Architecture and the Environment

Julia Walker

By necessity, all buildings respond to their natural environment—even when their designers do not consciously use the environment as a source of inspiration. From vernacular to high-style architecture, buildings must respond to and accommodate their ecological situations. Architecture's very existence is inherently defined by the physical features of its geographical location. In fact, the earliest known dwellings were shaped from existing natural forms, like caves, cliffs, and grottoes, in which nomadic groups of hunter-gatherers could find shelter from predators and harsh conditions. Climate, landscape, and topography all impact the forms, materials, and techniques that are available for any given project. Sometimes, these qualities are delimiting factors, restricting the options that determine a building's ability to fulfill its most essential functions. For example, canvas roofs perform well in very hot, dry settings, but will collapse or mold in climates that are wet and cold. At other moments, organic nature supplies new and creative visual ideas, and the resulting buildings imitate nature's forms and motifs. In all contexts, the environment sets the terms for architecture, both in its artistic possibilities and its practical functions.

Maybe the most omnipresent factor influencing architecture's relationship with the environment is the need for buildings to adapt to the climactic conditions that surround them. Due to the remarkably varied landscape of the North American continent, indigenous groups created inventive and regionally specific forms that were compatible with their locations. One of the most important vernacular building materials in the southwestern United States—adobe, the Spanish term for mudbrick—is particularly well-suited to its desert environment. In such sunny, dry regions, adobe has several ecological advantages. Usually composed of mud and straw, it is made up of cheap and easily available materials. In climates with little precipitation, adobe can prove extremely durable, lasting for centuries with relatively low maintenance. Finally, in places like the American southwest, adobe has excellent thermal performance. It absorbs sunlight during the day to keep interiors cool, then radiates it after dark to temper cold desert nights, thus keeping building temperatures fairly stable instead of fluctuating with conditions outside. Visually, adobe structures are striking in their clarity and impact, appearing almost as a sculptural extension of their natural settings. Puebloan tribes were responsible for some of the most monumental uses of adobe, and often used existing natural features to fortify their structures. At Mesa Verde (Figure 10.3-4), located in the southeastern corner of present-day Colorado, the Anasazi created complicated, multifamily dwellings inside limestone cliffs. Constructed from adobe bricks and connected with wooden ladders, dwellings could accommodate up to 100 people at a time. The density of the population and the foreboding face of the cliff wall offered protection from enemy tribes. The Taos Pueblo in New Mexico, which has been continuously occupied for over a millennium, demonstrates a similarly communal approach to the problem of shelter. Here, multistory adobe residences are accumulated into a well-organized apartment-style building complex, complete with ceremonial kivas. The two main buildings of the complex flank the Rio Grande River, which provided a water supply for the manufacture of the adobe bricks and for the sustenance of the Taos tribe. Adobe continues to be a common building material in these regions, and true adobe structures (rather than buildings constructed

from other materials that merely adopt a vague “Pueblo style”) are enjoying a resurgence of popularity due to their efficient thermal properties.

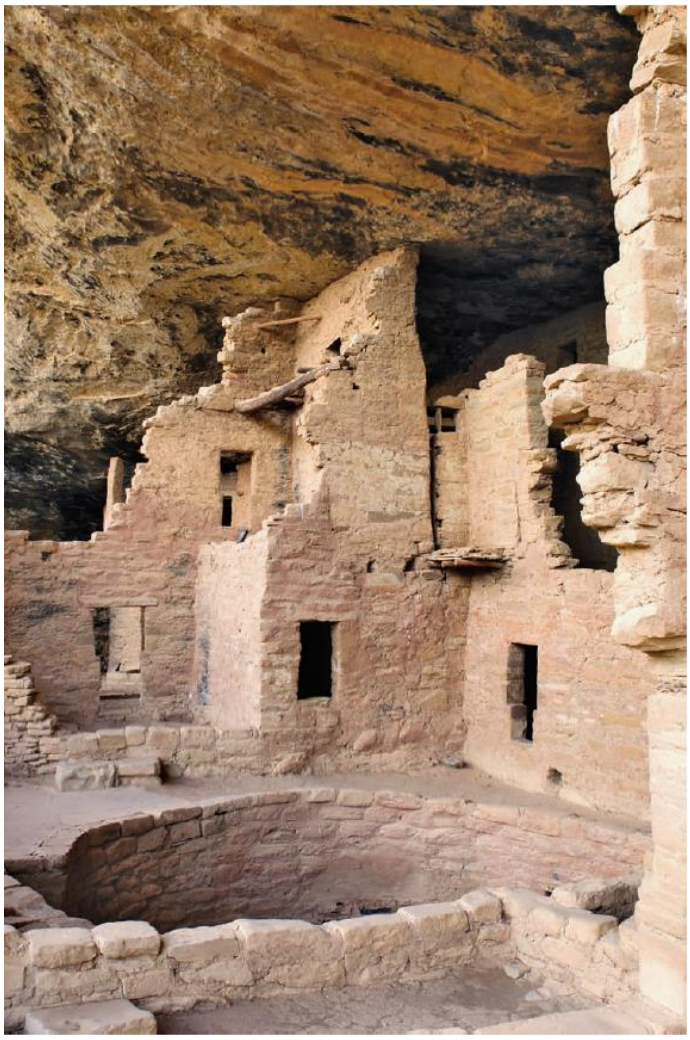

Figure 10.3-4

The adobe architecture of the Puebloan peoples tended to be unornamented, gaining visual strength from its seamless integration with nature. Other similarly integrated buildings, however, achieve this integration through ornament representing the environmental features that govern life—for example, the aquatic motifs of the palace complex at Knossos (Figure 3.1-7). The buildings of the palace, whose form was improvised and accumulated over many years, were able to be built quickly and lightly. The wooden frame easily supported the gypsum walls, so interior rooms tended to be open, bright, and well-ventilated, relatively free of internal supports. Thanks to the temperate climate of the region, the palace’s airy interior opened onto its natural setting, and many daily activities would have occurred in the terraces and courtyards outside. Throughout the spaces of the palace, both interior and exterior, decoration is drawn from nature itself, which was visible at nearly every moment from doors, windows, and terraces. Even those rooms whose functions required more privacy—such as the royal

throne room, in which the king and his family would have received important visitors (Figure 3.1-7)—thematize their natural setting.

Figure 3.1-7

The royal throne itself is incorporated into the wall, surrounded by foliate decoration and frescoed griffins relaxing on their haunches. In the so-called queen's megaron, frolicking dolphins framed by wave-like motifs would have surrounded the queen in her bath, connecting her to the sea outside that supported life in the palace. Even the well-known "Toreador" fresco (Figure 3.1-5), depicting a muscular youth participating in the ritual of bull-jumping, suggests that Minoan life existed in concert with nature.

Figure 3.1-5

Though the bodies of both the bull and the man are rendered in a state of maximum tension, there is a sense of unity to the treatment of their bodies, much like acrobats straining in coordinated effort. Along with the palace's rambling and piecemeal massing, these qualities lend the structure a tranquil informality. In general, ancient Aegean architecture is characterized by a peaceful and harmonious continuity with its natural environment.

The same sense of continuity with nature, yet far more formalized, can be found in the temples of Zen Buddhism. At the Ryoanji temple in Kyoto (Figure 12.3-7), dating to the sixteenth century, the building shows the same integration with the environment present in the architecture of proto-Greek civilizations—but for very different purposes. The temple's broad overhanging eaves, typical of the sacred architecture of the Edo period, open onto various natural vignettes: a rock garden, a moss garden, a pond, and a garden surrounding a tea house. Each of these natural spaces has specific significance to Zen, whose followers pursue a path of enlightenment through meditation, insight, and a cultivated engagement with daily life. The rock garden, for example, contains fifteen precisely arranged rocks set in an orthogonal bed of white gravel. As is characteristic of Zen gardens, this highly artificial garden acts as a metaphor for the larger natural world. The gravel represents fluid environmental elements, like seas, creeks, and rivers (themselves a metaphor for transience and impermanence), while the rocks represent fixed elements like mountains and islands. The white pebbles are kept carefully raked into linear patterns as a meditative activity. Thus, while the formal composition of the garden is symbolic of the outside world, it is also a metaphor for the effortful practice of introspection that lies at the heart of Zen.

Figure 12.3-7

Since the 1960s, increasing urgency has surrounded architecture's need to respond to its environment. Modern architecture's perceived indifference to varying natural conditions, as well as the ecological toll of global modernization itself, has contributed to a widespread sense of emergency in the field. Architects of many backgrounds attempted to address these environmental problems, but they could generally be categorized into two groups: the conventional, who believed that architecture could work within existing economic systems to correct damaging environmental trends, and the countercultural, who argued that environmental crisis had necessitated a radical reconsideration of patterns of living. In the latter group, the Italian architect Paolo Soleri is exemplary for his visions of a post-apocalyptic human race living on architect-designed asteroids. At his architectural "laboratory," a community for 5,000 people that he called Arcosanti (Figure 20.1-9), Soleri experimented with self-sustaining architectural configurations.

Figure 20.1-9

Under continuous construction since 1970, the community was the realization of Soleri's theory of "arcology"—an idea of building that combined architecture with ecology. Though only 5% of the envisioned structures were completed in Soleri's lifetime, it remains a compelling vision of alternative dwelling. Fabricated mostly from poured-in-place concrete, the forms of Arcosanti are not constrained by any single style, at some points appearing almost historicizing and at others appearing to have been made by some future human society. Soleri's idiosyncratic vision of an efficient and ethical community remains fairly unique, but far more popular has been the conventionalized approach of Norman Foster, who has worked to help governments, corporations, and individuals use

more sustainable architecture. In fact, Foster's first major commission came in the form of an office building—the Willis Faber & Dumas building in Ipswich (Figure 20.2-13a), completed in 1975.

Figure 20.2-13a

In opposition to Soleri's far-out forms, Willis Faber is indisputably modernist in its embrace of the machine aesthetic. Its footprint is amoebic and voluptuous, flowing to the edges of its irregular site in a way that Foster compared to a pancake in a pan. An undulating curtain wall, glazed from floor to roof, wraps around a row of perimeter columns, reflecting the surrounding medieval street scene during the day and dissolving into transparency at night. Free of the visual interruptions of mullions or struts, the solar-tinted glass flows liquidly from a row of clamping at the roof level, allowing the continuous wall surface to provide maximum visual impact on a challenging site. At Willis Faber, Foster sought to create a space that would encourage community as much as productivity—a place for hip, creative minds to work and play, much like his more recent Apple Headquarters in Cupertino, California (Figure 20.2-13b). Enlivened with acid green décor, Willis Faber contains a swimming pool (now defunct) and a roof garden for office gatherings—a feature that insulates the building and ensures good thermal performance. Foster's intention was to make "green" design appealing to young consumers both within the building and outside its glassy walls. His goal was not to critique the practices of industry, but rather to help its processes become more oriented towards conservation. He himself observed, "As every industrialist knows, a happy workforce is a productive workforce." In the years since completing Willis Faber, Foster has gone on to build a vast multinational practice based on a fundamental commitment to

sustainability, and many other firms have followed suit. Given the acceleration of ecological problems across the globe, it seems safe to assume that the environment will remain a source of both serious concern and moral-ethical inspiration within the field of architecture for many years to come.

Figure 20.2-13b

For Further Reading

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