# ENVIRONMENTAL DESIGN: SOCIAL SCIENCES AS A PRAGMATIC DESIGN TOOL

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In contemporary environmental design, the designer has had to look to the life sciences and social sciences such as psychology, sociology, medicine, political science, economics, biology, anthropology, and physiology, to generate the solution to the design/built environment. This idea of the designer using other sources for design information input is not new. In 1856 David Boswell Reid, M.D., wrote:

"In short, wherever man has a place to cover his head, whether it be in the palaces of the affluent or the cellar of the humble poor, architecture necessarily holds a leading way. It adds to the comfort of the family fireside, or produces discomfort, originates disease, and leaves the constitution a prey to physical evils that hasten finally to a fatal termination."

To understand and solve a design problem, the designer must have a strong foundation knowledge for the various life and social sciences.

One of the disciplines from which designers must draw heavily upon is visual psychology. The designer must refer to research in the phenomenon of stereoscopic vision. Although the two eyes register two distinct slightly different images, they get fused into one stereoscopic picture and the sensation of depth is created in our minds. Numerous visual psychologists have developed their own theories pertaining to perception of stereoscopic pictures. Gibson proposed his psychological theory of perception based upon gradients of stimulation. It should be noted here that his notion of perception is counterpoint to the earlier "point theory of light" also known as the theory of corresponding points or the stereoscopic effect. Gibson supported the theory that organisms react specifically to the order of the points of origin of light spots, as well as to the character of the light in each spot. This variable of light distribution upon the retina is called ordinal stimulation. He also made reference to C. M. Child and his research proposal that the light sensitive cells of the retinal mosaic and the neural tissue in the brain connected with them can react to gradients of stimulation. Perhaps one of the most important

problems facing both environmental design and psychology lies in the fact that the physical features of the environment affect action by virture of the way these features are interpreted and defined by each individual. The designer is responsible for the personal differences that naturally occur between his clients and is charged with each design commission to reflect these differences in the design solution. If it is true that one's visual perception is influenced by a past history of one's own perception, the designer can only suggest an appropriate visual response to designed spaces. Since there is no control over the vast source of visual stimulation an individual may encounter over a life cycle designers are limited in the control they have over one's visual response to the created environment. Our aesthetic judgments are substantially modified by nonsensual data derived from social experience. This again can be easily confirmed in daily life. It is ultimately our faith in antiseptic measures that makes the immaculate white nurses' uniforms and spotless sheets of the hospital so reassuring. It is our knowledge of their cost which exaggerates the visual difference between diamonds and crystal, or the gustatory difference between the flavor of pheasant and chicken.

## DENSITY EFFECTS

In the realm of the sociologists, experiments have been conducted with Norway rats in which behavioral changes have been observed, the population varied. As the population was increased to twice that of normal, stress was definitely detectable. At increased densities, gross distortions of behavior were observed in the rats. Overcrowding can cause astonishing behavioral effects, resulting in an " . . . array of abnormal behaviors developing. Prominent among these are nearly total dissolution of all maternal behavior, predominance of homosexuality, and marked social withdrawl to the point where many individuals appear to be unaware of their associates despite their close proximity." (Calhoun, 1966). As most scientist would agree, it is wrongfully dangerous to draw direct conclusions from

animal experiments. If one could walk unde-
tectably through New York City, it would be
blatantly obvious that the high density living
environment there could very well be the root
of most of the social deviances. Crimes such
as assault, rape, murder, plus outward per-
sonal manifestations such as bizarre dress
codes, strutting and gregarious, offensive be-
havior are everyday events.

Calhoun found that a social species will nor-
mally favor living as compact groups in space
averaging 12 adults. "By virtue of his biological
heritage, Homosapiens appears to have been
long related and presumably adjusted to a way
of life that was most harmonious when the
population was fragmented into small social
groups of about twelve adults." Real human
evidence of this phenomenon could have been
seen in the highly unsuccessful attempt by the
department of Housing and Urban Develop-
ment (H.U.D.) in their Ingoe-Pruit high-rise,
low-cost housing development in St. Louis,
Missouri. This can be documented by the ex-
traordinarily large number of rapes, robberies,
murders and gang wars; therefore, the project
was labeled hopeless and downright danger-
ous. Thus, close to 10 years after the construc-
tion, well-placed sticks of dynamite at the cost
of the taxpayers were the result of Ingoe-
Pruit's razing. It was an embarrassing situation
for all parties involved in the planning of the de-
velopment.

Experimental studies relating crowding per
se to pathology in humans are practically non-
existent. This is not to deny that numerous
writers have described and even itemized their
conceptions of the ill effects of over-concentra-
tion and overcrowding. Population density has
been related to psychosomatic symptomatol-
ogy, neurosis, psychosis, juvenile delin-
quency, alcoholism, and alienation. The prob-
lem remains that in none of these accounts
can crowding legitimately be separated from
associated phenomena including low income,
inadequate food, lack of education, and social
prejudice. Descriptions of crowding usually
select some ghetto-like area, such as New
York's Harlem or Chicago's Near North Side,
and attribute some casual role to the empirical
and logical relationship between crowding and
social pathology.

## TERRITORY AND PERSONAL SPACE

Edward Hall is an anthropologist/psycholo-
gist who has described and conducted empiri-
cal investigations involving personal space. By
personal space, Hall refers to a series of imagi-
nary bubbles which surround each individual
and which moves with the individual. Personal
space should not be confused with territorial
space. Territorial space is a relatively station-
ary area which does not move with the indi-
vidual. An animal or man will usually mark the
boundaries of his territory so that they are visi-
ble to others, but the boundaries of personal
space are invisible. Animals will usually fight to
maintain dominion over territory, but will with-
draw if others intrude into their personal space
(Hall, 1958). By defining the distances or
series of bubbles of space which surround
man, Hall has made an important point of re-
ference:

"Every living thing has a physical boundary
that separates it from its external environment.
Beginning with the bacteria and the simple cell
and ending with man, every organism has a
detectable limit which marks where it begins
and ends. A short distance up the phylogenetic
scale, however, another, non-physical bound-
ary appears that exists outside the physical
one. This new boundary is harder to delimit
than the first but is just as real. We call this the
*organism's territory*. (Hall 1958 146).

When the designer has to refer to these per-
sonal and territorial spaces in a specific design
problem, he must first ground the information
to cultural values. He should be sensitively
aware of the cultural values of the people for
whom he is defining space. The designer
should be aware that his values are unique
only to the minority group of which he is a part.
All cultural and subcultural values should be
identified by the designer and should influence
his physical definition of space. When a desig-
ner creates spaces and sequence of spaces
which fail to meet cultural needs of the people
involved, is not this failure just as serious as
perhaps not meeting the more obvious needs
of aesthetics, quality detaining, economic con-
sideration, or the heating, and cooling, and
ventilating requirements?

## ESTHETIC FACTORS

Many designers consider the esthetic qual-
ities of a building environment to be of utmost

importance. Some even agree that the main contribution of the designer lies within the aesthetic realm. But esthetic values are generally culturally defined. The esthetic quality of architecture and space are generally an expression of what a particular culture considers to be esthetically pleasing. Aesthetic expressions are influenced by techniques of the designer, by the material used and by the function of the designed space. This is not surprising since most designers have been educated in schools which share similar philosophies of design and which expose the student to design studios, critiques, sketch problems, basic abstract design problems plus other similarities. Emerging from this common education, the designer esthetically values the ingenious use of the abstract design elements of color, texture, line, and light. The person who is not trained in the arts fails to understand or respond to the aesthetic values of the contemporary designer. Not only do the design schools encourage a subculture of environmental esthetics, but a wide array of design publications also have a tendency to help funnel the accepted esthetic values of the designer down a common path. Design work of Kahn, Rudolph, Wright, Neutra, Mies, and Corbus, have been published many times attesting to the esthetic qualities of their buildings and interior. The spin-off of these publications are the cliches that have been born to support the less talented designer. In the mounds of proliferate journals, accurate reproductions of "classic" designs have led to a new direction in architectural design — manipulation of one design into another.

An important point is that those designers who highly value the esthetic qualities of a space should realize that perhaps their esthetic values are not absolute. Esthetic values are generally culturally defined and are a part of the subculture of the designer. It is therefore wrong to design for all subcultures as though they shared value systems. It makes more sense for a designer to identify the values of his client — both esthetic and environmental — before he designs, and to let such identified values guide his design decisions throughout the design problem.

## SOCIOPETAL AND SOCIOFUGAL SPACE

Osmond (1965), a *social psychologist,* clas-

sifies enclosed space as either sociopetal or sociofugal: space that draws people together or forces them apart. Examples of sociofugal spaces are bus and train stations, and waiting rooms. The New England village green at which citizens could gather and discuss their political desires is an example of sociopetal space. Even within a single building, usually both kinds of space are provided.

Hospitals are micro-societies that possess all the intricacies of social groupings and have complex hierarchical people and environmental groups. Sommer (1960), has conducted experiments with hospital sociopetal spaces. He analyzed the wards of mental hospitals and addressed himself to the question of how the design of the ward and the arrangements of furniture affect the interaction between people. His studies have shown that five times as many patients were occupied constructively in the day-room in the corridor. He also observed that friendless patients tended to congregate in the corridor. If patient morale is of the highest order of concern, therefore from a behavioral standpoint, long corridors in hospital design should be eliminated.

From all Sommer's research, which included building types other than hospitals, he concluded that people who sit or work close to one another tend to become friends. He also has noted that conversation between people sitting at the corners of tables occurs twice as frequently as when people sit side by side and six times as frequently as those between people across the table from each other.

Stea (1965) has investigated the effects of territorial changes within office spaces. By simply moving existing desks, filing cabinets and moveable partitions, new office spaces or territories can be defined. As a result of this type of change in existing territory, employees are forced to restructure their behavior. Offices are created by designers who are unaware of the implication of new territories upon office behavior. Many office buildings have been designed with the modular-moveable partitions which allow for the manipulation of old territories into new ones. Stea states that perhaps the reluctance to adjust to newly defined territories brought about by manipulation of the partitions may be one of the reasons why existing office partitions are seldom moved. By changing the defining characteristics of a terri-

tory, a change in human behavior occurs within it, but, conversely, changes in behavior lead to changes in territory. The bored office worker engages in active stimulus-seeking behavior and therefore enlarges the boundaries of his territory. He may take more frequent and perhaps more distant coffee breaks, or perhaps take many more prolonged and apparently purposeless trips to the library located in another part of a complex of buildings. He may attempt to pick up social acquaintances along the way and may even attempt to acquire professional contacts in remote areas to give authenticity to his ramblings. The behavior of the bored office worker results in what is commonly called restlessness which in turn leads to the establishing of new territories.

The designer's view of space is unique when compared with the objective views of the behavioral and social sciences as previously stated. This is true because the designer is part artist and therefore tempers his objective view of the world with sensuous (intuitive) and subjective feelings. Another factor which makes the designer's view of space unique, is that he is one of the few people who has the training and capability to solve problems in a spatial manner. The designer's goal is to translate the data of the other professions and disciplines into physical reality. The psychologist, psychiatrist, social-psychologist, and sociologist, measure human behavior under various experimental conditions and present the results of such training and necessary experience to translate their gathered data into meaningful, practical building spaces. The designer is a member of the one of the few professions which trains its members to visualize and solve problems in a three-dimensional spatial manner. After all is said, all data are collected, all drawings are completed, all the walls are up "I think people have an instinct for space. It is something they like, like good food, sex, or anything else, but the last thing they can do is talk about it. It is best to watch their eyes." (Jonson, & Rowan, 1965.)

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