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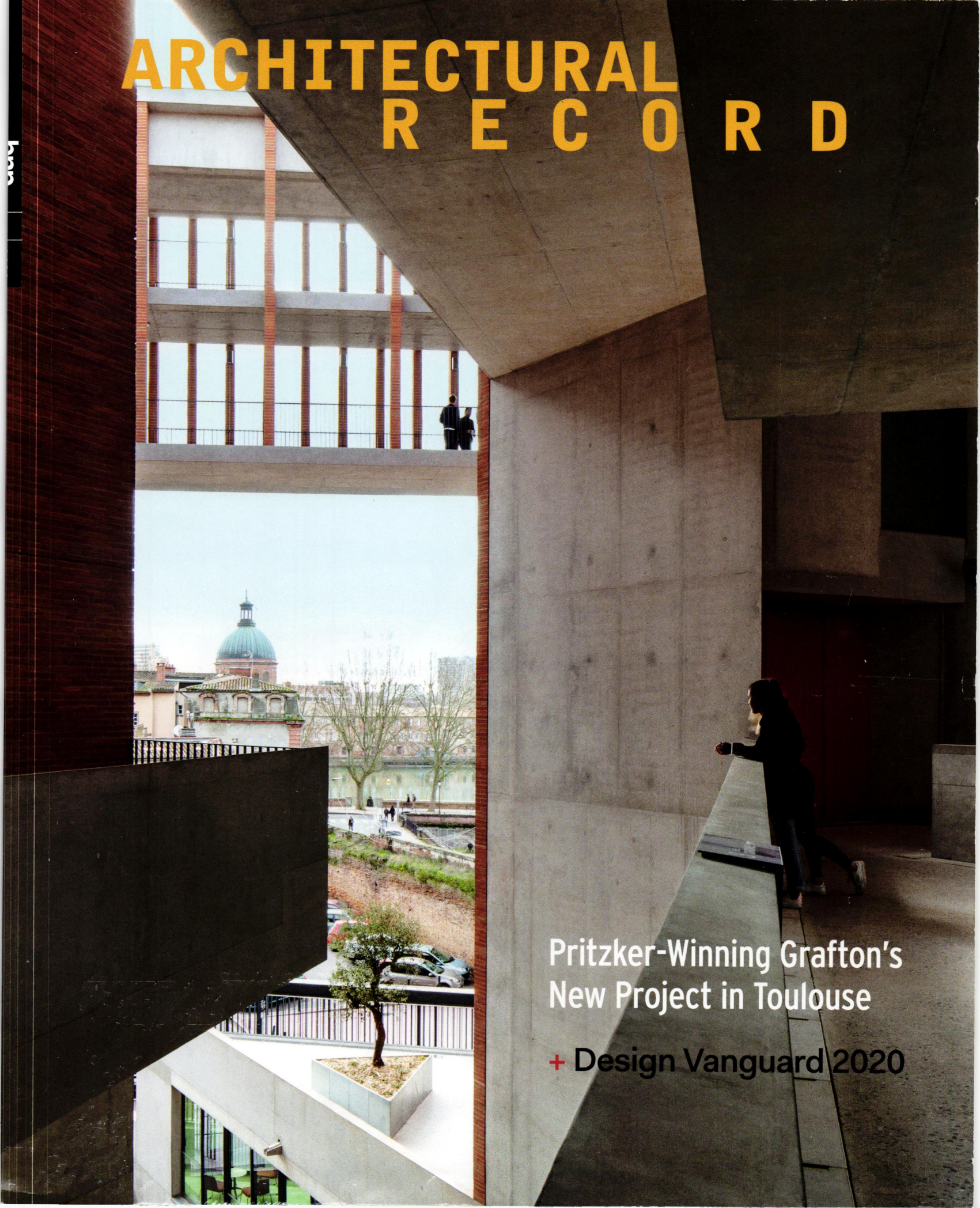

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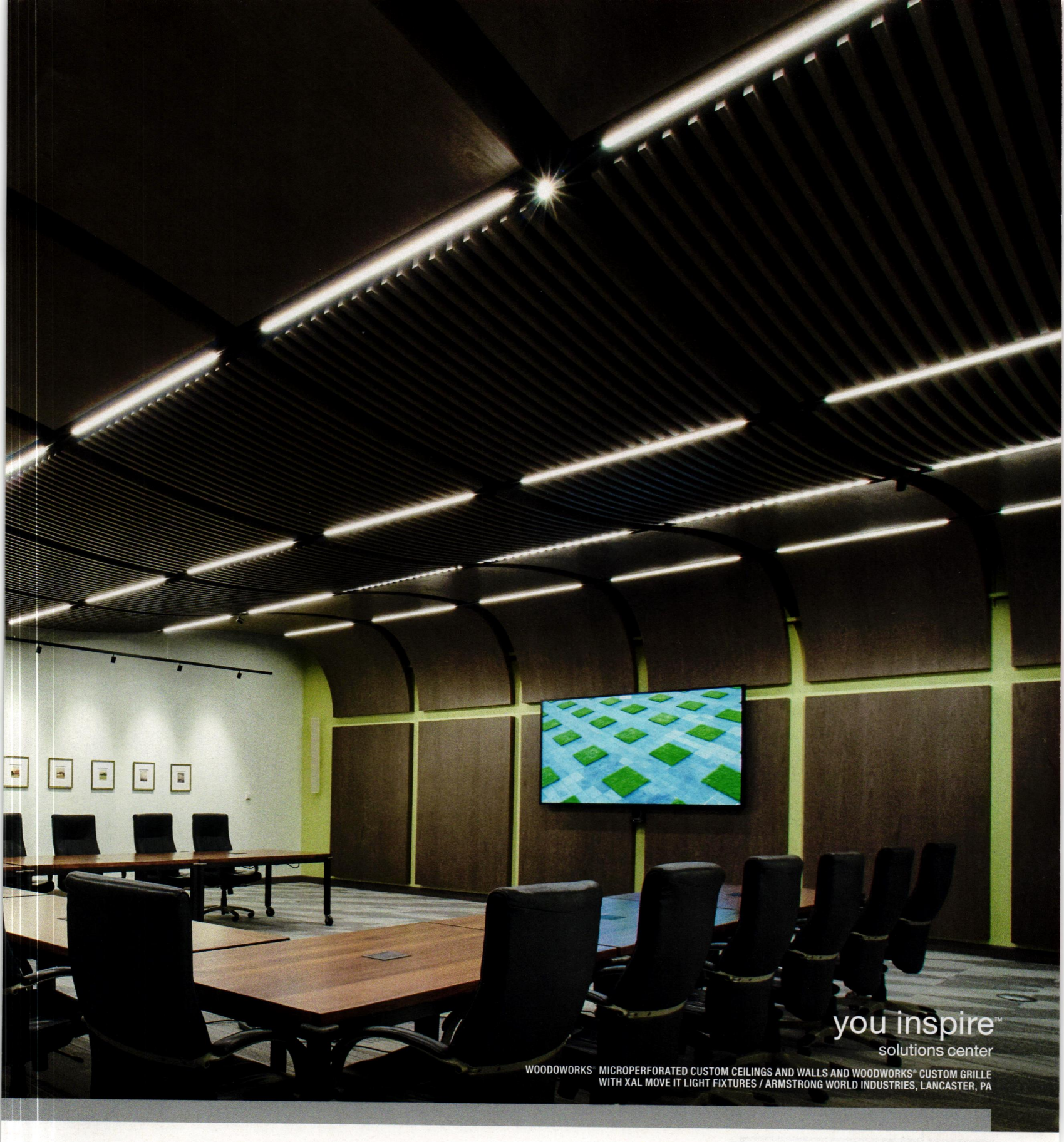

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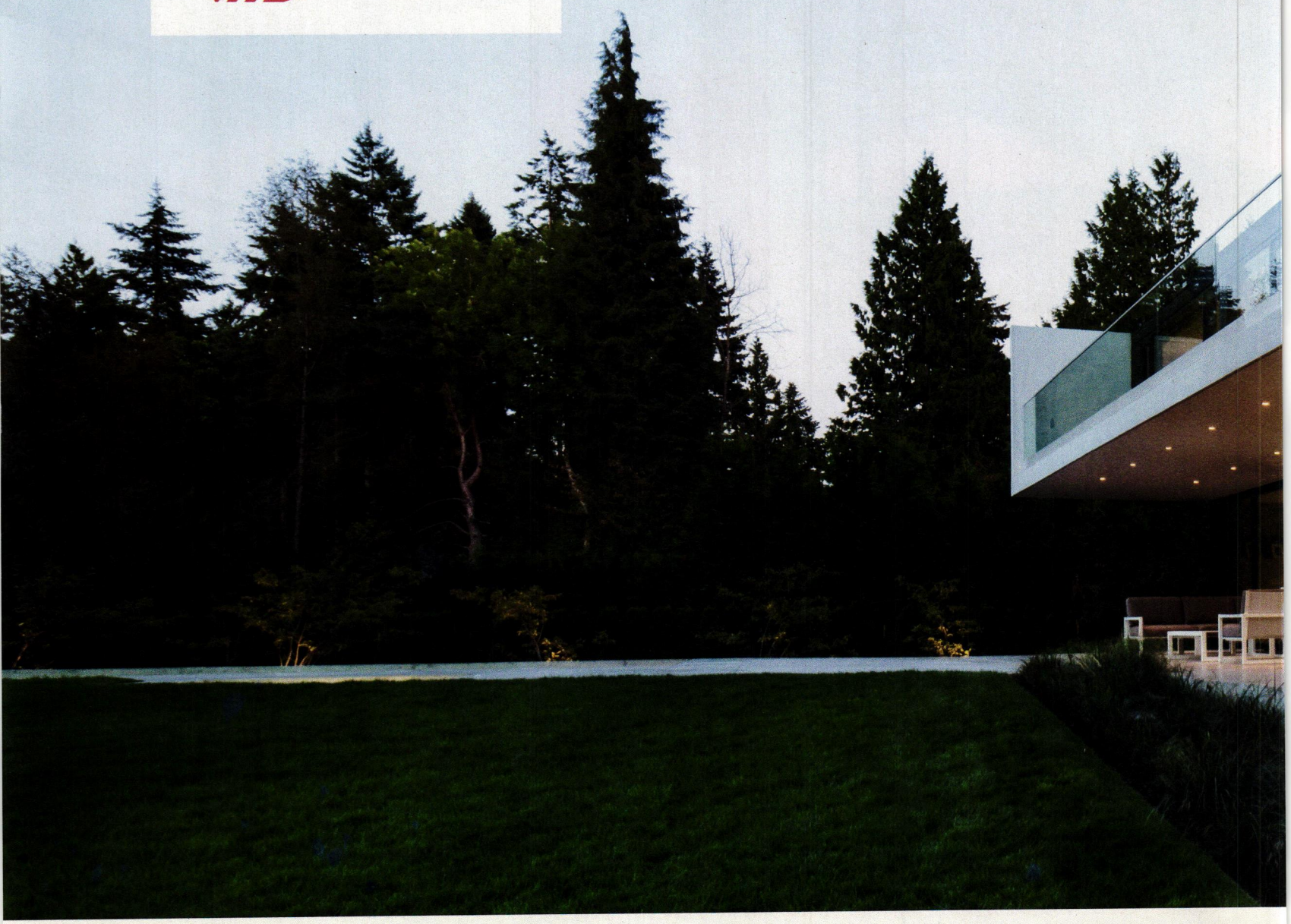

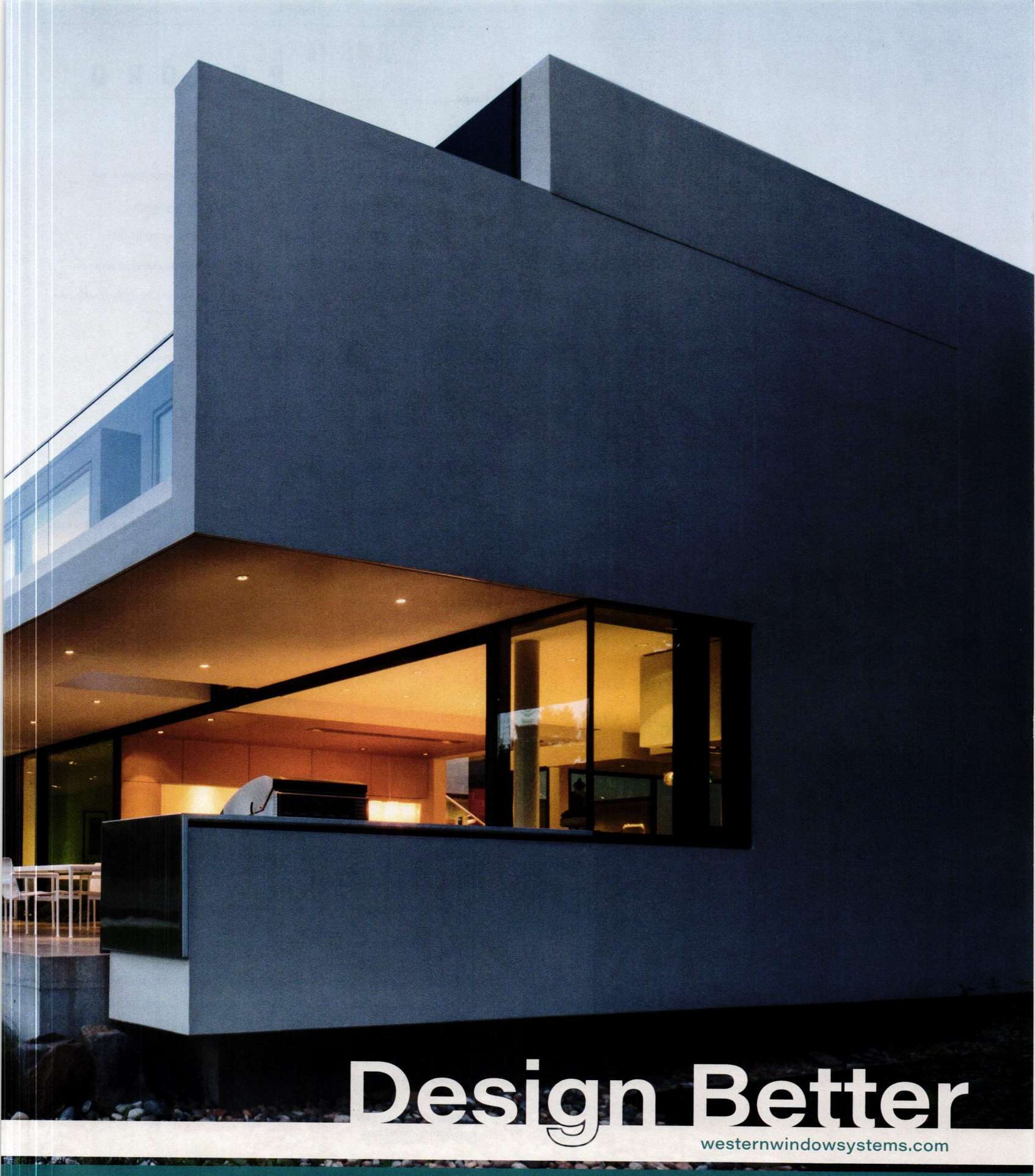

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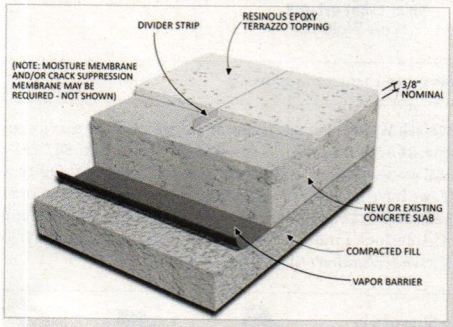

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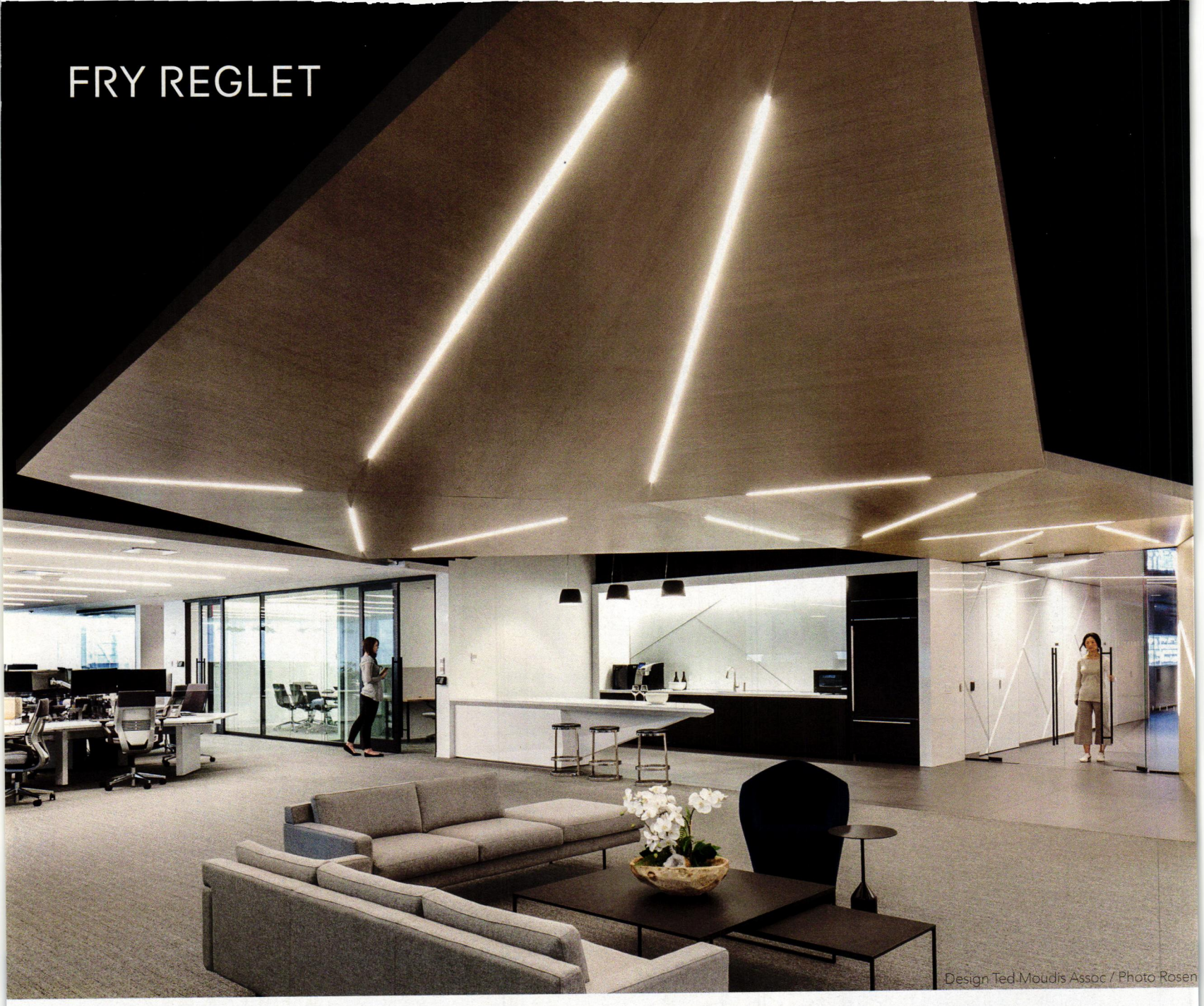

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NEWS

19 PANDEMIC SHIFTS PROFESSION'S FOCUS TO HEALTH CARE *By James S. Russell, FAIA*

20 ARCHITECTURE SCHOOLS ADAPT TO AN UNCERTAIN FUTURE *By Heather Corcoran*

24 OBITUARY: MICHAEL SORKIN, 1948-2020 *By Cathleen McGuigan*

26 NEWSMAKER: KIMBERLY DOWDELL *By Miriam Sitz*

DEPARTMENTS

16 EDITOR'S LETTER: DESIGNING THE FUTURE

29 HOUSE OF THE MONTH: MANUEL CERVANTES' HOME STUDIO *By Miriam Sitz*

35 LANDSCAPE: TAINAN SPRING BY MVRDV *By Kara Mavros*

39 GUESS THE ARCHITECT

40 IN PRACTICE: THREE WOMEN LEAD SOM *By Suzanne Stephens*

51 PRODUCTS: HARDWARE *By Sheila Kim*

56 PRODUCTS: ANTIMICROBIAL *By Sheila Kim*

BOOKS

45 *BUILDING AMERICA: THE LIFE OF BENJAMIN HENRY LATROBE* BY JEAN H. BAKER *Reviewed by Richard Korman*

36 NINE NEW BOOKS ON PAST AND PRESENT DESIGN *Reviewed by Suzanne Stephens*

PROJECTS

60 TOULOUSE SCHOOL OF ECONOMICS, FRANCE GRAFTON ARCHITECTS *By Tim Abrahams*

68 MUSÉE ATELIER AUDEMARS PIGUET, SWITZERLAND BJARKE INGELS GROUP *By Andrew Ayers*

BUILDING TYPE STUDY 1,017 HOSPITALITY

77 SAN SA VILLAGE, CHINA IILAB. *By Aric Chen*

82 GUSTO 501, TORONTO PARTISANS ARCHITECTS *By Alex Bozikovic*

86 QUIRK HOTEL, VIRGINIA ARCHITECTUREFIRM *By Josephine Minutillo*

DESIGN VANGUARD 2020

95 INTRODUCTION

96 CRISTIÁN IZQUIERDO

98 ATELIERJUN

100 VLADIMIR RADUTNY ARCHITECTS

102 CRISTOPH HESSE ARCHITEKTEN

104 N H D M ARCHITECTS

106 YOUNG PROJECTS

108 SPACE POPULAR

110 WORD

112 MCLEOD KREDELL ARCHITECTS

114 O STUDIO ARCHITECTS

POLICY

118 THINK GLOBAL, ACT LOCAL FORWARD-LOOKING CITIES LEAD THE WAY TOWARD A ZERO-CARBON FUTURE. *By Katharine Logan; Joann Gonchar, FAIA; Mira Locher, FAIA*

LIGHTING

131 ABERDEEN ART GALLERY HOSKINS ARCHITECTS AND SPEIRS + MAJOR *By Chris Foges*

134 TAMARINDO STAYNER ARCHITECTS *By Linda C. Lentz*

136 PRODUCTS: LIGHTING *By Sheila Kim*

171 DATES & EVENTS

176 SNAPSHOT: SINAN BOOKS POETRY STORE BY WUTOPIA LAB *By Kara Mavros*

THIS PAGE: CHURCH OF SEED, CHINA, BY O STUDIO ARCHITECTS. PHOTO BY IWAN BAAN.

COVER: TOULOUSE SCHOOL OF ECONOMICS, FRANCE, BY GRAFTON ARCHITECTS. PHOTO BY FRÉDÉRIQUE FÉLIX-FAURE.

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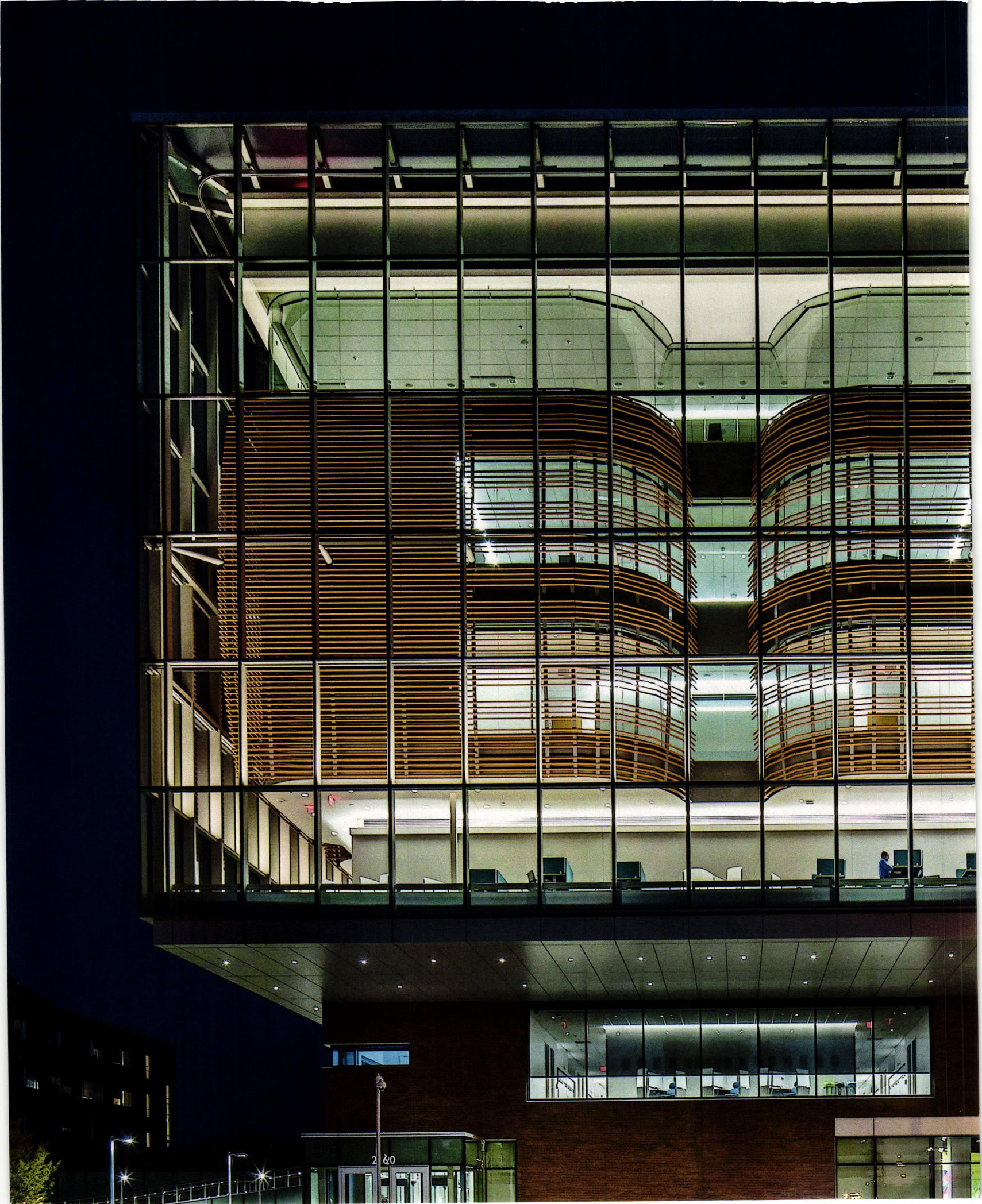

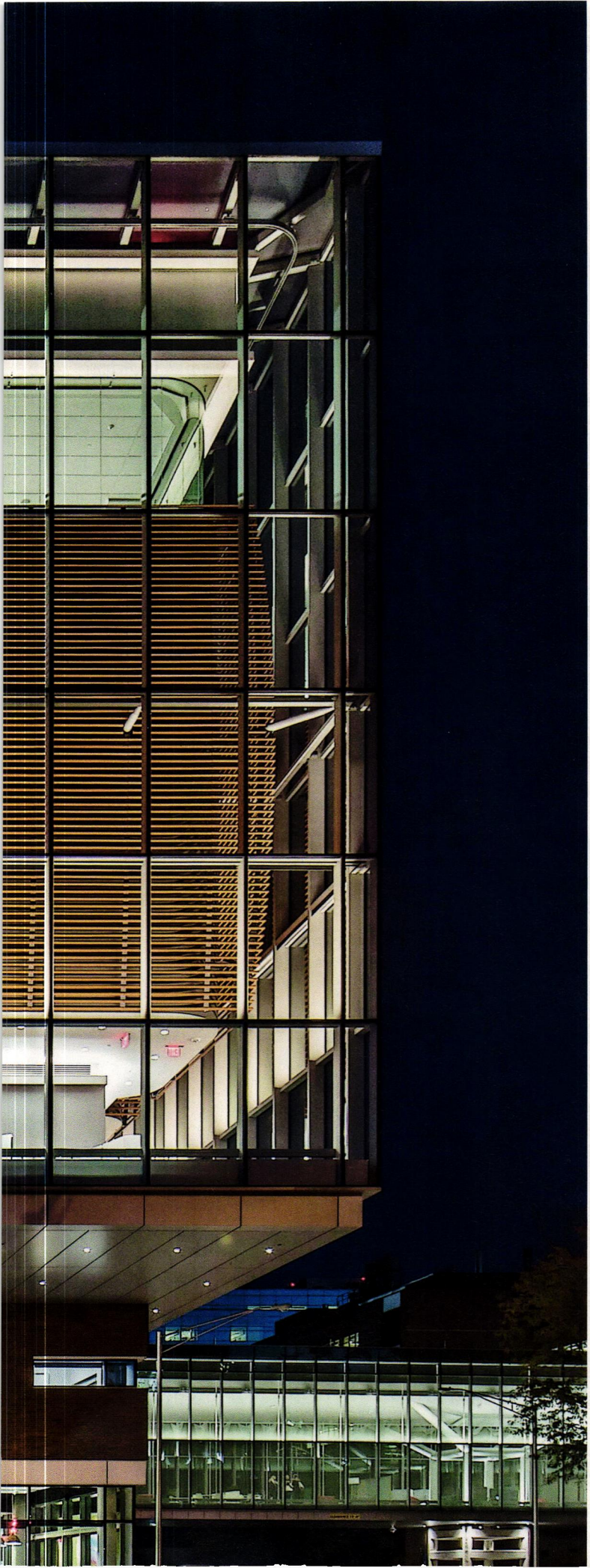

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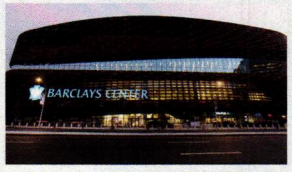

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Page 166

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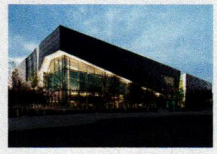

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Designing the Future

How the pandemic will change our world.

Without civic morality, communities perish; without personal morality, their survival has no value.—Bertrand Russell

THE ROUND-THE-CLOCK drumbeat of news about coronavirus pounds us with tragic statistics: 2 million cases worldwide and more than 100,000 deaths. At press time, deaths from coronavirus in the United States had surpassed Italy's total to be the highest in the world at more than 25,000. As the economy crashes, the number of people unemployed is soaring toward 20 million.

In architecture firms, a cascade of layoffs and furloughs has begun.

But if there is any upside to the coronavirus crisis, it is in the response of communities—health-care workers first and foremost; grocery-store clerks and bus drivers still on the job; and volunteers, helping formally or informally, including architects fabricating face masks and shields, or using their expertise to expand and convert facilities to care for the deluge of sick patients (page 19).

And there are ad hoc communities, too, who rise up in cities around the world and throw open their windows to cheer those on the front lines of the pandemic.

Can all this human electricity, fueling the common good, be harnessed beyond the current crisis? Before coronavirus cases were even close to peaking, writers and thinkers were already asking how our world will be different on the other side. Some have raised the specter of authoritarianism, as most of us have been taking stringent orders from the top. But others believe that the values exemplified in this moment will persist. People will "become newly conscious of interdependency and community," predicts author Jonathan Rauch, writing in *Politico*. For sociologist Eric Klinenberg, the "pandemic marks the end of our romance with market society and hyper-individualism . . . When this ends, we will reorient our politics and make substantial new investments in public goods—for health, especially—and public services."

His point is well taken: for one thing, the virus has disproportionally infected African Americans (page 26) and the poor, and rampaged through homeless shelters and housing for the disabled.

Obviously, too, we will work in new ways, with the wider use of digital tools for toiling together while being apart. But schools are likely to change less, as education—including architectural—is suffering from inequality and the lack of personal contact (page 20).

And there will be paradoxes to face. While carbon emissions dropped radically as the streets emptied of cars, urban dwellers might not rush to mass transit. And density is already being questioned. "Denser cities are more energy-efficient," the urbanist Richard Sennett pointed out in *The Guardian*, but "there is going to be a conflict between the competing demands of public health and the climate."

Architects can play a major role in navigating this uncertain future, through reimagining health care, housing, transportation, and the public realm as sustainable systems that are more equitable for diverse communities and conflicting concerns.



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Michael Sorkin, who died of coronavirus on March 26 (page 24) and was a longtime contributing editor of RECORD, imagined the city in an era of autonomous vehicles and flying Ubers (RECORD, April 2017). Yet this future, he maintained, "must include the defense of many of our traditional gathering places—our squares, plazas, parks, and sidewalks . . . We move to live, to experience the other, to engage the pleasures of place, to collaborate, to enjoy happy accidents of encounter, and to enlarge the space of the political, which demands the verifying integrity of the face-to-face."

Like Sorkin, William Menking, the founding editor in chief of *The Architect's Newspaper*, who died of lymphoma on April 11, was a civic moralist. Menking, who was trained as an architect but worked as a curator and writer, as well as an editor, recently helped start the Grace Farms Foundation's initiative to end modern slavery and child labor in the supply chain of architectural products (RECORD, September 2019). And, like Sorkin, he was a teacher. Both influenced legions of architects to believe they can make a difference in shaping the world.

While we honor those who contributed so much to the ideas around architecture and urbanism, we also look to the future: in this issue, RECORD presents Design Vanguard 2020, our annual awards program for distinguished young practices from around the globe (page 95). And we are pleased to publish a stunning new project by Grafton Architects, founded by Yvonne Farrell and Shelley McNamara (page 60), who are this year's Pritzker Prize winners, the first women partners to be so honored. That is a promising sign for a future of greater equity and civic morality. With coronavirus still raging, we just can't be sure when the future will begin.

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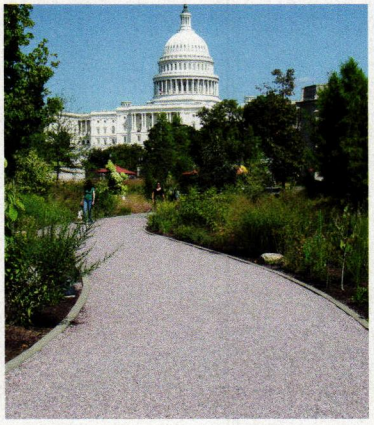





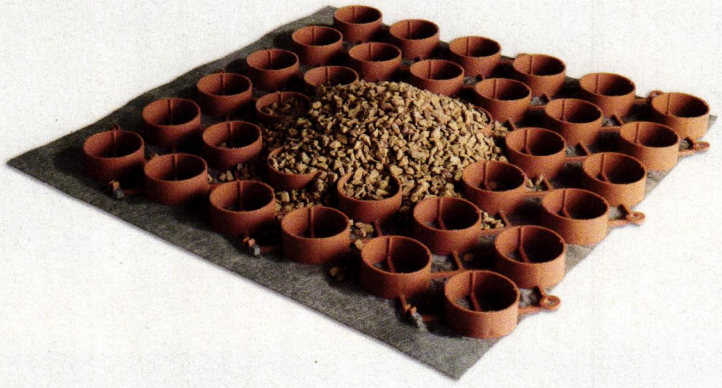

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perspective

As the coronavirus has shown, we are capable of joining forces against a common, invisible enemy. Hopefully, we have learned that preventative measures are better and less costly than reactive ones.

—Architect Pat Sapinsley, in an op-ed for Forbes, *reflecting on how lessons of the pandemic are relevant to the fight against climate change.*

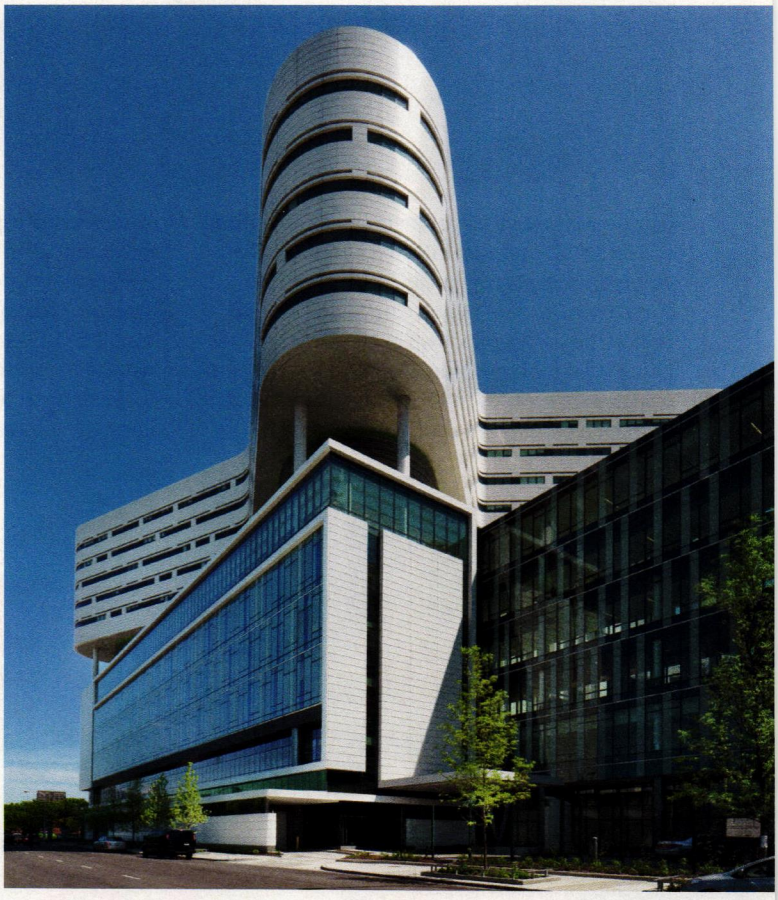
Pandemic Shifts Profession's Focus to Health Care

BY JAMES S. RUSSELL, FAIA

OVER THE LAST several months, the COVID-19 pandemic has upended almost every aspect of day-to-day life, infecting millions of people across the globe, hundreds of thousands of whom have died. Many in the architecture, engineering, and construction industry have turned their focus to the rapid delivery of health-care facilities, to treat the ill and attempt to stave off the pandemic's spread, and much of that work has been concentrated in coronavirus hot spots like New York.

Initial projections indicated that the largest city in the U.S. would need tens of thousands of additional hospital beds for the infected. Hospital systems married their in-house facilities staffs with architects and engineers to quickly assess how they might accommodate the expected influx. New York–based medical center NYU Langone Health, for example, retrofitted some older buildings to serve both contagious and noncontagious patients. A decommissioned structure was built out for large-scale coronavirus testing; a conference room became a staff testing center.

For many hospitals, an early goal was to fit out as many rooms as possible to Airborne Infection Isolation (AII) standards, a time-consuming and involved process. Using negative-pressure ventilation, and exhaust that is not recirculated, AII rooms prevent people nearby from being exposed to the airborne virus. But as updated guidance emerged from the U.S. Centers for Disease Control that the virus generally does not hang in air (rather, it clings to larger droplets that quickly precipitate), centers shifted to reserve AII rooms for only the most serious COVID-19 patients, whose treatment produces high quantities of virus-carrying vapor.



Perkins and Will designed the McCormick Foundation Center for Advanced Emergency Response (right) in Chicago to handle an unexpected surge of patients. The Army Corps of Engineers converted New York's Javits Convention Center (bottom) into a field hospital.

In adapting existing spaces to handle the coronavirus, "what you need is distancing," says Chris Scovel, a director at Boston-based nonprofit MASS Design Group. "You try to isolate beds and provide quite generous corridors." In addition, says MASS founding principal Michael Murphy, facilities need to have "protocols on surface infection and staff and patient separation," such as infectious-disease areas sealed off and entered through vestibules.

Strategies derived from treatment centers built in places pummeled by the most serious contagious outbreaks in the world, such as tuberculosis, are embodied in guidance for architects that MASS is developing, with input from medical and public-health experts. The firm's first publication outlines a tent-clinic prototype, with features that can also be applied to existing buildings. The design emulates AII best practices for ventilation by mounting a simple, screened exhaust vent at bed height. With supply air-fed from above, the vent removes contaminants before they can contact the health-care worker.



Other lessons come from hospitals in the U.S., like Rush University Medical Center. Recognizing the possibility of a pandemic or other mass casualty event, the Chicago institution opened the Robert R. McCormick Foundation Center for Advanced Emergency Response in 2012. The Perkins and Will–designed building includes an expansive covered sally port, within which ambulances deliver patients, that can be sealed off by overhead doors. In the current COVID-19 crisis, tents have been erected within the sally port to assess incoming patients. (Hospitals are increasingly

PHOTOGRAPHY: © JAMES STEINKAMP (TOP); U.S. AIR NATIONAL GUARD/PATRICK CORDOVA (BOTTOM)

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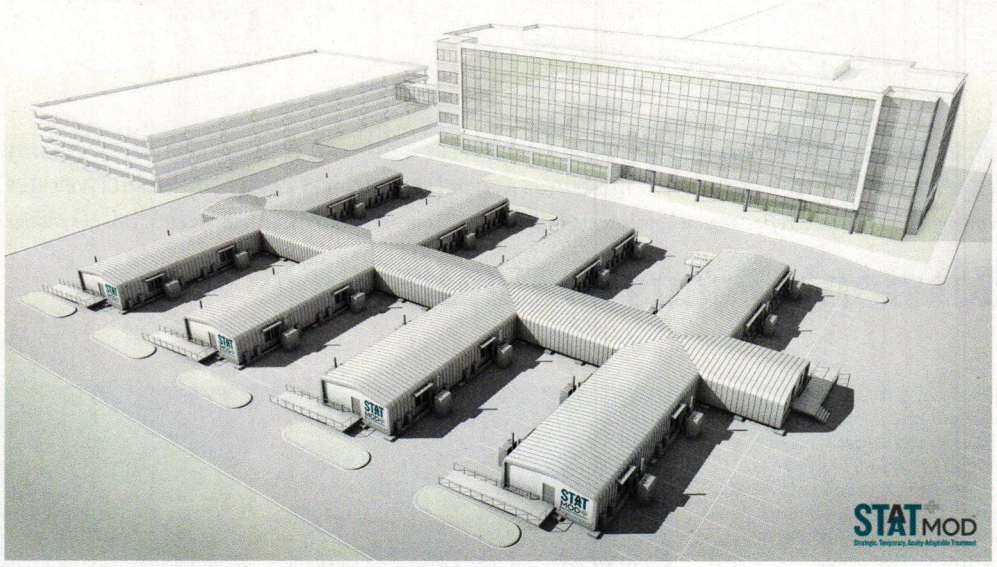

STAAT Mod units can be connected to one another on-site in various configurations.

IMAGE: COURTESY THE BOLDT COMPANY/HGA

using such tents to separate the possibly infected from staff and non-infected patients.) The emergency department can be divided into three pods, each of which can be deployed to isolate the contagious. Two of the pods are now being used for coronavirus intake. The hospital has also set up beds in its expansive lobby for less-acute patients—a contingency that the architects anticipated by installing access to power and utilities in the columns.

Several cities have addressed the surge in demand with rapidly assembled "field hospitals." The U.S. Army Corps of Engineers installed beds in New York's Jacob K. Javits Convention Center (more than 2000 were planned), and other temporary facilities have gone up in Los Angeles, Chicago, and Detroit.

The Boldt Company, a contractor in Appleton, Wisconsin, is prefabricating modular structures, designed by the firm HGA, that meet the need for speed without the sanitation and ventilation problems of tents. STAAT Mod, as the units are called, can be delivered on a standard truck trailer. They contain two finished patient rooms and a bathroom, along with medical and HVAC infrastructure that meet the negative-pressure standards for AII rooms.

Virtual reality simulations allowed healthcare professionals and HGA process engineers to weigh in on the validity of the designs, even as social-distancing orders precluded in-person meetings and the construction of physical prototypes. Projects are currently under way at four sites, with the first 16-bed configuration planned to be operational the first week of May.

Even as some cities are "flattening the curve" of rising cases, there seems little reason to slacken efforts to adapt hospitals to better manage such an unpredictable contagion. The next pandemic—or a rebound of the current one—could be just around the corner. ■



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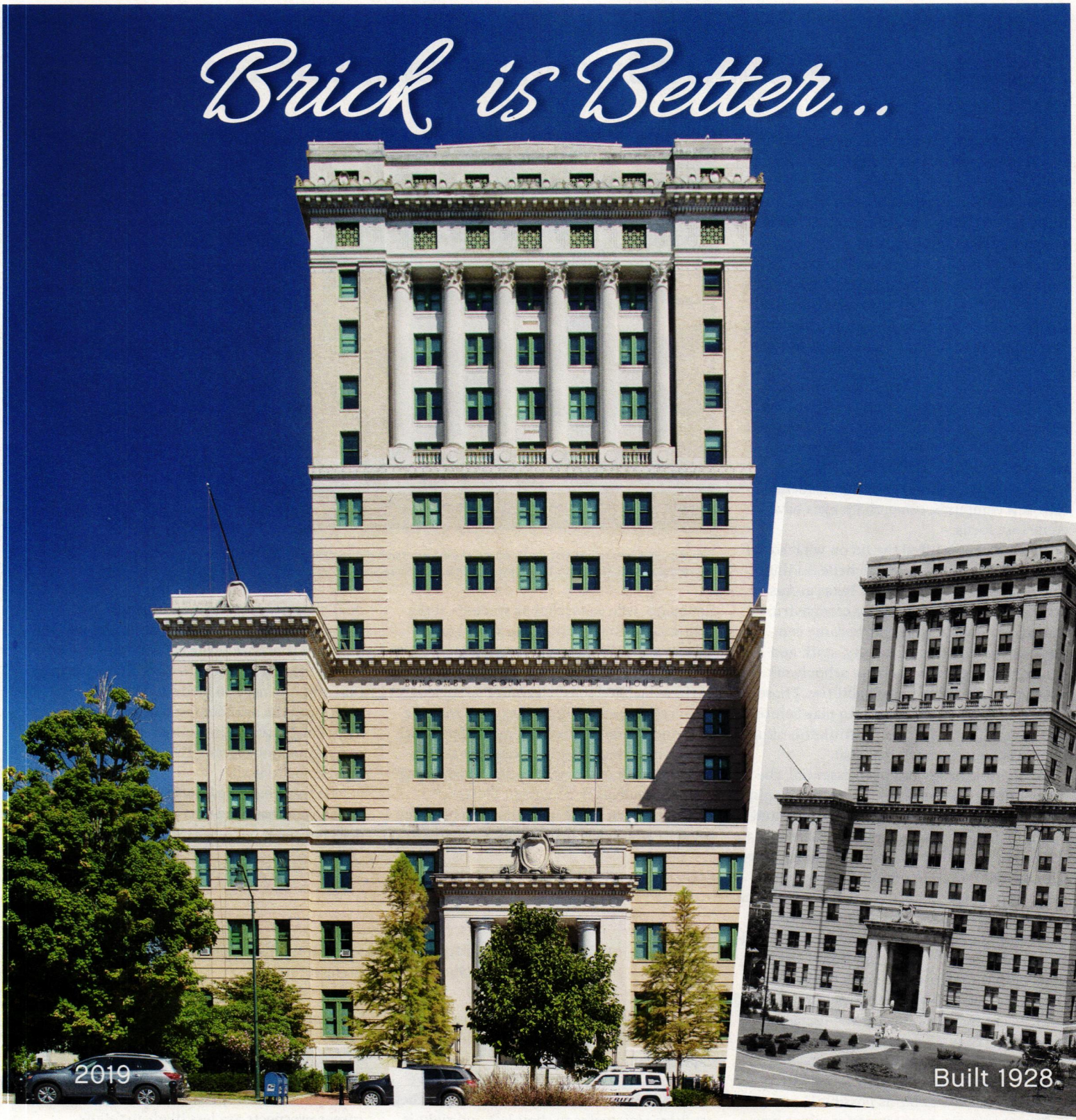

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Architecture Schools Adapt to an Uncertain Future

BY HEATHER CORCORAN

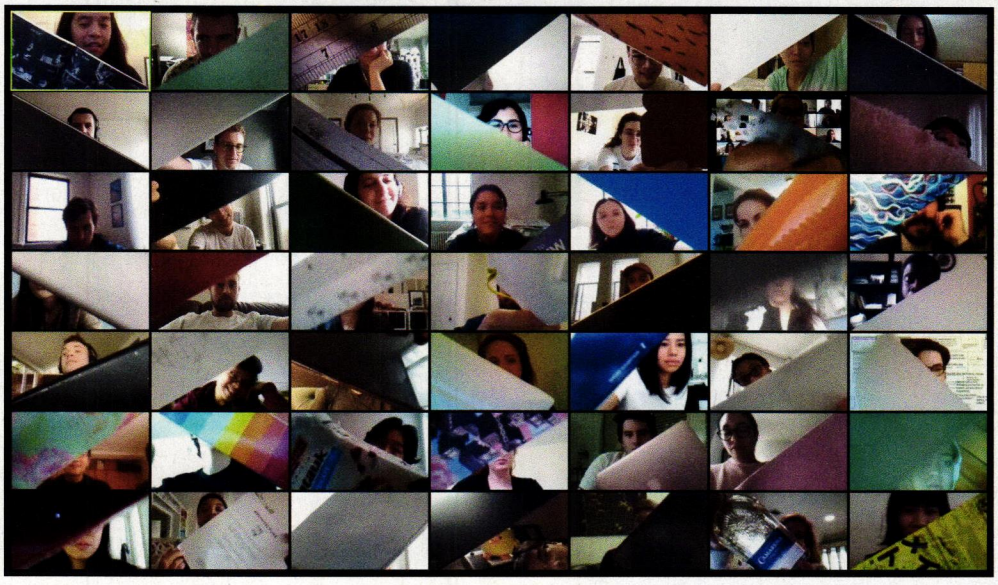
FOR THE 25,000 STUDENTS in accredited architecture programs nationwide—plus those studying landscape architecture, interior design, historic preservation, planning, and related disciplines—the spread of COVID-19 has meant a sudden midsemester pivot from hands-on studios and fieldwork to remote learning. While technology has eased aspects of the transition, the current crisis has shed light on inequities in architectural education, leading some to rethink what design schools might look like in a post-pandemic world.

For administrators, the first priority has been making sure students are safe and have access to the technology required to complete their coursework online—even, in the case of the Yale School of Architecture, shipping laptops to students. But now that students have left campuses, other challenges have come into focus.

"It's as if we've lifted the lid on what social human life really is," says Michelle Addington, dean of the University of Texas at Austin School of Architecture. As the coronavirus spread and social distancing became compulsory, she heard from faculty, staff, and students struggling to balance schoolwork with new caretaking responsibilities. Those things "didn't have to come into play before, but should have," she says. "I think this situation has opened a crack into that."

While technology has been essential, the pandemic has also revealed its limits. Meejin Yoon, dean of Cornell Architecture, Art, and Planning (AAP), says that, before, there was a sense that technology was an equalizing force. "But having moved to remote instruction, we're finding that equity is a major issue." The sudden shift—"a push, not a pull" into online learning—has highlighted a number of inequities. Spread across "every time zone," the now homebound students face novel challenges, from a lack of high-speed internet or dedicated workspaces to new childcare and homeschooling duties. "How we can experiment with architectural pedagogy and mediums and formats," asks Yoon, "but in a way that's as equitable and accessible as possible?"

Many academics have responded with a new sense of openness, says Deborah Berke, dean of Yale Architecture. "Learning from this balance between rigor and generosity of spirit makes expanded forms of education more possible," she says. For some institutions, pursuing balance has meant scrapping the pressure of grades. "We're treating this situation as an opportunity to explore, invent, and try new things," says Andrew Heumann, who co-teaches 83 students at the Columbia University Graduate School of Architecture, Planning and Preservation (GSAPP). His class has taken a playful approach, creating a "quaranzine" and collaboratively making images within the now ubiquitous video-conferencing grid. And yet an important element of personal contact is missing, he says. "I can't get as complete a picture of everything that's happening with my students in a moment like this."



Students and faculty interact via video call during a session of the spring 2020 GSAPP course Architectural Drawing and Representation II, taught by Dan Taeyoung, Violet Whitney, Quentin Yiu, Lexi Tsien-Shiang, and Andrew Heumann.

Keeping that sense of connection has been key for Felix Heisel, who teaches a first-year undergraduate architecture studio at Cornell that shifted from hand-drawing and material exploration to digital representation. But how can the group experience be retained? "We can give them instruction, but the input they get from classmates to their left and right is missing right now," he says.

For those about to graduate, pedagogical limitations are compounded by fears about how the post-coronavirus economy will affect firms' ability to hire.

"I've gone through all the stages of grief to acceptance, at this point," says Allison Fricke, set to graduate from Columbia GSAPP with dual master's degrees in architecture and historic preservation. For students like her, the pandemic has meant the cancellation of studio travel, the end of access to libraries and fabrication labs, the need to hold final reviews via video, and the abandonment of commencement celebrations—in addition to frozen or nonexistent job offers. "This really is an anticlimactic end to it all."

The spiraling economy is something schools have to address head-on. "My philosophy is, it does not serve our students to give them unjustified optimism in a state of great uncertainty," says Phil Bernstein, an associate dean at Yale. He organized a panel of practitioners who had entered the workforce during previous downturns to speak with students, whose career prospects are less likely to follow traditional paths than recent graduates'. "As educators, we're going to have to be superclear about why and how we are training the next generation of architects—and how they're relevant in the post-pandemic world," he says. "If we don't, given the cost of an architecture education these days, we're going to see a lot of empty seats in studios." ■

'It does not serve our students to give them unjustified optimism in a state of great uncertainty.'

– Phil Bernstein, associate dean for Administration and Financial Affairs, Yale School of Architecture

IMAGE: COURTESY COLUMBIA GSAPP



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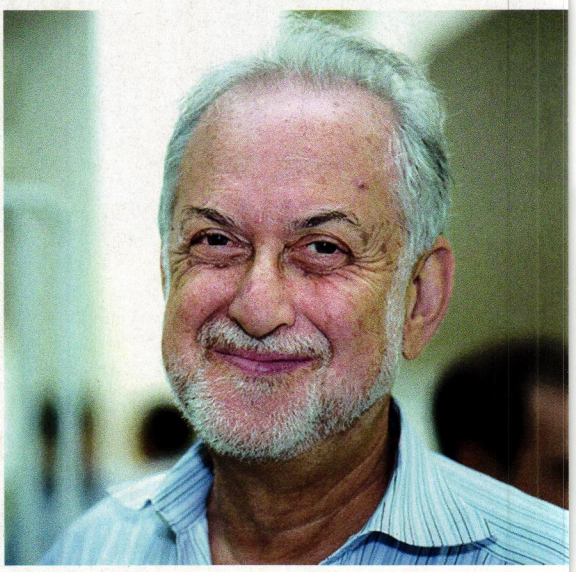
Obituary: Michael Sorkin, 1948–2020

BY CATHLEEN MCGUIGAN



MICHAEL SORKIN, architect, author, teacher, and one of the most distinctive voices for social justice and sustainability in the design of the urban environment, died in New York on March 26, 2020, at the age of 71, after contracting COVID-19. A distinguished professor and director of the urban-design program at the Bernard and Anne Spitzer School of Architecture at the City College of New York, Sorkin was a longtime contributing editor and friend of ARCHITECTURAL RECORD, as well as architecture critic for *The Nation*. "Michael's essays for RECORD were always insightful and the most original of anything being written about architecture today," says Victoria Newhouse, another contributor to the magazine. Sorkin was also known for the biting essays he wrote for *The Village Voice* in the high days of Postmodernism. In addition, he wrote or edited 20 books.

His office, Michael Sorkin Studio, had a number of urban design and architecture projects in China. Closer to home, he was a recent finalist in a design competition for affordable housing on infill lots in New York, with the multiunit House as Garden for a site in Harlem. His firm's nonprofit arm, Terreform, is a research studio for exploring sustainability.

Sorkin was a world-class provocateur, his criticism always served up with keen intelligence, love of language, and sharp wit. Two months before the 2016 presidential election, Sorkin wrote presciently in an opinion piece for RECORD, "Civilizations are marked by their priorities, and ours are too given over to prisons, malls, and McMansions and too little to good housing for all, complete and sustainable communities, green energy, rational mobility, structures of succor. Politics programs our architecture. The emblem of Trump's agenda is a piece of architecture—that absurd pharaonic wall he bruits for the Mexican border. His whole project trumpets control, and his mantra is shared by many an architect: just leave it to me!"

Advocating that that control must be shared with communities, Sorkin wrote in the magazine that planning in New York City had become "too skewed toward money and away from people," saying that "the capacity of neighborhoods to meaningfully participate in planning their own destinies—and that of the larger realms we all share—is



Colleagues and Friends Offer Tributes

Thom Mayne
Founding Partner, Morphosis
His voice was incisive and fearless and sometimes stinging. He challenged me repeatedly with words I often didn't want to hear. But I trusted him—his comments were clearly coming from a place of generosity and honesty and commitment to his project, which was, finally, about social justice. He spoke of our awesome responsibilities, he spoke relentlessly of the power of architecture to change lives, he never stopped insisting that we must never stop fighting—for what we believed in, for a resistance to the status quo.

Marion Weiss
Cofounder, Weiss/Manfredi
He had the capacity to bring you, midsentence, into the particular urban or literary adventure he was in the midst of and was equally interested in whatever journey you might be on. Bumping into him a few months ago in Tribeca, with a request for advice, led to a series of brief e-mails from him, all with the subject heading, "One more idea." Reading these e-mails last week brought tears to my eyes; those subject headings were so emblematic of the conversations we all wish we could continue with him.

Joseph Giovannini
Architect and Critic
There were so many Michaels: the comedian, the theorist, the empathetic and inspirational teacher, the urbanist, the professor, the friend, the husband, the moralist, the bon vivant, and of course the architect who didn't build nearly enough. The common denominator to the entire vast Sorkin enterprise, with all its moving parts—essays, articles, urban plans, environmentalism, architecture, teaching, lecturing—was his driving intelligence, which he delivered with humor and sound judgment.

Nader Tehrani
Dean, Irwin S. Chanin School of Architecture at Cooper Union
Principal, NADAAA
Words flowed seemingly effortlessly, with incisive precision, belying the actual intellectual efforts that preceded his theoretical labor. He reminded us that ideas come in many forms, but moreover that they do not exist outside of the medium in which they are communicated. His words were the instruments of his ideas, and he demonstrated that his ideas relied on the very lexicon he was able to manipulate. He made us love language and the allusive nature of meanings, references, and the worlds of associations they impart.

fundamental. Wisdom doesn't belong to any particular group."

And while he could publicly call out a colleague like Zaha Hadid over a controversial statement, Sorkin was affectionate after she died, recalling a long-ago trip in Brazil, where he and his wife trekked with her from an ill-fated conference in São Paulo to a transgender beach in Rio to a pilgrimage to Oscar Niemeyer. "Zaha was a brilliant traveling companion: she would not be denied. Restaurants that had closed reopened to cook for us. Prices fell for everything from knickknacks to precious stones under the irresistible force of her bargaining," he wrote. "We all ate well, got the first cab, received excellent service everywhere, and were warmed by her generous radiance."

Despite his short-changed ideals and pointed words, Sorkin retained a slyly humorous outlook on life. Students, colleagues, and others fortunate to know him were well acquainted with his own generous radiance.■

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Kimberly Dowdell

BY MIRIAM SITZ

IN MID-APRIL, cities and states across the U.S. began to release preliminary data showing that communities of color are being disproportionately stricken by COVID-19. In New York, black and Latino people are dying at twice the rate of white people; in Chicago, African-American patients account for 72 percent of coronavirus-related deaths, while comprising just under a third of the population. Officials have pointed to longstanding inequalities in income, resources, health, and access to health care as likely causes of this disturbing trend.



Chicago-based architect Kimberly Dowdell, director of business development for HOK and the 2019–20 national president of the National Organization of Minority Architects (NOMA), has studied architecture and public policy at Cornell University and Harvard University's John F. Kennedy School of Government. She spoke with RECORD about how systemic disparities have exacerbated the virus's effect on minority communities—and how the pandemic's economic repercussions might impact the next generation of young architects of color.

How can architects help disrupt historically entrenched inequalities that have left many people of color more vulnerable to COVID-19?

It's less about physical design and more about policy design. It comes down to how resources are allocated, and how people are able to move about in their environments. But structural inequalities have been a characteristic of our nation from the beginning, particularly for African Americans. Just look back at housing policies from the middle of the 20th century, when redlining and restrictive covenants put people who look alike in particular neighborhoods based on their economic standing. It's tragic to be able to predict someone's health outcomes or life expectancy by their zip code. If the biased practices of the 1950s and '60s hadn't occurred, and people of color were able to live wherever they wanted to live, I think that we'd be seeing fewer tragedies right now.

So we have to start in the halls of government. Last year, Chicago Mayor Lori Lightfoot hired urban planner Maurice Cox, who I worked with for the City of Detroit, as planning commissioner. He and his team are working to invest in the under-resourced south and west parts of the city, which are largely African-American and Latino.

New York governor Andrew Cuomo suggested that the disproportionate representation of black and Hispanic people in frontline jobs has placed those communities at higher risk of infection. So let's talk about work. One of your NOMA goals has been to encourage people of underrepresented backgrounds to pursue architecture. Does that feel more urgent now?

Governor Cuomo is absolutely correct that a lot of essential workers are people of color, who must choose between exposure to the virus or not getting a paycheck. So, again, it comes down to economics. Part of my "ALL in for NOMA" platform, which stands for Access, Leadership, and Legacy, focuses on providing access to the profession for everyone—particularly those in underserved groups, like the African-American community, which represents just 2 percent of the profession.

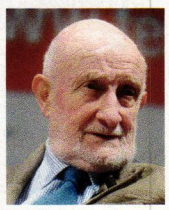
Part of that is the new Fellows Program, which will place five recent graduates with firms in five cities for 12-week paid internships. By providing housing and transportation support, we're trying to break down barriers that often prevent kids of lower-income backgrounds from relocating for a new opportunity. We received over 70 applications and had moved on to the shortlist when the pandemic hit, so things are currently on hold. But I want to communicate to both the firms and the fellows that we are committed to supporting them, despite the present uncertainty.

You graduated just as the Great Recession hit and estimate that half of your classmates are not employed in architecture in the traditional sense. How can the heavy toll of financial downturns on new graduates be mitigated?

We lost nearly a generation of architects in 2008 and 2009, and we don't want to see that happen again. This is where we look to our local chapters to rally around the emerging professionals who are most vulnerable.

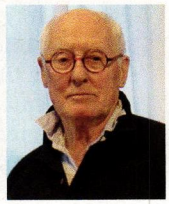
We have to be intentional about investing in young people from under-resourced communities. There's a higher likelihood that a person of color is from one of those communities—but, of course, that's not always the situation; don't assume that, just because someone is a person of color, they don't have resources. Our job as an organization is to help pool resources from places that can invest in NOMA and redistribute them to those who need support, so that young people have a chance to stay in the profession and take part in shaping their communities. ■

Vittorio Gregotti, 1927–2020

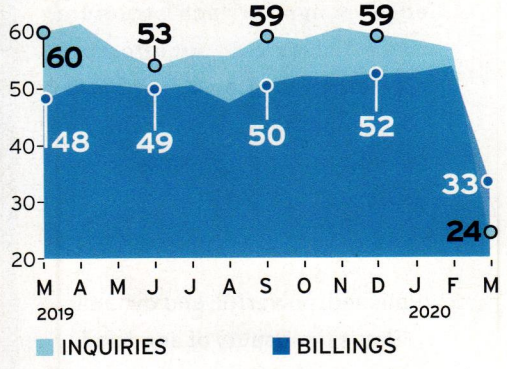


The architect who helped transform the Estadi Olímpic de Montjuïc in Barcelona into the 1992 Olympic Stadium died of pneumonia in Milan on March 15, 2020, at age 92, after contracting COVID-19. Gregotti, who founded his own studio in 1974, was known for both his design and curatorial work. In 1976, he cocurated the first Venice Architecture Biennale with Peter Eisenman, who remembers his late colleague as "one of the leaders of the Postmodern movement in Italy." Gregotti also edited the Italian architecture magazine *Casabella* "during one of its most influential moments," Eisenman tells RECORD. "He was, to the end, a person who loved architecture."

Michael McKinnell, 1935–2020



The British-born designer died March 27, 2020, at age 84, after having become ill with the novel coronavirus. In 1962, while a graduate student at Columbia University, McKinnell and his professor Gerhard Kallmann won an open competition to design a city hall for Boston with their scheme for a Brutalist "hill town." The young designers "thought of concrete as an authentic and honest way to build," says critic Robert Campbell, "because everything, from the structural frame to the smallest details, could be made of the same material—unlike what McKinnell called 'the decadently degenerate frippery and surface concerns' of much commercial work of that era."



Architectural Billings Nosedive

The AIA's latest data show that firm billings fell 20 points, from 53.4 in February to 33.3 in March, as the COVID-19 pandemic disrupted the global economy and all facets of normal life. New project inquiries dropped by more than half, from 56.5 to 23.8; new design contracts also fell, from 52 to 27.1.

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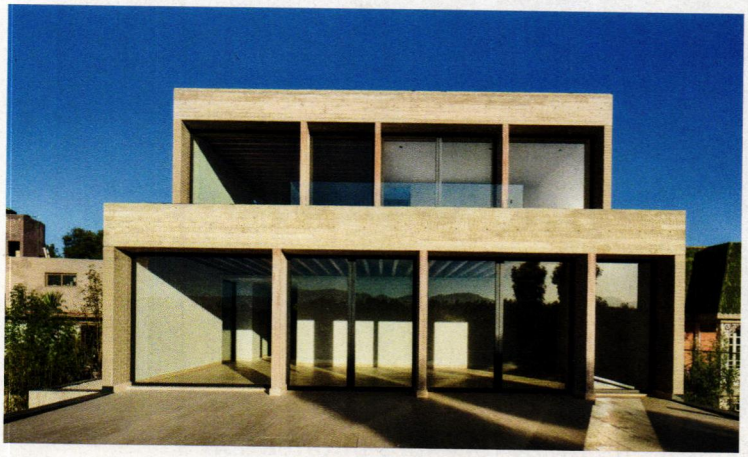
AN ARCHITECT'S HOME CUM PERSONAL STUDIO ALLOWS CLIENTS TO EXPERIENCE HIS DESIGN ETHOS. BY MIRIAM SITZ



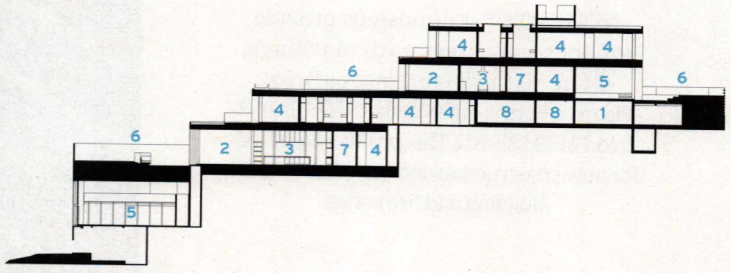
"I HATE the ambience of an office," says architect Manuel Cervantes. So, when designing a house for his own young family of 5 in the Lomas de Chapultepec neighborhood of Mexico City, a top priority was to include a personal studio. "I conceived of it as a space where I could bring clients to have a more personal interaction with our design aesthetic. It is hard to show a client the various elements of the design concept when you are not surrounded by them."

The 9,400-square-foot, terraced structure is actually two dwellings: a rental unit occupies the upper three floors, while the architect, his wife, and their children—aged 8 years, 2 years, and 3 months—live on the levels below. The "income house" and primary residence share an entrance but diverge from there. Bedrooms in both units open to a family room, with the open kitchen, dining, and living spaces gathered on a different floor from the private quarters. Most rooms have an outdoor patio, which, thanks to the city's mild climate, becomes an extension of the interior space.

Cervantes kept the material palette simple, sticking to cast-in-place concrete, brick, and wood, "Because of earthquakes, our structures in Mexico City are big, dense, and robust," he says, referring to the light gray concrete featured in the interiors. "I like to have its raw expression visible throughout the space," says the architect. Masonry and cinnamon-colored cement panels bring texture and dynamism to other walls



The living room (top) of the architect's house extends outdoors via a landscaped terrace, while the rental unit (above) opens to a patio.



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3 KITCHEN
4 BEDROOM
5 STUDIO
6 TERRACE/PATIO
7 LAUNDRY
8 PARKING

PHOTOGRAPHY: © RAFAEL GAMO





Floor-to-ceiling glazing floods the architect's studio (above, left) with daylight. Generous openings throughout the multi-level house (above, right) provide abundant natural illumination to both units.

inside, while large squares of ricinto, a dark basalt used here on floors and stairs, root the structure in its context. "It was important for me to use local materials, since I want to relate the atmosphere of a place to its culture," says the architect. This tile links the interiors to the exteriors, where organically rounded pavers of the same material cover the ground.

With terraces on each floor, the overall structure follows the slope of its site, which cascades down to a ravine. A perimeter wall encloses the building, allowing each outdoor space to become "a personal escape," as Cervantes calls it. "I placed a high value on creating this inner world, where you can avoid any distraction." While this approach wouldn't be necessary in the countryside or in a smaller town, Cervantes finds "it works perfectly well in a city of more than 20 million people." The architect worked with a landscape architect to bring his ideas about the entire residential concept to life. Combined with abundant generous openings, the result is a collection of spaces that give breathing room to inhabitants of every part of the house—while creating an oasis in one of the world's largest cities. ■

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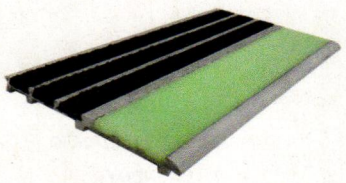

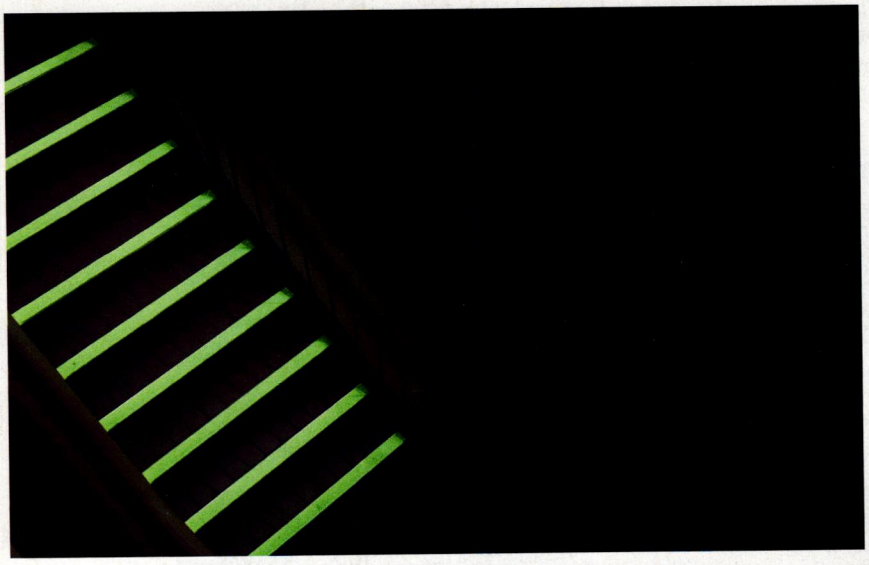

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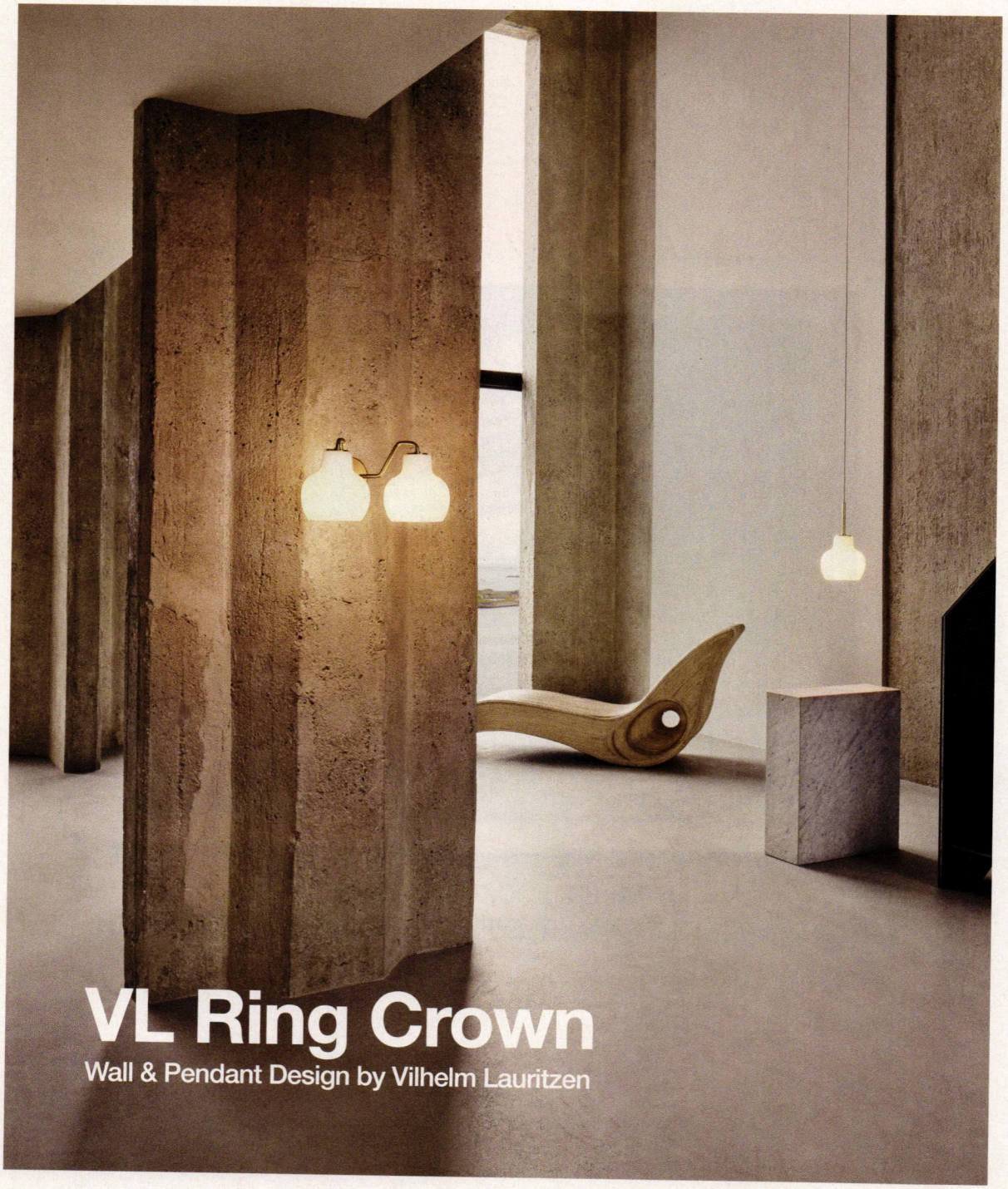

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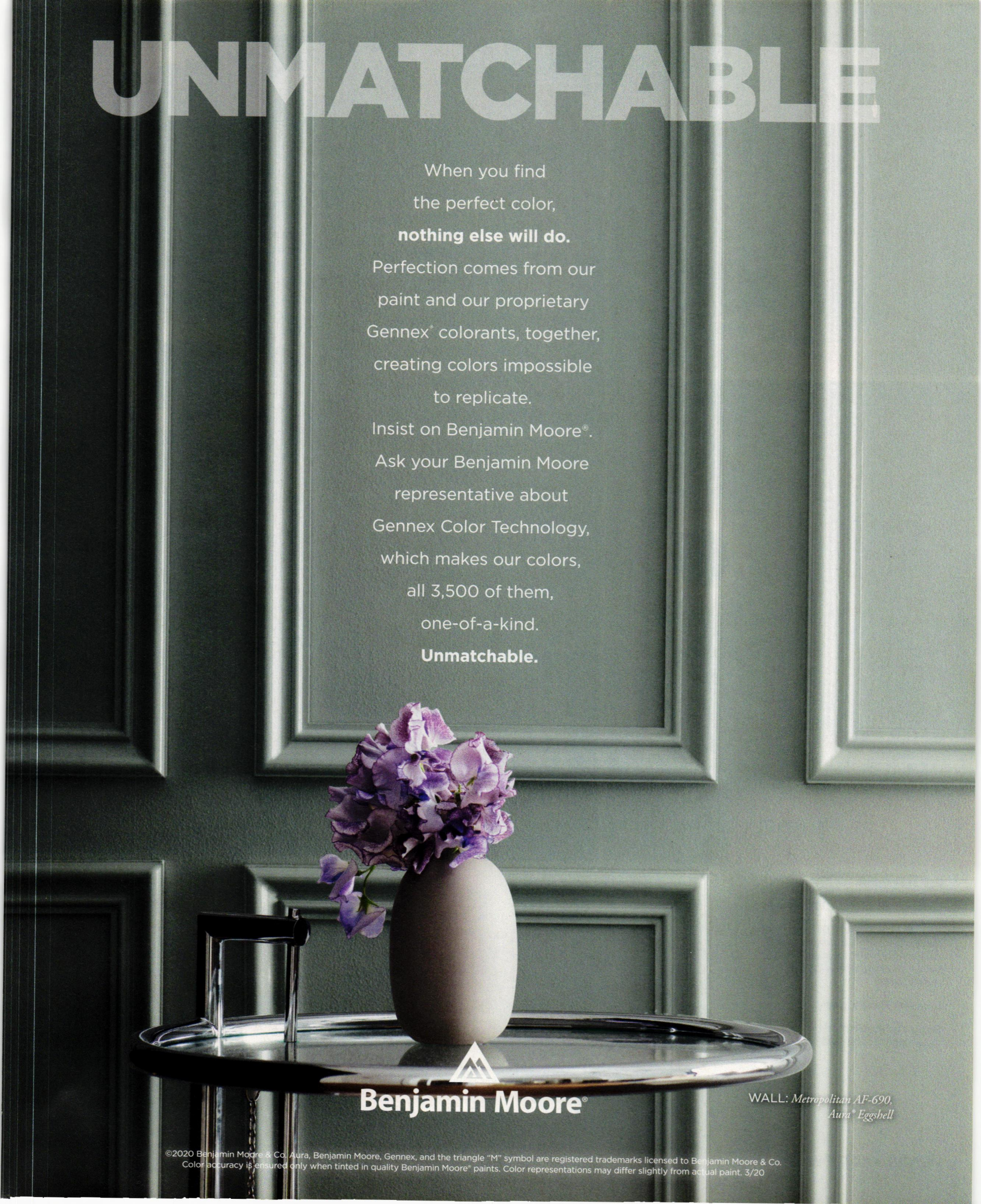
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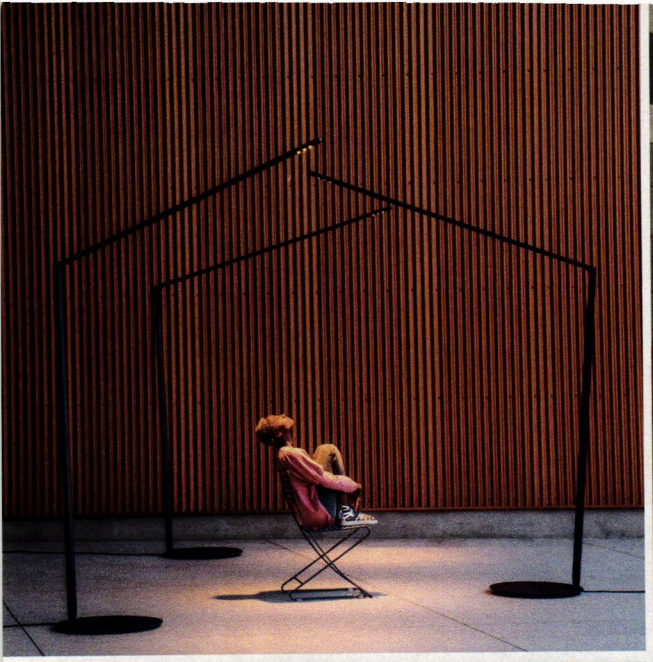

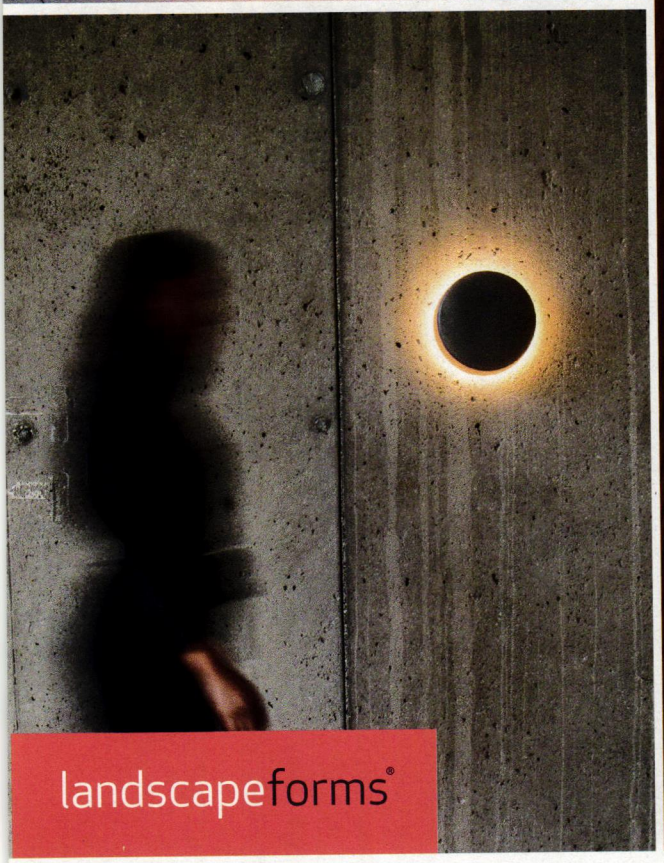

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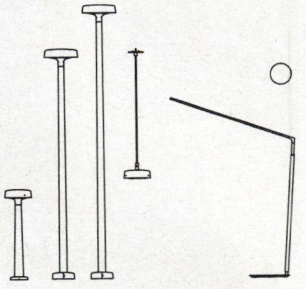

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A DEFUNCT SHOPPING MALL IN TAIWAN IS TRANSFORMED INTO A PUBLIC PARK.

BY KARA MAVROS



THOUGH THE coastal city of Tainan is Taiwan's oldest urban enclave—and proud of it, says Hui-Hsin Liao, architect and project coordinator at MVRDV—its residents also appreciate the region's modern relics. The Netherlands-based firm recently completed Tainan Spring, a sunken "urban lagoon" and outdoor complex that draws from the not-so-distant-past: it is built within the ruins of an abandoned shopping mall.

The origins of the site itself can be traced back hundreds of years. In the 17th century, the abutting Tainan Canal extended inland, and the area was home to a prominent shipping port. By the 1960s, a portion of the harbor was closed and, in 1983, developers built the multilevel China-Town Mall, which included retail, housing, and entertainment. The partially subterranean complex was once a popular destination for locals, but its novelty waned as it deteriorated and became crime infested. The site was neglected until five years ago, when the Urban Development Bureau of the Tainan City Government commissioned MVRDV—as the winners of an international landscape competition—to redesign the five-acre area as an outdoor plaza and transform a stretch of Haian Road, which runs perpendicular to it.

After demolishing most of the mall's structure, the team resurfaced the floors of the underground parking level with terrazzo and added water and foliage to create two "urban lagoons" which are open to the public for wading and relaxing year-round in the tropical heat. The



The architects opted to keep some of the existing white-painted structural concrete columns (above) within and around the pool to preserve the memory of the former mall.

PHOTOGRAPHY: © DARIA SCAGLIOLA



In early March, Tainan Spring opened to favorable reviews from locals (at the time of this interview, on March 18, Taiwan had few coronavirus patients and the public was still free to move about the city as usual).

resulting design of the bodies of water is a delightful hybrid of the natural and the manmade, with gradually sloping shores and sandbar-like islands throughout, some of which are also landscaped. With the help of a local consultant, the firm planted the former shopping mall—and the length of Haian Road—with grass and trees native to the region, says Liao, who also cites feng shui as a major influence throughout the planning phase. As the plantings grow in, she hopes they will transform the artificial bodies of water into a lush oasis.

Designed during a particularly dire dengue fever outbreak in 2015, MVRDV made the water levels mutable, between 2 and 20 inches, says Liao, so that even in another flare-up of the mosquito-borne epidemic, the area could remain open with a very shallow expanse of water, minimizing mosquitoes' ability to breed. (More recently, Taiwan has also felt the impact of COVID-19, though—as of press time—not nearly as severely as its neighboring countries.)

The family-friendly project is also a model for a circular economy in Taiwan, says Liao: "When we demolished the shopping complex, we recycled most of the metal and materials." Some of the "ruins" were preserved for posterity, however. Water tanks and other modern artifacts from the mall remain in the subbasement level and are visible to the public through two panels of glass in the terrazzo floor beside the lagoons. By offering a glimpse into the inner workings of the former retail center, Liao hopes the public will appreciate the new landscape as a part of Tainan's contemporary history. ■





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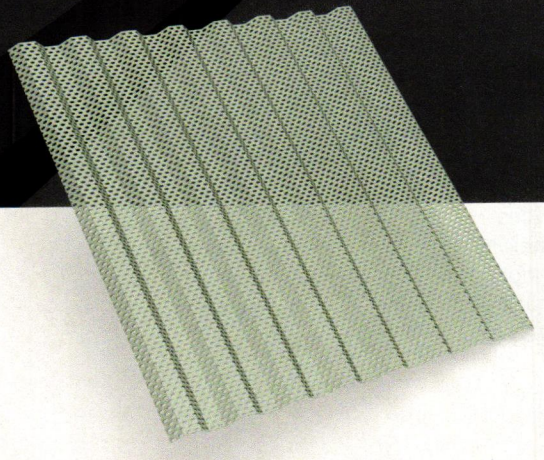

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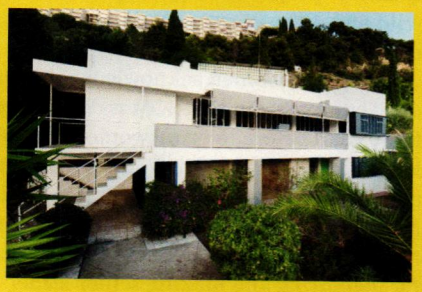

The architect for the E-1027 house in southern France is **Eileen Gray**. The Scottish-born designer, who made her reputation in Paris with her furniture and interior design, completed this Modernist vacation dwelling in 1929 with help from her close associate, the architect Jean Badovici. Le Corbusier, a chum, later visited and left his imprint in the form of murals.

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Women Take Charge

SOM makes an historic move with three women at the top.

BY SUZANNE STEPHENS





BACK WHEN Louis Skidmore and Nathaniel Owings formed an architectural practice in Chicago in 1936, and then brought engineer John Merrill into its fledgling New York office in 1939, it was men who ran firms (Julia Morgan being a rare exception). Men continued to dominate the leadership at Skidmore, Owings & Merrill (SOM) over the decades as it grew to today's approximately 1,250-person firm with nine international offices. Then Marilyn Taylor, a partner in charge of urban design and planning in the New York office, briefly became chair of the company, in 2001. But at the end of her two-year term, the partners decided that the Executive Committee, which included one partner each from the New York, Chicago, and San Francisco offices to advise the chair, should run the place. For some years after Taylor left SOM (she became dean of the University of Pennsylvania's school of design in 2008), it was hard to find women well represented on the top rungs of power.

But, as of this fall, three female partners will take charge of SOM's Executive Committee: Carrie Byles, in the San Francisco office, has been on the committee since 2016; Xuan Fu, from Chicago, joined in 2019; and now the 2020 ascension of Laura Ettelman, in the New York office, to this tier makes SOM highly unusual to be a top-10 U.S. architecture firm entirely run by women.

Having women in this leadership position may make little difference to SOM's architectural-design approach, but it does send a powerful message about its policies on hiring and promotions. Specifically, it may encourage more women to come to the firm rather than see SOM as a stopover on the way to starting their own offices or going to a competitor.

All three women on the Executive Committee come from strong project-management and technical backgrounds. Byles, who has a B.Arch. from Washington State University, arrived at SOM with specializations in math and computer studies. Her digital knowledge, says Craig Hartman, a consulting partner based in San Francisco, enabled her to help get the entire company working remotely during the current COVID-19 crisis.

Fu got her B.Arch. at Beijing University of Civil Engineering and Architecture and an M.Arch. at Ball State University College of Architecture and Planning in Muncie, Indiana, before joining the firm in 1994. She began working on the Jin Mao Tower in Shanghai (completed in 1999, and the tallest building in China until 2007) and, since then, has been in the front line of many SOM projects in China, such as the planning for Xiong'an City, an urban complex near Beijing with strong sustainability features.

Ettelman earned her B.Arch. from Cornell University and joined SOM in 1996, after stints at other corporate firms. Although she felt drawn to design, she decided her strengths were in management: "You have to be efficient and strategic with leadership skills," she says, qualities she believes are characteristic of many women. "And females are good at shaping a consensus," she adds. All these characteristics she found useful in guiding the large-scale work of Terminal 1 at the Toronto Pearson International Airport (2014) and the Chhatrapati Shivaji Maharaj International Airport, Terminal 2, in Mumbai (2014).

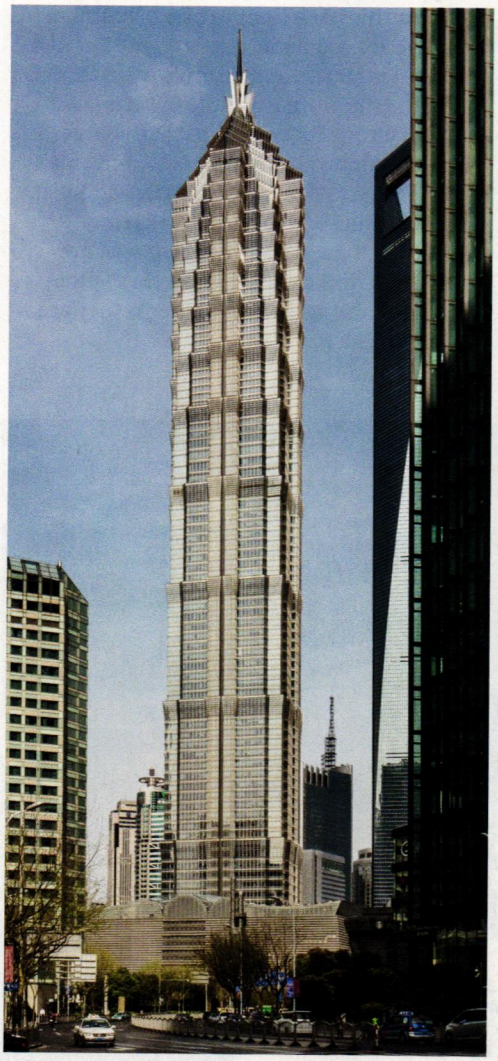
In spite of the impressive credentials and managerial abilities of the female partners, it seems obvious to ask why none of these executives comes from a design background, as some previous members of the committee have. Perhaps the lack of a designer doesn't matter in managing a large office, but it matters for public relations. For too long, women architects have been viewed (especially in big firms) as the reliable, detail-oriented, project-manager types who keep the wild and crazy creative designers—usually men—on track.

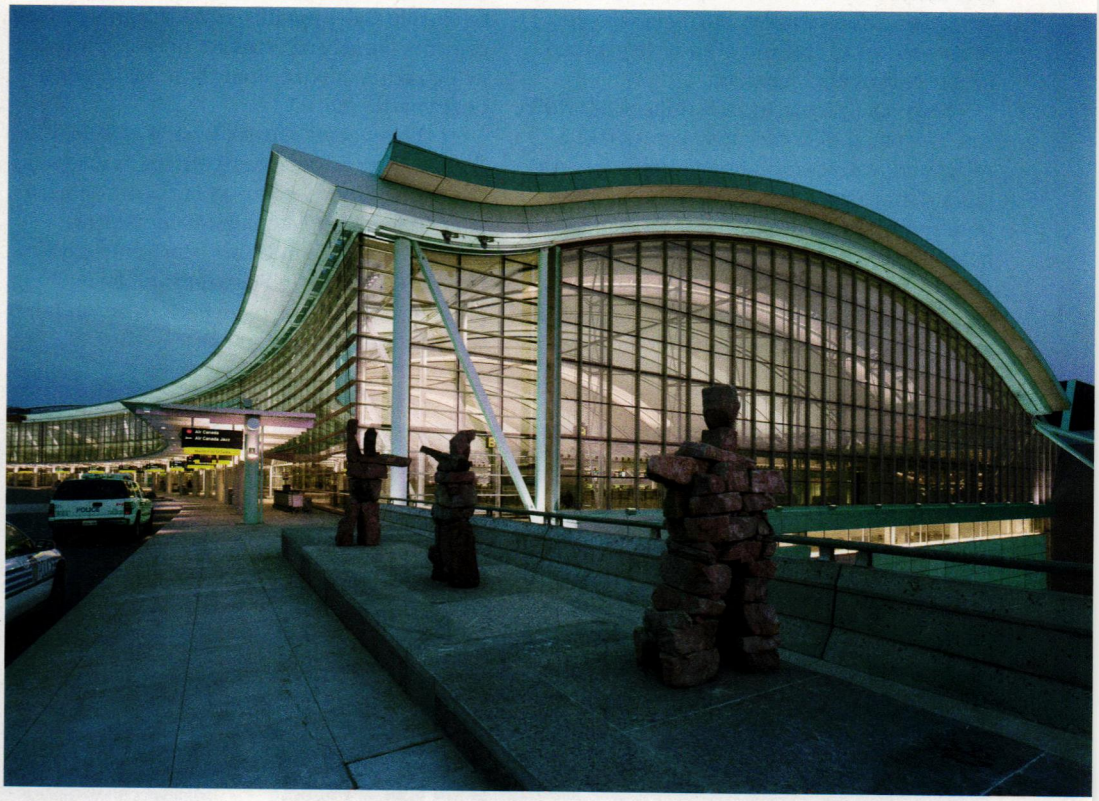
The three women acknowledge this prejudice, but maintain that SOM is doing much more than before to bring women into all leadership positions. The Women's Initiative, an endeavor originally started by Taylor in the New York office, now extends across the firm and has been an employee-advocacy group for mentoring and making senior leadership





Carrie Byles (opposite, top); Xuan Fu and Laura Ettelman (far left and left). Rice University BioScience Research Collaborative, Houston, 2009 (opposite, bottom); Jin Mao Tower, Shanghai, 1999; Toronto Pearson International Airport, Terminal 1, 2014 (bottom, left and below).





PHOTOGRAPHY: © CODY PICKENS (OPPOSITE, TOP; TOP, LEFT), CESAR RUBIO (OPPOSITE, BOTTOM); LUCAS BLAIR SIMPSON (TOP, RIGHT); TIM GRIFFITH (BOTTOM, LEFT); TIMOTHY HURSLEY (BOTTOM, RIGHT)

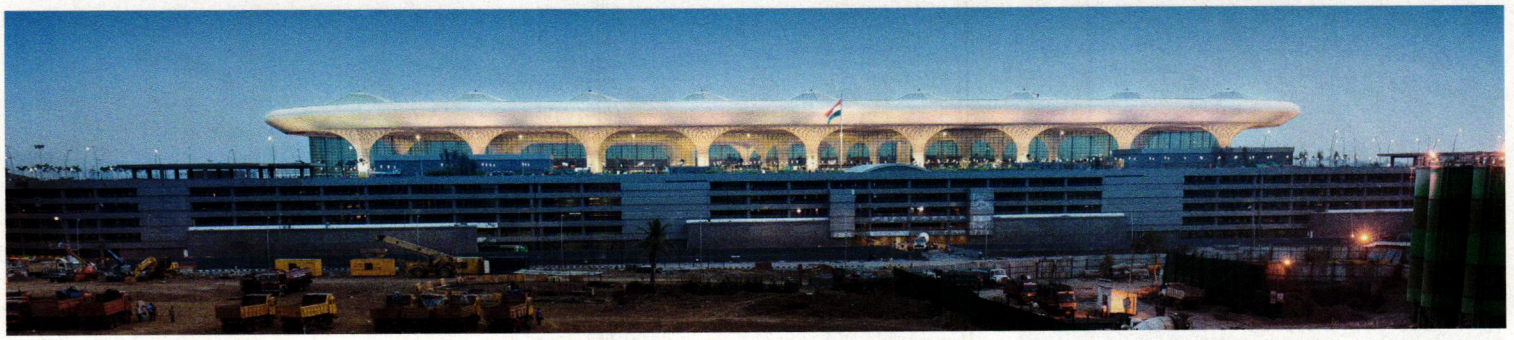
aware of the obstacles to women's advancement. Ettelman asserts that SOM is working to achieve a fifty-fifty gender equality of partners, to reflect the current ratio in architecture schools. Says Xuan Fu, "We recognize challenges that come from balancing work and life, and want to prevent a turnover in women, especially when they become mothers." So, says Fu, who does have children, "we are thinking about how they can schedule their time and solve day care problems."

After Taylor left the firm, Julia Murphy, now a director in the New York office, helped rejuvenate the Women's Initiative. Murphy points out that SOM has rewritten job descriptions and clarified how decisions are made in the annual review process by the Evaluation and Compensation Committee, a powerful group that recommends promotion and salary adjustments for both partners and directors.

Clients, as well as the firm management, need to undergo a change in thinking about women's contributions, Byles says. Seeing women as authority figures in the design and construction process has been helped greatly by having more clients of the same gender. "The opportunities changed when this started happening," says Byles, who worked successfully with facilities director Barbara White Bryson on the Rice University BioScience Research Collaborative in Houston in 2009.

SOM's website maintains that diversity—of race, color, religion, ethnicity, and culture, as well as gender—remains a priority in hiring and promoting; the firm recently formed a Talent, Equity, Diversity, and Development Committee to increase opportunities. On another front, one key strategy for advancement within the firm has existed for years–the mandatory retirement age of 65 for partners, making room for younger architects to rise. While 65 may strike those soon to be eligible

perspective practice



Chhatrapati Shivaji Maharaj International Airport, Terminal 2, Mumbai (2014).

PHOTOGRAPHY: © ROBERT POLIDORI/MUMBAI INTERNATIONAL AIRPORT

as quite young, SOM appears wedded to this idea (maybe it's time for a separate committee on ageism). Nevertheless, partners who do retire can opt to consult, even if they are no longer part of management.

There is no predicting how long SOM will be run by women. The executive committee is rotational, with two-year term limits and no more than three consecutive terms allowed. Underpinning the leadership is an elaborate bureaucracy, with 23 equity partners across architecture, planning, interiors, and engineering; 44 directors; and an array of advisors to the executive committee, from the Chief Financial Officer to the Chief People Officer (yes, that's the name). If all this sounds rather top-heavy, Byles points out the advantage: "We consider ourselves fortunate to be a privately held partnership, without shareholders or a board of directors."

At the moment, the leadership at SOM, like that in other architectural offices, is assessing the damage to the business of the coronavirus pandemic. The hold on construction first affected the work in China, though Fu says that SOM's offices in Shanghai and Hong Kong are cautiously trying to go back to normal. Construction work is on pause in the U.S., though staff continue to respond to RFPs. Things change weekly. When asked about layoffs as this issue went to press, Ettelman said, "We see economic constraints." Because of these, she, Byles, and Fu are part of a Crisis Recovery Committee to address the issues.

What a time for women to take charge! So much is unknown, and what is to come may not be pretty. "With Laura, Carrie, and Xuen, it is an unusual and different ballgame," says Murphy. Let's hope that the three who are stepping up to the plate can bat these problems out of the park. It would seem they are well equipped. ■







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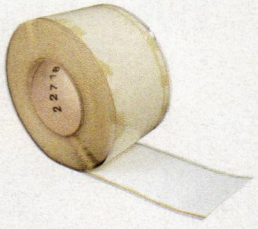

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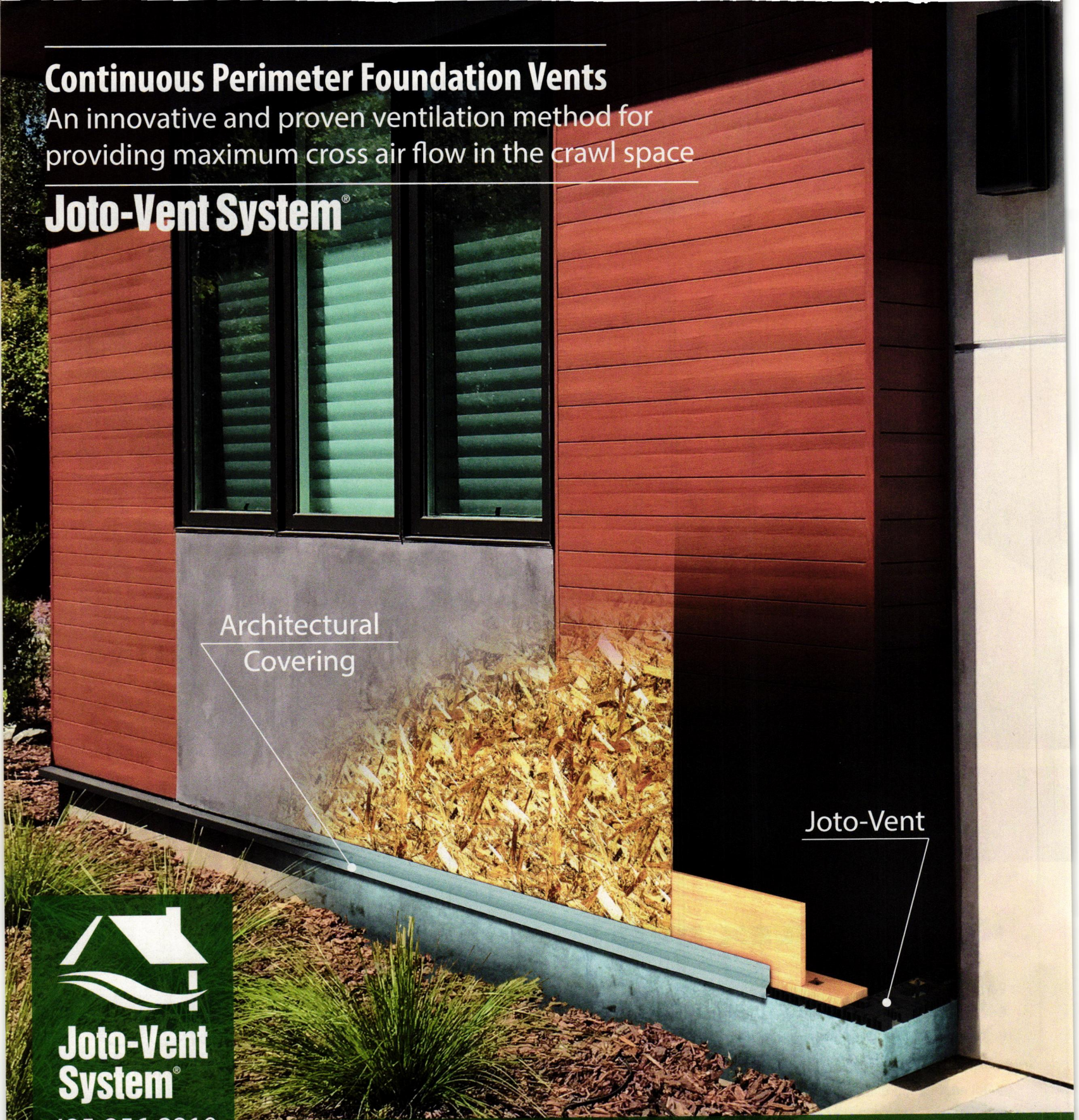

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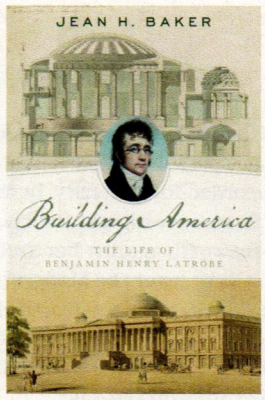
The Trials of a Proud "First" Architect

Building America: The Life of Benjamin Henry Latrobe, *by Jean H. Baker. Oxford University Press, 304 pages, $34.95.*

Reviewed by Richard Korman



IN THE FALL of 1817, architect Benjamin Henry Latrobe had reached his breaking point. His son had recently died, debts piled ever higher, and the commissioner overseeing Latrobe's work completing the Capitol in Washington, D.C., Col. Samuel Lane—a diminutive man handicapped by a gunshot wound—bombed him with military-style requests for information and ordered materials without informing Latrobe. He counted the days Latrobe was away from the Capitol project on other matters.

Called by President James Monroe to the White House for a meeting with Lane, Latrobe, who stood more than 6 feet tall, seized the smaller man by the collar and exclaimed, "Were you not a cripple I would shake you to atoms, you poor contemptible wretch." Monroe intervened, and Latrobe turned to the president and claimed that Lane's "provocations" and Latrobe's birth, family, education, and talent rendered his outburst "excusable."

The incident, as described by Latrobe's wife, Mary, in a memoir, and recounted in Baker's valuable new biography, says much about its subject's stressful and combative work life and sense of himself.

Baker puts Latrobe's flaws, and his more endearing qualities as a father and husband, under the socially astute modern historian's microscope. The man said to be America's first architect and engineer (though many others performed those services at the time) is given credit for proclaiming that architecture was a sovereign profession—one that couldn't be trusted to mere "mechanics"—that required training and deserved fair compensation. After emigrating from England at age 32, Latrobe found little respect for architects in his adopted country and often was stuck paying the costs of a project and blamed for anything that went wrong.

Despite his aspirations to wealth and status—he falsely claimed he was descended from an aristocratic French family—Latrobe never ascended to financial security and an autumnal satisfaction with his life's work. A more diplomatic man might have, but that wasn't Latrobe.

Little of his work still stands; much is only on paper. What is extant contains parts of the U.S. Capitol, including the famous corncob Corinthian column capitals; designs of numerous houses; and advice to Thomas Jefferson on his plan for the University of Virginia. Latrobe was the most skillful designer of Neoclassical structures, linking the young country to an Edenic republicanism. Sublimely multitalented, Latrobe the engineer was equally adept, flushing fresh water through the streets of postcolonial Philadelphia with an innovative pump system—powered by a steam engine enclosed within a domed cylinder and fronted by Doric columns. If the ensuing centuries have brought too many dreary American buildings with columned porticos, one could argue Latrobe helped start that, too.

This book should succeed Talbot Hamlin's Pulitzer Prize–winning doorstopper, *Benjamin Henry Latrobe: Architect, Artist, Engineer* (1955), as the definitive biography. Baker does her best to bring to life Mary Latrobe, who provided ballast and brains amid her husband's numerous bad investments and incapacitating migraines. The Latrobes were itinerants, leaving behind creditors and disappointments with each move. Baker notes Latrobe's appreciation of his wife's "tolerance for their vagabond life."

In one last reach for financial security via a prestigious commission in 1818, Latrobe, by this time burdened with a reputation for extravagance and temperament, came in second in a suspiciously unfair architectural competition (Latrobe hated them) to design the Second Bank of the U.S. in Philadelphia. The architect then led his family to New Orleans, contracted yellow fever, and died at 60.

Designers have over the centuries continued Latrobe's search for quality American architecture, though the direct line to Louis Sullivan and Frank Lloyd Wright that Baker sees may be claiming too much. You can say that Latrobe was one of America's first professionally trained architects, and that his legacy is one of an uncompromising and long-suffering champion for his profession and its vision and stewardship of the built environment. ■

Richard Korman, deputy editor of Engineering News-Record, *has written for* The New York Times, BusinessWeek, *theatlantic.com, and salon.com.*

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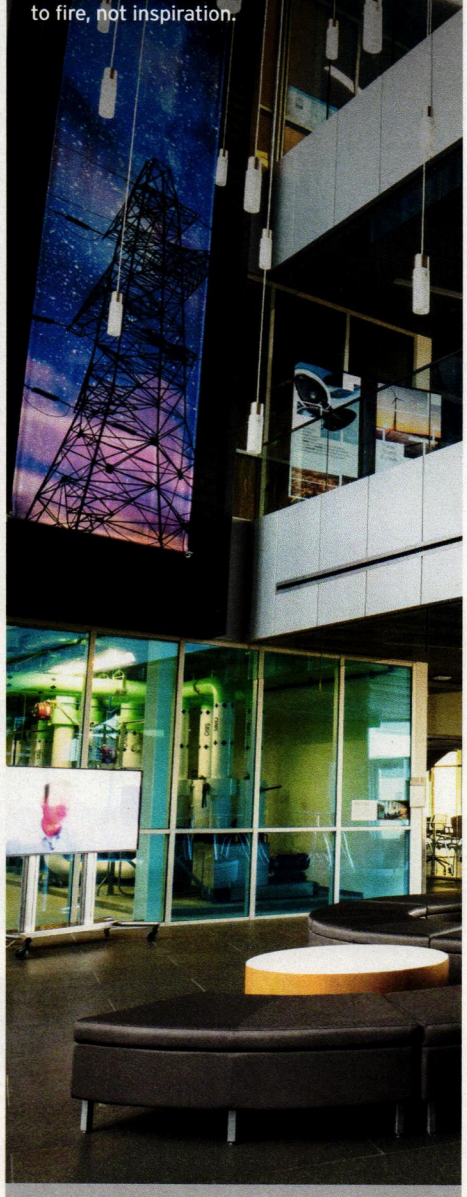
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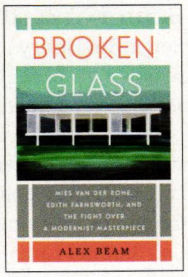
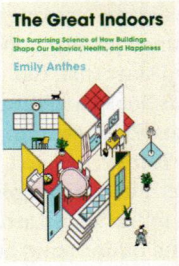
REVIEWED BY SUZANNE STEPHENS



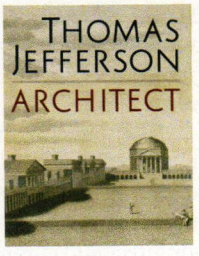
Broken Glass: Mies van der Rohe, Edith Farnsworth, and the Fight Over a Modernist Masterpiece, *by Alex Beam. Random House, 352 pages, $28.*

In architecture lore, the tales of male architects charming the socks off female clients are legion. Some are recorded for posterity. In this case, journalist Alex Beam investigates the lawsuit brought by Edith Farnsworth against her architect, Ludwig Mies van der Rohe, over the Modernist masterpiece she commissioned, the Farnsworth House in Plano, Illinois, completed in 1951. As costs went up, and the charming architect, with whom the client had had an intimate relationship, went back to his old girlfriend, only architecture won the day.



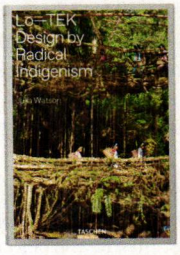
The Great Indoors: The Surprising Science of How Buildings Shape Our Behavior, Health, and Happiness, *by Emily Anthes. Scientific American/Farrar, Straus and Giroux, 304 pages, $28.*

Anthes, a science journalist, analyzes how various types of indoor settings influence behavior, providing some very interesting facts in the days of COVID-19. For example, a Danish study points out that open-office workers took 62 percent more sick days than those with private offices, which evidently afford the same protection from infectious disease as a private hospital room.



Thomas Jefferson, Architect: Palladian Models, Democratic Principles, and the Conflict of Ideals, *by Lloyd deWitt and Corey Piper. Chrysler Museum of Norfolk/Yale University Press, 208 pages, $45.*

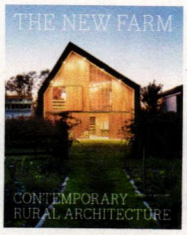
A series of essays accompanying a fall 2019 exhibition at the Chrysler Museum in Norfolk, Virginia, addresses the architectural accomplishments of the third president of the U.S. Although the amateur's designs for the University of Virginia, the Virginia State Capitol in Richmond, and his own houses at Monticello and Poplar Forest are well mined, this compilation, with contributions from Mabel O. Wilson and Louis P. Nelson on Jefferson's use of slave labor, brings a necessary, new perspective to his legacy.



Lo-TEK: Design by Radical Indigenism, *by Julia Watson. Taschen, 420 pages, $50.*

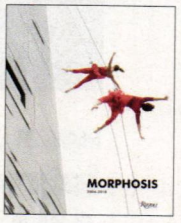
Some may think the title refers to the work of the New York firm LOT-EK Architecture and Design. It does not. In this book, the Australian-born, New York–based landscape architect Julia Watson presents 18 fascinating studies of traditional ecological knowledge (the TEK in the title). Works include the organic (literally) bridges created with the living roots of rubber trees by the Khasi people of northeast India.

The New Farm: Contemporary Rural Architecture, *by Daniel P. Gregory; foreword by Abby Rockefeller. Princeton Architectural Press, 192 pages, $45.*



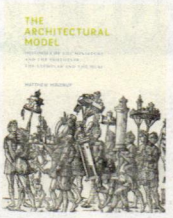
This collection, extending from California to Kentucky and as far as Tasmania, of contemporary farm buildings shows how barns, mills, and farmhouses are part of a strong vernacular and modernist tradition. The 16 examples selected by Daniel Gregory, a former editor at *Sunset* magazine, often pay homage to such Bay Area modernists in the postwar period as William Wurster.

Morphosis: 2004-2018, *by Thom Mayne. Rizzoli, 708 pages, $115.*



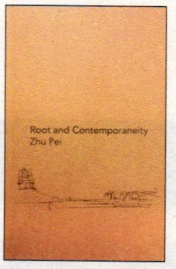
This sixth volume of work by the Los Angeles firm Morphosis, led by Pritzker Prize–winner Thom Mayne, demonstrates once again that there is no lack of bravado in its architecture. The exploration of materials—such as precast-concrete cladding for the cubiform Perot Museum of Nature and Science in Dallas, or the textured aluminum facade for the recently opened Casablanca Finance City Tower in Morocco—is well demonstrated by photographs and drawings.

The Architectural Model: Histories of the Miniature and the Prototype, the Exemplar and the Muse, *by Matthew Mindrup. MIT Press, 352 pages, $46.*



Even with the dependence on digital tools, architects still rely on physical, three-dimensional architectural models to develop a design idea or show a client the solution's spatial strengths. The author, a senior lecturer at the University of Sydney's School of Architecture, Design, and Planning, explores the many uses and meanings of this architectural object, from antiquity to the present.

Zhu Pei: Root + Contemporaneity, *edited by Brian Carter. University of Buffalo's School of Architecture and Planning/Buffalo Books, 48 pages, $15.*



The publication of a lecture given by the Chinese architect Zhu Pei in February 2019 at the University of Buffalo in New York State focuses on his new Imperial Kiln Museum in the historic pottery center of Jingdezhen, in southeast China. The publication presents sketches, drawings, and construction photos of the highly crafted series of brick-clad concrete barrel vaults for the soon-to-open museum.

Piranesi Drawings: Visions of Antiquity, *by Sarah Vowles. Thames & Hudson, 144 pages, $29.95.*



Published to accompany an exhibition that opened in February at the British Museum (now temporarily closed during the coronavirus pandemic), this handsome collection of drawings appears 300 years after the birth of the Italian artist. Giovanni Battista Piranesi made his reputation with his etchings of Rome's architecture and antiquities and with his spatial fantasies such as *Le Carceri* (*Prisons*); Vowles, a curator at the museum, shows how these drafting abilities evolved over time. ■



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MAY 6, 2020 @ 2:00 PM EDT

Ceiling Systems for High Performing Schools

CREDITS: 1 AIA LU/HSW; 1 AIBD P-CE; 0.1 IACET CEU

The informed specification of ceiling systems can contribute to high speech intelligibility, minimal noise, a naturally lit environment, and good air quality. This leads to better behavior and an enhanced learning process. This course demonstrates the importance of ceiling systems to a high-performing school, and therefore to the development of high-performing students, and to the well-being of educators and administrators. To improve the performance of schools and students, look up. It could be as simple as that.



SPEAKER:
DIANA HART
Manager of Business Development and Architectural Development, Rockfon

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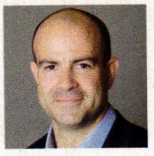
MAY 19, 2020 @ 1:00 PM EDT

Fire-Rated Glass & Framing Solutions for Healthcare Facilities

CREDITS: 1 AIA LU/HSW; 1 AIBD P-CE; 0.1 IACET CEU

Creating light-filled and open environments conducive to patient wellbeing and healing is important in modern healthcare facility design, but there is also the issue of safety. How can healthcare facility design support occupant wellbeing while ensuring patients, healthcare professionals and first responders can safely exit the building and work to extinguish flames during a fire event? This presentation will take a look at real-world examples to understand how current fire-rated glazing solutions are addressing the demand for safer healthcare facilities.



SPEAKER:
ZACH PASSMAN
Territory Account Manager, Technical Glass Products

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MAY 21, 2020 @ 2:00 PM EDT

Introduction to ADA Signage

CREDITS: 1 AIA LU/HSW; 1 AIBD P-CE; 0.1 IACET CEU

The Americans with Disabilities Act (ADA) turns 30 years old in 2020. Originally passed in 1990, the major revision to the Standards for Accessible Design (SAD) in 2010 gave the law more teeth – compliance is now required and enforceable on the federal level.

Since the ADA views visual impairments as a disability covered under the Act, there are specific guidelines pertaining to signage products. The two categories covered under interior signage are Wall Mounted, Ceiling Mounted or Projected. Within the Wall Mounted category, Identification of permanent room signs, Directional signs, and Informational signs are covered. Within the Ceiling or Projected Mounted category, Directional and Information signs are covered.



SPEAKER:
DAN ROLLER
Product Manager - Architectural Signage, Inpro

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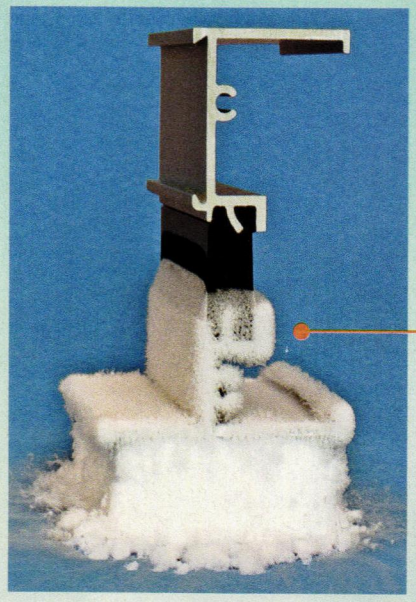

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By Sheila Kim



PD96

The industry's first auto-latching and -locking mortise lock assembly for sliding doors, PD96 enables architects to insert sliding doors into areas of limited usable space without compromising security. Potential commercial applications include storerooms, classrooms, and offices. The lockset is constructed with 304 stainless-steel in three finishes and is ADA-compliant.

unisonhardware.com

Bullet+Stone

The combination of raw concrete and metal is a typical palette used for buildings and interiors, but it's rarely seen on handles. Designer Doorware breaks with convention in its Bullet+Stone collection of handles and knobs. The hardware is crafted in brass and comes in a variety of finishes with a concrete face that adds durability and texture.

designerdoorware.com





Departure

Today's technology-obsessed society is always plugging in to charge phones and laptops, even while out and about. This device-charging receptacle meets the need for power with a design conceived specifically for beam seating in settings such as transportation hubs and waiting rooms. Options include two standard outlets or a combination of an outlet with USB and USB C ports. It mounts onto most beam structures, including rectangular, round, and T-shaped.

dekko.com



Select Straight Knurled

Emtek's Select lever line for interior doors has been expanded with new textures and materials. Among them is the straight-knurled lever, which can be mixed and matched with existing Select rosette and stem variations. Finishes include satin or unlacquered brass, oil-rubbed bronze, polished or satin nickel, polished chrome, and black.

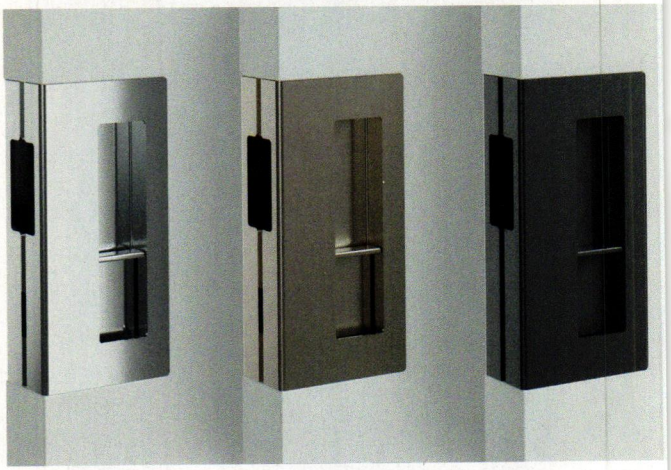
emtek.com

products **hardware**



Midcentury Modern Series

Clean and minimal, the lever collection takes inspiration from Midcentury Modern aesthetics. Five styles are offered, such as Bauhaus, which plays with geometry by presenting a sharp right angle that terminates in a cylinder, and Lugano, an asymmetrical tapered handle that's reminiscent of a cantilever. All are solid brass, available with a choice of several patinas and with smooth or textured grips.
ashleynorton.com



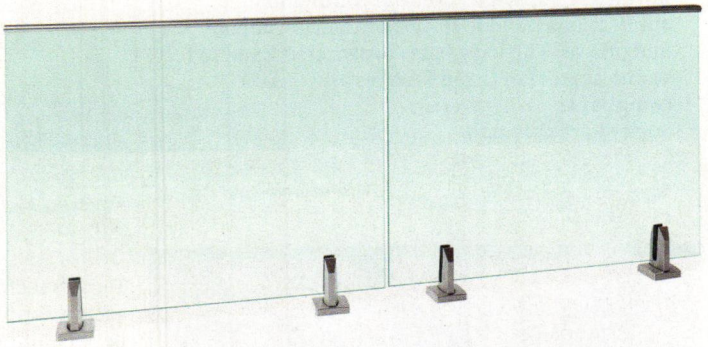
Privacy Pocket Door Lock

A sleek modern solution for pocket doors, this new lockset features a recessed edge pull with completely concealed screws; a discreet linear latch set within the handle niche activates the lock. Meanwhile, it features a minimal recessed grip on the locking side, allowing users to easily pull the door back out of the pocket. Three finishes are offered: brushed nickel, polished chrome, and matte black.
kovaproducts.com



Switch Core

This solution from Best by Dormakaba simplifies the conversion of a mechanical lock into a digital one without the need for wiring. Switch Core is a tech-integrated unit that can replace a range of cylindrical or mortise cores in existing hardware by popular brands such as Sargent, Yale, Schlage, and Corbin Russwin, among others. Access-control software manages entry permission, while key fobs or Bluetooth-enabled mobile devices activate the core.
timeforaswitch.com

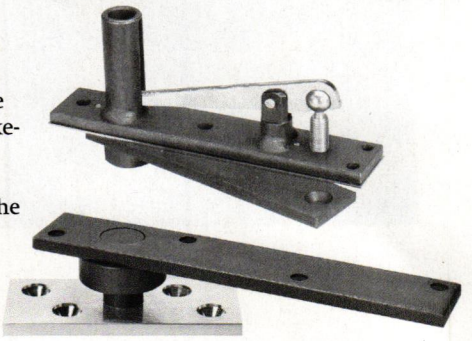


Glass Railing

Suitable for indoor and outdoor applications, this railing-hardware and glass system is offered in one framed and three frameless versions. The framed system holds ⅜" or ½" tempered glass, while the frameless hardware—available in side-mount, base-rail, or standoff-pin configuration—holds ½" tempered glass. Viewrail provides Starphire low-iron glass.
viewrail.com

375 Pivot Set

This hinge assemblage combines features from existing Rixson lines—the bottom pivot of the 370 with the longer pivot pin of the 345. The result is an earthquake-tolerant pivot hinge that can accommodate tall exterior or interior doors weighing up to 500 pounds. Since it is glimpsable when the door is in operation, the 375 is specifiable in 17 finishes ranging from dark, oxidized satin bronze to white suede powder coat.
rixson.com

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CASE STUDY
Hyatt Regency | Seattle, WA

BILCO Hatches Sit Atop Largest Hotel in Pacific Northwest

The Hyatt Regency Seattle soars more than 500 feet into the skyline, and stands as the crown jewel in the city's vast and growing hotel landscape. The hotel opened in December 2018 and with 1,269 rooms spread out on 45 stories, the hotel is the largest in the Pacific Northwest.

Hotels have become a high priority in Seattle, as seven hotels and a record 2,192 hotel rooms opened in Seattle in 2018. The city is home to six Fortune 500 companies – Amazon's headquarters are located there and Google has 4,500 employees in the area – and a major expansion of the adjacent Washington State Convention Center is expected to be complete in 2022. Meeting space and hotel rooms are in high demand in the Emerald City.

The Hyatt Regency Seattle addresses the meeting space issue with 103,000 square feet. It also includes two restaurants, bars, and shops and two ballrooms with more than 19,000 square feet each. There is an executive boardroom with a private balcony and 46 meeting rooms that range between 600 and 1,900 square feet. There is a wide range of guest rooms, including the astonishing Presidential Suite, which has 1,700 square feet, living room, dining room, butler's pantry and workspace. There is plenty of elbow room all around.

Four roof hatches manufactured by The BILCO Company provided an important component in the construction of the hotel. LMN Architects included two hatches that are 3-feet, 2-inches by 12 feet and two more that are 3-feet, 2-inches by 14 feet. They provide rooftop access to mechanical equipment. "BILCO's reputation as an industry leader and company's ability to accommodate the sizes needed in a timely matter were almost assuredly important factors for LMN," said Lisa Stevens of GVA Northwest, which procured the hatches for RC Building Specialties.

The hatches were also equipped with motorized operation to facilitate opening and closing. They included modified curb liners and heating cables with snow sensors, which keep snow from accumulating on top of the hatch and automatically stop when the storm passes. The curb features the Bil-Clip® flashing system, an innovative method to quickly and easily secure single-ply roofing to the hatch. The hatches include compression spring operators for lift assistance and an automatic hold-open arm with grip handle release and are manufactured with corrosion-resistant materials.

Chris Chesire, Managing Partner for RC Building Specialties, said the roof hatches were integral to the design of the hotel by the architectural team. "That's what they specified, and we were able to install them without any difficulty," said Chesire, who worked on the project as a subcontractor for Sellen Construction.

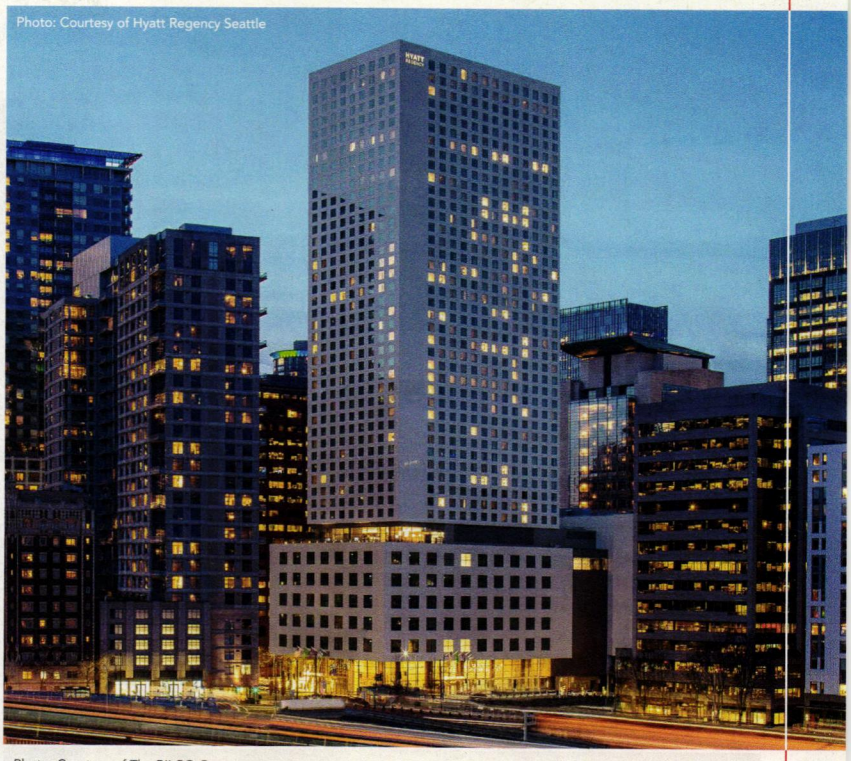

Photo: Courtesy of Hyatt Regency Seattle

Photo: Courtesy of The BILCO Company



The hotel opened 23 years after developer Richard Hedreen purchased the property, and closed the book on one of the region's most highly-anticipated projects. "It has already become a natural home for many of the city's most significant economic, cultural and culinary experiences," said Stephen Van Dyck, Design Partner for LMN Architects. "It is also open, welcoming and accessible along the street edge, and has knit itself into the fabric of people's everyday lives."

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Germ Fighters

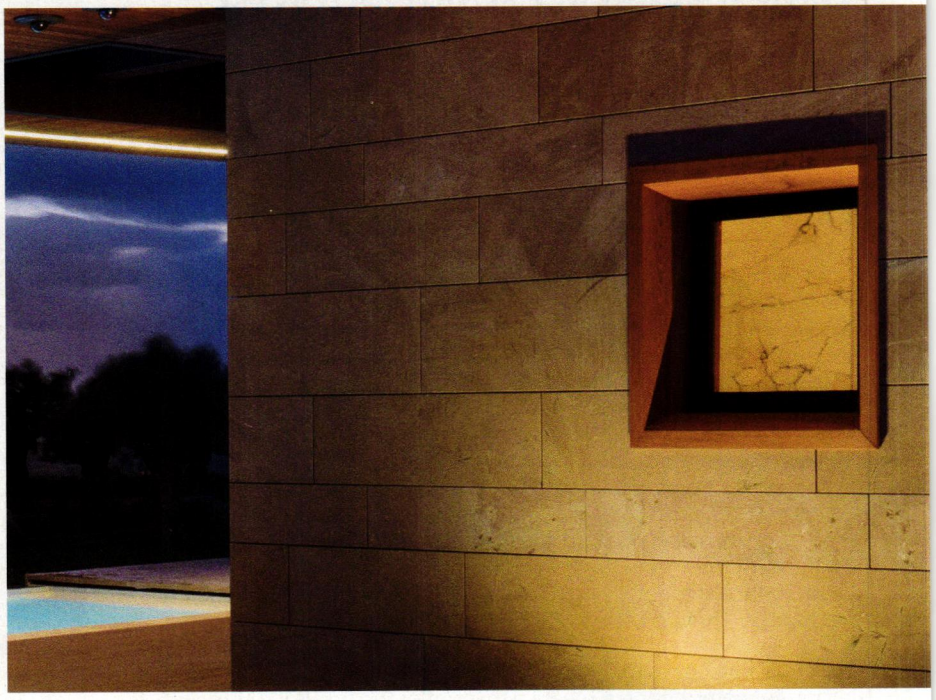
As public awareness of COVID-19–and investigation into combating it–continues, the time is ripe for exploring new products that promote hygiene.

By Sheila Kim



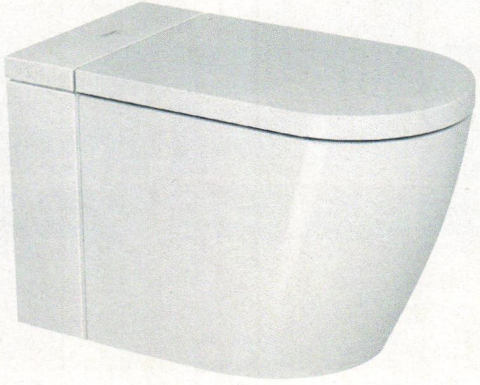
LinoWall xf2

Tarkett has developed the only linoleum product approved for wall application. LinoWall joins the manufacturer's existing LinoFloor line, empowering architects with the opportunity to create coordinated designs. Currently, three pastel and three neutral hues matching LinoFloor palettes are available, all of which feature the proprietary xf2 surface treatment for added protection against stains and abrasions. The wall products are 2mm-thick and naturally bactericidal.
tarkettsee.com



Bios Antibacterial

Italian manufacturer Casalgrande Padana has formulated its Bios porcelain-stone line to kill 99.9% of the world's four predominant bacterial strains–staph, enterococcus, E. coli, and pseudomonas aeruginosa. Although it isn't antiviral, this development is said to have exceptionally hygienic properties, a timely innovation as Italy continues to deal with the COVID-19 pandemic. The tiles incorporate titanium dioxide–an inert mineral considered to be free of harmful emissions–to battle bacteria and tackle odors. Suitable for high-traffic areas, indoors or out.
casalgrandepadana.com



SensoWash I

This Philippe Starck–designed smart toilet cum bidet boasts comforts and conveniences including a heated seat, night light, and remote control, among others. Hygienic features such as a rimless bowl and optional antibacterial glaze combine with functions that minimize contact and increase cleaning effectiveness: Users can select water temperature and intensity; a temperature-adjustable dryer eliminates the need for towels; the bidet nozzle and spray wand self-clean automatically before and after each use; and auto-flushing is available.
duravit.us

Verge Soap Dispenser and Faucet Set

This new handwashing solution speaks to architects and designers on both aesthetics and performance. Verge pairs four existing sensor-faucet styles with coordinating sensor-activated soap dispensers, resulting in a more cohesive design. The faucets also automatically flush the water line every 24 hours to minimize germ buildup.
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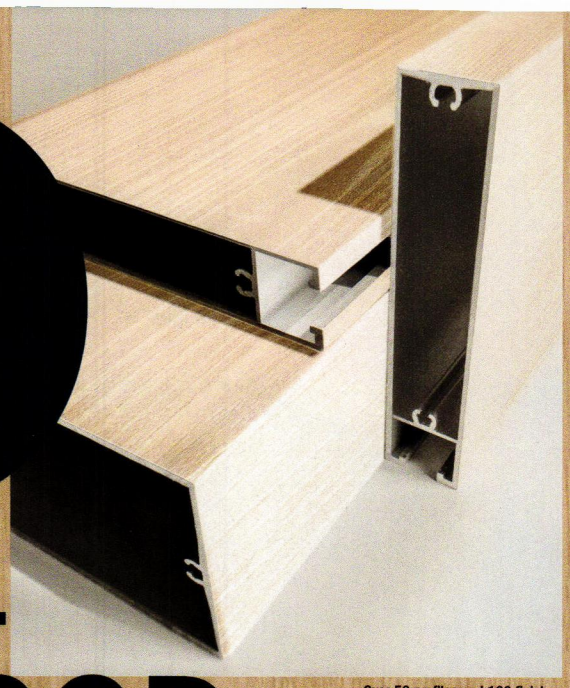

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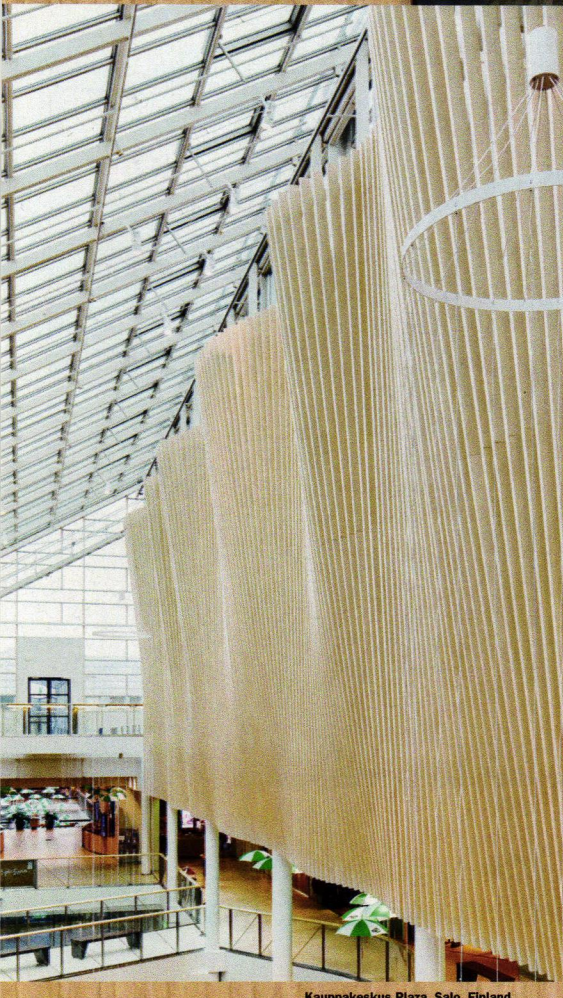

Kauppakeskus Plaza, Salo, Finland



The Griffin Club, Los Angeles

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French Toast

This year's Pritzker Prize winners have much to celebrate, with a remarkable new building tucked into an old city in southern France.

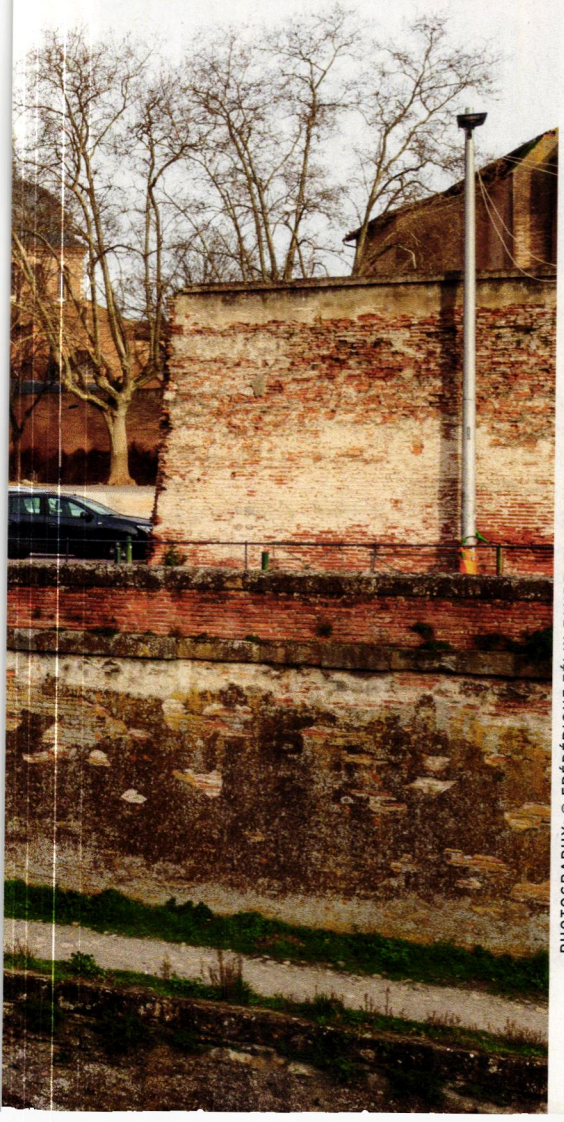
BY TIM ABRAHAMS

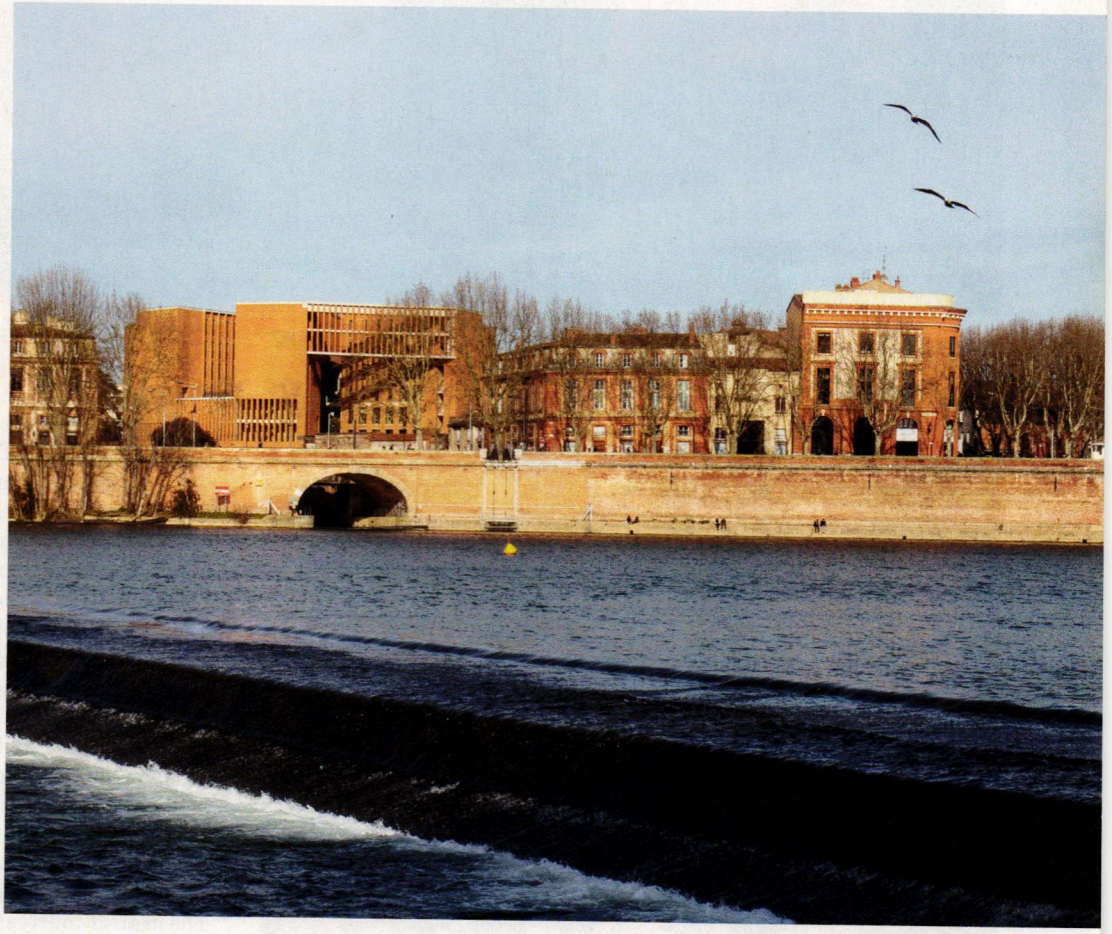


THE CONFLUENCE seemed perfect: just after being awarded the Pritzker Prize on March 3, Dublin-based Grafton Architects should also have been celebrating the completion of a suite of three stunning academic buildings. The trio lined up along a meridian through western Europe, from Kingston-upon-Thames, just west of London (Kingston University Town House), south to the outskirts of Paris (Institut Mines-Télécom, Paris-Saclay), then to Toulouse, France. But with the advent of the COVID-19 pandemic's closing universities and canceling travel, instead of a celebration, it has been a time for introspection for Grafton founding partners Yvonne Farrell and Shelley McNamara. "The lesson of the coronavirus," says Farrell, "is that architecture is a physical experience and that humans react to space physically." Without the physical relationship, she suggests, there is no emotion in architecture.

Few new buildings make the absence of physical experience more regrettable than the Toulouse School of Economics (TSE), which is arguably the greatest in their recent triumvirate of powerful, sophisticated buildings. While the IMT building outside Paris successfully conjures up its own architectural language amid the semi-academic, semicorporate environment of a new research park, it is less nuanced than the TSE's; the building in Kingston gives a sprawling ad hoc campus a presence on the main road, but it is limited in its scope.

The Toulouse School of Economics, meanwhile, capitalizes on "what you might call a terrifyingly rich site," says Farrell. It stands on the edge of the old Roman heart of the southern French city, on the point where waters from the River Garonne enter the beautiful Canal de Brienne, dug in the 18th century. Boldly occupying a rare breach in the city's old Roman wall on one side and standing up to high-rise housing blocks to the north, the





PHOTOGRAPHY: © FRÉDÉRIQUE FÉLIX-FAURE (EXCEPT AS NOTED)

RICH SITE The school sits on a promontory along the Garonne River (above) and next to the 18th-century Canal de Brienne (left).





HEART OF THE MATTER The entrance and gently rising path (above, at left in photo, and left) lead to the concrete central core (opposite).

building extends to the limit of an otherwise awkward triangular site at the southern edge of the university, rising to the full height prescribed by the Bâtiments de France—the base of the cupola of the adjacent church, St. Pierre des Chartreux.

The architects have responded to this rich site by creating a dynamic 194,000-square-foot structure with a centripetal plan, a choreographed pirouette of brick. At its core, it is unmistakably a Grafton building—redoubtable, generous, concrete. In plan, it is relatively simple. The building has three wings, the central of which is straight and the two outermost of which dogleg to the perimeter. The southeastern tips of these wings contains bigger spaces, such as the two largest auditoria. (Throughout are a total of 20 meeting rooms and 288 offices over six floors.) These wings are intersected midway by a transversal "*coursive*," or walkway, an element that binds the building together and creates the primary armature of circulation. Yet it also makes the experience of the central courtyard richer by dividing it into discrete areas and allowing a visual interplay between interior and exterior.

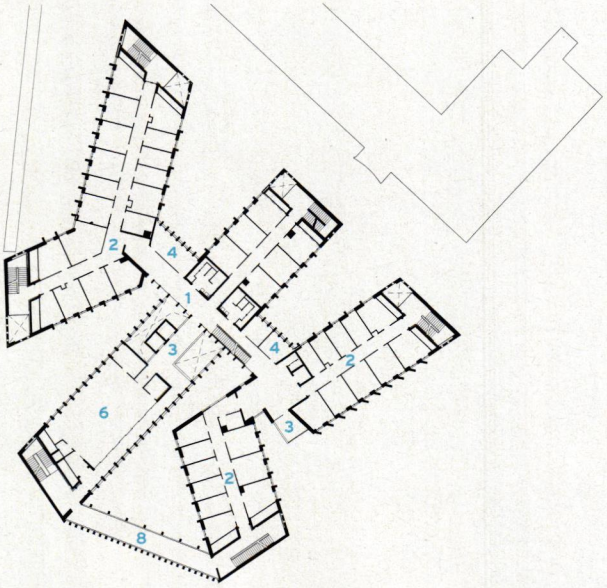
The central courtyard is entered via a gentle ramp between two wings rising from the plaza to the southwest. This small incline is enough to create a sense of arrival, believes Farrell. "Somehow, it holds



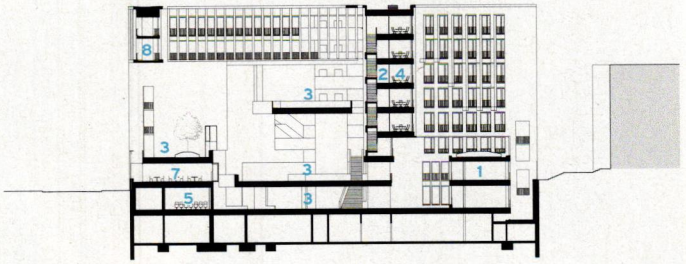
PHOTOGRAPHY: © DENNIS GILBERT



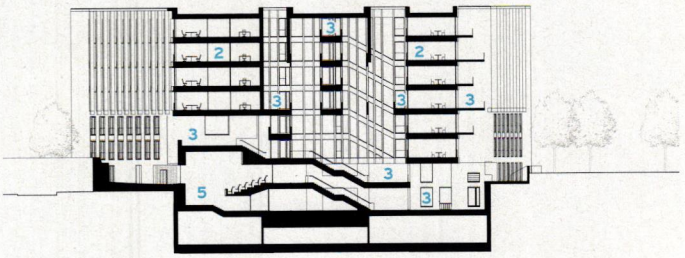
ELEVATION A-A



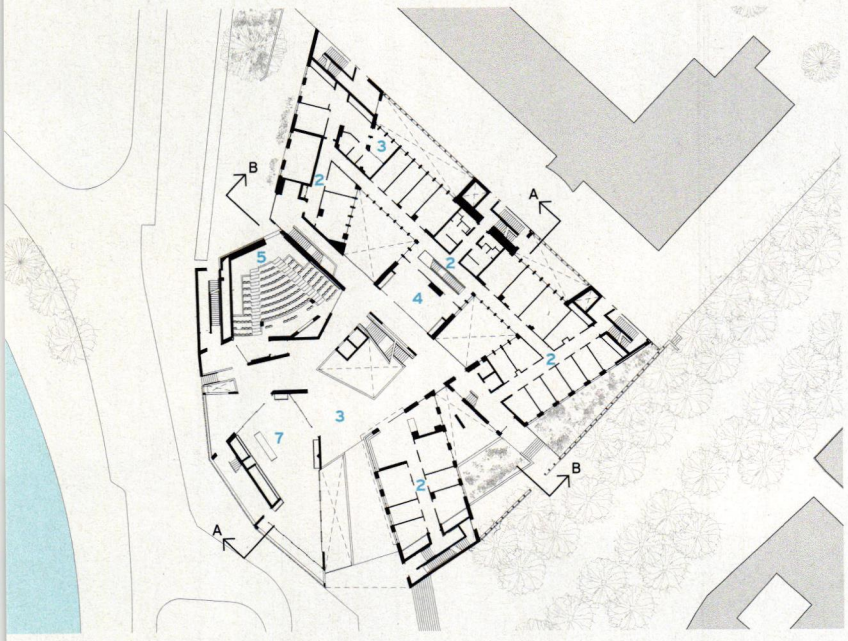
FIFTH-FLOOR PLAN



SECTION A - A



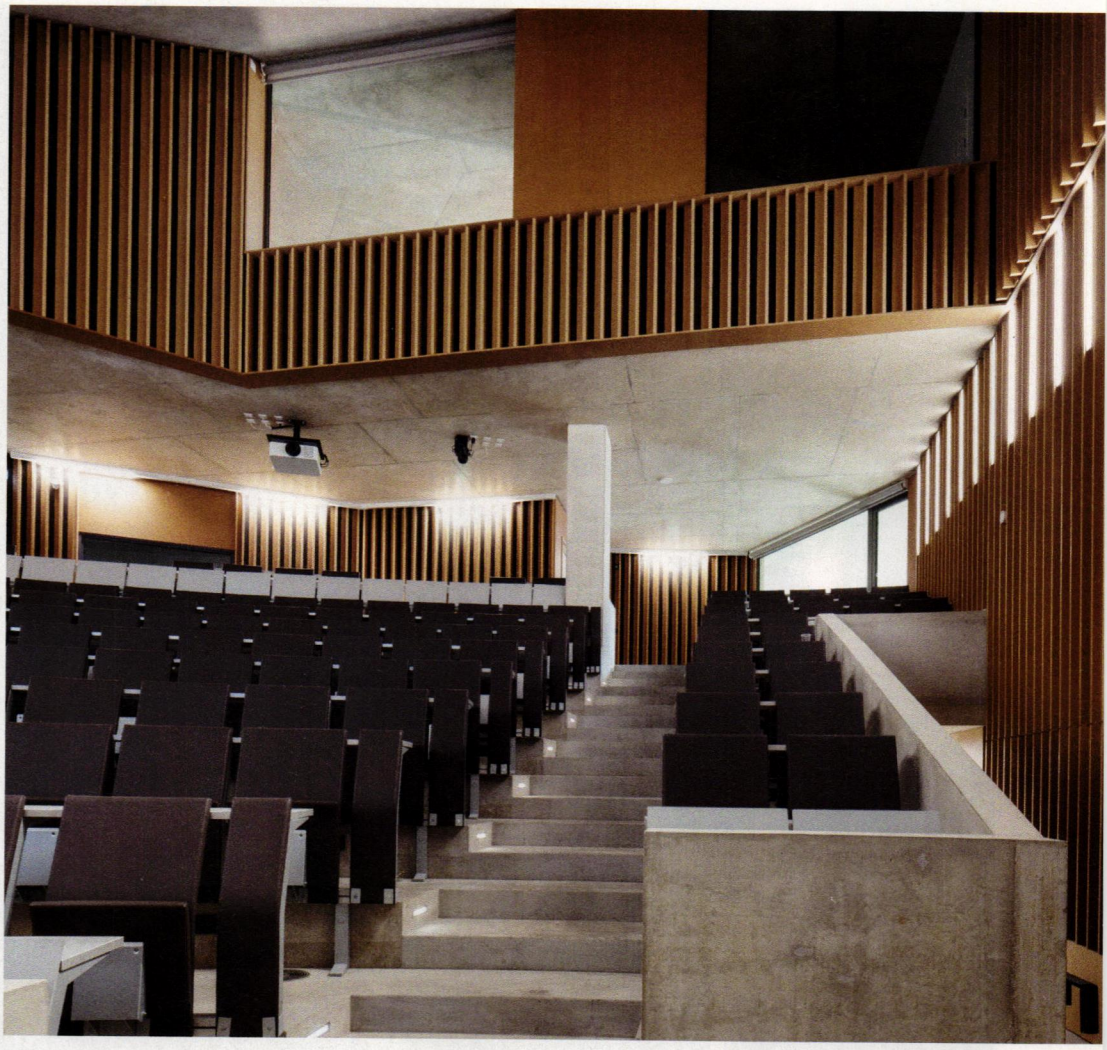
SECTION B - B



GROUND-FLOOR PLAN

0 30 FT.
10 M.

1 CIRCULATION GALLERY
2 OFFICES
3 EXTERNAL TERRACE
4 MEETING ROOM
5 AUDITORIUM
6 TEACHERS LOUNGE
7 CAFÉ
8 SKY CLOISTER





DOWN TO BUSINESS One of the auditoria (right) and the café (bottom).

you enough that you stop," she says. "On the left-hand side you can have a cup of coffee at the ground floor café, and you might just leave then, if you're a member of the public. But if you are a professor, or a researcher, then you'd make choices. You might go up the stairs. You might decide you'd go on the lift, or you might just amble around."

Unlike the perimeter of the wings, which are clad in brick, the concrete of the *coursive* is left bare. Approached through the spaces between the wings, it is tough in appearance and clearly where the business of the building takes place. The journey into the school is a dance between interior and exterior, as one gazes through the *coursive* to the courtyard beyond or up through it at the sky above. "We ended up with what we call a sundial. It's a central space which inhales and exhales at the edges to deal with the conditions around us," says McNamara. The building opens out as one ascends on its uncovered stairs, with open walkways at upper levels predominating and views of the city becoming an omnipresence.

The central elevator core, which dominates this space, is key to the structure, but the building is further strengthened at the end of the wings by vertical concrete columns secured by lateral beams. These act effectively as buttresses, less legible than the ones that support the town's medieval churches but just as strong. The vertical buttresses are inlaid with courses of brick, interrupted by perforations: at these junctures the brick skin of the building stands separate from the concrete mass, creating semi-external stair towers that, acting as fire escapes, also provide an alternative route to the central circulation.

"We were trying to take things we've fallen in love with in Toulouse and find a way of stitching them together," says McNamara, contrasting their collage strategy in Toulouse with their design methodology on, say, the Bocconi University building in Milan, which has an urbanistic plan based on a section. The predominant exterior material of TSE is a case in point. The brick was produced locally and follows the dimensions of the Roman version (16½ inches long by 2 inches high and modulated in width for varying effects). It is ubiquitous in the construction of the major landmarks of the town, like the Gothic Church of the Jacobins—very thin and softly colored. "The brick looks edible," says McNamara. "Like a biscuit," says Farrell.

Trapped as we currently all are in lockdown, we see it as a particularly tantalizing, tactile piece of architecture—unabashed in its scale



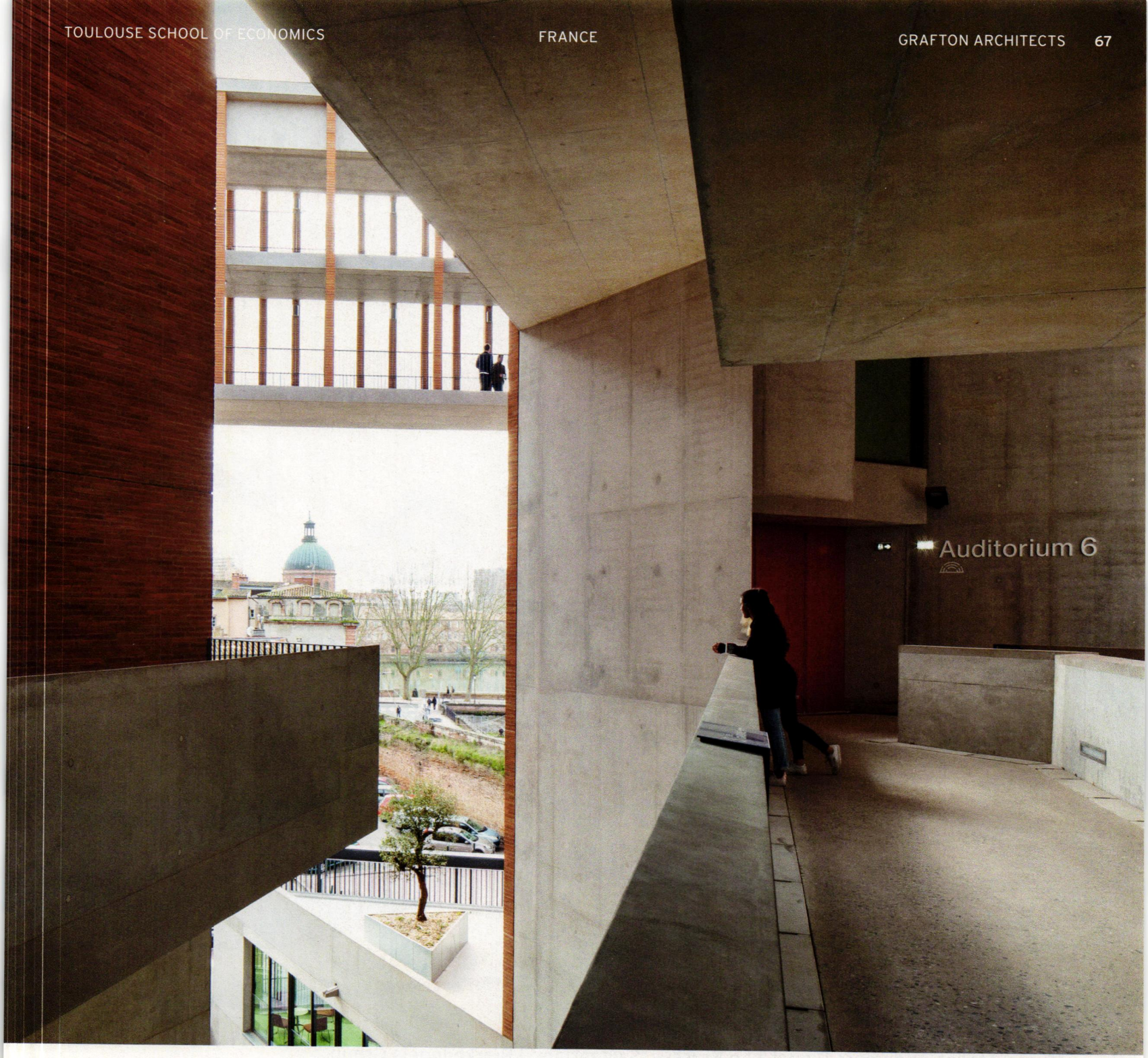


DELICIOUS The brick on the exterior (left) and inside the semi-external stair towers (above) is locally made. The building's many vantage points make the city an omnipresence (opposite).

and presence. It is already an established presence on the Toulouse riverscape. "The building anchors you at that particular coordinate on the earth," says Farrell. "You feel the Garonne, you feel the Canal de Brienne." If only they could, right now! For the moment, though, McNamara's and Farrell's thoughts remain on the health of their families and colleagues, with their Pritzker Champagne remaining metaphorically on ice. "We haven't had the opportunity to celebrate yet," they say. "It will make it all the sweeter when we do." ■

Tim Abrahams, a former editor at the Canadian Centre for Architecture, is a critic based in the UK.

PHOTOGRAPHY: © GRAFTON ARCHITECTS (2)



credits

ARCHITECT: Grafton Architects – Shelley McNamara, Yvonne Farrell, principals; Philippe O'Sullivan, Gerard Carty, Abi Hudson, Ailbhe Walsh, Briain Moriarty, Conor McGowan, David Healy, Donal O'Herlihy, Ivan O'Connell, James Rossa O'Hare, Joanne Lyons, John-Barry Lowe, Kieran O'Brien, Matthew McCullagh, Petrina Tierney, Simona Castelli, team

ENGINEER: Chapman BDSP London

CONSULTANTS: Oteis Toulouse (mechanical/electrical/environmental); Vulcaneo (fire); Gleeds (quantity surveyor)

CONTRACTORS: Eiffage Midi Pyrénée (structure), Bourdarios (brick facade), Realco (aluminum windows), St Eloi (steelwork), Smac (roofing), Ineo (electrical), Eiffage Thermie (mechanical/plumbing)

CLIENT: Université Toulouse Capitole

SIZE: 194,000 square feet

COST: $29 million

COMPLETION DATE: December 2019

SOURCES

GLASS: Guardian

MASONRY: Search Results Terres Cuites du Saves

METAL FRAME: Technal

RAISED FLOORING: Comey



Musée Atelier Audemars Piguet | Le Brassus, Switzerland | Bjarke Ingels Group

Round and Round

Resembling land art, a sculptural museum and workshop for a storied Swiss watch manufacturer takes advantage of its site's topography.

BY ANDREW AYERS

PHOTOGRAPHY BY IWAN BAAN



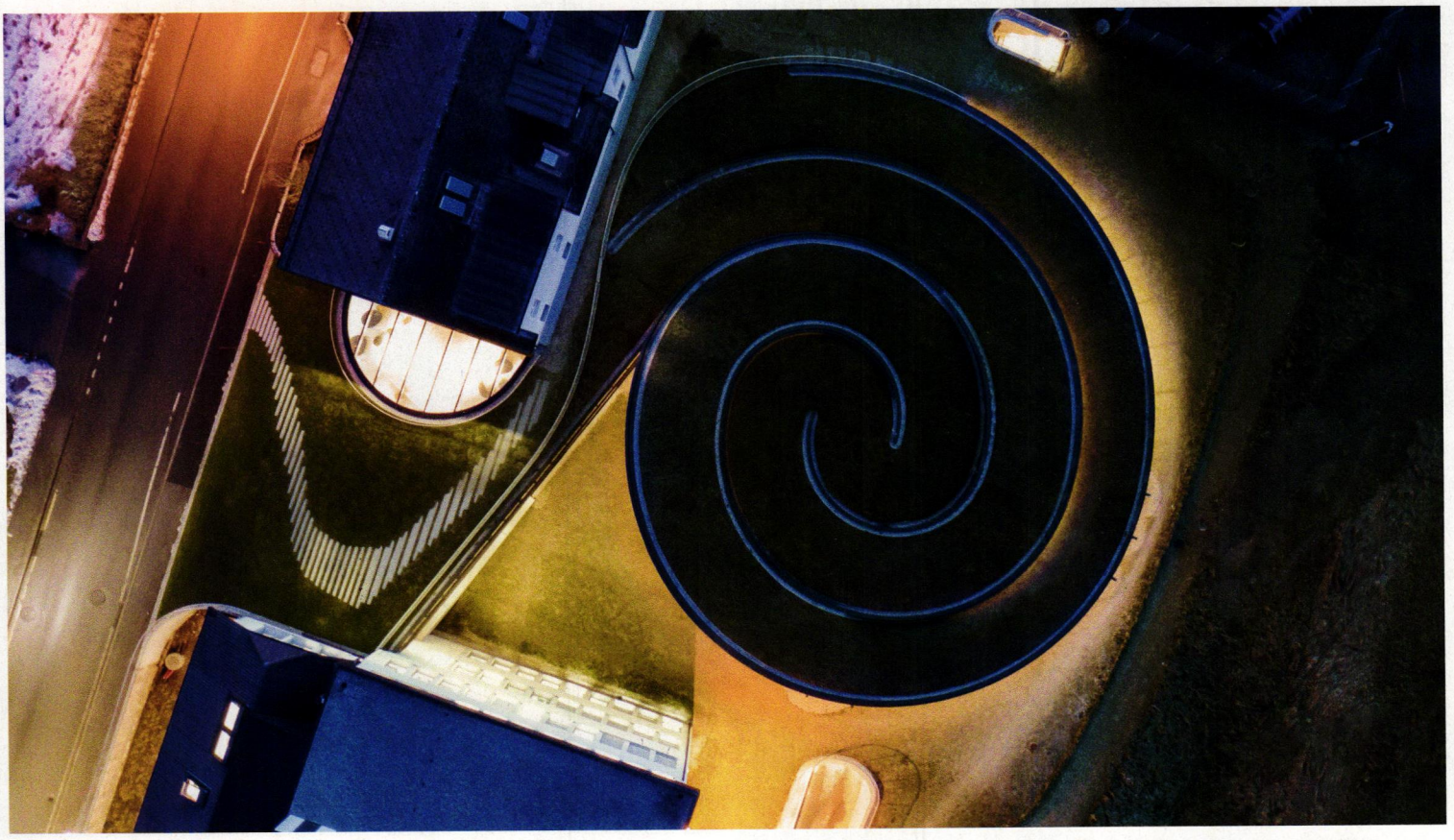


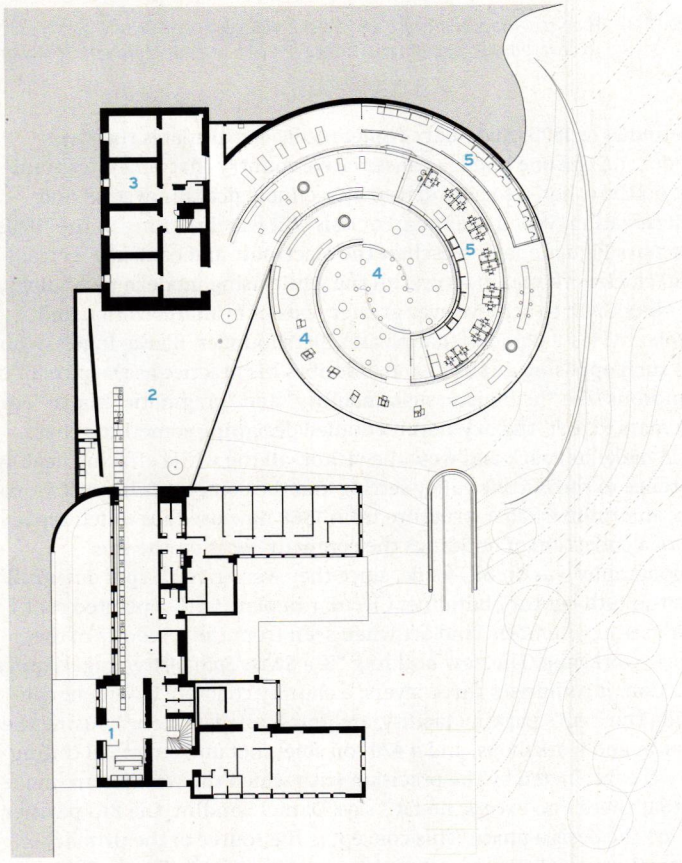
WIND IT UP The serpentine workshop and museum building (above and left) is built into a slope and covered with a green roof, making it reminiscent of Robert Smithson's *Spiral Jetty*.

"ARCHITECTURE and watchmaking hold a unique place in culture," says Michael Friedman, of Swiss watchmaker Audemars Piguet. Friedman, who is head of complications—meaning he oversees the integration of watch functions that do more than mark the hours and minutes—explains that both disciplines involve engineering and mathematics, the need to understand and combine many different materials, and an artistic aspect. These are literal parallels, perhaps, but Danish architecture studio BIG took them very much to heart when designing the new museum and workshop at Le Brassus, in the Vallée de Joux. The result is an immersive educational showroom for the company's painstakingly handmade timepieces, whose fans include Formula One race car driver Michael Schumacher and hip-hop stars Jay-Z and Kanye West.

Founded in 1875, Audemars Piguet nicely encapsulates the Swiss paradox: on the one hand, a conservative country that venerates tradition; on the other, a society driven by technological innovation and modernization. When the "quartz crisis" hit watchmaking in the 1970s, Audemars Piguet opted to eschew the electronic and continue its traditional clockwork manufacture, all the while using modern technology, including CAD, to achieve ever greater feats of miniaturization and complexity. It's a paradox that pleases BIG's founder, Bjarke Ingels, who likes such opposing dualities and describes his practice as the pursuit of oxymorons like "hedonistic sustainability" and "pragmatic utopia." For Audemars Piguet, the oxymoron entailed designing something that would make its mark and wow the visitor, all the while effacing itself in deference to the bucolic valley setting and the company's historic workshop, an unremarkable structure from 1868 now used for watch repair, part of a collection of buildings the company owns on the site.

Topography was on BIG's side, since they were given a spot downhill from the 19th-century building. Circular in plan, with a planted roof, the museum resembles land art when seen from the windows of the historic workshop. The new building "is a Swiss *Spiral Jetty*," Ingels quips. In section, it comprises three layers: a chunky concrete basement containing the firm's parking facility, an almost all-glass floor housing the museum and workshops, and a 470-ton steel roof and technical ceiling. "We were fascinated by the precision with which the watches are made and that there's no excess, no fat," says Daniel Sundlin, the BIG partner who led the design phase. This concept is the source of the primary technical feat: rather than columns or load-bearing walls, the heavy roof stands on structural glass, 110 panels of it in all.





FLOOR PLAN

Manufactured in Austria, and each requiring three weeks to make, the panels comprise three to six layers of float glass, depending on the load borne. The thickest at are at the perimeter and include argon-filled insulation cavities. A gesture that Ingels likens to mystery clocks, whose hands appear to float in front of crystal, the structural glass is all the more remarkable in that it conforms to both seismic regulations (although glass performs poorly in tension, the panels' curvature helps stiffen them) and the stringent Swiss energy-consumption standard Minergie. Obviously, solar gain and glare were an issue, so in addition to a low-E coating, computer-modeled woven-brass brises-soleil wrap parts of the building, their weft and warp varying according to predicted sun exposure.

Visitors enter through an existing street-side building before proceeding through a lobby, which flows seamlessly into the new museum space. Again to trim off excess fat, but also to increase intimacy given how small watches are, BIG chose to avoid the classic museological enfilade of rooms. "You have the continuous history of the Audemars Piguet brand," explains Sundlin, "but we rolled it up in a double spiral," which, though the space is open, manifests itself through changes in floor and ceiling levels. "The spiral is like a watch spring coiling up," says Ingels. "We

ABOVE AND BELOW
The glass-and-brass museum display cases (above) echo the materials of the architecture and its perforated brass ceilings and terrazzo floors with brass joints. The workshops (right), which wrap the exhibition areas, are hermetically sealed behind glass and entered through air locks.



PHOTOGRAPHY: COURTESY AUDEMARS PIGUET (TOP)



MADE FOR SHADE Woven brass brises-soleil are intended to protect the interiors from glare, their weft and warp varying according to computer-modeled sun exposure.

wanted it to feel like a light pavilion where the spring is hovering over your head." Part of the visitor circuit (run by appointment starting this summer and only for a guided tour) includes the watchmaking ateliers: pressurized so that dust does not fall on worktops, they are hermetically sealed behind glass and entered through air locks. The museum display cases and scenography, conceived by German interior-design firm Atelier Brückner, deploy the same glass-and-brass vocabulary as BIG's building (whose suspended ceiling is in perforated brass and floor in terrazzo with brass joints), and allow light and the gaze to flow through and around them.

On paper this all sounds great: an intelligent response to a challenging brief, where form and content are symbolically intertwined, technology is pushed to its utmost, and everything realized with the precision detailing Swiss contractors are famed for. And yet the experience seems disappointing—banal even. BIG wanted to maximize the views and maintain the oxymoron that you're simultaneously inside and out. But, with no framing device to set off the valley prospect, the effect is anticlimactic. Moreover, the many and very thick black joints between the narrow perimeter panes read like steel supports, destroying the wraparound-glass illusion (*le détail qui tue* if ever there was one). And there are practical disadvantages too: on the February afternoon I visited, some watchmakers had opened black umbrellas to shade their workstations from the snow-glare-intensified sunlight flooding in. All that effort and money—quite how much has not been divulged—to build what feels like a blinged-up luxury-car showroom! But Audemars Piguet presumably knows its market—race car drivers, rappers, et al.—so this must be just what purchasers of $27,000 watches want. ■

Andrew Ayers is a Paris-based writer, researcher, translator, and educator.

credits

ARCHITECT: Bjarke Ingels Group (BIG)
ARCHITECT OF RECORD: CCHE Architecture and Design
EXHIBITION DESIGNER: Atelier Brückner
CONSULTANTS: Dr. Lüchinger+Meyer Bauingenieure (structure, facades); Fondation Pierre Chuard Ingénieurs-Conseils (mechanical); L'Atelier du Paysage Jean-Yves Le Baron (landscape); Belzner Holmes Light-Design (lighting); Estia (sustainability); EcoAcoustique (acoustics); MAB Ingenierie (electrical); Chings (plumbing); Niklas (security); Geneux Dancet (waterproofing)
CLIENT: Audemars Piguet
SIZE: 27,000 square feet
COST: withheld
COMPLETION DATE: April 2020

SOURCES

STRUCTURAL GLASS: Frener Reifer/STL Technologies
ACOUSTICAL CEILINGS: KST
TERRAZZO FLOORS: Moll
FLOOR AND WALL TILE: Mutina Mews
LIGHTING: Gubi, iGuzzini, Flos, Zumtobel, Eigenart
LIGHTING CONTROLS: Osram



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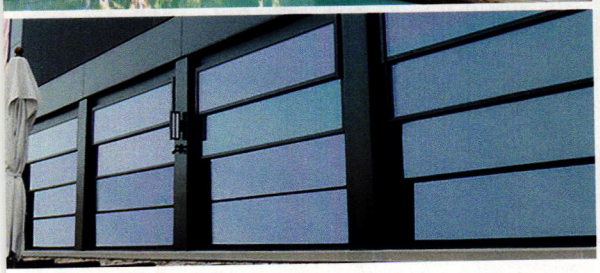

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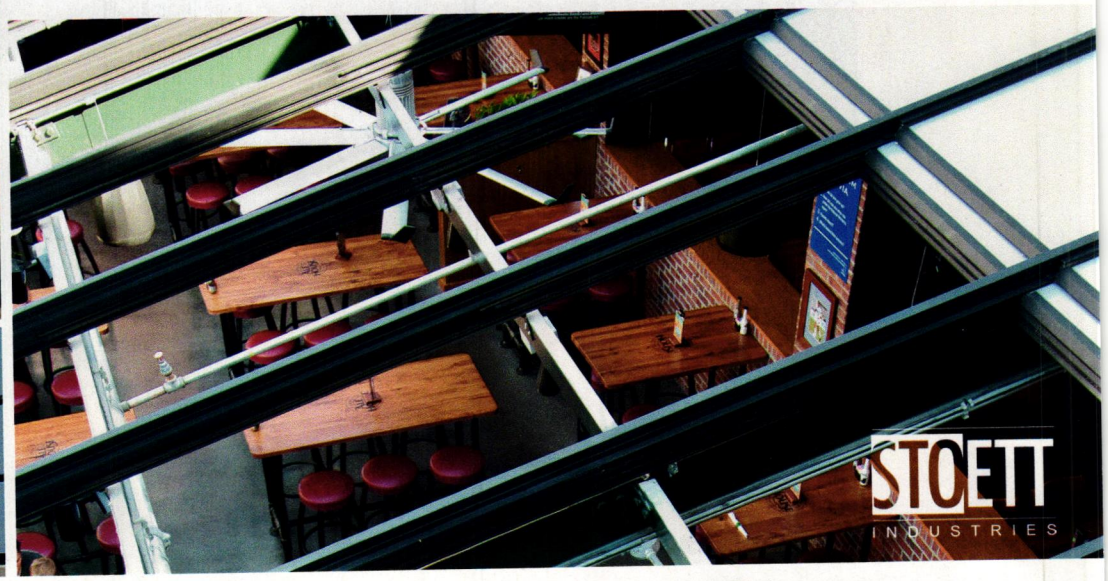

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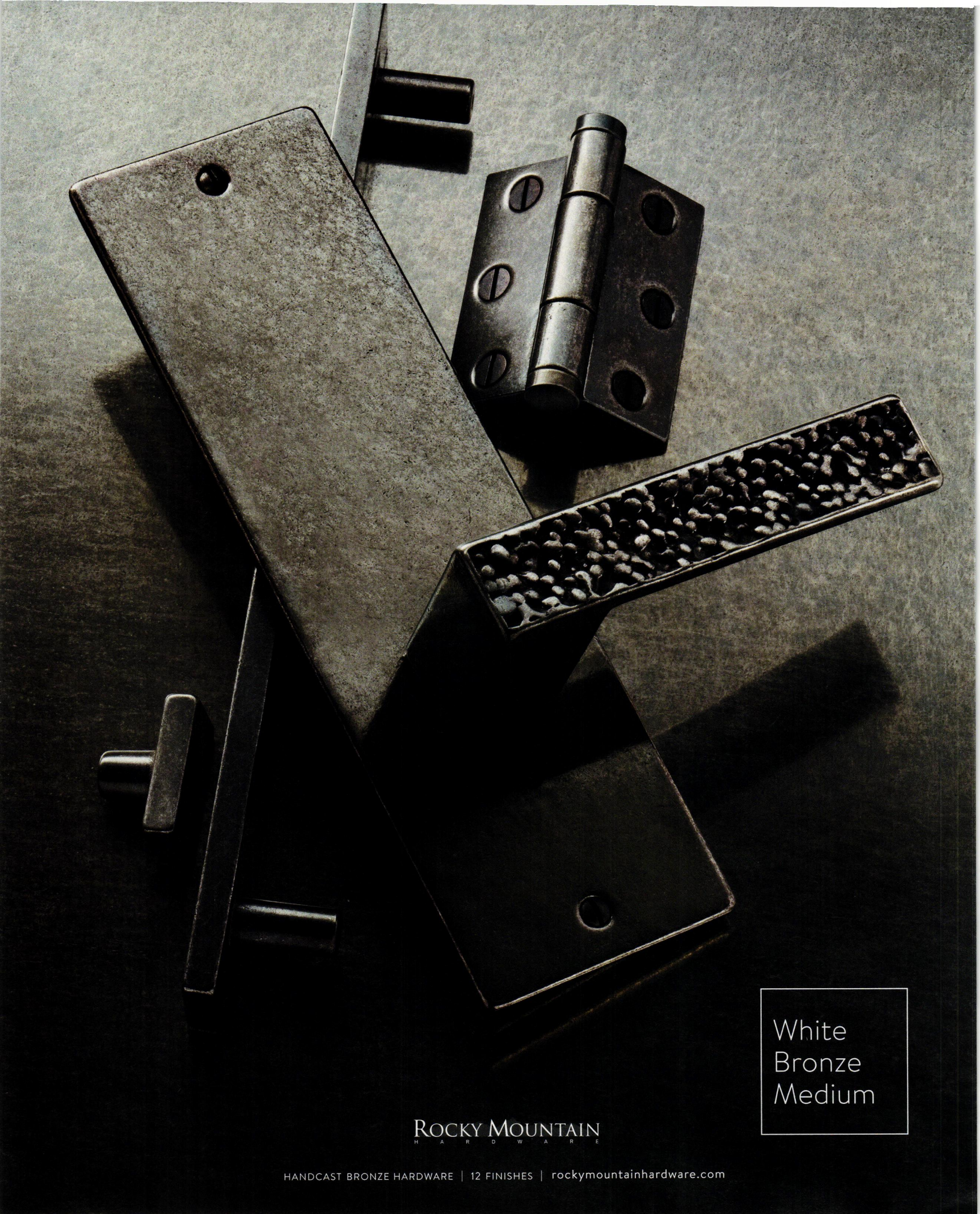

White
Bronze
Medium
ROCKY MOUNTAIN
HARDWARE
HANDCAST BRONZE HARDWARE | 12 FINISHES | rockymountainhardware.com

San Sa Village | Beigou, China | IILab.

Alone Together

Pre-social distancing, a hotel is designed to foster both community and solitude.

BY ARIC CHEN

PHOTOGRAPHY BY FERNANDO GUERRA







WHEN THE San Sa Village hotel opened last September in Beigou, a village about two hours northeast of Beijing, near the Mutianyu section of the Great Wall of China, "coronavirus" had yet to enter the popular lexicon, and the term COVID-19 did not exist. It was the pre-lockdown era, and Chinese people were still traveling for leisure in unprecedented numbers.

Domestically, tourism increasingly meant heading to the countryside. And with its 16 rooms spread among a cluster of low brick buildings, San Sa Village joined a mini-spate of homestays and guesthouses that were opening in Beigou, a small enclave otherwise known for its chestnuts, walnuts, and picturesque views of the mountains and the Great Wall.

Before COVID-19 brought travel and so much else to a halt, China was experiencing a boom in rural architecture as the government unleashed a raft of initiatives aimed at



IT TAKES A VILLAGE The 16-room hotel is a neighborhood-like cluster of low-slung buildings connected by courtyards and terraces (above and opposite). Locally sourced wood and fieldstone, as well as red and gray brick, lend the complex a rich texture.

narrowing the country's yawning rural-urban economic divide. Following in the footsteps of Wang Shu, Liu Jiakun, Zhang Lei, and others, a generation of younger architects was transforming the countryside with new guesthouses, community centers, museums, housing, workshops, and other projects that combined local materials and knowhow with a sensitivity to site, scale, rural life, and the people who comprise it.

In fact, when the Shanghai office of llLab. first got the San Sa Village commission in 2015—"This project took four years, a very, very long time in China," says llLab. partner Liu Hanxiao—it was a different era in China's rural development too. The client, a developer, had previously hired another architecture firm whose proposal for the site was somewhat banal: "a three-story hotel with a driveway entrance; a big lobby with a fireplace and water feature in the middle; and guest rooms around it, all under one roof," Liu recalls. "Think of the most typical thing you can imagine—that was it." Sensing the shift in architectural tides, the client approached llLab. (pronounced "el-el-lab") for an alternative, and the studio came up with what it calls a "village within a village."



MOOD SWINGS Ample outdoor spaces and serene guest rooms, with strong connections to the mountainous landscape and the Great Wall beyond, offer opportunities both for gathering and solitary contemplation.



1 FRONT GATE
2 RECEPTION HOUSE
3 PUBLIC RESTROOM
4 KITCHEN
5 EVENT SPACE
6 LOUNGE, BAR
7 EXISTING WALL
8 STAFF OFFICE
9 STORAGE
10 STAFF RESTROOM
11 MECHANICALS
12 BEDROOM
13 LOUNGE AREA
14 TEA SPACE
15 BATHROOM

SITE PLAN

0 50 FT.
15 M.

Located on the southeastern edge of town, where a gas station once stood, San Sa Village's 10 one- and two-story brick pavilions, housing guest rooms, a dining hall, multifunctional room, and reception area, huddle on a 25,000-square-foot site. In determining their arrangement, Liu and his team looked to traditional typologies, but opted against the rigid formality of the orthogonal courtyards that are endemic to northern China. Instead, they went for a more irregular, southern-Chinese-inspired configuration that creates a sense of intimacy while giving each building its own sight lines and views. "Each has its own private corner that you can enjoy," says Liu.

At the same time, large windows, outside spaces, and the structures' close proximity encourage interactions "in a neighborhood-like condition, where you know your neighbor and can chat, and still see each other from the balconies," Liu says. Meanwhile, instead of walls or other barriers, the team employed different paving patterns and grade changes to more subtly demarcate semiprivate outdoor areas like guest room terraces. Indeed, throughout, llLab. sought to create ambiguous boundaries that delicately negotiate the public and personal—a means of spatially fostering both community and solitude in a way that's now tempting to think of as social distancing.

The architects also wanted the hotel to have a porous relationship with the village. While llLab. had no choice but to retain existing walls that belonged to adjacent properties, as many openings were kept as possible. In fact, the project's relatively long timeline was the result, in part, of an extended process of engagement with local residents. "It took us a long time to understand the village," Liu says. "We wanted to get to know how people live there, their sense of intimacy, and really make this project part of the village."

On a practical level, that meant understanding local construction techniques, ranging from concrete framing to brickwork. Fieldstones gathered nearby were used for paving and building plinths, and locally sourced varieties of wood help fill the interiors. A fair amount of improvisation was also required. For example, llLab. initially intended to fully clad the structures in the village's ubiquitous red brick. However, toward the beginning of construction, the local kilns were shuttered—part of Beijing's pollution-control efforts—leaving only gray bricks from



further afield to make up the difference. Attempts were made to mix red and gray in pixelated patterns but, unsatisfied with the results, Liu elected to simply clad lower floors in red and upper ones in gray. "It was a mutually inspiring process," he says, referring to the village workmen.

This February, having only just opened, San Sa Village closed its doors—and remains closed, as of this writing—as the coronavirus began taking hold across China. But that doesn't mean it's been empty. According to Liu, local residents have enthusiastically taken to using the hotel's courtyards and other outdoor spaces for their morning exercises and other routines. In this sense, the project has succeeded. "I think the villagers are enjoying this moment, being there by themselves," he says. ■

Aric Chen is an independent curator and writer based in Shanghai.

credits

ARCHITECT: IILAB. – Liu Hanxio, lead architect

CONSULTANTS: Yi Wang (civil engineering); Shanghai Di Cui Landscaping (landscape design)

GENERAL CONTRACTOR: San She Inn Cultural Management; Guobing Zhou

CLIENT: 2049 Group

SIZE: 25,000 square feet (site); 17,000 square feet (built)

COST: $5.6 million

COMPLETION DATE: July 2019

SOURCES

WINDOWS: Meichi

ENTRANCES: Mali

MILLWORK: Best

FLOOR AND WALL TILE: Best; Perfec

FURNISHINGS: Mokuba Japan; Baxter; B&B Italia; Neue Wiener Werkstätte; Artisan

Gusto 501 | Toronto | PARTISANS Architects

Brick House

A restaurant's stacked parti is a poster child for urban infill.

BY ALEX BOZIKOVIC

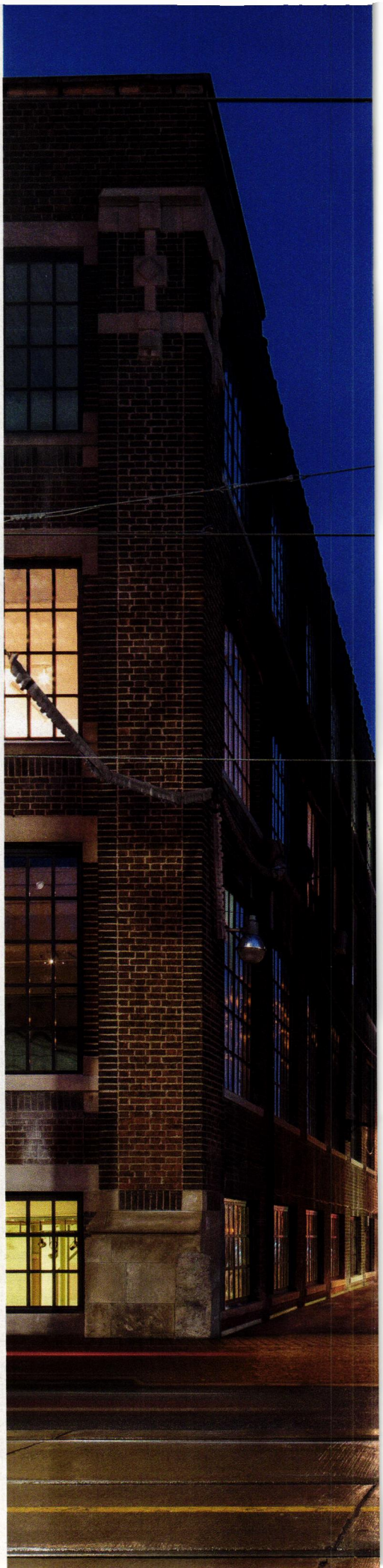
PHOTOGRAPHY BY NIC LEHOUX

RESTAURANTS TEND to work well when they're on one floor. There's a clear logic to having diners and a kitchen on the same level. But Gusto 501, a new Southern Italian restaurant in Toronto, turns the convention on its side. The purpose-built structure includes five discrete dining spaces on four floors, held together by an atrium and distinctive rippling walls made of clay. "By going upward, we're showing the potential for infill buildings like this one," says the project's lead architect, Jonathan Friedman, of the emerging Toronto firm PARTISANS.

Filling a downtown lot of just 30 feet by 60 feet, Gusto 501 offers space for roughly 200 diners. Its interior configuration enables a high level of flexibility, which will be particularly important as the restaurant ramps up operations when it reopens in the wake of the COVID-19 crisis. "It allows many configurations to accommodate different numbers of people and types of activities," Friedman says.

Gusto 501's main floor centers around a curvy Italian pizza oven, and opens onto busy King Street East with a wall of three horizontal 20-foot-wide glass panels. The panels are stacked one atop the other and, at the touch of a button, retract from the top and bottom to the middle, allowing walk-up coffee service and al fresco dining on the ground floor and admitting fresh air to the top-level dining area. A

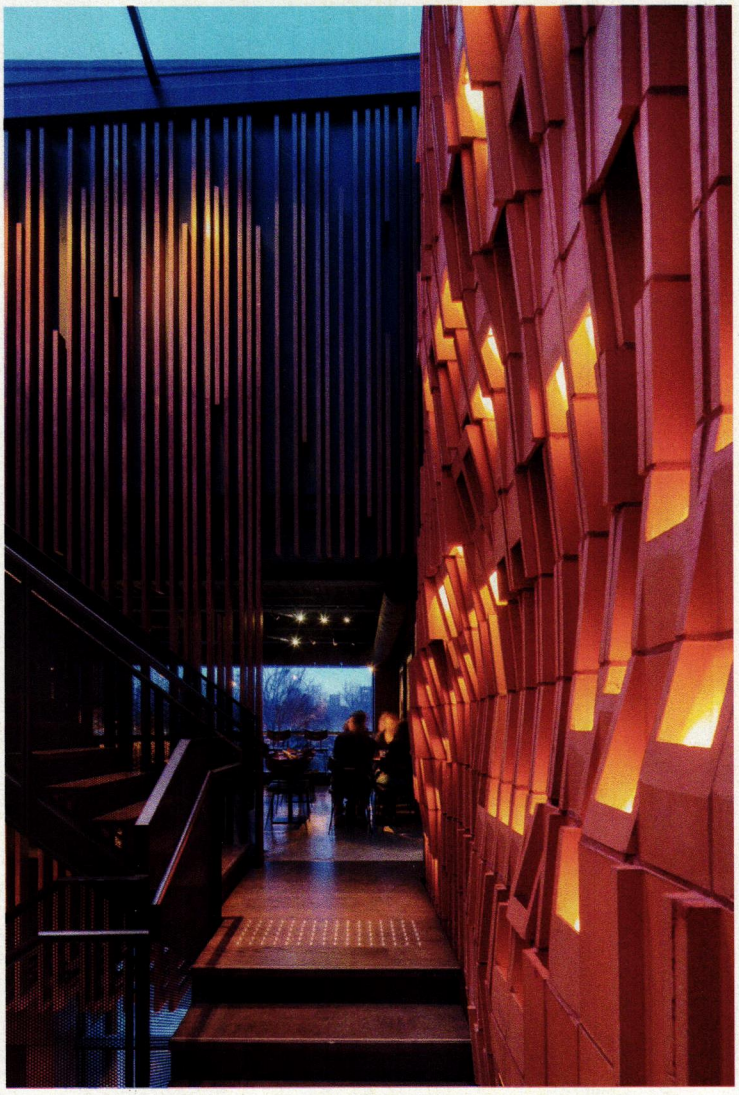




PHOTOGRAPHY: COURTESY PARTISANS ARCHITECTS (LEFT)



MATERIAL CONNECTION
The weathering-steel exterior speaks to the interior, which is lined in terra-cotta bricks. Broad expanses of glass slide together to open up the front facade in good weather (opposite).

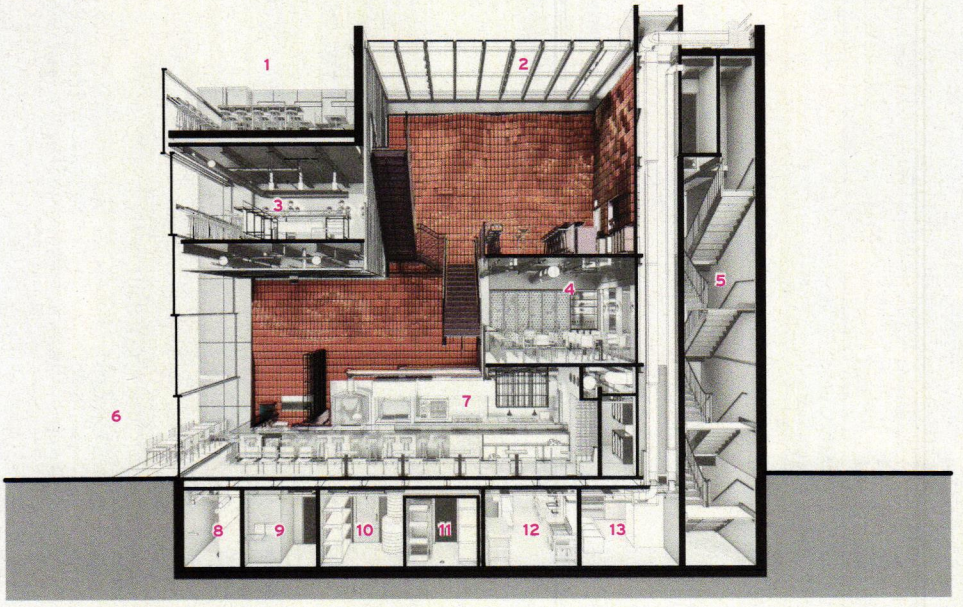


grand stair rises through the center of the restaurant beneath a skylight. It leads to a mezzanine dining area and then continues to the second floor (which has separate spaces front and back), and, finally, to a roof deck. "You could have five independent events going on," Friedman explains, "or a wedding that occupies the entire building, or some kind of performance that occupies the central stair." It's a unique offering in the neighborhood, which is composed of light industry and 19th-century housing, but is now seeing residential towers rise by the dozen.

The interior experiences are varied. The second-floor rear space functions as a cocktail bar, and it is appropriately moody and dim. The level's front end, however, looks through the glazed elevation onto a freeway overpass a block away; cars whiz past, providing a metropolitan hum that is not very Italian but is undeniably dramatic. This space, which has its own kitchen, is conceived as a stage for culinary drama. Owner Janet Zuccarini imagines it as a place to bring in the chefs of her seven-restaurant empire—which includes the acclaimed Felix in Venice Beach, California—for guest stints. It's a place to test out menu options, and give chefs a chance to experiment or, simply, a place to seat overflow diners from the main part of the restaurant.

One material holds the building together, in spectacular form. The interior walls are clad with a three-dimensional layer of clay bricks. The hollow 6-by-12-by-12-inch units, colloquially known as "speed tile," were custom-fabricated by Cleveland's Sandkuhl Clay Tile, which jet-cut the units to create 24 different profiles. These range from flat tiles to projecting rectangles, with many different diagonal cuts in between. The architects, employing BIM, have arranged 6,500 of these along the walls to serve several purposes. The first is visual: as you move up the main stair, the clay crests like a wave alongside you, its ripples extending all the way to the ceiling, to stunning effect. The irregular patterns also diffuse sound, while the individual tiles contain recessed sconces, which scatter the light across the warm surface of the clay. Finally, they conceal the restaurant's mechanicals; custom clay grates cover the air vents.

It's a creative use of a humble material. Speed tile was once common in North America, employed as infill for walls, much as concrete block is today. (PARTISANS recently encountered them while gut-renovating a 1920s office tower in downtown Toronto.) They remain common across much of the rest of the world today. For Zuccarini, they bring



SECTION PERSPECTIVE

0 16 FT.
4 M.

1 ROOFTOP PATIO
2 COCKTAIL BAR
3 CHEF'S KITCHEN
4 MEZZANINE WINE BAR
5 EXIT STAIR
6 STREET-LEVEL PATIO
7 KITCHEN
8 MECHANICAL
9 OFFICE
10 LIQUOR CAGE
11 REFRIGERATOR
12 PREP KITCHEN
13 DISHWASH

FLEX TIME A composition of discrete dining areas, Gusto 501 will allow for flexibility when it reopens in the wake of the COVID-19 pandemic (right). Clay brick in 24 profiles brings a dynamism to the interior (opposite).

back childhood memories of working on sites with her housebuilder father in Italy.

For the architects, this building has its own significance: it's their first ground-up project. Over less than a decade in practice, PARTISANS, co-led by Alexander Josephson and Pooya Baktash, has taken on projects at a range of scales, from a bar interior to the master plan for an exurban township that could accommodate 150,000 people. The firm now has a staff of about 20. But the restaurant's role as a showpiece for the firm has become complicated. It debuted in February, about a month before COVID-19 shut the city down; and while the opening attracted full houses and critical praise, this will be a very difficult year for the business, along with the rest of the hospitality industry. Will diners return? Will Gusto 501 thrive once the crisis subsides? "Absolutely," Friedman says with emphasis. "There's going to be a strong desire to get back to ordinary things. Wanting to have dinner, to have a glass of wine in a social setting, is going to come back. That desire to make connection—it's just part of being human." ■

Alex Bozikovic is the architecture critic for The Globe and Mail *and author of* Toronto Architecture: A City Guide.

credits

ARCHITECT: PARTISANS Architects – Jonathan Friedman, Alexander Josephson, Pooya Baktash, Benjamin Salance, Tim Melnichuk, Ivan Vasyliv

ENGINEERS: Blackwell Structural Engineers; BK Consulting (m/e); RDH Building Science (building envelope); Pico (terra-cotta masonry, structural)

INTERIOR DÉCOR CONSULTING: Wendy Haworth Design Studio

GENERAL CONTRACTOR: Boszko & Verity

CLIENT: Gusto 54 Restaurant Group

SIZE: 9,500 square feet

COST: withheld

COMPLETION DATE: February 2020

SOURCES

TERRA-COTTA MASONRY: Sandkuhl

INSULATED METAL PANEL: Kingspan

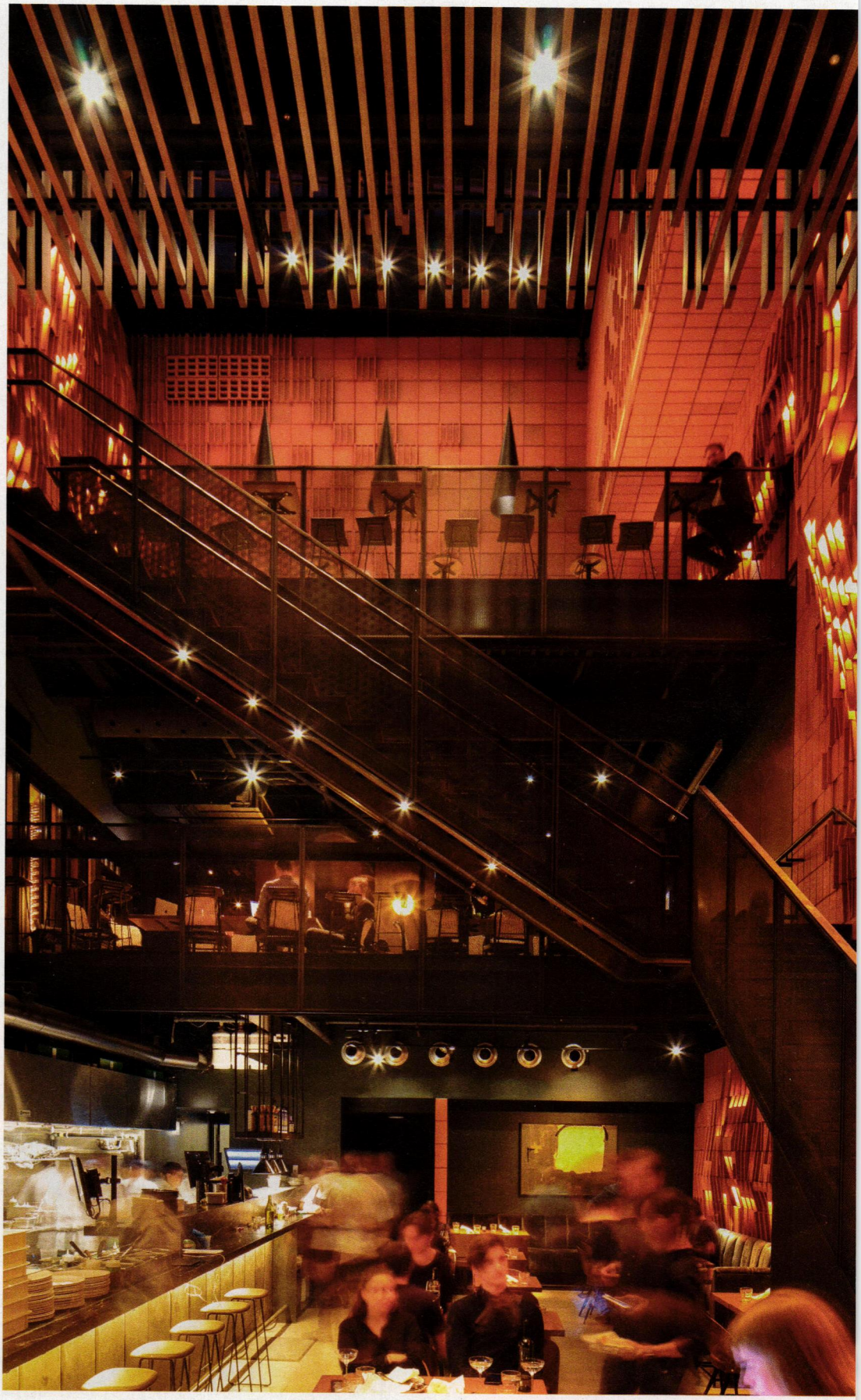
GLAZING: Panoramah!

MOISTURE BARRIER: Blueskin; Tremco Paraseal

PAINTS & STAINS: Sherwin-Williams

RESILIENT FLOORING: Altro

RUBBER STAIR TREAD: Johnsonite



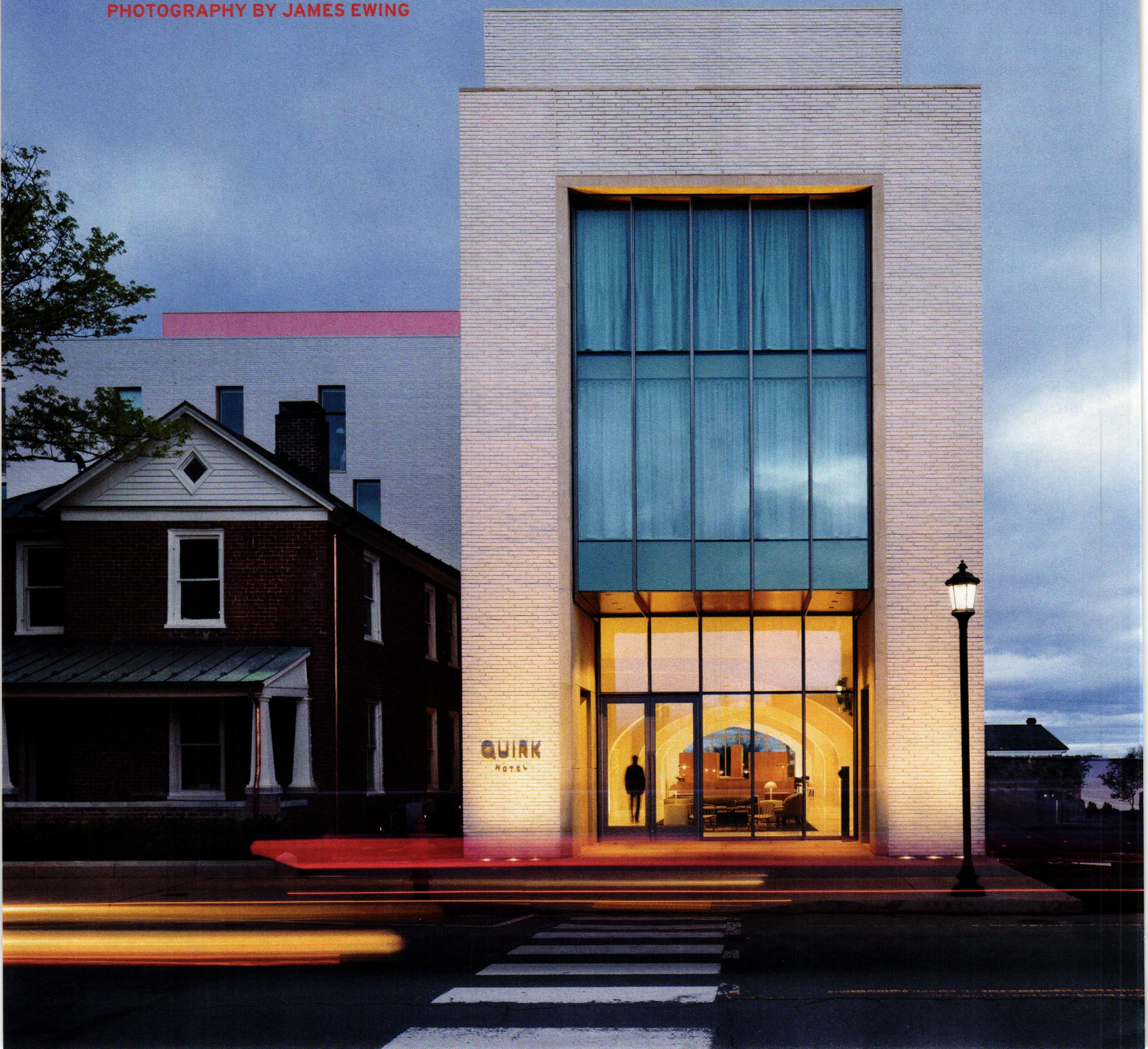
Quirk Hotel | Charlottesville, Virginia | ArchitectureFirm

Paint the Town

The gallerist owner of an art-themed Richmond hotel opens a new outpost nearby.

BY JOSEPHINE MINUTILLO

PHOTOGRAPHY BY JAMES EWING





THE NAME, Quirk, is misleading. There's nothing peculiar or eccentric about this new hotel in Charlottesville, Virginia. Rather, it is a highly anticipated high-end addition to the city's limited hospitality options, and that's instantly apparent upon entering its towering new white-brick structure along West Main Street.

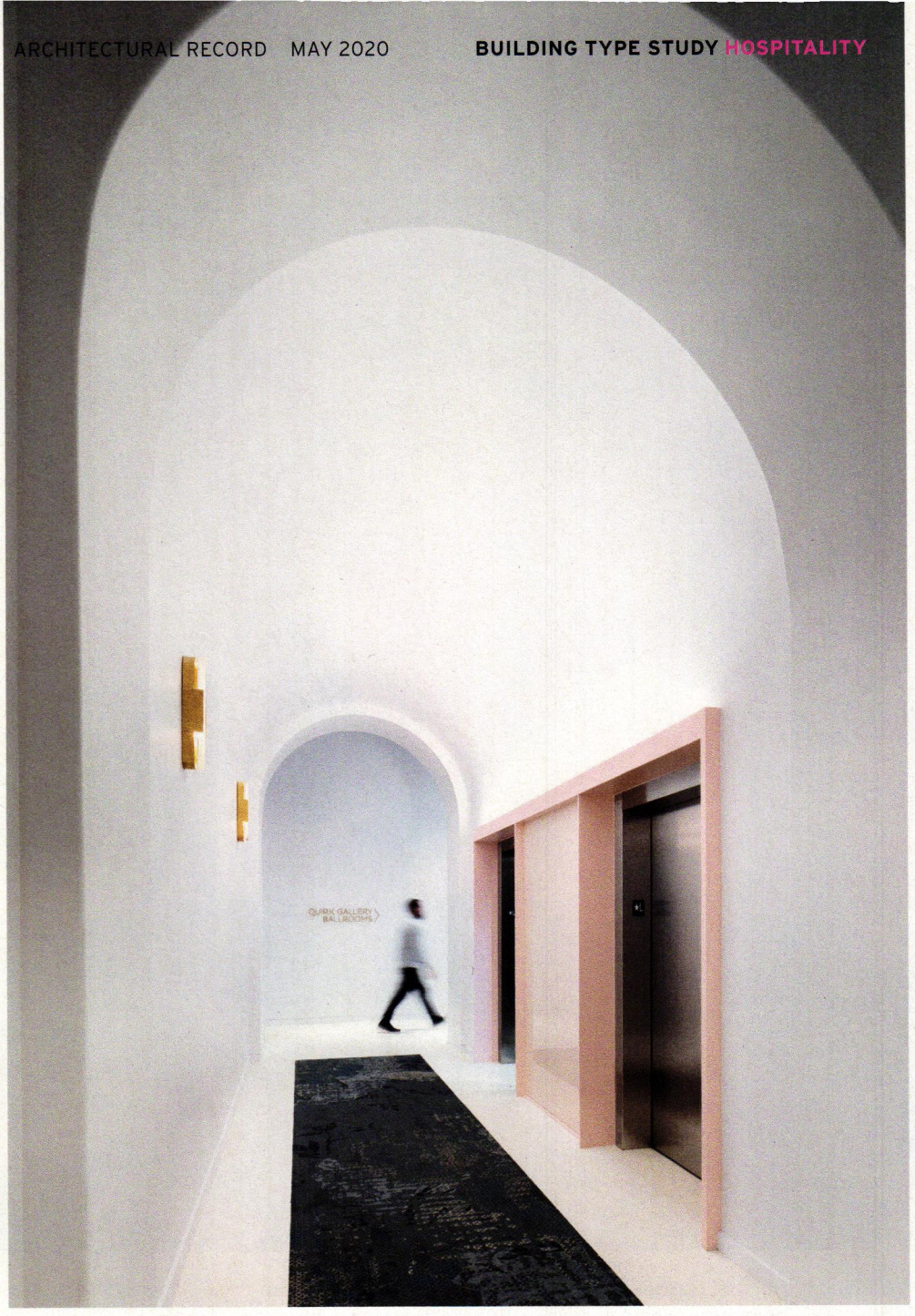
Set back slightly from the historic houses immediately adjacent to it, the long lobby and reception area—"a living room for the city," according to Danny MacNelly, partner at ArchitectureFirm, the hotel's designer—serves as a bright and cheery procession leading to the other public spaces: a restaurant and ballrooms to the left and, straight ahead, a bar, lounge, and gift shop. The building extends through the entire block, which descends to the north, where a lower-level art gallery, accessed by stairs coming down from the shop, opens onto Commerce Street on the opposite side.

The art gallery was not an afterthought. Indeed, art was the driving force behind this hotel, and its precursor, the first Quirk Hotel, in downtown Richmond, about an hour away, which opened in 2015. Katie Ukrop, who owns the small chain with her husband and a group of investors, is director of Richmond's Quirk Gallery, namesake of the boutique lodging. Says Ukrop, "This new space really allows the art to sing."

The Richmond- and Brooklyn-based ArchitectureFirm worked with the Ukrops on the first Quirk, renovating a 1916 Renaissance-style former department store. "It was less challenging to build from the ground up," says Katie of the Charlottesville branch. "We were able to create the spaces that we needed without being limited by the confines of a historic building."

A signature element of the new building, however, was inspired by its sister hotel's historic structure. A series of striking split arches caps the 15-foot-high tube-like volume that stretches from the entrance to the rear facade, "a distillation," says MacNelly, of the groin-vaulted ceiling of the 1916 Richmond building. "It was a way,

WARM WELCOME
Entering through the hotel's tall white-brick facade (opposite), visitors find a long lobby and reception space marked by a series of arches (above).





SOUTHERN COMFORT Arches dominate the public spaces, from the bar (opposite, top) to the gift shop just past the lounge (opposite, bottom left) to the elevator lobby (left). Like the gallery (opposite, bottom right), the hotel's rooms are punctuated by colorful works of art, which include the headboards (bottom).

architecturally, of keeping the brand identity with the move."

The arches also serve as wayfinding—as you proceed down the arcade, gaps between the curving forms mark hallways that lead to other areas—the restaurant and restrooms, for instance. While some arches conceal structural columns or plumbing, many are simply framed-out drywall, all skimmed in plaster.

And, while this time around the architects had more freedom designing a new building rather than restoring an old one, there was the matter of the two 19th-century houses just next door—one, from 1824, known as Paxton Place, is listed on the National Register of Historic Places. Those had to be maintained while becoming part of the hotel.

Though Charlottesville is known as a college town—the University of Virginia's Jeffersonian campus is within walking distance—it is also a popular destination for weddings, and the hotel plans to take advantage of that fact with a variety of amenities including two large ballrooms and overflow event space outdoors. The 1824 structure contained a beauty salon, which made sense to keep as a service for visiting wedding parties. The other small house was converted into a two-story café and whiskey lounge.

Within the new building, public spaces are elegantly furnished. Pink is the color of choice, another carryover of the Richmond outpost. Bathroom walls, much of the seating, and a good deal of the art on display for the opening exhibition have a rosy hue. The restaurant, where colors skew to a blue and gold palette, offers fine dining inside, and café seating in the adjacent courtyard, visible from the dining room through floor-to-ceiling glazing. That outdoor space between the historic houses and the rear of the hotel can be accessed from the sidewalk. "We wanted to make the restaurant feel like part of the city," says project manager Mitch Crowder.

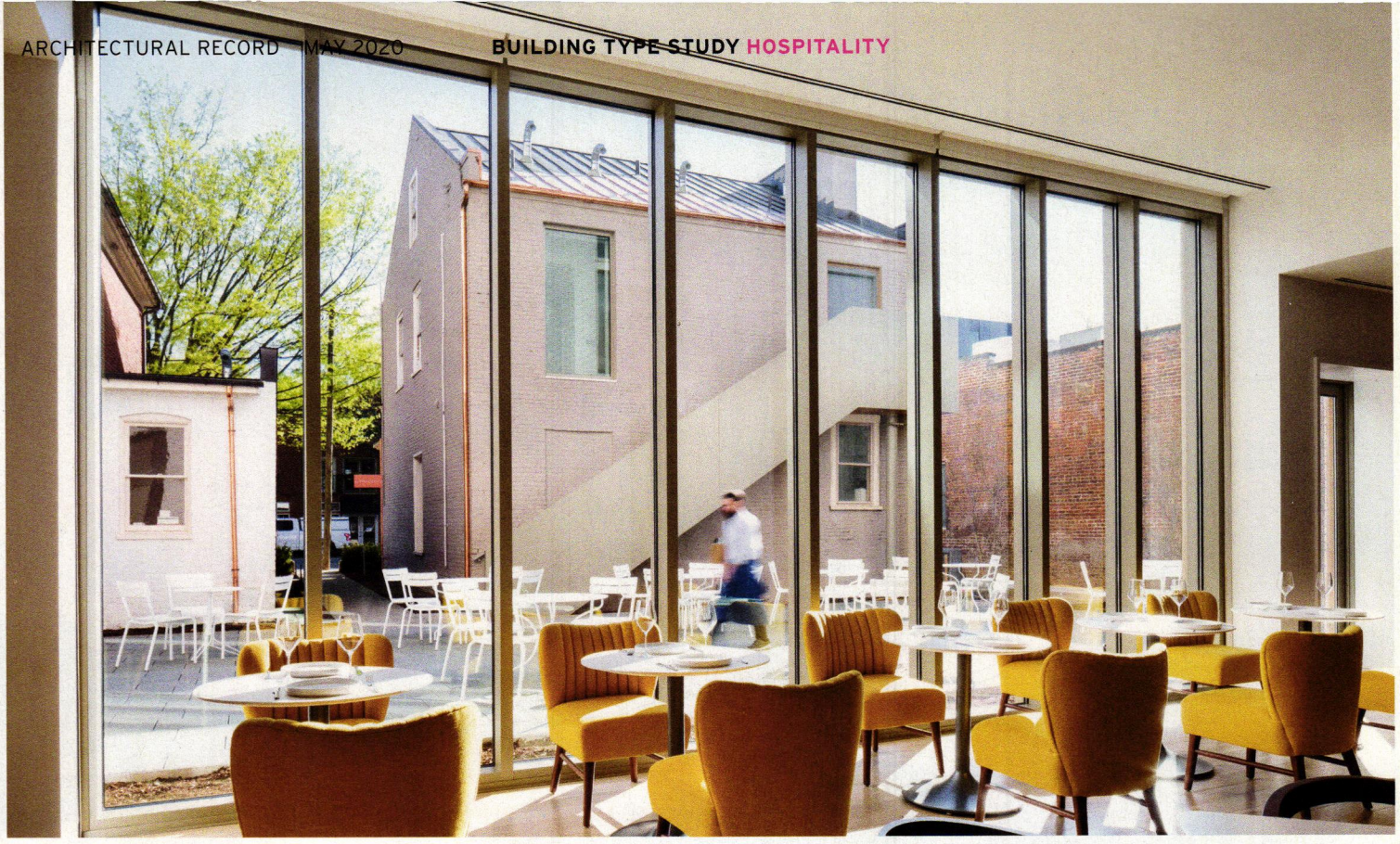
The interiors are meant to be a neutral backdrop for art. Guest rooms are simple, with the exception of one distinct feature: custom headboards are reproductions printed on canvas of Richmond artist Kiki Slaughter's drip paintings.

The rooftop bar, a wildly popular feature

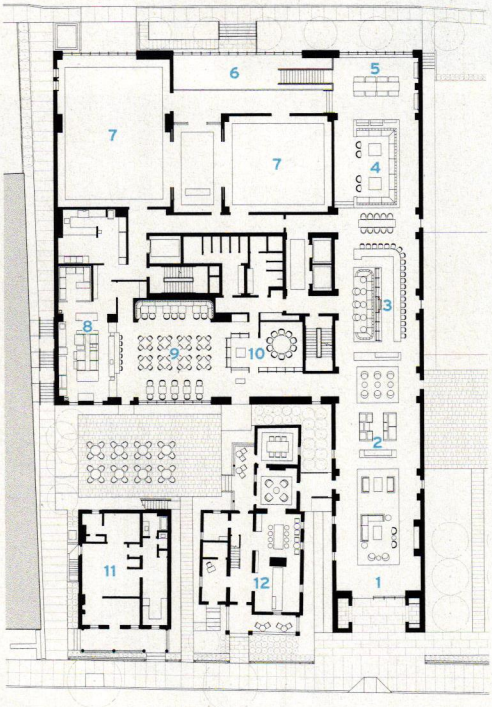




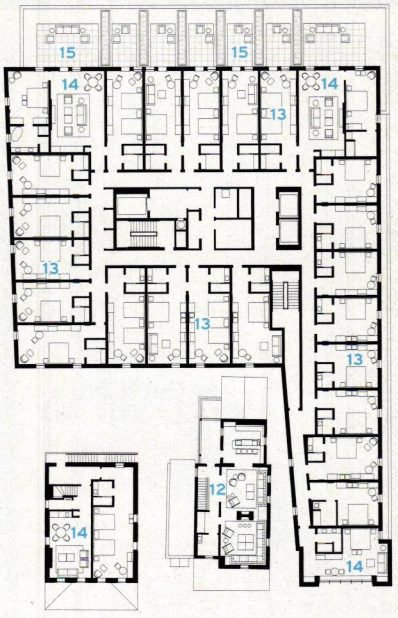




DINING IN The restaurant has expansive views to the courtyard, set between the new building and existing houses.



GROUND-FLOOR PLAN



SECOND/TYPICAL FLOOR PLAN

1 LOBBY
2 RECEPTION
3 BAR
4 LOUNGE
5 GIFT SHOP
6 ART GALLERY (BELOW)
7 BALLROOM
8 KITCHEN
9 RESTAURANT
10 PRIVATE DINING
11 SALON
12 CAFÉ AND WHISKEY LOUNGE
13 GUEST ROOM
14 SUITE
15 TERRACE

of the Richmond hotel, was not yet completed during a recent visit in Charlottesville—just days after the new hotel's opening celebration in early March, and days before it would be forced to close, like most other nonessential businesses across the country, due to the coronavirus. Despite an inauspicious beginning, the Quirk Hotel Charlottesville is poised to be a hot spot, just like its predecessor. ■

credits

ARCHITECT: ArchitectureFirm – Danny MacNelly, partner in charge; Mitch Crowder, project manager; Patrick Gegen, interior designer; Katherine Treppendahl, project architect; Adam Ruffin, Katie MacNelly, partners

ENGINEERS: Dunlap & Partners (m/e/p); Engineering Solutions (structural); Timmons Group (civil)

GENERAL CONTRACTOR: Martin Horn

CLIENT: Quirk Charlottesville, LLC

SIZE: 82,700 square feet

COST: $30 million (total); $22 million (construction)

COMPLETION DATE: February 2020

SOURCES

BRICK: Belden Brick

WINDOWS AND DOORS: Kawneer

GLAZING: Vitro Architectural Glass

CUSTOM MILLWORK: Vangarde Woodworks

HARDWARE: Assa Abloy

CARPET: ShawContract (guest room floors); Brintons

ELEVATORS: Schindler

FURNITURE: Lily Jack, Andreu World, Thos. Moser, Stolab, Gubi, Muuto, BluDot, Mamagreen, Fermob

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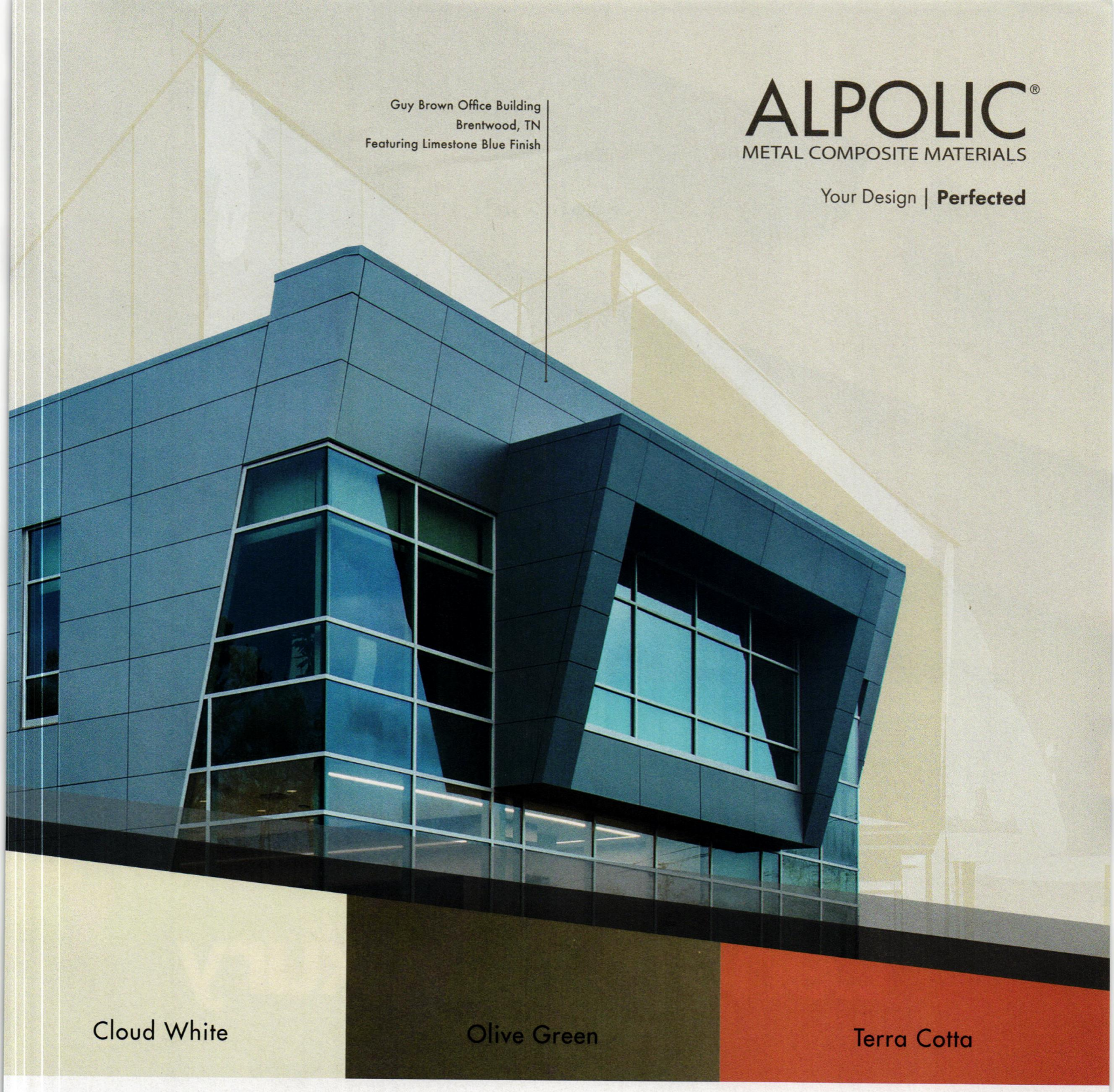
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Santiago, Chile

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Vladimir Radutny Architects
Chicago

Christoph Hesse Architekten
Korbach/Berlin, Germany

N H D M Architects
New York

Young Projects
New York

Space Popular
London

WORD
Los Angeles

McLeod Kredell Architects
Middlebury, Vermont

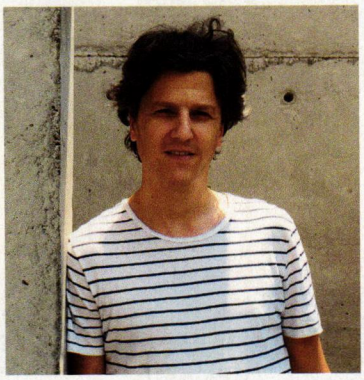
O Studio Architects
Hong Kong

PHOTOGRAPHY: © ROLAND HALBE

HOUSE IN MATANZAS BY CRISTIÁN IZQUIERDO

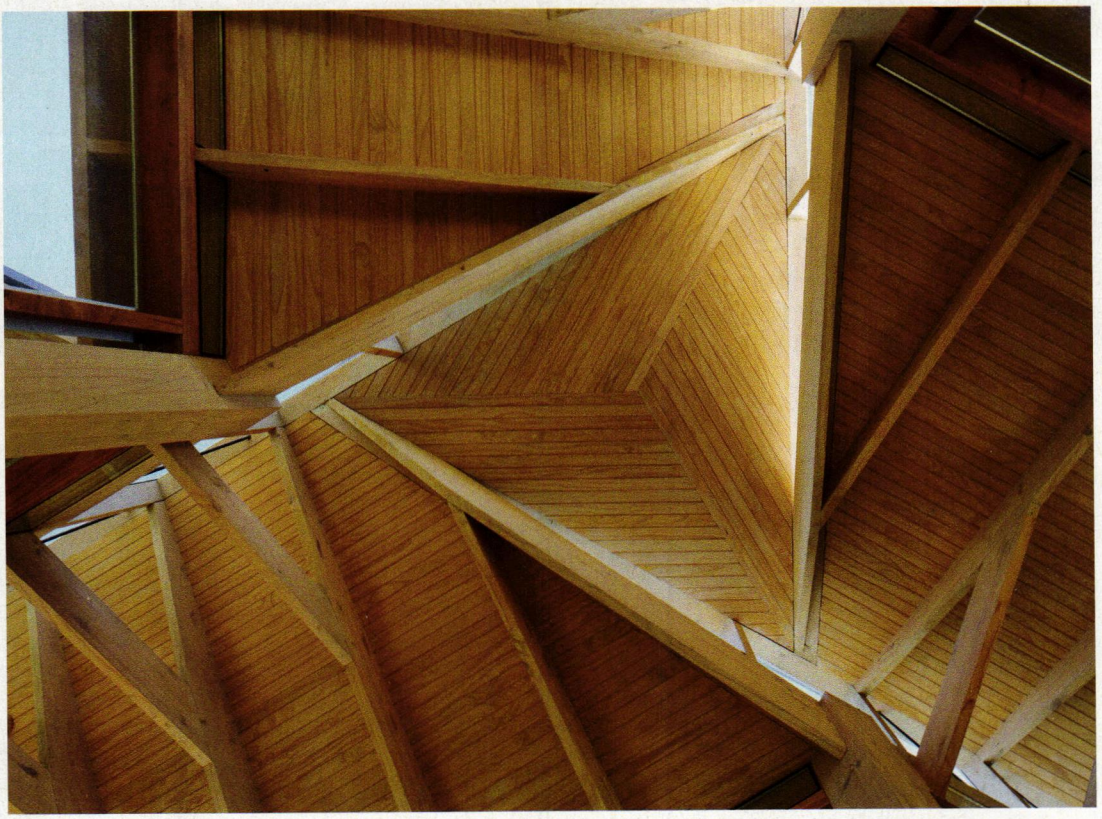
Cristián Izquierdo

SANTIAGO, CHILE



FOUNDED: 2012
DESIGN STAFF: 4–6
PRINCIPAL: Cristián Izquierdo
EDUCATION: Columbia University, MSc Advanced Architectural Design, 2014; Pontificia Universidad Católica de Chile, Architecture degree, 2008
WORK HISTORY: Izquierdo Lehmann, 2010–12
KEY COMPLETED PROJECTS: Housing complex in Alcántara St., 2019; House in Matanzas, 2018; House in Chicureo II, 2018; House in El Peumo, 2017; House in Morrillos, 2016; House in Futrono, 2014 (all in Chile)
KEY CURRENT PROJECTS: 21 rowhouses in Lo Recabarren, House in Chicureo II, five rowhouses in San Crescente (all in Chile)
cristianizquierdo.cl

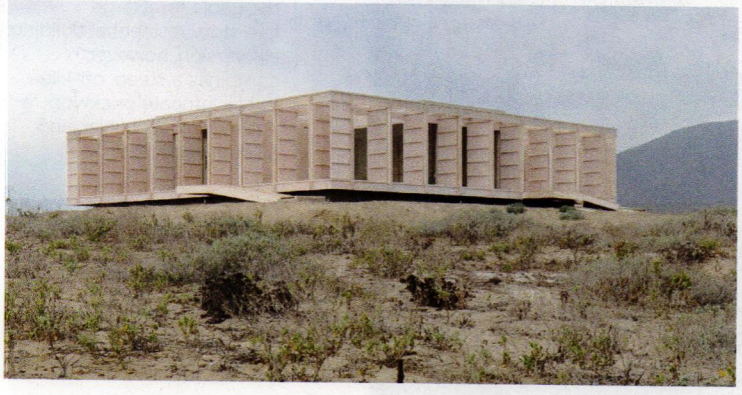
Chilean architect Cristián Izquierdo was reluctant to get into the family business—both parents are architects, while several uncles and his brother are in construction—but in the last decade, he has embraced the profession, creating a series of stunning private residences and larger housing complexes. "We have tried to develop projects conceived as pavilions, constructions governed by an autonomous system of relations based on culturally shared ideas. We are interested in mediating the gap between the eloquence of its rules and the uncertainty of its interpretation."

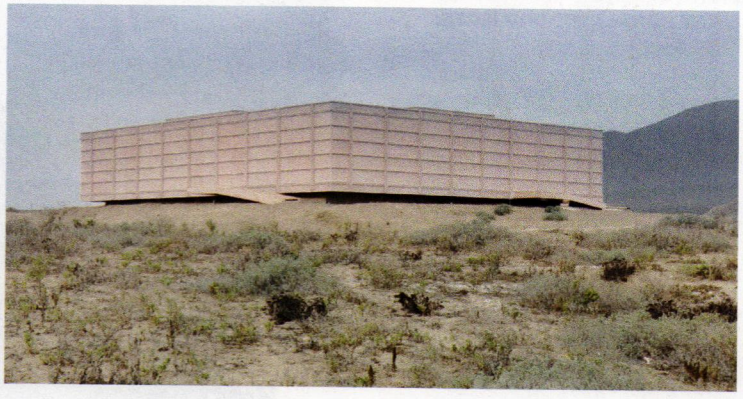


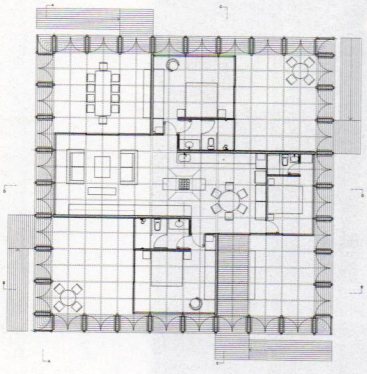
HOUSE IN CHICUREO II
Each of the three rectangular wings of this house, located in a suburb of Santiago, is arranged around a central equilateral triangle. "The symmetry of the form is something that comes at the end of the process, where you already know the relationships you are looking for in the project," says the architect. "It's a way of emphasizing the relationship [between rooms] and making them visible rather than starting from there." The rooms in the 2,000-square-foot abode are configured under a gabled ceiling of laminated pinewood.

PHOTOGRAPHY: COURTESY CRISTIÁN IZQUIERDO (TOP, LEFT); © ROLAND HALBE (LEFT; OPPOSITE, TOP); TOMÁS RODRÍGUEZ (OPPOSITE, MIDDLE 2)









HOUSE IN MATANZAS

Most of the architect's commissions have been similar in program and size, so, in a way, the design solution has repeated, he says. He starts with a central interior and mediates between the core and its surroundings, as seen in this 1,900-square-foot vacation home (top). "I try to foster compact solutions and usually avoid corridors," he says, citing the need to encourage families to inhabit the same spaces, despite having tranquil private bedrooms. In this house, a central wooden pavilion on a circular base splays outward to four areas, all with separate exterior courtyards and sweeping views.

HOUSE IN MORILLOS

The remote vacation villa (above) was one of the first commissions Izquierdo received after founding his practice. "I drew almost every detail," he recalls. "I even participated in the construction process." Four rooms, one in each corner of the square house, come together in a shared central kitchen. Each room is connected to an equivalent-sized courtyard, both covered by a common beamed ceiling. The exterior is enclosed in 72 wood doors, which open outward.

AtelierJun

GYEONGGI-DO, KOREA



FOUNDED: 2013
DESIGN STAFF: 2–4
PRINCIPAL: Junsang You
EDUCATION: Harvard Graduate School of Design, M.Arch., 2010; Korea University, B.Engineering, 2006
WORK HISTORY: Skidmore Owings & Merrill (SOM), 2010–12; BIG, 2009
KEY COMPLETED PROJECTS: Boulder House, 2019; Five Masses, 2019; Gable House, 2015; Bracing House, 2015 (all in Seoul)
KEY CURRENT PROJECTS: Former South Korean President Kim Dae-jung's private-residence renovation, Seoul; R House, Seongnam-si; Mutronics research facility, Anseong-si (all in Korea)
a-jun.net

As design and construction have progressed to a point of seemingly overcoming gravity, Junsang You believes more than ever in the honesty of materials. For this South Korean native, designing and building within the country's dense cities, architecture becomes the process of making what looks light lighter and what looks heavy heavier. A design for an invisible folly appears simply, but quite incredibly, as dripping paint, while the construction of his many housing projects reveals the true nature of their everyday building materials—brick, concrete, and stone.



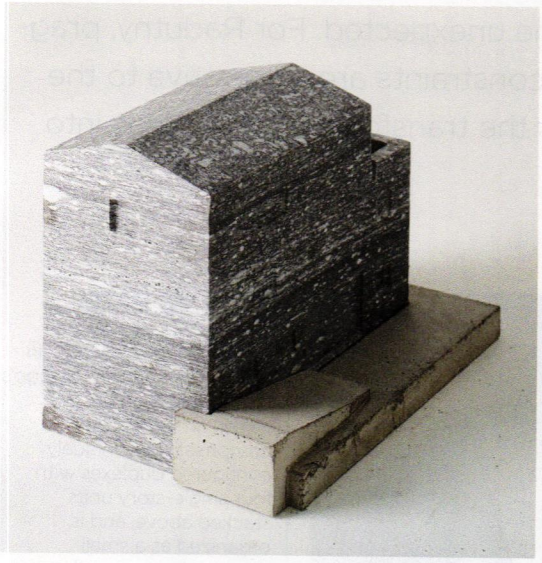
THE GABLE HOUSE

For this project, the architect adapts a style which he says has suddenly become very popular in small-scale housing in Korea, interpreting the gable for a large five-story residential building. His version, however, combines a steep, off-kilter gable, intricate brickwork, a street-level cantilever, and a prominent metal roof.

PHOTOGRAPHY: © ATELIERJUN (TOP); NAMGOONG SUN (BOTTOM AND OPPOSITE)

THE BOULDER HOUSE

For this single-family residence, the client wanted a building that felt heavy and solid, like a boulder. The cladding is a quartzite called Alps Snow, which has a soft and uniform horizontal layering (as seen in the 1:40 model of the house made from the stone, inset below). From a distance, the construction joints of the individual blocks disappear into the overall pattern, making the completed four-story building appear as a single mass. Wood vertical louvers over windows and doors were custom designed to conceal all hardware. Downspouts, gutters, security sensors, and other typical exterior trappings are also hidden.





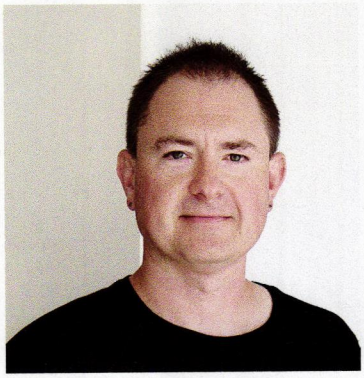


THE FIVE MASSES

As with the Gable House, AtelierJun was working within strict zoning codes to maximize buildable area in this structure. Here, the firm chose to create five cuboid forms, irregularly arranged on the tight lot, that culminate in terraces with unobstructed views to a nearby park. Living rooms and bedrooms occupy rectangular spaces, while kitchens and bathrooms are located in the residual triangular and trapezoidal areas, maximizing interior efficiency. Bright, uniform brick was selected to emphasize the shadows created by the splayed forms.

Vladimir Radutny Architects

CHICAGO



Born in Ukraine, Vladimir Radutny has called Chicago home for over 30 years. His practice focuses on innovative design solutions that challenge the conventional interpretations of space, function, and material use. The work exemplifies a cohesion of spatial logic and consideration of light as a foundation in crafting the unexpected. For Radutny, pragmatic requirements and budgetary constraints are imperative to the overall design equation that enables the transformation of ideas into built work.

FOUNDED: 2014

DESIGN STAFF: 3

PRINCIPAL: Vladimir Radutny

EDUCATION: University of Illinois School of Architecture, M.Arch., 2002 and B.Arch., 2000

WORK HISTORY: SIDE Architecture, 2008–14; Krueck + Sexton Architects, 2006–08; Perkins + Will, 2003–06; Boyarsky Murphy Architects, 2002–03; Murphy/Jahn Architects, 2002

KEY COMPLETED PROJECTS: Unit 2808, 2019; 2016 W. Rice, 2019; Michigan Loft, 2018; Unit 3E, 2014; RDG Offices, 2014 (all in Chicago)

KEY CURRENT PROJECTS: 999 Lake Shore Drive; Unit 8408; R-Home (all in Chicago)

radutny.com



2016 W. RICE

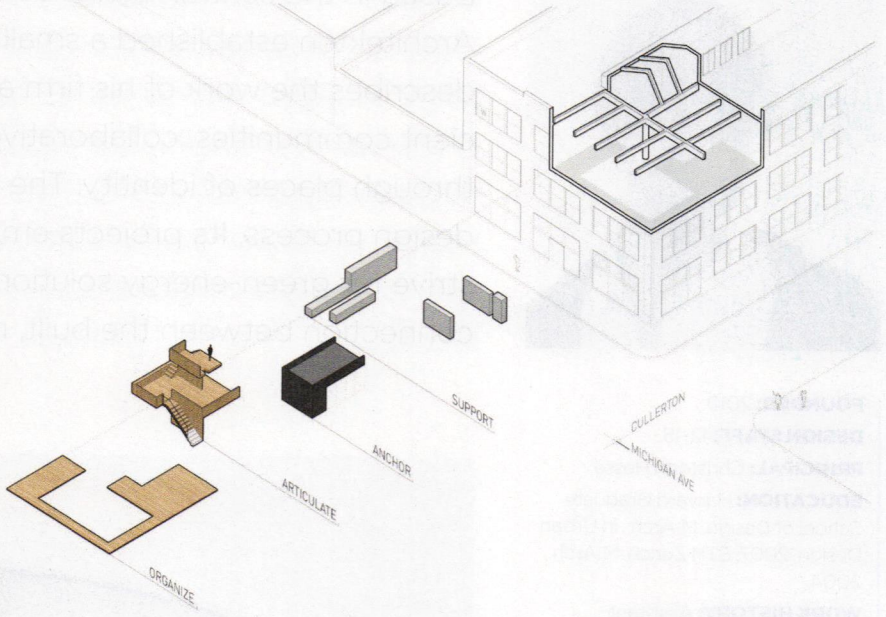
This 14,000-square-foot condominium is located in the heart of one of Chicago's oldest neighborhoods, Ukrainian Village. It comprises four uniquely configured duplexes with four single-story units stacked above, and is organized as a small community wrapped in one contiguous corrugated metal skin (selected for its reflective qualities). Two large cubic voids define terraces at the second floor, where the articulated steel balconies and stairs are nested, echoing Chicago's famous fire escapes.

PHOTOGRAPHY: © MIKE SCHWARTZ (EXCEPT AS NOTED); J.C. BUCK (BOTTOM)



MICHIGAN LOFT

Inside a century-old structure originally built for automotive assembly and display, Radutny renovated a residence that was poorly functioning as a domestic space, crafting an evocative living environment within an impressive 2,250-square-foot volume. Scaled architectural components, material restraint, and theatrical lighting throughout lessens the immensity while maintaining openness and clarity of space.





UNIT 2808

This 28th-floor dwelling was renovated for a couple who wanted an urban sanctuary as their second home. All plaster walls were removed and the space reconfigured to create vantage points that did not previously exist in the south-facing unit with views to the Chicago skyline. Black floating lines organize the primary living space and become thinner as they elevate vertically above the floor plane. Walls and custom built-ins are simply read as planes and surfaces that encompass the domestic space.

Christoph Hesse Architekten

KORBACH/BERLIN, GERMANY



Based in the central highlands of Germany since 2010, Christoph Hesse Architekten established a small branch office in Berlin in 2018. Hesse describes the work of his firm as creating local networks of self-sufficient communities, collaborative urban developments, and connectivity through places of identity. The studio actively involves users in the design process. Its projects employ natural and recycled materials and strive for green-energy solutions, with an aim to help to reestablish the connection between the built, natural, and social environment.

FOUNDED: 2010

DESIGN STAFF: 12–15

PRINCIPAL: Christoph Hesse

EDUCATION: Harvard Graduate School of Design, M.Arch., in Urban Design, 2007; ETH Zurich, M.Arch., 2004

WORK HISTORY: Assistant Professor at the Department of Architecture, Technical University of Darmstadt, 2008–13; David Chipperfield Architects, 2000–01

KEY COMPLETED PROJECTS: Straw Therme Pavilion, 2019; Villa F, 2016; Vitos, 2016 (all in Germany)

KEY CURRENT PROJECTS: Visitor Center with museum at Lake Edersee; Seelenorte (Places of Soul), Sauerland (both in Germany)

christophhesse.eu



VILLA F

This 2,150-square-foot self-sufficient office and residential complex, in the small village of Titmaringhausen, was designed to inspire the community to take advantage of the ecologist-and-inventor client's adjacent biogas plant—which treats farm waste by capturing harmful methane gas and using it as fuel. After completing the brick and stone building, an ecofriendly energy network was built in a bottom-up approach by locals. According to the architect, the energy costs of the community dropped by more than half, and the CO_2 emissions by 100 percent.

PHOTOGRAPHY: © TSCHINKERSTEN FOTOGRAFIE (TOP AND OPPOSITE, BOTTOM); CHRISTOPH HESSE (BOTTOM AND OPPOSITE, TOP RIGHT); THOMAS BARON (OPPOSITE, TOP LEFT)





STRAW THERME PAVILION

Made of straw bales and recycled coffee bags, the temporary pavilion celebrated the 750th anniversary of the village of Referinghausen, Hesse's hometown, in May 2019, and its independence from the global energy market. The straw metaphorically represents the biomass. The steel basin with hot water in the interior symbolizes the energy produced out of this biomass.

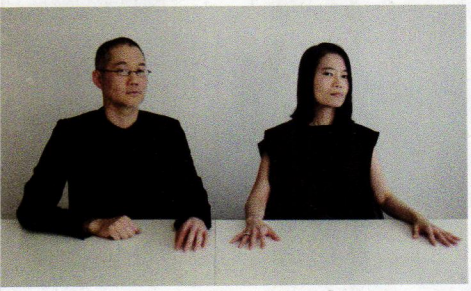


VITOS

What began as a design solely for a large parking structure developed—with a little convincing from the architect—into an outpatient psychiatric clinic. Located in Korbach, where the firm is based, VITOS offers therapy space for traumatized refugee children coming from Syria and other conflict regions in the Middle East.

N H D M Architects

NEW YORK



FOUNDED: 2011

DESIGN STAFF: 5–7

PRINCIPALS: Nahyun Hwang and David Eugin Moon

EDUCATION: *Hwang:* Harvard Graduate School of Design, M.Arch., 2001; Yonsei University, B.S. in Architecture, 1996.
Moon: Harvard Graduate School of Design, M.Arch., 2001; University of Michigan, B.S. in Architecture, 1998

WORK HISTORY: *Hwang:* James Corner Field Operations, 2004–10; Stan Allen Architect, 2003–04; Herzog & de Meuron, 2002–03; OMA, 2002.
Moon: OMA, 2005–09; 1100 Architect, 2005; Shigeru Ban Architects, 2002

KEY COMPLETED PROJECTS: Interim Urbanism: Youth Dwelling City, New York, 2019; Whole Hearts, New York, 2018; Open Ground + NJP Flux Room, Nam June Paik Art Center, Yong-In, Korea, 2017; Chevy-in-the-Hole, Flint, MI, 2013; Nam June Paik Library, Yong-In, Korea, 2011

KEY CURRENT PROJECTS: Now You Belong Here, Venice; Museum of C, New York; Wolgok Youth Platform, Seoul

nhdm.net

Partners in life and in work, Nahyun Hwang and David Moon believe in the agency of architecture to address today's complex social, political, cultural, and environmental challenges. For them, the realities of contemporary cities serve not only as subjects of investigation, but as inspiration and a fertile testing ground for experimentation and transformation. Working between the borders of architecture and other disciplines, at vastly varying scales, their New York–based office engages diverse modes of practice, in many cases involving the public in different forms as a critical collaborator.

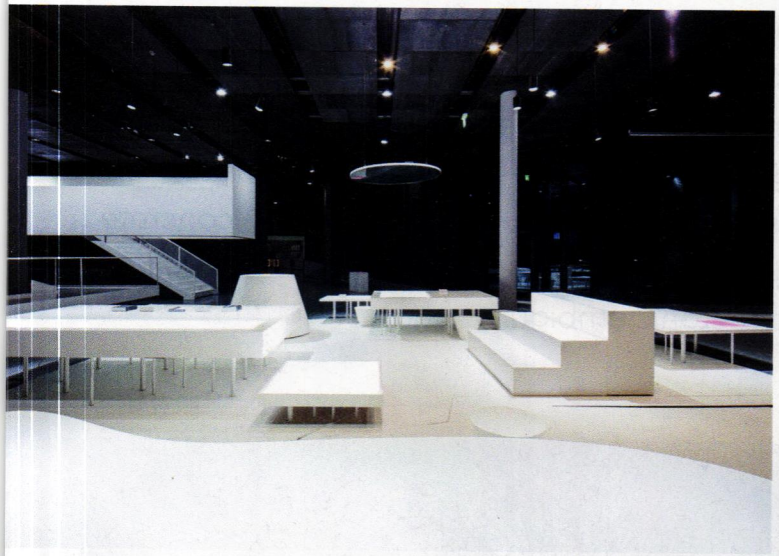


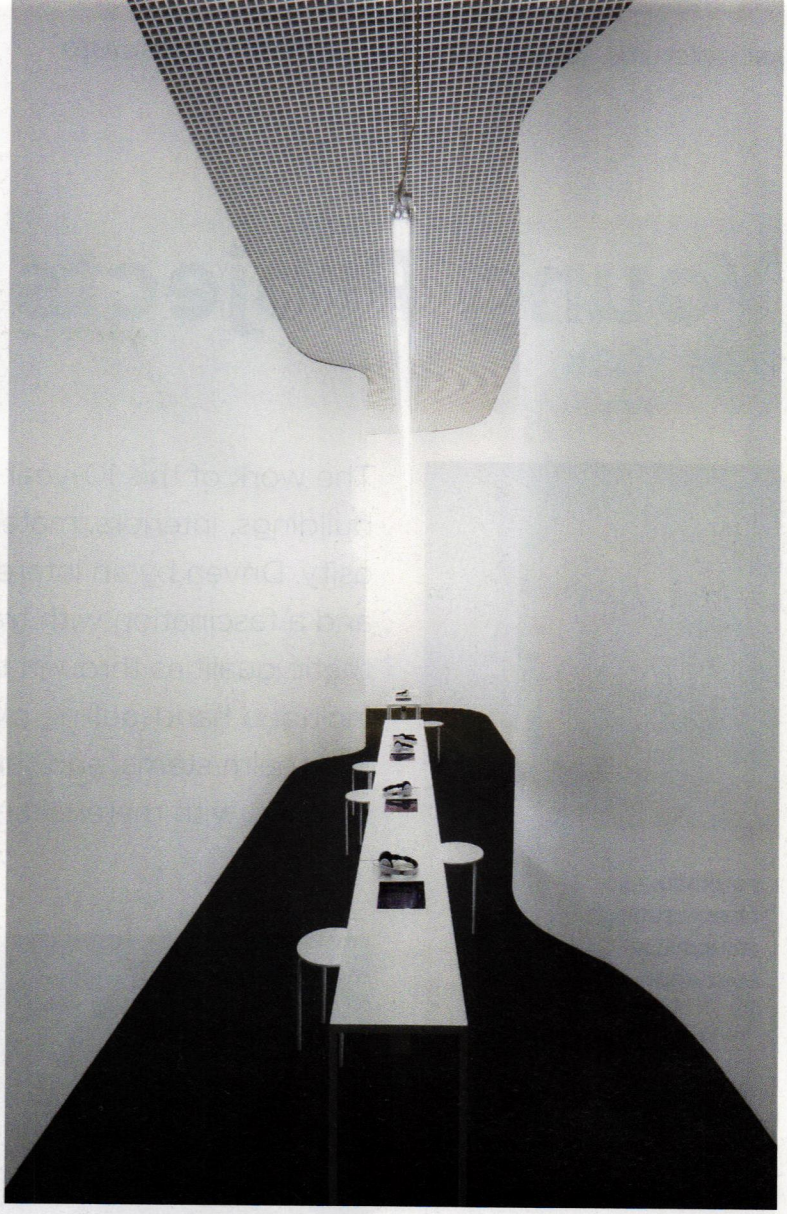
NAM JUNE PAIK LIBRARY
Inspired by artist Nam June Paik's artistic processes and his concept of "Random Access," N H D M designed a multifunctional spatial device and its context, which redefine the relationship between library users and information in this public art library in the Nam June Paik Art Center in Yong-In, a rapidly growing satellite of Seoul. The central structure "Library Machine" actively deploys the architectural and programmatic strategies typical of Paik's interior artificial landscapes.

PHOTOGRAPHY: © N H D M (TOP AND OPPOSITE, BOTTOM); NAM JUNE PAIK ART CENTER (BOTTOM AND OPPOSITE, TOP 2)

OPEN GROUND/FLUX NJP PLAYROOM

Also within the Nam June Paik Art Center in Yong-In, but completed several years after the library, this renovation project reconfigures 12,000 square feet of the existing museum and provides the public with new ways to interpret, linger, exchange, and inhabit the institution. Open Ground (below), the new entry floor of the museum, is designed around three large-scale programmatic zones. Flux NJP Playroom (right), on the second floor, is a space for user-guided self-learning and exploration with media-integrated custom furnishing.







WOLGOK YOUTH PLATFORM

Despite Korea's strong economy, almost a quarter of its population between the ages of 20 and 34 lives in informal, makeshift, and often below-standard homes. This ambitious venture, initiated by Habitat for Humanity Korea and a division of Seoul's local government, is an experimental co-living project that combines homes for low-income youths, job-training and start-up business platforms, and public spaces, including a branch library and a park. The project explores the notion of openness and sharing in collective-housing typologies while preserving individuality and intimacy and maintaining connections to the multiple scales and operations of the city.

Young Projects

NEW YORK



The work of this 10-year-old practice, founded by Bryan Young, spans buildings, interiors, material prototyping, furniture, and objects of curiosity. Driven by an interest in pattern, texture, and spatial complexity, and a fascination with transformation, its designers explore new aesthetic qualities through trials of material formation. The research has included hand-pulling plaster with an irregular knife, forming concrete with palm stems, and thinning onyx to varied transparencies, resulting in forms with material and tectonic ambiguity.

FOUNDED: 2010

DESIGN STAFF: 10

PRINCIPAL: Bryan Young

EDUCATION: Harvard Graduate School of Design, M.Arch., 2003; University of California at Berkeley, B.A., 1997

WORK HISTORY: Allied Works Architecture, 2005–10; Architecture Research Office (ARO), 2003–05; Skidmore Owings & Merrill (SOM), 2000–02 (intermittent); Peter Pfau/Jane Cee Collaborative, 1998–99

KEY COMPLETED PROJECTS: Pulled Plaster Loft, New York, 2016; Wythe Corner Townhouse, Brooklyn, 2016; Match-Maker, New York, 2014

KEY CURRENT PROJECTS: The Retreat House, Glitch House, Guest House, Rock House, Yoga Pavilion, all in Playa Grande, Dominican Republic; Six Square House, Bridgehampton, NY; Wells Center, Amagansett, NY

young-projects.com



SIX SQUARE HOUSE
This 3,500-square-foot house in Bridgehampton, New York, is made up of six 24-foot by 24-foot gable-roofed modules that connect through curving roof ridges. The kitchen and living spaces are linked to one another around a large central courtyard, emphasizing the flow of the continuous ruled ceiling geometry. Bedrooms feature framed views of the two-acre site's mature trees.

PHOTOGRAPHY: © YOUNG PROJECTS

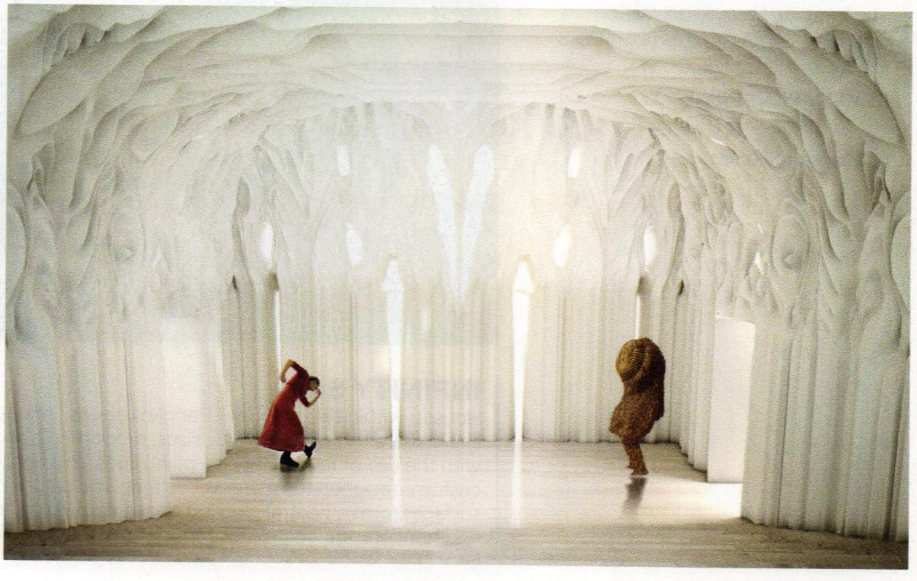


GLITCH HOUSE

One of five very different structures that make up a wellness retreat spread out over six acres of tropical forest at Playa Grande in the Dominican Republic, all designed by Young Projects, Glitch House is composed of over 10,000 handmade encaustic cement tiles. The graphic on the tiles overlaps with the shadows cast from the staggered CMU geometry of the walls. What from afar may appear as a blur of color comes into focus as a bold, responsive pattern within the lush landscape.

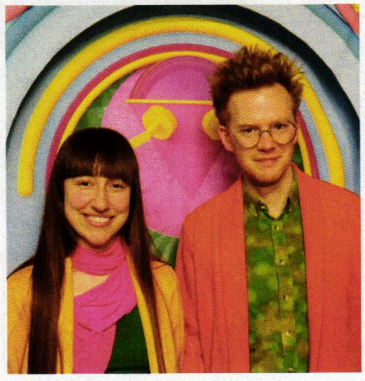
THE KITCHEN

A finalist in a 2017 competition to renovate and expand the offices, galleries, and performance spaces of the Kitchen, a multidisciplinary arts nonprofit in New York, Young Projects proposed an extension on the roof. The new theater there challenges the notion of a minimalist black box for a performance environment. The ornate plasterwork creates an evocative space that functions well acoustically by selectively absorbing and diffusing sound.



Space Popular

LONDON



FOUNDED: 2013

DESIGN STAFF: 2

PRINCIPALS: Fredrik Hellberg and Lara Lesmes

EDUCATION: *Hellberg:* Architectural Association School of Architecture, Diploma (Hons) 2011. *Lesmes:* Architectural Association School of Architecture, Diploma 2011

WORK HISTORY: *Hellberg:* Sauerbruch Hutton, 2008–09; Stephane Paumier Architects, New Delhi, 2009.
Lesmes: Selgascano, 2005–07.

KEY COMPLETED PROJECTS: Freestyle, London, 2020; Brick Vault House, Valencia, Spain, 2019; Gate of Bright Lights, Seoul, 2019; The Wardian Case, Milan, 2019; Value in the Virtual, Stockholm, 2018; Infinity Spa, Bangkok, 2016

KEY CURRENT PROJECT: Infinity Wellbeing, Bangkok

spacepopular.com

Space Popular is directed by Lara Lesmes and Fredrik Hellberg, both graduates of the Architectural Association in London, where they now teach. They founded the practice in Bangkok in 2013, and have been based in London since 2016. Space Popular creates spaces, objects, and events in both physical and virtual space, concentrating on how the two realms will blend together in the near future. The multidisciplinary studio has completed buildings, exhibitions, public artworks, furniture collections, and interiors across Asia and Europe, as well as virtual architecture in the Immersive Internet.



INFINITY SPA

Housed within two standard Bangkok shops, Infinity Spa is an exercise in object versus background. The concrete shells share the same layouts, sizes, proportions, and materials. The aim was to visually eliminate the concrete shell with the use of few materials—paint, light, and textiles—and to concentrate the attention on the nearly 20 custom-designed furniture pieces that would communicate purpose in an otherwise muted space where all the surfaces form a neutral glowing backdrop. What started as a technical environmental necessity—absolute light and temperature control for the spa treatments—became the driving experiential feature.

PHOTOGRAPHY: © EVA SOMMEREGGER (TOP); W WORKSPACE (BOTTOM); MARIELA APOLLONIO (OPPOSITE, TOP 2); DAVID GALASA (OPPOSITE, BOTTOM)



BRICK VAULT HOUSE

For this prototype house in Valencia, Spain, a thin steel frame superstructure, painted green, serves as a grid system that can be easily replicated or used in different configurations to suit various-sized plots and programs. Here, the grid is partially filled with white cubes that make up the open-plan living areas and the bedrooms, leaving a number of covered outdoor spaces. The shallow masonry arched ceilings are a version of a Catalan vault, popular in the region.





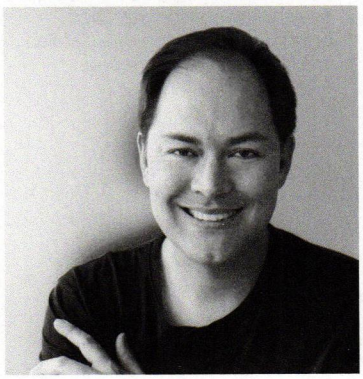
THE WARDIAN CASE

Part of the 2019 exhibition *DE/CODING*, the Wardian Case was displayed in the tapestry rooms at the Palazzo Reale in Milan. An early type of terrarium invented in 1829, these containers were used to transport rare plants between different continents and climates. Space Popular's Wardian Case was presented as a symbolic bearer of information and knowledge to be accessed through both physical and digital realms. Emphasized by contact with various textures of fabric and virtual-reality vision, the augmented dimensions of the room are unveiled, just like the narratives of its tapestries.



WORD

LOS ANGELES



FOUNDED: 2010
DESIGN STAFF: 2–4
PRINCIPAL: Chris Warren
EDUCATION: University of Pennsylvania Stuart Weitzman School of Design, M.Arch., 2000; University of Colorado Boulder, B.Envd., 1997
WORK HISTORY: Studio Shift, 2006–09; Morphosis Architects, 2000–06
KEY COMPLETED PROJECTS: Shoreheights Residence, Malibu, 2020; Flower Creative, Glendale, 2018; Little Ground Café, Glendale, 2016 (all in California)
KEY CURRENT PROJECTS: Hollywood Creative Office, Hollywood; Gould Residence, Los Angeles; LXS Creative Office, Los Angeles
word-architecture.com

Begun as Warren Office for Research and Design, the name has evolved to become simply WORD, as the term also represents the firm's approach to architecture. Just as words are a distinct element of speech, Warren considers architecture a fundamental piece of a more important whole and sees it as, even in small and incremental ways, positively affecting the greater context and society in general. While the work is not yet urban in scale, Warren is an indefatigable urbanist and endeavors to infuse his thinking into all of his projects, combining a love of light, space and social space, assembly, nature, and nuance.



LITTLE GROUND CAFÉ

Located in a district where workers drive into their fully serviced, closed campuses for 8–12 hours a day and seldom leave, this corner walk-up café is a study in texture, transparency, and materiality that aims to inspire and enhance the area's sparse pedestrian culture. Variability in the size, angle, color, and spacing of the cedar screen draws attention from passersby at all speeds, and offers differing degrees of shading and view mitigation. Concrete seating is contoured for comfort and follows an arc at the corner, allowing for seamless continuity and flow of materials.

IMAGES: © WORD (THIS PAGE AND OPPOSITE, TOP); SQUARE VOXEL (OPPOSITE, BOTTOM 2)



FLOWER CREATIVE OFFICE

Mandated to maintain the existing envelope of this 1930s storage shed, WORD created a bold facade as a counterpoint to the often heavy traffic of the street it sits on. The new exterior is composed of off-the-shelf standing-seam metal in two sizes, forming a subtle graphic band that "cuts" through two windows.

OPTICAL SHOP

Asked by a major optical brand to create a retail concept that would be able to represent multiple lines of eyewear in a singular space, WORD created a replicable design that can conform to various retail locations and store sizes. The first store, the client's U.S. flagship, will reside in a double-height space in Los Angeles.

BARILLA PAVILION

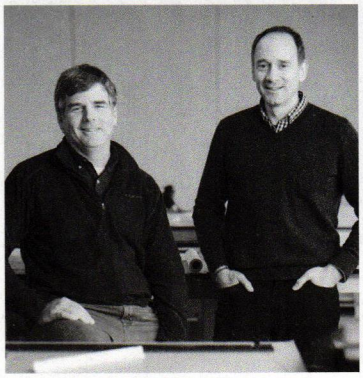
A 2018 competition entry for an exhibition space for pasta-maker Barilla, the design has an open-air community space as its core element—a singular composition made of undulating structural ribs that interact with the landscape and vary in their form to modulate natural light, employ sustainable strategies, and support myriad programs.





McLeod Kredell Architects

MIDDLEBURY, VERMONT



John McLeod and Stephen Kredell believe that design is more than aesthetics or technology: it is an approach to practice, and theirs is that anyone and anywhere deserves design. Through teaching, working with private clients, partnering with communities, and building alongside students and volunteers, they practice an architecture that gives back, and honors people and place. Projects range from modest, necessary structures such as chicken tractors or greenhouses for rural island communities, to net zero residences and academic buildings.

FOUNDED: 2011

DESIGN STAFF: 2–4

PRINCIPALS: John McLeod, Stephen Kredell

EDUCATION: *McLeod:* Virginia Tech, M.Arch., 1997; University of Virginia, B.A., 1991. *Kredell:* Virginia Tech, M.Arch., 1997; University of Pennsylvania, B.A., 1991

WORK HISTORY: *McLeod:* John McLeod Architect 2007–11; Rogers Marvel Architects, 1997-2004; Studio Architetto Hunziker, 1995. *Kredell:* Truex Cullins, 2005–11; Rogers Marvel Architects, 2003–05; John Ciardullo Associates, 1998–2003

KEY COMPLETED PROJECTS: Middlebury College Computer Science Building, Middlebury, VT, 2019; Foote Farm House, Cornwall, VT, 2013; Island Design Assembly community design/build projects, Maine, 2012–19

KEY CURRENT PROJECTS: Middlebury College Art & Architecture building renovation, Middlebury; Private Residence, Stowe; ongoing Habitat for Humanity housing design with Middlebury College architecture students (all in Vermont)

mcleodkredell.com



HABITAT FOR HUMANITY HOUSING

In their roles as studio professors at Middlebury College, the architects work with their students to design affordable houses with the local chapter of Habitat for Humanity. Each house is built to Vermont's highest performance standards for energy efficiency, thus minimizing the operating costs for the owners. For the first pair of houses, standing-seam metal on the roof and long walls, with local white cedar infill at the gable ends, reinforces the extruded form.

PHOTOGRAPHY: © PAUL DAHM (TOP); LINDSAY SELIN (BOTTOM); SUSAN TEARE (OPPOSITE TOP AND BOTTOM RIGHT); MCLEOD KREDELL ARCHITECTS (OPPOSITE BOTTOM LEFT)

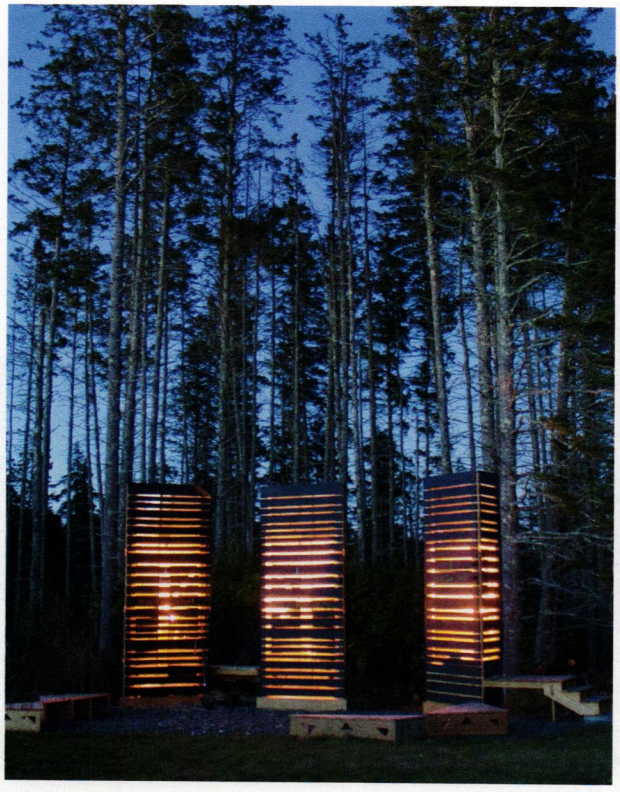


NATURE PRESERVE HOUSE

To test the belief that Vermont architecture can be both modern and of its place, this 1,500-square-foot house in Weybridge, Vermont, belonging to McLeod, sticks to the fundamentals of traditional rural New England houses: a base anchored in the landscape, a wood-skinned box resting on the base, an overall economy of form, and a central hearth. It also has a "poor man's green roof" made of hay bales from a nearby farm.

ALDER BROOK CABINS

These seasonal cabins with a shared bathhouse offer simple overnight accommodations and a place of retreat next to Alder Brook in the northern hardwood forest of the Green Mountains. This 250-square-foot horizontal version contains spaces with varying transparency and adjustable enclosure depending on weather.



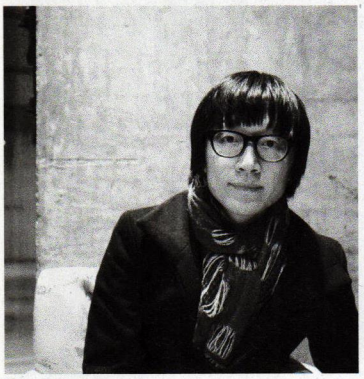
COMPOST TOWERS

Built for a school in North Haven Island, Maine, these slatted towers allow compost to aerate in place, without transfer. The towers, which are used as a teaching opportunity and also for storage of garden tools, are on axis with the approach drive and glow at night with solar powered lights.



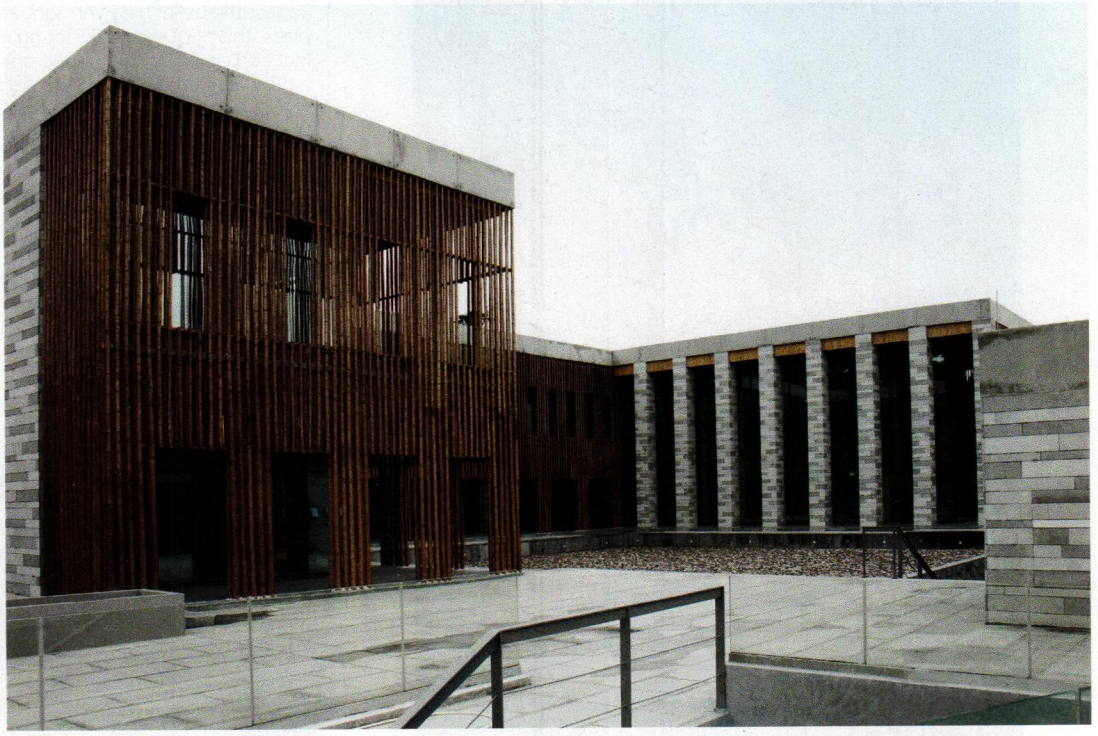
O Studio Architects

HONG KONG



FOUNDED: 2011
DESIGN STAFF: 3
PRINCIPAL: Fai Au
EDUCATION: Harvard Graduate School of Design, M.Des., 2011; Chinese University of Hong Kong, M.A. (Philosophy), 2008; Royal Melbourne Institute of Technology, B.Arch., 1999
WORK HISTORY: Rocco Design, 2010; OMA, 2009; ADARC, 2005–08; Aedas, 2005; P&T Group, 2002–05
KEY COMPLETED PROJECTS: Snowland Air Base, Zhangjiakou, 2020; Green Origin Ice Wine Pavilion, Zhangjiakou, 2019; National Proteome Science Center, Beijing, 2015; Church of Seed, Huizhou, 2011; Luofu Mountain Museum, Huizhou, 2011 (all in China)
KEY CURRENT PROJECTS: Snowland Cultural Center; Laurent Peak Hotel; Bailong Museum (all in Zhangjiakou, China)
ostudioarchitects.com

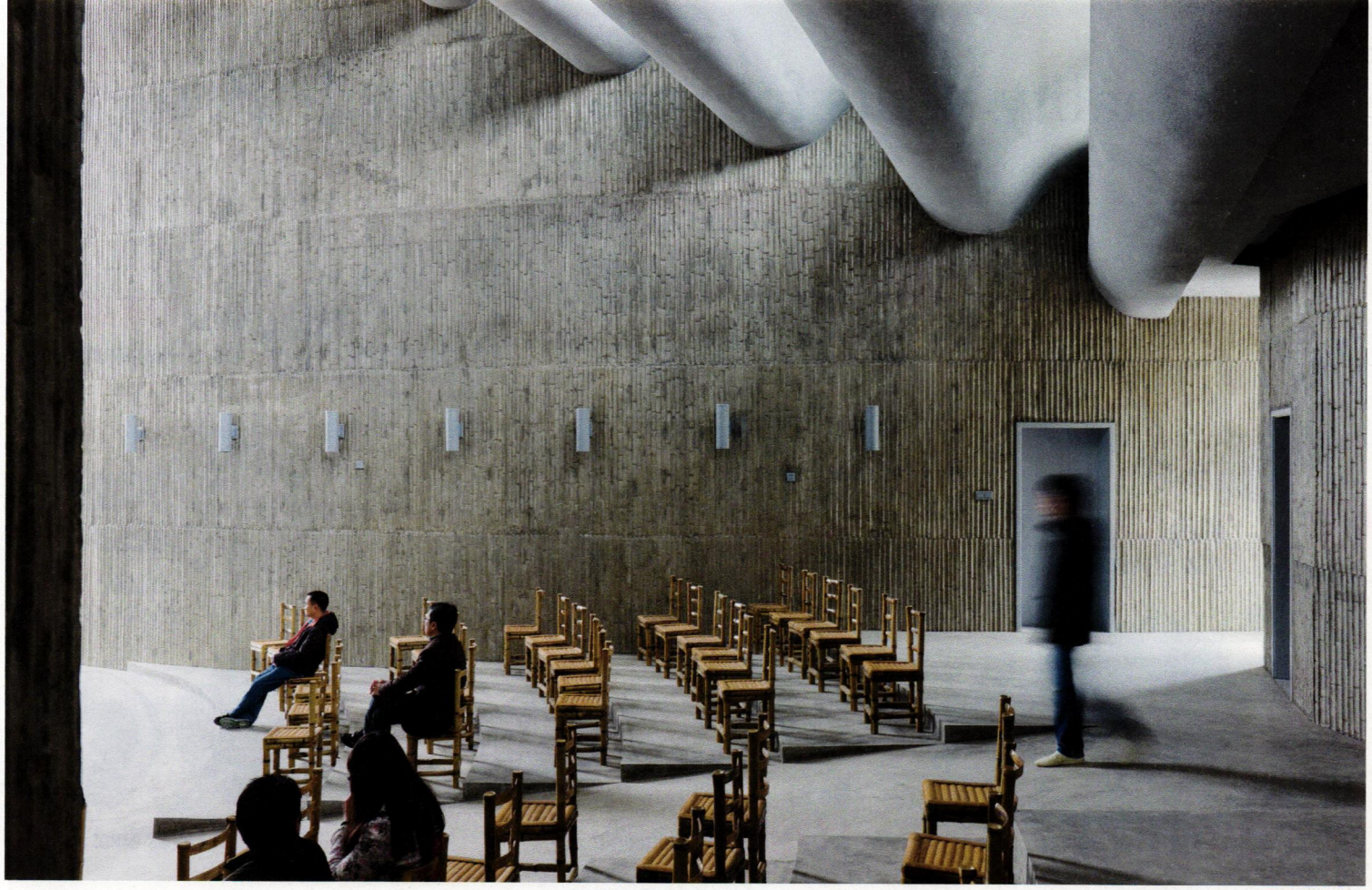
Born in Guangzhou, raised in Hong Kong, and educated across several continents, Fai Au investigates new directions in architecture through his work as a designer, professor, and curator. Yet the constant self-reminder of his practice is to return to the fundamentals of architecture—form, space, light, and material. Resisting the overexuberant production of architectural forms by fast and convenient computational tools, Au instead hopes to arrive at design solutions that anchor deeply into the cultural and physical context, manifest the essence of place, and respond to regional climate and local building technology.



LUOFU MOUNTAIN MUSEUM

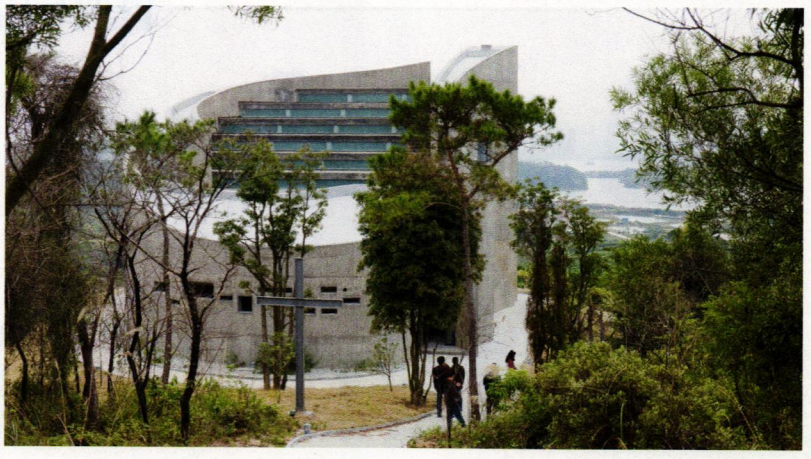
Located in the scenic district of the sacred Luofu Mountain, among the famous Taoist mountains in China, this 14,000-square-foot museum provides display spaces for wood and stone sculptures by local artists and exhibitions showing the development history of the scenic district and the history of vernacular culture. Its rectilinear form gently sinks into the slope of the mountain and wraps a semi-open courtyard space. Local materials such as bamboo, limestone, and oyster shell are used as shading devices, wall construction, building skin, and texture palettes, recalling the traditional Chinese wisdom of sustainable design and construction techniques.

PHOTOGRAPHY: © O STUDIO ARCHITECTS (THIS PAGE AND OPPOSITE, BOTTOM); IWAN BAAN (OPPOSITE, TOP 2)



CHURCH OF SEED

Also located at Luofu Mountain, the Church of Seed provides not only worship and meditation space for Christians but recreational and gathering places for people from the surrounding villages. The design is inspired by the story of a seed in the Bible. A curve that marks the enclosing wall splits into three: the southeast-facing wall has a cross-shape opening that invites the morning sun; the solid, west-facing wall blocks the afternoon sun; and the cavity of the north-facing wall accommodates building services. The stepped roof surface, with scooped light wells, allows diffuse northern light into the interior.





NATIONAL PROTEOME SCIENCE CENTER

For this project, O Studio designed the entrance space for the National Proteome Science Center, one of the most important centers for genetic research in China. The firm created a four-story volume infused with daylight from an expansive roof skylight. Reconstituted stone and white stucco are the two primary materials that shape the minimal and abstract space, which is highlighted by a dramatic spiral staircase.

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DRYER VENTS



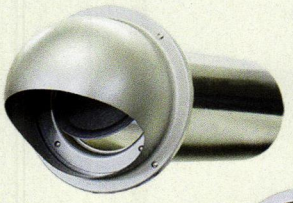
NEW

Model: **CFX-P**
4"& 6" Aluminum

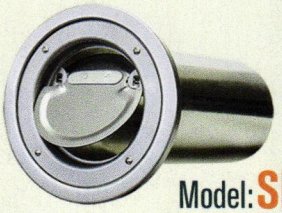
NEW



Model: **CFXF-P**
4"& 6" Aluminum

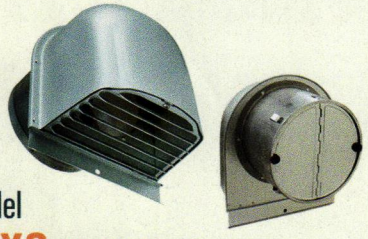


Model: **SFB-P**
4"& 6" Aluminum

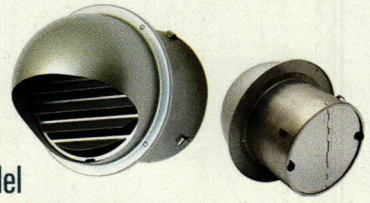


Model: **SB-P**
4"& 6" Aluminum

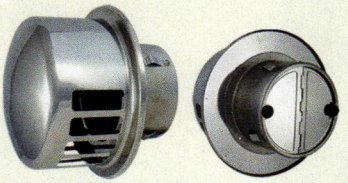
NEW



Model
CFXC 4"& 6" Aluminum



Model
SFZC 4"& 6" Aluminum



Model
RCC-S 4"& 6" Stainless Steel

VENT CAPS

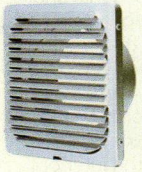


NEW

Model
CFX
3"-12" Aluminum



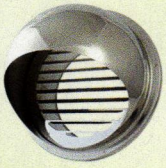
Model
SX
3"-8" Aluminum



Model
KX
3"-6" Aluminum



Model
SXL
10"-16" Aluminim



Model
SFX-S
4"& 6" Stainless Steel



Model
SX-S
4"& 6" Stainless Steel



Model
RCA-S
4"& 6" Stainless Steel

FRESH AIR GRILLES



Model
JRC
4"& 6" Aluminum



Model
JRA
4"& 6" ABS Resin



Model
DK-M8
3",4",6" ABS Resin



Model
JSP
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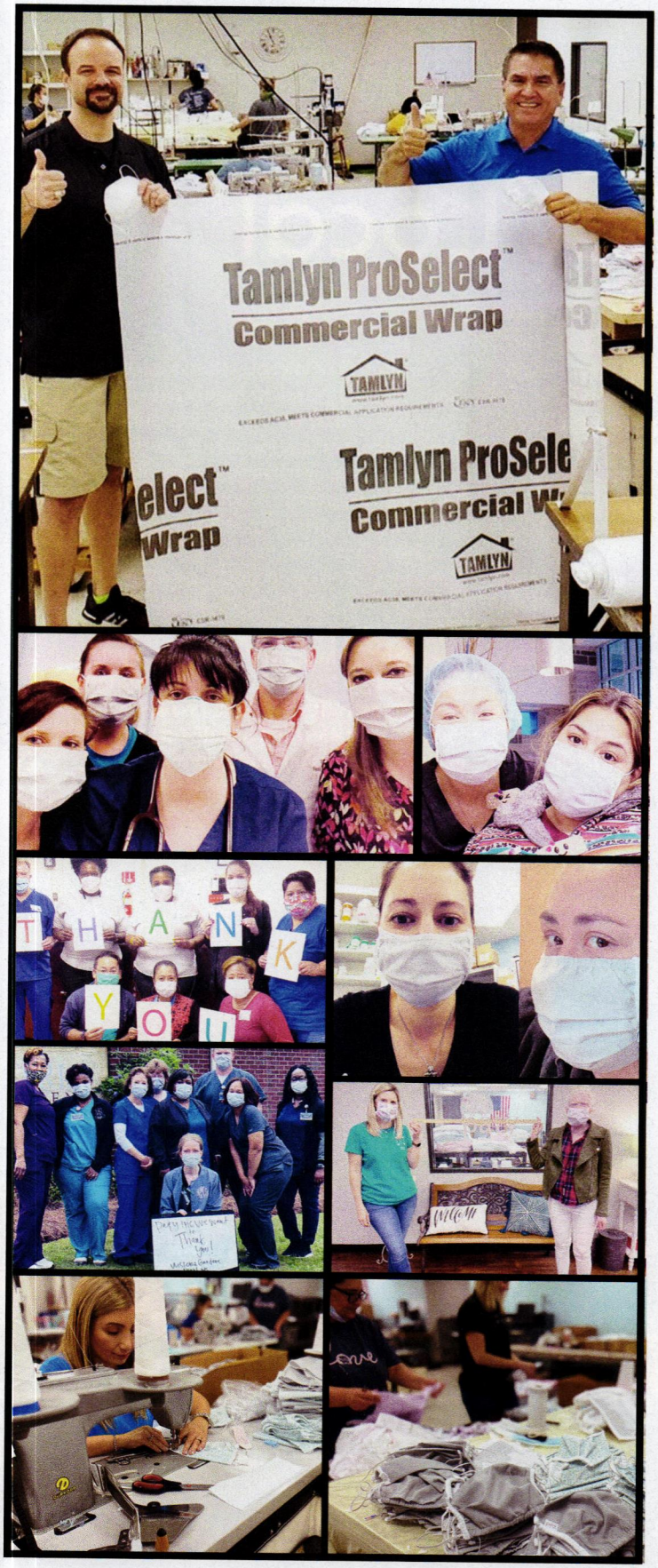

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Think Global, Act Local

Forward-looking cities lead the way toward a zero-carbon future.

A GOAL without a plan is just a wish. That adage is especially true for the near-universally held goal of reducing human-caused carbon emissions. Cities—where a growing majority of the world's population lives, where about three quarters of global emissions are generated, and where the impacts of the climate crisis are increasingly felt—have a critical role to play in developing and implementing the requisite plan. Many plans, in fact, because cities are uniquely well positioned to tailor strategies to local circumstances for maximum effect.

"Cities set the trends and take the lead," says Paul Cartwright, program manager for new-building efficiency with C40 Cities, a global network of major municipalities committed to addressing the climate crisis. "Even where cities don't have direct powers, they still find ways to take a leadership role." Parallel with such initiatives as the 2030 Challenge, and the AIA's 2030 Commitment, C40's member cities have pledged to ensure that new buildings operate at net zero carbon by 2030, and all buildings by 2050.

It's now 2020. In this section, RECORD checks in with five of these leading cities—New York, San Francisco, Vancouver, Stockholm, and Tokyo—asking whether their climate-action plans are on track to meet these commitments, and sharing snapshots of key initiatives and achievements to date.

Within cities, buildings are one of the largest consumers of energy, often accounting for more than half—and, in highly dense urban areas where mass transit reduces pollution from the transportation sector, more than 70 percent—of greenhouse-gas emissions, according to a 2016 analysis conducted by C40 in collaboration with Arup. A 2017 study by the McKinsey Center for Business and Environment suggests that optimizing energy use in buildings can reap between 20 and 55 percent of a city's emissions-reduction potential. Heavy-hitting measures include stringent standards for new construction, building-envelope retrofits, HVAC and water heating, lighting upgrades, and installation of building automation and controls. Add in cuts from



decarbonizing the electricity grid, and these efforts can account for up to 60 percent of a city's potential savings.

There are many tools available to catalyze these reductions. Cities have the power to set performance criteria and energy consumption limits, such as Tokyo's cap-and-trade program (page 126), New York's Local Law 97 (page 120), and Vancouver's Zero Emissions Building Plan (page 122). They can demonstrate best practices in the municipality's own real-estate portfolio, as in Stockholm's aggressive energy-consumption limits for buildings on city-owned land (page 124) and San Francisco's requirement that new municipal facilities depend only on electricity for power (page 121). Cities can use money—or money-equivalent mechanisms, such as density bonuses and preferential permit processing—to incentivize improvements. Vancouver's 5 percent density allowance, for instance, ensures that developers building to Passive House standard aren't penalized on square footage because of thicker walls. And cities have the ability, through information and communication, and through connections with higher levels of government, to influence other actors to implement additional education measures.

A critical obstacle cities often face in achieving emissions-reduction goals is a limited ability to access, manage, and analyze high-quality data. Data enable municipalities to understand the source and significance of their greenhouse-gas emissions, set appropriate mitigation targets, develop strong and cost-effective climate-action plans, and monitor progress. Leading cities have developed successful reporting and disclosure policies to generate high-quality data on building energy performance, and the analytical tools to make sense of it. Tokyo, for example, introduced energy-reporting policies for private office buildings in 2005, and has since achieved energy savings in this sector of about 30 percent. American cities such as New York are seeing results from benchmarking and disclosure schemes. And Stockholm's showcase development, Royal Seaport, backs up its energy-consumption limit for new buildings with post-occupancy monitoring and reporting.

A 2019 survey conducted by the U.S. Conference of Mayors found that 96 percent of 182 responding cities from 39 states are feeling the impact of the climate crisis. In the last five years, nearly every one of them has experienced a climate-related incident, whether flooding, heat wave, drought, or forest fire. Over the last 12 months, 60 percent have launched or significantly expanded a climate initiative or policy, and 57 percent will launch or significantly expand a climate initiative or policy this year.

At this critical juncture in the growing climate emergency, the building-related actions highlighted in the following pages demonstrate what becomes practical and possible when cities commit to a carbon-free future. *Katharine Logan*



NEW YORK SKYLINE, AS SEEN FROM THE WEST

PHOTOGRAPHY: © VLAD GHIEA/ALAMY STOCK PHOTO

New York

ADVOCATES OF New York's Local Law 97 refer to it as the most ambitious climate legislation for buildings enacted by any city in the world. The claim might sound like hyperbole, but John Mandyck, CEO of the Urban Green Council, a nonprofit that helped shape the regulation, points to its scope and scale. It applies to 50,000 existing buildings—any that are 25,000 square feet or larger. These structures amount to 60 percent of the city's floor area and are responsible for 40 percent of total greenhouse-gas emissions. By 2030, the law is expected to reduce emissions from large buildings by at least 40 percent compared to a 2005 baseline, which means cutting 5.3 million metric tons of carbon dioxide from current levels, the equivalent of San Francisco's citywide emissions.

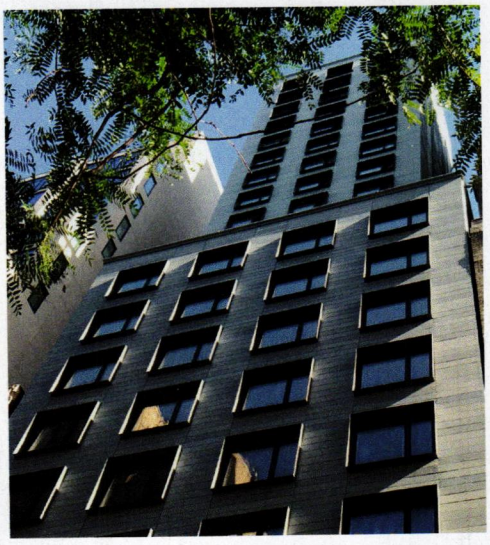
The most consequential piece in a package of bills known as the Climate Mobilization Act, the law was passed by the City Council in April last year. It sets increasingly stringent limits for the amount of CO_2 facilities can emit based on building type. The first set of regulations go into effect in 2024, targeting the most carbon-intensive 20 percent of buildings, while the 2030 limits target the most carbon-intensive 75 percent. (Subsequent limits will be set by the Department of Buildings to achieve an 80 percent reduction in emissions citywide by 2050.) These thresholds are not aspirational but statutory, points out Mandyck: owners who fail to meet the limits face steep fines.

How can owners bring underperforming buildings into compliance? They can put new operating strategies in place, implement energy-saving retrofits, or buy green power. Work can be financed through a special low-interest loan program. Some building types—income-restricted housing or places of worship—can opt instead to complete a prescribed set of low-cost energy-saving measures, including insulating pipes, installing boiler sensors and controls, and fixing heating-system leaks.

Although the measure is aimed at upgrading existing structures, a year after a new building is completed, it is subject to the law's stringent reporting requirements and emissions limits. Some proponents maintain Local Law 97 isn't strict enough for new construction or projects that involve significant renovation or expansion. "New buildings should have different requirements," says Stas Zakrzewski, principal of ZH Architects, who sits on an advisory board helping guide the law's implementation. He points to two of his firm's recent projects: a five-story condo building in Brooklyn that incorporates a three-story existing structure and an all-new



A five-story condo building in Brooklyn (left) and a 55-unit rental apartment tower in Manhattan (bottom), both recently completed and designed by ZH Architects, deploy such features as highly insulated and airtight facades, triple-glazed windows, and minimized thermal bridges. Both are expected to meet Local Law 97's anticipated emissions limits for 2050.

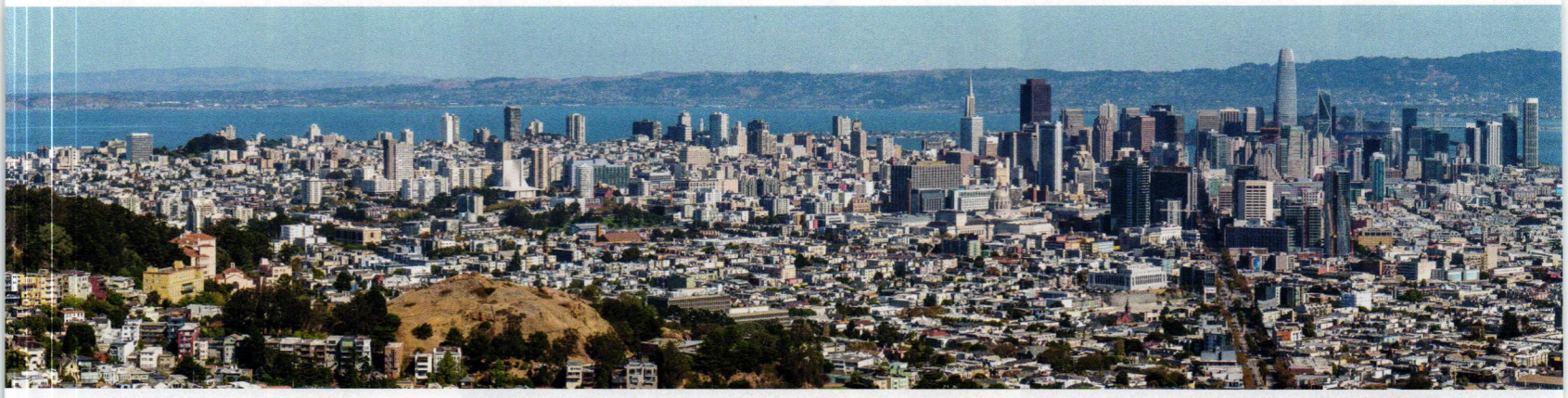


55-unit rental residential tower in Manhattan. The smaller building, at only 7,000 square feet, is not subject to Local Law 97. Nevertheless, it is expected to meet the anticipated 2050 emissions limits for residential construction—offering an example that other projects could emulate, with its highly insulated, airtight building envelope, triple-glazed windows, and minimized thermal bridges. Many of these strategies have been deployed on the tower, which has projected emissions far below the 2050 limits.

Some advocates of the law worry that it does not deal well with carbon-intensive uses, including those of trading floors and data centers. "This is a legitimate concern," says Mandyck. "The carbon metric is straightforward, but it is a blunt instrument." He suggests that a cap-and-trade scheme like Tokyo's (see page 126) could be a remedy; his organization is involved in developing the carbon-trading implementation plan that the law requires. It would allow a building with justified high-energy uses to buy credits from another building with emissions below its target.

It is too early to know how many out-of-compliance owners will perform retrofits, buy offsets, or simply pay the fine, notes Richard Yancey, executive director of the nonprofit Building Energy Exchange. But he is optimistic about the language of Local Law 97, which includes placeholders for programs like carbon trading and allows for other future adjustments in order to meet its reduction targets. It's "critically important" to get these modifications right, says Yancey: "Cities all over the world are looking to New York." *Joann Gonchar, FAIA*

PHOTOGRAPHY: © ED CARUSO (TOP), COURTESY ZH ARCHITECTS (BOTTOM)



San Francisco

OVER THE past 30 years, San Francisco has made impressive progress cleaning up its built environment. Since 1990, carbon emissions from the operation of buildings have dropped 51 percent. And between 2013 and 2018—despite tremendous economic growth—energy use in commercial structures was reduced 11 percent. But with buildings still responsible for 2.2 million tons of greenhouse-gas emissions annually (about 44 percent of the citywide total), there is more work to do. To completely decarbonize buildings in San Francisco by midcentury, "we need to redouble our efforts," says Barry Hooper, senior green-building coordinator with the city's Department of the Environment. "The next 10 years will be critical."

A primary focus for San Francisco has been on greening the electrical grid while advancing all-electric buildings and moving away from the use of natural gas. Last September, the Board of Supervisors approved legislation requiring that buildings larger than 50,000 square feet depend only on renewable energy by 2030. Then, in January of this year, they adopted two ordinances. One bans gas connections in new or significantly renovated municipal facilities. A second sets a higher performance bar—above the already stringent energy code—for all buildings that opt to include gas infrastructure.

Such all-electric measures have been sweeping California. Berkeley was first, with its city council voting last July to prohibit gas hookups in new small and midsize residential buildings. Since then, 29 other jurisdictions throughout the state have adopted regulations that discourage gas or outright ban it. These policies will have a significant impact, since much of California's grid is already carbon-free. In San Francisco, almost 70 percent of its electricity comes from renewable sources, while an astounding 81 percent of building-related emissions are attributed to natural gas.

All-electric advocates tout a number of benefits beyond reductions in climate-warming emissions: better indoor air quality as a result of eliminating combustion and avoiding the risks associated with flammable gas in a seismic region. In addition, repairing natural gas infrastructure damaged during a major quake could take many months, compared with a week for restoring electrical service.

For multifamily buildings in particular, electrification makes good sense, says Katie Ackerly, sustainability lead at David Baker Architects. Among its all-electric projects are two buildings in Hunters View, with 120 affordable units, slated to break ground in January 2021. Ackerly explains that domestic hot water is the largest single energy consumer in housing, and heat pump technology for this use is not only well established, but often works at a higher efficiency.

Anne Torney, a partner at Mithun, says a sticking point for the all-electric concept is in market-rate housing, where developers consider high-end gas ranges a selling point. "Affordable-housing nonprofits think about community benefits and public policy goals more broadly, and they don't need to worry about marketability," she says. Her firm has several affordable all-electric multifamily projects under way, including the 131-unit Balboa Park Upper Yard, expected to break ground early next year.

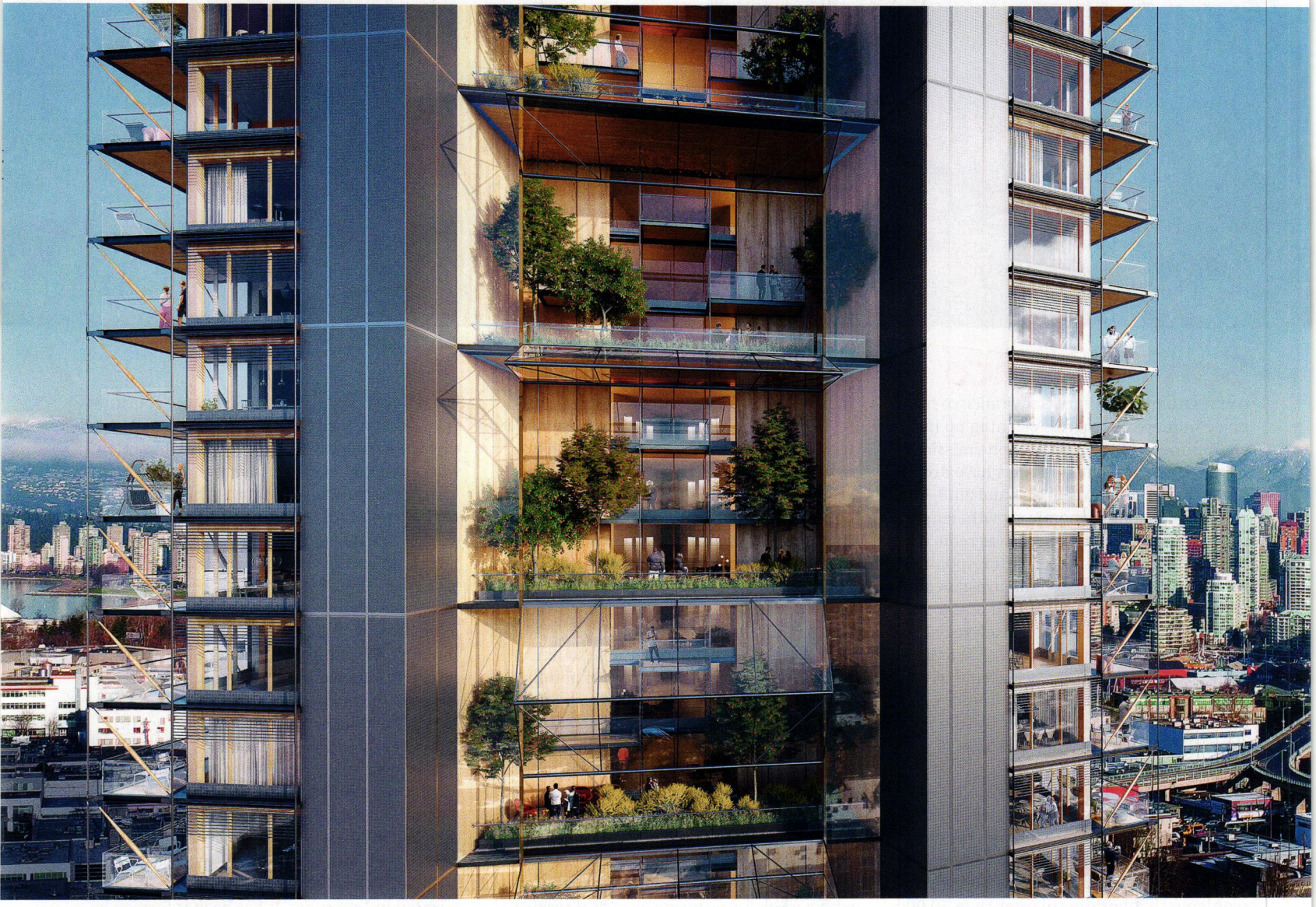
Moving all-electric new construction forward is the easy part, says Hooper. "The tougher question is, 'What do we do with our existing buildings?'" How best to wean all of the city's building stock off gas will be addressed in a zero emissions "road map" to be released in November. It has been informed by a task force that includes design professionals, developers, utilities, and community members. Hooper acknowledges that implementing these policy recommendations will require time and investment from both the public and private sectors. But, he warns, "the cost of inaction will be greater." *Joann Gonchar, FAIA*





One market where the all-electric typology is taking hold in San Francisco (top) is in affordable housing. Two such projects slated to break ground early next year are a pair of buildings, with a total of 120 apartments, in Hunters View, designed by David Baker Architects (far left) and the 131-unit Balboa Park Upper Yard, designed by Mithun (left).

IMAGES: © MARCELO VINANTE/ALAMY STOCK PHOTO (TOP); COURTESY DAVID BAKER ARCHITECTS (BOTTOM, LEFT); MITHUN (BOTTOM, RIGHT)



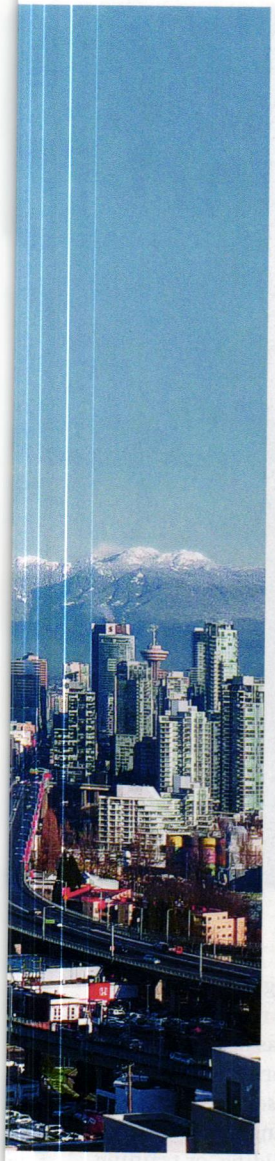
Vancouver

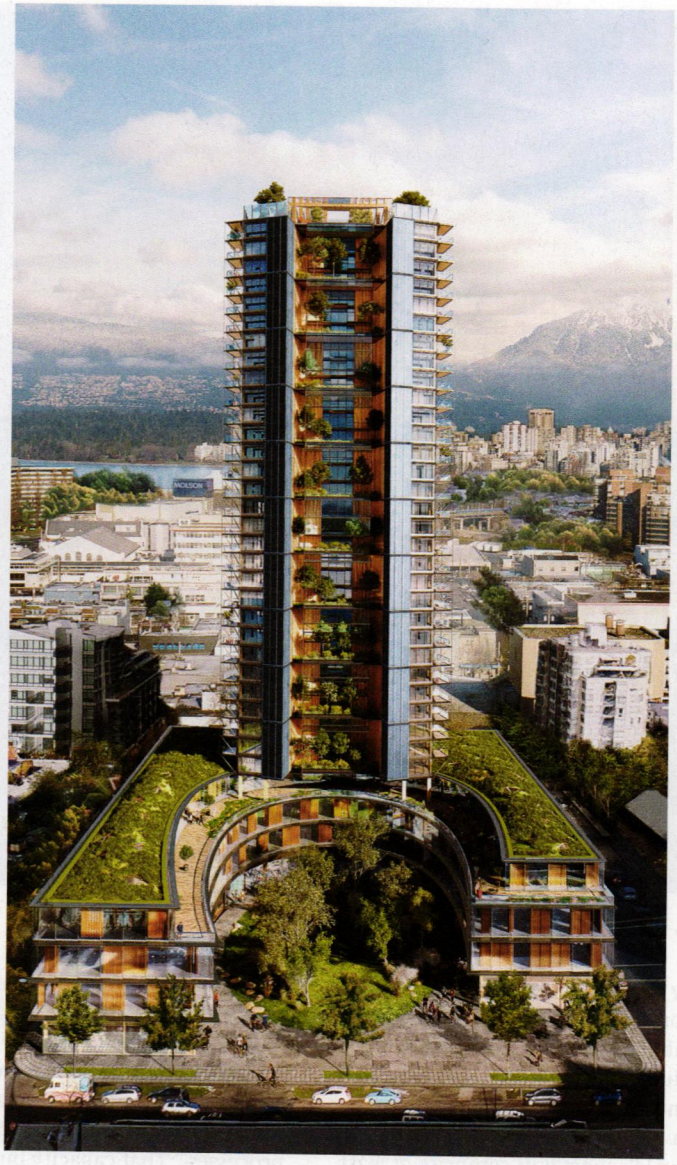
LIKE OTHER cities with strong commitments to combating climate change, Vancouver, Canada, is targeting citywide carbon neutrality by 2050. Because half of the metropolis's existing building stock is expected to have been replaced by then, emissions limits apply to new construction first. "Everything that's not a solution today becomes a problem later," says Doug Smith, sustainability director at the City of Vancouver.

Within the overall 2050 limit, the municipality's Zero Emissions Buildings Plan (2016) establishes a finely sliced series of deadlines reflecting the degree of challenge faced by various building types. Commercial and residential projects have the lowest hurdle in reducing emissions, with plenty of successful precedents. As of 2025, zero emissions buildings—those that are highly efficient and meet their energy needs from renewable sources—will be the only new construction permitted in these two categories. More specialized buildings, such as schools, hospitals, and industrial facilities, will have a little longer to achieve the target—until 2030. "It's important to set those limits far in advance so that industry understands what they are and when they're coming," says Smith, "so there are no surprises." To date, emissions from new buildings in the city have dropped by 43 percent compared to a 2007 benchmark.

In addition to regulating, the municipal government is also leading by example. As Vancouver's single biggest landlord, with a portfolio of over 600 buildings, the city began imposing a zero-emissions requirement on its own new construction—including libraries, fire stations, community centers, and police stations—two years ago, and is now working to bring its existing buildings to zero emissions before 2040.

For all other existing buildings, the city is developing a plan in consultation with residents and industry for a target deadline of zero emissions by 2045. Achieving zero emissions presents a bigger challenge for older buildings—and a more delicate one, says Smith. "You don't want to create an equity issue where wealthier homeowners can afford to meet the new standards, and people just getting by can't." The initial approach will focus on raising awareness of emissions levels through reporting on energy consumption and encouraging the integration of reduction measures into scheduled maintenance and replacements. "Our strategy for the next three or four years is to start educating existing







Canada's Earth Tower, currently in design by the Vancouver office of Perkins and Will, aims to be, at 40 stories, the world's tallest hybrid mass timber structure. The mixed-use building, which rises from a U-shaped podium (left) and includes coworking space (above) and 200 apartments, has such features as multistory winter gardens (opposite). The project is targeting Passive House certification and is helping inform the development of the Canada Green Building Council's forthcoming Zero Carbon Building Standard.

IMAGES: COURTESY PERKINS AND WILL

building owners," says Smith. The plan is expected to go before council in October this year.

As well as setting limits, providing leadership, and catalyzing change (with available tools such as regulations, funding, and density incentives), Vancouver sees education as critical. "Everything we're doing now, we've never done before," says Smith, "so we need to work with industry, to help them reduce their learning curve." The municipality subsidizes training for trades in the techniques of zero-emissions construction, such as tight building envelopes and blower door testing. It has also instituted a Zero Emissions Building Exchange (ZEBx), which pays the developers of cutting-edge projects to hire technical and engineering students to document the process, including notes, photography, videos, and site tours, all concluding with a published report of successes and lessons learned. "The role of ZEBx is to bring together members of what's otherwise a very competitive industry," says Smith, "and have them learn from each other."

As of this past February, zero-emissions projects in the city's pipeline included 344,000 square feet approved for building permits, 909,000 square feet approved for rezoning or development, and 3.91 million square feet in inquiries and applications. Most of these projects are designed to the Passive House standard, with the remainder designed to the net zero criteria of such programs as the Living Building Challenge and Natural Resources Canada's R-2000.

As an example of the type of project waiting in the wings, a 40-story hybrid mass-timber tower now in design at the local office of Perkins and Will is helping to inform the development of the Canada Green Building Council's forthcoming Zero Carbon Building Standard. In addition to its zero-emissions operation, Canada's Earth Tower, as the planned mixed-use building is called, will sequester carbon in its wood structure. "Timber buildings built to the Passive House standard are absolutely what we all should be doing to address climate change," says Derek Newby, a Perkins and Will associate principal. With a growing number of built examples in Vancouver and worldwide, he says, "both strategies are well understood and achievable now." *Katharine Logan*

Katharine Logan is an architectural designer and a writer focusing on design, sustainability, and well-being.



Stockholm

SWEDEN'S CAPITAL CITY has ambitious twin climate goals: fossil-fuel-free operations and net zero greenhouse-gas emissions by 2040. And the construction sector is critical to its success: to meet these targets, more than half of its emissions reductions must come from buildings. The greatest building-related savings will come from heating, as an already efficient citywide district heating grid (covering 80 percent of Stockholm's structures) shifts to renewable-energy sources. At the individual-building scale, a key strategy requires almost all new construction to achieve net zero carbon by 2030. One indicator of progress to date is the city's meeting its 2020 emissions milestone two years ahead of schedule, achieving a maximum of 2.2 metric tons per resident in 2018 (down from 2014's 2.7 ton benchmark). "So, yes," says Björn Hugosson, Stockholm's chief climate officer, "the target will be achieved."

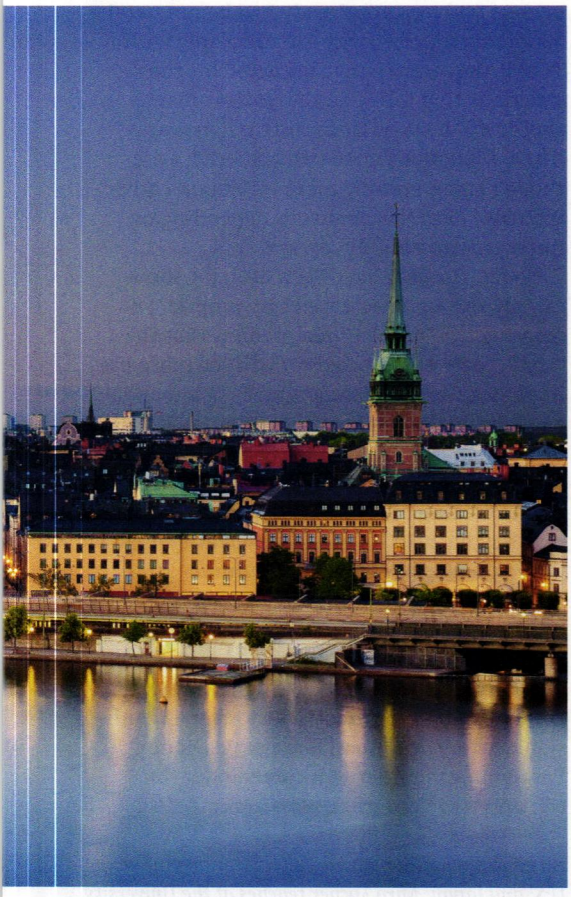
Getting a head start on the 2030 deadline, Stockholm instituted a requirement eight years ago that new residential and commercial buildings on municipal land operate at a maximum 55 kWh/m², an energy use intensity (EUI) equivalent to the Passive House standard. More than 60 percent of the city's geographical area is owned by the municipality, and Stockholm Royal Seaport, a 585-acre brownfield development on publicly owned waterfront, represents a leading edge in sustainable urban development worldwide.

Begun in 2009, with completion anticipated in 2030, Royal Seaport will comprise at least 12,000 new homes and 35,000 workplaces, all designed to comply with the EUI 55 limit. The project's 20-year timeline allows for iterative learning, and each building's energy performance is assessed when two years of post-occupancy data have accumulated. "We are not just setting an ambitious standard, but we are also following up with verification," says Christina Salmhofer, the development's sustainability strategist. Discrepancies between the project's predicted and actual energy consumption demonstrate the importance of that commitment. Measured performance values of completed buildings are averaging 73 kWh/m², and, while that's still 15 percent below Sweden's nationally legislated target, it's well above the EUI 55 limit that modeling shows the buildings, as designed, were capable of achieving.

The shortcomings result mainly from construction quality-assurance issues, especially in regard to thermal bridging in facades, and from inadequate testing and refinement of building systems to operate as designed, complicated by insufficient metering. "It's really sad," says Salmhofer, "because there was so much capacity-building during the design processes." That capacity-building, or training, focused on developers and designers, however. So, while developers understand the effort involved and the importance of the standard, and architects and engineers are capable of designing to it, more education is needed for the construction and operations phases of projects, she says. "This is the challenge facing the industry right now."

Meanwhile, the fourth phase of Royal Seaport's build-out is under way and features residences designed to an even higher standard, net positive energy. Completed in 2019, a pair of buildings designed by local architecture firm DinnellJohansson, with energy consultant InCoord, contains 43 dwelling units with a design EUI of 14.8. Building-integrated solar panels generate 16.1 kWh/m²/year, supplemented with wastewater and ventilation heat exchangers and geothermal energy. In addition to high levels of insulation, effective daylighting, and a compact form, the project's

PHOTOGRAPHY: © RUDY BALASKO (TOP); LENNART JOHANSSON (OPPOSITE, TOP);







balconies are integral to its energy strategy while serving as an amenity for residents. As self-supporting elements that are separate from the building's structure (thereby eliminating thermal bridging), the balconies wrap each building in its own microclimate, which can be adapted using operable external screens to take advantage of the prefabricated concrete structure's thermal mass.

The Plus Energy houses were already complete when performance metrics from earlier buildings became available, so it may turn out that the newer buildings also suffer from construction-phase shortcomings, but the project team is working hard to control the operations and maintenance variables those earlier tests highlighted. Data will be reported after one year, with a more reliable assessment expected after two.

Looking ahead, Salmhofer says Royal Seaport's next priority is the creation of regenerative systems throughout the development, such as heat extraction from graywater and agricultural-nutrient extraction from blackwater. "Moving from the building level to the city level—with more integration and more connection—is definitely the next step," she says. *Katharine Logan*

Picturesque Stockholm (opposite, top) has set stringent energy-efficiency standards for all construction on municipal land. One large-scale development on 585 acres of city-owned property is the transformation of its seaport into 12,000 residences and 35,000 workplaces (top). The latest phase of the project includes apartment buildings by Dinell Johansson (above), designed to produce more energy than they consume. In addition to high levels of insulation, a compact form, and effective daylighting, the buildings' balconies have a separate, self-supporting structure—a strategy that minimizes thermal bridging.



Mori Buildings' Toranomon Hills mixed-use complex, with towers by Ingenhoven Architects (at left and at right in photo), Nihon Sekkei (at center), and eventually OMA, depends on high-performance design and 100 percent renewable energy.

Tokyo

A DECADE AGO, recognizing that commercial and industrial buildings—including its iconic high-rise towers—produced almost half of the city's total carbon emissions, Tokyo started the world's first urban carbon cap-and-trade initiative. The mandatory program aims to reduce CO_2 emissions by 30 percent and energy consumption by 38 percent, compared to 2000 levels, in 1,400 of the city's largest carbon emitters. Although the facilities covered by the program represent just 2 percent of the total number of Tokyo's commercial buildings, they account for nearly 19 percent of emissions, making the policy "effective and powerful," says Satoshi Chida, Tokyo Cap-and-Trade Program (TCaTP) director, and a critical element in the city's plan for achieving zero emissions by 2050.

Implemented in five-year phases, the TCaTP places increasingly stringent limits on emissions, while also creating a framework for trading carbon credits. Facilities with reductions in excess of the required caps receive credits, which can be banked for future use or sold to facilities with deficient reductions. To further incentivize high-performance building design, Tokyo annually recognizes "top level" and "near top level" facilities and awards them, in recognition of their early actions, a relaxation of the caps in future phases.

Tokyo clients and architects are responding to the city's increased emphasis on energy efficiency through state-of-the-art facilities and innovative building-management schemes. Mori Buildings, one of Japan's largest developers, is promoting high-performance design and the use of 100 percent renewable energy throughout Toranomon Hills, a mixed-use complex rising in central Tokyo. The first building, the 2014 Toranomon Hills Mori Tower, designed by Nihon Sekkei, was certified as a top-level facility in 2018. Two subsequent structures, by Düsseldorf-based Ingenhoven Architects, are a just-finished office tower and a residential high-rise slated for completion early next year. Both are expected to achieve top-level status. With features such as planted outdoor ledges, high-performance glazing, photovoltaics, and advanced lighting and mechanical systems, firm founder Christoph Ingehoven hopes his designs "will influence the way Tokyo develops over the next 20 years, with more planted facades, more public green space, and high levels of sustainable-building certifications." The complex's final building, the Toranomon Station Tower, OMA's first high-rise in Tokyo, recently broke ground and also is targeting significant reductions in energy consumption and CO_2 emissions.

The program has been achieving better than expected reductions. The goal for the TCaTP's initial phase (2010–14) was a 6–8 percent reduction from base year CO_2 emissions, followed by a second phase (2015–19) goal of 15–17 percent. But the results showed a 25 percent decrease by 2014 and a 27 percent reduction by 2018.

Initial reductions were achieved in part due to stringent energy-use restrictions in the aftermath of the 2011 Fukushima nuclear power plant accident, but also through improved operations, changes to building systems and equipment, and modified tenant behavior. Chida notes that the program has made the city's buildings more resilient. Since owners and tenants already had begun to take action to reduce energy use to comply with TCaTP, they were better prepared for the restrictions that followed the nuclear plant's shutdown, he says. Once restrictions were lifted, reductions were still achieved, even though Japan became more reliant on carbon-intensive electricity sources, depending on imported oil, natural gas, and coal.

So far, the cuts have been brought about mainly through decreased consumption, or meeting the "caps." Chida predicts that the "trade" part of the program will see more use in phases three and four, which each mandate an additional 10 percent reduction, as it will be increasingly difficult for existing facilities to meet these progressively stringent targets.

The trading of credits will also come into play for the 2020 Tokyo Olympic/Paralympic Games, now postponed until summer 2021. The Tokyo Metropolitan Government developed a separate Sustainability Plan for the renovated and newly constructed sports venues and is working to secure donations of credits from TCaTP to offset the Games' emissions. After the Games, large-scale Olympic/Paralympic facilities will come under the cap-and-trade program. *Mira Locher, FAIA*

An educator, author, and architect working in the U.S. and Japan, Mira Locher teaches at the University of Utah and is a partner in Kajika Architecture.

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Learning Objectives

1 Outline the leading-edge policies for reducing carbon emissions from both new and existing buildings for the five cities profiled.

2 Describe ways to incentivize low-carbon building design, construction, and operations.

3 Explain how a carbon cap-and-trade program for buildings works.

4 Discuss the potential benefits of all-electric buildings.

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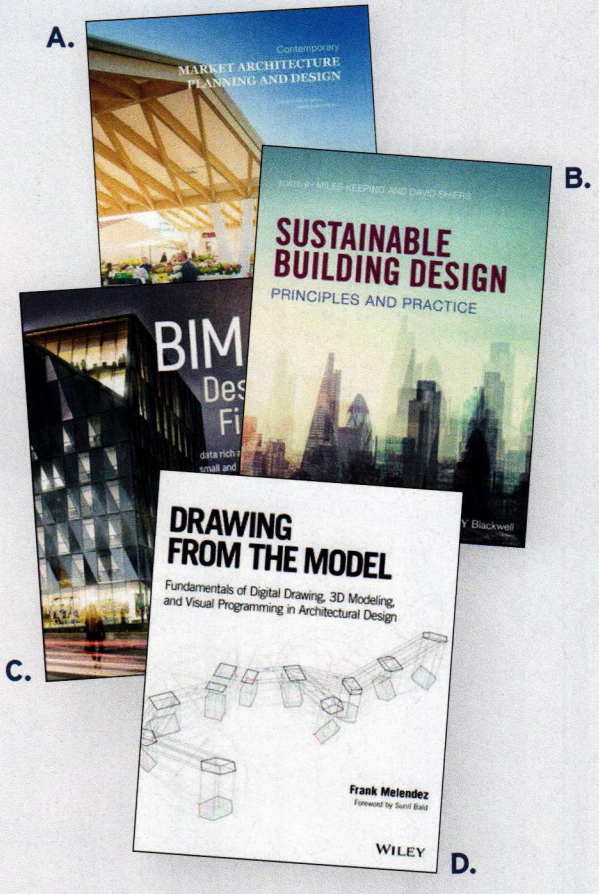

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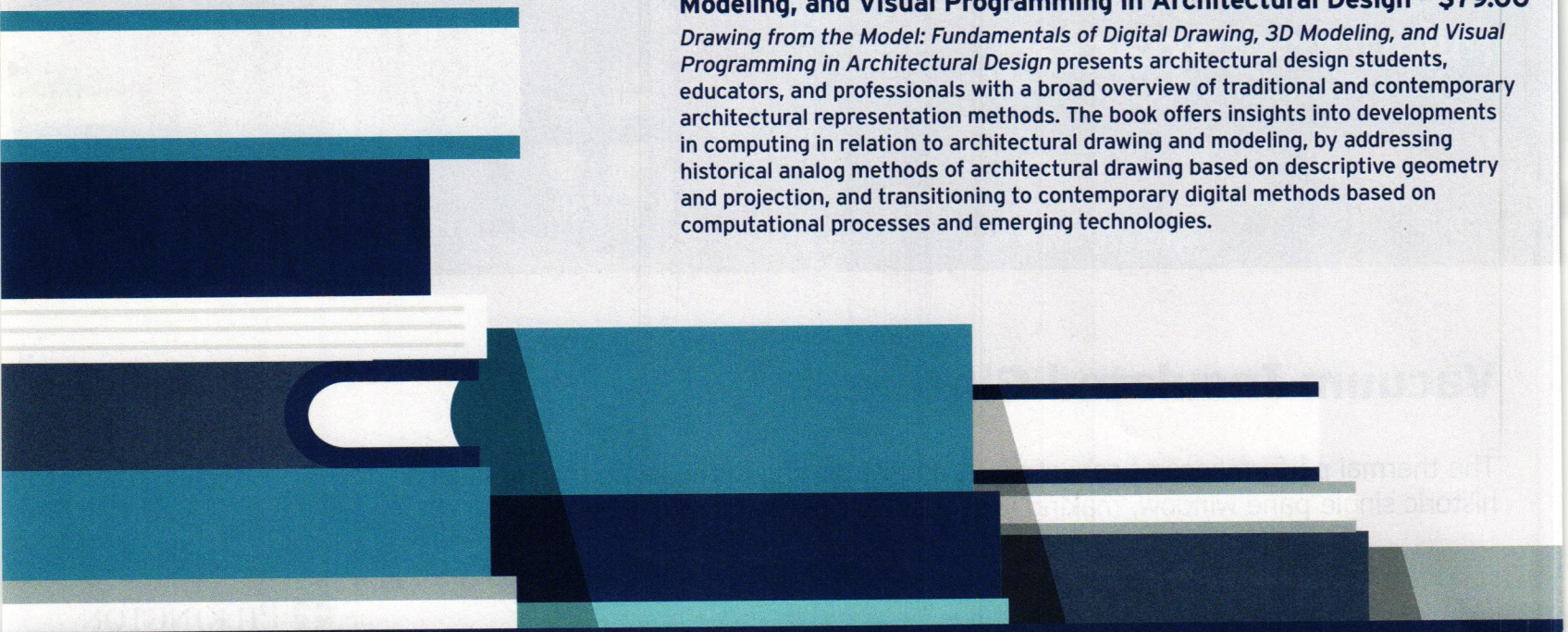

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Aberdeen Art Gallery

Hoskins Architects

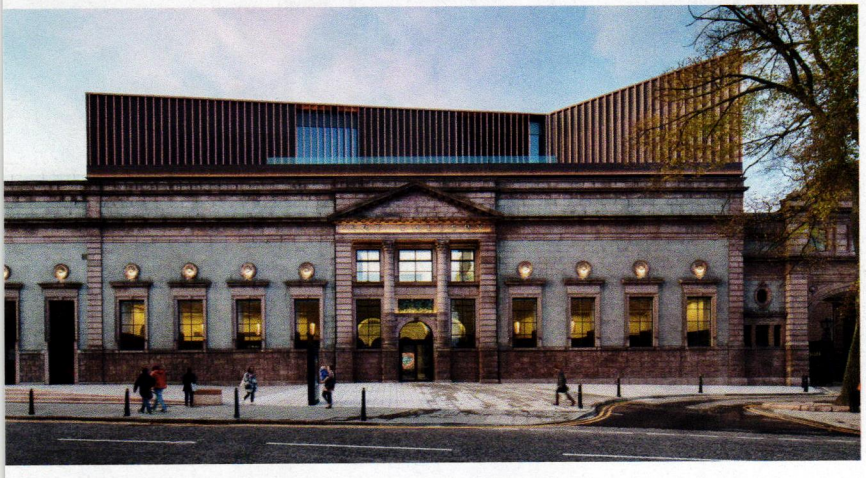
Speirs + Major

By Chris Foges

ONE UNAVOIDABLE downside to Hoskins Architects' elegant copper-clad third-story addition to the Aberdeen Art Gallery was the loss of natural top light in its windowless second-floor exhibition spaces. On Scotland's northeast coast there is less than seven hours' daylight in winter, and its benefits are keenly felt, says Carrie Donahue Bremner of Speirs + Major, lighting designer for the $42 million, four-year renovation project.

PHOTOGRAPHY: © GILLIAN HAYES





Maintaining the luminous, airy ambience of those rooms was a major component of a scheme that celebrates the character of the late 19th-century granite building.

In nine second-floor galleries arranged around a central three-story atrium containing the sculpture court, the designers have installed laylights that dominate the ceiling in each room. Comprising color-tunable LED arrays behind white acrylic diffusers, these are programmed to increase the warmth of the lamps over the course of a day, from a cool 6000 Kelvin in the morning to a cozier 3000 Kelvin toward evening. As well as disguising the fact that these are now wholly interior spaces, the laylights' purpose was to recreate the evenness and intensity of the illumination from skylights, explains Donahue Bremner. Using only spotlights and washes to light paintings and architectural features "would have appeared quite dark and in contrast to the experience people enjoyed in those spaces."

Variations in the color of the light do not correspond directly to con-





DARK VICTORY
A large circular pendant dominates the Aberdeen Gallery of Art's Remembrance Hall (opening page); the daylit sculpture gallery (above) is located below the glazed roof of the museum's new third floor (opposite, bottom and top, right); skylights were replaced by laylights in windowless second-floor galleries (bottom, right).

ditions outside, but they suggest the behavior of daylight by changing over time. Programmable settings are currently the same for all seasons, though they may be adjusted, in response to feedback or curatorial needs. Flexibility is provided by spotlight tracks within the edges of the laylights and linear LEDs, tucked behind plaster cornices, that cast light upward over the original curved ceilings.

The design also celebrates the museum's architectural heritage. In the top-lit sculpture court, daylight is complemented by a lighting system that accentuates details at its edges, such as a lofty sculptural frieze and the vaulted arches lining its perimeter that are uplit by luminaires on column capitals. "If possible, we hid fixtures so that you see what we want you to see—the architecture—rather than the light source," says Donahue Bremner. But where the protected historic fabric made this impossible, the benefits of lighting were weighed against the visible presence of technology. In the sculpture court, reflected light from the vaults obviates the need for downlight and creates an enclosure at the museum's heart.

Overhead, an existing skylight has been replaced by the roof of the extension one floor above, with ribbons of glass set between deep beams. At night, lighting is directed onto one side of each beam, so that the roof structure doesn't become a big, dark mirror but acts as a positive ceiling. Another contemporary intervention is found within the triple-height Remembrance Hall near the entrance, where a ring-shaped pendant can be raised and lowered to suit uses ranging from temporary exhibitions to military memorial ceremonies. Measuring 18 feet in diameter and weighing 1,100 pounds, this halo incorporates a panoply of lighting technologies that provide both visual brightness and the ability to highlight specific areas within the space. A backlit outer face emits a "soft, general" light, while uplights wash the domed ceiling, low-glare adjustable downlights illuminate mobile exhibition cases, and high-definition video projectors allow artists to show works on the floor.

The measured approach extends to the exterior, where illumination is concentrated on a few elements of particular



importance–including dials above the pedimented windows and a sculptural war memorial—and is supplemented by light spilling from carefully positioned custom copper fixtures within the gallery's restaurant. Such restraint is the product of both environmental and aesthetic concerns. Whether highlighting one of the many facade details loved by the public, or gently augmenting or simulating daylit interiors, Speirs + Major shows that less can be more. ■

credits

ARCHITECT: Hoskins Architects
LIGHTING DESIGNER: Speirs + Major
ENGINEER: Buro Happold
GENERAL CONTRACTOR: McLaughlin & Harvey
CONSULTANT: Dowds Group (electrical contractor)
CLIENT: Aberdeen City Council
SIZE: 65,000 square feet
COST: $42.5 million
COMPLETION DATE: October 2019

SOURCES

AMBIENT LIGHTING: Erco; KKDC; Stoane Lighting; iGuzzini; Lumenpulse; Zumtobel; Glashutte Limberg; Spectral (feature pendant in Remembrance Hall)
DOWNLIGHTS: Lucifer Lighting; iGuzzini; Orluna; WE-EF
TASKLIGHTING: Santa&Cole; Aktiva; KKDC; iGuzzini
EXTERIOR LIGHTING: WE-EF; ACDC; Orluna; Meyer; KKDC
CONTROLS: Zumtobel (Litecom)



LIGHT OF DAY Common electrical-connection components were used to craft fixtures for Ketra S30 PAR lamps between the roof and ceiling joists. Painted yellow, each assembly cost $10, minus the lamps (above). The lights can be adjusted to amplify colorful accents, such as a bold mural in the mescal bar (below.)

Tamarindo

Stayner Architects

By Linda C. Lentz



HUSBAND AND WIFE TEAM Pedro and Sarah Resendiz were ready to trade in their popular food truck Tamarindo—which they had been driving around Orange County, California, since 2013—for a brick-and-mortar version of the business in San Clemente. They didn't want to lose the casual, sunlit vibe of roadside dining in the transition, however, so reproduction of that outdoor experience and light were key factors in their brief when the couple hired Los Angeles–based Stayner Architects to transform a dilapidated 1940s building into a full-service restaurant for their well-regarded Mexican cuisine.

Led by principal Christian Stayner, the firm managed all aspects of the project: the architecture, the business plan, entitlements and approvals, construction, interiors, graphics—and lighting design. After gutting and stabilizing the single-story wood and masonry structure to comply with seismic codes, the architects focused on introducing daylight into the dining room. They installed full-height glazing on the building's east-facing front facade, opening the interior to a patio, then inserted six skylights into

the roof to carry sunlight into the space. In the rear, western light from the kitchen filters through a ribbed-glass lattice screen.

Inside, Stayner nodded to the Mesoamerican colors, textures, and forms found in mid 20th-century works by Luis Barragán and Juan O'Gorman. A brick wall features a bold mural; the wood ceiling and joists are painted bright yellow; furniture, floors, and walls are made of ash wood, treated with tongue oil or blackened. With a similar sense of craft, the firm developed a cementitious terrazzo for the table- and bar tops. For electric illumination, says Stayner, "We wanted lights that, during the day, were compatible with the natural light, not overly yellow and orange. At the same time, we didn't want the light at night to be so blue it would be unpleasant."

To capture the range of color temperatures and output flexibility necessary to mimic nature's spectrum—a span from 1,400 to 10,000 Kelvin—Stayner chose a series of tunable RGBW LED lamps that offer more hue variations than tunable-white options. These are controlled by a wireless system (from the same manufacturer to avoid potential protocol conflicts) that responds to an astronomical clock. This maintains a light consistent with the sun streaming in from the street and skylights throughout the day, all year. In the evening, the lights dim to a warm glow for a more intimate ambience. At the same time, strategically placed lamps are tuned to amplify colorful design accents within the space and complement the food. All the lamps are individually addressable for on-the-fly adjustments via wall keypads or an app on the owners' phones. "We can also remotely push new programming to their lighting," says Stayner.

While the number of variables and controls at Tamarindo may seem intimidating, he notes that the wireless, individually addressable system also presented surprising opportunities after installation. "For us as architects, not lighting designers, this really opens up possibilities," Stayner adds. "It's great to have this level of control, especially for a hospitality setting." ■

credits

ARCHITECT: Stayner Architects – Christian Stayner, principal; Jonathan Anthony, Robert Michel, project designers; John Guinn, terrazzo development and fabrication

ENGINEER: Rory O. Zack

GENERAL CONTRACTOR: Stayner Properties

CLIENT: Sarah and Pedro Resendiz

SIZE: 3,000 square feet

COST: withheld

COMPLETION DATE: May 2019

SOURCES

LIGHTING: Ketra (D3 downlights, S30 PAR lamps, G2 linear accent luminaire, A20 lamps, N4 Hub, N3 Satellite Control)

STRUCTURAL SYSTEM: Simpson Strong-Tie, Rosboro

WINDOWS & DOORS: Western Window Systems

SKYLIGHTS: Velux





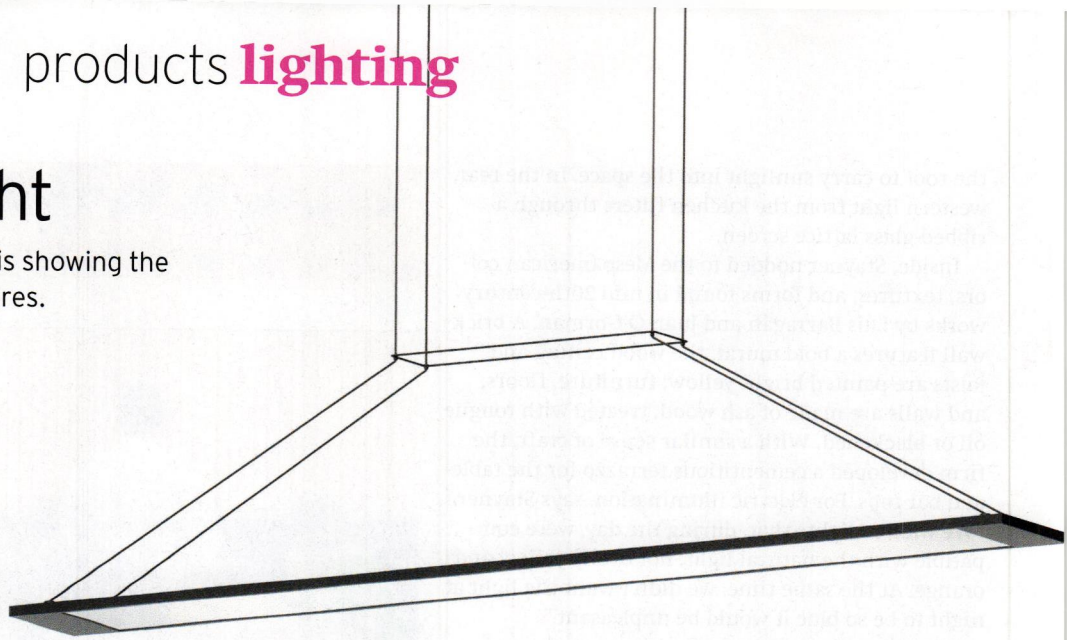
DELICATE BALANCE Ketra D3 downlights showcase the rear bar in a color temperature consistent with the dining area (top); in the evening, the system dims down to a gentle glow, with ample light above the tables.

PHOTOGRAPHY: © LIZ KUBALL, COURTESY KETRA

The Speed of Light

Continuously advancing LED technology is showing the way to more creative and innovative fixtures.

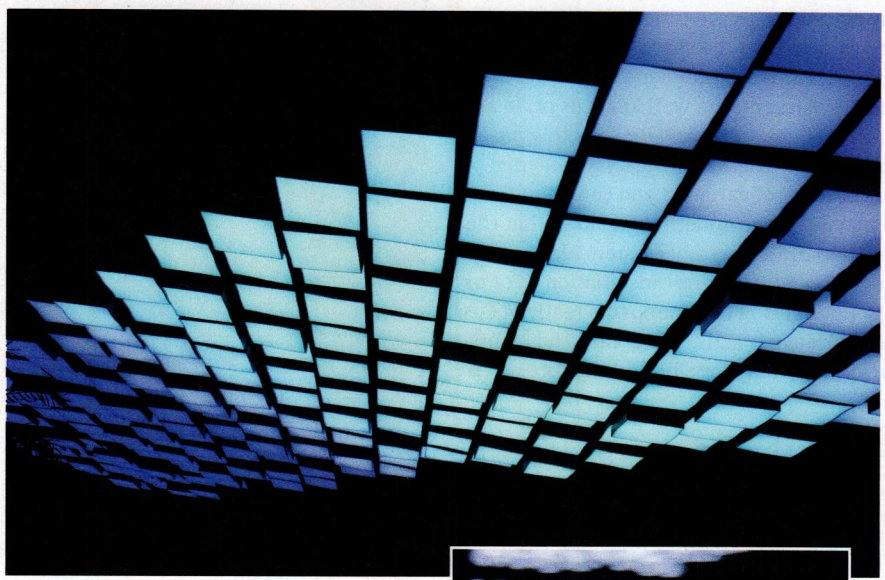
By Sheila Kim



Perfile
Rubber-encased cables create an eye-catching linear structure while suspending a single 40"-long x 4¾"-wide edge-lit panel measuring just ½" thick. The flat panel emits 2,600 lumens of 3,000K light and is encased in aluminum, with a bright satin aluminum, satin black, or satin white finish. The covered cables and canopy are coated to match, and the 6'-long drop cord is adjustable for a range of ceiling heights.
sonnemanawayoflight.com

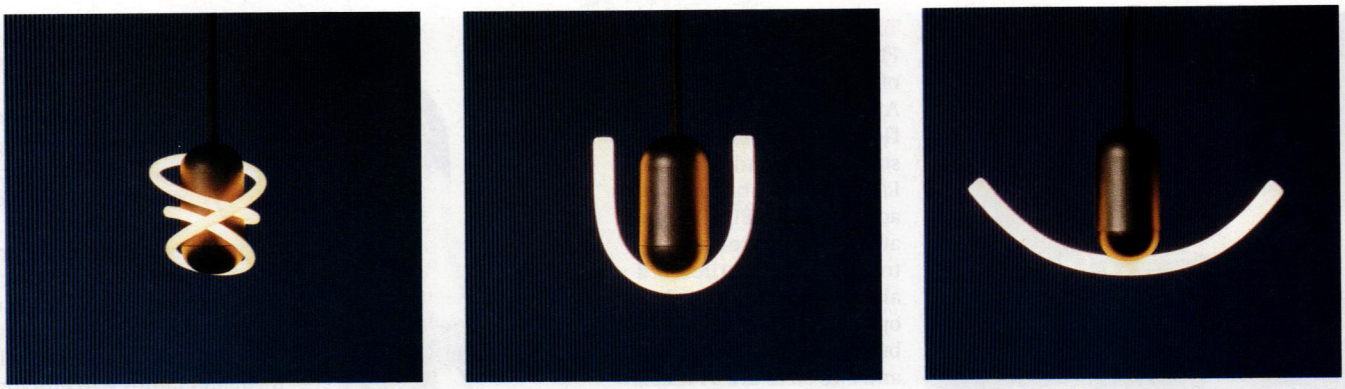


Slope
A modern take on the conventional outdoor post light, Slope sports a thin, angular disc-shaped luminaire cantilevering from a slim, unornamented pole. The disc, which measures 18¼" in diameter, slopes down at a subtle 9° angle to a thickness of under 1" at its thinnest point, and is specifiable with an 18- or 36-LED array. Column, wall-mounted, and back-to-back versions are also available. Depending on the component and model, up to four powder-coat finishes are offered.
landscapeforms.com





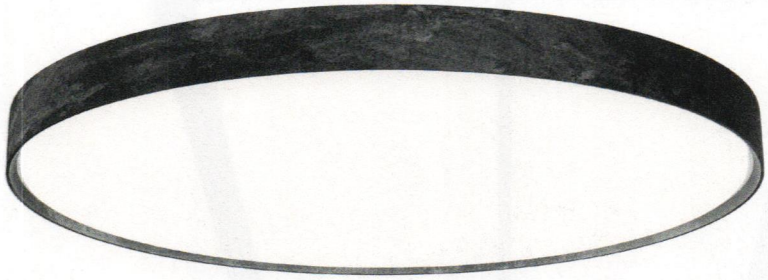
Cubic Sky
Originally created for a resort in Puerto Rico, this canopy was designed by multidisciplinary architecture and software-engineering studio Cactus. This system comprises 15"-square LED-lit acrylic and aluminum squares, individually controlled via a tablet-based interface (also created by Cactus), that can be configured to suit myriad custom applications. The controls manage color, intensity, patterns, and animation.
cactus.is



Curli and Smile

Newly available in the U.S., these pendant luminaires from British brand Beem marry graphic and industrial design with technology and whimsy using flexible LED tubes. The three different Smile versions feature bent sandblasted borosilicate-glass diffusers, while Curli sports a polycarbonate asymmetrical coil. All are attached to a black ceramic, capsule-shaped base. Exclusively available in North America through Ameico.

ameico.com



LP Slim

A simple light-filled circle makes LP Slim universally complementary to any architectural and interior scheme. Available in recessed, semi-recessed, surface-mount, and pendant options, the fixture comes in three diameters, ranging from 9¾" to 26⅔", and four rim finishes: raw dark aluminum, gray aluminum, black, or white.

louispoulsen.com

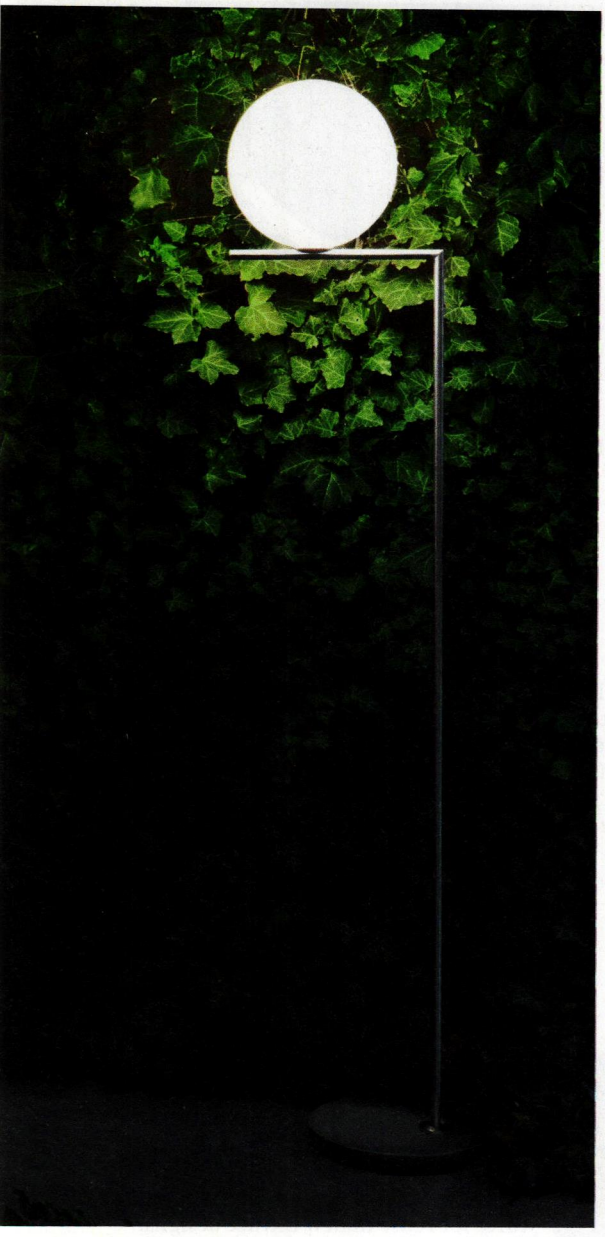


3-D-Printed Luminaires

Supporting a circular economy, tailor-made 3-D-printed fixtures from Signify are made with flexible, 100% recyclable polycarbonate. Commercial clients can return the luminaires to the manufacturer for reuse in new fixture designs. An additional environmental factor is a reduced carbon footprint compared with that of metal luminaires, since they weigh less and are fabricated in—and shipped from—factories close to urban areas of various continents.

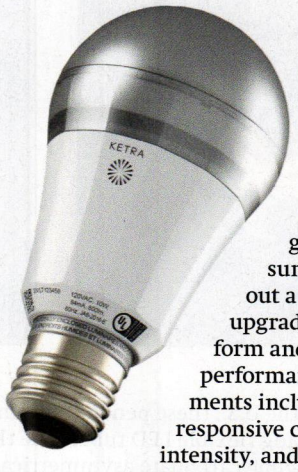
signify.com

products **lighting**



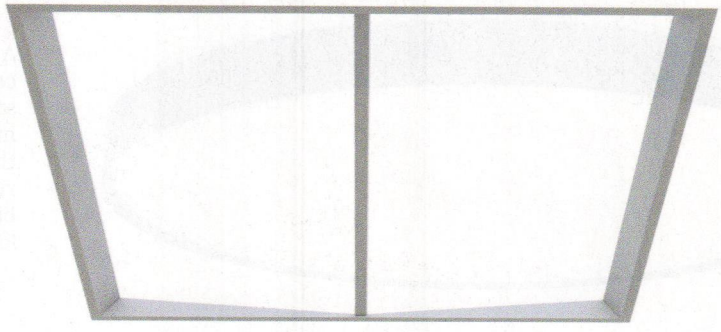
IC Lights Outdoor

Flos tweaked the materials of this popular Michael Anastassiades–designed floor lamp to render it suitable for outdoor use. Like a delicate balancing act, its white LED-illuminated glass sphere rests on top of a slim, cantilevered aluminum stem. Four base options, such as brushed brass on a gray lava stone, and two sizes are available: 53" (delivering 180 lumens) and 73" (1,100 lumens).
usa.flos.com



Next-Generation Ketra Lighting

Ketra already has a reputation for high-quality LED lamps and controls, which accurately render color and can be programmed to follow the sun's progression throughout a day. Recent engineering upgrades to its software platform and lamps will enhance performance. These improvements include: a smoother, more responsive control of temperature, intensity, and color; greater vibrancy of the surroundings; and a vastly wider range of white color temperatures.
ketra.com



Versify

This sleek LED troffer uses edge lighting to spread the light more evenly across the lens surface, better conceal individual LEDs, and reduce glare—without reducing output. It is available in four sizes—1' x 2', 1' x 4', 2' square, and 2' x 4'—and an overall depth of just 2". Options include tunable-white light (from 2,700K to 6,500K) and discreet integrated motion sensors.
hubbell.com



Smart 1.9

Modular Lighting Instruments' miniature downlight line has three new flange designs, all measuring just under 2" in diameter with an aperture of less than 1½". Customization options include finishes in black, white, or gold for square or round finish plates and trims; lamping in 2,700K, 3,000K, or 3,500K color temperatures; and a choice of frosted-, solite-, or clear glass diffusers. Each lamp can deliver up to 311 lumens of light.
supermodular.us

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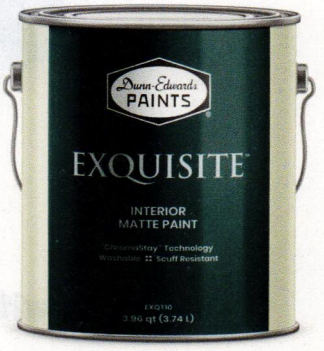

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Hospitality and Retail Go Green

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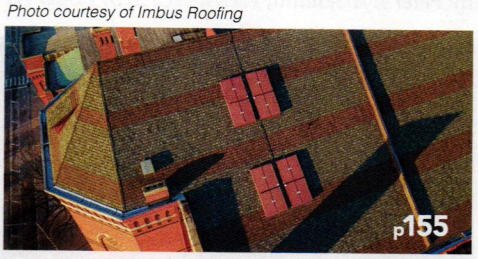

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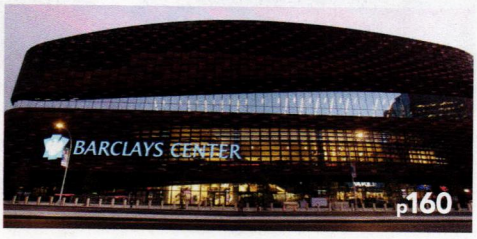

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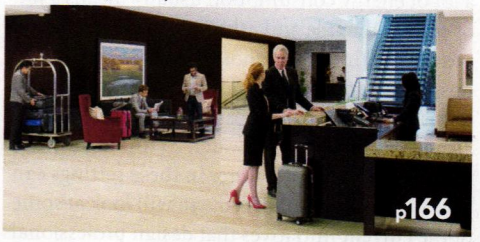

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Hospitality and Retail Go Green

Checking in to luxury and energy efficiency

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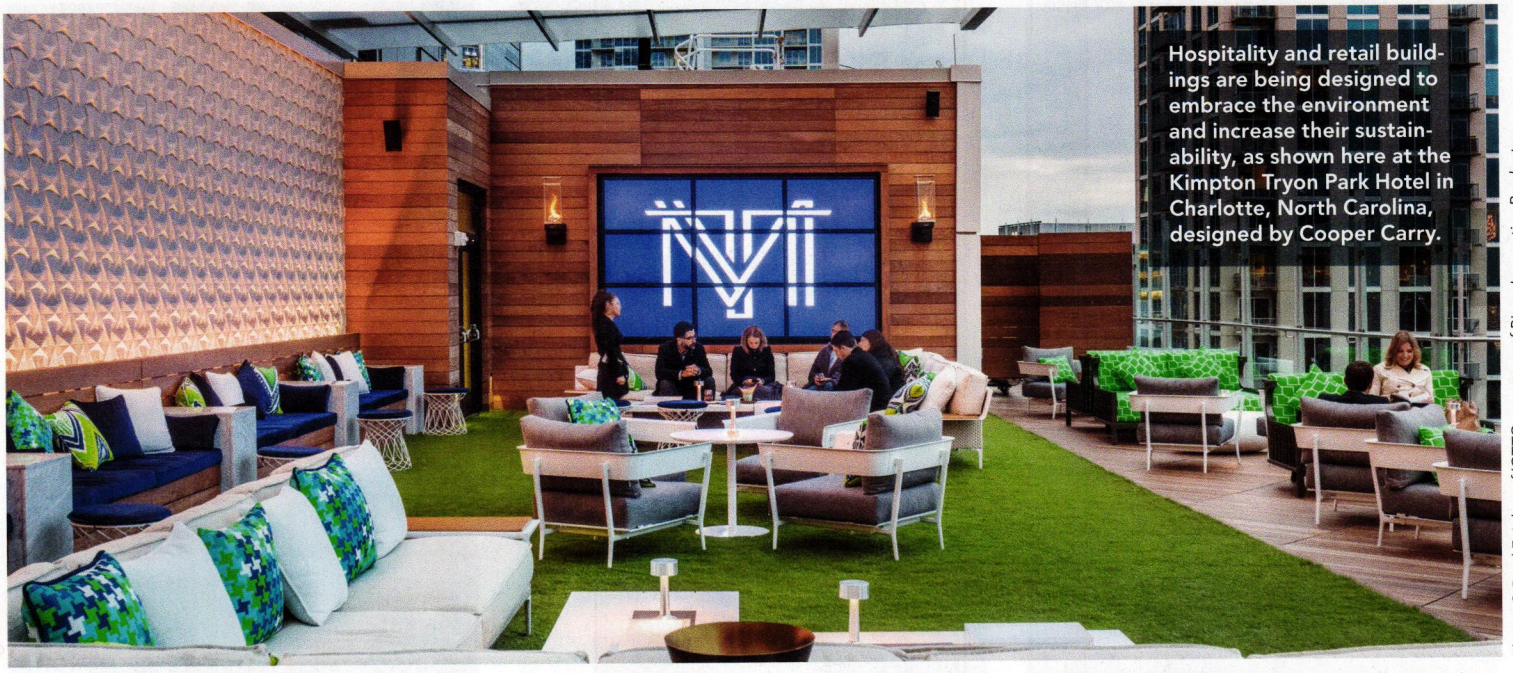
By Peter J. Arsenault, FAIA, NCARB, LEED AP



Hospitality and retail buildings are being designed to embrace the environment and increase their sustainability, as shown here at the Kimpton Tryon Park Hotel in Charlotte, North Carolina, designed by Cooper Carry.

Photo: © Brad Feinknopf/OTTO; courtesy of Bison Innovative Products

The transformation of the building industry to be greener and achieve better energy performance over the past several decades is evident everywhere. While great progress has been made, there is still more to do, particularly in the hospitality and retail sector, which is typically a very large consumer of energy. Since a lot of energy consumption usually means a lot of carbon dioxide and other greenhouse gases are emitted into the atmosphere, designers of hospitality and retail buildings are in a position to make a big impact. Hospitality buildings are also large consumers of water, so finding ways to manage and conserve water in these settings can also be significant. This course will look at some of the current initiatives that design professionals can tap into and some examples of strategies that can be employed to reduce these aspects of the environmental footprint for hospitality and retail facilities of all types.

INDOOR/OUTDOOR SPACES

There are many cases in hospitality and retail settings where taking advantage of an outside space connected to an indoor one is very desirable. Doing so can create either positive or negative impacts on the energy performance of the building, depending on how it is done. The issue becomes one of control between the indoors and outdoors. A great example of this is the use of operable glass walls. When open, they provide a seamless connection between indoor and outdoor spaces, often reducing the need for constructed square footage, while providing natural ventilation to the interior. When closed, high-performance operable glass walls become part of the building envelope, providing a thermal separation between indoors and outdoors while still allowing natural daylight and views.

The key to a successful project is the selection of a quality operable glass wall product that can handle the daily commercial grind that a hospitality and retail environment requires (i.e., has demonstrated traits of reliability, long-term durability, ease of use for the employee, etc.). To contribute to the green and sustainable aspects of the building, it needs to meet the challenges of changing weather and environmental conditions, such as wind, water, and large temperature swings. Of course, it also needs to fit in with the building structural system, resisting impacts and forced entry. Fortunately, all of these components can be specified into operable glass walls, making them excellent candidates for meeting the desires of hospitality and retail clients while still addressing energy performance, carbon contributions, and green building.

How does this all play out in design? Opening glass walls enable hotel designers to create large, inviting entrances, incorporate beautiful views,

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Learning Objectives

After reading this article, you should be able to:

1. Identify and recognize the health and welfare benefits of indoor and outdoor spaces that are high performance and provide connections to the natural environment.
2. Assess the health and sustainability aspects of bathrooms in hospitality and retail buildings.
3. Explain the importance of proper evaluation and selection of materials for sustainability and green building concerns.
4. Determine ways to incorporate the health and welfare design and performance principles presented directly into buildings as shown in case studies.

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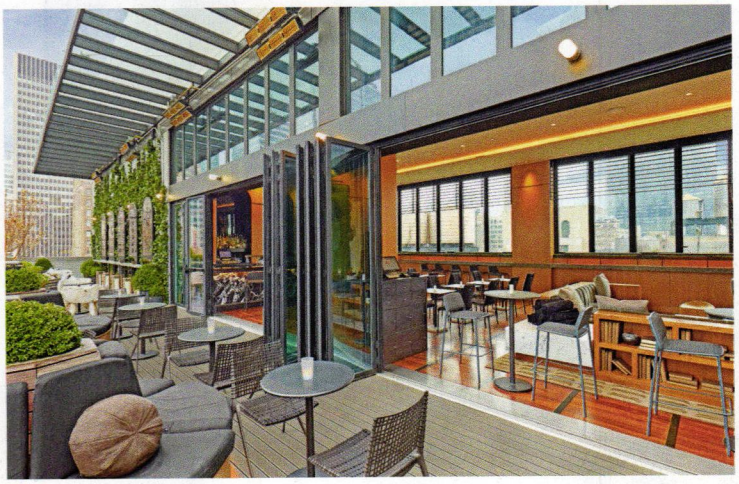

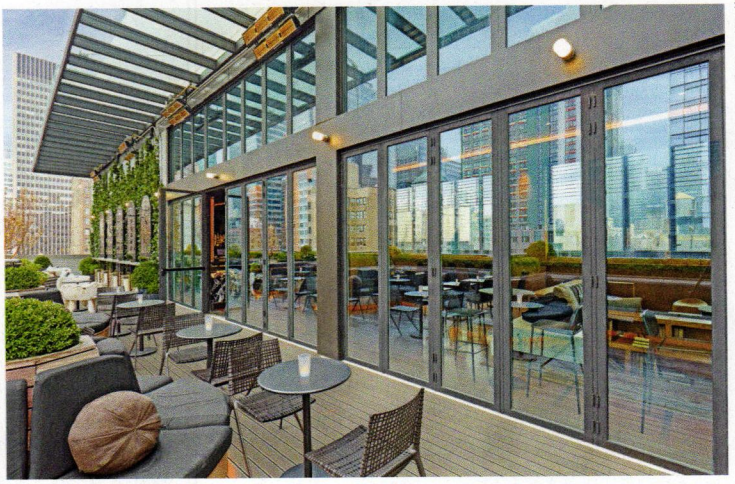

Photos courtesy of NanaWall

Opening glass walls provide great design flexibility for hospitality and retail spaces while at the same time offering performance options consistent with green and sustainable design.

connect with hotel landscaping, and provide natural daylight and fresh air into registration, dining, and guestroom areas. For retail spaces, a wide-open entrance eliminates barriers by creating a seamless transition between street and store, attracting customers inside, which can lead to an increase in sales. With expanded display areas, shoppers are enticed and are readily drawn deep into the store. When it is time to close, the storefront can continue to showcase the interior and provides a secure, energy-efficient, transparent facade that seals tight as an energy-saving and dust-control measure after-hours. Restaurants can boost revenue with increased seating capacity and enhance dining experiences by installing opening glass walls to open a restaurant's interior to surrounding outdoor spaces, whether a roofed or open patio.

From a performance standpoint, operable glass walls must keep the cold on the outside while maintaining warmth inside in heating season and vice versa in cooling season. All of the usual means to do that are available in operable glass walls, including glazing choices, air infiltration details, and frame options. The products must provide superior humidity and moisture control while resisting wind-driven water from entering the establishment. To meet security concerns, opening glass wall locking mechanisms must be easy to use. Opening glass walls can be specified to be very secure through robust systems that securely lock each panel in place.

ROOFTOP AND OUTDOOR SPACES

Accessing outdoor spaces is desirable in retail and hospitality settings because it is appealing to guests, potentially profitable to building owners, and environmentally sustainable. Outdoor spaces are seen as amenities in many settings, allowing guests to have a more enjoyable experience enhanced by fresh air and the outdoor environment. Bringing more guests to the venues, whether for events or day-to-day activities, means more business for the owners. When those outdoor spaces are roof decks or terraces, they present an opportunity to design them as green roofs or other sustainable spaces. The key becomes how to create them without damaging the existing roofing systems.

The answer to this design challenge is often found in modular and versatile deck systems that are supported by adjustable pedestals. Such systems give architects the design flexibility to create unique and beautiful rooftop environments and outdoor amenity spaces. Adjustable pedestal deck systems can be utilized over any structural surface: on bare structural decks, rooftop decks, roof membranes, green roofs, plazas/terraces, compacted grade, pavement, pool surrounds, or even inside water features. The surfaces can include a mix of paver materials, such as wood, stone, structural porcelain, crushed rock, grating, artificial turf, and concrete. Additionally, planter cubes and benches can be added to create unique, custom looks. As a fully finished system, it can accommodate restaurants, hotels, retail, and other commercial buildings.

Green roof deck designs demonstrate imagination in the use of materials that minimize maintenance and the environmental footprint. Incorpo-



Photo: © Mike Schwartz; courtesy of Bison Innovative Products

The 21c Museum Hotel in Oklahoma City incorporates adjustable deck pedestals and 2x2 smooth 8-plank ipê wood tiles to crown the hotel's rooftop deck. The attractive space includes outdoor lounging, recreation, and green roof areas framing the Ford assembly plant's water tower from the original Albert Kahn design.



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rating a pedestal system can provide pedestrian access to these green roofs and can expand usable space to include gardens and walkways. Similarly, pedestal deck systems help reduce cooling loads of the building because they create a separate, protective layer above the roof that allows air to flow between the deck and the roof.

Adjustable deck systems are commonly available that incorporate three types of components.

Deck Supports

High-density polypropylene plastic that is 100 percent recyclable is a common material to make the adjustable deck supports from. This makes them impervious to water, mold, and freeze-thaw cycles. Their adjustability offers tremendous design flexibility and, compared to traditional deck building materials and methods, provides one of the most labor- and cost-efficient methods of creating a flat, level deck over a sloped surface. As a gravity system, the supports do not penetrate but rather protect roofing and waterproofing membranes, thus causing no damage or harm to the surface below. Adjustable pedestal systems can support decks over occupied space, allowing space for electrical systems, duct work, and irrigation. Pedestal systems are available in a range of heights and weight-bearing capacities to suit a variety of applications. Residential, commercial, and industrial grades each have different characteristics, so deciding which system to specify is dependent on the support and elevation requirements of the installation.

Deck Surfaces

Deck supports are designed to elevate a variety of surfaces, including granite or concrete pavers, wood tiles, composite materials, fiberglass grating, and conventional joist systems. Any modular deck surface material can be removed for routine maintenance, repairs to the roof, or to gain access to other systems. Wood tiles are particularly popular for their light weight, ease of workability, and attractive appearance. Wood tiles can be laid in a parquet or linear pattern, or mixed with pavers, river rock, stone, plank decking, or other options to create unique aesthetics. Often made from hardwoods, wood species include fused bamboo, cumaru, garapa, ipê, mahogany, and massaranduba that are commercial grade and available in standard and Forest Stewardship Council (FSC) certified products. Many of these tropical hardwoods have a rich grain and color, are exceptionally dense, weather very well, and are resistant to insects. The density of hardwood species means there is minimal maintenance. If maintaining the wood color is desired, wood tiles can be periodically cleaned and sealed. Left to weather naturally, they will develop a silvery-gray patina.

Photo courtesy of Bradley Corp.



Commercial bathrooms incorporate a variety of materials, most of which can be selected from sustainable or green product choices.

Site Furnishings

Manufacturers of pedestal deck systems also offer coordinated, modular elements that are designed to integrate with their deck systems while giving the architect complete design flexibility. For example, modular cubes made from ipê or high-strength aluminum in an array of colors and finishes can serve as planters or include a top for seating and/or storage. Cubes commonly have drain holes and irrigation sleeves that make caring for plants or vegetables convenient and hassle free. Storage can be used for seasonal items like cushions or throw pillows. Similarly, aluminum rock trays that are light weight and durable add dimension and texture to deck areas. Deck designs can even include recessed lighting to enhance the ambiance of the environment while improving visibility and safety during nighttime or other dark conditions.

Overall, pedestal systems create valuable, usable outdoor space for both owners and their clients, customers, and visitors. Rooftop decks are a way for hospitality or retail spaces to differentiate themselves from the competition.

SUSTAINABLE BATHROOMS

In hospitality and retail settings, bathrooms typically get a lot of use, which means they deserve a lot of design attention. This is true not only for design and functionality but also sustainability. Manufacturers of products used in bathrooms have addressed these points by paying attention to several areas that contribute to green bathroom design. Some of the more significant points in this regard are discussed as follows.

Water Consumption

Water-conserving toilets and faucets are mandated by codes. Manufacturers have embraced this need by providing fixtures that dispense adequate amounts of water with the appearance of abundance. Newer, touch-free handwashing fixtures feature a 0.5 gallon per minute (GPM) or ultra-high-efficiency 0.35 GPM faucet option.

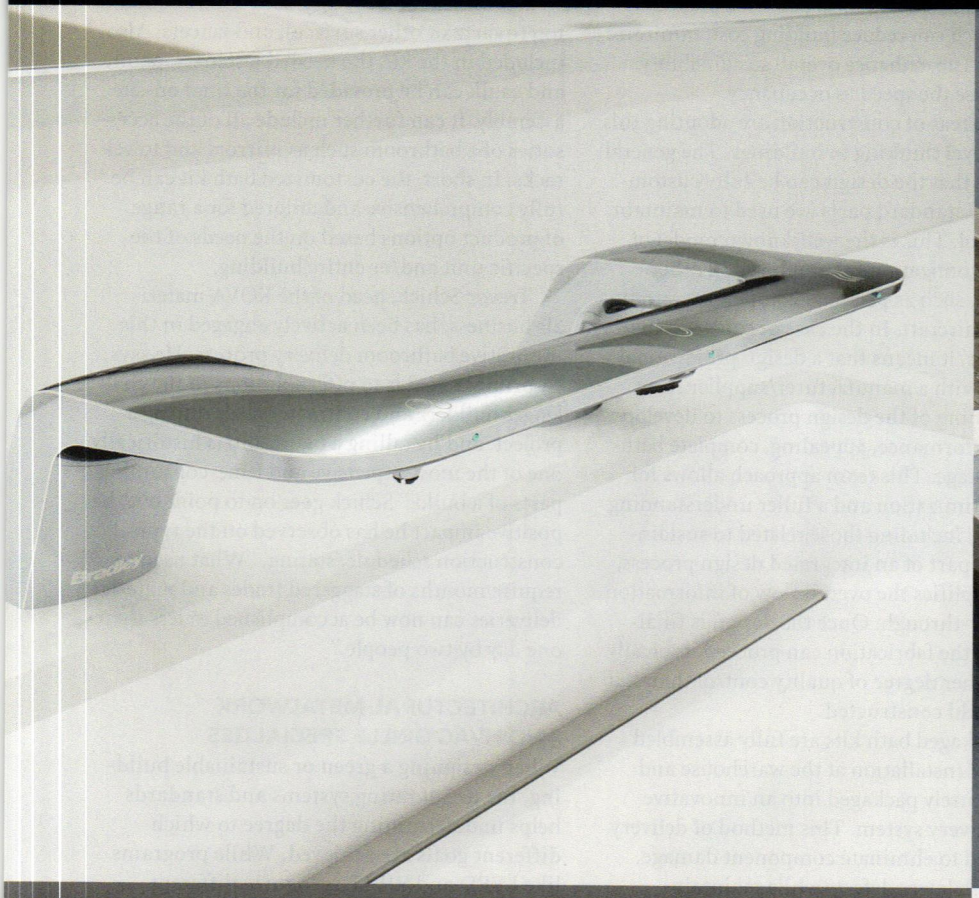
Materials

A variety of materials can be specified into bathroom designs that have better life-cycle assessment properties than others. For example, natural quartz material has become appealing because it can be molded into round and curved shapes providing stunning design options while providing high performance in terms of long-term durability and hygiene. Made from natural materials, such as quartz and granite, plus pre-consumer recycled content and a bio-based resin, natural quartz can contain up to 70 percent natural content and is available as a GREENGUARD certified product.

Similarly, solid-surface material can last longer than some other material choices and easily be repaired and renewed, thus minimizing the need for replacement or disposal. Products made of solid surface are completely molded, including bowls, overflows, backsplashes and aprons, eliminating fabrication waste and the use of sealants and adhesives. Solid surface is a nonporous material, which means that it will not support the growth of mold, mildew, or bacteria—substances that can adversely affect indoor air quality. Recycled solid surface



TOTAL TRANSFORMATION





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composed of bio-based resin and pre-consumer recycled granules is another GREENGUARD certified option.

Commercial bathroom accessories made of stainless steel can be specified from manufacturers who incorporate both recycled content and renewable energy in its manufacturing process. Up to 100 percent of the energy required for the production of some stainless steel bathroom accessories can be offset with renewable energy. These accessories can also be made from a combination of post-consumer and pre-consumer stainless steel.

Design Innovations

By using manufacturing innovations and processes, recycled packaging and materials, and award-winning product design, manufacturers are improving their contributions to green building design. While this is helpful, they also offer completely touch-free handwashing technology that conserves water and paper while cutting maintenance costs. Touch-free, adjustable-speed hand dryers, for example, cut paper towel waste and are 96 percent less expensive to use than paper towels.

A particular innovation that helps all around is the development of a combination fixture that provides soap dispensing, water, and drying all in one, touchless, easy-to-use approach. This helps reduce consumption of water and energy while keeping everything in one place at the sink, thus helping with the overall cleanliness of the bathroom as well. The sensors in such devices can be programmed to eliminate simultaneous activations of nearby functions, thus saving wasted water and energy.

Kris Alderson, senior marketing manager, Bradley Corp., informs, "Commercial bathroom manufacturers are providing architects and other design professionals with innovative technologies and products that conserve water and energy and incorporate sustainable materials." This is good news for everyone. It is, however, up to the design professionals to select and specify accordingly.

PREPACKAGED BATHROOMS

In hospitality settings, the number of bathrooms located throughout the building is typically quite high. Even if each one is small, as in a hotel guestroom, the fact that there is one in every guestroom plus more in common areas means that their cumulative overall impact is high. This is true in terms of affecting the building design, the amount of square footage needed, the sustainability of the project, and the project budget. Given all of this, it is not surprising that a number of companies have developed prepackaged bathrooms that are designed to reduce these impacts by optimizing the way that bathroom components are ordered and installed. This prepackaging approach can reduce building cost, minimize material waste, enhance overall sustainability, and increase the speed to occupancy.

Many areas of construction are adopting this systems-level thinking to buildings. The general premise is that the design can be fully customized, while standard parts are used to maintain cost control. This is the well-known model of "mass customization" as employed in other industries, such as personal computers, automobiles, and aircraft. In the case of constructing bathrooms, it means that a design professional can work with a manufacturer/supplier from the beginning of the design process to develop a high-performance, appealing, complete bathroom package. This team approach allows for design optimization and a fuller understanding of options, including those related to sustainability. As part of an integrated design process, it also simplifies the overall flow of information and follow-through. Once the design is finalized, then the fabrication can proceed, typically with a higher degree of quality control than if it were all field constructed.

Prepackaged bath kits are fully assembled in order of installation at the warehouse and can be securely packaged into an innovative cradle delivery system. This method of delivery is designed to eliminate component damage, resulting in lower defects while maintaining quality products. As they are completed, based on an agreed-upon schedule, the final modules or packages can be trucked to the site. With proper planning, as the trucks arrive, the packaged units can be lifted with cranes and placed into position in the building as it is being constructed. That means they can be installed more quickly and with much less waste than conventional construction methods.

To expedite the remaining work in the field, a sequential installation guide can be provided by the manufacturer/assembler. The fully coordinated system can include all of the common design elements of a complete bathroom. These can include a full tub with surrounding structure, toilet and vanity with sink, countertop (quartz or other surface), and faucets. Also included in the kit, the needed fasteners, paint, and caulk can be provided for the final on-site assembly. It can further include all of the accessories of a bathroom such as mirrors and towel racks. In short, the customized bath kit can be fully comprehensive and tailored for a range of product options based on the needs of the specific unit and/or entire building.

Trevor Schick, head of the KOVA materials business, has been actively engaged in this innovative bathroom delivery process. He says, "A primary goal is to offer solutions to the challenges builders and contractors face during a project, and installing a bathroom is historically one of the most expensive and time-consuming parts of a build." Schick goes on to point out the positive impact he has observed on the typical construction schedule, stating, "What used to require months of staggered trades and material deliveries can now be accomplished in less than one day by two people."

ARCHITECTURAL METALWORK AND HVAC GRILLE SPECIALTIES

When designing a green or sustainable building, the use of rating systems and standards helps in determining the degree to which different goals are achieved. While programs like LEED and WELL recognize different certification levels, allowing designers to pick





Photos courtesy of KOVA

Custom-designed, prepackaged bath kits are ideal for streamlining the process of installing multiple bathrooms into hospitality buildings, among others.


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and choose which attributes to pursue, full certification in the Living Building Challenge (LBC) requires that 100 percent of the building needs comply with the criteria. The LBC does allow recognition for individual petals that make up the total program, but all of the requirements for the petals must be met. The implication of this total approach is that everything in the design and/or specifications for a project needs to be looked at through the lens of a truly regenerative, healthy, and positive built environment. This can be easy to think of for the major components of a building such as structure, facades, finishes, etc., but total compliance means that it applies to specialty products too, such as accessories, trims, grilles, and similar items used in a building.

To illustrate this concept, let us take a look at a common and required product in most hospitality and retail buildings in the form of metal grilles, which cover HVAC openings or can be used for decorative and supporting purposes in walls, floors, and ceilings. Of course, there are choices in such products, and many come with a variety of attributes. They can offer a high-quality, custom product, giving architects and designers the freedom to design with luxury decorative metalwork and still be mindful that they are getting an environmentally friendly product. Aluminum is widely used in heating, ventilation, and air conditioning because of its resistance to corrosion and the extremes of heat and cold. It is also fully recyclable and can be reused time and time again with no loss in quality.

Green aluminum products are available for interior and exterior applications, which can provide a functional and aesthetic solution for architects and designers when trying to achieve certification for projects.

When used in a building pursuing LEED or LBC certification, architectural grilles need to be looked at and assessed on several fronts:

- **Recycled metal content:** Up to 94 percent post-consumer content recycled aluminum is possible and should be part of the specification for linear bar grilles, perforated grilles, or custom-fabricated products.
- **Durability and ease of maintenance:** The most sustainable product is one that lasts and does not need to be replaced or repaired unduly over time.
- **Finishes:** If any finish is used on the grilles, it needs to have low or zero volatile organic compound (VOC) content to qualify for a health-related certification. Some powder coatings that are electrostatically applied and then cured under heat without the use of solvents may be the best choice here.

Just like other products used in a building, the use of Declare labels issued by the International Living Future Institute can be asked for and used to compare different manufactured products based on the relevant criteria above. This information can be used for LBC projects, but note too that Declare has been approved as a compliance pathway for the LEED v4 Building Product Disclosure and Optimization Credit, Option 1. Regardless of the program being pursued, all products of all sizes and types used in a building need the transparent data and information that such declarations provide.

Photos courtesy of ARCHITECTURAL GRILLE



Aluminum HVAC grilles with 94 percent post-consumer recycled content used in green buildings or following the Living Building Challenge are as significant as any other building product when total compliance with standards is required.

Edward Wawrynek, a customer service specialist with ARCHITECTURAL GRILLE, informs, "Manufacturers of metal specialties are committed to sustainability, responsibly sourcing recycled metals, and using environmentally friendly, non-Red List materials in our manufacturing processes. Some are able to meet Living Building Challenge requirements and are certified to provide eco-friendly grilles to hospitality and retail buildings or other projects." Specifying accordingly improves the sustainability of hospitality buildings where they are used.

DESIGNING WITH COILED WIRE FABRIC

In hospitality and retail settings, there may be a need to provide a degree of separation between different spaces without the use of a solid wall or partition. In fact, it may even be desirable to provide some controlled connectivity between spaces for visual, airflow, sound, or other reasons. A number of different products have been used to achieve this effect, particularly in interiors, but an emerging, innovative choice is the use of a coiled wire fabric. Such products are different from traditional metal mesh materials in that they are designed as architectural products for use in a variety of ways.

Coiled wire fabric is a durable, thin material that is lighter in weight than traditional wire mesh and offers more design flexibility. For interiors, architects and designers can use coiled wire fabric for curtains, ceiling treatments, wall coverings, security gates, and even as complete partitions, all adding elegance and purpose to spaces. On hospitality and retail exteriors, it can be used for sun shading, security protection, resilience enhancements, or aesthetic facade treatments. It is available with a range of attachment systems, allowing for different building conditions and finish treatments. The material can be left to hang (i.e., flowing freely) or secured at both the top and bottom and pulled taut to create a semi-rigid condition. Because of its fabric nature, curved and undulating shapes are easily achieved, providing interiors with more character and vitality than rectilinear shapes alone.

Coiled wire fabric can contribute to green building design in a number of ways. It has been tested and shown to be an easy and attractive way to save on air-conditioning costs by limiting the amount of sunlight entering the building. When used on the interior of windows, coiled wire fabric can reduce energy consumption by up to 5.7 percent and up to 21.3 percent when used for exterior shading scrim panels. Uniquely, the metal fabric does not block views to the outside like typical window curtains do. For retrofit applications where advanced high-performance glazing has not been installed, coiled wire fabric systems can be especially effective.

As a metal material, coiled wire fabric is a durable product with a long service life. It can contain recycled content and is 100 percent recyclable when it is removed from service. When used on building interiors, it is worth noting that no toxic chemicals are used in the

material's manufacturing process. Some even carry Declare labels, indicating the degree to which human health and the environment are protected by the products. Declare labels give consumers full transparency on the product, including where it comes from, what it is made of, and where it goes at the end of its life cycle.

SPECIFYING COILED WIRE FABRIC

When selecting a coiled wire fabric system for a hospitality or retail project, there are a lot of different choices in the details of how it can be specified. Following are some aspects to keep in mind when specifying and designing with this innovative material.

- **Material makeup:** Coiled wire fabric systems begin with a base metal wire in varieties of steel, aluminum, brass, copper, and stainless steel. The choice of the wire material and its gauge impact the weight, functionality, and aesthetics of the final fabric. By altering the base material, wire gauges, weave pattern, and finishes, the strength, rigidity, and appearance can all be chosen to meet thte design or performance characteristics being sought. It is worth noting that the fabric is available in virtually unlimited widths and up to 40 feet in length or height, so large installations can be achieved with a single panel in many cases. For projects needing more than a 40-foot span of fabric, multiple coils can be spliced together at the job site in a routine fashion and still create a continuous appearance.
- **Light transparency:** Coiled wire fabric will allow light to pass through, but how much and how visually transparent it appears will be based directly on the specified makeup of a particular fabric. Those with thicker wires and tighter weaves will allow less light than those with thinner wires and more open weaves. Architects and designers can vary the level of transparency by altering these factors to suit their needs. Fullness is another factor that designers can alter to vary the level of light able to pass through the coiled wire fabric. By using more material than what is required to cover a given area, a billowing drapery effect may be achieved, causing the mesh to overlap, which can be used to allow in more or less light.
- **Formability:** As with any fabric type of product, coiled wire fabric is free flowing and flexible. That means it can be formed and shaped to create undulating or curved surfaces, flat taut surfaces, or a combination of any of these. This allows for a high degree of creativity in how spaces are defined and articulated, both for walls and ceilings.
- **Color:** Coiled wire fabric is available in either a natural, uncoated state or with resilient powder-coating finishes for a sharp, long-lasting aesthetic. The color choices are broad, allowing it to be a successful part of virtually any design scheme. Further, the finishes can be specified with low VOC content or even Declare labels to protect human health when used on interiors.
- **Performance traits:** Coiled wire fabric can be used for light diffusion to further enhance the interior ambient lighting of a space. In appropriate strengths, it can provide partitioning for safety, fall protection, blast mitigation, and security. Further, if there is an interest in extending its use to the exterior, the material is durable enough to withstand those rigors as well.
- **Cost-effectiveness:** Compared to the full construction of rigid partitions or other separation elements, coiled wire fabric is a very affordable option. It is also more economical than commercial woven wire mesh that is typically designed for other purposes. This affordability lets architects and designers flex their creativity, produce signature interior designs, and turn projects with modest budgets into something unique, innovative, and responsive to project needs.

Designers who recognize the innovative uses of this product and its green building traits can achieve successful outcomes in hospitality and retail settings.

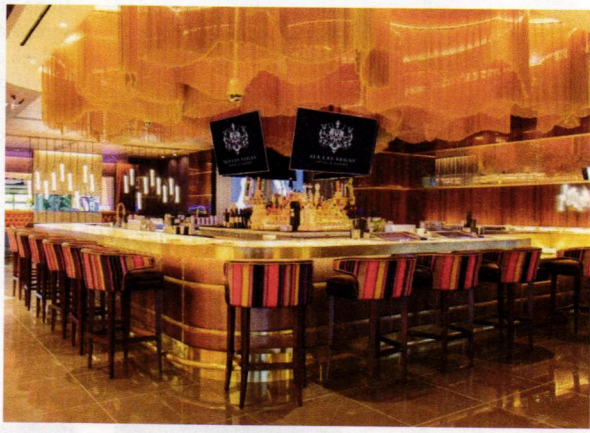
CONCLUSION

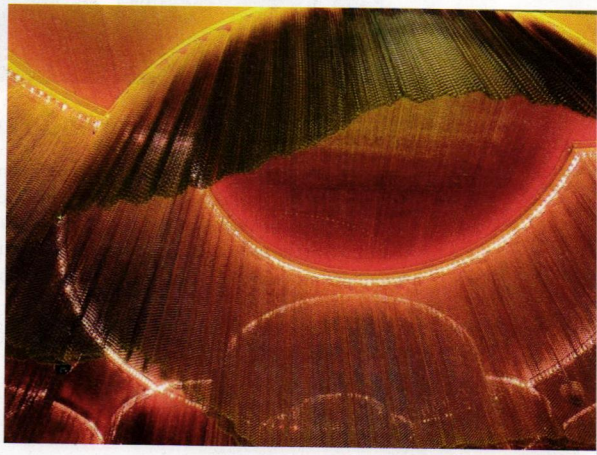
Hospitality and retail facilities have the opportunity to demonstrate a wide variety of green and sustainable building practices. This is true when incorporating innovative ways to create and link indoor and outdoor spaces. It can make an impact in bathroom design and in prepackaging of the components of multiple bathroom units. Focusing on materials that use recycled metals in innovative ways assists in reducing the environmental footprint and achieving green building certifications. Overall, hospitality and retail buildings can be a big part of the modern green building movement.

Continues at ce.architecturalrecord.com

Photos courtesy of Cascade Architectural







The Casbar Lounge at the Sahara Hotel in Las Vegas uses coiled wire fabric to provide separation and connectivity between spaces while also acting as an artistic light screen.

Peter J. Arsenault, FAIA, NCARB, LEED AP, *is a nationally known architect, consultant, continuing education presenter, and prolific author advancing carbon positive buildings by design.* ***www.pjaarch.com, www.linkedin.com/in/pjaarch***

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PRODUCT REVIEW

Hospitality and Retail Go Green

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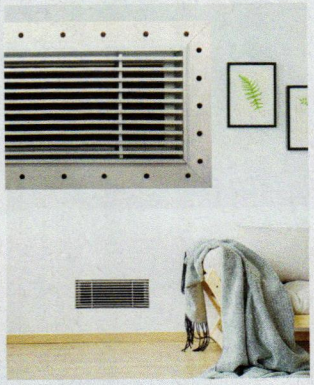

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Minimalist design at its best, the original Spackle In J-Frame Grille offers an easy, clean-line installation method for wall and ceiling HVAC applications. It uses common drywall screws and spackle to achieve a sleek aesthetic finish with no visible mounting screws to detract from the overall visual design of the space.

www.archgrille.com

Bison Innovative Products

Image courtesy of Bison Innovative Products



Rooftop Deck Systems

Manufactured in the USA with 20 percent post-industrial recycled materials, Bison Pedestals create level decks over sloped surfaces. They elevate and support wood tiles, pavers, site furnishings, and a variety of other surfaces. Bison Wood Tiles are commercial grade, constructed from sustainably harvested hardwoods, and available in standard and Forest Stewardship Council (FSC) certified options.

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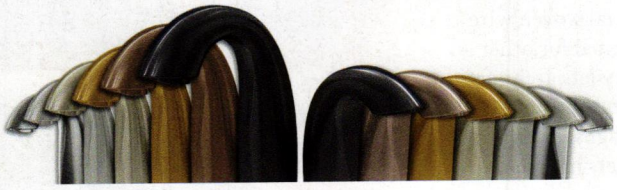

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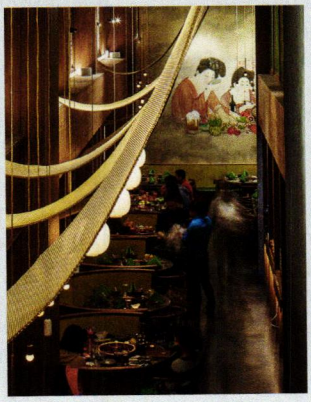


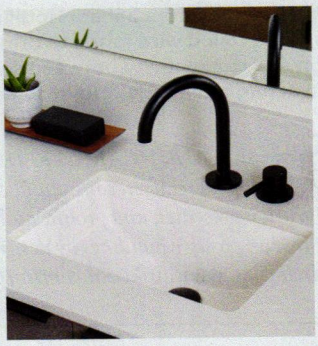
Fabricoil® Coiled Wire Fabric

At Tang Hotpot, Fabricoil® adds a layer of translucency and mystery to the space while integrating perfectly with the restaurant's modern design. Fabricoil also reflects light in various directions for a beautiful diffusion throughout the dining area. The space is highlighted by the shimmering artisan-crafted copper pots and floating copper mesh by Cascade Architectural.

www.cascade-architectural.com

KOVA

Photo: Adrian Delsi



Plumbing Fixtures

KOVA and KOVA SELECT plumbing fixtures blend seamlessly with a variety of styles, balancing form and function to ensure ergonomic comfort and sleek design. Thoughtful modular configuration systems allow KOVA to work from a standard kit of parts to deliver multiple products with a range of configurations.

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NanaWall

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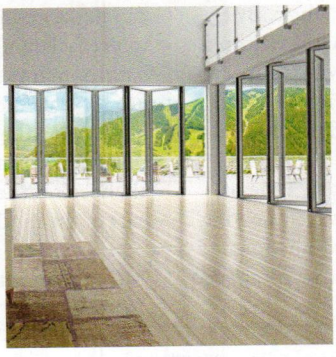

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The Building Science of Floor Systems

Vapor drive can be just as important in crawl space wood floor assemblies as it is in wall designs

Sponsored by AdvanTech® subfloor assembly | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*



Photo courtesy of Huber Engineered Woods, LLC

Floor assembly systems are concealed once construction is complete. When they are over crawl spaces, the goal is not to also conceal moisture problems.

Building science in wood-framed buildings has been widely used to address issues related to moisture migration, air leakage, and vapor diffusion, most commonly in wall and roof assemblies. However, all of these same dynamics take place in floor assemblies too, especially when a crawl space is used for the foundation type below the floor. It is further exacerbated in warm and humid climate zones, which seem to be the areas where crawl spaces are most common. In some cases, whether by design or by chance, moisture buildup in the floor assembly has not been a significant problem. However, the recent popularity of resilient flooring being used over wood subfloors, particularly luxury vinyl tile (LVT) or luxury vinyl plank (LVP), has been discovered to create some risk. Such vapor-impermeable flooring does not allow a floor assembly to dry to the interior if it does absorb moisture, causing deterioration, mold, and mildew issues that have routinely been so widely addressed in walls and roofs.

Continues at ce.architecturalrecord.com

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Learning Objectives

After reading this article, you should be able to:

1. Identify and recognize the health and safety issues of moisture and vapor drive in wood-framed floor assemblies, particularly over crawl space foundations.
2. Investigate the building code requirements and exceptions related to crawl space design, ventilation, and protection of the structure.
3. Assess the characteristics of subflooring and finish flooring materials that can contribute to moisture and vapor issues in a wood floor assembly.
4. Review best practices and identify solutions as found in building projects that incorporate the principles presented for successful, safe floor construction.

To receive AIA credit, you are required to read the entire article and pass the test. Go to **ce.architecturalrecord.com** for complete text and to take the test for free.

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Photo courtesy of Imbus Roofing

Automatic smoke vents were installed on the roof of the Cincinnati Music Hall when the 140-year-old facility underwent a major renovation.

Fighting Fires and Saving Lives in Large, Single-Story, Undivided Buildings

A closer look at the need to incorporate automatic smoke vents into these designs

Sponsored by The BILCO Company | *By Jeanette Fitzgerald Pitts*

A tragic truth about building codes is that they are often based on the tough lessons learned from disasters that could have been avoided. Fire safety is a perfect example of this phenomenon. Consider the Great Chicago Fire of 1871, which was supposedly started by Mrs. O'Leary's cow knocking a lantern into hay, fueled by the massive number of constructions of wood and other combustible materials hastily erected to serve Chicago's rapidly growing population, and finally stopped when it ran out of fuel. The fire destroyed one-third of Chicago's buildings and killed 250 people. As a result, fire and building codes changed the spacing and material requirements that were used for reconstruction.

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***Jeanette Fitzgerald Pitts** has written nearly 100 continuing education courses exploring the benefits of incorporating new building products, systems, and processes into project design and development.*

CONTINUING EDUCATION

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Learning Objectives

After reading this article, you should be able to:

1. Explain why using automatic smoke vents in large, single-story, undivided buildings became common after the 1953 General Motors fire and the standard that was developed to guide the design of these life-safety systems.
2. Understand how automatic smoke ventilation changes the development of a fire in large, single-story, undivided buildings, and the benefits that this fire- and life-safety product provides.
3. Identify the applicable fire- and life-safety codes that dictate the use of automatic smoke ventilation.
4. Specify the automatic smoke vent that is best suited for the unique needs of a project.

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Natural design materials, such as wood ceiling systems, contribute to occupant well-being by fulfilling a fundamental human need: connection with nature.

All photos courtesy of CertainTeed

Natural Materials in Biophilic Design

In creating a direct connection to nature, wood ceilings and wall systems can boost occupant health, well-being, and productivity

Sponsored by CertainTeed | *By Barbara Horwitz-Bennett*

There is no question that a walk in the park, the fresh air, and the sun's warmth on one's skin surrounded by grass and trees is a refreshing, positive experience.

Driven by a growing body of research proving the physical, physiological, and emotional benefits promoted by connections to nature, architects and designers are actively incorporating natural elements, particularly wood, into their designs.

Biophilia—or the the love of living things, as translated from ancient Greek—was first coined by the renowned psychologist Erich Fromm in 1964, in describing humans' attraction to things that are alive and vital. It was then popularized by biologist Edward O. Wilson in the 1980s in response to urbanization's growing disconnection with nature.

While civilization has lived an agrarian existence for centuries, with people predominately living among nature, the advent of the Industrial Revolution changed all of that.

"Throughout history, humans have been reliant upon and connected to nature for basic needs of food and shelter," says Pamela Lucas Rew, AIA, partner, KSS Architects, Princeton, New Jersey. "As we transitioned to an industrial society, we have become more dependent upon machines and technology for our basic needs and less connected to nature. This decreased connection to nature has a negative impact on our ability to relax, concentrate, control stress, socialize, and collaborate."

To help rectify this, the integration of natural materials into architectural designs is a growing phenomenon. And although biophilic design is not a new concept, companies and institutions are recognizing its positive impact on individuals' comfort, attitude, and health in their daily lives.

Although an indirect connection to nature has always been a strong component of architecture, biophilic design is now taking center stage, according to Angelica Paleczny, AIA, LEED AP BD+C, interior designer at global design firm Perkins and Will in Chicago.

While plants and greenery are generally associated with biophilia, designs also extend to water, natural light, stone, and wood. Countering concrete, smog, and noise, a well-designed biophilic environment can provide an oasis of calm and serenity, reconnecting occupants to a healthier outdoor environment.

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Learning Objectives

After reading this article, you should be able to:

1. List the factors driving biophilic design with natural materials in commercial spaces.
2. Identify the research-proven physical, physiological, and emotional benefits of biophilic interiors, particularly wood.
3. Review the design and installation details of various wood ceiling and wall systems and their applications.
4. Discuss the pros and cons of natural wood, engineered wood, and faux wood products in relation to biophilia and other sustainable design factors.

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Because of its wide-ranging aesthetic benefits and performance applications, wood emerges as a particularly effective material for biophilic design strategies.

WOOD AND BIOPHILIA

Wood occupies its own special niche in biophilic design, doubling as a building material and, in some cases, a structural element. In most scenarios, well-executed wall and ceiling designs can create a unique warmth and feelings of comfort for occupants.

"The natural grain patterns and textures, the natural aroma, and the warm colors contribute to reducing stress responses, lowering blood pressure, and improving overall mood," says Gary McNay, AIA, LEED AP BD+C, ILFI Ambassador, academic planning and design at Gensler, Atlanta.

Nash Emrich, senior sustainability consultant at Paladino and Company, Grand Forks, North Dakota, agrees: "There is no question that I behave and feel differently when I am hiking a mountain, floating a river, or riding single track through the trees. I do not feel this sense of wildness, perspective, and freedom when surrounded by concrete in a city or stuck in a typical office building looking at plastic furniture, ceiling tiles, and fluorescent lighting."

To counter this, Paleczny explains that surrounding one's day-to-day life with natural elements brings the comfort of nature into the interior, and it gives visual and tactical reminders of the environment beyond the walls.

Overall, biophilic design also offers sustainability benefits, such as reduced energy consumption by utilizing daylight and reducing artificial light, and better air quality by using natural materials with healthy ingredients.

"But the primary economic benefit has to do with the occupants of the building and their productivity," says Joey-Michelle Hutchison, RA, LEED AP BD+C, CSBA, senior associate, vice president of CallisonRTKL, Seattle. "Payroll is one of the biggest expenses of just about any U.S. business and biophilic design can increase employee satisfaction and productivity, and reduce employee absenteeism and turnover—which are all significant positive economic benefits."

MAKING THE CASE

Delving into the growing cache of biophilia research, many aspects of physical and emotional health are boosted in biophilic environments.

One formative concept, the Attention Restorative Theory, was introduced by University of Michigan Professors of Psychology Rachel and Steven Kaplan in their book, *The Experience of Nature: A Psychological Perspective*. The theory, which has been borne out by additional research, states that humans' ability to concentrate is finite and taxed throughout the day as they encounter numerous stimuli. Contact with nature serves to replenish those resources, thereby enhancing focused attention and memory, and reducing mental fatigue and stress.

Along these lines, a recent study at the University of Melbourne found that something as quick as a 40-second break in nature—regardless of whether its outdoors or indoors—increases one's ability to concentrate by 6 percent.

Another interesting approach called *shinrin-yoku*, or forest bathing, is the ancient Japanese practice of restorative walks through natural settings, most often forests. The efficacy of this method was best illustrated in one study that took 87 non-insulin-dependent diabetics and monitored their blood glucose levels over the course of six years.[1] The project compared the effects of taking 3- to 6-kilometer walks through the forest with exercising on indoor treadmills and indoor pools. While indoor exercise reduced blood glucose levels by 21.2 percent, forest bathing decreased blood glucose by 39.7 percent.

In the bigger picture, Lucas Rew explains that research supports the categorization of five basic human needs that can be satisfied by the connection to nature. These include the following:

- **Community:** People feel comfortable collaborating when they understand their place within a given community.
- **Identity:** People can be creative when they understand the defined identity of a place.
- **Navigation:** People can afford to be curious when they feel safe to explore and navigate an environment with ease.
- **Transition:** People can be confident when they control the way they transition from one space or activity to another.
- **Choice:** People can be independent when they have the choice to control their own experience.

Despite all of these benefits, the bottom line often proves to be the most convincing argument. In analyzing how much organizations spend on their personnel versus other business expenses, more than 100 times more, on average, is spent on people than on energy costs within the workplace.

Continues at ce.architecturalrecord.com

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Well-designed spaces with the appropriate quantity and quality of natural daylight, like Benenden Hospital in the United Kingdom, help create spaces that are good for both buildings and people.

Photo: Alex Upton

Optimizing Daylight in Different Buildings

Not all buildings are the same, and neither are their daylighting solutions

Sponsored by Kalwall® Corporation | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*

Incorporating daylight into buildings is a fundamental yet sometimes challenging design issue. At the most basic level, sunlight provides natural lighting and a connection to the outdoors for the people inside the building. However, simply letting sunlight into a building means that the light level and quality are largely uncontrolled—the building receives whatever the sun and sky provide. More sophisticated approaches focus on intentional, controlled daylighting, including the locations of the light in the building, the intensity or amount of light, the color properties of the light, and the ability to disperse or diffuse the light so as to control glare. In this course, we address the implications of incorporating a balanced daylighting approach within the design of buildings. We also look at the specific impacts of well-designed daylighting on the people who use the buildings. This includes a discussion of the attributes of light quality and some of the current methods to analyze, predict, and achieve the most appropriate results for a particular building.

DAYLIGHTING IN BUILDINGS

Bringing daylight into buildings has been a primary design goal of buildings throughout history. In times before the introduction of artificial electric lighting, it was often a critical design element not only for functionality but also symbolism representing life and vitality in some cases. This combination of the practicality

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1 GBCI CE HOUR

Learning Objectives

After reading this article, you should be able to:

1. Identify and recognize the characteristics of daylighting in buildings that are designed to be green and sustainable.
2. Investigate the health and welfare benefits of daylighting for people who occupy or use different types of buildings.
3. Assess the performance considerations of different types of glazing systems used for daylighting to balance green building design needs.
4. Explore new advances in computer simulation used to analyze and optimize daylighting performance into a specific building design in a specific location.

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and design feature capability of daylight has been used in a wide range of forms and techniques for centuries. This has been dictated, in large part, by the available building technologies of each time period and location, but has included openings to let in sunlight that is direct, reflected, diffused, or otherwise captured and dispersed. In some cases, this has been controlled through the use of shutters, baffles, or windows, while in others, there have simply been openings in the walls and/or roofs of buildings.

In recent decades, additional significance has been placed on daylight. As buildings have become more tightly constructed and the use of mechanical and electrical systems has become integral to design, sunlight has become a friend of buildings in need of heating or lighting energy and a foe of those needing cooling energy. Too little daylight in a building requires more artificial electric lighting. Too much daylight can create unwanted glare that will cause people to block it with shades, blinds, etc. and turn on the electric lights. It can also produce a higher cooling load from the direct solar gain that requires more electricity to address. This has given rise to a considerable amount of effort by code developers, design professionals, construction teams, and product manufacturers to find the best balance between beneficial daylight and overall energy performance in buildings.

Adding to the mix is the understanding that the "best" solutions certainly vary based on the geographic location of the building, the climate, the time of year, and even the time of day.

An additional significant feature of daylight is the health and wellness aspects it brings to the building occupants. Working or functioning in the proper amount of light is both a fundamental and reasonable expectation of people in buildings. The Illuminating Engineering Society of North America (IESNA) is the nationally recognized source for determining what is really meant by "proper amount of lighting" in different situations. The organization describes itself as The Lighting Authority® and "seeks to improve the lighted environment by bringing together those with lighting knowledge and by translating that knowledge into actions that benefit the public." By using data generated by the IESNA based on years of studies by experts and input from users, design professionals can determine how much light (measured in lux) is appropriate, within acceptable ranges, for particular building situations.

Beyond quantity of light, other significant organizations including the National Aeronautics and Space Administration (NASA), different branches of the U.S. Military, major universities, and the National Institute of Health (NIH) have all done work related to the quality of light for human purposes. Based on their work, it is fair to say that simply adding more light is not always the best solution, but rather, factors including the intensity, color, direction (direct or diffuse), and other aspects of the light are equally if not more important. It is often these light quality issues that are tied to the health and wellness of people inside buildings, particularly when they are produced by daylighting schemes.

STUDIED BENEFITS OF DAYLIGHTING

Since the year 2000, a fair number of independent studies have looked at the benefits and consequences of different types of light on people. Recognizing this body of work, the design community has responded either directly or through some well-known organizations. The LEED green building rating system, for example, has included a recognition of the benefits of daylighting since its inception. A number of credits and points in this popular system are directly tied to established knowledge in several areas, including energy optimization and indoor environmental quality.

First, related to the impacts on energy consumption, calculations or computer modeling are encouraged that demonstrate the areas in the building that can benefit from daylighting. Not only should those areas allow artificial lights to be turned off, but they should also lower the cooling load by eliminating internally generated heat from the electric lights. Nonetheless, these benefits need to be balanced with the overall impact that additional solar heat gain into the building will create on cooling requirements. The overall intent is for energy optimization and a notable reduction in the carbon footprint of the building.

Second, related to occupant welfare, LEED and the WELL Building Standard both look at indoor environmental quality issues. WELL delves deeper into the details of the impacts on people, but both programs address similar concerns in regard to daylighting, all based on cited sources, research, and standards. In particular, the intent is to use natural daylight to enhance and stimulate indoor environments while balancing performance, value, and aesthetics. There is specific attention given to prioritizing the appropriate control of light color and intensity, which has been shown to greatly help with natural, circadian, biological rhythms in people.

Continues at ce.architecturalrecord.com

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Photo: Jeffrey Totaro

People who spend time in buildings with natural daylighting, such as Hudson County High Tech High School in New Jersey, have better outcomes than those who do not get enough daylight.

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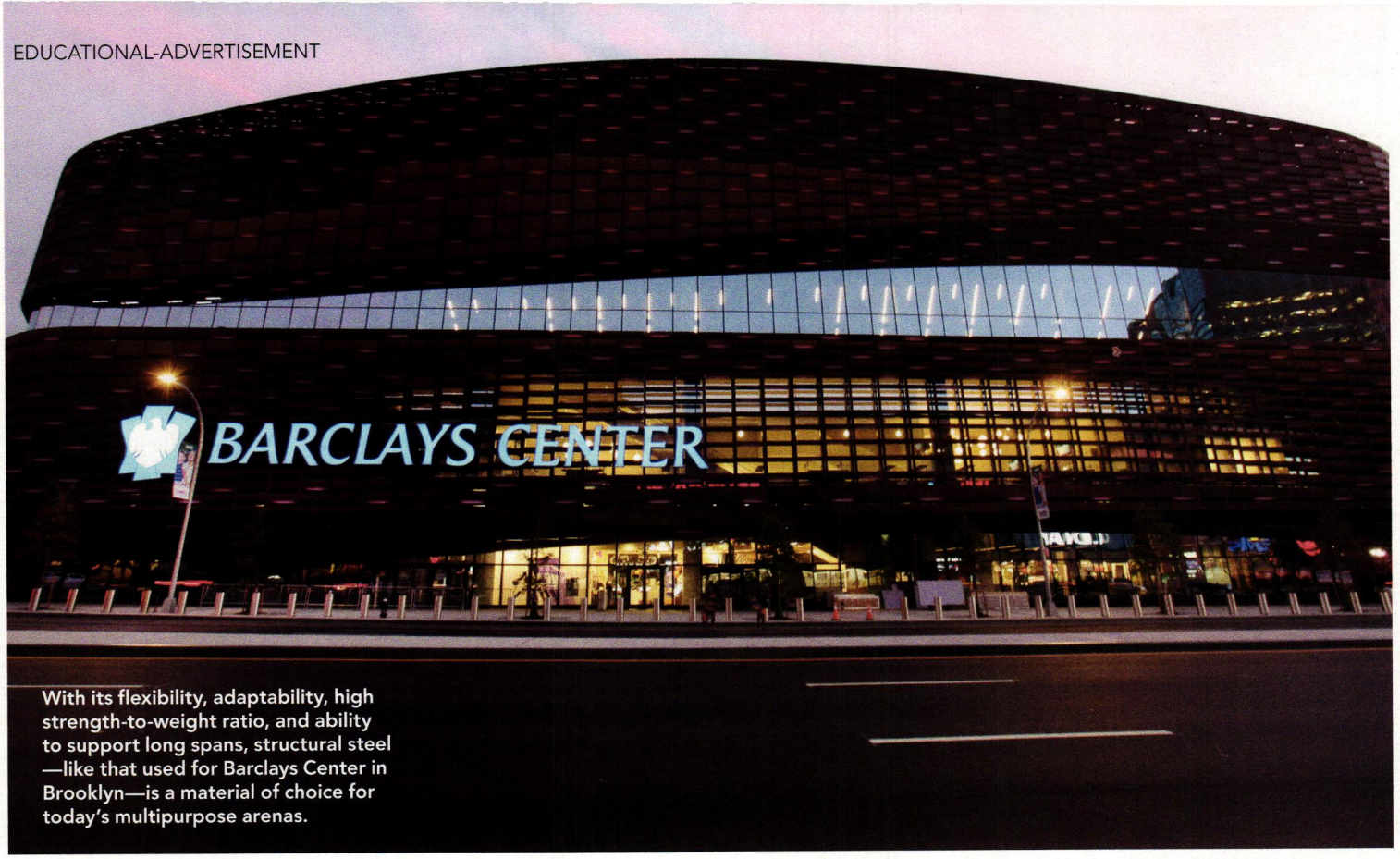

With its flexibility, adaptability, high strength-to-weight ratio, and ability to support long spans, structural steel —like that used for Barclays Center in Brooklyn—is a material of choice for today's multipurpose arenas.

Photo courtesy of Thornton Tomasetti

Adapting to Change: Arenas Rely on Steel

Structural steel delivers the flexibility and adaptability required by today and tomorrow's multipurpose arenas

Sponsored by The Steel Institute of New York | *By Barbara Horwitz-Bennett*

In the battle for fans and audience members, today's multipurpose arenas are boasting bigger and better scoreboards, over-the-top amenities, and unique and varied seating options to lure spectators out of their homes (and off of their smartphones) and into the arenas to watch the games, competitions, and concerts.

Arenas, as opposed to larger stadium venues, have the nimbleness to support the quick and varied changeovers required by the variety of events and attractions utilizing the spaces. However, to optimally support current and future venue needs, these arenas must have the ability to adapt and upgrade.

One key aspect of this equation is the roof design. "The roof often comprises the largest surface area on an arena, and the vast, unobstructed program space it shelters below offers maximum flexibility for reconfiguration and reuse," states John Cerone, principal, SHoP Architects, New York.

In fact, seating bowls and support spaces are constantly being reinvented to support trending fan behaviors, says Bart Miller, PE, principal, senior project manager, national sports market leader, Walter P. Moore, Houston. Tasked with frequent renovations, it behooves arenas to anticipate future structural support and flexibility needs from the onset.

"Effective planning and informed decision-making early in the design process can save millions in construction costs and generate millions in future revenues," Miller explains. "Structural steel allows for the most flexibility in structural modifications, as it can be economically configured for optimal column locations and structural framing depths that allow for contiguous open spaces and increased ceiling heights, and it can be easily reinforced or removed in the future if necessary."

In addition to sporting events, infrastructure must be built to accommodate top music performers and tours.

"Concerts are asking more of arena roof structures with each new tour by applying heavier and more numerous loads, often that move, distributed over much larger areas than ever before," Miller reports.

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Learning Objectives

After reading this article, you should be able to:

1. Summarize multipurpose arenas' evolving needs for adaptability and flexibility to service a variety of venues.
2. Discuss the benefits of structural steel roofs for arenas, including their light weight, high strength-to-weight ratio, and ability to support growing high-capacity rigging load requirements.
3. List key factors that must be considered when designing a long-span arena roof.
4. Review the structural design details of noteworthy steel roof retrofit projects.

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HIGH-CAPACITY RIGGING GRIDS

Consequently, one of the critical design decisions for a long-span roof system is the evaluation of loading assumptions for concert rigging and scoreboards, explains Jeff Callow, PE, LEED AP, principal, Thornton Tomasetti, New York. "No one wants to have tours turn their facility away because they are limited on what they can do and hang from the roof," he says.

As venues compete for concerts and other events, arenas that have suitable show rigging capacity, frequent and useful points to rig from, and are easy and safe to access are at a great advantage, confirms Brian A. Dickson, PE, SE, senior principal, Magnusson Klemencic Associates, Seattle.

"A clever, experienced arena roof design will integrate the catwalk provisions and rigging points seamlessly into the roof design from the outset," adds Peter Aryes, global service leader, structural, for Aurecon, an engineering firm active in the Australian and South African market with a specialty in arenas and stadiums.

Putting things into perspective, venues designed as recently as 10–15 years ago can generally support rigging grids of up to 100,000–120,000 pounds concentrated over the center and end stages only. Now those grids are proving inadequate, as today's heaviest arena shows—such as Kanye West, Drake, and Game of Thrones—can exceed 250,000 pounds with loads distributed widely across the entire venue roof structure.

In response, many venues are now looking to increase their rigging grid capacity and coverage, which often necessitates the addition of rigging beams and may require strengthening of their primary roof structures. "In planning a new facility, owners should consider proportioning their rigging grid to extend across the entire event floor, be configured for optimum speed and accessibility, and provide far more capacity than they think they will need," recommends Miller. "The construction costs associated with additional capacity and coverage are nominal, making it much wiser to build it now than to retrofit later."

STRUCTURAL STEEL ROOFS

In addition to supporting high-capacity rigging loads, structural steel for long-span roof structures is arguably the "right system" for arena and event centers, asserts Dickson.

"Structural steel is familiar and readily available in nearly any market, can accommodate nearly any desired shape, and can span distances of 300 feet to 400 feet with ease," Miller states.

Additionally, steel structures can be retrofitted by selective structural strengthening of the existing shapes and/or connections to achieve greater capacity.

As a lightweight material with a high strength-to-weight ratio, structural steel supports long spans, which is ideal for fabrication and erection. By manufacturing the members into smaller pieces, they are easier to transport and move onto the job site, where they are then attached. "The versatility of using either bolted or welded connections provides fabricators and erectors with ultimate flexibility in selecting fabrication processes and installation techniques that fit their equipment, capabilities, and often limited project schedules," Miller explains.

Steel can also be attached to existing concrete structures, or in many cases, columns can be threaded through the existing structure to provide support for new roof elements, adds Cristobal Correa, PE, principal, structures, Buro Happold, New York.

The structural steel members can be easily modified, strengthened, or removed in the field, which is especially important for multipurpose venues with evolving functional, operational, and aesthetic requirements.

Offering some more insight into why steel is particularly suited for large spans with less distance between the columns/supports, Charis J. Gantes, Ph.D., professor of structural engineering, National Technical University of Athens, Greece, explains that as the span increases, the stresses increase proportionally to the square of the span and the deflections proportionally to the fourth power of the span—or in other words, very quickly. It then becomes very difficult to satisfy the stress/strength and deflection/serviceability constraints.

One strategy is increasing the section, but this is not very effective because then the self-weight also increases. Besides adding to cost, this also adds to the weight that the structure must sustain. Gantes explains that in large spans, the structure mostly carries itself, with little reserve left for live loads, and at a certain span length, the structure cannot even carry itself. "Therefore, for large spans, such as in arena roofs, it is effective to use materials that have high allowable stress to satisfy strength constraints and high modulus of elasticity to satisfy serviceability constraints. This makes steel the best and perhaps only choice," he says.

This issue of minimizing the self-weight of the structure is of primary importance, emphasizes Craig Tracy, vice president, WSP, Montclair, New Jersey, as every pound of self-weight robs capacity from the structure to support external loads, such as snow, wind etc., and each square inch of structure that is added to support self-weight requires more material to support that added weight.

"The inefficiency of this structural tail-chasing is minimized by using materials that have the best strength and stiffness/modulus relative to their density," Tracy states. "Comparing the best materials available for construction today, one finds that structural steel has a 50 percent higher specific strength and 30 percent higher specific modulus than concrete."

Continues at ce.architecturalrecord.com

Barbara Horwitz-Bennett *is a veteran architectural journalist who has written hundreds of CEUs and articles for various AEC publications.* ***www.bhbennett.com***

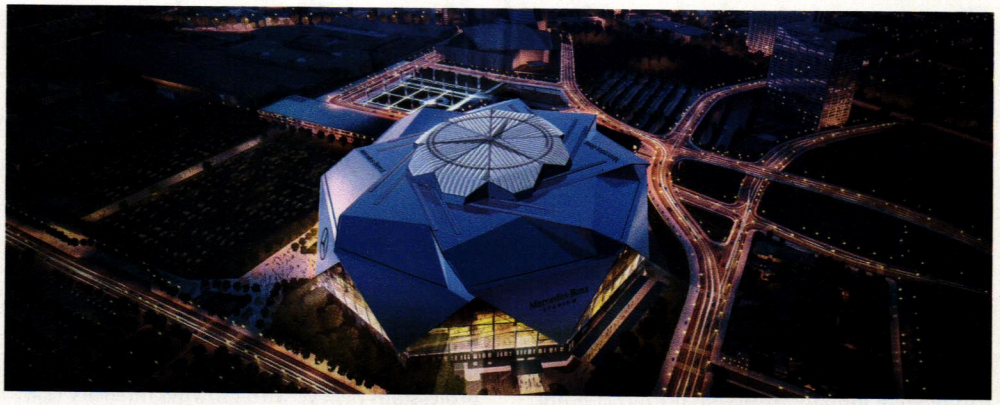

Image courtesy of AMB Sports & Entertainment

Retractable roofs offer the best of both worlds—an authentic outdoor fan experience and a comfortable, temperature-controlled environment on cold, rainy, or exceptionally hot days—as shown here at Atlanta's Mercedes-Benz Stadium.

Steel Institute of New York

The Steel Institute of New York is a not-for-profit association created to advance the interests of the steel construction industry. The institute sponsors programs to help architects, engineers, developers, and construction managers in the New York building community develop engineering solutions using structural steel construction. **www.siny.org**



Transpired solar-collector panels attached over any exterior, noncombustible, weathertight wall provide a building with preheated ventilation air.

All images courtesy of ATAS International, Inc.

Innovative Technologies for Sustainable Building Envelopes

Solar air heated walls, cool roofs and walls, and solar-ready roof design

Sponsored by ATAS International, Inc. | *By Kathy Price-Robinson*

We humans have put more planet-warming carbon into the atmosphere in the past 30 years than we had in all of human history up until that point. Many believe recent climate events demonstrate that if we do not preserve the delicate balances in the natural world that make life here possible, we are risking our very existence.

Of all the greenhouse gas emissions released into the atmosphere, some 30–40 percent of them comes from the built environment. The energy needed to ventilate, heat, and cool the air inside of buildings is responsible for a significant portion of these emissions. Experts in the design, engineering, and construction professions believe with growing intensity that creating a built environment in harmony with nature is critical for our survival.

Such is the power of metal features in building envelopes that exploit the natural forces of physics, of air and energy flow, to heat and cool buildings. This course illustrates the intelligence of specifying transpired metal walls that preheat fresh air in winter prior to

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Learning Objectives

After reading this article, you should be able to:

1. Discuss how metal cladding uses sunlight in heating climates to provide a building with preheated ventilation air.
2. Explain how cutting-edge cool roof technologies, including UV-reflective pigments and above-sheathing ventilation, provide relief in cooling climates.
3. Identify how metal roofing provides a solar-ready platform for photovoltaic systems.
4. Define how metal cladding on roofs and walls can contribute to green building objectives, including LEED certification.

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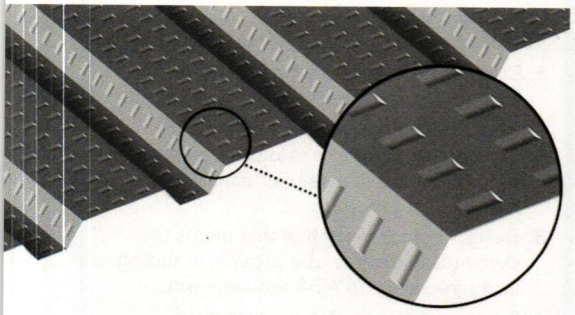
intake, cool roofing in cooling climates, and roofing that is solar ready. Not to be underestimated is the tremendous potential for LEED v4 points when designing a smart building envelope with metal features. We will begin with the surprisingly simple yet profoundly effective energy-saving strategy of installing transpired solar collectors on a building wall.

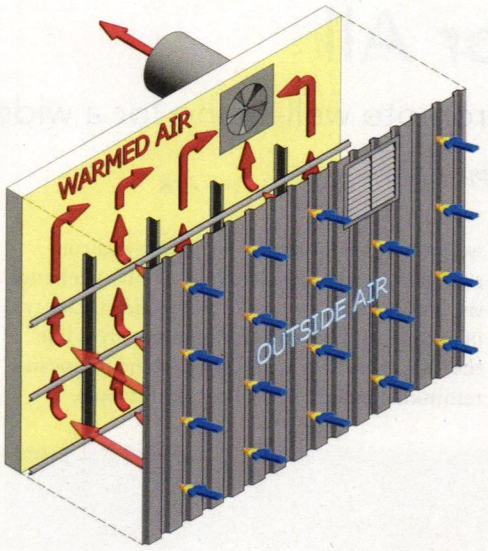
TRANSPIRED SOLAR COLLECTORS: LOW TECH, HIGH IMPACT

The phrase "transpired solar collector" may sound complex, but it is an ingeniously uncomplicated and straightforward energy-saving building system. A U.S. Department of Energy Federal Technology Alert titled "Transpired Collectors (Solar Preheaters for Outdoor Ventilation Air)," states that "transpired collectors are a renewable energy technology that is well proven" plus is "readily available and has considerable potential" for many applications.[1] A transpired solar-collector system is used to preheat outside air before it enters the building to provide fresh-air changes and natural dehumidification. As a result, it offers opportunities to reduce energy consumption in the built environment.

Here is the concept: A transpired solar collector is a perforated metal wall panel (on the market, aluminum, zinc, steel, and polycarbonate are found) that is usually mounted onto the south-facing exterior of a building (though mounts on southeast and southwest walls are also adequate to provide preheated air). The precision perforations in the wall panels allow for outside air to travel through the face of the panel. When the metal panel is exposed to sunlight, it heats up, which creates a layer of warm air on the surface of the panel. This solar-heated air is then drawn through the perforations, where it rises between the two walls and enters the building's central ventilation system or supply fan, where it is then distributed through the building's duct work.



Precision-lanced perforations allow heated outdoor air to enter the gap between the building's outer wall and metal panels.



The outside air is heated by the sun and then drawn through the perforations into the plenum. The air is further heated as it passes by the edges of the openings. It is warmed even more inside of the plenum, and then the warmed air is drawn into the building.

Imagine a brisk winter day with an ambient temperature of 20 degrees Fahrenheit. Now imagine that the air entering the building's air-handling system is not 20 degrees but instead has been preheated by the transpired solar collectors and is a relatively toasty 40, 50, or even 60 degrees depending on various factors, including instantaneous solar radiation, airflow through the collector, and outside wind conditions. The preheated ventilation air entering the building will result in a major reduction of energy use.

In summer, the same transpired panels perform as insulation, preventing the full force of solar heat from reaching the wall. However, in this season, the heated air created in the plenum bypasses the building's air-handling system and is released into the atmosphere, keeping the building cooler.

A Technology Developed by NREL

Transpired solar collectors were developed in 1989 by the National Renewable Energy Lab (NREL), as well as being developed concurrently by private researchers.

Prior to 1989, the Federal Technology Alert on transpired collectors explains, "Solar air-heating systems resembled flat-plate water-heating systems. These early systems contained a dark metal absorber, but they also had glazing—a transparent cover—that prevented heat loss to the atmosphere. Rather than pull air through the absorber, these systems heated the air flowing parallel to the absorber. Compared to transpired collector technology, these systems were less efficient because solar radiation was reflected off of the glazing, and they had comparatively poor heat transfer from the absorber to the air. They were also more expensive because of the added material cost as well as installation."[2]

Once the glazing was removed and perforations added, the system to heat intake air took on new efficacy, with higher efficiency and lower costs.

Almost Unlimited Application Potential

Transpired solar collectors are used for a variety of applications, including:

- Schools K–12
- Higher-education facilities
- Office buildings
- Medical facilities
- Government buildings
- Military facilities
- High-rise apartments
- Mixed-use facilities
- Shopping centers
- Industrial/manufacturing facilities
- Warehouses
- Agricultural buildings
- Residential (small-space heating)

How the Systems Are Installed

Transpired solar-collector panels can be installed over any noncombustible wall material and over or around existing wall openings. These systems offer ease of installation, as they do not require any special tools or skills.

First, light-gauge framing members (vertical Z-sections and horizontal hats) are attached to the wall. The perforated aluminum or zinc panels are then attached to the framing, creating an offset or a plenum. Panels are typically installed 4–8 inches from the wall, as determined through an engineering study.

Continues at ce.architecturalrecord.com

Kathy Price-Robinson *has written about building design and construction for her entire career.* ***www.linkedin.com/in/kathypricerobinson***

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CONTINUING EDUCATION

Performance for All

Designing sink stations that promote well-being for a wide range of ages and abilities

Sponsored by BLANCO | *By Amanda Voss, MPP*

To describe performance in a sustainable and modern way, it needs to embrace wellness alongside aesthetics, products, and codes. The Oxford Dictionary defines wellness as "the state of being in good health, especially as an actively pursued goal." Making wellness a goal for residential design and construction means considering how to best enhance the health, comfort, productivity, and efficiency of occupants. Especially for high-use areas like the kitchen, setting wellness as a standard means rethinking materials, features, and layouts.



The most sustainable kitchen design will accommodate wellness for all, regardless of age or ability level.

All Photos courtesy of BLANCO

SELECTING MATERIALS FOR WELLNESS GOALS

Today's kitchens face multiple demands from diverse user groups. The kitchen may be placed in a universal design, requiring open accommodation of users aged infant through elderly; it may be serving multiple duties in a tiny home; or it may simply be trying to keep up with a young and growing family.

At the center of the kitchen space is the sink. Since a significant part of all kitchen work happens at the sink, having a sink that is properly designed and easy to use becomes very important. Paying attention to the unique combination of space and user requirements helps guide the selection of the best sink size, style, and material. The selected material will have an impact on the entire kitchen's design and aesthetic, as well as how healthy and usable the sink will be. To promote wellness across all user groups, each material should be carefully considered for its cleanability, hygienic properties, durability, and ease of maintenance.

SINK MATERIAL TYPES

Stainless Steel

Today, the most popular material for kitchen sinks remains stainless steel. As a flexible

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AIA Continuing Education Provider — 1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Discuss the features and standards in the kitchen that are important considerations for comfort, productivity, and efficiency.
2. Explain how advances in kitchen technology promote wellness, healthier eating, and improved ergonomics.
3. Design a modern kitchen that meets the demands of diverse user groups, including living-in-place and ADA requirements.
4. Strategize kitchen stations that make prepping, cooking, and cleaning a more seamless experience for all users.

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AIA COURSE #K2005J



Stainless steel sinks create a nonporous, hygienic, durable product. Leading manufacturers are introducing nontraditional stainless steel sink designs, including apron-front farmhouse styles.

material, stainless steel sinks are available in a wide variety of sizes, styles, and types. Stainless steel is heat, stain, and chip resistant.

Stainless steel is classified in terms of gauge. A lower gauge number means slightly thicker steel was used in the sink's construction, while a higher gauge number means thinner steel was used. Most sinks fall within the 16-gauge to 24-gauge range, with the majority of residential sinks falling between 18 gauge and 22 gauge. However, it is important to note that the actual difference between gauges is small. For example, the difference in thickness between a 16-gauge and 18-gauge sink is only $^{1}/_{16}$ inch.

To add extra aesthetic appeal to the stainless steel, manufacturers may offer a variety of different finishes, from satin to glossy.

A superior stainless steel sink is made of 304 series alloy stainless steel, featuring the highest-quality 18/10 chrome-nickel formulation. These two numbers are the ultimate factor in deciding stainless steel sink quality. Type 304 stainless steel contains 18–20 percent chromium and 8–10.5 percent nickel. Type 304 therefore contains more chrome and nickel and has a higher corrosion resistance than types 201, 202, 301, and 302. This formulation creates a nonporous material, providing a hygienic, rust free, and extremely durable product. Certain manufacturer finishes, such as a satin polished finish, help to create an enduring, easy-to-clean luster that is impervious to water stains and calcium deposits.

However, stainless steel sinks do have drawbacks. As a material, stainless steel easily conveys noise, so sound-deadening pads or a spray coating should be incorporated to reduce sink noise from running water and the garbage disposal. Stainless steel also can scratch more easily than other sink materials and is liable to show water spots. Low-quality stainless steel sinks with uneven finishes can quickly discolor and may allow bacteria to grow in finish flaws.

Luckily, leading manufacturers have created a unique material innovation to address these issues: specially finished stainless steel with a velvet-matte aesthetic and homogenous structure. This finish makes the stainless steel more than twice as hard in comparison to traditional stainless steel, highly resistant to scratches, and almost impervious to fingerprints. While prices are dependent upon the gauge, chrome/nickel content, series quality of material, size, and mounting type, stainless steel offers an affordable and durable material choice for the kitchen sink.



The highest-quality composite sinks offer unique material advantages, including scratch-, heat-, and stain-resistant features, along with a nonporous surface with antibacterial properties. They also do not emit substances over time, preserving indoor air quality and food integrity.

Composite Sinks

An emerging sink material over the past decade, composite sinks are usually made from either a granite or quartz composite. The crushed stone is mixed with a resin filler. These sinks vary in quality and composition, and quality can be discerned by how the sinks are certified. While quartz and plastic composite sinks tend to have stone content below 70 percent and are regulated under "plastic plumbing fixtures," the leading granite composite sinks feature an average ratio of up to 80 percent stone to 20 percent resin. This combination produces a material that shares the aesthetic qualities of real granite or quartz, without the maintenance and durability issues associated with solid stone sinks. True granite composite sinks featuring an 80 percent stone ratio are certified under "terrazzo, concrete, composite stone, and natural stone plumbing fixtures." It also allows for a range of color options, depending on the manufacturer. The variable color palette allows it to pair well with a variety of natural stone and granite countertops.

Continues at ce.architecturalrecord.com

Amanda Voss, MPP, *is an author, editor, and policy analyst. Writing for multiple publications, she also serves as the managing editor for* Energy Design Update.

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All photos courtesy of Benjamin Moore



Scuff-resistant paint repels marks and keeps surfaces looking newly painted in high-traffic areas for extended periods, without the need for frequent cleaning and retouching.

Scuff-Resistant Paint: Long-Term Durability, Low Maintenance

Advanced technology meets a range of challenges in high-traffic commercial environments

Sponsored by Benjamin Moore & Co. | *By Layne Evans*

The painted surfaces in high-traffic environments come into constant contact with people, furniture, equipment, and a range of other challenges, depending on the space. As a result, intensive cleaning has always been accepted as a routine part of maintenance. Frequent retouching, repair, and eventual repainting are inevitable. Even with careful maintenance, many painted surfaces in high-traffic settings can appear worn after only a few months in service.

Three major solutions are:

- heavy-duty, two-component epoxies that require measuring, mixing, and have a short pot-life;
- pre-catalyzed, one-component epoxies formulated primarily to withstand the frequent hard scrubbing needed to remove daily marks and stains; and
- conventional latex paints in a higher sheen to increase cleansability.

In this course, we will examine one-component scuff-resistant latex paint, an effective solution for demanding, high-traffic environments. We will explain how it works, how it differs from other coatings used in high-traffic environments, and how it helps improve overall performance.

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AIA Continuing Education Provider — 1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Discuss unique challenges to paint performance, maintenance, and durability in high-traffic commercial environments.
2. Describe the impact of scuff-resistant paint on long-term durability and decreased maintenance needs in high-traffic areas.
3. Compare characteristics of scuff-resistant paint and other coatings often specified for demanding conditions, including two-component coatings and pre-catalyzed epoxies, and recognize differences in operational and environmental impacts.
4. Evaluate the life-cycle costs of the most durable scuff-resistant paint technologies compared to other coatings currently available for high-traffic settings.

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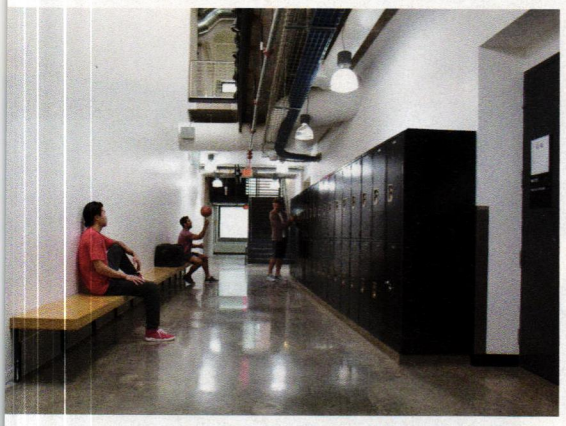
"Scuffs" cover many kinds of disfiguring marks left by the constant flow of people and equipment in high-traffic hallways in corporate facilities.



Durable surfaces that maintain cleanliness, a welcoming atmosphere, and a safe, healthy environment are critical in health-care settings.



Painted surfaces in all types of educational settings are subject to daily heavy traffic. Scuff-resistant paint maintains clean appearance without frequent scrubbing and retouching.

DEMAND FOR DURABILITY

Although in many interiors the most challenging decisions are related to color and design, in high-traffic areas, there are additional physical demands. Every day in high-traffic commercial environments there are multiple opportunities for the walls to be rubbed, marked, stained, and scuffed, either by impact or simple contact.

The breakthrough formula in scuff-resistant paint was developed to address challenges faced in these demanding environments. "These are 24/7, high-occupancy, high-abuse environments. Painting is a definite interruption. We were hearing frustration from many companies about serviceability, the real business cost of constant cleaning and repainting, even using heavy-duty epoxies," says Jim Gorman, senior strategic account manager of national accounts for Benjamin Moore & Co., who works directly with large corporations such as national hotels, restaurants, and retail chains with hundreds of facilities. "We went to our research department with a list of really specific requirements."

The basic requirements included that the paint: be one component to avoid the complications and risk of error when mixing two-component paints; have low VOCs; be fast drying and have less odor to permit painting while operations continued with minimal disruption and quick return to service; and have something that was not available in existing paints: the ability to resist scuffs and marks for minimum maintenance and repainting. The paint had to perform in a wide range of high-traffic applications, each with unique challenges as follow.

- **Health care:** The overall sector includes many different types of settings, from hospitals to outpatient centers to specialty care facilities, as well as a growing number of specialized spaces for an aging population, ranging from varying levels of assisted living to modifications for aging in place. (See "Design for an Aging Population" case study.) Heavy traffic includes not only patients, families, visitors, and staff but also intensive use of equipment: rolling carts, beds, and high-tech treatment and monitoring units. The need for extreme cleanliness is fundamental. Disruption must be severely minimized and areas rapidly returned to service. Paints may need to include antimicrobial additives to inhibit the growth of mold and mildew on the surface of the paint film.
- **Education:** Daily heavy traffic characterizes all types of educational settings in classrooms, hallways, cafeterias, dormitories, stairwells, gathering spaces, and gyms. Visual design must be appealing and support learning. Many new signature buildings on university campuses in particular feature state-of-the art architecture and performance. But educational buildings of all types generally have strict operation, maintenance, and replacement budgets and select products for long-term durability. For example, at the Independent Day School in Middlefield, Connecticut, scuff-resistant paint was used throughout common areas, hallways, and restrooms. According to the school's Director of Facilities Jim Rumberger, "Cleanup is easy, just a wet wipe. But my favorite aspect of the paint is the fact that I will not have to go back and paint hallways and rooms every year."
- **Corporate, business, and public buildings:** In these types of spaces, from corporate headquarters to restaurants to airport terminals, visual design appeal is a priority. Many large corporations are highly brand conscious, and colors are an essential part of that brand, including when the color scheme is based on bright white. But constant heavy traffic of people and equipment results in severe wear to painted surfaces. Minimizing maintenance and downtime is important. For example, vacant spaces in office buildings must be quickly repainted for new occupants or painted while furnished.
- **Hospitality:** In these settings, there is a constant flow of guests, service personnel, cleaning, and maintenance crews throughout the facility in guestrooms, lobbies, stairwells, restaurants, and service areas. Furniture and equipment are frequently moving in public spaces and dining areas. In many large hotels, for example, the largest source of unsightly damage to walls is the housekeeping staff, working quickly with large carts and other cleaning equipment. In restaurants, a small space such as the storage area for high chairs, always visible to the public, might be almost impossible to keep presentable and free from marks without frequent retouching. Most areas cannot be closed for more than a short period for painting and maintenance.

Continues at ce.architecturalrecord.com

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ARCHITECTURAL RECORD

Online Programming

Art, Design & Architecture Museum at UCSB
Santa Barbara, California
The school has put many of its collections and archives online, including the exhibitions *J.R. Davidson: A European Contribution to California Modernism*; *Irving J. Gill: Simplicity and Reform*; and *UCSB Campus Architecture: Design and Social Change*. Other collections available on its site include work from architects Myron Hunt and Harold Chambers, Robert Stacy-Judd, R. M. Schindler, Lutah Maria Riggs, Thornton Abell, Gregory Ain, Julius R. Davidson, Palmer Sabin, Kem Weber, Whitney Smith and Wayne Williams, Edward Killingsworth, Rex Lotery, Maynard Lyndon, A. E. Morris, and Barton Myers, among others. See museum.ucsb.edu.

Chicago Architecture Center
Chicago
The institution has launched *CAC@Home*, a mini-magazine that includes quizzes and other online interactive content, and CAC Live, where online events are accessible remotely, many of which are free to members. For more, see architecture.org.

Corning Museum of Glass
Corning, New York
This institution is offering a collection of online resources for use at home, including a printable coloring book and virtual gallery tours on Google Arts & Culture. On its YouTube channel, glassmaking and glass-conservation videos are available, as well as its "You Design It; We Make It" demos where glassmakers turn audience-submitted drawings into individual pieces. Learn more at visit.cmog.org/resources.

Crystal Bridges Museum of American Art
Bentonville, Arkansas
Online visitors can view art and architecture collections through narrated virtual reality tours. Works available online are Kerry James Marshall's *Our Town*, and *Kindred Spirits* by Asher B. Durand. Virtual tours are also available through Google Street View for the Frank Lloyd Wright–designed Bachman-Wilson House and R. Buckminster Fuller's *Fly's Eye Dome*. See more at crystalbridges.org/vr/.

Solomon R. Guggenheim Museum
New York
Though the Frank Lloyd Wright–designed museum is closed, visitors can still tour it online via Google Arts & Culture. An accompanying audio guide about the building's design is also available. Online visitors can also learn about the exhibitions that will be on view when the museum reopens, including *The Fullness of Color: 1960s Painting*, and *Marking Time: Process in Minimal Abstraction*. A collection of video interviews with museum staff and recently featured artists is also available to view online. See guggenheim.org.

Hollyhock House
Los Angeles
The Virtual Accessibility Experience provides online guests with 360-degree views of the facade, interiors, and roof terraces, offering tidbits about the house's history and design. The digital archive, which contains original drawings and blueprints by Frank Lloyd Wright, is also free and accessible online. For more, visit hollyhockhousevirtual.org and hollyhockhouse.omeka.net

LACMA
Los Angeles
The museum—which is currently under renovation—has a wide selection of videos available to watch online about the artworks and artists

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Performance Data:
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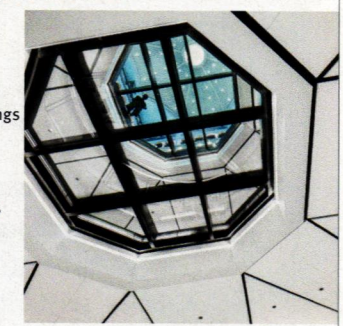

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Menil Collection
Houston
Visit the institution's YouTube channel for artist talks, lectures, and an interview with architects Sharon Johnston and Mark Lee, who designed its new Drawing Institute. Much of the Menil's 10,000-piece collection is also available to view online. Visit menil.org/collection.

MoMA
New York
Images, interviews, and descriptions from current exhibitions are on the museum site. Watch nine films online from the *Private Lives Public Spaces* exhibition, with commentary from the curators. Learning guides with slideshows, worksheets, and other museum resources are also available, as well as free online courses through Coursera. Each course features original videos, texts, and audio, including studio visits and conversations with artists, educators, and curators. For more, visit moma.org.

Museum of Fine Arts
Houston
The institution's collections of 70,000 artworks and selected exhibitions are available to browse online. Virtual visitors can also access film screenings, art-making activities, recorded lectures, artist's talks, and more, on the museum's site and through Google Arts & Culture. Visit mfah.org.

Museum of Islamic Art
Doha, Qatar
Online visitors can tour the I.M. Pei–designed museum and much of the collection on Google Arts & Culture. Family activities, including coloring exercises, puzzles, word searches, and art-tutorial videos are also available on the website. Visit mia.org.qa/en.

National Building Exhibition
Washington, D.C.
A new, online-only exhibition and essay is available on the museum's website by artist Camilo José Vergara called *Documenting Crossroads: The Coronavirus in Poor, Minority Communities*. It features 49 photographs taken from early March into early April, as well as an essay chronicling Vergara's firsthand observations. See more at nbm.org.

Serpentine Galleries
London
While the gallery buildings are closed, the Serpentine's work continues through online exhibitions, digital commissions, podcasts, special broadcasts, and more. Those interested can download the Bloomberg Connects app to hear from artists, curators, and special guests talking about Serpentine exhibitions. Over 750 artist interviews, talks, and performances are also available on the Serpentine's YouTube page. A new podcast series by the institution, called *Back to Earth*, explores art's role in the climate emergency and is also available online. See serpentinegalleries.org.

Tippet Rise Art Center
Fishtail, Montana
Art exhibits at the 12,000-acre center—including the Francis Kéré–designed pavilion *Xylem* and three monumental works by Ensamble Studio, *Domo*, *Beartooth Portal*, and *Inverted Portal*—are available to view online through

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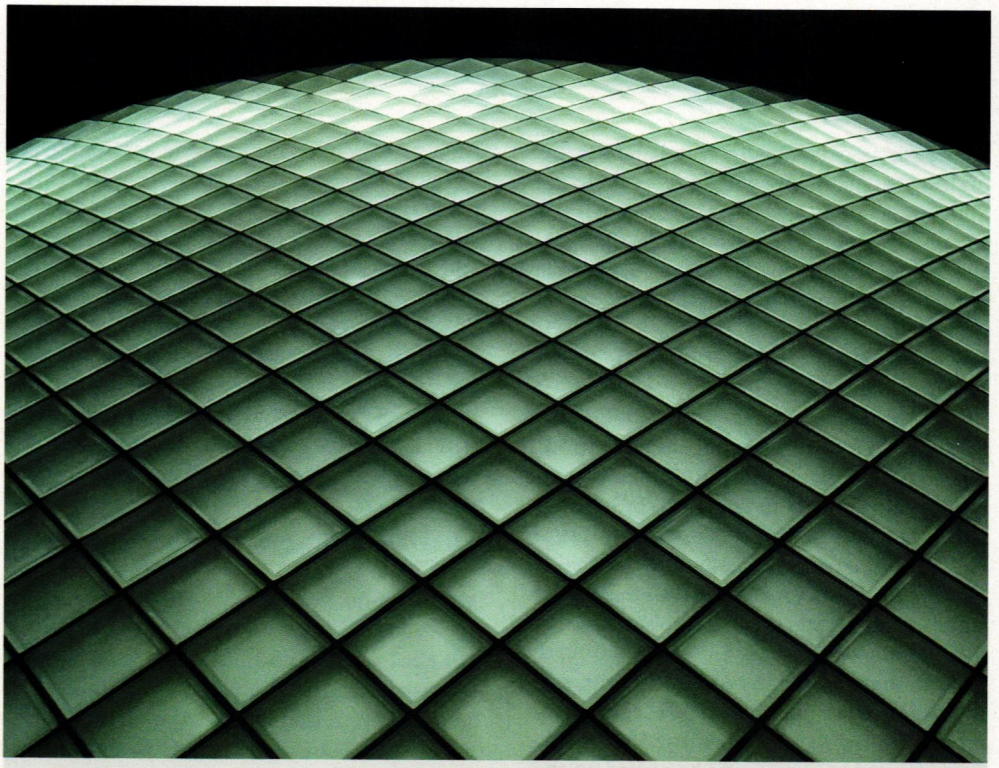
Google Arts & Culture. Many recordings of the live concerts from the site are available on the center's YouTube channel. Interviews and conversations can also be heard on the Tippet Rise Podcast. Visit tippetrise.org.

Yale Center for British Art
New Haven, Connecticut
The Yale Center for British Art mobile app offers users a guide to works in the Center's collection as well as detailed information about its landmark building, designed by Louis I. Kahn. On the Center's site, coloring books for children are also available to download. See britishart.yale.edu.

Competitions

Landslide 2020
Deadline: May 1, 2020
The Cultural Landscape Foundation (TCLF) released a call for project nominations for the foundation's annual report about threatened and at-risk landscapes. This year's theme, Women Who Shaped the American Landscape, coinciding with the centennial of women's suffrage, will focus on at-risk landscapes cre-



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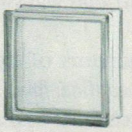

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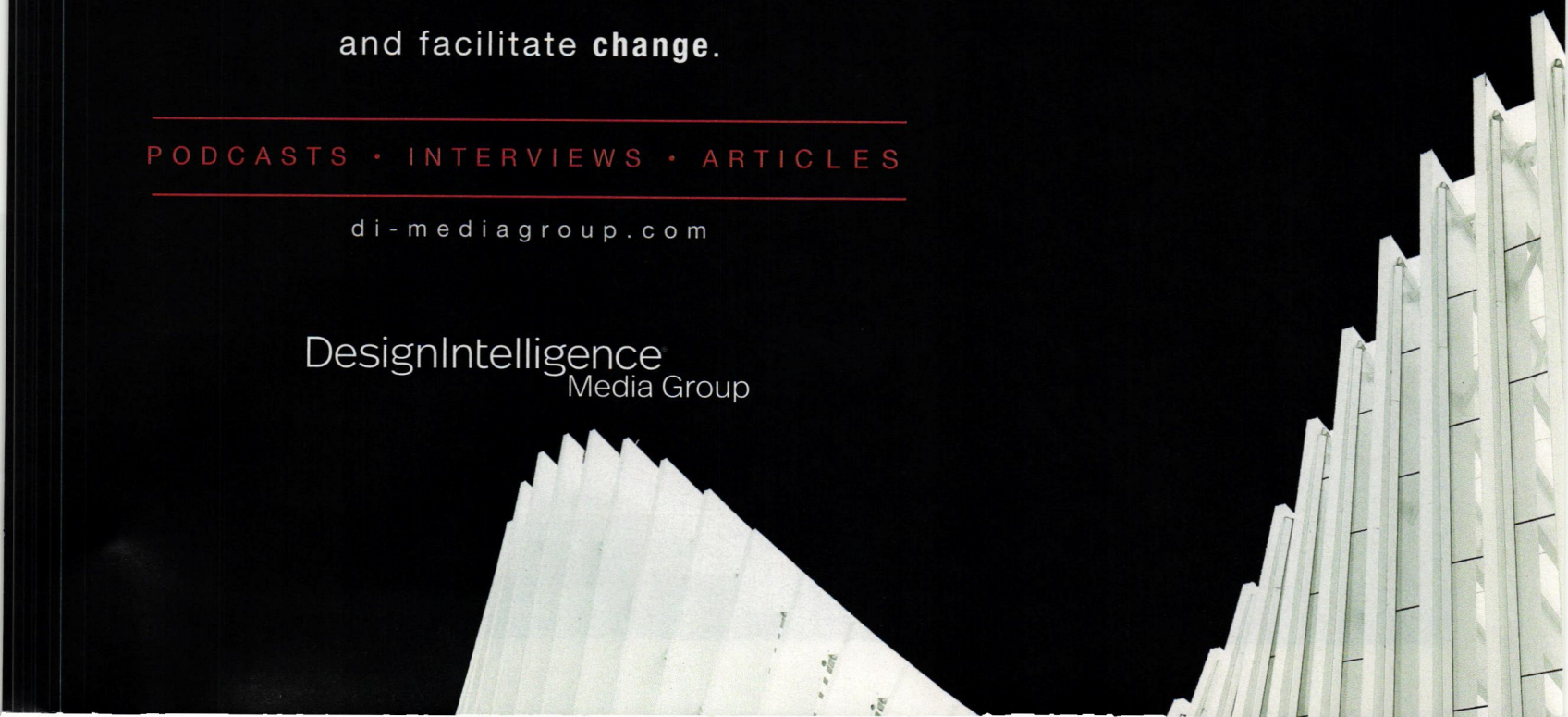


ated by or associated with female landscape architects. The report will be released in September, along with a website and a traveling photographic exhibition that will debut at the Boston Architectural College, September 8. For more information, go to tclf.org.

Low-Cost House Design Competition
Deadline: June 1, 2020
This competition aims to promote alternative solutions to housing, coming up with affordable and sustainable units of limited size and budget to meet urgent demands for housing urban and low-income residents. Entrants are challenged to conceive a new and original concept for a low-cost house with expandable units or local materials. Each submission must be for no more than two floors (including the ground floor) with a maximum-500-square-foot single-floor plan. Winners receive cash prizes totaling $1,000–including $500 for the first-place winner–and will be posted on the official website. More at low-costhouse.com.

Airport of the Future Design Competition
Deadline: July 1, 2020
Students and recent graduates from around the world are invited to submit to Fentress Global Challenge's competition as they create a new airport-terminal concept. Entrants are encouraged to utilize forecasts for population, environmental conditions, modes of travel, and potential destinations in the creation of their concept. Submissions will be judged on innovation and creativity, responsiveness to the site, sustainability and resiliency, and functionality. First place will receive $15,000 in cash and prizes, and four additional entries will also receive awards. For more information, see fentressglobalchallenge.com.

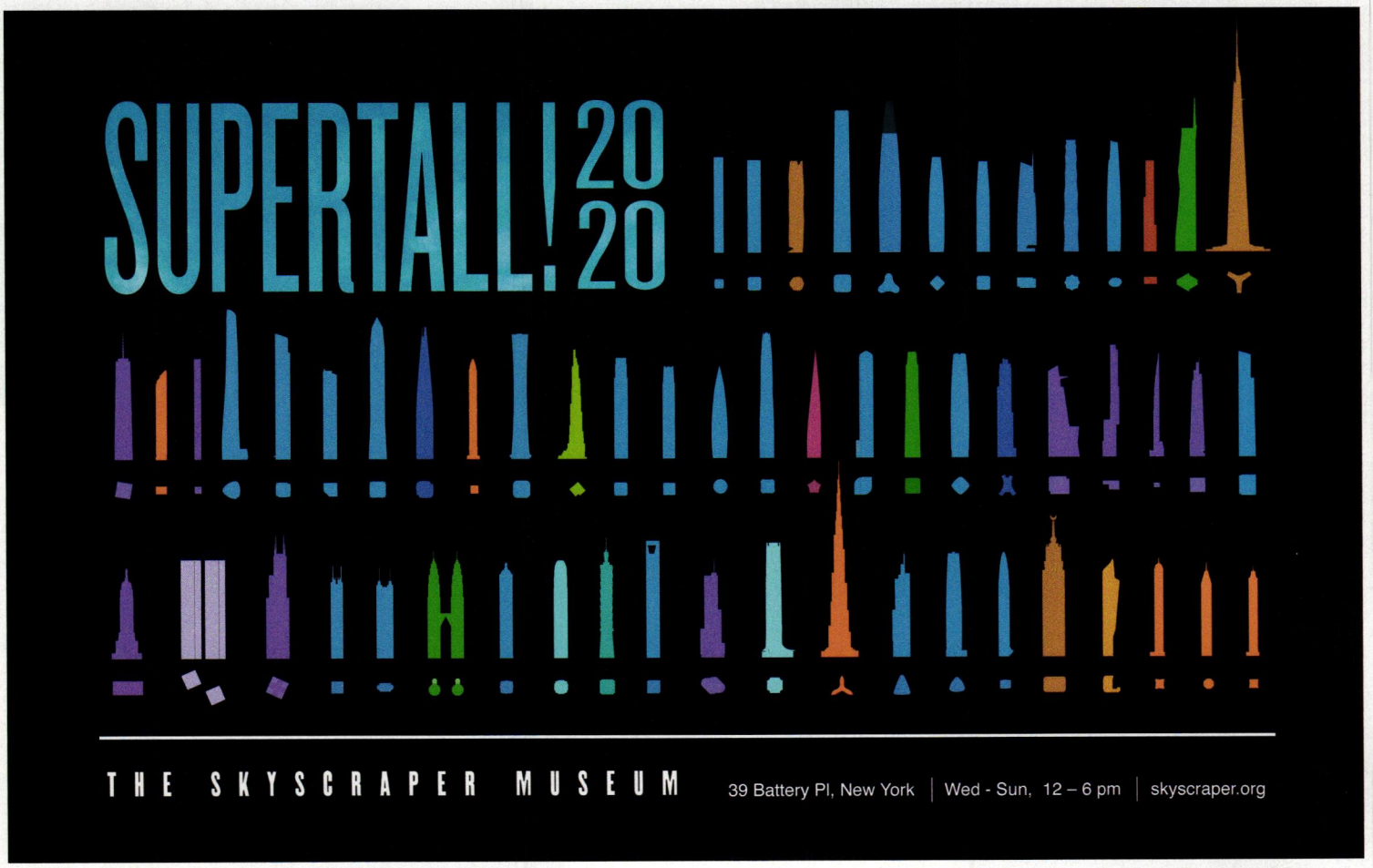
Online Events

Main E-vent
May 2, 2020
SCI-Arc's annual fundraising gala and exhibition preview Main Event is now "Main E-vent," a virtual event that guests from all over the world are able to attend by purchasing a ticket. Starting at 6 p.m. PST, via an online Zoom call, the event will feature a live online dance party with DJ, digital cocktail-lounge experiences, prize-drawings, and showcase student work, all to support the SCI-Arc Scholarship Fund. See sciarc.edu.

Small & Tiny House Movement: 1995 to Now
May 5, 2020
This live webinar by the Center for Architecture aims to answer questions, including "What is the Tiny House Movement?" These and other questions will be explored through the work–research, teachings, writings, and architecture designs–of five Tiny House influencers as panelists discuss the topic online, from 6–8 p.m. EST. See calendar.aiany.org.

London Festival of Architecture
June 1–30, 2020
LFA Digital 2020 will take place online throughout the month of June, ahead of the broader LFA program, which is scheduled to take place later in the year. This year's event theme is power. Every year since 2004, the program of events has been delivered by more than 300 independent organizations and individuals and included installations, tours, talks and more. For additional information, go to londonfestivalofarchitecture.org.

E-mail information two months in advance to areditor@bnpmedia.com.



Advertisers Index

Advertiser	Page
Aamsco Lighting	47
ALPOLIC/Mitsubishi Plastics Composites America, Inc.	93
Aluflam NA LLC	45
Architectural Grille	145
Architectural Record - Academy Of Digital Learning	170
Architectural Record - ASLA Conference	92
Architectural Record - Bookstore	128
Architectural Record - Build Your Skills	168
Architectural Record - Connect With Us	140
Architectural Record - Education Exchange	153
Architectural Record - Webinars	169
Architectural Record - May Webinar Schedule	48
Armstrong World Industries	CV2, 1
ATAS	162, 163
Azon	49
B&D Builders	27
B+N Industries, INC.	58
Benjamin Moore & Co.	33, 166, 167
Bercy Chen Studio	172
Bilco Company	55, 155
Bison	143
Blanco	164, 165
Bradley Corporation	147
Cascade Coil	CVR 3
CertainTeed Ceilings	156, 157
Delray Lighting	130
Design Intelligence	173
Doug Mockett & Company	46
Dunn-Edwards Corp.	139
DuPont	37
EarthCam, Inc.	36
Endicott Clay Products	28
Epic Metals	54
Formica	23
Forms & Surfaces	73
Fry Reglet	10
Glen-Gery	94
H.E. Williams Inc.	75
Heather & Little Ltd.	42
Hoover Treated Wood Products	59
Hormann High Performance Doors	9
Huber Engineered Woods	154
Huntco Supply	20
Invisible Structures, INC	18
Joto-Vent System USA, Inc.	44
Kalwall	158, 159
Kingspan Light+Air | CPI Daylighting	91
Kova Products	149
Landscape Forms	34
Lorin Industries	25
Louis Poulsen USA INC.	31
Lumion	CVR 4
Major Industries	24
NanaWall	17
National Terrazzo & Mosaic Association	7
Ornamental Metal Institute of New York	8
Petersen Aluminum	38
Pilkington North America	127
Reef Industries	42
RH Tamlyn & Sons	117
Rocky Mountain Hardware	76
SAFTIFIRST	57
SEIHO	116
Seves Glass Block	173
Skyscraper Museum, The	174
Soprema, Inc.	15
Steel Institute of New York	6, 160, 161
Stoett Industries	74
Technical Glass Products	2, 3
The Belden Brick Company	21
Tournesol Siteworks	53
TURF Designs	50
U.S. Green Building Council	129
Versico Roofing Systems	43
Vitro Architectural Glass (Formerly PPG Glass)	12, 13
Western Window Systems - WWS	4, 5
Wooster Products	30

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snapshot

PROJECT SINAN BOOKS POETRY STORE
LOCATION SHANGHAI
ARCHITECT WUTOPIA LAB



Since it was constructed in 1932, this building, originally an Eastern Orthodox church, has served a range of functions, housing offices, apartments, and a restaurant. For the structure's latest incarnation, as the Sinan Books Poetry Store, Shanghai-based Wutopia Lab used 45 tons of steel to create soaring bookshelves, which morph into a beehive-shaped armature. Daylight spills into the shop through the original domed ceiling, reinventing the former church as a new kind of modern sacred space. *Kara Mavros*

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