronicle, *May 25, 1965)*

The best way to learn the location of invisible boundaries is to keep walking until somebody complains. Personal space refers to an area with invisible boundaries surrounding a person's body into which intruders may not come. Like the porcupines in Schopenhauer's fable, people like to be close enough to obtain warmth and comradeship but far enough away to avoid pricking one another. Personal space is not necessarily spherical in shape, nor does it extend equally in all directions. (People are