FIGURE 3–31 *The Fountain of the Four Rivers (Gian Lorenzo Bernini, 1648–51) in the Piazza Navona, Rome, at Christmastime. The lights in the fountain create a focal point for the activities in the surrounding market stalls erected at this time of year. Photograph by Dennis Tate.*

FIGURE 3–32 *In Barcelona, a café space is created on the Ramblas by illuminating a curved trellis overhead. The trellis becomes a focus for activity and a symbolic enclosure, visually separated from the surrounding traffic.*

Creating a focus with daylight requires precise siting and orientation as well as careful use of materials. In Orvieto, Italy, the Cathedral is a strong focus at the end of the Via Maitani. The church's west façade (Lorenzo Maitani, constructed during the fourteenth to seventeenth centuries) glimmers in afternoon sunlight while the walls fronting the Via Maitani are in shadow. The façade is highly modeled and articulated, presenting a rich play of light and shadow. Its stone is a light golden yellow that stands out against the darker colors on the adjacent street. Gold mosaics sparkle in the sunlight. Differences in form, material, color, and orientation between the façades of the church and its neighbors focus attention on the church in the afternoon sunlight.

It might seem easier to create focus through light inside a building since the environment is more controlled, but it is often a challenge to balance all the forces that are involved. It is not just a matter of punching one hole in a wall and leaving everything else dark: that situation creates glare. There must be balanced light; but the focus, to be effective, must seem to be brighter. In the apse of St. Peter's in Rome, the sculpture of St. Peter's Chair (Bernini, 1667) incorporates a stained-glass sunburst that attracts attention by its gold color and through its luminosity in contrast to the shadowed sculpture below. Daylight also enters the space from windows at the same level and higher up, providing ambient illumination. The sunburst, however, is set apart by its coloring and by its small size and circular form. The golden-colored light that enters through it plays on the bronze forms of the surrounding sculpture, creating a composition in chiaroscuro. It holds within it the image of the

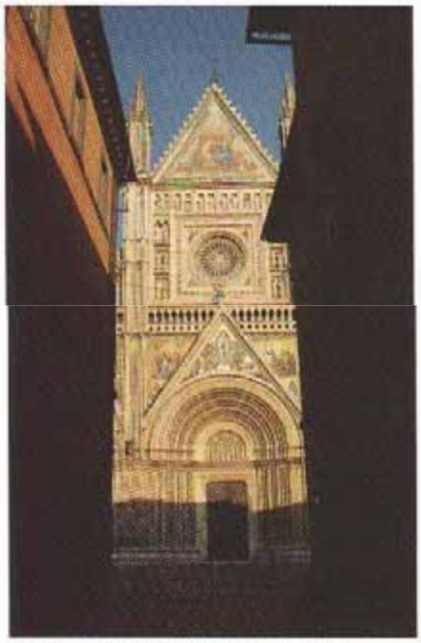

FIGURE 3–33 *The western façade of the Cathedral in Orvieto, Italy. Photograph by Catherine Jean Barrett.*

FIGURE 3–34 *St. Peter's Chair in the apse of St. Peter's in Rome. Photograph by Catherine Jean Barrett.*

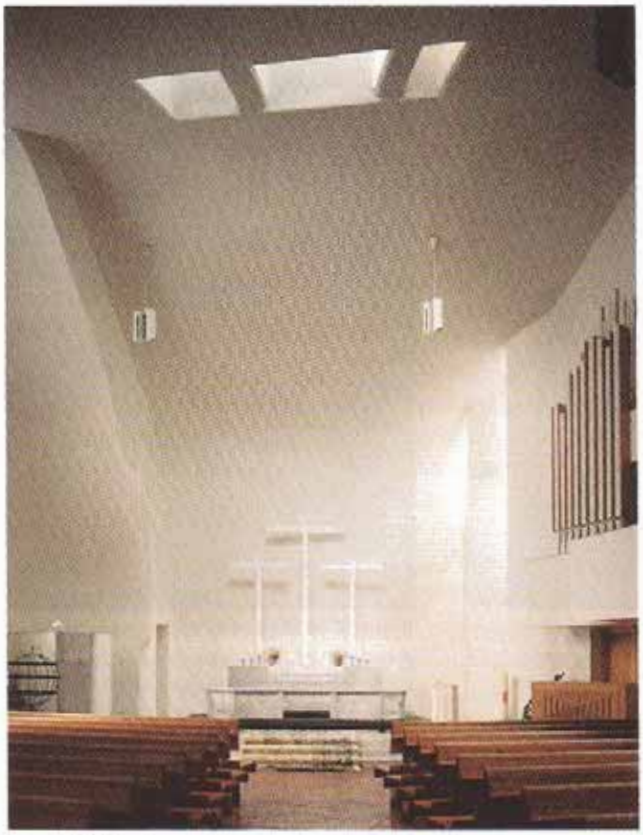

FIGURE 3–35A *View of the crosses, altar, and pulpit in the Church in Vuoksenniska, Imatra, Finland.*

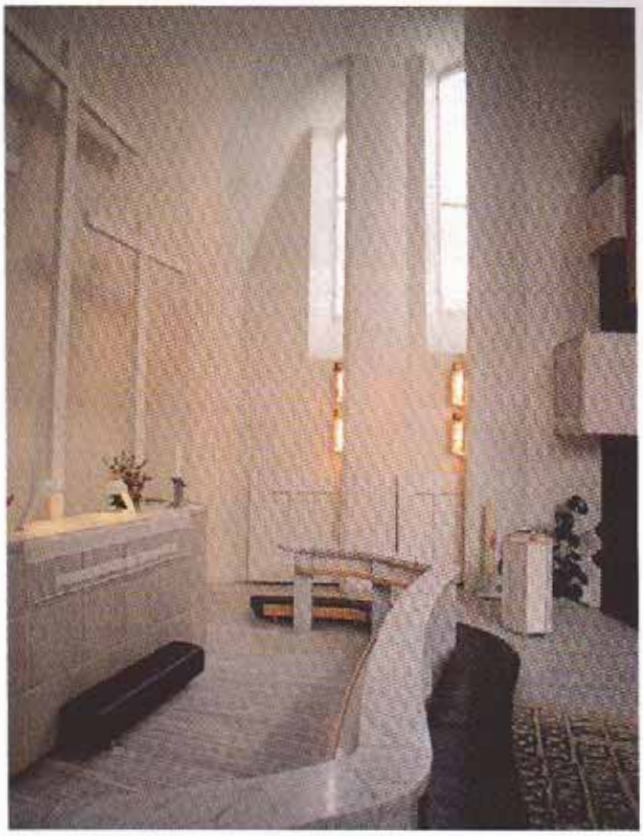

FIGURE 3–35B *View of the light sources for the altar and crosses.*

dove, the symbol of the Holy Spirit: the light that enters through this window symbolizes divine light. It is the golden burst of light that first draws one's attention to the sculpture, but it is the many levels of detail that keep it there. Form, material, and color provide the contrasts that focus attention on the sunburst.

Almost three centuries later, the altar and cross of Christ Church Lutheran (Eliel Saarinen, 1949) in Minneapolis, Minnesota, were made the foci of the sanctuary with a completely different set of forms revealed in light. In Chapter 2, the way the form of the cross is delineated in light was described (see Figure 2–10). Earlier in this chapter, the way that light unifies the simple volume of the space was described (see Figure 3–18). These two sets of lighting strategies together create the focus on the crosses at the front of the church. The concept and the intention of the design were brought together by lighting forms to create particular spatial relationships.

The altar and three crosses were made the focal point in the Church in Vuoksenniska, Imatra, Finland (Alvar Aalto Architect, 1956–58), in quite a different way. This composition is one made up of subtle changes in value. The altar is white marble with (at the moment of the photograph) an altar cloth of light gray; the crosses are white; and the surrounding walls and ceiling are white. It is an effect of chiaroscuro, but a quiet one, one in which light plays a larger role than shadow. A light cannon protruding through the roof grabs light from the sky and aims it at the altar and crosses, casting shadows behind the crosses even when the sky is cloudy. Two light niches in the north wall to the right of the altar direct light from the side toward the altar and crosses and, through the cut-out in the wall to the left of the altar, to the pulpit. Even though the entire interior is bathed in light, the focus on

FIGURE 3–35C *Longitudinal section through the church showing the relationship of the skylight to the crosses and altar.*

FIGURE 3–36 *A gallery in the museum Historial de la grande guerre in Péronne, France. Photograph by Virginia Cartwright.*

FIGURE 3–37 *In a shop in Barcelona, a trio of incandescent globe fixtures not only shed useful light on the cash register but also draw attention to the tiny shop itself.*

the necessary elements to a Lutheran church—altar table, cross, and pulpit[28]—is achieved.

Electric lighting emphasizes and repeats this focus. Two small hooded incandescent fixtures are mounted on the top of the altar table, casting a warm glow on its top as well as throwing shadows of the crosses on the wall. The light niches each have two incandescent fixtures made of brass that contribute warm light from the side. These gentle gradations of light and shadow create their own subtle high-key chiaroscuro to complement the daylight composition.

Focus is often desired in the daytime in museums to attract attention to displays. In the museum Historial de la grande guerre (Henri Ciriani, 1987–92) in Péronne, France, electric light is used in some galleries to provide focus on the displays while daylight plays a background role. The glazing above the floor and at the end wall allows a view out to the enclosing wall ruins—a historical reminder—and also allows daylight to wash over the floor and wall surfaces. It is electric light, however, from PAR lamps[29] that precisely highlights certain displays. The color and intensity of the electric light, as well as the precise pattern that it takes, distinguishes it from the more evenly distributed daylight and draws attention to the objects it illuminates.

The brightness of electric lighting fixtures themselves attracts attention, so they can be used as focal points. Their

FIGURE 3–38 *It is people that inhabit architecture, and to whom attention should be drawn. In a café in Stuttgart, lighting fixtures are located to focus on the customers. Photograph by Dennis Tate.*

luminance must be controlled, however, so that it is not uncomfortably bright. Light can provide focus, either through its source or through the surfaces that it illuminates. Awareness of this guiding potential of light is an aid to using light that directs.

FIGURE 3–39 *Ghirardelli Square, San Francisco, at night.*

Light to develop a hierarchy

Light aids in orientation when it adds cues that help us negotiate an established spatial hierarchy. As mentioned earlier, monuments and special parts of a city are lighted at night to make them focal points in the nightscape. They then become part of a spatial hierarchy that defines the city as a whole. An example of a special district that has its own hierarchy within a city is Ghirardelli Square (original renovation by Wurster, Bernardi, and Emmons, with Lawrence Halprin and John Matthias, 1962–67) in San Francisco, California. A huge lighted sign on top of the building announces its presence and establishes its location in relationship to the rest of the city. A hierarchy of lighting fixtures was developed to reinforce the spatial organization of the complex. The lighting theme is a variation on carnival lights: small incandescent lamps are used in lines and groups to delineate special areas. The "Ghirardelli" sign is made up of these small lamps (although they are too far away in the photograph to be seen as separate lamps), as are the lighting standards that line the stairway from the street to the square. In these lighting fixtures, bands of the small lamps are arranged in a radial pattern to form a globe. These fixtures indicate the transition from the street below—with its two fixtures with plain diffusing globes—up the stairway to the delights of the square above.

FIGURE 3–40 *Interior view of the atrium, Stockholms Sodra in Stockholm.*

The interior of Stockholms Sodra in Stockholm (completed 1989) displays an elegant hierarchy of light. The atrium is topped by a curved vault of glazing and the end wall is fully glazed. Daylight provides all the light necessary on a bright summer day. Electric lighting fixtures stand by, however, for the long dark winter. White saucer-like fixtures are suspended down the center. The light sources are concealed in the lower hemispheres, illuminating the upper "saucers" which become focal points and suggest separation of the lower lobby from the upper reaches of the space. On the ground floor white globes are grouped on short street-lighting standards, four globes to a post, giving a sense of human scale to this vast room. On the first balcony, fluorescent wall sconces direct pools of light to the ceiling. On the second and third balconies, cylindrical fixtures focus light on planters. Above the top row of interior windows, indirect lighting fixtures illuminate the upper surfaces and the skylight. The rendition of the atrium by day and by night are totally different, but in each version the hierarchy of the space is defined. In daylight, the grading of light from top to bottom reveals the order. By night each area is defined with its own particular light. The vertical organization of the building and its spatial hierarchy are reinforced by the design of the lighting with both daylight and electric sources.

Horizontal divisions of space are defined in the Resurrection Chapel (Erik Bryggmann, 1939–41, renovated 1984) in the Turku Cemetery in Finland. The mourners sit in the pews to the left, and the casket is

FIGURE 3–41 *The Resurrection Chapel in the Turku Cemetery in Finland.*

FIGURE 3–42 *Communal hall, Apollo Montessori School, Amsterdam, The Netherlands.*

placed under the low ceiling in the light of the windows to the right. The altar and cross form another area of focus. Daylight furnishes the major definitions, washing the altar and cross with light from the side and flooding the low-ceilinged area with light from two sides. High windows on the right sprinkle light into the high-ceilinged seating area, with a few small windows on the left affording more a view of the trees outside than adding significant amounts of light to the room. The areas for mourners, the coffin, and the cross are distinct one from the other in both enclosure and light. Electric lighting fixtures continue the differentiation. Suspended brass fixtures (see Figure 2–45) float over the seated mourners and direct pools of light downward. Brass fixtures mounted on the low ceiling of the lateral area direct light to the ceiling as well as downward. At the altar, candles both large and small glimmer even in the daylight. Each area has its distinctive light relating it to the whole.

In the Apollo Montessori School (Herman Hertzberger, 1980–83) in Amsterdam, The Netherlands, light defines use. The communal hall is topped by skylights and borrows daylight through side openings. The classrooms have fluorescent lighting fixtures for ambient light in addition to daylight from large windows. At the classroom entry, fluorescent lamps hidden behind yellow plexiglass cast warm pools of light onto the wood surfaces of the private work place. There are three levels of lighting organization that are consistently applied: ambient daylighting for the communal hall, overhead fluorescent lighting and perimeter daylight for the classrooms, and local lighting for special individual areas. The spatial hierarchy of the school, from communal areas to private retreats, is reinforced by its lighting.

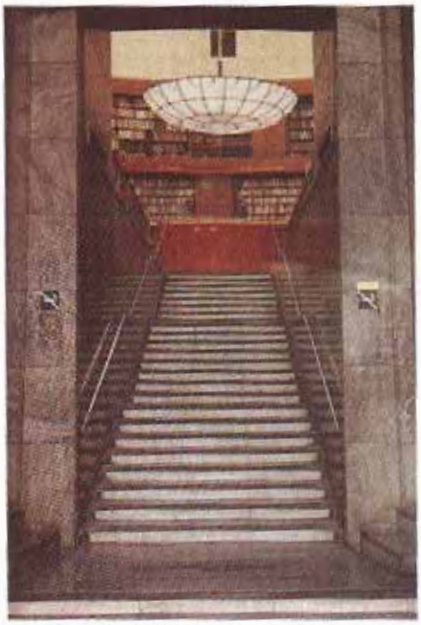

FIGURE 3–43 *Main stairway in the Stockholm Public Library.*

Light and movement

Procession can be encouraged by light. We tend to follow light. Light can beckon us down a path, through the woods to the open fields, to the end of the tunnel. The brightest objects or points of light attract us most, so relative brightness is important. If one wants to suggest a direction of movement in the dark countryside, the light need not be bright. If one wants to foster movement in Times Square, the light needs to be very bright.

Movement is encouraged by light at the destination. At the Stockholm Public Library (Erik Gunnar Asplund, 1918–27), the main staircase leads up between dark gray walls to the daylit rotunda above. The hovering glass bowl of a lighting fixture catches the daylight, becoming a daylighting fixture in addition to its role as an

FIGURE 3–44A *Corridor in the Camino Real Hotel in Ixtapa, Mexico.*

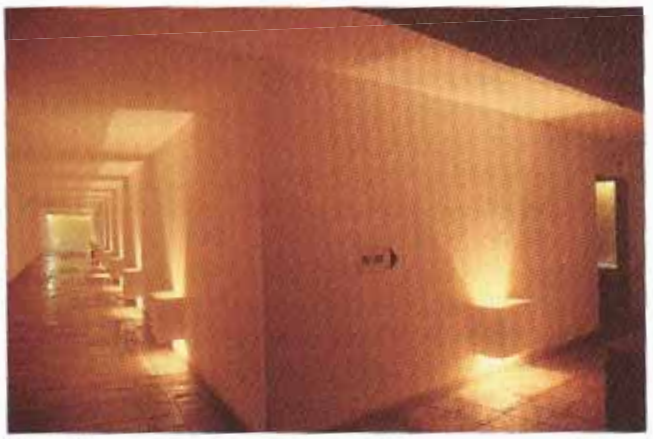

FIGURE 3–44B *Another corridor by night.*

FIGURE 3–45 *Main shopping arcade in the Pike Place Market in Seattle, Washington.*

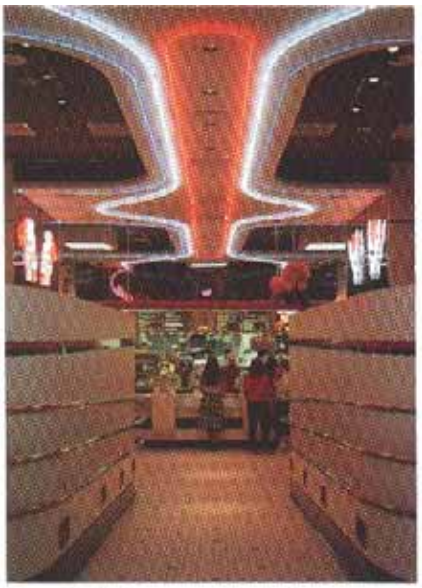

FIGURE 3–46 *Movement is clearly encouraged in a fast-food restaurant in Raleigh, North Carolina—movement right up to the ordering counter. The strips of neon, whose image is reflected in a mirror above and behind the counter, swoop into the distance, drawing one along with them.*

electric lighting fixture. It marks the destination and distributes light both by day and by night.

In the corridor of the Camino Real Hotel (Ricardo Legorreta, 1981) in Ixtapa, Mexico, a screen of yellow-painted open concrete blocks creates a clear perspective and a differentiation between the outside wall and the inside wall. The alternation of light and shadow also creates a sense of movement by the rhythm it suggests. The light patterns produced by the yellow screen suggest a *staccato* rhythm that accompanies one down the corridor. The pattern of light changes rhythm beyond the doorway where it takes up the longer interval of a colonnade. An enclosed corridor at the same hotel is made into an event by the spacing of incandescent lamps in low boxes that create patterns of light on the ceiling and floor. These rhythms are regular beats, like a bass accompaniment, steady and repetitive. The light patterns, seen in perspective at constant intervals, mark off the distance already covered and yet to go, registering one's movement.

Four rhythms of light mark the variation of movement in the Pike Place Market in Seattle, Washington: the continuous wash of daylight from the side; the steady beat of the dark green enamel industrial fixtures with incandescent lamps spaced evenly between columns, highlighting the goods for sale; the faster rhythm of the bare incandescent lamps outlining the edges of the ceiling over the center walkway; and intermittent loud accents of neon signs announcing special attractions (just visible in the background). The daylight provides the ambient background light. The industrial fixtures demarcate the "stop and look" areas, where people who have escaped from the current of the central corridor gather in eddies to sample the goods. Reinforcing the natural perspective of the columns and the ceiling, the lights also reflect the relative speed of movement in the market.

The arcade at the court level of the Salk Research Institute (Louis I. Kahn, 1959–65) in La Jolla, California, displays a rhythm of light and dark in daylight and at night as well. The clear alternations between sunlight and shadow, and light and dark, define the receding perspective. The light, coming from the side by both day and night, draws one out into the court. Repeating the direction of the daylight with electric light connects the two situations in one's memory. One is simultaneously drawn both down the arcade and to the light.

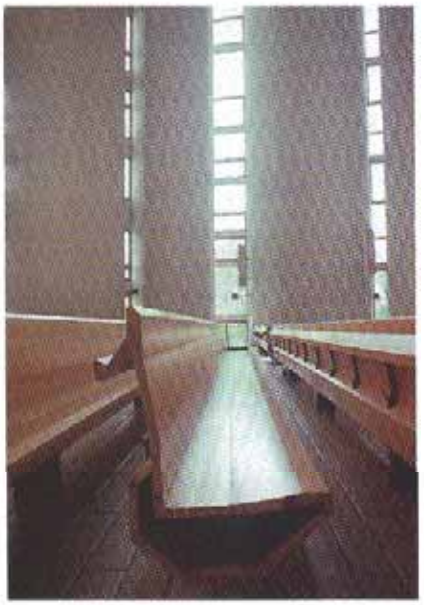

FIGURE 3–47 *In the Kalevala Church in Finland, the structure, the light, and the form are integrally bound together in a syncopated rhythm that defines the perimeter of the sanctuary. Movement along the benches is encouraged by the movement toward the light. One is presented with light as a goal upon entering the church, when taking one's seat, and again when facing the altar and pulpit (see Figure 3–20). Light accompanies movement.*

FIGURE 3–48A *Arcade at the lower level of the Salk Research Institute in La Jolla, California. Day.*

FIGURE 3–48B *Night.*

All of these ways of expressing space in light—defining the boundary between inside and outside, defining spatial enclosure, and directing movement—enrich our experience in buildings. When light is used purposefully to reveal the spatial definition intended by the architect, then form, space, and light are joined together to create experiences rich in light.

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3. Millin, Laura J., Editor. 1982. *James Turrell: Four Light Installations*. (Seattle, Wash.: The Real Comet Press), p. 19. Reprinted with permission of James Turrell.

4. Ibid., p. 20.

5. Venturi, Robert. 1966. *Complexity and Contradiction in Architecture*. (New York: The Museum of Modern Art), pp. 88–89. Venturi devoted an entire chapter to "The Inside and the Outside," the formal resolution of the difference between inside and outside and the richness of the complexity possible in the resulting forms.

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8. Energy savings result both from less electrical power consumed by lighting fixtures and also from lower cooling demands. Two watts of lighting require approximately one watt of cooling to offset the heat gain. Incandescent lamps add more heat to a space than do fluorescent lamps for the same amount of light delivered. Since most office buildings in most climates are cooled most of the time, saving lighting energy has a significant effect on overall energy use.

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11. The mild climate of southern California requires little protection from the cold. In this coastal location on the sea cliffs, morning fog is the norm, preventing overheating inside the glass house. The line of eucalyptus trees to the south shades the major glass façade.

12. Nicholson, Arnold. 1958. "Mr. Kelly's Magic Lights." *Saturday Evening Post*, July 5, 61.

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14. The photograph here was taken on a rainy day, so some effort of imagination is needed to fill in the "harsh desert light."

15. Erickson, Arthur. 1975. *The Architecture of Arthur Erickson.* (Montreal, Quebec: Tundra Books), p. 33.

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26. Pietilä, Reimi. 1983. "A 'Gestalt' Building" in *A + U: Alvar Aalto.* May 1983 Extra Edition, 12–13.

27. If the wash of light on the curved wall were not even but patterned, then those patterns would attract attention and interfere with the sense of a continuous enclosing plane, as do reflections on the lower glass panels.

28. Pietilä, Reimi, op. cit.

29. PAR is an acronym for parabolic reflector. The silvered reflector behind the filament is shaped to throw a particular pattern of light ranging from a very narrow spot to a wide flood. The relationship between the filament and the parabolic reflector is crucial to achieving the distribution, as is the treatment of the glass lens of the lamp.