Chapter 11

Transitioning, Circulation, and Barriers

The focus of this chapter is on how people move through space and on how this movement can be managed. Good design facilitates, directs, and prevents the movement of people within a setting. The primary focus of this chapter is on circulation. Circulation focuses on how people move through the experience. Conceptually, in terms of circulation there is not much difference between areas and facilities.

This chapter focuses on three conceptual principles: circulation, transitioning, and barriers. Circulation focuses on how people move within space and designing space to facilitate or retard that movement. Transitioning focuses on the conceptual relationship between spatial elements. For those who are familiar with bubble diagrams, functional transitioning utilizes bubble diagrams to spatially show relationships between program areas. Thematic transitioning elevates functional transitioning with symbolic meaning. Barriers focus on retarding movement. It makes movement more difficult by using barriers, obstacles and other obstructions to restrict and direct movement. Together circulation and barriers work together to manage the experience of people by managing their movement. This chapter serves as one of the foundational sections for later chapters, particularly site design (Chapter 18) and facility design (Chapter 19 and Chapter 20).

Identify Major Program Areas

The first step in the process is to identify the major program areas. These areas can also include major support services and administrative function if they are major program areas. Once they are identified, the issue becomes how they are interconnected and how people move between and within these areas. Conceptually, there is little difference between areas, and what will become rooms in a building.

<b>***Program Areas for the Magic Kingdom*** – Disney identified the major program areas in the Magic Kingdom. These are listed in Figure 11.1. These program areas are discussed later in this chapter under radial and hub circulation. As evident in a quote used later in this chapter, Disney gave considerable thought to the spatial layout of the major program areas to each other and their effect on the visitor's experience.

Figure 11.1:
Disney World's Magic Kingdom

A. Program Areas
   1) Main Street
   2) Cinderella's Castle
   3) Adventureland
   4) Frontierland
   5) Fantasyland
   6) Tomorrowland

<b>***Program Areas for the Recreation Community Center*** – The program areas for a recreation community center are listed in Figure 11.2. The floor plan was adapted from a plan in an old textbook. It represents a typical design of modest size. From a technical standpoint, the facility has been reversed engineered from the floor plan backward to the bubble diagrams and the listing of major program areas. Actually, this can be a useful process in practice because it underscores focusing on conceptual interrelationships. It is easy to focus on small things in the plan and lose sight of the "big picture" or the interplay between the major program areas. Also, it relates to "walking the plan" discussed later in this chapter where the plan is hypothetically walked to determine circulation and the practicality of the spatial layout.

Figure 11.2:
Recreation Community Center

A. Major Program Areas
    1) Auditorium/Gymnasium
    2) Multi-purpose Room
    3) Game Room
B. Administrative
    1) Office
C. Support Services
    1) Kitchen
    2) Restrooms
    3) Storage Areas

Each of the program areas are discussed in greater depth. There are three major program areas. These are the auditorium/gymnasium, multi-purpose room, and game room. Administratively there is an office. Support services include the kitchen, restrooms and storage areas. Storage areas are discussed later in the developmental process. However, in this phase of the planning process, the bubbles represent major program areas.

<c>**Auditorium/Gymnasium** – The name of the space denotes dual uses. As a gymnasium, it is worth noting that there are no locker rooms servicing the facility. This means that visitors will change in the restrooms or arrive at the facility already dressed for the activity.

In the auditorium mode, the room requires chairs, tables and perhaps a stage. This requires a storage area to store these items when the facility is being used as a gymnasium. The storage area is off on the left. At some point it will need to be determined if it is of sufficient size to store the chairs and tables.

<c>**Multi-purpose Room** – Located on the right side of the building, the multi-purpose room is in close proximity to the kitchen and restrooms. The room can be used as a classroom or meeting room for civic groups.

<c>**Game Room** – The game room area is located by itself on the left side of the building. From a noise standpoint, this is probably a good thing. There is one access to the room. It is spatially separated from the kitchen, most likely by design. Also, it is separated from the multi-purpose room which will keep the multi-purpose room quieter.

<c>**Administration (Office)** – Located off the lobby, the office has a commanding view of the lobby, entrance and general circulation within the facility. The office contains a ticket window which can service the gymnasium. Also, it provides visual access into the lobby area.

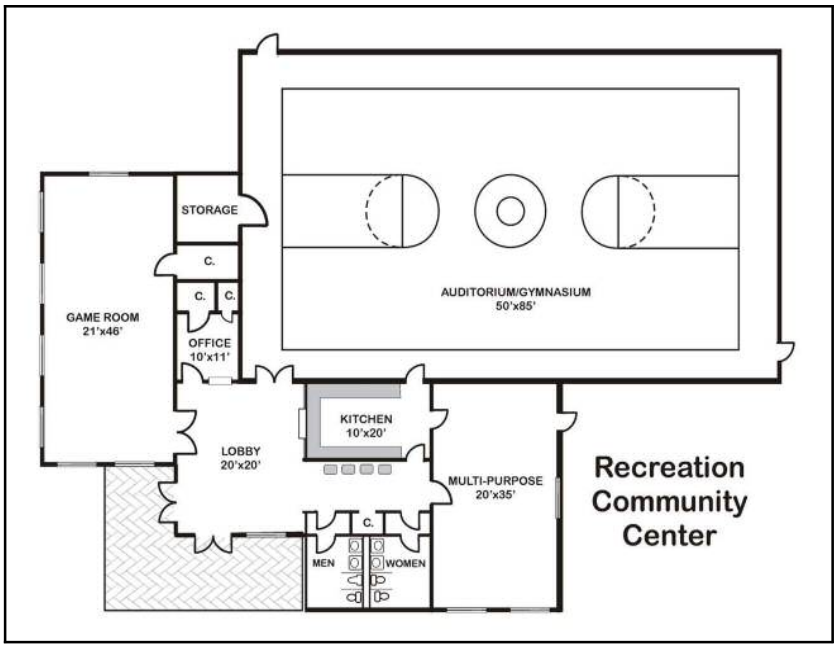

Figure 11.2: Recreation Community Center Floor Plan – The first step is to identify the major program area for a recreation community center. Source: author – [file:\ProgramAreasRecCenter04.pdf]

<c>**Kitchen** – Located spatially in the center of the facility is the kitchen. In one sense, it could be said that the kitchen is the heart of the facility. Actually, its central location enables it to service the auditorium and multi-purpose room. There is a door to the auditorium and another door to the multi-purpose room which enables the kitchen to service either of these program areas. The kitchen is located directly across from the restrooms and this may cause a problem.

The kitchen is small and most likely serves as a catering kitchen. Most likely it has a sink, stove, refrigerator. It can handle small functions or moderately sized catered functions. Centrally located, it has direct access to the auditorium/gym and multi-purpose rooms. The kitchen doesn't directly service the game room. This is not unexpected from a service perspective since food is normally kept out of the game room.

<c>**Restrooms** – The restrooms should be accessible from the major program areas. The restrooms are reasonably accessible to the major program areas. One criticism of the restroom location is that the restrooms may be located too close to the counter area of the kitchen. This will become evident in the section on walking the plan.

<c>**Support Services and Maintenance** – So far, spatial relationships and bubble diagrams have been viewed from the user perspective. It is important to consider them from the perspective of support services. The Recreation Community Center has a small kitchen. If a caterer caters an event, they will most likely use the front door to access the kitchen area. For this type of limited operation, access through the front door will most likely be acceptable.

However, if there is a larger operation where there is a food service or restaurant business, the design of a facility will need to provide service access. Usually, this is in the back of the building or at a location where visitors are not present. The idling diesel engine of a delivery vehicle is not normally considered an attractant for visitors. Also, consider Disney World was elevated to the second floor to enable delivery of services during the day through the tunnels.

<a>***Functional Transitioning (bubble diagrams)*** – Functional transitioning focuses on physically moving people from one venue to the next venue. In Figure 11.3, a visitor needs to physically move from the parking lot to the beach area or nature trail. People can walk to the area. Although unlikely, a tram can transport visitors or some other mechanism can be used to transport people to the beach. Generally, there are three types of flow patterns. These are linear or destination, circular, and radial or hub.

<b>***Bubble Diagrams*** – Bubble diagrams represent spatially the major program areas identified in the facility or area. This was done in the previous section for the Magic Kingdom and the Recreation Community Center (see Figure 11.5, Figure 11.6, and Figure 11.8). Think of them as plates that can and are moved around. The objective is to obtain a good interrelationship between the elements and a good circulation pattern between them. There are general rules or guidelines that are applicable to drawing bubble diagrams. These are listed below.

1. Identify major program areas. Support areas such as closets and storage areas are not usually considered at this point in the planning process (see Figure 11.5, Figure 11.6, and Figure 11.8).
2. Areas are drawn in proportion to their projected size. Larger areas are drawn larger than smaller areas (see Figure 11.5 and see Figure 11.8). If the eventual size of the area is not known, areas may be drawn as equal sized bubbles (see Figure 11.6).
3. Move the areas so that their proximity to each other makes conceptual sense.
4. Consider circulation patterns. Where do people enter? Where do they exit. Consider thematic transitioning. Usually, important flow patterns are drawn on the bubble diagrams.

<b>***Linear or Destination Circulation*** – In general, it can be said that most of people's movement eventually leads to a destination. Most people are going somewhere specific. There are exceptions. For example, people walking laps around a track don't really have a destination other then crossing the finish line with each lap completed.

<c>**<u>Beach Entrance</u>** – Illustrating destination or linear movement, the destination of visitors is the beach entrance (Figure 11.3). Normally, people seek the quickest route from the parking lot to the beach. They enter the park in their automobile using the entrance road. They get out of their cars and walk past the kiosk on the way to the beach. They follow the trail to reach the beach which is also their destination. In order to reach their destination of the beach, the park needs to provide the entrance road, parking lot, kiosk, and the trail to the beach. In order to transition people from the parking lot to the beach, all of the previously mentioned resources need to be provided. Also, the course of travel needs to be obvious. Functionally, it is an issue of

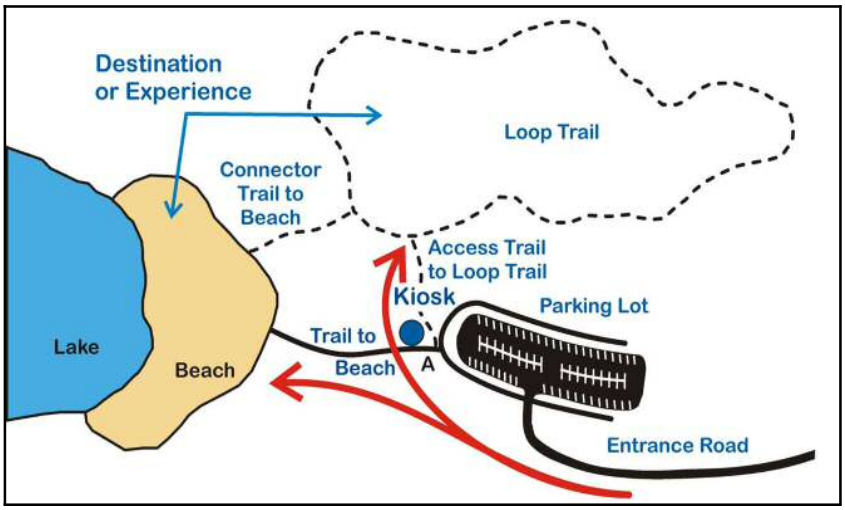

Figure 11.03: Beach Entrance – Expressing functional transitioning, the logic flow of people is as follows. They enter the park and park in the parking lot. They follow the trail to the beach. Their movement through the park follows a fairly predictable pattern or flow. Source: author – [file:\BeachEntrance.jpg]

physically moving people to where they need to go. In this case, the circulation pattern is linear or destination oriented.

<c>**Merkle Center** – In the Merkle center, the primary movement of people is fairly linear. It takes them through the building and to the overlooks (destination). The Frank Oslislo Visitors Center or the Merkle Center is used to discuss thematic transitioning later in this chapter. However, in terms of functional tranitioning, it also demonstrates linear or destination movement (Figure 11.4). Upon entering the main entrance, the hall splits into two walkways that exit through two doors to an overlook area. In terms of moving people through space, it is destination oriented.

Figure 11.4: Frank Oslislo Visitors Center – Inside the entrance the view opens up to a two-story window that opens up the experience to the outdoors. Source: Author – [file:\DSC_1011.jpg]

<b>***Circular Flow*** – The second type of flow is circular. Circular means that people can move through the area or facility in a circular manner. Although their movement can be and is still often destination oriented, people have the opportunity to move in a circular manner. In analyzing floor plans for homes, generally, a circular flow is considered highly desirable, particularly on the first floor. This means that there is more than one way to get to the kitchen, family room, etc. Usually, the second floor is linear or destination oriented. People have to leave through the same doorway that they used to enter the room.

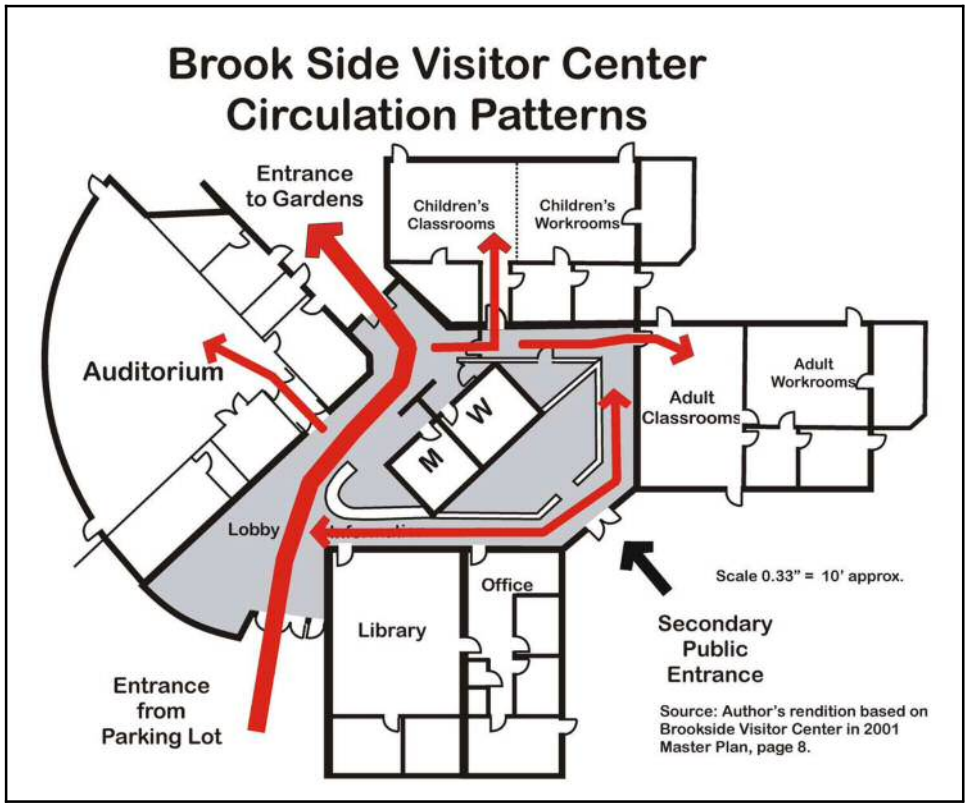

Figure 11.5: Brookside Gardens Visitor Center – Circular Flow – The restrooms and information booth occupy the center of the building. The major program areas are located around the outside perimeter of the hallway. Leaving a room, people can go to the right or to the left to reach somewhere else in the building. Source: author – [file:\VisitorCenter95%2[144].jpg]

The Brookside Gardens Visitor Center exhibits a typical circular flow (see Figure 11.5). The restrooms and information booth occupy the center of the building. The other major program

areas (i.e. auditorium, classrooms, library, workrooms, and office are located around the outside perimeter of the circular hallway. The circular hallways allow for easy access to different parts of the building. Note the difference in hallway widths. Part of the hallway serves as a walkthrough from the main entrance, past the information booth, and into the gardens.

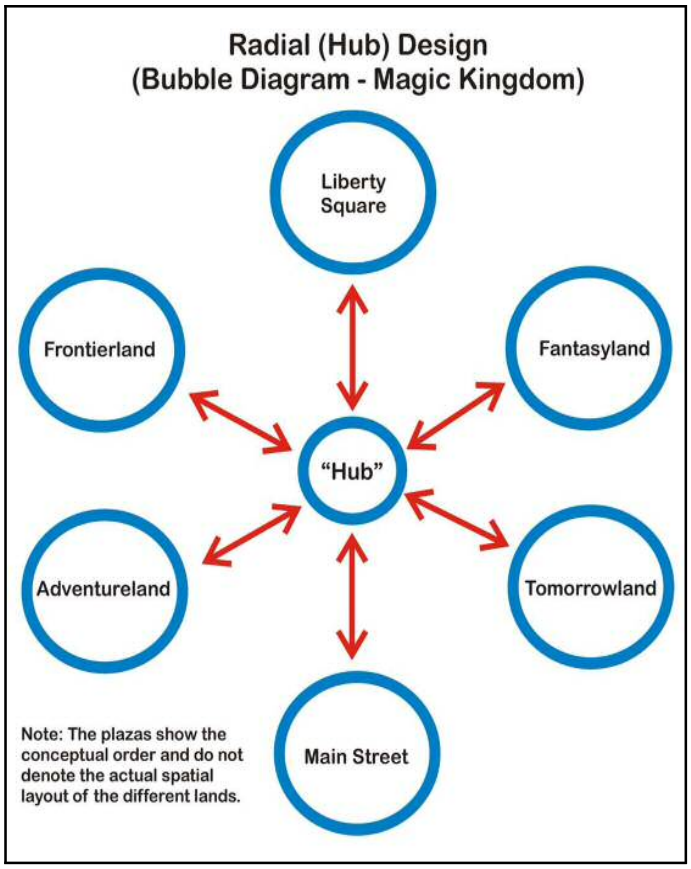

Figure 11.6 – Radiating (hub) Approach – A radiating or hub system utilizes a centralized location (hub) with features radiating outward from the hub. Source: author – [file:\BubbleDiagram02.cdr]

<b>***Radial or Hub Flow*** – In the radial or "hub" approach, the program areas are arranged around a central hub where the program areas radiate outward from the hub like spokes on a wheel. The hub can be a small area or plaza such as the hub in the following Disney example or the area could be a large functional area such as a food court or other service area often found in shopping malls or airports. Actually, the design is more common than might be expected. Two examples are provided. These are the Magic Kingdom and the Community Recreation Center.

<c>**Magic Kingdom** – The radiating axises or hub approach is illustrated in the basic spatial layout of the Magic Kingdom at Disney World (Figure 11.6 and Figure 11.7). In Figure 11.6, people enter the hub from Main Street from which they radiate outward into one of the theme areas. The following passage provides insight into the basic design of the Magic Kingdom as a series of radiating spokes from the hub. In addition, Walt Disney notes in the passage that the hub approach provides a sense of orientation for visitors.

> The Magic Kingdom's most interesting design element is perhaps its overall layout. Main Street, U.S.A. is an entrance corridor – a sort of long "hallway" that can absorb many guests in a short time. The far end of Main Street, U.S.A. opens into a spacious central Plaza, or hub. From here, pathways fan out like the spokes of a wheel, leading to Adventureland, Frontierland, Liberty Square, Fantasyland, and Tomorrowland. Each land features a visual centerpoint, and is easy to enter and exit.
>
> "That gives people a sense of orientation," Walt Disney said. "They know where they are at all times [because all paths lead back to the Plaza], and it saves a lot of walking."
>
> This unique "people-flow" system has sometimes been called the "miracle of the hub." The concept was introduced in the original design of Disneyland in California. (Walt Disney Productions, 1982, p. 26)

Figure 11.7: "Miracle of the Hub" – People enter the "Hub" from Main Street (behind the photographer). The different lands radiate outward from the hub including Cinderella's Castle. Magic Kingdom, Orlando, Florida. Source: author – [file:\DS2000-006.jpg]

<c>**Recreation Community Center** – This section analyzes the Recreation Community Center in terms of its bubble diagram and its hub or radial flow pattern. Four major program areas were identified in its bubble diagram with flow patterns (see Figure 11.8 and Figure 11.9). These are the game room, auditorium/gymnasium, and multi-purpose room. Conceptually, these program areas are connected to each other with a common foyer. Conceptually, the process is no different than the six program areas connected by the Hub at Disney World (see Figure 11.6). Since the kitchen and restrooms were centralized, the multi-purpose room was extended outward from the foyer and connected to it with a hallway. This is a common practice. If the program area can't be connected directly to the common area, a hallway is created to make the connection.

In a very real sense, all paths in the Recreation Community Center lead to the foyer. All major program areas are connected to the foyer. Second, the office supervises most of the flow to the major program areas. From a design perspective, this is a common type of design.

<b>***Walk the Plan*** – The floor plan is the culmination of the planning process (Figure 11.9). Circulation deals with how people access the major program areas. It is how people move through the facility. Although most people will analyze the circulation patterns as they would use the facility, circulation patterns for administrators, maintenance, and support groups should be considered also.

The easiest way to determine circulation and how people will move through the facility is to "walk the plan." As a visitor using the building, open the main door. Enter the lobby. Is there an administrative control point over looking the entrance? Located off the lobby, the office potentially provides supervision of the entrance. The lobby is 400 square feet and provides easy access to the game room and auditorium/gym. Access to the multi-purpose room is down a short hallway. In general, the major program areas are easily accessible from the entrance.

Conceptually, the circulation pattern isn't much different than the hub in Disney World. The lobby connects the major program areas. From the lobby, the circulation pattern is pretty much destination oriented. The major program areas are "dead-ended" meaning that people will go directly to the program area they seek (e.g. game room, auditorium/gym, multi-purpose room and rest rooms. With the lobby, there is good flow between the major program areas also.

Walking the plan reveals that although there is a gymnasium, there are no locker rooms for changing. This may limit use of the gym. Or, expect people to use the restrooms to double as a changing area. A dual use auditorium/gym will need a place for easy storage of chairs and tables while the area is being used as a gymnasium. Potentially, adequate storage areas are provided. If not adequate, they have at least been addressed.

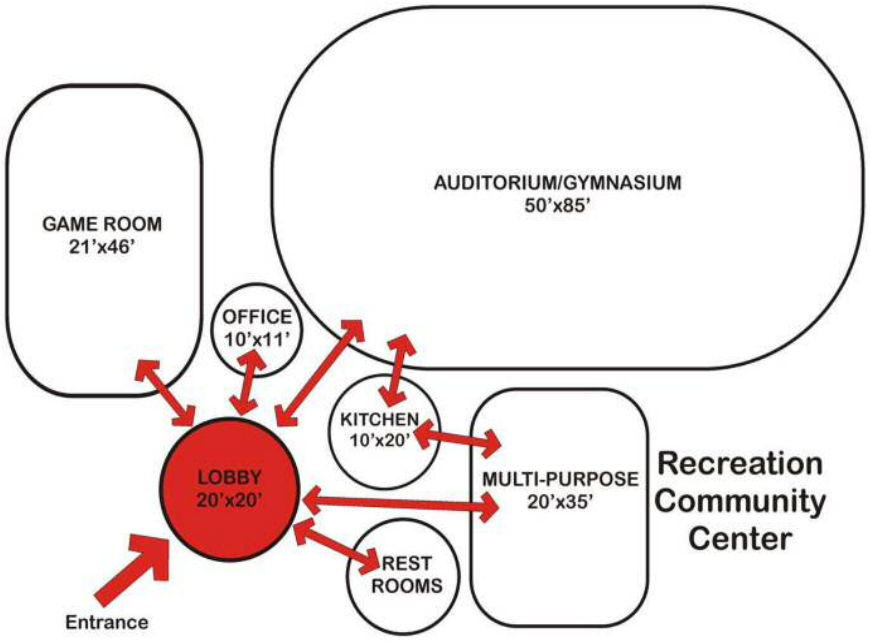

Figure 11.8: Recreation Community Center – Hub Flow Pattern – To determine circulation in the facility, "walk the plan." Source: author – [file\:BUBBLE-RecreationCenterBubble02[144].jpg]

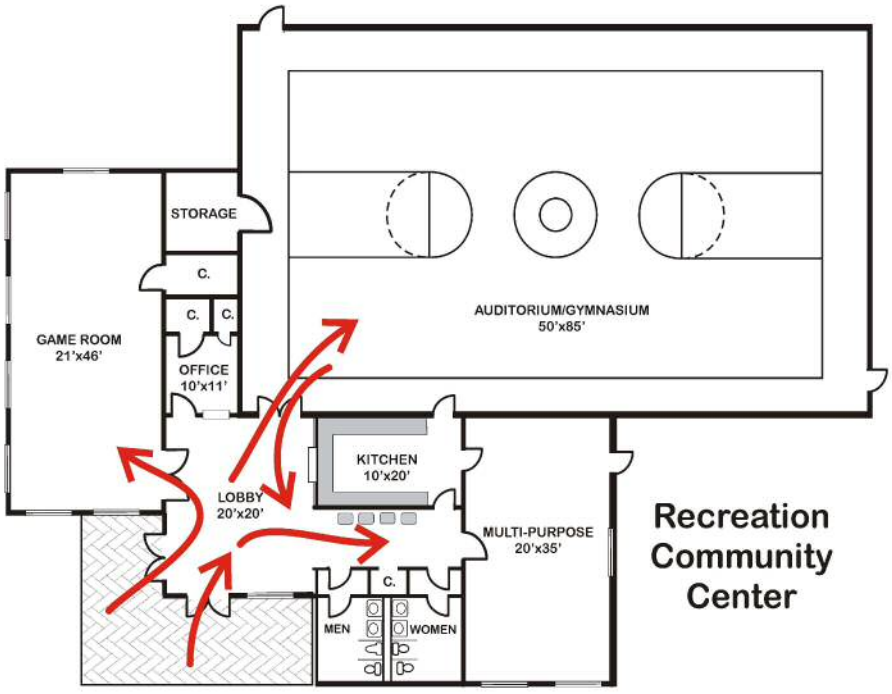

Figure 11.9: Recreation Community Center – To determine circulation in the facility, "walk the plan." Source: author – [file:\FloorPlanCommunityCenter02.cdr]

Thematic Transitioning

Figure 11.10: Sea World Entrance – Although there are some thematic elements, the Sea World entrance tends to be more functional than thematic. Source: author – [file:\SWSA003.jpg]

In addition to being functional, transitioning can also be thematic. In terms of the experience, the transition symbolically transforms the visitor from one setting into the next experience. Thematic transitioning relates to Huizinga's (1955) principles of play. Huziniga discusses that when a person steps onto the playground, play begins. He suggests that the playground is a magical place that is different from the world around it. It is a special place. Thematic transitioning is part of creating that special place. It focuses on the transformation. Although the transition can involve little more than walking through a gate and stepping onto the playground, good thematic transitioning involves the experience of being transformed.

<b>**Sea World Entrance** – At Sea World in San Antonio, transitioning occurs simply by passing through the gate (Figure 11.10). It is a marginal thematic transitioning. The transitioning involves little more than passing from the parking lot into the park.

<b>**Disney Example** – Transitioning into the Magic Kingdom at Disney World was introduced as part of creating the experience in Chapter 1. The entrance into the Magic Kingdom is by either the monorail or steamboat and thematically, it is similar to Peter Pan having to fly to Neverland (see Figure 11.11). It is a trip. It provides orientation, or perhaps it really provides disorientation with the outside world because the parking lot is over there somewhere. It is all part of creating a separate world with a unique experience. In the language of Huzinga (1955), it is a "magical place." The monorail and steamboat help to create a magical experience in this far off place. It is worth mentioning again, that Disney went to considerable expense to transport people by monorail or steamboat to the Magic Kingdom.

Also, remember that one of the problems with Disneyland was that it was possible to see thing outside the Magic Kingdom inside the park. In Disney World, they designed the Magic Kingdom so that only the Magic Kingdom was visible from inside the park.

Figure 11.11: Monorail – The purpose of the monorail is more than to merely transport visitors to the Magic Kingdom. Its transitions visitors into the Magic Kingdom helping to make it a very special place. Source: Kurtti, (1996, p.42) – [file:\Monorail[13].jpg]

<b>**Merkle Wildlife Sanctuary** – Located on the Merkle Wildlife Sanctuary, the Frank Oslislo Visitors Center is a two story building overlooking several ponds and other habitat favoring Canadian geese. In comparison with other buildings, it was not an expensive building to build. Nor is it a uniquely designed building designed by a famous architect like Frank Lloyd Wright. Its significance is in part that the building shows what can be done in implementing a thematic transition on a limited budget. And it does it quite well.

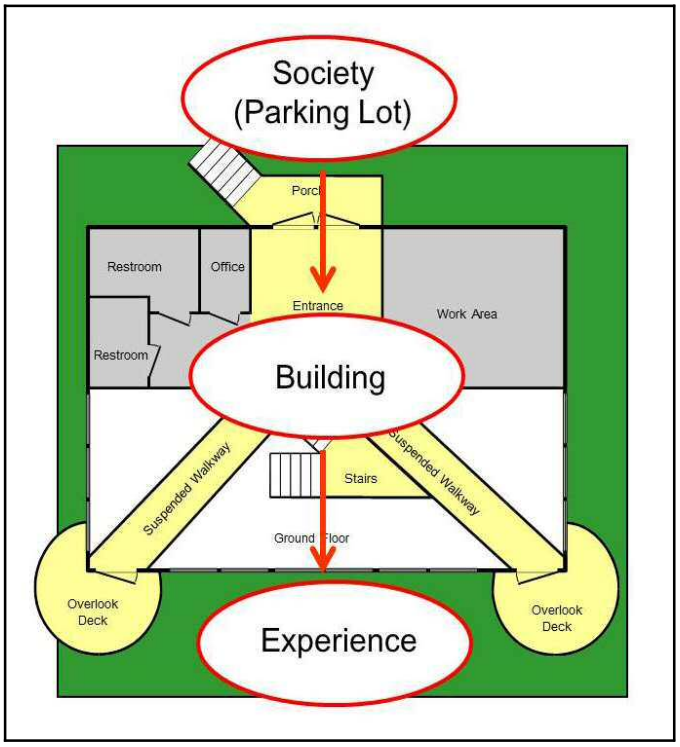

Figure 11.12: Frank Oslislo Visitors Center (layout) – The basic floor plan indicates the thematic transitioning of the experience from the parking lot (civilization) to nature and the world of geese. Source: author – [file:\MerkleCenterTransition.jpg]

Thematically, the building transitions the visitor from the civilization (parking lot) to nature and the world of geese (Figure 11.12). Conceptually, the building is designed to facilitate this transition. The front of the building or the portion of the building facing the parking lot is fairly subdued (Figure 11.13). People enter through a double door. The offices, restrooms, work area, and nature center on the first floor are located along this rear wall. Conceptually, these rooms form a barrier with the parking lot that they are leaving. Since there is not much to see on these walls, there is little incentive to look backwards. There are no windows.

In contrast, there is considerable incentive to look out the rear of the building. Upon entering the building, the visitor's eye is immediately attracted to the rear wall which is a solid two stories of windows (see Figure 11.04). The eye is attracted because the area is normally light and bright and the brightness attracts people's vision. The view is enhanced because the two walkways form a "V" from the entrance area and assists in creating the two story visual treat out the windows on the rear wall (see Figure 11.04). The experience or the world of the geese is located on the other side of the window. The two walkways lead to two outdoor overlooks and the world of the geese. Thematically, the building transitions its visitors from the old world into the new world.

Figure 11.13: Frank Oslislo Visitors Center – The entrance to the Merkle Center is understated and subdued. It is not majestic, nor is a grand entrance that draws attention to itself. It is simply part of the transition into the world of geese. Source: Author – [file:\DSC_1008.jpg]

Influencing Human Movement with Barriers

Most people think of barriers as an object placed between a person and their destination to prevent them from taking the obvious course. In terms of the yen and yang, pathways are the yen. They open up experiences. Barriers are the yang. They block or retard access. In this respect barriers are generally viewed with a negative connotation. In a sense, designing barriers to human movement are designing ways to control the experience in terms of what is experienced and what is not experienced. For the planner, placing physical and psychological barriers are an important part of creating the experience. It guides and directs human movement. Also, it is used to create, prevent and redirect the experience.

Creating barriers are related to the spatial discussion and the summary in the Figure "Relationship between Sensory Inputs and Informal Space" (see Figure 2.4) The table focuses on sensory inputs and their impact on people's behavior. In creating barriers, it is important to address the senses including vision (visual), oral/auditory (noise), olfactory (smell), and thermal (heat). In addition, the discussion includes both physical and psychological barriers. This portion of the chapter addresses managing these sensory input sources in terms of barriers.

<b>***Physical Barriers*** – In general, the higher, wider, and denser the barrier, the more likely it is to be an actual physical barrier (Figure 11.14). Normally, when the minimum height of the potential barrier reaches approximately two feet, objects will tend to become effective physical barriers. In addition, fences and walls present the cue to the public that they are barriers. Carpenter (1975, p. 163) notes that when vegetation becomes over six feet thick, it tends to become an effective physical barrier. This barrier is enhanced when the limbs of the vegetation can grow together to form an impenetrable barrier.

Normally, when the minimum height of the potential barrier reaches approximately two feet, objects will tend to become effective physical barriers. In addition, fences and walls present the cue to the public that they are barriers which enhances their effect as a barrier.

Planners think of how to facilitate the movement of people, but equally important is that they need to think how to redirect people's movement. Plants, fences, walls, mounding, and water can act as barriers. They need not be intrusive and if designed correctly they can contribute positively to the experience.

In terms of barriers, most people play a mental game involving the planner's planned course of travel, the short-cut, and the barriers present. It is important to make the course of travel obvious. In this sense, people make a psychological assessment regarding taking the benefit (the desired course of travel) or the cost (taking the shortcut through the barrier). The

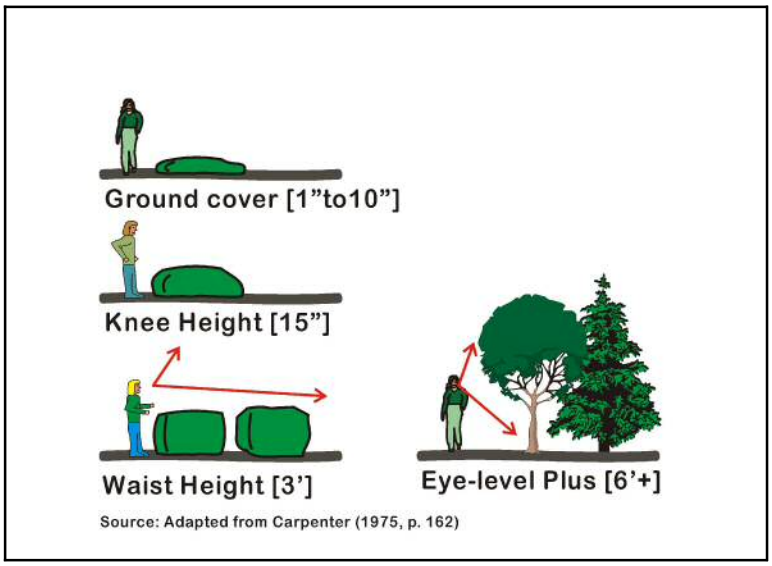

Figure 11.14: Vegetative Barriers (heights) – When vegetation reaches two to three feet high it tends to become a physical barrier. When it reaches five to six feet in height, it also becomes a visual barrier. Source: adapted from Carpenter (1975, p.162) [file:\Barrier01.cdr]

greater the distance around the barrier, the more incentive people have to take the shortcut through the barrier. Conversely, the shorter the distance around the barrier, the more likely the barrier will be effective. A corollary is that the greater the distance around the barrier, the better the barrier needs to be as a barrier to prevent people from taking the shortcut. Apply this principle to the three barriers discussed under vegetative barriers (see Figure 11.19, Figure 11.20, and Figure 11.21).

<c>**Physical Barriers** – A *physical barrier* is defined as an actual object placed between a person and their destination to modify, prevent or encourage their course of travel. Typical physical barriers include plants, mounding, fences, walls, moats, ponds, streams, etc. Physical barriers are placed to influence or encourage the movement of people. People can go through, over, or around barriers to reach their destination.

<c>**Psychological Barriers** – A *psychological barrier* is a perceived barrier. Normally, a series of steps is not considered a physical barrier. However, the same series of steps may be perceived as a barrier by the elderly or handicapped. A one foot high hedge is not much of a physical barrier. However, it may be perceived as a psychological barrier, particularly if it is easy to walk around the hedge. The height and width of the hedge affects perception and whether people will take a shortcut through the hedge. Generally, all physical barriers are also psychological barriers. However, as in the example of the steps, not all psychological barriers are necessarily a physical barrier.

Figure 11.15: Sitting on the Fence – Although the fence is not high enough to present a true physical barrier, people can easily walk around it. So, it serves the purpose. Although the width of the fence does not facilitate using the fence as a seat, the unintentional consequence of the fence is that people are using it for a seat. Philadelphia Zoo, Philadelphia, Pennsylvania. Source: author [file:\PHZ0847.jpg]

<c>**Fences and Walls** – Fences and walls are obvious physical barriers. Fences can be somewhat innocuous and they can provide a psychological cue to people that they are a barrier.

The fence around the plantings in Figure 11.15 is roughly two feet high. It illustrates several points. It is not much of an obstruction. Most people can easily step over the fence and take the direct route. However the course of travel around the plantings is obvious and convenient. There is no need to take the short-cut through the plantings. It is not so much that the fence is an effective barrier, as the course of travel is obvious. Although the fence is not designed as a seat and its narrowness doesn't facilitate sitting, it seems as if the general public finds it a convenient seat. Most likely it indicates a need for benches in this area.

In addition to serving as a barrier, walls can also create a place to sit. In the previous example, the fence was an unintentional seat for people. In Figure 11.16, the wall in Balboa park is the right height to sit upon and people do so. Compare the height and width of the wall with that of the bench on the left. The wall is a slightly higher seat. To expect people not to use this wall as a seat would be poor planning. To encourage people not to use the wall as a seat, the planner could have made the wall higher, narrower or lined the front of the wall with benches. As noted in Figure 11.15 making the wall narrower might not be much of a deterrent.

In the next example, the fence on the inside of the switchback on the return trail at Fallingwaters is a physical barrier to prevent people from taking the shortcut on the inside of the switchback (Figure 11.17). Also, the fence is a cultural cue not to take the shortcut either. Examination of the topography of the area in the cutback reveals no shortcut trails on this switchback. Apparently, this fence is effective as a physical barrier.

Sometimes a fence is the easiest and most effective physical barrier. In Figure 11.18 the mesh black fence lines both sides of the path. It is fairly unobtrusive and it keeps people on the path, particularly on a path that is as serpentine as this path. As a side note, the curb is of sufficient width and thickness to encourage many children to use the curb as a balance beam as they walk around the bend in the trail. Close examination of the soil between the fence and curb reveals considerable compaction.

Figure 11.16: Guitar Player – This wall serves two purposes. It is designed to contain people and it is designed for sitting. Examination of the ground behind the guitar player indicates some compaction. There is little compaction further up the wall. Balboa Park, San Diego, California. Source: author – [file:\DSCN0560.jpg]

Figure 11.17: Fence on Switchback – This fence is a physical barrier that prevents people from taking a shortcut on the switchback. To follow the trail around the bend, follow the fence. Fallingwaters, Ohiopyle, Pennsylvania. Source: Author – [file: \fw100switchback.JPG]

<c>**Vegetative Barriers** – In general, the higher, wider, and denser the vegetative barrier, the more likely it is to be an actual physical barrier. Normally, when the minimum height of the vegetative barriers approaches three feet in height, they will tend to become effective physical barriers (see Figure 11.14) Carpenter (1975, p. 163) notes that when vegetation becomes over six feet thick, it tends to become an effective physical barrier. Also, it becomes a visual barrier. This barrier is enhanced when the limbs of the vegetation can grow together to form an impenetrable barrier.

<d>**One Foot High Vegetative Barriers** – In Centennial Park in Atlanta, a clump of small shrubs next to the curb of the road and sidewalk (Figure 11.19). It illustrates the effectiveness and lack of effectiveness of low level vegetation as a physical barrier.

For people walking on the sidewalk, the course of travel is obvious and most people will simply walk past this clump of vegetation. Also, for people on the walkway, the clump is four feet thick. In contrast, people crossing the street will not find this clump of bushes much of a deterrent. It is only two feet thick and most people will take the short cut through the center of the bushes. There is evidence in the picture that people have walked through center of the bushes.

<d>**Three Foot High Vegetative Barriers** – The scene depicted in Figure 11.20 illustrates the relationship between the planner's course of travel, the short-cut, and the barrier. The destination is the monument in the small plaza. The planner's course of travel is the small walkway visible on the left. The short-cut would be through the dense bushes two the three feet high. Given the nearby path, the vegetation is an effective barrier and people would use the designed path.

<d>**Six Foot High Vegetative Barriers** – In a different portion of Centennial Park, an interlocking hedge over six feet tall separates the sidewalk and street from the park (Figure 11.21). If forms both a visual and physical barrier separating the street from the park. Returning to the entrance of the Owl Trail (see Figure 12.14), there are six to eight foot bushes at the beginning of the trail. Their express purpose is to form a visual barrier.

<c>**Combining Barriers** – Often fences and vegetation can be combined to form an effective barrier (Figure 10.22). The statue of the lions is an invitation for children to climb the statue. A fence around the statue prevents children from climbing, but by itself, it looks sterile and prohibitive. The large plants in front of the fence breakup the fence and hide a good portion of the fence. The net result is that the fence does its job and looks less obtrusive.

Figure 11.18: Mesh Fence – The black colored fence is fairly unobtrusive and easily blends into the background. Note the soil compaction on the right side between the curb and fence. The curb is sufficiently wide to encourage many children to use the curb as a balance beam to walk around the bend in the trail. Source: author [file:\PHZ0881.jpg]

Figure 11.19: One Foot High Vegetation – For people crossing the street, the bushes do not offer much of a deterrent to pedestrian traffic and most people will simply walk through the center of the bushes. Source: author [file:\Centennialpk022.jpg]

Figure 11.20: Three Foot High Vegetative Barrier – For most people, the height, width and density of these shrubs constitute a physical barrier, but not a visual barrier. Most people will find the path on the left to walk around the shrubs a convenient alternative. Psychologically, the *cost* of taking the shortcut is high versus the *benefit* of taking the appropriate path. Centennial Park, Atlanta, Georgia. Source: Author [file:\Centennialpk019.jpg]

Figure 11.21: Six Foot High Vegetative Barrier – This hedge row forms both a physical and visual barrier separating the people on the sidewalk from the park. The planner wanted to hide the park from the street along this portion of the street. Centennial Park, Atlanta, Georgia. Source: Author [file:\Centennialpk017.jpg]

In Chapter 18 on the Site Planning Process, one of the main reasons for redesigning the entrance at Brookside Gardens was to hide the large deer fence (see Figure 18.7). The redesigned entrance pictured in Figure 18.11 hides portions of the fence with vegetation. It is designed to subdue the impact of the fence on the entrance scene.

Figure 11.22: Vegetation Hides Fence – Fences can reinforce vegetative barriers. Children may seek to climb on the lion statue. The plants provide a visual barrier, but not much of a physical deterrent to a determined climber. The fence behind the plants is the deterrent and physical barrier. Philadelphia Zoo, Philadelphia, Pennsylvania. Source: author [file:\PHZ0871.jpg]

<c>**Water Barriers** – Streams, ponds, moats, and other water bodies can be used to create effective barriers. Few people are going to walk into or through a body of water. Also, water is a natural attractant of people. They will search it out and enjoy its presence. In addition, it serves as an efficient barrier also. The bridge in Figure 11.23 connects the two shores of lake. Without the bridge, people would need to walk around the shoreline to reach the other side.

At Craig Ranch park in Las Vegas, the park designers did not purposely design the pond behind the stage to be a barrier (Figure 11.24). They were thinking of an area for paddle boats. However, it is an effective natural barrier preventing people from accessing the back of the stage. At two feet deep, people could forge through the pond if they were determined to do so. But who would forge through the pond? In practice, it is both a physical and psychological barrier. People are required to use the walkway. Even though the designers didn't seek to create a barrier, it is an effective barrier.

Figure 11.23: Water Barriers – Without the bridge, the two shores of this lake would be difficult to access each other. Lake Artemesia, Berywn Heights, Maryland. Source: author [file:\Artemesia142.jpg]

Figure 11.24: Pond Behind the Amplitheater – The park designers did not purposely design the pond behind the stage to be a barrier. However, it is an effective natural barrier preventing people from accessing the stage. Craig Ranch, Las Vegas, Nevada. Source: author – [file:\CR_1381.jpg]

<c>**Mounding** – Mounding is the creation of earthen mounds to provide relief and containment (Figure 11.25). The mounding on the left creates a physical, visual, and noise barrier. It redirects people's movement. Few people will walk over this mound to get to the other side, and will walk around the mound. Its height blocks and limits people's vision. In addition, it absorbs sound and reduces sound transmission to primarily refracted sound.

People seeking entrance to the Hitchens Building face an interest choice in terms of entering the building (Figure 11.26). Also, it demonstrates the potential impact of mounding as a deterrent to people's movement. People seeking entrance to the building park along the circle and then have one of three choices to access the building. First, they can walk around the island to the left, go down the steps and walk up the ramp to the building. Second, they can walk on the level sidewalk around the right of the island. Third, they can walk on the grass and go up and over the island. An informal survey reveals that roughly half the people will walk around to the right of the island, and roughly half the people will wall up and over the grass. Few people take the left route with the steps. It requires more effort. If the mounding were steeper, fewer people would take the shortcut over the grassy mound. But then the view of the front of the building would become more obstructed also. The amount of mounding present suggests that for many people the shortcut and the level route around the mound are about equal.

Figure 11.25: Mounding – The mounding on the left creates a physical, visual, and noise barrier. Most people will walk around the mound rather than over it. Its height blocks or limits people's vision and it absorbs sound and limits sound transmission to primarily refracted sound. Source: Carpenter, 1975, p. 177– [file:\DSC_1008.jpg]

Figure 11.26: Hitchens Building – People seeking entrance to the Hitchens Building park along the circle and then have one of three choices to access the building. They can walk around the island to the left, go down the steps and walk up the ramp to the building. Second, they can walk on the level around the right of the island. Third, they can walk on the grass over the island. Source: author – [file:\Hitchen03.jpg]

<c>**Other Physical Barriers (Natural and Man-made)** – There are numerous sources of physical barriers. These include both natural and man-made barriers. Major roads and railroads can create significant barriers. When developing Williamsburg Virginia, a major parkway traversing across the community was buried in a tunnel underneath the historic district. Along with the noise and other distractions, a major problem was averted. In Chapter 12 on trails, the Appalachian Mountain Club utilized brush to fill gullies and old trails to act as physical barriers to hikers (see Figure 13.10 and Figure 13.28). In addition, the use of a physical barriers are discussed in terms of removing and extinguishing an old trail (see Figure 13.26).

<b>***Visual Barriers (vision)*** – The use of barriers to create visual barriers is a significant and important use of barriers. Visual barriers were discussed extensively in Chapter 8, Organizing Space and the manipulation of the vertical and overhead planes to create an experience. For this reason, the discussion of visual barriers is limited in this chapter.

In this chapter, the hedges that separate the sidewalk from Centennial Park form a visual barrier as well as a physical barrier (see Figure 11.21). It is by design also. The low level hedges in Figure 11.20 show the effect of eliminating a visual barrier in the same park. The buildings surrounding the patio behind the Greenhow house in Williamsburg creates a visual barrier and an experience of intimacy (see Figure 8.31). Even the bushes behind the guitar player in Balboa Park is a visual and noise barrier that helps hide the major street behind and below it (see Figure 11.16). The earth mounding in Figure 11.25 provides a visual barrier of the street on the other side of the vest pocket park.

<b>***Noise Barriers (oral/auditory)*** – Vegetation and mounding can be used to create a sound barrier and reduce noise. Noise reduction can be significant. Loudness is perceived in terms of frequency and pressure. The pressure of sound is measured with "*decibels (dB)*." A decibel is a logarithmic scale. This means that doubling loudness results in a ten fold or 10 dB increase in sound pressure or intensity. Sound travels out from the source in waves. Generally, plants and other objects can absorb the sound or reflect the sound back in the direction it came (Figure 11.27). Sound will fill in the voids created by objects (refracted).

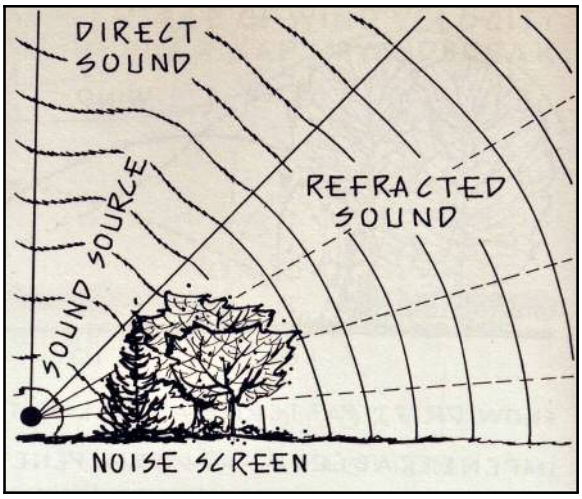

Figure 11.27: Direct and Refracted Sound – Sound travels in waves out from the source. Objects can absorb the sound energy or reflect it back in the direction that it originated. Source: adapted from Carpenter (1975, p.170) [8-39] [file:\DSC_1004.jpg]

Carpenter (1975, p. 170) notes that plants are more effective in reducing the annoying high frequency sounds by 10 to 20 dBs. Large dense pine that are 50 to 100 feet wide can be used to reduce the low end frequencies (rumble) by ten percent. Also, he notes that mixed plants tend to be more effective than single plantings and that deciduous plants are only more effective when there are leaves on the plants. He suggests that plants can reduce automobile noise from 20% to 75% depending on topography (Figure 10.28). The noise in the road cut tends to absorb some of the sound.

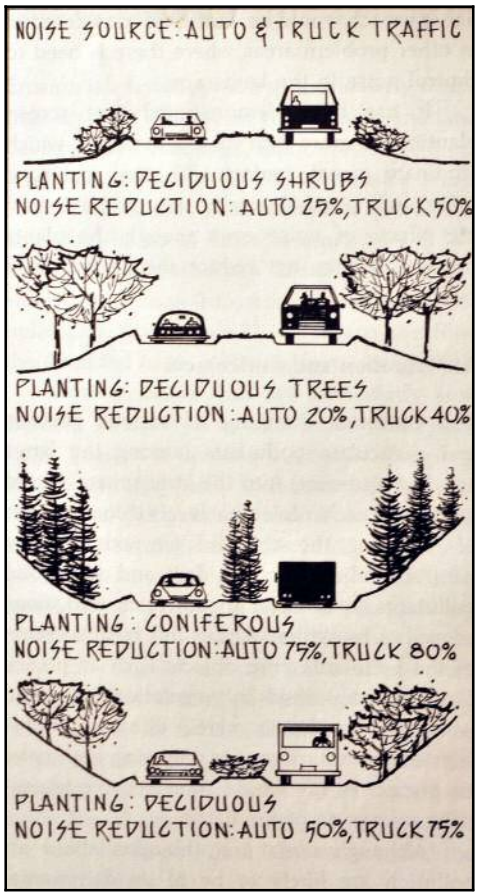

Figure 11.28: Traffic Noise Reductions – Conifer planting can reduce auto noise 75% to 80%. Deciduous plantings can reduce auto noise 50% to 75%. Source: adapted from Carpenter (1975, p.171) [8-41] [file:\DSC_1006.jpg]

<b>***Smell (olfactory) Barriers*** – Generally, the dispersion of pollutants that smell is based on the wind and movement of air and temperature. Carpenter (1975, p. 172) notes that gases are absorbed by plants, soil, and water although in terms of most gaseous pollutants this is not significant. Also, wind and air movement merely dilutes the smell. To a degree, vegetation and other barriers can contain the polluting smells. If the source of the polluting gases is due to decomposition of organic matter, it is also temperature related. The higher the ambient temperature, the more quickly the decomposition, and the greater the contribution of polluting gases.

The solution to olfactory pollutants is as follows. First, remove the source of the pollutant gases to a location away from people. This is the Disney approach. The constantly remove trash and other sources of gaseous pollutants from the Magic Kingdom. In addition, they use a central vacuum system to transport much of the trash and compact it (Figure 11.29). Next, the source of gaseous pollutants can be contained and localized. This approach will tend to concentrate the pollution. The last approach is to disperse the smell. This dilutes the smell. The downside of this approach is

that more people experience some pollution than few people experience a lot of pollution.

<b>***Heat (thermal) Barriers*** – Heat or thermal barriers dovetails with the chapter on sustainability. In general, thermal barriers involve placing barriers to block the sun's radiation and create shade or to remove barriers to allow the sun to heat the area. This topic will be address again in more depth in the Chapter 16, Design with Nature.

The Greenhow patio in Figure 11.30 illustrates the creation of a "*micro-climate*" (see also Figure 8.31) The walls of the building (vertical planes) block the late afternoon sun and the tree creates a barrier (overhead plane) that blocks the sun. The barriers can create an area that is significantly cooler in the evening. In addition, the thermal barriers reduce the solar radiation heating the brick patio which stores the heat and contributes to the late afternoon heat as the bricks radiate their stored heat.

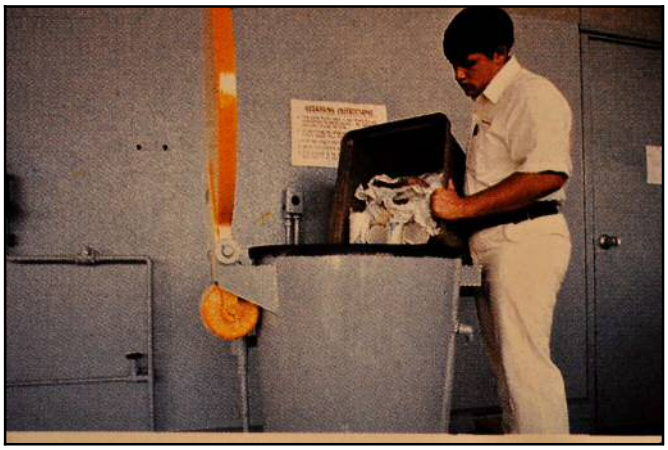

Figure 11.29: Disney's Central Vacuum – Disney installed a central vacuum system in the Magic Kingdom to help remove the trash and other sources of gaseous pollution from the park. Source: Walt Disney Productions (1982) [file:\DSC_0068.jpg]

Figure 11.30: Greenhow Patio – The Greenhow patio demonstrates the use of barriers to reduce the thermal heating from the sun. Source: author [file:\WB049.jpg]

Summary

The concepts of transitioning, circulation and barriers go directly to the design of space to create an experience. The principles and concepts discussed in this chapter are integrated throughout the text. Transitioning involves the transition of people into the experience. It can be more than simply a functional transition. It can be a moving and symbolic thematic transitioning. In designing the Frank Oslislo Visitors Center at the Merkle Wildlife Sanctuary, the visitor's center creates a powerful statement regarding the transition into the world of geese. It is moving into a new world. In a "Peter Pan" type experience of transporting people to Neverland, Disney World used a monorail or steamboat to metaphorically transport visitors to the Magic Kingdom. The thematic transition helps to make the Magic Kingdom a very special place.

Circulation focuses on how people move through space. Three types of circulation were introduced. These were linear or destination, circular, and radial or hub.

Barriers complement circulation. They are the yang in the yin and yang. Where pathways make movement easier, barriers seek to direct the movement by discouraging some types of movement. It can be as simple as a hedge or fence that keeps people on the pathway. It includes both natural (vegetative, mounding, etc.) and man-made barriers (roads, railroads, etc.). In addition to physical barriers, barriers are sensory related and include visual, smell, noise, and thermal barriers.

References:

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