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Stimulus and Symbol: The View from the Bridge

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The genesis of this volume is of more than parochial interest. It represents an attempt by the issue editors to relate behavioral science to an important societal concern: the quality of the environment. The increase of interest in this area is impressive. The New Conservation of the Kennedy-Johnson era has moved steadily to increase the stock of natural parkland, to limit air and water pollution, and to challenge the ugliness that mars both town and country (28).

This revival of environmental interest, on a scale not seen since the great depression, seems to be compounded both of ambition and fear. The ambitions spring from the Galbraithian theory of the affluent society where redress in the unfavorable balance between public need and private consumption is required (10). Surely a nation as affluent as ours, the argument goes, should seek in its collective use of landscape and townscape the same high standard it strives to provide for its private spaces.

The fears that stimulate the widespread concern are generated by the very success of the man-made environment. New chemicals and materials are introduced into the air, soil, and water, while at the same time suburban growth and water shortage suggest at least in popular accounts, natural resource pressure (22, 6). As the industrial revolution is symbolized by the machine invading the garden (16), so the fear persists that the sweet smell of success of the scientific revolution may just be masking the ozone production of photochemical smog.

Behavioral Science and the Physical Environment

But if national policy seeks to concern itself with the environmental basis of the Great Society, a spectre still haunts the social and behavioral sciences. Buried with the ghosts of Hippocrates, Montesquieu, Lamarck, Huntington, and other environmental theorists and theories is the incentive for a sophisticated examination of man's response to the physical environment (cf. 27). A current review of the dominant strands of the social and behavioral sciences vis-a-vis the study of the environment suggests the following assessment.

For economics, environment is traditionally viewed as land, a member of the trinity of productive inputs, and an input whose importance declines with increased industrialization (23). In anthropology, environment is, of course, important, especially as a setting for primitive cultures. But more often than not it proclaims the triumph of culture over a single physical setting (cf. 17, 12). Sociology, even in its most physically oriented subdiscipline, human ecology, sees the physical city as the dependent entity, a function of social organization and change (15). For many psychologists, the environment is but neutral stuff that must wait patiently for form and meaning obtained only through the mind and senses (1). Even in geography, with its tradition of man-environment interest, the study of environment calls for apologetics (cf. 21, 26). In all the social sciences, the "proper study of mankind is man."

But the study of environment has not been neglected completely. In fact, within the set of disciplines related to environmental manipulation, a veritable boom has taken place anticipating as well as mirroring the New Conservation. There are two main groups of disciplines: those related to public health and sanitary engineering and those related to design—architecture, landscape architecture, city and regional planning.

Environmental Disciplines

As a mark of intellectual revival these traditional disciplines have acquired new names. Thus public health and sanitary engineering become first environmental health disciplines and more recently environmental sciences, expanding into ecology and biomedical engineering. The design disciplines have prospered as well, coming together in sophisticated centers, colleges and schools of environmental design. The genuine social concern with the environment and the evolution of professional training into environmental disciplines should encourage a reexamination by social and behavioral science of its traditional attitude toward environmental study. The papers in this volume, in the main the work of geographers and psychologists, hopefully anticipate such an effort. It is the presumption of this short paper to try

to clarify the role that behavioral science can play in both supplementing and directing the efforts of the professional practitioner.

There are, of course, behavioral assumptions behind each practical conservation program. In some cases these assumptions are somewhat suspect. In all cases, for the programs to be truly effective, they require study. Thus it is ineffective to allocate funds for beautifying interstate highways without knowing the perceptual qualities of scenery when viewed from a speeding automobile. Intelligent provision of open space for urban areas is hampered by the almost total absence of information on the use of the open space presently available. The optimal distribution of new funds provided for in the Land and Water Act for recreation will be hampered by our limited understanding of the motivational aspects of leisure time pursuits. And so on. The catalog of problems related to each new or proposed policy is a lengthy one. Instead of a list of future research needs (some are presented elsewhere in this volume), I might suggest a framework for defining such needs—a central task and a beginning towards a theory of environment. The central task of the behavioral and social sciences in the study of environment is to relate the stimulus properties of the environment to their symbolic human manifestations and in turn to define the stimulus properties of the symbolic environments that men create.

Stimulus Properties of the Environment

In focusing on the critical relation between stimulus and symbol I am deeply indebted to the work of René Dubos. In the Yale Silliman Lectures, *Man Adapting*, he states:

In obscure ways human life converts the physicochemical processes of purely biological existence into actions, representations, and aspirations which pose to the science of man problems not found in the same degree in the study of other living organisms. . . . Mechanical stresses, irritating materials, radiations, and temperature act directly on the human fabric just as they do on other nonhuman structures of similar composition, whether these be monkeys, oaks, amoebas, viruses, or inanimate substances. But in addition to their direct effects on the constituents of the body machine, environmental forces also have indirect effects on living things. . . .

This chain of indirect responses is of greatest importance in man because of his propensity to symbolize everything that happens to him, and then to react to the symbols as if they were actual environmental stimuli.

Thus, all the perceptions and interpretations of the mind become translated into organic processes. For this reason, the actual effects that the environment exerts on man commonly bear little if any resemblance to the direct effects that could have been expected from the physicochemical nature of the stimulus. The body machine reacts not only to the

stimulus itself but also to all the symbols associated with the experiences of the past and the expectations of the future, symbols which are converted into effective stimuli by a particular event (pp. 5-7).

To the extent that environment has been studied at all, the stimulus properties of the environment are the ones that have been traditionally examined by the environmental sciences. Dubos himself reviews much of the literature: the daily, lunar and seasonal periodicities related to cosmic and solar forces, bio-climatology with both its grand theory and careful physiological study, and the organic world of pathogens and disease which lies beyond the scope of this journal issue (8).

There are other direct physical stimuli that affect the physico-chemical nature of man. Geophysical hazard—earthquake, hurricane, tornado, lightning, fire, and flood—drastically act on man (5). Artificial stimuli—the irritants placed in air and water; the rising noise levels and compacted space of urban environments—lead to stressful overstimulation. The converse, the sensory deprivation that may occur by the monotonous sameness of the world of nature or man (9) may prove harmful, as well.

These are usually studied singly and from their noxious aspect, the emphasis being placed on either their gross elimination or the reduction of their danger to man. The present environmental sciences are still deeply rooted in public health and sanitary engineering and in the great struggles to protect men from filth and disease. To this outsider, such a tradition seems to leave the environmental sciences overly directed toward health and disease prevention, deeply rooted in the search for a specific etiology.

The major non-professional area of environmental study, ecology, also seems to be strongly bound to its own origins. The ecologist is deeply concerned with the multi-factorial aspects of the environment. Studies commonly contain observations of water, temperature, aeration, radiation, soil conditions, seasonality, photo-periodicity and all the many variables found to affect plant and animal communities (7). However, it is precisely the historical roots of ecology in plant and animal study that render it much less promising for students of human response to the environment. Moreover, many ecologists seem to share a sense of threat from human activity. They see in population growth and urban sprawl the destruction of their prized plant and animal communities. It would seem to be metaphorically proper to note that ecology has yet to accept the notion of a human climax.

The tendency of the environmental sciences to view environmental stimuli either as specific etiological agents of sickness or as complex systems relevant in the main to lower life orders make them ill-equipped to meet the new demands placed upon them. For one sig-

nificant aspect of these new demands is that more and more they involve the symbolic meaning of specific or collective stimuli.

An example of these demands and the understanding required to meet them might be the use of water in our complex society. The use for water grows with population and affluence. This growth is complicated by pollution and local shortage usually arising from causes other than natural inadequacy. Some of the suggested methods of coping with these problems involve the multiple use of present facilities, recycling water for additional use, and the establishment of limited rationing through the market mechanism. Not all suggestions are negative responses, for improvements in the supply of water provide the opportunity for positive attainments ranging from the enhancement of the recreational potential of a natural site to providing a medium for mass prevention of tooth decay.

In recognition of both the new needs and opportunities, intensive investigation into the rational aspects of water allocation and use has been underway for some ten years (4). However, the nonrational aspects of water use have only begun to be studied.

Common social phenomena such as public dismay over the use of reclaimed waste water, professional opposition to swimming in water supply reservoirs, community resistance to the introduction of fluorides—even the failure to assess reasonable charges for water cannot be adequately explained as solely cognitive decisions. One might well begin to examine the nonrational aspects of water use by studying the myth and symbol, sacred and profane, in which water imagery abounds. Is there not some relation between the uniqueness attributed to water, the double standard with which it is allocated, and the symbols and meanings of the womb, the flood, the baptismal font, Lourdes, or even the primordial origin of terrestrial life? (cf. 19).

Symbolic Properties of Design

In contrast to the environmental science disciplines, the design disciplines abound in symbol—they are veritable symbol makers. The challenge to the designer is to create a design that fulfills some function and also proclaims symbolically some deeper meaning in building, garden, concrete or spatial arrangement. The tension between the need to enclose, house, or site specific human activities and to create symbolic meanings in their own right has not been an equitable one. While much design seems mediocre and fails in both its form and function, the attention of the most talented has been directed to the aesthetic expression of the total design, not to the behavioral consequences of their work.

A. E. Parr has noted this tension in the case of functional architecture:

From the day a man first laid one stone upon another the purpose of building has been to shelter us against the weather, protect us against enemies and dangers, and shield us from the terrors that dwell in the anonymous darkness and distance beyond. According to Pevsner, functionalism has put an end to much of this. To calm our fears and make us feel secure in our surroundings is no longer a purpose of architecture. The proper aim is to glorify, and thereby reinforce our anxieties, instead of trying to ease our tensions by the design of our milieu (20, p. 8).

Elsewhere in this volume an architect and psychologist plead for collaboration in identifying the stimulus properties of their symbolic designs, but the problem is more extensive than architecture (cf. 25, 29). City planners have long visualized cities and city spaces in plan from map, model and aerial photography. The patterning of the city with planned areas bound together by a network of arterials is deeply and symbolically engrained in their work. But the sense of relatedness and identity that Nairn suggests as characteristic of the humane townscape (18) is not to be derived from a bird's eye view. It is what is seen from the paths and action spaces of the inhabitants and it is this image of the city and view from the road that is relevant (14, 2).

Conclusion

The environmental disciplines are in an era when they are newly challenged by broad social concern and offered the prospect of increased interest, support, and prestige. They stand somewhat split between science and design, suggestive of C. P. Snow's two cultures (24). Perhaps the social and behavioral sciences can help bridge the gap by injecting new intellectual content to relate both science and design to human needs.

For most if not all of the social and behavioral sciences are preoccupied with both the stimulus and symbolic properties of the human phenomena within their purview. It is not always that these wings of each discipline are in constant dialogue, witness experimental and clinical psychology, but at least they are sheltered beneath the same tent.

In building such a bridge, geography and psychology, in particular, might find the beginning of a modest but worthy collaboration (30, 11, 13, 3). Geography has long dealt with the stimulus properties of the environment—weather, topography, city form—and the symbolic qualities—space, regions, maps. Its research has been organized by area, frequently carried out in the field, and marked often by generality of vision at the expense of precision of insight. Psychology has ignored in the main the physical environment, even though it has studied intensively the perception and symbolization of discrete stimuli. Its carefully controlled laboratory research has often been marked by precision of insight obtained at the expense of our ability to gen-

eralize its findings. Yet these findings and principles may be highly suggestive for studies relating men's behavior to the environment in which he lives, as illustrated in the various papers that follow. If this analysis is correct, a useful complementarity is indicated, one that might lead to substantial progress in understanding man's response to the physical environment. The view from the bridge is worth looking at!

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