

Light and Shadow

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Lighting design includes the design of shadows as well as the design of light. Much as musicians make sounds to capture silence and architects develop complex shapes to envelop empty space, lighting designers illuminate with shadows.

In traditional Japanese architecture, massive tile or thatch roofs with deep eaves create rooms bathed in darkness. Even at midday, little sunlight manages to make its way inside. As a result, the ambience of a Japanese room depends on the variation of shadows, heavy shadows against light shadows. Many Westerners are surprised by the simplicity of Japanese rooms, perceiving in them no more than ashen walls bereft of ornament. This reaction is understandable, but it betrays a failure to comprehend the benefits of shadows.

A Japanese room often has a picture alcove and in it a hanging scroll and a flower arrangement. The alcove is marked off with plain wood and plain walls, an area into which sunlight never penetrates. Cutting off light from this space forms a world of shadows, revealing qualities quite different from those of any wall painting or ornament. In the mysterious depths of these dark places lies the magic of shadows. Were the shadows banished from its corners, the alcove would revert to mere void.

Light and *dark* are not antagonistic to each other. They are counterparts, like the *yin* and *yang* of Chinese cosmology that combine to produce all that comes to be. Without shade or darkness, light loses much of its meaning; patterns of light and shade render the prominences of surfaces and objects in the visual field.

Three-dimensional form is "seen" as a relationship of light and shadow. If a projecting corner formed by the meeting of two white planes is lighted so that the two sides look equally bright, the eye can no longer discern the edge of the corner. You may still recognize it because of the binocular function of your eyes or because you can see where the two planes intersect other planes. But you have lost an essential means of seeing that there *is* a corner.

It will not help to increase the light if it is increased equally on both sides, but if the light on one side is reduced to produce a decided difference in the lighting of the two planes, the corner becomes evident, even if the total intensity of light has become lower.

LIGHTING FOR PERFORMANCE

Many lighting systems are designed solely to allow performance of or participation in an activity. By increasing the general brightness level and filling in shadows, these systems reduce or eliminate contrast, producing a diffuse environment. These systems are intended to permit casual circulation, loosely controlled congregation and assembly, or individual selection of interest points. In these situations, the diffuse lighting approach produces a random focal condition in keeping with the background mood and environmental requirements of an activity.

This line of thought led to development of the distraction-free working environment -- an area suitable for difficult and sustained visual tasks. Lighting systems that indiscriminately flood a space with general overhead illumination, however, tend to be behaviorally neutral. They exert no intentional reinforcing or guiding influence on an individual's impressions or behavior. The diffusion and uniformity of light create a bland psychological effect, reminiscent of a cloudy, overcast day. For some types of activities, such systems are noticeably inadequate.

HIGHLIGHTS AND SHADOWS

There are far too many uniformly lighted interiors that remind us of a cloudy day. Diffused light creates a shadowless environment: forms are not quite plastic, and textural effects are generally poor.

Most people feel more alert, energetic, and positive on a sunny day, a day marked by bright highlights and sharp shadows. In fact, the principal difference between a "dull, dreary day" and a "pretty day" is the lighting condition. Controlling diffusion (as well as sparkle and color) makes it possible to create an environment that feels like a sunny day.

People interpret the overall environment chiefly through brightness relationships. Their subjective impressions of visual space are primarily a function of brightness patterns and pattern organization -- the relationship of surfaces that are lighted or left in relative darkness.

The eye is involuntarily drawn to bright objects or to areas that contrast with the background. High contrast can be effective when the objective is to direct observers' attention and interest to selected detail while de-emphasizing other objects, areas, or surfaces.

The effect of a single spotlight on a stage demonstrates the influence of brightness contrast in establishing definite focal points. A space lighted in this way tends to dominate observers, directing and holding their attention and interest. The high contrast produces a sense of visual direction and focus in an environment, which is desirable for activities that involve fixed focal centers and a high degree of visual concentration on the part of observers,

AN INFLUENTIAL MEDIUM

Lighting designs that create specific patterns of light and shade actively influence human visual experiences such as guiding circulation, focusing attention, and affecting impressions of a room or activity. Their intention is to reinforce a specific pattern of impressions or behavior. Such designs recognize that light can be a medium that influences an individual's attention or alters the information content in the visual field.

Some lighting patterns affect personal orientation and understanding of a room's surfaces and objects. For example, spotlighting and shelf-lighting affect observers' attention and consciousness, wall lighting and corner lighting their understanding of room size and shape. Together, these lighting techniques can establish or modify an individual's sense of enclosure.

Other lighting patterns involve the communication of ideas and impressions of activity setting or mood. Designers can use light patterns to help establish a sense of intimacy, privacy, playfulness, enchantment, or somberness to provide an appropriate background for the intended activity.

People and activities become the dominant features when the lighting emphasizes horizontal planes. (Photo courtesy of G.E. Slide Library.)



PEOPLE AND PLACES

The use of high brightness contrast can make a restaurant setting magical. If a lighting system is designed to illuminate horizontal surfaces, such as table tops, while de-emphasizing the architecture, people and activities become the dominant feature; this lighting condition increases awareness of nearby detail, people, and movement and encourages gregarious involvement among the patrons. The architecture will appear as a neutral or subordinate visual influence.

The architectural environment, however, is interpreted by illuminating vertical and overhead surfaces. When

lighting focuses the visual emphasis on peripheral surfaces, such as walls, the intensity of illumination on the table tops is reduced; objects and people in the central area fall into silhouette. Activity is then visually subordinate to the general space, inducing a more intimate atmosphere in which individuals feel a sense of privacy or anonymity.

Illuminating vertical and overhead surfaces focuses attention on the architectural environment. (Photo courtesy of G.E. Slide Library.)



The subjective judgment of space is affected by the intensity of brightness patterns as well as by the organization of lighted areas and surfaces. Although the basic distribution characteristics of a lighting system may remain unchanged, significant variations in the quantity of emitted light affect the intensity of reflections within a space. This reflected light is a diffusing influence and alters impressions of brightness contrast. At the low end of the brightness scale, a luminous glow produced by a low dimmer setting reduces diffusion and creates a high degree of contrast. Higher intensities increase reflections and tend to reduce shadow and silhouette.

Psychological reactions are also involved in these changes. High general intensities tend to contribute to a sense of increased activity and efficiency; low general intensities tend to induce an attitude of relaxation and slower-paced activity.

The impression of relaxation can be further reinforced by nonuniform wall lighting. Uniform illumination is an effective means of increasing the visual perception of a space; nonuniform illumination, with its play of light and shadow, is suited to establishing a sense of privacy or intimacy.

SPARKLE

An important component of shadows is the presence of sparkle (glitter). Relatively small areas of high intensity brightness may be points of sparkle and highlight that give a sense of vitality to an environment. Just as highlights on a sunny day can be emotionally stimulating, brightness accents can add visual interest to an interior.

The presence or absence of sparkle and highlight are the visual attributes that make sunny days interesting and stimulating and cloudy, overcast days flat and dull. Sparkle can be introduced indoors by low intensity light sources, such as Christmas tree lights or clear filament lamps in conjunction with crystal glass, as in a chandelier. Candles, with dancing shadows cast by their flickering points of flame, can add a sense of enchantment to an environment, stimulating conversation and enhancing the appetite.

Specular materials can also introduce highlight and sparkle. But the brilliance of uncontrolled electric lighting can present serious problems of reflection and brightness control for uninterrupted specular surfaces.

In a dark room, the flickering light of a candle can give precious metals a glow like that upon the horizon at sunset. It is little wonder that ancient cultures used gold leaf or gold dust in their temples and threads of silver and gold for their priests' garments. In dim interiors, these materials served as reflectors; in the shadows, their reflective property was used as a secondary light source.

From candle to oil lamp, oil lamp to gaslight, gaslight to electric light, our quest for a brighter light has never ceased. We spare no pains to eradicate even the most minute shadow. Only in the shadows, though, can much of light be appreciated. A good listener appreciates conversation by its pauses. Let us also appreciate light by its

shadows.