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CONTENTS

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Bottom: Low/Rise House, by Spiegel Aihara Workshop.

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03.14

19 Menil Drawing Institute

FRONT

74 Frank Lloyd Wright at MoMA

CENTER

BACK

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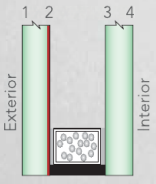

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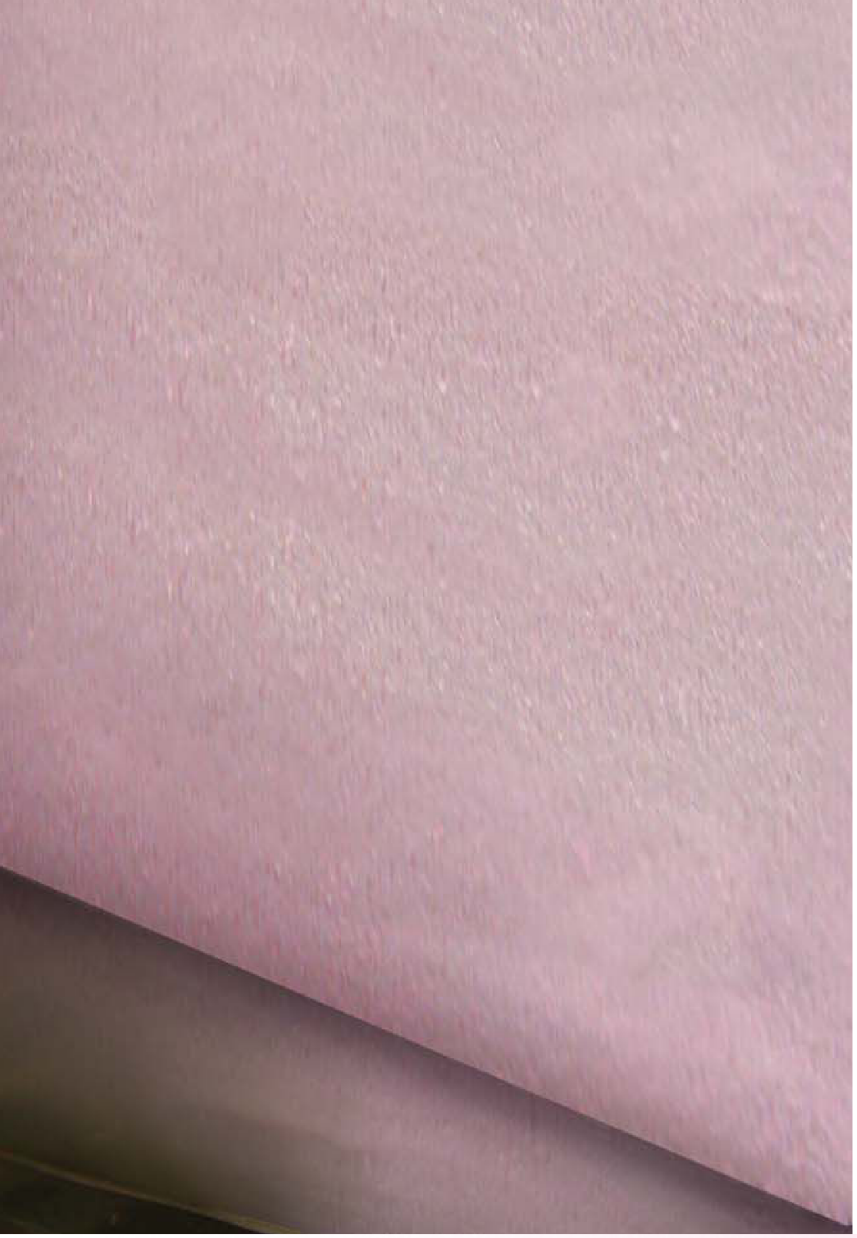

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STAR TRACK

From Las Vegas's star-studded cast of gaming resorts to New York landmark **Yonkers Raceway**, casinos are becoming synonymous with innovative design. This historic 1890s racetrack bet its future on a 21st-century overhaul of its **Empire City Casino** by New York-based **Studio V Architecture**. With a philosophy of exploring architectural expression based on contemporary technology, the award-winning firm capped its redesign with a space-age *porte-cochère* of steel latticework clad with ETFE Teflon-coated film. The innovative entrance stunningly reinvents the casino's image and marks the first U.S. application of this cutting-edge material—showing a building need not be conventional to be a good bet.

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SCI-FI AND HARD SCIENCE

WHEN THE DYSTOPIAN VISIONS OF SCIENCE FICTION START RINGING TRUE, YOU CAN BET THERE IS SOMETHING WRONG.

BEING A FANBOY HAS ITS BENEFITS. LIKE WHENEVER I CATCH UP ON THE NEWS. BECAUSE THESE DAYS I FIND SCIENCE FICTION CAN BE MY BEST, AND SOMETIMES MY ONLY, FRAME OF REFERENCE.

I'M SOMETHING of a science fiction geek. While you won't catch me at Comic-Con dressed as a Wookiee, it is true that Ridley Scott's *Blade Runner* is one of my favorite movies, and that I have owned three successive copies of Frank Herbert's *Dune*, each of which has fallen to pieces after multiple readings.

I generally keep this particular set of enthusiasms to myself—there are topics of conversation with broader appeal than, say, the theme of decay in Katsuhiro Otomo's epic manga series *Akira*—but being a fanboy does have its benefits. Like whenever I catch up on the news. Because these days I find science fiction can be my best, and sometimes my only, frame of reference.

Science fiction isn't such an odd preoccupation for designers. After all, central to the genre is the conceptualization of entire worlds. Director Fritz Lang's *Metropolis* is no less powerful—and was no less influential—than Le Corbusier's contemporaneous Ville Radieuse. To be clear, however, there is science fiction, and there is science fiction.

I'm not much interested in the *Predator* movies, for instance. Arnold Schwarzenegger's line from the first installment, "If it bleeds, we can kill it," sums up the empty first-person-shooter attitude toward violence—that it's free of moral consequence. Never mind that the target from outer space is usually just a stand-in for communism or feminism or illegal immigration. If it's a metaphor, we can kill it.

Nor, by contrast, am I a fan of the *Star Trek* school of wide-eyed utopianism. Too many of humanity's core causes for conflict and self-improvement—politics, sectarianism, resource limitations—have been miraculously resolved in the giddy rush to go where no one has gone before. (What fuels that warp core? Hugs?)

No, the subgenre that really grabs me is the dystopian, in which science fiction mirrors our own society, warts and all. Particularly the warts. One such work, *Flood* by Stephen Baxter, follows the near-collapse of civilization in the face of rapidly rising seas. Never mind that seismic activity, not climate change, is the author's scientific explanation for the calamity. The book was published in 2008, and, at the time, its descriptions of London and New York flooding read as science fiction—which is to say, implausible—even though Hurricane Katrina had happened just three years before.

Then a pattern began to emerge. In 2010, floods in China left thousands dead and forced millions to evacuate, while an intense monsoon season left one-fifth of Pakistan underwater. In 2012, Hurricane Sandy whalloped the Eastern Seaboard. Last September, Colorado exceeded its average annual rainfall in just five days, with horrifying results. And last month, record rainfall and 100-mph winds drove thousands from their homes in Southern England.

And don't get me started on the droughts.

I hope the worst events in *Flood* never come to pass, but science and science fiction seem to be falling into ever-closer alignment. In October, the journal *Nature* published a report that compiled 39 different peer-reviewed climate models into a single forecast of the dates for "climate departure," when the lowest temperatures in a region are warmer than the average highs of 1860 to 2005.

As *National Geographic* puts it in an article about the report, "The coldest year in New Guinea after 2020 will be warmer than the hottest year anyone there has ever experienced." New York City and Washington, D.C., are scheduled to depart by 2047, with a five-year margin of error.

This is why we need more architects who focus on resilient systems, like Susannah Drake, AIA. (See page 70.) It can be exciting when science fiction becomes reality—like when man walked on the Moon—but visions of the future can be both positive and negative. When science fiction's downsides ring true, architects need to stand up and take note.

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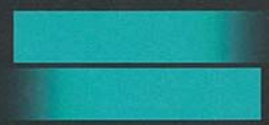

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ON THE DRAWING BOARD

THE NEXT ADDITION TO THE MENIL COLLECTION, THE MENIL DRAWING INSTITUTE, LOOKS TO LIVE UP TO A CHALLENGING LEGACY.

THE MENIL COLLECTION has never played it safe. With any luck, the young Los Angeles–based firm Johnston Marklee—which debuted its design for the Menil Drawing Institute (MDI), alongside new landscaping by Michael Van Valkenburgh Associates, last month—will follow suit. Due in 2017, the 30,000-square-foot, $40 million project will be the latest addition to the 30-acre Houston arts campus. There, it joins Philip Johnson's Rothko Chapel and Renzo Piano's masterful cypress-clad, ingeniously daylit main building—the template for many strikingly similar subsequent Piano museums, winner of the 2013 AIA 25-Year Honor Award, and not an easy act to follow.

Early renderings of the MDI show galleries, support, and archival space—plus cloister-like courtyards encircled with white-painted steel canopies in an inverted-hip-roof configuration—packed into a footprint of just 17,000 square feet, all below a 16-foot-high profile consistent with the ridges of nearby cottages. As in Piano's main building, outdoor space at the DMI extends far inside the perimeter of the institution. But where Piano deployed his daylighting apparatus as an arbor, Johnston Marklee uses those cloisters and canopies, whose deep overhangs ensure the modulated daylighting vital to viewing, to protect delicate works on paper.

The shortlist for the project included London's David Chipperfield Architects (author of the 2009 de Menil campus plan), Tokyo's SANAA, and Mexico City's Tatiana Bilbao. Johnston Marklee's long experience with residential projects—like the firm's charismatically barnacle-like and much-admired 2004 Hill House in Pacific Palisades, Los Angeles—helps the firm to mediate between the neighborhood's domestic scale and the campus's monumental manner. By investing in an emerging practice rather than in an established name, the MDI has chosen yesterday's Renzo Piano over today's. And if Johnston Marklee can put a little more L.A. swagger into this tight but tidy preliminary design, the results may be remarkable.

THOMAS DE MONCHAUX

The Menil Drawing Institute will be the first freestanding U.S. building devoted solely to the display and study of works on paper.

Is the MoMA Sculpture Garden Doomed?

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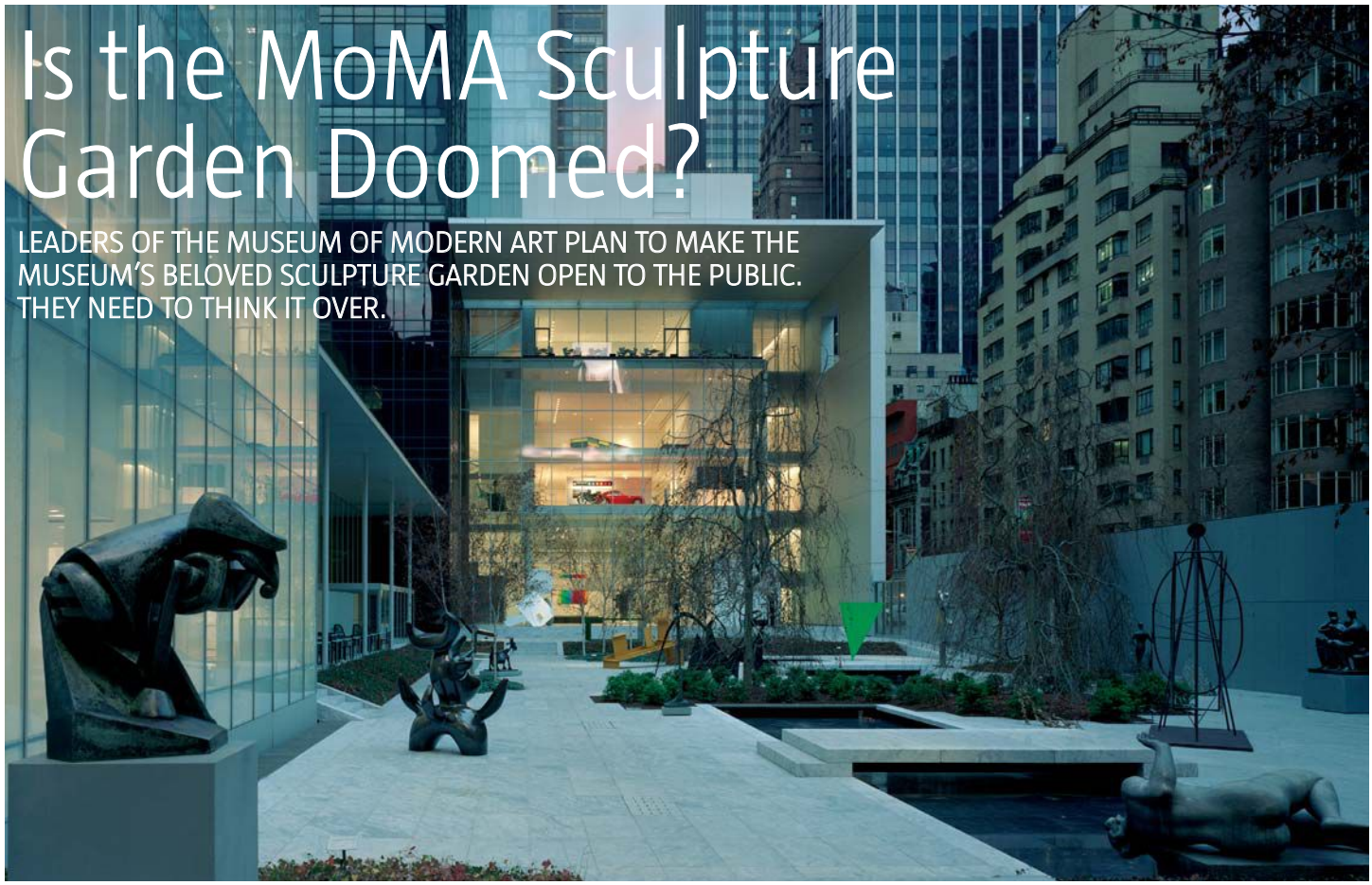

TIMOTHY HURSLEY

THE DEBATE OVER MoMA'S GARDEN RAISES BIGGER ISSUES THAT DESIGN PROFESSIONALS, STEWARDS, AND ADVOCATES MUST ADDRESS, PARTICULARLY WITH THE RENAISSANCE OF THE URBAN CORE.

THERE'S PLENTY OF NEW FUEL for the perennial sport of Museum of Modern Art–bashing, as the museum pursues a controversial expansion plan. Will the architecture firm of Diller Scofidio + Renfro be able to raze the MoMA-owned and widely acclaimed former American Folk Art Museum building, designed by Tod Williams Billie Tsien Architects, to accommodate an expansion of the critically derided MoMA building designed by Yoshio Taniguchi, Hon. FAIA? Commentary is flying. Panels have been empaneled. The issue has attracted many players into a preservation debate that is still heating up: Elizabeth Diller survived one *auto-da-fé* already. The media are hyping the feud as personal because of the potential for a Grand Guignol starring two of architecture's first couples.

Setting aside such dishy digressions, it's encouraging to see this vigorous debate about an existential threat to recent work by celebrated practitioners. But where was the public discourse when Martha Schwartz's award-winning design for the Jacob Javits Plaza was replaced last year by Michael Van Valkenburgh's work? Schwartz's design at 15 was barely older than the Folk Art Museum building being razed by MoMA. Is it different for building architecture than landscape architecture?

Maybe the Javits situation needed a get-out-of-jail-free card, which is what MoMA officials hope they have in offering some form of increased public access to their famed Abby Aldrich Rockefeller Sculpture Garden, designed by Philip Johnson in 1953. Well, not so fast. A recent article in *The New York Times* quoted six landscape architects, including James Corner, Ken Smith, Michael Van Valkenburgh, and Laurie Olin, Hon. AIA (which may be a record for the number of landscape architects quoted in a *Times* article). Opinions differ. Smith said: "It's a good idea." Olin is skeptical: "They're using [a promise of increased access] to pacify people about something else that has people upset, and in the course of it, they're watering down what was special."

If MoMA throws open its garden, what could happen? How do stewards of cultural landscapes, whether an individual site (like the garden), a larger site (like New York's High Line), or a much, much larger site (like the city of Savannah, Ga.) manage the visitor experience, which ranges from restorative contemplation to active stimulation? Savannah, whose population is under 150,000, had more than 12 million tourists in 2012 (up from 7 million in 2006). The High Line's 2013 visitation was 4.8 million people, 50 percent of them residents, up from 3.7 million visits in 2011 and double the 2010 figure. Balancing the needs of tourists and residents is difficult work. "Our challenge is to figure out how to sustain the park as a special place for New Yorkers, and we are actively working toward this goal," wrote one Friends of the High Line blogger in 2012. "We are exploring ways to make it easier for

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New Yorkers to know when visitation is at its peak, such as live Web cams, Twitter updates, and more." Maybe it's time for congestion pricing, or HOV (High Occupancy Visitor) lanes.

With increased access, a site risks being loved to death. Philip Johnson, designer of MoMA's sculpture garden, addressed its carrying capacity in the 1994 book *Philip Johnson: The Architect in His Own Words*. Johnson fielded the direct question: "Is [the garden] at its best when there are very few people in the garden or when there are a lot?" He replied: "It's better to have a few, of course, because then you get the feeling of the space. But it can take solid crowds."

That takes us back to how we measure success in terms of the visitor experience. Johnson himself said: "You need a place to relax after looking at the artwork. You're so relieved that there is no painting to focus on."

The Central Park Conservancy has successfully implemented a sort of crop rotation for people by luring visitors north with the addition of the Charles A. Dana Discovery Center on the Harlem Meer (opened in 1993) and shifting locales for where dogs run off leash (among other steps) to meet the needs of visitors while maintaining the site's integrity. By contrast, the lawn of the National Mall in Washington, D.C., frequently looks bedraggled; this is the biggest reason why the annual National Book Festival is being moved to D.C.'s convention center. Johnson's Glass House in New Canaan, Conn., has limited visitation, as does the Hillwood Estate, Museum and Garden in Washington, D.C., but both are located in residential neighborhoods, which imposed the limits. (The Glass House's stewards did apply to increase the number of visitors but withdrew the application following a predictable backlash from neighbors.)

The debate over MoMA's garden raises bigger issues that design professionals, stewards, and advocates must address, particularly with the renaissance and growth of the urban core. Can success be measured by valuing the quality of an experience that honors a site's design intent rather than the greatest number of visitors? Is less more? In his 1988 treatise *City: Rediscovering the Center*, the great social and cultural theorist William H. "Holly" Whyte posed this question: "What if we were to succeed too well? Conceivably, so many more people might be attracted as to crowd out the values they came to enjoy." MoMA must be careful what it wishes for.

CHARLES BIRNBAUM

Charles A. Birnbaum is the president and founder of the Cultural Landscape Foundation.

DAVID BENJAMIN'S BUILDING BLOCKS

THE NEXT MOMA PS1 OFFERING WILL BE ONE OF THE MOST EXPERIMENTAL IN THE HISTORY OF THE YOUNG ARCHITECTS PROGRAM.

THE ARCHITECTURE WEBOSPHERE is abuzz about David Benjamin, co-founder of New York–based The Living, and his winning proposal for the Museum of Modern Art (MoMA)'s 2014 PS1 Young Architects Program. The firm's experiments with gill-like breathing windows, micro-archipelagos of water-testing devices, and collective sensory networks for buildings have broadened the field's notions of what building products and architectural practice can be.

Benjamin's proposal, an installation called "Hy-Fi," will be a brick tower that frames three circular oculi at the top, providing both shade and cooling breezes for summer visitors to the Long Island City, N.Y., institution, via stack-effect ventilation. The most compelling aspect of Benjamin's proposal, however, is the brick that The Living is using to build the tower: One type is a bio-engineered brick made of corn stalks and living mycelium roots, and another is a reflective brick made of thermoformed multilayer-optical film, produced by 3M.

In an email conversation, Benjamin says that the process to make the bricks out of agricultural waste and fungi is adjustable. "By varying factors such as coarseness of the chopped-up byproducts, duration of growth, process of drying, and post-treatments, we can tune the material strength, density, and hardness of the material," he writes.

Benjamin shared images of the first laboratory prototypes. These look like wide loaves of bread dough that he colors with a variety of dyes (presumably because people expect bricks to be red, although some of the tones he uses are tantalizingly high-chroma).

Visitors to the summer "Warm-Up" parties in the museum's courtyard will recall the sweltering heat that typically shapes these events—and may wonder how a tower built with biological materials could possibly survive such conditions. The material is inert, however, which should allow it to last all three summer months without degrading while still being safely compostable once "Hy-Fi" is dismantled. In an effort to convince skeptics (and simply for the sake of good practice), Benjamin writes, the firm has "already been conducting accelerated aging tests to confirm the performance of the material after 90 days of New York City summer conditions, including wet/dry cycling and UV exposure."

Benjamin and his team are working with London-based Arup, which is providing structural consultation on the tower design as well as the expected mechanical performance of the bricks. As one of the most experimental PS1 proposals from a materials standpoint, Hy-Fi stands as one of the most anticipated Young Architects Program designs to date. BLAINE BROWNELL

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Q+A: FRANCINE HOUBEN

"I HOPE MIES WILL BE PROUD OF ME. THAT'S MY DREAM."
—FRANCINE HOUBEN

This model, proposed by Mecanoo and Martinez+Johnson, shows what the MLK Memorial Library might look like after a renovation and with the addition of mixed-use space on top of the Mies building.

LAST MONTH, the District of Columbia Public Library system selected Dutch firm Mecanoo Architecten and Washington, D.C.–based firm Martinez+Johnson Architecture to renovate the capital's central library, the Martin Luther King Jr. Memorial Library—a 1972 building designed by Ludwig Mies van der Rohe. The library has suffered from decades of neglect and deferred maintenance. Now, in addition to a renovation, it may also get a new mixed-use addition, rooftop gardens, and other features. Mecanoo's founding partner and creative director, Francine Houben, Hon. FAIA, spoke to ARCHITECT about the team's plans for the only library that Mies ever designed.

What features in the MLK Memorial Library no longer support the needs of 21st-century library users?
Many floors have almost no daylight because they are blocked by walls. The structure is really of Mies van der Rohe, but I think that the way they made all the partition walls is quite illogical, because where they put most of the brick walls, you could make it totally transparent. So we cleaned up the building a lot. I hope Mies will be proud of me. That's my dream.

Do you have a favorite building designed by Mies?
The museum in Berlin [Neue Nationalgalerie]. Its pavilion is perfect. So is the composition of materials and proportions. Also, there are his skyscrapers in New York and Chicago, but I think you also have to realize the things he designed were in a certain period.

What is the city market hall in your proposal?
The term market hall was something that was in our brief. The entrance, in my dreams, is that even a father with a five-year-young son or daughter could enter the building and both be inspired. When you enter the building right now, it's very Miesian, it's not so welcoming for everybody, and it's a little bit more of the atmosphere of a corporate office building.

Patricia Patkau, an architect on one of the finalist teams, said that she is not certain that this building can honor someone like Martin Luther King Jr. Can you respond to that?
Yeah, I do not agree. If we, the way we propose in our sketches, try out these different layers—one floor is about innovation, one floor is more the market hall, one floor is celebrating education, one floor that is still celebrating the traditional books, one floor that is about history and the future of African American studies in Washington. There is also the debate center, the conference center, and the general idea that the freedom of speech oversees the whole city. For me, that really symbolizes Martin Luther King Jr.

You've said that the building should be "more human" and could use a "female touch."
When we were working on the project, we put a picture of Martin Luther King and a picture of Mies van der Rohe on the ceiling. Mies van der Rohe is very masculine, and at the same time Martin Luther King is very human. So maybe I add a little bit of a female touch.

This will be only the second project in the U.S. for your firm. Is this the beginning of more projects here?
I would love that! But we will see if they want us.

You've cited David Hockney as an inspiration. Has anyone else had particular influence on your work?
I always liked the work of Charles and Ray Eames. It's innovative, it's technical, it's human, it's useful. It's also playful, and it's still modern even after 50 years. SARA JOHNSON

TOP: ELI MEIR KAPLAN; LEFT: PETER ARKLE

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A&D IN L.A.

The architects are invading Los Angeles for the inaugural L.A. edition of the Architecture & Design Film Festival. *The Human Scale*—a documentary on the behavioral studies of Danish architect Jan Gehl—is just one of dozens of film screenings on architecture and design. March 12–16. **K.C.**

TOP: MVRDV

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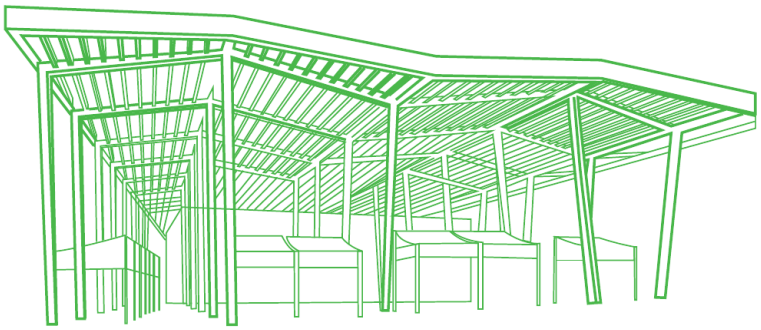
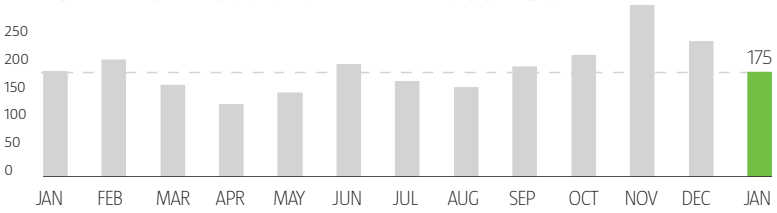


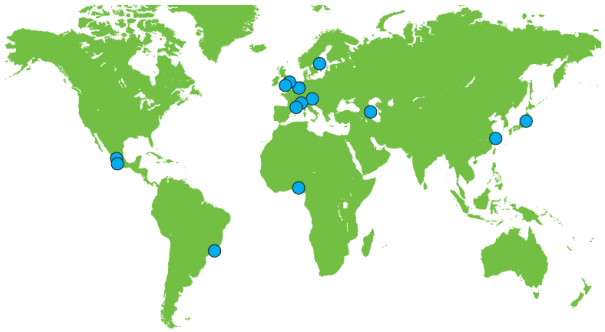
MARKET HALL, INTERRUPTED

The Wakefield Market Hall in Yorkshire, England, has failed to attract a significant following since its opening in 2008—and now, it may be up for redevelopment. Designed by David Adjaye, Hon. FAIA, the 43,000-square-foot project may be replaced by a multiplex cinema. Controversy has followed the market hall, the first public project designed by Adjaye, as concerns over its layout have been matched by issues regarding paving and drainage at the market. Indoor markets in neighboring precincts appear to be affecting the demand for Wakefield Market Hall, despite its architectural pedigree. Adjaye is currently overseeing the construction of the National Museum of African American History and Culture in Washington, D.C.

ADP NATIONAL JOB GROWTH IN THOUSANDS



Architecture Finalists for the Design Museum's 2014 Designs of the Year



Museo Jumex, Mexico City
David Chipperfield Architects

Newhall Be, Harlow, England
Alison Brooks Architects

Praça das Artes Performing Arts Centre, São Paulo
Brasil Arquitetura

St Moritz Church (interior renovation), Augsburg, Germany
John Pawson Architects

The New Crematorium At The Woodland Cemetery, Stockholm
Johan Celsing Arkitecktkontor

Wa Shan Guesthouse, Hangzhou, China Wang Shu

Child Chemo House, Osaka, Japan
Tezuka Architects, Takaharu & Yui Tezuka

Façade For Paul Smith, Albemarle Street, Mayfair, London 6a Architects

Frac Nord-Pas de Calais, Dunkerque, France
Anne Lacaton & Architects Vassal

Heydar Aliyev Center, Baku, Azerbaijan
Zaha Hadid and Patrik Schumacher

La Tallera Siqueiros, Cuernavaca, Morelos, Mexico Frida Escobedo

Makoko Floating School, Lagos, Nigeria
NLÉ, Makoko Community Building Team

Frac Centre—Les Turbulences, Orléans, France Jakob + MacFarlane

Mont-de-Marsan Médiathèque, Mont-de-Marsan, France archi5

January Jobs Report

New construction jobs reported by the U.S. Department of Labor's Bureau of Labor Statistics

16,800	+ 10,100	+ 21,200	+ 4,800	= **52,900**
Residential Construction	Heavy and Civil Engineering	Nonresidential Construction	Architectural and Engineering Services	Total Construction Jobs Added

STEP UP

Peter Zellner
Director of design, Southern California
AECOM

In the art world, Zellner is known best for designing the 3,500-square-foot white cube that houses the Matthew Marks Gallery in West Hollywood, Calif. Zellner, who established Zellnerplus in 2004, follows former Skidmore, Owins & Merrill principal Ross Wimer to (potentially) greener pastures at AECOM.

Dan Noble, FAIA
President, CEO
HKS

A 32-year veteran of the industry, Noble will direct 28 offices and more than 1,000 staffers as the next president of HKS. He's prepared: Noble has designed or collaborated on more than 125 projects, representing some 30 million square feet and more than $5 billion in construction costs. He currently sits on the boards of the American College of Healthcare Architects and the AIA Academy of Architecture for Health—the first architect to do so. Noble joined HKS in 1983 as an intern architect.

Kimberly Rousseau
Director of interior design
Cooper Carry

STEP DOWN

Harriet Tregoning
Director of planning
Washington, D.C.

In Washington, D.C., the name Harriet Tregoning may ring out for years to come. As the D.C. planning director for two four-year terms, Tregoning oversaw a period of growth that any major metropolis would envy: U.S. Census figures show that the nation's capital has added some 100,00 new residents since the early 2000s. In that time, as the city has sometimes struggled to deal with its growth and gentrification, Tregoning juggled the addition of bike lanes as well as the needs of new affordable housing. While she's leaving the city, she won't be moving far: Tregoning is taking an executive position with the U.S. Department of Housing and Urban Development.

John Pron
Professor of architecture
Temple University Tyler School of Design

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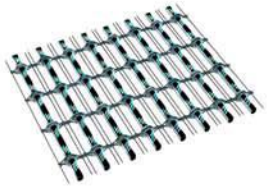

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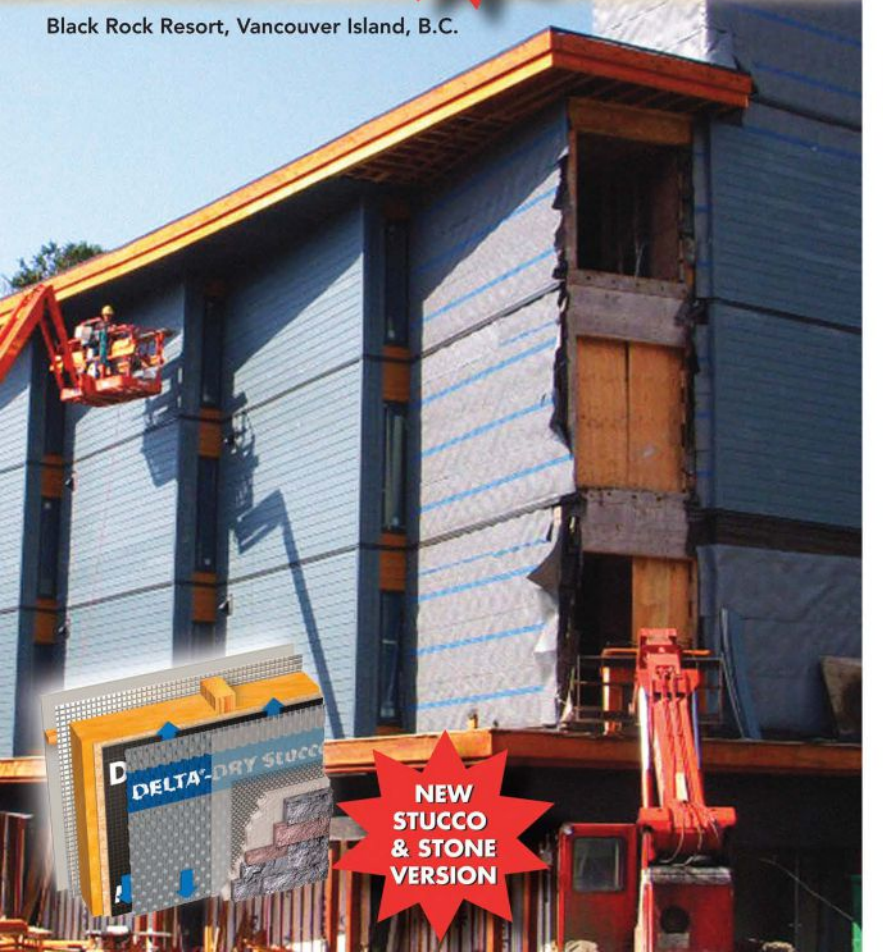

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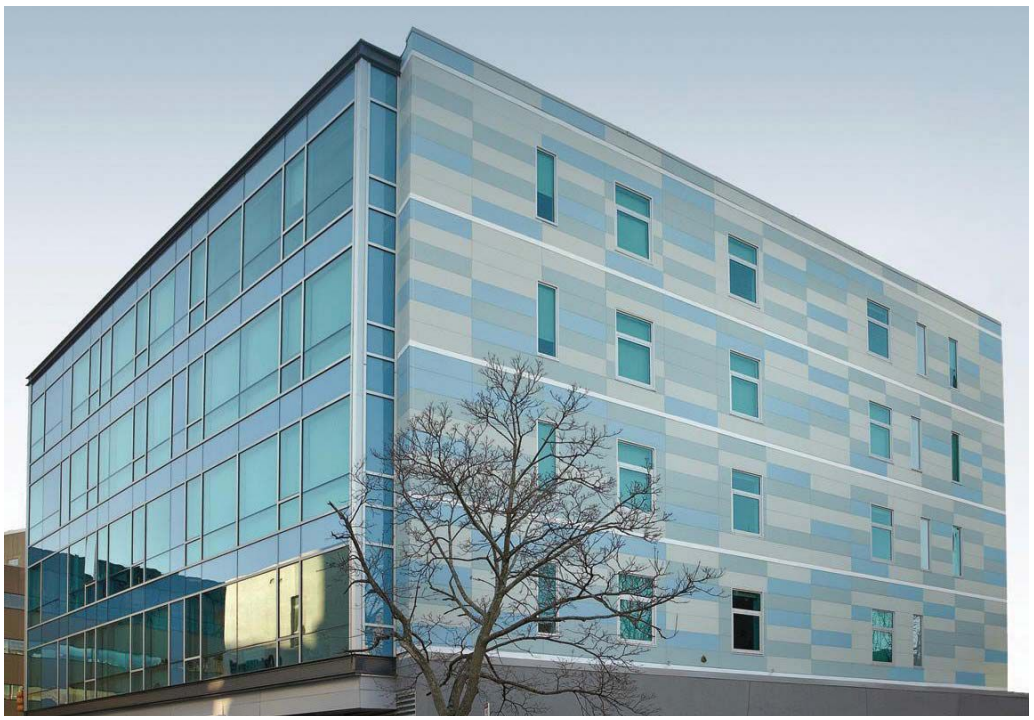

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LEARNING OBJECTIVES

After reading this article you will be able to:

1. Identify the key differences between a conventional exterior wall and a rain screen wall.
2. List the key advantages of a rainscreen wall system.
3. Define the basic physics of air and moisture flow through exterior walls and the conditions when it is most important to use a rain screen wall.
4. Identify the common problems encountered with rain screens wall systems and the key differences in design, construction, and maintenance.

CONTINUING EDUCATION

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Use the learning objectives above to focus your study as you read this article.

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By Jay Hall, PhD, Jay Hall & Associates, Inc.

INTRODUCTION

Rainscreen wall systems are used to protect buildings from water penetration and related moisture damage. They are especially effective when used with impermeable types of exterior cladding. In very wet regions of the U.S., rainscreen wall systems are sometimes required by code (i.e., regions with greater than 60 inches of rainfall per year). It is considered good practice to use rainscreen wall systems in moderately wet climates (i.e., 20–60 inches of rain fall per year). They are also very effective for improving the durability of the exterior walls of buildings – when porous building materials are used. Rainscreen wall systems can also offer an attractive light weight approach to constructing an exterior wall. This is a continuing education course for designers, contractors, and building owners who are not familiar with rainscreen wall systems.

THREE GOALS

We all know that the primary purpose of a building is to protect the occupants in the building from the outside weather. However, one of the most challenging aspects of this simple goal is to ensure that the exterior shell, or envelope, of a building forms an effective weather barrier. Key weather factors include extreme temperatures, wind (air flow), rainfall and humidity (moisture), and the sun (i.e., light, radiation, and glare). The exterior wall serves as an air barrier, a moisture barrier, and a thermal barrier.

Many exterior walls do not effectively accomplish all three goals. The thermal barrier (i.e., insulation) can only perform its role if it remains dry. Further, many incorrectly believe that insulation is an air barrier. In conventional wall systems, the exterior cladding is sometimes expected to be the air barrier as well. Regardless, it is important that the exterior cladding blocks the moisture from penetration into the wall system.

However, the most common failures are wind (air) and moisture penetration. In any wall system, wherever dissimilar materials meet, or wherever there is a physical joint, there is a risk of water leakage penetrating into the interior of the wall system. One of the most common leakage problems is around windows (especially above and below).

Air leakage has major energy and occupant comfort implications. The long term impact of moisture penetration may shorten the lifetime of the building shell (due to the physical decomposition of any moisture-susceptible wall components), and even worse, health-threatening mold and mildew contamination within the wall system. The goal of this article is to introduce the concept of rainscreen wall systems for buildings, and how this approach to exterior wall design and construction is superior to conventional wall systems.

A rainscreen wall system is a different approach to exterior wall design and construction than is usually used. This approach looks similar to conventional wall designs (see **Exhibit 1**), but it is very different behind the exterior surface. Generally, a rainscreen wall system includes an additional element that is relatively simple but difficult to implement effectively: a vertical air gap. The air gap can be as small as a quarter of an inch to a full inch. It is typically located just inside of exterior cladding (see **Exhibit 2**).

TYPES OF WALL SYSTEMS

There are three general types of wall systems used in the U.S.

Barrier Walls. A barrier wall is an assembly that relies primarily on the exterior cladding to resist bulk rainwater penetration. The insulated frame wall abuts directly against the exterior cladding such that any leakage in the exterior cladding will penetrate all the way into the wall system (including the insulation).

Mass Walls. Mass walls are designed to rely upon a combination of wall thickness and sheer mass (i.e., brick, masonry block, or concrete) to resist bulk rainwater penetration. Mass walls are rarely used today.

Cavity Walls. Cavity walls are also referred to as screen or drained wall systems. The advantage of this type of wall system is its ability to resist rainwater penetration. Brick and block walls are almost always designed with an air gap or cavity. It is becoming more popular to design wall systems that utilize an air space and drainage plane to resist bulk water penetration.

This article is focused on the features and benefits of cavity walls.

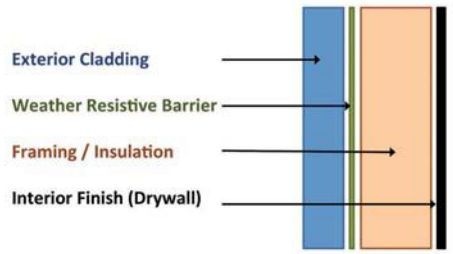
BASIC COMPONENTS OF EXTERIOR WALLS

There are four primary components to conventional wall systems:

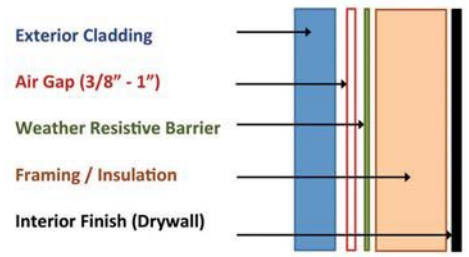
Exterior Cladding. The primary defense mechanism for keeping rain (bulk water) out of the exterior wall. Examples include: brick; metal, plastic, cementious siding; wood panels, or glass.

EXHIBIT 2

Basic Components of a Wall System



Conventional Wall System.



Rainscreen Wall System

Weather Resistive Barrier/Sheathing. In both conventional and rainscreen wall systems, the water resistive barrier serves as a drainage plane, to shed any bulk water that penetrates the exterior cladding down the wall. It is typically a very thin membrane. Another critical role is to form an air barrier. The third role is to allow a small amount of water vapor (or moisture) to move through it. This allows for drying of the interior wall to the air gap. It is important that horizontal seams in the water resistive barrier are layered overtop of the layer below, to ensure that water does not leak behind the water resistive barrier as it runs down the wall. Or, put another way, "Do not tuck your raincoat into your pants."

Wall Framing Insulation. Wood, aluminum, or steel structural wall framing, with insulation within the framing cavity (and possibly an additional continuous layer of insulated sheathing outside of the framing).

Interior Finish (Drywall). The part of the wall system that is visible from the inside, with the primary purpose of hiding the other parts of the wall system.

Of course, most wall systems also have numerous windows and doorways as well. These are some of the most common leakage points where water penetrates behind the exterior cladding and into the interior wall layers.

In a rainscreen wall system, an additional air gap layer is created between the exterior cladding and the water resistive barrier. The air gap serves two primary purposes:

1. A channel where water (moisture) that penetrates the exterior cladding can be drained down the building.
2. An avenue for moisture to escape from the interior wall layers, whenever moisture exists in the interior wall layers (i.e., from internal moisture sources, or from humidity that has infiltrated from the exterior).

Sometimes the term rainscreen is used to describe the exterior cladding itself. This leads to confusion about what a **rainscreen wall system** is and what it is designed to do. The most important aspect of a rainscreen wall system is the air barrier behind the exterior cladding and the goal of improved moisture management within the overall wall system.

Note that with conventional wall systems, the weather resistive barrier is usually flush against the exterior cladding. This prevents any moisture within the wall from escaping through the exterior cladding. Thus, the moisture can only escape through the interior side of the wall back into the interior of the building. With only one pathway for escape, the moisture will tend to stay in the wall longer. In extreme conditions, the built up moisture may do substantial damage.

TERMINOLOGY

Some of the terminology used in this continuing education course may be confusing. There are several terms used that may seem to have similar meanings but actually have critical differences in meaning. It is important to clearly understand these subtleties to fully understand how rainscreen wall systems work.

The SmithGroupJJR designing a project that is targeting LEED platinum certification as sustainability and energy efficiency was a top priority. The team designed a pressure equalizing terracotta rainscreen cladding system provided by Shildan in conjunction with an R30 thermal envelope for optimum energy performance.

Permeability can be used to express the relative flow rate of any (or all) of three distinct types of fluids:

1. Air flow
2. Bulk water flow
3. Moisture (water vapor) flow

This concept is further complicated by the fact that water vapor may be fully engrained in an air flow stream, or moisture can move independent of the air movement (i.e., via diffusion).

There is also a syntax that is used to convey varying levels of permeability, including:

- Impermeable
- Semi-permeable
- Permeable

Levels of permeability can also be expressed using terms that are less intuitive, including: barrier, retarder, and resistive. Performance metrics for permeability are discussed in the section below.

BENEFITS OF RAINSCREENS

Generally, conventional walls should have an impermeable exterior cladding surface. When bulk water leaks inside of the exterior cladding, it will likely penetrate into the interior layers of the wall. The water that penetrates the exterior cladding may wet the insulation, framing, and drywall. In extreme cases (i.e., very leaky exterior cladding), a conventional wall can become saturated with trapped moisture. Without timely drying, this can lead to a breakdown in the wall system, including: (1) loss of insulation effectiveness, and (2) mold, mildew, and rot within the wall, especially at the interior drywall surface.

Any water that accidentally moves through this exterior cladding must be removed from the inner wall layers. If the exterior cladding is impermeable, the water can only be removed by migrating all of the way through to the interior surface of the wall. The moisture cannot move to the outdoor side of the wall because the outer wall layer is impermeable.

However, with a rainscreen wall system, the water will collect in the air gap and drain down the building inside the air gap. This air gap drainage system minimizes the risk of the water damage to the interior layers of the wall. The weather resistive membrane lines the interior of the air gap and protects the interior wall from any bulk water that may collect in the air gap.

Another important aspect of rainscreen wall systems is moisture management. Sometimes moisture migrates into the wall from the inside (from rooms with higher humidity, like bathrooms and kitchens). In other cases, summer humidity may move through the wall from the outside inwards. Also, the membrane should allow moisture in the interior of the wall to migrate into and out of the air gap (behind the exterior cladding). In this manner, any moisture that enters the interior wall layer can dry both to the inside and to the air gap. This is especially important to prevent interstitial condensation. In the winter, the outer parts of the wall system are colder than the inner parts of the wall system. Any moisture that it trapped in the wall system will condense when it is cooled. Similarly, in the summer, the inner parts of the wall system are cooler than the outer layers. The ambient humidity may migrate into the inner wall, become trapped, and condense if the wall cannot breathe.

Another major benefit of rainscreen wall systems is that they can enable substantially lighter wall systems (and possibly more economical too). For example, one of the most common exterior walls systems used is masonry and brick (to provide structural support for the entire building). Alternatively, larger buildings are built with structural steel and reinforced concrete. These types of building designs do not need the exterior walls for structural support. Instead, the exterior walls are only for protection from the weather. These walls can be made of much lighter and thinner materials.

MOISTURE DRIVERS

When it rains, bulk water can leak into any open cracks in a wall system. Generally, gravity is the primary driver pulling moisture vertically down the wall. But there are other drivers that can contribute to moisture penetration into walls. Perhaps one of the most important is wind pressure. In extreme storms, winds speeds can reach more than 100 mph. This creates a large dynamic pressure on the exterior walls of buildings. For example, a 50 mph wind exerts over six pounds of pressure per square foot. This is enough pressure to drive moisture into the smallest of cracks.

Solar radiation is also a major cause of moisture movement. When the sun comes out after a rain shower, the intense solar heat can vaporize the water that remains on the exterior cladding (and possibly inside of more porous cladding materials like brick). Further, as the exterior surface heats up, relative to the interior surface, a vapor pressure difference is created that drives the moisture deeper into the interior layers of the wall. The water resistive barrier typically has limited ability to slow this moisture migration. In the summer, if the interior of the building is air conditioned, this moisture may re-condense within the interior layers of the wall system. This moisture will be dissipated more quickly if the wall can breathe through both sides (i.e., to the interior as well as into the outer air gap in the rainscreen wall system).

PERFORMANCE STANDARDS

The residential and commercial building codes in the U.S. (2012 IECC[1] and ASHRAE 90.1[2]) speak directly to the need for high levels of thermal performance and air tightness of exterior walls.

THERMAL BRIDGING

When heat leaks through a wall system via the highly conductive components of the wall (e.g., the framing members), it is effectively short circuiting around the insulation in the cavity sections of the wall.

Thermal bridging is a much larger concern with metal framing than wood framing. Framing in a wall system can comprise as much as 20% of the wall surface area.

Thermal Performance of Walls

In recent years, there has been an aggressive effort to increase the levels of wall insulation (i.e., thermal performance of walls) required by the energy codes. In colder climates, the most recent versions of the ASHRAE Standard 90.1 (2010) and the International Energy Conservation Code (2012 IECC) may require the use of continuous insulated sheathing. This sheathing provides several roles: improved thermal control, an air barrier, and a water/moisture barrier.

Typically, rigid foam sheathing is usually used on the exterior side of the cavity insulation (and the exterior side of the wall framing system). The weather resistive membrane separates the insulated sheathing from the air gap in the rainscreen wall system. Alternatively, the foam sheathing may be used on the interior side of the frame wall. Either approach offers the advantage of minimizing thermal bridging, especially when steel framing is used.

It is very important to use caution when using rigid foam sheathing. Rigid foam sheathing affects the moisture management strategy for the wall system. Some types of rigid foam sheathing are relatively impermeable, and moisture may be trapped inside a wall system. Such walls may have more limited drying potential. Further, this extra layer of insulation may change the temperature profile within the wall and may increase (or possibly decrease) interstitial condensation. Deliberate consideration of the heat, air, and moisture flows are especially important with the use of insulated sheathing. A well designed rainscreen wall system minimizes these risks.

Visit http://go.hw.net/AR314Course1 to read more and complete the quiz for credit.

SPONSOR INFORMATION

QUIZ

1. From the exterior, rainscreen wall systems look very similar to conventional wall systems.
   a. True
   b. False

2. What is a rainscreen wall system?
   a. An air gap that allows bulk water to drain between the exterior cladding and the remainder of the wall system
   b. A wall system that allows exterior walls to breathe to both the inside and the outside
   c. An air barrier that enables buildings to comply with the new energy code requirements
   d. A design approach that reduces bulk water penetration into exterior walls
   e. A specialized wall system used only in very wet climates

3. What is the primary purpose of the exterior cladding in a wall system?
   a. Thermal barrier
   b. Air barrier
   c. Bulk water barrier
   d. Weather barrier
   e. Vapor barrier
   f. All of the above

4. What is the primary purpose of the weather resistive barrier in a wall system?
   a. Thermal barrier
   b. Air barrier
   c. Bulk water barrier
   d. Weather barrier
   e. Vapor barrier
   f. All of the above

5. What is the primary purpose of the vertical-channel air gap in a rainscreen wall system?
   a. Air flow
   b. Bulk water flow
   c. Water vapor flow
   d. All of the above
   e. A and C only

6. What are the primary forces that drive rain (bulk water) into a building's exterior envelope?
   a. Gravity
   b. Wind pressure
   c. Sun
   d. Indoor–outdoor temperature difference
   e. All of the above
   f. B and C only

7. When should a rainscreen wall system be used?
   a. Buildings located in a region with large amounts of rainfall
   b. Buildings located in a region with high humidity
   c. Buildings that require a light-weight wall system
   d. Buildings that have durability as a primary design goal
   e. All of the above
   f. A and B only

8. What is a perm?
   a. An acronym for "permeable and extra resistive materials"
   b. A unit of measure defined in ASHRAE Standard 90.1
   c. A test requirement in IECC 2012
   d. A metric used to delineate between impermeable, semi-permeable, and permeable materials
   e. A relative indicator of air leakage through a material

9. True or False: A rainscreen wall assembly employs interior gypsum board as the air barrier, with an air leakage rate of 0.003 cfm /sq. ft. Does this comply with ASHRAE 90.1-2010?
   a. True
   b. False

10. True or False: With a rainscreen wall system, there should be no bulk water penetration behind the exterior cladding.
    a. True
    b. False

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AIAVOICES

CONTRIBUTING STRUCTURES | MAKING THE CASE FOR ARCHITECTURE

Zoë Ryan is the John H. Bryan Chair and Curator of Architecture and Design at the Art Institute of Chicago. As a writer and curator, she has been instrumental in translating design thinking for a wide public audience. Ryan's critical eye is also valued by competition organizers, and she has served as a juror for a range of competitions and awards programs, including the Harvard University Graduate School of Design Wheelwright Prize, the National Design Awards of the Cooper-Hewitt National Design Museum, and the Chicago Architecture Foundation's Chicago Prize. She is currently curating the Istanbul Design Biennial.

I'VE ORGANIZED A NUMBER OF ARCHITECTURE EXHIBITIONS HERE in Chicago—and I mention this because when you're telling a story about an architect you're not always talking about success stories in terms of built work. You're often talking about the competitions that architects didn't win. And yet, these designs can be just as important as the winning projects. Competitions allow architects to contribute their ideas and research that sometimes exist outside of their normal workload, but are integral to their design thinking. And competitions often mark seminal moments in an architect's career.

Competitions are all about collaboration, and the process can make for very interesting stories for the general public. Take, for instance, the MoMA PS1 Young Architects Program. I take notice of the shortlist of finalists as much as I do the winner. But every one of those firms has to deal with financial constraints and workflow issues—splitting the time of employees, for instance. There is also a business angle to how a competition challenges a firm's identity and takes it in a direction it might never have gone before.

As a writer and curator, I'm interested in iterations—how design can respond to and push a series of related ideas. If there's a public component of a competition, the gap between design insiders and outsiders narrows significantly. For me, living in Chicago is fantastic—there's a high level of public engagement in design and architecture generally.

It's true that architecture is all around us, but when we think about architecture competitions—especially those for public projects—I think people respond to those that invite them to be a part of the conversation, that prompt them to think about the contexts for these projects, and about the stakeholders that are an integral part of the process.

When I was a student, I remember being struck by architecture's proprietary language. I see my responsibility as a curator and juror as interpreting that language. I want to clarify the contribution that an entry will make to furthering architecture's relevance to daily life.

—As told to William Richards AIA

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AIANOW

ACROSS THE INSTITUTE

Compiled by William Richards

1. Space Is the Place. When *The New York Times Magazine* profiled the artist James Turrell (ahead of a retrospective that debuted simultaneously in three cites last summer), a few things about him became clear. While light is the subject of his art, light would be nothing without its artifice: custom-built rooms and modified interiors. Just because you've received a MacArthur "genius" grant doesn't mean you can't get sued (all those light tricks and dark rooms can be a little disorienting and hazardous). And, most impressively, the man owns an extinct volcano in Arizona. Does Turrell and his work personify the architectural sublime, or is it "anti-architecture"? The Los Angeles County Museum of Art will conclude its Turrell retrospective on April 6.

↗ See for yourself and learn more at *lacma.org*.

2 ***Cool Spaces.*** Stephen Chung, AIA, knows cool—and he's bringing his show *Cool Spaces!* to PBS and PBS affiliates on March 31, when "Performance Spaces" explores the ins and outs of Dallas Cowboys Stadium by HKS, the Kauffman Center for the Performing Arts in Kansas City, Mo., by Safdie Architects, and Barclays Center in Brooklyn by SHoP Architects. Other episodes next month include "Libraries" (April 7), "Art Spaces" (April 14), and "Healing Spaces" (April 21). Look for the accompanying book, *Cool Spaces!: The Best New Architecture*, at Barnes & Noble and other outlets in April.

↗ Learn more at *aia.org/coolspaces*.

3 ***Pack Your Bags.*** Since 2012, the Harvard Graduate School of Design's (GSD) $100,000 Wheelwright Prize has been available to any graduate of an accredited school of architecture—not just the GSD. Never mind that the designer Gia Wolff, the inaugural recipient for 2013, is a GSD alumna; the important thing is the prize's potential. Wolff has finished traveling and will lecture next month at the Louisiana State University College of Art + Design on her Wheelwright project, "Floating City: The Community-Based Architecture of Parade Floats," sponsored in part by AIA Baton Rouge.

↗ Learn more at *design.lsu.edu* and *aiabr.com*.

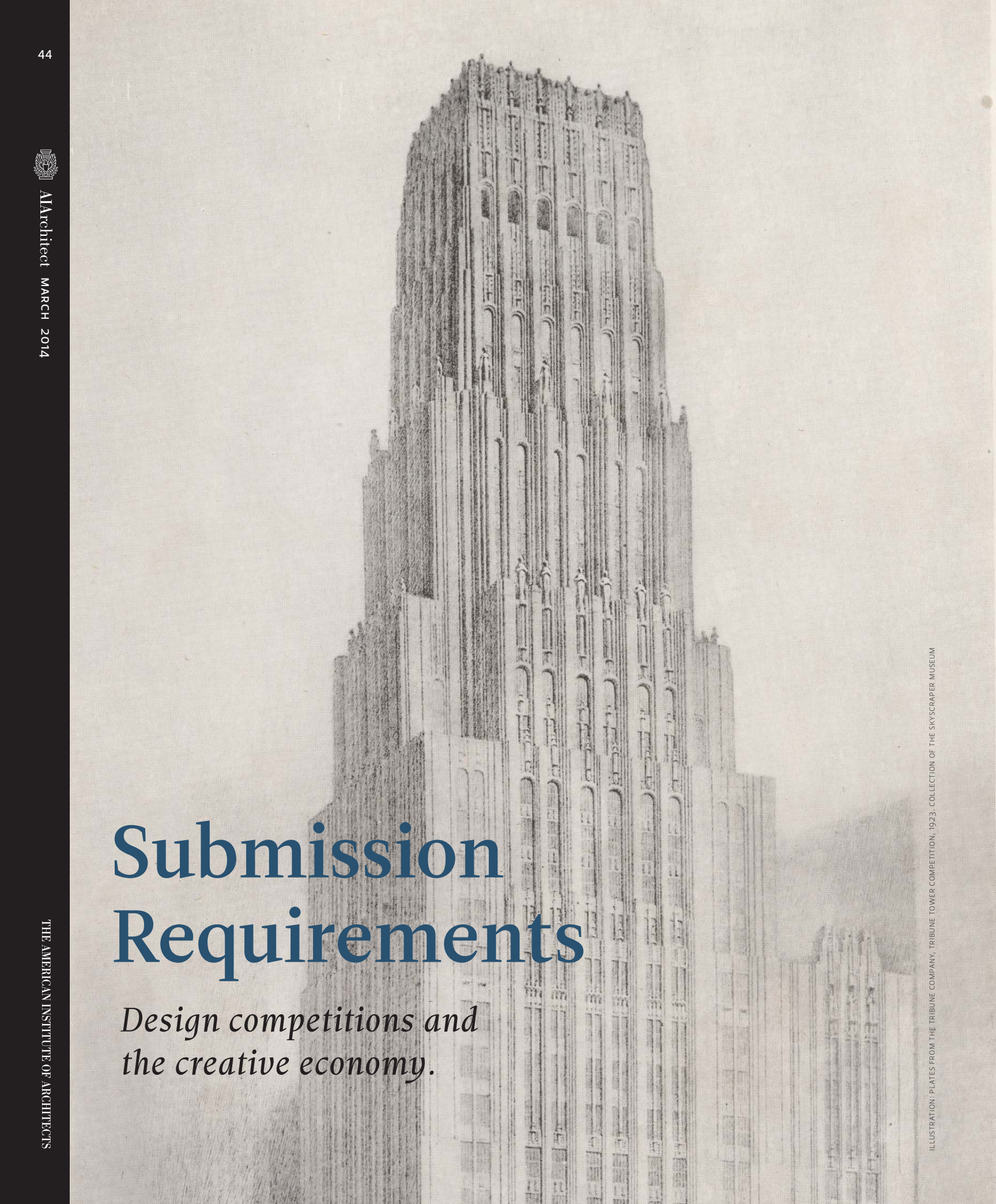
4 ***Global Practice.*** If you've been following architecture in Europe, you've come across Nasrine Seraji's work. Her Paris firm, Atelier Seraji, has completed apartments, mixed-use buildings, student housing, a stock exchange addition, sports centers, and master plans in more than seven French cities, as well as in Vienna, Tehran, and Beijing. Seraji's work has also been the subject of more than a dozen exhibitions. She will discuss these and other projects as the headliner of the AIA St. Louis Scholarship Trust Lecture at the Sam Fox School of Design & Visual Arts at Washington University in St. Louis.

↗ Learn more at *samfoxschool.wustl.edu*.

5 ***Healthy Debate.*** What part of public health belongs to design? How can good design principles translate into sound standards that support positive health outcomes? How can design solutions address social equity? To answer these and other questions, the AIA, the AIA Foundation, and ACSA will convene "The Value of Design: Design and Health," a cross-disciplinary summit for architects, public health officials, government and nongovernment organizations, universities, and members of the private sector that will take place at AIA National Headquarters in Washington, D.C.

↗ Learn more at *aia.org/practicing*.

IMAGE 1: JAMES TURRELL, LIGHT REIGNFALL, 2011, GASWORK. COURTESY JAMES TURELL, PACE GALLERY AND GARAGE CENTER FOR CONTEMPORARY CULTURE, MOSCOW. @ JAMES TURRELL, PHOTO @ FLORIAN HOLZERR. IMAGE 4: VIE, VILLE, ARCHITECTURE. COURTESY ASAA.



Submission Requirements

Design competitions and the creative economy.

ILLUSTRATION: PLATES FROM THE TRIBUNE COMPANY, TRIBUNE TOWER COMPETITION, 1923. COLLECTION OF THE SKYSCRAPER MUSEUM

1922 Tribune Tower competition (left to right): entries by Bertram Goodhue; Bruno Taut, Walter Gunther, and Kurz Schutz; and Walter Gropius. Opposite: Eliel Saarinen's second prize entry (with Chicago architects Dwight Wallace and Bertell Grenman).

AN ARCHITECTURAL COMPETITION CAN BE AN ADRENALIN RUSH. Just imagine hundreds of designers, from the famous to the wet-behind-the-ears, all thinking about the same program, all simultaneously striving to improve the commonweal with a brilliant solution to a major urban problem—or at least designing an icon that will change their careers forever.

A competition is an opportunity for an untried visionary to sweep away the Old Guard and offer a transformative paradigm. Maya Lin, a Yale undergraduate in 1981 when she beat out 1,441 other entrants to design the Vietnam Veterans Memorial in Washington, D.C., epitomizes that dream. Her controversial incision in the landscape on the National Mall changed how we approach commemorative public monuments. "Competitions are the province of the young and the unemployed," says Andrus Burr, FAIA, a Williamstown, Mass., architect and Lin's critic for the competition project at Yale.

"Superstars are too busy to enter competitions," says Helsinki architect Mikko Heikkinen, Hon. FAIA, whose firm, Heikkinen-Komonen Architects, got its big start by winning a competition. While that is not always true, there's a kind of idealism and youthful ardor that fuels stories like Lin's and is the basis of hundreds of so-called "ideas competitions" that happen each year.

In a similar manner, Joseph Paxton, an architect and gardener, came up with a giant greenhouse to house the world's first international exposition in London's Hyde Park in 1851. The Crystal Palace revolutionized the nature of large structures through prefabrication, among other achievements. The other contenders, with their Gothic peaks and massive brick domes, were rendered mute by the simplicity of Paxton's ferrovitreous cathedral.

Some students learn about legendary competitions, such as that for the Tribune Tower in Chicago in 1922, for which a Gothic Revival design by the New York architects John Mead Howells and Raymond Hood beat out the likes of Walter Gropius and Eliel Saarinen, who both submitted spare, modern takes on monumental commercial architecture. (This introduces us to the myth of more accomplished but slighted designers who deserved to win. If one placed second in a competition, one could avoid the headaches of construction while preserving an unassailable position of superiority.) Several years later, Saarinen was notified that he had won the contest to build Gateway Arch in St. Louis, only to be subsequently informed that it was his son, Eero, who had secured that plum commission. A story like that is closer to Shakespearean tragedy than to the everyday drudgery of office work.

The competition process is often fraught with difficulty, especially when a project is both very public and extremely significant (think of the recent Eisenhower Memorial in Washington, D.C., or the suite of buildings at Ground Zero in New York). Danish architect Jørn Utzon gave a continent an instantly recognizable signature with his winning design for the Sydney Opera House (juror

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Eero Saarinen was Utzon's most vociferous backer), which opened in 1973. While Utzon's billowing sails in Sydney Harbour symbolized post-colonial Australia, construction glitches and cost overruns forced his resignation and his return to Denmark.

Scandinavians are great believers in the competition process (the Tribune Tower competition brought the Saarinens to America, for instance). In Finland, all public buildings must pass through the competition process. Two recent contests—for a museum in the hinterland town of Mänttä and a library in the center of Helsinki—each attracted over 500 would-be designers from around the globe.

Some firms can even trace their origin to a competition. The Norwegian firm Snøhetta was founded in order to enter the 1989 competition for a library in Alexandria, Egypt. After winning, Snøhetta gained instant recognition and went on to win the contest for the Oslo Opera House, as well as for the James B. Hunt Jr. Library at North Carolina State University in Raleigh. "We have found that the competition environment opened the door for many young designers and brought forward many unique designs," says Snøhetta principal Craig Dykers, AIA. "Many of our best designs have come through competitions."

In 1957 Raimund Abraham and Friedrich St. Florian, FAIA, then students in Graz, Austria, placed third in a competition for the Pan Arabian University in Saudi Arabia. Gropius placed fourth. Two years later, the Austrians won the contest for a cultural center in the Belgian Congo (Richard Neutra chaired that jury). Abraham and St. Florian then placed second in the competition for Paris' Centre Pompidou, which turned out to be one of the most important contests of the modern era.

The Pompidou, like the National World War II Memorial competition that St. Florian won in 1998, represents the sort of obligatory project that tempts many a well-established architect. Despite understanding that Finnish architectural taste has evolved beyond purely rational forms (which are not dissimilar to his own work), St. Florian saw an opportunity. "I could not not enter the Helsinki library competition, given the building's role as the chief centennial project of that architecturally literate country," says St. Florian.

American Hustle

The United States has a long history of competitions. George Washington and Thomas Jefferson believed architecture would establish the right identity for a fledging republic, and a call for entries and jury would establish a democratic process to realize some of its first official buildings. Both the Capitol and the "President's House" were deemed worthy of open competitions, as was the Washington Monument. Later, the Lincoln Memorial competition demonstrated that American architects had mastered the Beaux-Arts aesthetic as well as their European counterparts. Competitions should have gained much wider acceptance. After all, they are not that hard to run, they can bring their sponsors fairly easy money, they can reap tremendous publicity, and, perhaps most important, competitions can raise both the dialogue around and the quality of what is ultimately built.

Yet the United States has never been really comfortable with competitions. G. Stanley Collyer Jr., Hon. AIA, founder and publisher of *Competitions Magazine* and adviser to countless architectural contests, laments that there are too few competitions in this country. "There are almost no open competitions for substantial projects, with the result that upcoming architects are more or less left out," he says, noting that while architecturally savvy cultures like Argentina and Brazil hold a lot of competitions, they are limited to their citizens. But, Collyer adds, "American architects are doing quite well abroad, especially in Taiwan, where open competitions are the rule."

One successful initiative that has improved the level of architectural design for public buildings is the General Services Administration's Design Excellence Program, which has produced scores of handsome new courthouses and federal buildings in many cities. This was the brainchild of Ed Feiner, FAIA, chief architect at the GSA from 1996 to 2005, who reinvented the federal procurement program for architecture while forcing the government to stress both sustainability and design quality. Yet even these competitions are limited. The U.S. State Department, too, has tried to balance security with design excellence when commissioning new American embassies. And while the latest embassy short list may include some very good designers, the same big names seem to keep showing up. Invited, limited competitions simply do not hold the excitement or the promise of contests that are open to everyone.

There are some architectural firms in the United States that regularly enter competitions. Perkins+Will, particularly the Chicago office under the leadership of Ralph Johnson, FAIA, has been active and successful. Firm principal Thomas Mozina, AIA, won the competition to build a 600,000-square-foot research center for the Northwestern University medical school. But for every win, there are more painful losses, particularly for firms that seek out competitions. After winning the contest to build a museum for the Catholic University of Louvain in Belgium, Perkins+Will's Todd Snapp, AIA, came in second behind Studio Gang for a dormitory at University of Chicago. "That was a tough one to lose," rues Snapp.

While competitions are vital and necessary, they represent a major investment in time and resources on the part of the entering firm. "I don't do many competitions; I cannot afford the time to do them," says Frank Harmon, FAIA. Harmon, whose Raleigh, N.C., firm employs a handful of architects, knows all too well the tightly wrought economics of devoting a couple of weeks of office time to a competition. Small firms, he says, have to be very selective when it comes to competitions.

Even so, competitions are sometimes about more than costs. In 2008, Harmon won the competition for the AIA NC Center for Architecture and Design in Raleigh. It was "the right thing to do," and the design brief was for a very convincing site downtown, he says, but "everything depends upon the quality of the jury." Even an avant-garde outsider firm like Snøhetta could win a major library commission for North Carolina State because of "an outstanding jury."

"Design competitions are not a cure-all for engendering good design," says Dykers, but competitions do matter to architects because they encourage debate, innovation, and kingmaking. They are especially important now as a way to encourage dialogue on the need for greater architectural responsibility—competitions should be incubators for solutions in areas such as public health, climate change, and population control that cannot be addressed by single projects.

So how do we get more competitions? How about, for example, asking professional schools to require students to enter at least one contest in order to graduate? How about offering professional credits to enter competitions? Competitions can secure a healthier, more sustainable future, but they also directly engage the architect's role in that future, and, thus, they support the profession. —*William Morgan*

AIAPERSPECTIVE

GIVE THEM THE TOOLS TO CHANGE LIVES

PHOTO: WILLIAM STEWART

EARLIER THIS YEAR, I JOINED A GROUP OF EDUCATORS, FIRM principals, National AIA Board members, and recent graduates at a summit to discuss the future of emerging professionals. Looming over our discussions—the elephant in the room, if you will—was the rising cost of an architecture education and the financial burden students take away from campus along with their diplomas. How large is the burden? The most recent statistics developed by the AIA indicate that 55 percent of those who have graduated are more than $40,000 in debt.

Even more than the challenges of the Architect Registration Exam or landing a job in a highly competitive economy, this burden poses perhaps the greatest threat to the future of our profession. The prospect of choosing a career where the first reward after years of study is a financial ball and chain discourages certain high school students from considering a career in architecture. And often, these are the traditionally underrepresented men and women we need to include in order to have a more inclusive profession. Even those who have already graduated find their career choices drastically constricted, prompting far too many to leave the field.

My parents were able to pay for four years of college for me. However, I was enrolled in a five-year professional degree program and also studied abroad during the summer between my third and fourth years. Thus, upon graduation, I had roughly the equivalent of two years of loans for tuition and room and board to pay back to the government. Fortunately for me, the cost of an education back then was much more affordable. I had a financial obligation, sure, but it was not a crushing one. That is no longer the case.

Fifty years ago, the Johnson administration launched an ambitious War on Poverty. I leave it to others to decide how this war has played out. What is not up for debate is that five decades later, whether by intent or neglect, we seem to have embarked on a war on the most vulnerable in our society. And among these people are talented young men and women who could use their gifts to shape more livable and prosperous communities. How can we, as a profession and a nation, allow their dreams to die by demanding a pound of flesh at the very beginning of their careers?

For the young men and women poised to embark upon a lifetime of service, especially those who come from minority communities that we want to recruit, there is the beginning of a remedy; it's called the National Design Services Act (NDSA). If enacted, this legislation would help students with their finances while they work to improve communities across the United States. This is no silver bullet. It doesn't, for example, address the rising cost of an architectural education, a crisis fed in part by cuts in federal as well as state aid to America's colleges. It is, however, the start of a new hard-headed appreciation of the long-term value of the investment we make when we reach out to help our students and recent graduates whose work will change lives.

This year is an important election year. Do you know where the candidates stand on the American Institute of Architecture Student–inspired and AIA-drafted NDSA? Please ask. Then decide who you will support. But don't wait for November: Write your representatives today; seek their support for legislation that will allow young architects to gain invaluable real-world experience while helping their communities become more productive, resilient, healthy, and sustainable. Put into the hands and hearts of the rising generation of young architects the tools that will change lives. AIA

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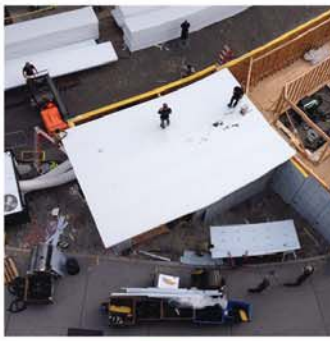



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PRODUCTS

THE DARK SIDE

The complex, thin-frame geometries in French designer Michaël Malapert's new collection of decorative elements are 3D printed from polyamide powder. "The idea was to reveal the structure of the shape and use it as a graphic pattern," says Malapert, who rendered the series in 3D Studio Max. **Dark Side** comprises a bowl, plate, cup, votive, and vase in red, yellow, blue, black, and white. *themfamily.fr* Circle 100

MATERIAL GOODS

Healthy Spaces

THE NEED FOR STERILE AND EFFICIENT ENVIRONMENTS THAT ARE ALSO WARM AND INVITING CAN CAUSE A RIFT BETWEEN FUNCTION AND AESTHETICS IN HEALTHCARE FACILITIES. THE LATEST PRODUCTS AND TECH TO HIT THE SECTOR AIM TO BALANCE CLEAN SPACES AND GOOD DESIGN.

Text by **Hallie Busta**
Edited by **Wanda Lau**

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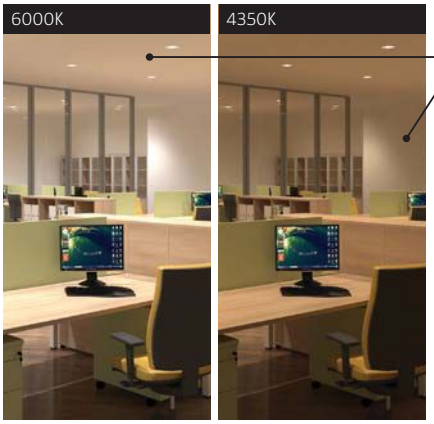
SUPPORT WINGS

Designed by William McDonough, FAIA, and carpet maker Patcraft, **Butterfly Effect** is a series of modular carpet tiles that pair environmental sustainability with social enterprise. The manufacturer diverts 2% of the proceeds from the sale of its versatile flooring to fund pediatric cancer research at St. Jude Children's Research Hospital in Memphis, Tenn. The product gets its name and design—which emulates the dynamic patterns of a butterfly's wing—from the principle of chaos theory that connects seemingly insignificant occurrences to major events. *patcraft.com* Circle 101

The series comprises three patterns (Dart, shown), each offered in 18 colorways, that can be specified as a fractal image or pixelation.

Certified by Cradle to Cradle, a product standard co-developed by McDonough, the carpet tiles are made of solution-dyed, stain-repellant nylon fibers.



The control technology varies the color temperature of electric lighting from 6000K to 2700K.

OPTIMAL LIGHT

USAI Lighting's **Color Select** technology lets users control the color temperature of downlights and wallwashers to provide cold light during patient examinations and warm light while patients relax. *usaillumination.com* Circle 103

The semi-transparent fabric can drape for uses such as panels, partitions, and curtains.

An antimicrobial finish on the flame-retardant polyester fabric resists dirt and moisture.

COOL CURTAINS

The **Health Care** collection from Swiss textile maker Création Baumann comprises 11 nature-inspired designs in a range of hues. Among the designs, Basic IV UN (shown) features a monochromatic pattern with a gradient. *creationbaumann.com* Circle 104

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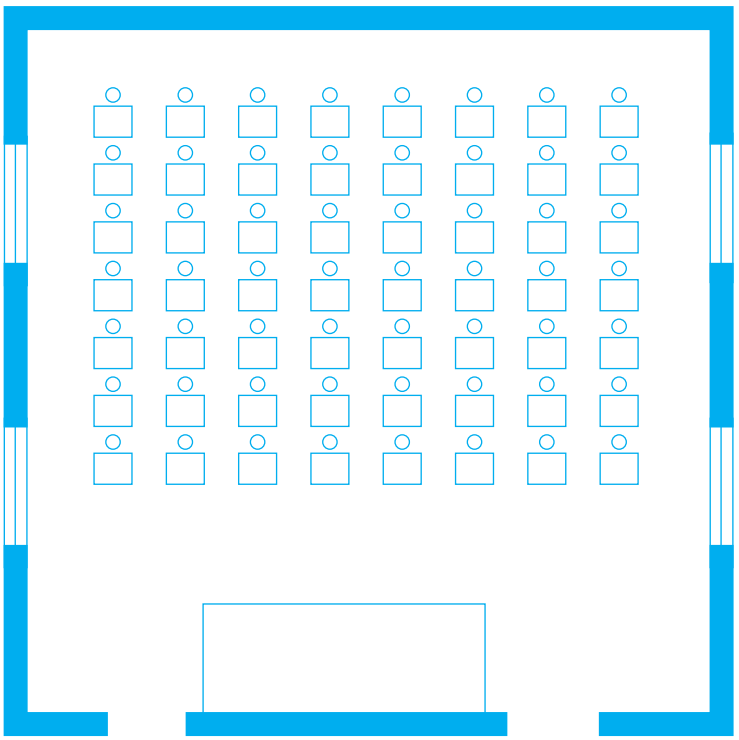

IN CONTEXT

A Continuing Education

THE QUEST TO CREATE THE OPTIMAL LEARNING ENVIRONMENT IS BRINGING FORCES OUTSIDE THE CURRICULUM INTO CLASSROOM DESIGN.

Text by **Jennifer Brite**
Edited by **Hallie Busta**

K–12 CLASSROOMS HAVE EVOLVED significantly from the quaint one-room schoolhouses of yore, as academics, administrators, and architects try to grasp how design impacts learning.

"We're re-learning how to build schools that are efficient while being comfortable and appropriate for learning," says Lindsay Baker, a doctoral candidate in building science at the University of California, Berkeley, and author of a 2012 report on the history of classroom design.

A 2012 study by U.K.–based design firm IBI Nightingale with the University of Salford, also in the U.K., found that the confluence of classroom design features, such as room orientation, HVAC, acoustics, and furniture, can enhance or set back a student's academic progress by up to 25 percent during the course of a year.

The report also found that allowing teachers to easily rearrange furniture for different activities was a key factor in improving student learning. Additionally, a 2008 study of college students by Grand Valley State University in Allendale, Mich., found that sitting on exercise balls during class helped them pay attention.

The takeaway for designers? Furniture should be specified during design development, says Caroline Paradise, who heads research and development at IBI Nightingale. "If you get it wrong, it can have a lasting effect on the performance of the students, and it is difficult and costly to change," she says.

Furniture makers are taking note. Last March, Smith System released the Flavors Noodle desk chair, which lets students tilt left, right, forward, and backward in their seats. Herman Miller has designed classroom furniture that moves away from the "traditional, lecture-based [teaching] approach," says Jeff Vredevoogd, director of the company's education seating business. Its 2010 Everywhere Table, for example, comprises a kit of tabletop shapes and leg styles that can be mixed and matched in multiple configurations.

"More and more, one design doesn't fit all," Vredevoogd says.

The Evolution of Classroom Design in the U.S.

1870 to 1914 The Second Industrial Revolution
New education mandates and laws banning child labor rapidly increase school enrollments, standardizing facility design. Classroom layouts maximize floor space with instructors lecturing from raised platforms and pupils sitting at fixed desks many rows deep (diagram shown, left).

1929 The Great Depression begins.
Architects, including Eliel Saarinen and Richard Neutra, join education reformers of the 1920s and '30s to soften the utilitarian approach of the previous decades. Their daylit rooms offer views outside with desks arranged in groups rather than in rows.

1939 to 1945 Word War II

The postwar population boom spawns new construction as schools race to meet growing infrastructure needs, often sacrificing the design innovation of the past decade to build quickly and affordably.

1954 Public schools in the U.S. begin desegregation.

Traditional row-and-column layouts are challenged again in the '60s and '70s. Open-education classrooms are free of walls and students are grouped by subject matter and skill as teachers move freely among them.

1973 Section 504 of the Rehabilitation Act calls for schools to accommodate individuals with disabilities.

The postwar building boom ends and many districts struggle as rosters and funding dwindle. Energy conservation gains ground. Schools opt for electric lighting and mechanical conditioning, often closing off large windows in the hopes of saving energy.

1998 The U.S. Green Building Council (USGBC) launches LEED.
Renewed environmental awareness causes school districts to prioritize energy efficiency and indoor air quality in new facilities.

2007 USGBC introduces LEED for Schools.
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IN THE EXTREME TEMPERATURES OF RIYADH, SAUDI ARABIA, THE GLASS-ENCLOSED EXPANSION TO KING FAHD NATIONAL LIBRARY GETS DIMENSIONAL AND HEAT RELIEF WITH A TENSILE FABRIC FAÇADE.

Text by **Logan Ward**
Photos by **Christian Richters**

THE FAÇADE OF the recently expanded King Fahd National Library may look delicate but it more than pulls its own weight. The bold, yet contextual, design is crucial to the performance of the building, which is located in the extreme climate of Riyadh, Saudi Arabia.

Functionally speaking, the approximately 1,000 twisted squares of textile shade the building and infuse its interior spaces with natural light without completely blocking occupant views. This wouldn't be a critical matter were it not for the city's bustling activity, says Thomas Lücking, the Berlin-based managing director of German design firm Gerber Architekten, which designed the 440,000-square-foot addition as part of a larger renovation of the 1986 library. "The sky in Riyadh is quite boring, always bluish-white." But, he adds, "you can look down and see the life on the streets."

The design also pays homage to the region's culture. The tensile structure references the local nomadic tradition—as recently as 1950, 40 percent of the country's population lived in tents—while the intricate pattern echoes the rich history of geometric Islamic ornamentation. "To cover and veil precious objects in Saudi Arabia is also a tradition," Lücking says.

Completed in 2013, the renovation occupies the geographical heart of Riyadh's rapidly modernizing Olaya District. Rather than overtaking a public square by constructing an adjacent freestanding structure, Gerber designed its shrouded cuboid addition to envelope the existing library completely.

In a city that often experiences temperatures exceeding 100 F, "a glass building is nonsense," Lücking says. But the firm clung to its concept of wrapping the existing library with a glass edifice by shading the glazing with a polytetrafluoroethylene (PTFE)-coated, woven-glass-fiber membrane by Sefar Architecture. The smooth, self-cleaning membrane is better suited to the desert environment than PVC-coated polyester, another common awning material. The latter can yellow in the sun while the former starts as beige and then whitens over time, Lücking says.

Gerber initially experimented with a pattern of triangular awnings, but computer simulations of the sun's annual transit across the site by German environmental engineering

Pfeifer, a rope, anchoring, and lifting company in Germany, fabricated the cable and cast-steel end connectors that secure the cable nets to the steel cable support system fabricated by Ali Tamimi Sons Co., in Saudi Arabia.

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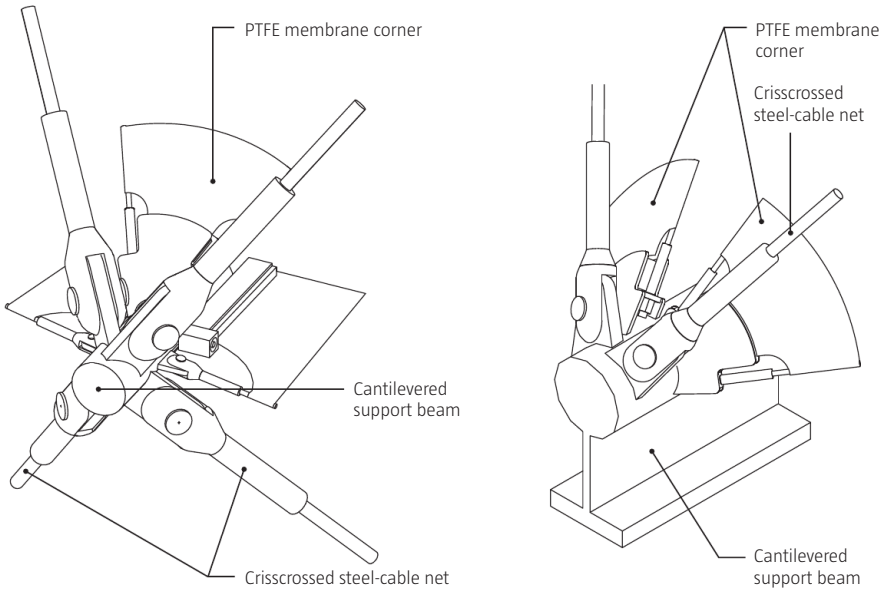


firm DS-Plan calculated that the optimal awning shape was a twisted, three-dimensional square tipped on its end.

Each square of membrane measures 5 meters along the diagonal and is forced into an anticlastic—or double-curved—shape by cast-steel end connectors that pull each membrane corner to two nets of crisscrossed steel cable, spaced 8 feet apart. A steel-cable support system ties the tensile structure to cantilevered beams bristling out from the existing steel-and-concrete building.

The awnings block 93 percent of the incoming sunlight all day, save for about 30 minutes at daybreak and 30 minutes at sunset. To avoid turning their glass building into a greenhouse, the designers left a 2-meter gap between the tensile fabric façade and the building. Convection circulates hot air up and out of the cavity.

That geometry was the starting point, Lücking says. "The rhythm of the façade dictated everything else ... the grid of structural elements and the interior space."

JOSH PARTEE

DETAIL

A Timber Structure on a Tight Budget

MONEY WAS TIGHT for the Cascades Academy, in Bend, Ore., which needed a facility to accommodate its growing student population that had been stuck in rented classrooms since the private day school's founding in 2003. While the forested site overlooking the Deschutes River called for a timber structure, the nonprofit's budget was more in the realm of fiber-cement cladding or stucco on block.

In 2007, the school's board of directors hired Portland, Ore.–based Hennebery Eddy Architects to design a master plan for the 21-acre site, but the board pressed the pause button when the economy soured. In 2009, after plans resumed and Hennebery Eddy began design on a 38,500-square-foot facility, talk turned to slashing costs—and expectations. A couple of the school's board members spoke up, says Hennebery Eddy founding principal and project design leader Tim Eddy, AIA. "They wanted a building that belongs in the region."

Resolved to avoid the Pacific Northwest's overused chalet aesthetic, the firm crafted a "more finely detailed piece of contemporary architecture" that reflects the school's nature-focused mission and met the budget, Eddy says. Wood, glass, and novel steel connection details blur the line between the outdoors and indoors while strategic material and design choices made the project financially feasible. LOGAN WARD

Learn how Hennebery Eddy realized its design for the Cascades Academy at architectmagazine.com. The Detail series of innovative material-assembly solutions is proudly supported by reThink Wood.

To the delight of the public, Starpath is being tested on 1,615 square feet of an existing path through Christ's Pieces municipal park in Cambridge, England.

MIND & MATTER

Star-Crossed Paths

PRO-TEQ SURFACING'S PHOTOLUMINESCENT FINISH GIVES PAVING NEW LIFE IN A BRILLIANT WAY.

Text by **Blaine Brownell, AIA**

ILLUMINATING THE OUTDOORS can be a good—and necessary—thing in areas of pedestrian and vehicular traffic. While NighTec Leuchtsteine's luminous pavers, Studio Roosegaarde's Smart Highway, and BIG's Digital Interactive Roadway are either still in the early stages of development or have proven too costly to implement market wide, U.K.–based Pro-Teq Surfacing has a solution that literally dazzles.

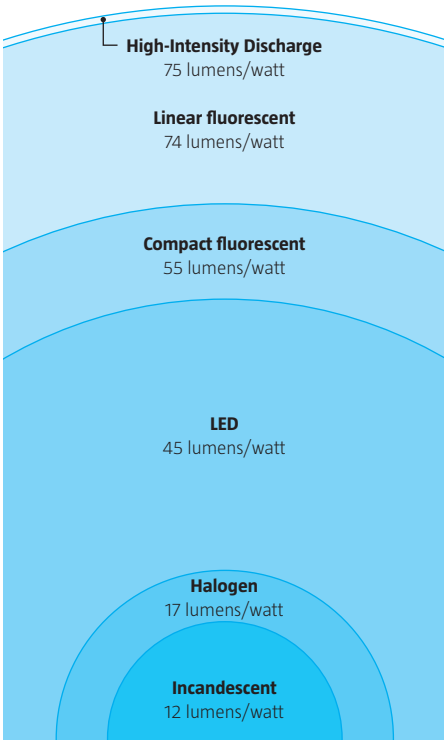
Starpath is a surfacing product that is sprayed onto common paving materials, such as concrete, asphalt, or timber, and it costs just under $11 per square foot. The elastomeric substance contains luminescent aggregates that absorb ultraviolet radiation during the day and release low-level lighting in the evening via photoluminescence, a process by which a material absorbs and releases photons, moving from a heightened energy state to a lower one, over time. Once the UV light penetrates Starpath's aggregate, the treated surface will glow for up to 16 hours if blue or green aggregate is used; other colors are available but their glow is shorter lived.

Starpath can revive degraded pathways with a smooth, anti-slip coating, according to Pro-Teq. Applicators must wear face masks to filter the polyurethane-based mixture's fumes, but the coating is inert once applied and should last at least a decade before re-application is needed.

The product adjusts to ambient light levels, Pro-Teq owner Hamish Scott said in an October 2013 press release. It's "almost like it has a mind of its own," he said. "[T]his is pure nature doing its work."

Although Starpath represents a notable improvement in self-illuminated surfacing products, the diffused and low light output is inadequate for pedestrian safety, which requires lighting levels that clearly reveal the features and behavior of other pedestrians. However, the technology may allow for a reduction in the number and frequency of streetlights and could even eliminate pedestrian lighting in areas designated as safe. Such a change would not only reduce energy consumption, but also please dark-sky advocates, revealing stars in the nighttime sky as well as on the ground.

Luminous Efficacy of Conventional Sources



Since Starpath's brightness depends on the strength of the solar energy it absorbs, its output at night can vary.

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EXPERIENCING BOLD DESIGN BEGINS WITH A STRIKING ENTRANCE

2013 ANNUAL DESIGN REVIEW

Trahan Architects' Louisiana Sports Hall of Fame and Northwest Louisiana History Museum project took a contemporary approach that combined bold and practical elements into an imaginative modern design. The architects looked to CRL-Blumcraft® 1301 Series 'All-Glass' Entrance Systems that contain the slimmest door rail profile in the industry, allowing for virtually uninterrupted glass viewing areas to elevate the high-concept building's modern aesthetic. 1301 Series Entrance Doors are the original. Often imitated but never matched, this system provides the most glass with the least metal of any entrance door system on the market.

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A detail from a Highway Outfall Landscape Detention (HOLD) System prototype in New York, designed by Dlandstudio to collect and clean stormwater runoff.

COURTESY DLANDSTUDIO

BEST PRACTICES

VALUE ADDED

ARCHITECTS HAVE BEEN SLOW TO CHAMPION THE RETURN ON INVESTMENT THAT THEIR WORK CAN BRING. BUT EVEN A LITTLE DATA CAN CONVINCE CLIENTS THAT SPENDING MORE CAN MEAN SAVING MORE.

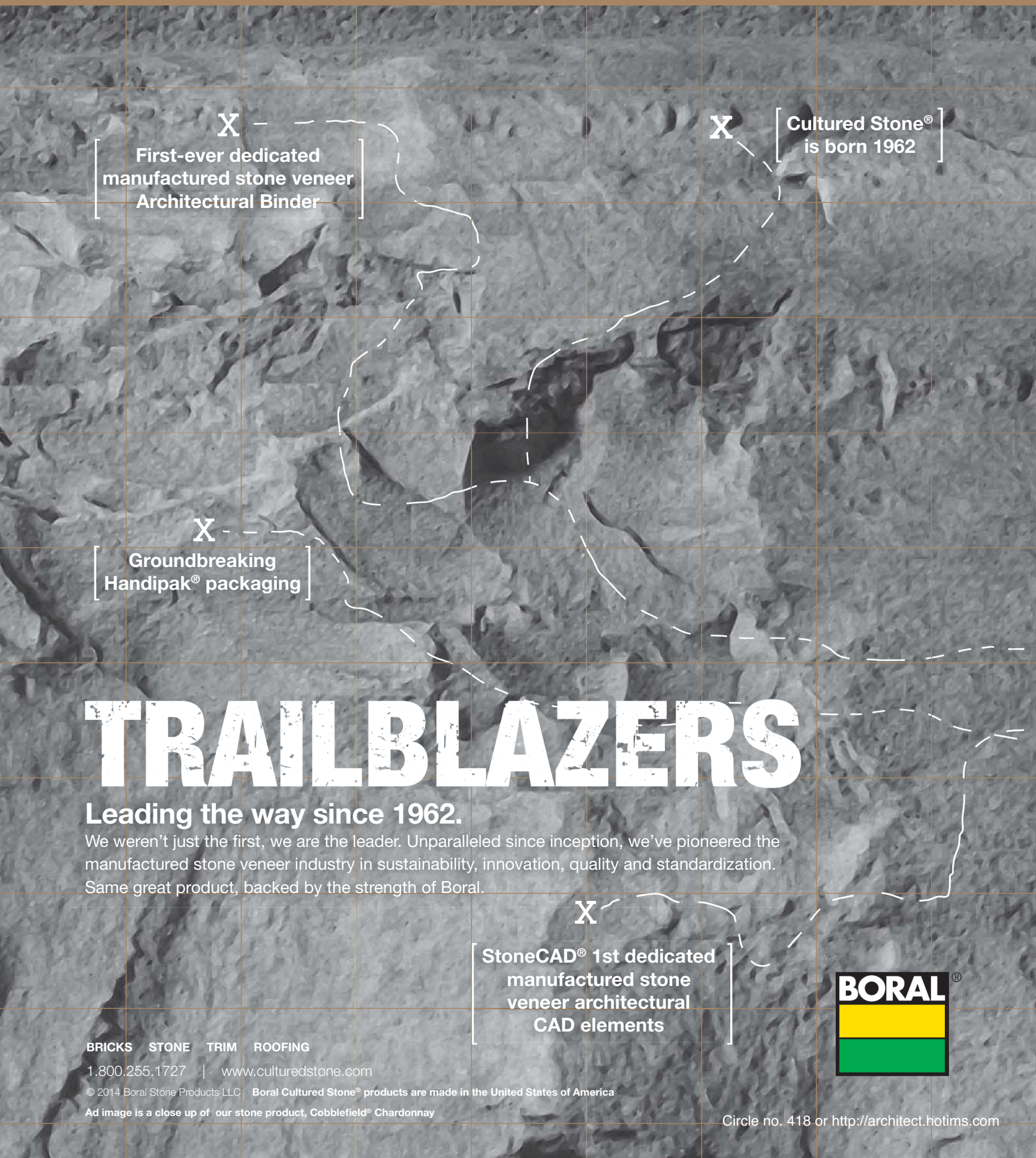
Text by **Thomas Fisher, Assoc. AIA**
Illustration by **Jessica Rubenstein**

LAST OCTOBER, Edward Mazria, AIA, the founder and CEO of Architecture 2030, shared a surprising statistic during a talk he gave at the Design Futures Council's Leadership Summit on Sustainable Design. Mazria said that the U.S. Energy Information Administration "forecasts that American consumers will spend $4.61 trillion less on energy between 2013 and 2030 than was originally projected in 2005."

This is good news, of course, for everyone who cares about reducing energy consumption. But Mazria's comment raised a question for me: How do the energy savings architects have generated for clients compare to our fees? With some 100,000 architects nationwide, according to NCARB, and with gross revenue per employee estimated at roughly $200,000, according to *Design Intelligence,* that means architects earn about $20 billion in fees annually. Compare that to the $4.61 trillion in projected energy savings over the next 17 years, which works out to an average of $271 billion per year.

Granted, while "architects have certainly played a part" in reducing energy consumption, says Mazria, "we can't attribute the savings to any one group—design, codes, federal and state legislation, and incentives all play a role." Still, even if architects can claim only one-tenth of those savings—$27 billion per year—the profession more than justifies its annual fees solely with the reductions that architects bring to clients' energy costs.

Moreover, consider that homeowners, on average, realize a 60 percent return from substantial residential improvements, or that 87 percent of nonresidential clients in a Deloitte Consulting survey said that green retrofits increased the productivity of employees. All of this helps make a case for the return on investment (ROI) of architecture itself, but it also demonstrates the tremendous ROI of



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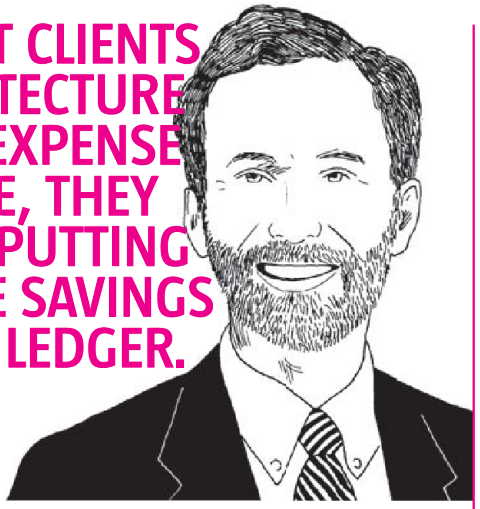
WHILE MOST CLIENTS VIEW ARCHITECTURE FEES AS AN EXPENSE TO MINIMIZE, THEY SHOULD BE PUTTING FEES ON THE SAVINGS SIDE OF THE LEDGER.



THOMAS FISCHER, DEAN, COLLEGE OF DESIGN AT THE UNIVERSITY OF MINNESOTA

architectural fees. Indeed, while most clients view fees as an expense that they need to minimize, they should be putting architecture fees on the savings side of the ledger, as an investment that brings a handsome return.

The fault for clients' misperception of our value, unfortunately, lies with us. To its detriment, the architectural profession has long had a weak research culture. Most firms do not revisit their projects to document the savings that the clients realized, and most architectural schools have few faculty or students doing post-occupancy research. The profession also has a weak communications culture, with firms not widely sharing available ROI data, and with most claims of the value of our work lacking any hard evidence.

Our design culture, ironically, may present the greatest hurdle to demonstrating our value. Too many in the profession hold on to the out-of-date idea that quantifying the effects of design somehow diminishes it and destroys its mystique, an idea that mystifies most people outside of the profession and that lessens our influence. Add to that the equally antiquated idea of the "gentleman" architect who shouldn't appear to need or want money—a self-fulfilling prophecy that too many clients have been all too happy to oblige.

SO HOW DO WE do the research needed and promote it in a way that will get our clients to move our work to the savings side of their ledgers? A group of firms with offices in the Minneapolis–St. Paul region—AECOM, Cuningham Group, DLR Group, HGA, Mortenson Construction, MSR, and Perkins+Will—in partnership with the School of Architecture at the University of Minnesota, where I am the dean, have started a promising effort in this direction. They have established a "consortium for research practices," in which the firms pay an annual membership fee to join. Each firm supports at least one student per year who does research of relevance to the firm and of interest to the larger consortium. Other firms, like Gensler, have also invested heavily in research and made it available to the profession through its own publications.

Not all of this research directly demonstrates the savings that architects generate for clients. But it shows that our profession is finally becoming serious about research and about sharing our findings, and it demonstrates that quantifying the value of design does not detract from design quality. Eventually, firms should be able to enter into fee conversations with clients armed with hard data about the savings they have generated, and able to ask clients how much they want to save: Very low fees make it difficult for firms to save clients much money, while higher fees enable clients to increase their savings and improve ROI. It's their choice.

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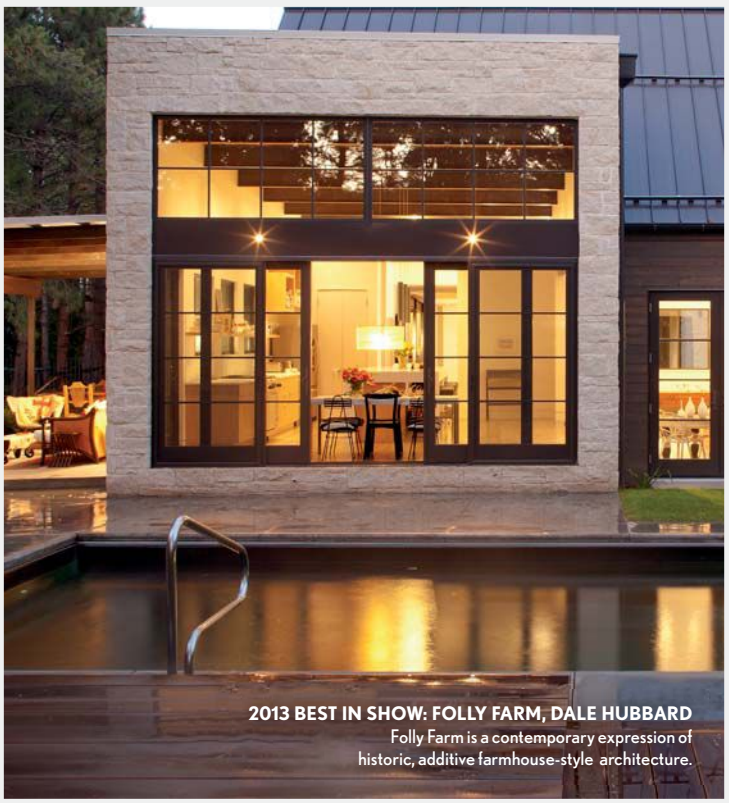

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NEXT PROGRESSIVES

SEA CHANGE

SUSANNAH DRAKE OF DLANDSTUDIO IS REVIVING CONTAMINATED LANDSCAPES WITH HER POLITICALLY SAVVY PRACTICE.

Susannah Drake in the Brooklyn, N.Y., office of her firm, Dlandstudio.

Text by **Elizabeth Evitts Dickinson**
Portrait by **Noah Kalina**

OUTSIDE THE WINDOW of my office, I see a beautiful river called the Jones Falls as it winds through the city of Baltimore to the Chesapeake Bay. Above this river is an elevated expressway, so I also see the fetid runoff that drains from eight lanes of asphalt into the water below. A few blocks from here, several roads have been decimated as construction crews attempt to repair 100-year-old sewer pipes. And this isn't unique to where I live. Stormwater management and failing infrastructure are national concerns, the latter causing a $3.1 trillion loss in U.S. gross domestic product, according to the American Society of Civil Engineers. That's $3,100 per household.

Susannah C. Drake, AIA, principal of Brooklyn, N.Y.–based Dlandstudio, has built her practice around these pressing issues. Take the Gowanus Canal, a 2-mile-long waterway in Brooklyn. The canal was declared an U.S. Environmental Protection Agency Superfund site several years ago and is considered one of the most polluted waterways in the country. It's exactly the kind of design challenge that Drake loves to tackle. "A city is an incredibly complex and interesting system, and I like to think holistically about a problem," she says.

Drake's unconventional path out of architecture school inspired her to establish this niche. A licensed architect and a licensed landscape architect, she graduated with master's degrees in both disciplines from Harvard University's Graduate School of Design. "When I first got out of Harvard I had three Ivy League degrees and I couldn't get a job," Drake says (she attended Dartmouth College as an undergraduate). "People asked me: 'What do

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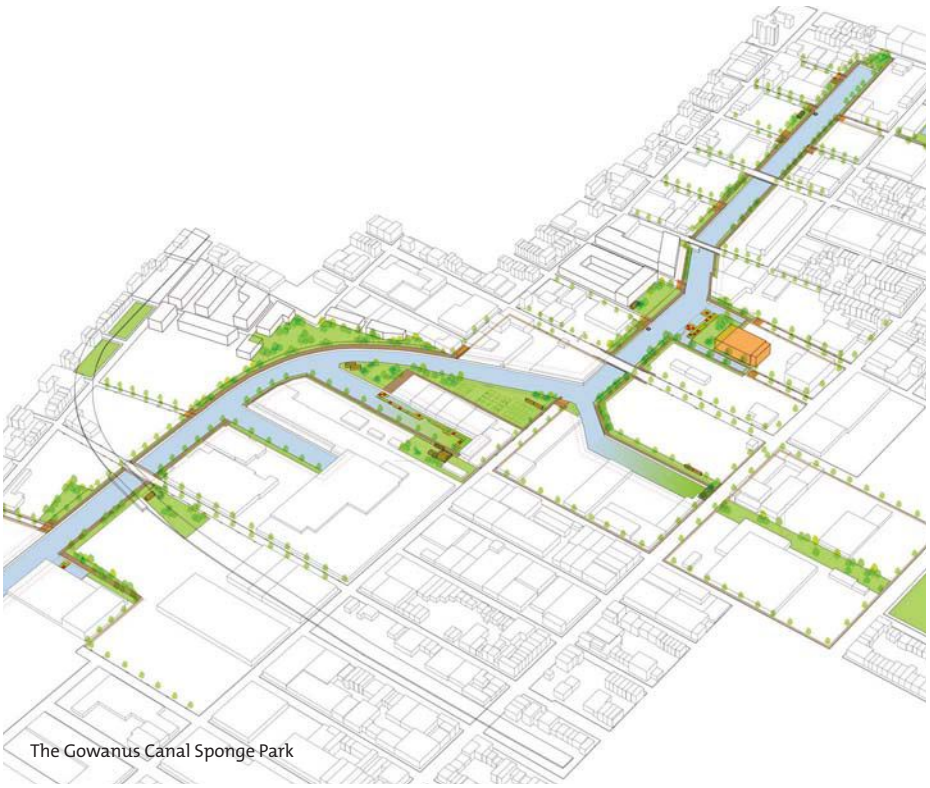


The Gowanus Canal Sponge Park

The Gowanus Canal Sponge Park

you want to do? Do you want to be an architect or a landscape architect?' They were forcing me to choose. And I thought, 'This is wrong!'"

In 2005, Drake founded Dlandstudio, which now has eight employees from a mix of backgrounds. (Over the years, she's employed staff with expertise in the fine arts, astronomy, religion, biology, and graphic design.) "I thought I could figure out a way to work across disciplines and create a design think tank within practice," she says. "I wanted to make a lot of changes to the standard way of operating within the urban world."

Consider the firm's vision for the Gowanus Canal Sponge Park, which provides a system of open space designed to absorb and remediate stormwater. Here, wetlands act like sponges, with plants and engineered soils leaching heavy metals and toxins out of contaminated water. But the plan is more than just environmental. It integrates hydrology, ecology, land use, and cultural preservation. Sponge Park includes community amenities, like a green walking path and the Pilot Street-End Sponge Park that leads to the canal off 2nd Street. The street-end park will create a much-needed public space while using things like bioswales to mitigate polluted runoff.

The complexity of Drake's multilayered design is matched only by the complexity of the politics underpinning the project. Multiple agencies—federal, regional, and local—maintain ownership of the Gowanus Canal, and Drake has worked for years with all of them on developing this plan. "There are 200 permits that we have to get for any project on the waterfront, and that's even before you get to construction," she says.

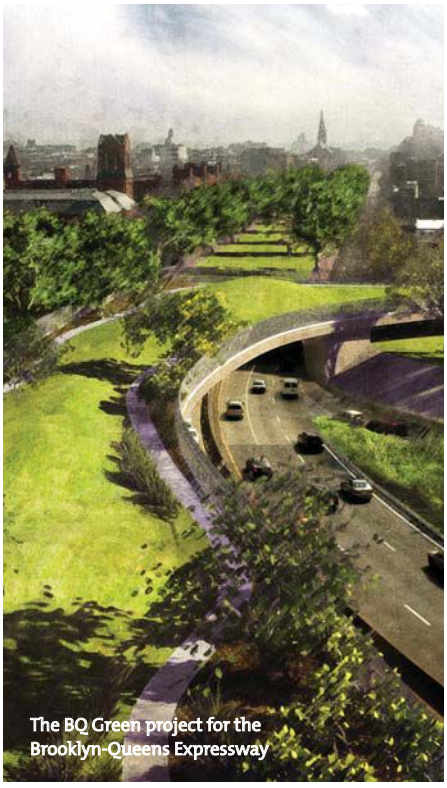
Indeed, her firm's work is as much about politics as it is about design research and development. "Designers don't always operate with the consideration of the way the political system operates, or even the way the electoral system operates," Drake says. "The political process involves figuring out the agendas of all these agencies and how my project actually helps them. That's when you can start to get things done."

This fall, construction will finally begin on Sponge Park. "We're going to have the first street-end bioswale in New York City," Drake says. The intention is for this street-end park system to become a prototype that can be used on other streets throughout the city.

DLANDSTUDIO HAS ANOTHER prototype project now underway in New York, this one targeting stormwater runoff from raised highways. Called Highway Outfall Landscape Detention (HOLD) System, this modular prototype has been installed at three sites in Flushing Bay and the Bronx. The ultimate goal, Drake says, is to export the system to other cities. The firm has a patent pending for the HOLD system as well as for Sponge Park, and has trademarked both names as a way of creating a potential revenue stream. "It's so the pain and suffering that I've gone through can have some economic reward," Drake says.

Dlandstudio has also tackled the issue of rising sea levels, collaborating with New York's Architecture Research Office (ARO) for the Museum of Modern Art's "Rising Currents" exhibit in 2010. Their proposal, called "A New Urban Ground," suggests a way to revamp the hardscape of a city to manage rising coastal waterways. The firms proposed an adaptable system of porous green streets capable of draining precipitation, as well as allowing an influx of water to come in, but then get out, quickly. Fiberoptic cables and other hardware that currently live beneath the streetscape would be moved below sidewalks and placed inside underwater vaults accessible via hatches. "That releases the street to become a permeable open space," Drake says.

Stephen Cassell, AIA, principal at ARO, reached out to Drake for the exhibit because he had heard about Sponge Park. "Susannah is good at throwing lots of ideas out on the table, some direct evolutions of what you're working on at the time, others complete right turns. It's a creative process that allows you to reframe



The BQ Green project for the Brooklyn-Queens Expressway

the way you think of things," Cassell says. "She's among a vanguard of designers doing lots of fruitful thinking about the complexities of the city. In 10 years, as the results of that thinking trickle down, it's really going to change the way we perceive and use cities."

THOUGH OUR AGING INFRASTRUCTURE may seem like an intractable issue, Drake notes that there is already money in the pipeline to repair our roadways, bridges, and sanitation systems. The trick is to leverage those funds by expanding our definition of infrastructure. "Infrastructure today is way beyond thinking about the physical thing. Think instead about the economic value of the real estate," she says.

By example, she points to the Brooklyn Queens Expressway (BQE), which already has some federal funds allocated for its repair. Her project, BQGreen, proposes a way to reknit the communities divided by construction of the BQE by making the highway an ecologically productive spine that supports new recreation spaces as well as infrastructural improvements. The road would become a public amenity for everyone, not just for drivers. "It makes no sense for a transit corridor to be only about transit when it's running through some of the most expensive real estate in the world," Drake says. "So don't just solve one very specific problem. Think holistically."

"A New Urban Ground," Dlandstudio and ARO's entry for MoMA's "Rising Currents" exhibit

CRITIQUE

OUTSIDER ARCHITECT

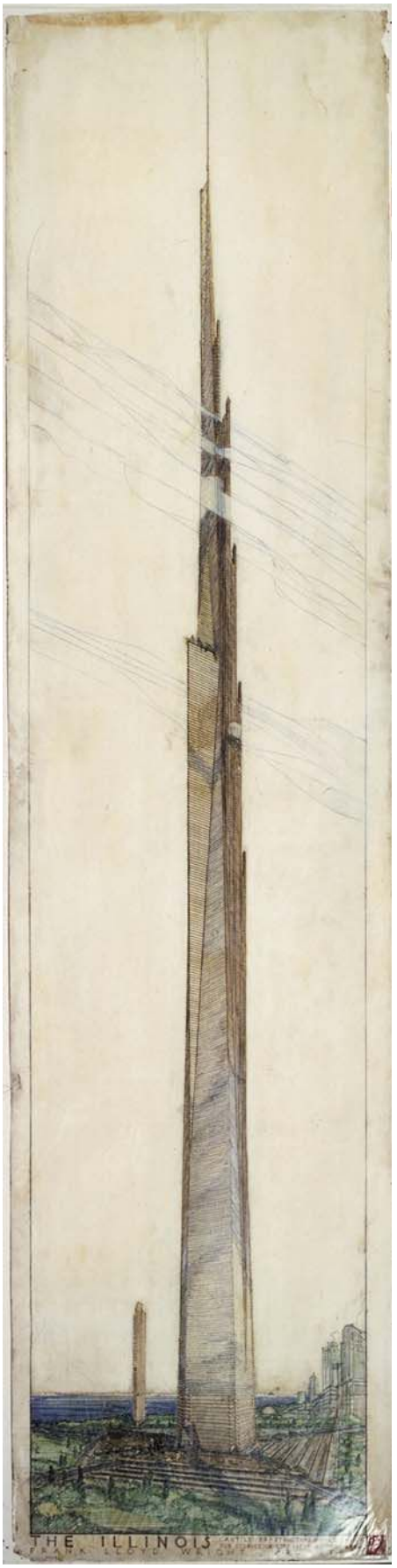
MOMA'S EXHIBIT ON THE HIGH-RISES AND CITYSCAPES OF FRANK LLOYD WRIGHT REVEALS BOTH HIS TOWERING AMBITION AND THE SURPRISING AMBIVALENCE THAT ARCHITECTS HAVE ABOUT PUBLICIZING THEIR PRIVATE WORLDS.

Text by **Thomas de Monchaux**

"MY WAY HAS been too long and too lonely," Frank Lloyd Wright telegraphed Philip Johnson shortly before the 1932 opening of the Museum of Modern Art's (MoMA) epochal International Style exhibit, in an unsuccessful attempt to withdraw from the show, "to make a belated bow to my people as a modern architect ... "

Wright's way was certainly long. Born only two years after the assassination of President Abraham Lincoln and dying only four years before the assassination of President John F. Kennedy—from the Age of Steam into the Age of the Atom—Wright outlived every era and style into which curators like Johnson have always been eager to place designers. To measure his long span in another way, consider that H.H. Richardson was 30 years old when Wright was born, and Frank Gehry, FAIA, was 30 years old when Wright died.

And Wright's way was certainly lonely. Despite all his accolades and acolytes—the latter more cultishly organized than most thanks to the Taliesin Fellowship—Wright's formal language was at once so inimitable and so mutable that, unlike the reducible and thus reproducible formalisms of Le Corbusier and Mies van der Rohe (his 20-years-younger peers), Wright left many mourners but no real heirs. "Wrightian" is thus the most repellent of designerly adjectives, indicating the insistent presence of Wright's many tropes—sweeping horizontals, Cherokee reds, pinwheeling plans, catch-and-release cross-sections, hollyhock pictograms in leaded glass—but the profound absence of whatever it was that animated those tropes into enduring art. The enthusiasm of civilians for this sort of thing generally horrifies contemporary architects only slightly less



The 1956 Mile High Illinois tower in Chicago.

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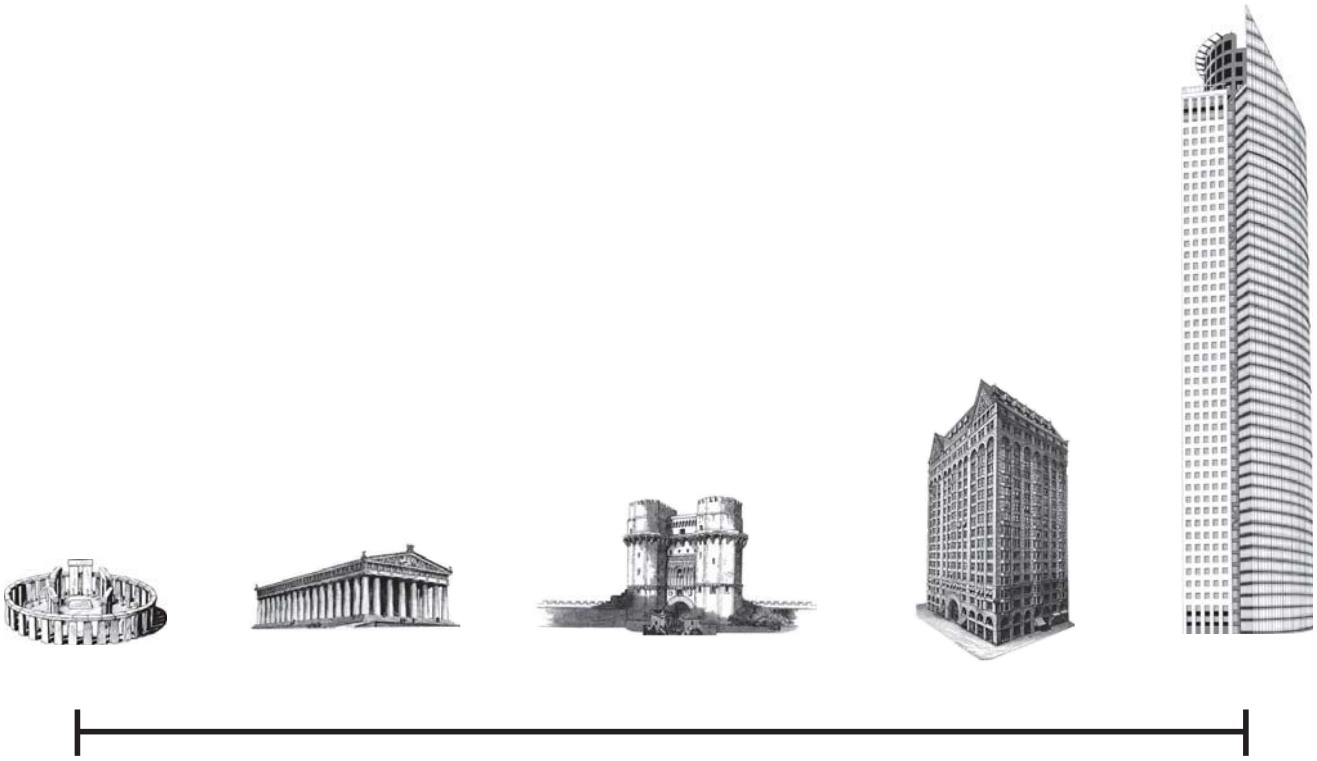

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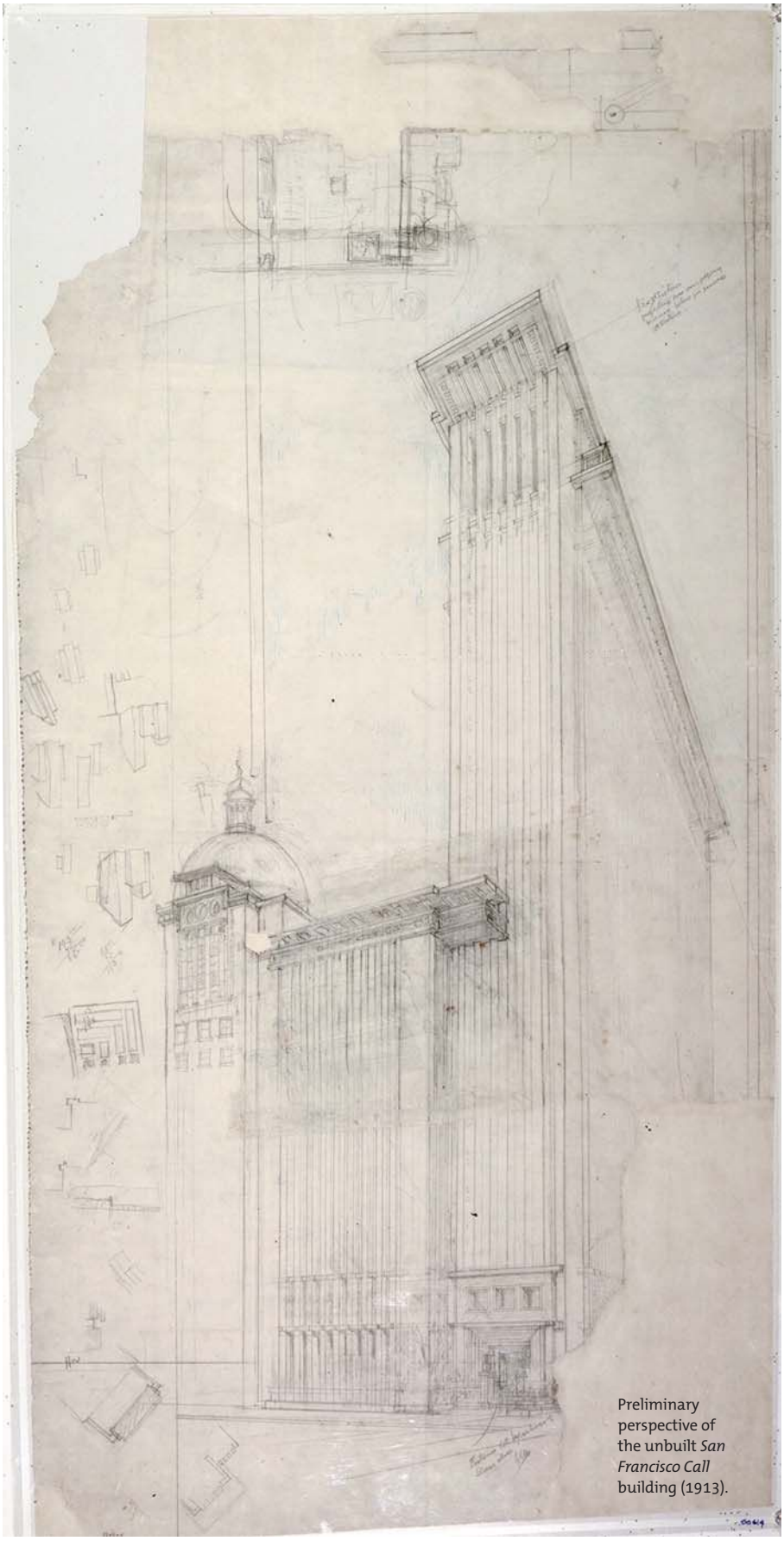
than a client's expressed interest in, say, Louis Comfort Tiffany or Christopher Alexander.

Yet in his long and lonely way, this historical outlier and self-described contrarian set the universal template for the contemporary performance of architect as cultural figure: the Randian secular prophet in the mode of Howard Roark, the universal theorist in the mode of Buckminster Fuller, the worldly artiste in the mode of, well, Philip Johnson and everybody else. The unpunctuated telegram Wright sent Johnson in 1932 continued with the refusal to make that belated bow, "in company with a self advertising amateur and a high powered salesman." That was a dig at Raymond Hood and one-time apprentice Richard Neutra, respectively—however much Wright's own mastery of the American arts of serene amateurism and sanguine salesmanship paved the way for Hood, Neutra, and all the rest.

WRIGHT'S WORK, despite his telegrammed demurral, was ultimately featured in MoMA's 1932 show—albeit with visible ambivalence in both architect and curator. He was the first architect, in 1940, to receive a solo retrospective at MoMA's new midtown building, and now he is back in "Frank Lloyd Wright and the City: Density vs. Dispersal," an exhibit on the occasion of the recent joint acquisition of Wright's archives by the museum and Columbia University's Avery Architectural & Fine Arts Library. On the rather slender premise of Wright as a theorist of high-rise hyperdensity in service of a landscape of pastoral sparsity (call it "towers because gardens"), the exhibit assembles exquisite original drawings and models of Wright's notable tall buildings, plus the Broadacre City project he began in 1934.

The showpieces are towering 1956 elevations for the unbuilt Mile High Illinois skyscraper that Wright proposed for Chicago, plus three large-scale models that were part of the archive acquisition. An 8-foot-tall, 7-foot-wide 1940 model of an unbuilt 24-story Sullivanesque skyscraper, originally developed for *The San Francisco Call* newspaper in 1913, features low-relief, white-painted wood worthy of Louise Nevelson. There's also a 6-foot-tall wood, plastic, and metal model of Price Tower, the mixed-use residential and commercial tower incongruously built in the low-lying town of Bartlesville, Okla., in 1956; and a 12-foot-by-12-foot wood-and-cardboard diorama from 1935 of Broadacre City, cinematic in detail and as gorgeous as a Persian rug in its muted jewel-like colors. Home movies show Taliesin apprentices tinkering with the Broadacre model in a scrubby Arizona field—a landscape within a landscape—while an entertaining period film illustrates, among other things, how easily a



Preliminary perspective of the unbuilt *San Francisco Call* building (1913).

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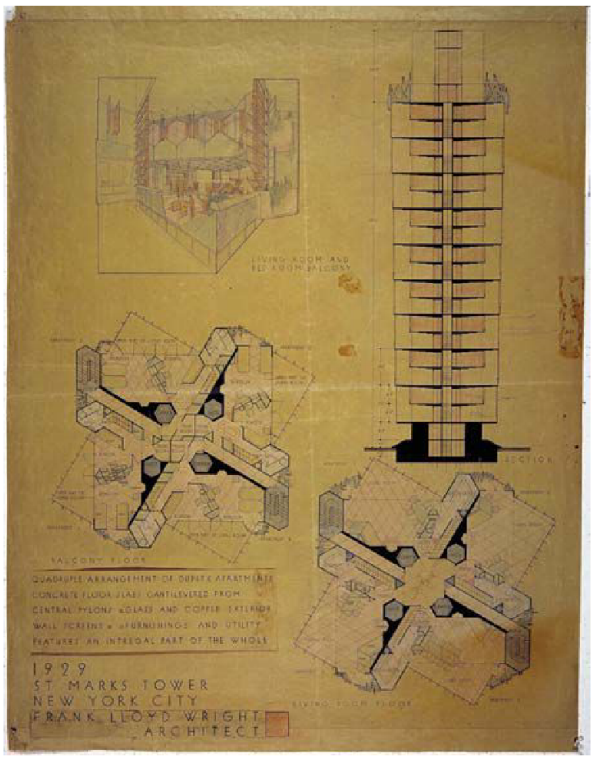

A 1929 section and perspective cutaway of a duplex apartment from the St. Mark's-in-the-Bouwerie Tower.

pencil-skirted secretary can ascend an elevator in Wright's 1943–50 Racine, Wis., Johnson Wax Research Laboratory Tower, to carry a file from her desk to an obliged chemist's hands.

Despite the charisma of the models, the real stars are the smudgy working drawings and annotated construction documents—many presented in glassed-in picture boxes, tilted in the manner of drafting tables, that recall Wright's own installation of his work at MoMA in 1940. Mixed in with more polished and familiar images, the drawings reveal all the fuss of an architecture office hard at work. There, in the margins of *Call* building perspectives, is a set of hasty cross-sections in which Wright appears to work out where he might conceal electric lighting in the overhanging cornice. There, on the obverse of a Mile High tower sketch of a typical floor, is a cascade of calculations for different square footages and budget targets. There, scrawled in Wright's looping hand across the top of a night-time rendering of a carport, is a note to someone named Peter, to "build this up in black and white for reproduction." Side-by-side with a much-published ink-on-paper axonometric of the unbuilt 1924 National Life Insurance Company Building in Chicago is the far more energetic document that must have been its underdrawing, all graphite and blue pencil on yellow trace—and, scooting along the base, swift little doodles of Duesenbergs and Packards.

THE PICTURE THAT EMERGES from all these documents undermines, of course, that cultural figure, perfected by Wright, of architect as solitary genius. All those underdrawings have the look of documents passed through many hands. The same selection of works would have equally served an exhibit premised on collective creativity in practice. But a picture also emerges of singular obsession and compulsion. The best example of this is the pinwheel-plan, corncob-elevation design of the Price Tower, which first recognizably appears in 1927 as the unbuilt St. Mark's-in-the-Bouwerie Towers project for Manhattan. Its particular plan geometry may have had something to do with the angle at which Stuyvesant Street hits East 10th Street and 2nd Avenue, and later with obscuring lateral views between towers when Wright proposed multiples for the St. Marks's churchyard. But by the time the same essential design was built in Bartlesville 30 years later, or was planted across Broadacre City like so many toothpick flagpoles, the form was entirely self-referential.

And unlike the spatial layouts of the early Oak Park houses or early Usonian houses (which show up in Broadacre, too, in charming pink cardboard), the form isn't especially functional or closely calibrated to ergonomics or routines. All perilous parallelogram stair treads

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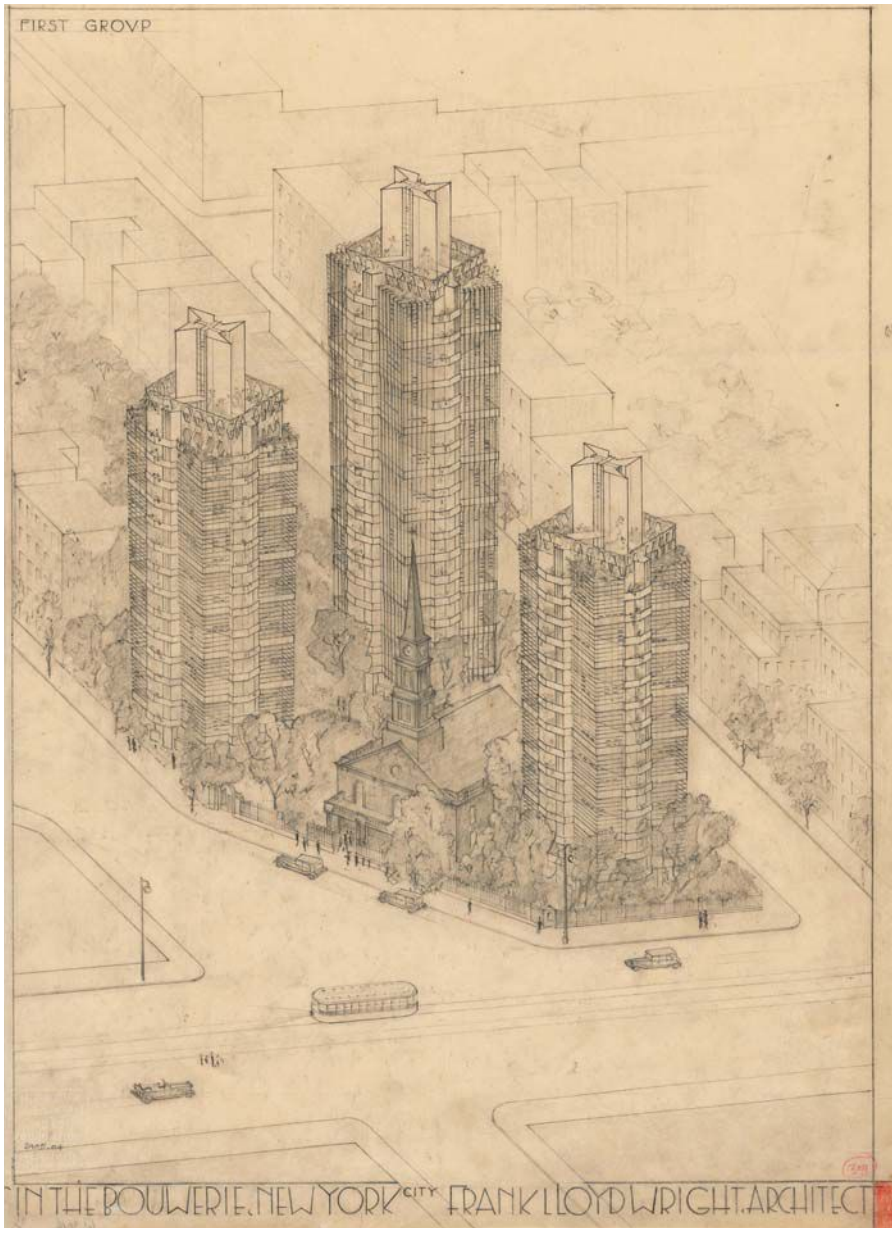

Aerial perspective of the unbuilt St. Mark's-in-the-Bouwerie Towers in New York (1927–31).

and triangular rooms and awkward acute and oblique angles, the Price Tower plan is more a fugue on diamonds and triangles, radiating like the stamens and petals of a flower, than it is a design for life. As with Johnson Wax and the Mile High tower, the Price design insists on a poetic but not especially efficient "taproot" structural system in which a single central foundation pier anchors successive floors that are purely cantilevered from center to perimeter. Draft construction documents for Bartlesville show the intricate extremes to which Wright's office went, embedding steel-mesh reinforcements at carefully calibrated angles, to finesse those concrete floor plates down to a palatable thinness at their edge. It's an exercise in ingenuity that is the opposite of the organically integrated architecture whose image it serves.

Wright's work is so familiar that it is easy to miss how strange it is. Grandiose solipsism, as modeled by Wright, is so much the manner of contemporary architects that it goes largely unexamined. To contemplate the elaborate frontispiece to the Mile High tower, with its stentorian Memorial Dedications to the likes of Elisha Otis ("Inventor of the Upended Street"),

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Top: A Taliesen fellow in Chandler, Ariz., works on a 1935 model of Wright's Broadacre City development scheme, which sought to bring urban density to suburbia. **Bottom:** Apprentices in the Taliesin drafting room c. 1952 work on a model of the Price Company Tower in Bartlesville, Okla.

COURTESY THE FRANK LLOYD WRIGHT FOUNDATION ARCHIVES (THE MUSEUM OF MODERN ART | AVERY ARCHITECTURAL & FINE ARTS LIBRARY, COLUMBIA UNIVERSITY, NEW YORK)

its Salutations to the likes of "Professor Pier Luigi Nervi", its self-descriptions of its author only as "Son of Chicago" (and, endearingly, as recipient of honorary degrees in engineering from Germany and Switzerland), is to detect less a proposal for a particular building than the construction of a private cosmology.

To contemplate the Broadacre City model, as jolly and creepy as a model railroad in its self-contained perfection, in its accumulation of tidy artificial solutions for tidy artificial problems (including a grand house on a convenient mesa whose notional resident much surely have been Wright himself), is to see less and less the public proposal with which the exhibit, with perhaps willful credulity, presents it—and to see further and further into a private world. The model has the feel of one of those projects that, upon his death, an otherwise undistinguished clerk or draftsman is discovered to have constructed, complete with syncretic mythology and personal gods, in his basement.

THE OPENING OF "Frank Lloyd Wright and the City" coincided, in January, with MoMA's announcement that it would demolish the neighboring building that once housed the American Folk Art Museum. While the loss of that much-loved design by Tod Williams Billie Tsien Architects is noteworthy, so is the loss of the fortuitous juxtaposition of the definitive modern mainstream with the vernacular and outsider tradition that is both its perpetual shadow and occasional inspiration. It's easy to imagine Wright's Broadacre City permanently installed in the Folk Art building, where it could splendidly anchor the use of that model-and-drawing-scaled-structure as MoMA's architecture gallery. And where it would hold its own among the memories of Henry Darger's "Realms of the Unreal," or Achilles Rizzoli's "Expeau of Magnitude, Magnificence, and Manifestation," and every other such private world made poignantly public.

Architects' most gratifying self-understanding is that they are those worldly artistes: businesslike creatives, tasteful technocrats, visionaries who can also run a company. Perhaps their difficulty in assimilating Wright is not only aesthetic, but in how his thrilling weirdness, compounded by his scandalous domestic life and cultish enablers, reveals in him what architects all fear in themselves: that they are primarily authors of internal worlds, crowded and invisible, intricate and unbuildable. And that their outward success is not methodical or predictable, but occurs primarily in the embarrassing manner of, say, J.R.R. Tolkien, when some splinter of their interior landscapes and languages serendipitously pierces the culture at large.

Perhaps architects will concede the erasure of the Folk Art Museum building from the streetscape of West 53rd Street because, in some gesture of simultaneous pride and shame, they would erase that embarrassing shadow, that inference of interiority, from their own façades. Perhaps because architects are, in their own eyes, outsider artists: the kind of artists who, even as they seek recognition and remuneration, also have the impulse to distance their work from the material world it ostensibly addresses, to exceed the height and breadth of that worldly reach—to respond, as Wright did in the concluding words of his telegram refusing Johnson's invitation, "sorry but kindly and finally drop me out of your promotion."

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Previous Spread: Seen from the north, the 10-story storage wing is covered in aluminum panels. **Above:** The stacked trays of offices and public spaces. **Below:** In the storage volume, vertical strips of fenestration mark voids between the stacks.

Text by **Joseph Giovannini**

The archives of France were long housed in the center of Paris in the Hôtel de Soubise, a gracious, two-story, 18th-century palace whose symmetries, proportions, and stately order expressed in stone the humanistic rationalism of the French Enlightenment. By the turn of the millennium, however, the archives had outgrown the palace, and a new repository was needed.

Following long-standing state policy and recent studies of a "Grand Paris" that promote a decentralized—and democratized—culture in the suburbs rather than in the city center, France's Ministry of Culture and Communication staged a competition in 2005 for a new, expanded archive for the post-revolutionary *nouveau régime* material in a state-of-the-art facility outside the city center. The site in the Parisian suburb of Pierrefitte-sur-Seine is located at the end of the extended Saint Denis Metro Line 13, adjacent to a new University of Paris campus, and not far from the Cathedral of Saint Denis, where the French kings and queens of the *ancien régime* are interred. (Their archives, dating back to the seventh century, remain ensconced in the Hôtel de Soubise.)

If reason is to the French what beauty is to the Italians, the new context for the archives was not only a vote for *égalité*, but also for rationality. The new archive would, the ministry hoped, play a role in building a new, expanded French cultural ecosystem that embraced the overlooked and marginalized outer edges—and societies—of the city. The move was smart.

The winning design, by Roman architects Massimiliano Fuksas, Hon. FAIA, Doriana Fuksas, and their eponymous studio, is arguably as rational as the Hôtel de Soubise was in its time. After all, when René Descartes, a father of the Enlightenment, wrote his philosophy *Discours de la méthode* (1637), he admitted only what was clear and self-evidently true. For the archives of the country that invented and first adopted the metric system, the Fuksas scheme was a model of methodical and measured clarity, laid out in a straightforward Cartesian grid, and built in the materials of our time—glass, steel, and aluminum.

The 10-story structure is a virtual translation of 18th-century rationalism into a modern idiom, minus the Hôtel de Soubise's aristocratic lineage, and minus any sense of craft—here, abstraction of the mind has replaced any evidence of the hand. The architects, with Studio Fuksas's Michele D'Arcangelo acting as project architect, have sited the building not only in the context of the new cultural ecosystem but also in the context and tradition of French reason, without concessions or apologies.

The clarity of the nearly 1,165,000-square-foot building declares itself from the street, where a pedestrian just off the Metro can see the whole complex in three-quarter view. Long, juxtaposed, stacked, and cantilevered prisms—each with a triangulated, exoskeletal façade—stand in front of a huge 10-story, aluminum-clad box, housing the archives behind its very crisp edges. "I intended to design a jewel box," Massimiliano Fuksas says, "with scattered elements and suspended functions in front."

Reflections in the anodized aluminum cladding the archive dissolve its mass, while providing a plain, ethereal backdrop that silhouettes the stack of prisms to the fore—these volumes house conservation labs, administrative offices, conference rooms, lounges, and reception areas. The architects have separated the individual prisms with wide gaps that act as reveals allowing light, air, and shadow between the sections. Enclosed bridges link the front and back structures over a canyon of space that sits between the archive and the office volumes.

At ground level, shallow pools meander in and out of the sections—filling the space between the two structures and under the bridges—reflecting light and mirroring the building above. These form a calming context that recalls the great gardens of the French Enlightenment. The architects speak of the ensemble as a landscape, but the gaps between the sections tilt the landscape, creating dynamic vertical and diagonal views in a porous, three-dimensional field of structure.

The ground level offers three access points: for visitors, personnel, and deliveries. The main entrance and reception lobby link to the main reading room, the heart of the entire complex, which has the spatial volume and presence of a modern cathedral. Massimiliano and Doriana have kept the space visually controlled and neutral, with a sea of ebony desks forming a datum that visually anchors the triple-height space. Natural light enters through a brise-soleil replete with fins that adjust to allow light, while still protecting books and researchers from glare. The architects have calmed and simplified the interior to a point of academic monasticism.

Staff members work at desks and in rooms on the inboard side of the reading room; librarians are seated at a raised control point that gives them a visual overview of the space. Behind the desks is the access point to the 10 floors of archives, which are arranged in a double-loaded plan, with a central trunk corridor branching into separate stacks, each separated from the other with a full-height void of space. Each stack is windowless, to protect the materials inside, and each is separately air-conditioned and heated via equipment in a decentralized system. The archives give way to bridges that connect to the administrative satellites.

Despite the non-aligned geometries of the stacked volume, the satellites connect with perfect clarity via internal corridors. All interiors have windows off balconies serving as service galleries, which ring all the office blocks. The cantilevered upper prisms shade the lower buildings, while also creating cavernous exterior spaces spotted with columns that rise from the squared pools of water below. Although the pools evoke the landscape and bring a natural element into the environment that forms a common "ground" between the satellites and the archives, the water is also treated as an architectural element, conforming to, and extending, the geometries of the building. The effect is environmental, reflecting the buildings above, sending dappled effects onto walls and soffits, and generally softening the experience with water's tranquilizing effect. The water is not treated as an object but as an environmental base for the building complex.

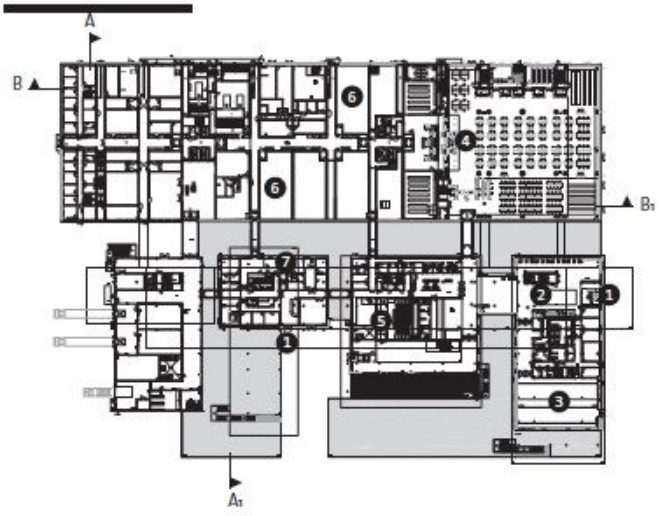
The whole enterprise, including both the institution itself and the building that now houses it, is an appropriate response to its larger urban context. "The building is scaled to the small houses [across from the] front, and the scale graduates, stepping up to tall structures that will eventually be built behind," Fuksas says. But besides the appropriateness of its scale here, the design abstracts the rationalist essence of French culture and builds on it, and so belongs to this institution and site. Unlike the Pompidou Center, designed by Renzo Piano, Hon. FAIA, and Richard Rogers, Hon. FAIA, to which this campus seems visually related, the archives do not play on technical imagery or allude to the Industrial Revolution. The design strips the architecture of any fetishizing of the machine, taking the building back to pure Enlightenment rationalism.

For all its conceptual clarity, the simplicity is deceptive. What appears at first to be a rudimentary Cartesian layout that builds off the grid seems, at moments, to introduce chaos theory. In the tall underbelly of the satellites, the columns are so multitudinous that they become a forest of piers, all set into a playful parallax within the spatial push and pull of the office blocks above and the basins of water at grade. There is an added twist of Italian *chiaroscuro* as the openings among the stacked blocks create shifting compositions of light and shade, solid and void.

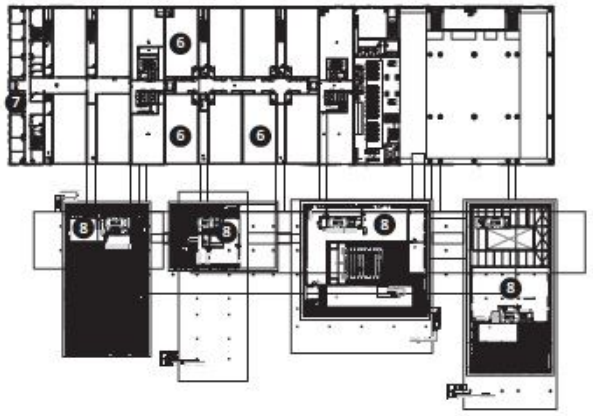
Yet an excess of reason can breed irrationality. The satellites, so apparently clear, edge toward the irrational as the columns multiply within a complex void that expands and contracts in shadow and light. Through the apparent complexity, one cannot comprehend the whole from any single viewing point, even from a frontal position, as one could the Hôtel de Soubise and the Pompidou Center. If there is a whole, it is elusive. There are subversive strains of counterintuitive logic in this building that shade and nuance what is otherwise a thesis of architectural clarity.

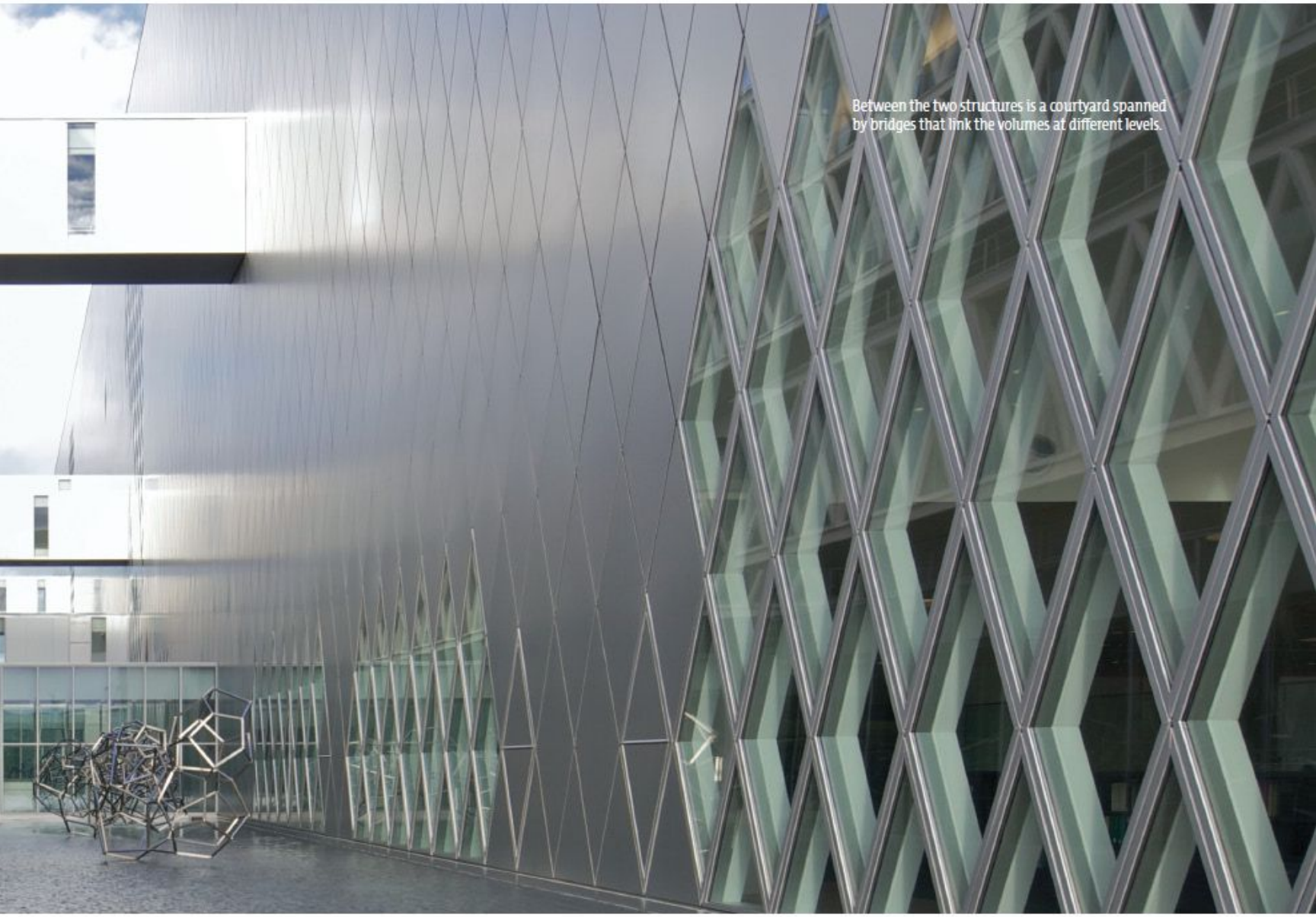
TOP: © KAMAL KHALFI; BOTTOM: © ROLAND HALBE

Ground-Floor Plan



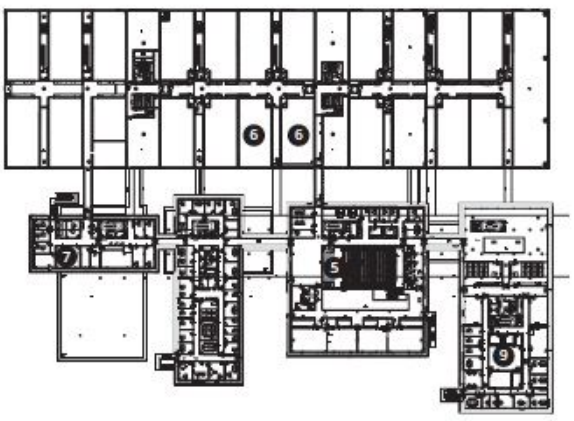
Second-Floor Plan



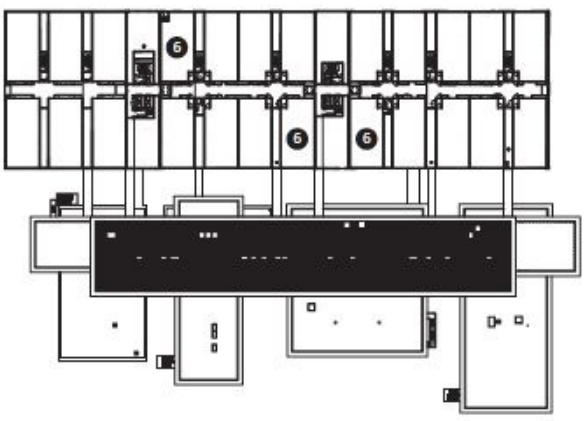


Between the two structures is a courtyard spanned by bridges that link the volumes at different levels.

Third-Floor Plan



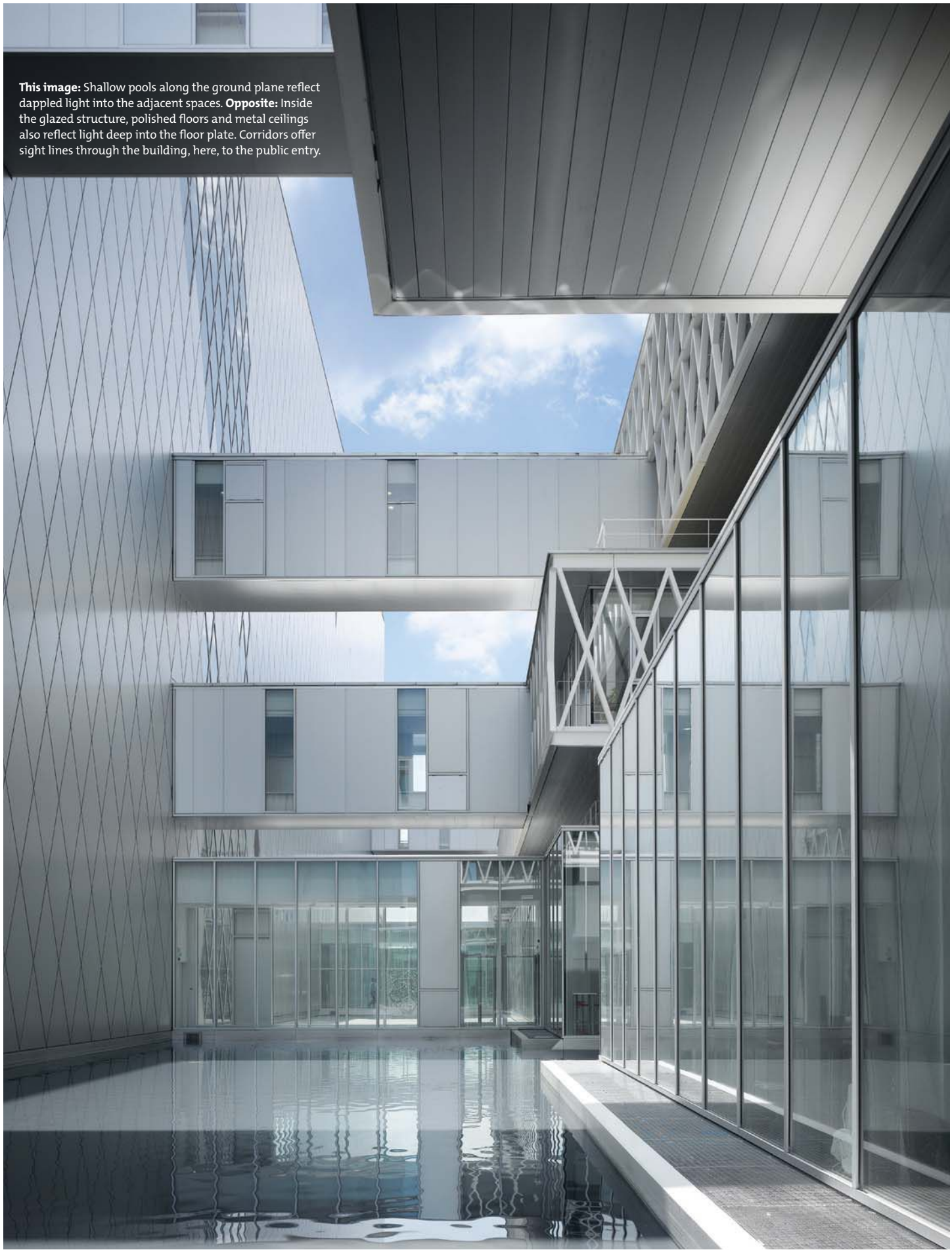
Typical Upper-Level Floor Plan



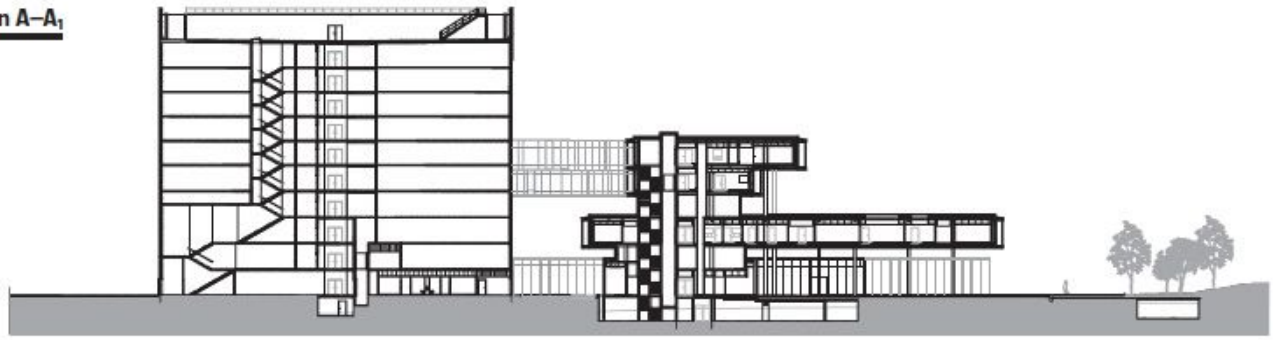
1. Entrance
2. Lobby
3. Exhibition hall
4. Reading room
5. Conference room
6. Archive storage
7. Office
8. Mechanical
9. Multimedia room

0 66 132 N

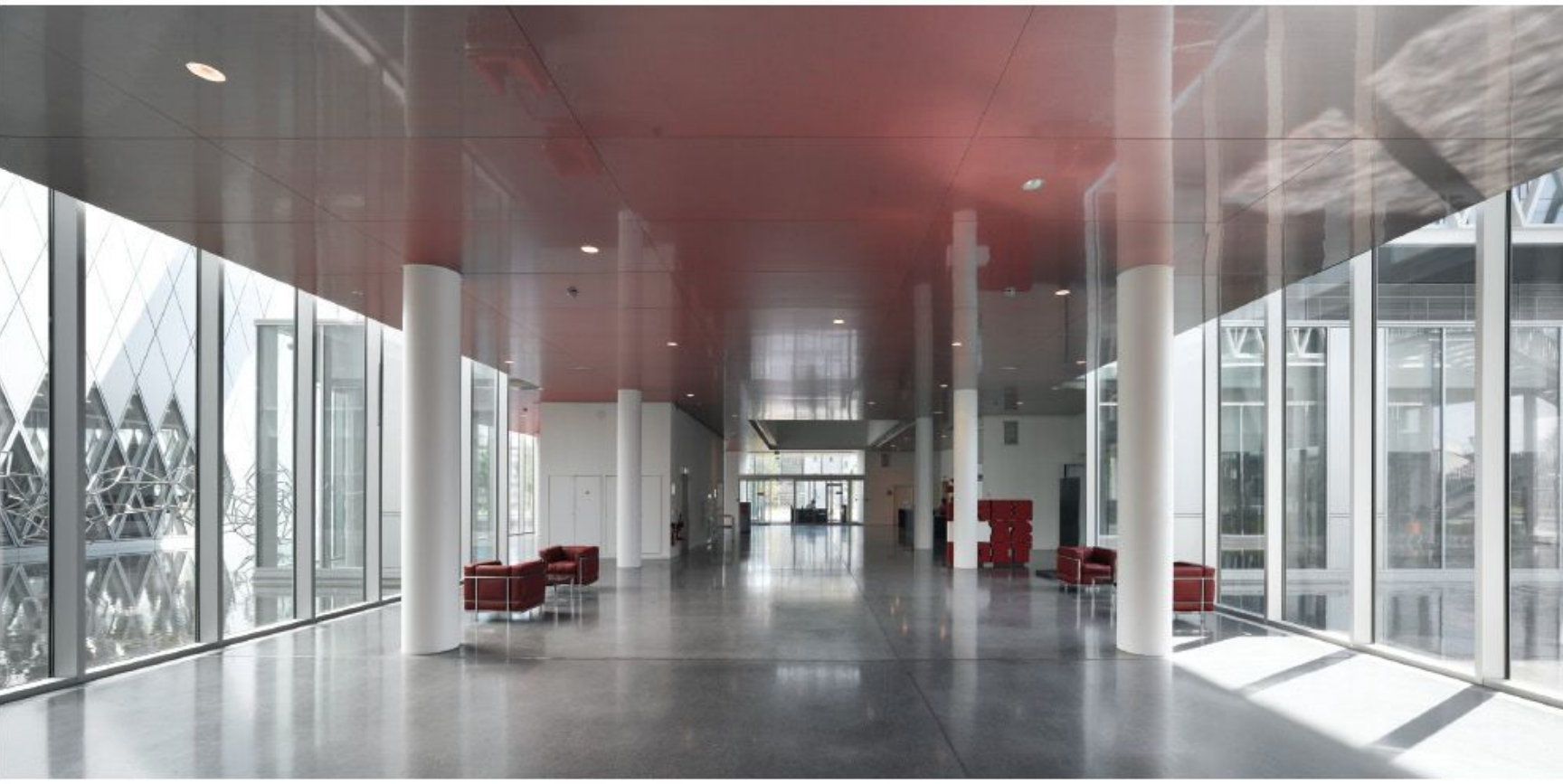
This image: Shallow pools along the ground plane reflect dappled light into the adjacent spaces. **Opposite:** Inside the glazed structure, polished floors and metal ceilings also reflect light deep into the floor plate. Corridors offer sight lines through the building, here, to the public entry.

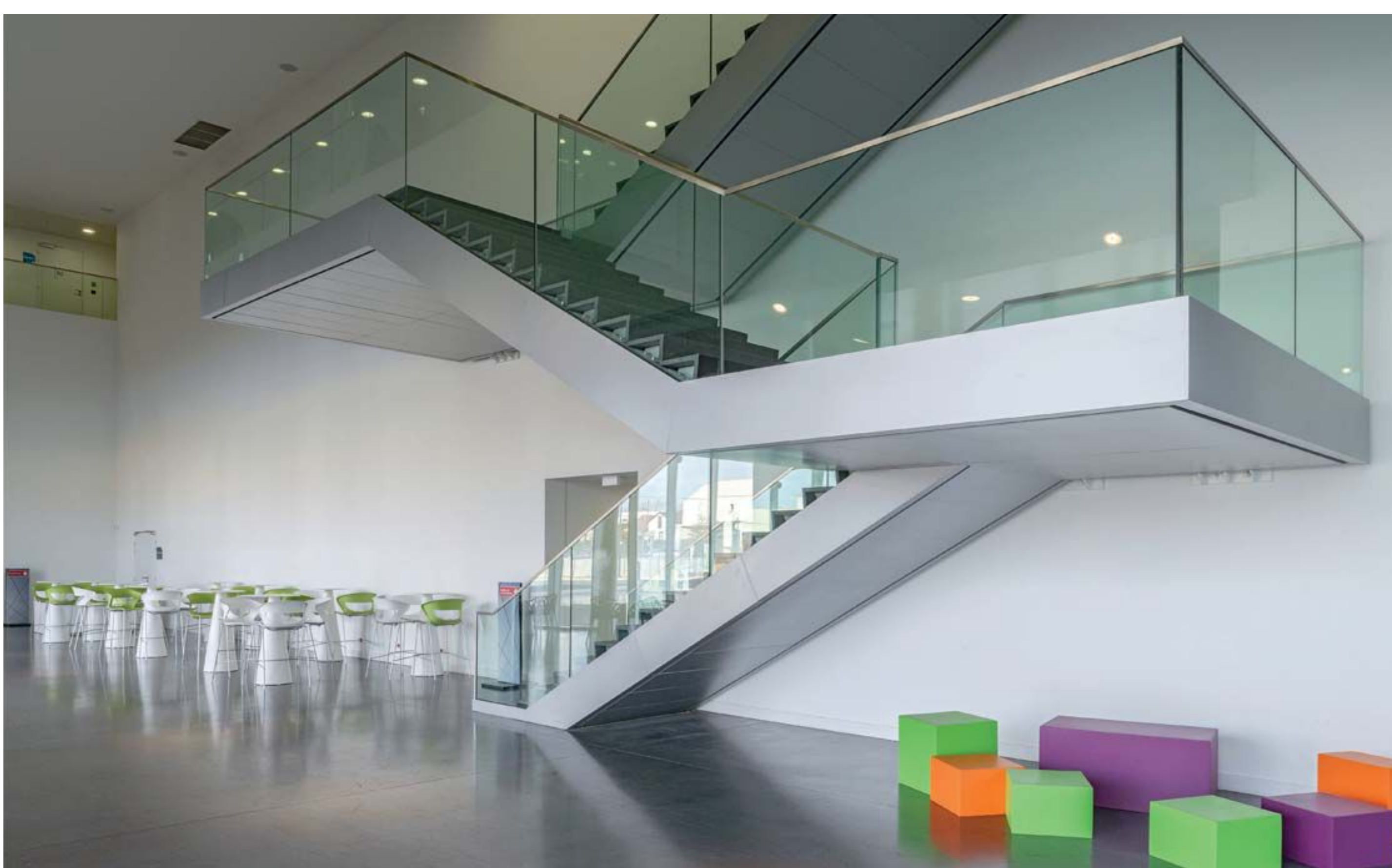


Section A–A$_1$



Section B–B$_1$

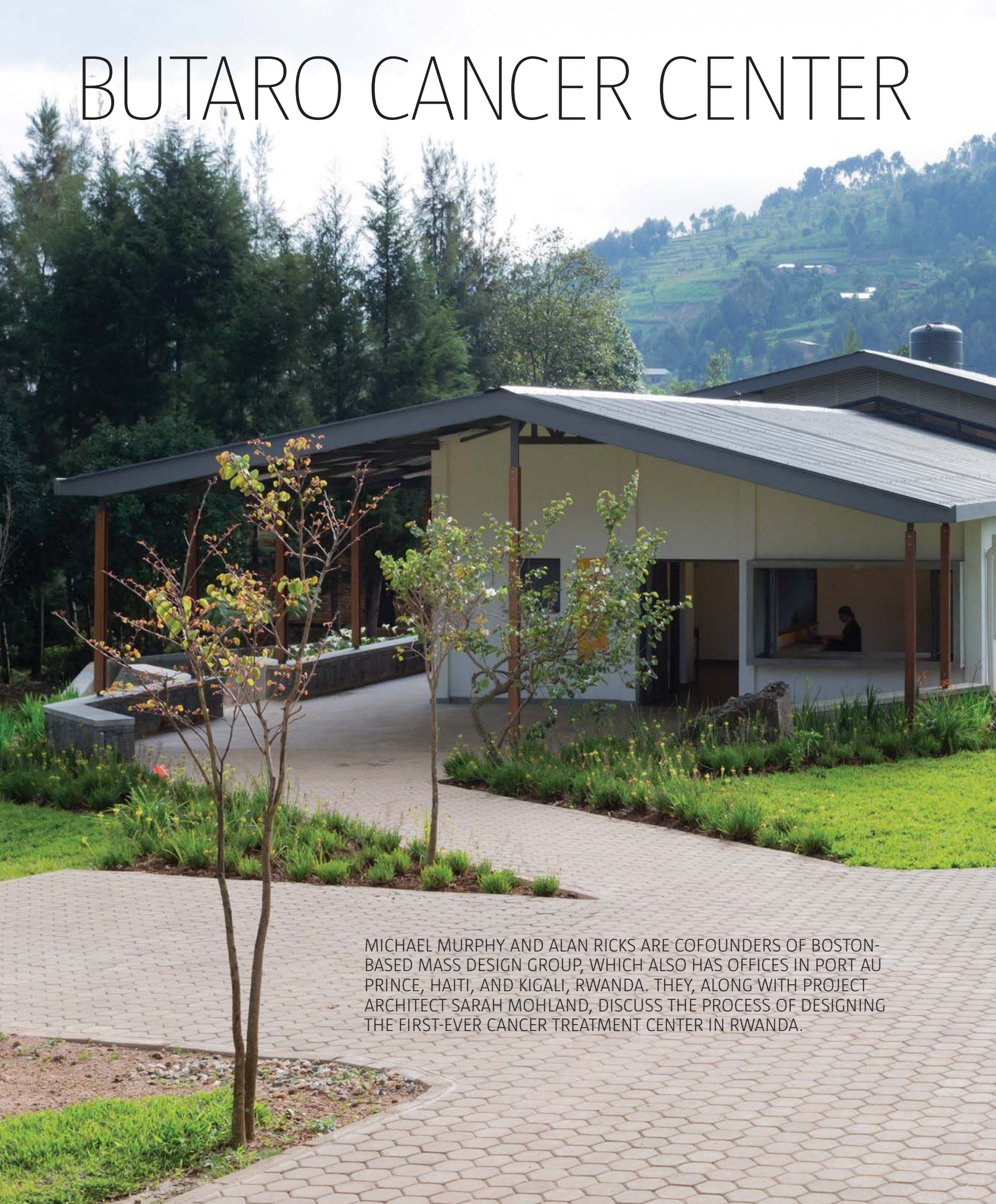




LEFT: © PHILIPPE RUAULT; RIGHT: © ROLAND HALBE

Opposite: The minimal palette continues inside, with bursts of color in archives' storage (top) and the accent furniture (bottom). **This image:** The ground-floor reading room features rows of black tables, where scholars can view archival material.

BUTARO CANCER CENTER



MICHAEL MURPHY AND ALAN RICKS ARE COFOUNDERS OF BOSTON-BASED MASS DESIGN GROUP, WHICH ALSO HAS OFFICES IN PORT AU PRINCE, HAITI, AND KIGALI, RWANDA. THEY, ALONG WITH PROJECT ARCHITECT SARAH MOHLAND, DISCUSS THE PROCESS OF DESIGNING THE FIRST-EVER CANCER TREATMENT CENTER IN RWANDA.


Cancer Care
za kanseri

Text by **Thomas Fisher, Assoc. AIA**
Photos by **Iwan Baan**

The cancer center is part of a 15-year master plan for this rural site. How does the new building fit into the work you've already done there?
Michael Murphy: Our partners, Boston-based Partners In Health, as well as the Ministry of Health of Rwanda who run the Butaro District Hospital [which MASS completed in 2011], have a commitment to bringing the best healthcare that they can to the poorest communities that they serve.

A lot of the funding for healthcare in emerging economies in the Global South aligns with communicable diseases, such as tuberculosis, malaria, and HIV. Partners in Health is now looking to the future, to noncommunicable diseases such as cancer, obesity, and diabetes—the kinds of things that start to affect people as they live longer. And so they chose to start what is now the first outpatient cancer center in East Africa, I believe—the first cancer treatment in Rwanda for sure.

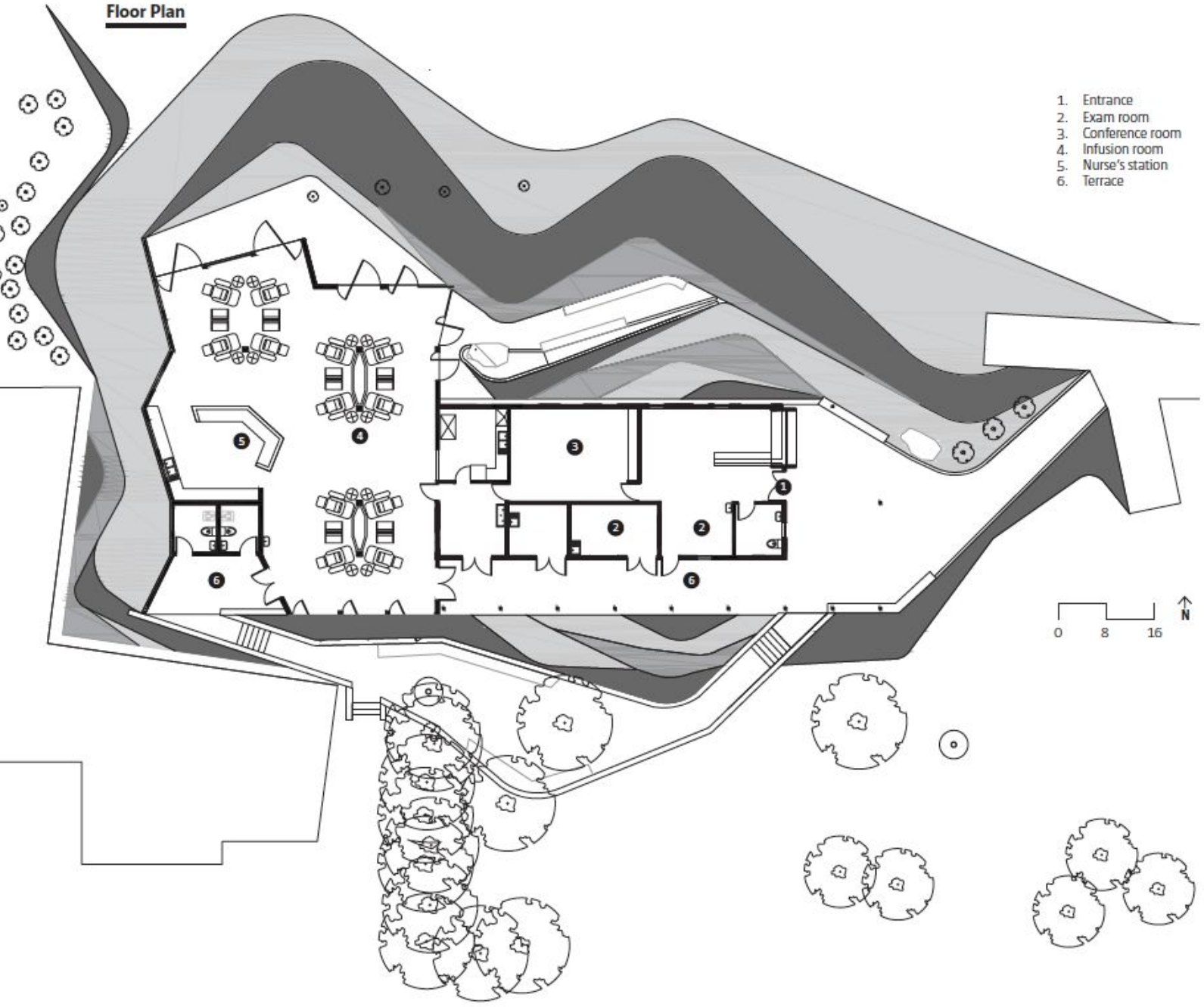
Is it drawing people from a much wider area because of that?
Murphy: It will certainly draw people from all over Rwanda ... as the referral center for cancer. [Also] I think, ambitiously, [from] the neighboring countries, the Congo and Uganda, which are in close proximity.

What's been the larger impact of this center on the local community?
Murphy: The economic impact of the hospital has been substantial. When I first got to Butaro in the beginning of 2008 there was no electricity in the town; there were mostly empty businesses. Not even six years later, there's a hydroelectric dam in town. In the whole village below the hospital, there's lots of fresh coats of paint on businesses. A Bank of Kigali has opened up there, not to mention middle-class families are moving to this community because there's ongoing work at the hospital both in terms of service, nursing, as well as in construction.

I know that this project has also involved developing construction skills in the local population, building infrastructure.
Murphy: One of the privileges of getting to invest more than five years into this one site is that we've been able to grow relationships with a variety of team members. MASS is bringing expertise, and that's being melded with the wealth of knowledge from people in the local community and with Rwanda regionally. Over the course of these projects we've been able to find really skilled workers. But what's even more exciting is that we've seen these people take those skills and find other jobs because of the recognition they've received for the work on these projects. We've seen that in different trades such as masonry, welding, weaving, and pottery.
Alan Ricks: It reminds us that so much of the architecture is about maximizing the potential of labor. And in order for us to achieve high-quality

Previous spread: To adapt an existing building on the campus into the new ambulatory cancer center, MASS Design Group turned to hand-sawed formwork for concrete mixed on site, and used CMUs formed on site to replace much of the original structure. **Top:** Surrounding the center are landscaped pathways lined by locally sourced volcanic stone, leading to the entrances and gardens for patients. **Left:** A butterfly roof, topped by metal material from Tolirwa, contains concealed gutters that funnel rainwater into cisterns for use elsewhere on the site.

Floor Plan



results with limited resources, by necessity our practice began with trying to see what high-skilled local labor we could leverage to maximize the impact, the dignity, the beauty, and the outreach this process could potentially have into the community.

How did you focus on patient care in the design of the cancer center?

Sarah Mohland: The infusion center is a place where patients spend six to eight hours at a time receiving treatment, so we tried to make the space as comfortable and peaceful as possible. The interior is a very bright yellow and it creates a calm space. Patient care is centralized along three infusion pods, and it allows for the patients to have visitors. A chair provides seating for up to two family members. We emphasized patient care by allowing for easy access for the physicians and the nurses to reach them in a centralized place.

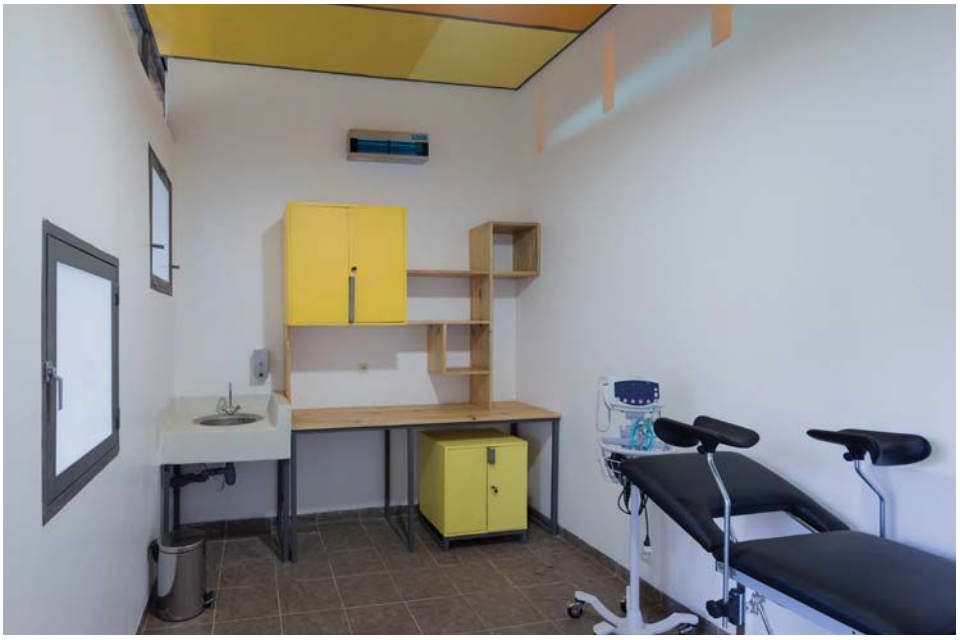
Murphy: There was potential here to take advantage of this amazing landscape. By customizing the doors and opening the façade, we knew we could create an open space for these patients to feel dignity and respite. In order to open the view, we created a butterfly roof, which is also represented in the Y-shape of the columns themselves. So there's a thematic strategy in the engineering as well as the holding up the roof of this kind of lifting, this branching up, in order to create a more lively open space.

There's a lot we can learn about medical space in the U.S. from what is being prototyped in Rwanda. Open air, leveraging the environment—those are things that have been largely designed out of U.S. medical facilities. I think it behooves us to remember how those kinds of open air environments can also be very valuable and protective and safe for patients.

Describe the structure and the building materials. Were there any unique decisions that you had to make because of climate or culture?

Murphy: The way we approach every project is through an initial immersion. The idea is not only to uncover the challenges on the project, but also to uncover opportunities that we can leverage to amplify the impact. When Rwanda labor costs for a good-paying job are still low relative to materials, it creates a real opportunity for customization on a larger scale.

Left: A large overhang protects the entrance to the ambulatory cancer center and provides a sheltered gathering space. The design team was able to work with skilled local labor to create detailing such as the projecting concrete jamb around the custom steel windows. **Bottom:** Inside the infusion room, which is the center's largest space, custom millwork and a nurse's station are all painted in vivid yellow shades from Ameki Color. A custom light fixture hangs from the steel frame and painted plywood ceiling.



And so we said, "Okay, we're creating this custom hand-sawed wood formwork, and isn't this a chance to do something more unique with the structure of the space to give it a character that reflects that opportunity?" And so we worked with our Rwanda engineering team to look at how we could optimize the structure to create this spacious, airy open space while using the form of the structure to highlight that.

It's clear that your work in Butaro shows the value that good design can bring to the country in a way that is often not appreciated in the developed world.
Murphy: I think we forget that it's possible to design an architecture that improves people's lives first and foremost, rather than the aspirational object that could be value engineered out. Our system is so overdesigned in terms of liabilities and litigiousness that it's hard to sift through it to see the value and the potential that's right in front of us to change the built environment we're already living in. I think working in Rwanda shows us that it's not only possible, it's absolutely imperative. If we don't do it, we're going to see our infrastructure continue to corrode and fall apart in the U.S. We're going to see job opportunities that are lost. We're going to see a lack of investment in health and safety in our communities if we don't think about the infrastructure we live within as part of the methodology to improve our lives.

In other words, we, too, could become a Rwanda unless we take these things seriously.
Murphy: I really believe that.

Top: Custom millwork is seen again in the private exam room. **Right:** In the infusion room, patients can sit with family members in custom furniture that sits on SAJ floor tile while they receive their treatment. Large-scale doors can open to the outside to promote cross-breeze from the Big Ass Fans fixture installed overhead.

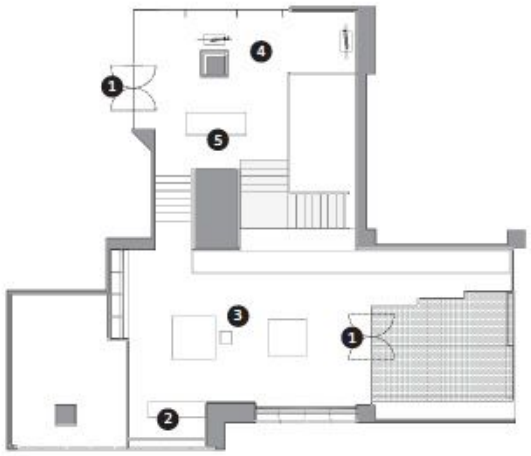
REALITY LAB

TOKYO-BASED ARCHITECTURE, INTERIORS, AND PRODUCT DESIGN FIRM TOKUJIN YOSHIOKA CREATED A NEW RETAIL EXPERIENCE FOR CLOTHING COMPANY ISSEY MIYAKE.

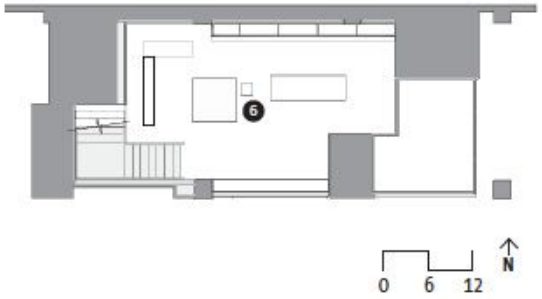
Text by **Katie Gerfen**
Photos by **Masaya Yoshimura**

Previous spread: The multilevel Reality Lab in Tokyo, seen from its stairwell, is principal Tokujin Yoshioka's 17th collaboration with clothier Issey Miyake. His studio, which was established in 2000, has also designed retail spaces for Swarovski and Camper. **This Image:** There are two street entrances to the store. Alongside one of them, a blue aluminum shelf displays several of the pleated light fixtures that Issey Miyake designed for the Italian manufacturer Artemide. **Opposite:** The other entrance is a bright spot in the streetscape of Tokyo's Aoyama shopping district. Miyake's Homme Plissé menswear line, which combines heavy fabrics with the designer's signature pleats, inspired Yoshioka to create textural contrasts between construction materials.

Mezzanine- and Upper-Level Plan



Lower-Level Plan



1. Entrance
2. Check out
3. Upper-level showroom
4. Mezzanine-level showroom
5. Double-height space
6. Lower-level showroom

Top: The architects went through many color combinations before settling on green and blue for the aluminum clothing displays, because, Yoshioka says, those colors "maximally evoke the texture of collections which will be contained at the store." Blue racks are confined to the upper level. **Above:** The lower level features green displays. Yoshioka's office designed the steel tables with the angled legs for Italian furniture maker Desalto. Known as Element, the series complements the sculptural, freestanding steel clothing racks deployed throughout. **Opposite:** Yoshioka was interested in "incorporating the trace of time cultivated in the space," he says. The view from the stairwell drives home, as Yoshioka says, "the contrast between the texture of peeled wall and futuristic, colored aluminum—the contrast between history and future."

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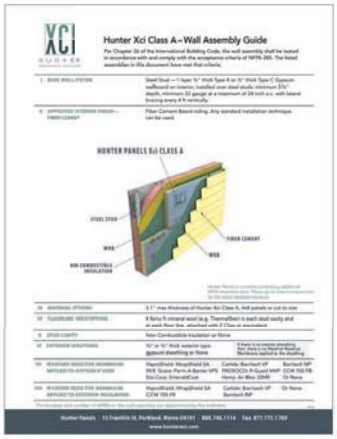

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Low/Rise House

DAN SPIEGEL, OF SAN FRANCISCO–BASED SPIEGEL AIHARA WORKSHOP, DESIGNED THIS SINGLE-FAMILY HOUSE WITH A RARE QUALITY BY THE STANDARDS OF SILICON VALLEY: RESTRAINT.

Text by **Deane Madsen**
Photos by **Bruce Damonte**

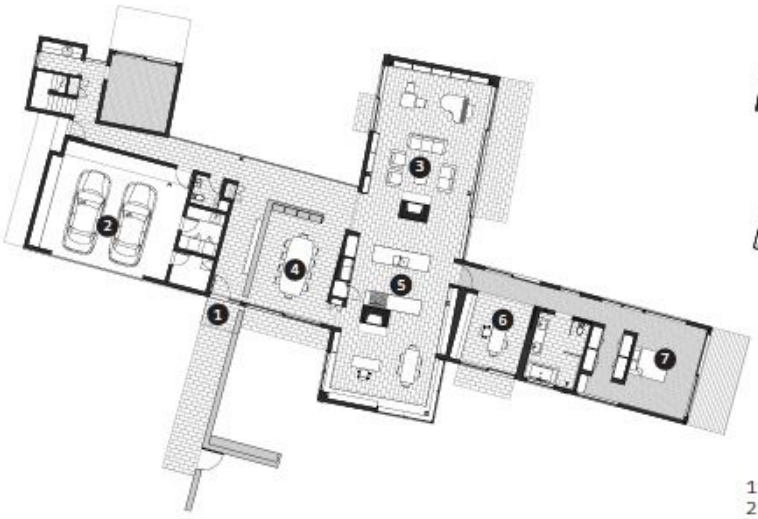
MENLO PARK, CALIF., may be a hotbed of Silicon Valley innovation, but when it comes to architecture, the scenario is far less inspiring, trending toward a homogeneous spread of Mediterranean-style McMansions. Dan Spiegel, AIA, of San Francisco–based Spiegel Aihara Workshop (SAW), chose to eliminate wasted space and stylistic gestures in favor of smart living for two of his toughest clients—a pair of Stanford University professors who also happen to be his parents.

At 4,500 square feet, the Low/Rise House is relatively modest for the area, comprising two ranch-like, single-story bars that intersect at the center of the half-acre site. A three-level guest tower rises from the western edge of the structure. Sliding glass doors open the ground-floor living spaces to lush landscaping—designed by Spiegel's wife and partner Megumi Aihara—as well as to the northern California climate, which "verges on magical," Spiegel says. Opening the house to the outdoors has the added benefits of both natural ventilation and increased capacity for parties.

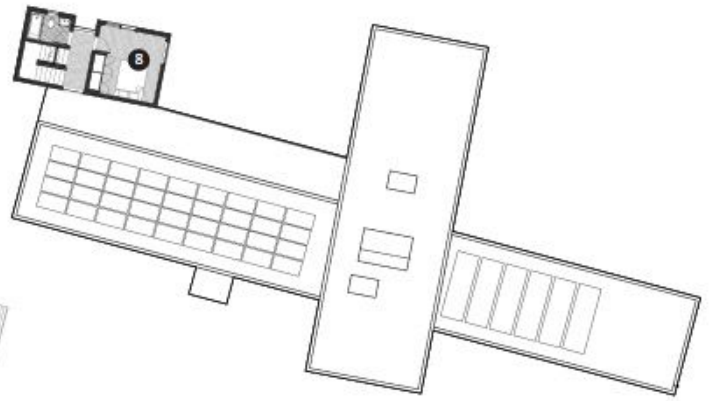
Although Spiegel opted not to pursue certification, he integrated many green features in the project. Flat rooftops host photovoltaic arrays that produce 90 percent of the energy used in the house. Additional energy savings can be found in the guest tower, whose utilities can be powered on or off via mobile apps to ensure that the space won't draw power when unoccupied. This flexibility of space makes the house intimate enough for two, but still comfortable when the couple's grown children visit. "A lot of times, flexibility is a placeholder for vagueness," Spiegel says. "We wanted these spaces to be quite specific for each use, but to allow for different kinds of use patterns." Plus, having a roof deck atop the tower affords views out to nearby Windy Hill Open Space Preserve and over the neighborhood's tree canopy.

The fact that this is where his parents live also means that Spiegel will have plenty of opportunities to learn lessons from it over time, to see how materials age, and to conduct in-person post-occupancy tests. As for the house's punch-list? "It'll be an ongoing thing," Spiegel says.

Ground-Floor Plan



Second-Floor Plan



1. Entrance
2. Garage
3. Living room
4. Dining room
5. Kitchen
6. Office
7. Master bedroom
8. Guest bedroom

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Previous spread: The landscaped entrance to the wood-clad Low/Rise House is at the end of a Vermont slate walkway, and flanked by a board-formed concrete wall that separates parking from private garden; the wall's formwork was re-used as floor joists. **Opposite, below:** At the house's western end is a three-story tower that accommodates a guest suite on each floor. The roof deck overlooks the surrounding landscape, while photovoltaics from Builders Solar line the PVC-clad roofs of the two lower volumes. These panels bring in 90 percent of the house's required electricity. **Below:** The living spaces in the lower volumes, including the living room, seen here, are all able to be open to the outdoors via sliding low-E glass panels from Cardinal Glass Industries. The floors are lined in Vermont slate, and exposed structural steel along the ceiling plane serves as crown molding. **Right:** The master bedroom, in the eastern end of the house, features a white oak floor and Douglas Fir ceiling, and sliding panels that open onto a private deck.

New National Archives of France, page 84

Project New National Archives of France, Paris
Client French Ministry of Culture and Communication, represented by Direction des Archives de France (DAF)
Architect Studio Fuksas, Rome—Massimiliano Fuksas, Hon. FAIA, and Doriana Fuksas (principals)
Delegate Client Opérateur du Patrimoine et des Projets Immobiliers de la Culture (OPPIC)
Engineer Betom Ingégnierie
General Contractor Bouygues Construction
Landscape Design Florence Mercier
Acoustics Altia
Control Department Socotec
Façades Kyotec
Furnishings James Ebéniste, Betom Ingégnierie (public spaces); Poltrona Frau (conference room)
Scenography Conference Room Architecture and Technique
Shelving Samodeff
Artistic Interventions Pascal Convert, Susanna Fritscher, Antony Gormley
Size 108,136 square meters (1,163,966 square feet)

Butaro Ambulatory Cancer Center, page 94

Project Butaro Ambulatory Cancer Center, Butaro Hospital, Burera District, Rwanda
Client Ministry of Health in partnership with Partners in Health
Architect MASS Design Group, Boston and Kigali, Rwanda
M/E, Civil, and Structural Engineer MASS Design Group with Kayihura Nyundo from Ubatsi
Interior and Lighting Designer MASS Design Group
General Contractor Partners In Health
Construction Manager Joas Peter Ngendabanga
Size 4,307 square feet

Materials and Sources

Ceilings Custom-fabricated steel frame and painted plywood
Concrete Hand-mixed on site
Exterior Wall Systems CMUs produced on site
Fabrics and Finishes Locally sourced African patterned fabric
Flooring Terrazzo; SAJ Tile
Furniture and Millwork Custom-fabricated
HVAC Big Ass Fans *bigassfans.com*
Masonry and Stone Locally sourced volcanic stone
Paints and Finishes Ameki Color *amekicolor.com*
Roofing Tolirwa
Wayfinding Custom-fabricated signage designed by MASS Design Group
Windows Custom-fabricated steel windows

Reality Lab. Issey Miyake, page 102

Project Reality Lab. Issey Miyake, Tokyo
Client Issey Miyake
Architect Tokujin Yoshioka, Tokyo—Tokujin Yoshioka (principal)
Planner Miyake Design Studio
Cost Withheld

Low/Rise House, page 109

Project Low/Rise House, Menlo Park, Calif.
Client Withheld
Architect Spiegel Aihara Workshop (SAW), San Francisco—Dan Spiegel, AIA
Consulting Architect OKB Architecture, Peter Rose + Partners
Structural Engineer Larry Cofer
Mechanical Engineer Monterey Energy Group
Civil Engineer Murray Engineers
Landscape Design Spiegel Aihara Workshop (SAW), Megumi Aihara
Landscape Contractor Terra Ferma Landscapes
General Contractor Hunner Associates
Audiovisual Active Integration
Size 4,500 square feet
Cost Withheld

Materials and Sources

Appliances LG *lg.com*; Miele *mieleusa.com*; Sub-Zero *subzero-wolf.com*
Bathroom Fixtures Dornbracht *dornbracht.com*; Hansgrohe *hansgrohe.com*
Cabinets Capstone Cabinets *capstonecabinets.com*
Countertops locally quarried Virginia Mist granite
Flooring Camara Slate (green Vermont slate) *camaraslate.com*; white oak
Furniture Miles & May *milesandmay.com*; Semigood Design *semigoods.com*
Glass Cardinal Glass Industries Low-e *cardinalcorp.com*
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Roofing PVC
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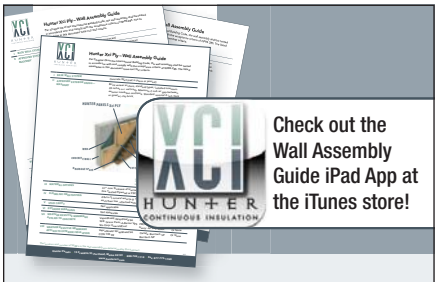

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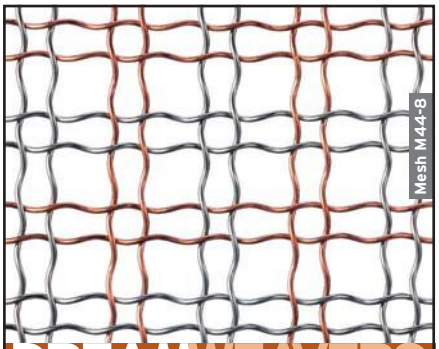

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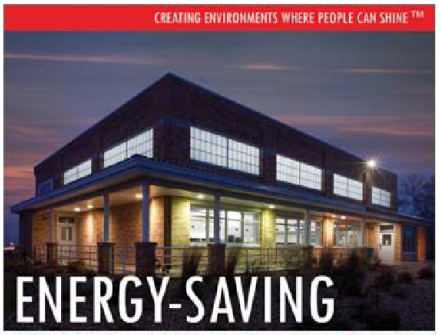

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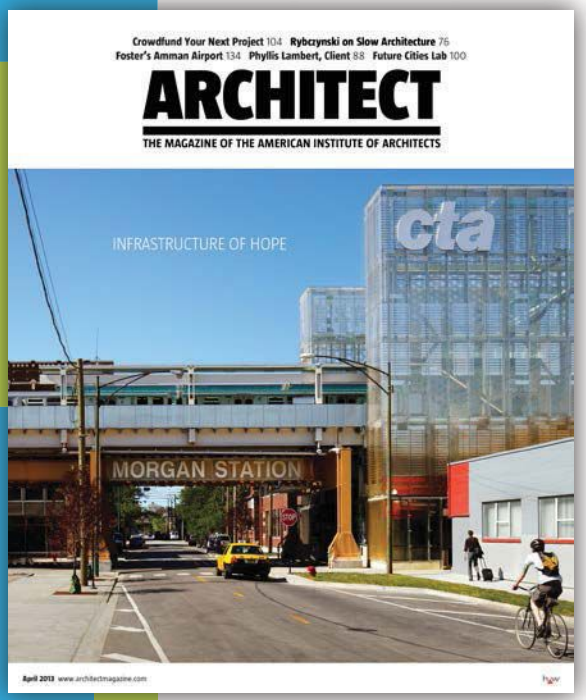

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Spanning Disciplines

DESIGNED TO CROSS A PLANNED RESERVOIR, THE RUCK-A-CHUCKY BRIDGE WOULD HAVE BEEN A MARRIAGE OF ARCHITECTURE AND ENGINEERING.

Text by **John Morris Dixon, FAIA**

THE 1979 P/A AWARDS JURY challenged precedent by bestowing a rare First Award on a project in which engineers took the lead. Credit for the design of the Ruck-a-Chucky bridge was shared by T.Y. Lin International, Hanson Engineers, and Skidmore, Owings & Merrill (SOM). Leading the project, along with the founders of the Lin and Hanson firms, was SOM's Myron Goldsmith, renowned as both an architect and an engineer. Juror Barry Elbasani praised the project as a reminder "that architecture is everywhere about us and not necessarily in a building."

The bridge was designed to span the American River in California, about 10 miles upstream from a planned dam. The challenge was to connect roads running parallel to the steep valley walls without requiring the extensive and costly re-grading required for a straight bridge, and a curved span with customary vertical supports was ruled out by the 450-foot depth of the anticipated reservoir. Hence the "hanging arc" concept for the bridge, with a curved concrete deck supported by 80 post-tensioned cables anchored in the slopes of the gorge.

Although preliminary work at the dam site was underway when the bridge was designed, its construction was subsequently halted. The same thing happened to a very different bridge that remained unbuilt—another 1979 P/A winner, Michael Graves's Fargo-Moorhead Cultural Center Bridge, which was to span the Red River between North Dakota and Minnesota.

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