# PRINCIPLES OF EXHIBIT DESIGN

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In the last issue (Bitgood & Patterson, 1987), we described some principles that apply to orientation and circulation. In the next to the last issue the empirical factors involved in the design of effective exhibit labels were discussed (Volume I, No. 3). The current article will describe principles of visitor behavior that relate to three other aspects of exhibit design: (1) the characteristics of the exhibit object or animal; (2) the characteristics of exhibit architecture; and (3) the characteristics of the visitors. The list of principles does not claim to be exhaustive; we hope that it stimulates your thinking and challenges you to further test their validity. Most of these principles have at least some empirical basis; however, additional research is needed to confirm these effects, to discover the specific parameters of each variable, and to determine the relative impact of each factor on visitor behavior. We are indebted to the work of others for ideas on many of these principles (e.g., Koran & Koran, 1986; Melton, 1972; Screven, 1986).

**Exhibit Object/Animal Factors**

1. Size. *Larger objects or animals produce longer viewing times than smaller ones.*

Bitgood, Patterson, Benefield, & Landers (1986) found a strong correlation between animal size and viewing time for zoo exhibits. Marcellini & Jensen (1986) reported similar results in the National Zoo's reptile house.

2. Motion. *Moving objects or animals produce longer viewing times than stationary ones.*

Melton (1972) reported greater visitor attention to a moving machine in a science museum. Bitgood et al (1986) reported longer viewing times during periods in which zoo animals were active.

3. Novelty. *Exhibit objects and animals that are novel attract more attention than common ones.*

Visitors flock to see white tigers, koalas, and pandas in zoos or exhibits such as the King Tut collection in museums. Systemic research is needed on this factor.

4. Other Intrinsic Qualities. *There are certain qualities of an exhibit object or animal that are intrinsically interesting.*

The Hope Diamond is an example of an object with extremely high interest value. Infants of species in zoos also have considerable intrinsic interests to visitors (Bitgood et al, 1986). Melton (1935; 1972) showed that paintings were intrinsically more interesting to visitors than period furniture.

5. Sensory Qualities. *Exhibit objects or animals appear to have greater interest if a second sensory mode is added to the visual mode.*

Peart (1984) found that adding sound to an exhibit increased its attracting and holding power. Koran, Koran, and Longino (1986) found that adding touch to an exhibit substantially increased the time at an exhibit. It is unknown if other sensory systems have a similar effect on visitors.

6. Interactive Elements. *When visitors' responses produce a counterresponse, viewing time is increased.*

Melton (1972) reported increased visitor attention in an electricity exhibit when an interactive element was present. Bitgood et al (1986) found that a push button device that enacted a light in an otters' den produced longer viewing times than similar exhibits without the light. Other examples include interactive computers, staff answering visitors' questions, and visitor feeding/animal begging interactions.

7. Triangulation. *More exciting exhibits appear to act as a catalyst for social interaction between visitors.*

Whyte (1980) suggested that there are certain events such as street performers and unusual sculpture that stimulate social contact between strangers in the street. This principle of triangulation appears to operate in exhibition-type facilities also: the more interesting the exhibit, the more likely it will stimulate social contact. Serrel (1981) demonstrated this effect when new exhibit labels were installed at the Brookfield Zoo.

**Architectural Factors**

1. Visibility. *The greater the ease of visibility with which the object can be viewed, the more attention the object or animal will receive.*

Visibility is assumed to be influenced by at least three variables: (1) level of lighting; (2) visual obstacles; and (3) visual screens (Bitgood et al, 1986). Level of lighting becomes a factor when the level is so low that visitors cannot see unless they have 15-20 minutes of dark adaptation. In exhibits with low levels of lighting, very few visitors take the time to allow their eyes to dark adapt. Visual obstacles include solid barriers, rocks, trees, and other objects that block the line of sight between the visitor and the object or animal. Visual screens refer to materials such as fences, bars, and glare that interfere with a clear view of the object or animal.

2. Proximity. *The closer the proximity between the visitor and the object or animal, the greater the stopping power and viewing time.*

Bitgood et al (1986) found that the percentage of visitors that stopped to view a Greater Kudu exhibit was directly related to the distance between the animal and the visitor. The generality of this effect needs to be determined.

3. Position of the exhibit object. *The position of an exhibit object/animal in relation to visitors, other objects or animals and with respect to eye level will influence the tendency for visitors to stop and the duration of viewing.*

Melton (1935; 1972) reported that a central position of art objects on the wall resulted in greater visitor attention. In addition, upper row positions of objects received greater attention than lower positions. Bitgood et al (1986) showed that visitors were more likely to stop to view an animal if it was closer to the viewing fence than if it was many feet away.

4. Realism. *The more "real" the exhibit is perceived, the more positive will be the attitudes to and viewing time of the exhibit.*

The data for this principle are sketchy at this time. Finlay (1986) found that animals were perceived differently when they were shown in natural environments than in caged environments. Bitgood et al. (1986) found longer viewing times for animals displayed in naturalistic exhibits than for the same animals in less naturalistic exhibits.

5. Sensory competition. *Extra-exhibit stimuli compete with the exhibit and result in a decrease in the attracting or stopping power of the exhibit.*

Extra-exhibit stimuli include the presence of exhibits close by that visually compete with a particular exhibit, or it can include auditory stimuli from other exhibits, or it could include exit attraction (see "Principles of Orientation and Circulation" from Vol. I, No. 4). Melton (1972) found that every exhibit object competes with every other object in a museum. Bitgood, et al (1986) found a decrease in visitor stopping at zoo exhibits when exhibits were placed on both sides of a walkway compared with exhibits only on one side.

6. Other design factors. *Other design factors such as recessing exhibit objects also impact on visitors' reactions.*

Dierking, Koran, Lehman, Koran, and Munyer (1984) showed that recessing an exhibit object had an effect opposite to what was intended. Instead of improving learning from the exhibit, visitors actually learned more from an exhibit that was not recessed than from one that was.

**Visitor Factors**

1. Demographic characteristics. *Age, gender, socioeconomic status, and ethnic factors may all influence visitor reactions to exhibits.*

The fact that children react differently than adults is well documented in visitor studies (e.g., Bitgood, Nichols, Pierce, and Patterson, 1986; Koran, Koran, and Longino, 1986; Marcellini & Jensen, 1986). Other demographic factors have also been suggested as influencing visitor behavior. Gender, ethnic origin, and educational level may all be important in understanding visitors. Additional research is needed to sort out these factors.

2. Special interests. *The special interests of visitors will determine the attracting and holding power of exhibits.*

Bitgood and Patterson (1986) in a general survey of visitors to the Anniston Museum of Natural History found that a large percentage of visitors reported that the bird exhibits were their most favorite; an equal number stated that the birds were their least favorite. Furthermore, this attitude was correlated with whether they visited the bird exhibits. Such results suggest that special interests (likes and dislikes) are important predictors of visitors' behavior.

3. Object satiation ("museum fatigue"). *Visitors become less and less interested in exhibit objects the longer they view similar exhibits.*

Melton (1935; 1972) described this phenomenon in art museums. Bitgood et al (1966) observed a similar effect in a zoo reptile house and Falk, Koran, Dierking, and Dreblow (1985) reported this effect in a science museum.

4. Perception of animals'/objects'qualities. *The perceived qualities of the animal/object (e.g., beauty, dangerousness) will influence its attracting power.*

Bitgood, et al (1986) found that animals that are perceived as beautiful or dangerous generated higher rates of stopping than animals perceived as less beautiful or dangerous. It is important to emphasize that the perception of these animals/objects may not be accurate. For example, people tend to view constrictor snakes as dangerous, even though they pose little or no threat to humans.

5. Perception of animals/objects as a function of their surroundings. *The perceived qualities of animals/objects are, to some degree, the result of the surroundings in which they are experienced.*

Finlay (1986) found that people rated the qualities of animals shown in cages different from those shown in natural surroundings. Coe (1985) argued that the design of exhibits can influence the perception of exhibits in terms of a dominance-submissive dimension. If the visitor is looking down on the captive animal from above rather than looking up at the animal from below, the visitor is more likely to perceive a dominance role over the animal.

6. Social influences. *The presence and behavior of other people influences visitors' behavior .*

People tend to conform to the behavior of others by imitating others. For example, Bitgood and Patterson (unpublished) have found that feeding at a monkey island usually occurred in a chain of individuals feeding the animals immediately after one person started. People also adjust their speed of walking to the crowd. Finally, people are attracted by crowds if they believe the crowd has formed to view something of interest, whereas people are repelled by crowds if a long wait with inadequate return is anticipated.

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**Conclusion**

The principles described above are, at this point, a combination of fact and speculation. *We challenge you to refine, disprove, improve or whatever else is necessary to establish scientific principles of visitor behavior!*

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Editorial Note: The following summary is from an article that I believe should be read by anyone who has anything to do with exhibits. I hope this summary will motivate you to find and read the original article. It is well worth the effort. [Editor]

# HOW TO EXHIBIT A BULLFROG

Conway, W. G. (1968). How to Exhibit a Bullfrog: A Bed-time Story for Zoo Men. Curator, 2/4: 310-318.

This article, one of the more thought-provoking on the elements of good zoo exhibition, describes a dream in which a devil, called "M", takes the author through a bullfrog exhibit to show the unlimited possibilities of exhibiting even the most common type of species.

M argued: "Why, the bullfrog has unlimited possibilities. You zoo people put the poor fifty-cent bullfrog, one or two at a time, in a half-full glass and steel aquarium, then put up a badly worded three-line label and consider your exhibit complete... Of course this is hardly surprising from people of such diminutive imaginations that they exhibit tree-loving orang-utans in concrete and tile bathrooms or in medieval concrete pits with not even a suggestion of a tree. How can you expect to excite or educate by exhibiting an animal, that looks like a man, slumped in a concrete bathroom that provides him so little space and variety that he can do no more than men do in bathrooms?"

Throughout the narrative in which M escorts the author through the exhibit, design features are clearly described. A few examples will be described here. As they approach the entrance to the exhibit, they encounter a gate that controls access to the exhibit. The gate is programmed to allow an optimum number of visitors inside the exhibit at one time. The controlled access prevents overcrowding in the exhibit and the waiting to enter is assumed to provide a sense of anticipation. M pointed out that mechanical conveyers to move people through the exhibit would not be individualized enough for the different levels of interest, age and education.

Other design devices included: (1) pre-set binoculars attached to the rail of the boardwalk over the pond, thus allowing close-up views of favorite bullfrog resting areas; (2) a variety of devices to focus the visitors attention on important aspects of the bullfrog's anatomy, physiology, or behavior; (3) the use of sound and participatory devices; (4) the liberal use of audio-visual devices including movie film to demonstrate points; (5) interactive devices such as pushbuttons, visitor manipulated lights to involve the visitor, and a pinball machine that showed the species hazards as frog pinballs disappeared in the mouths of symbolic predators. □