

Plenums: Eero Saarinen and the Civic Quality of Air

At this moment...of international scientific techniques, I propose: only one house for all countries...In winter it is warm inside, in summer cool, which means that at all times there is clean air inside at exactly 18°. – Le Corbusier¹

EXPANSIVE INTERIORS

Comfort created the American suburb. A consistent pattern of land allocation based on automotive convenience now extends into repetitive and unvarying interiors. In fact, a steady-state objective for interior air assumes consistent conditions are ideal. When one recounts pleasurable encounters in buildings and landscapes, however, it is obvious the desire for homogeneity is grossly incomplete. Thermal variety, especially when coupled with luminous and acoustic variation, supports more generous and complex architectural experiences. Based on universalizing (and averaging) concepts of convenience and comfort, contemporary space is a largely ubiquitous inhabitable zone sandwiched between a field of carpet and a grid of suspended ceiling tiles. Floor and ceiling coordinate space as a consistent effect of air conditioning, fluorescent lighting, acoustic absorption, fire detection and fire suppression. Such space is serviced by a plenum, a zone of uninhabitable air. But if inhabitable air is considered a plenum and understood by its broader definition—a space completely filled with matter—then architectural space can be conceived through the technical and aesthetic qualities of air—heat, sound and air-scattered light.

This paper will present a study of two nearly identical suburban libraries in Montgomery, AL. Located in diverse neighborhoods—one affluent, the other underserved—the renovations proposed by an undergraduate Interior Architecture studio enrich subtle physical differences to engage critical differences in local context. As design research, the studio visited several iconic buildings by architect Eero Saarinen (1910-1961). Like Saarinen's Irwin Union Bank and Miller House, the existing libraries are a basic 100'x 100'x 9' plenum of air. Unlike the libraries, however, the Saarinen projects structure a complex and mutable variety. To propose a similar richness, meaningful variety between and within the libraries is studied as qualities of

Kevin Moore
Auburn University

Robert Sproull, Jr.
Auburn University



1

Figure 1: Interior Architecture Students sketching the aire inside one of two twin libraries in Montgomery, AL.

air. Air is often indistinct, but a public library should accommodate diverse activities with distinctly different thermal, acoustic and lighting requirements. While each project proposes a new image, the icon-making of Eero Saarinen concedes to renovations that are more similar to the direct physical experience of his work. The civic identity of each library is now redefined as a field of environmental effects to create public places with a renewed civic identity beyond imagery. In this way, contentious differences between the libraries are approached optimistically and obliquely as invisible yet profound effects of air.

TWO LIBRARIES

Architecture/Interior Architecture (ARIA) is a dual degree program within the Auburn School of Architecture, Planning and Landscape Architecture. Attending to physical and professional seams between interior and exterior, the program prepares students as leaders in conceiving and shaping a more integrated built environment. Summer Thesis is the culmination of the Interior Architecture degree, and it combines design, research, professional practice, history and theory into an intensive 10-week course of study. A distinct advantage of this integrated curriculum is the convergence of effort around a single design project.

The twin libraries are an excellent case study for this integrated approach. Completed in the early 1990's, the E.L. Lowder and Rufus A. Lewis Branch Libraries are optimized plenums of uniform air, comfortable enough and convenient. At first, they are uncanny twins, almost entirely indistinguishable. Inside, embellishments from employees and artwork created by the their associated neighborhoods allude to deeper social distinctions. Their similarity even includes a matching structural crack in the exact same location, a symptom of larger design flaws.

The buildings are difficult to admire (Figure 1). Although banal, the plenum defined by carpet and acoustic ceiling tile is a sophisticated one; it integrates overlapping environmental controls in an affordable and easily maintainable system. This system also allows an open plan. The directors of each library value this openness. The single space is informal and recognizable as public, if not exactly civic. Unfortunately, uniform standards of comfort result in a monolithic luminous, acoustic and thermal environment, frustrating the expanding role of the library as a place of collaborative work. Worse, the twin libraries suppress unique differences in their immediate sites and neighborhoods.

This curious situation—nearly identical public buildings in very different sites—is a product of the process by which they were built. As Montgomery sprawled eastward in the late 1980's and early 1990's, new public buildings helped establish new communities. Instead of creating unique structures for each library, as Andrew Carnegie might have done 125 years ago, the city bypassed hiring an architect altogether. The planning department handled all of the design duties for the Lowder Branch Library. When the underserved Ridgecrest neighborhood in western Montgomery learned of the new library, they requested one as well. The design was simply repeated for the Lewis Branch Library, even without a site plan. While the Lowder library fills its site, the Lewis library is adrift in a field of asphalt on axis with a major highway.

Architectural variety was disregarded in the original design of the libraries, but they serve radically different patrons. The residents of each neighborhood vary on average by age, (30 years old at Lowder compared to 48 at Lewis). They differ considerably by income: over 75% of the households served by Lewis make less than \$30,000 annually, while 75% of those near Lowder exceed this figure. The neighborhoods themselves vary by age. The Lowder branch is situated in the newer eastern side of Montgomery where homes average about 25 years old and cost about \$153,000. The homes served by the Lewis branch are about twice that age and sell for about \$65,000. The divide is racial as well.

The future of these libraries is not new construction. The Montgomery City-Country Public Library has embraced digital media to improve access to resources. This conserves space and has the potential to redefine the library as a collaborative place to share and create knowledge. In this case, renovation is a realistic, sustainable and innovative solution to evolving needs. Given the pernicious history of segregation and racial injustice in Montgomery, the studio respected each library as vital public institution with a diverse and loyal constituency. In fact, entirely new experiential potentials lie in maximizing effects with a minimum of resources. This new sensibility may assume less formal invention and more careful consideration of small but profound environmental effects. Partially unburdened by architectural image, renovations can focus on small but profound atmospheric pleasures.

EERO SAARINEN: PLENUMS DEFINED BY SURFACES

Eliel and Eero Saarinen are remembered for integrating disparate design practices. Besides negotiating radical shifts in architecture during the first decades of the 20th century, Eliel was well known for city planning and furniture design. His second wife, Loja, was an accomplished textile designer who created window treatments, upholstery and floor coverings. The result is a total environment—landscape, architecture, interiors—that was also a family affair. Their son, Eero, daughter, Pipsan, and her husband, Robert Swanson, all worked as designers in the firm. As the architect and president of the Cranbrook Academy of Art, Eliel Saarinen had a profound influence on American design. Cranbrook's holistic setting and apprenticeship curriculum has produced prominent alumni including Harry Bertoia, Charles and Ray Eames, Florence Knoll, Fumihiko Maki, Ralph Rapson and Harry Weese. In total, these designers proposed a distinctly American Modernism, one more expansive and lush than its ascetic Continental predecessor.

Eero Saarinen was at the center of this new expansive American design. Like his father, Eero worked with interior designers and landscape architects to fashion total environments. Many of his projects propose structural daring or material invention. While each work is amazingly consistent, his body of work is wildly diverse. The office of Eero Saarinen became a model for the Interior Architecture studio. Rather than ignore an adjacent scale or abandon it to a related discipline, students were encouraged to approach environmental effects opportunistically. This shift in attention is useful in Interior Architecture, where distinctions between wall and furniture and interior and landscape can be reframed just enough for students to infiltrate an adjacent discipline.

The studio looked broadly at Saarinen's work in the context of post-war American architecture but carefully studied a few key expansive interiors. A

one-week field trip allowed students to sketch, photograph and describe the qualities of air at the Cranbrook Academy (1928-1942) and Saarinen House (1928-30) in Detroit, MI and Concordia College (1955) in Fort Wayne, IN. In Columbus, IN the studio visited the First Christian Church (1942), North Christian Church (1959-63), Irwin Union Bank (1954) and the Miller House (1954-57). While the trip amassed a catalogue of interior and exterior materials, the most pertinent case studies were the low inhabitable plenums of the Irwin Union Bank and the Miller House. Before the trip, a large model was built of each (Figures 2-4). In both cases, the floor and ceiling are primary experiential surfaces. Rather than walls—upright and representational—the horizontal surfaces structure posture in the public realm.

In the Irwin Union Bank, for example, the floor of local brick humbly masks soil tracked in by local farmers.² This waxed floor captures reflected light and color, as does the expansive white ceiling interrupted by a grid of monumental uplights. These uplights pierce the structural plenum as shallow domes. The domes are unmistakably analogous to the surrounding tree canopy by landscape architect Dan Kiley, completing the bank as a plenum of space defined by a floor of baked earth and a ceiling of dappled and reflected light. Low and open, the Irwin Union bank invites the public to walk in from under the trees and sit with a banker without traversing a voluminous lobby or protective facade. It is a deferential civility defined by an inviting floor and a floating ceiling. Vertical surfaces lose their traditional symbolic role. Instead, curtains and sumptuous furniture delicately define places and postures within the bank.

The Miller House is another stunning example of integrated design. The house is a sophisticated collaboration between Eero Saarinen, Dan Kiley and interior designer Alexander Girard. Again, the ceiling and floor focuses attention on the details of the interior and landscape. The otherwise monolithic white ceiling is sliced by a grid of skylights. These continuous plenums nestle between bifurcated beams as a pocket of air between exterior skylights and a tray of interior translucent glass. The result is an ambient luminescence³, a serene foggy glow from emanating through and reflecting from translucent and matte surfaces.

In fact, the house is an erudite study in removing reflections, an inverse of the Barcelona Pavilion. The interior walls of Alabama marble are pitted enough to retain their veining but lose their sheen⁴. The skylights even trace the exterior of the outer walls to cut glare from the large sliding walls of glass. The bright travertine floor, too, slides into the landscape to further dissolve the exterior wall and reflect light onto the low but buoyant ceiling. Suspended in a mist, the intricate fabrics and curious objects selected by Girard connect with the equally lush and manicured plants curated by Kiley. Saturated color and delicate pattern are arranged in variously scaled grids to unify the inside and outside of the house.

The floor, too, connects interior and exterior into a unified landscape. The studio discussed the history of material invention and spatial expansion in post-war America. In his essay "Ultrasuede," George Wagner explains the highly developed surfaces of both Eliel and Eero Saarinen. In the Saarinen House, for example, Eliel draped traditional handcrafted rugs from the wall, over furniture and onto the floor.⁵ Eliel's draped rugs were also communal



2

thermal events; carpets were pulled up over numb legs in cold weather. In the Miller house, Eero generalizes this touching convergence of furniture and floor to create a generous piece of architectural furniture. The famous “lounge pit” is the communal heart of the house. In both cases, extensive but intimate fabrics elicit a convivial posture, from curling under a rug to lounging within a cushioned floor. Much post-war furniture conspired with carpet to propose such a recumbent life on the floor.

This sprawling floorscape rolled out of the Miller House and into the TWA Terminal (1960). The strategy took root and was adopted and generalized by increasingly larger institutions. Wagner clearly outlines the promise of such an expansive openness, an architectural anonymity that suspends the body in the public realm⁶. As floors and furniture converge, the public is invited to improvise on a seamless carpet landscape extending from wall to wall. Wagner explains the inward focus and bodily suspension of post-war expansive interiors as a deliberate solicitation of self-expression, an invitation to posture in freedom or rebellion.

Air conditioning made the expansive interior possible, however, and Wagner does not note the thermal origins of Elie’s draped rugs. If the seamless-ness of carpet solicits bodily improvisation, homogenous air gives few cues for personal or communal thermal action. Furthermore, carpet combines with absorptive ceiling tiles to remove reverberant sound. Entire interiors are optimized for conversational speech. Although air conditioning, lighting and acoustic absorption had been compressed into an integrated ceiling before the war,⁷ Saarinen continued to invent options. At the GM Technical Center (1957) and John Deere Headquarters (1964), for example, Saarinen engineered sophisticated ceilings that choreograph downlights, sprinklers, speakers, diffusing baffles and perforated screens. Although monolithic, the solutions are various and tailored to each institution.

Such sophisticated horizontal surfaces structure a plenum of mutable environmental effects. In his description of North Christian Church, Wagner explains:

Eero Saarinen’s church is a sort of space dome, caught between a molded floor and an inflected roof, two shells in tension, pulled away so that they never touch. Religious iconography has been minimized, reduced in scale and made discreet, no larger than a body. The space is full of little but light, dim and wavering, filtering down through a baffled oculus and washing up under the eaves across the soft, porous plaster. As little as a passing cloud can produce tremulous modulations. The ceiling reads like canvas that absorbs all the light and reflects all the color. The interior is monolithic, monochromatic and very subtle.⁸

Figure 2: *Public Mediations*, student work based on the civic uplifts of the Irwin Union Bank.

This is a subtlety architects notice. And photograph. But the North Christian Church, another collaboration between Saarinen and Kiley, is also memorable for the deep shade of its apple orchard and the hushed echo of its interior shell. Most memorable, however, is the shift in attention. Once we notice subtle variety, we simply attend to it with delight.

MEANINGFUL VARIETY: PLENUMS DEFINED BY AIR

By focusing on the direct physical experience of Saarinen's work, the studio endeavored to shift attention from the patterns and profiles of his highly developed surfaces to the environmental effects they produce. As Jennifer Yoos explains, "Architects need to broaden their scope of considerations and see air, and the other phenomena of the temporal field, as part of their medium. Space is not simply a by-product of architectural form but a field of energy and material effects that can be designed."⁹

A plenum defined by air—with a focus on thermal and acoustic variety—could retain an informal openness while expanding the choices for personal and collaborative work in a contemporary library. Here, air is proposed as an aesthetic and performative medium. Instead of defining spaces with inert boundaries, students were encouraged to manipulate luminous, acoustic and thermal zones. After studying both sites, each student selected one library to infuse with meaningful variety based on unique opportunities of the site. The Lewis branch, for example, begged a solution to the deracinated parking lot.

LUMINOUS VARIETY

In the interior, sunlight is almost entirely reflected from adjacent exterior surfaces or scattered by air into an ambient luminescence. The ceilings of the Irwin Union Bank, Miller House and North Christian Church are all uplit with sun reflected from an adjacent landscape surface. Natural light is traditionally a source of significance in a library, and every student developed a lighting strategy. Most students were also able to coordinate this strategy with another effect of air.

Public Mediations (Figure 2), a proposal for the Lowder branch, reuses ideas from the Irwin Union Bank. The project addresses the civic interior as a generous, light-filled space while recognizing the contradictions that arise from the need for private space in a large public room. By sloping the ceiling plane up to a large central lantern, the light overhead exaggerates the effects of weather over the course of a day. Sunlight is filtered through channel glass in the morning and translucent wood veneer in the afternoon. A collection of oversized resilient furniture combines desks, bookshelves, and integrated lighting to create a monastic edge around the perimeter. Forming small alcoves or reading rooms, these pieces allow patrons to inhabit the stacks and retreat to acoustic shadows to study, instruct or daydream. Private and communal work spaces share a civic lantern but are zoned into acoustically diverse pockets of air.

ACOUSTIC VARIETY

In "Resonant Texts," Shannon Mattern voices the critical role of acoustics in public libraries. Libraries once had a distinct sound; they were reverberant chambers for quiet study. Silence was disciplined, while noise was



3



4

inefficient, disorderly and uncivil.¹⁰ With changing work habits and expanding choices of media, however, there is no single sound of reading today. Libraries are active places to engage with ideas through collaborative work and debate.¹¹ To fully embrace new technologies and fluid work habits, contemporary libraries must accommodate a growing range of activities including quiet study, group tutoring, video production, language classes and public lectures. Each of these activities requires a slightly different quality of air. In this case, absorptive, reflective and resonant surfaces can be orchestrated to tune individual rooms and spaces to forge a meaningful acoustic diversity—from a quiet refuge to a boisterous hangout.

THERMAL VARIETY

In “On Seeing Air,” Jennifer Yoos challenges architects to invest in the aesthetic potential of space as a variety of microclimates.¹² As an alternative to uniformly conditioned space, architectural surfaces direct and temper an experiential mass of material air. The Miller House, in particular, is defined by pockets of air held between walls, furniture and planting. The unifying ceiling and floor extend into the landscape, creating additional rooms in the garden.

Referring to the Miller House, Reading Gallery (Figure 3) integrates with the landscape to provide thermal and acoustic variety for the diverse patrons of the underserved Lewis Branch Library. A new glass enclosure extends the interior eight feet, essentially wrapping the existing interior in a plenum to create an intimate reading gallery. With varying glazing types

Figure 3: Reading Gallery, student work based on the microclimates of the Miller House

Figure 4: At Home in the Library, students work based on the zones of thermal and acoustic variety in the Miller House.

designed to filter light and direct views, each space within the addition is thermally unique. This enhances individual choice for short, extended or repeat visits. Behind the new glass enclosure, the existing brick wall is carefully opened to connect the landscape to the now more collaborative center, providing a fluidity of movement with different qualities of light and air. The building promotes this connectivity with the surrounding community to provide inspiring spaces that enhance the learning and working environment.

A proposal for the Lowder branch, *At Home in the Library* (Figure 4), considers the library a home for the community—a place to be both alone and together. This project relates directly to the subtlety observed in the Miller House and begins to incorporate a residential thermal devices including a porch and hearth. Within the walls of the existing building, rooms of the library compose an expansive interior around a cooling hearth with an operable skylight to facilitate evaporation of condensation. While this thermally activated surface generates various temperature zones, the spatial arrangement of materials and furniture suggests an equally variegated acoustic and social landscape. The intensity of sound is controlled through the strategic placement of materials such as cork, and an oversized conversation area offers multiple seating configurations for individual or group study. This translation of the domestic interior suggests a new civic-ness for suburbia and becomes a collaborative home with a variety of creative environments.

CIVIC AIR

The corral is a fence around a space; the souk is a carpet on the ground and a cloth ceiling. In other words, there are structures that prioritize the walls...and there are structures that prioritize the floor and ceiling... Institutional architecture is about walls and control, about keeping out time and change, aliens and foreigners. Commercial architecture is about no walls, about that eight-foot space of human interaction that encloses the planet.¹³

An expansive interior defined by a floor and ceiling, that eight-foot space of human interaction that encloses the planet, locates meaning in exchange, bodily posture and environmental effects. The suppression of symbolic vertical surfaces alleviates the responsibility to represent an ethical constructional logic or communal image. For identical libraries in dissimilar neighborhoods, this suppression is productive. Rather than choosing a new image first, defining the library as a plenum of saturated air proliferates potential activities and postures. Monolithic acoustic and thermal qualities are replaced with a practical and sensual variety.¹⁴ Each library can become a place of multiple private experiences rather than a singular representational vision.

When the architecture of Eero Saarinen is not overtly expressive, it is often subtle enough to suspend a self-expressive visitor in a field of environmental and social potentials. In the Miller House, for example, the communal “lounge pit” is nestled deep in the center of a field of environmental effects. This center connects directly to the exterior through sliding glass walls. But the overall effect is a delicate balance. The house can be expansive because it is so low. It can direct attention outward because it is so hermetic. It can be lush because it is so sparse. Crucially, it can be comfortable because it is so uncertain. The contradictions are insistent and infectious.

Recent experiments in environmental variety have led to the hyperactive personalization of space through new user-controlled digital technologies. Sadly, these experiments have not loosened the preeminence of ubiquitous comfort. The tyranny of private experience now extends to the control of microclimates. But public space assumes a crucial stubbornness, the submission to a pleasurable inconvenience. On a planet 2 to 4 degrees warmer, we may need to delight in a broader and less stable understanding of thermal comfort. We may need to reinvest in communal thermal action. The Miller House quietly forces such a communal bond through climate. The family gathers in a plenum of air. Subtle variations in thermal, luminous and acoustic qualities elicit a shared sense of wonder. This sense has the potential to create public places with a renewed civic identity beyond imagery. As a mutable but obdurate medium, air is insistently experiential and delicately collective.

ENDNOTES

1. Le Corbusier, *Precisions on the Present State of Architecture and City Planning*, trans. Edith Schreiber Aujame (Cambridge, MA: The MIT Press, 1991), 66.
2. T. Kelly Wilson (Director, Indiana University Center for Art and Design--Columbus) in discussion with the authors, June 14, 2012.
3. Ambient luminescence borrowed from lighting designer Richard Kelly. See Dietrich Neumann, ed., *The Structure of Light: Richard Kelly and the Illumination of Modern Architecture* (New Haven: Yale University Press, 2010).
4. For a detailed description of a similar technique is used in the CBS Building (1965), see Reinhold Martin, "What is a Material?" in *Eero Saarinen: Shaping the Future*, ed. Donald Albrecht and Eeva-Liisa Pelkonen (New Haven: Yale University Press, 2006), 68-81.
5. George Wagner, "Ultrasuede," *Perspecta* 33 (2002): 92.
6. Wagner, "Ultrasuede," 96.
7. For a fascinating history of Modern absorptive ceilings, see Emily Thompson, *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900-1933* (Cambridge, MA: The MIT Press, 2002).
8. Wagner, "Ultrasuede," 95.
9. Jennifer Yoos, "On Seeing Air," *ARCADE* 28.3 (Spring 2010), accessed December 20, 2011, <http://www.arcadejournal.com/public/IssueArticle.aspx?Volume=28&Issue=3&Article=371>.
10. Shannon Mattern, "Resonant Texts: Sounds of the American Public Library," *The Senses & Society* 2:3 (Fall 2007): 282.
11. Mattern, "Resonant Texts," 286.
12. Yoos, "On Seeing Air."
13. Dave Hickey, "On Not Being Governed" in *The New Architectural Pragmatism*, ed. William S. Saunders (Minneapolis, University of Minnesota Press, 2007), 95.
14. Wagner, "Ultrasuede," 98.