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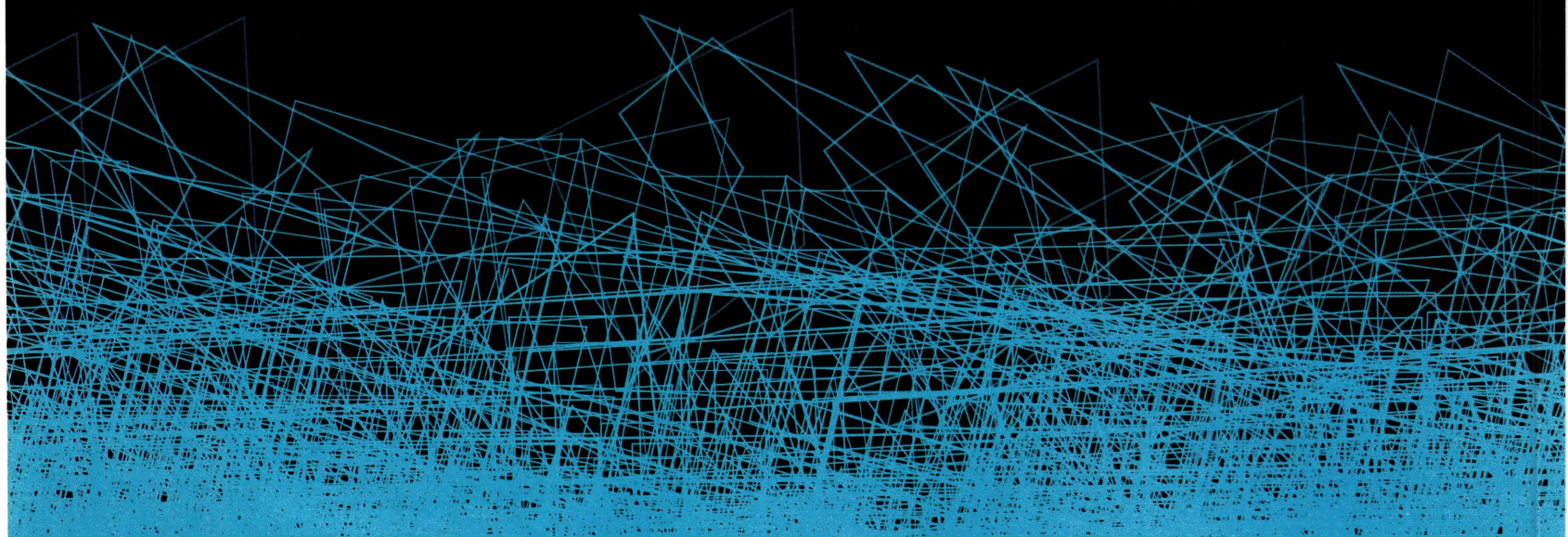

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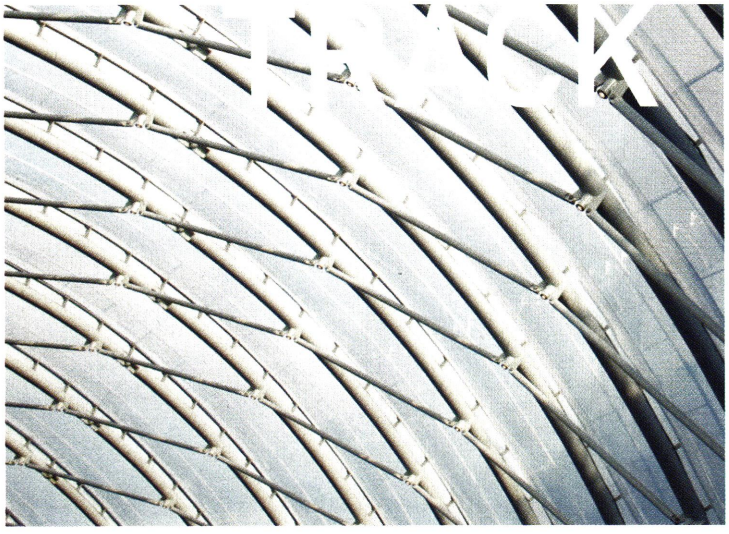

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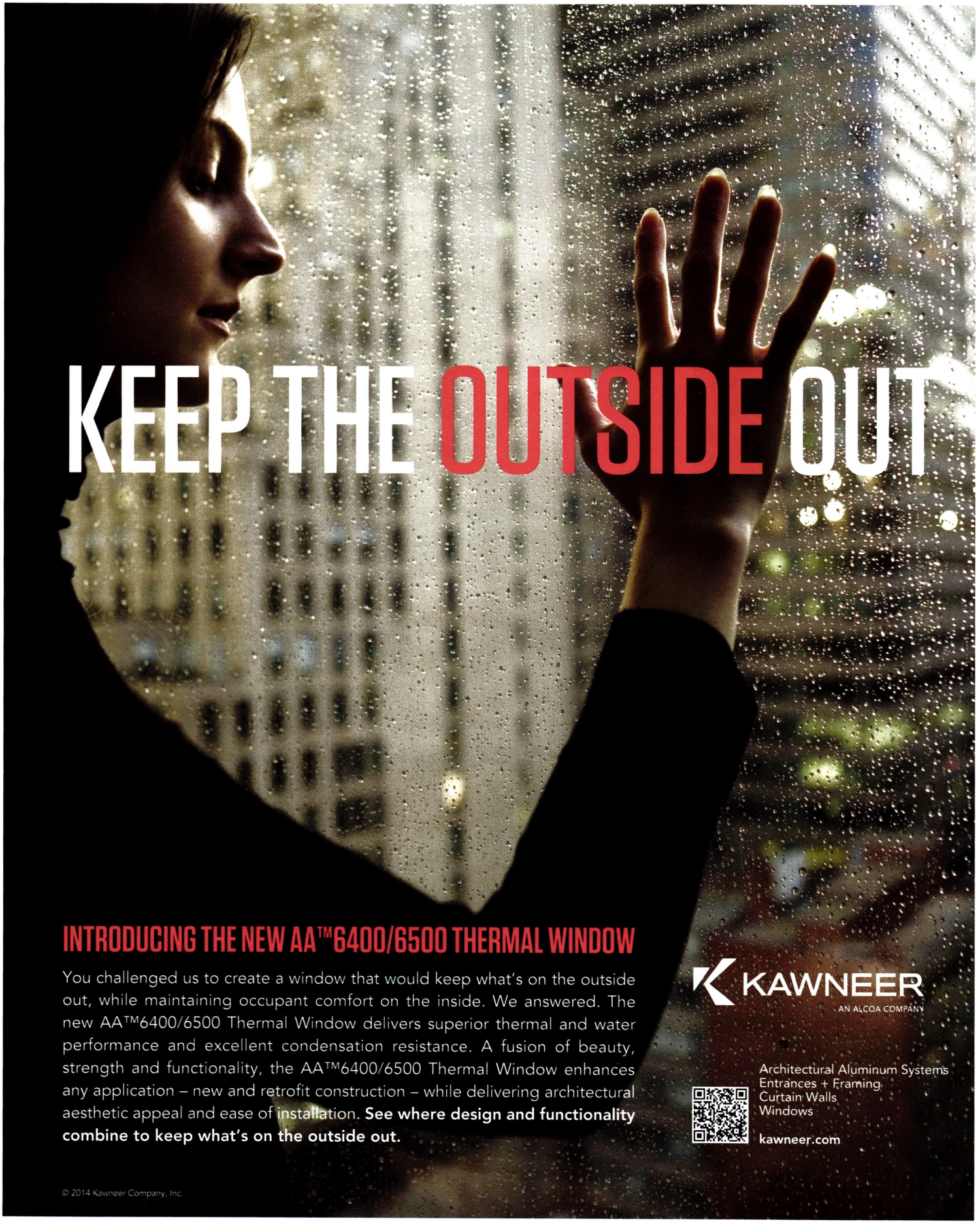
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Transformations

New architecture's impact on the urban realm, from Los Angeles to Glasgow to Rio

IN THE PAGES of RECORD, we like to explore a work of architecture not only for the strength of its design but for the impact on its surroundings. In this issue, we look at several new cultural projects that are having a profound effect on urban sites. Steven Holl's controversial addition to the Glasgow School of Art, opposite Charles Rennie Mackintosh's early 20th-century masterpiece (page 120), brings a sense of lightness—with its luminous translucent glass skin—to that gritty Scottish city, where it rains more than half the year. In Mexico City, David Chipperfield designed the Jumex Museum (page 106) to stand up to its bigger and noisier neighbors, especially the shiny, curvaceous Soumaya Museum, which towers over it. Chipperfield's building shows its teeth—with a jagged roofline and the powerful solidity of its travertine cladding—as well as its generosity, with an expansive opening to a new civic plaza that is part of the scheme. In the heart of Los Angeles, Thom Mayne and his firm Morphosis have created the architectural equivalent of a Hollywood blockbuster for Emerson College (page 100), with a mélange of vibrant forms embraced by an enormous frame, which brings a jolt of new life to an anonymous stretch of Sunset Boulevard.

Speaking of Hollywood, one of my all-time favorite movies is Alfred Hitchcock's 1946 romantic thriller, *Notorious*. In the film, Ingrid Bergman agrees to infiltrate a cabal of Nazis in Brazil; and as she and U.S. intelligence agent Cary Grant fly to Rio de Janeiro, they (and the audience) see the city's dramatic beauty from the air. It was from that aerial view that Le Corbusier, who loved planes, said he sketched his snaking urban plan for Rio (never realized) in 1929. Of course, down on the ground, the city (and "its violent and sublime landscape," as Le Corbusier called it) was—and is—very different.

Next month, with the World Cup matches playing in Rio and 11 other Brazilian cities, millions of eyes around the globe will be fixed on South America's largest country. While the economic boom of a few years back—along with the Cup and Rio's winning bid for the 2016 Olympics—launched a frenzy of plans for infrastructure and new architecture, the recent slowdown in growth is just one reason why Brazil presents as many challenges as opportunities for both local and foreign architects. Unfinished transit and other architectural projects, poor construction quality, and the protests of citizens from the burgeoning middle class and those living in favelas, exemplify some of the problems the country is facing. RECORD's special report, "Spotlight on Brazil" (page 71), outlines both the successes and difficulties for architects who are working there.

One of Brazil's most famous Modern architects of her day was Lina Bo Bardi. While she was overshadowed internationally by Oscar Niemeyer, her tough aesthetic, softened by her explorations of Brazil's varied cultures and craftsmanship, is earning fresh appreciation through two new books and an exhibition devoted to her work (page 90).

Similarly, an American woman architect of an earlier era, Julia Morgan (1872–1957), is finally getting her due (page 58). Late last year, Morgan was selected as the 2014 AIA Gold Medalist, one of only 12 winners in the medal's 107-year history to be honored posthumously. Her achievements were stupendous, beginning with the fact that she was the first woman—from any country—to earn a degree from the École des Beaux-Arts in Paris, in 1902. Though she is by far best known for designing William Randolph Hearst's castle at San Simeon in California, she left behind a huge body of work—more than 700 completed projects, about 200 more than Frank Lloyd Wright.

RECORD is pleased to feature Morgan, along with the work of two other recent Gold Medalists, Holl and Mayne, in this issue. ■

Cathleen McGuigan

Cathleen McGuigan, Editor in Chief

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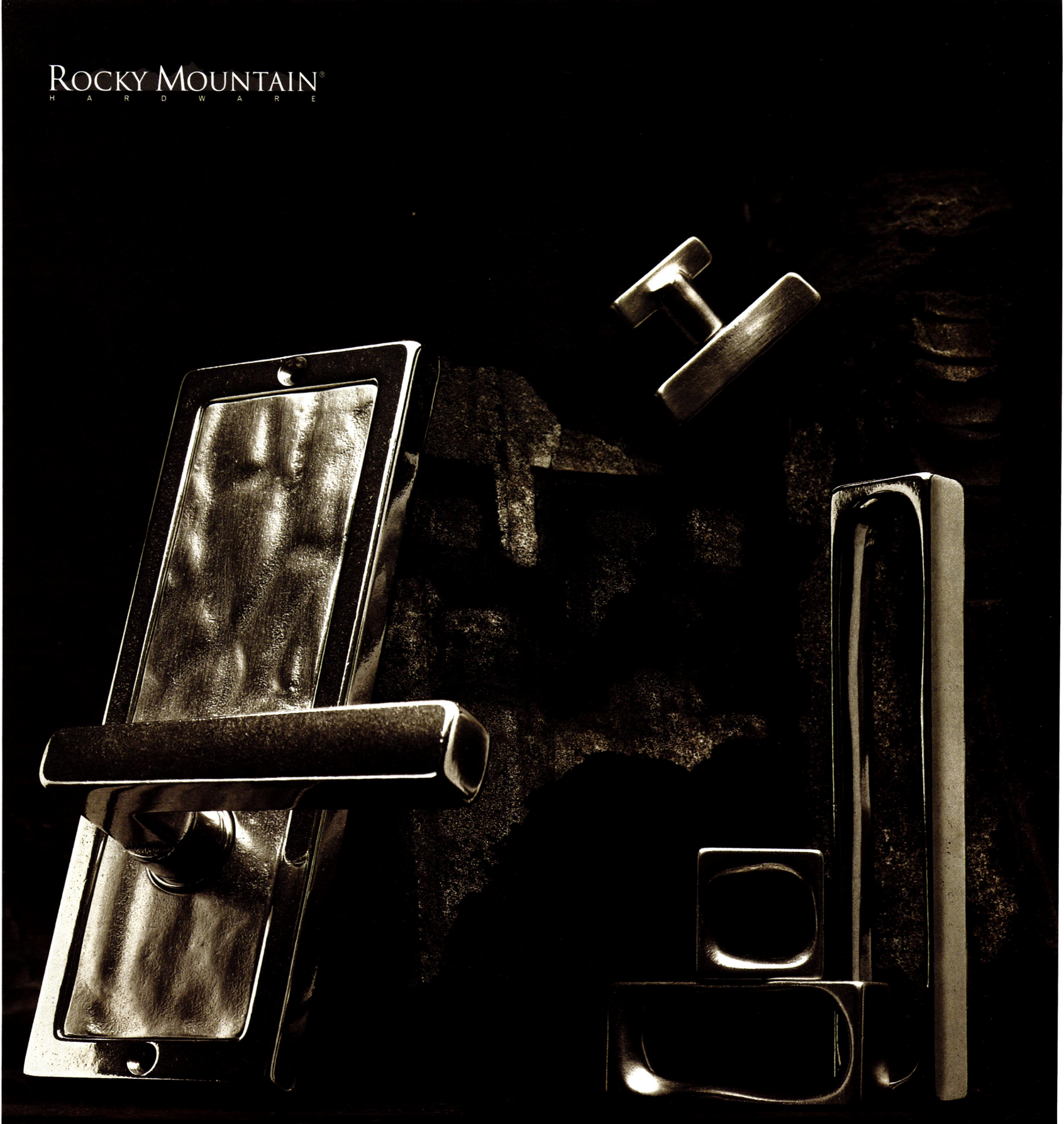

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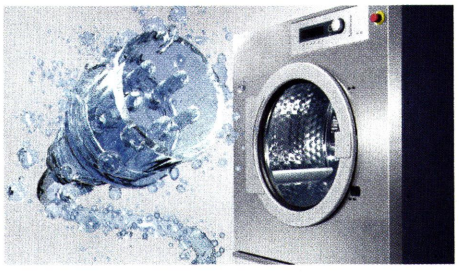

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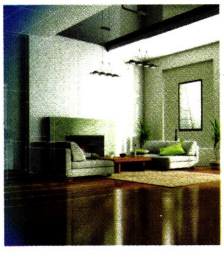

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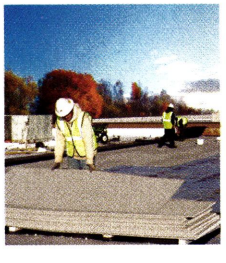

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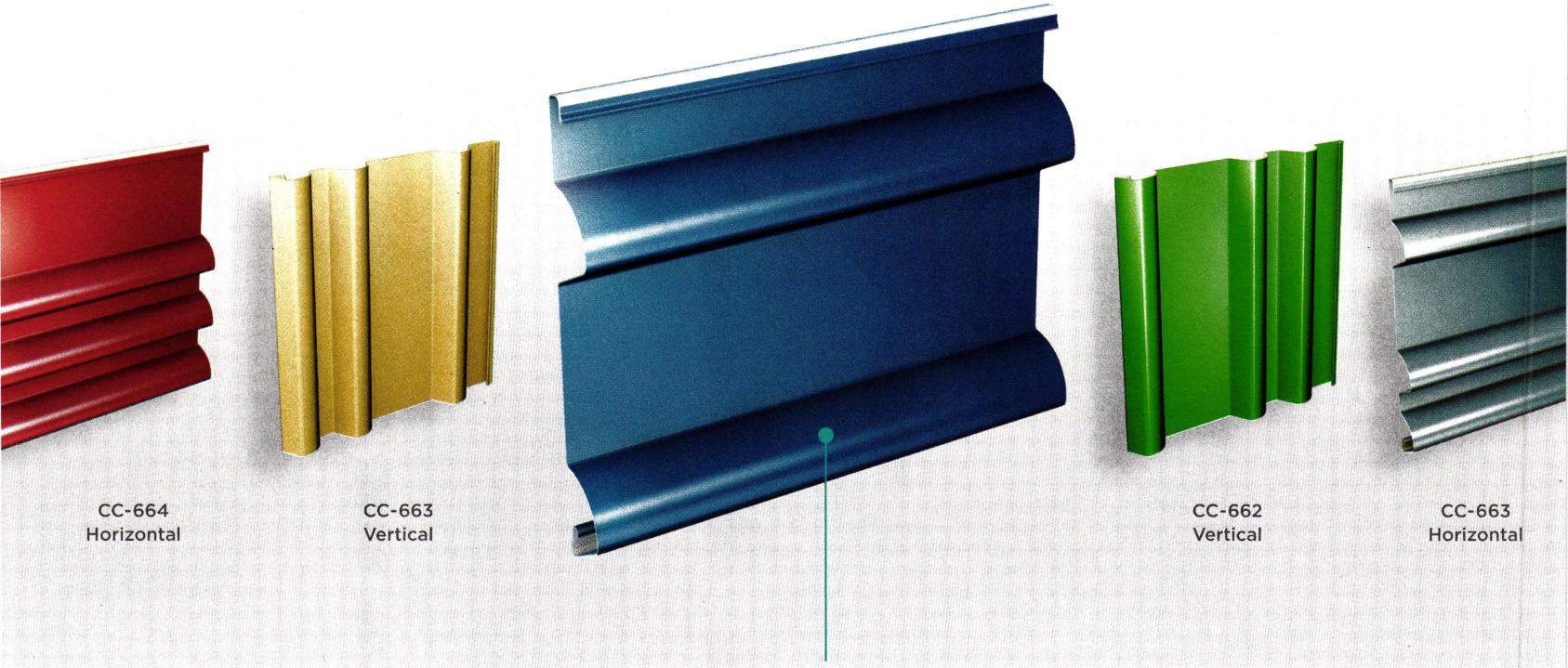

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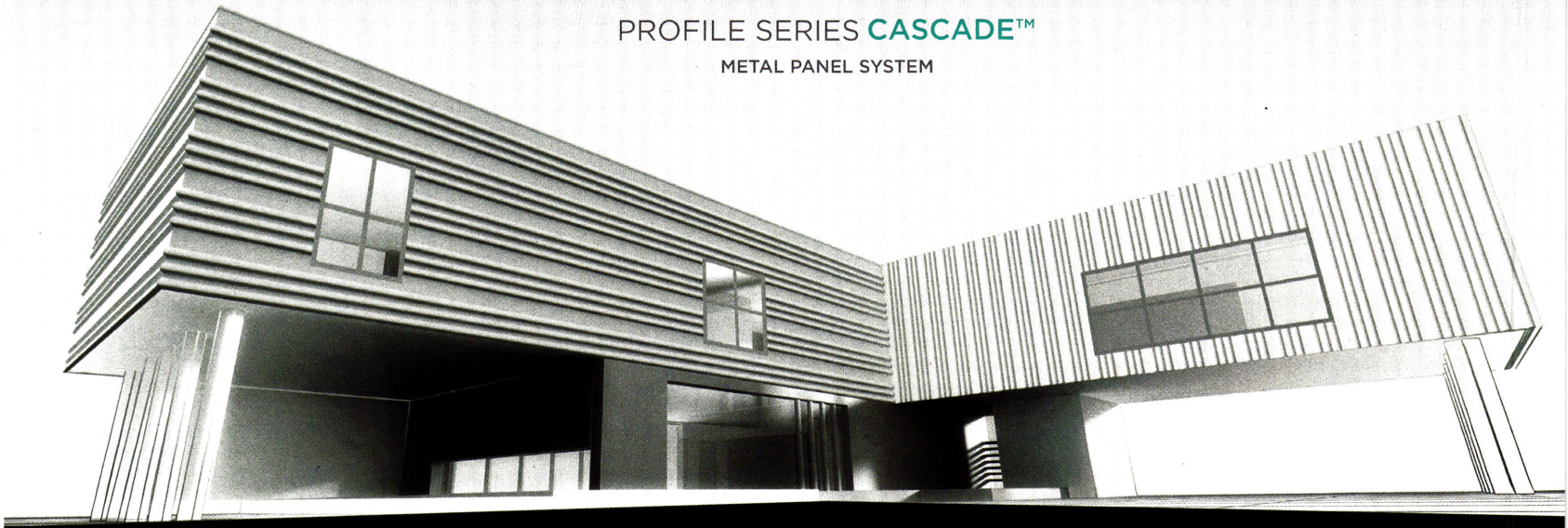

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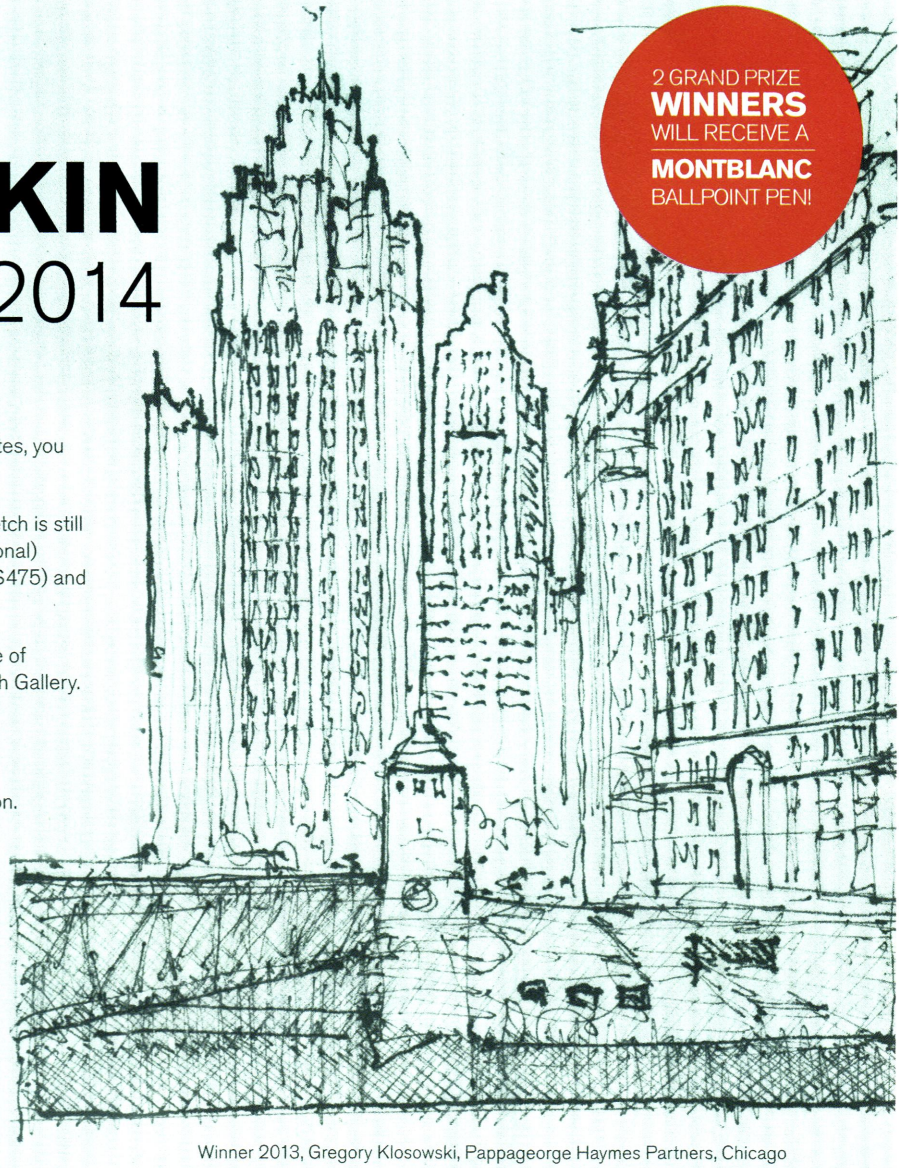

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perspective

I find this incredible, that the RIBA, which I thought of as being an extremely honorable institution, would vote for or agitate for sanctions against Israel. *–Richard Meier, condemning RIBA's recent resolution calling for the suspension of Israeli architects from the International Architects Union.*

A Big Box Store Scales Down and Branches Out

BY AMANDA KOLSON HURLEY

Hickok Cole Architects designed a Walmart in the Fort Totten neighborhood of Washington, D.C., with 345 residential units atop the 125,000-square-foot store.

IMAGES: COURTESY HICKOK COLE

IF YOU HEARD that urban redevelopment in some Washington, D.C., neighborhoods was being spurred by Walmart, you might think it was a joke: Walmart, with its leviathan stores in the outer reaches of sprawl? But in a bid to crack urban markets, Walmart is piloting new, smaller store designs on infill sites, which sometimes integrate other uses and often connect with public transit. Its first two D.C. stores—out of an eventual total of six spread around the city—opened late last year. The third is now under construction in Fort Totten, a neighborhood a few miles north of the city's downtown.

Fort Totten Square, designed by Hickok Cole Architects, is a sharp departure from the retailer's usual formula. Hickok Cole is placing 345 residential units above a Walmart that, at 125,000 square feet, is hardly small, but is a step down from its "supercenter" format, which averages 180,000 square feet. On top of the Walmart, four stories of apartments will wrap around two large courtyards, one with a swimming pool. At the northeast corner of the site, smaller stores and restaurants will occupy another 10,000 square feet. The Fort Totten Metro station, offering access to three subway lines, is a five-minute walk away.

With its staggered facades of dark composite panels and glass, the design is edgy for D.C. and for a neighborhood of older single-family homes. (On the neighborhood-facing, Third Street side, though, there is "a lot more brick," notes Michael Hickok, the project's lead designer.) The developer, JBG Companies, wants to attract some of the young people

Visit our online section at architecturalrecord.com/news.

Fort Totten Square will have two interconnected courtyards for residents, featuring a swimming pool, a garden, and large club room surrounded by an outdoor terrace.

who have been moving to Washington in droves during recent years. Not all of them can afford to live downtown, and Fort Totten Square—within range of several universities, and not far from nightlife on H Street—could be an appealing option. The apartments will be market-rate but "competitively priced relative to other D.C. submarkets," according to JBG's Tony Greenberg.

So, this is the question for Hickok Cole, a D.C.-based firm that recently completed National Public Radio's new headquarters: What was it like working with Walmart? "We went into it with great trepidation," Hickok admits. The design team worried not just about the retailer's wanting supersized signage, but also about the more prosaic challenge of putting residential plumbing above a grocery store—the risk of a bathtub's leaking onto the lettuce and broccoli. But everyone was happy with the plumbing drawings, and branding wasn't an issue either. "When we did the [main] facade, they were sensitive about our suggestion that we have an appropriate scale for that storefront," Hickok adds.

Hickok tried to respect the scale of the neighborhood while fitting in parking, and without blowing the budget. He was helped greatly by the topography of the site: there is a 20-foot grade change from the front to the back. After the designers slotted in a level of parking underground and put the Walmart on top of it, the store was at grade at the front of the building, but invisible on the neighborhood side. Another unexpected boon: a high-pressure gas line that runs under the southwest corner of the site. "We literally could not build over it," Hickok says. "Because of that, we got a natural plaza" right in front of the Walmart.

For years, Fort Totten was hardly touched by the development juggernaut that swept through so many D.C. neighborhoods. Some residents objected to Walmart's coming in, but others welcome the jobs it will bring, and groceries that don't require a drive across the border into Maryland. Fort Totten Square is expected to open in the first quarter of 2015. ■

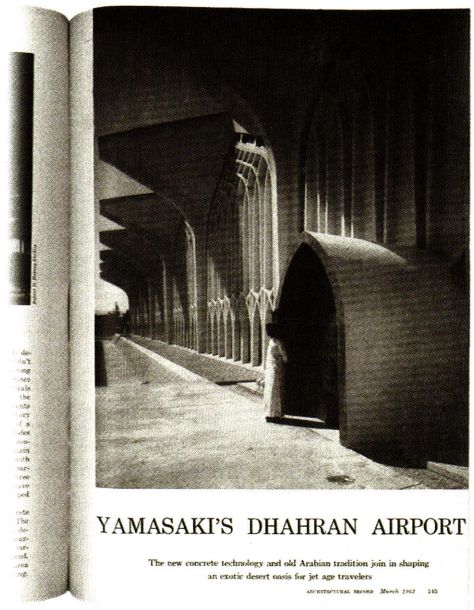
Office Space: Venice Biennale Preview

BY WILLIAM HANLEY

EVER THE CHAMPION of far-reaching concepts, this year's Venice Architecture Biennale director Rem Koolhaas has taken the unusual step of not only determining a theme for the main exhibitions but also asking each of the 65 independently organized national pavilions to follow his lead. Under the umbrella title *Fundamentals*, the architect has planned a three-part show that will include a section presenting a taxonomy of basic building components, *Elements of Architecture*; and *Mondeitalia*, a cross-disciplinary examination of the host country. For the third component, Koolhaas has decreed that the national pavilions adhere to a single theme, *Absorbing Modernity: 1914–2014*, asking them "to show, each in their own way, the process of erasure of national characteristics in architecture in favor of the almost universal adoption of a single modern language and a single repertoire of typologies—a more complex process than we typically recognize."

During the century in question, the United States has been a chief exporter of modern architecture, for better or worse. But rather than represent that history by looking at aesthetics or specific buildings, the organizers of the U.S. pavilion have decided to illuminate its influence on practice—and to do it literally, in real time.

Co-organized by New York's Storefront for Art and Architecture, Boston-based journal *Praxis*, and a research team from MIT, the exhibition, titled *OfficeUS*, will convert the U.S. pavilion in Venice's Giardini into a temporary architecture studio. Following an open call, the organizers have selected eight design practitioners—an international group of four individuals and two duos—who have been working for less than 15 years, to serve as partners in an ad hoc firm. They will set up shop inside the pavilion and, with a volunteer



An article about Minoru Yamasaki's Dhahran Airport in Saudi Arabia (RECORD, March 1963, page 145) is among the historical documents included in *OfficeUS*.

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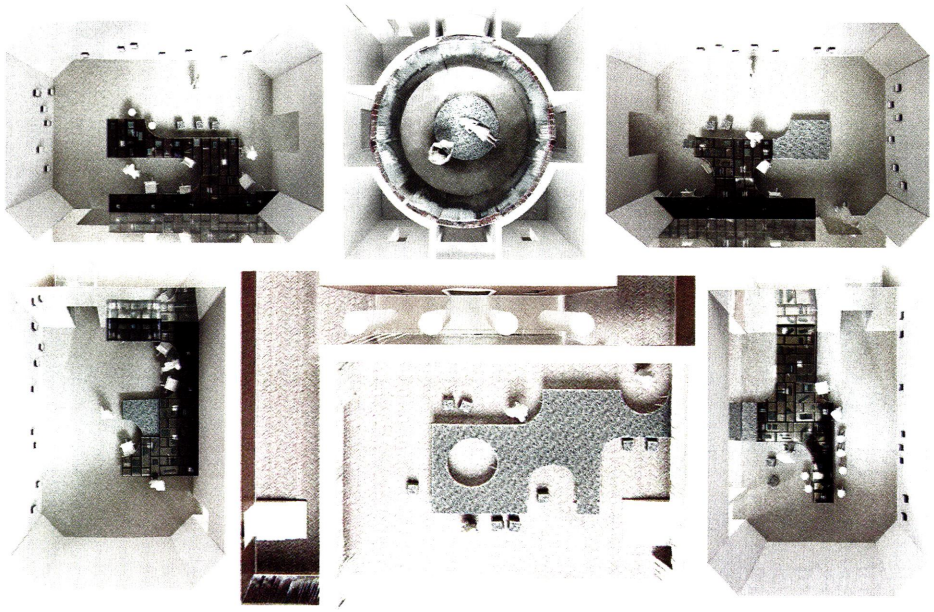

New York firm Leong Leong designed the pavilion's interior to be both an exhibition space for archival material and a working office, with modular worktables that double as display cases. The firm plans to wrap the exterior of the pavilion in strips of mirrored material mimicking vertical blinds, ubiquitous features in 20th-century corporate settings.

staff, work there for the five-month duration of the show.

The plan is for the designers to produce unspecified architectural projects based on a set of 25 issues—"Best Practices," "Trojan Horses," "Magical States," and "Little Americas," among them—one for each week of the exhibition. The organizers devised the list while creating a large repository of documents, models, and material samples representing some 1,000 projects realized abroad by 200 American architecture firms over the course of the last 100 years. That archive will also serve as raw material for the designers' work during the exhibition.

"We want to create a space for discussion and engagement with historical materials, but also for the production of design," says Eva Franch i Gilabert, director of the Storefront. "The partners will decide over the course of each week how they want to rework that history into a contemporary object that reflects the past but also projects into the future."

The designers will collaborate with a group of 90 satellite offices around the world, connected through the *OfficeUS* website and with visiting experts who will stage a series of workshops related to each topic. The results will be displayed in the pavilion, on the web, and in one of four books to be published in conjunction with the exhibition. The other publications will be an overview of the exhibition, an atlas of several buildings in the archive, and a manual of office protocols drawn from actual employee handbooks, with a series of new essays.

If this sounds as if it will have the visual appeal of an all-night charette, rest assured: the organizers have enlisted New York firm Leong Leong—known for its spectacle-conjuring but intelligent work—to design the pavilion. Their plan centers on modular tables that appear to spill through the Palladian pavilion's wings as a continuous desk, interspersed with lounging spaces for visitors. Below a surface of smoky translucent plexiglass, vitrines with mirrored bases will contain objects from the archive as well as office supplies, 3-D printers, and other ephemera typically used by a design firm. "There is this idea that cloud computing and remote technology allows us to connect and collaborate in a way that has led us to have less material stuff, but we've found that, in architecture offices, it's actually the opposite—rapid prototyping and other developments have led us to accumulate more," says Dominic Leong, a founder and director at the firm. "So the table is a hybrid, between the context of an exhibition and an office. Its shape allows for collaboration, and it also lets you see all the tools." Documents from the archive will be displayed on small metal shelves along the perimeter walls. The organizers received $100,000 in funding from the U.S. State Department to pull off the exhibition—far less than most governments contribute to their pavilions. As of publication, the organizers are still raising additional funds, having secured roughly $700,000 so far.

What distinguishes the United States among exporters of global modernism, according to Franch i Gilabert, is the standardization of architecture practice that its firms fostered. "The production of protocols and office organizations is where the U.S. has contributed the most," she says. "And we want the exhibition to produce, not necessarily a new set of practices, but a forward-looking counterpoint to those standard ways of working." ■

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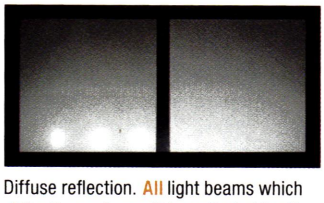

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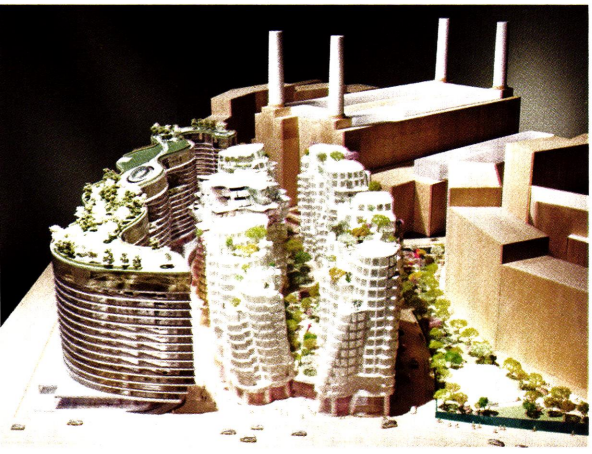
CIRCLE 27

Gehry's Battersea

BY FRED A. BERNSTEIN

IF YOU'RE wondering when architects will get the respect they deserve, the answer may be: never. By some measures, Frank Gehry, 85, is having a good year, with several large projects about to open and others in the pipeline. But nothing comes easy. After 10 years of work on the performing-arts center at the World Trade Center site, Gehry learned that he might lose the commission, but not from the client. A few weeks later, Congress weighed in on his design for the Dwight D. Eisenhower Memorial on the National Mall; Rep. Aaron Schock called it a "theme park without a coherent theme." And in London, he was attacked for seeming to ignore the need for affordable housing when his design for residential buildings at the Battersea Power Station site was unveiled.



Frank Gehry and Foster + Partners unveiled their designs for residential buildings that will be part of London's redeveloped Battersea Power Station site.

IMAGE: COURTESY BATTERSEA POWER STATION DEVELOPMENT COMPANY

First the good news: both Gehry's Biomuseo in Panama (RECORD, March 2014, page 23) and his Louis Vuitton Foundation for Creation in Paris are scheduled to open this year. Projects in the works include the Facebook West campus in California's Silicon Valley (in February, the company moved into the offices he designed in New York City); a visual arts center in Arles, France; and five large apartment towers at Battersea. (After Rafael Viñoly's role in the mixed-use project was reduced from architect to master planner, the developer asked Gehry and Norman Foster to design buildings for its 42 acres.)

But in unveiling his titanium towers for Battersea, Gehry "walked straight into a raging debate about the capital's affordable-housing crisis," according to the *Guardian*. Housing advocates attacked him for not including a single affordable unit among his 700 condos. Gehry responded that he had nothing to do with the number or location of affordable units (a formula worked out by the developer and the local governing council).

Meanwhile, it's been a decade since Gehry was chosen to design a performing-arts center at the World Trade Center site, on a plot now occupied by a temporary commuter station. In February, *The New York Times* reported that the center's new management team was considering reducing the size of the project and might scrap Gehry's plan entirely. Damning with faint praise, Maggie Boepple, the newly installed president of the center, said that Gehry is "excellent at models. We love his model." But, she added, "so many mistakes are made when genius architects design a building" before the program is in place. Gehry told the *Times* he had received nothing but "radio silence" from the center's executives. Still, there may yet be a reconciliation. At press time, a spokesman for the center said the organization was negotiating with Gehry Partners.

Meanwhile, on April 3, the National Capital Planning Commission gave a thumbs-down to Gehry's plan for the Eisenhower Memorial. The commissioners voted 7–3 to send Gehry back to the drawing board to address the size and position of the stainless-steel tapestries that are the focal point of his design. The commission, whose approval is required before the project can proceed, isn't saying no to Gehry—just keeping him on a short leash; it asked him to return every two months, starting in June, "to provide updates on the design modifications." As if the architect has nothing else to do. ■

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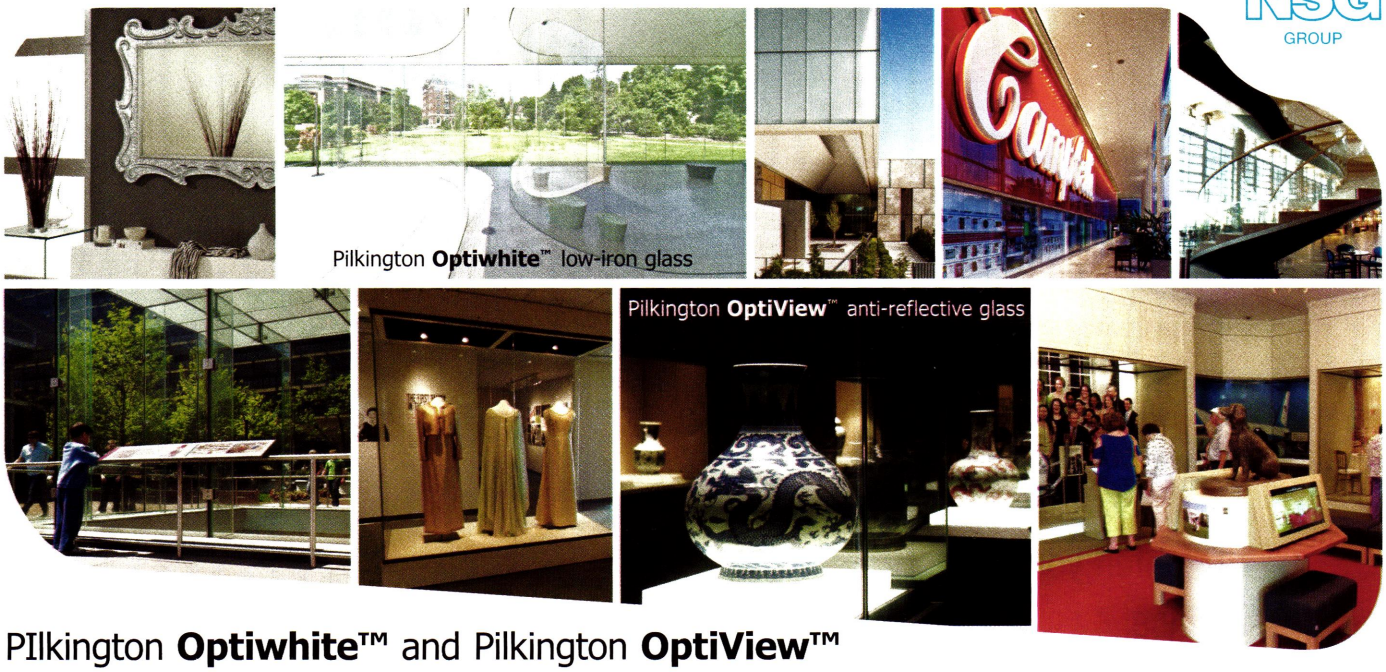

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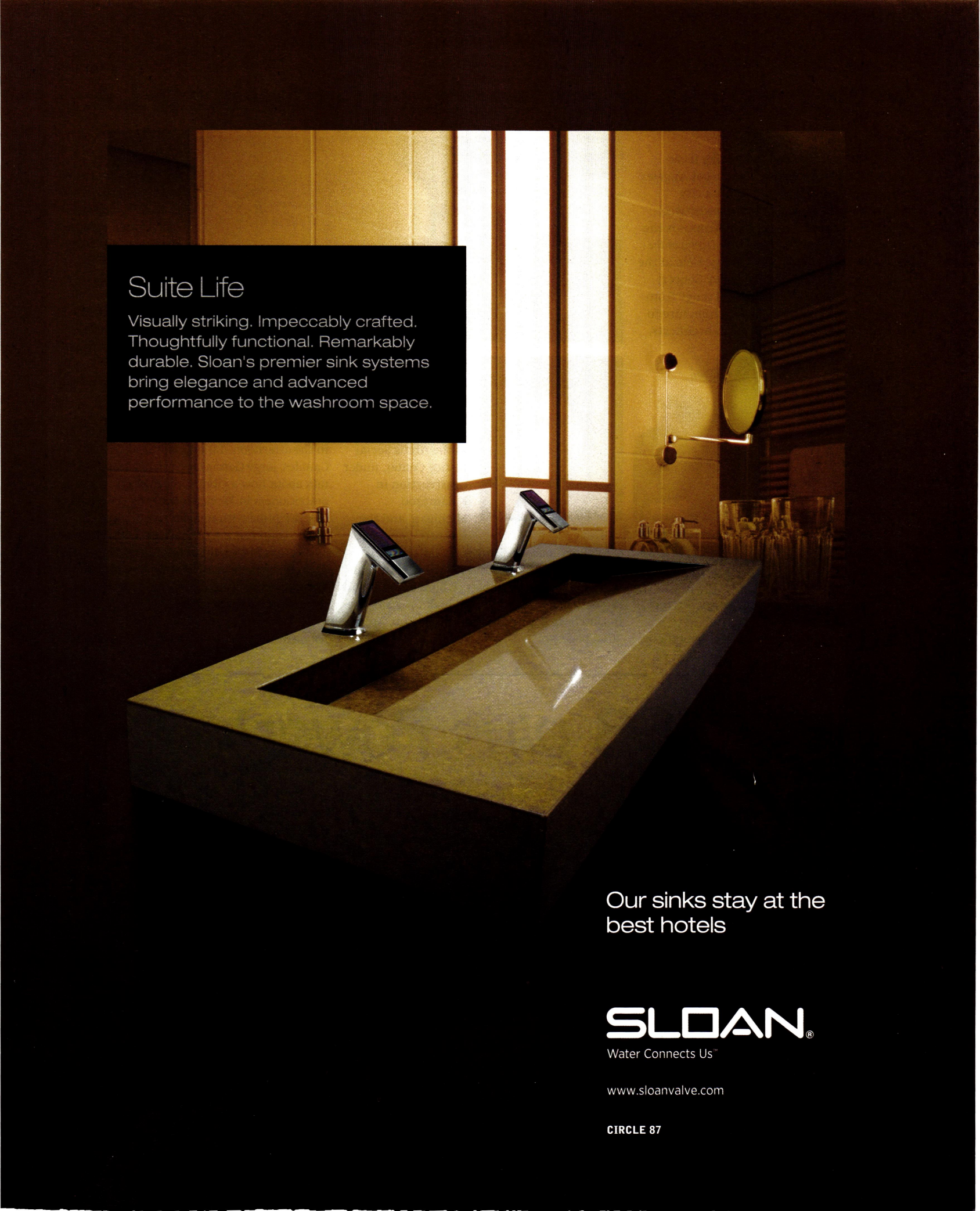
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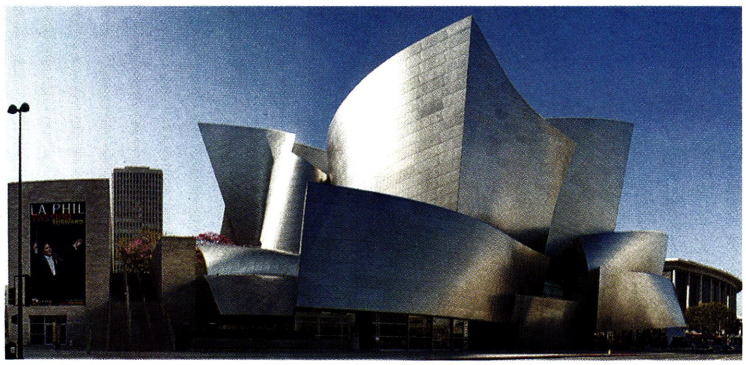
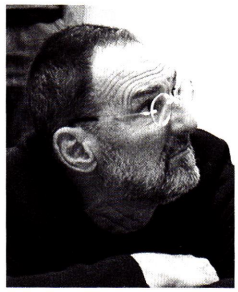
Go West: RECORD Brings Innovation Conference to L.A.

ARCHITECTURAL RECORD will bring its acclaimed Innovation Conference to Los Angeles for the first time, on May 21. L.A.—a city known for blurring the boundaries between urbanism, architecture, and landscape—is the perfect place to host *Breakthrough: Design at the Intersection of Art, Science & Technology*. Held at the Frank Gehry–designed Walt Disney Concert Hall (2003), conference topics will range from the merging of landscape and architecture to the growing influence of Mexico's architects,





Tatiana Bilbao, Thom Mayne, and Jeanne Gang are among the speakers at Architectural Record's Innovation Spring conference in Los Angeles. The conference will take place on May 21, 2014, at the Walt Disney Concert Hall.

and the integration of contemporary art, technology, and design.

The day will kick off with a keynote talk by Jeanne Gang, founding principal of Studio Gang in Chicago. Gang will show such projects as the Arcus Social Justice Center, under construction in Kalamazoo, Michigan, and the recently completed WMS Boathouse in Chicago's Clark Park.

Artist Doug Aitken and founding principal of Allied Works Architecture Brad Cloepfil will discuss their collaborations, including a house in Dutchess County, New York (RECORD, April 2014, page 74).

Panel topics include a case study devoted to the Cornell University tech campus planned for Roosevelt Island in New York City, with Thom Mayne, Marion Weiss, and Michael Manfedi presenting their schemes for various buildings.

"Grounded: Where Architecture & Landscape Meet" will be moderated by Christopher Hawthorne, architecture critic for the *Los Angeles Times* and a frequent RECORD contributor. In the afternoon, Tatiana Bilbao, Fernando Canales, Jorge Garcia, and Michel Rojkind will talk about how a vibrant community of young practitioners in Mexico is pushing the limits of the discipline with imaginative designs.

The conference will conclude with a keynote by Thomas Phifer, founder of his eponymous firm. He will discuss the ways in which he brings a commitment to sustainability and technology to his work. ■

Register for Innovation at construction.com/events

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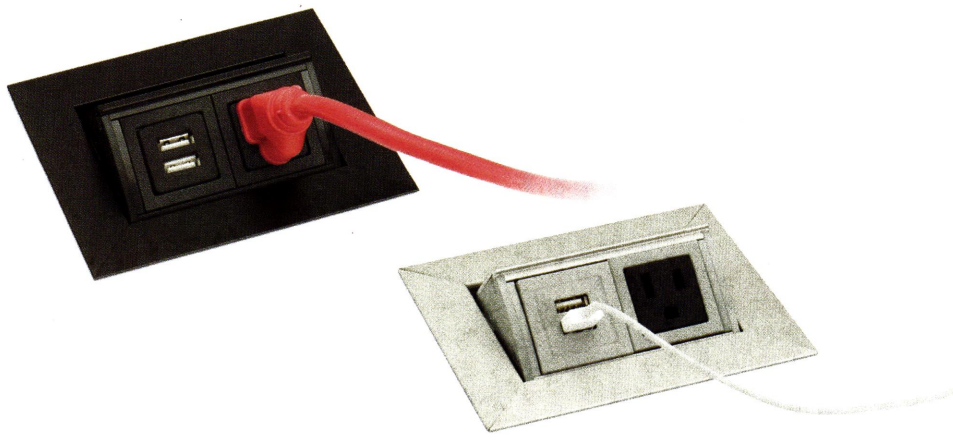

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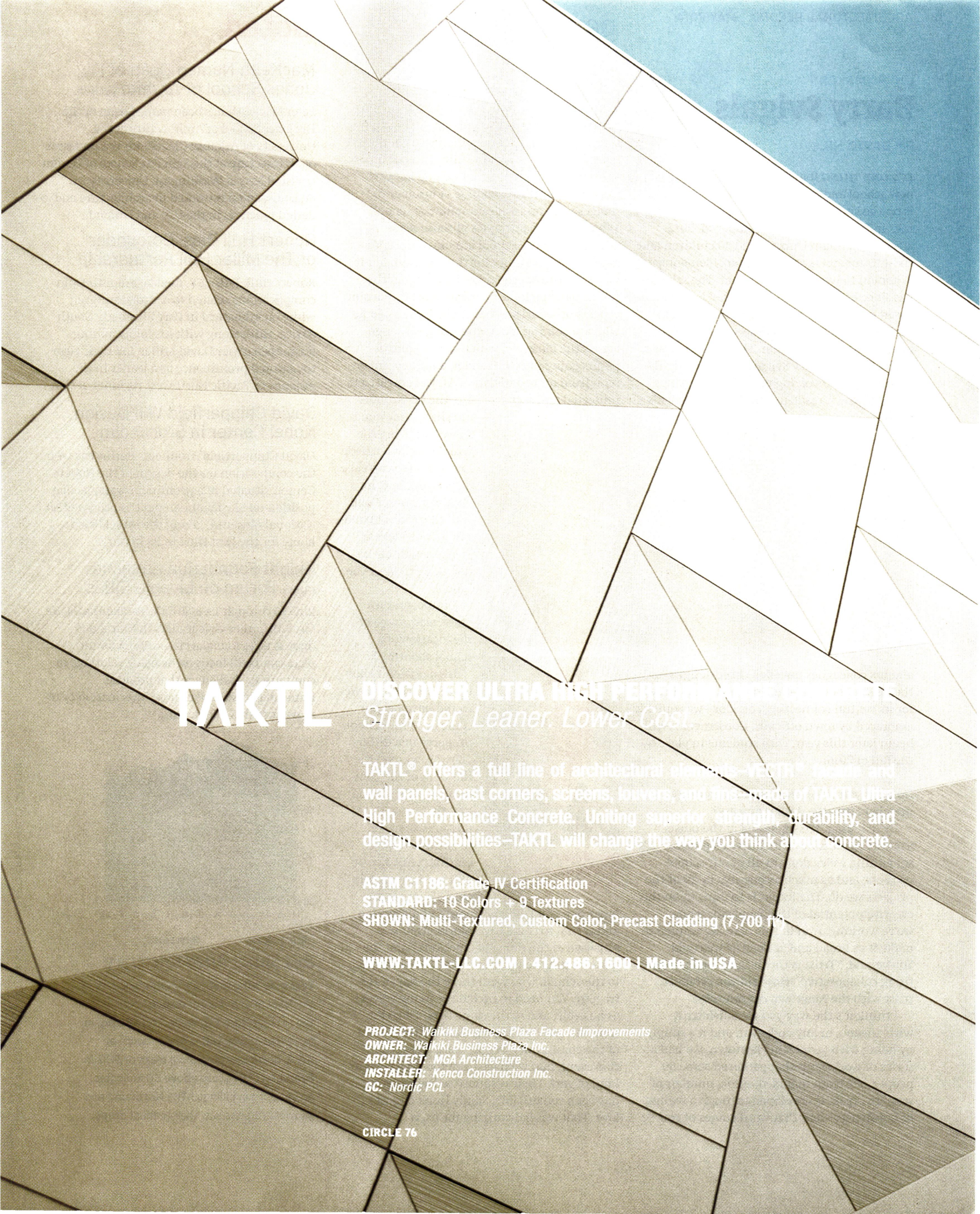
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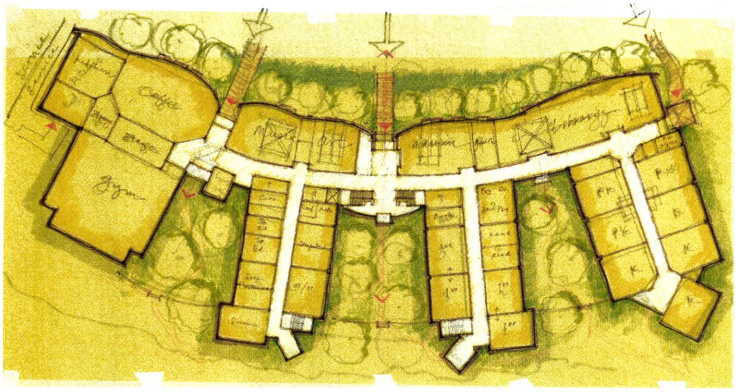
CIRCLE 76

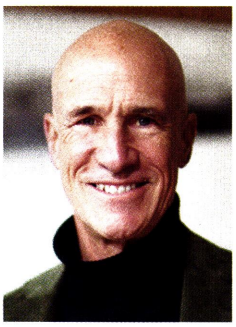
[NEWSMAKER]

Barry Svigals

BY DAVID HILL

IT'S ONE THING for an architect to design a new school and quite another when that school is on the site of one of the worst mass shootings in U.S. history. On December 14, 2012, 20-year-old Adam Lanza killed 20 children and six staff members at Sandy Hook Elementary School in Newtown, Connecticut. The school has since been razed. In September, New Haven–based firm Svigals + Partners was chosen to design a new building on the same property, but in a different location. The design process, led by founder Barry Svigals, has been highly collaborative, involving numerous meetings with Newtown residents. In February, Svigals and his colleagues unveiled three designs for the new school, and one—dubbed Main Street for its central connecting corridor—was quickly embraced by town officials. Construction will begin later this year, with students in place by the fall of 2016.





Barry Svigals (above) and his firm's working design for the new school (top).

How did you bring Newtown community members into the design process?

By listening. We suggested at the outset that the process be as inclusive as possible. It's something we've done in all of our school projects, and as much as possible in all of the projects we do. The intent is to draw upon the creative potential of the people for whom we're working. And in this case, we wanted to make it as broad and as deep as we could.

You've said, "Trust is the foundation for everything collaborative." How did you establish trust with the Newtown community?

I think it's the way you establish trust with anyone, in any endeavor, and it's simply by being with people. In Newtown, we had a series of workshops that gathered some 50 people, our team included, into a number of sessions. Trust is developed through a feeling of familiarity—and that word comes of course from "family"—and the sense of feeling connected to one another. As part of the process in Newtown, we asked people to bring in images of their homes and places in the community that were meaningful to them. Everyone began to get a sense of what was important in that exchange. A number of images were an inspiration for the school.

What are some examples of those features?

In front of the school is a bioswale. It's a teaching opportunity for the children, but it also serves to set the school away from the public parking lot. One of the most important aspects of security is being able to see people who are coming. There are bridges that go across the bioswale, which create control points going into the school, and they can be seen from quite a distance. All the entries are protected and secured. Also, the classrooms are slightly elevated so we can bring the windows down a little lower. People can't see directly in, but the children can see out.

Will there be a memorial for the victims?

There will be. It's not going to be at the school.

Is it important to erase every trace of the location of a school shooting?

It's a difficult challenge. We thought we would have people come onto the school property in a different way, which was the wish of the community. As it turned out, that wasn't possible, so we're reconfiguring the existing entrance. It will not be recognizable. That was the focus of a tremendous amount of discussion and trying to come to a solution that was sensitive to the range of emotions from the parents and the teachers who will be coming to the school, who were there the day of the tragedy. You need to include as many voices as possible, and at the same time allow for something that is appropriate for the future of the community. People were changed by this event, and we have been too, in a certain kind of way. Their response to the shooting has been remarkable. Sandy Hook chooses love. That was galvanizing for us. ■

noted

MacKeith Named Dean of Fay Jones School of Architecture

Peter MacKeith has been named dean of the Fay Jones School of Architecture at the University of Arkansas. MacKeith is a professor of architecture at the Sam Fox School of Design & Visual Arts at Washington University in St. Louis, and has worked in architecture and design practices in the U.S. and Finland.

Robert Hull Dies, Cofounder of The Miller Hull Partnership

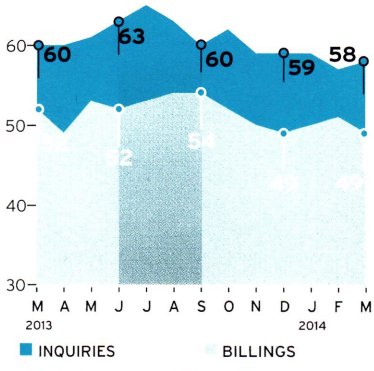
Robert Hull, FAIA, 68, died last month from complications related to a stroke suffered while on sabbatical in Port Elizabeth, South Africa. Hull, along with his longstanding business partner David Miller, led their firm to national prominence as a leader in the practice of Pacific Northwest regional design.

David Chipperfield Will Design Nobel Center in Stockholm

David Chipperfield Architects Berlin has won the competition for the design of the Nobel Center, situated in a prominent water's-edge position on Blasieholmen next to the Swedish National Museum, giving the Nobel Prize a home for the first time in its history.

Knight Foundation Launches New Forum on Livable Cities

June 16 through 18, *8-80 Cities Forum: The Doable City* will gather civic leaders in Chicago to discuss ways to make cities more vibrant places and will focus on devising solutions to community challenges that produce immediate results. For more information or to register, visit 8-80cities.org.



ABI Slows After Recovery

Following a modest two-month recovery in the level of demand for design services, the Architecture Billings Index (ABI) again turned negative, with a March score of 48.8, down sharply from a mark of 50.7 in February. (Any score above 50 indicates an increase in billings.) The Northeast and Midwest regions saw the steepest drops.

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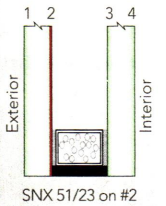

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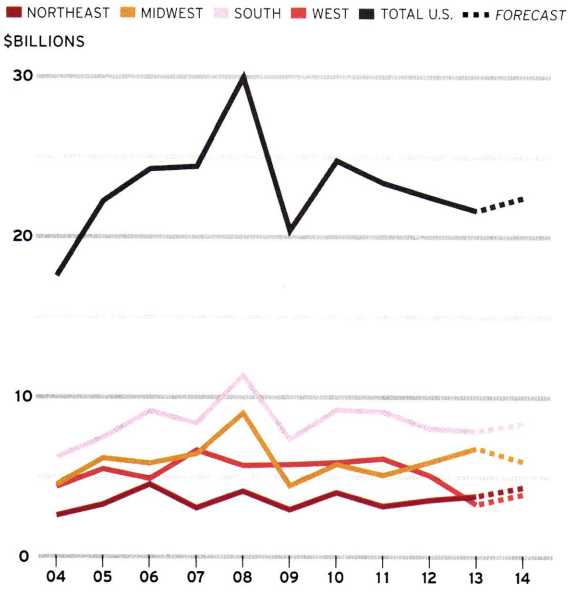
CIRCLE 80

MARKET FOCUS
HEALTH CARE

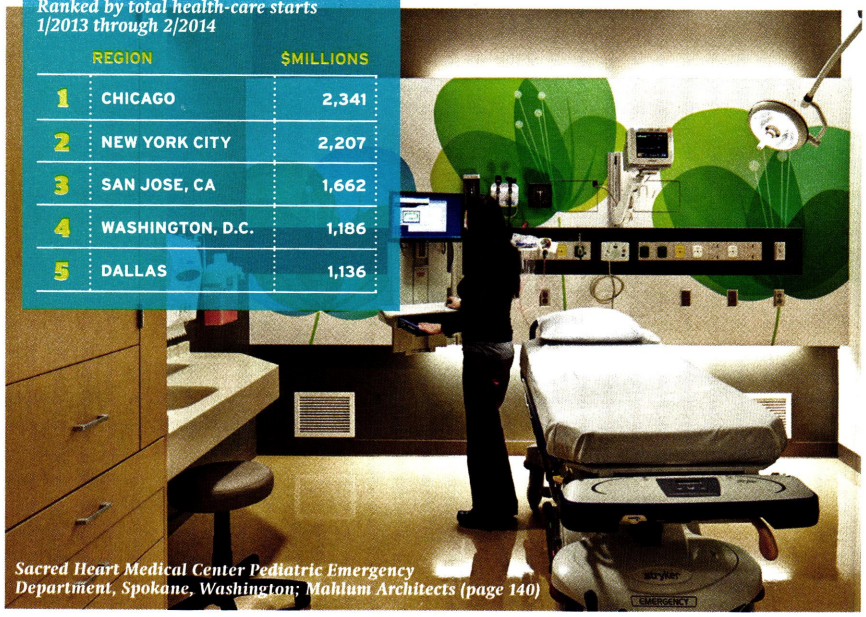
Health-care construction starts have been hampered by questions concerning the ramifications of the Affordable Care Act. But the market should soon pick up to meet the growing demands of an aging population.

Health-Care Starts by Region
In addition to U.S. total and 2014 forecast figures



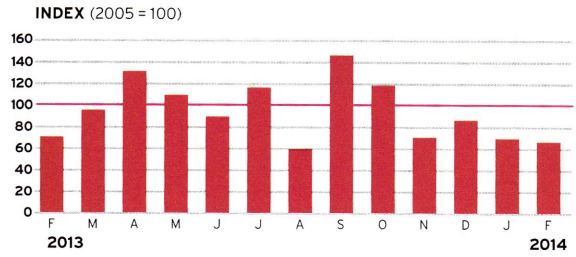
Top Metro-Area Markets
Ranked by total health-care starts 1/2013 through 2/2014

	REGION	$MILLIONS
1	CHICAGO	2,341
2	NEW YORK CITY	2,207
3	SAN JOSE, CA	1,662
4	WASHINGTON, D.C.	1,186
5	DALLAS	1,136



Sacred Heart Medical Center Pediatric Emergency Department, Spokane, Washington; Mahlum Architects (page 140)

The Dodge Index for Health-care Construction 2/2013–2/2014



The index is based on seasonally adjusted data for U.S. health-care construction starts. The average dollar value of projects in 2005 serves as the index baseline.

Top 5 Design Firms
Ranked by health-care construction starts 1/2011 through 2/2014

1. **NBBJ**
2. **Rafael Viñoly Architects**
3. **Earl Swensson Associates**
4. **H+L Architecture**
5. **ZGF Architects**

Top 5 Projects
Ranked by health-care construction starts 1/2013 through 2/2014

$830 MILLION
PROJECT: New Stanford Hospital
ARCHITECT: Rafael Viñoly Architects
LOCATION: Palo Alto, CA

$550 MILLION
PROJECT: The Ability Institute of RIC
ARCHITECTS: HDR, Gensler
LOCATION: Chicago

$537 MILLION
PROJECT: Fort Bliss Replacement Hospital
ARCHITECT: HDR
LOCATION: El Paso, TX

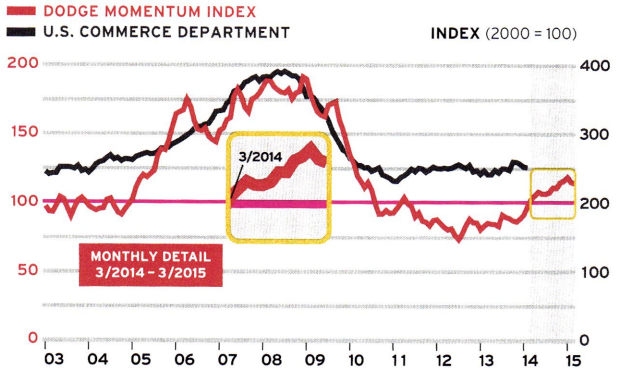
$450 MILLION
PROJECT: Stamford Hospital
ARCHITECT: WHR Architects
LOCATION: Stamford, CT

$340 MILLION
PROJECT: Sanford Medical Center
ARCHITECT: HKS Architects
LOCATION: Fargo, ND

MOMENTUM INDEX SLIPS AGAIN

In March, the Momentum Index retreated for a second month in a row, falling 0.8% to 113.8. Despite the drop, the long-term outlook for construction is still a positive one.

The Dodge Momentum Index is a leading indicator of construction spending. The information is derived from first-issued planning reports in McGraw Hill Construction's Dodge Reports database. The data lead the U.S. Commerce Department's nonresidential spending by a full year. In the graph to the right, the index has been shifted forward 12 months to reflect its relationship with the Commerce data.



McGraw Hill Dodge Analytics tracks projects from predesign through construction to capture hard construction costs, square footage, and other key statistical information.

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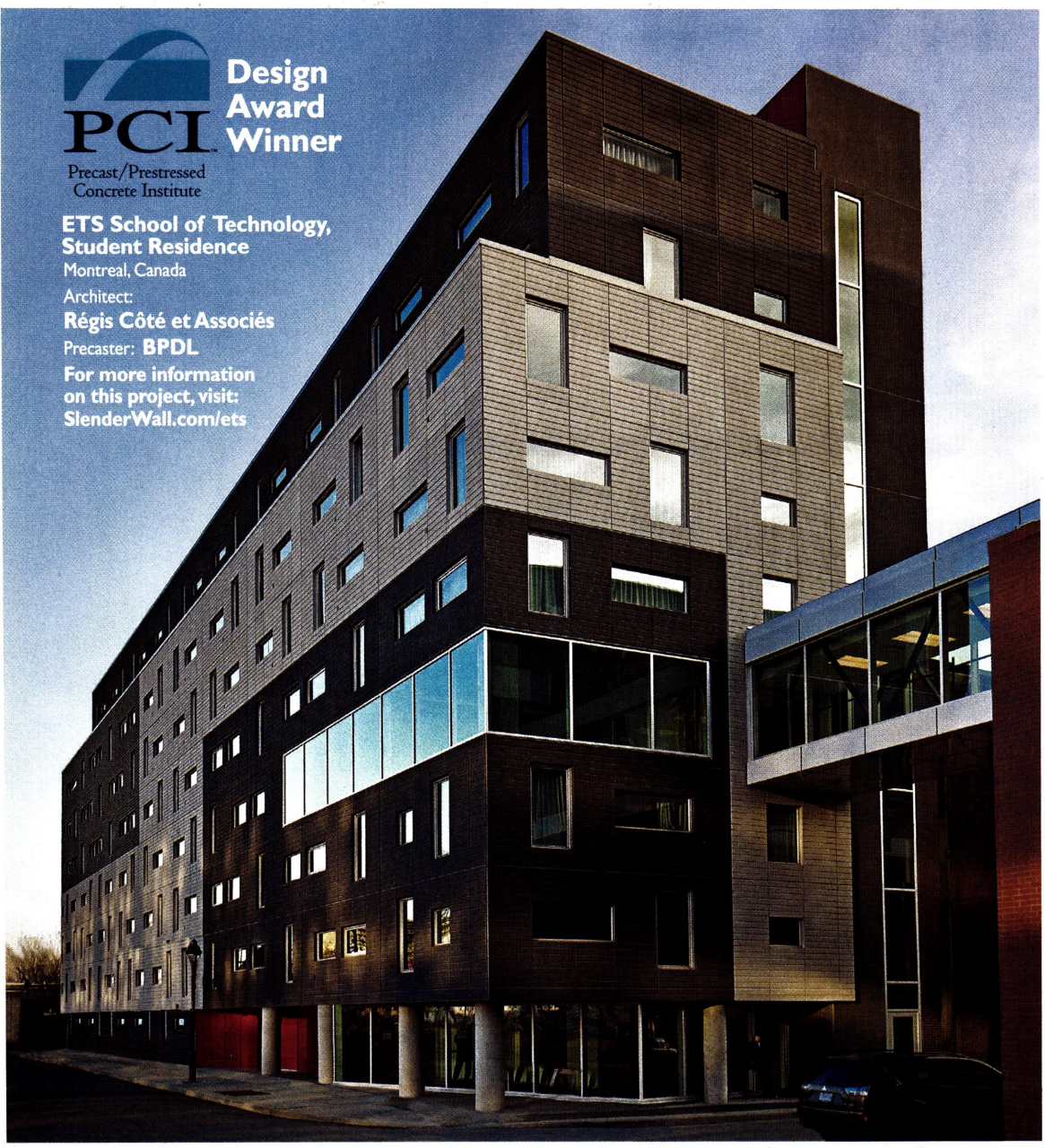

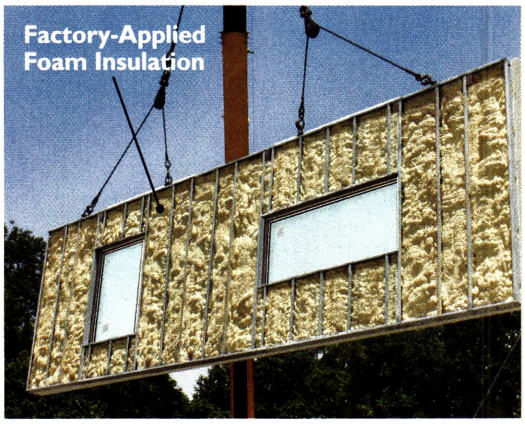

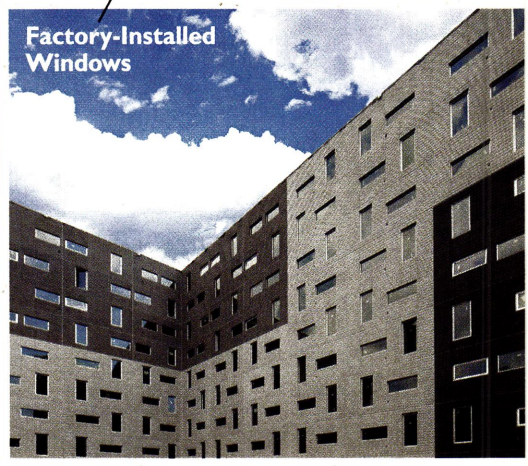

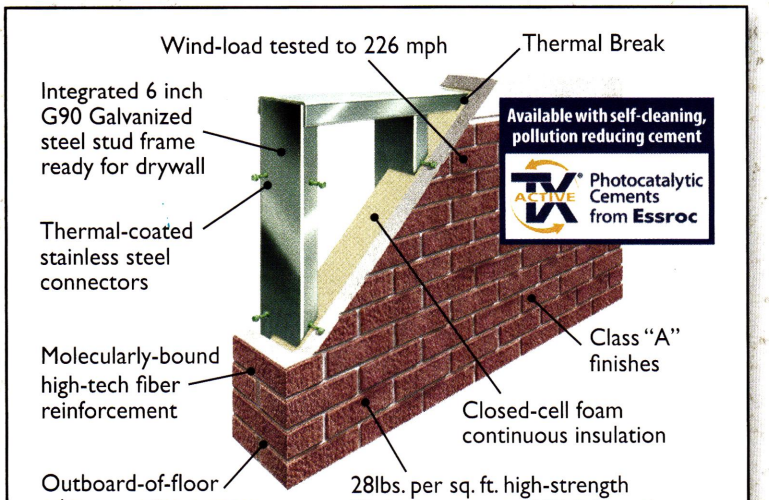

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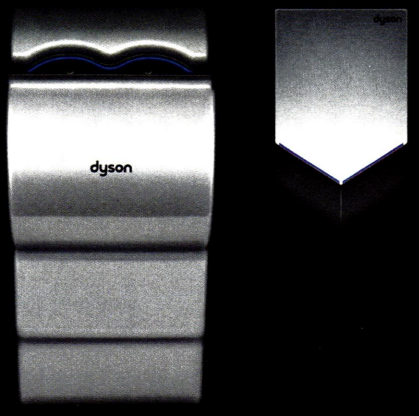

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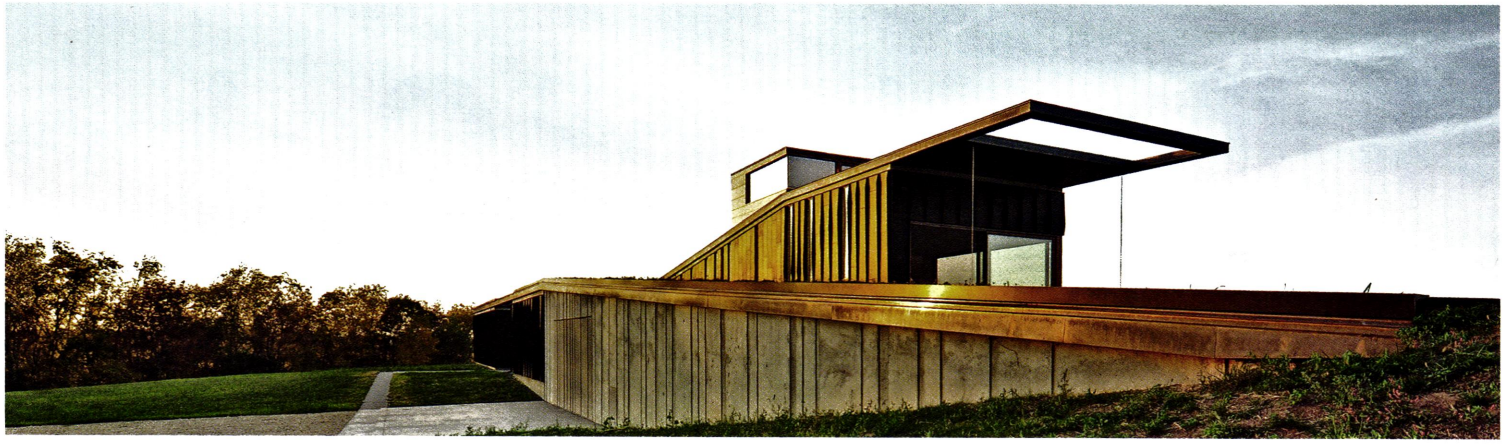
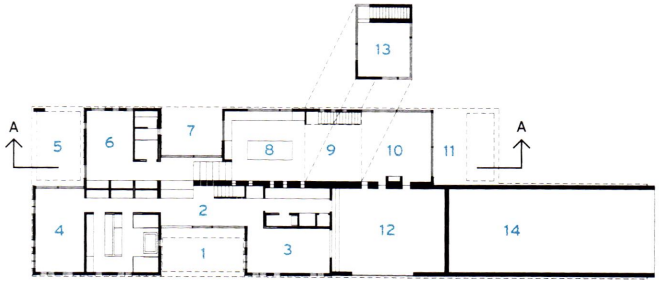
CIRCLE 70

perspective house of the month

ARCHITECT JOHNSEN SCHMALING DESIGNED THE TOPO HOUSE IN BLUE MOUNDS, WISCONSIN, TO PHYSICALLY BLEND IN WITH ITS NATURAL SETTING. **BY LAMAR CLARKSON ANDERSON**



Set into a gentle grassy slope (above and below), the house has a copper roof and concrete-fiber rainscreen walls with black aluminum fins. Inside, the kitchen, dining, and living spaces (left) open out to an expansive view.



MAIN FLOOR

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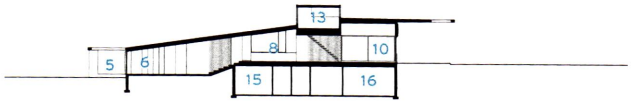
6 M.



SECTION A - A

0 20 FT.
6 M.

THE TROUBLE with building on unspoiled terrain is, well, spoiling it. When a nature-loving couple showed Johnsen Schmaling Architects their plot of land in the rolling hills of rural Wisconsin, the designer realized that any structure built on the site could be seen by hikers at the top of the adjacent Blue Mound State Park.

In response, the firm came up with Topo House, a hill-hugging landform of a structure that rises like a zigzagging ramp out of a grassy incline. They configured it as two thin bars, slightly offset, that gradually climb the slope of the site. At the house's highest point, an observatory pops out of the copper roof like a squared-off modernist periscope, and, at its lowest, a vegetated rooftop merges with the hillside. "It's almost like a microcosm of what the landscape does around it," principal Sebastian Schmaling says of the 3,300-square-foot steel, concrete, and wood structure. The cladding—a concrete-fiber-panel rainscreen striated with black anodized-aluminum fins—is a kind of microcosm of the land as well. The fins peak at different points, yielding an undulating texture that casts shifting shadows and mimics waves of windblown grass.

Inside, the floor plan feels like that of a single-story house, but pulled apart and staggered, as if a split-level ranch kept splitting. The architect used five separate floor plates (all, save for a partly submerged basement level, slab on grade) linked by short sets of stairs. Visitors enter through the house's lower half, via a courtyard and a glass-fronted foyer that shows off the couple's contemporary art collection. The foyer, sandwiched between the master suite to the north and an art studio to the south, sends visitors up a short set of steps that leads to another courtyard. The rest of the house unfolds southward, rising with the hill to progress from a neutral gray kitchen to the simple white dining and living rooms, where the roof cantilevers over a terrace to frame the view. Like gaps in the tree canopy on a hiking trail, tall, narrow slot windows offer teasing glimpses of the outdoors that open up at the house's glazed endcaps. A staircase in the dining room leads to the glassed-in observatory. "It's a journey through the space rather than having everything presented to you at the same time," says Schmaling. ■

1 ENTRY COURT
2 GALLERY
3 ART STUDIO
4 BEDROOM
5 GARDEN
6 FLEX ROOM
7 COVERED PATIO
8 KITCHEN
9 DINING
10 LIVING
11 TERRACE
12 GARAGE
13 OBSERVATORY
14 SLOPING GREEN ROOF
15 STORAGE
16 MECHANICAL

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CIRCLE 65

When Less is More Earth-friendly

Lessons from Modernism: Environmental Design Strategies in Architecture 1925-1970, *edited by Kevin Bone. Monacelli Press, May 2014, 224 pages, $40.*

Reviewed by Fred A. Bernstein

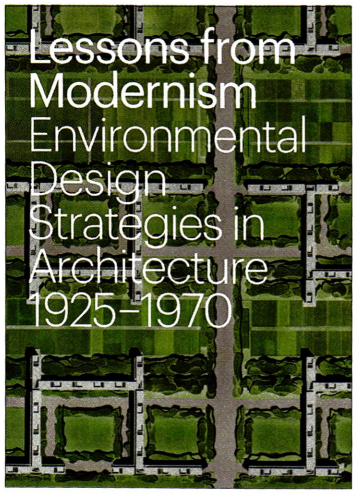
BY REDUCING green design to a set of checklists that are then used as shopping lists, LEED and similar environmental rating systems may actually increase consumption. And by turning sustainability into the province of consultants, such systems take the responsibility for making buildings ecologically sound out of the hands of architects.

It didn't have to be that way, Kevin Bone makes clear in this important new book. The outgrowth of a 2013 exhibition at New York's Cooper Union, where Bone is the director of the Institute for Sustainable Design, it demonstrates that many significant Modernist buildings were green by virtue of their small size and sensitive siting. The format of the book is simple: 25 buildings are presented in photographs, renderings, and diagrams showing how the structures relate to sun position and prevailing winds.

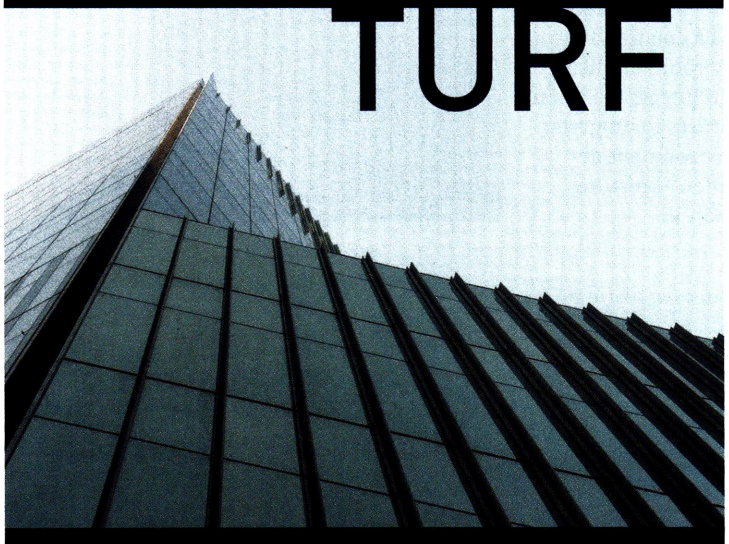
The text is slight; it summarizes the relevant characteristics of each building, such as the shading effects of brises-soleil and the heating effects of thermal masses, succinctly. Alvar Aalto's dwellings at Sunila, Finland, Bone writes, were designed "to take full advantage of the seasonal conditions," while Frank Lloyd Wright's Jacobs House II in Madison, Wisconsin, was "a precursor of the 1970s passive-solar movement."

In a way, the book is as low-tech as the buildings it describes. Computer modeling, which could confirm the underlying ideas of Bone and his collaborators, wasn't part of this project. But it doesn't take such technologies to see that small buildings require fewer resources to build and operate. Two Paul Rudolph beach houses included in the book would barely qualify as gazebos in 2014.

"The very argument of Modernism that put forth a case for buildings stripped of excess" and that "declares one should use what one needs, and not more" is the essence of sustainable design, Bone writes. True, there were very un-green aspects to Modernism, including suburbanization and, with it, reliance on the automobile, as David Rifkind points out in an introductory essay. According to Rifkind, "Le Corbusier's oeuvre demonstrates a paradox common to most of his contemporaries: a passionate concern with certain aspects of sustainability married to a curious disregard for others." But what really broke the ties between Modernism and sustainability was air-conditioning. As it became affordable in the postwar years, Daniel A. Barber notes in his concluding essay, "the perceived need to mitigate the climatic impacts on building largely evaporated." Now environmentalism has returned as a goal, but architects too often respond by adding green features to un-green buildings. Respect for the environment demands subtraction, not addition—knowing when to stop, not when to shop. ■



ASTOR TURF



In Manhattan's East Village, a neighborhood known for passionately independent movements, **51 Astor** coolly shows it belongs. Designed to attract a diverse range of tenants by **Maki and Associates** for **Edward J. Minskoff Equities**, it links two huge volumes on a full city block yet manages to appear different from each angle. The building's structural steel acrobatics ensure flexibility to serve this market long-term while coalescing with a neighborhood master plan to connect community through public space—a restrained composition in an unrestrained neighborhood.

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CIRCLE 25

Architect: Fumihiko Maki, Maki Associates
Structural Engineer: Ysrael A. Seinuk
Photo: Richard Ginsberg

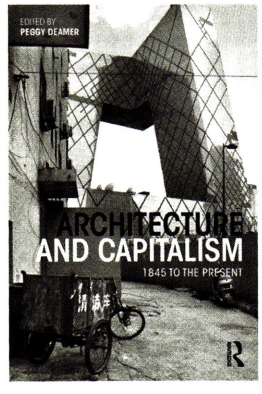
Money Talks

Architecture and Capitalism: 1845 to the Present, *edited by Peggy Deamer. Routledge, August 2013, 264 pages, $45.*

Reviewed by Eva Hagberg

AT THE TOP of the list of topics architects like to talk about as little as possible is money. Dirty, complicated money.

Which means that Yale University Professor Peggy Deamer's new book is a necessary—though highly theoretical and historical—addition to the global architectural conversation. And while the book doesn't delve into the particularities of the professional economy, it opens up essential avenues of inquiry, as well as expressing some inspiring examples of historical and architectural scholarship at its finest. The best (and best-written) essay is Robin Schuldenfrei's exploration of the Bauhaus's Haus am Horn, in which she weaves discussions of materiality and construction (complete with fantastic illustrations) into a thoughtful analysis of the economic realities behind the experimental 1923 house—and, ultimately, its financial difficulties and failure as a possible (and possibly replicable) Modernist icon.



Another highlight is Ellen Dunham-Jones's thoughtful take on Rem Koolhaas's theoretically and practically serious playfulness. Dunham-Jones notes Koolhaas's attempts to locate an architecture that exists on both a built and conceptual plane, while attacking assumptions about capitalism—as seen in his *Harvard Design School Guide to Shopping*, a melding of higher education and consumerism.

In her essay on Le Corbusier, Deborah Gans looks at the Swiss architect's enormous city plans—a topic certainly covered in other publications—but makes the connection to the cultural logic of capitalism more clearly than anyone else has done.

Deamer has given her book a broad chronological range. She starts it off with a preface and an introduction written by herself, short essays that perform a twofold function. First, they help situate the reader who may not be an expert in all the fields covered in the book. (These range from Nathan Rich's discussion of large-scale Indian semisuburban planning to Pier Vittorio Aureli's deep history of Archizoom, Superstudio, and Manfredo Tafuri.) Second, and most important, Deamer's introductory pieces lend a sense of continuity and an overarching frame to the often disparate essays.

Deamer assures us that these writings do all make sense together, even though they may not hinge easily on to a single conceptual framework—but neither does the extremely complex and often subjective subject of capitalism.

In an afterword entitled "Architecture Without Capitalism," architect and critic Michael Sorkin exhorts us (ironically) to simply "enter the communism of disembodiment" by downloading "our entire capacity onto silicon or its successor." He argues that this would obviate the need for built structures and therefore the machinations of money and property. But, as Sorkin says, "mental architecture is just a metaphor." As money, so clearly, is not. ■

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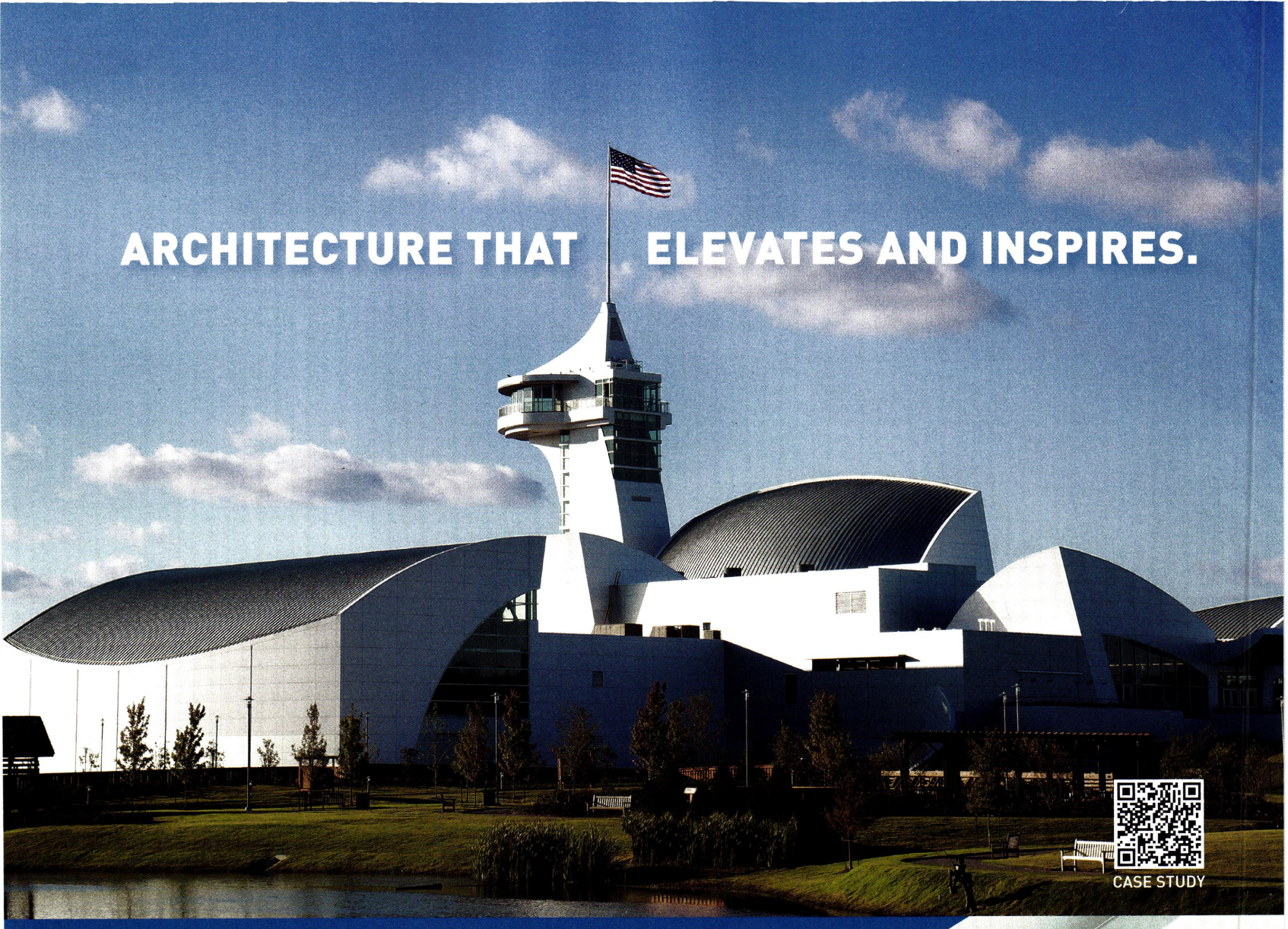

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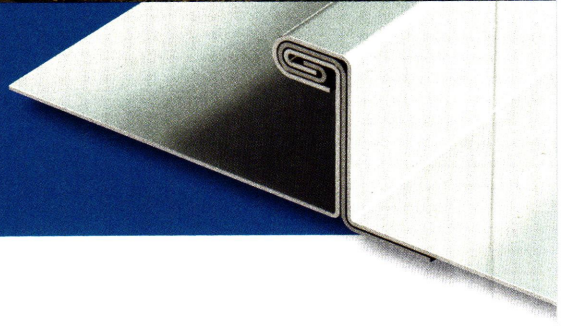

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CIRCLE 23

ARCHITECTURAL
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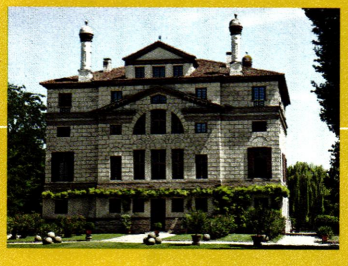
Guess the Architect Contest

ENTER NOW!

A new monthly contest from the editors of RECORD asks you to guess the architect for a building of historical importance.

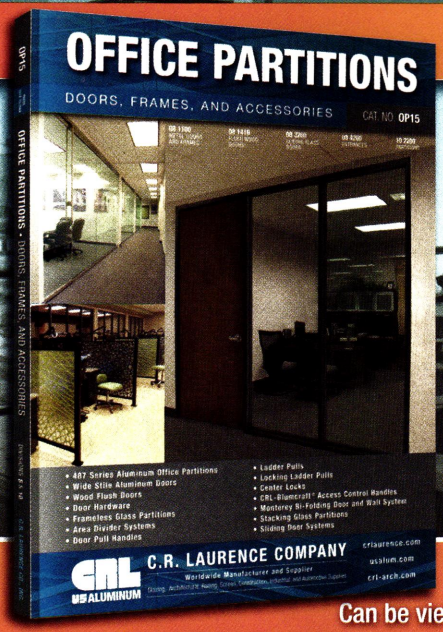
CLUE: AT THE TURN OF THE 20TH CENTURY, A YOUNG ARCHITECT DESIGNED A HOUSE FOR A PUBLISHER, GIVING IT A NO-NONSENSE EXTERIOR AND A WELL-CRAFTED INTERIOR.



The answer to the April issue's Guess the Architect is Andrea Palladio, who designed the Villa Foscari (La Malcontenta) in Malcontenta di Mira, near Venice (1549–53). For more details, including the winner, go to archrecord.com.

By entering, you have a chance to win an iPad mini.
See the complete rules and entry form online at archrecord.com.

PHOTOGRAPHY: © HUGH TRAINER; HANS A. ROSBACH (BOTTOM)



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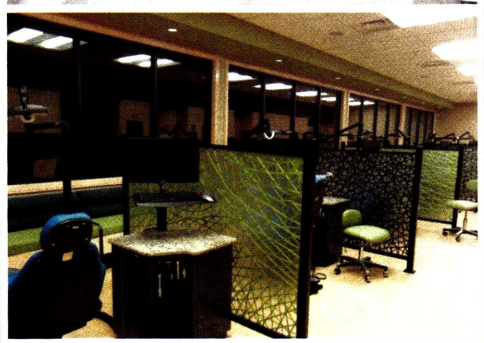

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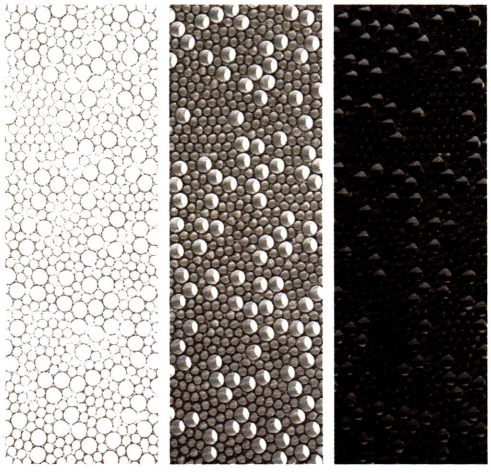

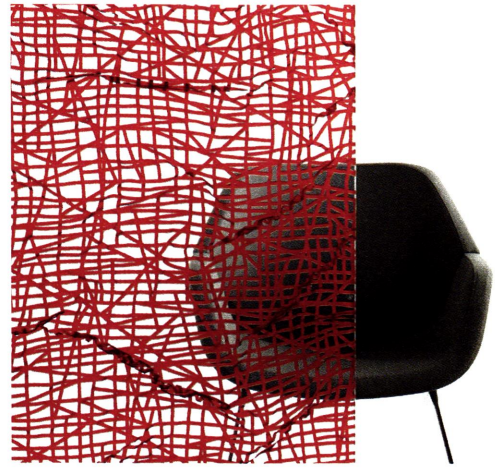

Bonded Series 3-D Black

Panelite panelite.us

Ideal for partition or ceiling cloud applications, the Bonded Series 3-D Black is a 3'3" x 10' panel that sandwiches transparent black polycarbonate honeycomb between acrylic faces. As the viewing angle changes, so does the material's hue–from black to shades of gray to clear. The honeycomb's striking pattern is formed using tubes of varying diameters. CIRCLE 200

Acousti-Seal Encore with Designtex Fabric

Modernfold modernfold.com

Now available with eight fabric coverings from Designtex, these operable partitions act as both visual and acoustical barriers, offering sound transmission class ratings of 52, 53, or 56. Acousti-Seal Encore can be specified as single 4"-thick panels or hinged pairs, and is installed on Modernfold's SureSet top and bottom seal system for stability. Applicable in meeting centers, offices, classrooms, and banquet halls. CIRCLE 205

Center Mount Glass and Combination Walls

Dirtt dirtt.net

Architects from Phoenix Design One enclosed a training center using Dirtt's Center Mount Glass and Combination Walls at the offices of PopHealthMan in Tempe, Arizona. The Center Mount system (foreground) features low-profile aluminum extrusions and glass panels that were assembled on-site, while a Combination Wall (rear) pairs clear glass with writeable, back-painted glass. CIRCLE 201

Windfall Color Cladding

Windfall Lumber windfalllumber.com

In collaboration with boutique paint company Yolo Colorhouse, Windfall Lumber has launched a color-rich cladding series coated with this premium VOC-free paint. Twelve shades are offered, ranging from earth tones to bold and pastel hues. The tongue-and-groove beveled-edge cladding is composed of FSC-certified Douglas fir and hemlock that has been reclaimed from deconstructed buildings within the Pacific Northwest. CIRCLE 204

Poured Glass

Studio by 3form 3-form.com

Featuring laser-cut textiles suspended in safety-rated architectural glass, 3form's new Poured Glass animates non-load-bearing walls, space dividers, privacy screens, and doors. Four different patterns–Entwine (shown), Buzz, Charmed, and Floret–are each available in a choice of 40 colors. The ¾"-thick panels can be specified in sizes of up to 5' wide and 10' high. CIRCLE 202

Custom Biofilter

Nedlaw Living Walls naturaire.com

Inside Scenic on Eglinton, a Toronto condominium, Page + Steele/IBI Group Architects incorporated a custom Biofilter of six living walls over an area of 375' square to improve air quality. The species are planted in a synthetic growth material on the marine-grade aluminum systems, while attached air-handling units draw the air through the plants' root zones to break down pollutants such as benzene and formaldehyde. CIRCLE 203

PHOTOGRAPHY: © MATT WINQUIST (TOP, CENTER); COURTESY NEDLAW LIVING WALLS (BOTTOM, RIGHT)

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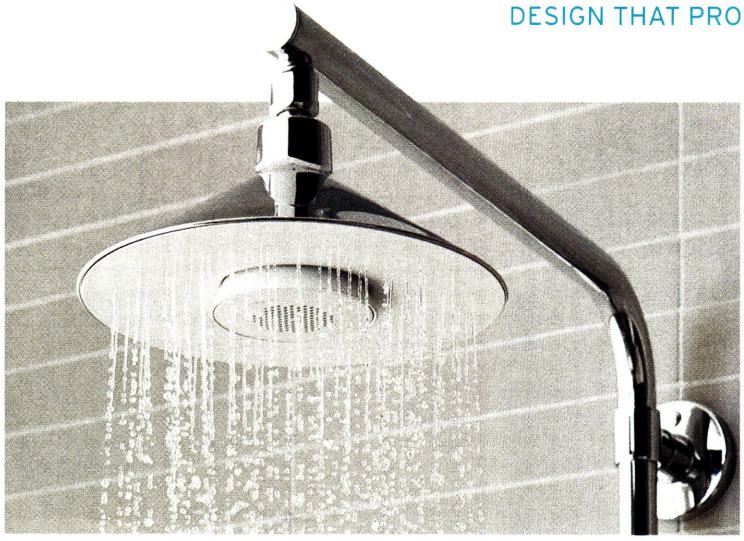
products **briefs**

CALMING FINISHES AND SPA-LIKE FIXTURES HIGHLIGHT DESIGN THAT PROMOTES WELL-BEING. **BY SHEILA KIM**



Moxie Rainhead

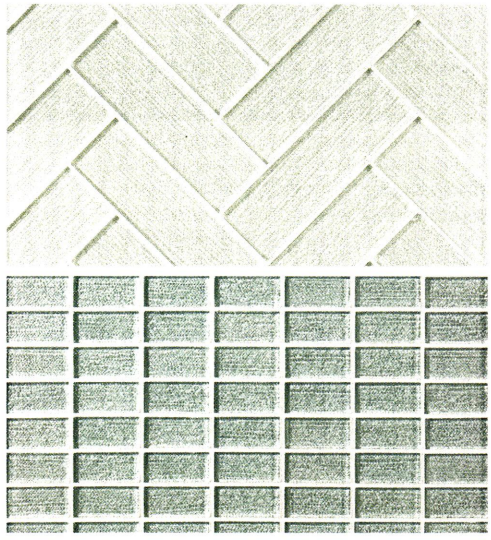
Kohler is building on its popular Moxie showerhead series—which integrates a removable Bluetooth-connected speaker—with a new version for bathers who enjoy singin' in the rain. Available in polished chrome, brushed nickel, oil-rubbed bronze, and white finishes, Moxie Rainhead features 90 angled nozzles and an air-induction technology that delivers a rich spray, and a magnetic center that docks the speaker in place. Any Bluetooth-enabled device can be paired with the speaker to stream music, podcasts, and other audio files. kohler.com CIRCLE 210

Archetype Porcelain Series

Rather than reproduce wood or concrete styles that are curently popular in the tile market, Bellavita Tile has created Archetype (below), a unique design that draws inspiration from various textures—from handwoven textiles to antique patinas of natural stone—and blends them into one cohesive composition using high-definition ink-jet technology. The units are available in 12" square, 12" x 24", or 24" square sizes, and are usable on walls and floors. bellavitatile.com CIRCLE 206

Flush-Mount Modern Recessed Control

ThermaSol now offers a flush-mount version of its Modern Recessed Control (left), for use with the manufacturer's ProSeries and AF Series residential steam-shower systems. Measuring 5⅓" x 3½", the six-button aluminum unit is offered in 14 finishes, such as polished chrome, polished brass, and oil-rubbed bronze. Users can manage functions ranging from temperature to duration of the steam session, as well as control ThermaSol's optional accessories for music and lighting. thermasol.com CIRCLE 209



System Bathtubs

Duravit has expanded its line of bathtubs with new high-tech, spa-quality versions of tubs from three of its recent designer collections: Matteo Thun's DuraStyle, Sieger Design's Happy D.2, and Philippe Starck's eponymous series (right). The acrylic fixtures can now be specified with massaging jets, LED lighting, an air-whirl system, and waterproof speakers. duravit.us CIRCLE 208

Jute

The subtle texture of Jute, a new glass tile from Ann Sacks, reflects light to give the illusion of greater dimension. Well suited to indoor walls and wet zones, such as showers, fountains, and pools, it comes in a field tile version (top) in two sizes—2" x 6" and 6" x 12", both 5/16" thick—as well as a 1" x 2" mosaic in a stacked pattern (above). A total of seven soft colors are available: azure, ecru, mist, oxygen, slate, smoke, and truffle (which features a gloss finish). annsacks.com CIRCLE 207

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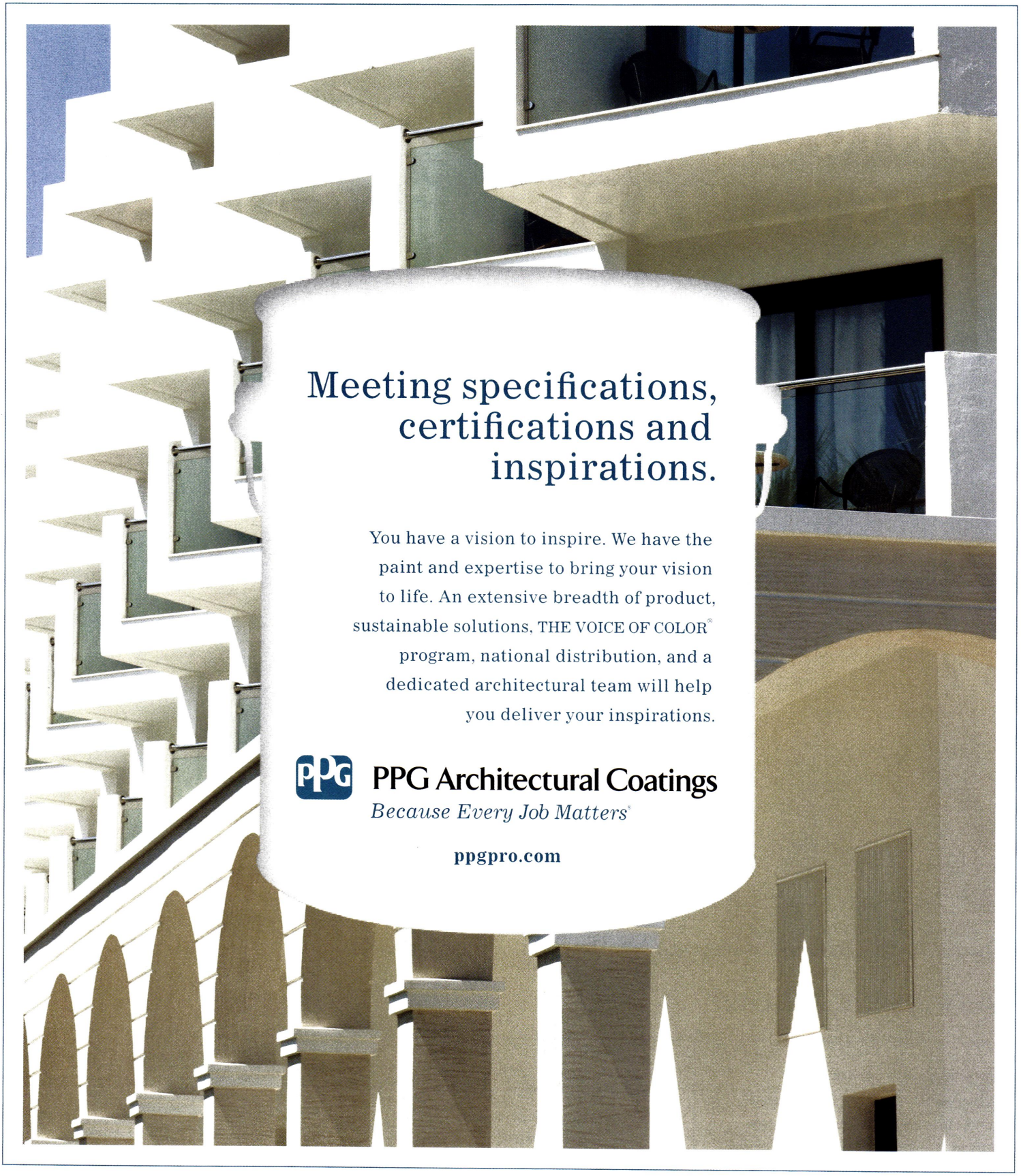

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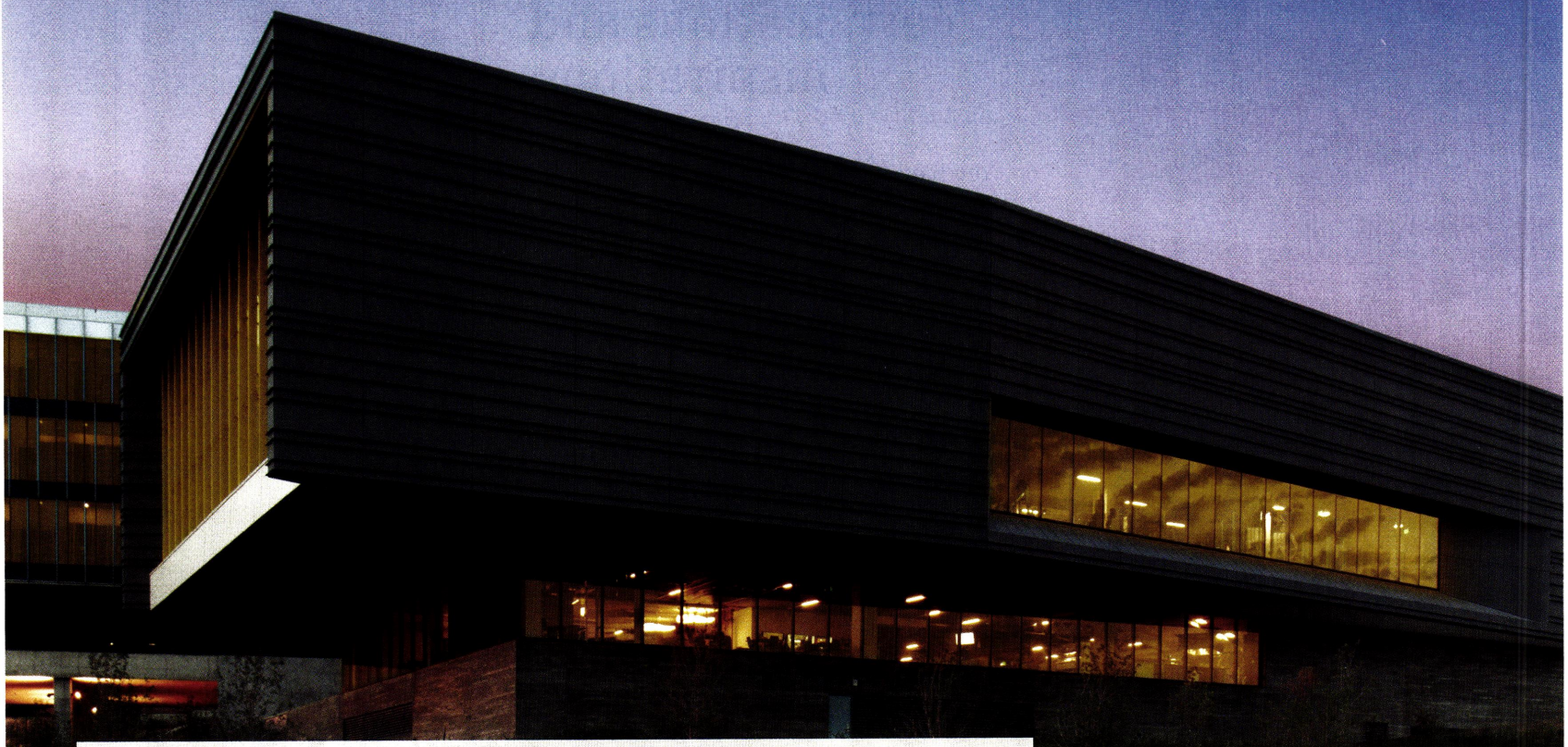

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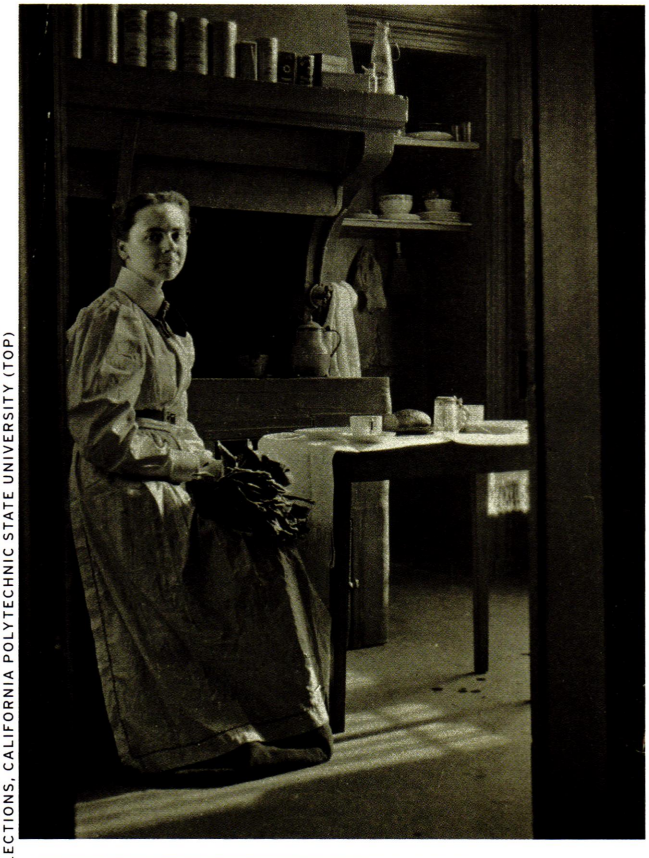
CIRCLE 64

A Woman for All Reasons

Julia Morgan's impressive legacy of architectural achievements from her 45-year practice in San Francisco has won her the AIA Gold Medal for 2014.

BY SUZANNE STEPHENS

QUIET RESOLVE
Studies in Paris would lead Julia Morgan (top) to the playful Bear House at Wyntoon (opposite) in Oregon (1933), and the sturdy Merrill Hall (bottom) at Asilomar Conference Grounds in Pacific Grove, California, in 1929.



PHOTOGRAPHY: © RICHARD BARNES (OPPOSITE AND BOTTOM); COURTESY JULIA MORGAN PAPERS, SPECIAL COLLECTIONS, CALIFORNIA POLYTECHNIC STATE UNIVERSITY (TOP)

THE WELL-PUBLICIZED announcement that Julia Morgan (1872–1957) is the recipient of the American Institute of Architects' Gold Medal for 2014—the first woman to receive the honor—naturally raises questions about why it took so long. She died 57 years ago. (We also might wonder about the logic of posthumous Gold Medals—but more about that later.) Whatever the nature of the debate, there should be no question about Morgan's deserving the award given "in recognition of a significant body of work of lasting influence on the theory and practice of architecture."

To begin with, we must acknowledge Morgan's historic role in a male-dominated profession: she was the first female to graduate from the highly prestigious architecture program at the Ecole des Beaux-Arts in Paris in 1902. After Morgan returned to her hometown of Oakland, California, she was the first female in the state to get her license. Then, in 1904, she became the first registered female architect to establish a full-time independent practice in the United States, according to biographer Mark A. Wilson. And she was (posthumously) the first woman to be inducted into the California Hall of Fame in 2008, two years after it was created.

CONCRETE CASTLE Morgan designed the San Simeon retreat for William Randolph Hearst in reinforced concrete, a material she began working with in 1903. Hearst wanted something grand, in the Spanish Renaissance style. He collected artifacts, antiques, and objets d'art to furnish the interiors, such as the bedroom (below), a part of the Doges Suite and one of the 58 bedrooms in the main house and guesthouses. The project took a long time to complete: Morgan looked at the site in 1919; the final touches were made to Casa Grande (left) in 1947.

The sheer output of Morgan's work—over 700 buildings, including schools, libraries, community centers, churches, and commercial buildings, not to mention houses—surpasses the achievements of her male and female peers. Frank Lloyd Wright, who completed 532 works of architecture during his lifetime, seems almost a slacker in comparison. Morgan, who never married, could undertake these projects without family responsibilities. But running an office of 8 to 10 men and women to do all this must have been grueling. And Morgan didn't just churn out buildings: her best-known work, Hearst Castle in San Simeon, the estate commissioned by William Randolph Hearst, took several decades to complete: site work started in 1919, and she spent at least 25 years on it.

The medal recognizes more than Morgan's significance as a role model; it acknowledges her technical and artistic accomplishments in architecture, including her pioneering forays into reinforced-concrete construction. Morgan, who graduated with a civil engineering degree in 1894 from Berkeley before going off to Paris, joined the office of John Galen Howard upon her return to the West Coast. He soon put her in charge of supervising the design and construction of the reinforced-concrete Greek Theater (1903) on the Berkeley campus, for which he was the master planner.

Not long after, Morgan opened her own office. Her early projects included a bell tower, out of reinforced concrete, El Campanil, for Mills College (1904)—along with the stately concrete Margaret Carnegie Library for the campus (1906), and the Hicks House in Berkeley (1906), later remodeled by another architect. Her explorations with this new material were contemporaneous with those of Auguste Perret, himself a student at the Ecole in the 1890s and an AIA Gold

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COZY HIDEAWAY
Hearst wanted his own office and library, so Morgan designed the Gothic Study (1931) on the main house's third floor (above). The ceiling combines 15th-century Spanish beams with arches designed in the Gothic style.

PHOTOGRAPHY: © MICHAEL DE LA PAZ

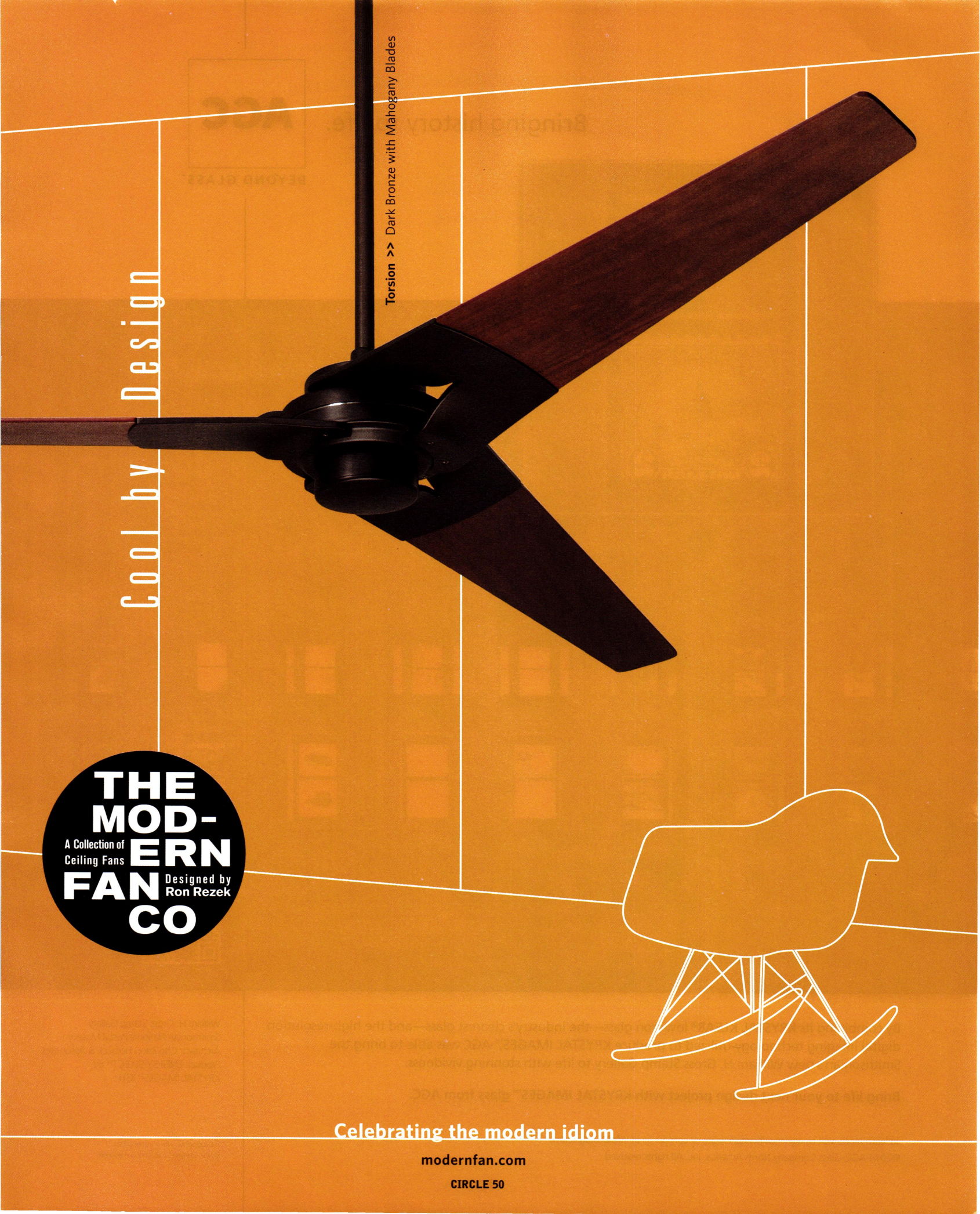
Medalist in 1952, who finished his concrete apartment building at 25 bis Rue Franklin in Paris in 1904.

Morgan's bold combination of architecture and engineering know-how could be seen in her use of exposed wood beams, struts, and trusses in any number of her projects, almost all in California. She immersed herself in a vernacular tradition that Bernard Maybeck (Gold Medalist, 1951)—with whom she studied and worked before going to Paris—was developing into a regional expression dubbed the First Bay Tradition. Based on the English Arts and Crafts movement, it placed an emphasis on natural materials from local sources, along with craftsmanship and the careful siting of architecture in the landscape. Morgan's sturdily elegant churches, graciously simple YWCA buildings, and other cultural centers in particular present striking examples of this sensibility—although the exposed wood beams and trusses of her roofs arguably adhered to the structural rationalism of French 19th-century thinking. In his letter of support for Morgan's nomination, Frank Gehry commended her for "expressing structure in new ways."

At Morgan's Asilomar YWCA-commissioned conference center in Pacific Grove (1913–28), a sturdily elegant Merrill Hall features 23-foot-long Douglas fir beams and Gothic arches creating an open-truss structure for the 800-seat room. As Denise Scott Brown noted in her recommendation to the AIA board, "Morgan's larger buildings were masterful exercises in modest monumentality and tender gravitas, beautifully executed."

Morgan also showed a remarkable ease in synthesizing historic styles, as we see at Wyntoon, a vacation retreat for the Hearst family in Oregon, near Mount Shasta, completed between 1924 and 1935. Here Medieval German or Austrian architectural motifs, combined with frescos by Willy Pogany on the Bear House (1933), endow the cottage with a story-book quality in an ultra-picturesque setting.

The plethora of commissions from repeat clients such as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CIRCLE 79

Phoebe Hearst and her son William obviously helped Morgan's practice: the latter's Hearst Castle, then called La Cuesta Encantada (Enchanted Hill), is clearly the most sumptuous of her works. While it doesn't appear to be advanced architecturally, the poured-concrete structure, where Renaissance and Baroque architectural motifs from southern Spain create an exotic setting, is suffused by a superb sense of proportion, color, texture, and composition.

For Morgan to get the Gold Medal would seem a slam dunk. Yet it took an extreme effort to organize the campaign, which was spearheaded by Julia Donoho, an AIA board member representing California. Donoho seems to have been sent from on high to carry this out: both an architect and an attorney, she had started out studying engineering at Princeton University before switching to its architecture school for both her bachelor's and her master's degrees.

After practicing architecture, Donoho earned a juris doctorate from Empire College in Santa Rosa—small wonder she approached the task of nominating Morgan as if it were a court case. Donoho garnered support within the AIA, put together an impressive packet of materials, sought letters from prominent professionals (including Michael Graves, as well as Gehry and Scott Brown), and asked one of the country's most innovative female practitioners, Jeanne Gang, to present Morgan's nomination to the AIA Board.

While the mission ended successfully, a posthumous award has raised questions about whether the Gold Medal should be given to those who are no longer with us. Some wonder why such an honor should not go to those who can appreciate it and be gratified by peer recognition. According to Richard Guy Wilson, who wrote *The AIA Gold Medal* in 1984 and an updated essay on the topic in 2008, the honor was modeled on the Royal Institute of British Architects' Royal Gold Medal, which is not bestowed posthumously. Indeed, in the AIA's case, the first three posthumous awards were accidental: they had been decided on just before the recipients' deaths, including that of Charles Follen McKim, in 1909, who had conceived the program in 1907. Over the years, more posthumous awards were given, often to architects struck down in the prime of their careers (such as Bertram Goodhue, Eero Saarinen, Samuel Mockbee), or were bestowed as belated historical recognition—for example to Louis Sullivan, and, of course, to Morgan, who had been preceded by 11 men, according to Wilson's count.

Considering that the practice of giving the Gold Medal posthumously has become somewhat of a custom by now, it is especially fitting for Morgan to receive it. Perhaps a better idea would be to establish a pantheon of deceased distinguished American architects (which could include non–Gold Medalists, such as Benjamin Latrobe). But this idea would not ease the immense amount of work that needs to be done to get a nomination through the complex selection process as it stands now. To be sure, this extreme effort, where the living architect submits credentials (and the dead need tireless proponents) could be debated as well. But that's another story. ■

"She designed to fit her clients, blending design strategy with structural articulation in a way that was expressive and contextual."
—Michael Graves

GOOD CLIENT William Randolph Hearst confers with Morgan during construction of the Hearst Castle in San Simeon in 1926. According to biographer Sara Boutelle, Morgan made 558 trips to the site between 1919 and 1939.

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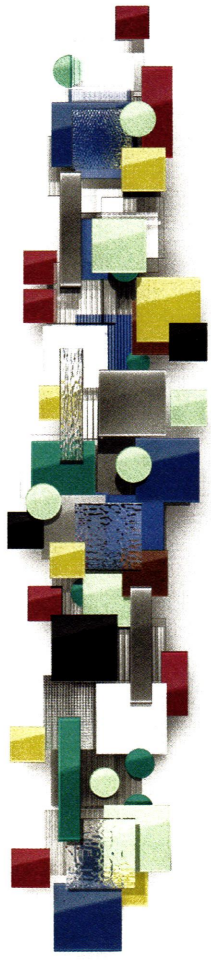

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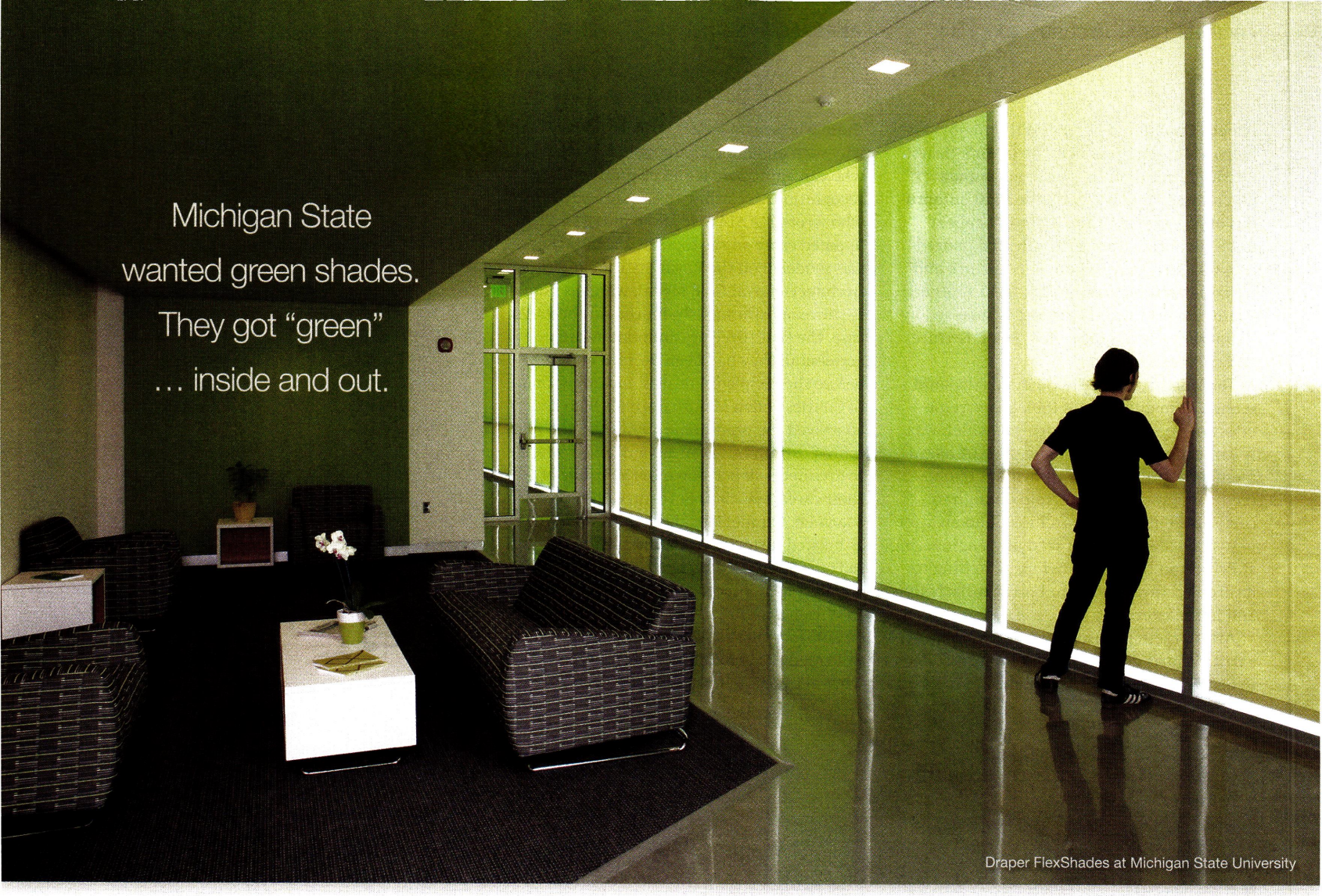

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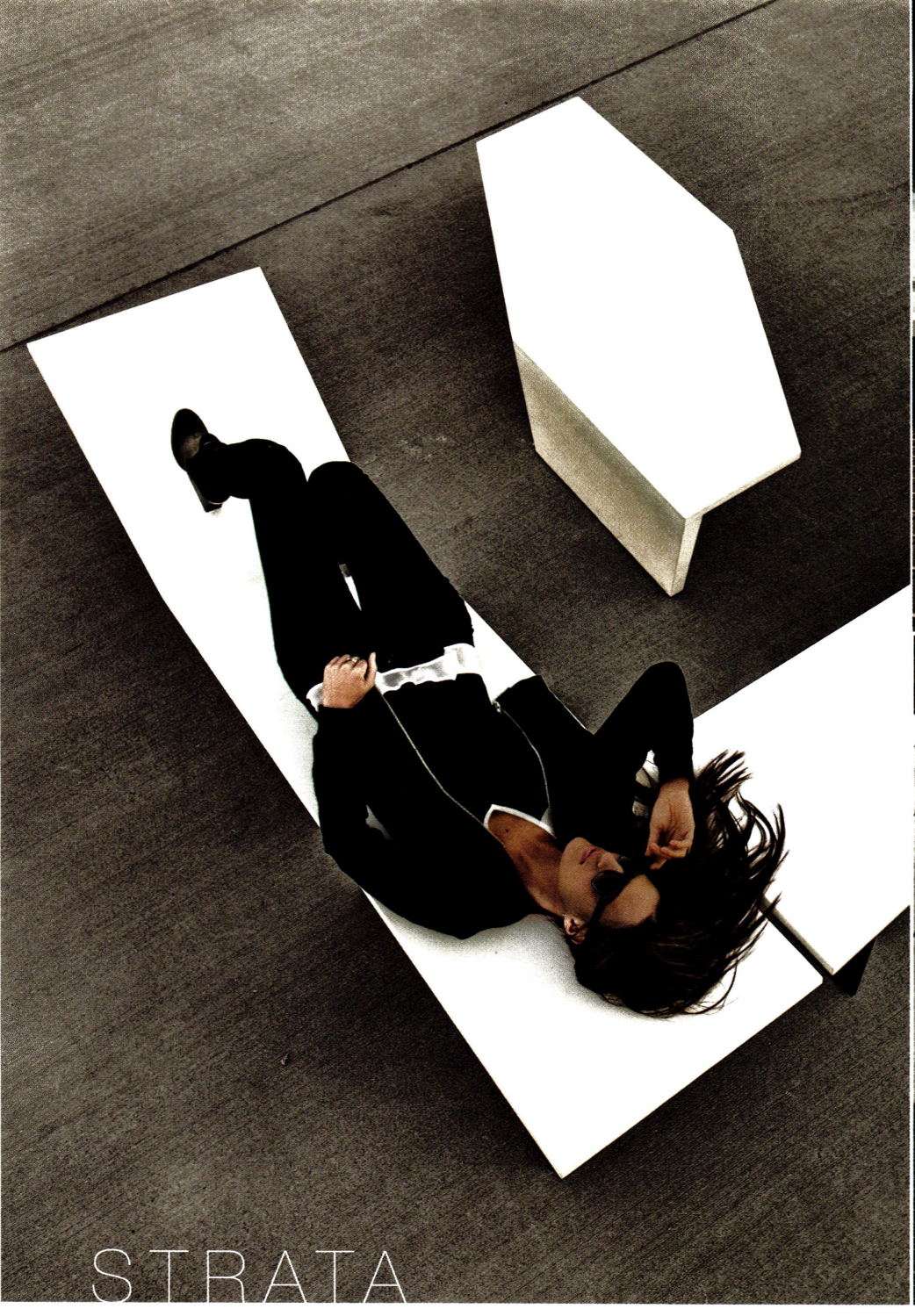

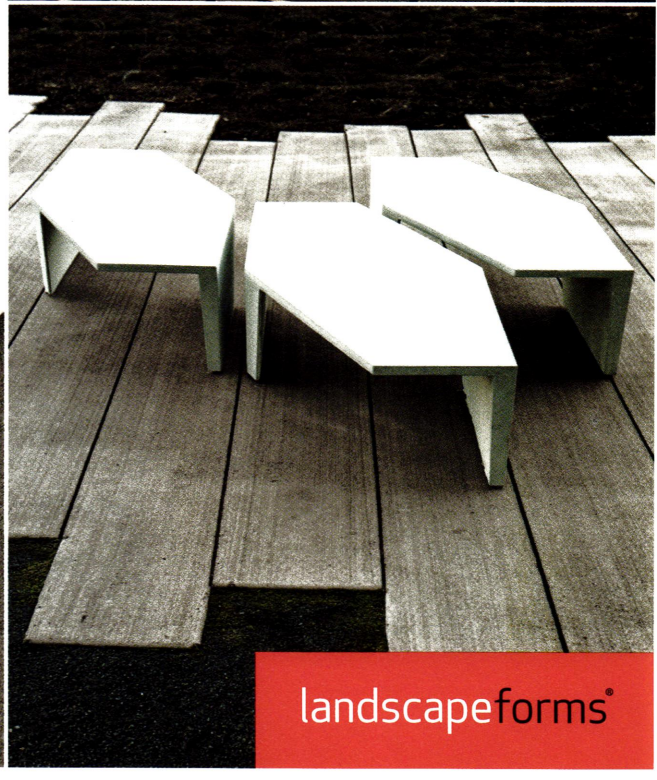

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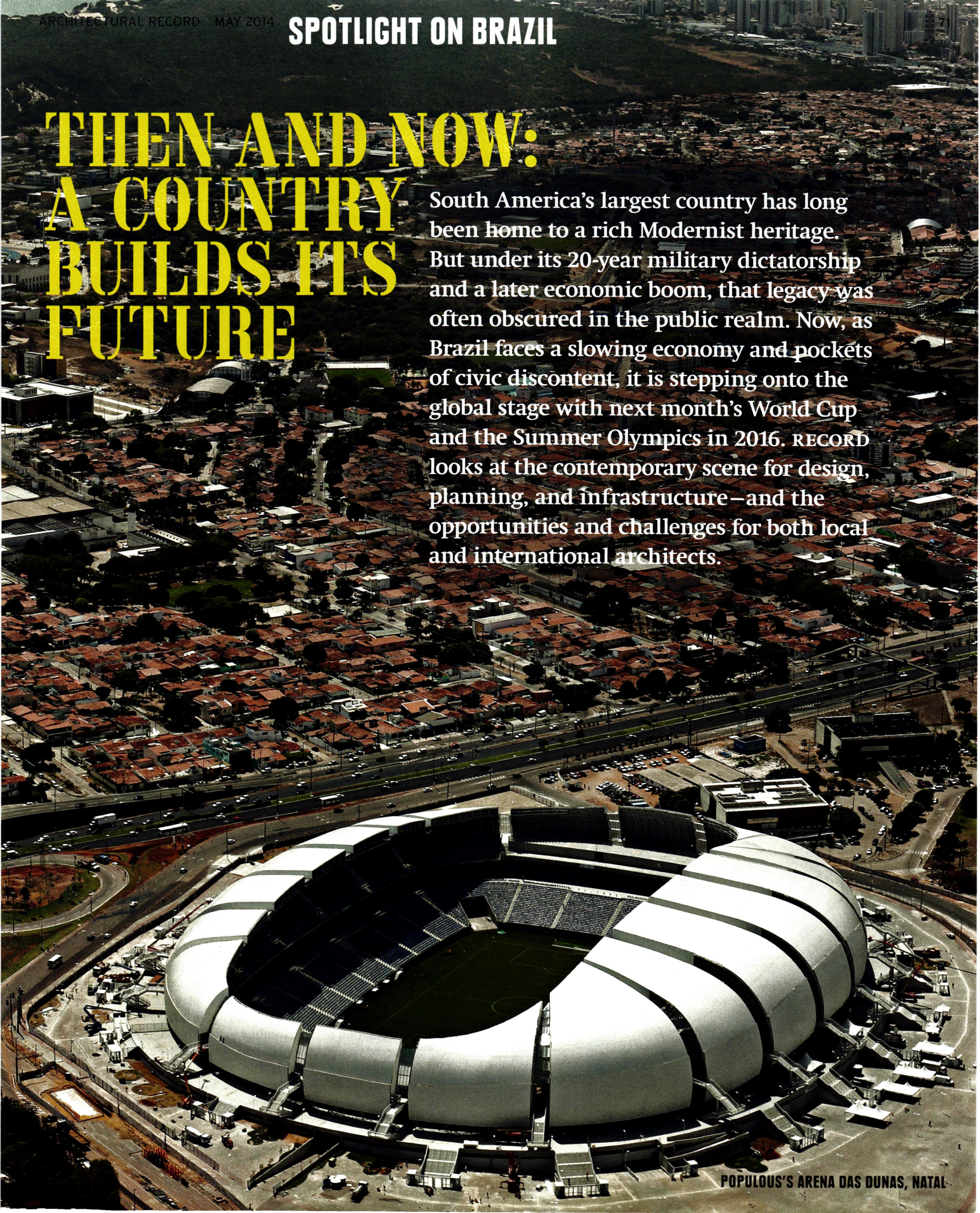
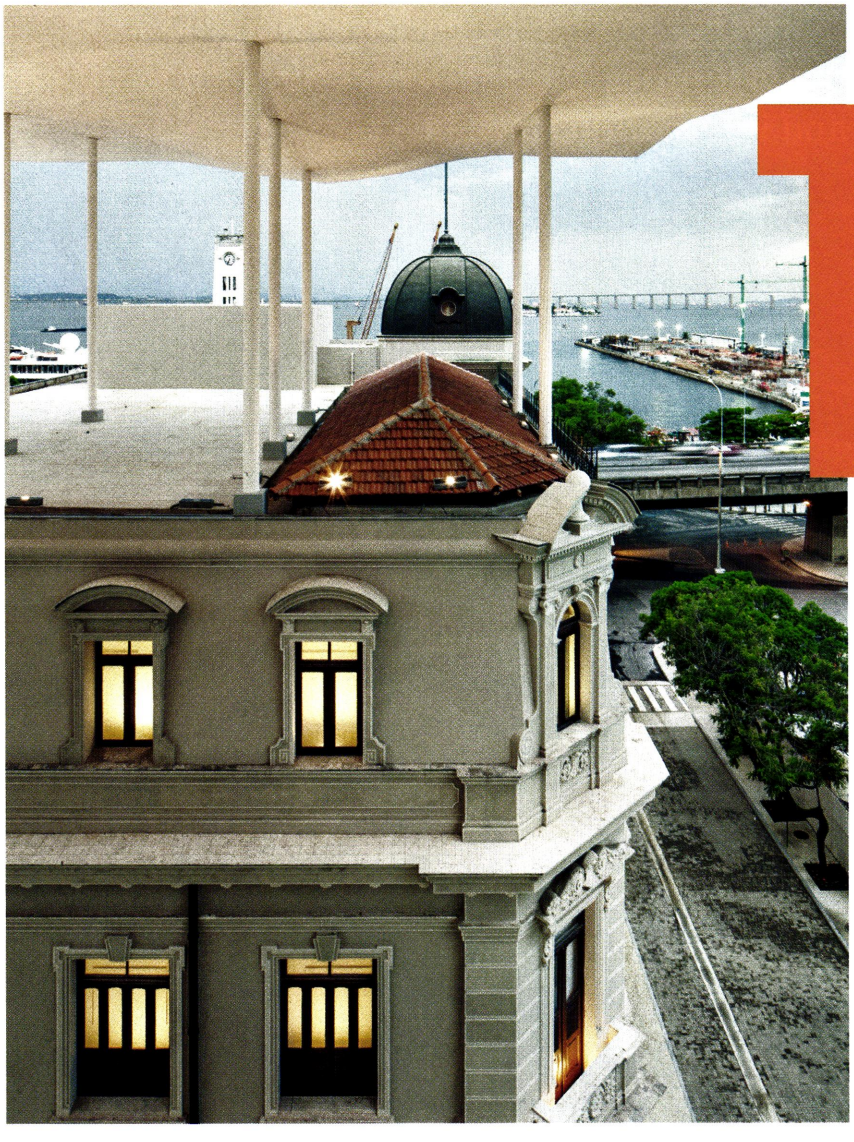
THEN AND NOW: A COUNTRY BUILDS ITS FUTURE

South America's largest country has long been home to a rich Modernist heritage. But under its 20-year military dictatorship and a later economic boom, that legacy was often obscured in the public realm. Now, as Brazil faces a slowing economy and pockets of civic discontent, it is stepping onto the global stage with next month's World Cup and the Summer Olympics in 2016. RECORD looks at the contemporary scene for design, planning, and infrastructure—and the opportunities and challenges for both local and international architects.



POPULOUS'S ARENA DAS DUNAS, NATAL

SPOTLIGHT ON BRAZIL



BY TOM HENNIGAN

These are exciting times in Brazil. Next month, the country will host a party of global proportions when 12 of its cities stage soccer's World Cup. Even after the iconic golden trophy is handed over to the winning team in Rio de Janeiro's Maracanã stadium in July and the millions of fans shut off their TVs, the "Marvelous City" will stay in the world spotlight, as the site of the 2016 summer Olympics. As it rushes to get ready for that next party, Rio today is an enormous building site. But it is not just the demand for sports facilities that is providing a host of opportunities for architects from Brazil and elsewhere. Latin America's largest country is enjoying its longest period of political stability and economic growth in decades, GDP expanding by 7.5 percent in 2010 alone. Authorities want to use the attention that comes with staging two of the planet's great mega-events to tout this progress, and that has meant commissions for planning and designing major infrastructure projects, as well as a new generation of civic amenities.

But in this complex and contradictory country, preparations for the World Cup and Olympics have highlighted both the advances made and the daunting challenges Brazil still faces as it seeks to improve the quality of life of its citizens. For any foreign admirer of the sweeping plans of Oscar Niemeyer and Lúcio Costa for Brasília, the nation's capital, first contact with Brazil's urban centers can come as a shock.

Across this vast nation, cities are plagued by decades of poor design and weak planning. This is the result of a toxic combination of two circumstances: a rapid urbanization—spurred by tens of millions of peasants fleeing drought during the middle of the last century, creating sprawling metropolises such as São Paulo—and a long military dictatorship that seized power 50 years ago, forcing many of the country's best architects into exile and leaving behind a

PHOTOGRAPHY: © LEONARDO FINOTTI (EXCEPT AS NOTED); SERGIO MORAES/REUTERS (PREVIOUS PAGE)

BIG TOP
For the Museu de Arte do Rio (opposite, top and bottom), Bernardes & Jacobsen Arquitetura designed an undulating canopy to unite three buildings from different eras in downtown Rio de Janeiro.

deep economic slump once the generals handed control back to civilians and returned to their barracks in 1985.

The World Cup and Olympics should be accelerants of long-overdue efforts at urban improvements. Last year's mass demonstrations, with citizens' demands for public transport, education, and health services—of a quality matching that of the new soccer stadiums—have provided an incentive for politicians to take risks such as pushing through programs like bus lanes, at the expense of the country's deeply entrenched car lobby. "Brazilians have more money and are consuming more, but the protests highlighted how our cities' development was not accompanied by improvement in the quality of life of people," says Pedro Rivera of RUA Arquitetos (and head of Columbia University's Studio-X) in Rio de Janeiro. "The protests were a demand for better access to public services. This makes me optimistic."

The demonstrations highlighted the delicacy of the moment in Brazil. With economic and social betterment come rising expectations, which the government has struggled to meet. But with the soccer tournament just weeks away, the results of Brazil's makeover have been mixed. The status of the architect in public life has declined since the 1964 coup, whose leaders equated the country's Modernist movement with subversion. This might explain why foreign practices have played the lead in preparing the 12 stadiums that will host the World Cup matches. "The first thought of our political class was to look abroad," says Rio architect Paulo Jacobsen. In Brasília—a UNESCO World Heritage Site—the German office GMP was hired to redesign the national stadium (among others), providing its facade with a striking forest of concrete columns, while Castro Mello, the São Paulo studio that designed the original 1974 venue, was reduced to working on the seating area. It is a pattern being repeated in other cities. Additional foreign offices to benefit from the

CROWNING GLORY
Both the Estadio Mineirão (right) and Estadio Castelão (below) were renovated to host the FIFA World Cup 2014. Working with a schematic design by GPA&A and GMP, BCMF Arquitetos adapted the former, a 1960s-era stadium in Belo Horizonte. In Fortaleza, Viglieca & Associados overhauled the latter 1970s structure.

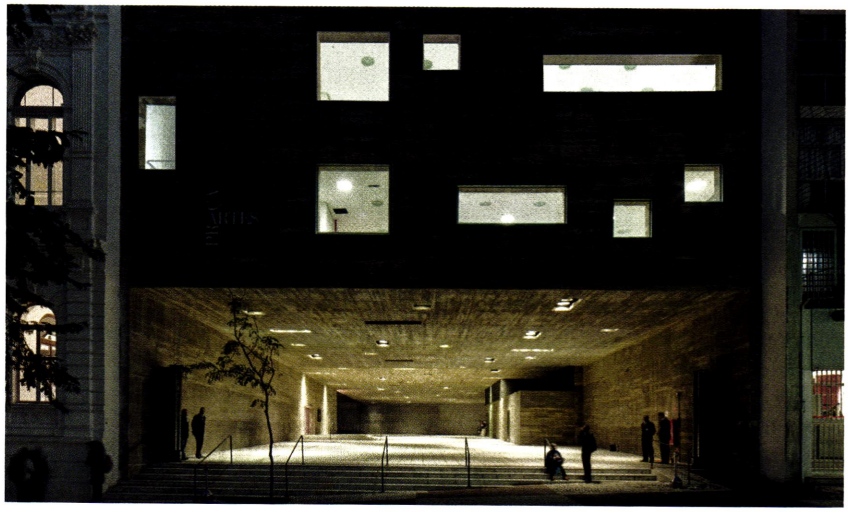
DRAMATIC INTERLUDE
In downtown São Paulo, local firm Brasil Arquitetura surrounded a historic conservatory with a plaza and a set of board-formed concrete buildings that contain Praça das Artes (above and opposite), a performing-arts center.

sporting events include U.S. firms AECOM, which devised the master plan for the Olympics, and Populous, which designed the Arena das Dunas soccer stadium in the northeastern city of Natal.

While sports facilities are being rushed to completion, infrastructure projects such as bus corridors and monorails have been scaled back or dropped altogether. Projects planned for the event, such as a monorail line linking one of São Paulo's airports to the rest of the city's rail network, will not be ready in time. "During the 1980s and 1990s, few public works were executed because of the economic crisis. And when your planners have little to do, you lose your ability to plan," says Rodrigo Prada, who monitors World Cup preparations for Sinaenco, Brazil's national association of architects and engineers. "Now we are paying the price. There will be a positive legacy from the World Cup, but it will be less than it could have been with better planning."

Because of the 2016 Olympic Games, the greatest effort at urban transformation is taking place in Rio de Janeiro, which suffered a long decline after the capital moved to Brasília in 1960. The main Olympic site is controversially located far from downtown but comes with a promise that it will leave a legacy of better transportation links between the city's traditional core and its semi-detached but fast-growing western zone, where the athletes' village is under construction. Meanwhile, a major redevelopment project is under way in the old port neighborhood near downtown. Here docks and warehouses are being repurposed as much needed commercial, residential, and cultural spaces—including Santiago Calatrava's Museum of Tomorrow—intended to redirect some of the city's growth from the periphery to the center.

"Rio is going to benefit more than cities just hosting the Cup," says Jacobsen, whose studio, Bernardes & Jacobsen Arquitetura (now Jacobsen Arquitetura), designed the new Museu de Arte do Rio in the port district. For this native Carioca whose first architectural practice was located in one of the city's infamous favelas, the most exciting development is the effort to regain control of the slums from heavily



armed drug gangs. As police move into neighborhoods long left to the rule of traffickers, city hall has followed, carrying out infrastructure and social projects to better integrate favelas with the rest of the city after decades of neglect. "This has been very positive," says Jacobsen. "Favelas are now being viewed differently by the rest of society, and the city is beginning to find solutions for some of the problems of residents living there." He cites the installation of a funicular in the Dona Marta slum and a cable car in the Complexo do Alemão as examples of how this new approach to the favelas is reshaping the city's mental geography.

But in parallel with this urban integration of the favelas, preparations for the coming mega-events have provided cover for the eviction of tens of thousands of poor residents from their homes in cities across Brazil. The government has relocated these people to distant urban fringes, where it has built most of the 1.5 million houses delivered so far as part of the My House My Life social-housing program. This initiative, set up in 2009 to address a housing deficit estimated to be as high as 8 million units, has been widely condemned by the country's architects for its poor design and lack of attention to residents' social needs. "We are now seeing the results, and they are terrible, at times worse than favelas," warns Marta Moreira of the São Paulo practice MMBB. "The concept is horrible. There is no attention to infrastructure. These developments lack schools, hospitals, even something as basic as a local bakery. It is a pattern we know does not work."

Bankrolled by cheap state credit and focused on quantity rather than quality, My House My Life serves the interests of the country's construction firms and not those of residents, argues Francisco Fanucci, a partner at São Paulo–based Brasil Arquitetura. "It is a grotesque repetition of the worst errors from the history of social housing in Brazil. They are building the favelas of tomorrow." Despite the anger and despair among Brazil's architects about My House My Life, there are pockets of progressive thinking in the public sector. Moreira points to São Paulo's municipal housing secretary Elisabete França whose administration was praised for promoting public housing that took care to include social infrastructure, as exemplified by MMBB's Jardim Edite and the Jardim Lidiane project developed by the local studio Andrade Morettin. These developments both house residents in centrally located neighborhoods rather than on the city's periphery, and incorporate public services such as day-care centers and clinics.

Of potentially wider-ranging impact is the recent revision of the master development plan in São Paulo undertaken by the new mayor, Fernando Haddad. It has won praise for its efforts to reverse decades of urban sprawl in South America's biggest metropolis and increase the density in the city's central regions while prioritizing public transport over the car. Such a change is vital in a city of 11 million people who spend hours each day stuck in smog-spewing traffic jams, but difficult in a country where the auto industry has long been propped up by a succession of governments of all stripes.

With the country's architectural profession operating under several crucial constraints, major challenges to progress remain. Commissions for civic projects from the private sector are relatively few in the absence of the tax incentives for philanthropy like those in the U.S., meaning the public sector maintains a dominant role. And efforts to deliver

A MOVE UP
Last year, MMBB, in partnership with H+F Arquitetos, transformed a São Paulo favela into the Jardim Edite social housing (above). The complex, which houses more than 250 families, consists of three 17-story towers alongside two five-story blocks.

quality public-sector design remain hobbled by a piece of legislation passed in 1993. Notorious among the country's architects, federal law 8.666 demands that all public contracts at the federal, state, and municipal levels—including those for architectural services—be open to tender, with the lowest bid to be declared the winner.

Drafted during the country's re-democratization process when the dictatorship ended, the legislation's goal was honorable—to combat deeply entrenched corruption in the public sector. But by using the same methodology to select design services that they use to buy the materials to realize them, public authorities have incentivized substandard architecture. "It drags everything down to the lowest level," laments Marcelo Ferraz of Brasil Arquitetura. "Architecture is not construction. It is intellectual and artistic work. As well as its technical side, it involves creation. And creative work has to

With the World Cup just weeks away, there have been many exciting developments but, overall, the results of Brazil's makeover have been mixed.

BOOK SMART
The Brasiliana Library (right and opposite), designed by Rodrigo Mindlin Loeb Arquitetura and Eduardo Riesenkampf de Almeida for the University of São Paulo campus in 2013, houses one of the largest private book collections in the world.

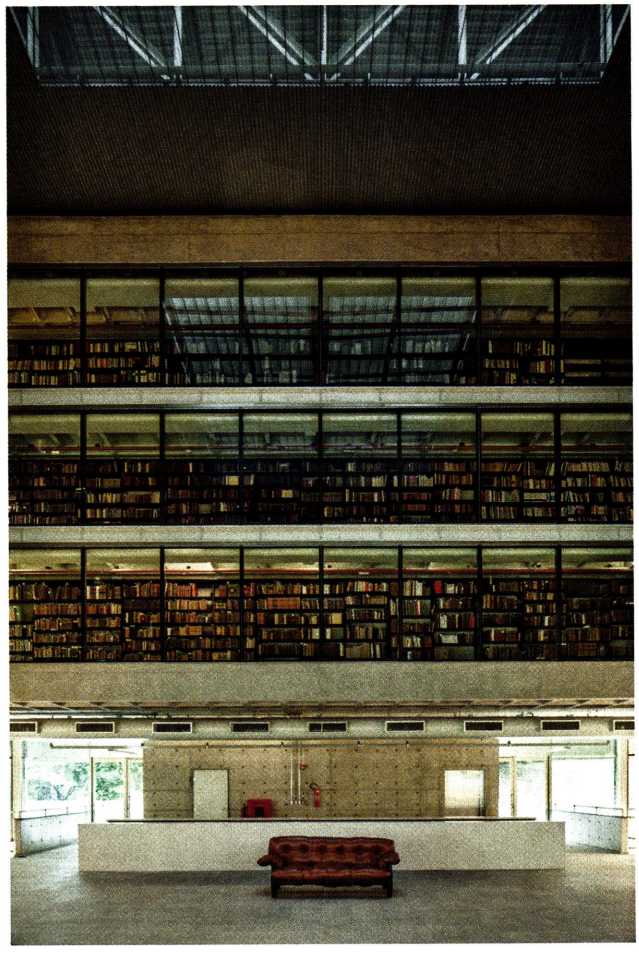
be handled in a different manner from the work of someone who sells concrete." He goes on, "The great error of law 8.666 is to lump them together. The law is so stupid, it does not even understand what architecture is. It disrespects it, and the civic result is suffering in many peoples' lives, because work badly done lasts as long as work well done."

When a project receives a dispensation from the law, as in the case of Praça das Artes in São Paulo, Brazil's rich design tradition is allowed to flourish, producing memorable contemporary work. Invoking a rigorously policed provision that allows the controversial tender process to be overlooked, the city's municipal government hired Ferraz and his partner Francisco Fanucci to design the award-winning cultural center. A key component in recent efforts to revitalize the city's downtown region, the building reemphasizes the value of public space and marks the return of intelligent civic design little seen in São Paulo since the inauguration in 1982 of Lina Bo Bardi's much-lauded SESC Pompeia (see page 90), another cultural center that the Modernist master forged from an abandoned old factory.

Ferraz and Fanucci have several similar projects in development across Brazil, after similar suspensions of law 8.666. One is a museum in the northeastern city of Recife celebrating the life of folksinger Luiz Gonzaga. "We would not be doing these projects if we had been obliged to bid on price," says Fanucci. "But suspending the bidding process is very complex and difficult, and this acts as a disincentive to authorities."

The Museu de Arte do Rio and Praça das Artes in São Paulo stand as evidence of how a new approach by the public sector to contracting architects could be hugely beneficial to the texture and experience of Brazil's cities. A new generation of talented young architects may have missed much of the bonanza from the World Cup and Olympics, but it is itching to find such solutions to the country's urban ills. The need to do so is vital. "The Praça das Artes is all very well," says its creator, Ferraz. "But São Paulo alone needs dozens of Praças das Artes." It is a daunting challenge, but in Brazil's contradictory manner, Ferraz's comment hints at immense potential. ■

Based in São Paulo, Tom Hennigan is the South America correspondent for The Irish Times.



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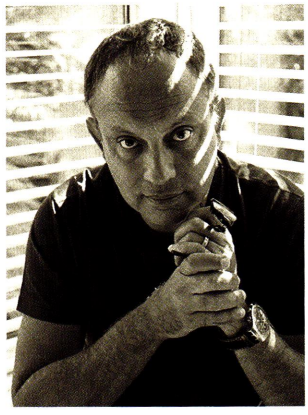
FROM THE FIELD

Brazilian architects talk about practice in Latin America's largest nation.

BY TOM HENNIGAN

ARTHUR CASAS ON TRENDS IN RESIDENTIAL DESIGN:

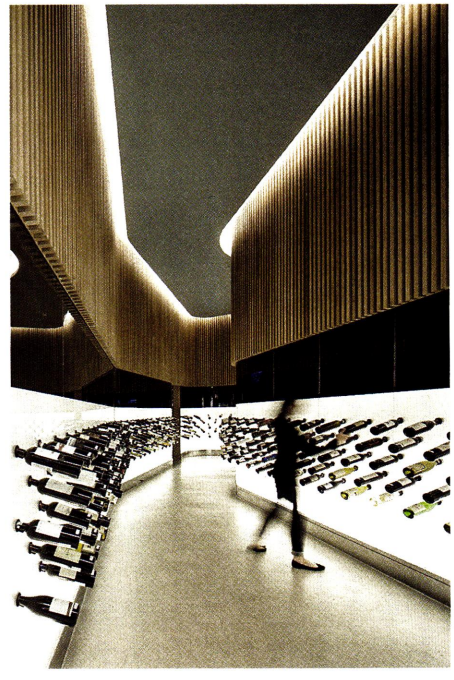


ARTHUR CASAS *is a graduate of the renowned architectural program at Mackenzie University in São Paulo and an heir to the city's Modernist traditions. While he is one of Brazil's most sought-after residential designers, his work also includes larger multifamily, commercial, and institutional projects.*

"At one time, Brazilian architecture was dominated by hybrids of classic European forms. Then came Modernism, which started with Niemeyer and the realization of his Pampulha neighborhood in Belo Horizonte in the 1940s.

By the middle of the 1960s, especially in São Paulo, Modernism had become very radical. Architects were able to impose their concepts on clients, which produced our rich architectural heritage. Designers managed to realize their ideas, but they produced houses that were cold and unattractive to live in. Houses made of concrete at a time when, here, we had no heating or air-conditioning meant homes that were cold in winter and hot in summer. There were houses without windows, ones with floors made of concrete. These are hugely interesting projects but not spaces for living in. They were extremely uncomfortable.

The children of the families that lived in these houses developed an aversion to Modernist architecture. Twenty years ago you heard people saying they would never live in a Modernist home because their parents had lived in one. So, up until a decade ago, residential architecture in cities like São Paulo and Rio de Janeiro—but especially São Paulo—was dominated by a Neoclassical architecture that was horrible. Apartment buildings were made up of a mixture of styles, to give the impression of luxury. In reality, these buildings were not good quality. They were extremely cheap to construct—with small windows and facades done in concrete—but designed to look luxurious.



CRISP FINISH Casas's Mistral wine store in São Paulo (right) takes its cues from undulating wood-lath walls. A private house, Casa Itu, abuts a small lake outside the city (above).

But trends shift. Since the year 2000, the tendency of the younger population, say, a buyer around 35 years old, is to purchase an apartment with a more modern design. Because of this demand, the construction companies began to seek out architects who work in this language. Our studio has been hired by firms to design such buildings. They are contemporary Modernist residential buildings. These things are cyclical, and this is where the cycle finds itself at the moment."

PEDRO RIVERA ON RETHINKING THE CITY:

PEDRO RIVERA *is a graduate of the architecture program at the Federal University in his native Rio de Janeiro. In 2008, with colleague Pedro Évora, he founded RUA Arquitetos in Rio. He is also a director of Studio-X Rio, part of Columbia University's network of laboratories dedicated to rethinking the future of cities.*

"After the economic boom that occurred under the dictatorship, we went into a very deep economic crisis. I started studying architecture in 1992 and I left school in 1997. It was the worst time you could have become an architect, because nothing was being built. The country did not invest in infrastructure. Nothing new was being added to our cities—there was only the degradation of what had existed before.

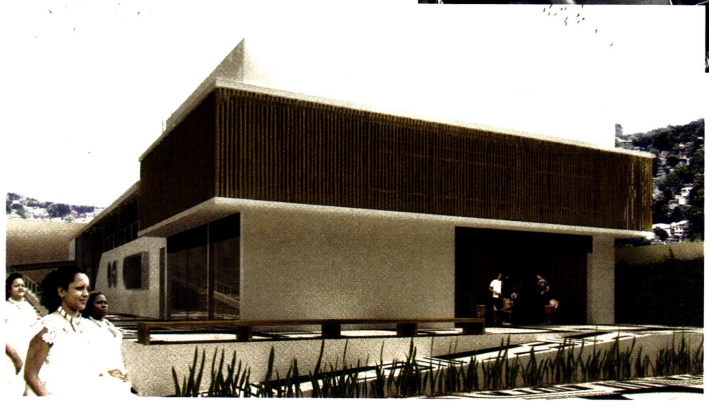
There was rapid growth of the favelas because, until the My House My Life program, there was no public-housing program in Brazil. When I became an architect, there was a real crisis: How do you become an architect if there is no architecture?

But this led to something interesting for my generation. Since there was no

PHOTOGRAPHY: © ANCAR BARCALLA (TOP); FERNANDO GUERRA (MIDDLE, 2); TIAGO PETRIK (BOTTOM)

work available when we graduated, many of us opened our own offices, because we had to 'invent' work. Together we were trying to figure out the possibilities, trying to connect the dots. It is very different compared to the generation coming out of school today, that have jobs waiting for them. Despite the crisis, it was in many ways a creative and inventive time. I worked on designing canopies and other basic infrastructure for street vendors in the old market of Belém, while a friend went on to do something similar for the market in one of Rio's favelas, helping formalize what was still then a highly informal part of city life.

In Brazil, migration to the cities was a phenomenon of the 1970s and 1980s. I like to think that, compared to China, we have an advantage because the size of our cities has stabilized, so we more or less know what their problems are. We have been an urban society for some time, which is a cause for optimism, because people moved to cities for the greater opportunities there. For me, cities are more places of opportunities than problems."



CLASS OF ITS OWN
A discussion at Rivera's Studio-X lab (above) at Praça Tiradentes in downtown Rio. A proposal for the headquarters of nonprofit organization Jongo Da Serrinha (left) will transform a warehouse into an education and cultural center in the Morro da Serrinha favela.

MARTA MOREIRA ON PUBLIC WORKS PROJECTS:

MARTA MOREIRA *is one of the founders of MMBB Arquitetos in São Paulo. Formed by a group of university friends who worked for a time under Eduardo de Almeida, the studio is one of the leading lights of the post-dictatorship generation of architects and is known for the high quality of its public works projects.*

"The way we typically work at MMBB, with projects such as Jardim Edite (a multi-tower public-housing project in a central business district that includes social services such as a clinic and day-care center for residents), we are contracted to develop the design as well as oversee the construction.

This is in contrast to what usually happens with public works, where you do not necessarily have the participation of architects throughout the process. The contracts are held by large construction companies, which employ architects but retain control over the contract.

The vision of the city as reflected in the government's My House My Life housing program, with its endless repetition of all these small identical houses way out on the urban perimeter, is horrible. We know that the centers of our cities have great potential. There are a large number of abandoned buildings and empty lots that could be reoccupied. This policy of building on the periphery is horrible. We are sending people far away from where the jobs are, meaning they will be dependent on a public transportation system that is often of poor quality, and sometimes does not even exist. It will be a disaster.

The problem is not just a question of the law [Law 8.666] demanding that authorities contract the cheapest bid to execute these projects—this is about political priorities. My House My Life ended up being a major profit generator for construction companies.

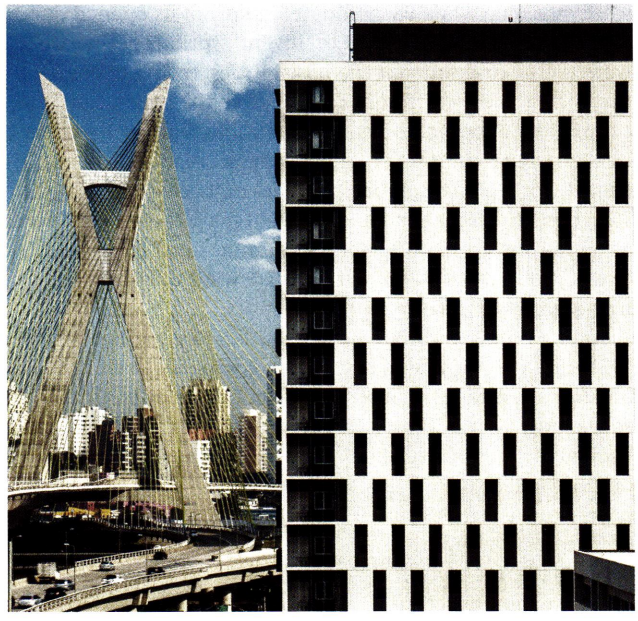
But there is a new generation in the public sector

A CREEK RUNS THROUGH IT
MMBB's Urban Project for Antonico Creek reconciles a São Paulo favela and its area's waterways.

IMAGES: © RUA ARQUITETOS (TOP, 2); GUILHERME PAOLIELLO (MIDDLE); MMBB ARQUITETOS (BOTTOM)

that has another vision, architects and planners who have backgrounds and educations that have equipped them to confront the challenges we face. There are now more architects and planners in authority who are better prepared to navigate policy across the various bureaucracies—something that has often failed to happen in the past.

The latest version of the master development plan for São Paulo is an example of this. It involved calling all the architectural institutions in Brazil for a debate on the revisions. This puts the discussion on another level—not just for architects, but also for society in general. This is important, because the scale of São Paulo [a metropolis of more than 11 million inhabitants] is so challenging."



SHELTER IN PLACE Moreira and her firm MMBB, with H+F Arquitetos, designed Jardim Edite social housing in São Paulo. The complex houses more than 250 familes on the site of a former favela, where the same families lived previously.

ANGELO BUCCI ON CREATING CITIZENSHIP:

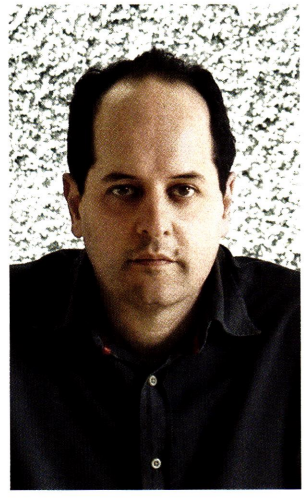
"Last year we were one of a group of architects invited to submit proposals to reimagine the future of the Museum of Modern Art in São Paulo in the city's Ibirapuera Park. We came up with the idea of four elevated pavilions that would be neither inside nor outside the park. They can be built without having to cut down a single tree or close a single road. These new pavilions would run through the city. You could have exhibitions above the avenues leading to the airport and space for temporary artists' residencies running through the park.

The amount of time it takes to get a project approved in a city like São Paulo is absurd. You can say that, here, bureaucracy keeps many jobs locked up in a drawer. But, despite this, there is some very important work being done. Another project here in São Paulo that I deeply admire is the Unified Education Centers [or CEUs, after their initials in Portuguese]. They were developed by Alexandre Delijaicov, André Takyia, and Wanderley Ariza and comprise 21 schools that were set up along the city's poor fringes during the administration of Mayor Marta Suplicy, from 2001 to 2004.

The project was developed at a time when the favelas were a much-discussed subject in architecture schools around the world. This debate always focused on the question of housing, which, of course, is important. But you can transform every house in the favela into a palace and you will still be lacking the most important thing, which is citizenship.

What the CEUs did was create centers of citizenship for these people. Not just for the children who got access to sports, swimming pools, cinema, libraries, and the Internet, but for everyone in the community. Every CEU has a theater, has an orchestra. Now parents and workers could visit these spaces on weekends. The program mobilized these communities. Suddenly, the city has 21 more public theaters, an extra 21 public swimming pools. It was a significant change.

Delijaicov and his colleagues created these centers to promote citizenship. People now have access to services that, historically, they had systematically been denied. It is an incredible concept, but it also underscores the lapses in Brazil's planning. Why did this project not continue? Why was this so hard to do? It should not be a problem to do the things that everyone knows need to be done. But the problem is bureaucracy and the lack of continuity in planning when political administrations change."



ANGELO BUCCI *has run the SPBR office in São Paulo since 2003. He became one of the most prominent members of the young generation of architects to emerge following the end of Brazil's military dictatorship after he won—along with Álvaro Puntoni and José Oswaldo Vilela—a public competition to design the Brazil pavilion at the 1992 Seville Expo, one of the first major civic projects following the return of democracy. For political reasons, the pavilion was not built.*

CITY LIFE Angelo Bucci completed this private residence in downtown São Paulo last year. It features a garden and a rooftop swimming pool (right).

PHOTOGRAPHY: © NELSON KON (TOP, BOTTOM); ANA OTTONI (MIDDLE)

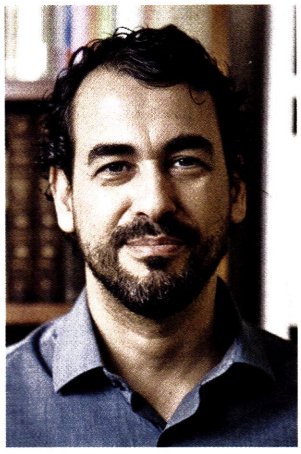
RODRIGO MINDLIN LOEB
ON BUILDING THE BRASILIANA LIBRARY:

"My grandparents originally planned a private foundation that would build the library and after 99 years have it become part of the public patrimony. It is a model similar to those in the U.S. But in Brazil, a regulatory change (aimed at preventing the creation of fictitious foundations in order to avoid taxes) demanded that all assets transferred to foundations were to be subject to taxation. This severely limited the incentive to set up foundations, especially in a country where citizens get very little return in terms of public services.

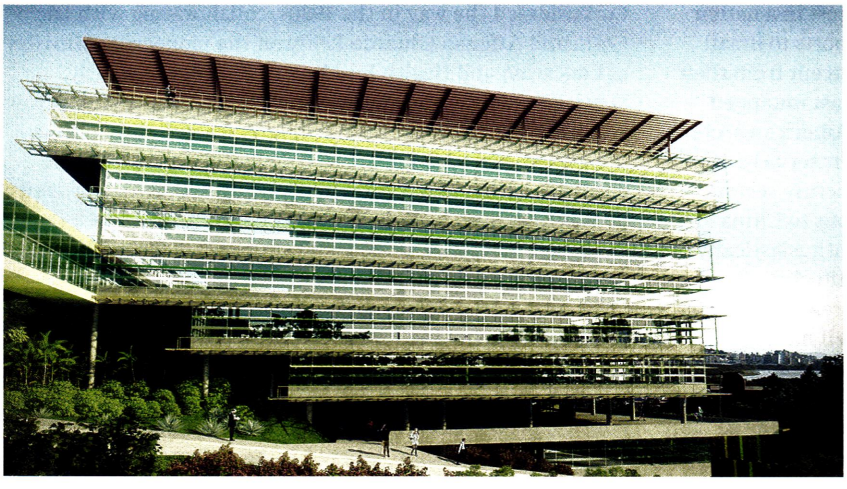
Because of this, the story of our library was unprecedented in Brazil. My grandparents made the donation directly to the University of São Paulo (USP, a public university), with the condition that the school construct and maintain a library within three and a half years.

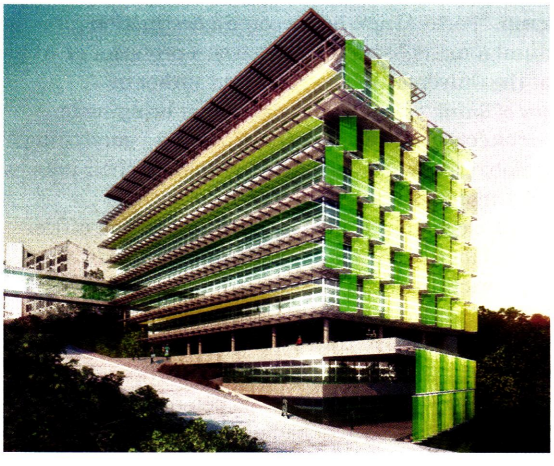
But after my grandparents signed, the project got caught up in Brazil's notorious red tape and institutional inertia. So we had to overcome this paralysis. We did, but with great sacrifice: a project that should have taken four years ended up lasting 13. Of course, it was worth it, because now we have a home for this wonderful collection. It was a rich and unique experience, but it lasted nine years longer than it should have—a real disincentive to others to follow our example.

I did this project with Eduardo de Almeida, who was my teacher at USP. It was a fantastic experience, though we fought a lot—in a positive way!—during the process. The library contains a lot of Eduardo and the Paulista school of Modernism. But Eduardo was open to other ideas, such as those represented by Louis Kahn's Salk Institute and Phillips Exeter Academy library, and Gordon Bunshaft's Beinecke library."



RODRIGO MINDLIN LOEB, *with his former professor Eduardo Riesenkampf de Almeida, designed the Brasiliana Library at the University of São Paulo, which houses the collection of rare books on Brazilian history and culture donated by Loeb's grandparents Guita and José Mindlin.*





ON THE BOOKS Mindlin Loeb's Brasiliana Library in São Paulo (right), designed with Eduardo Riesenkampf de Almeida, houses one of the largest private book collections in the world. In 2012, the firm designed headquarters for two government agencies for the state of Santa Catarina in south Brazil (left and above).

IMAGES: © ADI LEITE (TOP); NELSON KON (MIDDLE); ESTUDIO MELANCIA (BOTTOM, 2)

LEARNING TO SAMBA

Foreign architecture firms navigate cultural barriers and contend with the long shadow of Brazil's Modern masters.

BY JOSEPHINE MINUTILLO

Occupying nearly half of the South American landmass and containing more than 50 percent of the continent's population, Brazil seems at first glance to be a market ripe for foreign architects. Although a long-ruling military government and repressive politics placed the country at the margins of world events from the mid-1960s to the mid-1980s, political democratization since then has brought it back to center stage. An economy that had boomed in the face of the recent global recession, and preparations for the 2014 World Cup and 2016 Olympics piqued foreign interest in a nation with more than 200 million people. U.S. exports to Brazil reached nearly $44 billion in 2012, up 68 percent from their 2009 level. But Brazil represents not just a vast untapped consumer market for U.S. investors; North American architects recognize the opportunity to offer their services as well, especially in the urban design and infrastructure sectors.

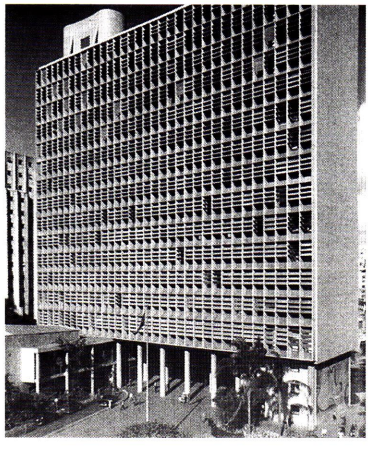
It might be tempting to make comparisons to China and oil-rich countries in the Middle East that enthusiastically called on big-name designers to create architectural bling in recent years, but Brazil hasn't welcomed foreign architects in the same way. Unlike those nations, Brazil has a strong Modernist architectural heritage, though it is sometimes ignored. "The thought is, 'With excellent architects in Brazil, why hire a firm from overseas?" says Zeuler R. M. de A. Lima, author of *Lina Bo Bardi*, a comprehensive look at one of Brazil's leading 20th-century architects (page 90).

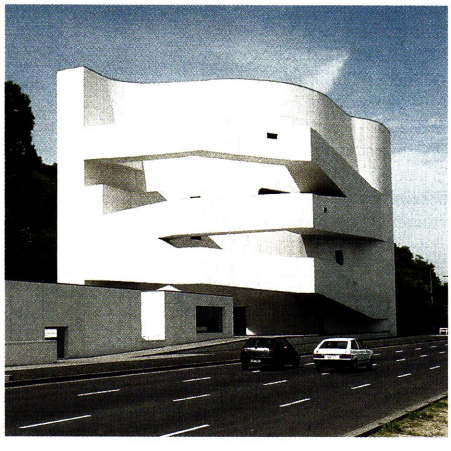
To help open the door to U.S. firms, the American Institute of Architects partnered with the U.S. Department of Commerce in October on an architectural trade mission to Recife and Rio. "We were essentially a matchmaking service," says Jessica Salmoiraghi, AIA's director of federal relations and counsel. "We set up one-on-one meetings and held receptions attended by local business owners." While the AIA is unable to confirm if any of the participants landed work in Brazil, a similar mission in 2012 led by British Prime Minister David Cameron, which included leaders from Zaha Hadid's and Norman Foster's firms, yielded substantial results. Foster has since set up a studio in São Paulo, and Hadid's office confirms it is working on a hotel in Rio.

Foreign architects have found success in Brazil before. Le Corbusier led the way in the 1930s, collaborating with Lúcio Costa and Affonso Eduardo Reidy on the pioneering Ministry of Education and Health Building in Rio. More recently, Santiago Calatrava began building the Museum of Tomorrow as part of the effort to transform Rio's waterfront. But it is not always easy going. Christian de Portzamparc's Cidade das Artes, while partly open, sits unfinished, with a lawsuit pending against the French Pritzker Prize laureate.

Though Herzog & de Meuron's simple 21,000-square-foot Arena do Morro gymnasium just opened in the Mãe Luiza favela in Natal in northern Brazil (page 86), its much larger Cultural Complex Luz for São Paulo, in the works since 2009, was recently suspended. There is also the inevitable backlash by locals still resistant to foreign designers. Not even the Portuguese architect Álvaro Siza was spared the outcry by citizens of Porto Alegre, where his Iberê Camargo Foundation opened in 2008. But the success of that building has softened the criticism. "Porto Alegre has become a destination for architectural tourists," says Hugo Segawa, a professor of architecture at the University of São Paulo and author of *Architecture of Brazil: 1900–1990*. "It shows that bringing in foreign architects and their expertise could be a good thing."

While global firms SOM and KPF have gotten their toes wet completing buildings in Brazil, firms such as Perkins+Will, Gensler, and AECOM have established offices there. José Gelabert-Navia, Perkins+Will's regional director for Latin America, has been traveling to Brazil from Miami for over eight years. "We can work very effectively with partner offices in the rest of South America," he says. "But it became obvious that, if you don't have an office run by Brazilians, you can't work in Brazil." When health-care products company Covidien, which had discussed working with





EARLIER IMPORTS Le Corbusier helped oversee the Ministry of Education and Health Building in Rio (below, left), designed by a team including Lúcio Costa and Affonso Eduardo Reidy, completed in 1943. Pritzker Prize–winning Portuguese architect Álvaro Siza designed the Iberê Camargo Foundation in Porto Alegre, which opened in 2008 (below, right).

BIG PLAYERS
Gensler has established itself in Brazil by working for tech companies such as Facebook and Intel, but it is also working on projects like a Wyndham hotel (above). AECOM won the job to design the master plan for the 2016 Olympic and Paralympic Park in Rio de Janeiro (left).

Perkins+Will, embarked on a substantial building project in Brazil, it prompted the architectural firm to form a strategic partnership with São Paulo firm Rocco Vidal in August 2012. The staff has since grown from 50 to 70—comparable in size to its New York office. "There is an extraordinary opportunity in Brazil for the expertise we bring in health care, research, and master planning," says Gelabert-Navia.

Gensler found its niche designing for tech companies. Luca Panhota leads the firm's São Paulo studio, which opened in 2010 when working on local offices for Facebook, Intel, and others. Though Brazilian, Panhota had practiced architecture almost exclusively in the U.S. "Contractors were shocked by the detail of our drawing sets," he recalls. "Normally, they try to solve everything during construction, without the architect's input." Another challenge architects face is Brazilian law itself, which requires public building projects to go to the lowest bidder. "We were invited to bid on the Olympic velodrome," says Panhota, "but we declined."

With nearly 50,000 employees worldwide, AECOM sees urban regeneration projects as an entry point in new markets. Even though its 2010 scheme to redevelop São Paulo's blighted Nova Luz district appears to have been abandoned, working in Brazil is an "investment in time," according to Bill Hanway, project leader of AECOM's winning bid for the 2016 Rio Olympics master plan. And despite AECOM's enormous size, Hanway admits that success is "strongly based around personal relationships."

A smaller firm with a big stake in Brazil, Davis Brody Bond has offices in New York and Washington, D.C., and opened a third, in São Paulo in 2007. "Our client made us do

IMAGES: COURTESY GENSLER (TOP); COURTESY AECOM (BOTTOM); PHOTOGRAPHY: © (WT-SHARED) RMX AT WTS WIKIVOYAGE (OPPOSITE, BOTTOM RIGHT)

CATALYTIC CONVERTER
Davis Brody Bond worked with Levisky Arquitetos to turn a brownfield site in São Paulo into Victor Civita Plaza, where a wood deck sits above the contaminated soil (left). Working for the developer WTorre, Arquitectonica designed WTorre Plaza and the JK Iguatemi shopping mall in São Paulo (bottom).

it," says partner Steven Davis, whose work with global manufacturing firm Valeo spanned more than a decade. "They said they could no longer pay us in the States." Brazil's protectionist laws impose at least a 14.75 percent tax on foreign professionals, though clients may end up paying as much as a 40 percent premium.

Led by Harvard-trained São Paulo native Anna Dietzsch, the office has also completed several neighborhood-revitalization projects, including the award-winning Victor Civita Plaza in São Paulo, which transformed a brownfield site into a recreational area and was among the first public-private urban renewal projects in Brazil.

Despite such groundbreaking work, Dietzsch admits that the process can be frustrating, especially for a "squeaky clean" firm, as Davis puts it. "The architect has much less control in Brazil," says Dietzsch. "And, whereas architects generally earn two-thirds of the design fee, and engineers get one-third in the U.S., it is the reverse in Brazil."

Some Brazilian clients know from the start that they want a foreign architect. For example, private developer WTorre hired Arquitectonica to design a high-end mall and office towers in São Paulo. Eskew+Dumez+Ripple is now designing a multiuse theater for the site. "I think they were looking for a firm that could do more innovative work than they could get in Brazil," says partner Steve Dumez.

The Fundação Roberto Marinho, established by the billionaire founder of Brazil's Organizações Globo, hired Santiago Calatrava to design the Museum of Tomorrow in Rio in 2010 and–after throwing out the results of a first competition among Brazilian architects–Diller Scofidio + Renfro (DS+R) to design Rio's Museum of Image and Sound in 2009. "Rio sees itself as a global city," explains Elizabeth Diller. "There is interest in bringing in foreign architects." It was DS+R's

Some foreign architects have found market niches, while others have brought innovative design strategies to their projects. All discover that investing in time is important.

GOOD VIBRATIONS
Inspired by Roberto Burle Marx's beach promenade, with its wavy-patterned pavers, Diller Scofidio + Renfro designed the Museum of Image and Sound in Rio as a vertical boulevard.

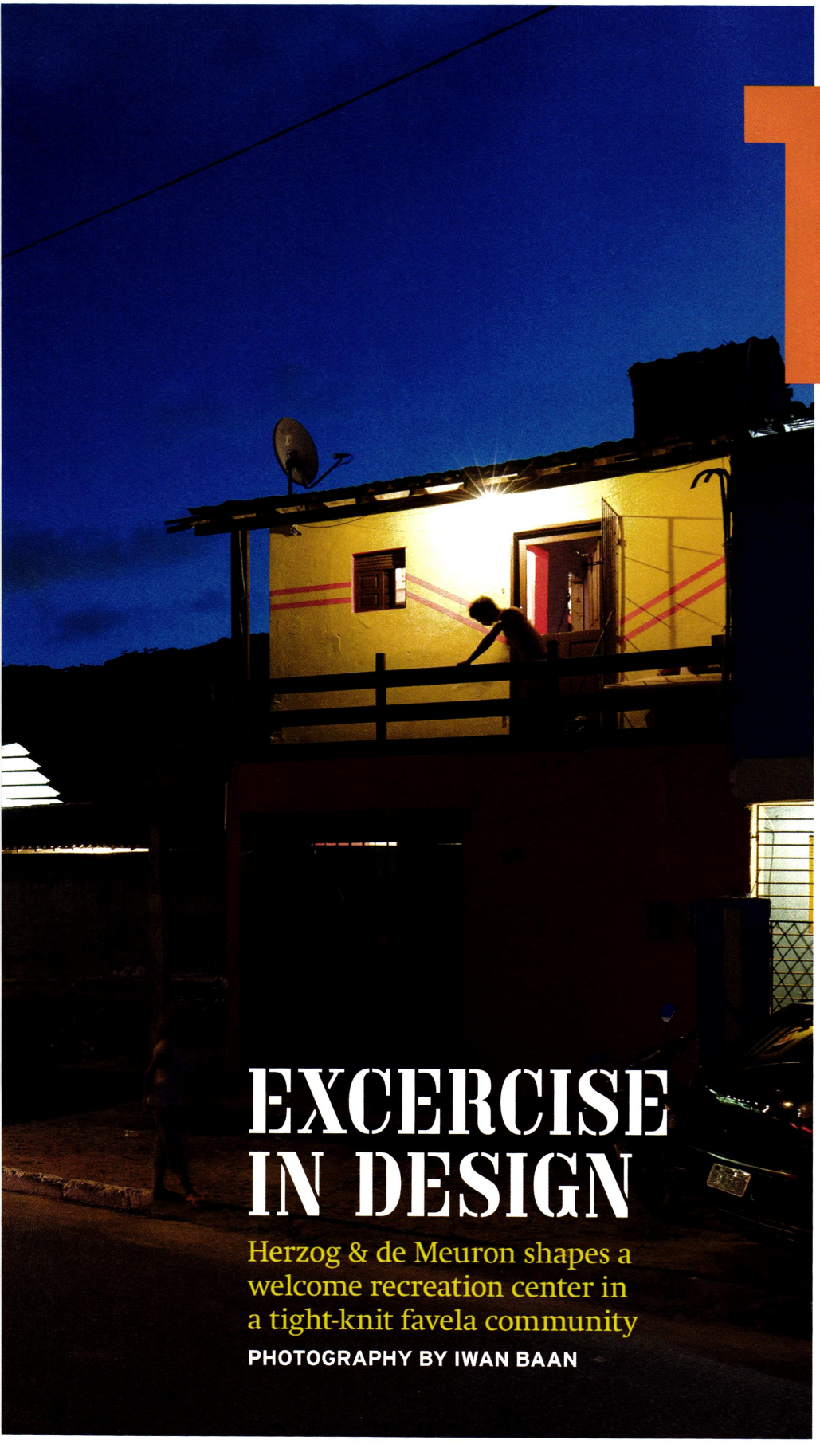
multidisciplinary approach that struck a nerve with the culturally diverse jury. "Rio is a place of tremendous organizational problems, incredible natural beauty, a wealthy population, tourists, and favelas," adds Diller. "That collision is something we saw as an interesting opportunity right on Copacabana Beach."

While most foreign firms doing a project in Brazil hand it off to the local architect after design development, DS+R chose to execute construction documents from New York, while still working closely with Rio firm Indio da Costa on 3-D modeling and construction supervision. "A lot of what's been built in Brazil in the last 20 years is pretty straightforward," says DS+R project leader Chris Andreacola, noting a dearth of innovative architecture. "In some ways our project represents a reemergence of Rio de Janeiro." The project is expected to be completed in time for the Rio Olympics.

As Brazil's economy slows and the impact of big events like the World Cup and Olympics wears off, firms such as Davis Brody Bond that are committed to their Brazilian presence plan to stay the course. Steven Davis points to construction giant Odebrecht as an example of a Brazilian company that finds his firm's mix of North American expertise and local execution very attractive. Hugo Segawa, the author and professor, believes foreign designers can help reconnect architecture to popular culture—the way Niemeyer had—though he cautions, "We don't need 'star' architects, but good, everyday architecture, and education." ■

Josephine Minutillo, a former senior editor at RECORD, *writes about architecture for many publications.*

IMAGES: COURTESY DILLER SCOFIDIO + RENFRO (THIS PAGE); NELSON KON/COURTESY DAVIS BRODY BOND (OPPOSITE, TOP); DANIEL DUCCI (OPPOSITE, BOTTOM)



EXCERCISE IN DESIGN

Herzog & de Meuron shapes a welcome recreation center in a tight-knit favela community

PHOTOGRAPHY BY IWAN BAAN

Tucked between lushly vegetated sand dunes and the Atlantic Ocean, the Mãe Luiza favela spills out from the fringes of Natal, a city of 800,000 people in northeastern Brazil. While the population of Mãe Luiza possesses a strong cultural identity because of its location at the edge of a state nature preserve, it faces challenges common to these dense outer neighborhoods—poverty, inadequate infrastructure, and a dearth of public space.

Herzog & de Meuron and the philanthropic branch of Ameropa, a Swiss fertilizer and grain dealer, partnered with a local organization in 2009 to shape A Vision for Mãe Luiza, a pro bono master plan that seeks to catalyze development in the community. The pioneering building, Areno do Morro, opened April 9.

Located on a 1.2-acre wedge-shaped patch of land a short walk from the ocean, Areno do Morro sits on the former site of an open-air gymnasium. The architect took formal cues from the original structure and, with the help of local workers, built a raw shed-like structure of steel and concrete to house an indoor athletic field used by a school and the community.

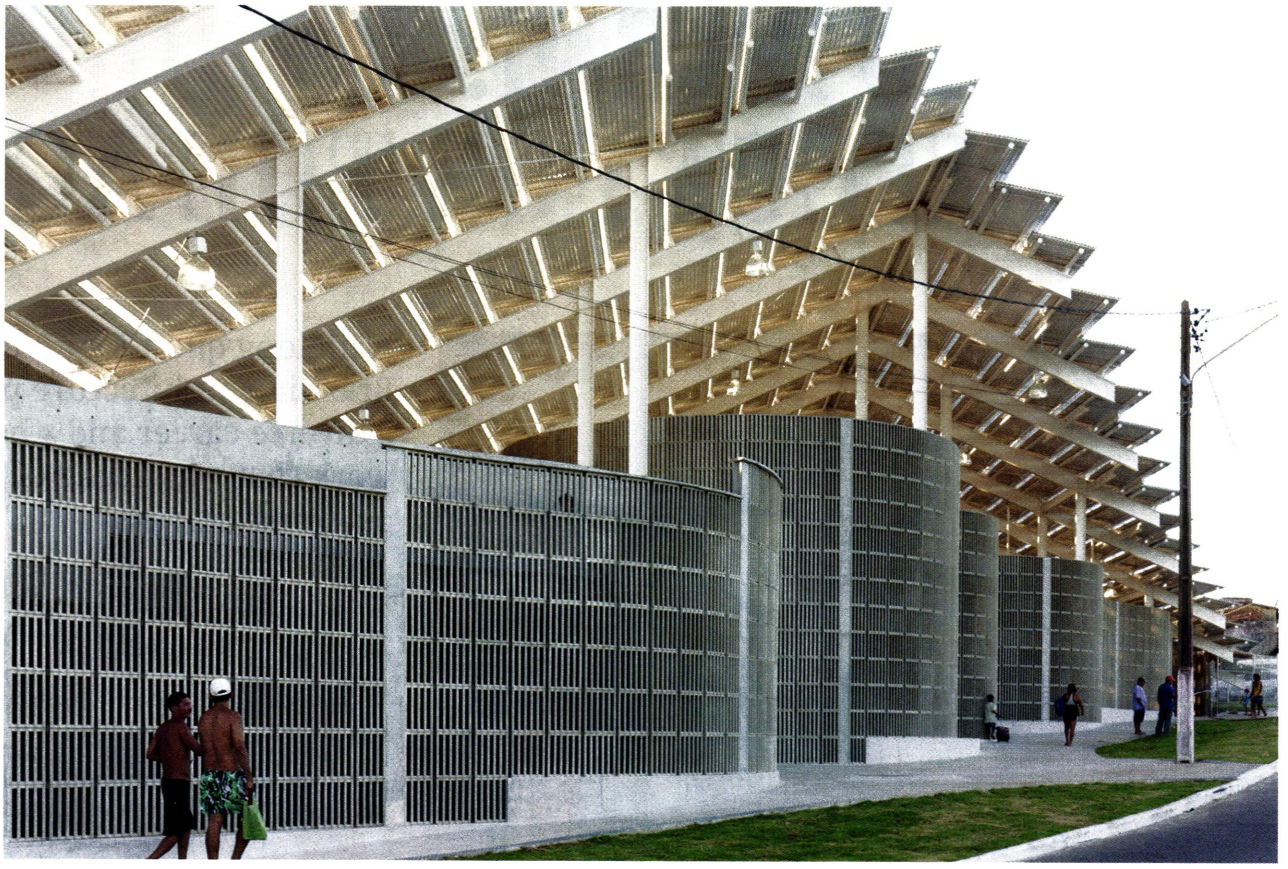
A pitched roof of corrugated aluminum panels hovers above a set of one-story cylindrical enclosures used as multipurpose spaces, a teacher's lounge, and changing rooms. The architect developed a special lightweight block with several vertical openings that allow people to see through some of the curved walls.

Inside, the arena's tiered concrete seating can accommodate up to 420 spectators to watch games of soccer, volleyball, and handball. A ramp takes visitors up to a second-floor terrace, which opens to views of the ocean.

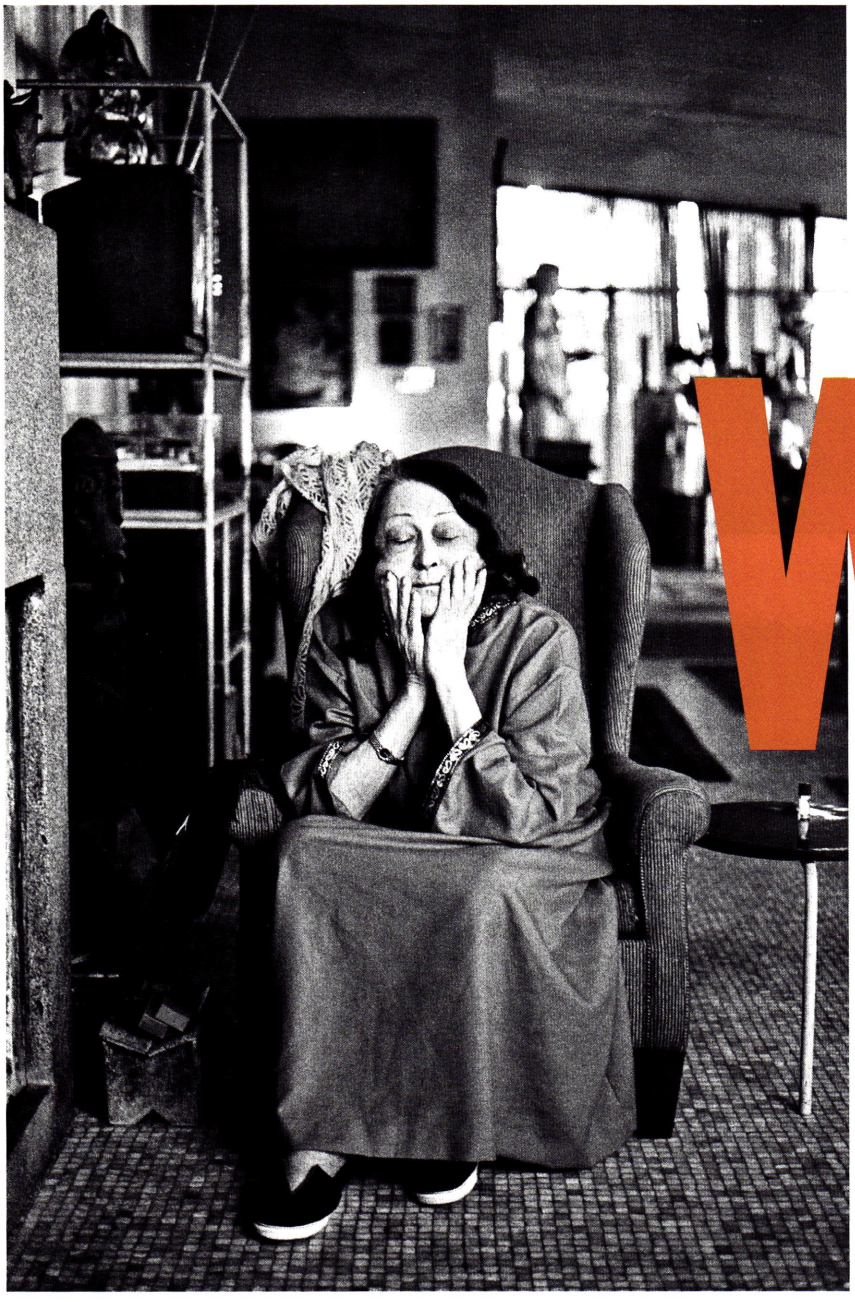
Viewed from afar, the structure floats with the lightness of a folded sheet of paper amid a dense patchwork quilt of orange tile roofs, and, at night, the gymnasium glows like a beacon.

Anna Fixsen

CONCRETE JUNGLE
Arena do Morro, a pro bono project by Herzog & de Meuron, occupies a wedge-shaped site between sand dunes and ocean in the Mãe Luiza favela in Natal, Brazil (opposite, bottom). Specially developed concrete block allows for permeable, see-through walls (left). Inside this gymnasium, integrated concrete seating that can accommodate up to 420 fans lines the perimeter of an indoor athletic field (above). A peaked roof of insulated corrugated aluminum spreads out above the entire structure. The panels overlap, letting in ocean breezes, but keeping rain out (opposite, top).



LINA BO BARDI: ARCHITECT FOR THE AGES



PRIVATE SANCTUARY
Lina Bo Bardi in the living room of her São Paulo home, Casa de Vidro, in 1991.

A lifelong quest for an inherently Brazilian architecture produced a diverse career and a body of work that was ahead of its time.

BY HATTIE HARTMAN

With the centenary of her birth this year, Italian-born Brazilian architect Lina Bo Bardi (1914–1992) is finally receiving the overdue international recognition she deserves. A European traveling exhibition, two new books in English, and the reissue of her 1951 Bowl Chair signal a growing swell of appreciation of Bo Bardi—or Lina, as she is affectionately known in Brazil—and a deeper understanding of her professional life. Her remarkable and versatile career included stints as an editor, graphic designer, scenographer, curator, educator, and—foremost—as an astonishing architect with a varied output. Her work drew on influences as diverse as industrial São Paulo's Eurocentric art milieu and Salvador's rich Portuguese colonial and African heritage in northeastern Brazil.

Along with the customary attention that accompanies a centenary, several events have converged to make a revisit of Bo Bardi's legacy timely and significant. The Brazilian economic boom in the first decade of this century has attracted international starchitects to Rio de Janeiro and São Paulo for the first time since Le Corbusier traveled to Rio to work on the Ministry of Education and Health building in 1936. This, coupled with Brazil's preparations for the World Cup to be played in 12 cities next month and the Olympic Games in 2016, has precipitated urban redevelopment and infrastructure investment and focused international interest on the rich legacy of Brazilian Modernism (and the country's emerging generation of architects) to a degree not seen since the inauguration of Brasília in 1960. Finally, the death of Oscar Niemeyer at the age of 104 in 2012 has permitted other strands of Brazilian architecture to emerge from his long shadow, which dominated the country's design culture for almost three generations.

ARTS AND LEISURE
In 1986, Bo Bardi transformed a 1920s-era steel-barrel factory into the SESC Pompeia Leisure Center in São Paulo (above, right). Art workshops there occupy former industrial sheds (above, left), while concrete towers house sports facilities and are connected by aerial walkways. The Museu de Arte de São Paulo (left), completed in 1968, comprises a 245-foot-long span above a public plaza along Avenida Paulista.

PHOTOGRAPHY: © NELSON KON (EXCEPT AS NOTED); JUAN ESTEVES (OPPOSITE)

DOMESTIC BLISS
Bo Bardi completed Casa de Vidro—the architect's first built work—for herself and her husband in 1952 (left). Located in São Paulo's Morumbi neighborhood, the house rests on 10 columns and surrounds a courtyard. Bo Bardi, who refused to furnish with sofas, designed a wood and canvas foldable chair in 1948 (below, right). The Italian manufacturer Arper reissued Bo Bardi's 1951 Bowl Chair (below, left) late last year.

Bo Bardi had a passion for Brazilian popular art and architecture, with its traditional materials, rough finishes, and embrace of nature.

Born Achillina Bo in Rome in 1914, the architect's formative years were spent near the nerve center of the political crosscurrents of Fascist Italy. Her education at the University of Rome combined a steeping in the city's ancient monuments with the rationalist principles that were taking hold in 1930s Italy. Drawn to Milan's more progressive and cosmopolitan architectural circles, Bo Bardi moved north in 1940 and spent the war years as an editor and graphic designer, working with Gio Ponti, among others. It was in Milan that she met Pietro Maria Bardi, an art dealer and journalist 14 years her senior. Soon, however, Bardi, confronted with the reality of Italy's postwar devastation and seeking to escape association with his Fascist alliances before the war, looked to South America as a new place to develop his artistic and curatorial activities. A 1943 exhibition at New York's Museum of Modern Art, *Brazil Builds*, had highlighted developments in Brazilian Modernism and brought the country to the Bardis' attention. The possibility of curating three art shows in Rio de Janeiro in 1946—including one in the recently completed Ministry of Education and Health building—was enough to entice the two Italians to plan an extended stay in Brazil. They married before departing.

Bo Bardi later wrote that arriving in Brazil, she had reached "an unimaginable country where everything was possible. I felt happy, and Brazil had no ruins." That did not mean that the place was devoid of its own political undertow. The government was already unofficially promoting the work of Lúcio Costa and Oscar Niemeyer as the architectural language of choice for the rapidly developing nation. Though

it took her some years to fully appreciate the implications of this architectural hegemony, Bo Bardi's subtle Modernism with hints of regional vernacular (developed to its full expression in later decades during her multiple sojourns in the city of Salvador) could not compete with the self-confident form-making of Niemeyer and his colleagues. This helps explain why her work has been so little appreciated outside of Brazil until recently.

Amongst Bo Bardi's 20 completed works, three São Paulo projects—separated by almost a decade from each other—stand out: the Casa de Vidro (1949–52), MASP (Museu de Arte de São Paulo, 1957–68), and the SESC Pompeia Leisure Center (1977–86). Designed for herself and her husband, Casa de Vidro was Bo Bardi's first built work, yet it revealed the seeds of her later hybrid design philosophy. Perched on 10 slender columns, a glazed volume contains the public part of the house and encloses a courtyard with a tree in its middle. Behind, a long masonry wing with timber shutters houses the bedroom and service areas and echoes the materials of Brazil's rural architecture. Subsequent stays in Salvador reinforced Bo Bardi's passion for Brazilian popular art and architecture, with their traditional materials, rough finishes, and embrace of nature.

GOOD NEIGHBOR Completed in 1958, the Valéria P. Cirell House in São Paulo (a short walk from Bo Bardi's own home) consists of two connected volumes surrounded by verandas. Inside, a tree trunk acts as a beam to support a mezzanine level, accessible by a spiral stair (right). A cylindrical guesthouse, La Torracia (below), was completed in 1964.

The architect's commission for MASP came through her husband's dealings in the São Paulo art world. Today, 50 years after its construction, the startling Brutalist building, whose suspended galleries span 245 feet over a public plaza on the city's busy Avenida Paulista, remains one of the city's few real civic spaces.

But the defining project of Bo Bardi's career was the SESC Pompeia Leisure Center where, with the support of an enlightened public-sector client, she was able to synthesize her humanitarian approach to design in a community facility at a neighborhood scale. The project involved the transformation of some 19 industrial sheds from an abandoned 1930s steel-barrel factory into a community center. For this, the architect designed two new concrete towers, which house sports facilities and form an urban landmark at the site's northeast perimeter. At SESC Pompeia, she challenged the austerity of the prevailing Brazilian Brutalism, softening it with lyrical window forms and handcrafted materials. Some of Bo Bardi's dedicated former associates who worked with her on SESC Pompeia continue to thrive in Brazil today, most notably Brasil Arquitetura and André Vainer Arquitetos.

For the reader who would like to dig further, Zeuler R. M.

PHOTOGRAPHY: © ZEULER R. LIMA (LEFT)

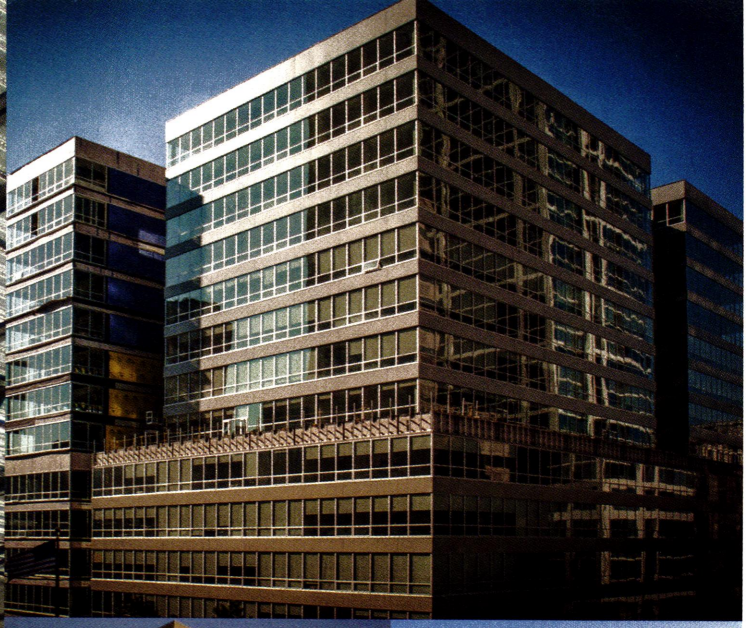
RENEWED VISION
In 1987, the city of Salvador commissioned Bo Bardi to revitalize a cluster of derelict buildings along a hillside. She maintained some of the existing structures and adapted them to create the Ladeira da Misericórdia Housing and Commercial Complex. The development included the Coati Restaurant (left), with its ribbed concrete motif. Bo Bardi completed another project, Cerrado Church, in the state of Minas Gerais, in 1982. Rather than design a single structure, the architect created three separate volumes to house a chapel, clergy house, and community hall (below).

de A. Lima's *Lina Bo Bardi* (Yale University Press, 2013) is an excellent reference. The culmination of 10 years of research, Lima's readable biography cum monograph skillfully elucidates Bo Bardi's life and career starting with her early years in Rome. Both the era of Brazilian optimism that formed the backdrop to MASP and the dark turmoil of the military dictatorship that lasted until 1985, during which Bo Bardi realized the dramatic and emblematic SESC Pompeia complex, are explored in depth. In addition, Catherine Veikos's *Lina Bo Bardi: The Theory of Architectural Practice* (Routledge, 2013) contains the first English translation of a 1957 seminal text by Bo Bardi.

The principles that drove Lina Bo Bardi's passions remain just as pertinent today as they were at the peak of her career over three decades ago: an architecture that favors humanism over iconic form, a desire to breathe new life into historic buildings, a fascination with local materials and craft, and a profound commitment to the belief in the architect as an agent of social change. Noemi Blager, curator of the exhibition *Lina Bo Bardi: Together* (due to tour the U.S. in 2015), cites the architect's attitude as her greatest legacy. She was ahead of her time, promoting cultural sustainability in the broadest sense. In the face of increasingly globalized architectural idioms, Bo Bardi's lifelong quest for an intrinsically Brazilian architecture remains ever more critical as the country's cities rush to transform themselves for their turn on the world stage. ■

Hattie Hartman is an editor at The Architects' Journal, *London.*

PHOTOGRAPHY: © ZEULER R. M. DE A. LIMA (BOTTOM)



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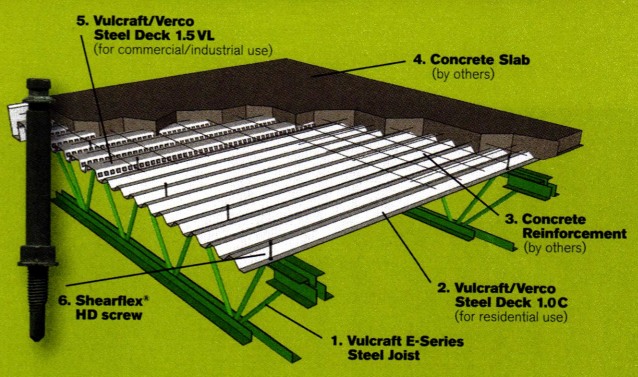

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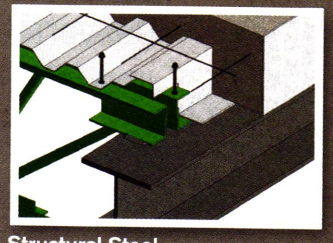

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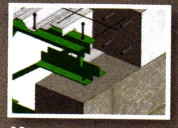
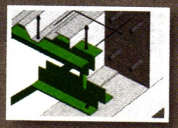
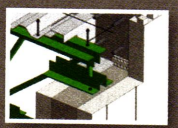


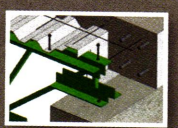
Masonry



Light Gauge Steel Stud



Insulated Concrete Forms (ICF)



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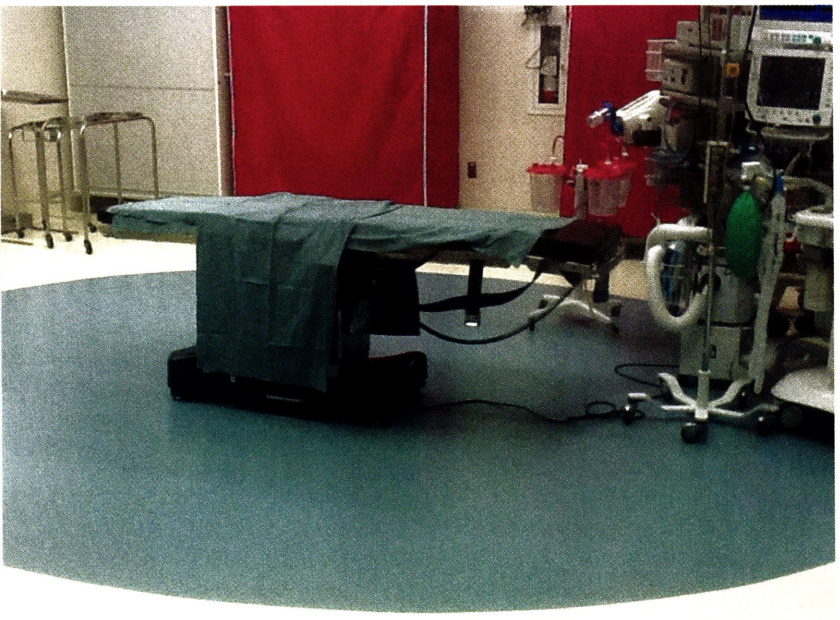

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1) Loew's Hotel, Santa Monica, CA; 2) New VGP tray-based green wall; 3) Private Residence, Palo Alto, CA; 4) Pirch, Costa Mesa, CA; 5) Juniper Networks, Sunnyvale, CA; 6) VGM Media Block; 7) Villa Marina Marketplace, Marina del Rey, CA.

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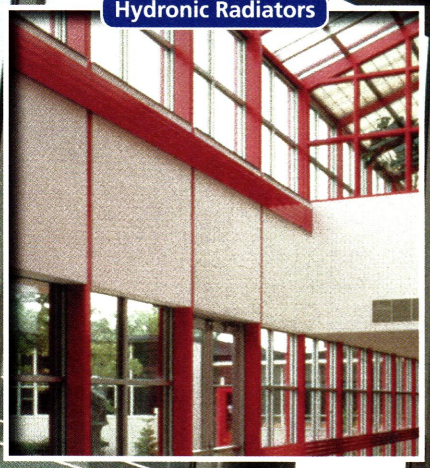

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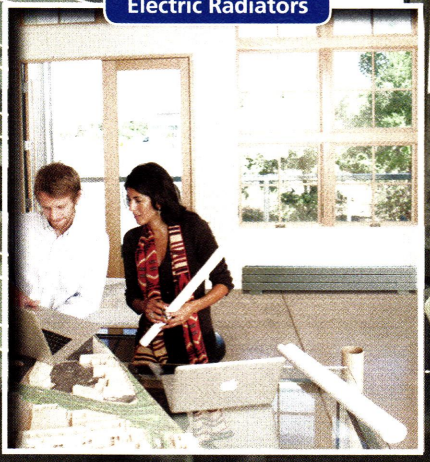

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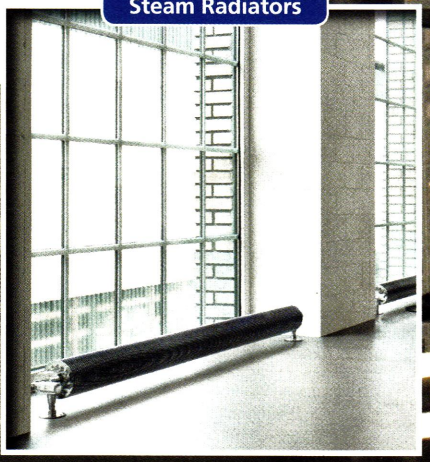

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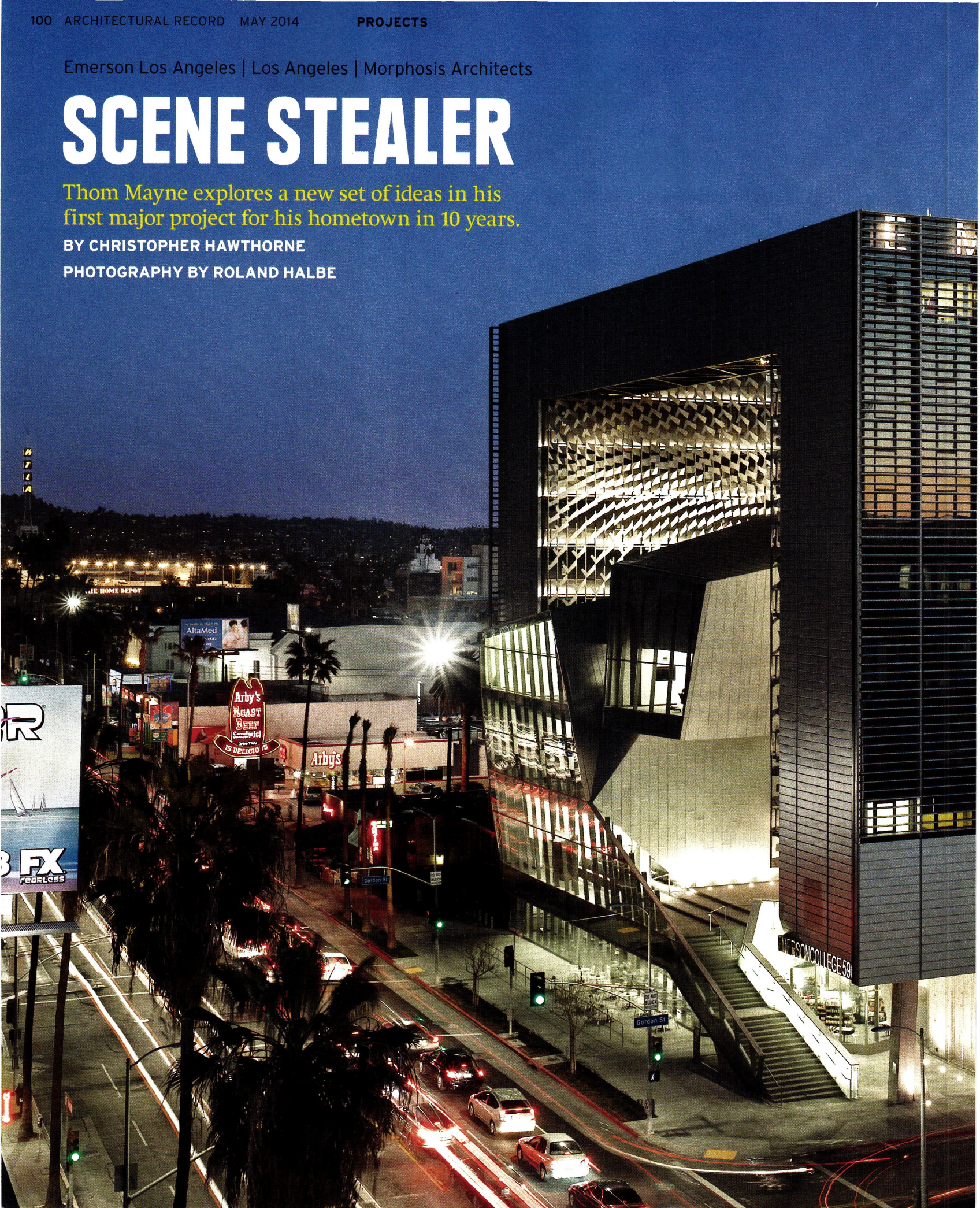
SCENE STEALER

Thom Mayne explores a new set of ideas in his first major project for his hometown in 10 years.

BY CHRISTOPHER HAWTHORNE

PHOTOGRAPHY BY ROLAND HALBE



STREET SMARTS The east and west facades of the dorm towers feature high-performance glass in a curtain wall behind a motorized sunscreen. The project is aiming for LEED Gold.

It has been a full decade since Thom Mayne made a major mark on his home city of Los Angeles. After the architect's Caltrans District 7 Headquarters opened in downtown L.A. in 2004—a looming, relentlessly gray battleship that helped Mayne win the Pritzker Prize the following year—he pursued prominent commissions around the country and the world, including an academic building in New York for Cooper Union (RECORD, November 2009, page 96), the Perot Museum of Nature and Science in Dallas (RECORD, January 2013, page 78) and the Phare Tower on the edge of Paris, which remains unbuilt.

The local work didn't go away entirely: Mayne helped design new Culver City offices for Morphosis, which he cofounded in 1972; for Caltech in Pasadena, there was a 2009 astronomy building that was, by the firm's standards, rather accommodating, its pinkish-red cement-board panels echoing the red-tile roofs and terra-cotta ornament of nearby campus landmarks. But as other Southern California projects were felled by the recession, Mayne himself began spending significant time in New York.

Now Morphosis is back with a big, brash addition to Sunset Boulevard, a site in the heart of Los Angeles, in a low-rise and rather anonymous landscape near the 101 freeway but offering dramatic views of the Hollywood Hills. Known as Emerson Los Angeles, or ELA, the building is a new Southern California home for 134-year-old Emerson College, the Boston school specializing in arts and communication that has long had an active internship program in Hollywood and counts a number of movie-business executives among its alumni. With a hybrid steel frame and concrete structure, the 107,000-square-foot building contains dormitories for as many 217 Emerson students (about 130 are now in attendance) as well as classrooms and production studios.

The common thread connecting Mayne's work in recent decades has been an interest in formal and metaphorical collision, in using buildings for academic as well as government clients to suggest tensions and fissures in contemporary society. "I'm interested in conflict and confrontation," Mayne told me in 2005, a couple of days after learning he'd won the Pritzker.

In certain lapel-grabbing ways the ELA building is a clear expression of that sensibility. The dorms are stacked in a pair of slender ten-story towers on the eastern and western edges of the site. Between them is a snaking, virtuosic pile

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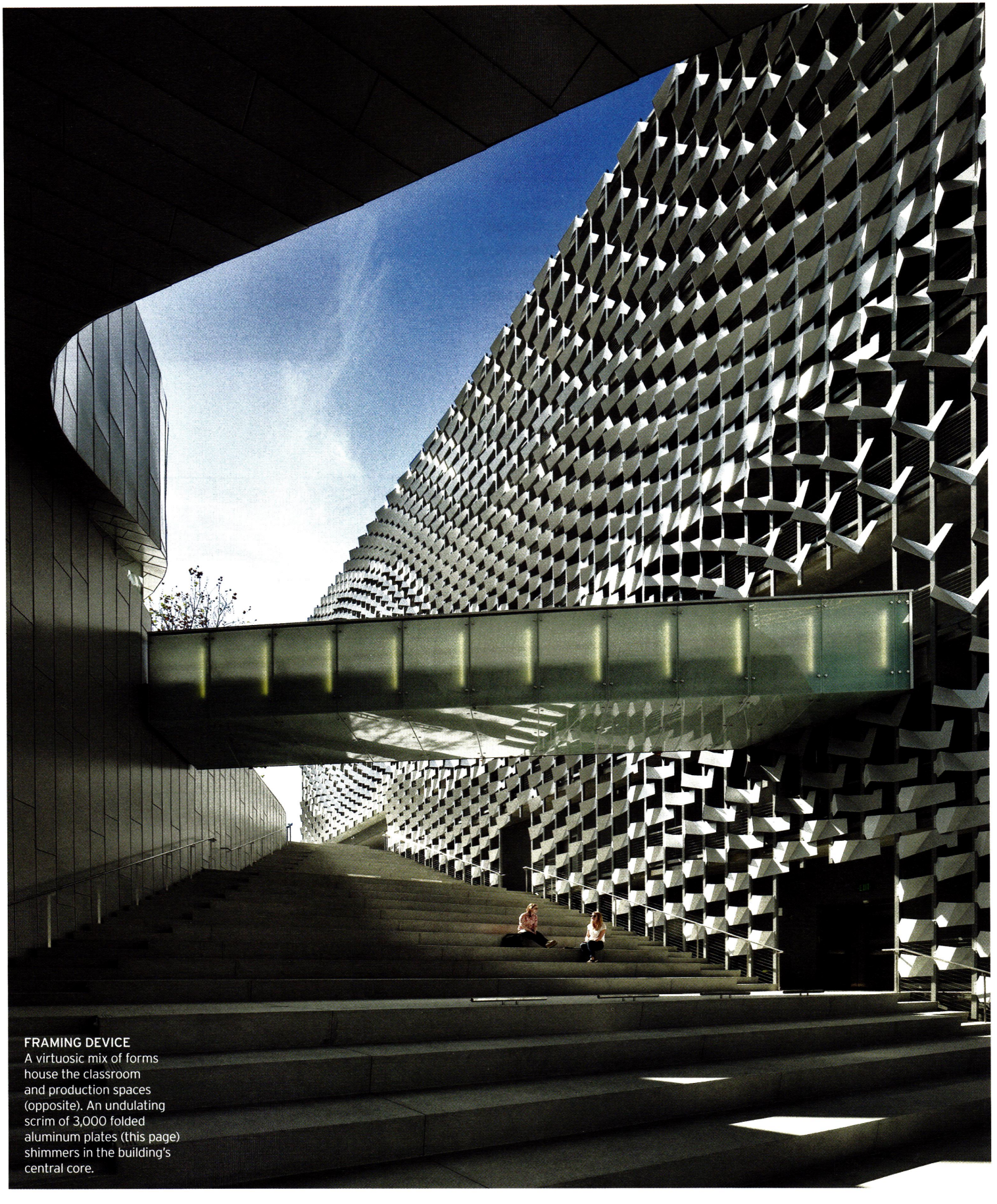
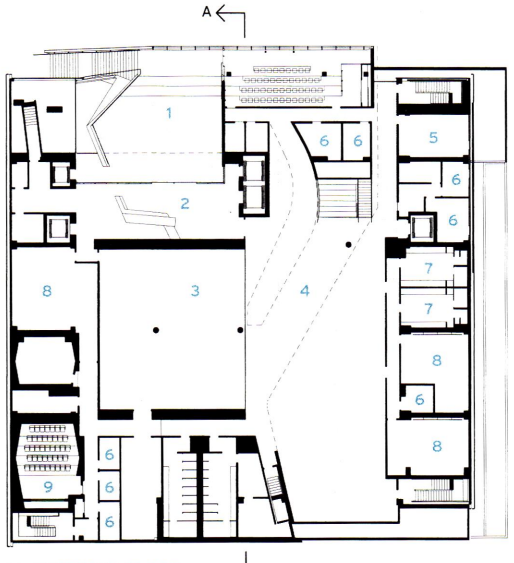
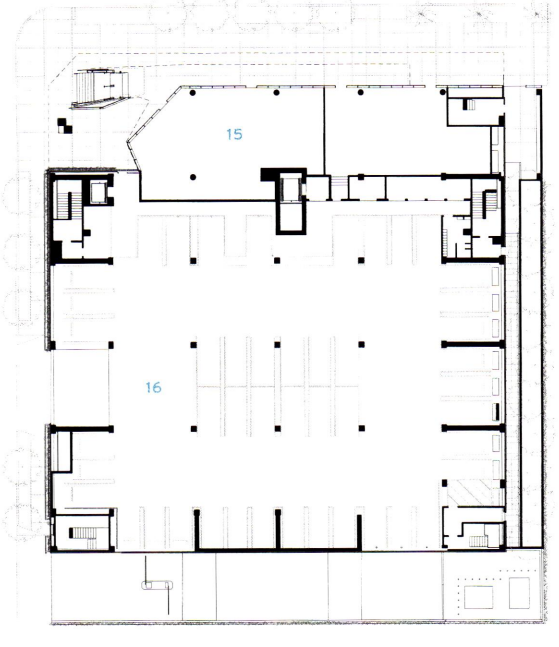


FRAMING DEVICE
A virtuosic mix of forms house the classroom and production spaces (opposite). An undulating scrim of 3,000 folded aluminum plates (this page) shimmers in the building's central core.

THIRD FLOOR



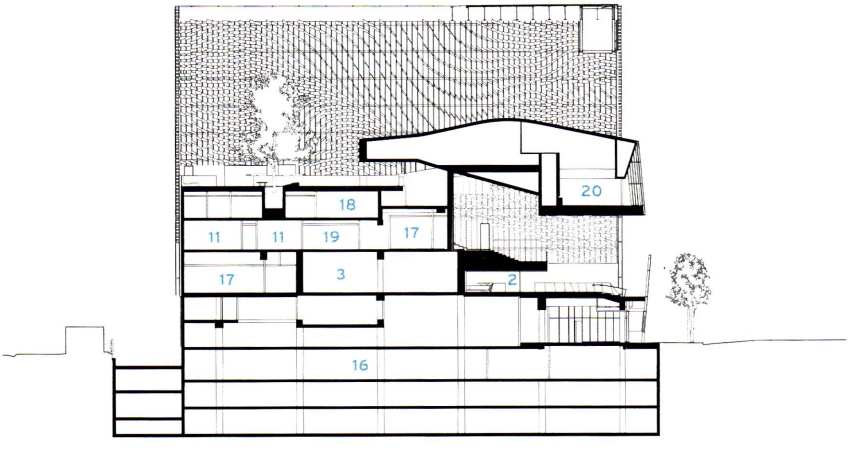
MAIN/SECOND FLOOR A



GROUND FLOOR

0 50 FT. 15 M.

1 ENTRY TERRACE
2 LOBBY
3 MULTIPURPOSE ASSEMBLY
4 TERRACE
5 VISITOR CENTER
6 OFFICE
7 DRESSING
8 STUDIO
9 SCREENING
10 DORMS
11 CLASSROOM
12 COMPUTER LAB
13 CONTROL ROOM
14 EDITING LAB
15 CAFÉ
16 PARKING
17 BATH
18 FITNESS
19 HALL
20 CONFERENCE



SECTION A - A

0 50 FT. 15 M.

credits

ARCHITECT: Morphosis Architects – Thom Mayne, design director; Kim Groves, project principal and manager; Chandler Ahrens, lead project designer; Aaron Ragan, project architect; Shanna Yates, project designer

ENGINEERS: John A. Martin & Associates (structural); Buro Happold (m/e/p); KPFF (civil)

CONSULTANTS: Katherine Spitz Associates (landscape); Horton Lees Brogden Lighting Design (lighting); Newson Brown Acoustics (acoustical)

CLIENT: Emerson College

SIZE: 120,000 square feet

COST: $85 million

COMPLETION DATE: January 2014

SOURCES

STRUCTURAL SYSTEM: CMC Steel Products

METAL PANELS: Zahner

METAL/GLASS CURTAIN WALL: Walters & Wolf; Construction Specialties

GLASS WALL SYSTEMS: Viracon

GLASS DOORS AND GUARDRAILS: Oldcastle BuildingEnvelope

SHADES: MechoSystems

FURNISHINGS: Vitra

of classroom and studio space that spills forward toward Sunset and points directly at the Hollywood sign to the north. Connecting the towers along the top of the building is a horizontal bar that holds a helipad and lighting equipment and serves to complete a giant frame wrapping around the mannered forms of the classroom and studio wing.

Behind and above the classrooms, facing south and tucked away from the street, is a wide terrace. Along the street is a café; a stair leads from the sidewalk to a glassed-in lobby on the second floor. Some familiar Morphosis tics are in evidence, most notably a frenzy of action on the exterior of the building at the expense of pinched and rather forgettable interior spaces. While the terrace is both full of architectural drama and a sunny, pleasant place to be, the small, spartan concrete dorm rooms are neither.

But the project also signals a long-awaited change of focus in the firm's work. After nearly a decade of producing a steady series of twisted, striated, and otherwise deformed boxes with dramatic stairs inside—Cooper Union, the Perot Museum, and the Caltech building all belong to this lineage—Mayne has begun exploring a fresh batch of ideas. The tortured box is gone, and in its place, thanks to the dramatic divide between the dormitory towers and the classroom spaces, is a compelling study of the gap between rational and irrational forms and, by extension, between left- and right-brain thinking.

The gesture that makes this exploration possible is the long bar across the top of the building. It turns a pair of vertical elements—the dormitory towers—into a frame, and the building into a giant arch. That arch recalls, most obviously, the Grande Arche office building in La Defense, the commercial district on the outskirts of Paris, a building by Johan Otto von Spreckelsen and Paul Andreu that Mayne has surely come to know well while working on the Phare Tower.

The boxy shape of the building's perimeter also connects the Emerson design to the history of Hollywood studio architecture. Studio stage sets have a similar contrast between pragmatic exterior architecture and wildly unorthodox created worlds. The building itself, with its shimmering fixed sunshade overlooking the central terrace, is meant to operate as a kind of stage set, or least charismatic backdrop, for the student filmmakers themselves. Once the students are done shooting, they can edit their work in sophisticated post-production facilities and show it to classmates and professors in a digital screening room.

On the whole, the design is decidedly self-conscious—a building that aims at monumentality by framing itself—but full of architectural power nonetheless. Taking on a site in the rather anonymous and lightly trafficked outskirts of Hollywood proper, Mayne and Morphosis didn't despair at the lack of architectural context and urban energy in the immediate vicinity. They simply decided to manufacture some context of their own—to produce not just an advertising campaign for Emerson's L.A. presence and their own return to the city but a kind of architectural billboard on which to show off that campaign to memorable and photogenic effect. ■

THAT'S ENTERTAINMENT
The cantilevered form in the central core of the building contains a conference room (below, left). The main lobby and reception area (below, right) are accessible from the second-floor outdoor terrace.

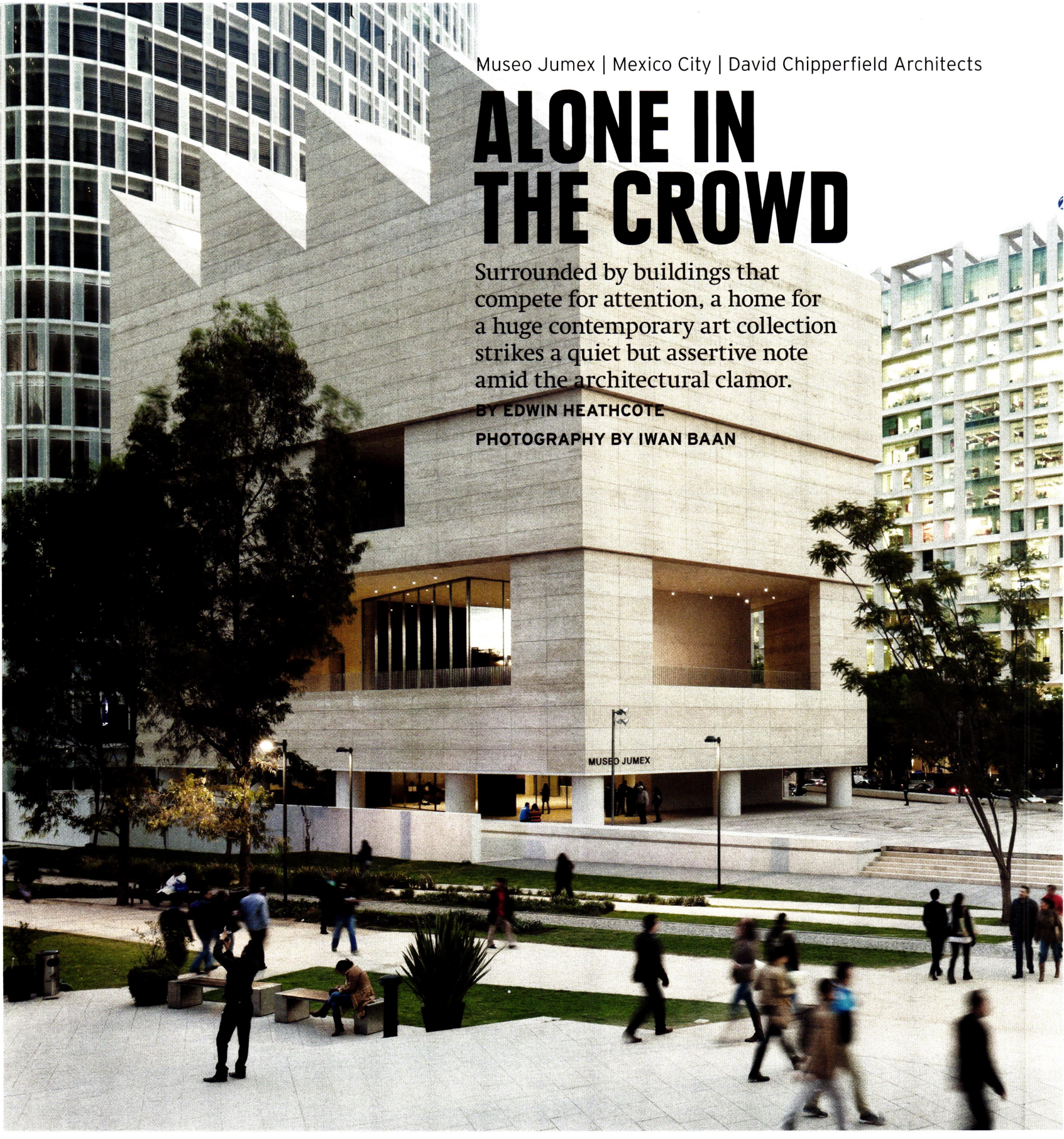
Museo Jumex | Mexico City | David Chipperfield Architects

ALONE IN THE CROWD

Surrounded by buildings that compete for attention, a home for a huge contemporary art collection strikes a quiet but assertive note amid the architectural clamor.

BY EDWIN HEATHCOTE

PHOTOGRAPHY BY IWAN BAAN



OPEN INVITATION
The travertine-clad Museo Jumex stands on a public plaza (opposite) that connects it to pedestrian traffic among a cluster of new buildings adjacent to Polanco, a tony district near the center of Mexico City. A second-floor terrace (left) provides views of the surrounding cityscape, including the looming Museo Soumaya, by Fernando Romero, that anchors the development.

The first exhibition space for the Colección Jumex—the private art collection of the company behind the ubiquitous Mexican juice brand—sat in the middle of the company's manufacturing facility on the northern outskirts of Mexico City. It was a curious location for a museum—not a converted industrial space, as with so many contemporary art venues, but a minimalist insertion into a working, and thus high-security, factory. But the Colección's new David Chipperfield–designed building, which opened last fall, couldn't be farther from the slum-surrounded factory setting.

Far more accessible than its predecessor, the new Museo Jumex, a marble-clad box capped with a jagged crown, sits in a still-emerging development at the edge of Polanco, a fashionable quarter near the heart of Mexico City. The new museum's neighborhood is a kind of architectural zoo, with the most exotic creature, the Museo Soumaya, at its center: designed by Fernando Romero, of the firm FR-EE, and containing the art collection of his father-in-law, magnate Carlos Slim, it is the ultimate self-conscious sculptural icon, with a cresting wave of reflective metal scales—the opposite of Chipperfield's restrained, Modernist-influenced body of work. Among other nearby attractions are a folded, angular black-steel-framed theater canopy designed by Madrid-based Ensamble Studio, a tower (also by Romero) with an elliptical plan, and a big-box mall.

The 43,000-square-foot museum is not small, yet it struggles to compete with the monsters surrounding it. In an effort to maintain a presence on a hemmed-in site, Chipperfield built up, stacking five stories above four levels of subterranean parking. A raised plaza leads into the entry, concealing a bookstore and administrative facilities below, while the levels above contain gallery and event space. Chipperfield also built solid—the heavily reinforced concrete structure is designed to exceed seismic standards in earthquake-prone Mexico City, while a steel frame forms the building's distinc-

tive sawtooth roofline. The walls, clad in Mexican travertine, do their best to resist the architectural cacophony outside and to evoke something as tough as a castle keep. "When you're building in a context like this," says Chipperfield, "you want the buildings to work together, to lean against each other, and to interweave. But you also need to ask, 'How can this particular building assert its place in the city?'"

The museum houses what is reputed to be one of the largest private collections of contemporary art in Latin America—overseen by Jumex scion Eugenio López Alonso—but it is open to the public, and one of the ways in which it stakes a claim in the neighborhood is by advertising its accessibility. "The challenge was how to make this building, which is quasi-public, more civic," says Chipperfield. "What made it easier was the unusual climate of this city."

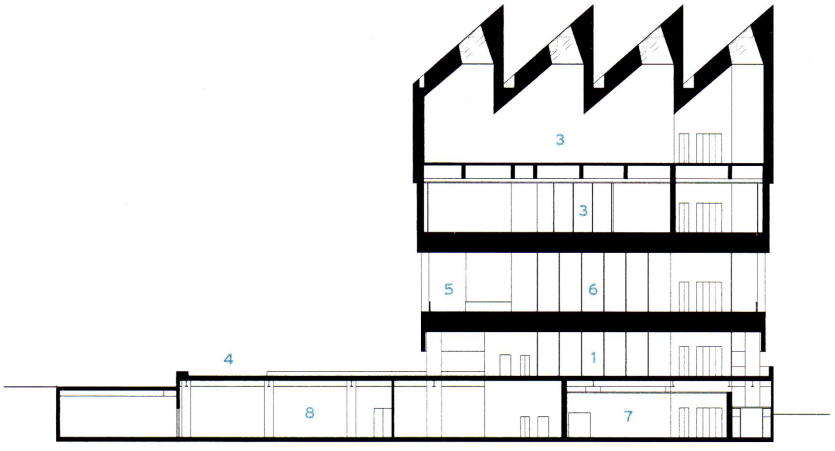
Huge pivoting timber doors set in glass walls comprise the building's main entrance and open the lobby to the outdoors to such an extent that it ceases to feel like a lobby at all. The first floor is really an extension of the plaza on which the building sits. "We wanted to enjoy the climate and play with the notion of the threshold," says Chipperfield.

The second floor is equally open, effectively a glass box set within the travertine carapace of the elevations. Its broad terraces look out to the city, but the interior is pure Mies. From the richly figured marble to the slender mullions, the Barcelona Pavilion echoes around the space, as it does throughout the project.

On the top floor, the building comes most fully to life. Here, under 30-foot-high ceilings, the museum's exaggerated

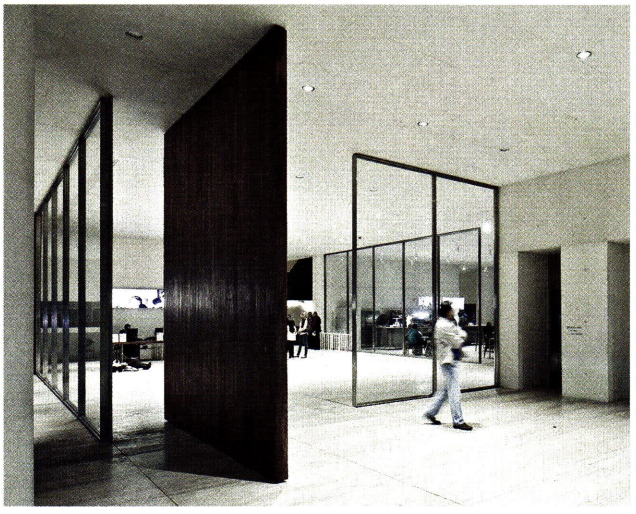
roofline lends its character to the interior. UV-filtering skylights on the west-facing pitched side of each ridge bring in daylight, while sheets of translucent plexiglass inside each spike disperse it into the exhibition space as an even glow. The dips in the roof profile dig deep into temporary partitions inside the gallery, so that the character of the ceiling is expressed in the volume of the space. With this move and others, Chipperfield attempted to strike a balance between a building that serves the art and one that has sculptural drama in its own right. "We had the classic museum problem," says the architect: "we wanted static galleries in which to look at work, but we also wanted spaces that could be more expressive."

DRAMATIC ARRIVAL A stair defined by a ribbon of black steel (above) spirals up through the museum. It culminates at a daylit top-floor gallery (opposite), where the museum's distinctive sawtooth roofline digs deep into the interior before rising to its highest point, 30 feet above the floor. Translucent plexiglass panels striped with white louvers even out the light admitted by skylights in each ridge.

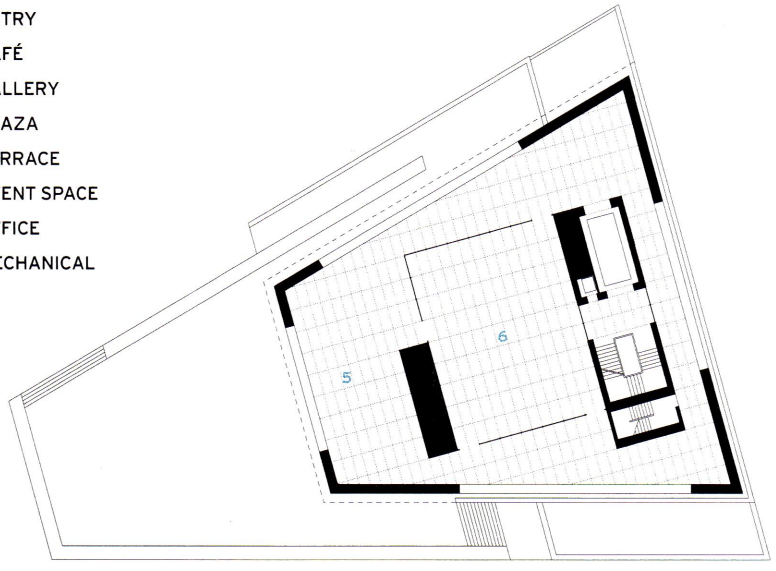


SECTION A - A

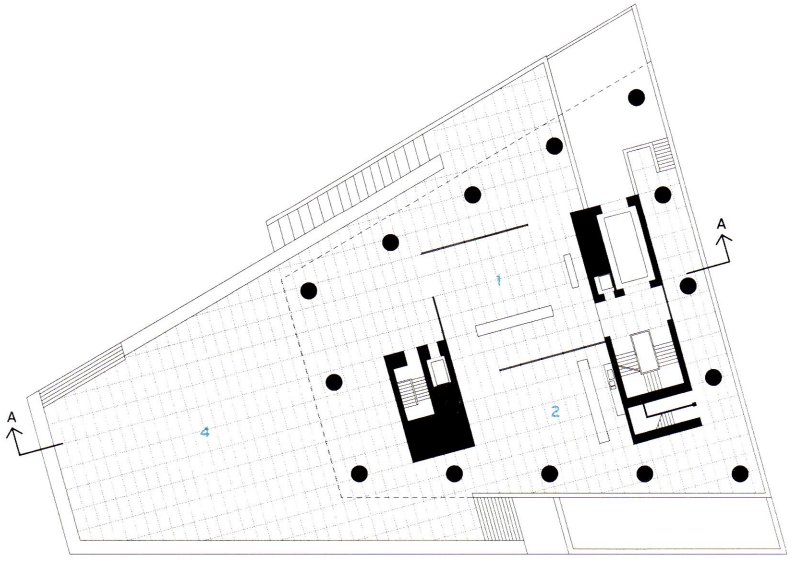
0 30 FT.
10 M.



1 ENTRY
2 CAFÉ
3 GALLERY
4 PLAZA
5 TERRACE
6 EVENT SPACE
7 OFFICE
8 MECHANICAL



SECOND FLOOR



GROUND FLOOR

0 30 FT.
10 M.

Chipperfield has succeeded in creating a building that addresses both concerns. A black-steel-clad stair connecting each floor deposits visitors in surprising settings—from the lobby to the terraces, each level is distinct from the last—while the culmination in the daylight-filled top-floor gallery is a sheer delight. The architect has made his name with museums, including the celebrated Neues Museum in Berlin and the exquisite St. Louis Art Museum expansion, working within extraordinarily diverse geographical and political contexts. This new neighborhood—unpredictable and over-scaled—is among the least hospitable, yet the Museo Jumex is robust enough to resist it and beautiful enough to keep drawing people in. ■

Edwin Heathcote is an architect and the architecture and design critic for the Financial Times. *His most recent book,* The Meaning of Home, *was published in 2012.*

credits

ARCHITECT: David Chipperfield Architects – David Chipperfield, principal; Andrew Phillips, director; Peter Jurschitzka, project architect; Jonathan Cohen, Robert Trent Davies, Johannes Feder, Christian Felgendreher, Sara Hengsbach, Alessandro Milani, Diana Su, project team

ASSOCIATE ARCHITECT: TAAU/Oscar Rodriguez – Cocoy Arenas, Alejandro Castañeda, Rubén Ocampo, Alejandro Rojas, Rafael Sevilla, project team

ENGINEERS: Arup/Alonso y Asociados (structural); Arup/Iacsa (services); Asociados A (electrical)

CONSULTANTS: Soluciones en Piedra Franco (facade); Arup (lighting); John Morgan Studio (graphics)

GENERAL CONTRACTOR: PC Constructores

CLIENT: Eugenio López Alonso

SIZE: 43,000 square feet

CONSTRUCTION COST: withheld

COMPLETION DATE: November 2013

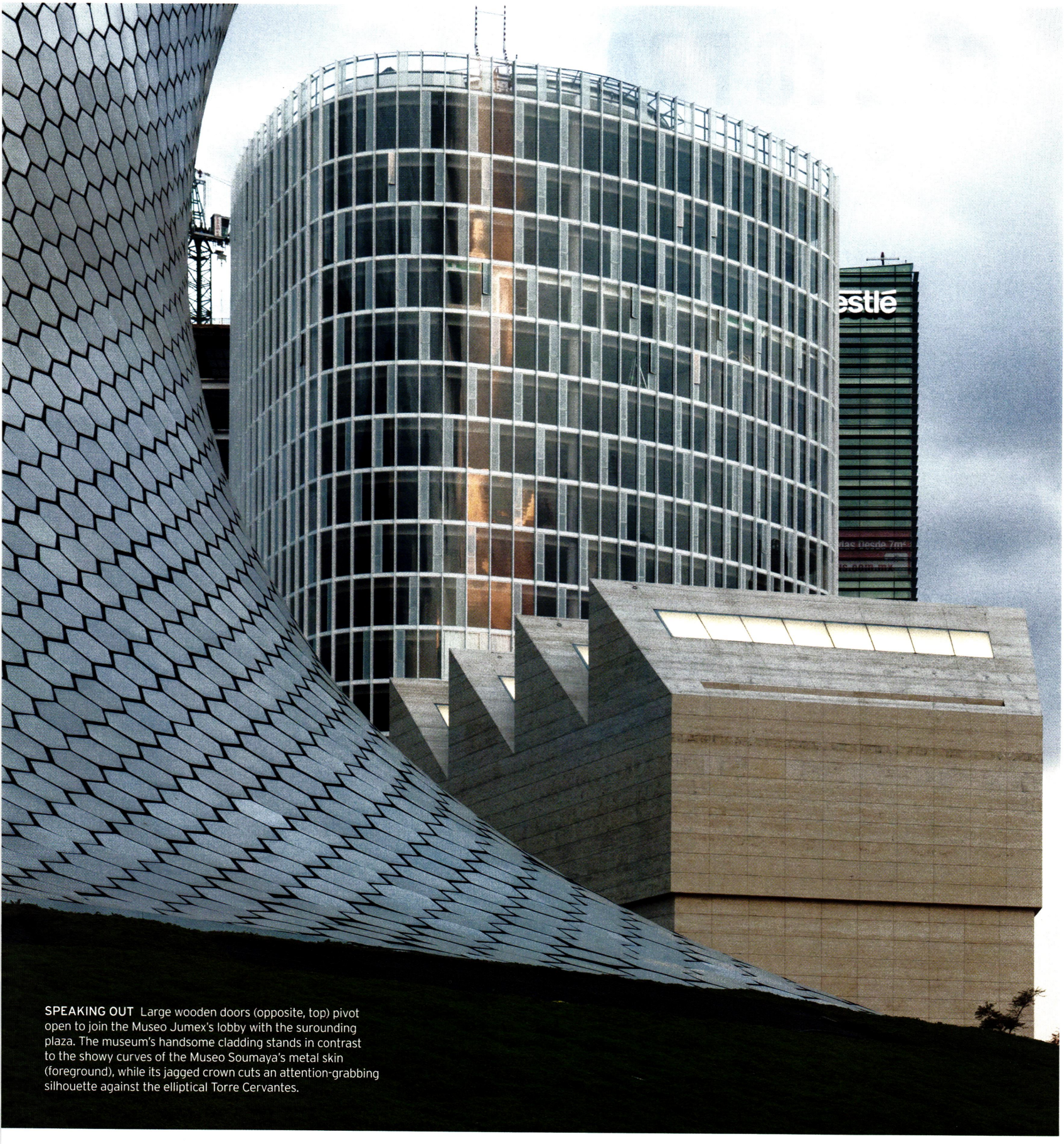
SOURCES

FACADE PANEL ANCHOR SYSTEM: Fischer

OFFICE FURNITURE: Vitra

LIGHTING: Zumtobel

ELEVATOR: Kone



SPEAKING OUT Large wooden doors (opposite, top) pivot open to join the Museo Jumex's lobby with the surounding plaza. The museum's handsome cladding stands in contrast to the showy curves of the Museo Soumaya's metal skin (foreground), while its jagged crown cuts an attention-grabbing silhouette against the elliptical Torre Cervantes.

Sancaklar Mosque | Istanbul | Emre Arolat Architects

CALL TO PRAYER

Using rugged materials and a modern design vocabulary, an architect creates a place of worship that connects the essence of Islam with contemporary life.

BY CLIFFORD A. PEARSON

PHOTOGRAPHY BY THOMAS MAYER

SPIRITUAL RETREAT Stone steps in a hillside lead to a courtyard with a library pavilion facing the entrance to the mosque. An old olive tree adds a sense of time to the landscape.

In most of the Muslim world, the dome and minaret signify the mosque, acting as symbols that transcend linguistic and cultural barriers. In Istanbul, with its haunting skyline of historic domes and towers, the association between these traditional forms and religion is especially strong. So Emre Arolat's design strategy for the Sancaklar Mosque on the outskirts of the city challenged long-held assumptions and popular images. "We wanted to get rid of the form," says Arolat, the 50-year-old Istanbul-based architect who set up his own firm with Gonca Paşolar in 2004, after working in his parents' practice since 1987. His parents—Neşet and Şaziment—have since joined Emre Arolat Architects (EAA), keeping the business a family affair.

For this, the firm's first mosque, Arolat, a nonobservant Muslim, relied on primary elements—strong materials like stone and concrete, contrasts of shadow and light, and an integration of building and site. The result is a simple but powerful place with a calm heart that encourages contemplation and prayer. At a time when conservative factions in Turkey are favoring buildings that look back to Ottoman sources, Arolat's affirmation of Modernism as a basis for contemporary Turkish architecture makes an important statement.

Though not known for religious buildings, Arolat had designed two housing projects in Izmir for the Sancaklar family, the developers whose nonprofit foundation commissioned the mosque. Set adjacent to new gated communities and overlooking Çekmece Lake, in a suburban area 15 miles west of Istanbul's historic core, the project straddles the boundary between the man-made and the natural. Across the road sit neo-Mediterranean houses and a shopping mall one might find in southern California. In the other direction, open fields slope down to the lake. Dealing with this awkward edge condition drove much of the design process.

"We realized that if we adjusted the topography just a little, we could make the building a part of the land," says Arolat. So he and his team inserted the 13,000-square-foot mosque in the side of the hill and erected a series of free-standing stone walls to buffer it from the adjacent road and parking lot. Leaving their cars, worshippers walk through one of two openings in a 4-foot-high, slate-clad wall and into a courtyard on the upper portion of the property. A canvas covering can be pulled along a steel pergola here to create a shaded space for funerals. The courtyard—partially paved with the same gray *kayrak* slate as the walls, though given a smooth finish—extends out to the lake, acting as an open terrace from which to enjoy the view.

From the street and the courtyard, the only enclosed structure visible is a rectangular minaret—also made of *kayrak* stone. To find the mosque proper, you need to walk down slate steps embedded in the grassy hillside, then go along a lower courtyard lined in the back with cascading water terraces flowing into a long reflecting pool. The sound of moving water helps block out any noise from the street, enveloping the outdoor space in a calming aural blanket.

On the north side of the courtyard, a long pavilion that serves as a library and meeting space seems to float above the reflecting pool. On the south, the mosque itself beckons quietly to worshippers—a poured-concrete slab roof emerging from the hillside to form a welcoming canopy and, at one end, a steeply raked curving stone wall, bulging mysteriously and looking a bit out of place. Women enter the prayer hall through a portal announced by a pair of concrete walls projecting out to the courtyard, while men walk along an outdoor corridor defined by a freestanding stone wall underneath the mosque's gently sloped concrete canopy. Almost hidden and utterly simple, the main entry expresses a humility that goes to the core of the project.

Instead of looking to the soaring spaces and elaborate geometric ornamentation of Ottoman-era mosques, Arolat found inspiration in the Cave of Hira, in present-day Saudi Arabia, where the Prophet Muhammad received the first revelations of the Quran. "We wanted to get away from any sense of spectacle, and reach the essence of the ritual of prayer," says the architect. The prayer hall is a long 700-square-foot open space with plain gray carpeting; one of its main walls is surfaced with the ever-present slate, and the other is made of poured concrete. These facing walls slope almost imperceptibly in the same direction, adding a subtle motion that echoes angled bodies bowing in devotion. At one of the short ends of the hall, a perforated metal screen separates women from men, while at the other, a glass wall painted black on the back reflects the image of the space and the worshippers in it. A piece of modern calligraphy by Mehmed Özçay glows from the black wall, its bold letters

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done in clear glass and lit from behind.

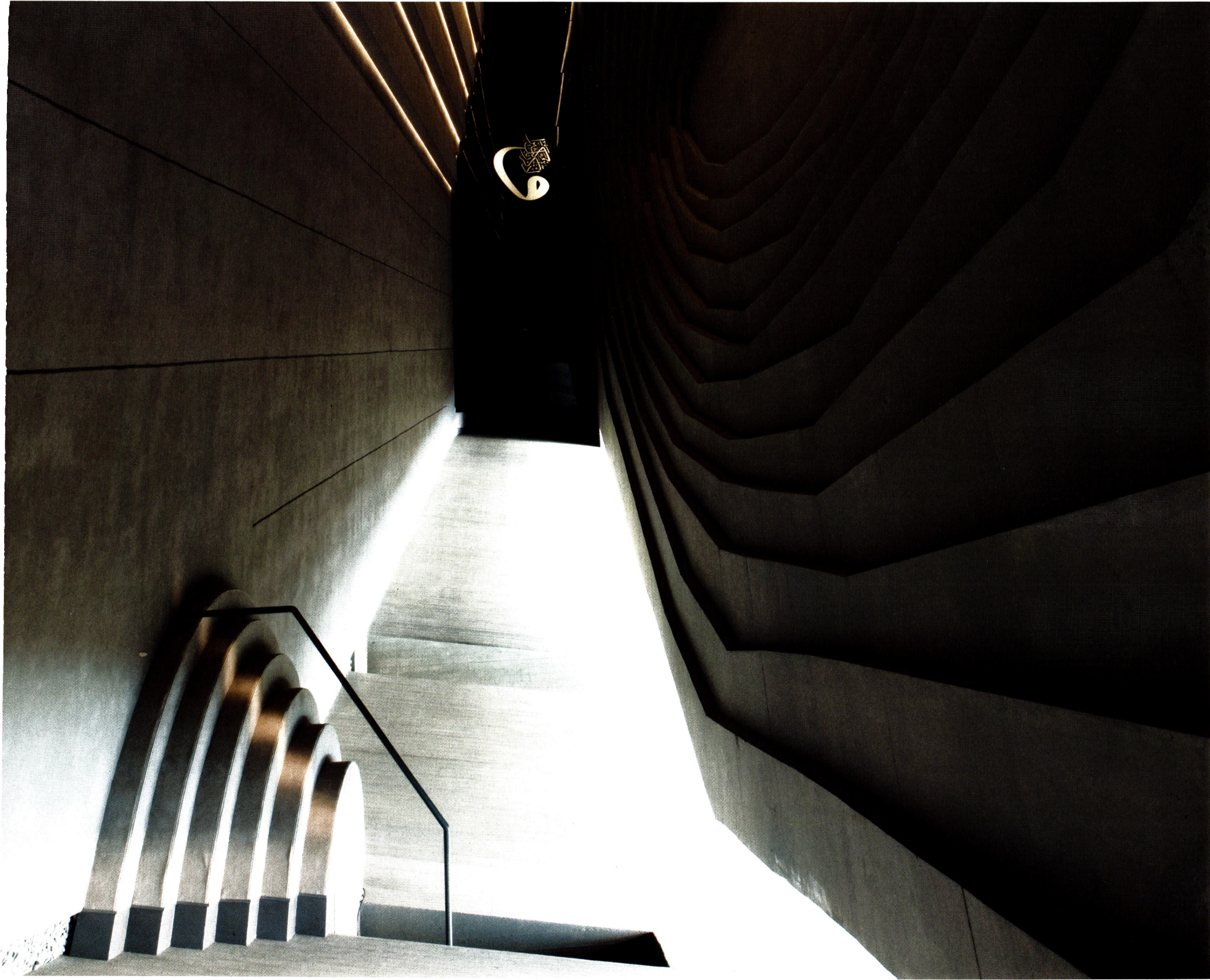
Swirling above the sanctuary, a vortex of stepped concrete layers forms the ceiling. Shaped like contour lines on a topographic map, the ceiling recalls both a cave and a shallow dome, but in an abstract way. To erect the complex ceiling, the contractor used hundreds of CNC-milled wood forms for the poured concrete and attached it to the rest of the building's concrete frame with a set of beams running above the prayer hall.

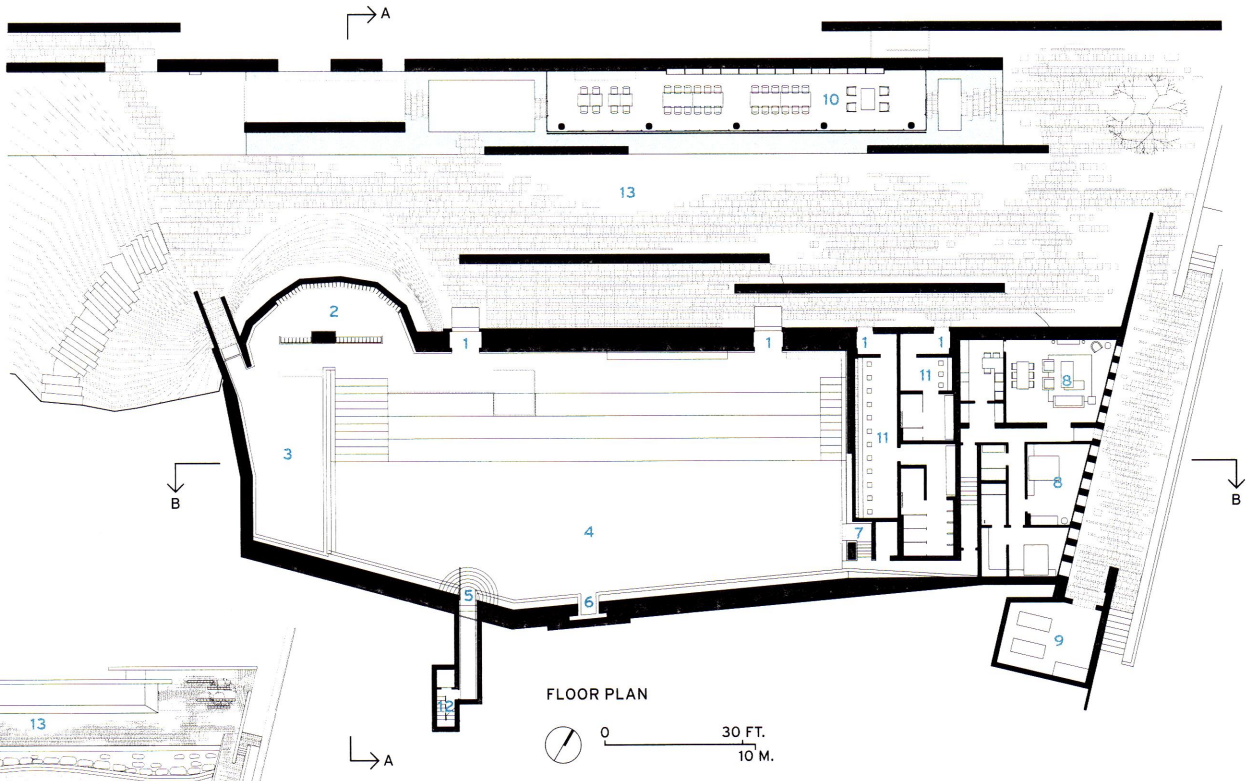
Eschewing decoration other than the roughly textured slate and the smooth concrete imprinted with the grain of its wood formwork, the architects at EAA used daylight to add drama to the interiors. The boldest example of this is the narrow skylight running above and illuminating the prayer hall's south wall, or *qiblah*, which faces Mecca. The concrete beams supporting the sanctuary ceiling run below this skylight, separating the flow of light into shafts at certain times of the day.

At most mosques, worshippers leave their shoes at the entrance. But here, Arolat got the footwear out of sight by tucking shoe shelves behind the curving stone wall that bulges out toward the lower courtyard. It may be a small move, but it's indicative of a larger effort to use minimalism to shape a contemplative place. Ali Elmaci, the imam of the mosque, appreciates the architect's effort to hone the building to its essentials. "There are no distractions to the worshippers," says the imam. "You have a closer, more peaceful relationship with the Creator." ■

EARTHBOUND
From the parking lot, only the minaret and a few stone walls are visible (above). Clad in a local slate and pushed against a hillside, the mosque seems to emerge from the earth almost as a natural formation. The board-formed concrete roof serves as a canopy over the women's entrance (right).

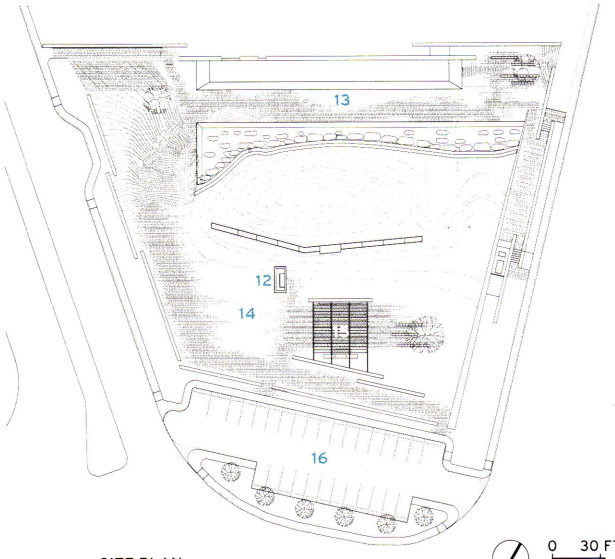
INNER SANCTUM
Daylight above the concrete wall facing Mecca slides in to illuminate one side of the prayer hall (right in photo), while a black glass wall perpendicular to it reflects the space.





FLOOR PLAN

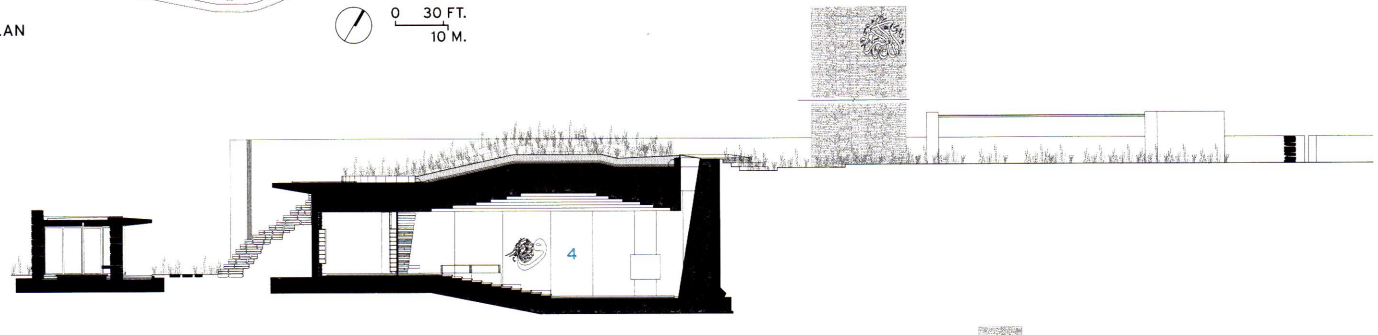
0 30 FT.
10 M.



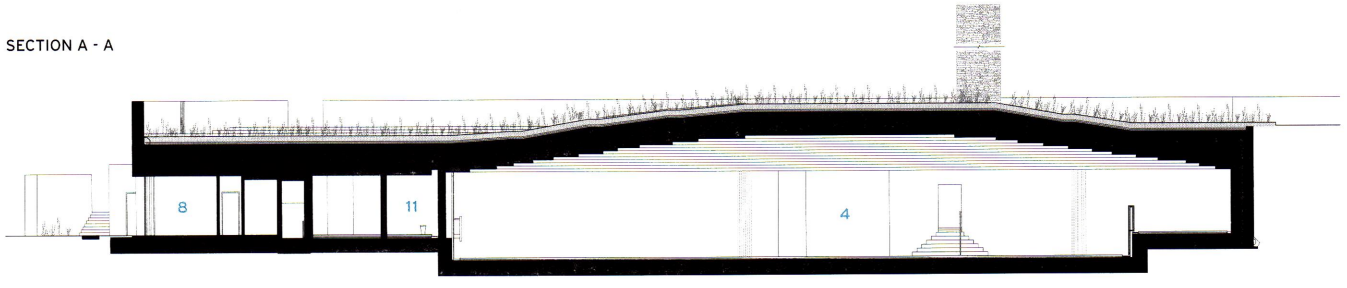
SITE PLAN

0 30 FT.
10 M.

1 ENTRY
2 SHOE SHELVES
3 WOMEN'S PRAYER HALL
4 MAIN PRAYER HALL
5 MINBAR (PULPIT)
6 MIHRAB (PRAYER NICHE)
7 SERMON PODIUM
8 LIVING QUARTERS FOR IMAM
9 MORTUARY AND RITUAL BATH
10 LIBRARY
11 ABLUTIONS
12 MINARET
13 LOWER COURTYARD
14 UPPER COURTYARD
15 FUNERAL COURT
16 PARKING



SECTION A - A



SECTION B - B

0 16 FT.
5 M.

LIGHT MOTIF
The architect used daylight streaming from above to draw special attention to important elements, such as the *mihrab*, or prayer niche (top), in the main hall and the ablutions area (bottom), where worshippers wash their hands and feet.

credits

ARCHITECT: Emre Arolat Architects – Emre Arolat, Uygar Yüksel, Leyla Kori, Nil Aynali, Fatih Tezman, Nurdan Gürlesin

ENGINEERS: Balkar Engineering (structural); Setta Engineering (mechanical); HB teknik (electrical)

CONSULTANTS: SLD, Piero Castiglioni (lighting); Sey Consulting (acoustics)

GENERAL CONTRACTOR: Sancaklar Foundation

CLIENT: Sancaklar Foundation

OWNER: Republic of Turkey Presidency of Religious Affairs

SIZE: 13,000 square feet

CONSTRUCTION COST: $1.125 million

COMPLETION DATE: January 2014

SOURCES

MASONRY: Boyut Yapi Mimarlik

CURTAIN WALL: Özcem Yapi

CARPET: Golden Hali

EXTERIOR AND INTERIOR LIGHTING: Vetas Electric & Lighting

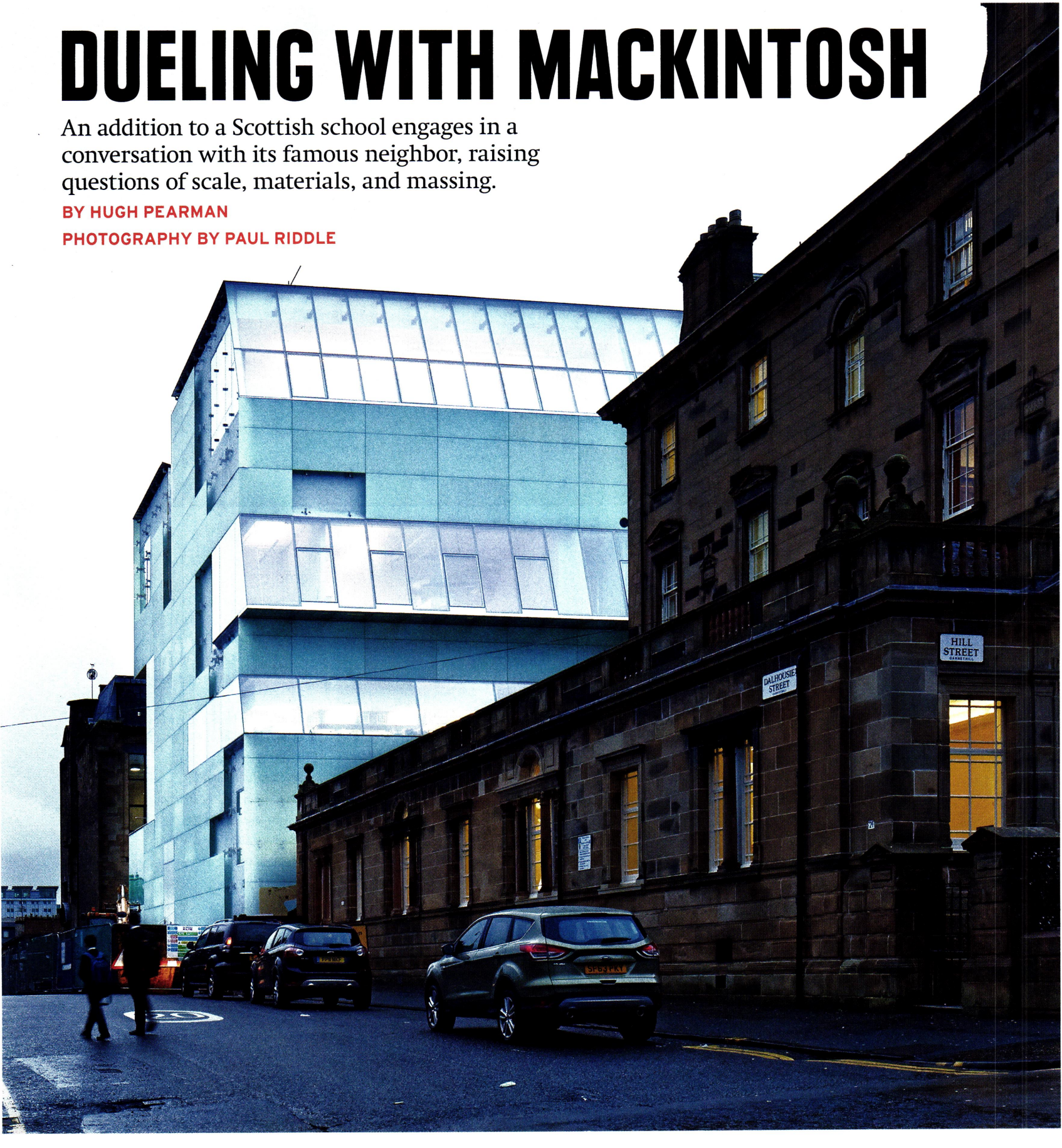
Seona Reid Building, Glasgow School of Art | Glasgow | Steven Holl Architects

DUELING WITH MACKINTOSH

An addition to a Scottish school engages in a conversation with its famous neighbor, raising questions of scale, materials, and massing.

BY HUGH PEARMAN

PHOTOGRAPHY BY PAUL RIDDLE



NEW ON THE BLOCK
Holl's addition echoes the massing of the Mackintosh building (at right, and opposite, far left). But its light materials and generous fenestration provide a contrast in terms of materiality.

Building directly opposite Charles Rennie Mackintosh's famed Glasgow School of Art, as Steven Holl has done, is simultaneously a plum job and the commission from hell. Mackintosh's school (1897–1909) is the building where Arts and Crafts met Art Nouveau, incorporating modern construction techniques while channeling the historic Scottish Baronial style. It is such a rich, clever, eccentric building, a touchstone for so many architects. But the problem is the same as the opportunity. In this exalted company, critics of the world are bound to draw comparisons.

It helped Holl that his site was previously occupied by unsuitable School of Art buildings from 1963 to 1980, including a Brutalist tower. Some people wanted to preserve them, but their demolition was not too controversial. However, Holl elected to keep another preexisting building at one end of the site, the stone-clad interwar Assembly Building, which was—and is again—the home of the bar, event rooms, and offices of the student association. This was a generous decision, as its incorporation takes a large bite out of the city block that would otherwise have been available: the Holl building sails over and partly absorbs it, dropping a structural leg and a slice of new facade over its flank. The old building's interiors have been renovated by jmarchitects, Holl's Glasgow collaborators, who teach at the school as well as practice. The two buildings do not connect internally.

The new building is clad in translucent pale-green laminated glass with open joints and concealed stainless-steel brackets, and is as reticent as any building of this considerable bulk could be. Articulated with a long set-back terrace and an entrance recess, but otherwise almost detail-free, it is like a full-scale foam model. This was a deliberate tactic on the part of Holl, a Mackintosh enthusiast whose rationale is to make a building that is the negative of its famous, finely detailed neighbour and that defers to it aesthetically. Where the Mackintosh building has what Holl calls "thin bones and a thick skin" (steel frame clad in stone), his Reid Building (named for the outgoing School of Art director Seona Reid, who commissioned it) is the opposite: thick, concrete "bones" inside, faced with a wafer-thin skin. The interiors of the Reid Building are as open and social as the Mackintosh building's are partitioned and intimate. But they both share large, high, north-lit studios, which in Holl's case are arranged along the back of the building, where the horizontal bands of angled glazing create a freer, more satisfying elevation than the front. The east and west flanks look sliced off sheer, as if with a hot wire.

My experience, on arriving and seeing the building for the first time, was initial disappointment at the mute exterior, followed by a steadily growing appreciation of the virtues inside. Disclaimer: builders were busy replacing faulty glass panels on the outside when I was there, and the planted terrace and street landscaping were yet to be completed, so I was denied the full external effect.

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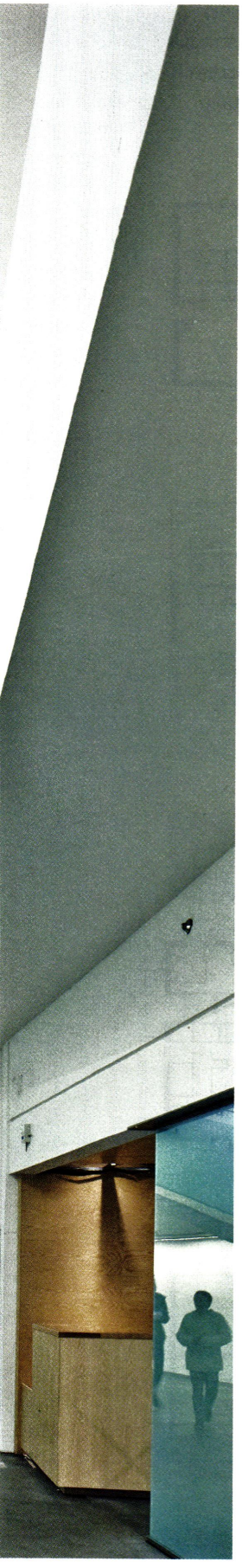
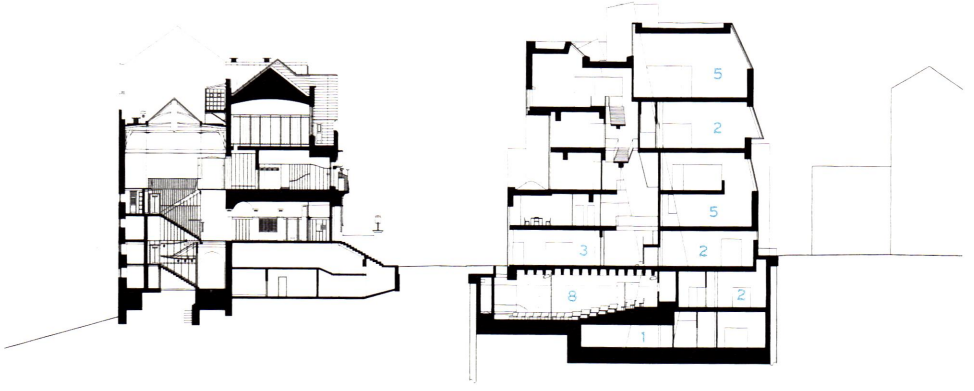
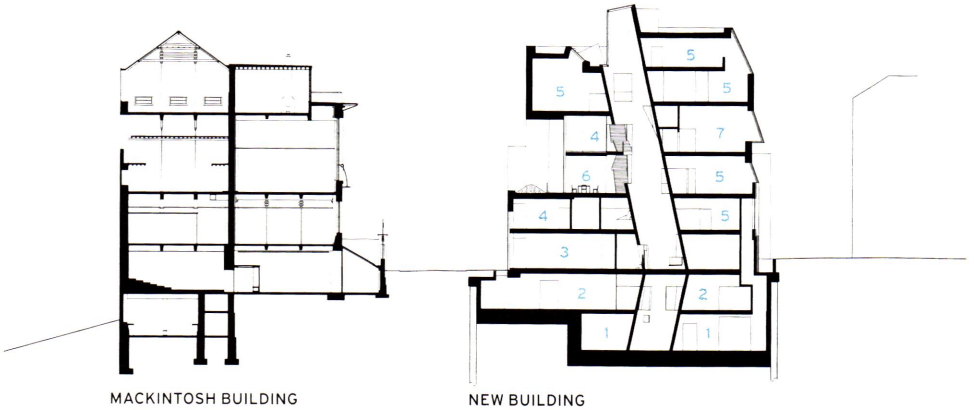


CIRCLING AROUND
The architect wove together the vertical and horizontal circulation systems, so stairs, bridges, and balconies work together to move students around the school. Some stairs slice through the light funnels (opposite) that push their way down from the top of the building to the bottom. A stair and balcony overlooking a dining area (left) serve as social elements allowing students to see and be seen.

1 STORAGE
2 WORKSHOP
3 EXHIBITION
4 OFFICES
5 STUDIOS
6 DINING
7 LAB
8 LECTURE THEATER



SECTION B - B



MACKINTOSH BUILDING

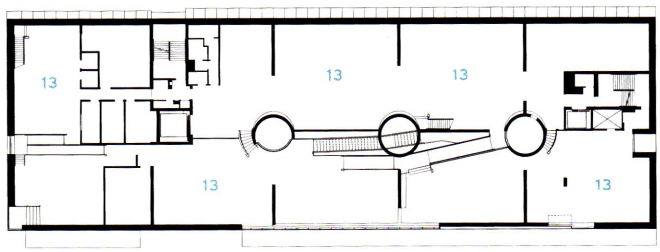
NEW BUILDING

SECTION A - A

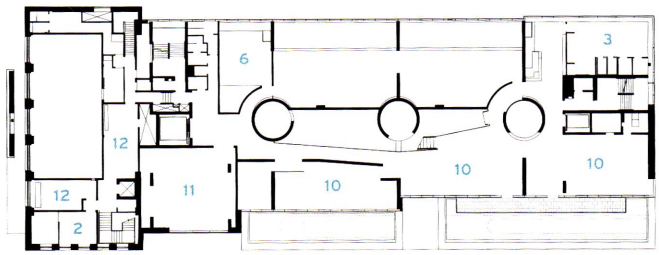
0 30 FT.
10 M.

FUNNEL VISION Although mostly empty, the three light funnels help animate the spaces around them and draw people to them. By cutting out openings in the funnels, Holl provides views into and through major spaces such as studios and workshop (above). An informal learning space occupies the ground floor of one of the funnels (opposite).

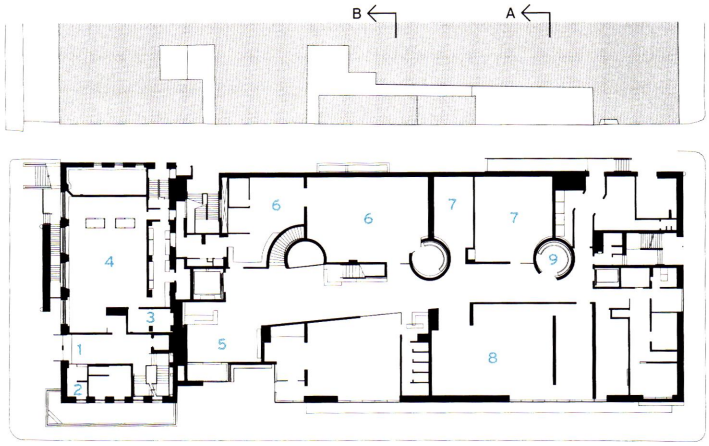
1 ENTRY HALL
2 OFFICE
3 KITCHEN
4 BAR
5 MAIN LOBBY
6 WORKSHOP
7 SEMINAR
8 EXHIBITION
9 INFORMAL LEARNING
10 DINING
11 CASE ROOM
12 GALLERY
13 STUDIO



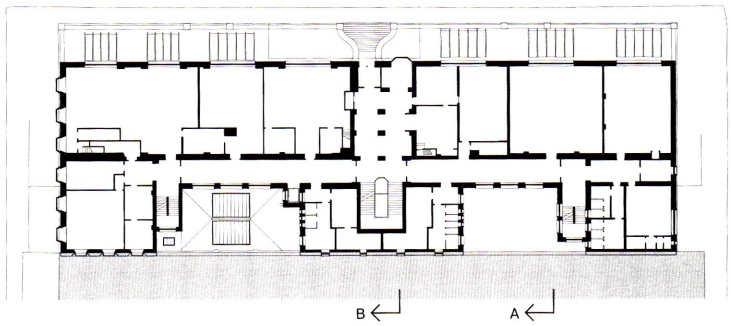
FIFTH FLOOR



THIRD FLOOR



GROUND FLOOR

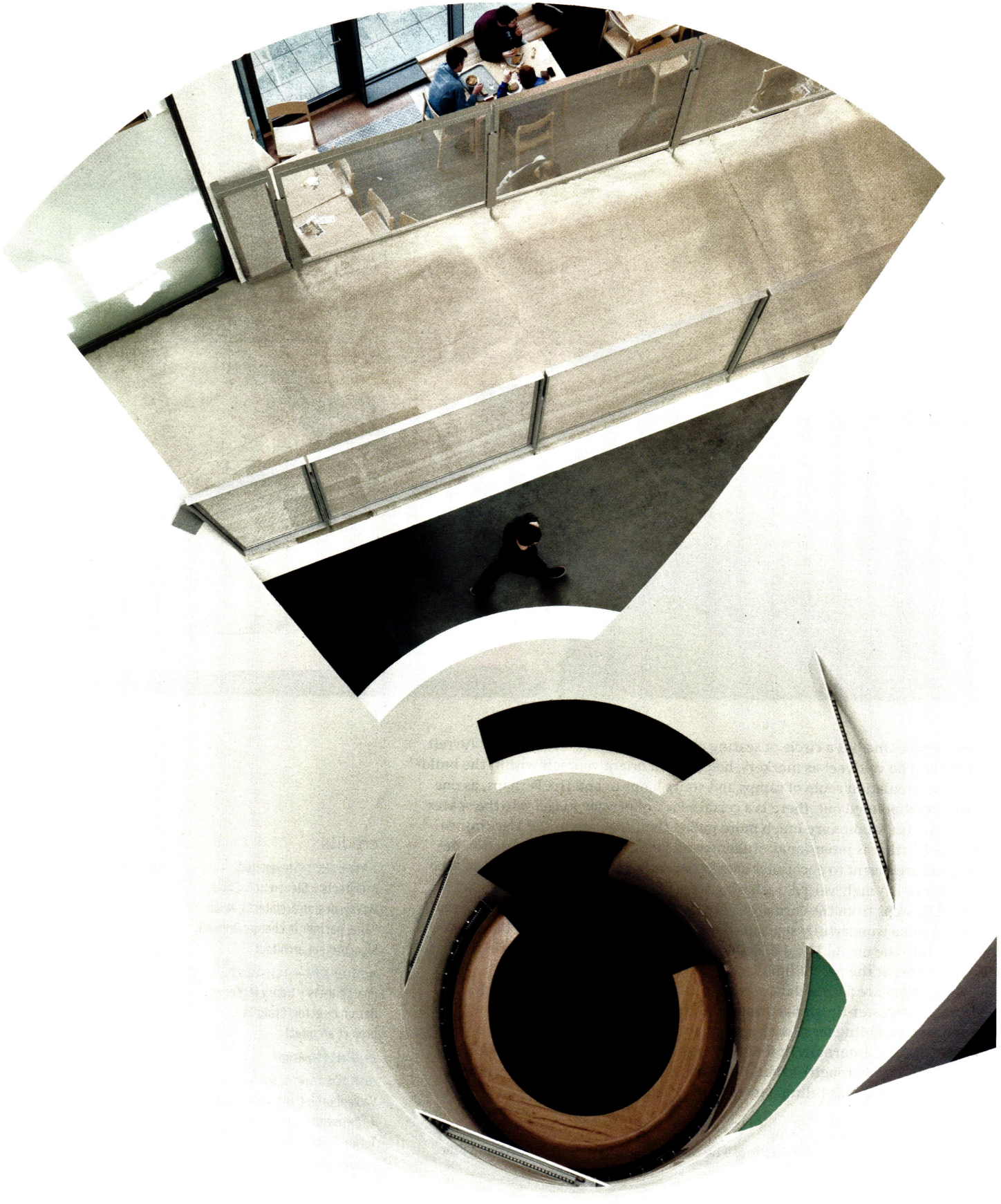


GROUND FLOOR OF EXISTING MACKINTOSH BUILDING

0 30 FT.
10 M.

The School of Art wanted a lot of accommodation on the site—for its design faculty, for a student dining hall and events space, for workshops, and for a public gallery. Holl achieved all this by sinking a lecture hall and workshops below grade, bringing daylight down into them from glass lenses in the sidewalk, and by going just as high as he dared. The overall mass of the building rises to the level of the roof ridge of the Mackintosh building across the street, while three big light funnels project a little higher yet, to 88 feet above datum. These constitute the defining feature of the building, the "driven voids of light," as he and his design partner Chris McVoy describe them. But although the new building may not technically loom over the old, it looks as if it is standing over its older sibling. This happens partly because of the viewing angles in this hilly city, but also because Mackintosh's careful detailing breaks down the apparent bulk of his building, while Holl's smooth, blocky facades do not perform the same service.

The design concept of the "driven voids of light" is wholly successful. Developed with structural engineers Arup, these elements are smooth-finished, cast-in-place concrete tubes that punch through the building, sloping toward the south as they rise from the ground level to the top and making a return angle as they go from the ground to the basement. The voids spill out into surrounding spaces via openings at



PHOTOGRAPHY: © IWAN BAAN (THIS PAGE)

NORTHERN LIGHTS
Like the Mackintosh building, the new Reid Building uses tall north-facing glazing to brighten studios.

various levels. One has a circle of seating at its base, making it feel like a Turrell "skyspace." The voids act as markers, helping you orient yourself within the building as the circulation route of ramps and stairs loops to and fro. Perhaps, as one student I met pointed out, there is a certain lack of privacy in the way the spaces interweave: the studios are much more public than they are in the Mackintosh building. But that is intentional: students and faculty from different design departments are meant to encounter each other rather than work in isolation. The spaces are satisfyingly varied, including a purely architectural lookout chamber accessed by steps from the corner of a studio, its view south over the city. Overall, there are some wonderfully spacious daylit studios, especially at the top where the view is to the north. The double-height dining hall on the second floor gazes directly across at the parent building.

The interiors are finished industrially, mostly white-painted cast-in-place concrete and plaster-finish partitions with timber and metal details. At a cost of $44 million (including fees), with a gross area of 125,350 square feet, this is not a lavish building. Internally, it feels just right; externally, its brittle slickness at present feels odd in tough old shipbuilding Glasgow. But give it time: gently glowing at night, Holl's hilltop lantern could become something of a cultural beacon too. ■

Hugh Pearman is the architecture critic of The Sunday Times *(UK) and the editor of the* Riba Journal.

credits

ARCHITECT: Steven Holl Architects – Steven Holl, Chris McVoy, design architects; Noah Yaffe, partner in charge; Dominik Sigg, project architect

ASSOCIATE ARCHITECT: jmarchitects – Henry McKeown, design director; Craig Tait, project architect

ENGINEER: Arup

CONSULTANTS: Michael Van Valkenburgh (landscape); Turner + Townsend (quantity surveyor); Turley Associates (planning)

GENERAL CONTRACTOR: Sir Robert McAlpine

CLIENT: Glasgow School of Art

SIZE: 125,350 square feet

CONSTRUCTION COST: $44 million

PROJECT COST: $83 million

COMPLETION DATE: April 2014

SOURCES

STAINLESS-STEEL CLADDING: Dane Architectural Systems

STEEL CURTAIN WALL: Jansen

METAL WINDOWS: Schuco

GLAZING: Saint Gobain

University of Kentucky Albert B. Chandler Hospital – Pavilion A, Lexington, KY
Architect: GBBN Architects, AECOM
Photo Credit: © Scott Pease / PeasePhotography.com

PCI Precast/Prestressed Concrete Institute

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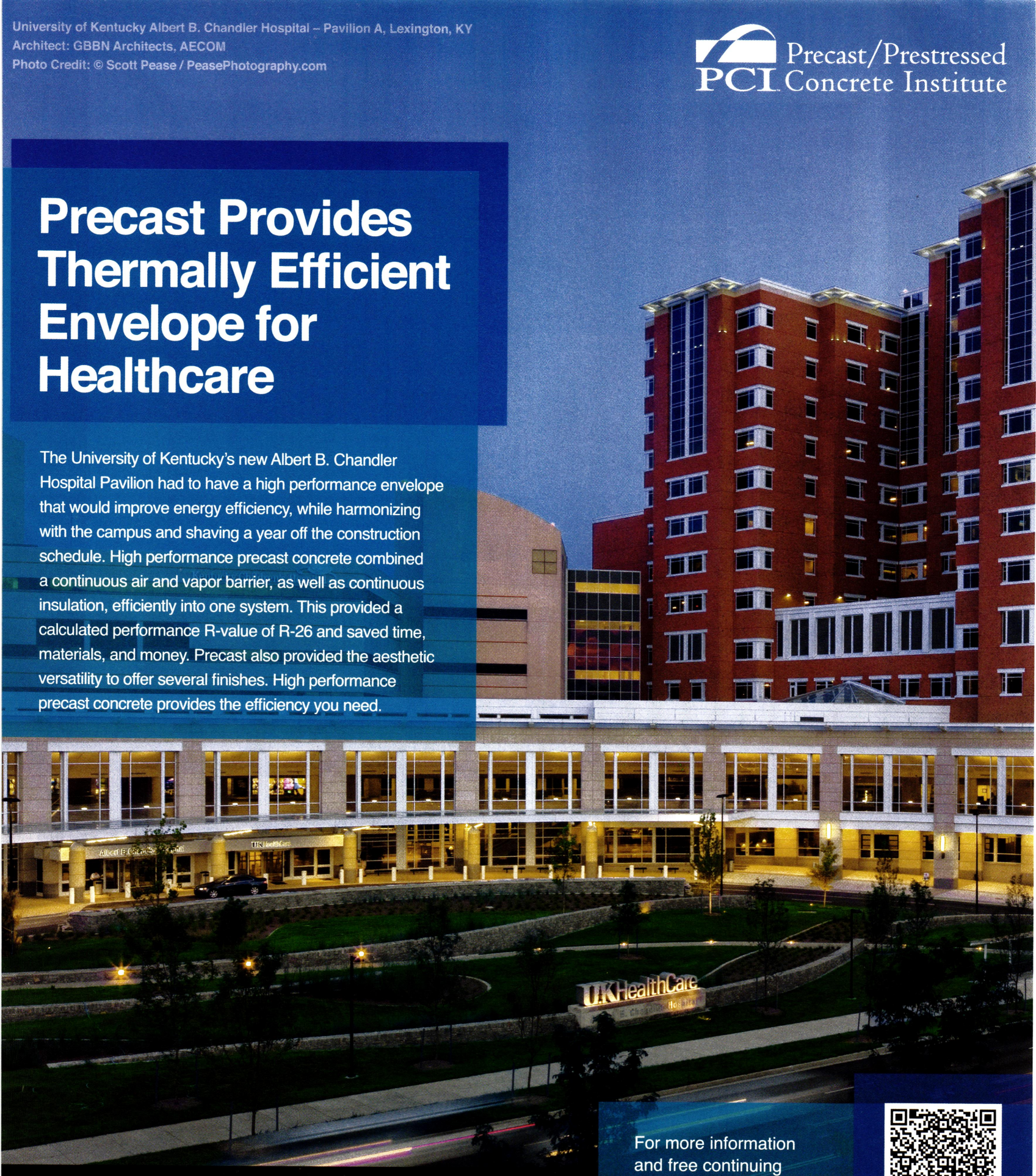

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CIRCLE 89

129 GLOBAL CENTER FOR HEALTH INNOVATION
132 LEGACY ER
136 ST. ANTHONY HOSPITAL
140 PEDIATRIC EMERGENCY DEPARTMENT EXPANSION, PROVIDENCE SACRED HEART MEDICAL CENTER

Urban Remedy

Cleveland

The Global Center for Health Innovation and adjacent Cleveland Convention Center by LMN Architects aim to reinvigorate an aging downtown.

By Steven Litt

WHEN IT OPENED officially in October 2013, the new Global Center for Health Innovation in Cleveland, designed by LMN Architects of Seattle, became the nation's first medical mart, a year-round showplace for advanced medical devices and technology. The four-story, 235,000-square-foot facility is intended to help brand Cleveland as an international hub of biotechnical innovation by attracting health-care-themed meetings and exhibits to the city's adjacent new underground convention center, also designed by LMN.

The two facilities, owned by Cuyahoga County and joined seamlessly below grade, have other big jobs as well: they're meant to bring a sense of polish and completion to the historic Group Plan District, a cluster of Beaux Arts government and civic buildings laid out in 1903 by Daniel Burnham in one of the nation's most significant City Beautiful compositions.

Beyond that, public and private backers hope that the Global Center and convention center—plus an attached 600-room convention hotel designed by Cooper Carry of Atlanta, to be built by 2016—will help reinvigorate the often lifeless 12.6-acre Mall, the centerpiece of Burnham's district.

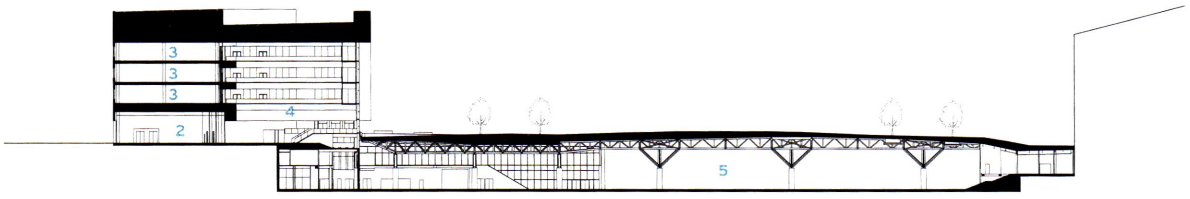
The rectangular greensward runs three blocks north–south

PHOTOGRAPHY: © JAMES MAGUIRE

through the center of the district, and also serves as the green roof of the mostly below-grade convention center. At the north end of the middle block of the Mall, the convention center roof swoops up 27 feet from the sidewalk, to provide a glassy 300-foot-long lobby, with a wide terrace on top that offers sweeping views of Lake Erie to the north and the city's downtown skyline to the south. The Mall is set between Public Square, the city's historic center, located catty-corner to the southwest, and the lakefront at North Coast Harbor to the northeast, home to the Cleveland Browns' stadium and I.M. Pei's Rock and Roll Hall of Fame and Museum.

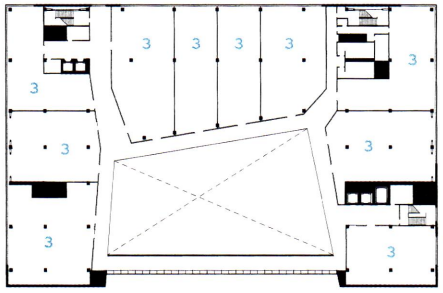
LMN's Rafael Viñoly-Menendez—not to be confused with his famous uncle Rafael Viñoly—designed both the Global Center and the convention center to ensure a smooth fit between the two, and to make sure the Global Center (the most visible part of the project) would complement its early-20th-century neighbors. The cornice height, massing, and setbacks of the four-story building echo those of the historic civic and government buildings in the area. To underscore the medical theme of the Global Center, Viñoly-Menendez wrapped its facades with eccentrically proportioned windows and specially molded precast concrete panels organized in an abstract pattern meant to evoke DNA sequences. The symbolism is hard to read, but the result is a distinctly contemporary building that, in its scale, pays deference to its Beaux Arts context.

MARKETPLACE ON THE MALL
The Global Center's pixilated windows and arrangement of precast concrete panels are inspired by DNA sequences (opposite, top left). An expansive atrium window has views of the historic Mall (opposite, top right). The Global Center and convention center (buried almost completely below grade), are part of Cleveland's historic core (opposite, bottom), with views of Lake Erie and the Cleveland Browns' stadium to the north.



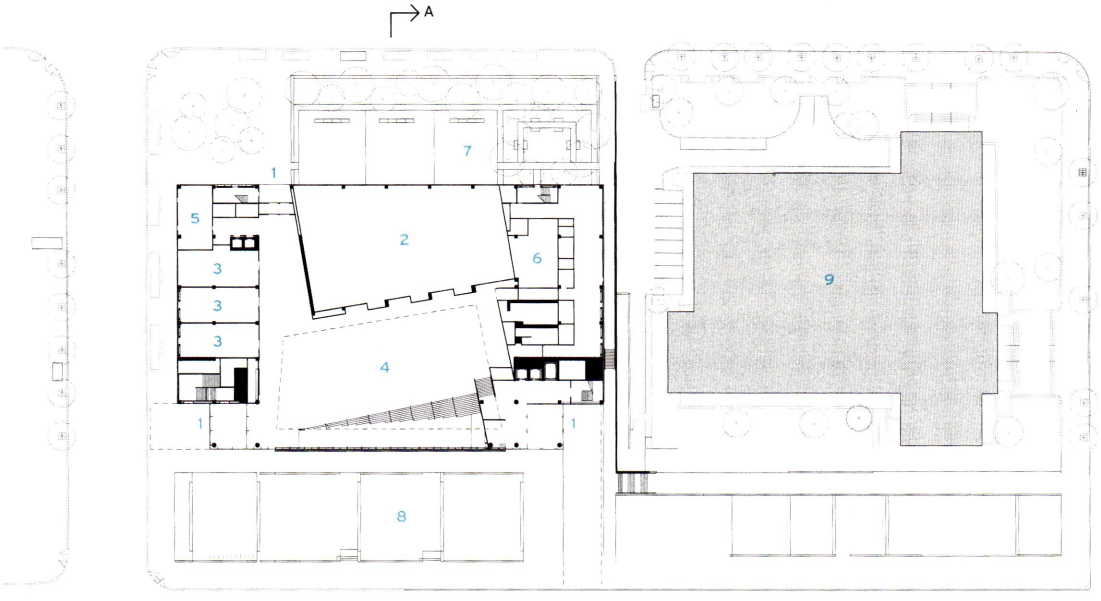
SECTION A - A

0 100 FT.
30 M.



TYPICAL SHOWROOM LEVEL

1 ENTRANCE
2 BALLROOM
3 SHOWROOM
4 ATRIUM
5 EXHIBIT HALL
6 KITCHEN
7 FUNCTION TERRACE
8 FUNCTION LAWN
9 EXISTING OFFICE BUILDING



GROUND FLOOR

0 100 FT.
30 M.

credits

ARCHITECT: LMN Architects – Chris Eseman, principal in charge; Mark Reddington, design partner; Howard Howlett, project manager; Rafael Viñoly-Menendez, Stephen Van Dyck, project architects

DESIGN BUILD ARCHITECT: URS, Robert P. Madison International

ENGINEERS: Ralph Tyler Companies, Osborn Consulting (civil); Magnusson Klemencic Associates, Barber & Hoffman Consulting Engineers, Osborn Consulting (structural); McCleskey Consulting, Karpinksi Engineering (m/e/p)

CLIENT: Cuyahoga County

CONSULTANTS: Horton Lees Brogden (lighting); Gustafson Guthrie Nichol with McKnight Associates (landscape); Van Auken Akins Architects (historic preservation)

SIZE: 235,000 square feet (Global Center); 767,000 square feet (convention center)

PROJECT COST: $465 million

COMPLETION DATE: June 2013

SOURCES

CURTAIN WALL: Nupress

PRECAST CONCRETE: Sidley Precast Group

GLAZING: Viracon

LIGHTING: Cooper Lighting, Louis Poulsen Lighting, Kurt Versen, Eureka, Amerlux Exterior

The Global Center flanks the west side of the Mall and faces east, toward the big outdoor space, with an atrium window that is nearly the full height of the facade. Inside, glass-enclosed showrooms wrap the south, west, and north sides of the atrium, providing views out onto the Mall and adjacent streets.

A pedestrian ramp located just inside the Global Center's main entry descends gently to escalators and the registration area for the convention center, located one level below. From a single pivot point in that area, it's possible to look from one building into another, with a secure sense of orientation.

The jury is still out on how well both buildings will perform economically and socially, but initial reactions have been positive. Exhibit spaces in the Global Center are 80 percent leased, with national tenants such as HIMSS, Philips, Cisco, and GE Healthcare, and local tenants including the Cleveland Clinic and University Hospitals. Between now and 2019, the Global Center and convention center have been booked for 233 events, nearly a third of which are health-care related, says David Johnson, the joint facility's director of marketing and sales.

Unfortunately, the budget for the $465 million project didn't provide for much more than turf on the reconfigured Mall, which will have to wait for the implementation of Gustafson Guthrie Nichol's landscape design. Cleveland Mayor Frank Jackson has charged a new commission to raise money for improvements to the Mall and for the makeover of Public Square, which has been designed by James Corner Field Operations. Another goal is to fund a pedestrian walkway to connect the north end of the Mall to the lakefront, rising above railroad tracks and a highway. Within two or three years, if more public and private dollars can be raised, Burnham's big vision for Cleveland, with this latest iteration, may finally be complete. ■

Steven Litt is the art and architecture critic of The Plain Dealer *in Cleveland.*

PHOTOGRAPHY: © ED LACASSE PHOTOGRAPHY; JAMES MAGUIRE (TOP RIGHT)

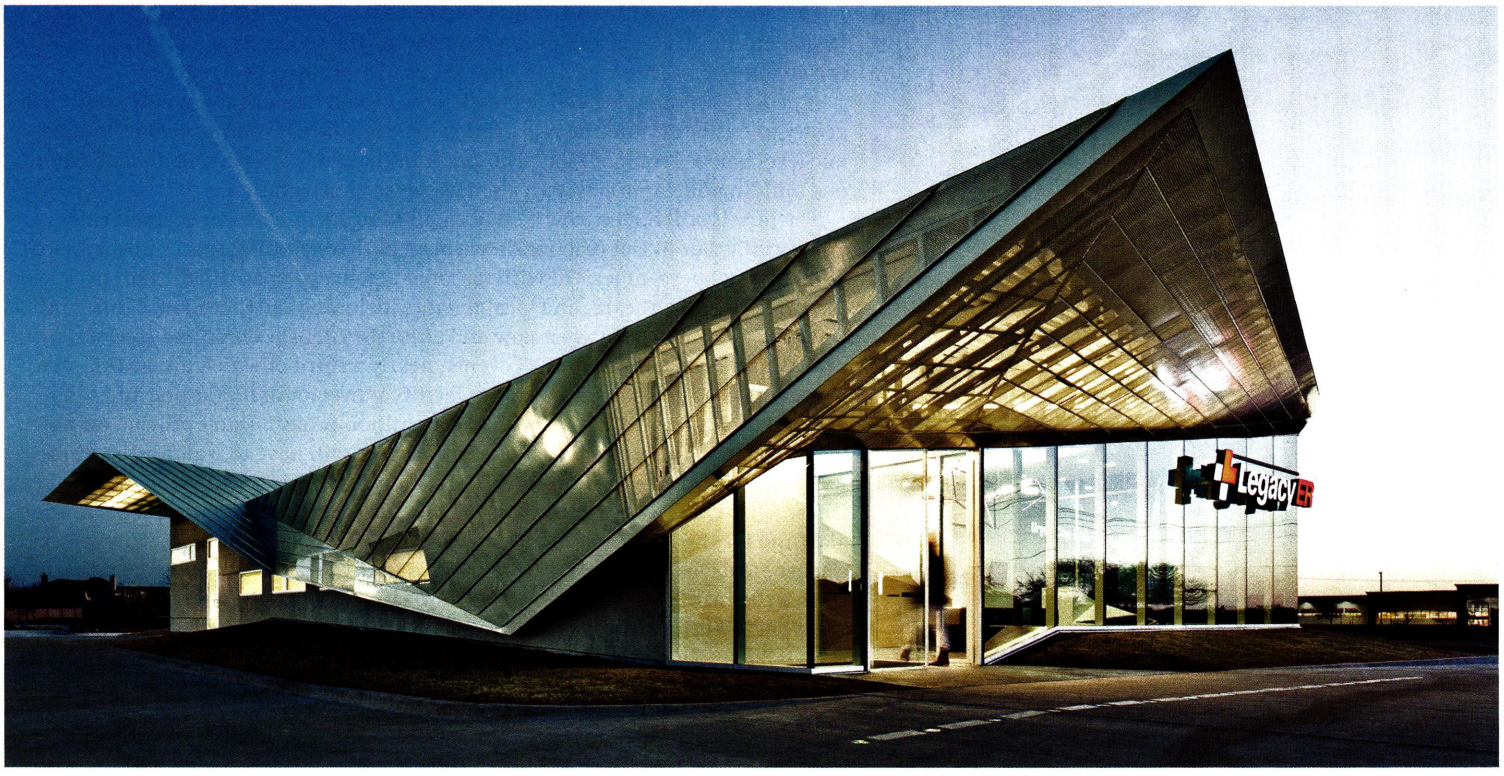
Roadside Attraction

Allen, Texas

Legacy ER, a freestanding emergency room and urgent-care facility stops traffic with an angular folded roof of zinc panels and perforated screens.

By Mark Lamster

Photography by Michael Moran



DRIVE IN
The Dallas firm 5G Studio Collaborative designed a freestanding emergency care center (FEEC) north of the city (left) that conveys a progressive medical orientation. The dynamic folded zinc-paneled roof, with perforated mesh screens (opposite, bottom), seeks to avoid the cavernous gloom of monolithic hospitals. Visitors enter a glazed vestibule (below) to find a large sunlit lobby.

WHAT WILL the future of American medical care look like? One answer to that question lies amid the suburban sprawl of Allen, Texas, a bedroom community sprouting from the tawny prairie land some 30 miles north of downtown Dallas. There, on a stretch of nondescript parkway lined with banal strip malls and cookie-cutter housing developments, you will find an unexpectedly antic structure of folded zinc planes, jutting angles, and perforated mesh screens.

This interloper is Legacy ER, an 8,500-square-foot freestanding emergency room and urgent-care facility owned and operated by a group of local physicians. The architect is Yen Ong, a partner in 5G Studio Collaborative, a nine-year-old Dallas-based practice, which gained prominence in 2011 with its design for the 1,000-room Dallas Omni Hotel, a sleek wedge wrapped with bands of LED lighting.

The Allen facility is the second clinic owned and operated by the Legacy ER group and is one of a rapidly growing number of freestanding emergency care centers (FECCs) presenting a speedier alternative to increasingly pressed hospital emergency departments.

Texas leads in this type of independent clinic, according to the American College of Emergency Physicians, largely due to supportive state laws and an entrepreneurial climate. Yet FECCs are almost always located in affluent areas with lower Medicaid and Medicare populations, because they are not recognized for reimbursement by those services. Since the clinics generally don't serve underprivileged communities and can charge hefty facility fees, the rise of FECCs has generated concern in the medical profession.

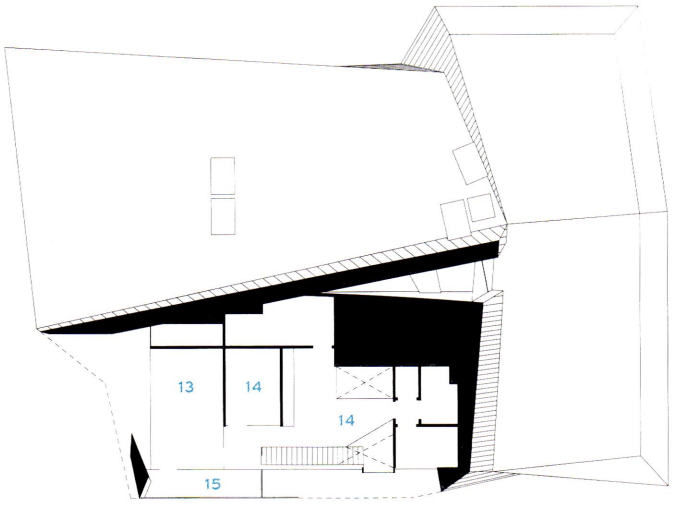
But for physicians frustrated with the various indignities of hospital-based emergency-care practice, FECCs suggest a progressive alternative. Architecturally, Legacy ER's Allen clinic stands out among the generic "doc-in-a-box" types, both as a model of enlightened aesthetics and for its commitment to evidence based design (EBD), where empirical research applied throughout the design process enhances efficiency, safety, and patient experience. In the facility's exam rooms, for instance, beds and plumbing are aligned so patients can always be approached from the same side (the left), to reduce mistakes born of constant reorientation.

Ong embraced this philosophy during the planning of an earlier clinic for the Legacy ER partners in nearby Frisco in 2008. He felt constrained there by the turnkey developers' wishes, but in Allen, the doctors contracted directly with 5G, giving Ong free aesthetic rein.

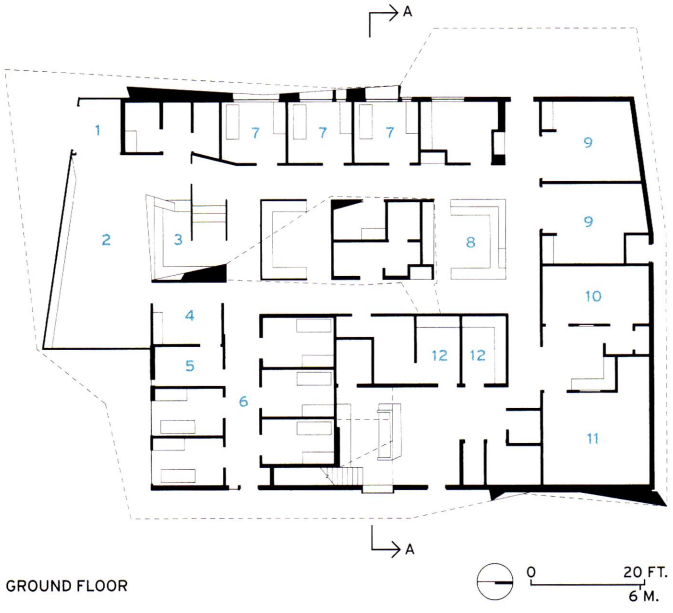
"Modern was part of the ticket," says Jay Woody, one of Legacy ER's founding partners. "If you're having a heart attack, you want to have a facility with the latest technology. If you see a building that's dingy and dull, you wonder if the doctors' medical knowledge is up to date."

The steel-framed structure and its landscaped parking lot are oriented for maximum visibility from the road. For all its folded dynamism, in plan it is a rectangular box containing two rooms for trauma, six for emergency exams, and five for urgent care, along with spaces for X-ray and CT-scan imaging, a laboratory, and various support functions. Its 11 beds can accommodate well over 100 patients in a day, served by an on-site staff of around 15.

The facility's bifurcated program explains the disposition of spaces: on one side they are dedicated to emergency medicine; and on the other, to less critical urgent care. The

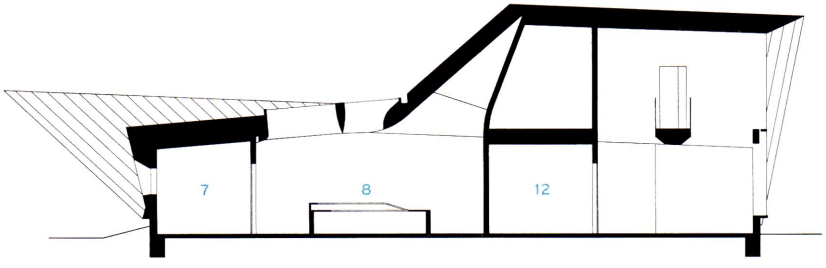


MEZZANINE



GROUND FLOOR

0 20 FT. 6 M.



SECTION A - A

0 20 FT. 6 M.

1 ENTRANCE VESTIBULE
2 LOBBY
3 RECEPTION
4 TRIAGE
5 MEDICAL WAITING ROOM
6 URGENT-CARE EXAM
7 EXAM
8 NURSE STATION
9 EMERGENCY TREATMENT
10 X-RAY
11 CT SCAN
12 CLEAN/SOILED WORK
13 CONFERENCE
14 OFFICE
15 BALCONY

credits

ARCHITECT: 5G Studio Collaborative – Yen Ong; Paul Merrill, Josh Allen, Christine Robbins-Elrod, Danielle Cross, team

ENGINEERS: Datum Engineers (structural); RLK Engineering (civil); Jordan & Skala Engineers (m/e/p)

CONSULTANTS: Smr Landscape Architects (landscape)

GENERAL CONTRACTOR: UEB Builders

CLIENT: Legacy ER

SIZE: 8,500 square feet

CONSTRUCTION COST: $3.6 million

PROJECT COST: $4.9 million

COMPLETION DATE: November 2013

SOURCES

METAL PANELS: Rheinzink

SPECIALTY FINISHES: Portland Cement Plaster

METAL AND GLASS CURTAIN WALL; GLASS: PPG

METAL FRAME WINDOWS AND CURTAIN WALL: YKK AP

SKYLIGHTS: Velux USA

CLEAN MACHINE
The large reception desk in the lobby (left) separates emergency-care functions from areas for less critical urgent care. Polished concrete floors flecked with recycled mirrors, along with glazed walls, augment the sense of light. A narrow steel stair (opposite) by the nourishment station leads to the mezzanine's conference room. Skylights above the folded ceiling and frosted-glass panels enclosing the spaces keep the emergency-care unit from seeming dark and gloomy.

compact plan, a product of Ong's application of EBD, is a direct response to the demand for efficiency. "In medical practice, a few seconds count a lot," says Ong. The nursing station, with its panoptic orientation, acts as the brain of the clinical zone, allowing the medical staff and the patients to to interact.

Also important in EBD is ample natural light. Here windows are included in exam rooms and at the ends of corridors, with skylights tucked into folded ceiling planes. "All that light makes it a nice place to work," says Woody, "and helps the healing process." The doctors have also found that the clinic's orthogonal geometry has a subconscious calming effect, making things seem neater than they are in reality.

When not tending patients, Woody and his partners can repair to a second-story conference room inserted under the folded zinc roof planes, reached by a steel stair and catwalk and shielded from the harsh Texas sun by the external perforated zinc screen. A small bedroom with adjacent bath is also provided for physicians on overnight call.

For both physicians and patients, the design represents a considerable improvement over the status quo. The typology, moreover, has the capacity to significantly improve access to care, if various regulatory issues are satisfied. As these facilities continue to proliferate, Legacy ER is a welcome example that other freestanding clinics might do well to follow. ■

Mark Lamster is the architecture critic of the Dallas Morning News.

Country Doctor

Pendleton, Oregon

In the hinterlands of northeastern Oregon, St. Anthony Hospital's new campus is a contemporary spin on a pioneer town's rich history.

By Laura Mirviss

Photography By Benjamin Benschneider

WHEN ST. ANTHONY Hospital's new campus opened in rural Pendleton, Oregon, last winter, a local brewer made a special beer for the occasion—the "Hail Mary"—and roughly 3,000 people (in a town of under 17,000 residents) stopped by to check out the new digs. "There was just a sea of people wanting to see it," says Kari Thorsen, an interior designer at the Seattle office of ZGF, the firm that designed the project. "It's an amazing community with such a rich history. There's such pride in the hospital."

St. Anthony's bucolic new campus is nestled among 90 acres of gently rolling hills, just off the highway at the edge of town. The L-shaped one-story hospital is attached to a canted two-story medical office building (owned by a private developer). Together they hug a "healing garden" to the west, lined with small boulders collected from a board member's ranch 10 miles away. Clad in gritty purple-and-green-tinged gray slate and metal panels, the hospital's unobtrusive design is inspired by the basalt outcroppings dotting the surrounding wheat fields. "We tried to conceal the scale of the building and make it blend into the hillside," says ZGF designer Craig

Rizzo, adding that the hills help shield the steel-frame structure from fierce winds that can reach 70 mph. "It looks as if it's always been there."

In the works for over a decade, the $74 million complex is a major upgrade from St. Anthony's former quarters four miles to the northeast, where the hospital operated for over a century on an increasingly cramped nine-acre parcel across the street from the famous Pendleton Woolen Mills. Founded by the Sisters of St. Francis in 1902—the nuns are said to have supplemented the construction funds by leaving collection jars in the various brothels and saloons in town—St. Anthony underwent numerous expansions and renovations over the years. By the early 2000s, it was clear that building a new hospital would be more economical than continuing to sink money into maintenance. The old campus will be razed this summer.

With 25 inpatient beds in addition to outpatient and emergency services, St. Anthony is a Critical Access facility—the only hospital in a 28-mile radius—and is owned by Catholic Health Initiatives, a nonprofit conglomerate that runs 78 hospitals around the country and has worked with ZGF on numerous projects in the Pacific Northwest. For this project, the client had an unusual request: to keep costs down, the new 105,200-square-foot hospital needed to serve the same number of patients and have the same facilities in half the square footage of the old space.

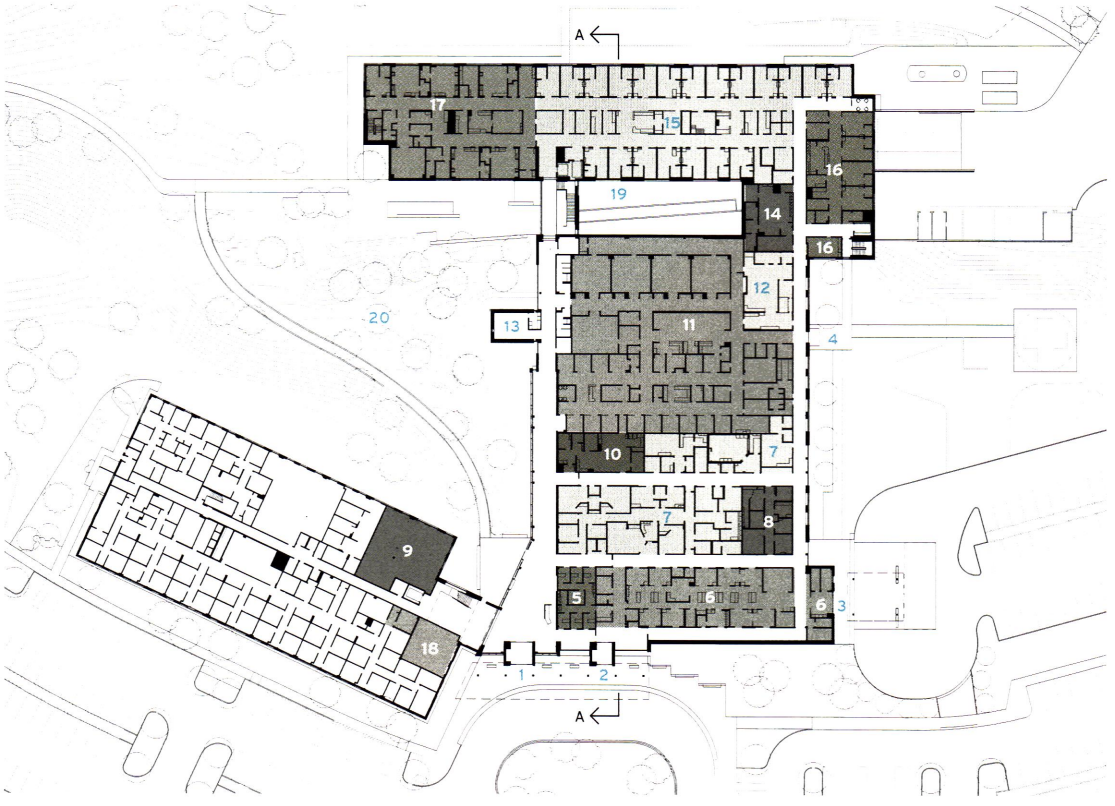
With a compact footprint, the new hospital is designed to maximize daylight and access to the outdoors while keeping patient travel to a minimum. (In the old labyrinthine hospital, patients were routinely wheeled down several hallways and escorted up and down elevators, just to get from their rooms to the lab and imaging areas. To prevent that, hospital staff asked the architects to confine treatment areas to one level in the new facility.)

Most patients arrive through the main entrance, entering a light-filled double-height atrium and checking in at a leather and Douglas fir–lined reception desk, before taking a seat along the long public corridor, where patients and families can look out into the healing garden while they wait to be called. A private corridor for staff, emergencies, and patients requiring privacy runs parallel, along the opposite, eastern perimeter of the building. Patient-care services are sandwiched between the two hallways.

The more public double-height hallway gradually slopes downward, ending at the entrance to a chapel, which serves as a transition point where the quieter inpatient wing begins, in the northern volume. The chapel, a small square room with textured plaster walls and reclaimed-wood floors, has a band of wraparound 2-foot-tall glazing at floor level, just high enough to give visitors a glimpse of the healing

NEW FRONTIER
Located on over 90 acres of rolling hills, St. Anthony Hospital's new campus (left) echoes the local landscape with a slate facade reminiscent of the basalt outcroppings in surrounding wheat fields. The main entrance to the hospital (below) has an adjacent emergency/after-hours entrance. In the evening, St. Anthony closes the main entrance and parts of the building to reduce utility costs.

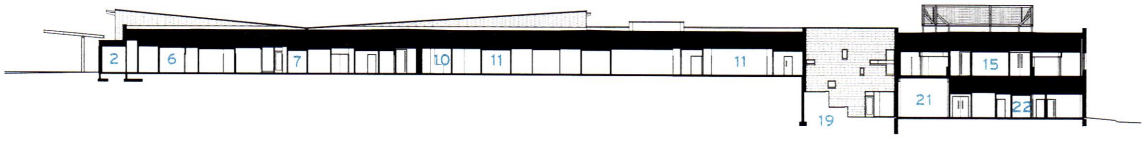
RURAL REMEDY
Mass is held every morning at 11:30 in the chapel (above), which seats 15 people. At the front, a panel made of reclaimed Douglas fir—with a cross cut out—slides in front of a window, casting a shadow of the cross on the back wall in the early evening. Designed by ZGF, the altar includes a slab of petrified wood weighing nearly 400 pounds. The cafeteria (left), located underneath the patient-treatment areas on the first floor, connects to the healing garden and has become a popular lunch spot for locals.



FIRST FLOOR

0 60 FT. 20 M.

1 MAIN ENTRANCE
2 EMERGENCY/AFTER-HOURS ENTRANCE
3 AMBULANCE ENTRANCE
4 STAFF AND HELIPORT ENTRANCE
5 ADMITTING
6 EMERGENCY DEPARTMENT
7 IMAGING
8 RESPIRATORY THERAPY
9 INFUSION
10 LAB
11 SURGERY
12 CENTRAL STERILE
13 CHAPEL
14 PHARMACY
15 MEDICAL/SURGICAL
16 ICU
17 FAMILY BIRTH
18 GIFT/COFFEE SHOP
19 INNER COURTYARD
20 HEALING GARDEN
21 MATERIALS/MANAGEMENT
22 ENVIRONMENTAL SUPPORT SERVICES



SECTION A - A

0 60 FT. 20 M.

garden while protecting their privacy. "We wanted folks to have a moment to themselves," says ZGF project manager John Mess. "We were trying to bring in that natural, Western feel with simple materials."

With a honky-tonk downtown on the National Register of Historic Places, an uninformed visitor walking along Main Street in Pendleton might mistake the architectural vernacular for, say, Texas. The town lives and breathes its pioneering past and has managed to turn it into a successful business: the Pendleton Round-Up, one of the largest rodeos in the U.S., is entering its 104th year. There is also a popular walking tour of Pendleton's former red-light district, including access to underground tunnels built by Chinese migrant railroad workers in the late 1800s. "We tried to pick up on some of that history, but we didn't necessarily give the hospital a plate ceiling, wagon wheels, and all that," says Mess. "You're getting some of that in the rustic wood, the fabric colors, and in the artwork from the Pacific Northwest, but we tried to incorporate it in a contemporary way." ■

credits

ARCHITECT: ZGF Architects – Allyn Stellmacher, partner in charge; John Mess, project manager; David MacLean, Greg Cha Fong, project architects; Craig Rizzo, Barbara Anderson, Tammy Felker, Mark Gesigner, Kari Thorsen, Melissa Eby, Ed Clark, Ellen Campbell, project team

ENGINEERS: Coughlin Porter Lundeen (structural/civil); AEI Engineers (m/e)

GENERAL CONTRACTOR: Sellen

CLIENT: St. Anthony Hospital/Catholic Health Initiatives

SIZE: 105,200 square feet

CONSTRUCTION COST: $45 million

PROJECT COST: $74 million

COMPLETION DATE: September 2013

SOURCES

MASONRY: Basalite

METAL PANELS: Morin

CURTAIN WALL: Arcadia

SLATE SHINGLES: Greenstone Slate/Nu-Lok

Red Alert!

Spokane

With a bold new entrance, the Providence Sacred Heart Medical Center Pediatric Emergency Department stands out from the crowd.

By John Cava

Photography by Benjamin Benschneider

FOR MOST of us, a hospital emergency room rarely induces feelings of peace and tranquility. But Mahlum Architects' Seattle office made that a top priority in the new 28,000-square-foot pediatric emergency expansion it designed for the Providence Sacred Heart Medical Center in Spokane. At least, it's calm on the interior. The exterior conveys a more vibrant sensibility.

Located on a dense 45-acre campus on a hilltop overlooking downtown Spokane, Mahlum's two-story $24 million wing differentiates itself from the hodgepodge of neighboring medical buildings with its striking fire-engine-red facade—a dazzling device for signaling the hospital's new emergency-care unit—which also includes an entrance for adult emergency services. "It was very intentional—it's a wayfinding device," says Mahlum associate Pierce McVey, whose firm has designed roughly a dozen buildings for the hospital, which now has over 600 beds.

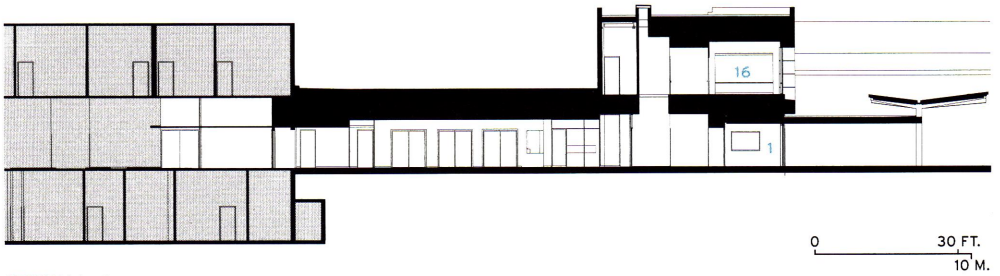
The pavilion's brightly colored aluminum panels clad a rectilinear structure that cantilevers dramatically toward the street, out over a gray aluminum and glass base. On the red-paneled second level, a glassed-walled playroom is recessed from the south facade and framed by yellow panels on the walls and soffit of the setback to give the surfaces more articulation. The steel canopy for a car drop-off flanking the east facade adds a sculptural note.

Visitors enter the new building by way of a narrow double-height glazed atrium where separate doors lead to a waiting area for children in the new wing, or for adults being admitted to an adjoining facility. A larger glazed atrium down the hall connects to the existing main hospital to the north. These vertical shafts of space help introduce natural light into an institutional setting, as do the glass walls of the coffee shop on the first floor, facing the street.

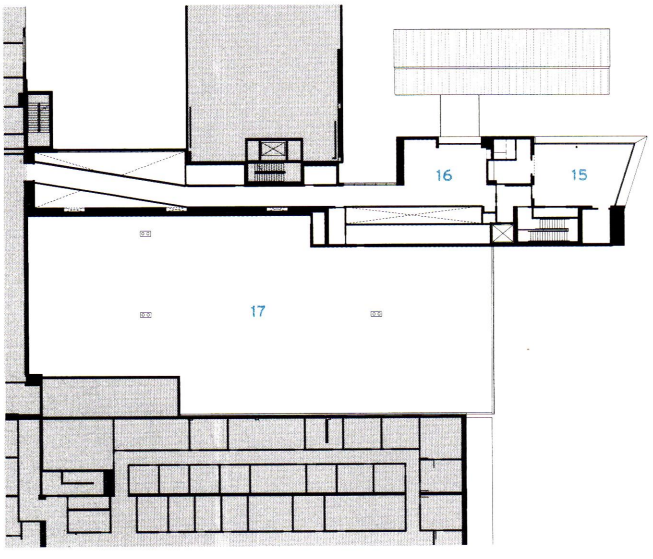
The main pediatric area occupies a large, open rectangular space on the ground floor, where the architect arranged the 17 exam rooms around the perimeter, with the staff area at the center. Sliding glass doors for the individual rooms allow them to be visually monitored, and Mahlum also came up with colorful wall graphics and indirect lighting to help reduce anxiety among the young patients. Other features are

NEW BEGINNING
Providence Sacred Heart Medical Center's new emergency entrance (opposite) is clad in bright-red metal panels with floor-to-ceiling glazing along much of the east facade. A narrow double-height atrium (right) marks the children's emergency room. On the second floor, large window walls partially covered by a metal perforated screen (below) bring light and views to the children's play area, used by patients and their siblings.

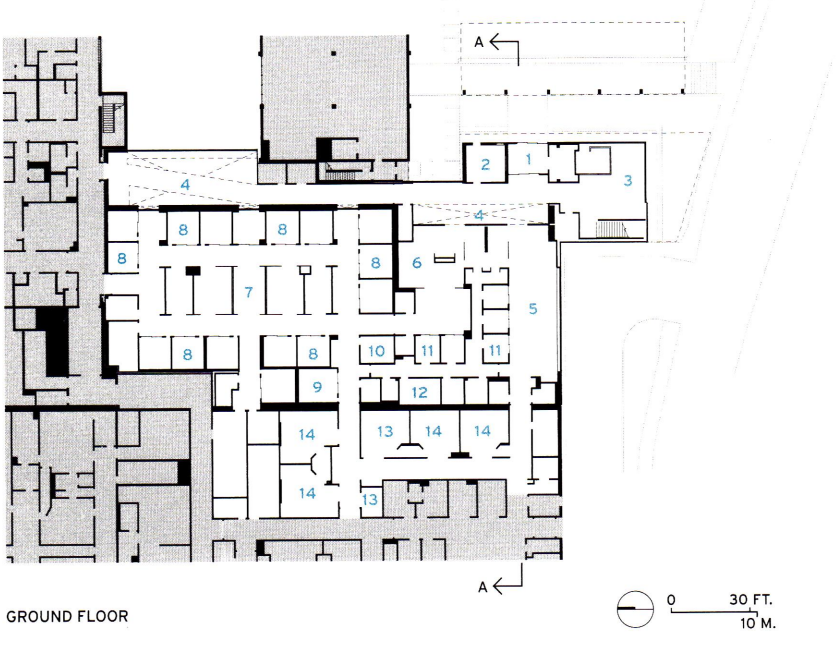
1 ENTRY
2 SECURITY
3 CAFÉ
4 ATRIUM
5 ADULT WAITING
6 PEDIATRIC WAITING
7 NURSES' STATION
8 EXAM
9 TREATMENT
10 FAMILY ROOM
11 TRIAGE
12 STAFF ROOM
13 RADIOLOGY
14 TRAUMA
15 CLUBHOUSE
16 RELAXATION
17 ROOF



SECTION A - A



SECOND FLOOR



GROUND FLOOR

meant to reduce stress as well. For example, the architect consolidated all of the medical equipment on a single horizontal band above each bed to keep the occupants from being overwhelmed by a jumble of plugs and cords. (In order to test out its ideas, the design team created a full-scale mock-up of a typical patient room and invited the staff to critique it.)

On the upper floor, a quiet seating area, with upholstered chairs and wood-paneled walls, imparts a domestic ambience for family members and visitors. Where the hall on the north turns into a bridge cutting across the northern double-height atrium, the architect covered the end wall with a photo-mural of a forest.

The glass-walled children's play area on that level has views to the south and east, of a small healing garden across the street and the city beyond. The toys, books, games, videos, and soft cushions in the play area are just one small benefit of the $3 million donation to the new wing from the Rypien Foundation. Mark Rypien, the former National Football League star and the Super Bowl's Most Valuable Player in 1992, created the charity after his son died of cancer at age three. "The Rypien Foundation was very engaged with these spaces," says McVey. "It wanted an environment that felt very safe, very nonclinical."

"It's almost too successful," says Michael Kelly, the hospital's director of facilities. "Patients and visitors from all over the complex come here to relax and escape the normal stress of a hospital stay." ■

John Cava is a Portland, Oregon–based architect and writer.

credits

ARCHITECT: Mahlum Architects – Gerald (Butch) Reifert, principal in charge; Gary Signs, project manager; Pierce McVey, project designer; Duncan Davidson, senior project architect; Wes Hoffman, project architect; Stacy Bender, P. J. Bauser, Steve Matsudaira, Jacob Strobl, Susan McNabb, project team

ENGINEERS: Coffman Engineers (structural/electrical); DCI Engineers (civil); MW Consulting Engineers (mechanical)

GENERAL CONTRACTOR: Bouten Construction

CLIENT: Sacred Heart Medical Center/Providence Health & Services

SIZE: 28,000 square feet

CONSTRUCTION COST: $18.6 million

PROJECT COST: $24 million

COMPLETION DATE: January 2013

SOURCES

CURTAIN WALL: Marlin Windows

METAL PANEL: Alcan Composites

GLASS: PPG Industries

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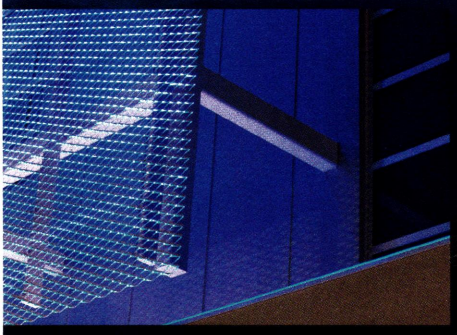

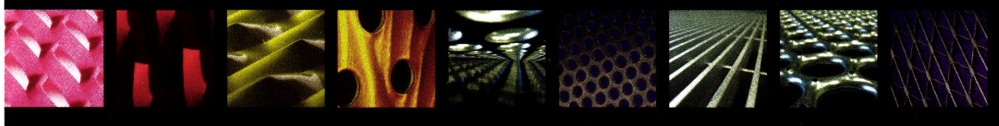

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CIRCLE 44

The New Master Builders

Architects warm to a project delivery method that makes them more integral to the construction process and reasserts their control over the final product.

By Joann Gonchar, AIA

FACT OR FICTION, it is a common perception that the design and construction process is plagued with problems: cost and schedule overruns, under-detailed design drawings, shoddy workmanship, disputes, and litigation. Some architects have been pursuing a remedy for this fraught situation—the project delivery method known as design-build. Until recently, most practitioners were reluctant to be too involved in construction. But that may be changing, with new approaches that make design-build a more viable alternative—one that gives the architect more control over the building process and the completed project.

According to the professional association the Design-Build Institute of America (DBIA), "design-build is a method of project delivery in which one entity—the design-build team—works under a single contract with the project owner to provide design and construction services." (With the more standard approach—design-bid-build—the owner hires an architect and a contractor separately and holds a contract with each.)

Fans of design-build tout its advantages. They say it provides the client with the convenience of a one-stop shop, or a single point of responsibility, for both design and construction. They maintain that it provides tight control of costs and schedules. And they claim it fosters greater collaboration, and therefore results in a less adversarial process, and ultimately produces higher-quality buildings.

The practice seems to be gaining momentum. According to a 2013 study by RS Means, a supplier of construction-costs data, design-build project delivery is used on 38 percent of nonresidential construction projects in the U.S., up from 29 percent in 2005. "It is not a fad. Design-build is here to stay," says Jim Whitaker, a principal in the Dallas office of HKS Architects and board chairman of DBIA. "It is just as important as sustainability and BIM [building information modeling] are."

JOHN M. ROLL U.S. COURTHOUSE Ehrlich Architects' $24 million courthouse in Yuma, Arizona, includes photovoltaic panels mounted on a weathered-steel entry canopy that supply 20 percent of the building's electricity.

PHOTOGRAPHY: © LAWRENCE ANDERSON

Some observers point to BIM and other digital technologies, and their potential for facilitating integration among project team members, as one factor in design-build's growth. "This integration is not as easily implemented with design-bid-build," says Michael Vardaro, managing partner at Zetlin & De Chiara, a construction-law firm.

A design-build team can be organized in a number of ways, though the most prevalent structure is contractor-led: the contractor holds the prime contract with the client, and the architect provides design services as a consultant to the contractor. According to a 2007 survey by the research firm ZweigWhite, contractors take the lead on 56 percent of design-build projects.

There is also an architect-led design-build (ALDB) delivery type. In this situation, the architect is the full-service leader of the project team, performing tasks such as hiring subcontractors, managing costs, and controlling construction means and methods, in addition to designing the building. Yet this format, with the architect at the helm, is rare: ZweigWhite says that design firms lead only 12 percent of design-build projects. (The remaining 32 percent are led by integrated design-build firms, the developer, or a joint venture.)

The dominance of the contractor-led method isn't surprising, since design-build first gained ground on projects where architecture

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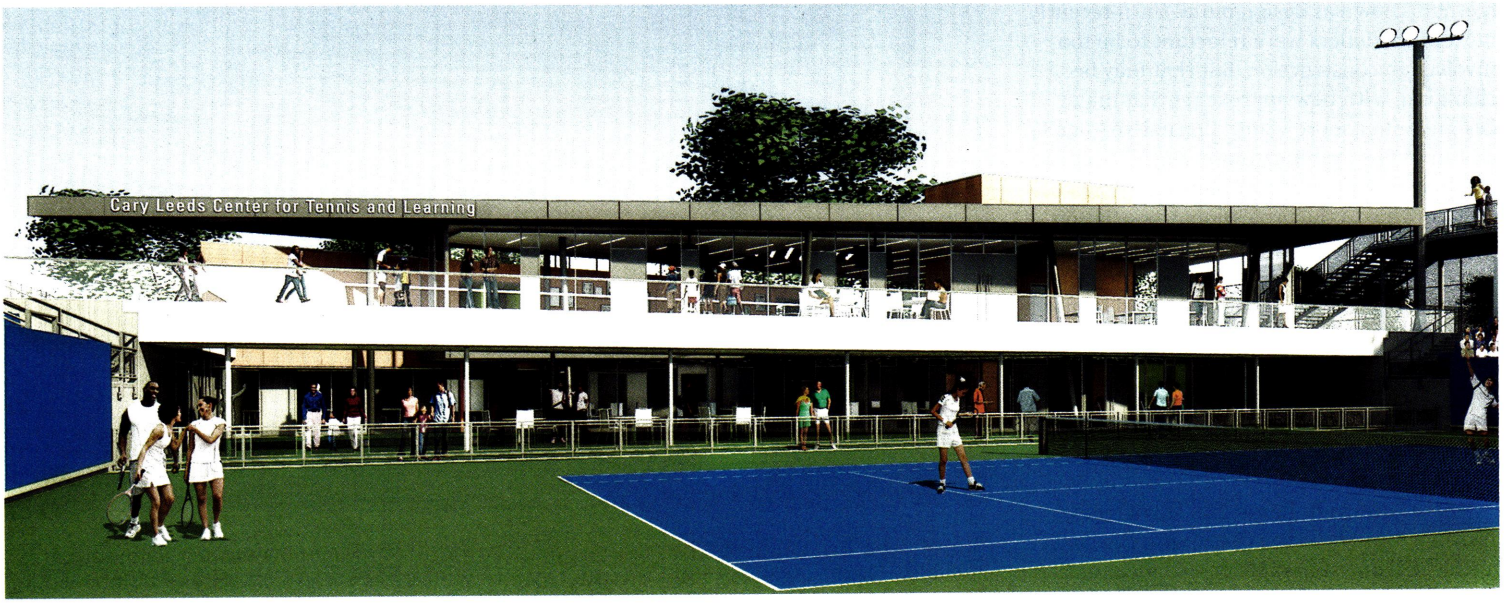

wasn't paramount, like roads or barracks. Nevertheless, some design-oriented architects, including Matthew Chaney, partner at Ehrlich Architects in Culver City, California, prefer the contractor-led process over the architect-led type. He cites insurance and design firms' limited bonding capacity as the challenges to ALDB, especially on large buildings like Ehrlich's recently dedicated 60,000-square-foot John M. Roll United States Courthouse in Yuma, Arizona. The $24 million building, which features photovoltaics mounted on a weathered-steel entry canopy, is the firm's second design-build project with the general contractor Sundt as lead. "Construction is not our core competency," says Chaney.

On the other hand, the architect-led process has its admirers. They maintain that design-build is especially well suited for buildings with a challenging site, a difficult program, or a tight budget. One of the most enthusiastic supporters, architect Peter Gluck, founder of New York–based GLUCK+, makes the case for the architect as the logical leader in his chapter on ALDB for the AIA's most recent edition of *The Architect's Handbook of Professional Practice*. Gluck argues that the owner benefits greatly from a process led by the architect who "originated the design and can take responsibility for its execution."

The ALDB approach affords what Gluck calls "informed freedom," allowing architects to invent and implement design solutions that might otherwise be deemed impractical or too expensive. He points to his firm's 12,000-square-foot facility for the Cary Leeds Center for Tennis & Learning, now under construction in Crotona Park in the Bronx, New York. When the $6.8 million clubhouse is completed early next year, New York children will be able to receive both free tennis instruction and academic tutoring.

As the project's design-builder, GLUCK+ was able to bring subcontractors onto the project early, in order to take advantage of their

RENDERINGS: COURTESY GLUCK+

CARY LEEDS CENTER
This 12,000-square-foot clubhouse (left and opposite, top and bottom) for a nonprofit that offers tennis lessons and academic tutoring to New York children is being designed and built by GLUCK+. To minimize the impact of the building on the surrounding municipal park, the firm has sunk the two-story structure and its adjacent tennis courts 12 feet below grade.

TROUSDALE HOUSE
Marmol Radziner's client for a Beverly Hills house (below) originally planned to hire a separate contractor, but then decided the firm's construction division was best suited for the job.

expertise on the clubhouse's civil construction challenges in the design phase. These complexities included sinking the two-story structure and its adjacent tennis courts 12 feet below grade. "The parks department wanted a building mindful of its context," says Deborah McFarlane Antoine, president and CEO of New York Junior Tennis & Learning, the nonprofit that will operate the center.

The building's defining element will be its thin, apparently floating triangular roof that comes to a knifelike point at one end. In order to preserve this architectural expression, GLUCK+ took some unusual steps, such as drawing mechanical and electrical elements as early as schematic design. The process not only ensured that the elements would fit between the finished ceiling and the roof deck without conflicting with structural elements, but it also provided a tool for discussing the design conceptually with the engineering consultants. It should also reduce the number of construction-phase surprises and the need for costly change orders.

Although GLUCK+ does not have its own construction tradespeople on staff, some architect-led design-build firms do, including Los Angeles–based Marmol Radziner. When they launched the firm in 1989, partners Leo Marmol and Ron Radziner couldn't find highly qualified contractors and craftsmen interested in working on their then modest commissions. So they built their projects themselves. "It was done out of sheer need," says Marmol. Since then, the company, known for luxurious houses that take their cues from Midcentury Modernism, has grown. It now includes, in addition to an 80-person architecture office, a construction division with its own concrete crew, carpenters, and metal and cabinet shops. The organization's integrated nature provides the architect with an unusual level of control over its projects, ensuring that "the design is fundamental," says Marmol, but also offering "a holistic view of cost and schedule."

PHOTOGRAPHY: © BARRY SCHWARTZ

Curiously, prospective clients are often unaware of Marmol Radziner's design-build expertise. Skip Paul, a senior advisor with investment firm Centerview Partners, hired the architect for a recently completed three-bedroom house in the Trousdale section of Beverly Hills simply because he "liked their very clean, Neutra-inspired work." Initially, Paul intended to have a separate contractor build the dwelling, which has deeply overhanging flat roofs and sliding glass doors opening onto terraces. But several months into the design process, he decided to hire Marmol Radziner's construction arm. It became clear, he says, "that they knew the vocabulary and understood how to translate it without compromising livability or aesthetics."

The most entrepreneurial architect-led design-build firms do away with clients altogether and act as their own developers. Such is the business model for San Diego–based architect Jonathan Segal, who has designed, built, and developed 20 projects since founding his firm 25 years ago. The arrangement gives him almost complete autonomy and flexibility, he says. "But I still have to answer to the building department and the banks," he concedes.

One project that demonstrates the firm's nimbleness is the 27-unit loft-apartment building The Q, in San Diego's Little Italy, completed in 2011. Characterized by floor-to-ceiling glass and projecting floor slabs, the building was first conceived as offices. But when the bottom fell out of the market in 2008, Segal was able to quickly get a new

THE Q Architect-developer Jonathan Segal had originally designed his 27-unit loft-apartment building (left) in the Little Italy section of San Diego as an office building. But when the economy tanked in 2008, he was able to convert it to residential use, even though the structure had been topped out and partially enclosed.

BELFIELD TOWNHOMES Three Philadelphia row houses (below, left and right), designed and built by Onion Flats, paved the way for the company's largest project yet—a 145-unit affordable-housing complex slated to begin construction in the fall. The current project, like the Belfield buildings, will depend on modular construction and is aiming for Passive House certification.

PHOTOGRAPHY: © JEFF DURKIN (TOP); SAM OBERTER (BOTTOM, 2)

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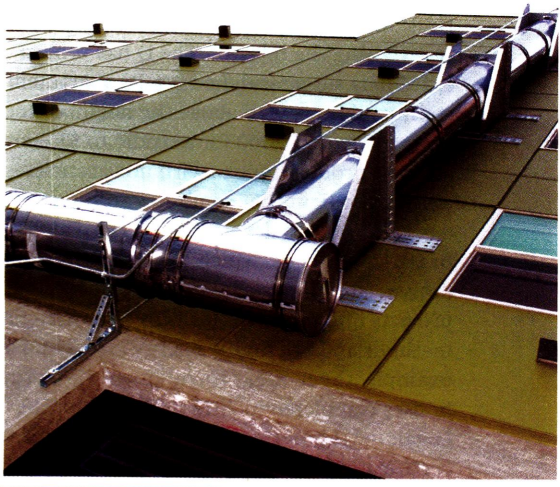

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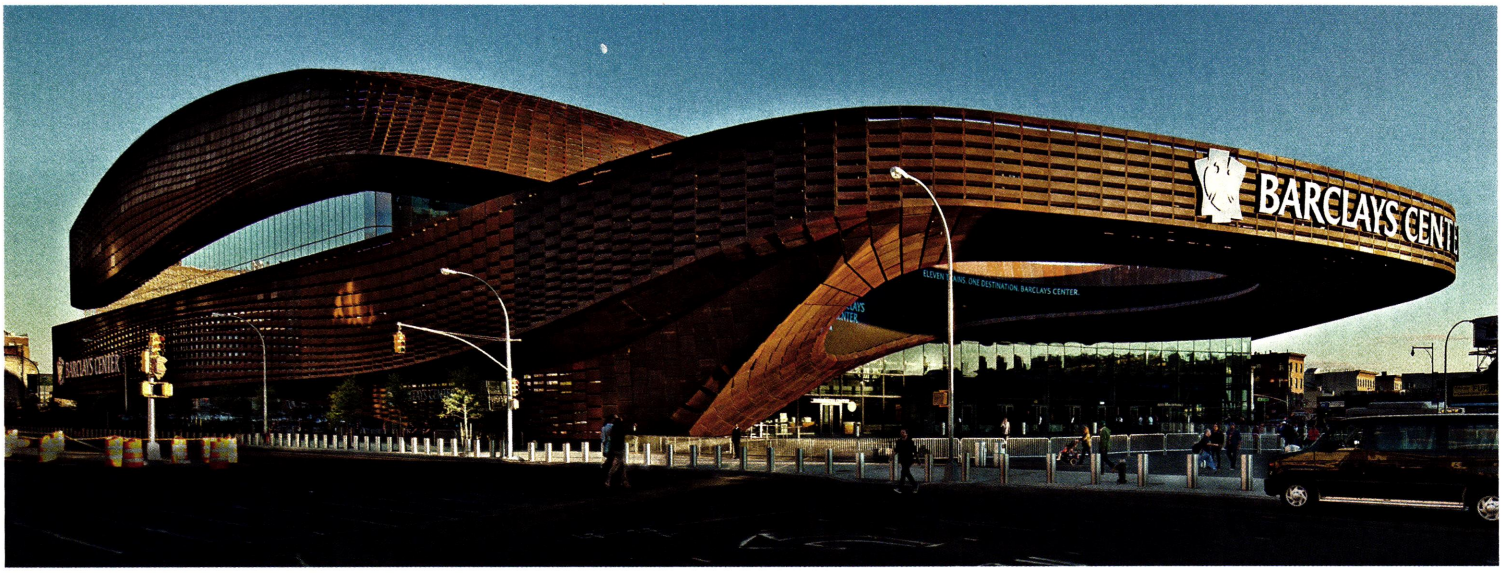

BARCLAYS CENTER Forest City Ratner, the developer of this 18,000-seat multipurpose arena in Brooklyn, turned to SHoP Architects to cloak an earlier, more utilitarian scheme. The architect, in turn, hired sister company SHoP Construction to help perform an accounting of the facade's thousands of components and integrate the skin's digital model with that for the base building. Once construction started, the SHoP spin-off worked as a consultant to the fabricator, helping detail the panels.

permit and convert the project to residential use, even though the structure had already been topped out and partially enclosed. Although the change in program meant modifications such as adding operable windows and redesigning the interior, The Q has proved extremely successful, he says. Its apartments command rents well above the neighborhood average—from $1,300 for a studio to $5,200 for a two-bedroom duplex—with no vacancies.

Another firm that combines architect-led design-build and development is Philadelphia-based Onion Flats, which has divisions for design, construction, and development. Its projects often deploy innovative construction methods and are highly energy-efficient. For example, the Belfield Townhomes, three row houses completed in 2012 in Philadelphia's Logan neighborhood, earned Passive House certification (an ultra-low energy designation)—the first to do so in Pennsylvania. The houses were assembled from factory-built wood-framed modules—a strategy that made them viable at less than $130 per square foot.

By demonstrating that high-performance design doesn't have to come at a premium, the Belfield houses have paved the way for Ridge Flats, the company's largest project yet. The 146-unit affordable-housing complex, which is targeting Passive House certification, is slated to break ground in Philly's East Falls section in September. Plumbob (the company's architectural arm) is designing it, while a joint venture of Onion Flats and the much larger Grasso Holdings is serving as developer. Although it will be built by a yet-to-be-named general contractor rather than by Onion Flats' construction division, Timothy McDonald, Onion Flats president, says his company is deeply involved in every aspect, from financing to property management, including design, construction detailing, and quality control on-site and at the factory where the apartments will be prefabricated. It "doesn't rely on our own hands to build it, but it maintains an intimate connection to those who do," he says.

A similar tie to the construction process appealed to New York–based SHoP Architects in its role at the Barclays Center, the 18,000-seat multipurpose arena in Brooklyn that opened in 2012. Here SHoP was hired directly by Forest City Ratner Companies, the developer, to dress up a utilitarian scheme created by the project's design-builder, Hunt Construction Group, with Ellerbe Becket (now AECOM) as its design consultant. SHoP devised a cloak of 12,000 unique preweathered steel panels that wrap the building like scales on a giant reptile. The architect in turn hired its firm's sister company, SHoP Construction, taking advantage of its expertise with digital technologies. SHoP Construction performed such tasks as coordinating the model for the new skin with Hunt's base building model as well as creating an accounting of the thousands of facade components. Once construction got under way, the SHoP spin-off served as the fabricator's consultant, helping detail the panels. "It was our way of maintaining control and not having the design shortchanged," says Jonathan Mallie, a principal with both SHoP entities.

There are myriad ways, it seems, that architects incorporate design-build into their practices. But, regardless of the approach, the goal is the same: to reassert control of design and construction and the quality of the final product. "At the end of the day," says Peter Gluck, extolling the benefits of ALDB, "it's all about design and making really good buildings that work." And who knows? It might just be the way of the future. ■

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Learning Objectives

1 Explain how the design-build project delivery method works.

2 Explain how the design-build project delivery method differs from design-bid-build.

3 Describe different types of design-build and the advantages and limitations of each.

4 Discuss the roles and responsibilities of the architect in different types of design-build projects.

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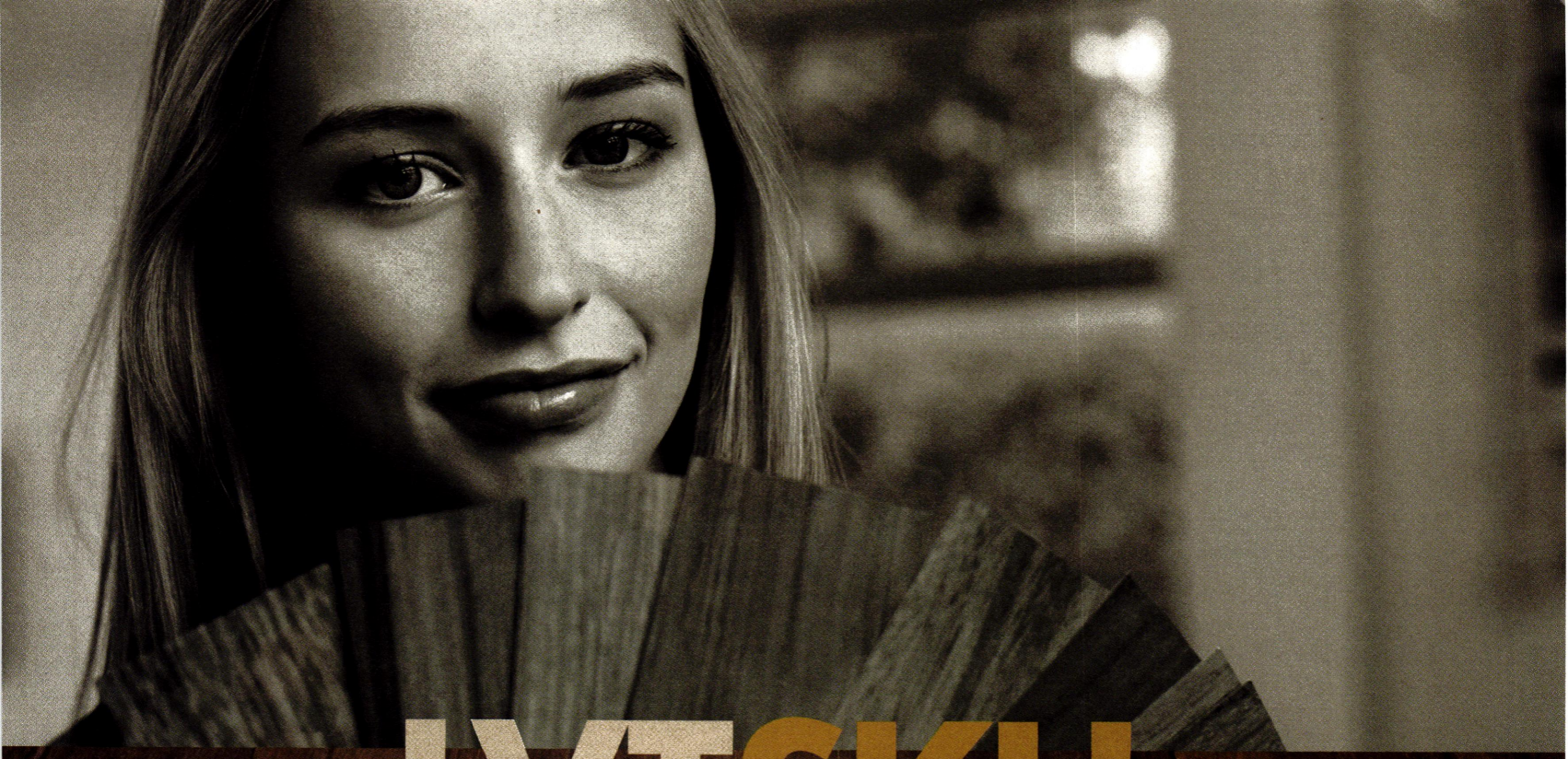

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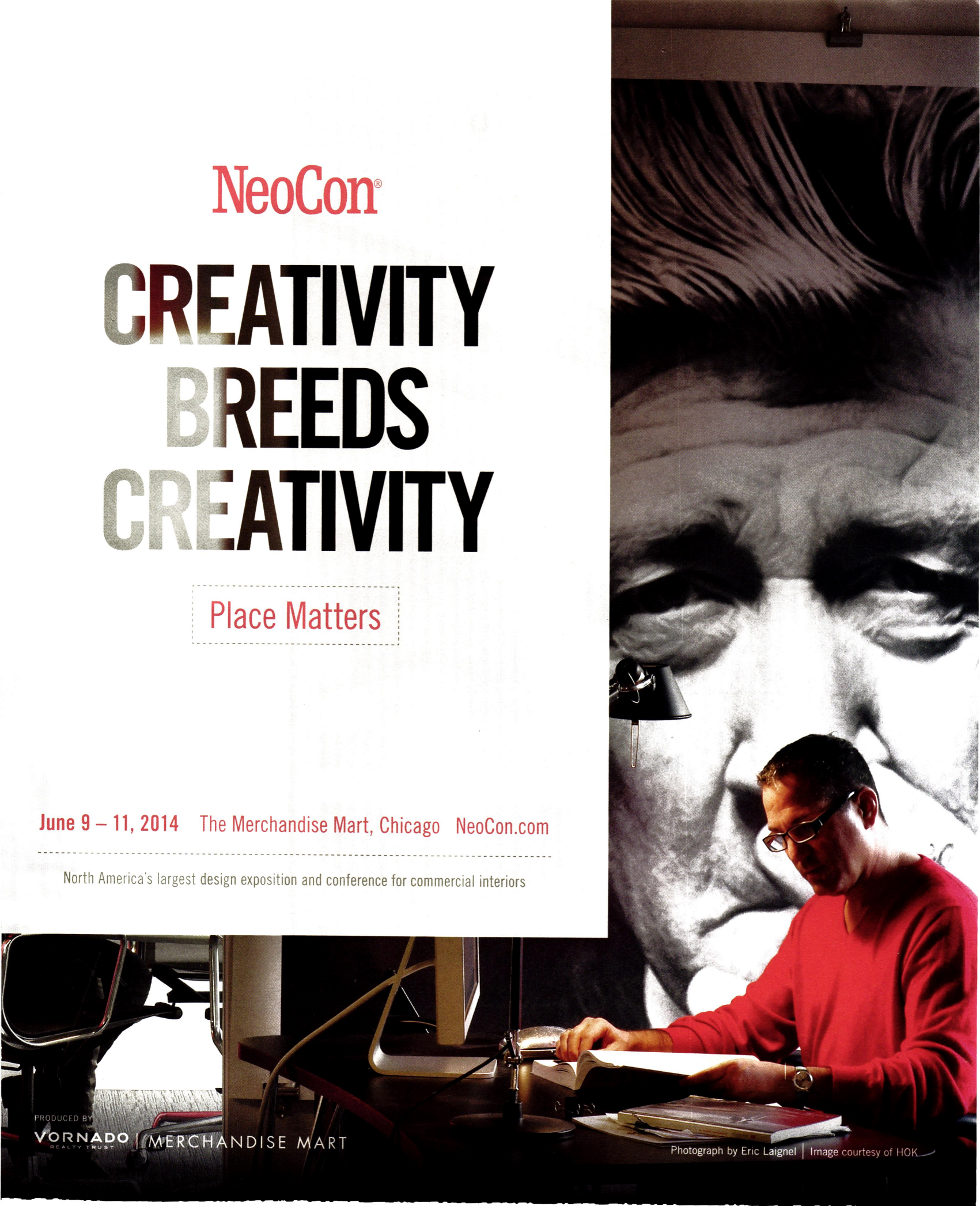

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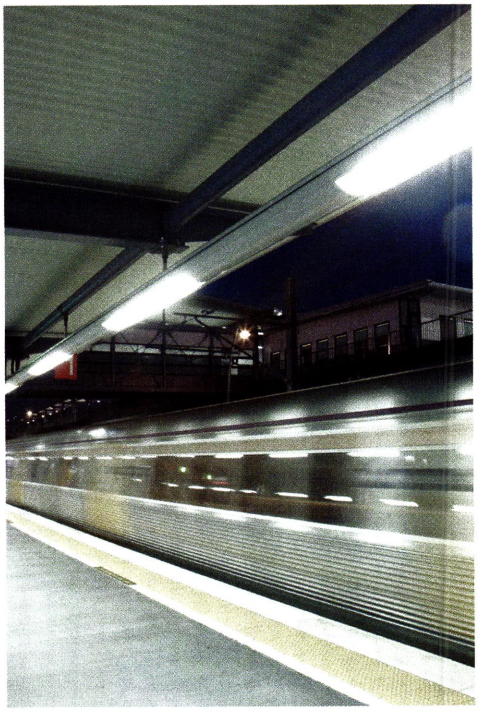

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CIRCLE 42

Simply Divine

Daylight, augmentd by an illuminated dome, bathes a baptismal font as reimagined by John Pawson for the St. Moritz Church (circa 1019).

PHOTOGRAPHY: © GILBERT MCCARRAGHER

Manipulating elements of light and shadow—derived from both the sun and man-made sources—the design teams of the projects that follow aim to reimagine, realize, or pay tribute to historic religious structures: an 11th-century Catholic church in Augsburg, Germany, Antoni Gaudí's Sagrada Família Basilica in Barcelona, and a museum in Ise City, Japan, dedicated to the traditions of a cloistered Shinto shrine complex.

160 St. Moritz Church
166 Temple Expiatori de la Sagrada Família
170 Sengukan Museum
175 Products

St. Moritz Church

Augsburg, Germany

John Pawson Ltd.

Mindseye Lighting

By Chris Foges

"SIMPLICITY," SAYS John Pawson, "allows us to focus on the things that matter." The British architect's "minimalist" renovation of the Catholic church of St. Moritz in Augsburg, Germany, embodies that idea. Stark white walls, a pale limestone floor, and finely crafted oak joinery give a harmonious expression to the diverse parts of a building formed in a thousand-year process of addition and subtraction, but also serve the project's greater purposes: to strengthen the connection between the architecture and the rituals of the church, and to engender a sense of the sacred.

The manipulation of light—both daylight and electric—played a critical role in Pawson's plan. Its effects are mostly subtle. Visitors should not feel that they are watching a show, explains the architect—but the first experience of the building is spectacular. From the newly reinstated west entrance door, a visitor's gaze is drawn through the full length of the building to the east, where windows lining the rounded apse have been replaced with panes of white onyx. During the day, the apse fills with diffuse light–and a hint of the numinous–while the translucent stone provides a point of visual interest on which the eye can comfortably rest.

For morning Mass, daylight from the apse and clerestory windows provides sufficient illumination with minimal assistance from the recently installed lighting fixtures. Bright sunlight-filled windows lead visitors to perceive that the room itself is bright, says project architect Jan Hobel. "By indirectly lighting the walls of the nave so that its surfaces appear brightly lit, we can enhance that perception, and therefore need a lower level of illumination overall."

The effect of light on the perception of space is also used to direct the attention of the congregation toward the altar in the chancel, in accordance with the church's liturgical principles, and give a sense of proximity to the proceedings. From the pews in the nave, the relatively dark side aisles recede from consciousness, as does the choir, which is situated between the congregation and the radiant apse, giving greater prominence to a figure of Christ that stands in isolation, bathed in light.

Working in collaboration with the London-based lighting design firm Mindseye, the architect devised a scheme that adjusts to change the perceived shape of the space to suit the variety of events taking place in the course of the liturgical year. The control system offers over 30 distinct "scenes." For ordinary evening services, floor-recessed LEDs highlight the columns with warm white light to make the nave feel "narrow and cozy," explains lead lighting designer Admir Jukanovic, while for larger celebrations, the whole space is brightly lit, revealing its more flamboyant Baroque-inspired domes and high windows. At the end of the Mass, another "scene" illuminates the west wall, subtly drawing the congregation toward the exit. Afterward, the church is open to the general public, and light levels rise in the aisles to encourage strollers to explore its collection of statues, now housed in backlit niches on the side walls.

As magicians know, we are fooled by illusions whose preparation requires more effort than the onlooker would ever suspect. At St. Moritz Church, the use of light to set the mood or direct traffic is enabled by an impressive array of technology—effective because of the lengths to which the designers have gone to conceal it. Hidden LEDs project vivid halos around the shallow vaults above the nave. Functional task lighting for activities below comes from metal halide luminaires secreted behind existing 5-inch vents in the vaults' plaster shells. They provide levels of 200 lux onto the pews—enough to read by. At the eastern end of the building, where more light is required, the narrow lenses of nine halogen projectors are directed through newly made

SERENE RESTRAINT Onyx panes admit diffuse daylight into the apse, where strong backlighting and front spots enhance the apparent size of a Christ figure seen from the nave. Dark oak choir stalls and metal mesh screens conceal an organ and a private gallery.

PHOTOGRAPHY: © GILBERT MCCARRAGHER (THIS PAGE); MARCUS SCHRÖTHER (OPPOSITE)

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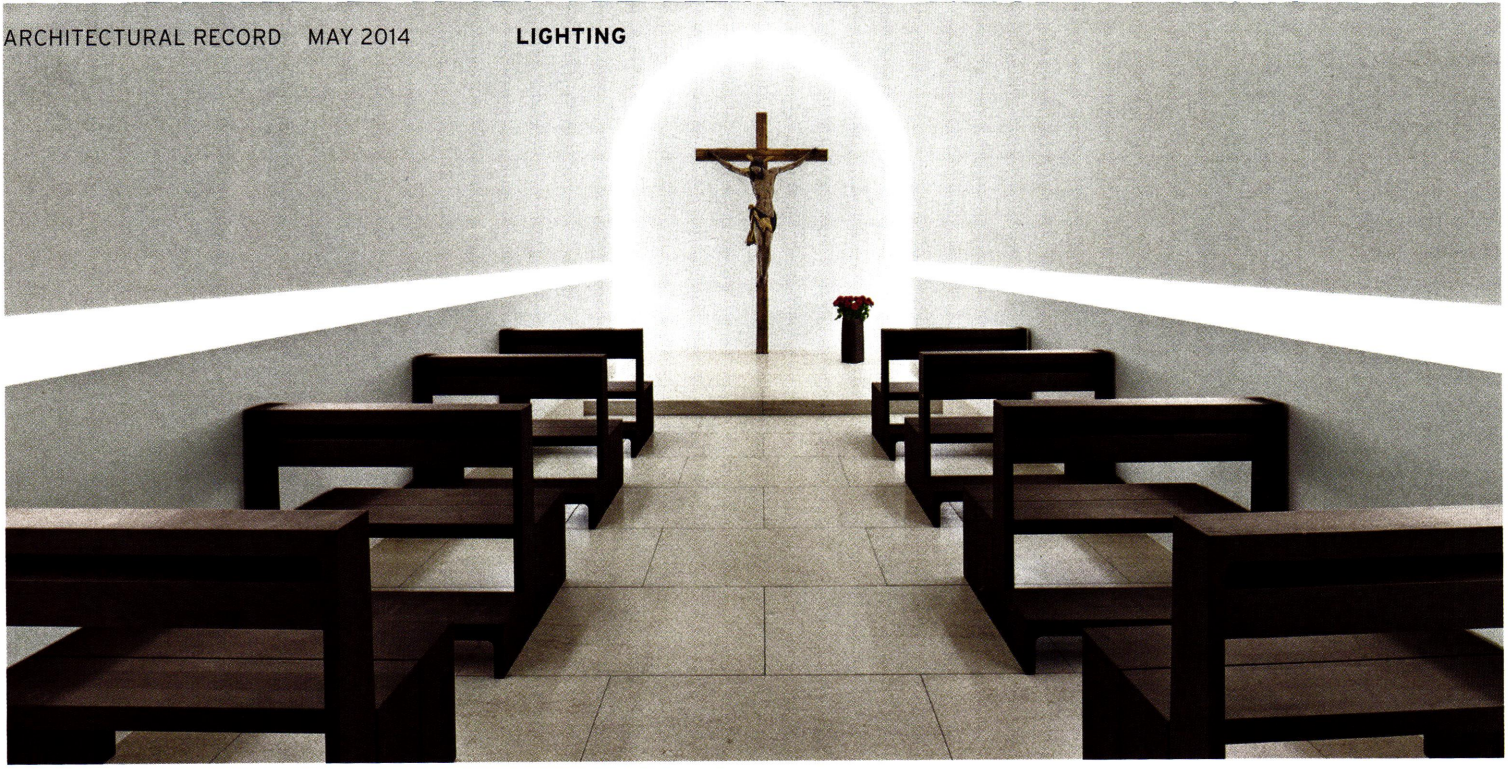
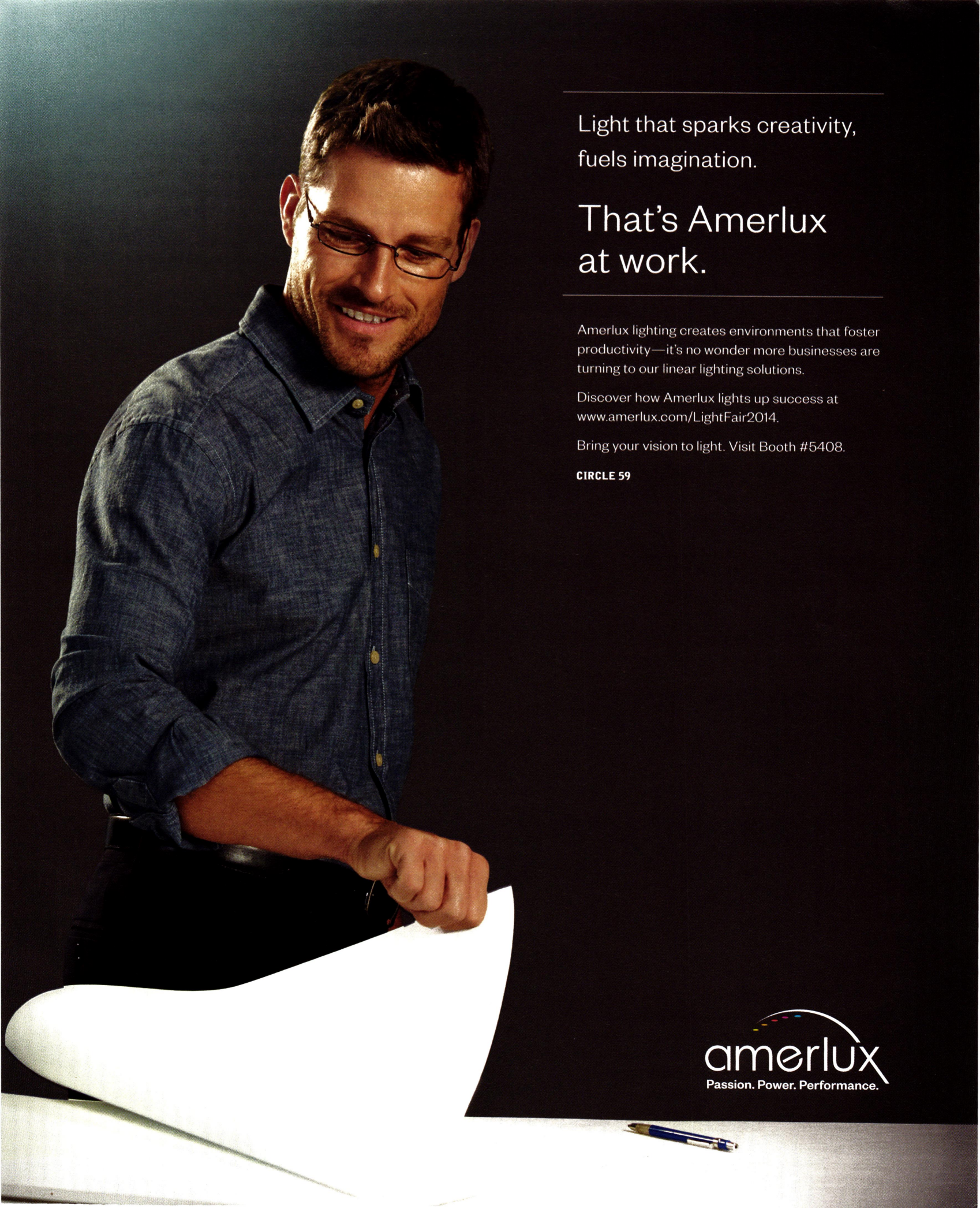


LIGHTING THE WAY An amalgam of light sources in St. Moritz Church creates distinct identities for the church's small chapels. One, the Langenmantel Chapel (not shown) blends candlelight and borrowed daylight to foster a contemplative atmosphere, while in the Sacrament Chapel (top, and bottom at rear), where two existing windows were blocked to remove daylight, concealed LEDs give a warm glow, and a crucifix is bathed in soft light from two projectors.

PHOTOGRAPHY: © GILBERT MCCARRAGHER (BOTTOM); MARCUS SCHRÖTHER (TOP)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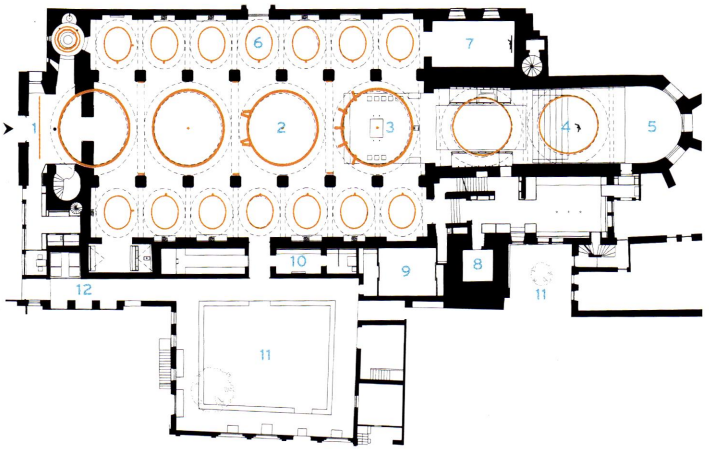
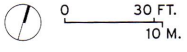


HIGH-LEVEL LIGHTING PLAN

MEDIUM-LEVEL LIGHTING PLAN

LOW-LEVEL LIGHTING PLAN



1 ENTRANCE
2 NAVE
3 ALTAR
4 HIGH CHOIR
5 APSE
6 AISLE
7 SACRAMENT CHAPEL
8 TOWER ROOM
9 MEDITATION ROOM
10 CONFESSION CHAPEL
11 COURTYARD
12 PASSAGE

apertures in the vault above the altar, hidden from view by an upturned cornice.

Equal care is taken to control how and where light falls. LED wall-washers illuminating the arches that span the nave have been adapted to prevent any spill onto the wall behind. This same attention to detail is evident in the handling of the small rooms accessed from the aisles. In the Sacramental Chapel, horizontal light slots guide the eye to a crucifix framed by an arc of light that spills from the junction between walls and vaulted ceiling, while, in the baptismal chapel, the font sits beneath an oculus that opens onto an illuminated dome suggesting infinite space above.

Such a quietly potent fusion of light and architecture quickly disproves the first impression of homogeneity conveyed by its minimalist color and material palette. That Pawson is able to speak of this rich, technically sophisticated project in terms of its simplicity is, perhaps, the measure of its success. ■

LUMINOUS ARC
Eight carved sculptures of the apostles were relocated from the main nave to niches in the aisles (one pictured above) to "achieve a clearer visual field." They are lit by LEDs concealed behind limestone plinths and by spotlights within the shallow domes overhead.

credits

ARCHITECT: John Pawson Ltd. – John Pawson, principal; Rainer Heuberger, executive architect; Jan Hobel, Reginald Verspreeuwen, project architects

LIGHTING DESIGNER: Mindseye Lighting

ENGINEERS: Dr. Schütz Ingenieure (structural); Ingenieurbüro Ulherr (mechanical)

CONSULTANTS: Müller BBM (acoustical); Elektro Seitz (electric)

CLIENT: Diocese of St. Moritz

SIZE: 20,000 square feet

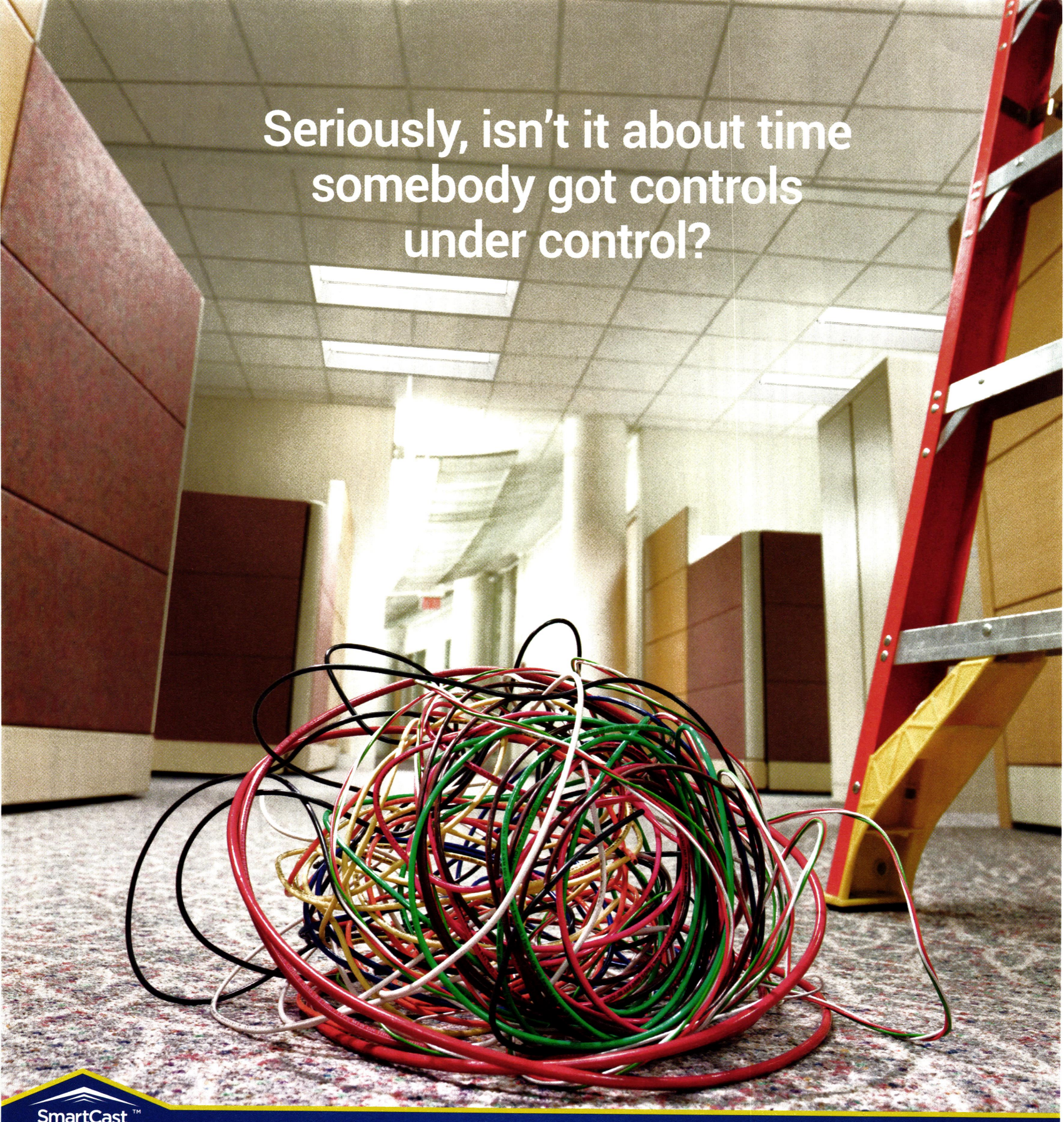
COST: withheld

COMPLETION DATE: April 2013

SOURCES

LIGHTING: ETC, LTS, iGuzzini, Precision Lighting, RUCO, Alexander Weckmer, Whitegoods, Martini, Norka, Vexica, Meyer (fixtures/luminaires); Dynalite (controls)

PHOTOGRAPHY: © MARCUS SCHRÖTHER



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PHOTOGRAPHY: © TEMPLE EXPIATORI DE LA SAGRADA FAMÍLIA (EXCEPT AS NOTED); © RAFAEL VARGAS (THIS PAGE)

La Sagrada Família

Barcelona

Antoni Gaudí/Jordi Faulí

Anoche

By David Cohn

LIGHTING AN ICONIC building designed more than a century ago is a challenge—especially when the project was never completed. Yet the inventive solutions for the nave of Antoni Gaudí's La Sagrada Família Basilica in Barcelona—still under construction 88 years after the architect's death in 1926—offer a close-up view of how contemporary designers are bringing this eccentric masterpiece to fruition. Their efforts are a labor of imaginative extrapolation, as anarchist militiamen destroyed all of Gaudí's original plans and models during the Spanish Civil War in 1936, when little more than the four towers of the Nativity Portal were complete. Using pieces of smashed plaster models, surviving molds, photos, written testimonies, and other documents, successive teams of architects have worked since 1940 to push the project forward. In this process, they have filled in unspecified details as best they could, working with artists and craftsmen, with controversial results but great popular success.

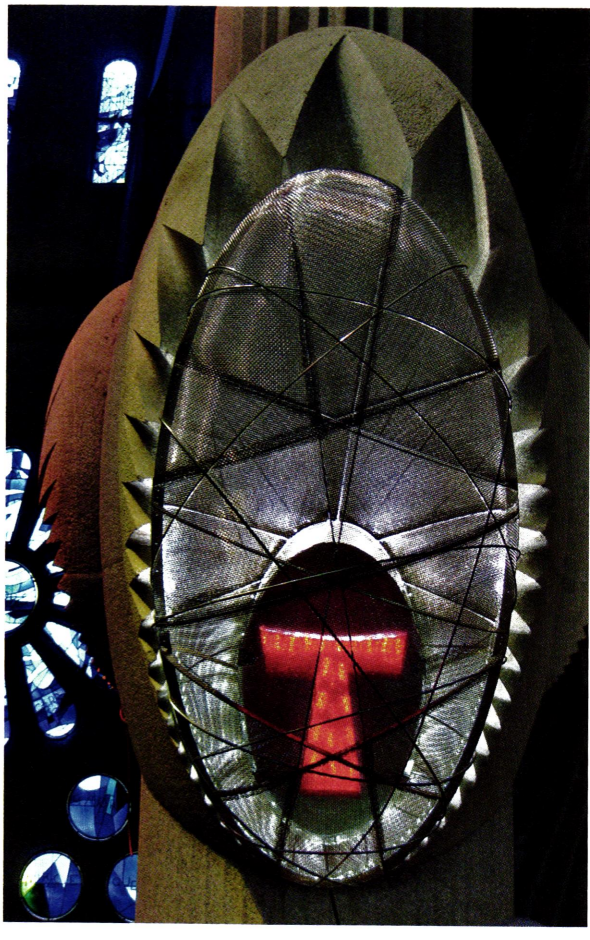
Pope Benedict XVI consecrated the nave in 2010, although many details were unfinished. The current chief architect for the Catholic foundation responsible for the project, Jordi Faulí, is now building the main portal and five towers over the crossing and apse. He hopes to complete the basilica, officially known as the Temple Expiatori de la Sagrada Família (Expiatory Temple of the Holy Family), in time for the centennial of Gaudí's death in 2026.

When it came time to consider lighting the nave, the design team—including Barcelona-based lighting specialists Anoche Iluminación Arquitectónica, led by Marià Vallès (with earlier contributions by architect Xavier Ferrés and the firm Biosca & Botey)—found both basic concepts and a surprising number of details in Gaudí's words and recovered documentation. These contained photos of plans and models, which they studied and meditated upon as if they were themselves sacred texts. Citing the written testimony of his disciples, collected after the master's death, Faulí explains, "The light in the temple should be harmonious but limited, neither too much nor too little, Gaudí said. And with a clear intent, to create an atmosphere conducive to meditation and the celebration of the Mass." Amid the branching columns and hyperbolic vaults of the nave, Gaudí foresaw a regular distribution of luminous symbols, starlike point lights and nearly 300 skylights illuminated by both daylight and electricity, "like the light that enters a forest canopy," Faulí comments. "He wanted the light to increase towards the altar," and so the original design provided two larger skylights over the apse and crossing, dedicated to God the Father and the Holy Spirit.

The level of detail that the design team has found for these lighting elements amid the fragments of Gaudí's studio is astounding, though they haven't hesitated to use the most advanced technical means to realize them. For the 300 smaller skylights of the vaults, Faulí quotes Gaudí directly, as recorded by a disciple: "The skylights of the central nave are equipped with large lanterns, made with metal fabric with diverse meshes to produce a glimmering light." A tiny original plaster cast of one, embossed with a miniature religious symbol, survives from a destroyed model.

With this as a reference, the Anoche team developed a fixture with a lightweight aluminum frame. Finished in stainless-steel mesh, this large luminaire adapts to the hyperbolic form of the skylight opening, and houses a ring of LEDs inside its perimeter. They suspended the fixture just below the opening, to emit light laterally across the vaulted ceiling. Craftsman Josep San Juan made the diffusers in fused colored glass, with Gaudí's symbols as interpreted by artist Antoni Vila.

Anoche also designed a variation on this LED fixture for the illuminated medallions that decorate the ellipsoidal "knots" or capitals of the piers, which connect the main shafts to their branching arms. Here crisscrossing loops of flexible steel rods and wire secure the glass diffusers in place against the stainless-steel mesh behind them. (A work in progress, only a



MASTERFUL VISION
Lighting elements are an integral part of Gaudí's hyperbolic vaults (opposite). They include 300 skylights with fused-glass medallions in the center of the vaults, illuminated by both natural and artificial means (left), point lights hidden in recesses in the vaults, and sconces with illuminated symbols representing dioceses of the world on the ellipsoidal column capitals (above).

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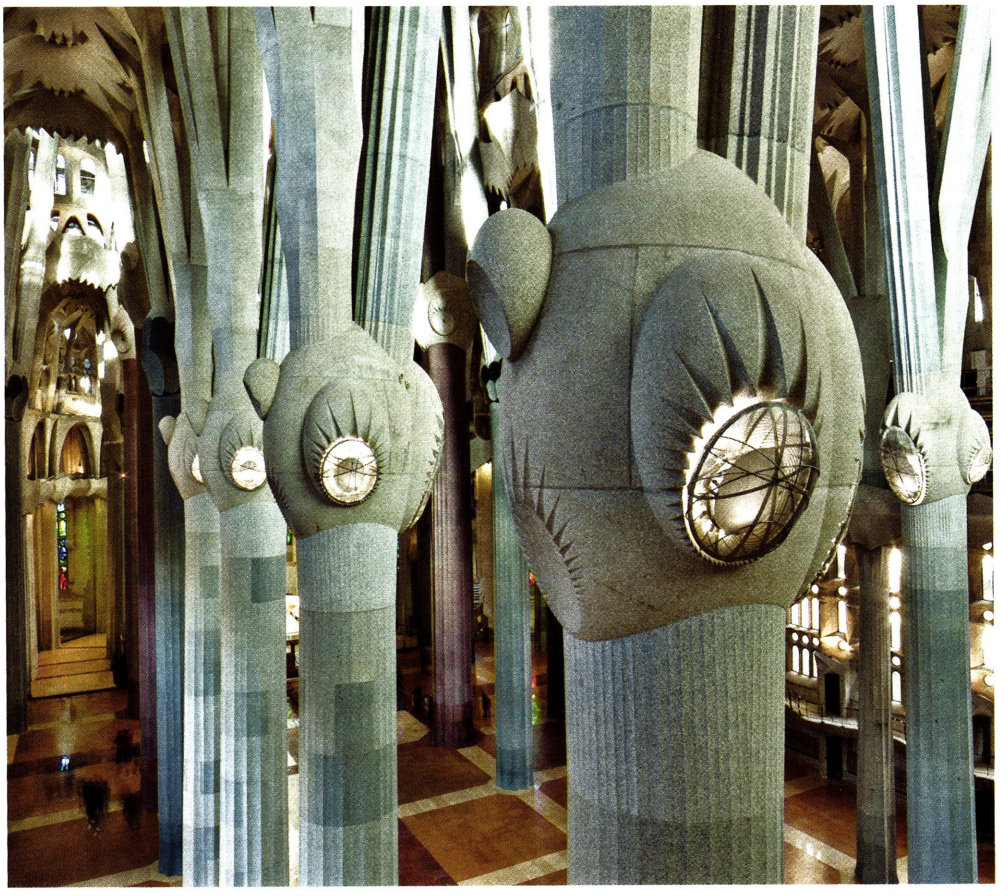
HIGH LIGHTS The lighting designers reveal a mock-up of a sconce framed in aluminum for the column capitals (below). Glass is held against the stainless-steel mesh of the fixture by loops of steel rods and wire (right and below). Most of these sconces are fitted with temporary lenses. Skylights over the crossing and apse (opposite)—still incomplete—are supplemented by spots and heighten the light in the altar precinct.



credits

ARCHITECT: Temple Expiatori Sagrada Família technique office (Department of Project) – Antoni Gaudí, design architect (1882-1926); Jordi Bonet (1985-2012); Jordi Faulí (from 2013), project architects

LIGHTING DESIGN: Biosca & Botey (1995-2006); Anoche Iluminación Arquitectónica, Ferrés Arquitectos (from 2006)

ENGINEERS: 2BMFG Arquitectes (structural)

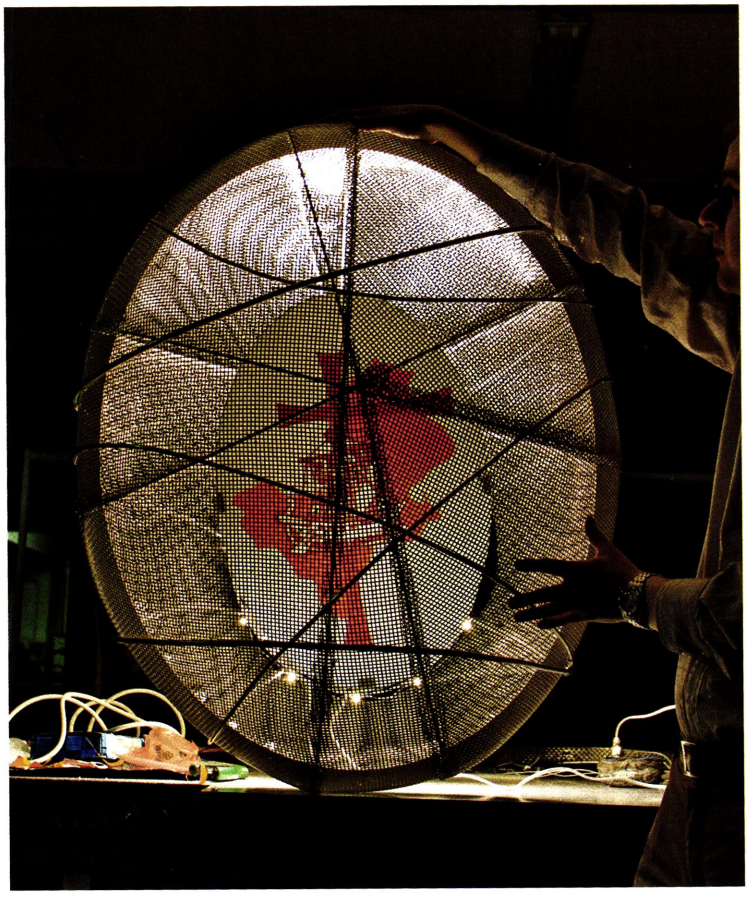
CLIENT/GENERAL CONTRACTOR: Foundation Junta Constructora Temple Expiatori de la Sagrada Família

SIZE: 48,500 square feet

COMPLETION: 2026 (projected)

SOURCES

LIGHTING: Philips, Vossloh-Schwabe, Troll, Simon Lighting, Tronics, LED A Porter (LEDs and fixtures); Daly (controls)



handful of the fused-glass medallions have been finished; the remaining fixtures have temporary glass lenses).

The designers chose LEDs as the light source in these particular fixtures to achieve an even and indirect illumination. Additionally, they plan to replace existing halogen downlights—temporarily installed for the papal visit in the starlike point lights of the vaults—with LEDs, which offer a smaller point of emission and a softer, subtler light. These point lights are to be installed in recesses that Gaudí designed in the ribs of the vaults. Vallès marvels at Gaudí's apparent foresight, remarking, "Nothing in his time could have effectively thrown light 130 feet," the distance from the vaults to the floor of the nave.

Lighting around the altar is also provisional at present. Twenty-four LED spotlights illuminate the ring of columns around the apse to define the altar precinct. This role will be taken over by fixtures in the two large skylights above the apse and crossing, according to Faulí. In the one completed skylight, sunlight mixed with the beam of a hidden spotlight spills down the golden inlay tiles of the vault around the opening like a radiant shower, giving the nave a dramatic point of focus. During the day, these features will have to compete with the light from the stained glass windows of the nave (many still unfinished), but the temple's designers are confident they can balance the overall effect.

While the basilica is Barcelona's most popular attraction, with over 2 million visitors a year, Vallès insists that their goal is not to light the architecture, as in other historic churches. "The lighting serves the function, which is worship," he says. Gaudí and his faithful design team conceived of the lighting systems not as a modern technical intrusion but as an integral element in the architecture and its symbol-laden decoration. The different fixtures are as much a part of the hyperbolic vaults and piers of the nave as its stained glass windows. ■

PHOTOGRAPHY: © RAFAEL VARGAS (TOP AND (OPPOSITE)

Sengukan Museum

Ise City, Japan

A. Kuryu Architect & Associates

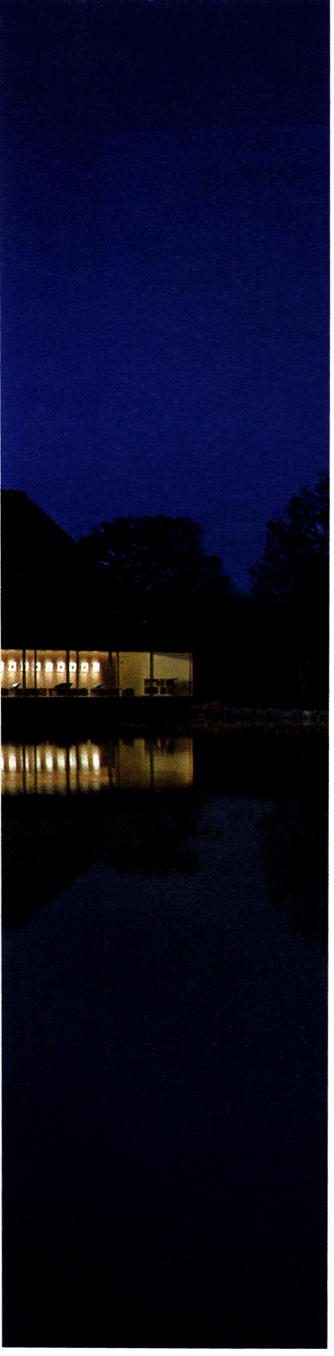
Lighting Planners Associates

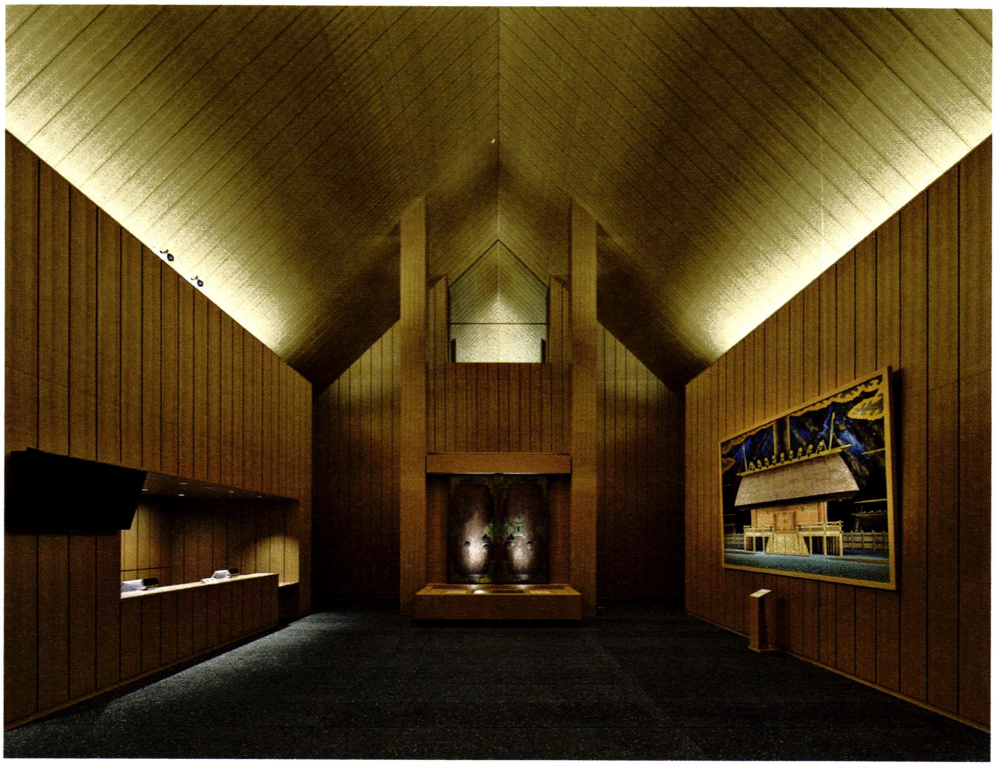
By Naomi R. Pollock, AIA

DEDICATED TO the goddess Amaterasu, Japan's highest Shinto deity, the country's two most sacred sites are the Naiku and the Geku sanctuaries within the Grand Shrine complex at Ise, in the Mie prefecture. Every 20 years, the simple wooden structures supported by wood columns and topped by thatched roofs, undergo a ritual reconstruction. Each of the two buildings is dismantled and erected anew on an adjacent site by highly specialized carpenters. Though this cycle has been going on for centuries, the individual shrines are so revered that they are kept under wraps, leaving most people unaware about what actually takes place. To shed light on the secretive ceremony, known as Sengu, shrine officials commissioned the Tokyo architect Akira Kuryu to design an Ise Shrine Sengu museum where, for the first time, visitors are able to view large-scale models of and artifacts salvaged from the buildings. Because he needed good lighting to accentuate the displays, Kuryu turned to the Tokyo-based Lighting Planners Associates (LPA).

Kuryu's L-shaped building is located near the entrance to the Geku (or outer) precinct and hugs an iris-studded pond. One leg contains a glazed rest pavilion, the other the museum, a single-story sequence of symmetrically organized spaces crowned by a massive pitched roof made of cast iron.

LPA developed an illumination plan that creates a series of contrasting light and dark spaces. "Merging natural and artificial light was the most important consideration," says lighting designer





LUMINOUS SERENITY
Lit primarily from within, the Sengukan Museum glows like a paper lantern (opposite). Inside the reception area (left), spotlights call attention to the *tobira* doors, while cove lights illuminate the pitched ceiling. In the main gallery (below), a split-level floor accommodates two large models: a 1:20 recreation of the entire Geku precinct and a 1:4 version of the Geku shrine itself.

PHOTOGRAPHY: © TOSHIO KANEKO

PICTURE THIS North and south display corridors, with differing daylight exposures, wrap the central exhibition halls. On the north side (above), a low window (a *jimado*) –beneath wall displays like the realistic landscape here–hugs the floor, revealing white pebbles outside.

Kaoru Mende. Blending the two enabled the museum to rely on daylight during its hours of operation (it closes at 4 p.m., except on special holidays), so visitors are able to view the displays as if in the shrine's natural setting.

Mende and his team lined the museum's approach with LED uplights, controlled to respond to outdoor conditions. These are embedded in the paving and continue into the reception area, guiding visitors inside, and helping the eye shift from exterior to interior light levels. Here, ceiling-mounted fixtures with 3,000-Kelvin, 32-watt fluorescent lamps and daylight-sensing dimmers provide ambient light. Task lights brighten the admissions desk, and halogen spots illuminate ornate *tobira* doors that once belonged to the Geku shrine but now greet gallery visitors.

Enclosed by large glass panes along one wall, the building's south corridor opens to expansive pond views and a flood of sunshine, while the shadowy north corridor is lined with a low window yielding limited views of the pebbly ground outside and a band of daylight at the wall's base. Concealed LED tapes extend the length of the glass, while recessed LED spots in the ceiling highlight wall-mounted displays. "We always try to integrate fixtures with the architecture," remarks Mende.

By contrast, the main gallery has no external exposure. Instead, its carefully calibrated luminous ceiling mimics the aura of a cloudy day. "Unlike [the way it is] in a [Christian] church, the lighting should be diffuse, to convey the spirit of Japanese space," explains Mende. The lighting team achieved this effect using metal halide spotlights and a ceiling of glass cloth. "It looks like wool but is made of glass fibers," explains Kuryu. Evenly spaced behind and along the base of a ceiling pitched at 45 degrees, the lamps are covered by oval spread lenses that distribute the light upward to the ridge. Minute adjustments to the lamps and their lenses help limit hot spots of higher lux levels near the ridge. "It was our challenge to make it even," says Mende.

By paying close attention to the sun's daily cycle, keeping the installed lighting elements to a minimum building-wide and fine-tuning the intensity of each one, LPA makes it seem as if there are barely any lights at all. ■

credits

ARCHITECT: A. Kuryu Architect & Associates – Akira Kuryu, principal

ARCHITECT OF RECORD: Tatsuo Iwasa

LIGHTING DESIGNER: Lighting Planners Associates – Kaoru Mende, Mari Kubota, Tsutomo Nagatsu

ENGINEERS: Katsuo Nakata Engineering

GENERAL CONTRACTOR: Taisei Corporation

CONSULTANTS: Placemedia Landscape Architects Cooperative (landscape)

CLIENT: Jingu Shikinen Zoueicho

SIZE: 21,200 square feet

COST: withheld

COMPLETION DATE: 2012

SOURCES

LIGHTING: Yamagiwa, DN Lighting, Toki (ambient interior lights); Yamagiwa (downlights, exterior); Modulex, Daiko, Yamagiwa, Erco (spotlights); Panasonic (controls)

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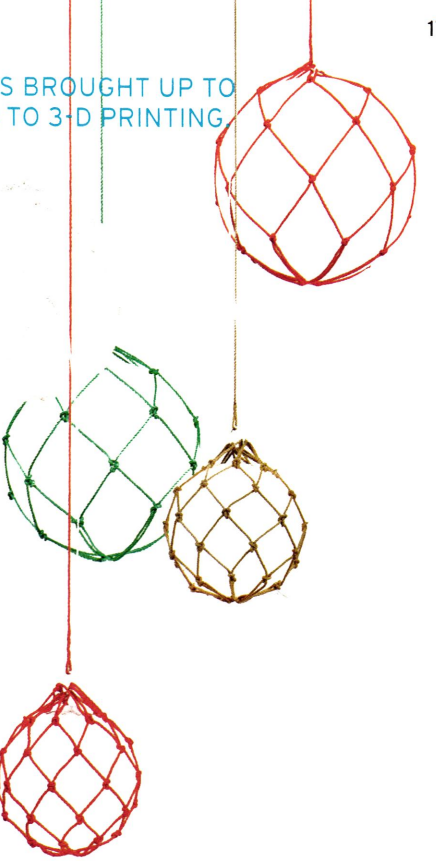
BY SHEILA KIM

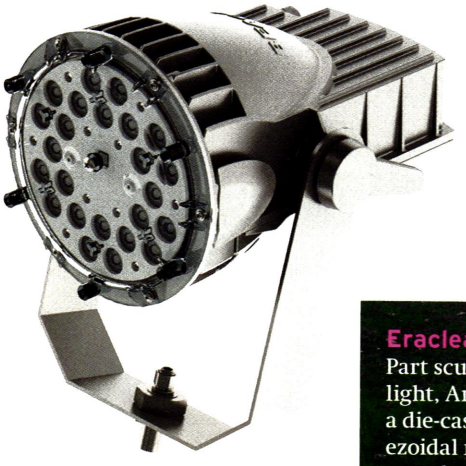
Trilia

Launched at Light + Building in Frankfurt, this Winona fixture was conceived to give architects and designers greater freedom in creating light compositions. Trilia features a tripod-like shape of 24 square OLED panels that can be grouped in multiples to produce a variety of patterns along ceilings and walls. Touted as the next generation in efficient lighting, OLEDs transmit light through surface areas as opposed to points. The luminaire is available with color temperatures of 3,000K, 3,500K, and 4,000K. acuitybrandsoled.com CIRCLE 211



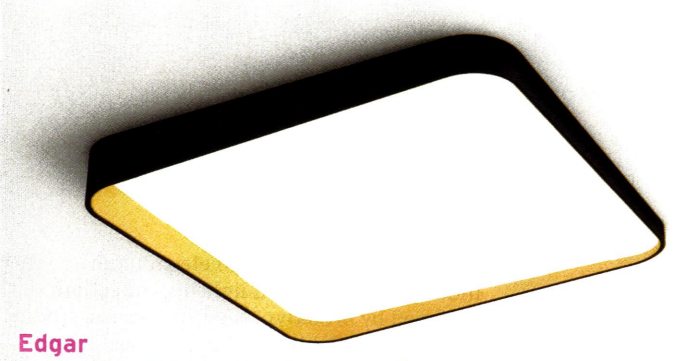
Cadet Luminaire

Beacon Products has introduced an LED floodlight to replace 50W–250W-equivalent quartz, compact fluorescent, metal halide, and high-pressure sodium lamps, making this an efficient alternative for illuminating landscapes, buildings, columns, and flags. Beam spreads range from 2 x 2 to 6 x 6 NEMA distributions, and its cartridge bezel system allows users to easily change the output to four levels in the field. Cadet is constructed of die-cast aluminum, powder-coated in 10 different finish colors, and comes with a UV-resistant thermoplastic acrylic lens. beaconproducts.com CIRCLE 215



Fisherman Pendant

Newly available in the U.S. through Global Lighting, Fisherman Pendant is a whimsical design by the Swedish lighting company Zero. The hand-knotted rope-cord nets—in white, orange, and natural beige, as well as custom colors—hold UV-stable polythene globes that measure 11¾", 15¾", or 25½" in diameter. For incandescent or compact fluorescent lamping. globallighting.com CIRCLE 212



Edgar

Designed by Belgium-based company Dark, Edgar is a ceiling-mount or suspension lamp with a square or round frame whose asymmetrical rim offers glimpses of a contrasting color on its interior. The aluminum body is finished in black or white, with an interior color of gold, black, or white. Edgar measures 12" square or 11" in diameter, and houses LEDs in 3,000K or 4,000K color temperatures. Available in the U.S. through Viso. visoinc.com CIRCLE 214

Eraclea

Part sculpture, part path light, Artemide's Eraclea is a die-cast concrete trapezoidal monolith with a round aperture that casts bidirectional light. The unit measures 20" wide x 31½" high and uses 8W LED lamping with a 4,000K color temperature. Eraclea mounts to the ground via a hot galvanized-steel plate. artemide.net CIRCLE 213

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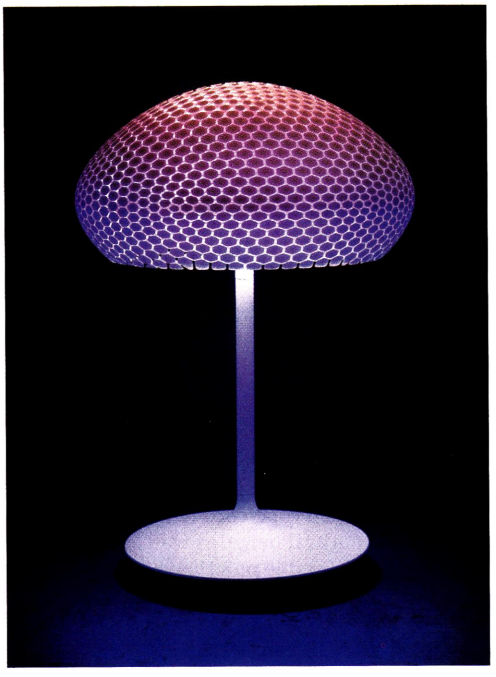
Vellum Luminaire

A linear LED suspension fixture from Peerless Lighting, the Vellum Luminaire (right) features low-profile aluminum housing with bezel framing in white, black, or a metallic finish. Available in 4' and 8' sections, the fixture can be combined to create long continuous rows of uniform, direct, or indirect light, and accommodates rounded or squared endcaps. Offered in 3,000K, 3,500K, or 4,000K color temperatures. peerlesslighting.com CIRCLE 216



BeveLED Mini

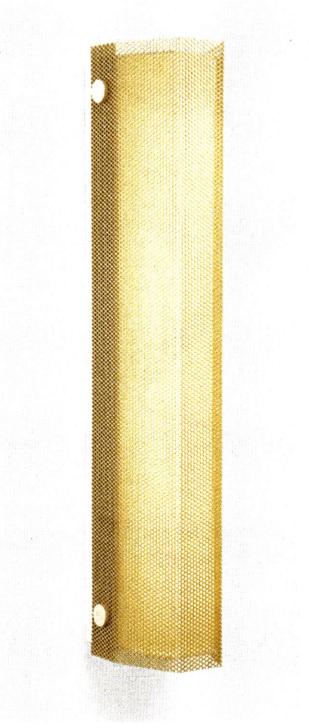
Usable as a downlight, or an adjustable or wall-wash light, BeveLED Mini (left) is the latest addition to the BeveLED recessed ceiling-fixture series from USAI. Through a 1½" aperture, it delivers more than 1,000 lumens in color temperatures of 2,700K, 3,000K, 3,500K, or 4,000K. In downlight applications, it offers three beam spreads: 25°, 35°, or 50°. The unit can be specified with a die-cast aluminum trim or trimless.
usaillumination.com CIRCLE 217

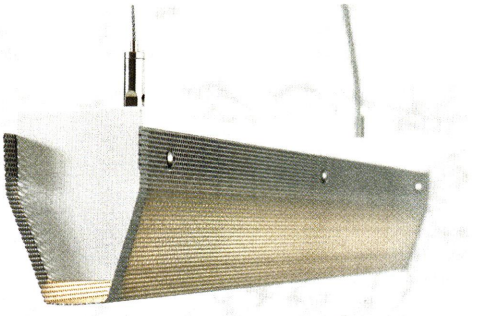
Entity

Building on its Hue wireless lighting system, Philips has introduced luminaires that work in conjunction with the Hue Bridge device and mobile app for remote control and programmable presets. One of the two new 3-D-printed designs is Entity (above), a polyamide-shade table light by German-based WertelOberfell that evokes imagery of bioluminescent deep-sea creatures. Its LED lamping can produce 16 million colors.
meethue.com CIRCLE 220

WX12

This Times Square Lighting fixture uses Xicato's 12.6W LED module to produce an even distribution field for wall washing. The steel can and yoke come in standard colors of white (left), black, or silver, though custom colors are also available. Measuring 4¾" in diameter and 8 15/16" high, WX12 can be mounted via a canopy, track, uni-strut, or pipe clamp. The lamping is specifiable with color temperatures of 3,000K or 4,000K.
tslight.com CIRCLE 219





Branch

Straddling a line between elegant and industrial, the Branch lighting collection designed by Brooklyn, New York–based studio Rich Brilliant Willing features a perforated-steel shell, powder-coated in gold, aluminum, earth, or champagne tones. The dimmable 435-lumen LED lamp is available in wall-sconce (left), pendant (above), chandelier, and floor-lamp versions. Three sconce sizes are offered, while the pendant and floor lamp each come in two sizes.
richbrilliantwilling.com CIRCLE 218

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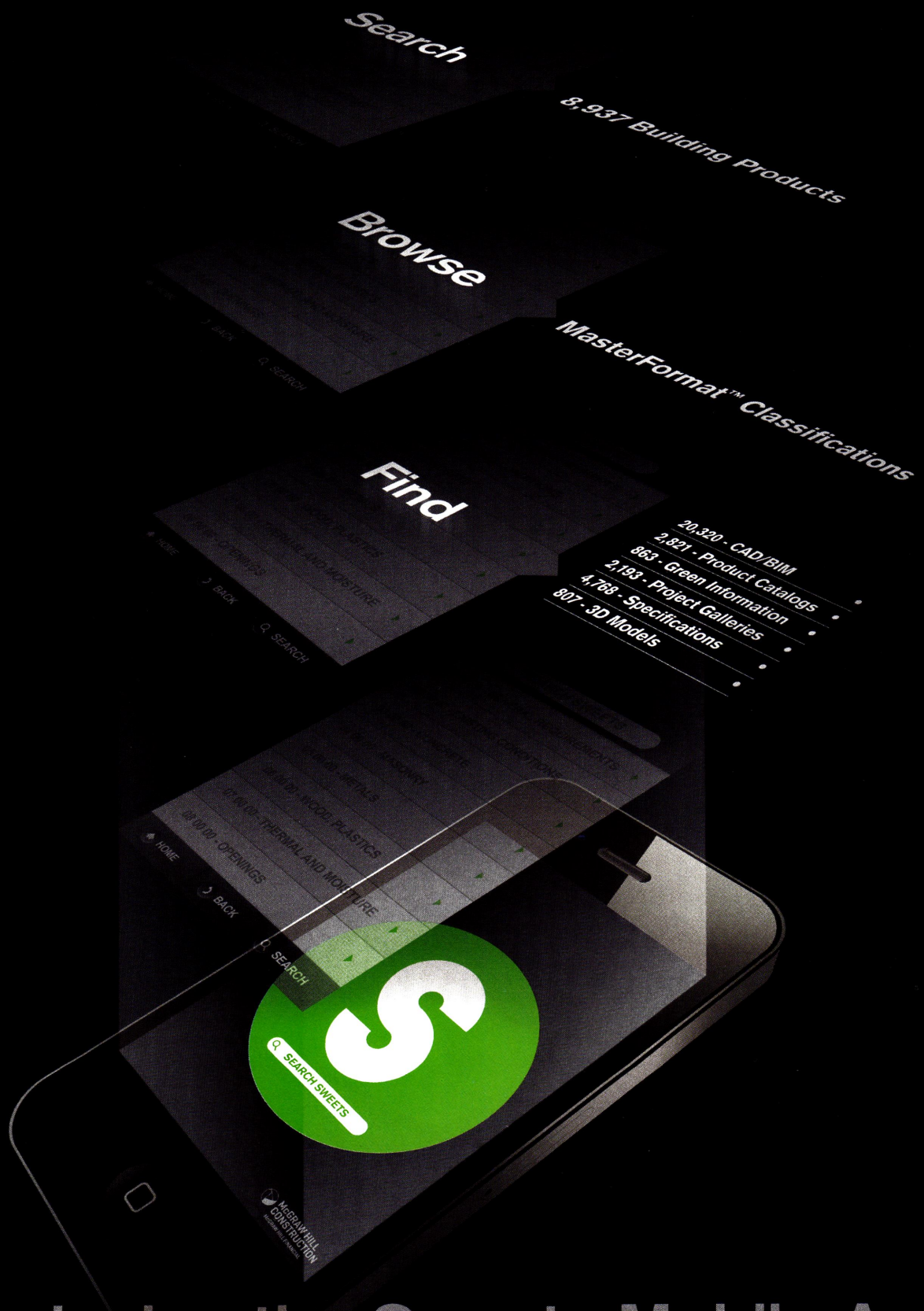

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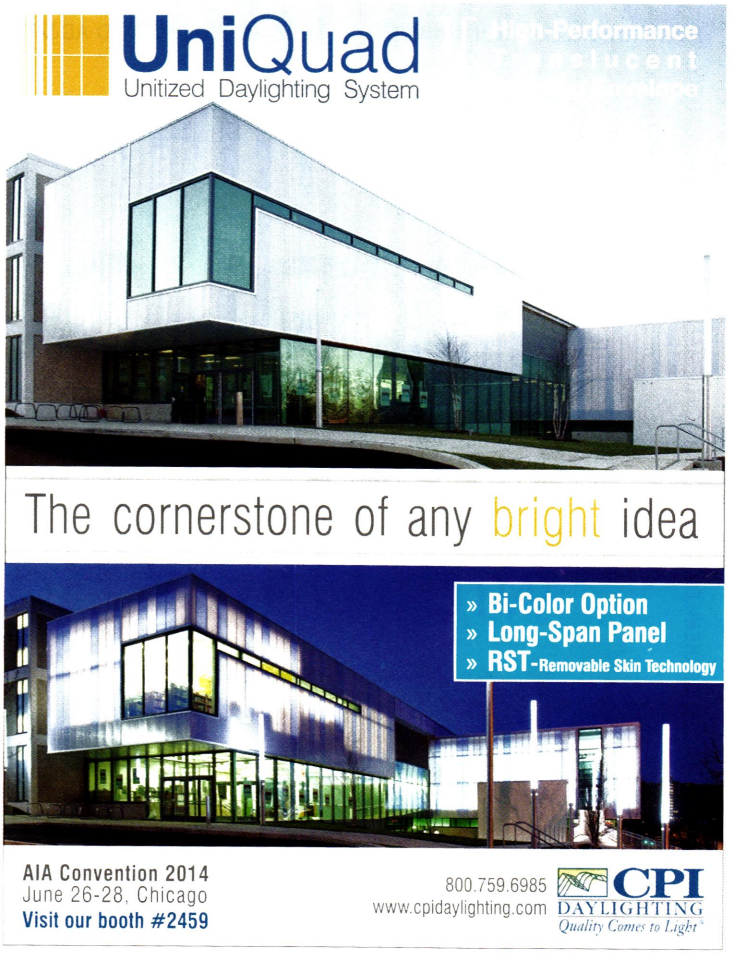

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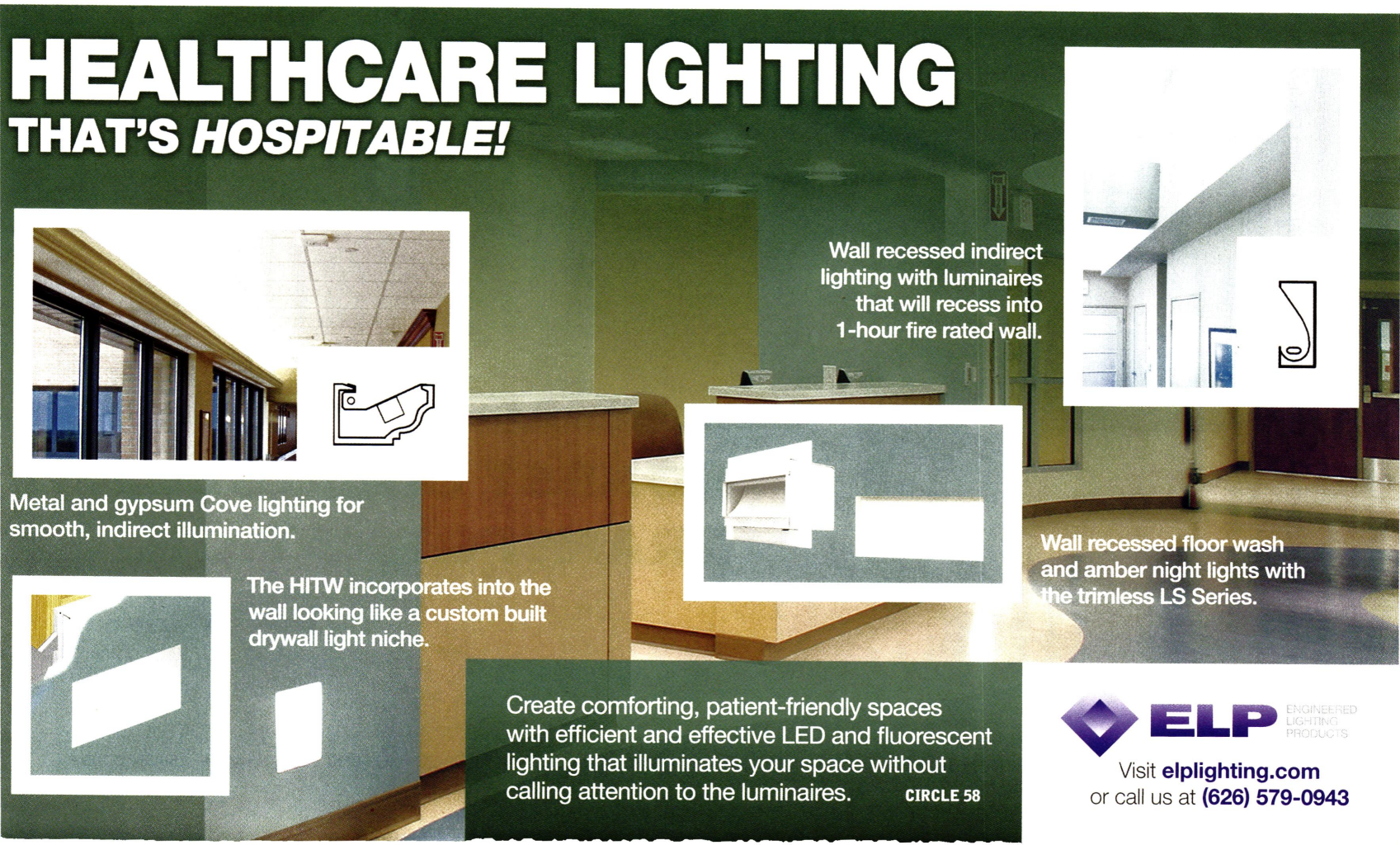

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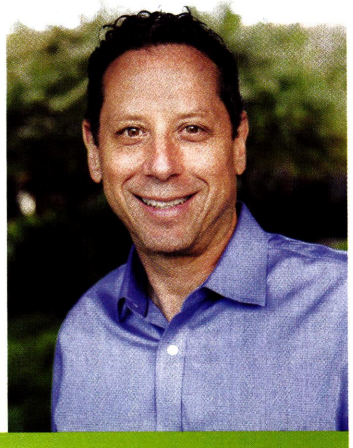

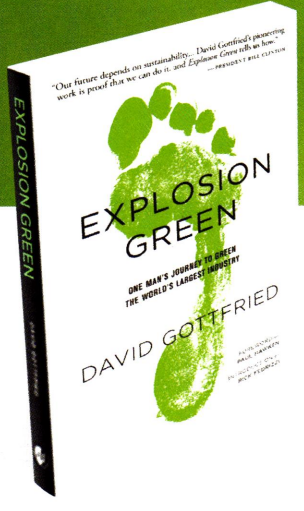

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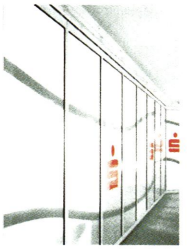

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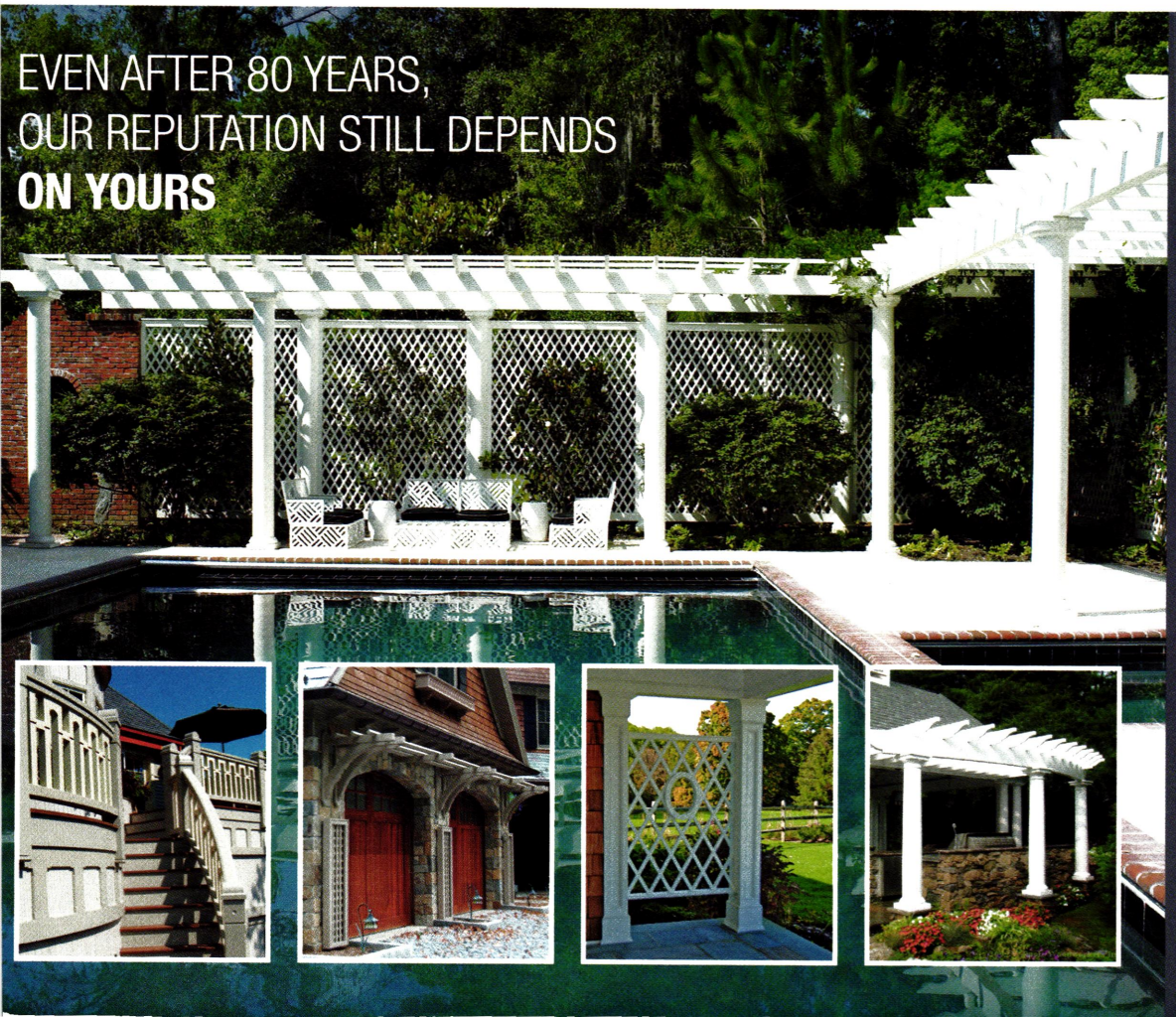

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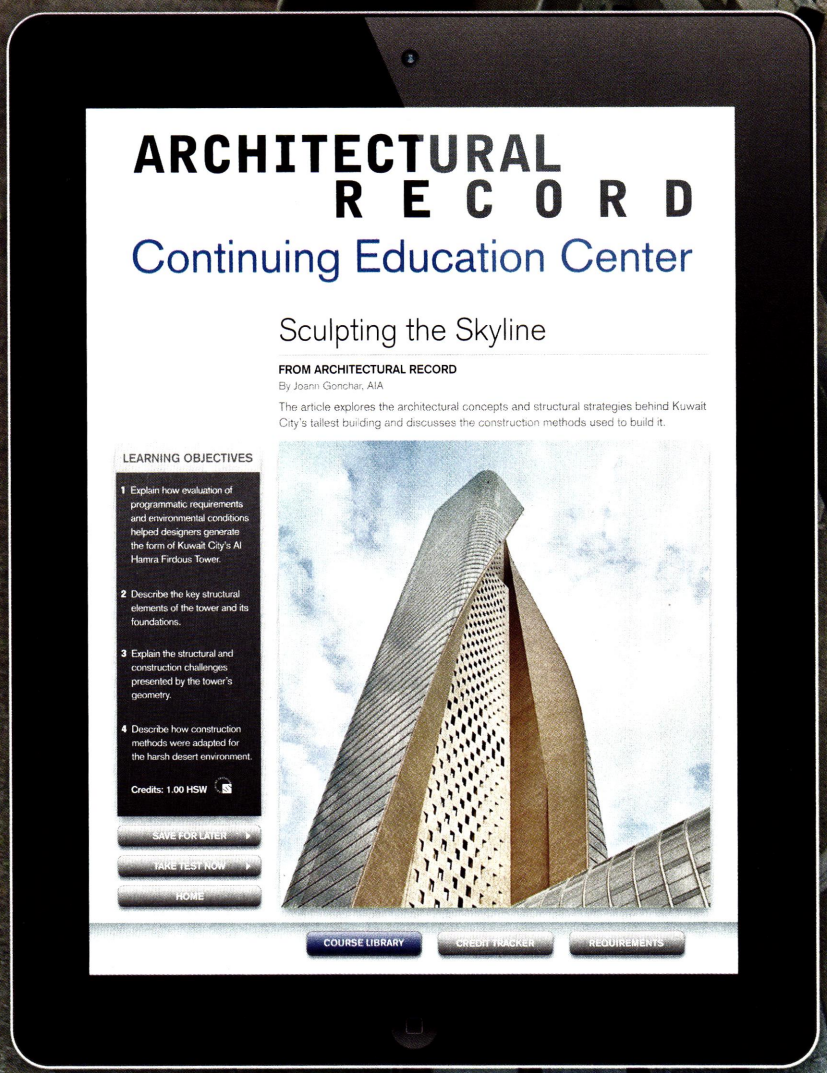

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A New World of Acoustics

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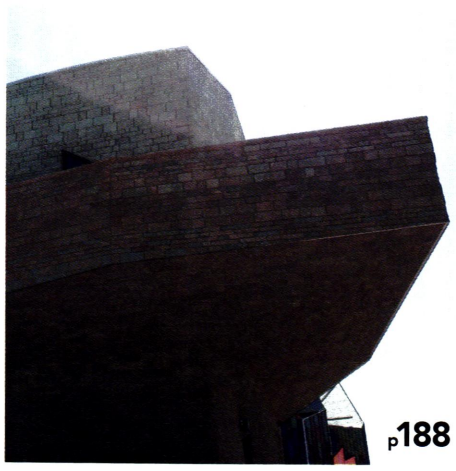

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A New World of Acoustics

Current and emerging options offer architects and designers a broad range of choice

Sponsored by Armstrong Ceiling and Wall Systems | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*

As architects and designers, we are all aware that people experience a building with our human senses. While designs often pay the most attention to what we see, our sense of hearing is also directly impacted as soon as someone or something makes a sound in a building. If the quality of sound is not a factor considered in a design, then it can result in poor acoustic quality, distracting noise, or an irritating experience. Poor architectural acoustics can be annoying or distracting such that it can impede concentration, comprehension, healing, or learning. By contrast, good sound qualities can add drama, vibrancy, and energy, creating a useful, inspiring, and helpful experience.

Overall, when visually appealing spaces and acoustically appropriate techniques come together, the end result is a fully successful building design. To achieve this positive balance of visual and acoustical performance, architects and designers have more material and system options than ever to choose from. This is particularly true when it comes to ceilings which have long been used for acoustic control in buildings of all types. Understanding the full range of options currently available from manufacturers allows design professionals to create ceilings that perform well acoustically, add to the visual aesthetics, and contribute to sustainable designs.

SOME FUNDAMENTALS OF ACOUSTICS

Acoustics is the scientific study of sound in all its forms, and architectural acoustics is specifically related to the interactions of sound both within and between architectural spaces. Professionals, specialists, and scientists have studied sound in terms of its generation, its

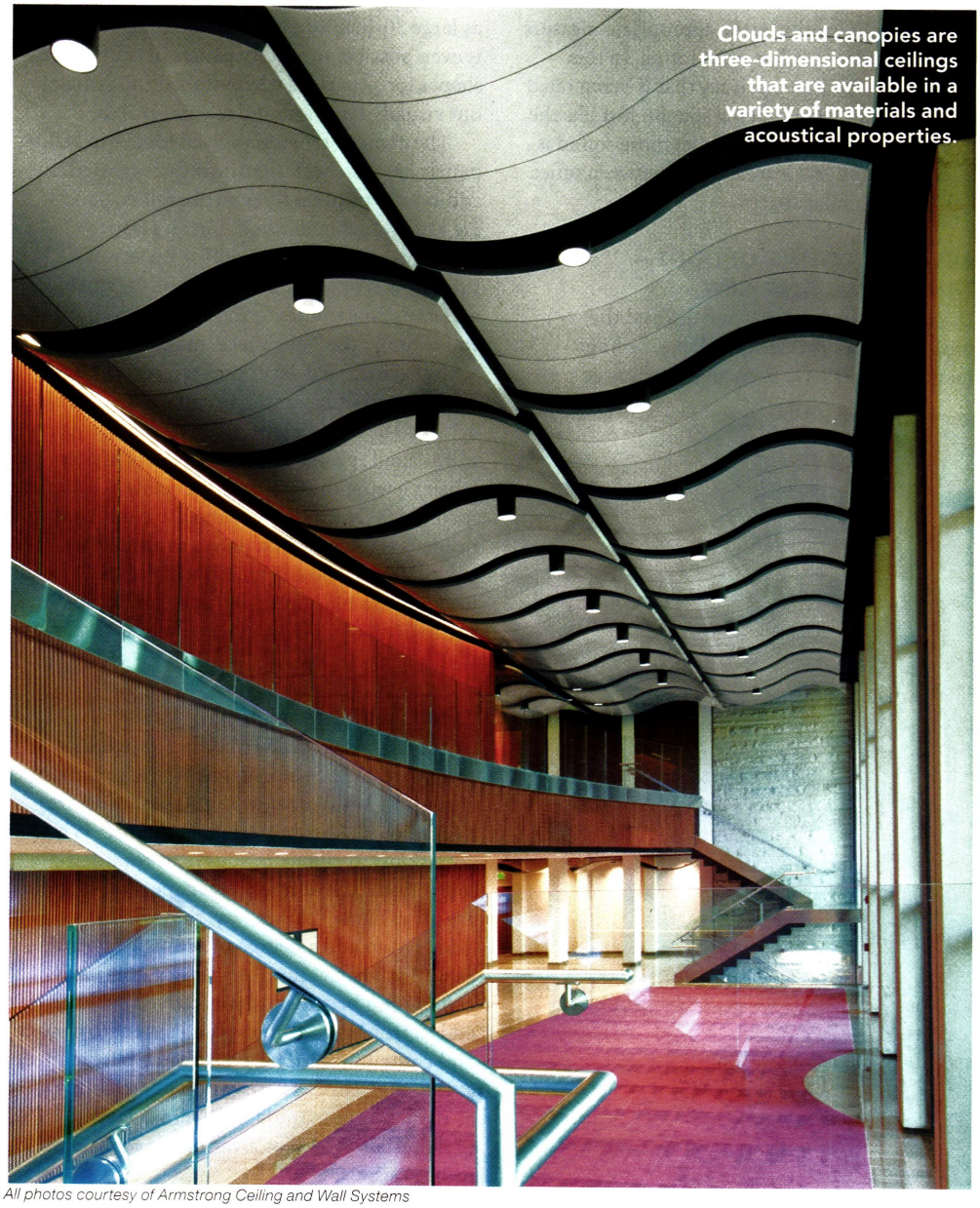
Architects and designers can control the visual appearance of ceilings and achieve excellent acoustic performance by understanding the many options available.

transmission through space and objects, and its reception by people. In all cases, sound radiates outwards from the source, of which there are many, both inside and outside of buildings.

Sound is typically characterized by its loudness and frequency content, such that loudness is measured in decibels (dB) and frequency is measured in Hertz (Hz). The sound as heard within a space will be a combination of direct sound from the sources and sound reflected off the various surfaces within the space. Highly reflective surfaces will redirect sound without significant changes except for direction, which in very "hard" rooms can result in long delay times for arrival at the listener, causing echoes. Highly sound-absorptive surfaces on the other hand will diminish the reflected sound waves and reduce reverberation and echoes. Based on the sound behavior, people can experience different levels of speech intelligibility, speech privacy, or sound intrusion depending on the room size and shape and the acoustic treatments within or between spaces.

Finding the right combination of sound absorption/reflection and sound attenuation (blocking) for a given space is a matter of using several well-developed tools to balance the acoustic characteristics within that space. (See sidebar in the online version of this course.) Sound absorption is the ability of a material or surface to deaden sound and is always frequency dependent. The sound absorption coefficient is measured on a scale of 0.0 – 1.0 over a frequency range, and the single number rating for a material is called the Noise Reduction Coefficient (NRC). The higher the NRC rating, the higher the overall (averaged over frequency) sound absorption of the material being measured. The NRC values published in ceiling manufacturers' data represent the percent of sound absorption per square foot of material used in continuous ceilings. If discontinuous ceilings are being installed or only partial areas have acoustic treatment (considered "unit" absorbers), then the overall sound absorption of the entire space can be measured and published as Sabins of absorption. Since we need to know the total sound absorption (Sabin) within a space, we can multiply the NRC by the number of square feet of continuous ceiling or we can add up the unit Sabins for the number and type of partial acoustical treatments that are in place.

The opposite of sound absorption is sound reflection which is also measured in the same way. A material with an NRC of 0.0 will reflect back all of the sound striking it and not absorb any. Typically, materials with NRC < 0.5 are considered sound reflectors. The use of too many sound-reflective materials, especially in large spaces, can create echoes and excessive reverberation of sound, which may be desirable in some cases, but not in others. A measure of reverberance is the Reverberation Time (RT) which is indicative of the persistence of sound after it was made, and is measured as the time it takes for sound to decay by 60 dB in level. Controlling or minimizing RT is particularly important in situations where people are listening to someone speaking since it directly affects the ability to understand the spoken word, which is referred to as "speech intelligibility." Long reverberation times mean that the listener will be subjected to reflected



Clouds and canopies are three-dimensional ceilings that are available in a variety of materials and acoustical properties.

All photos courtesy of Armstrong Ceiling and Wall Systems

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Learning Objectives

After reading this article, you should be able to:

1. Analyze and explore the fundamental principles related to interior acoustic design, and their relationship to green buildings and sustainable design.
2. Examine the traditional and new ceiling system options available to provide interior acoustic treatments that are both visually appealing as well as acoustically appropriate to the space use.
3. Assess the various characteristics of acoustical ceilings that can contribute to green and sustainable building design.
4. Recognize and identify the acoustic needs of different design applications and the attributes to look for, including contributions to green building certification.

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sound with long delay times relative to the direct sound from the talker, and these late reflections will result in "overlaps" of spoken words, making it more difficult to understand.

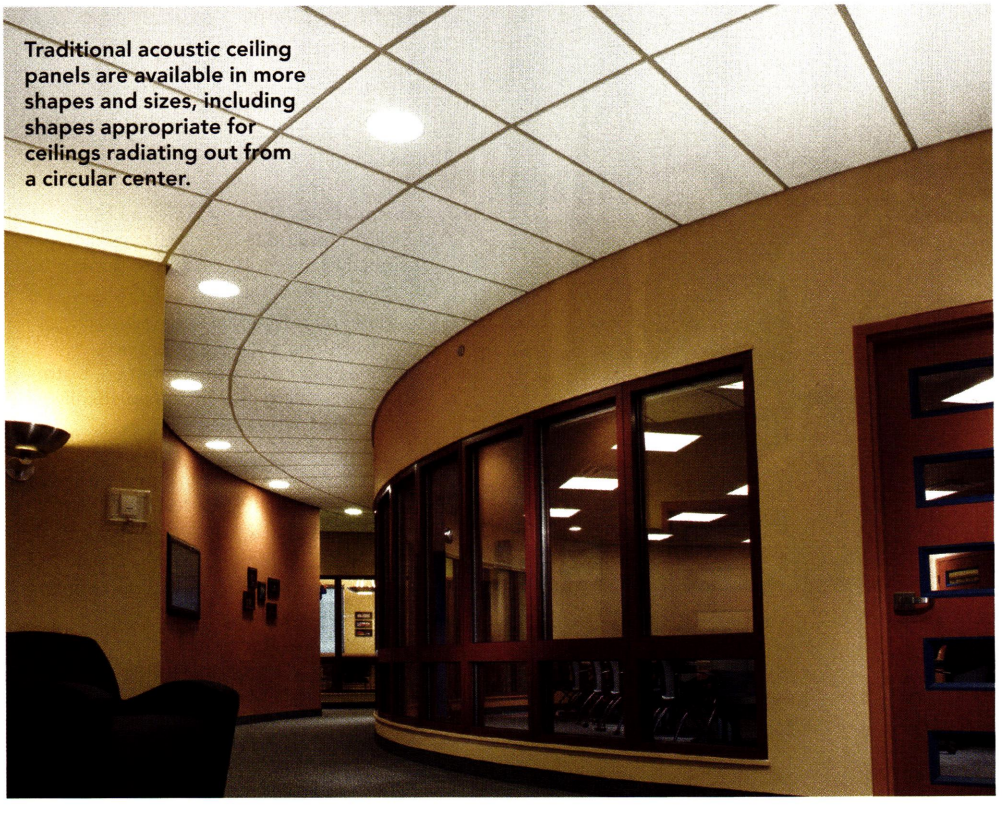
Some of the sound generated within a space will not be entirely contained within the space, but can be transferred through walls and ceilings into adjacent spaces. This sound intrusion into other spaces can create a lack of privacy or the presence of unwanted noise. The most common method for measuring how much sound is being transferred between wall assemblies is the Sound Transmission Class or STC rating. A higher STC rating means that more airborne sound is blocked by the component or assembly. Lower STC ratings mean that more sound passes through the components or assemblies, adding to the background noise level in the space, degrading the ability to hear and understand speech.

It should be noted that, contrary to the popular notion that sound passes through a structure, such is not exactly the case. Sound generated on one side of a wall will energize the wall structure and set it in motion, much like a diaphragm. The wall itself becomes the transmitter of the sound energy which can be heard on the opposite side of the wall by the listener. Hence, the ASTM test methods used to determine STC ratings have focused on this direct transmission process, and the STC number is derived from sound attenuation values tested at 16 standard frequencies from 125 Hz to 4,000 Hz. The subjective perceptions of the STC ratings are generally accurate for speech sounds but less so for amplified music, mechanical equipment noise, transportation noise, or any sound with substantial low-frequency energy below 125 Hz.

When assessing the sound transfer through ceilings, the specific measurement is the Ceiling Attenuation Class (CAC). This rating is essentially the equivalent of an STC rating for walls, but is specific to the ceiling conditions where a dividing wall is constructed only to the ceiling height, allowing sound to pass through a plenum space above the ceiling. This is a "two pass" test in that the sound can transmit up through the ceiling in one space, across the ceiling plenum, and back down through the ceiling in an adjacent space. The higher the CAC rating, the more sound that is attenuated, meaning that less is transferred between spaces. In cases where the walls of a space do not extend all the way to the ceiling, such as with movable office partitions or partial height furniture, the appropriate measure is the Articulation Class (AC) rating. In this condition, it is speech privacy that is being rated so more absorption is being sought. Just like the CAC, a higher rating means that more sound is attenuated and less is transferred between office cubicles or similar spaces.

ACOUSTIC CEILING OPTIONS—TRADITIONAL AND NEW

Using the principles of acoustics and the measurement processes available, ceiling manufacturers have been able to advance and refine their product offerings to provide architects and designers with a variety of choices. This variety allows for designs to be optimized for acoustic performance while still addressing visual and other aspects of the spaces.



Traditional acoustic ceiling panels are available in more shapes and sizes, including shapes appropriate for ceilings radiating out from a circular center.

Acoustical Ceiling Panels

Lay-in acoustical ceiling panels with a suspended grid system have been a traditional choice for many commercial and institutional buildings. They have commonly been available in standard 24-inch square or 24- x 48-inch rectangular sizes and made from mineral fiber or fiberglass materials. While these continue to be available and are a rather standard option, a whole new palette of ceiling panels and grids are also being produced. Ceiling panels are currently available in a wide range of sizes, patterns, and acoustical properties to suit a variety of design conditions. Long, narrow sizes such as 48 or 60 inches long by 6 inches wide are available as well as large 30-inch square panels among others. It is even possible to specify panels in trapezoidal shapes for situations where the ceiling radiates out visually from a rounded central area.

The choice of materials used for lay-in ceiling panels has also been significantly increased. In addition to mineral fiber or fiberglass, panels are also available in wood, metal, plastic, and translucent material with a variety of smoothness or textures. While the variety of materials contributes to the visual appearance and overall "feel" of a space, manufacturers have also included very good acoustic qualities into these ceiling panels. In some cases, that is achieved by using a pattern of very small (even ultra-small) perforations that are not visible when viewing the ceiling from below. Absorbent material is then added behind the panel that deadens the sound that passes through the perforations. The size and spacing of the perforations plus the reflectance of the panel material all combine to create desired NRC and CAC ratings.

Clouds and Canopies

A free-form approach to ceiling design has prompted the use of isolated panel formations that visually float below the structure above, hence promulgating the term "clouds." While commonly available in square or round formations, the actual size, shape, and material are all variable. In this way, they can be designed to add a degree of acoustic control as well as visual appeal to a space. Similarly, a canopy can be added that is curved such that it adds a true three-dimensional aspect to a space and contributes to the acoustical performance at the same time. These canopies are commonly available from manufacturers in a variety of materials as well as a variety of acoustical properties.

Left: Sound reverberation can be controlled with ceiling systems that are both acoustically efficient and visually exciting. Right: Vertical acoustical treatments such as baffles used in this ceiling space help to control reverberation time and overall sound quality.

Vertical Acoustical Treatments

In design situations where the horizontal plane of the ceiling is not desired but acoustic control is, then an alternate ceiling design can be created using vertically hanging acoustical treatments. In some cases, these treatments are long, linear acoustical elements that can be hung in unique configurations to aesthetically define spaces. They are generally available in rectangular standard sizes along with both standard and custom colors. These long, linear treatments can be suspended from a traditional 15/16-inch ceiling suspension system, or hung individually from the structure above. Properly designed and installed, they are approved for use in seismic areas and come with many options to achieve exceptional acoustical performance by reducing reverberation time in spaces.

The term "acoustical baffles" applies to vertical hanging acoustical treatments that are commonly larger and shaped closer to squares than rectangles. Baffles are a very good acoustical solution in large spaces open to the roof structure. Tests have shown that it is possible to achieve a 50 percent average reduction in reverberation time with only about 25 percent coverage of baffles in the space. This type of treatment comes in a wide variety of material choices, colors, textures, edge details, and even shapes. They can include up to 100 percent post-consumer woven fabric content or even be made from rapidly renewable bio products. Baffles are also readily seismic approved and easy to install with adjustable aircraft cables. Overall they add acoustical control to spaces with an exposed structure or roof deck and readily add visual benefits of color and texture to the space.

Ceiling to Wall Systems

Using the same or similar material on a wall as the one used on a ceiling can make a strong visual statement when it comes to enclosing a space. It can also create a strong acoustic control, depending on the NRC rating of the material used. Seamless, integrated, and flowing transitions between ceilings and walls can be achieved using standard manufactured components. From crisp, 90° angles to active, inviting curves that ebb and flow with a particular design, a wide variety of three-dimensional enclosures can be achieved. The material choices are varied as well, including wood with a warm inviting look, metal with a cooler more sophisticated appearance, translucent materials that can add intrigue, or textured fabrics that can do many different things. Together, the combination of material and shape can be very dramatic or simple and understated.

From an acoustical standpoint, the materials used can have a very low NRC rating to create a sound reflective environment that may be required in a nightclub or other active environment. By contrast a high NRC rated material could be chosen to absorb sound and create a quieter space.

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Peter J. Arsenault, FAIA, NCARB, LEED AP, *practices architecture, consults on green and sustainable design, writes on technical topics, and presents nationwide on all of the above. www.linkedin.com/in/pjaarch*

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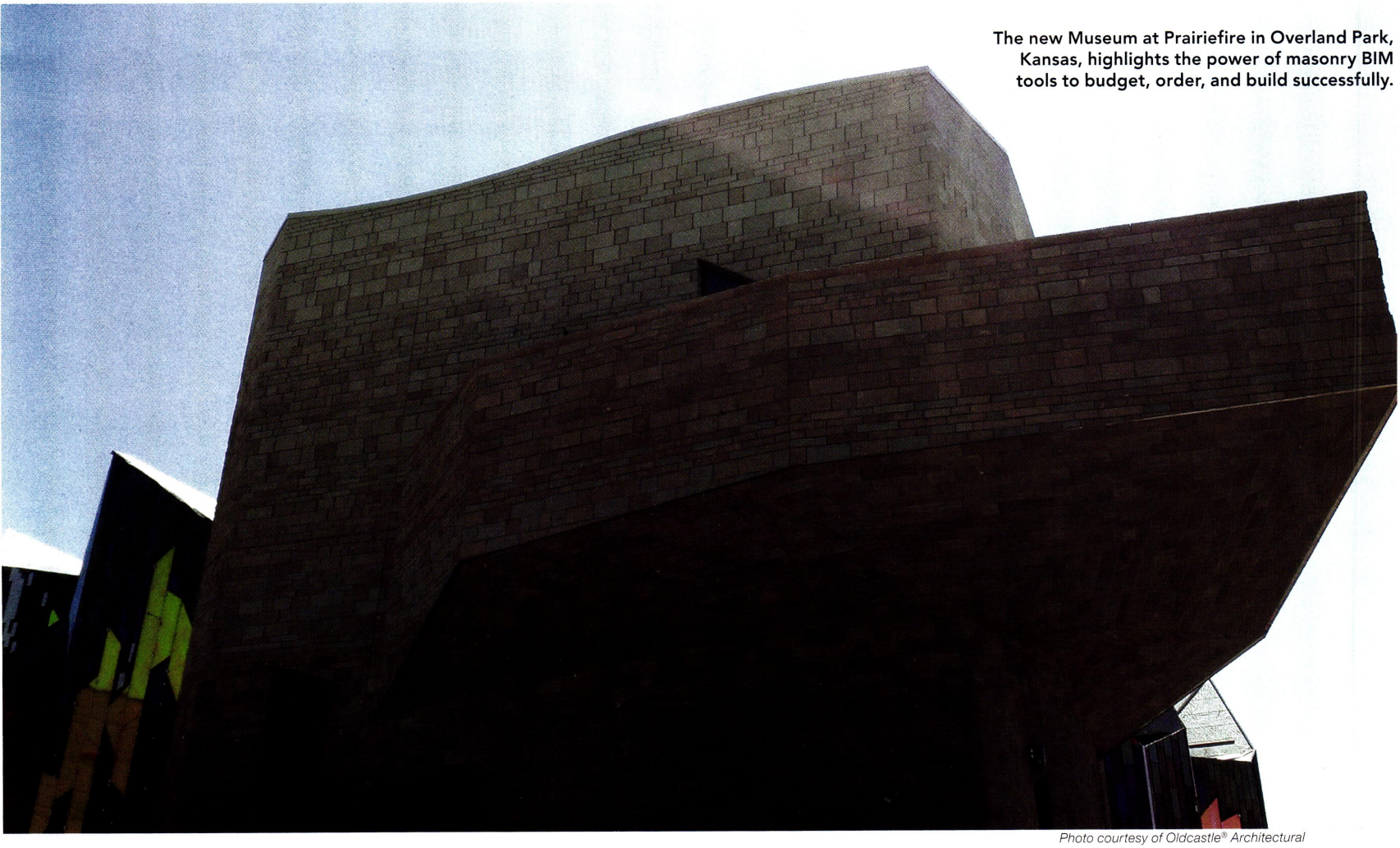

The new Museum at Prairiefire in Overland Park, Kansas, highlights the power of masonry BIM tools to budget, order, and build successfully.

Photo courtesy of Oldcastle® Architectural

BIM Comes to Masonry

The time-honored trade gets closer to meaningful Building Information Management

Sponsored by Oldcastle® Architectural | *By Tom Cuneio, ME*

Of all the acronyms in the design and construction industry today, BIM (Building Information Management) has to be one of the most recognized. Many in the industry are enthralled by all the brightly colored visions of projects still on the drawing board, the opportunity to immediately grasp the overall impact of a proposed modification in one system, and the intense record-keeping capability that translates to far easier repairs and renovations afforded by such advanced modeling capabilities. And with good reason. BIM stands to revolutionize the design and construction process, strengthening the traditional three-sided paradigm of success—project quality, cost, and schedule. Masonry, however, has largely been left behind in the race to BIMify the industry. This article will discuss the masonry situation in terms of existing and emerging BIM and other modeling capabilities, as well as challenges and benefits of a modeling system for masonry. Also provided will be real life examples of masonry projects that have enjoyed the benefits of modeling.

A TRADITIONAL TRADE—ADVANCED TECHNIQUES

The masonry trade is an extreme blend of old and new technology. Consider the situation in undeveloped countries such as Malawi, a small country in South East Africa. Roofs in this village are primarily constructed by lashing sticks together into a crude frame and then covering the frame with bundles of grass to provide minimal shelter from sun and rain. The homes are primarily constructed with mud brick. These bricks are dug from the native soil on site and then baked in a wood-fired oven,

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Learning Objectives

After reading this article, you should be able to:

1. Articulate the benefits of BIM to project cost, schedule, and quality.
2. Discuss the challenges that masonry faces in terms of meaningful modeling.
3. Explain the advantages that architects stand to gain as BIM for masonry is implemented.
4. Describe what architects can do now in using modeling to the fullest when specifying masonry products.

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also on site, to remove some of the moisture. The end product is a brick that is only slightly stronger than a dirt clod. They are laid in running bond using mud as mortar. They dig a small hole on the site and periodically wet the hole to dig "mortar" for laying the brick. No cement or other additive is used.

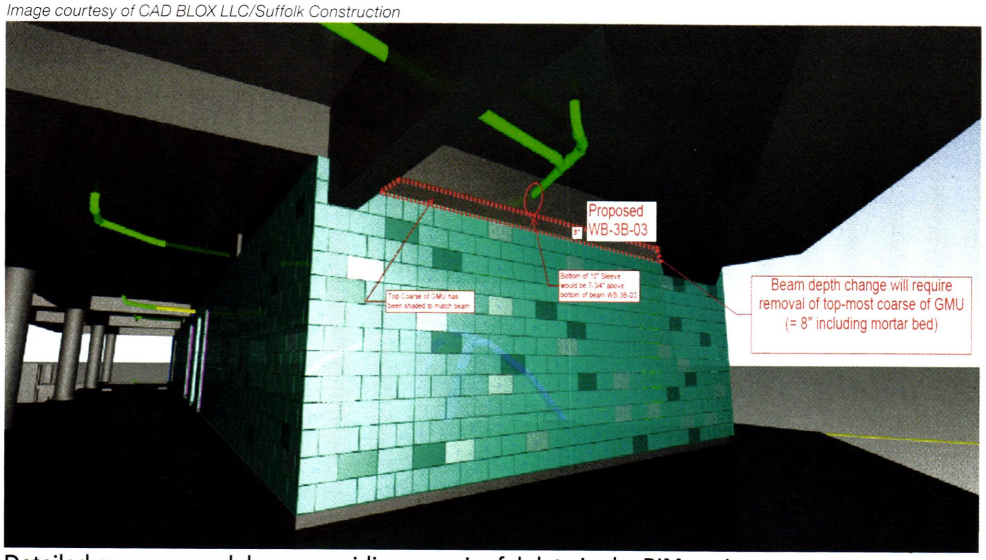
Dimensional tolerance? Unit compressive strength? Type S or Type N? f'n? These are nowhere to be found. On the other hand, these dwellings illustrate the simple beauty of masonry and the ancient roots of the trade. These structures are surprisingly sound. They have high thermal mass, are termite proof, require no transportation of materials, are 100 percent recyclable, are locally mined and manufactured. In fact they surpass even our best efforts at being "green" and sustainable. One man can mine, manufacture, deliver, and install all the necessary components to build these structures—a remarkable feat.

Since its inception thousands of years ago, masonry has in many ways not changed. It is still practiced today in exactly the same form that it began so long ago. Even at its most basic state, masonry is still a very effective means of providing shelter and security for people all over the world. At the other end of the spectrum is masonry in the U.S. In addition to cost, aesthetics, and durability, our projects must meet standards for energy performance and sustainability, and they must be technology friendly. Those involved with masonry products today may likely spend their time with high-end computer hardware, the latest in software developments, intricate algorithms and analytical methods. The push is on to develop something that has never occurred to those builders of mud huts but could prove invaluable in today's world demanding complex projects—3D models of masonry buildings to advance the art of BIM for masonry.

BUILDING INFORMATION MANAGEMENT (BIM)—WHAT IS IT?

As most architects know, BIM is a process that involves the generation and management of digital representations of physical and functional characteristics of places. Building Information Models (BIMs) constitute files, which may incorporate proprietary data and formats. These files are exchanged or networked to facilitate decision-making about a project and its design. BIM extends the format to 3D, incorporating the three primary spatial dimensions of width, height, and depth with other dimensions, such as time and cost, taking the information to a fourth and fifth dimension. BIM is object oriented, and in order to understand BIM, an understanding of the object being modeled is necessary. Unlike CAD, which represents elements with lines that define its geometry, BIM creates smart objects that contain several levels of information, or parametric data, including geometry, material properties, color and texture, cost, source and distribution information, and manufacturer. Each element in the BIM model "knows" how it relates to other objects and to the design in general.

Image courtesy of CAD BLOX LLC/Suffolk Construction



Detailed masonry models are providing meaningful data in the BIM environment.

Designs are represented as combinations of objects, or assemblies that can be simple or very complex, and can be analyzed as systems or according to cost. Because BIM defines objects as parameters and in relation to other objects, if an object is changed or modified, related objects will automatically change as will the associated cost estimates as well as material tracking, ordering, and many other attributes.

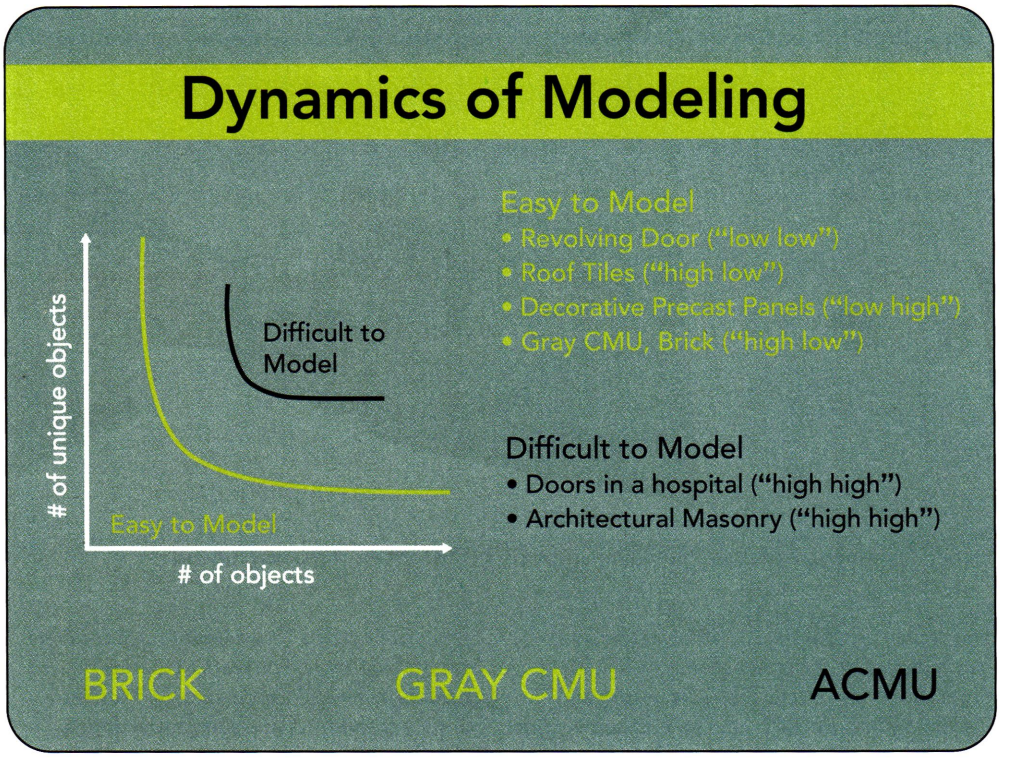
Because each member of the design team from architects and engineers to contractors and owners adds discipline-specific data to the single shared model, information losses are reduced and a more detailed database is created about a complex structure. Use of BIM, then, extends beyond the initial planning and design phase of the project, to have value throughout the building life cycle, and to support such project stages as construction management, project management, facility operation, and beyond. Early adopters are enthusiastic and confident that the use of BIM will enhance a variety of functions including improved visualization and productivity; better coordination of construction documents; increased information about specific materials and quantities for estimating and bidding; dramatic savings in overall project schedule and costs. BIM advocates also point out that most of the data needed for building energy performance analysis exists and that building energy simulation is feasible from an accuracy, time, and cost standpoint.

That said, some industries are more BIM-compatible than others. In terms of structural building materials, the main focus has been on incorporating steel and reinforced concrete into BIM software. For years, structural steel and cast-in-place concrete have had software with 3D capabilities and substantial design information that has made it easy for BIM software developers to build on. Likewise, several BIM tools have been developed for wood and cold-formed steel. Why not masonry? Arguably, the reasons stem principally from the intricacy of masonry products themselves and the endless possibilities to combine these products into complex arrays.

THE BIM-MASONRY CHALLENGE

One of the reasons masonry has not been included in BIM software is the sheer complexity of the material.

For starters there is the problem of managing the large number of units possible in a commercial masonry project. A block job may have several hundred thousand units and a large brick job can have more than a million units. Each unit has a unique location and orientation in the model, making unit model building a huge labor task. A variety of bond patterns are available to arrange the units in the building and sometimes several patterns are combined. Beyond this, many options exist for material and several are typically combined in a single job. There may be natural stone, manufactured stone, clay brick, concrete masonry, and within each option there can be many colors and textures, making the models even more complex. If that weren't enough of a challenge, an additional layer of complexity is added by shape variation. Consider a very simple case of a wall of 8816 standard concrete masonry units all in the same color and texture. Within that product there may be 75 percent solid units, bond beam units, open end units, double open end units, solid bottom units and on and



on it goes. Finally, additional layers such as making the job ground face or adding bullnose corners compound the problem. One can easily appreciate how much information must be tracked in a quality masonry model to get useful data. Each of the layers of complexity described above impact cost, so unless they can be tracked in the model, accurate cost data cannot be generated.

The dynamics of modeling are such that it is relatively easy to model materials that represent a small number of dissimilar objects regardless of complexity. Consider a revolving door which likely has only a few instances. It is also not difficult to model a very large number of homogeneous items as is the case for hundreds of thousands of roof tiles. But for masonry models which have both large number and great variation, the task becomes exponentially complex—especially for architectural masonry.

Challenges abound in incorporating masonry into BIM, and there are no easy answers, and no short cuts, just as there is little value in a model unless it is high quality and can take into account the complex layers of data required. It is not difficult for BIM designers to generate data, even for masonry. The real challenge for modeling masonry is quality data. While a stretcher—a basic unit in the field of a wall—may have a given cost, a corner unit of the same material can be three or four times as expensive in some architectural applications. Accurately accounting for these variations in product is essential to generate useful Quantity Takeoff (QTO) data for masonry.

THE LANDSCAPE TODAY

Analytical models do exist, however, to assist in the design and installation of architectural masonry products. A few proprietary services offer a host of advantages in reducing time, cost, and potential problems in building complicated masonry jobs. The landscape is also changing as masonry industry stakeholders join forces to collaborate on creating and implementing new generation BIM-M, or BIM for Masonry.

Current Software Modeling Tools

Post-bid commercial software modeling programs do exist to assist in the ordering and installation of architectural masonry products. The models help the project team understand the products, order them accurately, resolve design issues related to CMU, layout bond patterns, stage complex orders, and increase productivity in the field. Further, the software enables practitioners to troubleshoot unusual design conditions such as an atypical bond pattern, bullnoses, score patterns, multiple textures, cove bases, arches, radius walls, or all of the above. The most successful technologies build models one unit at a time, as is done in the field—an approach that allows effective handling of the complexity of glazed CMU, ground face CMU, stone veneer, or other types of prefinished masonry units. Multiple colors, multiple textures, and intricate bond patterns can be modeled as well. Coded models facilitate an understanding of how precisely to build difficult conditions, with 3D layout drawings showing all conditions in the model to increase productivity in the field. "The take off detail is invaluable of course," says Rick Riley of Hoffman Cortes Masonry, about this type of model. "The shop drawings save time and material in the field. They are like having a set of instructions on the wall. The foreman can give a copy to the b'layers on the wall and not worry about what is being set."

It is important to point out, however, that the complexity of this type of quality modeling is primarily a post-bid activity. Design time masonry modeling is still in development but is an achievable ambition which the industry is actively pursuing.

BIM-M

BIM-M, or BIM for Masonry, is in the works, with several funding organizations blazing the trail. The Mason Contractors Association of America (MCAA), the National Concrete Manufacturer's Association (NCMA), the International Union of Bricklayers and Allied Craftworkers (BAC), Western States Clay Products Association, the International Masonry Institute (IMI), and The Masonry Society (TMS) are recommending that software developers include masonry in BIM software. Working with the Georgia Institute of Technology, the group has completed a roadmap to achieve that goal and is now working on realizing their vision, all with the help of industry individuals including masonry contractors, material suppliers, structural engineers, architects, and general contractors. Their rationale: If masonry is not included in BIM software as steel and precast concrete are, masonry may appear to be difficult to work with, and find itself in a bad position competitively.

Phase 2, which involves creating a digital library of masonry units and accessories in a common format, is currently ongoing. In subsequent phases, the group will prepare proposals for software vendors to include more masonry capabilities into their products and, ultimately, implement new software for the masonry industry. These efforts are slated to begin in 2015 and 2016, respectively. A first-generation BIM(-M) software for masonry is anticipated sometime in 2017 or 2018, with industry watchers maintaining it will have a significant impact on the way masonry buildings are designed, constructed, and maintained.

THE POWER OF BIM

BIM has been dubbed a "game changer," and as such opens the door to many advantages over conventional "longhand" techniques that have been part of the construction process for centuries. While many architects will probably never work on a project with the staggering convolution of a Disney Concert Hall, most will work on projects that require sophisticated

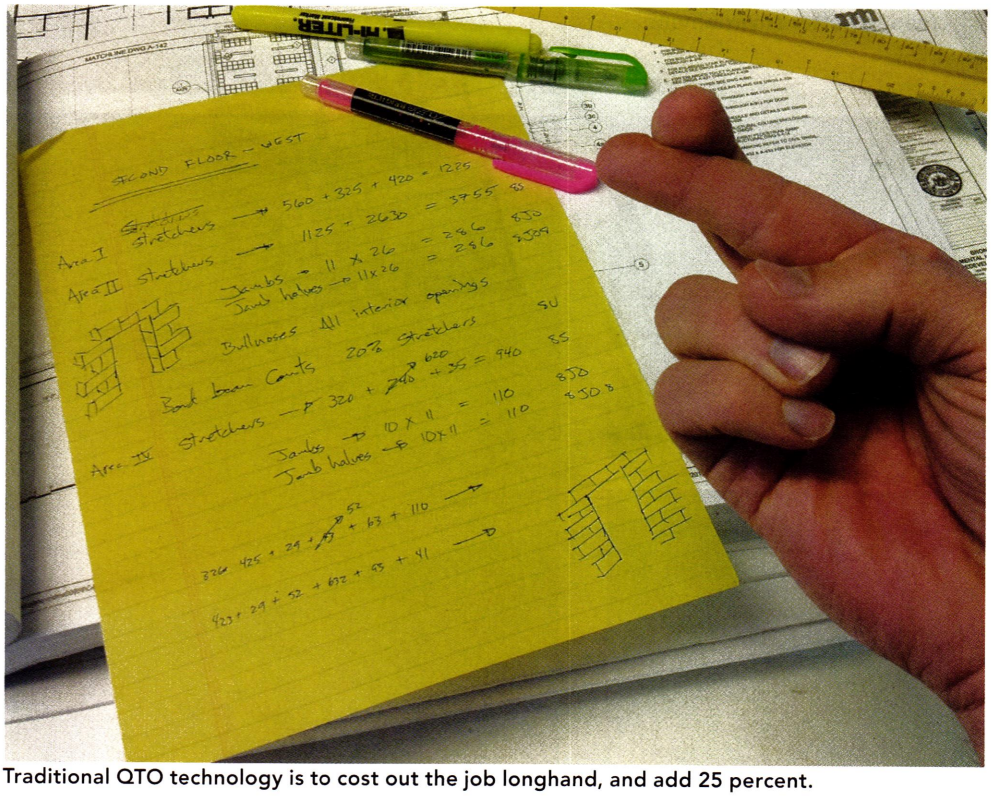
detailing. In these instances, which include most projects in today's development portfolios, BIM can simplify an architect's job in many ways.

Reduce or Eliminate Errors

Computerized models have great potential to reduce human error and if an effective planning effort has been made by each discipline and is carefully reviewed and shared, BIM has the potential to avoid or at least reduce mistakes. Orders can be extracted directly from a quality BIM model, providing an exact representation of unit types, colors, textures, and quantities. With confirmation of the accuracy of the model, the exact product order can be delivered, eliminating the usual waste factor in sizeable orders. Further, because the software can break down and provide a better understanding of the construction project, there is a smoother implementation by contractors and subcontractors.

Clash detection. Integral to BIM modeling, clash detection is possible because each discipline—structural, MEP engineering, environmental engineering, etc.—has created an independent model which is then integrated in a single multilevel model. Clash detection identifies where the separate models have incompatible parameters, or an out-of-order time sequence that might cause design changes, higher materials costs, and the accompanying cascade of schedule and budget overruns. In the past, clash detection was performed on site as opposed to in the design phase when constructability issues can be resolved before construction begins, saving vast sums of money and time and producing a better building.

Quantity takeoff. A key part of any project, take off and estimating has been a tedious, time-consuming task. In the masonry field, the traditional method has been to cost out a project longhand, and then add a margin to the bid based upon the complexity of the job to cover all the intricacies that hand calculations cannot account for. For complicated architectural jobs this margin can be as high as 25 to 30 percent to cover unforeseen conditions. Yet BIM modeling can substantially decrease the time and effort involved, and derive a more accurate result. Field experience is full of case studies that have followed the cost of contractors' mistakes in estimating and ordering. In 2011, for example, designers of a Chicago Public School specified 67,000 ground face units, and subsequently followed two paths: the contractor's cost numbers and ordering methods and a modeling program to determine the same issues. While the modeling effort provided what in hindsight was an accurate cost figure and ordering scheme, the designers went with the contractor's decisions, and ended up requiring 12 add orders, additional mold set up fees and freight costs, and experiencing significant delays and color variation problems.



Traditional QTO technology is to cost out the job longhand, and add 25 percent.

Benefits Realized

While prefabrication reduces field labor cost and time and increases accuracy in good quality construction, it requires highly reliable models to be successful. BIM models can achieve this level of accuracy via specifications, finishes, sequences, and a three-dimensional visual for each building component. Provided that BIM relates to fabricators' software, building elements can be manufactured according to precise specifications and delivered to the jobsite on time, in many cases curtailing costly and time-consuming field cutting. Since architectural masonry typically involves a manufacturer-applied design treatment to various faces and edges, like ground face or bullnose, it is essentially a very large prefabrication problem that is ideally suited to a BIM solution.

Optimizing Products

Synthesizing information from a number of disciplines, BIM has the capability to identify unique products, optimized for individual customers or projects, and for a faster, more efficient construction process in order to create better buildings with less effort. Masonry manufacturers typically have tremendous flexibility to produce exactly the right specialized unit to resolve just about any design condition but if these unique products are not located and accounted for during the QTO process, those units will never appear on the jobsite. This is another area where a BIM solution controls both the cost of masonry projects as well as the final aesthetic of the installation.

Continues at ce.architecturalrecord.com

Tom Cuneio *is a mechanical engineer who developed CAD BLOX 10 years ago to provide a reliable modeling method for complex masonry projects.*

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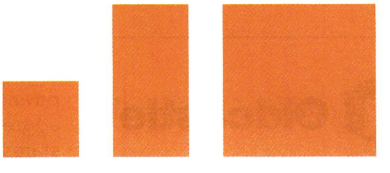

CIRCLE 16

Photo by Stantec/Halkin Architectural Photography LLC; courtesy of Forbo Flooring Systems

Children's Specialized Hospital in Mountainside, New Jersey

Creating Healthy Healthcare Environments

The choice of products can affect the health of staff and patients in healthcare facilities

Sponsored by Forbo Flooring Systems | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*

Patients generally tend to think of a healthcare facility as the first step on the road back to wellness. However, healthcare professionals, architects, and designers are becoming increasingly aware of a darker truth: The healthcare environment can create toxic threats to people, making them a short cut to more serious illness, permanent harm, and even death. And the risk isn't only limited to hospitals, but to other healthcare buildings where many people are brought together including all types of care facilities, acute care centers, specialty hospitals, clinics, ambulatory surgical centers, and long-term care facilities. The first step in creating truly healthy environments is to recognize the problem and then to find the most appropriate means of addressing it.

A GROWING PROBLEM: HOSPITAL ACQUIRED INFECTIONS

The means of transferring illness from one person to another in an indoor setting is contained in infectious bacteria. It is these bacteria that are deposited on surfaces typically from an already infected person. When a non-infected person comes in contact with the bacteria in the indoor environment they are prone to have it transferred to something they are eating or drinking or to enter their body

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Learning Objectives

After reading this article, you should be able to:

1. Identify and recognize the health issues related to the transfer of infectious bacteria in indoor healthcare environments.
2. Investigate the options and alternatives to improvement in healthier environments that contribute to indoor environmental quality in LEED and in general.
3. Compare and contrast the differences between chemical approaches and natural approaches to addressing infectious bacteria in LEED-certified buildings and others healthcare facilities.
4. Specify natural antimicrobial flooring and wall material consistent with LEED v4 for Healthcare.

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directly when they rub their eyes or nose, so they can become infected as well. This simple but common means of transferring infectious bacteria, and thus illness, is becoming increasingly recognized as a problem in indoor environments. Of particular concern is a growing realization that hospital patients are being infected with diseases from this bacteria while they were still in the hospital thus giving rise to the term hospital-acquired infections (HAIs).

Numerous studies have calculated the impact of these HAIs identifying as many as one in 20 patients who will contract an HAI sometime during a hospital stay. While it's bad enough that these hospital patients are getting infected and ill, what's worse is that four in every 100 will die. That's more than the number of Americans killed in car accidents, fires, and drowning combined. Hence, HAIs are currently recognized as being among the most common causes of accidental death in the United States.

In response to these serious concerns, healthcare professionals worldwide are becoming increasingly focused on creating environments that fulfill the fundamental tenet at the heart of every physician's Hippocratic Oath: *Primum Non Nocere*—first, do no harm. Architects and interior design professionals share in this focus in that we are obligated to protect the health, safety, and welfare of the public. While we also do not seek to do any harm to people, we have the means to find ways that improve the indoor environment to be truly healthier and safer, particularly to vulnerable populations such as hospital patients. Most architects and designers are already aware that indoor air is often contaminated with a complex mixture of chemicals from many sources, including emissions from building materials. Disease risks in people related to this polluted environment can include asthma, bronchitis, cancer, and reproductive, developmental, and neurological disorders. Hence it has become the norm to specify and design with building materials and products that avoid these emissions or contaminants in the interest of creating safer, cleaner indoor environments. We have the opportunity to act in a similar way regarding HAIs.

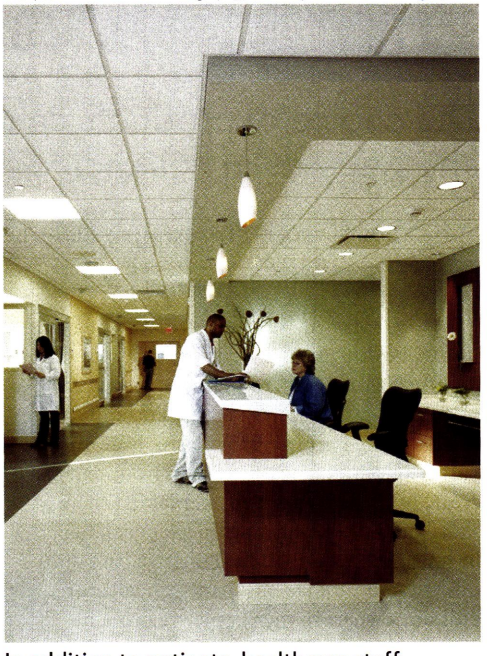
Hospital administrators and staff have also taken on the quest to create safer indoor environments by using cleaning routines that include powerful new antibacterial compounds developed to fight off infectious bacteria. The good news is that healthcare workers are beginning to make progress against two of the best-known infectious bacteria namely MRSA and *Clostridium difficile* (*C. difficile*). Government data from Public Health England reported that better control of MRSA and C. difficile led to a nationwide decrease in the prevalence of HAIs from 8.2 percent in 2006 to 6.4 percent in 2011. The bad news is that many other bacteria have reacted to those antibacterial compounds by mutating to resist them. A new wave of treatment-resistant bacteria is now emerging which includes Carbapenem-Resistant Enterobacteriaceae (CRE) and multidrug-resistant Acinetobacter. These new, mutated, treatment-resistant bacteria, referred to as "super bugs," combine a high mortality rate with resistance to nearly all contemporary antibiotics. With newer disinfectants and antibiotics being created to address this issue, the bacteria are likely to mutate again and escalate this form of biological warfare even further. Paradoxically, infection control professionals are also seeing a rise in the incidence of hospital-based infection from more common bacteria, from coliforms like salmonella and E. coli to treatment-resistant strains of tuberculosis.

In addition to enduring the use of these aggressive disinfectants, healthcare professionals are forced to function in an indoor environment filled with toxic disinfectant chemicals that are bound to impact patients and caregivers alike. Further, the cost of implementing this type of infection control becomes an escalating burden

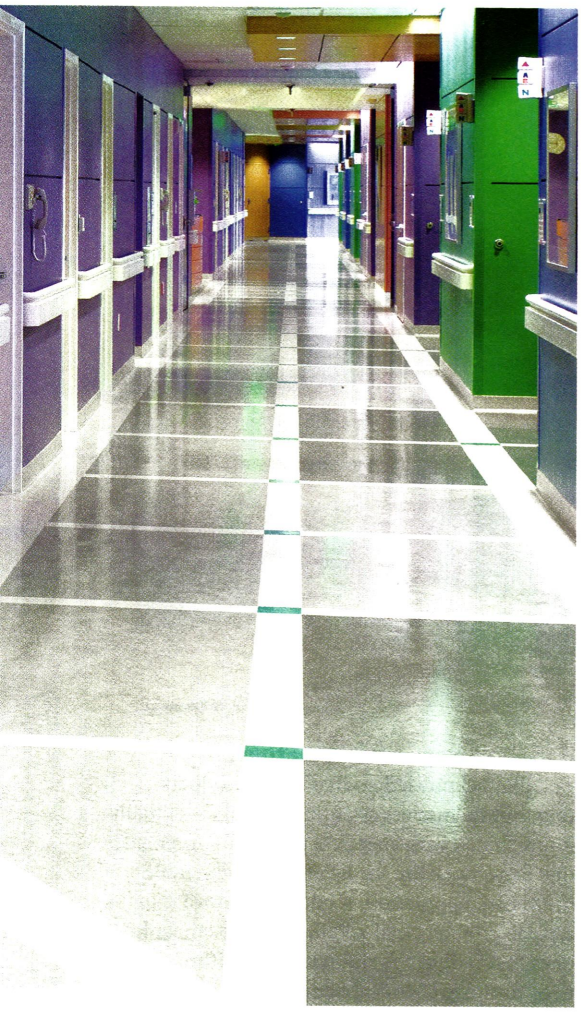
Photo by Brian Dressler Photography Inc.; courtesy of Forbo Flooring Systems

The Patewood Memorial Hospital in Greenville, South Carolina, used linoleum flooring that contributes to a positive life-cycle assessment for buildings.

Blanchard Valley Regional Medical Center, Findlay, OH, photo by Marquart Architectural Photography; courtesy of Forbo Flooring Systems



In addition to patients, healthcare staff who may work for years in hospitals and other facilities are at increased risk from environmentally acquired diseases.



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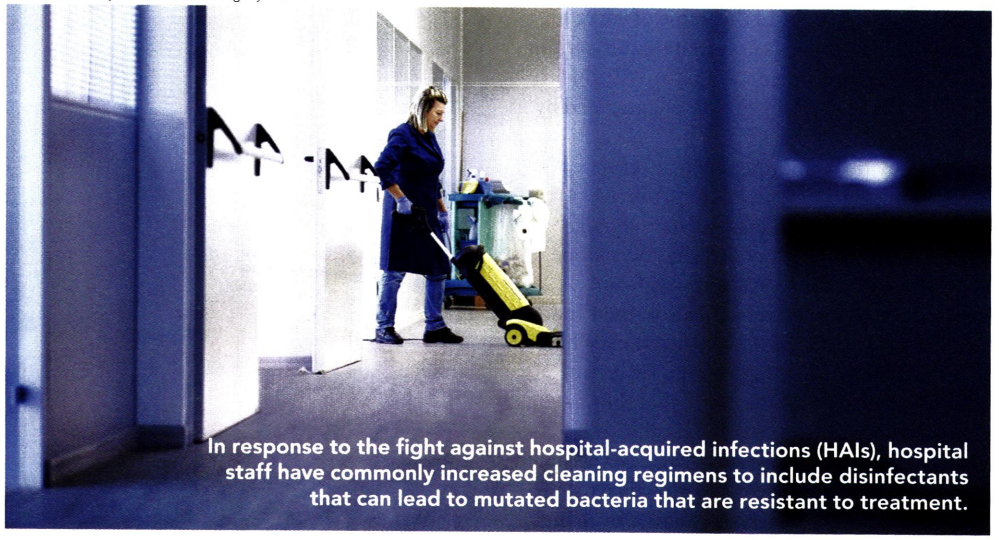

In response to the fight against hospital-acquired infections (HAIs), hospital staff have commonly increased cleaning regimens to include disinfectants that can lead to mutated bacteria that are resistant to treatment.

on already overtaxed healthcare budgets. In fact, research recently released by JAMA Internal Medicine reported that HAIs cost $9.8 billion every year. This report has understandably received an enormous amount of attention in an era where healthcare cost savings are constantly in the news.

INDUSTRY RESPONSE: ANTIMICROBIAL CHEMICALS

While cleaning and disinfecting will likely always be part of an appropriate plan to fight off infectious bacteria, other approaches have been investigated as well. One of the more common strategies is to specify products, such as fabrics and flooring, that are treated with chemicals that act as antimicrobial agents to prevent bacterial growth. Unfortunately, this solution creates more problems than it solves since the chemicals used to make these products anti-microbial are commonly classified as pesticides or biocides. That means that the added antimicrobial chemicals include harmful contaminants that are innocently being introduced into indoor environments although their long-term health effects are largely not known by designers, building owners, and maintenance professionals. However, a half century of experience with the environmental impact of pesticides teaches us that indiscriminate and/or excessive pesticide use can threaten more than just pests. It has been proven that these chemicals accumulate in our bodies over time such that regular small doses can be just as troubling as a large single dose. The danger is imminent—so much so that the European Union put a set of restrictive new rules on the use of biocides in place in 2012.

In this country, the U.S. Environmental Protection Agency (EPA) has gone a step further and identified persistent bio-accumulative and toxic (PBT) materials and indicated that they should clearly be avoided. Scientists are investigating the causal links between PBTs and pesticides and the increased incidence of several types of diseases. These diseases include asthma, allergies, and other respiratory diseases plus the proliferation of other chronic health consequences, including cancer, birth defects, neurological and reproductive disorders.

Adding insult to injury, there is another issue with antimicrobial chemicals added to products—they don't actually kill off bacteria. Instead, they typically prevent the bacteria from growing beyond whatever level already exists. That is good and desirable, but not when it relies on pesticide and biocide-based chemicals. The combination of remaining infectious bacteria and the added negative health effects of the added chemicals has been linked to a growing wave of chronic diseases that are hitting hospitals, clinics, and care centers nationwide.

INDOOR ENVIRONMENTAL QUALITY ISSUES

In the last half of the 20th century, according to the United Nations' Millennium Ecosystem Assessment, humans have changed their ecosystem more rapidly and extensively than in any comparable time in human history. The creation of a resultant "chemical society" has been a long-term concern of governments worldwide. In 1995, the United Nations called for global action to remove persistent organic pollutants (POPs) from our environment. The worldwide Stockholm Convention created an international treaty aiming to eliminate POPs from production and use. Unfortunately, the United States is one of only seven nations worldwide that has failed to ratify the treaty yet.

The consequences of ecological change and increased presence of chemical pollutants are starting to be associated with alarming increases in chronic diseases. The jump is particularly pronounced in diseases that have suspected links to hazardous chemicals present in building materials like vinyl flooring, wallpaper, and other products that use polyvinyl chloride (PVC). Numerous studies have shown PVC to be the single largest material source of dioxin to the global environment over the course of its life cycle including production, use, and disposal. Diseases linked to this exposure include childhood leukemia, brain cancer, and other childhood cancers that have increased by more than 20 percent since 1975. Studies have shown that the birth of males with undescended testicles has increased 200 percent between 1970 and 1993. In women, breast cancer rates increased by 40 percent between 1973 and 1998 and 40 percent more women had difficulty conceiving a child in 2002 than in 1982, with a particularly sharp increase in reproductive difficulty among younger women ages 18–25. In general, asthma was twice as common in 1995 as it was in 1980 and autism spectrum disorders have become 10 times more frequent today than in the 1990s. These health facts are becoming increasingly difficult to ignore. Levels of bio-accumulative phthalates, dioxins, mercury, lead, and cadmium used in our built environment must be addressed. The need is becoming more profound as we create indoor environments

that are more airtight in the name of energy efficiency. This trend is especially significant in healthcare environments, which are filled with patients whose diseases could be aggravated by environmental toxins.

While patients may be the focus of a healthcare environment, doctors, nurses, and other medical professionals are equally at risk. Surprisingly, very little has been done to protect U.S. health professionals from exposure to hazardous chemicals in their indoor environment. Some of these professionals have become concerned enough about the lack of control over chemical exposure that they have created an organization called Healthcare Without Harm (www.noharm.org). In the stated view of a representative of this global coalition of hospitals and healthcare systems, "by using excess energy, polluting the environment with phthalates, mercury, and other toxic chemicals, and producing waste which is burned rather than recycled, healthcare is ultimately compromising public health and damaging the ability of future generations to meet their needs." Related to the burning of medical waste and other materials containing toxins, it is important to remember that quite often when toxins go into an incinerator it often means toxins come out of an incinerator. Fortunately, their message is getting through as they pursue improvements to hospital, clinic, specialty care and long-term care interior environments. One bright spot is the agreement to eliminate the use of any PBT phthalates, a class of chemicals used to make polyvinyl chloride (PVC) plastics flexible. These chemicals have been specifically targeted since they pose specific, identifiable threats to occupants of healthcare environments. Studies of phthalate exposure in the hospital setting point to the possibility of retarded sexual development among babies with high blood phthalate levels. A larger threat exists for healthcare workers who can often experience heightened phthalate exposure over many years, leading to the potential for allergies, cancers (especially breast cancer), and endocrine disruption, plus a host of other risks from obesity and diabetes to liver disease and infertility.

The good news is that the products to solve the problem are already in the marketplace. PBT phthalates can be readily eliminated from an interior environment by choosing from the alternate, existing, and available building products that have never contained them and will never need to. All we need is the willingness of building designers, facility owners, and maintenance professionals to put them to use.

Photo by Fred Gerlich Photography; courtesy of Forbo Flooring Systems

McLeod Health Systems in Florence, South Carolina

AN ALTERNATIVE GREEN RESPONSE: NATURAL MATERIALS

While the larger problems of bacterial infestation and indoor environmental health may not lend themselves to quick, easy solutions, some steps can create an immediate improvement. Recognizing that there are alternatives to toxic or polluting solutions, the U.S. EPA has recommended that hospitals and other institutional or commercial facilities adopt an Integrated Pest Management (IPM) program to fight the super bug scourge. The IPM approach balances the need for effective control of hazards with a more global concern for the healthiness of everyone impacted, from patients and caregivers to beneficial microbes and bacteria. Three key steps are commonly part of an IPM program:

Prevention Rather than Poisoning

The EPA's approach focuses on investing time and effort to minimize risk, rather than reacting to preventable threats after they arise. The goal is to avoid surfaces that promote bacterial growth, to disinfect surfaces more frequently with milder cleaners, and to encourage activities (like hand washing and cough etiquette) that reduce the likelihood of transmitting infection.

Focus on Natural Alternatives

The EPA acknowledges that many products that tout themselves as antimicrobial are actually impregnated with chemical pesticides or biocides that can jeopardize the health of a vulnerable healthcare population. A good first move is to replace products that add to the problem with ones that reduce the risk naturally, without the need for toxic chemical additives or expensive installation or maintenance procedures. The use of natural materials which can naturally inhibit bacterial growth without additives can achieve the same result without exposing patients and healthcare givers to the risks of pesticides and their bio-accumulative toxicity.

Setting an Action Threshold

It is virtually impossible to totally eliminate bio-based risks, so the wiser strategy is to set an acceptable level of sanitation and maintain it consistently. This allows facility managers to sustain a healthful environment without expending vast resources to achieve a marginally negligible improvement.

▶ Continues at ce.architecturalrecord.com

Peter J. Arsenault, FAIA, NCARB, LEED AP, *practices architecture, consults on green and sustainable design, writes on technical topics, and presents nationwide on all of the above. www.linkedin.com/in/pjaarch*

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The Ins and Outs of Revolving Doors

The gateway to sustainability, safety, and comfort in today's entrance systems

Sponsored by Boon Edam

Let's face it. The built environment is an energy guzzler. The U.S. Green Building Council states that U.S. buildings have a considerable impact on natural resources. Buildings account for 40 percent of primary energy usage and 72 percent of electricity consumption as well as 32 percent of CO_2 emissions and 13.6 percent potable water consumption. The type of doors selected can have a big impact on a building's energy profile. Revolving doors can be eight times as energy efficient as their hinged counterparts—all while allowing large numbers of people to pass in and out, boosting security, and adding architectural interest to even the grandest façade. This article will discuss the green features of revolving doors and consider design elements as they relate to user comfort and safety. Also covered will be code requirements and a checklist of must-dos in properly specifying a revolving door for a given project.

THE ABCs OF REVOLVING DOORS

A revolving door typically consists of doors that hang on a central shaft and rotate around a vertical axis within a cylindrical enclosure called a drum. There are usually two, three, or four panels called door wings which typically incorporate glass. The opening of the drum enclosure is referred to as the throat opening.

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Learning Objectives

After reading this article, you should be able to:

1. Describe how revolving doors save energy and reduce air infiltration.
2. Discuss the features of revolving doors that ensure user safety.
3. List key elements of capacity and their influence on user comfort.
4. Properly specify revolving doors for various building types.

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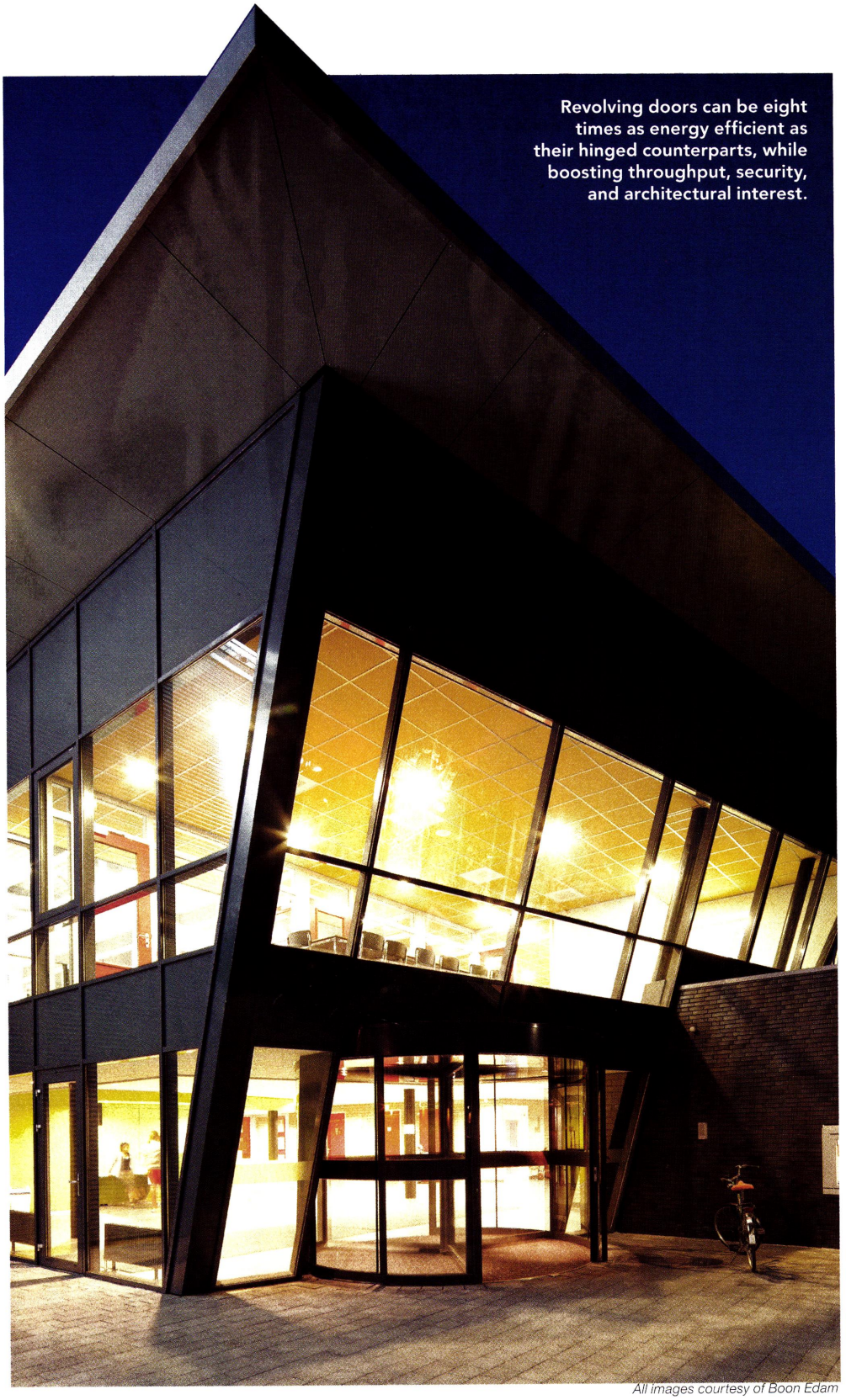


Revolving doors can be eight times as energy efficient as their hinged counterparts, while boosting throughput, security, and architectural interest.

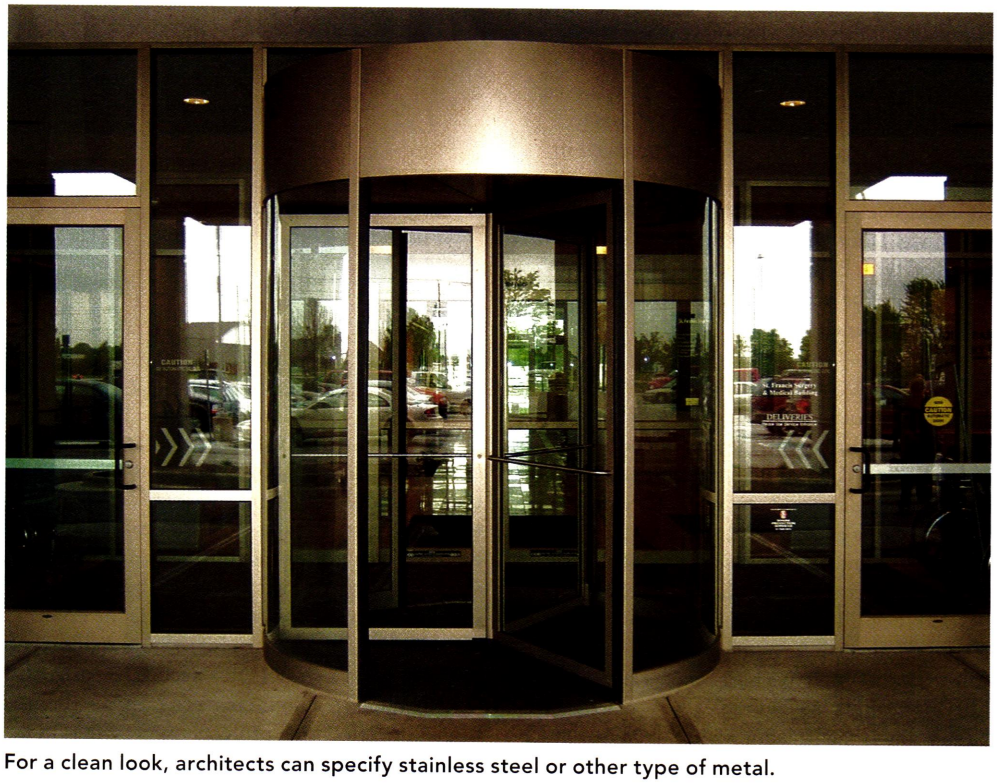
All images courtesy of Boon Edam

Manual revolving doors rotate with pushbars, causing all wings to rotate. Large-diameter revolving doors rotate automatically and can accommodate strollers, wheel chairs, and wheeled luggage. A speed control or "governor" mounted in either the ceiling or the floor prevents moving the doors at an unsafe speed. Automatic revolving doors are powered above or below the central shaft, or along the perimeter. Sensors in the door wings and the enclosure frame ensure that the speed with which the door revolves is limited. Other sensors can prevent or minimize the force of impact of the door wing on users. These settings can be customized to suit a building's specific requirements; for applications where children, elderly people, or people with special needs form a large part of the user profile, preventing any impact is paramount.

Not only can revolving doors efficiently handle bi-directional pedestrian traffic and reduce energy costs by maintaining an airlock, they improve comfort for building occupants and offer more usable space at building entrances compared to vestibules—all attributes that have been proven for more than 125 years. Revolving doors were invented in Philadelphia in 1888 by American-born Theophilus Van Kannel to reduce air infiltration. "As the door fits snugly in the casing," Van Kannel's 1888 patent states, "it is perfectly noiseless in its operation and effectually prevents the entrance of wind, snow, rain or dust either when it is closed or when persons are passing through it." The original motto of Van Kannel's company was "Always open, always closed," that is, always open to people, always closed to the elements.

A basic understanding of the way air behaves in a building sheds light on the benefits of revolving doors. Generally speaking, air flows in and out of a building because of differences in air pressure and humidity in what is known as the stack effect. In the winter, heated air rises toward the top of a building and as long as there are any openings on the ground floor, cold air rushes in to replace the heated air. The opposite happens in the summer, with the cold air flowing out the front doors. In addition, air flows through the building when doors, vents, or windows are open; this is known as a wind tunnel effect. Regular foot traffic through swinging or sliding doors can result in air leaks of up to thousands of cubic feet per minute, requiring more air to be heated or cooled.

Granted, a revolving door isn't airtight, but the barrier it creates makes the impact of that air pressure differential less important. Every time the door spins, some air will leave the building and some will come in, but overall, much less passes through a revolving door than a swing door. Not only are drafts eliminated, noise and air pollution minimized, and dirt and debris kept out of the building, but revolving doors also counter the effects of stack pressure, which increases in taller buildings. Where stack pressure is prevalent, the ease of operation of pushing a revolving door compared to pulling or pushing hinged or swinging doors is another key driver in selecting a revolving door system as the primary point of entry.



For a clean look, architects can specify stainless steel or other type of metal.

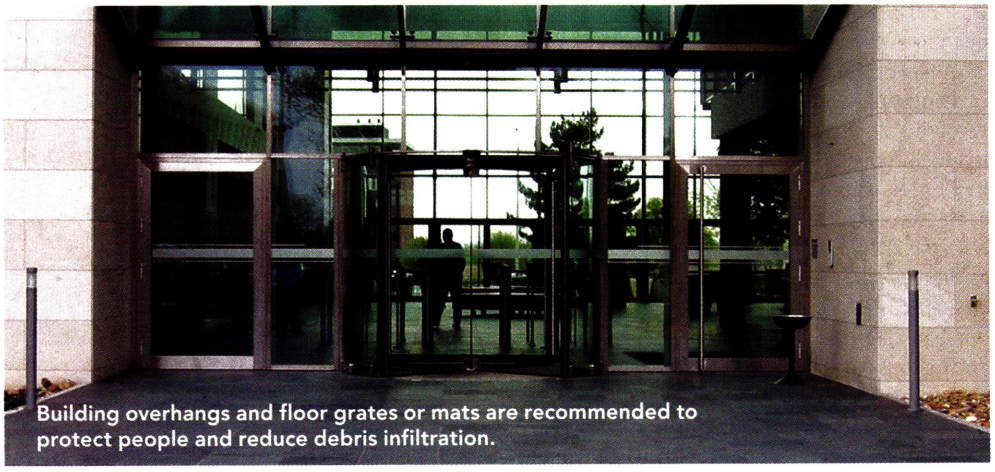
Dimensional elements can be selected to create a distinctive look.

Energy Saved by Revolving Doors: The MIT Study

In 2006, a team of graduate students at MIT conducted an analysis of door use in one building on campus, E25, where they found just 23 percent of visitors used the revolving doors. According to MIT's calculations, the swinging door allowed as much as eight times more air to pass through the building than the revolving door. According to the April 2009 *MIT Tech Talk* publication, "Research from MIT students indicates that if everyone were to use the revolving doors in Building E25, for example, MIT would save almost $7,500 in natural gas a year. That's enough to heat five houses over the same timeframe, and it also adds up to nearly 15 tons of CO_2."

According to the study, the revolving door stops conditioned air from moving freely. In contrast, an open swing door is like letting go of a balloon—the air rushes out of the opening. With a revolving door, only the air in the chamber with the person going through the door is transferred. The accompanying figure (see the online version of this course) illustrates how air is transferred in and out of a building. Cold air is more dense than warm, resulting in a pressure differential ("stack pressure") that moves conditioned air through open doors and cracks in seals. Wind blowing on the building adds to this pressure differential.

The MIT findings on how revolving door usage affects energy consumption are shown in the accompanying table (see the online version of this course). It is worth noting that if all people entering and exiting the building under study used revolving doors, the energy savings would be 74 percent, preventing the release


Building overhangs and floor grates or mats are recommended to protect people and reduce debris infiltration.

Revolving doors have maintained an "always open to people, always closed to the elements" approach since 1888.

of more than 14 tons of CO_2. However, these energy savings do not amount to 88 percent, as might be expected from the eight times less air transferred through the revolving door as through the swing doors. That is due to the fact that the revolving doors leak more than swing doors, lowering their overall efficiency slightly.

Energy savings depend on the weather. Heating is less efficient than cooling, and the indoor/outdoor temperature differential is larger in the winter than in the summer, so more energy is saved in the winter. Windy days are worse than calm ones. Still, every time a user walks through a door and feels that rush of "wind," they are feeling energy leave the building.

The accompanying chart (see the online version of this course) shows monthly-averaged total air leakages through MIT's Building E25 doors, with a revolving door usage of 23.3 percent. The watt-hour (symbolized Wh) is a unit of energy equivalent to one watt (1 W) of power expended for one hour (1 h) of time. The watt-hour is not a standard unit in any formal system, but it is commonly used in electrical applications.

Research showed that the average heat transfer per swing door passage is 78Wh (267 BTU), or the equivalent of 1.3 hours of light from a desk lamp; 4.3 hours of light from a compact fluorescent bulb; driving a car 306 feet; or jogging half a mile. Revolving doors, on the other hand, show reduced air infiltration, which translates to less energy wasted and consequently greater financial savings. Industry watchers maintain that revolving doors perpetually save money for the owner, with an average payback period of two to five years.

KEY ELEMENTS OF REVOLVING DOOR DESIGN

A building's entrance is its calling card, its first contact with visitors. As such its design is a key element to its success. In order to specify the right revolving door for a given project, several factors must be considered.

Façade

Revolving doors are an opportunity to enhance the drama of a building façade. Today's all-glass facades are the most popular building design and have virtually universal aesthetic appeal. Available in various widths and heights, an all-glass door complements the appeal of a glass façade. Minimal stainless steel trim and patch fittings contribute to a clean, sleek look. All-glass doors are naturally suitable for modern glass facades but they can also serve as a dramatic element in more traditional or classic designs. Vandalism-or burglary-resistant glass is also available. However, it is critical to note though that, by code, all glass doors in the U.S. are manually operated.

Another very common façade is a storefront which typically includes finished metal or painted elements with glass windows. To complement this style, the more traditional aluminum and glass revolving door works well as the frame can be either anodized or powder coated in a wide variety of colors to match the storefront. Architects interested in a more polished look can select cladding in stainless steel or another type of metal, such as bronze. Door wings and the drum walls can be inlaid with clear or tinted glass and where appropriate the drum can be in constructed of solid metal panels.

Connections to the Building

Revolving doors can be connected to buildings at mid-post, throat opening, and in several "keyhole" configurations including standard, double-bent glass, and angled (see the online version of this course for an illustration). The common connection used is the midpost. However, since half of the door protrudes beyond the building envelope, it would not be recommended where pedestrian space is limited or without a protective building overhang. An interior keyhole may be used when the lobby is large enough that the door will not encroach on a nearby elevator lobby, stairs, and escalators.

With an interior throat opening or keyhole connection, a door is completely mounted into the interior of a building and there is no part of the door itself that is exposed beyond the building envelope. This eliminates any rain or snow accumulating on the top of the door and greatly reduces accumulation inside the door. It also greatly benefits useful life and reduces the amount of maintenance needed. Finally, an interior mounted door creates a mini overhang or awning effect that protects users from rain or snow just before they enter the door.

Brand

Brand is important to all enterprises, and revolving doors can be selected to enhance an organization's brand identity among users. Doors can showcase trim color and glass options, including custom logo screen printing on the glass, custom pushbars, and canopy finishing and design in a way that emphasizes the visual identity of a company or organization. Automatic revolving doors with glass "showcases" in them allow space for seasonal promotions or special events.

Dimensional Elements

The diameter of the door, the height of the door opening and canopy, sidewall enclosure base, bottom rail sideline, and the width of vertical styles can all be optimized to create the desired look and complement surrounding building elements and doors. When these dimensional elements are specified with consideration of the surrounding features, a fluid and harmonious sightline is created. For dramatic appeal, an additional curved glass enclosure can be constructed above the revolving door to greatly elevate the door's visual impact.

Security

Security against man-made and natural hazards is a growing concern, and entry doors are a key focus of that concern for every building owner in both public and private sectors. Most revolving door manufacturers offer a variety of night locking options that can ensure the building is securely closed during non-opening hours. Options include different types of locking mechanisms that secure the door wings in their standard, resting position and night sliding doors that close over the throat opening of the revolving door. Doors can be locked from a remote location, and access control systems can be integrated with the door to allow authorized users to unlock and enter or exit the building. Today, many employee-only entrances use security revolving doors to prevent tailgating and piggybacking, which are unauthorized, and sometimes forceful, entry via a separate compartment or in the same compartment as an authorized person, respectively. Vandal- and bullet-resistant glass is also available.

In other applications, fewer safety measures and a minimal impact may be allowable in order to improve the flow of people through the door. Manufacturers can advise on what safety measures are advisable for a specific project.

Recommended Surrounding Features

Building overhangs provide shelter from weather and keep snow and rain from getting inside the door, and are a popular strategy in colder sections of the country. However, as described earlier, interior throat opening or keyhole connections can create the same benefit within the entry itself, making for a simpler, more cost-effective solution by requiring less of an exterior overhang to be built. In addition, if access control is used, an overhang provides protection during the brief pause when a user must gain authorization prior to entering a security revolving door.

All-glass revolving doors are well-suited for a glass facade.

Adequate attention should also be paid to flooring. While revolving doors require the floor surface beneath them to be perfectly level to ensure proper operation, there are other considerations. Using different flooring materials for the circular area occupied by the revolving door itself visually signifies to users the actual path of the moving door wings and makes for less confusion and hesitation upon entering. The installation of the matting materials at the exterior and interior will help avoid slips and falls. Many buildings also employ stainless steel floor grates on either the exterior or interior side of the door or even under the entire door to collect dirt and debris before entry in order to decrease maintenance costs. Grating or matting that continues 10 feet or more into the interior space can also help qualify for LEED IEQ5 (Indoor chemical and pollutant source control).

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CIRCLE 90

Shifts in Healthcare Design Create Demand for New Products

Innovative and energy-efficient cleaning systems reduce costs and address hospital-associated infections (HAIs)

Sponsored by Miele Professional
By Karin Tetlow

Major shifts are under way in the healthcare sector. Driven by changing demographics and the Patient Protection and Affordable Care Act, institutions are getting leaner as they look for greater efficiencies. New construction is shifting from the mega hospital to flexible satellite outpatient facilities that serve changing community needs, while small specialty surgical centers continue to grow to meet consumer demand for personal service and convenience. As baby boomers age, long-term care providers increasingly recognize that facilities which look and feel like home rather than a high-rise institution are proving to be effective,

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Learning Objectives
After reading this article, you should be able to:

1. Describe the trends in healthcare that are impacting facility design and the specification of energy-efficient products.
2. Explain how surface contaminants contribute to healthcare-associated infections (HAIs).
3. Identify cleaning systems for healthcare facilities that are code compliant, address HAIs, lower utility expenses, and reduce use of environmentally harmful chemicals.
4. Discuss how cleaning systems may contribute to sustainability and LEED®-HC credits.

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Energy-efficient H_2O dryer uses energy from hot water for drying.

Photo courtesy of Miele Professional

feasible, and sustainable. Even more significant is the continuing demand for sustainable construction, which, matched with stringent budgets, is a perfect combination of green and lean.

But healthcare facilities also have the critical requirement of supporting best practices in healthcare processes in order to combat healthcare-associated infections (HAIs). As Florence Nightingale wrote in "Notes on Hospitals" (1863): "It may seem a strange principle to enunciate as the very first requirement in a hospital that it should do the sick no harm. It is quite necessary, nevertheless, to lay down such a principle."

In a special issue of HERD (Health Environments Research & Design),[1] Kendall K. Hall, MD, MS and Douglas B. Kamerow, MD, MPH, note that HAIs are a serious and costly threat to public health in the U.S., afflict an estimated one in 20 hospitalized patients at any given time, and that hospital-acquired infections alone were responsible for between $28 billion and $33 billion in excess healthcare costs in 2002 (U.S. Department of Health & Human Services, 2012). In the same HERD publication, James P. Steinberg et al report that many pathogens causing HAIs can survive for weeks to months on dry surfaces. Organisms such as *Clostridium difficile* (*C. difficile*) can form spores that allow for prolonged survival and are relatively resistant to disinfection. Common causes of HAIs, notably *Staphylococcus aureus* (*S. aureus*) and *Enterococcus* (VRE), and their antibiotic-resistant strains also frequently contaminate the environment.

The most telling article focuses on a new awareness of sources of HAIs. Craig Zimring, Ph.D., et al report that HAI prevention has focused primarily on improving clinical practices. But that recently there has been growing recognition by both the infection prevention and design communities that the built environment—including fixed components that healthcare workers, patients, and families touch or interact—is an important component in the transmission of pathogens. (A review of articles relating to surface contamination and the spread of infectious pathogens was published in 2012.[2]) As Steinberg et al found, "the failure of routine cleaning to remove pathogens from the environment is not due to ineffective disinfectants, but rather to the lack of strict adherence to cleaning protocols."

Design professionals would do well, therefore, to evaluate every cleaning system in terms of their applicability to the shifting trends in healthcare delivery. Do they serve home-like long-term care facilities and smaller-scale ambulatory surgery centers? Does their return on investment make budgetary sense? Is there evidence of sustainability and contribution to USGBC Leadership in Energy & Environmental Design (LEED®) Healthcare certification? Above all, do they help prevent HAIs? There are a number of cleaning systems on the market that meet these criteria.

Photo courtesy of Miele Professional

Example of under-counter residential scale dishwasher that meets NSF sanitation requirements.

DISHWASHERS

After decades of long-term care providers opting for the code-compliant, multi-floor, hospital-like model, there is a changing trend towards smaller-scale facilities that build out rather than up. In a literature analysis of long-term care facility design in terms of both physical and psychological needs, Wang CH and CUO NW[3] found that creating a home-like environment was the top priority in long-term facility design, followed by Universal Design concepts and clustering living units to replace hospital-like wards. More and more providers are adopting the Green House® Project model that is transforming the culture of long-term care. A Green House home is created from the ground up to foster the same feeling and experience found in a real home. Each home is designed for 10-12 residents who have private bedrooms and bathrooms, a kitchen, dining room, and spaces for socializing. An innovative staff model gives residents four times more contact and reduces staff turnover. Research funded by Robert Wood Johnson Foundation that focused on quality of care, quality of life, and cost of care found that hospitalizations and total Medicare and Medicaid costs per resident were less than those in traditional nursing homes.

See endnotes in the online version of this article.

Continues at ce.architecturalrecord.com

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CIRCLE 93

The entry and atrium space of the University at Albany's new School of Business building reflects major trends in interior design that enhance health and productivity.

Photo by Halkin Mason Photography, courtesy of Perkins+Will New York

Interior Innovations Boost Performance—and Health

While products boost interior performance, people are the real focus

Sponsored by Nedlaw Living Walls Inc., Rocky Mountain Hardware, and TOTO

By C.C. Sullivan

The term "high-performance" hit the architecture and interior design professions a few years ago, and now it is somehow assumed that every new building or interior environment is designed to perform. That may be increasingly the case in all but the cost-conscious, bottom-dollar market segments, such as the developer-led retail and multifamily typologies. Yet recent innovations have shown that incremental and sometimes sudden, game-changing advances are influencing how architects and interior designers even define and measure performance.

Examples of these advances illustrate that they're rooted in research—in the social sciences, in global environmental studies, and in building technology R&D—driven by practitioners as well as experts from academia to industry. Novel concepts for mechanical systems, for example, have improved the ways that interiors can reduce energy use and conserve water while also making for more healthful, hygienic, and user-friendly indoor environments. New material finish and fabric formulations deliver benefits in resilience and antimicrobial properties, with ever-increasing

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Learning Objectives

After reading this article, you should be able to:

1. Explain how interior finishes and systems affect both indoor environmental quality (IEQ) and potential human performance and productivity.
2. Discuss how water use, energy use, and human health are interrelated and affected by interior product and system choice.
3. Describe three or more building materials and product solutions that improve building occupant productivity.
4. List recent trends in custom product development and application that impact performance in building interiors.

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opportunities for customization. Workstations, partitions, and raised floors are ever more adaptable, mobile and reconfigurable.

In addition, architecture and design (A&D) firms are driving the application of these innovative interior systems with an eye toward a high-level goal—nothing less than a transformation in how we work, live, and learn.

"In the commercial world, it's the new generation of companies in high-tech and media, especially on the West Coast, that are driving radical changes to our workplaces," says Andrew Bartle, AIA, LEED AP, principal of ABA Studio, New York, which designs interiors for corporate, cultural, and education clients as well as high-end homeowners. "Like some institutional owners, these newer companies embody a social attitude recognizing both the individual and the collective. The approach speaks to efficiency and productivity, but also elevates the potential of any organization."

In fact, the brash young companies reflect new thinking rooted in applied research on interior environments and human potential.

"In a diverse design practice such as ours, we've found recent trends in interior design reaching across market sectors that appear to link aspects of environmental design to improvements in productivity, health, and learning capacity," adds Joan Blumenfeld, FAIA, global interior design leader for Perkins+Will New York. "Several common attributes or trends are found to occur in all project types, regardless of the particular functionalities of the spaces under consideration." Linking the project types are metrics and other research-based conclusions, says Blumenfeld, that are "discrete parameters for success."

The bedrock of successful interiors today combines visual advances and performance-based enhancements, strata that often have merged in unlikely industries. "Today we are seeing the aesthetic and functional working together at a much higher level," says Dr. Alan Darlington, founder of Nedlaw Living Walls and a researcher in plant-environment interactions from the University of Guelph in Ontario, Canada. "We see interiors created with functional art and functional furniture, such as the plant walls found in many buildings that also work as biofilters for indoor air." According to Darlington, the biofilter concept emerged from their studies on aerospace life-support systems made with living plants to enhance air filtration and improve indoor environmental quality (IEQ) on lunar and Martian bases.

Yet the green walls have an obvious aesthetic benefit, too, even in modest interior renovations. "We often see plantings and art added in as last-minute flourishes, but instead they should be considered early in the schematic design phase to make the result as cohesive and inviting as possible," says Marlyn Zucosky, IIDA, director of interior design for Joshua Zinder Architecture + Design (JZA+D), Princeton, New Jersey, which has hospitality and workplace clients, among others. "They should be strategically integrated in atriums, common spaces, reception areas, and other highly visible or heavily trafficked zones."

Photo courtesy of Nedlaw Living Walls

The five-story living wall at Drexel University's Papadakis Building in Philadelphia, designed by Diamond and Schmitt Architects and Nedlaw Living Walls Inc., is the largest of its kind in the U.S. With 1,500 plants integrated into the building's air handling, the system achieves an 80 percent air quality improvement and 30 percent reduction in energy consumption.

In addition to biofilters, another unexpected dividend of the Space Race serves the thriving industrial base motivated by demand for water and energy conservation. And as the closed systems of rockets and space shuttles demonstrated, water and energy are practically the same challenge. This is often called the "water-energy nexus," a concept that experts like Cynthia Truelove, PhD, a senior water policy analyst with the California Public Utilities Commission, describe as the relationship between water use for producing energy and energy used "to collect, clean, move, store, and dispose of water."

The water-energy nexus is integral to several interior innovations through life-cycle assessment (LCA) and other techniques. "Today we're using sophisticated metrics to study carbon footprint and life-cycle impact of interior products that are brought to market,"

says Bill Strang, an industrial engineer and president of operations for TOTO Americas who has worked in another industry of closed-loop environments: submarines. "This approach considers everything from the raw material extraction to the manufacturing effects to the use phase in the finished interior." Among the most critical impacts, he adds, is a water-energy nexus data point: how much energy is necessary to pump and clean one gallon of water from an aquifer and deliver it to the user. The figure given in some national averages as about 0.0037 kilowatt-hours (kWh) per gallon.

So consider a typical user example: Strang points to one of America's largest airports, Hartsfield–Jackson Atlanta International Airport, which accommodates about 133,000 passengers per day, many of whom use water fountains and restrooms. TOTO analyzed all the restroom uses for men and women, and if all the toilets and urinals were converted from 1.6 gallons per flush (gpf) to the new EPA WaterSense level of 1.28 gpf, the airport operators would save about 3.7 million gallons of water per month. "This is the equivalent of about 13,600 kWh per month for energy saved because of the reduced water need," says Strang. "That eliminates as much as 22,000 pounds of carbon emissions that would be generated from coal-fired power plants, for example. It's a double-positive."

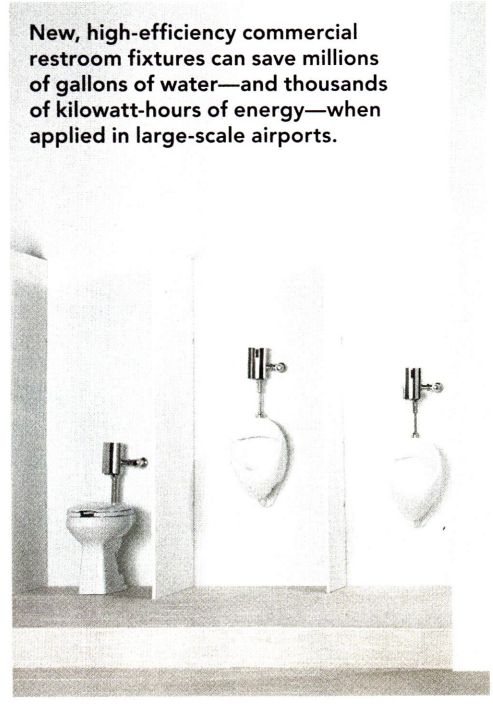
HEALTHIER, SAFER—AND HAPPIER?

Less carbon in the atmosphere is also linked to better human health in both direct and indirect ways. In this way, the airport restrooms example helps demonstrate today's deeper understanding of how aesthetics and interior product formulations affect occupant health.

Another example is finish selection for a range of interior products and systems, says Christine Pfau, marketing director at Rocky Mountain Hardware and a frequently cited source on hardware design and fabrication trends. "Today there are new antimicrobial products, and some are certified by the U.S. Food and Drug Administration for antibiotic resistance, which makes them a logical and valuable choice for healthcare interior applications and many other types of buildings," she explains. "Materials such as copper and bronze are inherently antimicrobial, and bronze hardware can be finished so that it does not inhibit those valuable properties." Other materials, such as brass and chrome as well as plastics, fibers, and solid surfaces, can be treated with various inhibitive chemicals.

Some interior architects favor the treated finishes, while other point out the limits on their effectiveness. "Some hardware manufacturers have antimicrobial finishes with an astonishingly long life," says Zucosky.

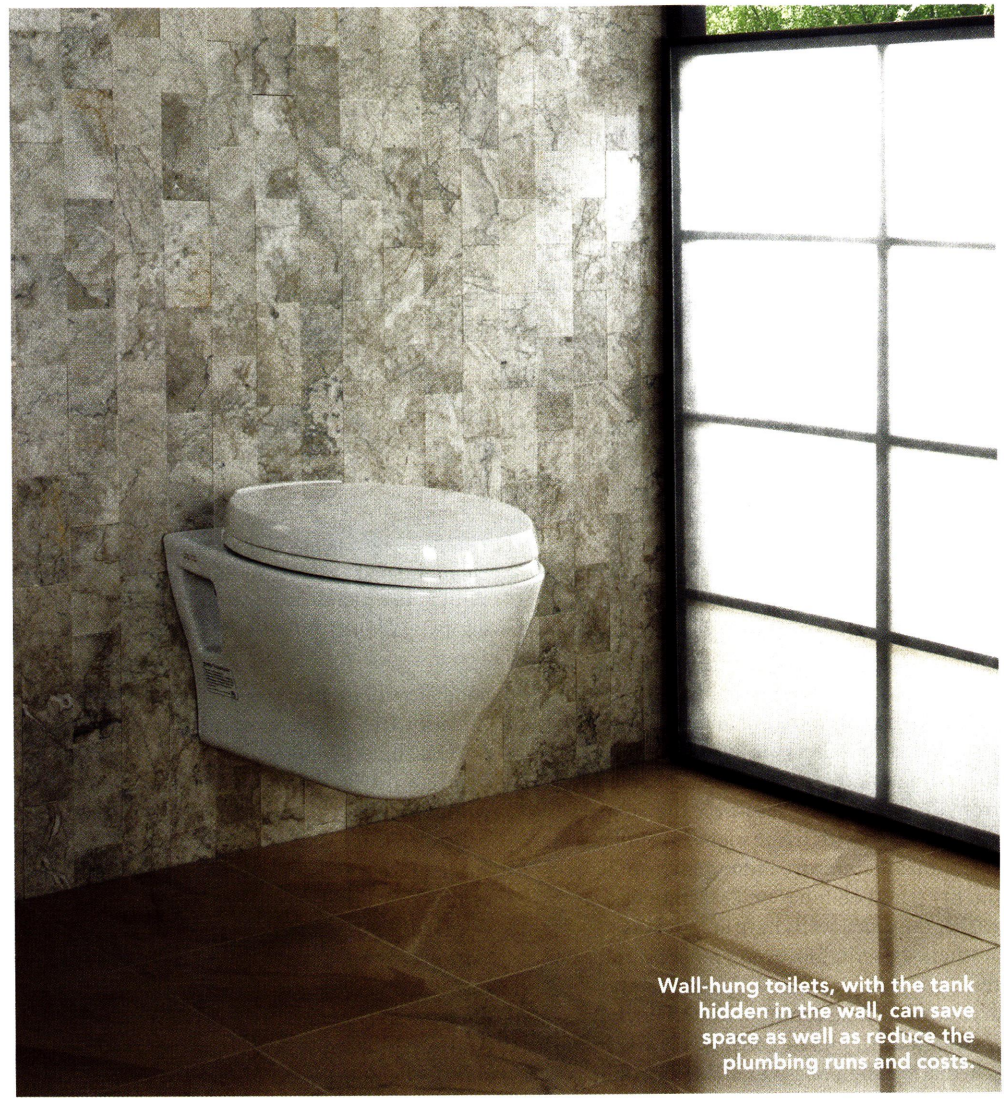
Photos courtesy of TOTO



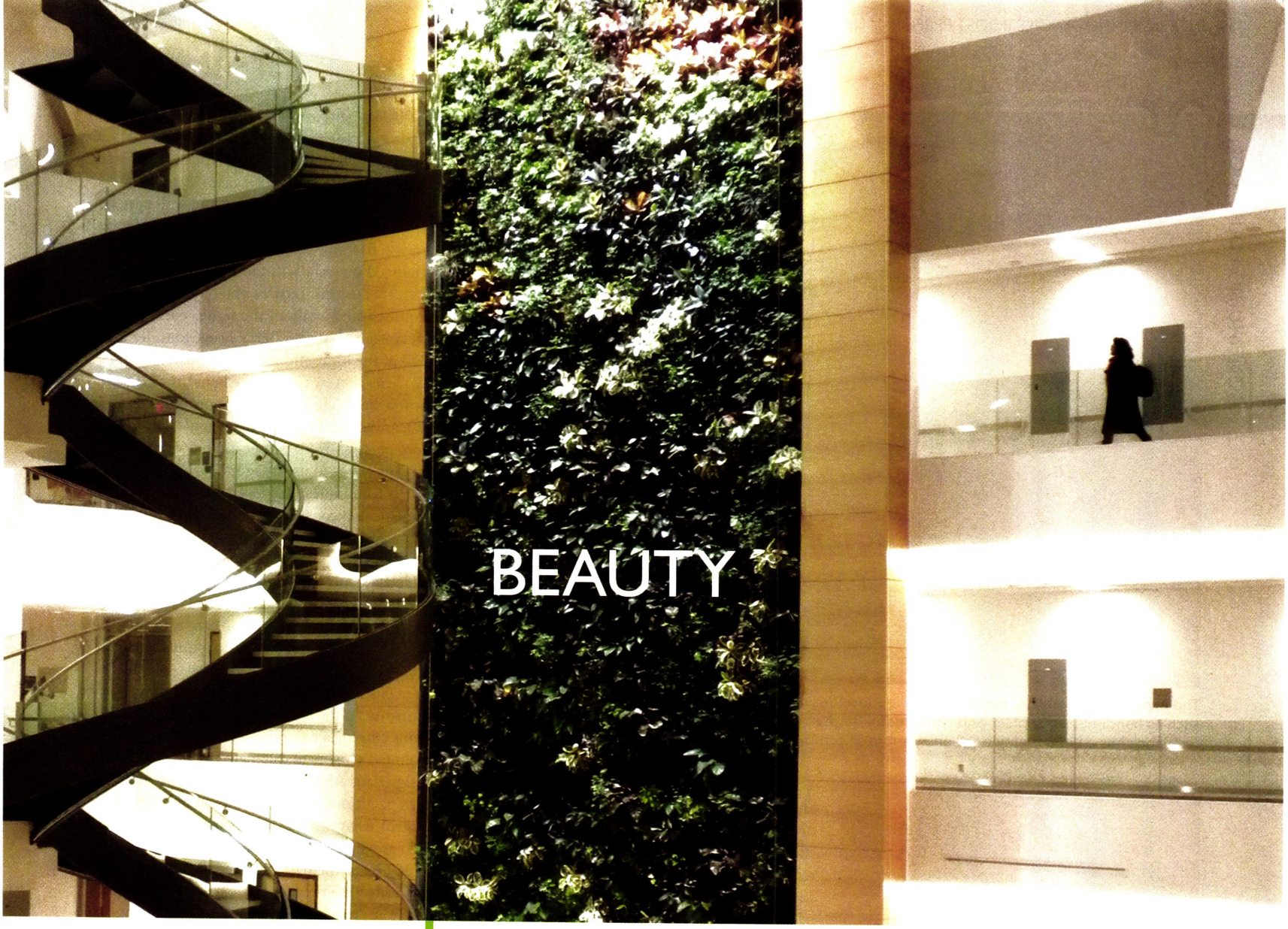
New, high-efficiency commercial restroom fixtures can save millions of gallons of water—and thousands of kilowatt-hours of energy—when applied in large-scale airports.

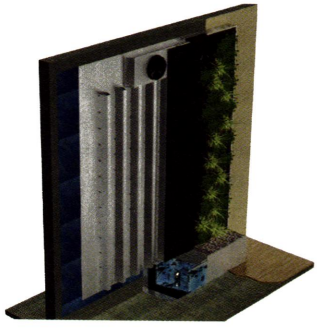
On the other hand, "Antimicrobial agents on interior finishes are a step toward assisting in infection control, but that cannot be the end of the story," notes Erin Fogarty, director of interior design with HMN Architects,[1] which designs healthcare, justice, and educational buildings. "Infection control is in everyone's hands—literally. Hand washing, good hygiene, and proper cleaning of the environment could be more important than the extra agents we add to our materials." Fogarty notes studies going back almost a decade confirming this,[2] from the Centers for Disease Control and Prevention and the Healthy Building Network.

Infection control is especially important for hospitals and similar facilities, where hospital-acquired infection (HAI) rates have risen in some areas, affecting as many as 2 million people and with about 90,000 deaths, according to RAD Consultants. That's more fatalities than some types of cancer, says the firm, and additional medical care for HAI survivors has reached as much as $30 billion nationwide for millions of days of extended hospitalization.[3]



Wall-hung toilets, with the tank hidden in the wall, can save space as well as reduce the plumbing runs and costs.





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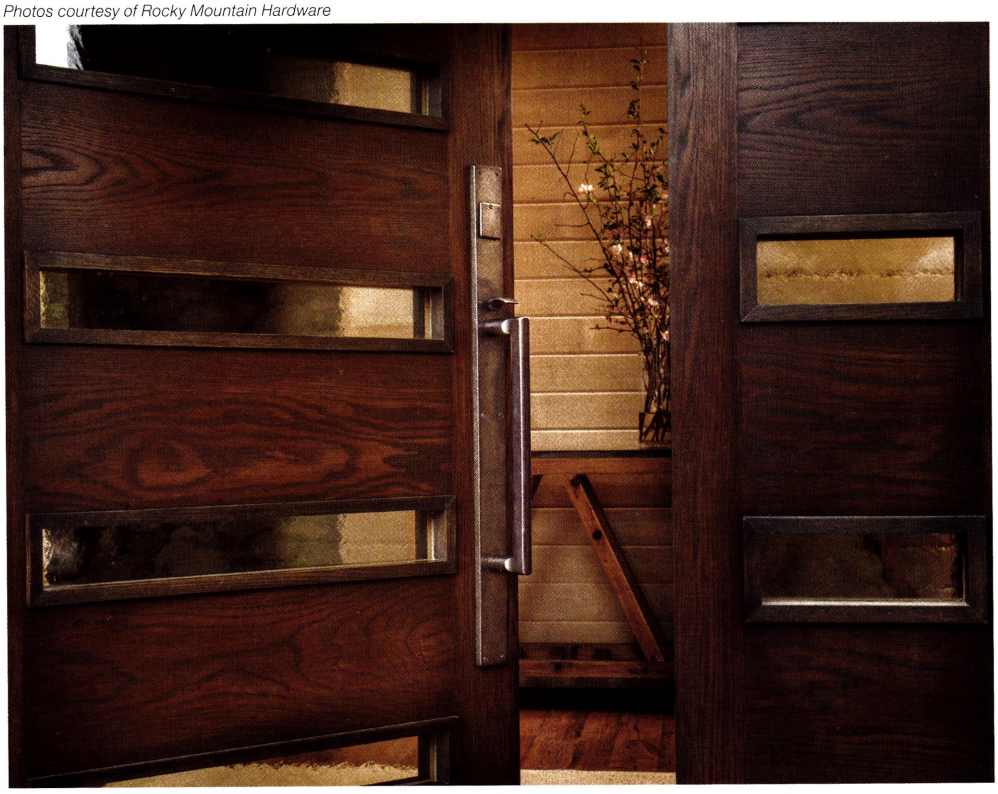

The increase in clean-line, modern hardware includes custom fabrication of building "touchpoints" such as handrails, door pulls, and other metal hardware in the high-end market segments. This residence has a high-quality door entry set in silicon bronze, with a dark luster finish.

In a hospital or other healthcare setting, some hardware use antimicrobial finishes. Bronze, which contains copper, is inherently antimicrobial.

In addition to the antimicrobial treatments, architects and designers are more focused today on the environmental impacts of producing such products as metal hardware. "Bronze is a relatively clean metal to produce, while others such as polished chrome can have unintended negative consequences on the environment due to byproducts from the chrome-plating process," says Zucosky, pointing to reports from Carleton College's Science Education Resource Center. The study concludes that electroplating has been linked to groundwater contamination from chromium VI in some places where production controls are not adequate, or where industrial manufacturing equipment is improperly disposed.[4]

According to OSHA, Cr(VI) or hexavalent chromium "is known to cause cancer. In addition, it targets the respiratory system, kidneys, liver, skin, and eyes. Chromium metal is added to alloy steel to increase hardenability and corrosion resistance," says the agency, "and Cr(VI) compounds are added to some coatings as an anticorrosive agent or as a pigment enhancer."[5] For electroplating as a decorative and protective coating, a Cr(VI) compound, chromic acid, is employed.

NOVEL FABRICATION PROCESSES

In addition to selecting healthy finishes, interiors increasingly benefit from customized, one-off fabrication processes for such products as hardware, ceiling and wall panels, furnishings, and lighting, say experts. "Not only can you use more environmentally friendly and enhanced materials, but today project teams can fabricate custom fixtures and hardware almost as quickly and at about the same cost as some stock products," says Barry Fries, founder and CEO of the high-end interiors construction firm B.R. Fries & Associates. The benefits of these approaches include ways to improve ergonomics, IEQ, and other health-related goals through more personalized, people-first designs.

"The key is to use integrated project delivery, or IPD techniques, and leverage newer, more sophisticated construction processes," says Fries, listing such methods as computer numeric controlled (CNC) milling and cutting, "laser-guided systems for aligning bespoke geometries on site, and full-scale digital templates for key details and assemblies." These can be useful in the fabrication phase for "touchpoints" such as handrails, door pulls, and stairwells, which are often customized for projects in high-end market segments. In the construction phase, contractor teams employ a combination of laser beams and mounted sensors to calculate angles and confirm design data. Applied to wood millwork and glass partitions, they offer careful oversight and control, even when installers must work "blind," such as when a wall obstructs a key datum.

While in the past the one-off fabrication methods have represented a more complex or costly approach, today they are competitive. "We've seen huge growth in custom cast designs in the hospitality and residential fields, among others," says Rocky Mountain Hardware's Pfau, noting the increased interest in clean-line, modern hardware choices that are often tailored specifically for a project or series of installations. "In part that's because of the nature of a cast product—it's all made to order, and the designer can fashion the hardware in the shape of a logo, solve a specific design issue such as accessibility for the disabled, or just create a whole new style."

See endnotes in the online version of this article.

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***C.C. Sullivan** is a marketing communications consultant specializing in architecture and construction.*

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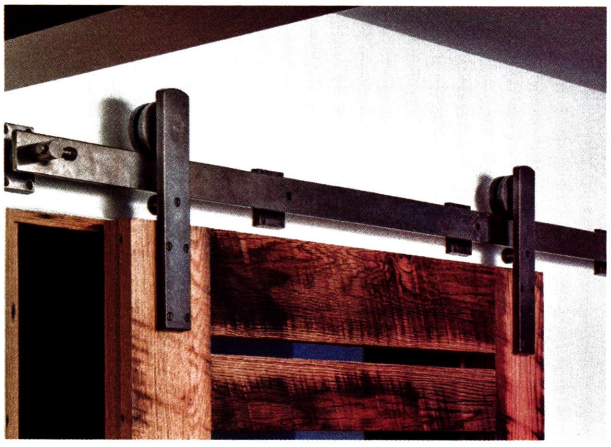

Hardware with an Agricultural Aesthetic

Hand cast in art-grade bronze, Rocky Mountain Hardware's Barn Door Track hardware was created to help hone in on today's trend of injecting an agricultural aesthetic into interiors. Of course, there's also the practical side to this door style: It provides a space-saving solution for separating rooms or adds character to crannies such as closets or pantries. Available in 10 finish options.

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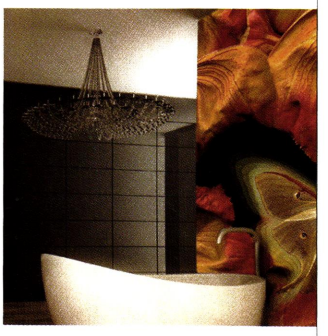

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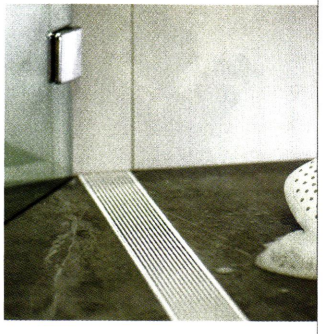

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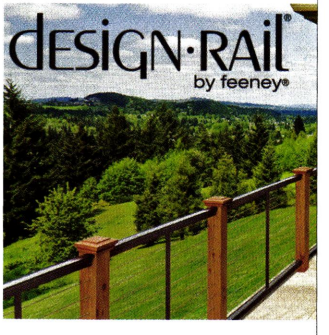

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New and Upcoming Exhibitions

Encounters
New York City
May 9–20, 2014
An interactive exhibition at the AIA New York Center for Architecture, with a surprising touch of augmented reality, *Encounters* is an architectural installation created to discover, explore, and present the work of Luis Vidal + Architects (LVA)—a celebration of their vision and major projects over the last 10 years, including Terminal 2 at London's Heathrow Airport, scheduled to open in June 2014. The exhibition was conceived to create a meditational space in which to experience the architectural queries and needs of the 21st century through Vidal's critical eye. For more information, visit aiany.org.

Finland: Designed Environments
Minneapolis
May 10–August 17, 2014
The first major U.S. exhibition devoted to contemporary Finnish design since the 1990s, *Finland: Designed Environments* will present a holistic overview of the past 15 years in Finland, a period of rapid innovation and design breakthroughs. The exhibition, hosted by the Minneapolis Institute of Arts, will pay particular attention to young Finnish architects emerging as major international voices, including K2S Architects, Hollmén Reuter Sandman, and Verstas Architects, among others. For more information, visit new.artsmia.org.

David Hartt: Stray Light
Chicago
May 17–August 11, 2014
David Hartt: Stray Light presents color photographs, sculptures, and a video installation by the Chicago-based Canadian artist, reflecting on the iconic headquarters of the Johnson Publishing Company in downtown Chicago. The 11-story modernist building, home to *Jet* and *Ebony* magazines starting in 1971, was heralded as the first major downtown Chicago building designed by an African American architect since the 18th century. At the Museum of Contemporary Art Chicago. For more information, visit mcachicago.org.

Design Revolution: Innovating for a Better World
Atlanta
May 25–August 3, 2014
Based on the idea that design is a way of looking at the world with an eye toward changing it, this exhibition offers a glimpse into the ways designers, engineers, students, professors, architects, and social entrepreneurs from the Southeast are designing solutions to the problems of the 21st century. These real-world problems range from the purification of water to the provision of shelter for the homeless, and from the rethinking of transportation systems to the development of games that produce positive world outcomes by teaching, training, and raising awareness of social issues. At the Museum of Design Atlanta. For more information, visit museumofdesign.org.

Ongoing Exhibitions

Sacred Spaces: The Photography of Ahmet Ertug
Philadelphia
Long-term exhibition
A two-part exhibition fittingly presented under the vaulted ceilings of the Penn Museum's first-floor Merle-Smith Galleries, *Sacred Spaces* features 24 works by innovative, acclaimed Turkish photographer Ahmet Ertug. Through his lens and with his exceptionally large-scale prints (some as large as 6 feet wide), Ertug captures the grandeur of the ancient Byzantine churches, all designated UNESCO World Heritage sites, in crisp, bright, detailed photographs. A digital-screen slide show of exterior images of the churches and an interactive kiosk where visitors can explore the rich iconography depicted in Ertug's photographs enhance the exhibition. At the Penn Museum. For more information, visit penn.museum.

SubUrbanisms: Casino Company Town, China Town
New London, Connecticut
Through May 12, 2014
SubUrbanisms explores the controversial conversion of single-family homes into multifamily communities by immigrant Chinese casino workers in Connecticut. Featuring infographics, photographs, maps, and architectural representations and speculations, the exhibit examines casino urbanization, workers' communities, and the contested suburban landscape through the lenses of architecture, landscape, and planning, as well as anthropology, geography, and contemporary critical art practices. At the Lyman Allyn Art Museum. For more information, visit lymanallyn.org.

The Space Between
New York City
Through May 17, 2014
The Space Between, an exhibition of new work by photographer Marc Yankus, explores the fine line between urban reality and architectural

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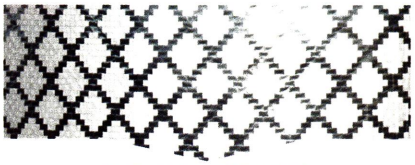
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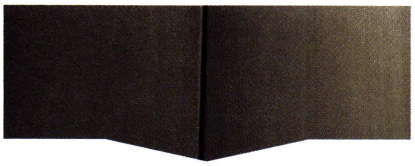
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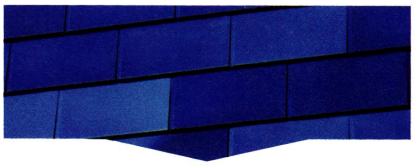
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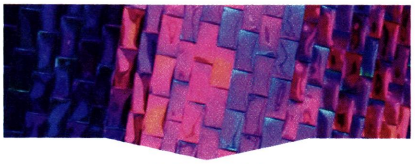
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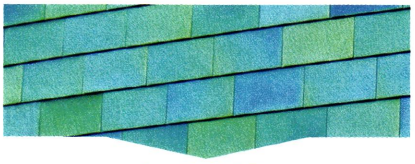
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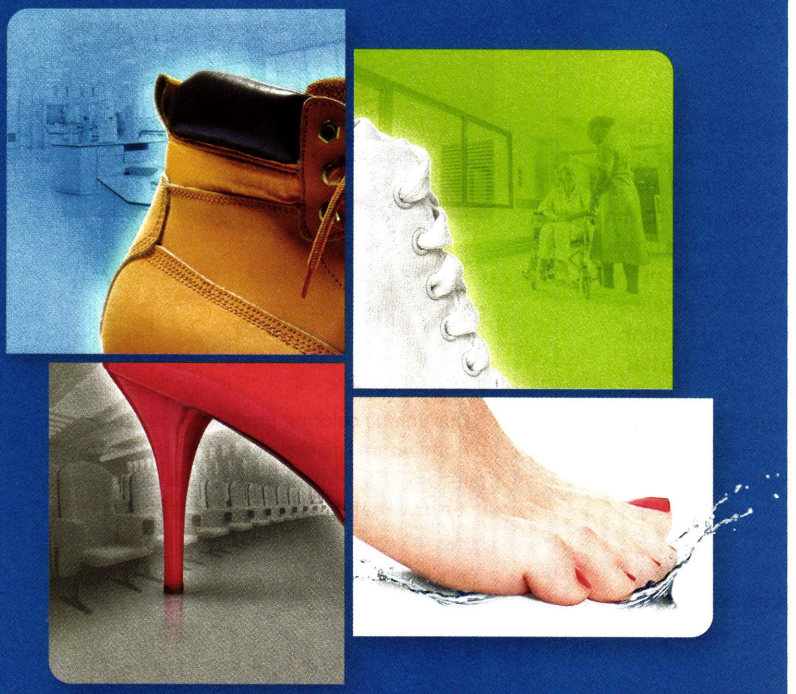

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fiction through surreal portraits of buildings. *The Space Between* presents images subtly altered to show a New York that exists on an aesthetic plane where imagination and documentation meet. At ClampArt. For more information, visit clampart.com.

Apertures
Los Angeles
Through May 18, 2014
A site-specific installation designed by Herwig Baumgartner and Scott Uriu at the SCI-Arc Gallery, *Apertures* reflects on a current architectural discourse of digital ecologies, emphasizing the relationship between the natural world and advances in digital technology, which leads to new types of interactive, organic buildings. The installation focuses on a symbiotic association between nature, building morphologies, and material expression. Rooted in Baumgartner+Uriu's work and ongoing research, *Apertures* challenges the notion of an architectural opening as a static object. For more information, visit sciarc.edu.

Photographing the Arab City in the 19th Century
Montreal
Through May 25, 2014
This exhibition at the Canadian Centre for Architecture explores the beginnings of photography in the Middle East and North Africa. Through a contemporary reading of panoramic views, streets, and monuments, the exhibition offers a shift in perspective, focusing on a morphological understanding of the planning of the traditional Arab city. For more information, visit cca.qc.ca.

Architecture + Photography
Pittsburgh
Through May 26, 2014
At the Carnegie Museum of Art, this exhibition demonstrates the rich relationship between architecture and photography. Four groups of objects explore this relationship in just a few of its many forms. A newly acquired portfolio of iconic modernist buildings by famed architectural photographer Ezra Stoller reveals how his imagery helped shaped public perception of modernism. A selection of photographs by Frances Benjamin Johnston of historic buildings in Charleston, South Carolina, reflects on photography as a documentary form that preserves our changing built environment. Visit carnegiemuseums.org.

London's Growing . . . Up!
London
Through June 12, 2014
London's skyline is currently going through an enormous change. More than 200 towers are planned in the capital in an attempt to meet the needs of its growing population. Through the use of images, video, models, CGIs, and visitor interaction, this exhibition at New London Architecture will present a past, present, and future view of London's skyline. For more information, visit newlondonarchitecture.org.

Lebbeus Woods: Architect
New York City
Through June 15, 2014
Acknowledging the parallels between society's physical and psychological constructions, architect Lebbeus Woods's career showed how these constructions transform our being. Working mostly, but not exclusively, with pencil on paper, Woods created an oeuvre of complex worlds, at times abstract and at times explicit, that present shifts, cycles, and repetitions within the built environment. At The Drawing Center. For more information, visit drawingcenter.org.

Foster + Partners: The Art of Architecture
Bangkok
Through June 29, 2014
Arranged along the themes of infrastructure, high-rise building, urban design, history, and culture—all within a framwork of sustainability—the works on display in this exhibit at the Bangkok Art and Culture Centre highlight the diversity of Foster + Partners' work. For more information, visit bacc.or.th.

California Design, 1930–1965: Living in a Modern Way
Salem, Massachusetts
Through July 6, 2014
An exhibition of more than 250 Midcentury Modern design objects, *California Design* features furniture, textiles, fashion, vehicles, and more to celebrate the impact of California designers between 1930 and 1965. The output of designers Charles and Ray Eames, Richard Neutra, and R. M. Schindler, along with previously unheralded figures, is shown in the context of the creative climate of California and the period. At the Peabody Essex Museum. Visit pem.org.

Mario Botta: Architecture and Memory
Charlotte, North Carolina
Through July 25, 2014
Considered one of the century's most fundamental contributors to postmodern classicism, Swiss architect Mario Botta is respected particularly for his sensitivity to regional vernacular and to the building's relationship with the land. The exhibition at the Bechtler Museum of Modern Art features sketches, original wood models, and photographs for 30 of Botta's projects. For more information, visit bechtler.org.

Bernard Tschumi
Paris
Through July 28, 2014
The Centre Pompidou hosts the first major European retrospective of the architect and theorist Bernard Tschumi. Since the late 1970s, Tschumi has been redefining architecture through a series of conceptual arguments rooted in film, literature, visual arts, and philosophy. The exhibition showcases some 350 drawings, sketches, collages, and models, many of them never shown previously. The installation, designed by the architect, also features archival documents and films. Visit centrepompidou.fr.

Lectures, Conferences & Symposia

A Modern Affair
New York City
May 13, 2014
DOCOMOMO New York/Tri-State welcomes aficionados of Midcentury Modernism to get a rare glimpse of the Edgar J. Kaufmann Jr. Conference Center designed by renowned Finnish architect Alvar Aalto. *A Modern Affair* supports the work of the New York/Tri-State chapter and celebrates the 50-year milestone of the center, which is one of only four Aalto-designed projects in the United States. For more information, visit docomomo.nytri.org.

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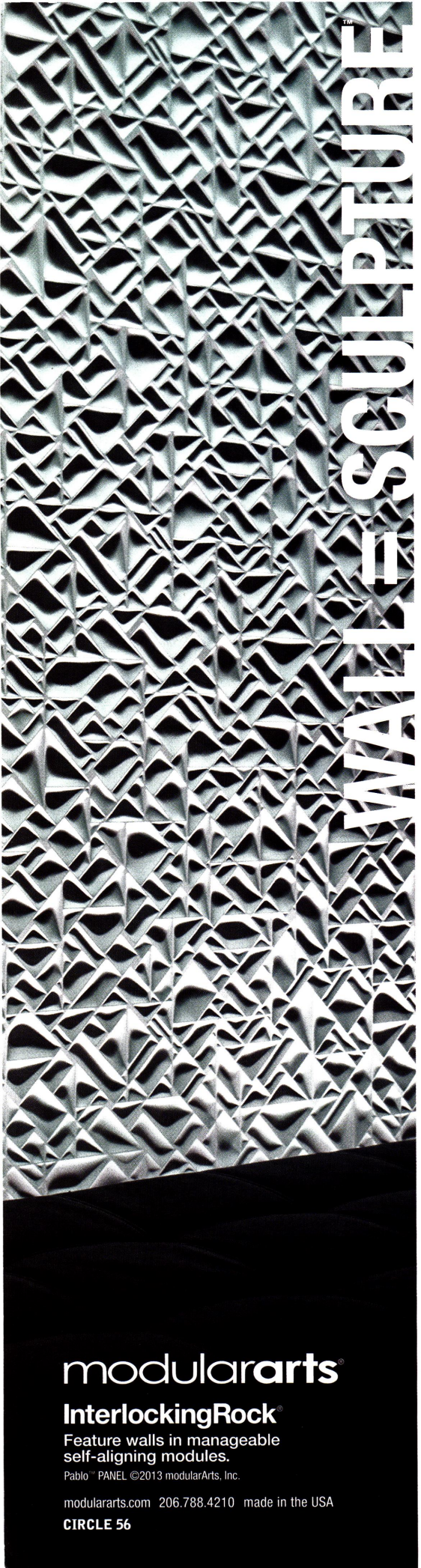

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urbanism, architecture, and landscape. Topics range from the merging of landscape and architecture to the growing influence of Mexico's architects and the integration of art, technology, and design. Speakers include Thom Mayne, Brad Cloepfil, Michel Rojkind, Thomas Phifer, and Tatiana Bilbao. At Walt Disney Concert Hall. Visit construction.com/events/2014/innovation-la.

7th Making Cities Livable Conference
Kingscliff, Australia
July 10–11, 2014
The conference will examine the challenges, opportunities, trends, and issues currently facing sector professionals. Delegates and presenters will examine how to plan for healthy, sustainable, and resilient cities. The challenges and opportunities facing Australia, as a nation and as part of a global village, will be explored. At Mantra on Salt Beach. For more information, visit healthycities.com.au.

Competitions

BIO 50: NOW
Submission deadline: May 31, 2014
The Biennial of Design (BIO 50) launches a call for applications for NOW, a program parallel to BIO 50's that will animate the city of Ljubljana, Slovenia, during the three months of the Biennial with events, exhibits, and lectures. BIO 50 invites individuals, designers, curators, educational and cultural institutions, and retail and business ventures to take part in NOW. Visit bio.si/en/news/368/bio-50-now-call-for-applications.

ISARCH Awards
Registration deadline: June 30, 2014
Architecture students are invited to promote university projects on an international scale. The competition is open to all architecture students who have graduated within the three years preceding the competition deadline. Jury members include Patrik Schumacher and Odile Decq. The three winning projects will receive prizes worth a total of €7,000. For more information, visit isarch.org.

WMF/Knoll Modernism Prize
Nomination deadline: June 30, 2014
This biennial prize is awarded to a design professional or firm in recognition of an innovative solution that preserves a modern landmark. Nominated projects should have enhanced a site's architectural, functional, economic, and environmental sustainability for the benefit of the community, and have been completed in the last five years. Visit wmf.org.

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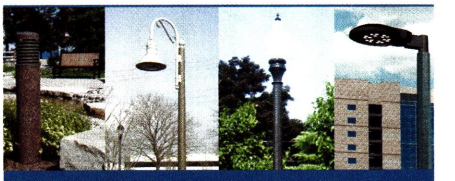

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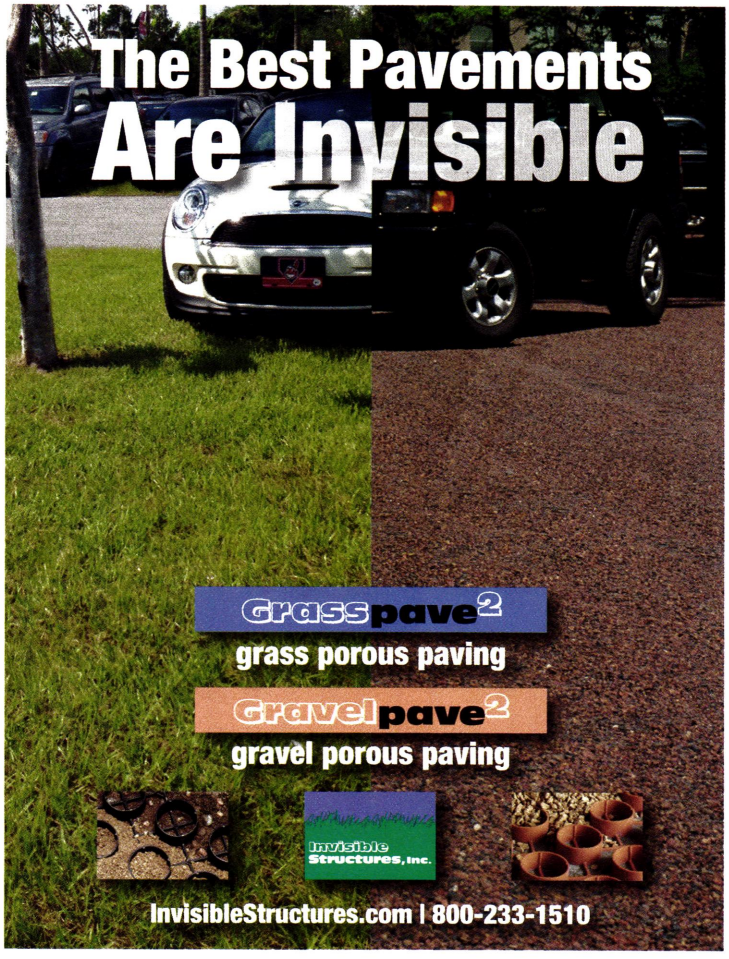

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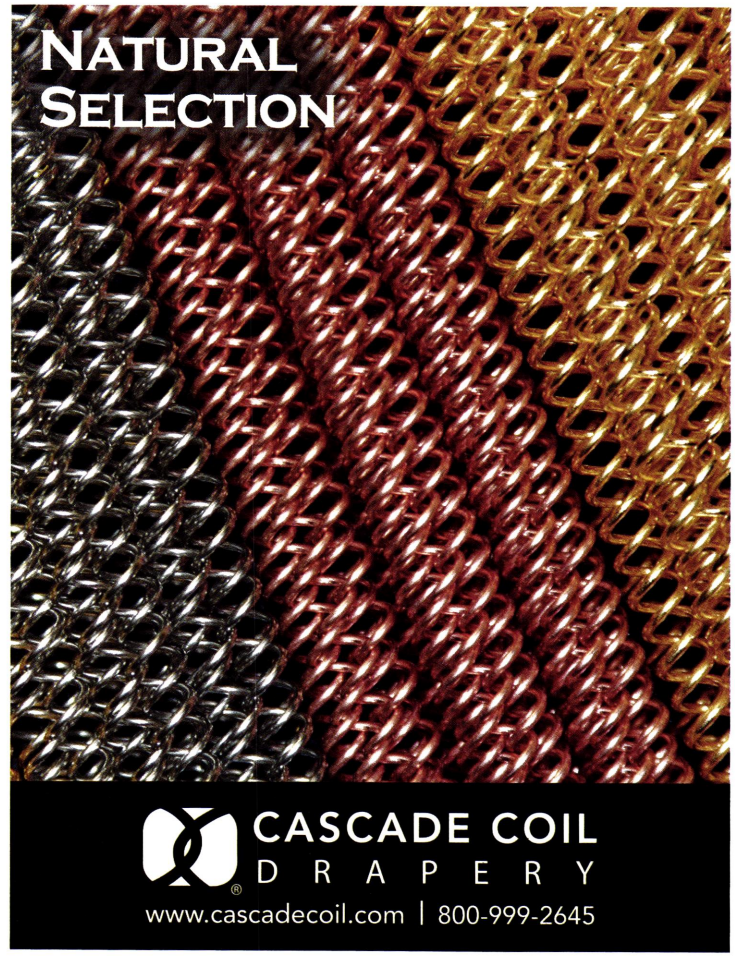

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snapshot

PROJECT PARC ZOOLOGIQUE DE PARIS
LOCATION PARIS
DESIGNER BERNARD TSCHUMI ARCHITECTS

WHEN ARCHITECT Bernard Tschumi was renovating a crumbling 1930s-era zoo on the edge of Paris, his design team faced challenges. After all, as the architect puts it, "A zoo is simultaneously a hospital, a prison, and a major restaurant—animals eat all the time."

Tschumi decided that for the zoo's seven new structures—aviaries, a greenhouse, and visitor facilities—he would create architecture that would blend in with the preexisting man-made landscape and be respectful of its historic context. Furthermore, the architecture for all creatures, including humans, would follow the same concept. In the case of the zoo's Sahel-Sudan biozone, which houses ostriches, kudus, and giraffes, a zigzagging larchwood skin conceals corrugated-metal-clad technical facilities; the space between these walls forms a hidden passageway for zookeepers. A café follows a similar scheme, with the kitchens tucked away beyond the metal screens. The larchwood weathers to a soft gray, the same hue as the 80-year-old 200-foot-tall Grand Rock, which looms above.

During construction Tschumi notes, the elephant in the room turned out to be the giraffes in the pen. "It's not so easy to transport a giraffe," he says, explaining why they remained (the other critters were relocated). "Amusingly enough, they watched us through the whole construction phase." *Anna Fixsen*

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