COLOR AS PART OF AN ARCHITECT'S DESIGN

DR. WAGIH FAWZI YOUSSEF

ABSTRACT

Color occupies a natural and intuitive part of the design process. If we are to avoid the possibility of future grey, non-chromatic towns and cities, we must re-orientate our concept of space–form relationships towards a deeper awareness of colored space and colored form as one totally integrated into the visual experience. At the same time, as a rule, it proves unsuccessful to attempt to conceal dull and monotonous architecture with strong colors. It is also pathetic when, in an era of system-building, we have to use color as a cue for people to find their way home.

Keywords: *Pop Architecture, multi-dimensional, chromatic conception, color perception*

INTRODUCTION

People attach all kinds of different meanings to colors; they think that there are strong relationships between the colors a person prefers for his clothing, home furnishings, the objects that surround him, and the traits of his personality. On the other hand, there are designers who feel the use of certain colors will produce certain kinds of behavior, and that color responses are more tied to man's emotions than to his intellect.

Colors identify objects in space, conveying information about the surroundings. We usually associate colors with happiness and lack of colors with boredom and sadness. Warm colors, yellow through orange to red, are seen as aggressive or advancing. Cool colors, green through blue to violet, are considered as receding or passive, and are less clearly focused by the eyes than warm colors. A. Ketchum discovered that a noise sounded louder to a listener in a white room than the same noise heard in a violet room, and that a dark blue packing crate seemed to feel heavier than an identical yellow colored crate.

Not only are certain colors associated with spatial reduction, expansion, weight and temperature, but it is also claimed that their use in room spaces may induce occupants to feel warmer; to the extent of compensating for inadequate heating. In fact, laboratory experiments have shown that the color red decidedly stimulates the nervous system, raises blood pressure, and speeds up both respiration rate and heartbeat. Also, it was found that in a blue room a person's blood pressure falls slightly, and the rates of heartbeat and breathing slow down. An American psychologist conducted an experiment where two identical ٢٠-minute lectures were presented to two separate audiences, one seated in a blue lecture theatre and the other in a red one. The blue group felt rather bored and under the impression that the lecture had lasted longer than the actual time, whereas the red group found the lecture interesting and felt that the time had passed quickly. Color has been used therapeutically in dealing with emotionally and mentally ill patients in the belief that manic and aggressive patients need cool colors to calm them down, whereas depressive and suicidal patients cheer up to warm and exciting colors. However, the world of color is full of contradictions. There is also a belief held that the color yellow stimulates the intellect and on this basis it has been prescribed as a suitable color for libraries and classrooms.

SYMBOLIZATION OF COLOR

Yellow was actually worshipped by the ancient Egyptians as part of a color–coded system which assigned yellow to the sun god, and black to evil. Red and yellow symbolized positive and negative respectively, and were also associated with good and evil spirits. They believed that colors embodied mystical powers and their temples were often painted with blue ceilings to represent the heavens, and green–colored floors symbolized the fertile meadows of the Nile. Extremes in skin complexion were highly prized and the cosmetic application of color was widely practiced in order to intensify flesh coloration; even the face of the Sphinx was painted red.

The walls of the ancient Chinese capital of Peking were painted red and roofs within the city colored yellow. The yellow roofs acted as a form of camouflage which blended buildings into the surrounding landscape, thereby protecting the inhabitants from any evil spirits who happened to pass overhead.

Recent experiments on the responses to external color in architecture by Dr. Sivik of Goteborg, Sweden and observations made by Oscar Neumann in the United States of reactions to his color proposals for external facades, indicate that people will accept much more intense colors in their environment than architects might predict or a sophisticated taste would allow.

Neurologists have also suggested that the nervous system not only reacts to stimulation but to changes in stimulation. Dr. Eric Miller has said that the brain needs constantly varying forms of stimulation in order to operate in relation to the environment. In support of this, J. Veron modified the old saying when he wrote "Variety is not only the spice of life, it is the very stuff of it". For instance, Pop Architecture, a phenomenon, directly echoing public taste, is rich in symbolism, decoration and, especially, color given that it is diametrically opposed to the hardness and uniform greyness of the forms produced by the modern architectural movement.

Color was also used, apparently for its own sake, in abstract designs painted high on the walls of a cave. The polychromatic cave dwelling being entirely acceptable to the mentality of primitive man. As the use of color moved out of the underground caves and into the sunlight, architectural color became richer. Colored images are made to protect the cave men from the spiritual powers which are felt to be as real as the forces of nature. This use of color occurs in almost all primitive and ancient cultures of the world. The symbolic use of color mainly functioned in areas such as religion, mythology and astrology, ceremonial occasions, for healing purposes, and to denote social status, races, and the elements of science and points of the compass.

THE SPATIAL USE OF COLOR

Color in built space can remove glare from the field of view. If color is warm, it can also direct attention. If the color is cool, the person will be able to concentrate on visual and mental tasks. It has been believed, throughout history that color affects the well-being and health of man.

The Egyptian's environmental color sense was extremely lively and was expressed in even, decided, and sometimes quite violent tones, but it could also be delicate and faint.

They loved to juxtapose contrasting colors in a manner which reveals a deep feeling for the unique quality of each particular hue. This positive application of color to their buildings and statuary accentuated architectural detail in a climate where plastic form would appear diffused. They also evolved a highly developed language of color which was so precise that it became an important element in hieroglyphics, their representational picture writing.

The ancient Greeks covered their architecture with color washes in the belief that the natural coloration of wood, marble, ivory and bronze was no substitute for the artistic creation of the city as a total art form. The marble figure of a woman found on the Athenian Acropolis was textured red, green, blue and yellow. Quite often statues had red lips, glowing eyes made of precious stones and even artificial eyelashes.

Romans are interested in colored buildings, brightly colored paints and marbles, gold, bronze and mosaics. They restricted the application of color to buildings and left sculpture unpainted. The coloring in the facades of Notre Dame in Paris are in the moldings, columns, sculptured ornaments and figures. There are bright reds, crude greens, orange, yellow ochre, blacks and pure white. In England in the cathedral of Wells, the niches are dark red, and the figures are painted yellow ochre, with the eyes and hair picked out in black and the lips in red. Renaissance rejected the redundant idea of symbolic color as part of an environmental language and turned towards an individual translation of colors of the real world. Leonardo da Vinci paints the effect of light and weather on the color of objects in space.

Kazimir Malevich and Piet Mondrian contributed to the spatial use of color, both to the internal and external surfaces of buildings. Mondrian's form of Abstraction meant that architectural color no longer served as an element of decoration but helped define contrasting tones of white, black and grey. He regarded all other colors as impure, thereby rejecting the browns which had prevailed hitherto, especially in late nineteenth century interiors.

During the early sixties, the Pop Art movement, with its blurred edges between painting and sculpture, emerged simultaneously in New York and Los Angeles and for its sources

drew from the imagery of the mass culture. Its departure from formal channels of art and subject matter heralded the return of color, in the form of murals and super graphics into the street space to take their place next to billboards and traffic signs. The increasing size of Pop Art objects had helped to accelerate the move away from the studio-gallery situation being also accompanied by a growing concern by artists who realized a pressing need to enhance the grey urban environment, and to establish new links with the community by ending their isolation from civic activity.

THE FORM-COLOR UNIT

Color-coding has been employed in a variety of settings including old homes, machine rooms of office buildings, and primary schools. The child comes to know its environment through the use of color, and also has a definite message conveyed to it about the nature of the learning process and the comprehensibility of the environment. In addition to the positive effects a bright color introduces into an otherwise sterile classroom environment, the painting of environmental components draws attention to these components, demanding that the child utilize them as elements of learning. Color and object are united, each being primary to the understanding of the environment.

The importance of having impact on the physical environment through the use of color has become an increasing concern of a number of contemporary visual artists. The American painter Gene Davis, famous for his acrylic stripe canvases, recently executed a work at the Philadelphia Museum of Art where he painted the driveway leading to the Museum with his characteristic strip signature. Besides acting as a focal point for the museum façade itself, this work both reflects the growing demand that artists be allowed greater freedom in determining how their work will be exhibited, and is a vivid example of the impact of color.

There has been resurgence in interest in large outdoor murals in many urban neighborhoods. These works are graphic examples of members of communities having impact upon their physical contexts and also frequently help meet people's cognitive needs. The meeting of these cognitive needs is accomplished in a variety of ways ranging from the possibility that the content or subject matter of the mural can provide useful

information about the neighborhood, its history, spatial arrangement, etc., to the very presence of the mural acting as a distinctive landmark which helps people orient themselves spatially.

These outdoor murals also serve as good examples of a number of advantages of using color as a solution to the environmental problems of cognition and competence. In general, they are relatively inexpensive, easily amenable to change, and allow the participation of a wider range of individuals than is typical in most urban environmental changes of this scale.

The form–color unit, being an immense reservoir of harmonizing or exalting stimuli, opens up prospects of health and joy needed for the equilibrium of vast concentrations of human beings. Exuberant color has followed periods of austerity, and is often applied in contrast with monochromatic or dismal surroundings or to reestablish an identity. The tower block Ichi Ban Kahn in Shinjuku, a suburb of Tokyo–Japan, painted by architect Minoru Takeyama, challenges its encompassing squalor through a highly saturated red, yellow and blue. Similarly, Jacques Starkier, the French architect, has explained how he attacked the pervading greyness of Levallois-Perret with a red, orange and yellow elementary school building which provides the children of the Parisian suburb with a personal possession. Another French school by architect Georges Pencreach located in the new town Cergy Pontoise demonstrates the effects of consultant Lenclos's exuberant manipulation of color, which both reflects the sheer enjoyment of rich saturated color by the young and boosts the visual impact of the area and its architecture.

As a decorative element, color has also been applied by designers to fragment or destroy the visual recti-linearity of modern architectural mass. This principle was adopted by the Italian architect, Carlo Santi, in a housing project in Bologna. His curved, multi-colored shapes rendered on to the exterior walls, being totally at variance with the structure, resemble Eduardo Paolozzi's application of color to disrupt the angularity of his sculpted forms. However, more recent development of color camouflage seeks only to conceal anonymous architecture through a striking and sometimes humorous fashion.

Color acts as a personal signature in the punctuation of secondary elements in the facades of houses. Color has been used as part of the modern architectural vocabulary; the results are often frugal as they are generated from a badly digested functionalism and a rigorous concern for necessary architecture. In this context, color connotes superficiality and frivolity.

Features in the visual arts of the twentieth century are the freedom and independence of color. New building techniques such as tensile construction and curtain–walling, coupled with new materials, have enabled the architect to achieve a new image of space and volume, but as yet no positive approach has been made in terms of color. Although maintenance problems have obviously been an inhibiting factor, the causes of this restraint are not entirely technical. The functionalist philosophy, on which architecture based its modern revolution, concentrated on objective factors, like utility and technology, with the result that subjective functions, like that of color, were overlooked.

Architecture is essentially an aesthetic of space as well as of construction in mass; this is because architectural form was derived originally from the building of habitable dwellings or caves. However, it is necessary to take into account the differences between the modern and classical concepts of space. This difference is signified by the term multi-dimensions. But in fact the multi-dimensional concepts which the visual arts have adapted from modern scientific theory involve practical problems which cannot be resolved in terms of concrete building without the aid of subjective means; that is to say by optical or psychological effects. This means the introduction of a new form of perspective by which the concrete three dimensional structures of buildings is fragmented or exploded by subjecting it to optical ambiguity. In other words, the urban architect would have to do what the Cubists initiated in painting. It is in this impressionist sense that free and independent color might play a part in realizing the multi-dimensional concept of urban environment.

COLOR AND LIGHT

Color does not exist without light, because color is a sensation conveyed through the medium of energy in the form of light radiations within the visible spectrum. As Sir Isaac

Newton explained in his *Optics*, "The rays are not colored. In them there is nothing else than a power to stir up a sensation of this or that color. It is the eye and brain of the observer which interprets the meaning of these energy message and perceive them as a sensation of color".

Designing with color and light together are essentially inseparable elements. Color and light can be used to give direction, to warn or call attention to an object or event, to modify or change a structure, to establish a desired environment, for sheer physical relief, or simply for pleasure or enjoyment. We have always tended to use strong colors in our buildings both internally and externally. This choice is basically an intuitive preference deriving from precedents such as the bold colors used in the eye-catching colors of advertisements. We enjoy the visual excitement of the juxtaposition of vivid colors and their effect on an object in the landscape.

Color reflection can have spectacular effects and a similar effect can be achieved more directly and predictably with transparent colors and by backlighting translucent colors. Multi-colored transparent fringes define a small open space and give it a warm rosy aura in a crowded store. During the day, sunlight streams through the multi-colored panels.

In order to arrive at a better chromatic conception of modern construction, it is essential to carry out a methodical analysis of the colors which are characteristic of each of the regions as a guide to the painting of buildings to identify the predominating characteristics and chromatic detail of the existing architecture in a given area, both in general and detailed form. In order to select subjects of analysis, individual houses or groups of buildings chosen as being representative, for embodying typical architectural and color qualities in keeping with their environment.

Present day architecture no longer responds to the natural landscape, but it creates its own landscape and its own environment. Here, color in material, structure, rhythm, contrast, can be a new plastic language whose riches are offered to the city of tomorrow. The recent intervention of the color concept, considered as a completely separate entity from planning and architecture, reveals two divergent schools of thought: on the one hand, pictorial and expressive polychrome which breaks with tradition and, on the other, the

search for an integrated polychrome, not expressly imitative as a creative process which takes these two factors into consideration.

According to Fernand Leger "The exterior volume of architecture, its sensitive weight, its distance, can be reduced or increased as a result of the colors adopted. Painters consciously manipulate the apparent weight of colors, and their paintings are often said to have a center of gravity which is possibly determined by color juxtaposition. Edward Bullough, ١٩٠٧, first experimented with this particular aspect of color perception by asking his subjects to judge, or balance small colored paper circles located at either end of a simulated balance arm with an adjustable fulcrum. His subjects generally agreed that the red and blue were the heaviest colors and that yellow appeared to be the lightest.

Warm or cool colors are determined by the function of the room space involved. Warm hues are associated with extraverted responses and feelings and they should be used in spaces where it would be beneficial to emphasize feelings of extraversion; using of cool colors will minimize them. Warm hues should generally be used if the temperature of the room is cool, the room size is too large, texture is smooth and a stimulating atmosphere is desired. Cool colors will add emphasis, and should generally be applied when the temperature of the space is warm.

The apparent spaciousness and openness of room spaces are influenced by many factors such as the shape of the room, the number, size and shape of windows and the lightness of the walls, ceiling and floor planes. It was found by Carl-Axel Acking and Rikard Kuller that spaciousness increases with corresponding increase in the chromatic strength of interior details but no such dependence was noted when chromatic strength was increased in the walls.

When the chromatic strength of details increased, the contrast between the details and walls was naturally enhanced. It might be this contrast effect and not the higher chromatic strength in itself that resulted in judgments of higher openness. The influence of lightness on shape is such that; dark surfaces attract each other, while light surfaces repel each other. Accordingly a dark ceiling will cause that plane to appear lower, two dark and two light walls in opposition will make the room appear short one way and long the other. If

lightness is important for the appearance of room spaciousness and shape, color strength is as important for complexity. Weak colors give a room an impression of calmness, strong colors make it appear exciting. Dark colored rooms appearing to be considered more expensive and potent.

Together with apparent depth, the effects of color on apparent temperature have also widely been used by interior designers and there has been considerable reporting, generate illusion of warmth as a result of the simple application of red paint. A fully saturated red is generally accepted as a color which increases physiological arousal and it will also be described as exciting and active, which rather suggests that it could induce movement or action of both mind and body. Red and other fully saturated hues particularly orange and yellow, appear to be ideal colors for incorporation into dynamic spaces where bodily locomotion, physical tasks or circulation are involved, such as corridors, stairways, entrance halls, bathrooms, toilets and, indeed streets concourses and pedestrian ways. People enjoy and need more saturated color in their external spaces.

CONCLUSION

The ultimate reason for any scientific study of color is to learn how to utilize it so as to have a predictable effect on people, and therefore the designer can begin to apply any information he must initially define criteria against which the effect a specific environment should be established. In other words, he should predetermine how a person might feel or react within a particular space and then develop color relationships at any early stage in relation to spatial function or the task which may be performed within it. This approach could contribute important knowledge to our understanding of color – space interaction.

A knowledge of color phenomena can also assist the designer and be employed in intensifying the spatial experience, such as in linked rooms or corridors, the resulting negative after-image induced by one space will usually reinforce the color impression made by the next. Color can be manipulated to increase or decrease the apparent spatial dimensions. Color contrast and figure – ground relationships; the distance and size of planes and objects being basically regulated by the brightness level of surface pigment.

The designer can employ the apparent weight of color to establish stability in both internal and external environments. The heavy colors, saturated reds, blues and violets could be articulated to encourage equilibrium in spaces where a positive gravitational link between floor and ceiling plane is important. For example, if red mass is supported by a yellow column, it could be perceived as appearing less stable than if the colors were reversed. The light weight colors such as yellows and greens could reduce the apparent heaviness of dominant and overpowering architectural mass.