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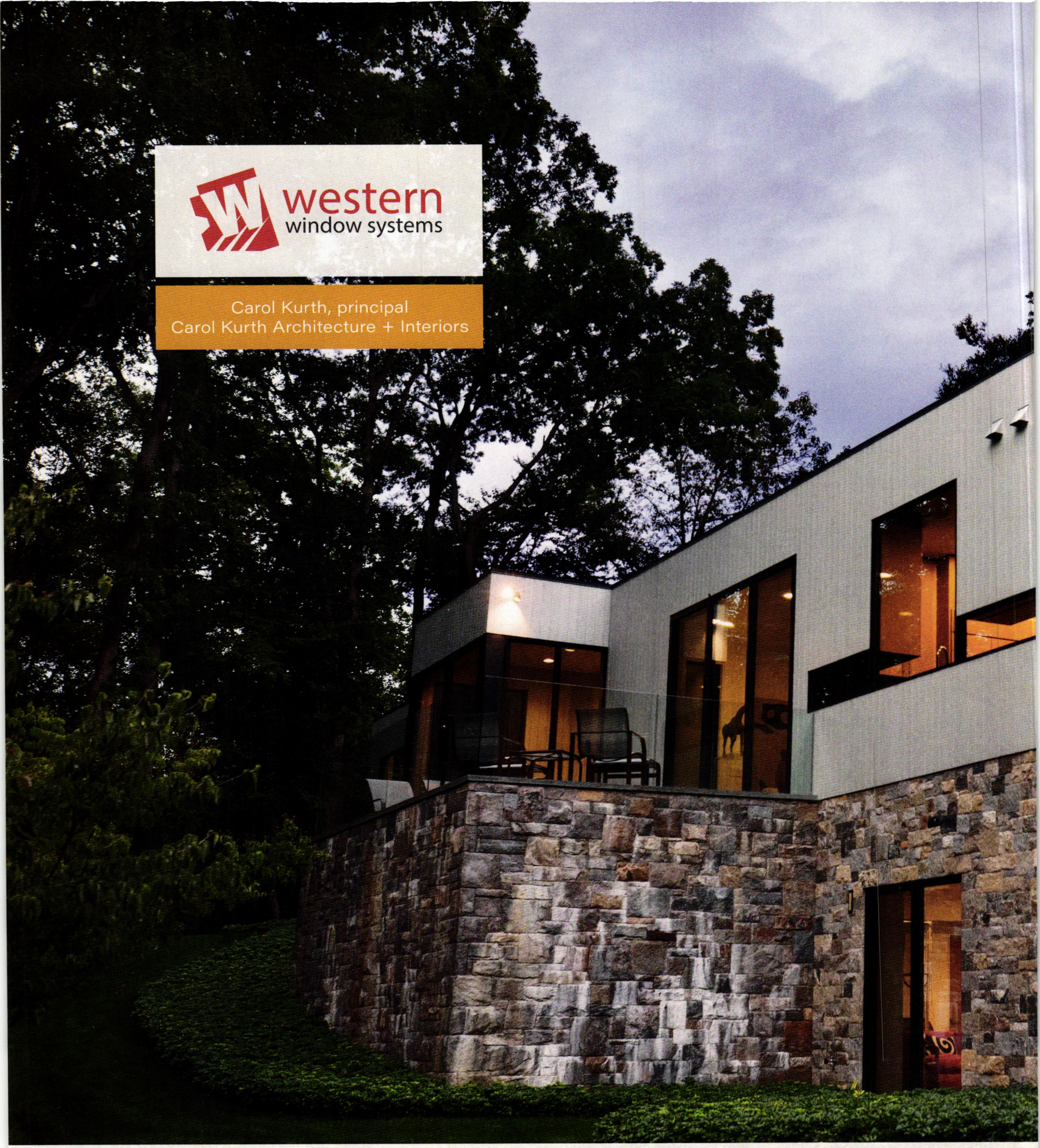
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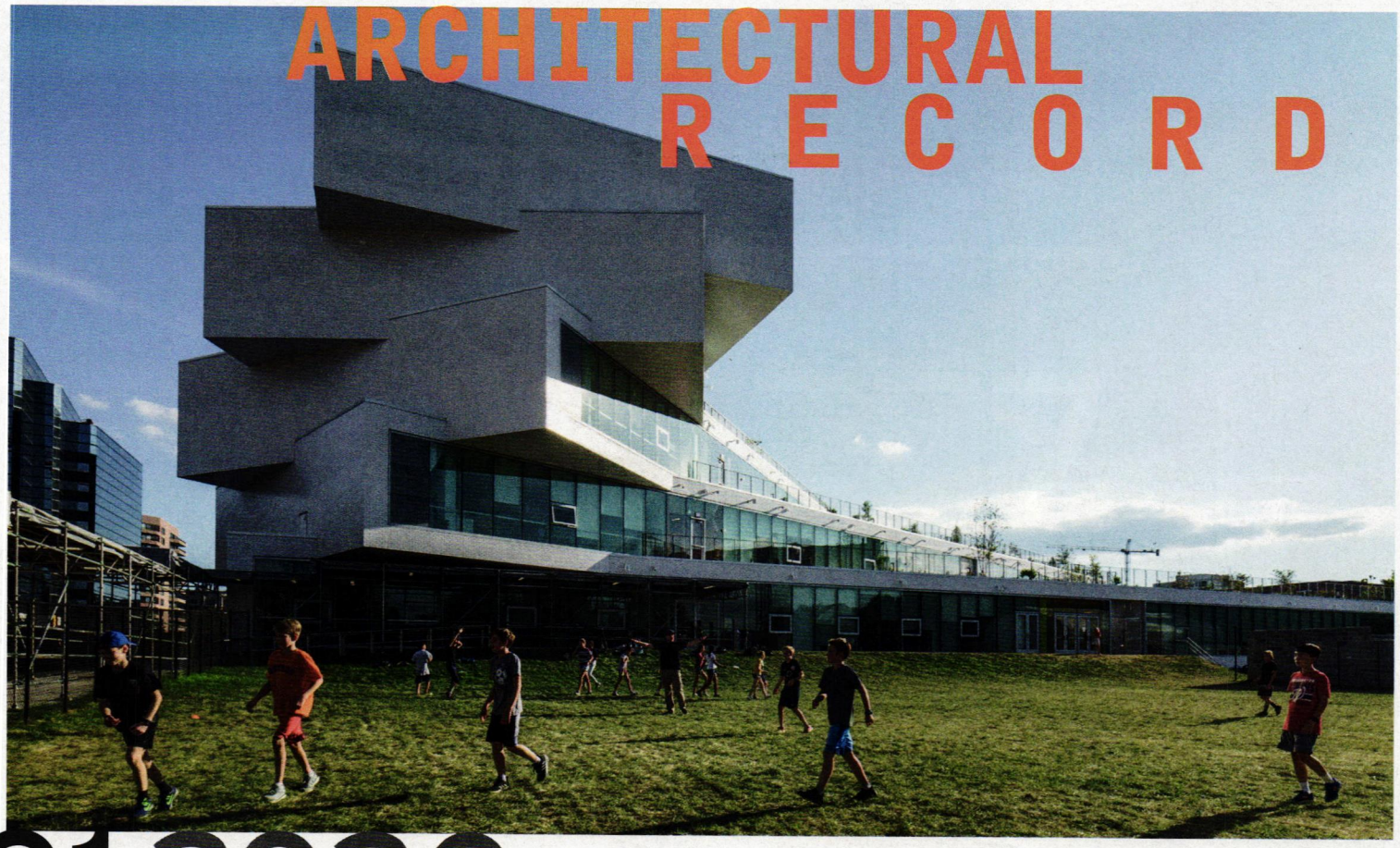

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COVER: LEEZA SOHO TOWER, BEIJING, BY ZAHA HADID ARCHITECTS. PHOTO BY HUFTON+CROW.

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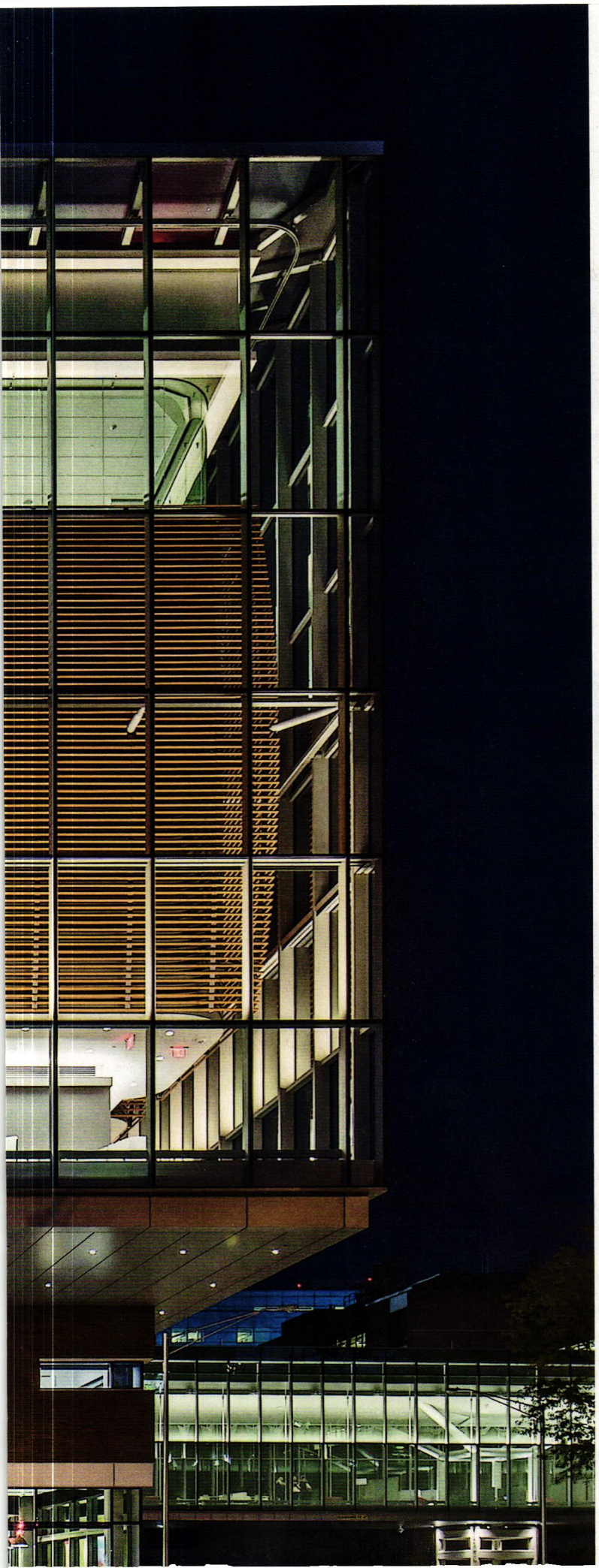
In our *Record Products* awards coverage last month, captions for products from Weather Shield and Unison Hardware were mistakenly swapped. We regret the error.



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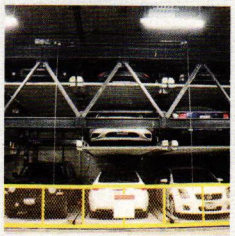

The Solution to the Parking Problem

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Maximizing Value with Interior Glass Door Solutions

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The Importance of Testing When Specifying Natural Stone

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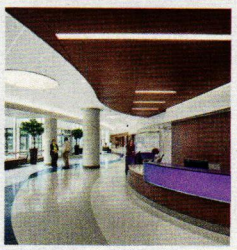

Putting People First

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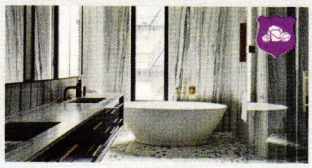

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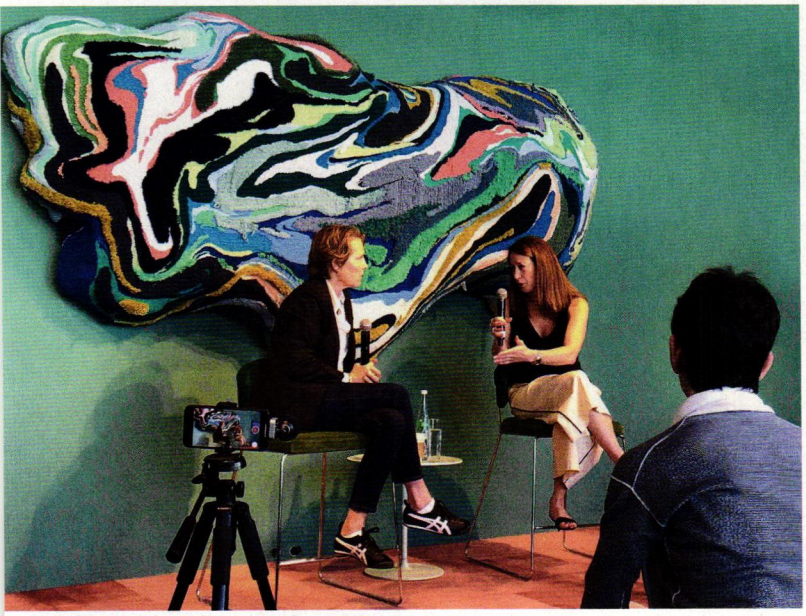

IN THE MAGIC CITY

During Art Basel/Design Miami in early December, features editor Josephine Minutillo (right) spoke with Annabelle Selldorf about the Rubell Museum (Record, December 2019), which opened the following day, as well as other cultural spaces the New York–based architect has designed over the years.

HIGH-ACHIEVING HIGH SCHOOL

Senior editor Linda Lentz (second from right) met with BVH Architecture and school administrators while visiting the Nebraska Center for Advanced Professional Studies (page 92).

NEAR FAIR VERONA

Managing editor Beth Broome (second from right) toured a primary school (page 74) in Colognola ai Colli, Italy, with (from left to right) the municipality's mayor, Claudio Carcereri De Prati; architect Claudio Lucchin; school director Lorenza Dalla Tezza; and Andrea Nogara of the public-buildings department.

PEACHY GREEN

Senior editor Joann Gonchar, FAIA (left), and senior news editor Miriam Sitz (right) attended sessions, went on tours, and listened to keynote talks from President Barack Obama (page 28), architect Jeanne Gang, and others at this year's Greenbuild conference in Atlanta.

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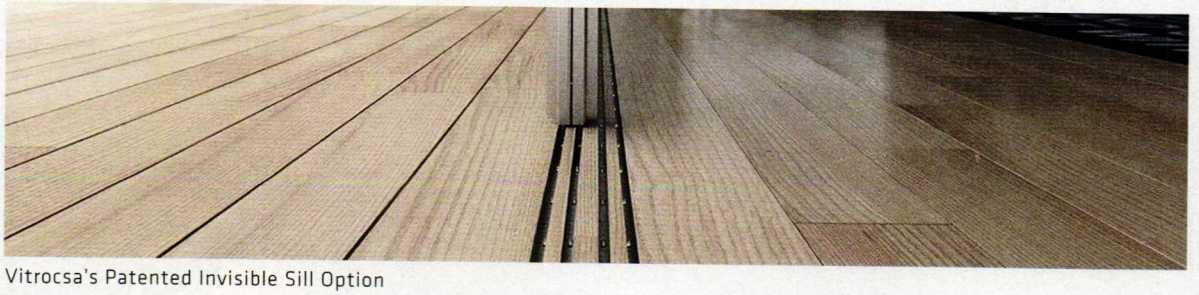

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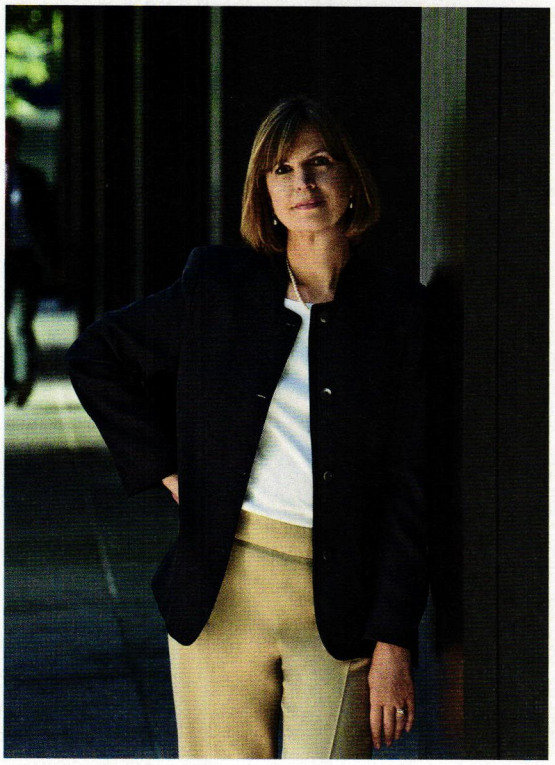
The Next Level of Sustainable Architecture

While major global powers refuse tough action on the climate crisis, architects, engineers, and contractors can help lead in reducing embodied carbon.



LAST MONTH, Greta Thunberg, the 16-year-old climate activist from Sweden, was named *Time* magazine's Person of the Year. Addressing the recent United Nations climate meeting in Madrid, she expressed frustration at the failure of nations to act. "I sincerely hope that world leaders—that people in power—grasp the urgency of the climate crisis," she said, "because, right now, it doesn't seem like they do." In Madrid, negotiators grappled with creating a carbon marketplace—where governments could buy and sell carbon credits depending on their level of compliance with reducing emissions—as a key part of the Paris Agreement. (Though the president has withdrawn the U.S. from the accord, the administration had representatives in Madrid because the pullout does not go into effect until November 4, 2020, the day after the election.) But in the end, the Madrid delegates could not agree on a carbon exchange, or on a means for compensating less developed countries for the devastation of extreme weather events made worse by global warming.

A number of countries, including the U.S. and other major polluters like China, India, Australia, and Brazil, also pushed back on calls for raising voluntary emissions targets despite frightening new research on climate change. Reports from international and U.S. government scientists are predicting more severe storms, heat, and flooding disasters far sooner than previously imagined, if carbon and other emissions continue to pour into the atmosphere. The ideal goal of keeping average temperature rise to only 1.5 degrees Celsius above preindustrial times'—by radically cutting the use of fossil fuels—is becoming more remote by the day.

The construction industry is the source of a total of 39 percent of such emissions globally, with the operation of buildings accounting for 28 percent. Architects have long been leaders in educating clients and the public about implementing energy savings and other sustainable tactics in their projects—strategies that have become integral to many building codes. But now attention is turning from such post-occupancy efficiencies to the other 11 percent of construction-industry pollution—the far more complex problem of embodied carbon in the construction process. That includes delving into the extraction, fabrication, and transportation of materials—an extension of the transparency that architects have been seeking though material certification and ingredient-disclosure programs.

Here at ARCHITECTURAL RECORD, we are convinced that covering sustainable building practices is more important than ever. For this issue, senior news editor Miriam Sitz spoke with architect Stacy Smedley (page 30), the director of sustainability for Skanska USA, who is behind the Embodied Carbon in Construction Calculator, or EC3—the free, open-source software that helps architects and engineers reduce embodied carbon in the planning and sourcing of their projects.

In the pages ahead, one example of reducing embodied carbon is in the material selection for the Delas Frères winery in the Rhône Valley (page 50). Paris-based architect Carl Fredrik Svenstedt created a stunning wavy facade, employing blocks of Estaillade stone quarried and fabricated nearby, using one-quarter of the embodied energy of concrete and costing far less (though concrete is extensively used elsewhere in the building).

Reducing energy use in operating a building is a big part of school design in this month's Building Type Study—from a novel new primary school near Verona, Italy, designed by Claudio Lucchin & Architetti Associati, that achieves the highest rating under the national energy-certification system (page 74), to the unusual cylindrical school on the edge of Copenhagen by Lundgaard & Tranberg that operates at near-zero energy (page 86). And the Heights secondary school in Arlington, Virginia—designed by BIG with dramatically stacked and staggered cantilevered forms that create 20,000 square feet of green roofs—aims to achieve LEED Gold (page 80).

Not only should such strategies become fundamental to building practices everywhere, but the architectural profession needs to embrace the tougher but equally essential standards for the specification of products in order to radically reduce embodied carbon.

Cathleen McGuigan

Cathleen McGuigan, Editor in Chief

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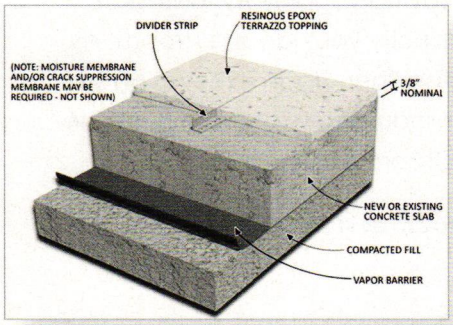

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perspective

Ice doesn't care if you're blue or red; it just melts.

–Dr. Marshall Shepherd, a climatologist and the Georgia Athletic Association Distinguished Professor of Geography and Atmospheric Sciences at the University of Georgia, speaking at Greenbuild 2019.

Marlon Blackwell Wins 2020 AIA Gold Medal

BY ALEX KLIMOSKI

LAST MONTH, the American Institute of Architects (AIA) announced that Fayetteville, Arkansas, architect Marlon Blackwell will receive the 2020 Gold Medal—its highest honor. The award recognizes those whose work has had an enduring impact on the theory and practice of architecture. Blackwell, a speaker at RECORD's Innovation Conference last fall, is the 78th Gold Medal winner.

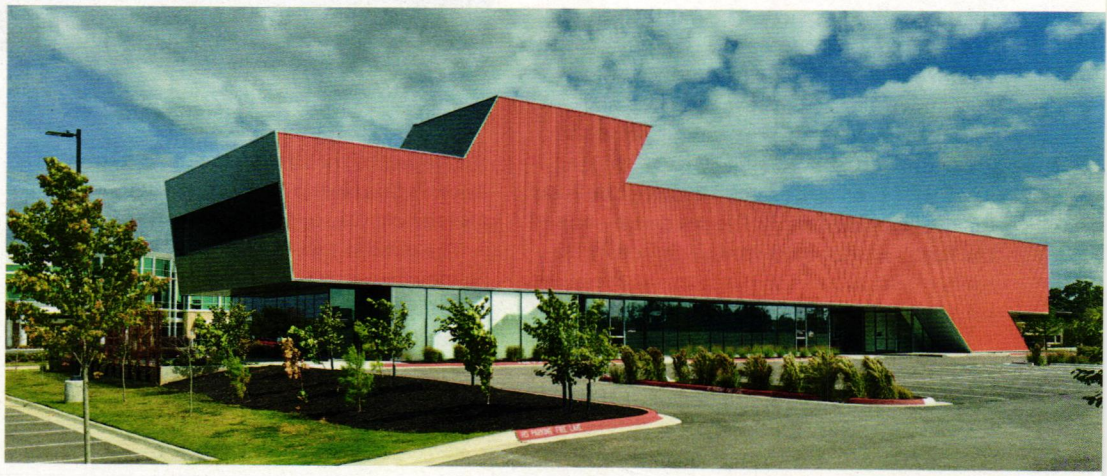
Blackwell grew up in an Alabama-based military family, earning his B.Arch. from Auburn University and M.Arch. from Syracuse University. He moved to Fayetteville in 1992 to teach at the University of Arkansas, and established his practice there in 2000. "Arkansas was the first place I lived and stayed awhile," Blackwell tells RECORD, adding that moving to the state was "an opportunity to really put my head down and work with minimal distraction." Along with E. Fay Jones, Warren Segraves, and Edward Durell Stone, his firm, Marlon Blackwell Architects (MBA), has helped put the Ozark region on the architectural map.

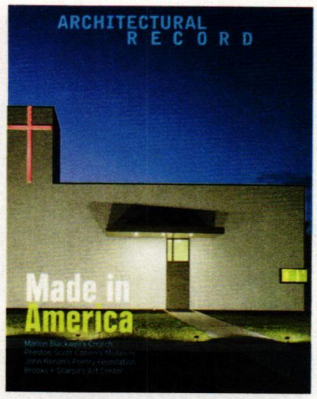
With each project, the architect seeks to contribute to the fundamental civic identity of a community, as seen in such projects as the Harvey Pediatric Clinic (RECORD, July 2017). That structure's idiosyncratic geometry and bold red-orange aluminum-zinc southern facade bring new life to its mundane surroundings, which Blackwell refers to as "ruburbia." He brought a similarly novel approach to an Eastern Orthodox Church (RECORD, November 2011) in the city of Springdale, where he transformed a small vernacular shed into a contemporary sanctuary by reskinning the structure with a standard box rib metal panel system. Punched openings at the corners add a degree of abstraction; at night, when the apertures are illuminated, the building serves as its own billboard along the adjacent interstate. "We are constantly trying to think about how we respond to the local while also making it part of a larger discourse," says Blackwell. "We're not willing to settle for placelessness; we're always trying to reaffirm place in a positive way."

His work extends throughout the South; in Memphis, his firm designed a group of structures for Shelby Farms Park (RECORD, August 2018), master-planned by James Corner Field Operations. And for the Lamplighter School of Innovation for pre-K through fourth-grade students (RECORD, January 2019) in Dallas, MBA created a copper-clad shed with a dramatic tilted roof.

Blackwell's work as an architect has been crucial to his career as a professor at the University of Arkansas, where he is department head of the E. Fay Jones School of Architecture and Design—and for which he designed a modern addition to its original Beaux Arts building (RECORD, November 2013). "Being a practitioner has helped me teach students to understand what it is to move from being critical—making commentary on the world—to being instrumental in making that commentary useful," he says. "Conceptualization is fantastic; realization is even better."

The architect, who acknowledges the support of his wife and MBA coprincipal, Meryati Johari-Blackwell, in his work, will be formally awarded at the AIA conference in Los Angeles in May. "I'm deeply honored and humbled," says Blackwell. "We feel this is a big win for all the folks in flyover country." ■





Marlon Blackwell designed the Harvey Pediatric Clinic (top), which opened in Rogers, Arkansas, in 2017. He completed the St. Nicholas Eastern Orthodox Church (above, right) in Springdale, Arkansas, in 2009, and the project appeared on Record's cover in November 2011.

PHOTOGRAPHY (CLOCKWISE FROM TOP): © TIMOTHY HURSLEY (2); MARK JACKSON-CHROMA

Visit our online section, architecturalrecord.com/news.

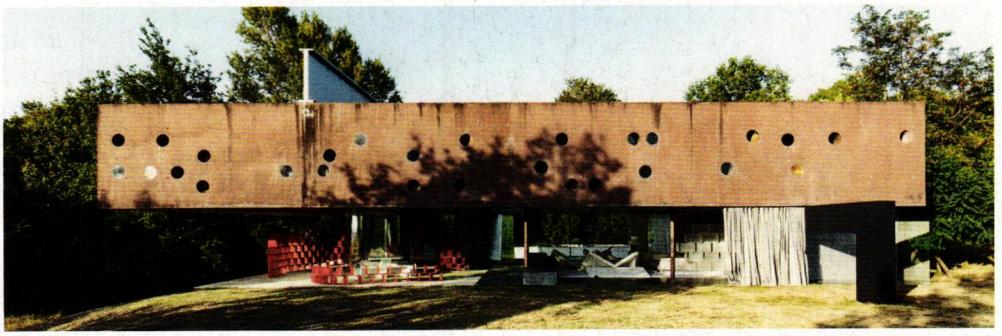
OMA Brings Pierre Paulin's Vision to the Bordeaux House

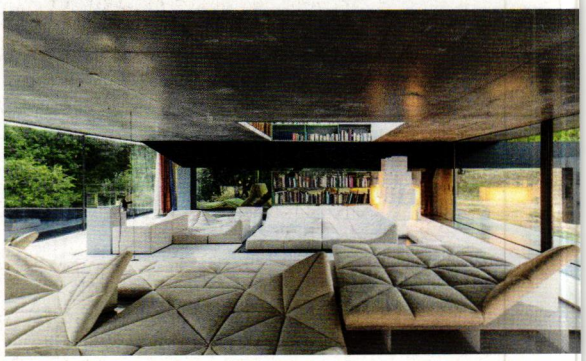
BY MIRIAM SITZ

MORE THAN 50 years after the late French designer Pierre Paulin first conceived of a modular system of residential furnishings, the so-called "Pierre Paulin Program" has finally come to fruition, thanks to the convergence of several professional and familial relationships.

Developed between 1969 and 1972, Paulin's vision was to create pieces that, arranged in a grid, would allow users to define and adjust their own living spaces. The family business dedicated to carrying on the designer's legacy, Paulin Paulin Paulin (PPP), produced the previously unrealized furniture only last year, asking OMA to install the unique set at the groundbreaking Bordeaux House (1998) in southwest France. Designed by Rem Koolhaas for the Lemoine family, the residence—one of the firm's earlier built works—famously features a central moving platform, as the client, Jean-François Lemoine, used a wheelchair.

Paulin and PPP have several connections of significance to the Bordeaux House: Hélène Lemoine, the wife of Jean-François, worked on textiles and colors for Paulin and still lives there. One of the three Lemoine children, Alice, is married to Paulin's son Benjamin, and the couple runs PPP.





Paulin's modular furniture (right) is installed throughout the Bordeaux House (above).

PHOTOGRAPHY: © OMA, MARCO CAPPELLETTI

The exhibition of the PPP-furnished house, on view through the end of January (and possibly beyond), is free and open to the public by appointment. OMA tells RECORD that, in the long term, pieces of the Pierre Paulin Program will be made available to a wider audience. ■

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David Adjaye's Protégé Mariam Kamara Designs Cultural Center

BY MIRIAM SITZ

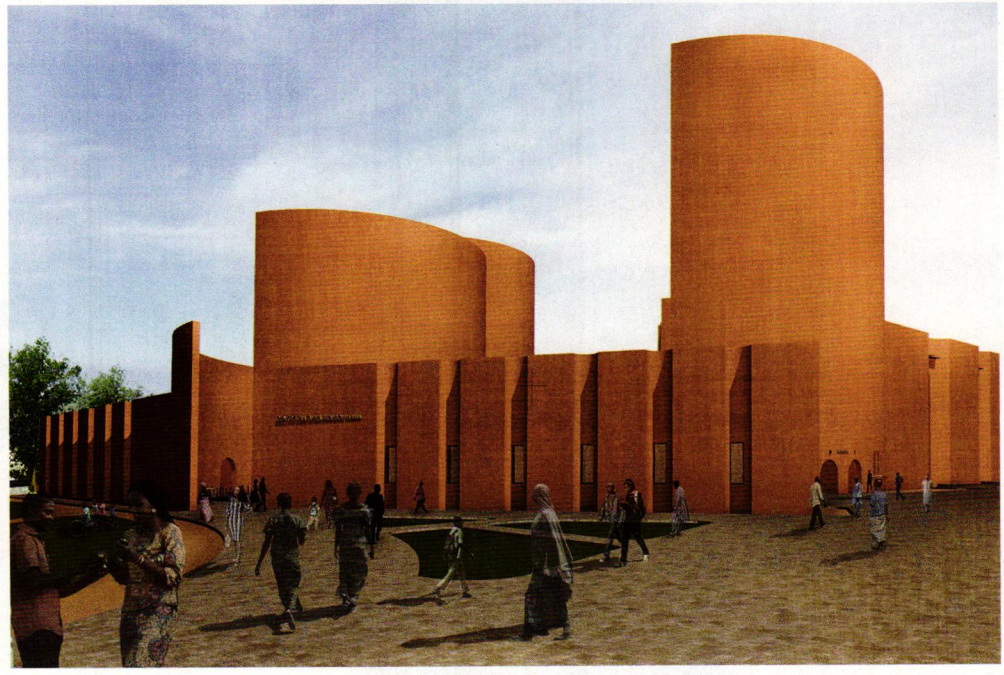
SINCE THE LATE 19TH CENTURY, when French colonization began to creep across the landlocked West African country of Niger, the capital city of Niamey has been segregated. The colonial master plan, dating back to the late 1890s, utilized a geologic barrier—a valley that ends at the banks of the Niger River—to separate colonizers from the indigenous population, the "haves" from the "have nots." Today, this historically disadvantaged area, called the Gounti Yena, is in the midst of a transformation bolstered, in part, by a constellation of cultural projects planned for the valley.

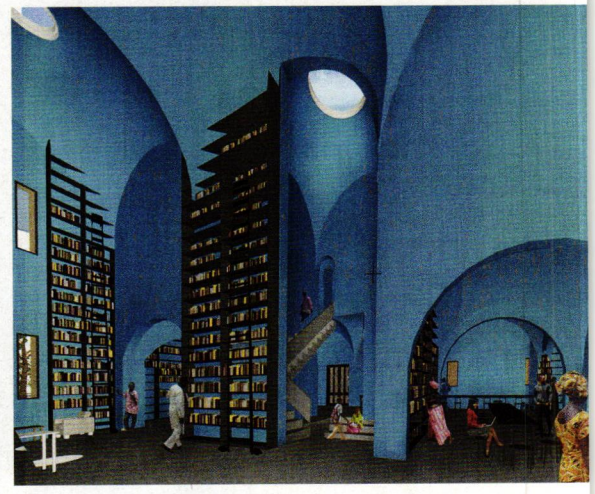
One such project is the Niamey Cultural Center, designed by Mariam Kamara, founder of the Niger-based firm Atelier Masōmī. The architect developed the idea over the last two years, while participating in the prestigious Rolex Mentor and Protégé Arts Initiative, which paired her with David Adjaye. "I knew I wanted to address some fundamental issues that we have in African cities," she told RECORD. "David thought it would be much more beneficial for me to work on my own project, which he could guide me through, rather than the more classical route of me coming to his office and working on a project there. It was an absolute gift."

From the beginning, Kamara and Adjaye sought to design something that would serve the public. The pair traveled the globe, visiting projects and cities to seek inspiration for what form Kamara's project might take. "I knew Niamey had been dying for a cultural center," says Kamara, so she organized a series of conversations with young creatives there, "to really see where the pulse of the city was—what people were thinking, what they were aspiring to, what spaces they felt were missing." She incorporated their feedback into her proposal to the city for a new civic hub with a public library, café, and flexible performance and art spaces.

Envisioned as a cluster of smaller structures, Kamara's design for the 59,000-square-foot complex creates shaded outdoor spaces for community gatherings—a response to Niamey's hot desert climate, as well as a desire to make the center welcoming to all residents. "It didn't make sense to make one big, monolithic building for this culture and climate," she tells RECORD. "It was really important to make it a place that people could walk through and still be a part of, without necessarily having to be patrons of the programs inside the buildings."

By making the public areas open and permeable to pedestrians and passersby, the center "becomes much more democratic," says Kamara. "I often take issue with museums or cultural centers, because these typologies are kind of new in our part of the world, and they can have a feeling of being elitist," she explains. "In a place where only 30 percent of the population is educated, you're making a space for only 30 percent of the people."





The library (right) will be a central component of the complex of raw-earth brick buildings (above).

She hopes that a person who might not "feel like they belong in the library" will feel welcome in the plaza just outside, eventually becoming comfortable enough to venture inside. "You don't need to feel like you have special license to be in these places."

Further rooting the project in its context, passive ventilation will cool the enclosed spaces, rainwater will be captured in underground tanks, trees and landscaping will provide shade, and raw-earth bricks—a common local material—will reinforce the structures' connection to the vernacular tradition. The city of Niamey is currently seeking funding, with the goal of starting construction in 2020.

Throughout design development, Kamara and Adjaye stayed in frequent communication via Whatsapp. After each community workshop in Niamey, Kamara would report back to Adjaye, recapping the major takeaways. "This is what I got out of the conversation, this is the direction I want to go, that kind of thing." She says she spent three months sketching ideas. "David is very demanding," she tells RECORD. "When I sent something that he thought I could improve, he definitely let me know. Oddly enough, it made me feel he really believed in my abilities to do better."

Though the official Rolex Mentor and Protégé Arts program ends in February 2020, Kamara feels confident their dialogue will continue. "Fundamentally, the way in which he handled the project not only gave me greater confidence, but made me dare to do much more. A lot of proposals I first put on the table were much more timid than I wanted. He pushed me, saying, 'No, that instinct that you have, go with that.'" ■

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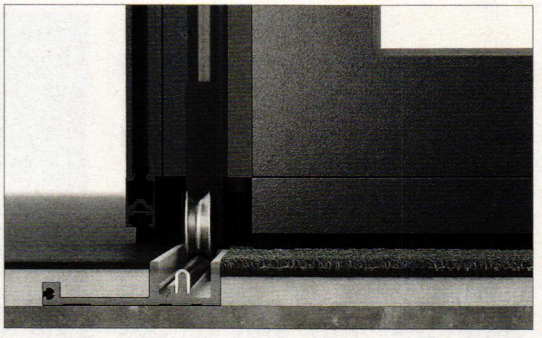

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Obama Talks Environment & Equity at Greenbuild 2019

BY MIRIAM SITZ

WELL BEFORE 8 A.M. on Wednesday, November 20, thousands of Greenbuild Expo attendees began assembling for the gathering's most highly anticipated keynote: a conversation with President Barack Obama. While not the first time a former president has spoken at the United States Green Building Council's (USGBC) annual conference (Bill Clinton delivered the opening plenary in 2007 and 2017), in this instance, excitement was high, with the line to enter the hall snaking through multiple levels of the Georgia World Congress Center.

Speaking with USGBC president and CEO Mahesh Ramanujam, the 44th president of the United States shared his thoughts on the most critical issues facing society today.

Obama identified two connected concerns as the most critical: climate change and the economy. "Climate change is an existential issue," he said. Unlike having bad tax policy for a presidential term or two, which can be corrected with time, "this is one of those where you can be too late. So I know of no issue that is more urgent than that."

"I would combine it, though, with the challenge of how we construct a globalized capitalist economy that actually provides everyone opportunity and is not continually accelerating inequality," he continued. "The reason I say those two things are connected is that it is harder to figure out how we solve sustainability issues and deal with climate change if you also have huge gaps in wealth and opportunity and education. And so we're not going to solve the former if we're not also attending to the latter."

Taking California's housing crisis as an example, the former president noted how, in certain metropolitan areas of the state, "building codes are so onerous that it makes construction of affordable housing almost impossible," which, in turn, can foster a negative mentality toward sustainability among those most affected economically.

"As wealth gets more and more concentrated, and more and more energy is used up by the few, the many become resentful," he said. "It undermines our sense of politics and a sense of community. It is hard for us then to mobilize the body politic around taking collective action."

'It is harder to figure out how we solve sustainability issues and deal with climate change if you also have huge gaps in wealth and opportunity and education.'

He called this fact a "legitimate criticism [of] those of us who consider ourselves progressive." At the local level, he explained, "we're not taking into account these specific costs and who's bearing them . . . If we want to think about sustainability, we have to do it in a way that also is thinking about affordability."

Another chronic problem of "do-gooders," he went on to say, is that "sometimes we like to tell people what they should think is impor-

PHOTOGRAPHY: © OSCAR & ASSOCIATES

The 44th president of the U.S. spoke about the most critical issues facing society today.

tant rather than actually asking them, 'What's important to you?'" He shared the advice he has given to emerging community organizers: "Your first job is not to talk but to listen."

With that in mind, Obama laid out a framework for how one might approach implementing sustainability strategies in a neighborhood. "The first thing I want to do is just go around and talk to them and find out, How do people live? What are their concerns? What do they think about their homes, what do they think about their neighbors, what works, what doesn't? Because when you listen, it turns out that you get a sense of what people's priorities are, what their values are, what their worries are," he said. "Then, figure out how to shape a sustainable agenda around those concerns."

He likened the process to how architects deal with their clients, referring to the Obama Presidential Center currently being designed by Tod Williams and Billie Tsien. "I can tell you, since I'm now dealing with architects—and I've got wonderful architects—that part of what makes an architect really terrific is if they actually care about your opinion."

Authentic concern for constituents was just one of the leadership strategies Obama shared at Greenbuild. He emphasized the importance of convening a diverse team, noting that diversity should be more than just symbolic. "The goal is to have people around the table who can bring to bear a set of different perspectives and correct for each other's blind spots—including yours." He also referenced the so-called "No Jerk Rule" deployed during his administration: "I had the luxury as president of trying to not have jerks around who were trying to undermine their coworkers or other team members, or who were obsessed with taking credit rather than actually getting the job done."

Obama ended with comments on how individuals, leaders, communities, and countries should strive to align their stated beliefs with the things they do. "If we say our children and the next generation are the most important thing, then we have to act in accordance with those values," he explained. "Presumably, that should be reflected in your policies and the people that you support."

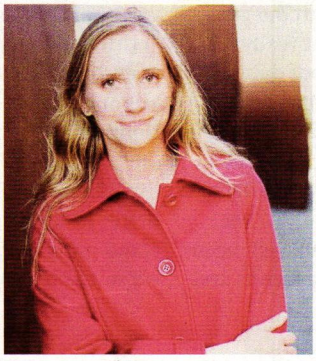
"Currently, there's more divergence [between values and actions] than I would like," he said. "I think it's very important in our personal lives, but also collectively, to get those back into alignment, and each of us can do our part." Nonprofits, the private sector, and governments all have roles to play as well, he said, in developing "a framework around which we can make better decisions. If we do, then I'm optimistic about our ability to solve these problems that we've created for ourselves." ■

[CLIMATE CHAMPION]

Stacy Smedley

BY MIRIAM SITZ

ACCORDING TO the United Nations Environment Programme, the manufacture of building materials produces 11 percent of all global greenhouse gases. In November 2019, the Carbon Leadership Forum and a host of partner organizations launched the Embodied Carbon in Construction Calculator, or EC3—free, open-source software intended to help architects, engineers, and clients assess and reduce these up-front emissions. The tool is the brainchild of Stacy Smedley, who serves as director of sustainability for Skanska USA. The Seattle-based designer spoke with RECORD about her career and the origins of EC3.



You have a longstanding interest in sustainability, both personally and professionally. Walk me through your trajectory.

I grew up in Oregon on acres of land that my grandfather owned, and, when I was about 8, he sold it. I watched as the acreage that I loved was clear-cut to make way for a housing development. I told my mom that when I grew up, I was going to design buildings that didn't destroy nature. I went to architecture school at the University of Washington, always wanting to focus on sustainability, and worked in architecture for 10 years.

How did you end up with Skanska USA?

While I was with KMD Architects, a colleague and I convinced the firm to donate its time to design the Bertschi School Living Building Science Wing [the first Living Building Challenge (LBC)–certified project in the state of Washington and the fourth in the world]. Skanska was the contractor on the project, and we co-located in their office. I got a lens into what general contractors do and was inspired to ask for a job, to see if I could influence multiple projects at once. Designers specify products, but the contractors are the ones actually procuring those materials.

And around that time, you started a nonprofit to build temporary school buildings, right?

Yes, that was after Bertschi, which got me thinking about how to engage more kids. There are tons of portable classrooms out there, so I thought, "What if we tried to replace them with Living facilities that could teach and inspire kids to care about sustainability?" We have three in place nationally [in Seattle, Pittsburgh, and Washington, D.C.]. And the plans are out there, open-source to the world, for anyone who wants to build one.

Tell me about your current role.

As the director of sustainability, I focus on the Seattle market. It's a pretty good place to be, because there's such a focus here on sustainability. Also, I'm the national subject-matter expert when it comes to the LBC and embodied carbon.

How do you explain embodied carbon to people unfamiliar with the concept?

I try to make it simple. There's operational carbon, which everyone understands—all the emissions from the energy the buildings consume. But embodied carbon is the emissions of everything up to turning on the light switch. It's the extraction of raw materials, the transfer of those materials to a manufacturing facility, that facility's emissions, the transport of materials to the site, the installation and the equipment it requires—all that is up-front embodied carbon. Then, there are the other stages: how many times those materials are replaced, and what happens to them when the buildings are demolished. So it is the whole life cycle of materials.

What gave you the idea for EC3?

I was brought on to help with carbon tracking for Skanska's commercial development projects in Seattle, and I started to see how challenging it was to determine the emissions of materials. When you did find that information, it was typically at the end of a project. We were saying, "Here are the emissions we put out in the world based on our material choices." We weren't able to influence projects early enough to actually reduce carbon. I saw a gap there.

And the tool became a reality quite quickly.

Yes, in about 15 months. C-Change Labs came up with a proof of concept. We brought on structural engineer Don Davies of Magnusson Klemencic Associates, who has looked at embodied carbon for a long time. Then, the Carbon Leadership Forum and its director Kate Simonen took it to a place where we could get industry buy-in.

You've said that the tool isn't perfect, but that there isn't time to wait for perfection.

Early on [Architecture 2030 founder] Ed Mazria told Kate and me that when they issued the 2030 Challenge, he learned you just have to draw a line in the sand. It doesn't matter if it's perfect; you just need to start, and people will act. We've released a beta version of EC3; now we want input and feedback from the whole industry to make it better. ■

noted

Architecture Research Office Wins 2020 AIA Architecture Firm Award

In mid-December, the AIA announced that it would honor New York–based ARO with its highest honor for a practice, praising the firm's work as "simultaneously humanistic and analytical." ARO is currently master-planning the Rothko Chapel campus in Houston and designed Congregation Beit Simchat Torah in New York (RECORD, May 2016).

Weiss/Manfredi Commissioned for La Brea Tar Pits Master Plan

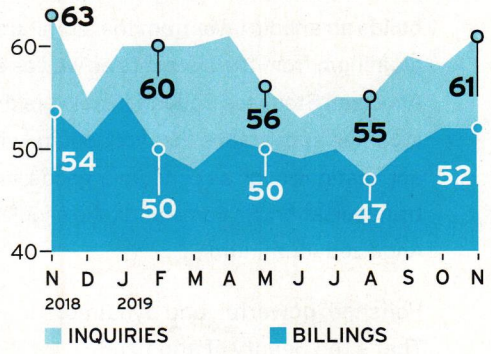
The Natural History Museums of Los Angeles County selected the New York–based firm to lead a design team that will master-plan the institution's 13-acre campus. The architects' concept adds a new building and connects the existing George C. Page Museum to the park by a triple-loop path.

New York City Passes Landmark Bird-Friendly Building Legislation

N.Y. City Council approved a new policy requiring that the materials in new buildings (and in some major renovations) meet avian-friendly standards, to reduce the risk of bird collisions. AIA New York and representatives from FXCollaborative and Ennead Architects joined the consortium of partners providing background on the issue.

Lincoln Center's Geffen Hall to Get Long-Awaited Revamp

The $550 million plan, led by Diamond Schmitt and Tod Williams Billie Tsien, will reimagine the interior of the 1962 Max Abramovitz–designed building but leave the exterior untouched. The capacity of the New York Philharmonic's home will be reduced by more than 500 seats.



Billings Stay Solid in November

The Architectural Billings Index scored 51.9 in November, according to the AIA's latest data. (Scores over 50 indicate an increase in firm billings.) New work inquiries rose to 60.9, up from 57.9 in October, and new design contracts remained steady at 52.9.

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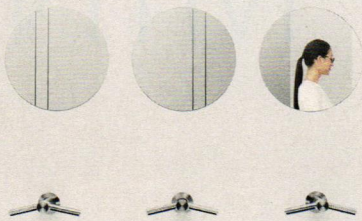

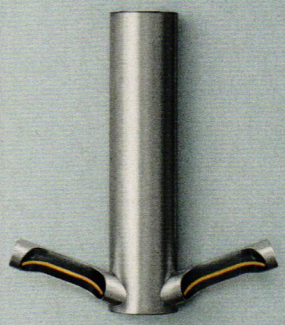

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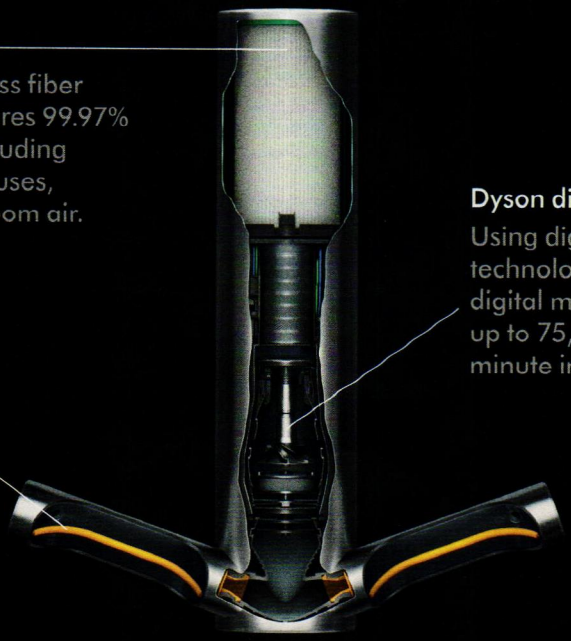

[1]Dry time and energy consumption calculated for Max mode. Dry time was determined using Dyson test method 769 based on NSF P335 to a measurement of 0.1g residual moisture.

[2]Average loudness (measured in sones) compared to Dyson Airblade™ hand dryers.

[3]Average electricity price $0.1/kWh as of May 2019. For calculations visit www.dyson.com/calcs.

[4]HEPA filter tested to IEST-RP-CC001.6, by an independent testing laboratory, under prescribed test conditions.

[5]Dry time determined for Max mode using Dyson test method 769 based on NSF P335 to a measurement of 0.1g residual moisture.

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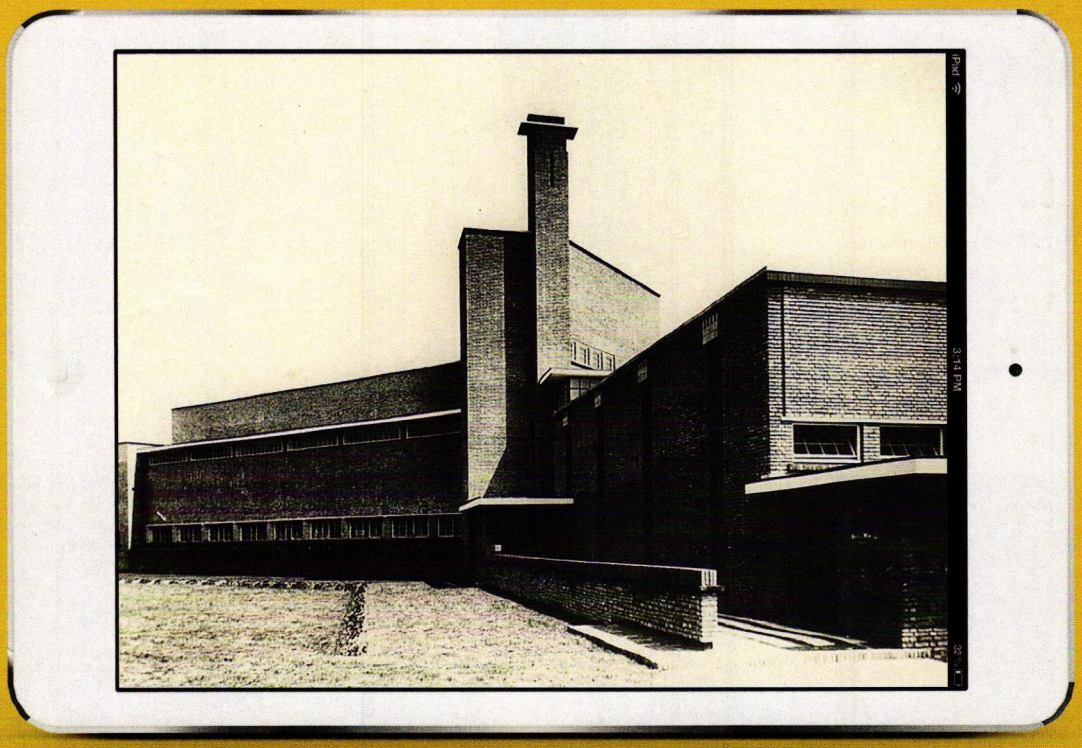

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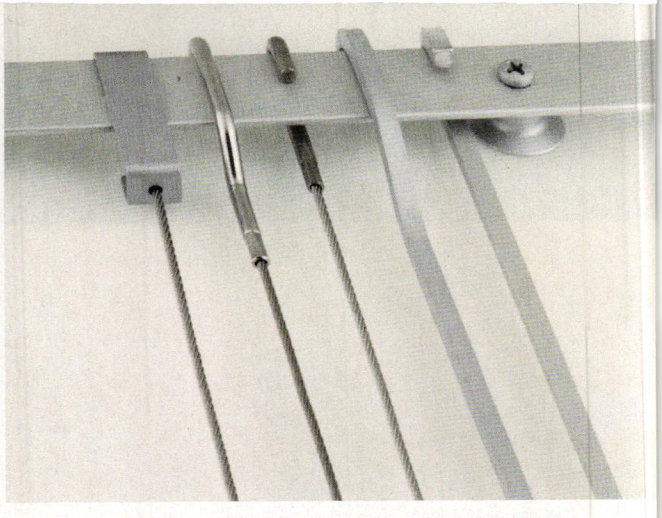

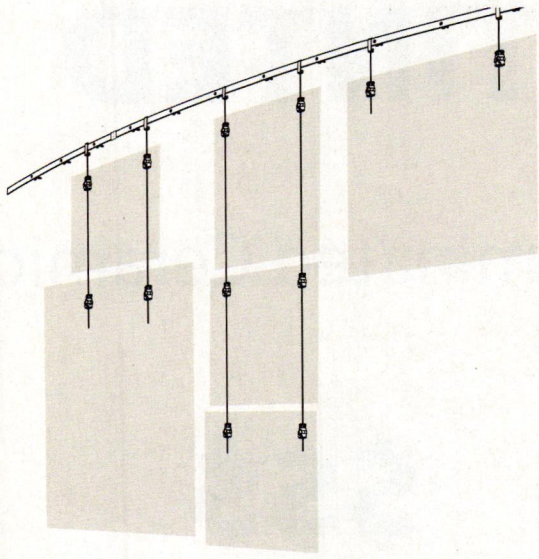

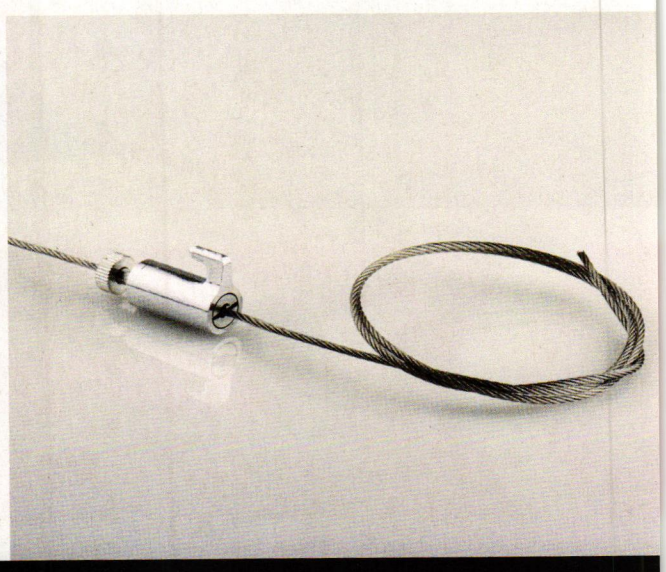

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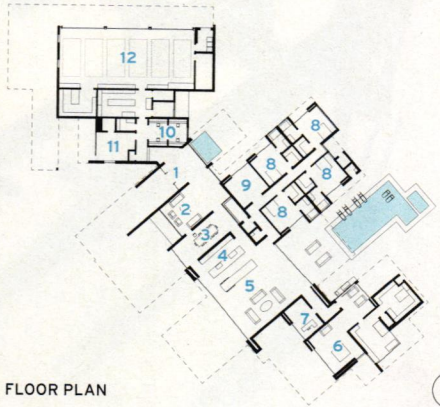
perspective **house of the month**

THE CAMELBACK HOUSE, SHADED BY DRAMATIC CANTILEVERED ROOFS, FUSES ITS INTERIOR WITH THE SURROUNDING TERRAIN. BY ALEX KLIMOSKI

ON AN ACRE of desert land in a low-density Phoenix suburb, part-owner of a national baseball team and single dad Jay Stein commissioned Santa Monica–based architect Hagy Belzberg to design a primary residence for him and his four children. In doing so, Belzberg wanted to capture the view of Camelback Mountain, for which the house is named, while preventing direct western sunlight from blazing through the 10,000-square-foot, five-bedroom house. To achieve this, he created a low-slung building as a series of linear pavilions. Up to 30-foot-long cantilevered roofs shoot out to the front—where local landscape architecture firm Floor Associates designed a garden of indigenous plants—as well as to the back patio and pool. The roofs' extensions visually emphasize sight lines from within the living spaces,

An entrance pathway is defined by freestanding concrete partitions (right). Sliding window walls open out to the front garden (below). Concrete walls provide thermal mass (bottom).



FLOOR PLAN

0 30 FT.
10 M.

1 ENTRANCE
2 LIVING
3 DINING
4 KITCHEN
5 FAMILY SPACE
6 MASTER BEDROOM
7 OFFICE
8 BEDROOM
9 PLAYROOM
10 CHILDREN'S STUDY
11 GYM
12 GARAGE

PHOTOGRAPHY: © BRUCE DAMONTE

A landscape of indigenous plants was designed as an extension of the interior. A laminated wood gazebo provides a shaded outdoor area for contemplation.

while protecting them from the sun's rays.

During the warmer months, fully glazed panels can slide into pockets within the house's concrete walls. Freestanding concrete partitions divide the main living and dining spaces and partially enclose the house's exterior entrance pathway yet maintain a sense of openness throughout.

The children have their own bedroom wing on the northeast side of the compound, as well as a separate study area located within a distinct rectilinear volume angled away from the main structure. This separate building also includes the garage, gym, and storage space.

Generously sized social areas, as well as abundant exterior gathering spaces and nooks, such as a gazebo of laminated wood slats at the house's front, provide the family with numerous areas to be alone or together and still enjoy the landscaping and surrounding mountainous topography. Says the architect about the overall concept: "The idea is to draw people through the house, pulling them to the outdoors." ■

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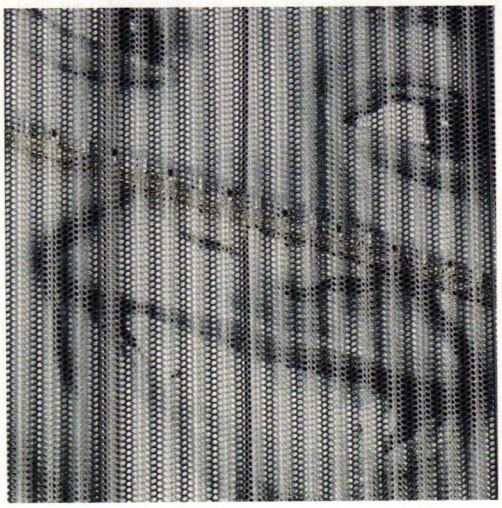
Moving Everest Charter School, Chicago, IL Installing contractor: WBR Roofing Architect: Team A General Contractor: Novak Owner: By The Hand
Photographer: Scott Bell Materials: 7/8-in. corrugated, 7/8-in. perforated Color: Charcoal



7/8-in. perforated corrugated panels overlay the graphic

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-Joe Buehler, AIA, LEED AP BD+C, TEAM A

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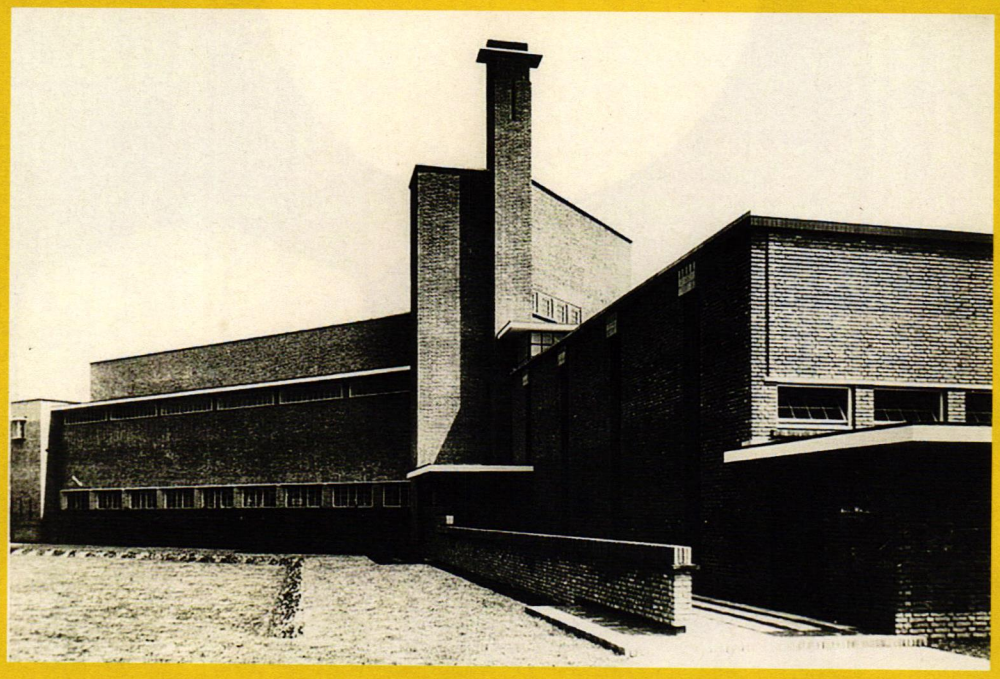

CLUE: THIS MODERNIST ARCHITECT WAS FAMOUS FOR HIS MANIPULATION OF BRICK TO CREATE TAUT, VOLUMETRIC FORMS. TRAINED AS A CIVIL ENGINEER, HE BECAME THE CITY ARCHITECT FOR A GROWING TOWN WHERE HE DESIGNED MUNICIPAL BUILDINGS, GARDEN VILLAGES, AND 17 SCHOOLS, OF WHICH THIS WAS CONSIDERED PARTICULARLY DISTINCTIVE.

The architect for Huntington Hartford's Gallery of Modern Art at 2 Columbus Circle in New York was **Edward Durell Stone**. When the building opened in 1964, Ada Louise Huxtable wrote in *The New York Times* that it was a "die-cut Venetian palazzo on lollipops." Ironically, a number of preservationists later fought to keep the Stone version intact when Allied Works completely remodeled it for the Museum of Art and Design in 2008.

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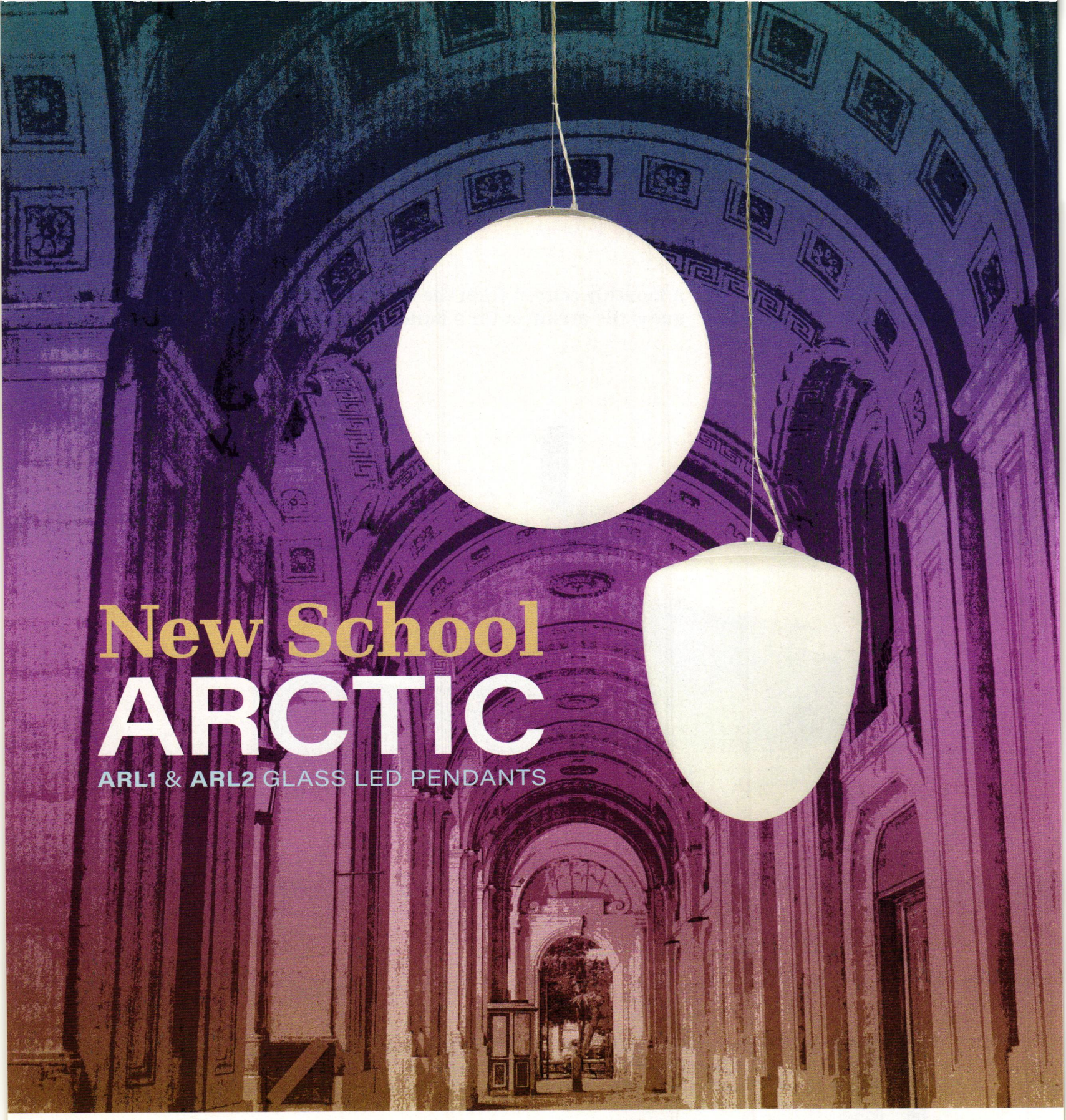

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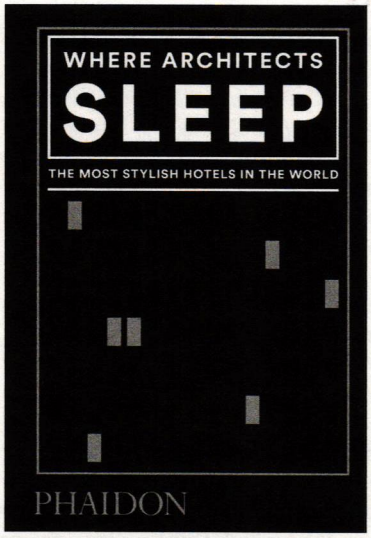
The Guidebook for the Very Choosy

Where Architects Sleep: The Most Stylish Hotels in the World, *by Sarah Miller. Phaidon, 528 pages, $29.95.*

Reviewed by Suzanne Stephens



THIS IS a guidebook for a certain kind of travel aficionado—the one who wants to know which hotels architects with keen design minds favor. In surveying over 270 international practitioners, editor Sarah Miller came up with more than 1,200 recommendations. Oddly, this book includes no photos—only websites of the establishments. Nor are the hotels' architects listed (even odder). Yet there are many surprises to discover in this compact compilation.

While Miller is not an architect or a hotelier, she has been steeped in those realms: her grandparents owned a hotel in London where she spent time growing up; her father, John Miller, practiced architecture in London with her stepmother, Su Miller, and her husband is the critic Deyan Sudjic, now director of London's Design Museum. And the Oxford-educated writer and journalist was a former editor in chief of *Condé Nast Traveller*, UK edition.

According to the book, some little-known hotels attract a sizable following: a cluster of architects say they wish they had designed the Amangiri resort in Canyon Point, Utah, including Michel Rojkind, Tom Kundig of Olson Kundig, Bruce Kuwabara of KPMB Architects, and Enrique Norten of Ten Arquitectos. Amangiri is, says Daniel Libeskind, "worth the travel," and Ron Radziner, of Marmol Radziner, and Deborah Berke also vote for it as a favorite desert retreat.

The design of Amangiri resulted from the collaboration of three architects: Marwan Al-Sayed, Wendell Burnette, and Rick Joy. (RECORD, May 2010). Yet, strangely, Joy did not list it in his recommendations. Known for his modernist/vernacular style, Joy cites the stately Connaught in London, in the luxury category. Also playing against type, the edgy architect Charles Renfro of Diller Scofidio + Renfro suggests the elegantly traditional Carlyle Hotel for visitors to New York. Steven Holl, known for sculptural topographical forms, calls the quietly classic Raphael Hotel in Paris his "all-time favorite." For the avant-garde Doriana and Massimiliano Fuksas, the Mediterranean Revival Beverly Hills Hotel is their first luxury choice. Carlo Ratti, who traffics in ultra-high-tech design, ranks the grand dame Bristol Hotel in Paris as his top place to stay. Not even modern architects follow the party line.

But, if you want to make a real discovery, look at the "best-kept secret" category. Paris's Le Pavillon de la Reine, which fronts the Place des Vosges, is nominated by Craig Dykers of Snøhetta (but he forgot to say, "Don't bother trying to reserve a room during Fashion Week"). And Norman Foster, so identified with steel and glass, considers the picturesque Inn at Little Washington in the foothills of the Blue Ridge Mountains of Virginia to fill the bill.

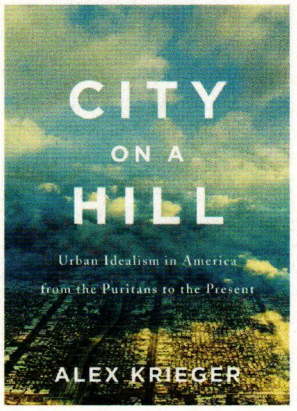
Some architects weren't shy about nominating their own hotels for the guide: Kundig recommends his Rolling Huts, in Mazama, Washington (RECORD, April 2008), for a mountain destination, while Norten includes his Habita Hotel in Mexico City as a good urban choice. Marilyn Kwok of Kohn Pedersen Fox looked to her contemporaries' work: the PUBLIC Hotel on Manhattan's Lower East Side, by Herzog de Meuron, is her "where I live" selection (RECORD, September 2017). Both Dan Wood of WORK/AC and Florian Idenburg of SO-IL elected Arcosanti, the utopian architectural and ecological commune/school in Arizona, founded by Paolo Soleri in 1970, as their pick for a desert resort. (It offers overnight accommodations but no amenities—even the wi-fi is spotty.) Farther off the beaten path is Annabelle Selldorf's top choice, an abandoned mining camp turned spa—Dunton Hot Springs, in Dolores, Colorado.

With all these unexpected preferences, this quirky guide to getting inside the minds of certain architects and their best-loved haunts is well worth consulting before your next trip. ■

Where It All Began

City on a Hill: Urban Idealism in America from the Puritans to the Present, *by Alex Krieger. Belknap/Harvard University Press, 464 pages, $35.*

Reviewed by Norman Weinstein



UNIQUE AMONG the patriotic anthems of nations, the lyrics to "America the Beautiful" proclaim, "Thine alabaster cities gleam,/ Undimmed by human tears!" The song intriguingly presents a nation where even suffering endemic to the human condition cannot dim the radiance of its settlements. Scoff at the sentimental lyrics dressed in dated language as you will, but that vision still carries political weight and imaginative energy. It's the perfect song to keep in mind while reading Alex Krieger's *City on a Hill.*

This is not because Krieger subscribes to a jingoistic notion of the supremacy of American cities over all others—quite the contrary. Krieger's focus is on how our nation's thinkers have reacted positively and negatively to utopian city visions. A practicing architect, planner, and professor, he brings enormous erudition to the promethean task of clarifying the sometimes shadowy role of these visions as he chronicles the ways that they have strongly shaped urban policies and designs. In this carefully argued and cinematically sweeping history, Krieger offers plentiful examples of how romantically perfectionistic ideals have influenced, for better or for worse, the creation of factory towns like Lowell, Massachusetts, and inspired religiously themed settlements like New Harmony, Indiana. In a fresh understanding of New Orleans, Krieger notes that for three centuries its citizens had been sure their town could resist the effects of nature.

The author thoughtfully illuminates the nuances of such dreams, spanning a spectrum from Biblically themed imagery of a city of God (the Massachusetts Bay Puritan colonists' City on a Hill of the book's title) to Chicago as the hub of triumphant capitalism. And there is Washington, D.C., Janus-faced, marked by the symbolism and monumentality of the public capital as well as the blight of its depressed neighborhoods.

Krieger is sensitive to backlashes against feverishly high-flown aspirations such as the 1960s' hippie back-to-the-land movements, which aimed to shift the idea of an American Eden from the city to the countryside. In an insightful reading of New Urbanism, the planning and development movement emphasizing "village-like," human-scale downtowns that juggle metropolitan amenities with rural neighborliness, Krieger carefully analyzes the Woodlands, near Houston, as an example of that balance.

In a field crowded with detailed histories of this kind, the book stands out as an invigorating study, rich in the history of ideas about what American urban settlements might have been and still may become. "It'll be a great place if they ever finish it," quipped O'Henry about New York. But, as Krieger reminds us, no city is ever completed once and for all, so we need to reflect on the key ideas of those who sought more perfect forms of this always imperfect place. ■

Norman Weinstein is a poet and music critic who writes about architecture.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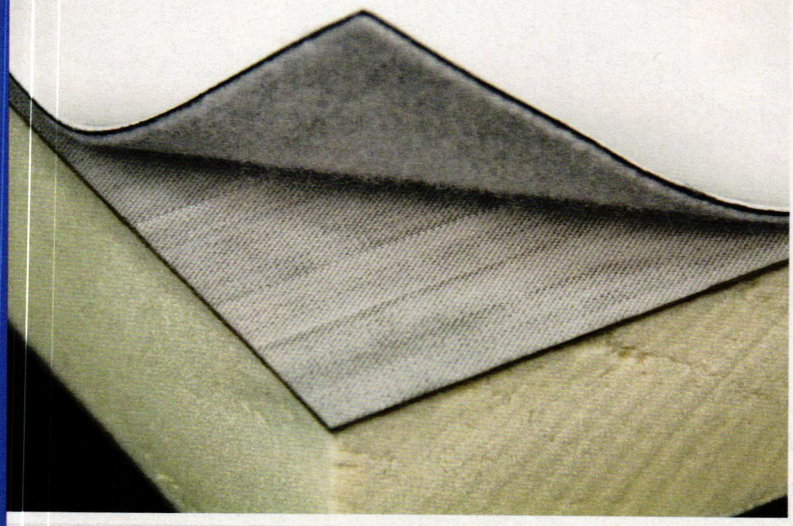

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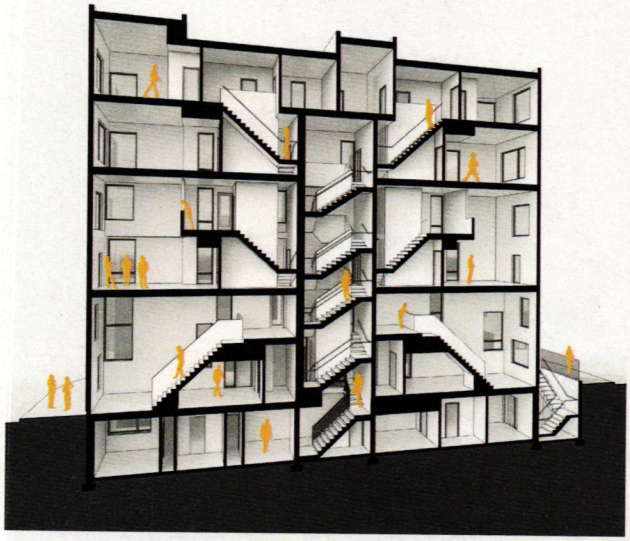
Small Lot, Tall Order

An architect and residential developer make the most of an oddly shaped site in Philadelphia.

BY JOANN GONCHAR, FAIA
PHOTOGRAPHY BY SAM OBERTER

IF YOU walked by 12th and Vine in Philadelphia only two years ago, you'd never guess that the meager empty space on the corner could actually be a building site. In fact, the 93-foot-long lot was so improbably narrow—only 11 feet wide—that you'd probably miss it altogether. But now the sliver of land at the edge of the Center City district has been transformed by local architecture firm ISA into seven sleek and livable apartments. The oddly shaped lot is a leftover from the construction of Interstate 676, a below-grade multilane highway dating from the late 1950s that sliced through Philadelphia's dense urban fabric.

Developer Callahan Ward acquired the site in 2015 for $265,000, and, through a series of deft moves, ISA was able to make the remnant workable. XS House contains a one-bedroom basement apartment, four "micro-lofts," each with a sleeping mezzanine, and a pair of two-bedroom duplexes. The 72-foot-tall, primarily wood-framed structure (it also includes four steel moment frames), organized around a central stair, is classified by code as a four-story building.



SECTION/PERSPECTIVE

Since the site had no height restrictions, the architects could theoretically have made XS House even taller, according to ISA principal Brian Phillips. However, the added height could only have been achieved with a series of tradeoffs which would have increased costs beyond the project's $1.1 million construction budget and gobbled up valuable floor area. It would have required a steel or concrete structure, a second stair for egress, and, for practicality, an elevator. (The XS House ground-floor units are accessible.)

Even without such additional vertical circulation elements, the units are compact. The micro-lofts, for instance, are only about 500 square feet. However, the architects have made them feel roomy by creating nearly double-story living rooms (thanks to the inclusion of the sleeping mezzanines) and by employing such space-saving tactics as combining the kitchens and the entry foyers. They also took advantage of a city zoning provision permitting limited cantilevers over the lot line with 3-foot-deep, boxlike facade projections. These serve as bay windows, expanding the dimensions of the interiors, and as balconies. In addition, the protruding elements lend the long, main elevation a syncopated rhythm, providing a flair that enlivens its workaday fiber-cement siding.

The finishes inside, like the exterior cladding, are basic—including engineered-wood floors, painted drywall, and white lacquered cabinets. But along with generously sized windows that afford views of the surrounding cityscape, the mostly white and beige palette bolsters the sense of spaciousness. Accents of sunny yellow pop up here and there as well, animating such spaces as the shared central stair.

The project was conceived as housing for young professionals, with monthly rents starting at around $1,500, according to Nino Cutrufello, Callahan Ward's development director. The building's jazzy exterior, its airy interiors, and its location should make XS House a hit with these target tenants. But, for the time being, XS House is being leased to a company that rents out the apartments for short-term stays. The two bedrooms run at $99 per night. The developer plans for the units to be market-rate

XS House occupies an oddly shaped site, only 11 feet wide (opposite, bottom) but 93 feet long (opposite, top). The compact apartments feel airy due to bay windows (above) and space-saving tactics, such as combining kitchens with circulation space (top).

rentals in about two years, once its short-stay lease ends, he says.

Other cities are also looking at their irregular lots as one answer to the housing shortage. New York, for example, launched a design competition in 2019 to identify affordable multifamily concepts that could be implemented on small, leftover parcels. Even though XS House is a market-rate project, its inventiveness, spatial efficiency, and relative economy could make it a model—one that could provide solutions for other dense urban environments and for people within a wide range of income levels. ■

credits

ARCHITECT: ISA (Interface Studio Architects) – Brian Phillips, Deb Katz, Alex Gauzza, Matt Underwood, Jason Jackson, project team

CONSULTANTS: Larsen + Landis Structural Engineers (structure); J+M Engineering (mep); Lam Partners (lighting)

CLIENT/
GENERAL CONTRACTOR: Callahan Ward

SIZE: 5,000 square feet

COST: $1.1 million

COMPLETION DATE: April 2019

SOURCES

FIBER CEMENT PANELS: James Hardie

METAL PANELS: Englert

WINDOWS: Andersen

ENTRANCES: Therma-Tru

DOOR HARDWARE: Schlage

CERAMIC TILE: Daltile

WOOD LAMINATE: Mohawk

RESILIENT FLOORING: Shaw

CARPET: Mohawk

LIGHTING: Klus, Barco, Philips, Viso

KITCHEN CABINETS: Multi-Housing Depot

PLUMBING FIXTURES AND FITTINGS: IKEA, Moen, Sterling

APPLIANCES: LG, Whirlpool, Maytag

A sunny yellow, cutouts in the drywall, and generously sized windows on the landings in the building's shared stairwell enliven and open up the tall and narrow space.

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Taking the Edge Off

For a winery in France's Rhône Valley, the architect fashions a wavy wall of solid stone.

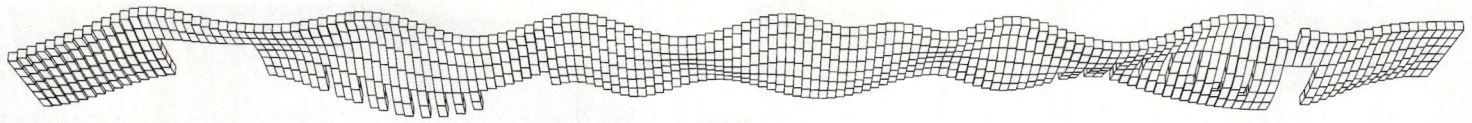
BY JOSEPHINE MINUTILLO
PHOTOGRAPHY BY DAN GLASSER

UP UNTIL about a century ago, most buildings in France were made of stone. The introduction of *béton armé* changed all that, and concrete became an expression of modernity. Paris-based architect Carl Fredrik Svenstedt has designed a number of contemporary structures throughout the country in large blocks of stone, including the Domaines Ott winery in Provence (RECORD, October 2017), reimagining the age-old material. Now his latest, another striking winery project, has the plastic quality normally associated with concrete.

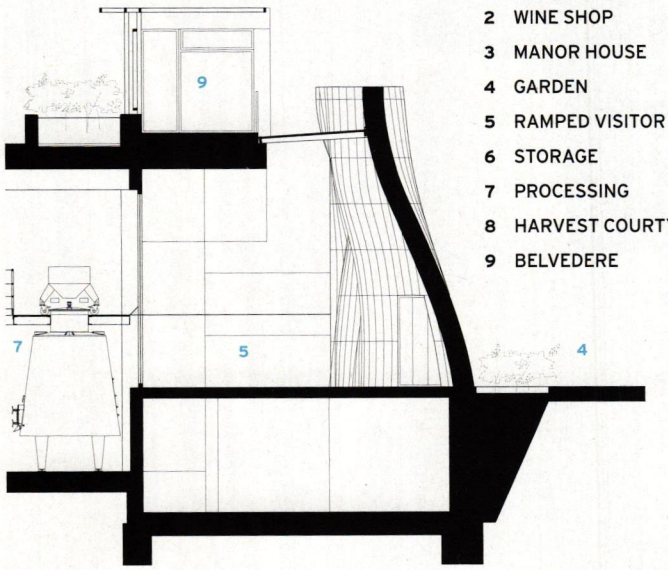
The Delas Frères winery is in the dense town center of Tain l'Hermitage on the left bank of the Rhône River in southeastern France, at the foot of terraced, sun-soaked hills that have yielded exceptional grape-bearing vines since Roman times, and that served as inspiration for a signature element of the new winery.

The site included a rundown manor house—renovated as a guest house with a restaurant and tasting rooms—and a garden once belonging to an old winemaking family, which Svenstedt has maintained as part of the winery's identity. He designed a straightforward stone wineshop along the street-facing edge of the property,

Delas Frères wanted to create a modern winemaking facility while investing in the center of the town. The undulating wall of the new building, which houses processing equipment and barrel storage, is a contemporary expression in stone beside the historic manor house (above). The stone for the wall was cut nearby. Gravel resulting from the process was reused to pave the garden (right).



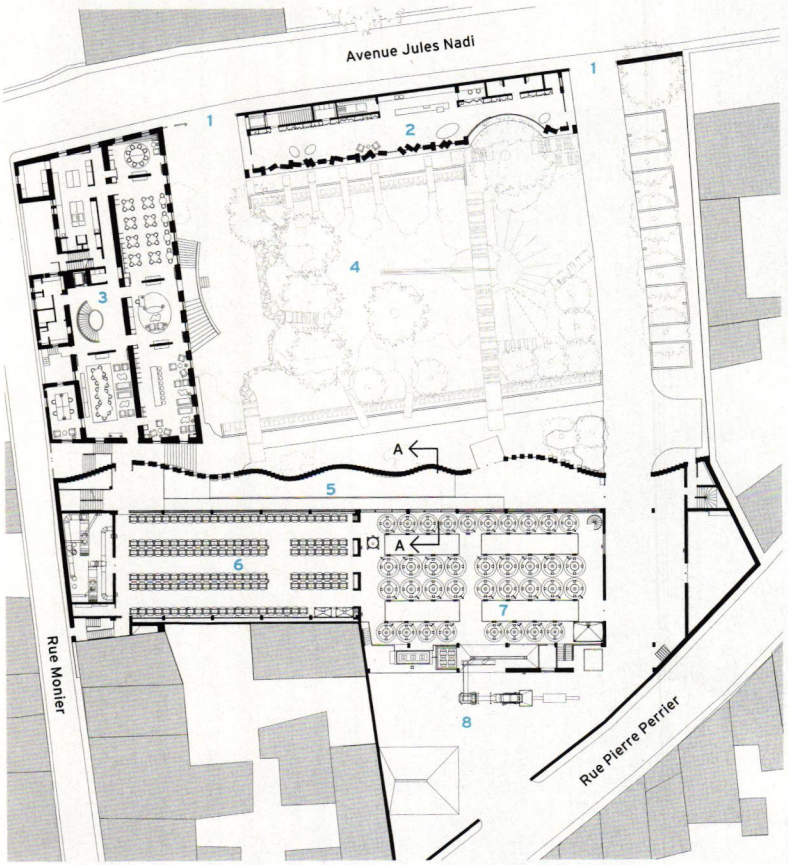
STONE FACADE



1 ENTRANCE
2 WINE SHOP
3 MANOR HOUSE
4 GARDEN
5 RAMPED VISITOR AREA
6 STORAGE
7 PROCESSING
8 HARVEST COURTYARD
9 BELVEDERE

SECTION A - A

0 6 FT. 2 M.



GROUND-FLOOR PLAN

0 30 FT. 10 M.

but the coup de théâtre is a 262-foot-long wall of waves at the opposite end of the garden, fronting the 34,000-square-foot wine-production facility.

The 23-foot-high structural facade is made entirely of load-bearing blocks of Estaillade stone, each weighing over 2 tons, extracted from farther down the Rhône. The blocks are held together horizontally by steel cables in grooves, as well as post-tensioned vertical steel cables that anchor the wall to the foundation. The design team considered other materials—analysis showed that building it in concrete would have used up four times more embodied energy—but the thermally inert stone was perfectly suited for this type of processing and storage facility, and did not require a complex wall assembly with cladding and insulation. "Stone turned out to be easier, less expensive, and more ecological," explains Svenstedt.

The 20-inch-thick blocks were wire-cut and sculpted by a robot at a facility, just 20 minutes away from the site, that typically produces decorative stone fireplaces and balustrades. Muses Svenstedt, "If you

A skylit ramped area (above) lies behind the wall of waves and allows visitors a peek into the winemaking facility, whose interiors are concrete (opposite). A rooftop belvedere offers views of the surrounding terrain (right).

can do it for classical architecture, why not something contemporary?" The porous limestone is softer and easier to cut than other rock types, especially right from the quarry, when still tender. It took three months to shape all the stone, which was installed by the same father-and-son team of masons that built Domaines Ott. Says Svenstedt, "They are artisans who are not afraid of technology."

According to the architect, the design process happened backwards: he first drew the undulations intuitively, having "learned some tricks from the masons," then input them in parametric software. A skylit, ramped area lies behind the curving wall, allowing vistors to discover the winemaking process and proceed up to the planted roof with views to the hills and town. Says Svenstedt, "The wall is the convergence of the whole project." ■

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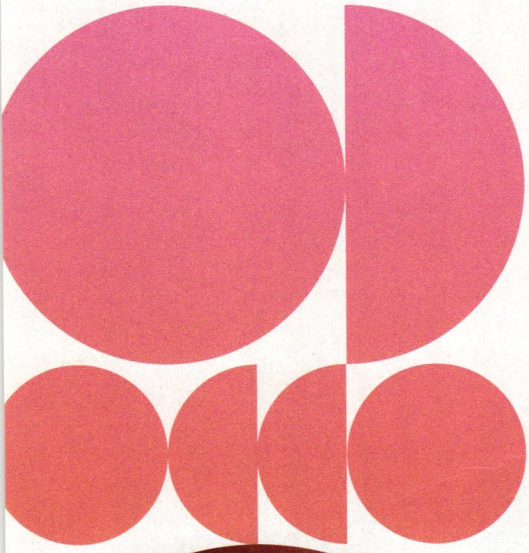

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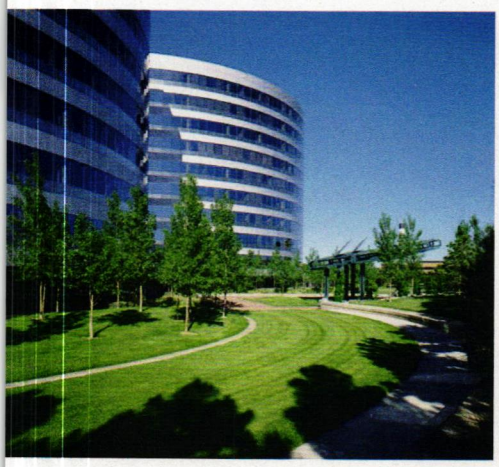

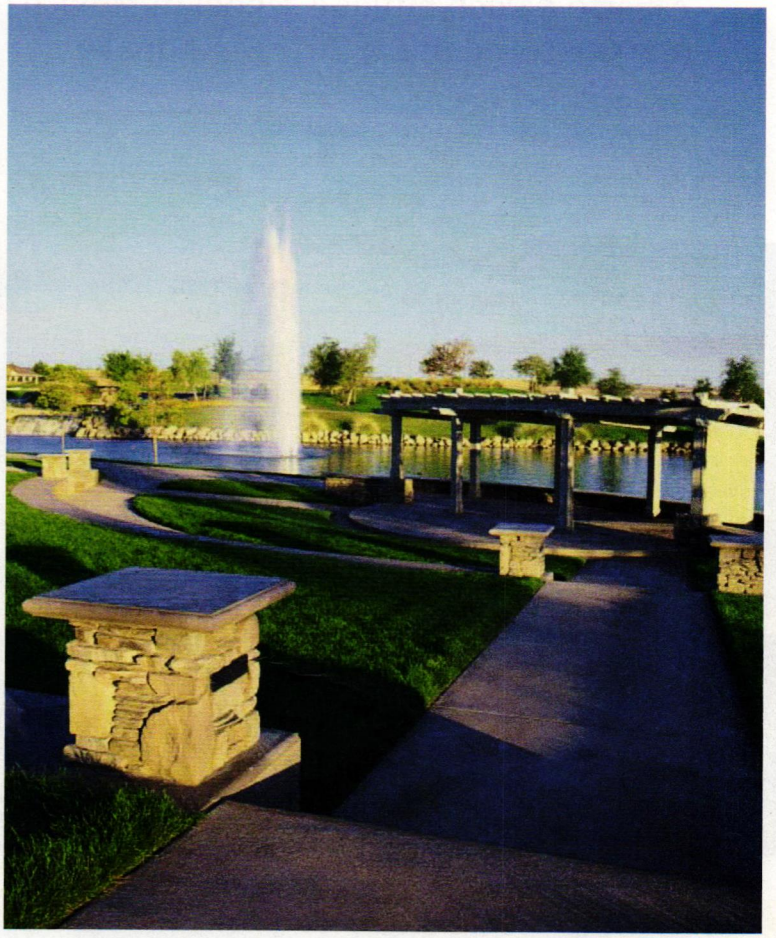

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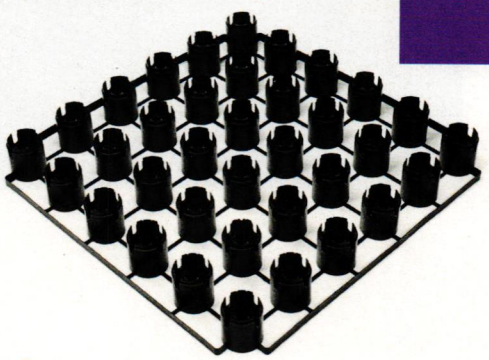

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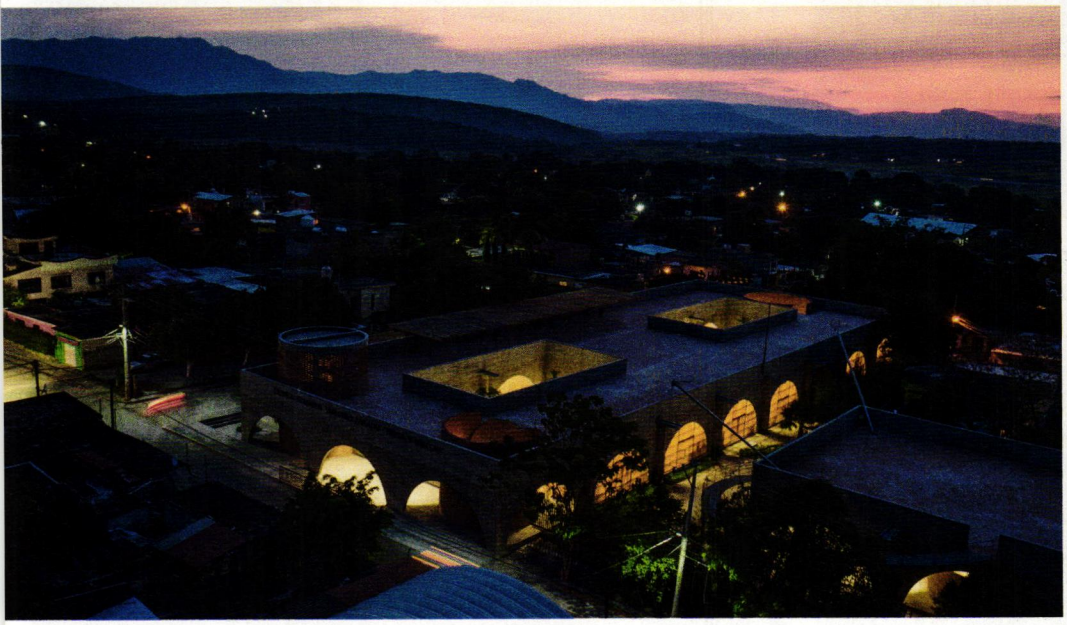
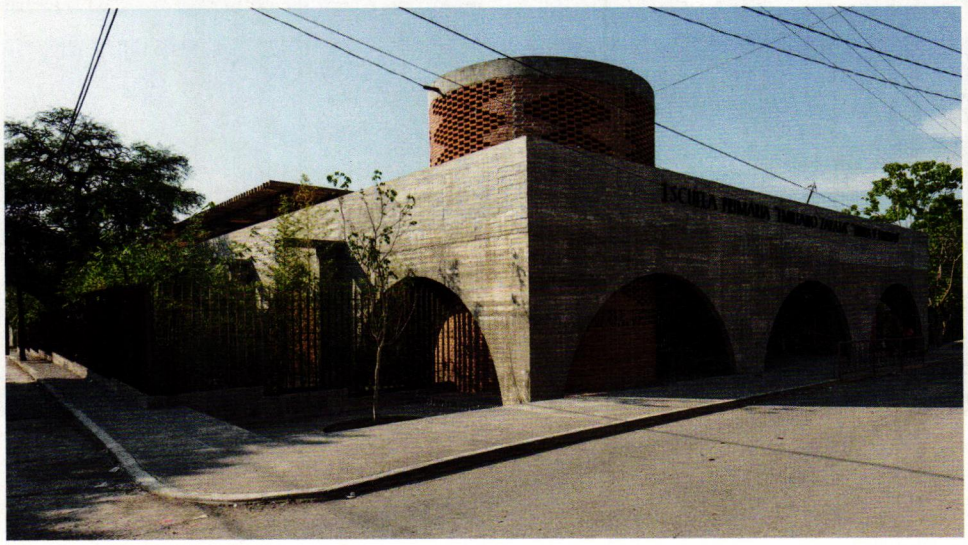
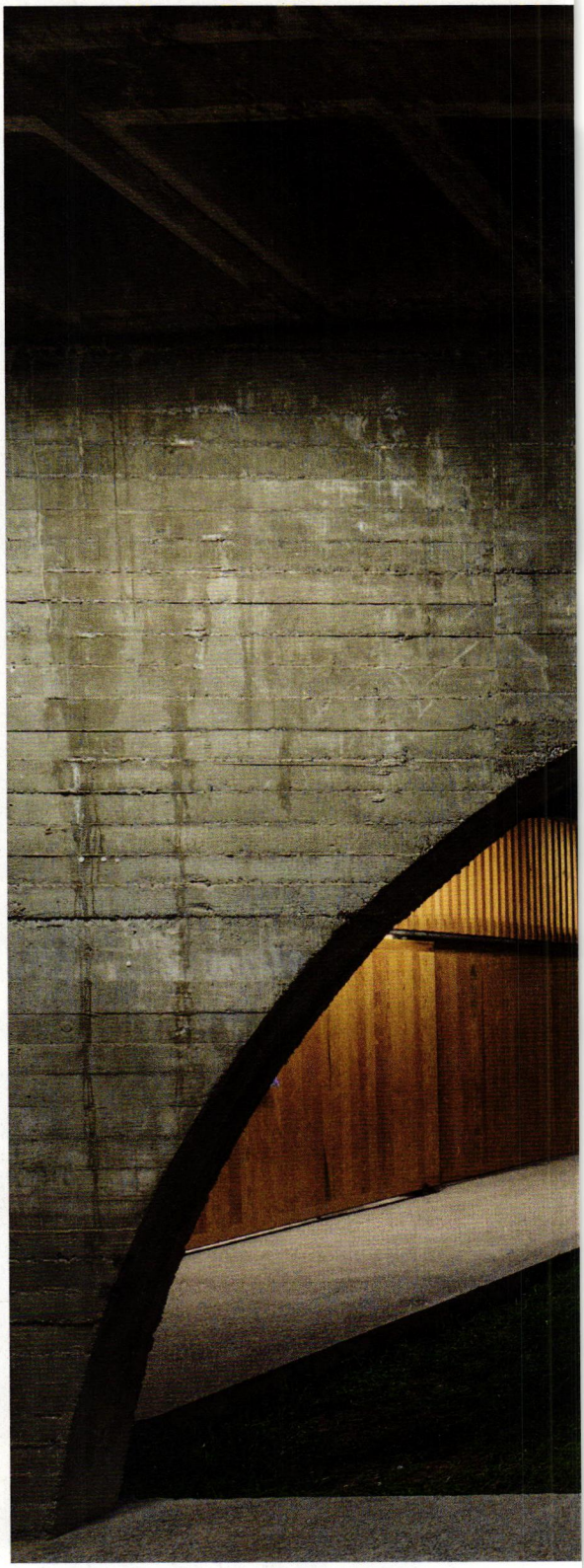
Rise to the Occasion

Alberto Kalach builds a school in Mexico to replace one destroyed in the 2017 earthquake.

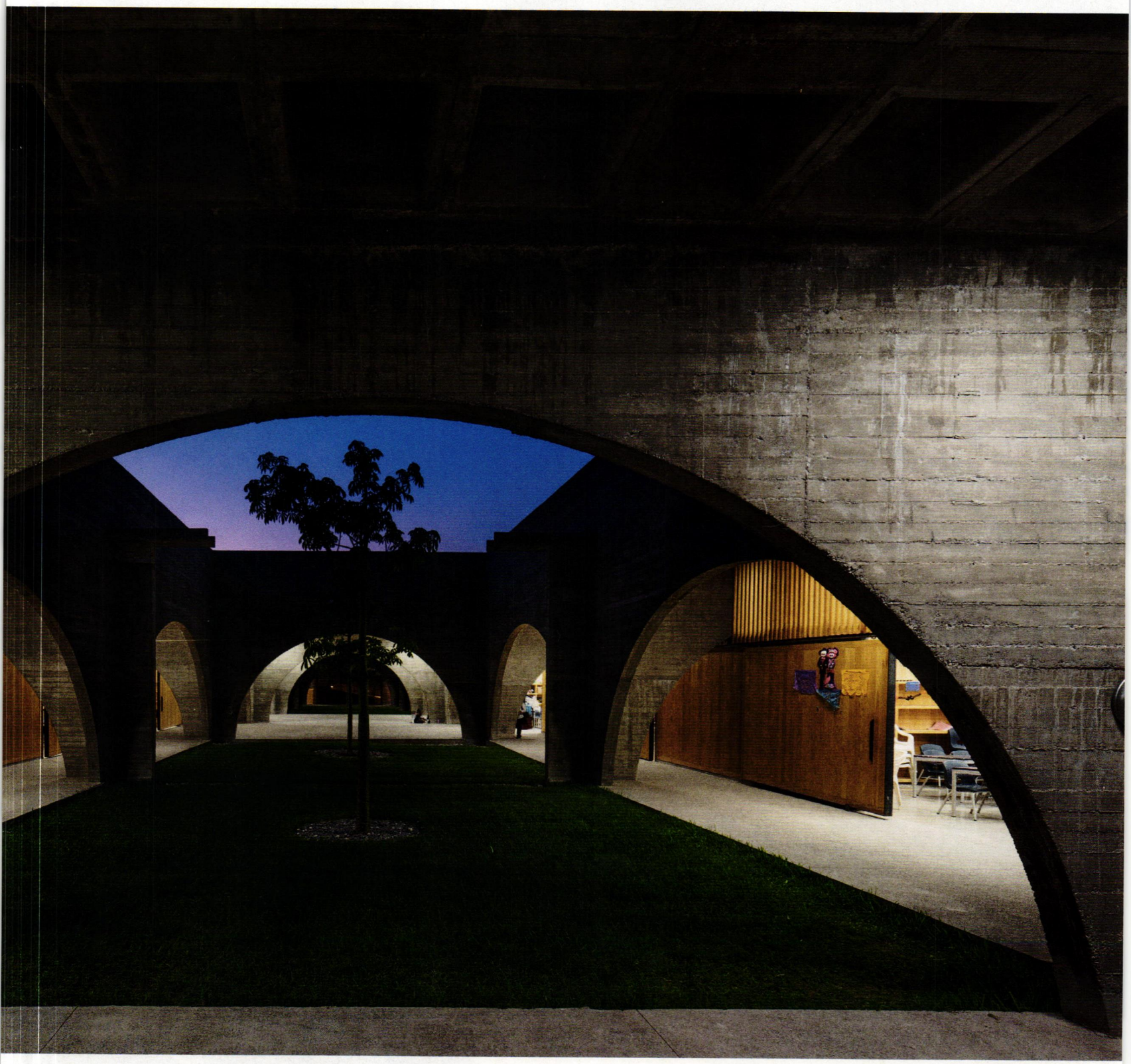
BY JOSEPHINE MINUTILLO
PHOTOGRAPHY BY JAIME NAVARRO







Led by Alberto Kalach, Mexico City–based Taller de Arquitectura X has just completed an elementary school in the small town of Higuerón, about 90 miles due south of the capital, in Jojutla, one of the municipalities hit hardest by the 7.1-magnitude earthquake that killed hundreds in 2017. Escuela Primaria Emiliano Zapata is a single-story structure containing 12 classrooms and additional media spaces around two central courtyards, for 120 students, ages 6 to 12.



Kalach designed the structure as a series of poured-in-place concrete arches. He points out that arches are "inherently stronger" in resisting seismic activity than post-and-beam constructions and are well suited for this type of facility, which was built in a year's time, for just over $1.5 million.

The 24,000-square-foot building combines concrete, wood, and brick. Classrooms open to the courtyards; there are also a number of other outdoor spaces, including the cafeteria, where the children can buy lunch from a local cooperative and dine under the arches. Spiraling stairs on one end, and a ramp on the other, lead to the rooftop play area, located there because of the tight site.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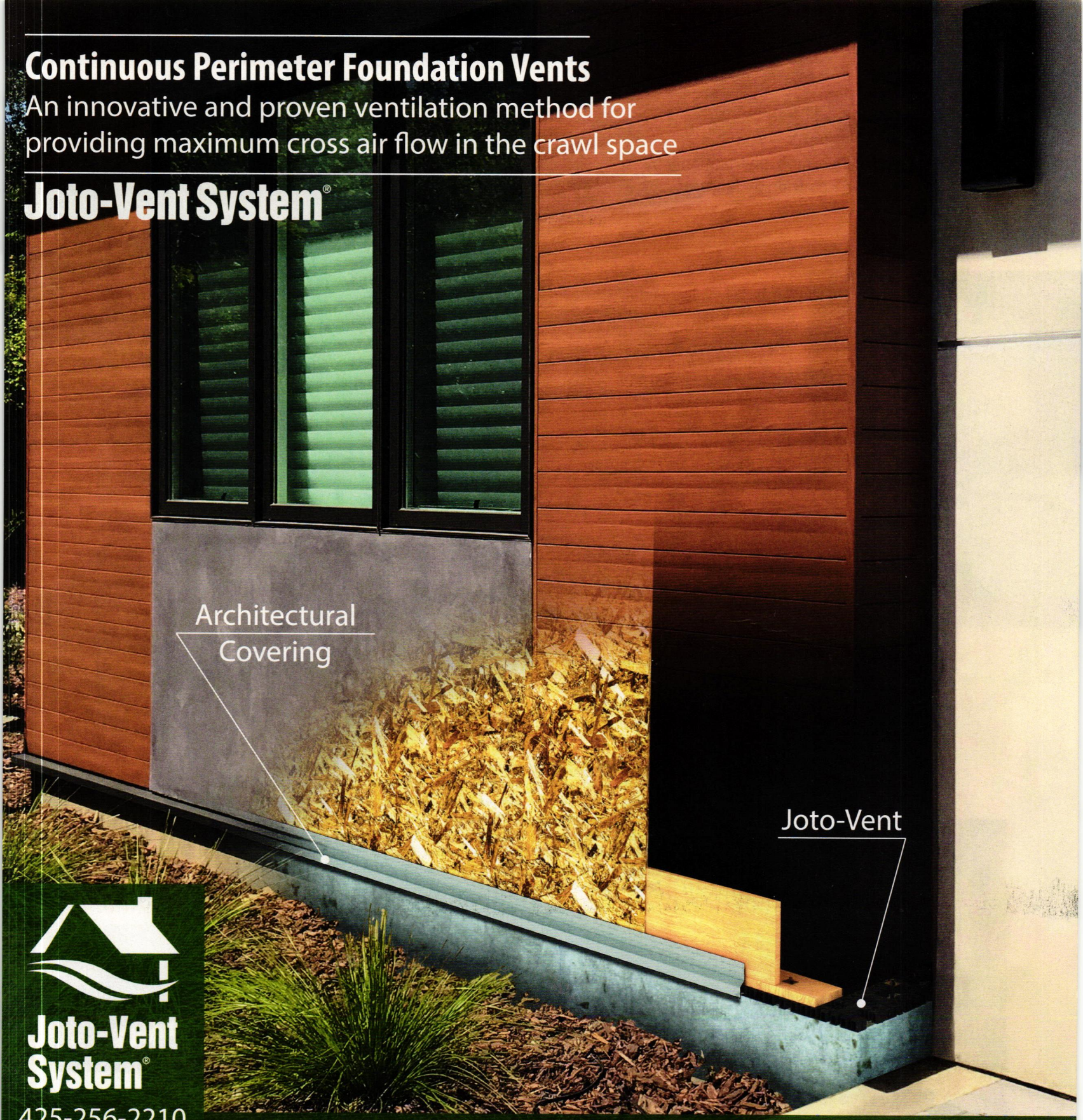

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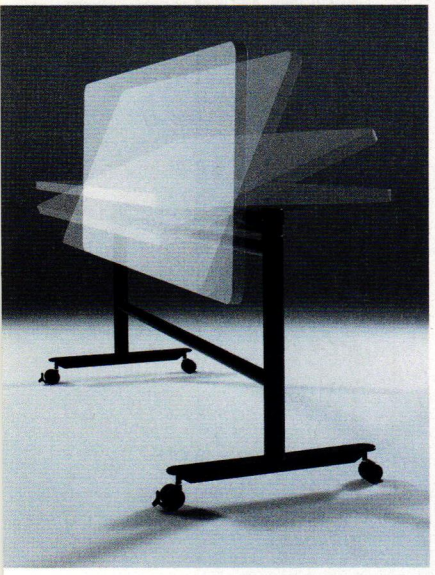
By Kelly Beamon



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versteel.com

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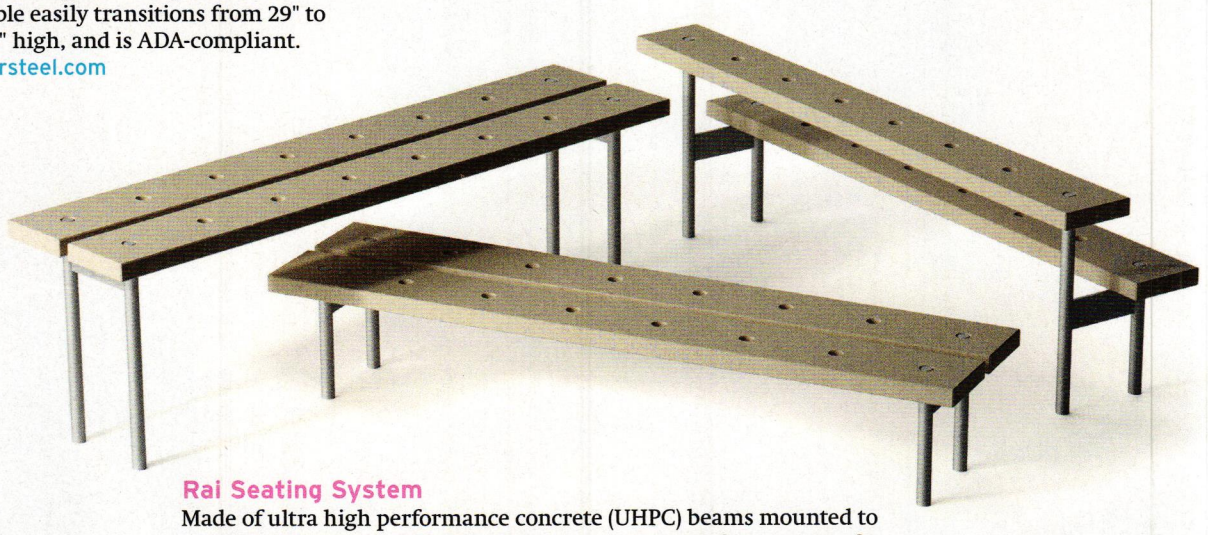
sagegreenlife.com



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landscapeforms.com

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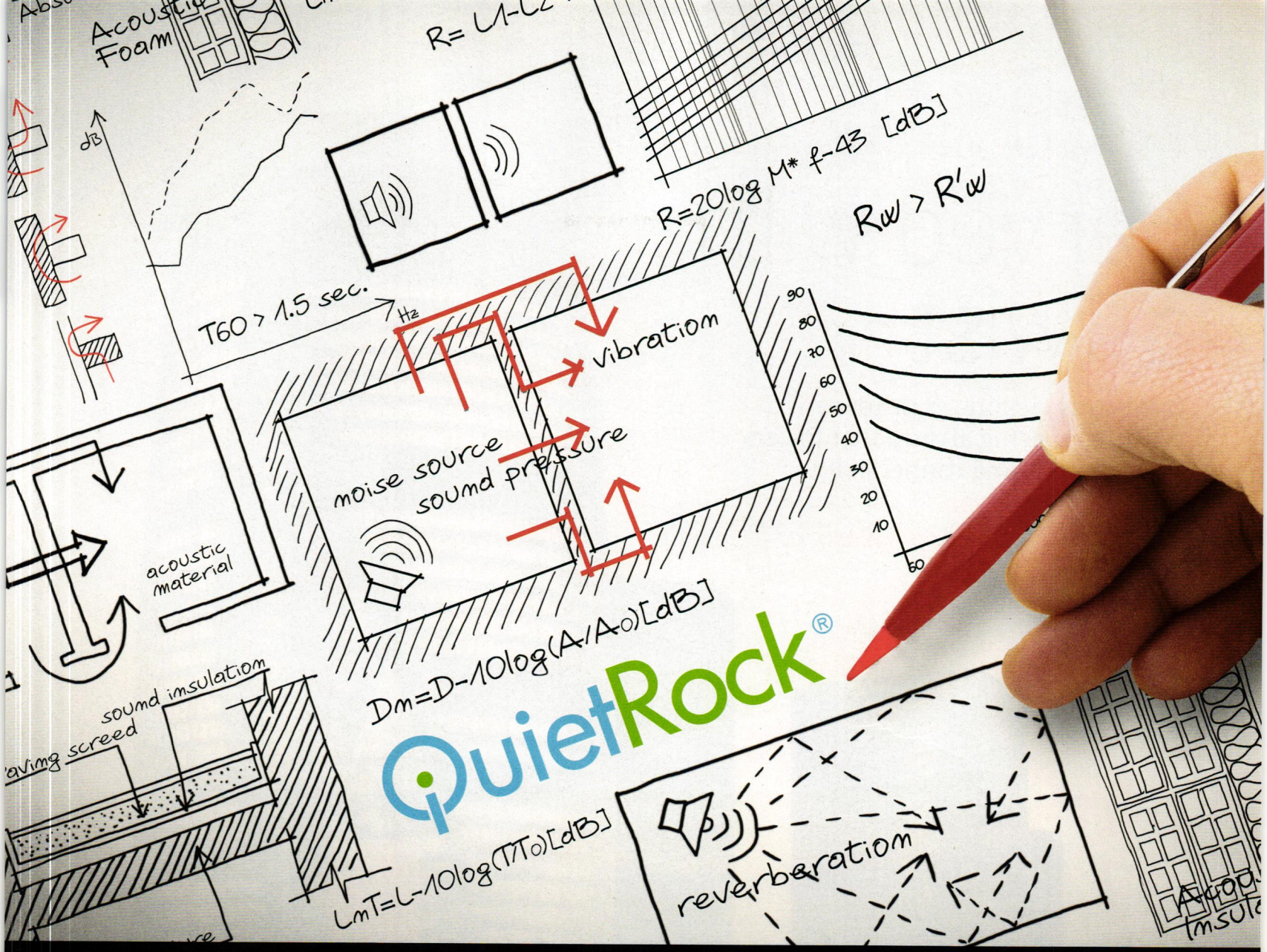

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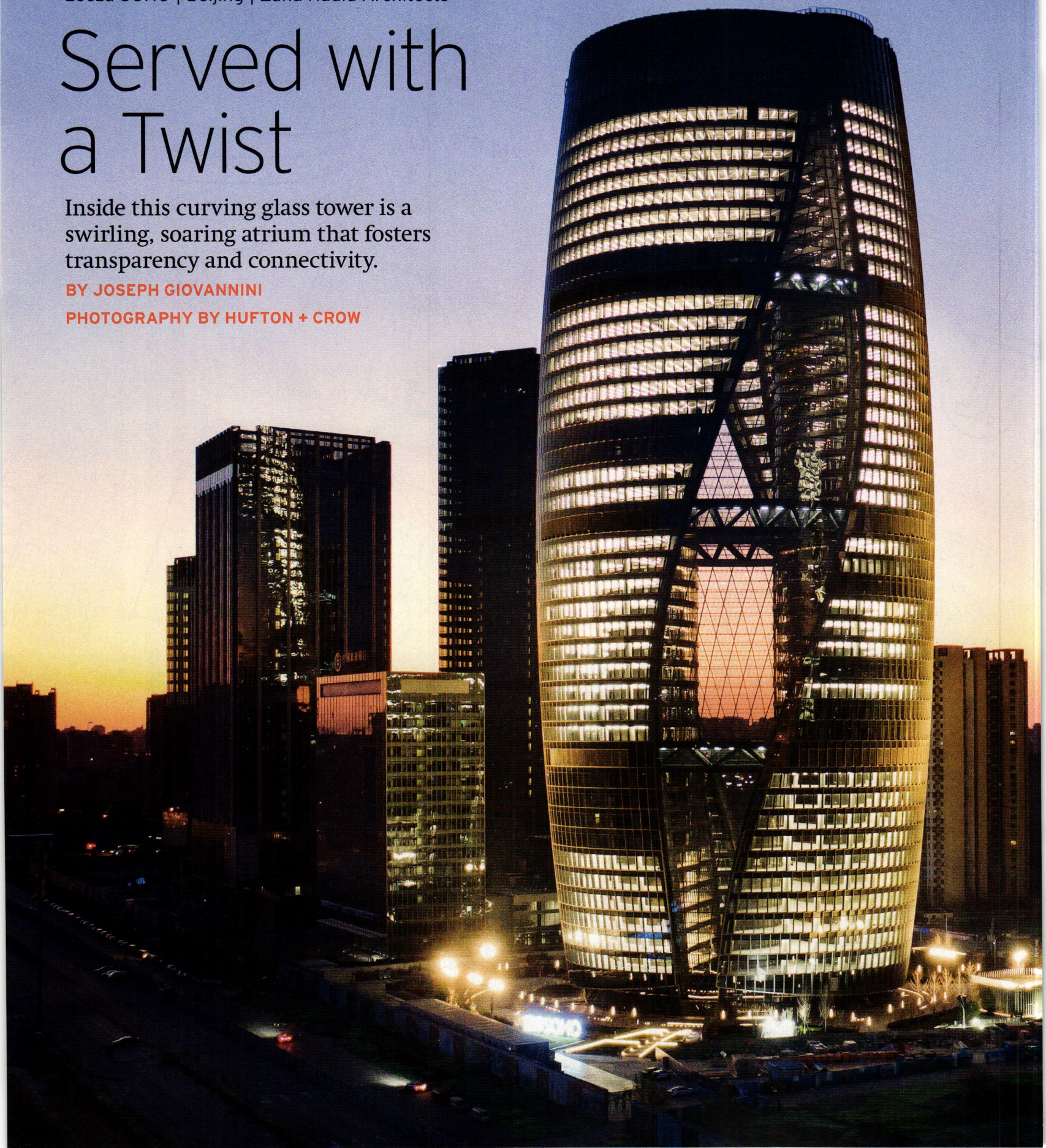
Leeza SOHO | Beijing | Zaha Hadid Architects

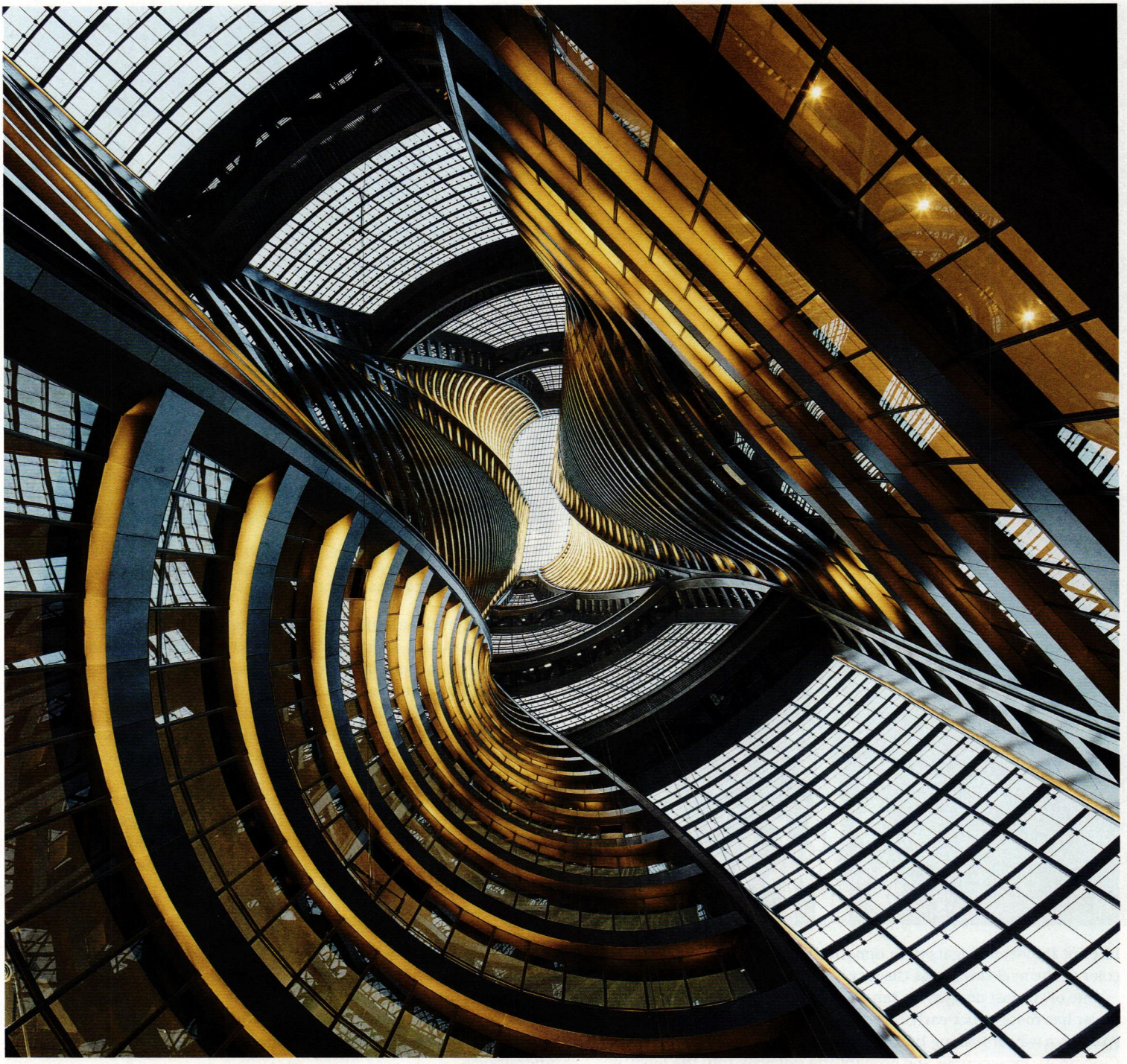
Served with a Twist

Inside this curving glass tower is a swirling, soaring atrium that fosters transparency and connectivity.

BY JOSEPH GIOVANNINI

PHOTOGRAPHY BY HUFTON + CROW

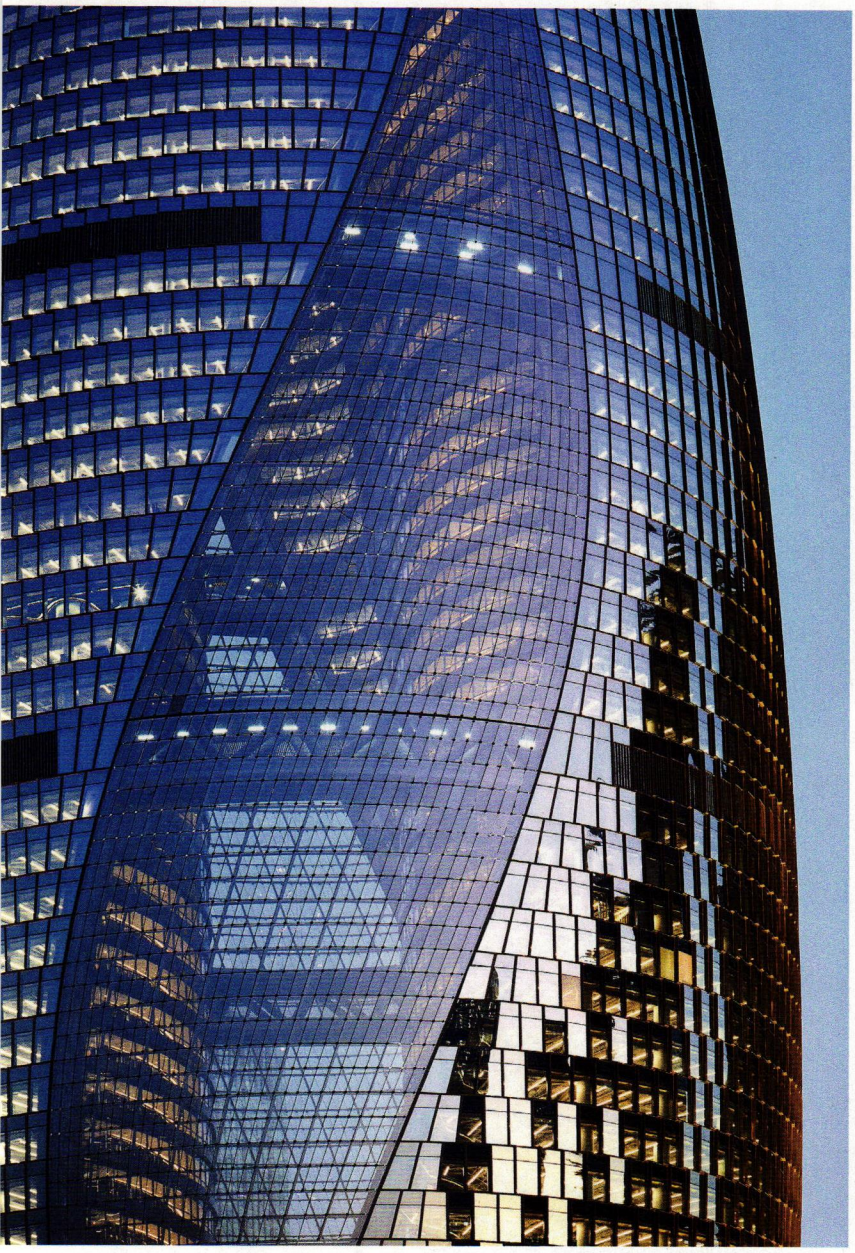


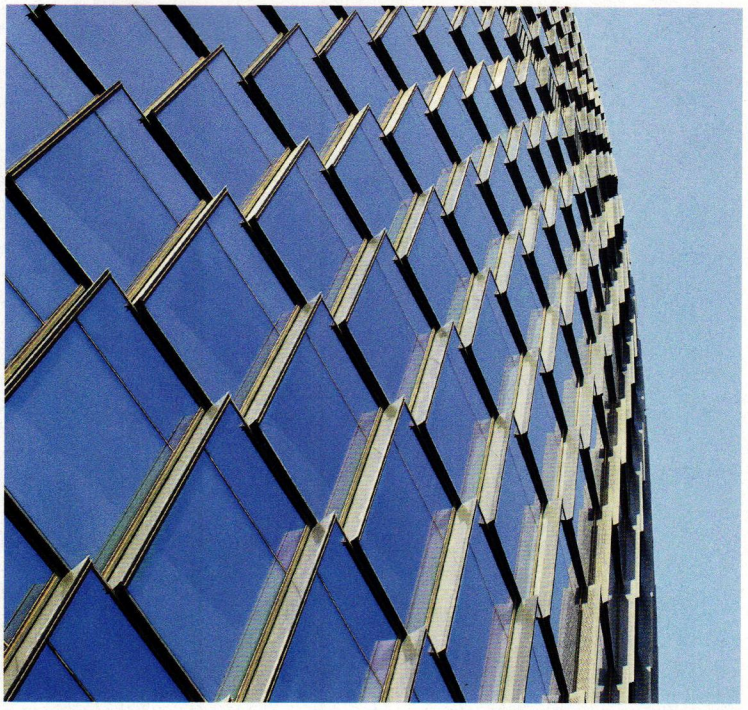


ATHLETIC TORQUE The vertical cut through the tower (left) creates two sides of the structure, each with its own core, while inside the soaring atrium (above), the open void spirals up between the two dynamic interior facades as they bulge out and recede.

COMMERCIAL HIGH-RISES may pack cities with people, but most towers are largely antisocial. Empty lobbies blank out street life, and elevators silence and isolate individuals. Thick concrete service cores relegate occupants to the perimeter, keeping people on one side of the building from people on the other. Floors stacked like pancakes stop communication between levels. Divided, striated, and contained, high-rises squeeze out the great architectural subject of modern architecture—space—eliminating the medium of social connectivity.

The design of the Leeza SOHO Tower by Zaha Hadid Architects (ZHA), which opened in Beijing in November with a galactic light show in the atrium, reinvents the typology of the office high-rise. Spiraling 45 stories around the tallest atrium in the world—637 feet high—and bowed with the entasis of an elegant Greek column, it may earn fame for its lithe profile on the skyline and for an architectural wit not seen since the Chrysler Building. But it is unique because it centers on an open volume rather than an opaque core, fostering community within a space as compressed and intimate as a New York City street. Each half of the building is serviced by its own core so that the two sides basically operate as independent towers, belted together by steel trusses ringing them into a stable structural unit. Each side is designed with a glazed





TURN, TURN, TURN The exterior curtain wall's glass modules (left and above) are staggered like fish scales. The lobby is a public space (opposite, top), and, from an upper-floor elevator core (opposite, bottom), tenants can look out across the atrium.

interior facade, facing its twin opposite. On any floor, you can see the color of the neckties across the way.

One of the last designs by Zaha Hadid before her death in 2016, the tower has roots in her early career, when she started cultivating public space as a way of stoking life and community in her architecture—in Cincinnati, for example, she brought the sidewalk into the lobby of the Rosenthal Center for Contemporary Art as an urban carpet. Patrik Schumacher, her partner, now the head of the London-based firm and a leading exponent of parametricism, maintains that the social web of digital platforms does not replace the need for public space—as old and fundamental as the Greek agora and the Roman forum—but can complement, reinforce, and extend it.

To open up Leeza, Hadid and Schumacher made a simple surgical cut down the middle of an elliptical cylinder, slicing it top to bottom, and pushing each of two banks of elevators to the sides, opening the core to form a chimney of space soaring up to a roof of skylights.

The form of the tower is basically an irregularly shaped double helix that turns around a point centered in the atrium. The facing facades spiral in a gyrational turbulence, twisting with the same athletic torque that ancient artists sculpted in statues like the Belvedere Torso and the Laocoön, both in the Vatican. The atrium is not a static void but a vectorial form that leads the eye up as the facades bulge and recede with the push and pull of varied configurations of office space, depending on the floor. Outside, the architects stepped and staggered the curtain wall's glass modules like scales on a fish to achieve the tower's continuously curving shape.

While exemplifying Vitruvius's rule about buildings' embodying firmness and commodity, here the third element—delight—triumphs. As the tower was completed, folks from the neighborhood rode their bikes over for a closer look at their spectacular new neighbor. Seen at night, the glazing of the tall seam between the two towers twists up its full height like a flame.

Satoshi Ohashi, head of ZHA's Beijing office and the project director, explains the twist. The axis of the atrium at its base aligns with a subway line that crosses the site at a diagonal, but the architects turned the tower 45 degrees as it rises so that the top aligns with the urban grid of the surrounding avenues. The base responds to the below-grade infrastructure, which will be developed with four stories of shopping and services.

Turning the building created tortional stresses inside that are reflected on the interior facades: the architects trace the turns and eruptions with leaning columns and fanning floor plates that document the vertical topography of forces.

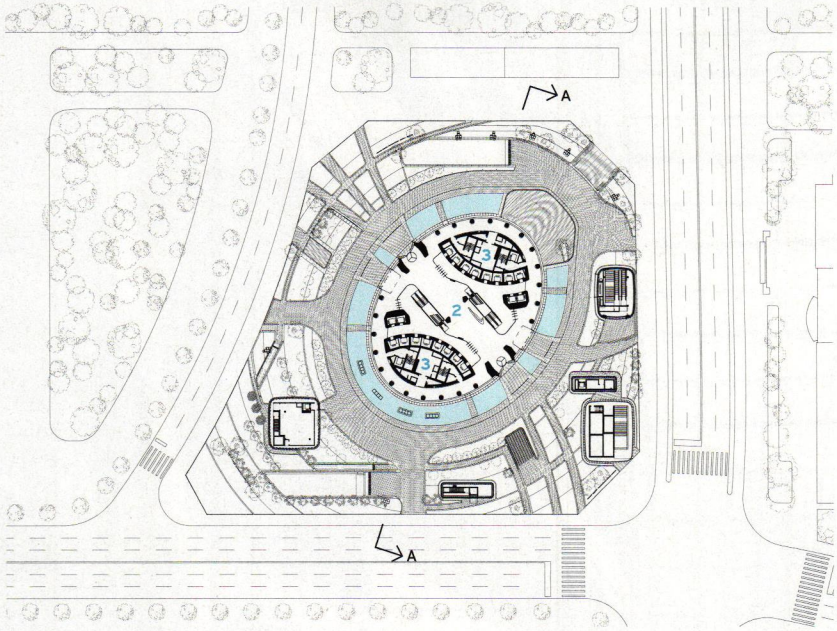
The barrel-like silhouette responded to the desire of the developer, SOHO China, to vary square footage on each of the 45 floors, which total 1.86 million square feet of commercial space. The client stipulated a minimum core-to-perimeter dimension of 27 feet, varying to a maximum of 47 feet. Constraints for fire lanes determined the narrow dimension at the tower's base; the widest floor plates occur mid-rise.

In his remarks at the packed opening, Schumacher acknowledged that the high-rise atrium has been hiding in plain sight for decades in the

hotels John Portman designed in the United States, beginning in the late 1960s. The architects simply transposed the idea to a commercial office building, though clearly the concept has evolved far beyond its original form—Portman's orthogonal atria were cold glaciers of space.

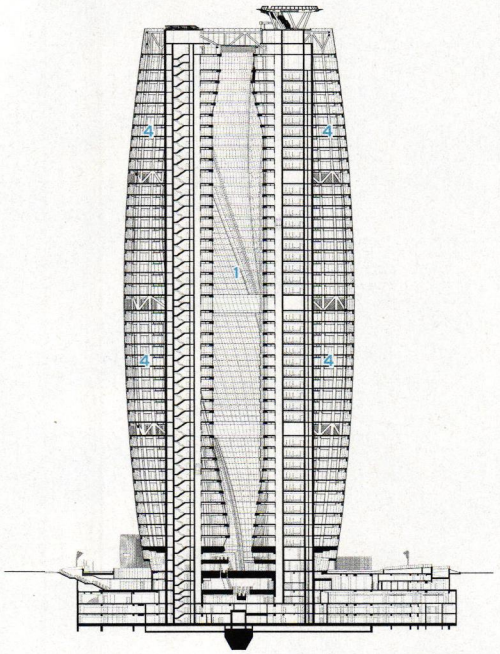
Parametric tools that integrated the building's systems with exacting precision, as well as generating the dazzling helical form, made it all feasible. The tower is designed to LEED Gold standards, including such features as photovoltaics and green swaths on the roof, with its advanced environmental efficiencies governed by those systems. Schumacher, the parametricist, says simply, "It's a fully digitally controlled design and digitally controlled building."

For him, the project is proof of the theory that a totally integrated building of seamless complexity can be commercially competitive, even within Beijing's overbuilt office marketplace. SOHO China, who have completed four



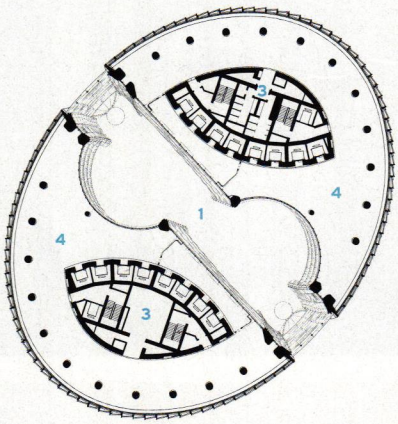
GROUND-FLOOR/SITE PLAN

0 100 FT. 30 M.

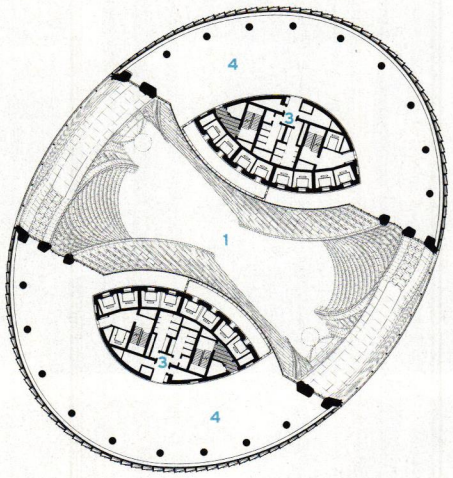


SECTION A - A

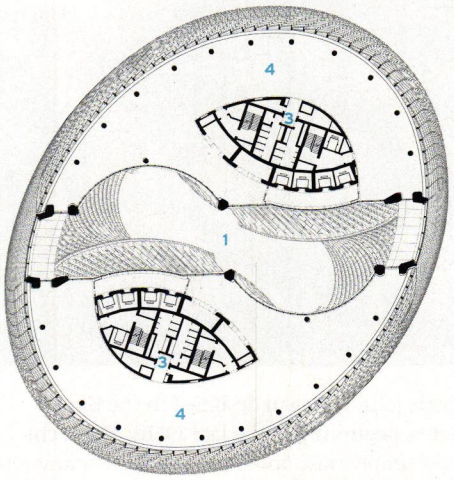
0 100 FT. 30 M.



FIFTH-FLOOR PLAN



20TH-FLOOR PLAN



40TH-FLOOR PLAN

0 50 FT. 15 M.

1 ATRIUM
2 LOBBY
3 ELEVATOR CORE
4 OFFICE SPACE

projects with ZHA since Hadid's 2004 Pritzker prize, were not acting as permissive art patrons but as knowledgeable, aggressive developers who understood that an exalted object would stand out and give their building the competitive advantage of prestige, desirability, and uniqueness.

In the crowded context of an emerging new business district in southwest Beijing, where the surrounding high-rises are respectable, conservative, and pinstriped—and predictably extruded up from a base—Leeza is an intelligent, charismatically idiosyncratic tower—a super-high-tech building that looks organic rather than mechanical: it expresses the soul of the new machine. Its emblematic daring reveals the cultural and entrepreneurial ambitions of a country willing to take smart risks. In China, with the depth of a great past, the building points to the depth of its future. ■

credits

ARCHITECT: Zaha Hadid Architects

EXECUTIVE ARCHITECT: Beijing Institute of Architectural Design

CONSULTANTS: Bollinger + Grohmann, China Academy of Building Research (structure); Konstruct West Partners, Knighton Facade, Yuanda (facade); Parsons Brinkerhoff (m/e/p); J+B Studios Architectural Design, Light Design, Leuchte (lighting)

GENERAL CONTRACTOR: China State Construction Engineering Corporation

CLIENT: SOHO China

SIZE: 1.86 million square feet

COST: withheld

COMPLETION DATE: November 2019

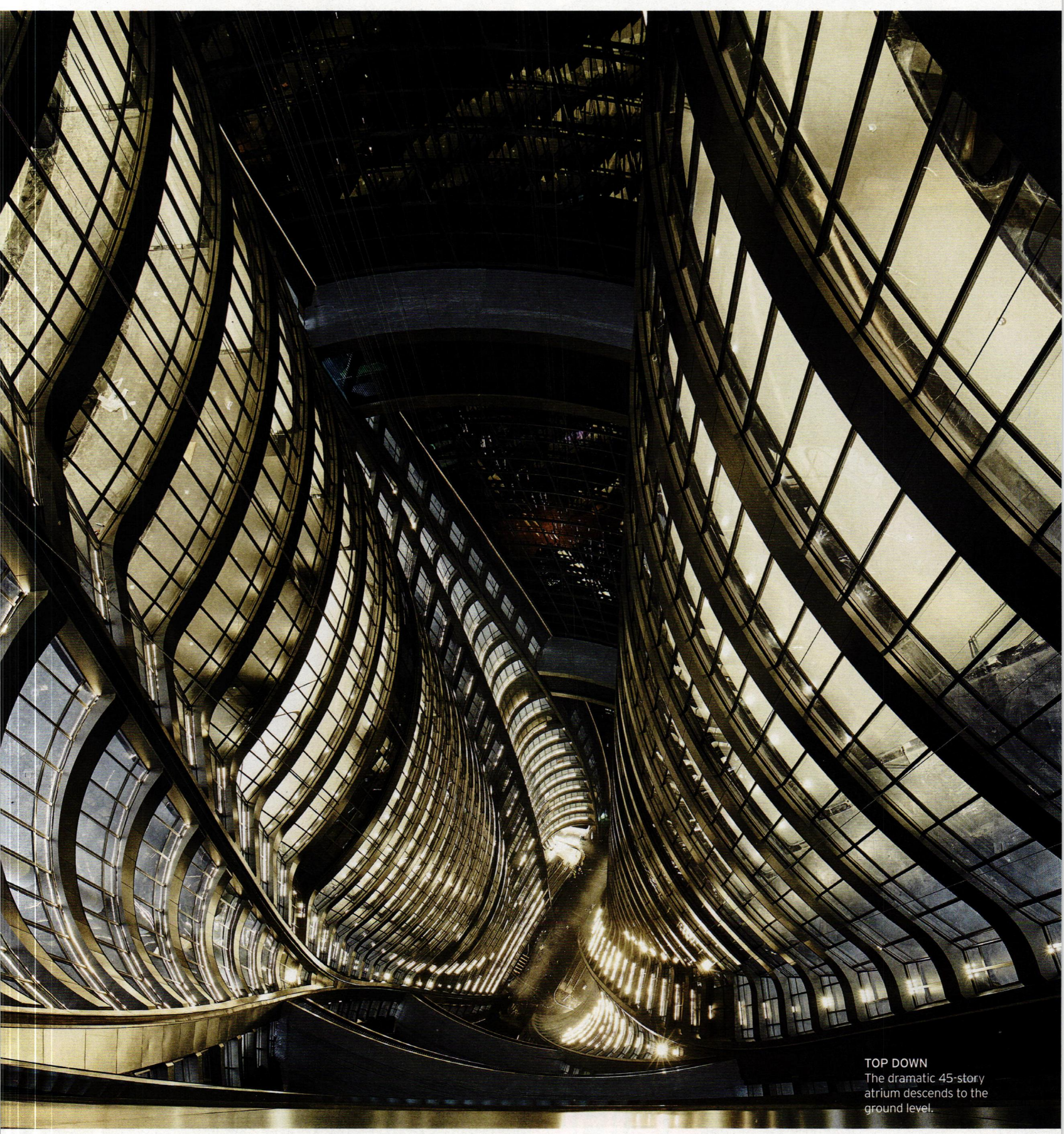
SOURCES

GLASS: Tianjin Yaopi

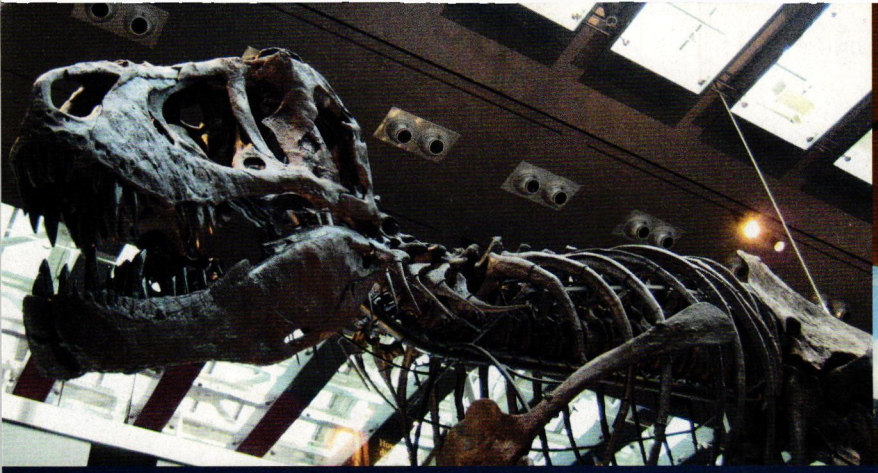
STAINLESS STEEL: Beijing Huaxin Ocean

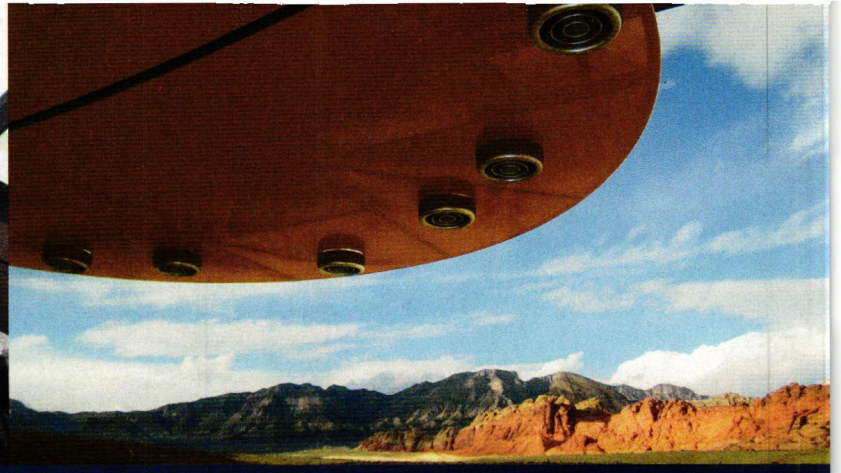
ELEVATORS: Hitachi

FIXTURES: Kohler



TOP DOWN
The dramatic 45-story atrium descends to the ground level.





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Model:**PK-K**
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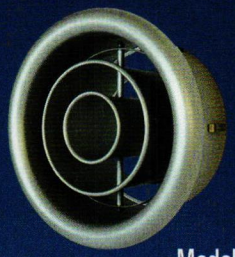

Model:**NT**
4"- 24" Aluminum

Model:**RHV**
6"- 24" Aluminum

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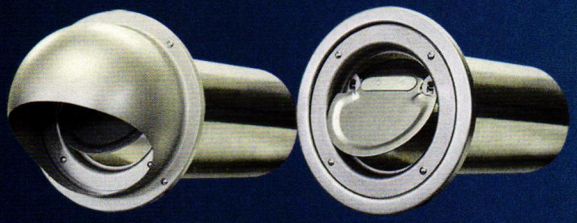
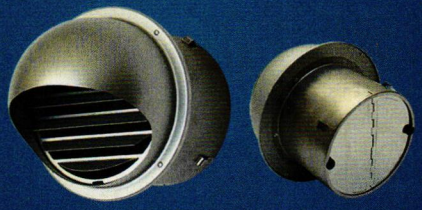


Model:**SFB-P**
4"& 6" Aluminum

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

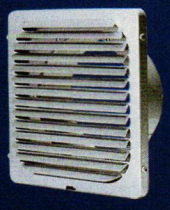


Model:**SFZC**
4"& 6" Aluminum

Model:**RCC-S**
4"& 6" Stainless Steel

VENT CAPS

Model:**SX**
3"- 8" Aluminum



Model:**KX**
3"- 6" Aluminum

Model:**SFX-S**
4"& 6" Stainless Steel

Model:**SXL**
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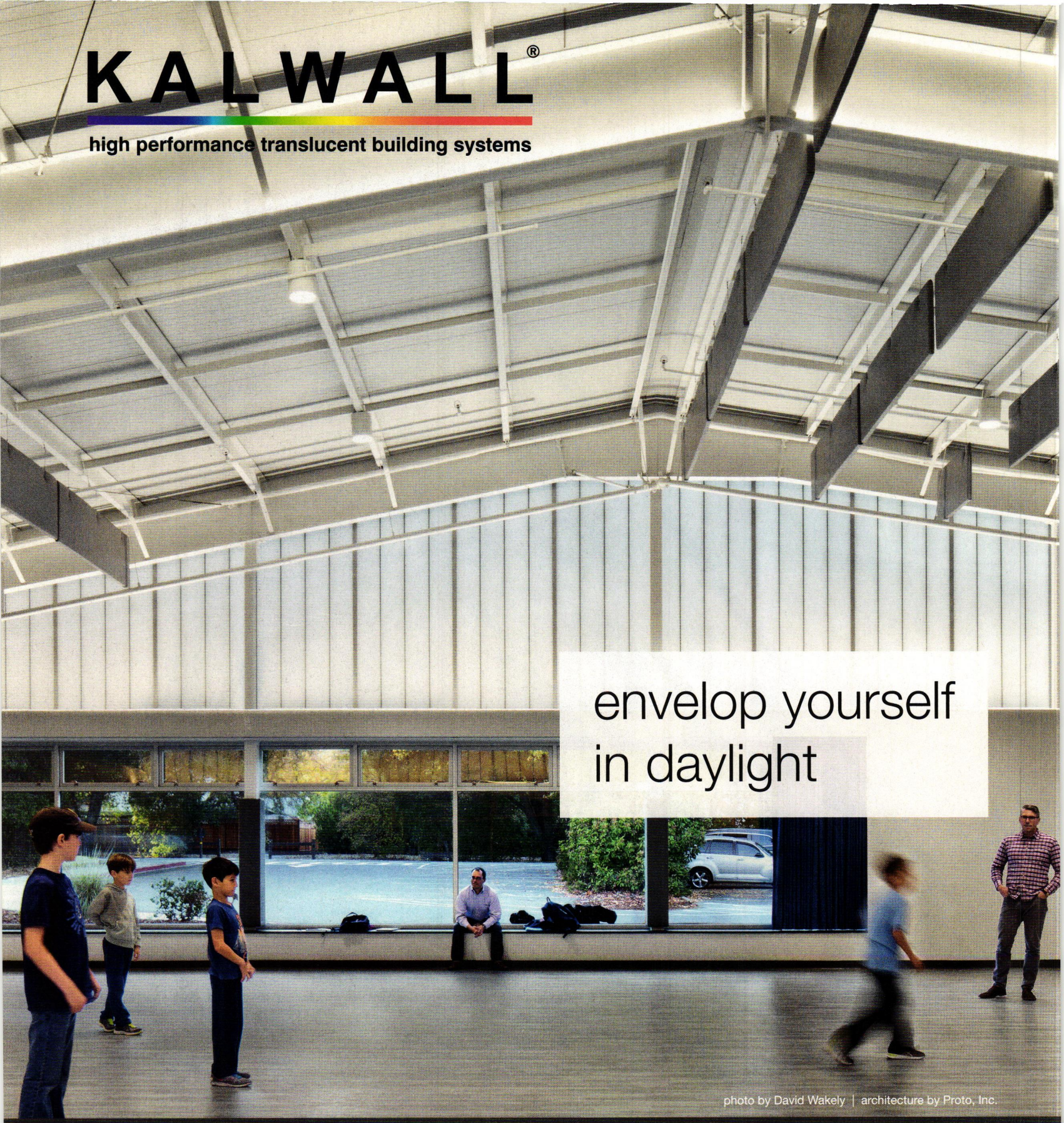

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BY LUNDGAARD & TRANBERG ARKITEKTER

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Scuola Colognola ai Colli | Italy | Claudio Lucchin & Architetti Associati

The Hills are Alive

A primary school rises from the earth, signaling a new approach to design and pedagogy.

BY BETH BROOME

PHOTOGRAPHY BY PAOLO RIOLZI

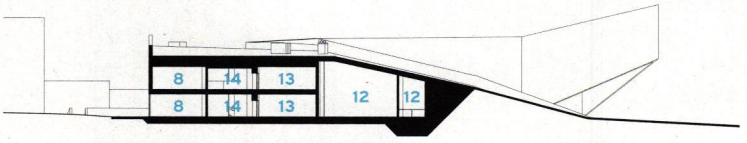
COLOGNOLA AI COLLI, half an hour east of Verona, Italy, is a quiet, conservative-minded industrial and farming village of 8,700. So, when architect Claudio Lucchin presented his design for a new primary school here that bucked tradition, it raised some eyebrows. "Please, can you build me a normal school?" the architect recalls the then-mayor imploring upon seeing his scheme and its unorthodox form and fenestration. "This one is too weird." But Lucchin is not interested in bowing to conformity, especially where education is involved. "When you do banal, it kills any form of curiosity or creativity," he says. "For me, it is important to make spaces with possibility."

Since founding his firm in 2004 in his native Bolzano, the capital of the country's South Tyrol province, Lucchin has designed a wide array of public buildings, including numerous schools, such as the subterranean Hannah Arendt academy in his hometown (RECORD, February 2014). In that context, Lucchin dug down to sink the school into its dense urban lot; the Scuola Colognola ai Colli ("of the hills"), on the other hand, which sits amid expansive vineyards with the foothills of the Alps beyond, rises from the earth. In its differentness, the building announces an evolving pedagogy. "Rather than the pupils' having to fit what a school offers," says Lucchin, "schools now have to accommodate the children and the diverse experiences they bring."

The new primary school replaces an outdated one from the '80s, which did not meet seismic standards, and which was part of a dowdy campus that also includes a kindergarten, middle school, and sports facility, all built over the last few decades. Against its rolling backdrop (and next to the old school, which was

HEART OF THE MATTER The school's coiling form originates from a grassy ramp that leads to a green roof and terminates with a prowlike volume that functions as a canopy. The building embraces a large courtyard at its center, to which ground-floor classrooms have direct access.

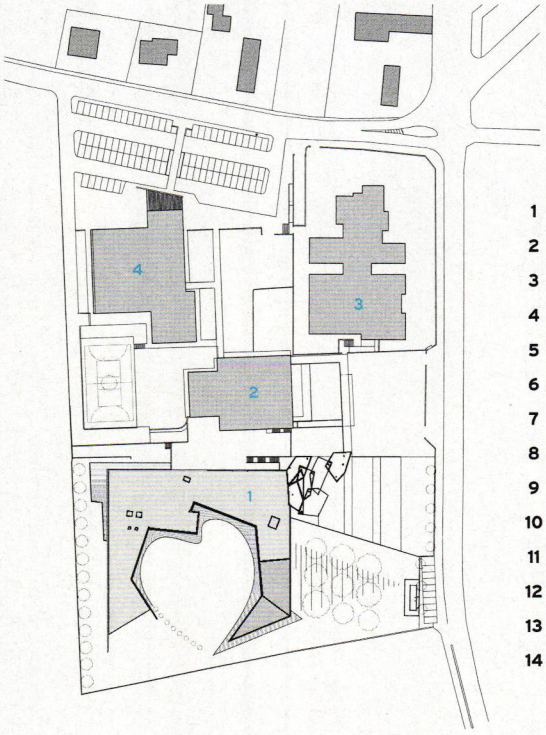
later demolished), Lucchin conceived the 26,000-square-foot building as a hill peeking up through the Garganega vines and fruit trees. The architect says that, whenever he gets a commission, he visits the local school and cemetery, to better understand the community. Colognola's graveyard sits above the village, a squared-C-shaped mausoleum embracing rows of tombstones between its arms. Taking cues from this structure, Lucchin envisioned a similar form—one that both protects and connects—with one arm of the C as a grassy ramp that travels from the ground up to a green roof. The gentle slope and roof serve as a play area and a lookout to the pastoral landscape, historic village, and the courtyard below. Such expansive open spaces are, not surprisingly, a highlight for the chil-



SECTION A - A

0 30 FT.
10 M.

UPPER-LEVEL PLAN



1 PRIMARY SCHOOL
2 MIDDLE SCHOOL
3 KINDERGARTEN
4 GYM
5 MAIN ENTRANCE
6 LOBBY
7 FLEXIBLE USE/MEETING
8 CLASSROOM
9 SPECIAL EDUCATION
10 TEACHER'S LOUNGE/MEETING
11 OPEN-AIR THEATER
12 MECHANICAL
13 TOILETS
14 CORRIDOR

SITE PLAN

0 100 FT.
30 M.

LOWER-LEVEL PLAN

0 50 FT.
15 M.

POP UP SHOP
The building emerges from the rolling topography and surrounding vineyards (opposite). The green roof and ramp is a favorite play space (above). A steel and polycarbonate canopy leads to the main entry.

dren. "Our favorite parts are the garden, the roof, and the large corridors where we can play, especially in winter when we go out less," says third-grader Asia. The reinforced-concrete-frame building continues its circular path on an upward trajectory that terminates in a somewhat awkward prow pointing to the sky—a formal folly with no program inside but which creates a sheltered stage area below for outdoor performances or events.

Though in the Veneto, the building was designed according to South Tyrol's stringent CasaClima energy-efficiency program. This made it possible to attain an A4 classification—the highest designation—under the national APE energy-certification rating system, for its high performance in terms of thermal insulation and energy efficiency. Beneath the green roof (which also supports a PV display), a super-tight envelope is composed of 8 inches of concrete with 8 inches of mineral-wool insulation. A deliberately chunky top layer of spray stucco—tinted to give the impression of the soil lifting from the ground—resembles thick cake frosting. The building's irregularly shaped windows are intended to recall the sky—"As you have a hill, you have clouds," says Lucchin. They are triple paned, with one of the two inner chambers containing automated louvers, especially important since the floor-to-ceiling glass on the elevations fronting the courtyard is south-facing, to take advantage of the views as well as of the thermal heat gain that warms the building in the damp cold of winter. Overall, the exterior has a rough-and-ready finish, fitting for its rural context.

It is the interiors here that really sing. Entering the school, a broad triangular lobby—which doubles as an auditorium—draws you in. The building's internal proportions—the compression and expansion from low, wide hallways into higher-ceilinged classrooms—have a calming, swaddling effect, as do the materials. The architects used oatmeal-colored cementitious wood-fiber acoustical panels on the ceilings and locally sourced ceramic tile with a wood-grain pattern on the floor (they had initially specified wood, but ceramic was more efficient for the radiant heating and cooling system). The walls are of a similar muted hue, left rough with just a scratch coat of plaster. The texture is a pleasing one against those of the surfaces below and above.

As you move through the building, the corridors crank and fluctuate in width, creating an element of surprise. Modestly proportioned classrooms and specialty rooms, flooded with abundant daylight, connect to the corridors via 4-foot-wide glass doors and large windows

LEADING THE WAY Generous corridors serve as flexible learning spaces (opposite, top). Hallways narrow and widen, leading to daylit classrooms (opposite, bottom). Vibrant colors mark vertical circulation (right).

with deep oak frames. The sills serve as reading nooks or benches, expanding the classrooms out into the halls. Answering the demand to accommodate a variety of teaching approaches beyond row-and-column-style seating, the circulation spaces allow for flexible learning spaces. "I enjoy the large corridors," says religion teacher Chiara Bonamini. "They are great for working in different ways—circles, small groups, for example—without the obstacle of tables." On a recent visit, children spread out in a hallway for a yoga lesson. Outside a classroom, an instructor talked to a fidgety boy on a window bench while keeping an eye on the rest of the children inside. "Teachers like it that windows help when working in small gatherings," notes school director Lorenza Dalla Tezza. Bonamini adds that at first she was concerned all the transparency would be distracting, but has come around. "Walking through the school, the teachers see what others are doing, and we get inspired," she says.

Approval of this odd, though sensitively crafted building seems, finally, to have taken hold even among the top brass of this tradition-bound enclave. "Having something completely different makes people curious," admits Claudio Carcereri De Prati, the new mayor. "And, through curiosity, they are enlightened." ■

credits

ARCHITECT: Claudio Lucchin & Architetti Associati – Claudio Lucchin, project manager; Angelo Rinaldo, Daniela Varnier, Marco Mozzarelli, Roberto Gionta, Michele Capra, Stefania Masuino, team

ENGINEERS: Fabio Giannici (structural), BRN Engineering (m/e)

GENERAL CONTRACTOR: MAK Costruzioni

CLIENT: Comune di Colognola ai Colli

SIZE: 26,000 square feet

COST: $5.5 million

COMPLETION DATE: May 2019

SOURCES

CURTAIN WALL: MA-COS

MOISTURE BARRIER: Isolchini

GREEN ROOF: Climagrün

ENTRANCE CANOPY: Caccaro Gastone

ELEVATORS: Schindler

FURNISHINGS: DMG Solution di Gebelin Manuel, Mobil Ferro di Rovigo

The Heights Building | Arlington, Virginia | BIG with Leo A Daly

Stacking the Deck

A public school swaps tradition for architectural bravado.

BY SUZANNE STEPHENS

PHOTOGRAPHY BY LAURIAN GHINITOIU

IN LOCKSTEP Classroom bars fan out from an elongated base (above). The white brick rainscreen emphasizes the volumetric play of light and shadow (opposite).

YOU DON'T necessarily expect the design of an American public school to be bold and energetic: perfunctory modern masonry boxes—usually one or two stories—seem to be a national default solution for this building type. Schools funded by taxpayer dollars are often too cautious about taking risks. But, in this case, the Arlington, Virginia, school system was willing to bet on BIG (Bjarke Ingels Group), a Copenhagen firm that embraces architectural restrictions with a brazen optimism.

Over the last decade or so, BIG's New York office has created a number of dashing projects in the U.S. such as the apartment buildings Via 57 West in New York (RECORD, September 2016) and the Grove at Grand Bay in Miami (RECORD, October 2017). If developers expect a lot from architects in return for their investment, so too did the Arlington Public Schools (APS). School authorities wanted an energy-efficient, state-of-the-art facility, with distinctive architecture for two secondary schools totaling 775 students from the sixth to 12th grades, in a dense neighborhood near the downtown. The much larger one, H-B Woodlawn, has a strong visual and performing-arts curriculum, with a lottery-based admissions system; the other, for about 50 pupils, is part of the Eunice Kennedy Shriver Program for special education.

BIG was asked by Leo A Daly, based in Washington, D.C., to join in responding to the RFP as the design architect. Partner in charge Bjarke Ingels liked the challenge. "For a public school with modest means, you make choices about getting something extraordinary out of ordinary materials," he says.

The architects came up with a scheme consisting of five rectilinear bars of double-loaded classrooms, four of which fan out acrobatically from the northeast corner above an elongated base that houses classrooms a well as such common spaces as the lobby and cafeteria, plus the administrative offices.

Brick—featured in the old school building that was on the site, as well as in much of Arlington's historic architecture—is the prominent material here, albeit in white, not red. White brick, says Ingels, "better expresses the volumes through the play of light and shadow." Deployed as a rainscreen system, thin glazed brick crisply covers the walls and soffits, which terminate in projecting corners. Using this technique also reduces the weight of the material and minimizes the steel needed for cantilevered spaces and glass walls.

At the main entrance on Wilson Boulevard, students enter the arresting assemblage to find an expansive three-story atrium. Inside, steps and bleachers angle up to the second-floor library on the southwest corner; if you walk north to the rear of the lobby, you see another step-and-bleacher triangle headed down to the gym on a lower floor that is mostly below grade.

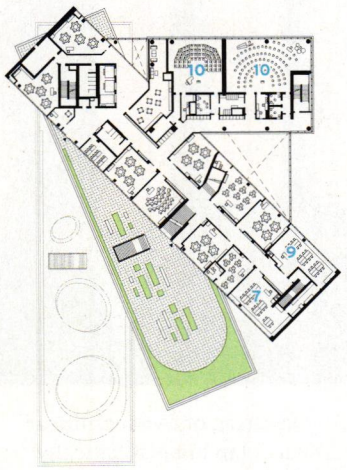
Stand in one spot of this main public space and you can see students walking, sitting, even playing basketball down in the gym—or clustered in the cafeteria ahead. You may also catch a glimpse of the plywood-lined library above. The multiple sight lines, the reverberant sounds, and the amount of daylight admitted through expanses of glass

give the atrium an exuberant spirit in keeping with the unbridled thrust of the architecture. This is no monastery.

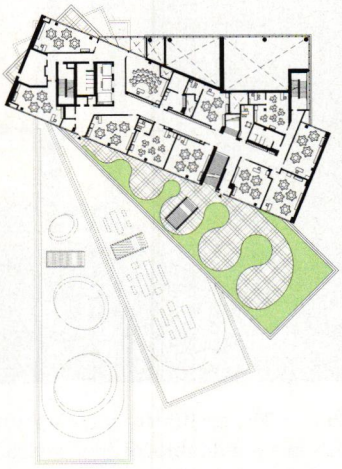
On the lower floor, next to the gym, is a 400-seat auditorium with an array of performing-arts support spaces. Nearby are occupational/physical therapy rooms and related spaces for the special education classes.

On the upper levels, each of the four classroom bars pivots away from the one above, allowing the architects to convert the roofs to landscaped terraces for outdoor gatherings. Two main stairways, one threading from the exterior terraces to the inside, the other angling steeply (it keeps you alert) within the halls, are precast concrete, each supported on a steel frame.

Every classroom hallway is memorable, thanks to the vibrant color scheme (yellow, orange, red, violet, and blue). The classrooms themselves, which accommodate 18 to 24 students each, are straightforward, though



LEVEL 3 PLAN

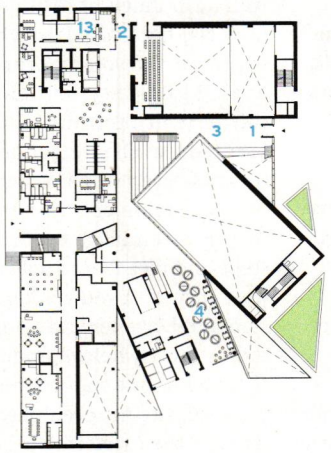


LEVEL 4 PLAN

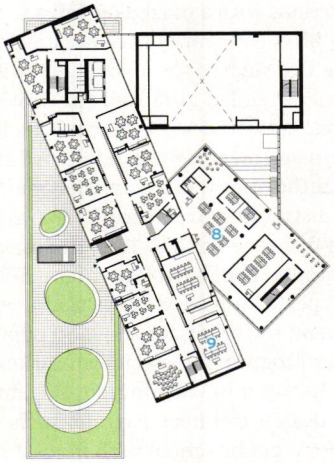
LEVEL 5 PLAN

1 ENTRANCE
2 VISITORS ENTRANCE
3 LOBBY
4 CAFETERIA
5 GYM
6 THEATER
7 BLACK-BOX THEATER
8 LIBRARY
9 SCIENCE LAB
10 MUSIC REHEARSAL
11 ART STUDIO
12 OCCUPATIONAL/PHYSICAL THERAPY
13 ADMINISTRATION

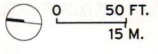
GROUND-FLOOR PLAN



LEVEL 1 PLAN



LEVEL 2 PLAN

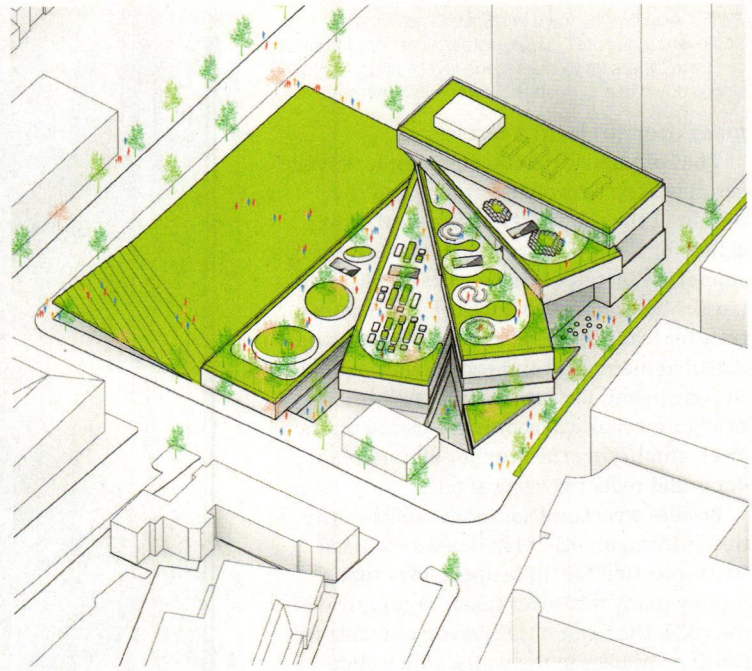


TWIST AGAIN The main entrance faces Wilson Boulevard (opposite); inside, a stair/bleacher of precast concrete tapers up to the second level (right). Another slopes down to a gym on the lower level (bottom).

many open to the roof terraces.

The volumetric parti seems simple, but the cantilevering bars of classrooms and the weight of the soil for the terraces' planting called for a complex structure. Steel framing supports concrete slabs on metal decks; steel trusses behind the exterior brick rainscreen transfer loads through vertical columns and diagonal members from each classroom bar to the one below. Because of the rotated floors, smaller mechanical rooms are placed on each level, amplifying the number of horizontal ducts and reducing vertical ones.

Besides structural solutions and the utilities' placement, other challenges included fire protection for these open, lofty spaces. Among many measures taken to comply with the code, the team has relied on operable fire shutters, hidden in the walls, which slide across stair openings. To further prevent smoke from rapidly rising up the stairs, they installed glass baffles at the ceiling, which are



AXONOMETRIC SHOWING ROOF TERRACES OF THE CLASSROOM BARS

18 inches deep and extend across the width of the staircase.

The school, with such measures as the building envelope's enhanced roof and wall insulation and LED lighting, is on track for a LEED Gold rating. While a standard IGU assembly is used for the glazing, it comes with a low-E interlayer. In addition, about 20,000 square feet of vegetated roof mitigate solar gain and runoff. And one rainwater cistern is used for plants and flushing; a stormwater-detention tank can be siphoned by the fire station next door and also deployed by a nearby development.

The collaboration between BIG and Leo A Daly has created an 180,000-square-foot showstopper for a little over $100 million (including fixtures, finishes, and equipment), or just over $550 per square foot. Aptly called the Heights Building for its verticality, sense of openness, and permeability, it embraces the neighborhood, the outdoors, and a variety of programs. Most important, it acts, notes Ingels, as "a canvas for the expression of life of children." ■

credits

DESIGN ARCHITECT: BIG (Bjarke Ingels Group) – Bjarke Ingels, Daniel Sundlin, Beat Schenk, Thomas Christoffersen, partners in charge; Aran Coakley, Sean Franklin, project managers; Tony-Saba Shiber, Ji-young Yoon, Adam Sheraden, project leaders

EXECUTIVE ARCHITECT: Leo A Daly –William Kline, principal in charge; Timothy Duffy, project manager/senior technical director; Alicia Goldberg, senior architect; Andrew Graham, project architect/BIM manager

ENGINEERS: Silman (structural); Interface Engineering (m/e/p); Gordon (civil)

GENERAL CONTRACTOR: Gilbane Building

CLIENT: Arlington Public Schools

SIZE: 180,000 square feet (not including terraces)

COST: $101 million

COMPLETION DATE: September 2019

SOURCES

BRICK RAINSCREEN: Telling Architectural Systems (Corium)

METAL PANELS: Vitrabond

INSULATED LAMINATED GLASS: Viracon

PRECAST CONCRETE: American Stone Virginia

METAL/GLASS CURTAIN WALL: YKK, Innovation Glass, Construction Specialties

MOISTURE BARRIER: Grace

GREEN ROOF ASSEMBLY: Furbish

TERRACE ROOF PAVERS: Wausau Tile

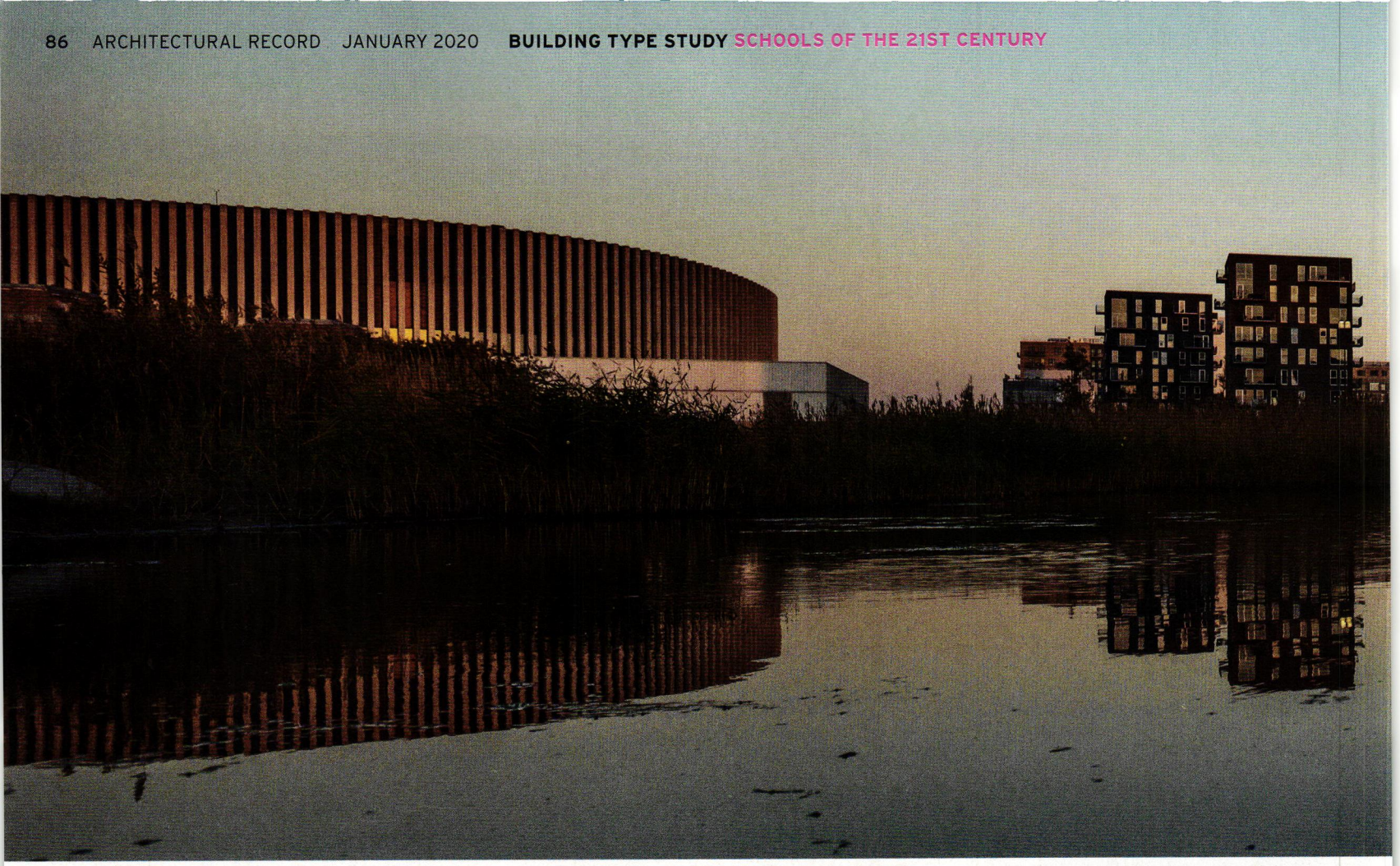
DOWNLIGHTS: Axis Lighting (linear fixtures); Louis Poulsen

EXTERIOR LIGHTING: Bega

ELEVATOR: Otis

BATHROOM TOILET/URINAL: Sloan, American Standard

OUTSIDE IN
From the fifth-level terrace (opposite, top), students can take stairs down to ones cascading below (opposite, bottom). Inside the school, each classroom bar is saturated in a different color (right). From the first-level lobby (below), students can gaze upon activities taking place in the gym.



Kalvebod Fælled School | Copenhagen | Lundgaard & Tranberg Arkitekter

Well-Rounded Education

A Danish school thinks outside the box to create singular spaces for learning and play.

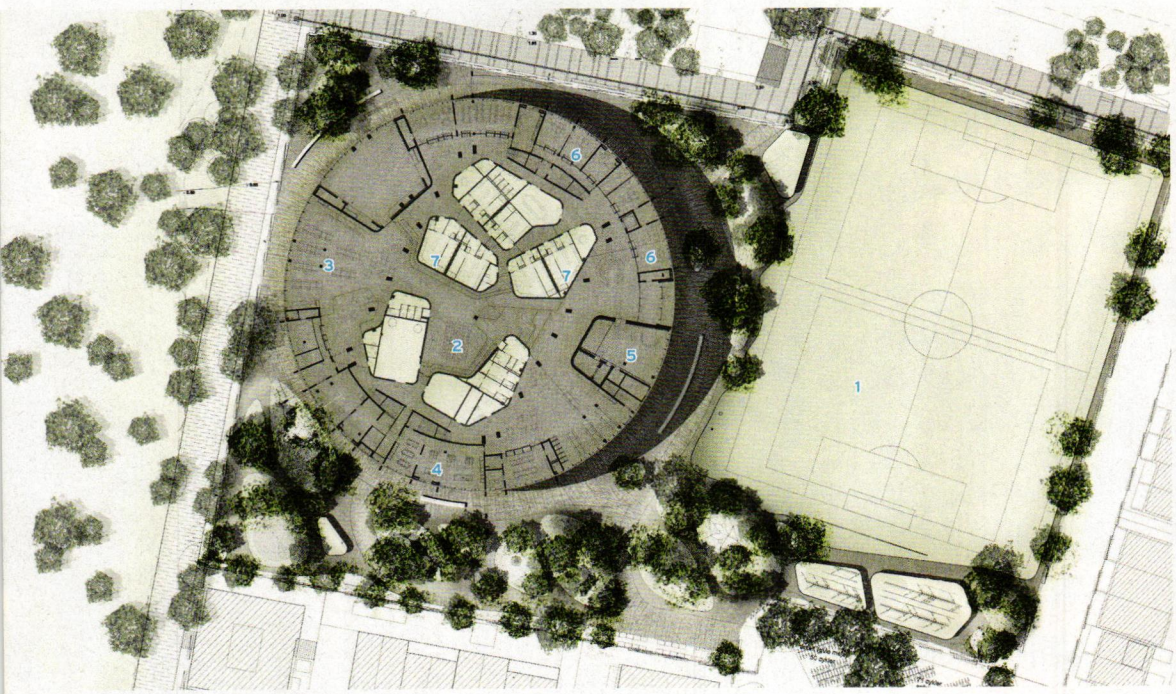
BY JOSEPHINE MINUTILLO

THE LANDSCAPE of Ørestad, a fairly recent development of office buildings, educational facilities, and housing on the southern outskirts of Copenhagen, next to hauntingly beautiful marshlands, is an odd array of wide-open spaces—often without a soul in sight—lined mainly with competent but sedate contemporary architecture. There are some exceptions, notably BIG's 8 House (RECORD, August 2011), in the form of a cascading figure eight. But more immediately visible from the elevated train and metro lines that swiftly connect this new area to the city center and the airport are a pair of distinctive round buildings. The larger of the two, the Royal Arena (2017), designed by 3XN, has become a popular venue for concerts and sporting events. The smaller one has a program not as obviously associated with its cylindrical form.

Indeed, the Kalvebod Fælled School is unlike most public schools, not just for its shape but for its design in the broadest sense, because it caters to progressive educational and sustainable goals. Its architects, from the Copenhagen-based firm Lundgaard & Tranberg, have embraced building in the round, having completed the 300-foot-diameter Tietgen Dormitory (2006) just over three miles to the north of this school, and the Axel Towers (2017), a cluster of five circular office buildings in the heart of the city. While the dormitory includes an expansive courtyard at its center and, at the towers, elevator cores, Lundgaard & Tranberg did something unique with the school, placing a large gymnasium within its belly, to create a compact and efficient drum of a building with a rich diversity of spaces.

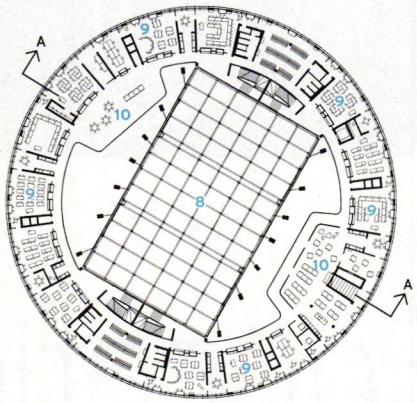
The three-story-high rectangular gymnasium spans levels two through four of the five-story building. Beneath it, on the ground floor, is the gently sloping auditorium, surrounded by irregularly shaped pods containing locker rooms and mechanical equipment and,

FULL CIRCLE Adjacent to 3XN's Royal Arena, the Kalvebod Fælled School is another circular landmark bordering a nature preserve (top). Skylights located throughout the concrete post-and-beam structure (opposite) bathe the interior in sunlight.



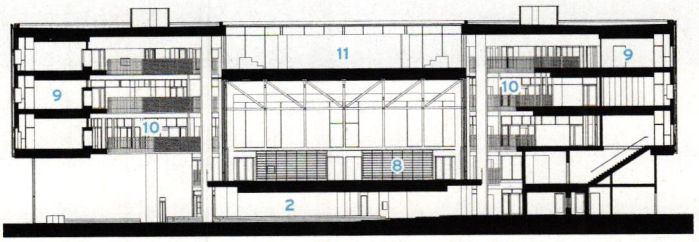
1 ATHLETIC FIELD
2 AUDITORIUM
3 CAFETERIA
4 KITCHEN
5 MUSIC STUDIO
6 FACULTY OFFICES
7 LOCKER ROOM
8 GYMNASIUM
9 CLASSROOM
10 COMMON AREA
11 ROOF TERRACE

GROUND-FLOOR/SITE PLAN



LEVEL 2 PLAN

0 50 FT.
15 M.



SECTION A - A

0 30 FT.
10 M.

credits

ARCHITECT: Lundgaard & Tranberg Arkitekter

ENGINEERS: Dansk Energi Management & Esbensen (technical); Jørgen Nielsen Rådgivende Ingeniører (construction & fire)

CONSULTANTS: BOGL (landscape); Gade & Mortensen Akustik (acoustics)

GENERAL CONTRACTOR: MT Højgaard

CLIENT: Københavns Ejendomme/Copenhagen Municipality

SIZE: 124,400 square feet

COST: $58 million

COMPLETION DATE: April 2018

SOURCES

WINDOWS AND DOORS: Wallmakers

INTERIOR WOOD CLADDING: Tripplex

ACOUSTIC CURTAINS: Fischer

FURNITURE: Flötotto (classrooms); Vitra/Artek

PHOTOGRAPHY: © TORBEN ESKEROD (THIS PAGE AND OPPOSITE, RIGHT); ANDERS SUNE BERG (OPPOSITE, TOP LEFT AND BOTTOM LEFT)

EAT AND PLAY The glazed gymnasium has a steel structure (opposite), and its interior can be viewed from most areas (top, left). The auditorium, below the gym at the center of the first level, features a ground-concrete floor and built-in seating (above, left). Students dine in an informal cafeteria along the perimeter (above).

wrapped along the perimeter, the cafeteria, kitchen, faculty offices, and special areas, including a large music studio. On the upper levels, classrooms, labs, and makerspaces comprise the outer ring of the building. Each upper level also contains a couple of large common areas projecting from the ring-like terraces, where students can hang out or study. Uniting all those rooms is a full-height interstitial yet grand space, bathed in sun through skylights located between the 64-foot-tall poured-concrete piers that march along the outside of the steel-framed glazed gymnasium, providing visual access across all parts of the building.

If the plan recalls that of a panopticon—that 18th-century experiment for institutional buildings, adopted mainly for prisons as a way to monitor inmates from a single, central point—its intention was the opposite. Rather than a means of surveillance, the design here allows everyone to see everyone, in a friendly way. "I think it gives the children a sense of freedom," muses Lundgaard & Tranberg founding partner Lene Tranberg about the 800 students, ages 6 to 16, that the school will eventually accommodate.

While the design of the building may seem inwardly focused, with the energy and activity of the gymnasium at its core, the spirit of the school is one that reaches out—quite literally to the soccer field and playground, to which the students escape

throughout the day as part of the active curriculum. The community also has regular access to the building after school hours. "There are people in this building until 10 o'clock most nights," says Anita Lindholm Krak, an architect on the project. The rolling terrain around the school, designed by BOGL landscape architects, encourages movement. Likewise, the 124,000-square-foot building is served only by one key-operated elevator, to ensure that children use the stairs.

When not outdoors, the occupants can't help but look outside. The school sits at the edge of the Ørestad development, with a nature preserve on the other side. Windmills in the distance are a reminder of the nontraditional forms of energy that are commonly used in Denmark. And the school does its part, operating at nearly zero-energy level. "We thought about installing solar panels," says Lindholm Krak, "but, rather than incur the additional cost and maintenance, we looked at ways to lower energy consumption." Extensive daylighting is one way. Also, there is no mechanical air conditioning: the building relies on passive ventilation and night cooling (due to the high concrete mass of the building), and efficient biomass district heating is employed.

Most noticeably, the building's facade—a mix of solid and perforated raw aluminum panels installed over staggered windows on the upper three levels—reacts to the sun, automatically shifting the position of the perforated panels to avoid heat gain and glare. (Teachers within the classrooms can manually adjust the panels as well.) A 6½-foot overhang protects the ground floor, which features a double-height window wall, from the sun. All windows are triple glazed.

Lundgaard & Tranberg used a very simple palette of pine wood (backed by felt acoustic insulation in certain areas, principally the auditorium), concrete, and glass throughout the building, designing the custom cabinetry, lockers, and nooks, and eliminating surfaces that require painting.

Kalvebod Fælled is the first school Lundgaard & Tranberg has completed, and it shows. The architects managed to avoid the usual tropes commonly associated with school facilities and instead produced an exceptional work of architecture befitting a building for elementary and secondary education—the design for which is often an unheralded task—and fitting the ambitious aspirations of this school in particular. As Lindholm Krak puts it, "Building a school is one of the finer things you can do." ■

PHOTOGRAPHY: © TORBEN ESKEROD; JENS LINDHE (OPPOSITE, TOP); ANDERS SUNE BERG (OPPOSITE, BOTTOM LEFT); DENNIS LEHMANN (OPPOSITE, BOTTOM RIGHT)

OUT OF SCHOOL The interstitial space is bathed in sunlight (opposite). The undulating landscape design encourages movement (right). The surrounding marshlands (top) offer striking views from within the classrooms (above).

Nebraska Center for Advanced Professional Studies | Fairfield, Nebraska | BVH Architecture

The Sky's the Limit

An unorthodox building rises to the challenge of a visionary rural high school program.

BY LINDA C. LENTZ

PHOTOGRAPHY BY COREY GAFFER

DRIVING PAST the harvested fields and pastures of eastern Nebraska on a cloudy late-autumn day, the big takeaway (at least for this urban native) was: land is abundant here. "Out in these rural stretches, there is room to sprawl," says Dennis Coudriet, a principal at BVH Architecture. Even in the metro areas of Lincoln and Omaha (each home to one of the firm's two studios), "you rarely find a school that's not one level," notes coprincipal Mark Bacon.

To challenge this norm, the architects created a two-story facility for a fledgling public high school—the Nebraska Center for Advanced Professional Studies (NCAPS)—that not only doubles the region's typical building height for K–12 institutions, it speaks to a progressive pedagogy with an unconventional approach designed to encourage creative thinking and collaboration.

Located 100 miles southwest of Lincoln in the farming community of Fairfield, the NCAPS campus, which opened a year ago, is an outgrowth of the Sandy Creek School, where kindergarteners through graduating seniors have coexisted since the 1960s in a rambling collection of contiguous low-lying masonry buildings. When South Central Unified School District #5 decided to transform its traditional high school into one with an interactive, profession-based syllabus (the first of its kind in Nebraska), it turned to BVH to develop a scheme for the existing site, which sits on the edge of a cornfield.

The new school, serving ninth to 12th graders from Sandy Creek and one other district school, encourages dynamic collaborative teaching and offers all juniors and seniors opportunities to take free college-level courses for college credit, as well as to explore a variety of career paths

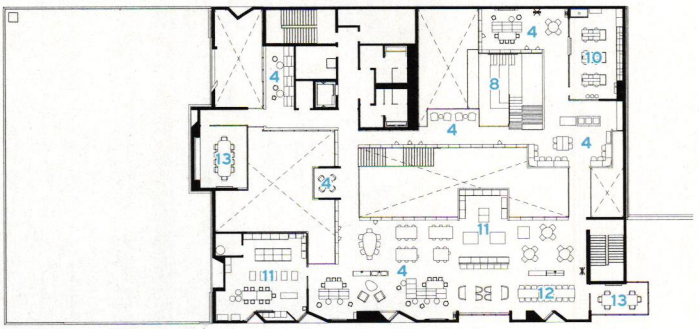
MOVING UP The two-story structure fits into the existing school, replacing a single-level classroom corridor.

–with mentorships at local organizations and companies–in such disciplines as health care, education, design and construction, manufacturing, agriculture, business, law, culinary science, and the arts.

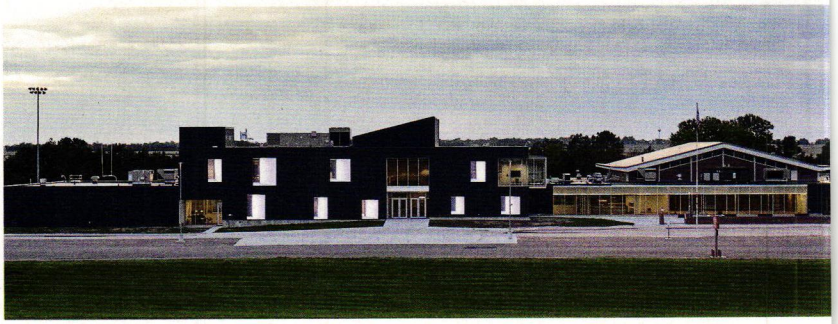
The BVH team worked closely with the educators, including district leaders and school principal Jason Searle, to determine the needs of this innovative learning model. After visiting a network of similar programs in other states and brainstorming with their clients, the architects developed renderings, physical and digital models, and virtual-reality walk-throughs to communicate potential spatial relationships. "We even looked at examples of workplace and other noneducational spaces," says Coudriet, because they didn't want a common school plan. In fact, he notes, early on, they considered one big space with no segregated rooms at all.

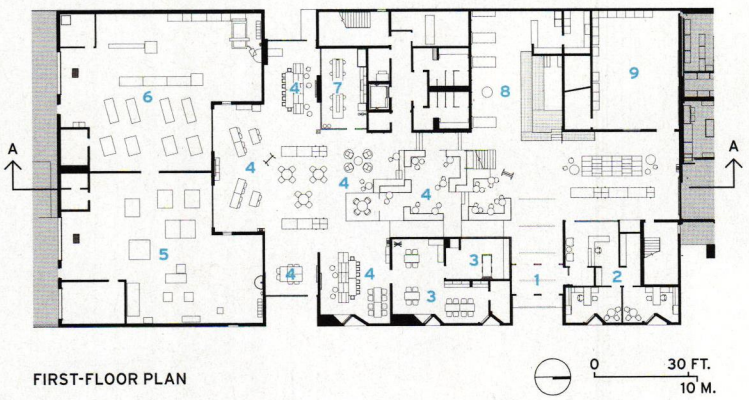
"We were looking to get away from the typical lecture format, to create a more engaging atmosphere for our students and teachers," says district curriculum director Amanda Skalka. "We knew we had to give them a different space. Otherwise, nothing would change."

Building up rather than out, the architects devised a radically new, 40,000-square-foot physical plant, remaining within the extant structural footprint. First, they demolished a cramped, narrow portion of the old school between the cafeteria on the northern side and a shop classroom on the south. In its place they inserted a double-height, steel-frame structure that extends into the existing single-story cafeteria with a 16-foot-deep, 1,700-square-foot addition, and connects to the shop. Then they wrapped this assemblage with an insulated ribbed-aluminum skin, a nod to the agricultural buildings dotting the surrounding landscape.



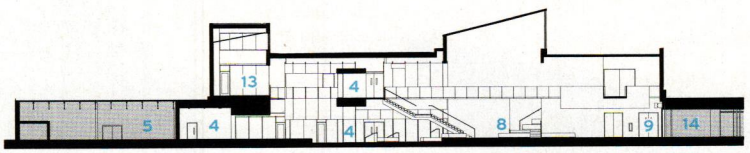
SECOND-FLOOR PLAN





FIRST-FLOOR PLAN

0 30 FT. 10 M.



SECTION A - A

0 30 FT. 10 M.

1 ENTRANCE FOYER
2 RECEPTION/OFFICE
3 MEDICAL LAB
4 FLEXIBLE LEARNING
5 WOOD STUDIO
6 METAL STUDIO
7 AGRICULTURE LAB
8 FORUM
9 MUSIC ROOM
10 SCIENCE LAB
11 ART
12 GRAPHICS/IT LAB
13 CONFERENCE ROOM
14 CAFETERIA

RAISING THE BAR Stitching to the sprawling 1960s architecture with a glazed cafeteria addition (above), the new building opens to a school forum (opposite), plus flexible spaces and writable-glass nooks for learning and gathering (right).

Several daylighting strategies—implemented for energy-saving, alertness, and wellness factors—mitigate the sun's glare yet provide ample natural light and views out. These include deeply recessed and canted east-facing windows, framed with white phenolic-resin panels; expanses of high-performance light-transmitting glazing with automated shades; and a north-facing clerestory roof monitor, its south-facing slope reinforced with infrastructure for future photovoltaics. Sensors activate electric illumination only as needed, so the interiors are largely daylit for the greater part of the day (depending on the season).

Inside the voluminous steel shell, the architects constructed a compact but open environment on two levels that comfortably accommodates the diversity of desired spaces for the 22 teachers and 195-plus students who circulate here throughout a school day. (Middle schoolers also come for introductory classes, like shop.) Some spaces are glass-enclosed (mostly for code issues), like the medical-simulation and agriculture labs on the ground floor, as well as the science, 3-D-art, and conference rooms on the prominent loftlike upper level. Other areas are partially glazed or without walls, and tucked into nooks or arranged in surprising configurations. All the interiors are accessible via broad wood steps, ramp, or elevator and are highly visible from the central gathering and learning place on the ground floor, where stacked wood benches and stylish contract furnishings invite convening for class, study, or just hanging out. This hub flows into the shop—renovated and split into up-to-date woodworking and manufacturing studios (both on view through transparent walls)—as well as the enlarged cafeteria, which now has a teaching kitchen and a student commons with cozy seating along the length of its new glass facade.

The industrial quality of the space is much

SEEING THE LIGHT A clerestory monitor floods the interior with daylight (above) that penetrates a teaching niche on the loftlike upper floor (left), as well as central and glass-enlosed spaces on both levels (opposite).

more in keeping with the vibe of a young tech company or a university, with glossy concrete floors, surprising jolts of color, and remarkably sophisticated and varied furnishings, including classics by Saarinen and Eames (purchased at a discount). "None of it is typical education furniture," says BVH interior designer Jackie Bacon. "They wanted flexibility, so we selected pieces from 20 different manufacturers with components that could work together to create assorted groupings in different places."

To make sure every arrangement and surface is functional, the designer specified easily movable pieces (some with built-in power sources), partitions that support electronics and storage, and an abundant use of writable-glass walls. To control the acoustics in the unobstructed setting, she employed sound-

absorbing wall materials and ceiling baffles, installed carpet in strategic spaces, and used soft furnishings whenever possible.

Walking into the school, one immediately senses a productive energy. Clusters of students, huddled around teachers or on their own, occupy the central hub, the flexible learning areas, and the bleacher-style steps that double as the school forum. A constant hum rises and falls, as in many professional offices. And while one senior told RECORD that the noise could be distracting, he added that it was usually not an issue for him and was far outweighed by the openness of the new architecture and the choices it provides. Its similarities to real work situations, he notes, "are preparing us for the future."

According to Skalka, after a year in the new space, "the culture is more collaborative." And with the whole school on view, there's a greater sense of accountability. Even teachers who were skeptical at the beginning are coming on board. "They've just embraced it," she says.

Science teacher Ashley Borer was one of those who was initially opposed to "the open-concept stuff." But now, she says, "I honestly love it, and would have a hard time going back to the way it was." ■

credits

ARCHITECT: BVH Architecture – Dennis Coudriet, principal; Jon Wiles, Mike Daily, Ryan Heir, architects; Jackie Bacon, Amy Dishman, interior designers

ENGINEERS: Lange Structural Group (structural); Morrissey Engineering (m/e); REGA Engineering (civil)

CONSULTANT: Foodlines (food service)

GENERAL CONTRACTOR: Cheever Construction

CLIENT: South Central Unified School District #5

SIZE: 40,000 square feet

COST: $11.4 million

COMPLETION DATE: December 2018

SOURCES

STRUCTURE: Apollo Steel; ClarkDietrich Building Systems

MASONRY: Christensen Concrete Products; Hohmann & Barnard

METAL PANELS: Kingspan (Morin)

CURTAIN WALL: Kawneer

GLASS: Guardian; Insulite

RAINSCREEN: Trespa

SURFACES: Armstrong (ceiling); PPG (paint); Koroseal Wilsonart; Formica; Metro Quartz; SRP; Milliken; Bentley

FURNISHINGS: Allsteel; Herman Miller; Knoll; National; Arper; Maharam; BuzziSpace; Spacestor; Kimball

LIGHTING: Columbia; Hubbell; Alights; Cree; Leviton; Finelite; Pathway; V2lighting

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DEADLINE: MARCH 1, 2020

RECORD INTERIOR 2019 WINNER: RS APARTMENT IN RIO DE JANEIRO BY STUDIO ARTHUR CASAS

PHOTOGRAPHY: © FILIPPO BAMBERGHI

Breathe Easier

Architects cut harmful chemicals in designing environments for children.

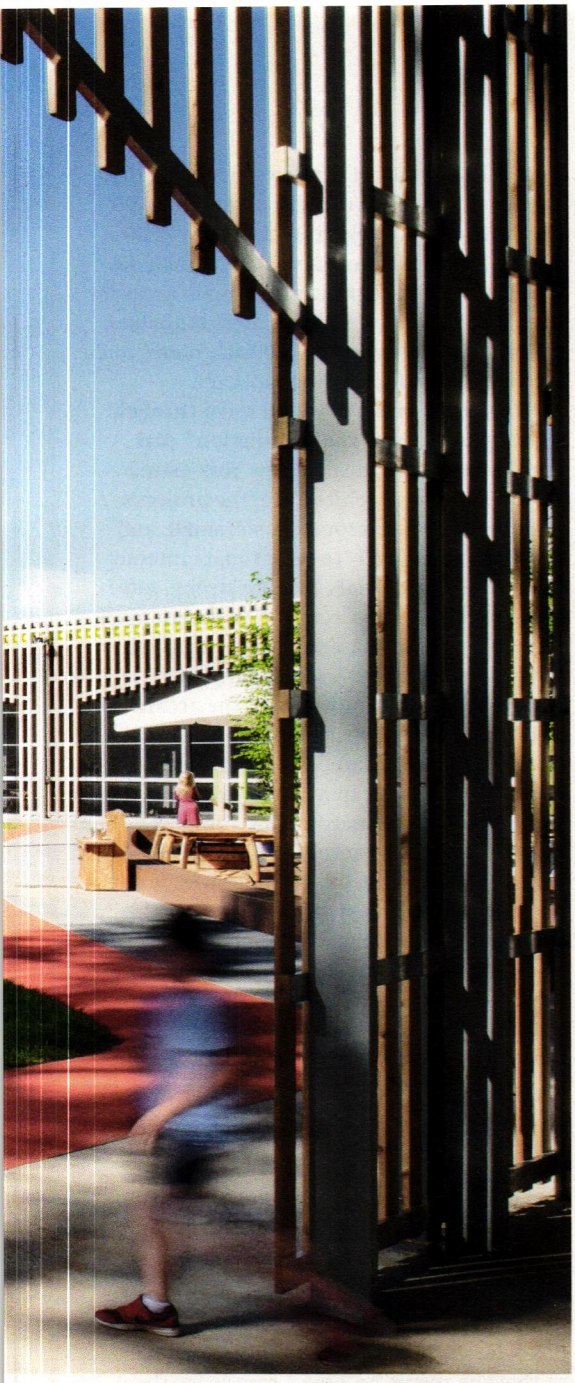
By Katharine Logan

LESS THAN 20 percent of human disease is genetically determined; the rest is triggered by the environment we live in. Volatile organic compounds (VOCs), bisphenols and phthalates, highly fluorinated chemicals, flame retardants, antimicrobials: these are some of the problematic substances commonly found in building materials. In children, their health impact is amplified, with potentially lifelong consequences.

"The lack of regulation in the chemical industry and in the material content of building products raises concern about construction practices," says Alison Mears, director of the Healthy Materials Lab at Parsons School of Design, "particularly when we focus on vulnerable groups like children." Childhood health conditions that have been linked to environmental toxins include respiratory illnesses such as asthma and pneumonia, behavioral problems such as attention deficit hyperactivity disorder and autism spectrum disorder, as well as flu and immunodeficiency disorders, obesity, and sudden infant death syndrome.

Children are exposed to environmental toxins primarily in three ways. They inhale particles and dust, which tend to collect near floor level, where children spend much of their time. They ingest contaminants as they eat, drink, and put things in their mouths. And they absorb chemicals through their skin as they crawl and tumble through the world around them. With their immature metabolisms, a little toxicity goes a long way. An infant in its first year consumes two and a half times as many calories, drinks five times as much water, and breathes three times as much air per pound of body weight as an adult. Neurologically, 90 percent of lifetime development occurs by age 4. So nowhere are architects' efforts to exclude toxin-laden materials from the buildings they design more important than in environments for children.

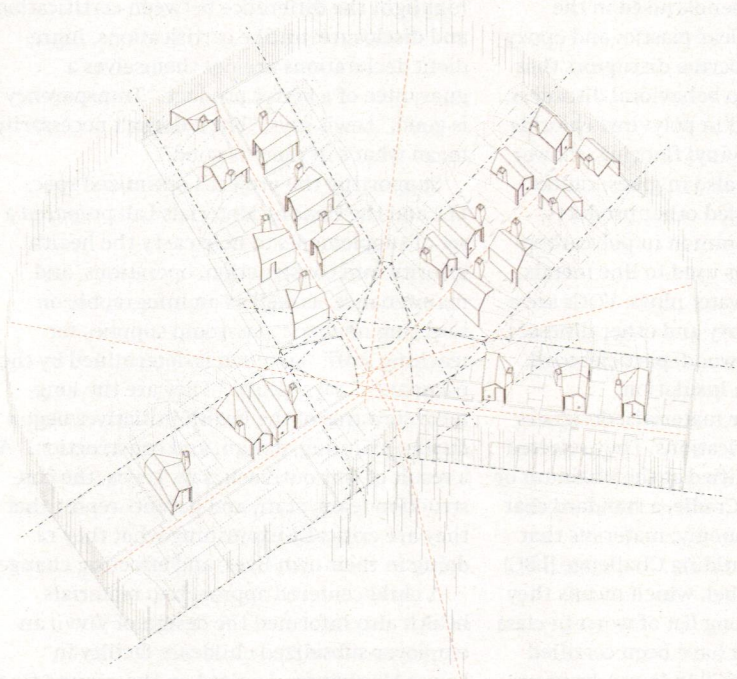
A project that prioritizes materials for health is the Helen R. Walton Children's Enrichment Center in Bentonville, Arkansas. Accommodating 240 children between the ages of 6 weeks and 5 years, the 45,000-square-foot facility, completed in 2019, is intended as a national model. Designed by New York–based LTL Architects in collaboration with SCAPE Landscape Architects (also in New York), the project's first strategy in creating a healthy environment is to facilitate getting the kids outside. The single-story building's 21 classrooms are organized into four wings that radiate from a central community room. The



LTL Architects configured the Helen R. Walton Children's Enrichment Center in Bentonville, Arkansas, so that its 21 classrooms are organized in wings that radiate from a central community room (above) and define outdoor play spaces (opposite).

wings define contiguous outdoor space, which in turn provides direct access to one of three playscapes designed to challenge the physical abilities of different ages. In addition to the developmental benefits of outdoor activity, says David Lewis, a principal at LTL, air quality is almost always better outside.

With connections to the outdoors established, the design team set about creating the healthiest interior environment possible within the project constraints. These included a construction budget of $238 per square foot and a requirement to use readily available products so the building could serve as a replicable model. Starting with schematic design, and with the help of an expert from the Healthy Materials Lab, LTL focused on excluding toxins linked to asthma, respiratory infections, and learning disorders, the health



HELEN R. WALTON CHILDREN'S ENRICHMENT CENTER – AXONOMETRIC DIAGRAM

IMAGES: © AARON KIMBERLIN (OPPOSITE AND TOP, RIGHT); COURTESY LTL ARCHITECTS (BOTTOM, RIGHT)

To avoid toxins linked to asthma, respiratory infections, and learning disorders, LTL selected products for the Children's Enrichment Center that included natural linoleum and rubber flooring and felt ceiling cladding.

issues most commonly affecting kids in the region. This meant that the designers sought to avoid plastics and plasticizers, as well as VOC-emitting adhesives and finishes.

Plasticizers, such as phthalates (used as plastic softeners, fragrance binders, solvents, and fixatives) and bisphenols (used in the manufacture of hard, clear plastics and epoxy resins), are known endocrine disruptors that have also been linked to behavioral disorders. Phthalates can be found in polyvinyl chloride (PVC) products such as vinyl flooring, shower curtains, and toys, and also in glues, caulks, paints, carpet, and myriad other products, while bisphenols are common in polycarbonate plastics and in resins used to line metals, such as food cans and water pipes. VOCs are a prime cause of respiratory and other illnesses, and are common in plywood, particleboard, glues, fabrics, and foam insulation.

To identify preferable materials, designers relied on product certifications. They selected products that were certified at the Platinum or Gold level by Cradle to Cradle, a standard that promotes a circular economy; materials that have earned a Living Building Challenge (LBC) Declare Red List Free label, which means they don't contain any of a long list of worst-in-class chemicals; or those that have been certified GREENGUARD Gold or SCS Indoor Advantage, two programs that identify products with low VOC emissions. Examples of selected products include natural linoleum and rubber flooring, wool felt ceiling cladding, plywood and fiberboard without added formaldehyde, and mineral-based paints. To avoid inappropriate substitutions, the project's specifications highlight the difference between certification and disclosure: unlike certifications, ingredient declarations are not themselves a guarantee of a better product. "Transparency is good," Lewis says, "but it doesn't necessarily mean what's in there is good."

Supporting the project's optimized spec, LTL and the Healthy Materials Lab prepared a set of supplements to help carry the health priority into construction, operations, and maintenance, as well as an infographic on selecting nontoxic classroom supplies for teaching staff. "So much is determined by the occupants," says Mears. "They are the long-term stewards of the health initiatives begun during planning, design, and construction." As a result of this outreach, says Lewis, the construction team, staff, and parents report that they are critically examining what they're doing in their own lives, and effecting change.

A child-centered approach to materials health also informed the design of Vivvi, an employer-subsidized childcare facility in Lower Manhattan. Located on the ground floor of an existing multiuse building, where 20-foot ceilings and tall windows create an airy, daylit volume, Vivvi accommodates up to 90 children aged 6 weeks to 4 years. The 7,200-square-foot facility, opened in 2019, includes four classrooms, four nurseries, open areas for movement and play, social centers for babies and toddlers, age-appropriate bathrooms, and a privacy room for nursing mothers.

"Babies and small children learn through sensory interaction and stimulation," says Carol Gretter, principal at New York–based Eleven of Eleven Architecture, the project's designer. Little ones touch, taste, smell, and feel everything, and "these intimate interactions require materials that are strong, safe, and cleanable," says Gretter. "We design inspirational learning spaces by balancing these physical qualities with visual harmony."

To meet these requirements, the architect prioritized natural materials, such as wood floors, inherently flame-resistant wool carpets, felt seating spots, and cork- and linseed-based tackboards. More complex materials, such as backers and adhesives, are VOC-free and, in the case of adhesives, water based. Easy-to-clean synthetics, such as the covers on wall padding and a set of letter-shaped cushions that serve as jumbo play forms, are PVC free.

Once the preferred materials were selected, the architect held a show-and-tell for the client and parent group. "We're putting things in our mouths, smelling them, and talking about what they're made out of," says Gretter. "We're choosing products that don't have any kind of toxins in them in any way." Overall, the material palette for Vivvi is not complicated. It relies on thoughtful planning to keep the number of products—and the time that goes into vetting them—to a minimum. Wherever possible, the materials are simple and neutral, so that the rooms become a canvas for the color and action the kids bring to the space.

The design pays particular attention to the first 3 feet above floor level, as this is the zone young children occupy. As well as selecting options for improved health factors, the project deploys materials in ways that are intended to engage their young users. Wood pull-up bars support babies learning to stand, wall-mounted mirrors intrigue them, 12-inch wood steps covering radiators serve as seating or infant-height countertops, cubbies offer toxin-free props for play and independent exploration, and, in several rooms, marker boards, complete with cork strips, allow for drawing, painting, and display.

High above this active zone, the design continues to provide for the kids' well-being with an acoustic ceiling spray that is GREENGUARD Gold–certified, natural-fiber-

based, and free of potential respiratory irritants such as glass or mineral fibers or silica dust. Acoustics is a materials issue that is "definitely part of a healthy environment," says Gretter, especially given the volume at which 90 babies and young children can express themselves.

In addition to relying on certifications to guide them, the architects reached out to industry connections. "This is our bailiwick," Gretter says, "so we're very familiar with materials for this age group. We have relationships with the manufacturers, and are able to talk with them about their specifications." For example, the architect requested a substitute for a changing station's standard top of plastic laminate on a wood composite. The replacement is a low-VOC, acrylic-based seamless solid surface, making it better for air quality and more hygienic. Gretter also credits an educated and committed client for prioritizing materials health from start to finish.

VIVVI – FLOOR PLAN

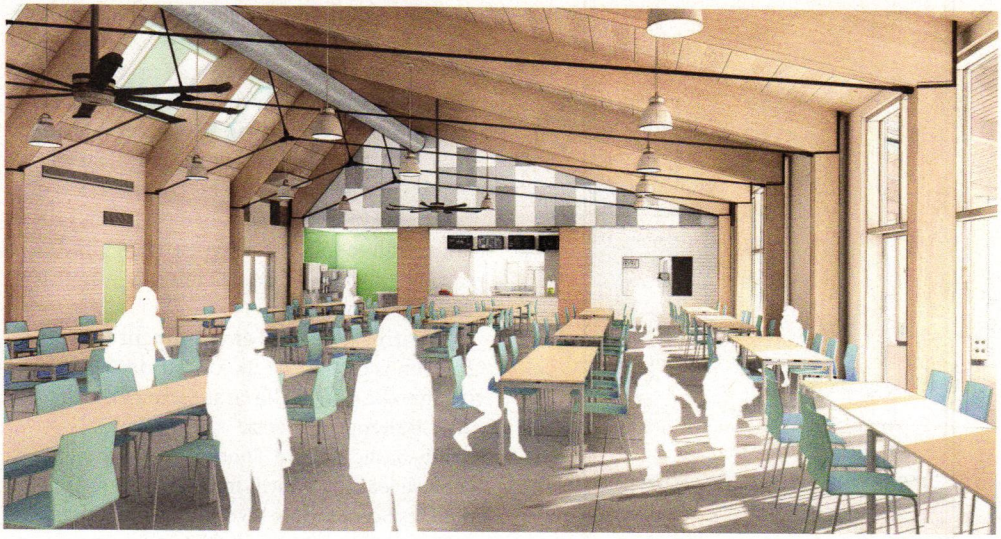
0 20 FT. 5 M.

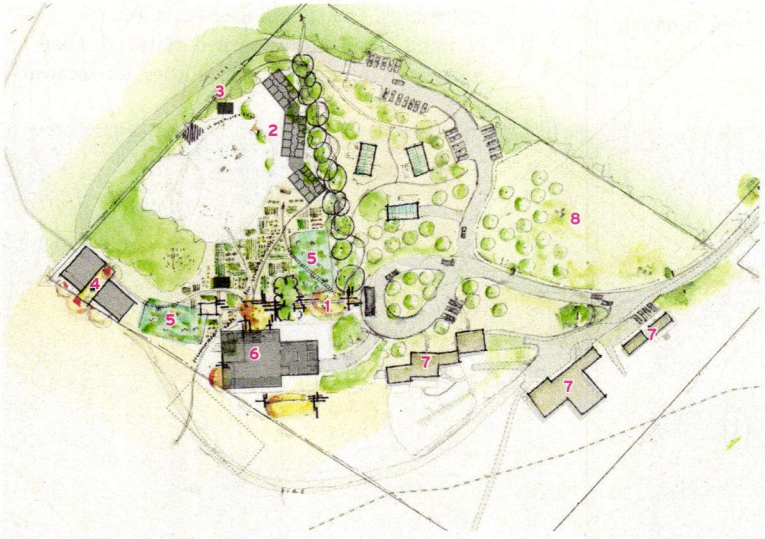
1 ENTRANCE
2 MULTIPURPOSE ROOM
3 NURSING ROOM
4 STAFF ROOM
5 SOCIAL CENTER
6 CLASSROOM
7 OFFICE
8 NURSERY

Keeping building materials simple and few as a means to a toxin-free palette also proved effective for the Ecology School at River Bend Farm, an organization that brings students from across New England for overnights and programs focused on environmental stewardship. The project, now under construction on a 105-acre site along Maine's Saco River, is committed to LBC-certified buildings and to making its entire campus Living Community Challenge compliant.

"Creating a healthy environment for the children is one of the major reasons they're trying to be one of the first Living Community Challenge projects," say Portland, Maine–based Kaplan Thompson Architects, who are leading a local four-firm team that includes Scott Simons Architects, Briburn, and landscape architects Richardson & Associates. The school uses recycled, reclaimed, and locally sourced materials that have been designed for durability, low mainte-

At Vivvi (above and top), a childcare facility in Lower Manhattan, Eleven of Eleven Architecture prioritized natural materials, including wood floors. Easy to clean PVC-free synthetics cover letter-shaped cushions that serve as jumbo play forms. Cubbies offer props for independent exploration.





THE ECOLOGY SCHOOL – SITE PLAN

A four-firm team of architects is designing the Ecology School at Riverbend Farm on a 105-acre site (bottom) along Maine's Saco River. It will include a 200-person dining hall and an all-electric non-combustion kitchen (top).

nance, and minimal embodied energy. They are low-VOC and formaldehyde free, contain no substances identified as chemicals of concern by the U.S. Environmental Protection Agency, and are LBC Compliant ("LBC Compliant," as opposed to Red List Free, means a product may contain some Red List chemicals temporarily exempted until commercially viable alternatives are available). "Because we have to scrutinize the materials, we make things harder if we choose too many," says Jesse Thompson, a principal at Kaplan Thompson. So the project's limited palette includes polished concrete, eastern white pine certified by the Forest Stewardship Council (FSC), galvanized metal roofing, wood, felt wall panels, low-VOC wallboard, and, depending on budget, a slatted cedar ceiling or an LBC Red List–compliant acoustic tile.

Although the architects would have preferred wood-framed windows, the market in those that are Red List Compliant and FSC-certified is still immature in the region. Suppliers often didn't know, or couldn't say, what the gaskets and sealants were made of. Health certifications in progress weren't certain to be complete in time to meet the project's schedule, and the architect ended up specifying fiberglass and aluminum windows despite their higher embodied energy. "You do have to build the building," says Thompson.

In a significant technical achievement, the Ecology School will provision a 200-person dining hall three times a day with a net zero kitchen that's all electric—eliminating gas burning inside. Combustion-free systems are an LBC requirement, but an exception exists for commercial kitchens. The Ecology School, however, opted to forgo the exception. "It's a milestone," says Thompson, "especially considering commercial kitchens have some of the most intensive energy use of any building type." Combustion is an example of oxidation, one of four main processes that can lead to toxic exposures. (The others are volatilization, or off-gassing; degradation, in which particles are released into dust, air, and water; and leaching, in which contaminants are released through dissolving.) So, in addition to shrinking the school's carbon footprint, the net zero combustion-free kitchen eliminates a potential source of air pollution in the spaces kids use.

While each of these projects—the Children's Enrichment Center, Vivvi, and the Ecology School—represents a significant achievement in reducing toxins in children's environments, their architects suggest that the aspiration needs to be pursued with a healthy dose of realism. "In a lot of cases, it's not black-and-white, do this and don't do that," says Lewis. "The science is complicated. You have to be observant and thoughtful, and accept that it's not possible to make the absolute perfect, 100 percent–guaranteed healthy project." However, it is possible—as these projects demonstrate—to significantly diminish hazards, helping to lay the foundations for lifelong health. ■

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

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Learning Objectives

1 Identify substances commonly found in building products that can have an adverse effect on human health.

2 Explain why children are particularly vulnerable to such substances.

3 Explain the difference between ingredient disclosure and product certification.

4 Describe methodologies for selecting and specifying healthy building products.

AIA/CES Course #K2001A

IMAGES: COURTESY SCOTT SIMONS ARCHITECTS (TOP); RICHARDSON & ASSOCIATES (BOTTOM)

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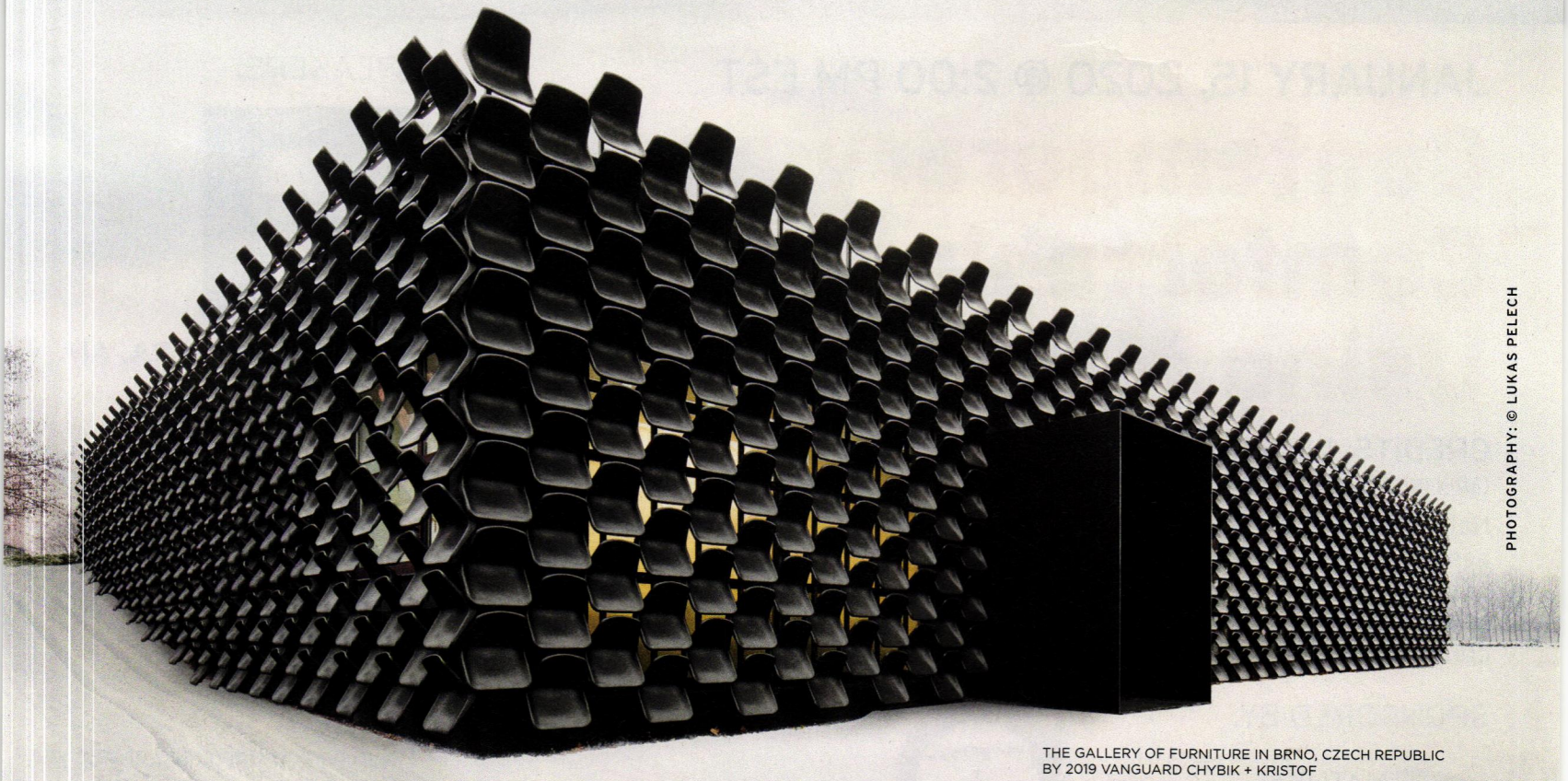

PHOTOGRAPHY: © LUKAS PELECH

THE GALLERY OF FURNITURE IN BRNO, CZECH REPUBLIC
BY 2019 VANGUARD CHYBIK + KRISTOF

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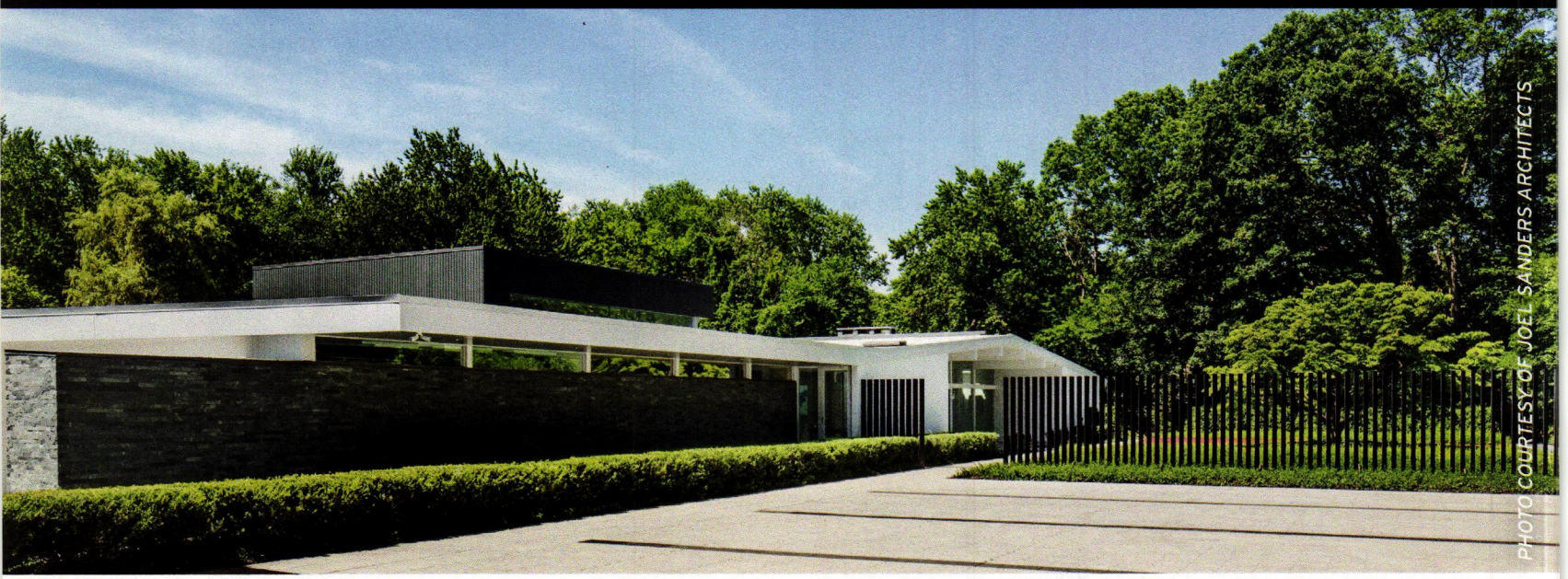
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JANUARY 15, 2020 @ 2:00 PM EST

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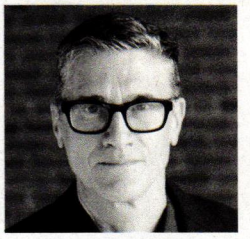

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PADDINGTON OFFICE, LONDON
BY EDWARD WILLIAMS ARCHITECTS

Paddington Office
London
Edward Williams Architects

LIKE A RESIDENCE, this workplace has a kitchen designed to be its heart. Located in a historic mews in London's Paddington neighborhood, the three-story, 2,260-square-foot building was recently renovated and transformed into an office by the London-based Edward Williams Architects for a client who wanted a modern yet intimate and friendly environment, in keeping with the domestic scale of its surroundings.

The onetime stable had been abandoned mid-restoration by a previous developer, who sought to convert it from a residence to offices. It was a crumbling shell, topped with a partial steel frame where the mansard roof should have been. Principal Edward Willliams and his team restored the brickwork on the perimeter walls and inserted a new steel frame into the cavity to support the two new upper levels of offices and workstations, as well as adding the ground-floor kitchen, adjacent conference room, and tidy L-shaped restroom enclosure between those spaces and a staircase to the second and third floors on the back wall. (Stairs are the only means of accessing upper floors, as the building is too small for an elevator.)

To adapt the structure for its new use, the architect worked with the client, a family-owned fund that invests in sustainable agriculture and forestry, to develop a fittingly carbon-neutral office. "We talked a lot about the image they wanted to project," says Williams. Taking cues from the ethos of the business, many of the construction materials are locally sourced or recycled and have minimal finishes. The design team also replaced the previous owner's gas boiler with an electric one for radiant heating beneath the floors, and installed operable skylights, efficient windows, and garage doors that provide passive cooling.

The interior, meanwhile, features a series of spaces capable of supporting multiple functions, making the most of the building's compact size. Few areas illustrate this concept better than the kitchen, which is also the reception area, breakout room, and, when necessary, extra workspace.

"The building doesn't have an enormous footprint, so we wanted to avoid unnecessary dead space," Williams says. He adds that "the office didn't need a lobby with security and a reception desk. So our approach was to design for transparency. Why not let clients be greeted by a tim-

PHOTOGRAPHY: © AGNESE SANVITO

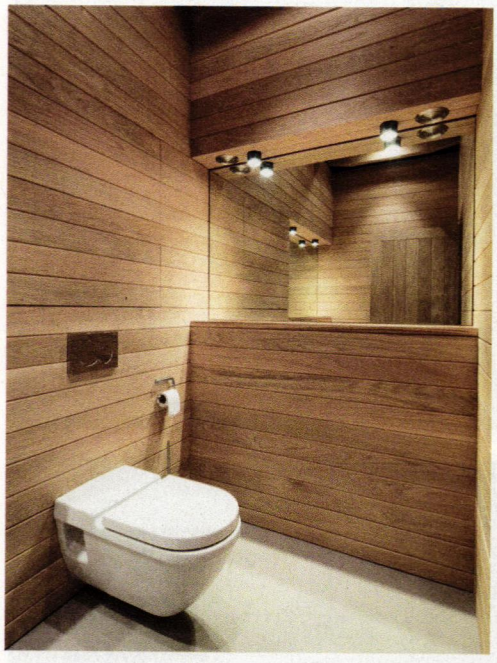
GRAND OPENING Garage doors (opposite) reveal a conference room and kitchen/reception area (this image), which share a wall with restrooms (below) on the other side.

ber table and a coffee machine?"

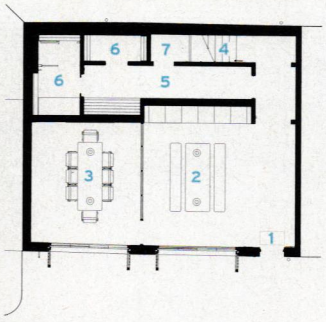
Visitors can enter through a narrow doorway or, in summer, through the garage doors. Either way, the warm, oak-clad, LED-lit kitchen is the first space they see. Except for a dining table flanked by two benches, the kitchen is identifiable only by its one-wall prep zone, consisting of an oak backsplash and cabinets, a sink in a stone countertop, and an oven. The space can be quickly transformed to accommodate a meeting or event. And activity can flow into the neighboring conference room, partly screened by a glass partition, or outside, if staff pull back either or both of the adjacent rooms' folding garage doors, which open to the mews' cobble paving.

Between these hospitable areas and the stairs, a door leads into the conveniently situated restroom zone, which contains a communal vanity on one side of a corridor, an enclosed water closet opposite, and a wheelchair-accessible powder room with its own sink at the opposite end. Surfaces here echo the kitchen's and meeting room's oak ceiling, soffit, and walls.

The office manager can remotely monitor clients' arrivals using a video entry system on the second floor—to ensure that the informal atmosphere doesn't undermine a warm welcome.



"We usually like to get two or three uses out of a space," says Williams. "It is possible to design efficiently and still provide a spatial feeling." *Kelly Beamon*



1 ENTRY
2 KITCHEN
3 CONFERENCE ROOM
4 STAIR
5 CORRIDOR
6 RESTROOM
7 MECHANICAL

GROUND-FLOOR PLAN

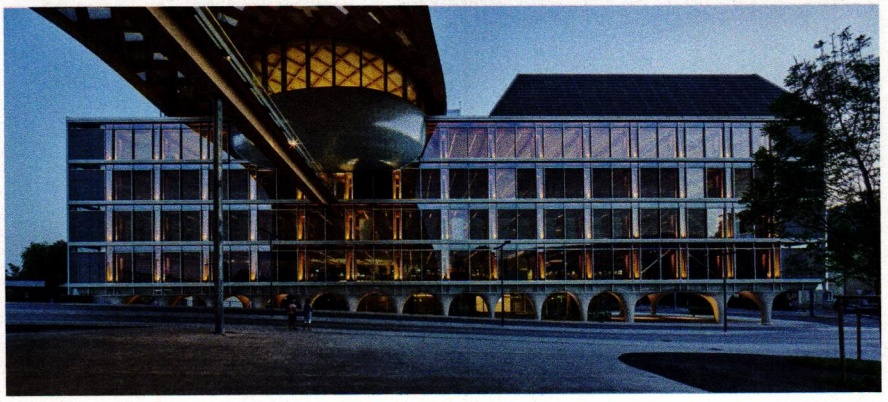
0 10 FT.
3 M.

credits

ARCHITECT: Edward Williams Architects – Edward Williams, principal in charge; Victoria Thong, associate
ENGINEER: Cundall
GENERAL CONTRACTOR: Lengard
SIZE: 2,260 square feet
COST: withheld
COMPLETION DATE: November 2018

SOURCES

STEEL: Mercer Steel
TIMBER JOISTS: Cavendish Joinery
GLASS PARTITIONS: Komfort
FLOOR: Corestone



Cité du Temps Restrooms
Biel/Bienne, Switzerland
Shigeru Ban Architects

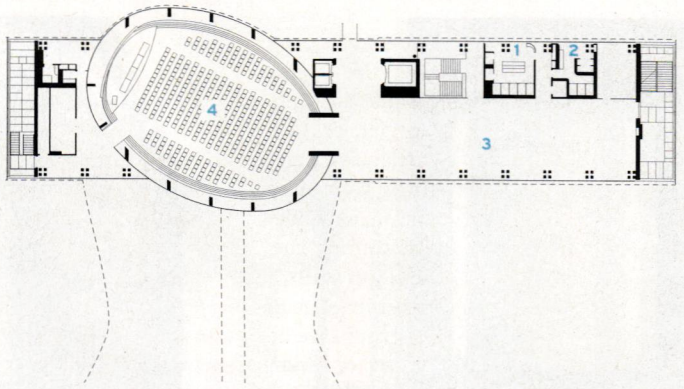
PUBLIC RESTROOMS are usually designed with such goals as reducing long lines and lowering maintenance costs. But those in one of a trio of buildings at the Swatch and Omega Headquarters, designed by the firm of Pritzker Prize laureate Shigeru Ban in Biel/Bienne, Switzerland, also feature views, elegant exposed-timber elements, and daylighting—architectural highlights seldom lavished on such utilitarian spaces.

These are located in the complex's 174,000-square-foot Swatch and Omega Museum and Conference Hall (also known as the Cité du Temps), which was completed last fall (RECORD, December 2019). Of 16 restrooms on five levels, seven occupy a privileged place along its south-facing glazed wall. The architect kept the main glass facade—the north side, which faces a plaza and his new Swatch headquarters—as open and unobscured as possible. In light of that plan, and the fact that most visitors to the mass timber building eventually pass through its restrooms, Yoshie Narimatsu, senior associate and project chief for Shigeru Ban Architects, says the team made the effort to extend the design aesthetic there too. "It's refreshing to see views from some of the public restrooms," she says.

The largest—a 344-square-foot women's room outside the top-floor assembly hall—features all of the building's benefits, including daylighting, a view (frosted window film was applied to the inside from floor to shoulder height for privacy), and even an island vanity that enables better circulation through the space. Because the domed event hall can accommodate up to 400 people, this location experiences the most traffic. Taking that into consideration, it has eight sinks on its central vanity (four on each side) under a double-sided mirror suspended from the 10-foot ceiling, to give visitors "the choice of multiple paths to the seven stalls," Narimatsu says. To further streamline the design, waste bins and soap dispensers are built into the solid-surface countertop, and paper towel dispensers are incorporated into the mirror. Even users on the stall-facing side can see the view through the high-quality triple-glazed window, which, combined with a radiant system under the floor, makes for highly efficient heating.

Restroom signage echoes the style of the larger complex; it features the same bold and playful stick figures as those guiding visitors throughout the building and within the connecting Swatch HQ to the north. For these, Ban

WINDOW WASHING The largest restroom (above), which features an abundance of natural light and exposed timber beams, is located along the south-facing wall, opposite the main facade (opposite, both).



FIFTH-FLOOR PLAN

1 WOMEN'S ROOM
2 MEN'S ROOM
3 FOYER
4 CONFERENCE HALL

0 30 FT.
10 M.

enlisted graphic designer Kenya Hana, principal of Nippon Design Center and a frequent collaborator.

But the project's most unusual detail (save for the views) is the exposed, locally sourced timber structure, with its grouping of four 11-inch-square glulam columns. Exposed timber is featured throughout Ban's buildings at the complex, including the Swatch headquarters and a factory for Omega. "Spruce is an important feature, and we wanted to amplify it—even inside the restrooms," Narimatsu says, explaining that this detail provides continuity. *Kara Mavros*

credits

ARCHITECT: Shigeru Ban Architects Europe

ARCHITECT OF RECORD: Itten+Brechbühl

ENGINEERS: Création Holz, SJB Kempter Fitze (structural); Gruner Roschi, Roschi+Partner, Gruner Kiwi (HVAC, sanitary, building automation); HKG Engineering (electrical); Leicht (facade); Reflexion (lighting); Commins Acoustics Workshop, Kuster + Partner (acoustic)

PROJECT MANAGER: Hayek Engineering

CLIENT: Swatch Group

SIZE: 60,200 square feet

COST: withheld

COMPLETION DATE: October 2019

SOURCES

WOOD: Blumer-Lehmann

FLOOR & WALL TILE: Bisazza

SINKS & COUNTER: Du Pont

MIRROR UNIT: Talsee

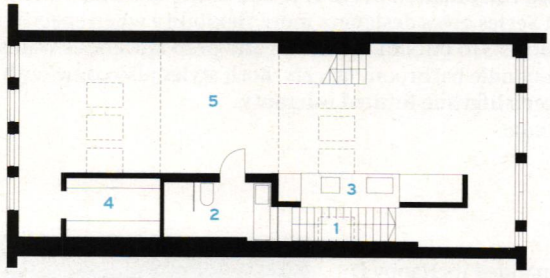
118 East Main Street

Charlottesville, Virginia

Bushman Dreyfus Architects

THE NEW kitchen and bathroom in a Charlottesville, Virginia, office-turned-apartment are both neatly concealed and showcased within a 40-foot-long reclaimed-oak box. Bushman Dreyfus Architects conceived the intervention while renovating the 1843 rowhouse for a couple who had purchased it as an investment property. With retail and office tenants on the ground and second levels, they wanted the dimly lit and unlivable third floor converted into a bright and welcoming second residence, where they also could host visiting family and friends.

The low-ceilinged top-floor space previously had a toilet, but no kitchen. According to principal Jeff Bushman, the owners' requirements for the project were that he add natural light and keep the design minimal, to make it feel more spacious. To accomplish that, the team removed part of the ceiling, combining the space with the attic level above to expose the building's sloped roof and make it an open, two-level dwelling. They installed skylights and designed a boxy enclosure in oak as the prominent feature of the 1,350-square-foot space, spanning nearly the entire 50-foot length of the floor.



THIRD-FLOOR PLAN

0 8 FT.
2 M.

1 ENTRY STAIR
2 BATHROOM
3 KITCHEN
4 STORAGE
5 LIVING/DINING

OPEN AND SHUT The studio's kitchen and bathroom are contained within a singular oak "box" (opposite, top). The kitchen pantry and appliances are placed within easily concealed cabinets (above). The bathroom's fully glazed partition admits natural light from newly inserted skylights, and a view to the entry stair (opposite, bottom).

To keep the living and dining area as open as possible, they kept a portion of the former attic and converted it into a sleeping loft overlooking the main space. The architects doubled the thickness of the gable roof with insulation to make it as energy-efficient as possible. Daylight pouring in through the skylights illuminates the living area as well as the apartment's steep entry stair, along the western brick wall, leading down to a sidewalk-level front door.

The oak volume wraps the stairwell, screening the landing from the main living area. The architects essentially built the enclosure as a large cabinet to hold the bathroom, complete with a shower, and a one-wall kitchen that includes an oven, dishwasher, full-size refrigerator, and a pantry behind plank-clad doors.

Above the kitchen's sink and cooktop, a windowlike cut through the oak volume frames a view of the exposed brick wall, instead of a backsplash, and a glimpse of the entryway below. To bring light into the windowless bathroom, its south-facing wall is fully glazed, giving it a floor-to-ceiling view of the stairwell. In this case, there were concerns about privacy, but, ultimately, the clients opted for the transparency.

To further extend the clean aesthetic, Bushman wanted to "minimize any appearance of products." Below the kitchen's opening, a low-profile utility trough with electrical outlets runs along the edge of the counter to obscure clutter. The bathroom employs the same unobtrusive feature, designed to match other custom hardware, such as a towel bar.

After updating the mechanical, electrical, and plumbing systems and installing insulation and structural framing, the apartment now exudes a streamlined, contemporary style. That part, according to Bushman, "was easy to figure out." *Alex Klimoski*

credits

ARCHITECT: Bushman Dreyfus Architects – Jeff Bushman; Aga Saulle, design team

ENGINEER: Dunbar, Milby, Williams, Pittman & Vaughn (structural)

GENERAL CONTRACTOR: Longview Management & Construction

SIZE: 1,350 square feet

COMPLETION DATE: April 2019

SOURCES

SKYLIGHTS: Velux

KITCHEN SINK: Kraus

KITCHEN FAUCET: Grohe

BATHROOM FAUCET: Hansgrohe

TOILET: Duravit

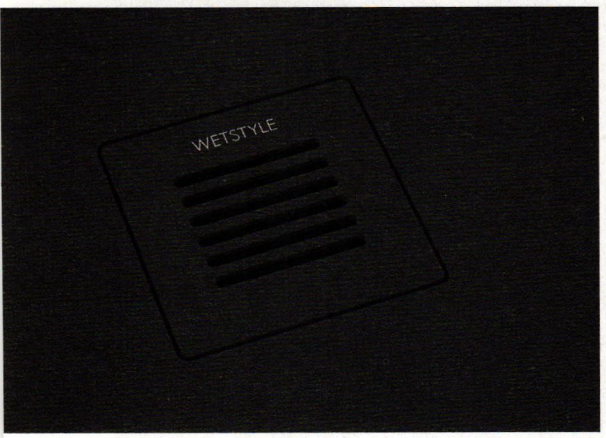
MEDICINE CABINET: Kohler

DOWNLIGHTS: Eurofase

Making a Splash

These state-of-the-art fixtures and finishes add versatility to residential and commercial projects.

By Kelly Beamon



Feel Collection

This shower base has an anti-slip surface designed to imitate the look and texture of real stone or slate, complete with an integrated drain cover. Called the Feel Collection, the shower floors require no grout and can be cut to fit on-site by installers.

wetstyle.com

Fusion Finish Series

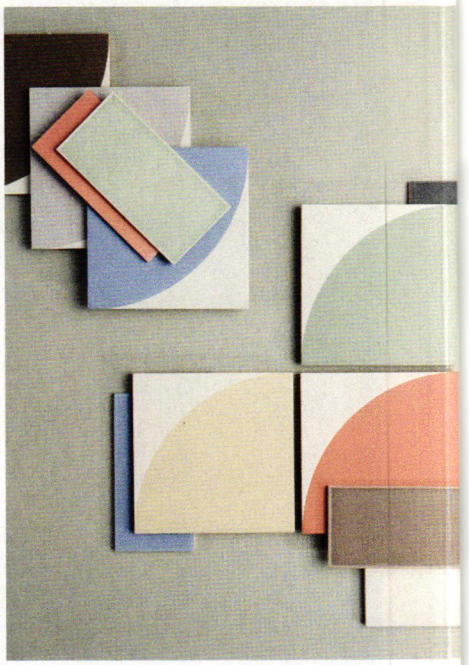
Moen is offering a selection of its kitchen and bath faucets in a contrasting combination of chrome and matte-black finishes. The Fusion Finish Series gives designers more flexibility when specifying the company's STō pulldown kitchen and prep faucets, as well as its Via single-handle bathroom faucets. Both styles also come with the manufacturer's lifetime limited warranty.

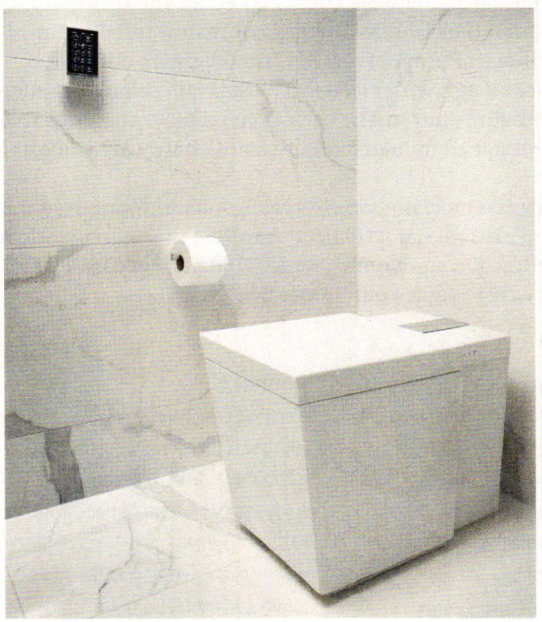
moen.com

Maddox Collection

Available in 8"-square porcelain formats and as a framed or flat ceramic field tile (4" x 8"), the versatile Maddox Collection from Tilebar is imbued with a textile-inspired geometry that enables numerous pattern configurations on a variety of vertical or horizontal surfaces. Designed by textile designer Stacy Garcia, the minimal graphics are also available in an array of muted colors.

tilebar.com





Numi 2.0

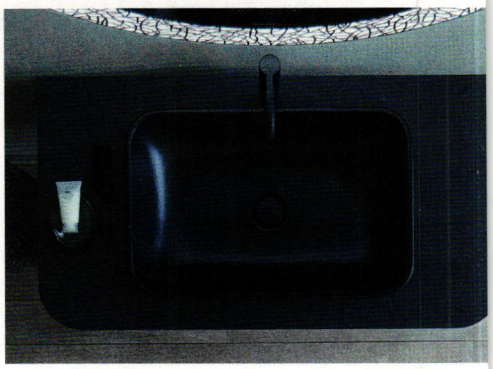
This Kohler toilet, which debuted in 2011, now with 2.0 enables the use of voice commands to activate its heated seat, foot warmer, automatic open-and-close lid, and an integrated light show, all via Amazon's Alexa. It can also play music and news.

kohler.com

Happy D.2 Plus

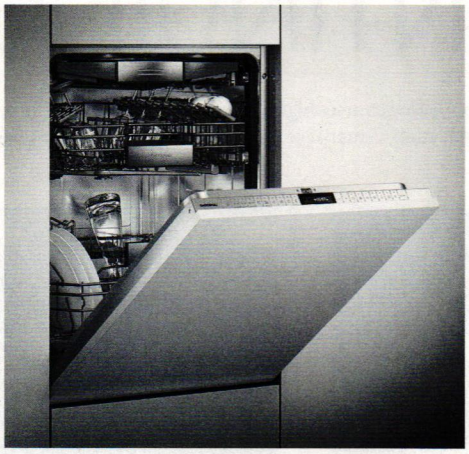
Duravit recently expanded its Happy D bath collection—designed by Michael Sieger 20 years ago—with a new range of complementary fixtures and furnishings. Happy D.2 Plus, as it's called, includes: above-the-counter basins, acrylic tubs, console lavs, illuminated circular mirrors, and storage cabinets. The company is additionally introducing new finishes—glossy white and glossy or matte Anthracite—that can also be specified for items in the Happy D line.

duravit.us



Beverage Center Column

Ideal for office kitchens and coworking projects, the Beverage Center Column was developed to organize large volumes of drinks in a full-size appliance. The base is designed to hold a range of bottle sizes; an optional transparent door conveniently showcases inventory. Measuring 30" wide, the refrigerated column can be combined with True Residential's other 30" column units.
true-residential.com

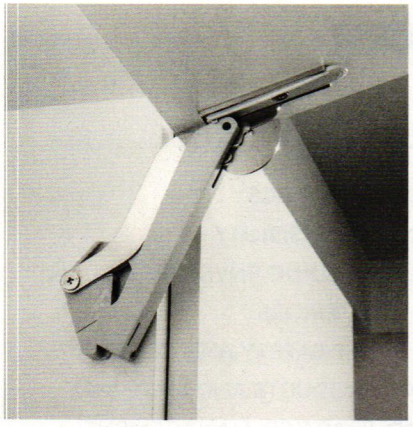


400 Series Dishwasher with Zeolite Drying

The latest version of Gaggenau's quiet and illuminated 400 Series Dishwasher adds the manufacturer's Home Connect control interface, for remote activation, and a new Extra Dry setting enabled by Zeolite, a natural mineral incorporated to optimize drying.
gaggenau.com

Dual Fuel Range

A cooktop that's half induction and half gas distinguishes this Fisher & Paykel range from other dual-fuel offerings. Four induction zones with nine heat settings boost the versatility of this model, which also features four gas burners and a pair of electric ovens (one a cubic 4.8', the other cubic 2.1'). The 48" appliance also features the manufacturer's self-cleaning technology, a touchscreen display, and illuminated dials.
fisherpaykel.com



Free Space

Manufacturer Häfele has engineered a durable and compact flap fitting that enables a lift-and-hold operation for a variety of cabinet doors weighing up to 42 pounds. The fitting's slim profile also allows for more space inside the cabinet, and can eliminate the forward door swings required by conventional hinged cabinet doors.
hafele.com

Quartz Luxe in Mint Crème

Elkay is offering its Quartz Luxe line of kitchen sinks in a new hue. Among the company's other 2020 debuts, the natural quartz-and-acrylic resin basins now come in Mint Crème as well as 15 other colors. Reinforced with a special fiberglass webbing, the Quartz line is available in a wide range of styles and a variety of mounting options. It can also be specified for laundry rooms.
elkay.com

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Photo courtesy of NanaWall


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Improving School Environments by Design

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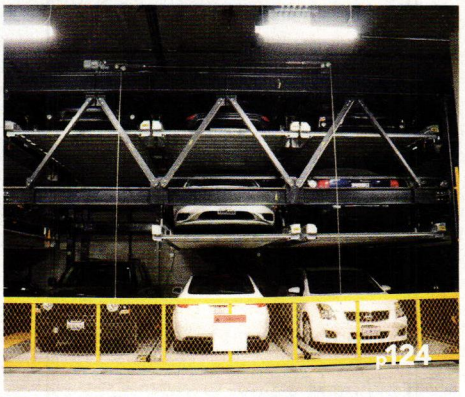
Photo courtesy of CityLift Parking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The Solution to the Parking Problem

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Photo courtesy of The Sliding Door Company


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Maximizing Value with Interior Glass Door Solutions

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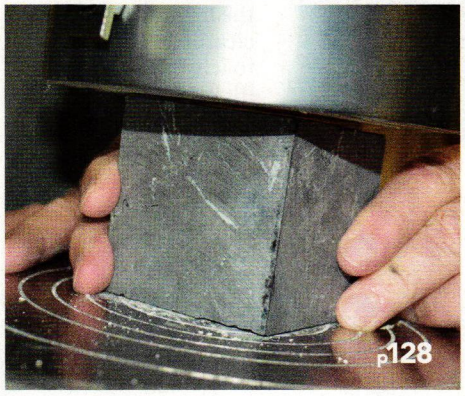
Photo courtesy of Natural Stone Institute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The Importance of Testing When Specifying Natural Stone

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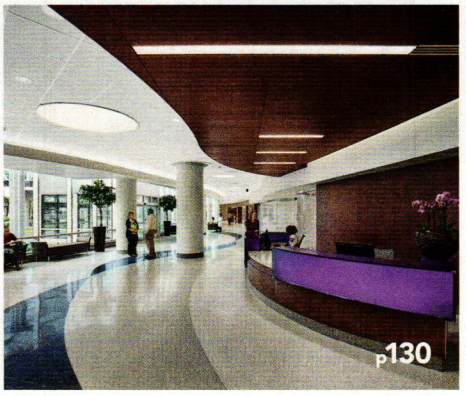
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Putting People First

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CATEGORIES

- **AC** ACOUSTICS
- **ACC** ACCESSIBILITY
- **BE** BUILDING ENVELOPE DESIGN
- **IN** INTERIORS
- **LS** LIFE SAFETY AND CODES
- **PM** PRODUCTS AND MATERIALS
- **PMD** PRACTICE, MANAGEMENT, DIGITAL TECHNOLOGY
- **SI** SITE INFRASTRUCTURE DESIGN
- **SU** SUSTAINABILITY

Courses may qualify for learning hours through most Canadian provincial architectural associations.

Using up-to-date information based on research and testing can inform the innovative design of school buildings to boost the health, safety, and general welfare of students, teachers, and staff.

Photo courtesy of NanaWall

Improving School Environments by Design

Incorporating some of the best design principles means selecting the best products and systems currently available

Sponsored by Inpro, NanaWall Systems, and SOPREMA, Inc. | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*

The design of K–12 schools continues to be studied, reviewed, and assessed, all with the intention of creating better learning and work environments for students, teachers, and staff. This is exemplified by the AIA Committee on Architecture for Education (CAE), which includes more than 8,000 architects and allied professional members nationwide. The CAE serves as an active and dedicated knowledge community of the AIA serving design professionals specializing in educational facilities. The Research Subcommittee of the CAE is supported by the CAE Foundation and has recently put forward a bold idea, namely "it is time to create a value proposition for data-driven evidence to help inform and influence design strategies for architects and educators around the human impact of buildings." The impetus behind this idea is to go beyond post-occupancy evaluations of school designs and move forward into more academic-based, scholarly research that can be disseminated across the professions to drive better design decisions. Toward that end, its invites broad participation to help the industry focus on the value of the relationship between human performance and building design.

While the concept of such evidence-based research may sound abstract, it is still manifest in some very practical decision-making during the design of school buildings. In some geographic locations, the focus is on new construction to accommodate population growth or changing demographics. In other locations, renovations and additions are much more the norm, where innovation is needed to improve and modernize the existing school facilities. In this course, we will use several aspects of school design as examples of common areas of concern for any of these project types or locations. We will also explore some of the performance issues that need to be addressed to keep school designs focused on better outcomes for all of the people who use them.

FLEXIBLE SPACE AS A DESIGN CONCEPT

Collaborative teaching and group learning are concepts in education that have received a lot of attention and investigation in recent times. In fact, it is generally understood that next-generation school design requires a more open and shared use of space to help foster such communal learning. Moreover, budgetary concerns often drive the need to utilize constructed space as efficiently and completely as possible. As a result, school boards and

CONTINUING EDUCATION

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Learning Objectives

After reading this article, you should be able to:

1. Identify and recognize the significance of flexible space, acoustics, and sunlight control on interior school spaces.
2. Assess the health and safety performance aspects of roofing systems as they relate to durability and sustainability.
3. Explain the importance of proper attention to restroom design in schools, particularly related to shower and locker rooms for privacy and safety.
4. Determine ways to incorporate the design principles presented into building project documentation as shown in examples.

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educators often request architects to consider ways to incorporate spaces that can be flexible in terms of usage by transforming them in size and character. Of course, that has to be easy to do and still allow for the spaces to function properly in each mode. After all, the goal is to enhance teaching and learning, not detract from it.

Among the solutions to meet these design challenges in schools are innovative operable glass walls. These products are made of panels that can be easily moved to define smaller spaces when they are closed and larger spaces when they are open. From a learning perspective, this solution allows the creation of defined areas for focused learning or the opening up of larger common areas where multiple students can work together on a range of activities utilizing shared resources, such as technology centers or presentation areas. Not only does this approach offer the sought-after variety for student programming, but it also means that teachers can support each other, fostering a better managed classroom environment. From an overall design perspective, creating such a flexible classroom configuration with operable glass walls can optimize or even reduce the needed floor space within a building envelope, which can translate into reduced construction costs.

This flexible space design approach using operable glass walls can address all of the following common needs articulated by teachers and administrators:

- **Variable-sized work groups:** Operable glass wall systems enable the separation of smaller groups that can engage effectively in discussions, separate teaching plans, or group projects while also providing opportunities for quiet zones, test centers, advanced or remedial work areas, etc.
- **Multiple concurrent activities:** Dividing the space with clear glass systems allows teachers to monitor multiple activities in separated spaces.
- **Outside volunteer space:** When parents or visitors volunteer in the classroom, they can use this area to work independently with students.
- **Shared resources:** Flexible access offers common storage space for shared books, supplies, or computers, thus reducing redundant purchases.
- **Teamwork:** Joining two or more classrooms with shared space allows teachers to configure space to meet their needs.
- **Class management:** One teacher can temporarily monitor two classes if another teacher has an emergency or needs a break.
- **Minimized visual distractions:** Use of mixed transparent glazing in the upper portion of the glass wall and opaque glazing in the lower portion allows seated students to be isolated from excessive distraction beyond the wall, while a standing teacher can monitor multiple spaces.
- **Cool-off/recovery areas:** Separated areas offer isolated, private space for behavioral and emotional issues or disciplinary actions.

Photo courtesy of NanaWall

Flexible learning spaces can be connected directly to the outdoors using operable glass walls, thus enhancing learning, exploration, and access control.

Acoustics and Flexible Space

There is a growing recognition that schools need good acoustical control to promote well-being and facilitate learning. This means that any wall system, including opening glass walls, needs to properly address the control of sound in and between the spaces where they are located. In particular, sound isolation is needed in flexible space designs so students can properly focus on their work or understand instruction from their teachers. The design challenge in schools can sometimes be finding a way to incorporate the flexible spaces being sought for classrooms and other spaces while still meeting the acoustical needs of those spaces.

Fortunately, manufacturers of operable glass walls have found ways to deliver impressive acoustical properties so designers can feel confident that incorporating such systems into school designs will not be seen as any type of a compromise. The best way to determine acoustical performance in walls is to have them tested to determine their sound transmission class (STC) rating. This common index provides a way to help determine how much sound (measured in decibels) is restricted from passing through a wall or similar assembly. The higher the rating, the less sound that passes through. Ratings on the order of STC 25 to STC 30 allow most speech to be heard or understood through the wall. A better condition that is often cited as a design goal is STC 35–45, which makes most speech illegible or inaudible. This is important not only within schools but also between inside and outside spaces, since not all schools are located in quiet surroundings.

Connections to Outdoor Spaces

In addition to creating flexible spaces that combine interior environments, there is a growing recognition of the importance of having students connect with outdoor areas too. This can mean either a visual connection through the use of clear glass or a physical connection that can be achieved by operating a door or wall system. Operable glass walls allow for both conditions by providing brighter interior spaces with natural daylight and creating simple, controllable transitions between the indoors and outdoors. This direct connection to the outdoors is part of a growing trend to use outdoor spaces for instruction and exploration, not just for recreation and physical exercise. This is true even in areas that have winter weather since there are still opportunities then too.

John Brown, AIA, partner with Hollis + Miller Architects, speaks from experience on the schools his firm has designed. "Connectivity, flexibility, and visibility were all very important concepts in the design of the spaces within these schools. While we still needed the capability of closing off spaces for more traditional classroom and learning spaces, we needed the capability of opening up the walls to accommodate larger groups, which would then allow for collaboration." The opening glass walls they have incorporated into their designs achieve all of these needs.

SUN CONTROLS

Adding natural daylight to a school building is fundamentally a good thing for many reasons, not the least of which is the documented cases of increased student performance and well-being that come about from it. However, the penetration of that daylight and/or direct sunlight into a

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school needs to be controlled. Too much concentrated daylight can create uncomfortable glare or interfere with computer and audio-visual images. Further, depending on the compass orientation of the building or the time of day, the sunlight could add more solar heat gain than desired, creating spaces that are uncomfortably warm. For all of these reasons, providing a solution for controlling or directing daylight into interior spaces is important for a successful outcome.

Interior Cordless Sun Shades

Controlling daylight and glare from the inside rather than the outside of a building is a design necessity in many cases for school buildings. Teachers and staff need to be able to quickly and easily make adjustments to suit periodic or daily changes in classroom needs for presentations and activities or simply to reduce distractions. In response, roller shades have commonly been placed in school room windows to create a great deal of flexibility and control. Fully open, they can allow for full penetration of daylight and clear views to the outside for students. For times when solar control is needed to reduce light, glare, or heat gain, they can be closed fully or partly. While historically, the shades have been made simply of room-darkening, opaque material, there are now a myriad of other options available to suit differing needs that improve the quality of the indoor school environment.

Textured roller shades can be used that allow diffused daylight to pass through a fabric appearance that reduces the total light transmission. In this way, they reduce glare, add comfort, and produce a favorable light quality inside the building. At the same time, they provide a degree of privacy or muted views through to the outdoors as may be desired. The particular characteristics of any such shade can be customized based on the particular weave and percentage of the area that is open versus closed in the fabric. Textured, partial light-transmitting shades can be used alone or in combination with other shades that are fully opaque to provide the greatest degree of flexibility and control.

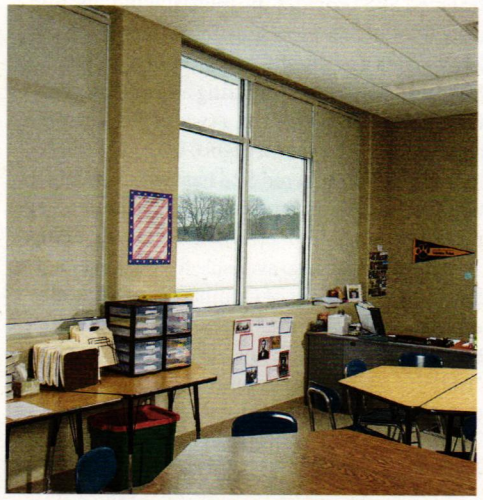
Shade systems are available that use chains or cords to raise and lower them, but there are also products available that are completely cordless. Such cordless window shades are a logical choice for school buildings since the presence of dangling cords can be a safety hazard for children. Rather than trying to contain or conceal the cords, the elimination of them dispels any potential problem. Cordless shades commonly use a spring roller system that allows for direct and easy manual adjustment of the shade with capability to raise and lower it to any height. A privacy track can also be included along the sides to keep the shades in place and provide additional light blocking at the window edges.

Any product used on the interior of a school building needs to be durable to be practical. Since schools are areas where damage or tampering is often a concern, it is worth noting that there are self-contained cordless window shade systems specifically designed to resist such damage. This type of system features side channels and an extremely durable security box fascia to protect its mechanical components, making it tough to inflict damage. The shade material itself can also be specified from available, non-organic, resilient fabrics that are durable and easy to clean.

Beyond these functional features, it is possible to design and create a theme from room to room by custom printing the shades with a graphic design selected by the designer. Printed shades can create a welcoming atmosphere in addition to hiding unsightly outdoor scenery. They are also less likely to be damaged or vandalized. It is entirely possible to add custom landscapes, artwork, educational themes, or even mascots and logos to the shades. Of course, standard fabric patterns can also be applied to a shade for simplicity.

In terms of energy performance impact, interior sun shades can help with the rejection of solar heat and have a positive impact on reducing energy needs for cooling as a result. For example, independent research using computerized energy models run for a medium-sized, two-story building in the midwestern United States compared a baseline building with no window shades to a building design that incorporated interior sun shades. Different types of shades were modeled that ranged in the percentage of openness in the fabric (i.e., less openness equals more shade fabric per square foot). The results of the modeling and analysis showed that annual energy savings related to space cooling, heat rejection, and ventilation fans could be realized between 5 to 9 percent. These savings were attributed to the ability of the fabric to reflect solar heat and keep the building from overheating on sunny days. Hence, this data shows that it is possible to provide controlled daylighting while still having a positive impact on overall energy use in a building.

Photos courtesy of Inpro



Interior cordless window shades with textured fabric can provide privacy or maintain connections to the exterior while helping with energy performance by reducing solar heat gain.

DESIGNING ROOFING FOR SAFETY

School buildings typically have large areas of roofing with predictable lifespans. In new construction, the type of roofing specified can be selected based on aesthetic appeal, lifespan, and initial cost as primary decision points. For reroofing projects, the same criteria come into play, but there may be limitations posed by the existing building construction. In addition to these common factors, though, the overriding criteria should be the long-term protection of the building and the safety of the building occupants. Keeping water out of a building is understandably important by itself, but the short-term and long-term damage to the building from slow, undetected water leaks can cause deterioration of construction assemblies to the point of rendering them unsafe. At the same time, the presence of water in building cavities can lead to the growth of mold and mildew, causing health concerns for the building occupants. Similarly, in the event of severe weather, roofing needs to be able to withstand wind uplift and other forces so as not to lose its protective properties or cause a hazard from windborne debris.

There are, of course, many options in the market that can keep water out of a building, but there is a need in school design to ensure that the selected system is addressing the myriad of weather and safety conditions to which it could be subjected. These concerns need to be addressed both at the time of installation and

for the entire lifespan of the roofing. Given the significant cost of replacements, the longer that lifespan can be, the better. With all of these points in mind, here are a few common roofing system types that are being used in both new construction and roof retrofit designs.

PVC Roofing Systems

Single-ply polyvinyl chloride (PVC) roofing membranes have been in common use for some time. They can be mechanically fastened or fully adhered to a variety of substrate materials, but for most roofing systems, mechanical fasteners often provide the best resistance to wind uplift. Unlike seams with some single plies that use adhesives or tapes to seal the seams, the seams of PVC membranes are typically heat welded, creating a continuous, watertight seal that has proven itself repeatedly. In cases where there are budgetary constraints, a system surfaced with PVC roof membrane provides a high-quality, long-lasting alternative. Further, if it is being compared to other roofing types such as a standing-seam metal roof, then it should be noted that PVC products with welded ribs are available that create a standing-seam metal appearance with less hit to the budget. Over the long term, PVC roofing products are regarded as durable and long lasting so they continue to effectively protect the building and its occupants for decades.

PVC roofing is available from different manufacturers, but not all products are manufactured equally. Some offer superior performance over other PVC membranes by holding to minimum standards compared to nominal standards. There are also PVC products that are classified as high performance with thicknesses up to 80 mils (2 millimeters), polyester reinforcing, and high degrees of flexibility. With mechanically fastened options, no VOCs need to be present in these installations. Such high-performance membranes also provide verified fire and chemical resistance, helping to assure the safety and protection of people and the building compared to other single-ply membranes in the market. Their superior weldability and workability make it easy to conform to complex roof geometries. The underside of such membranes commonly incorporates a heavy fleece-backing, while the topside is available in ENERGY STAR labeled white colors to create a "cool roof" surface. There are also a variety of other colors, including gray and tan, and some with a silver or copper appearance that mimics the look of real metal.

Photo courtesy of SOPREMA, Inc.

PVC roofing membranes are currently used on schools to provide a long-lasting, durable, and aesthetically pleasing roofing solution that protects both the building and people inside.

For fully adhered systems, a coordinated and approved bonding adhesive must be used, usually available from the same manufacturer as the PVC membrane. It is best to refer to the specific adhesive data sheet for application guidelines and requirements. For mechanically attached systems, the manufacturer's representative should be consulted for specific fastening patterns to achieve the desired wind uplift performance. In all cases, all laps and seams must be heat-welded to ensure a watertight seal and meet the needed classifications such as CRRC, FM, or UL.

SBS Roofing Systems

Another popular choice for low-slope roofing membranes on school projects is styrene butadiene styrene (SBS) modified bitumen roofing. The modification provided by SBS copolymer gives the asphalt bitumen membrane a rubber-like characteristic by forming a polymer network inside the bitumen material. The SBS allows for increased flexibility and durability, while the asphalt provides proven waterproofing capabilities. This combination makes SBS a premier solution in terms of providing long-term protection to the building.

SBS membranes can be applied in many ways, but two methods of particular importance for schools are mechanically fastened and the use of self-adhering products. Mechanically fastened SBS provides the highest wind uplift in its class, which is especially important in places like Florida and coastal areas that experience high-wind events. Combining a mechanically fastened SBS base sheet in a two-ply SBS system achieves superior performance with the longevity of SBS. Self-adhered SBS has been developed to create extremely strong interply adhesion with no open flames, hot kettles, or VOCs and odors.

Adhesives are also available for field installation between layers of membranes or applied directly to concrete roof decks. While applied directly to a concrete roof deck, the resulting "ribbon pattern" creates natural venting for the concrete and provides extremely high bond

Photo courtesy of SOPREMA, Inc.

SBS modified roofing is used very successfully and economically on school buildings including the Hazel Harvey Peace Elementary School in Fort Worth, Texas, shown here.

strength. This helps the moisture in the concrete leave the roof system over time without affecting the integrity of the assembly or its components. As a high-performance, single-component polymeric adhesive, when used as an interply adhesive, it provides an additional layer of elastomeric waterproofing protection beneath or between plies of membranes once the adhesive is cured. Also, these adhesives are solvent free and extremely low in VOCs, providing superior performance while ensuring a safe installation for the contractor, occupants, and environment.

Coating/Liquid-Applied Membranes

There are plenty of situations where special roofing conditions arise that are not easily addressed by membrane solutions. These can include atypical conditions along roofing edges or intersections with other surfaces, areas of premature aging, or areas needing special waterproofing attention, such as flashings. In these cases, the use of liquid-applied coatings or membranes is ideal since they can conform to any shape and cover the needed area seamlessly when cured. These types of products are also well suited for roofs that require a roof "extension" by covering overworn or problem areas until a complete, new roof can be installed. In some cases, liquid-applied membranes can even serve as a completely new system for a total roof area. Depending on the chemistry of the products being used, low-odor options are available that cause very little, if any disturbance to the building below, such that occupants may not even know roofing work is going on above.

Continues at ce.architecturalrecord.com

Peter J. Arsenault, FAIA, NCARB, LEED AP, *is a nationally known architect, consultant, continuing education presenter, and prolific author of more than 210 continuing education courses.* ***www.pjaarch.com, www.linkedin.com/in/pjaarch***

PRODUCT REVIEW

Improving School Environments by Design

Inpro

Photo courtesy of Inpro Corporation

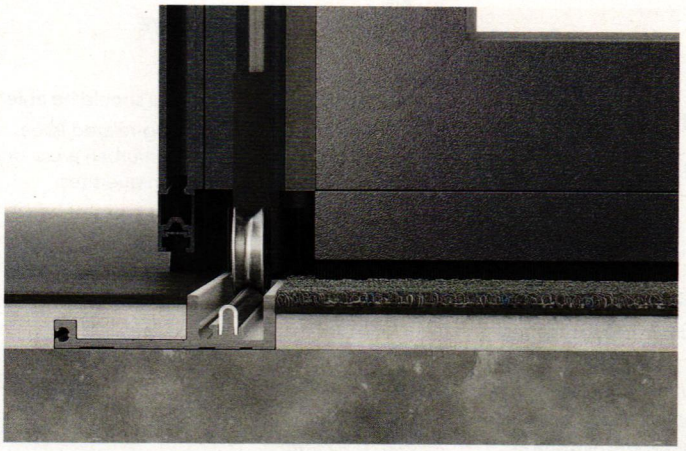
Solarity® Solar Shades

Traditional blinds are all or nothing: If you want to block the sun's heat or glare, you have to block your view as well. Inpro Solarity® Solar Shades bring balance to this struggle. They preserve the view while cutting glare and heat gain, with our energy modeling showing an annual savings of up to 9 percent in energy costs.

www.inprocorp.com

NanaWall

Photo courtesy of NanaWall Systems



SL64 Acoustical

NanaWall SL64 Acoustical is the only floor-supported folding opening glass wall to achieve STC 45. The system combines acoustically separated aluminum framing and specialized gasketing with sound-enhanced glass to achieve optimal performance. The ADA-compliant surface-mounted flush sill has only $^{15}/_{16}$ inch exposed track, creating true seamless transitions between spaces.

www.nanawall.com/products/sl64-acoustical

SOPREMA, Inc.

Photo courtesy of SOPREMA, Inc.

ALSAN® COATING SIL 402

ALSAN® Coating SIL 402 is a low-VOC, high-solids, single-component silicone roof coating that forms a durable weatherproof layer on low-slope roof surfaces and substrates. ALSAN Coating SIL 402 provides exceptional UV protection, resistance to standing water, and a reduction in energy consumption and rooftop temperatures.

www.soprema.us

All photos courtesy of CityLift Parking

Automated parking systems safely store cars in a much smaller footprint, dramatically reducing the amount of space that designers must reserve for parking.

The Solution to the Parking Problem

Automated parking systems improve the space efficiency and security of a parking structure

Sponsored by CityLift Parking | *By Jeanette Fitzgerald Pitts*

There is a problem with the conventional approach to parking in the United States: It requires too much space. Conventional parking solutions can take a few different forms: Off-street parking can be a flat surface lot or a multilevel high-rise or subterranean structure. On-street parking spots are another popular solution, and then, of course, there are the spots in residential garages and driveways. The one thing all of these traditional parking solutions have in common is the incredible amount of space they set aside to park a car. As a general rule, a typical conventional parking space allots 320 square feet per vehicle.

The size of the single car's footprint can add up, especially considering that cities small and large are finding space to provide more than 1 million parking spots. The city of Seattle has roughly 1.6 million parking spaces, as does the much smaller Des Moines, Iowa. There are about 1.9 million parking spaces throughout the five boroughs of New York City, and Philadelphia tips the scale with more than 2 million spots. All of this space represents a tremendous real estate value. A report written by Parkingmill for the Research Institute for Housing America estimated that the parking space provided by Des Moines, Iowa; Seattle; New York City; Philadelphia; and Jackson, Wyoming, combined was worth roughly $81 billion.

CONTINUING EDUCATION

AIA Continuing Education Provider **1 AIA LU/ELECTIVE**

Learning Objectives

After reading this article, you should be able to:

1. Summarize current parking-related issues that can plague projects in urban areas or on severely constrained or unique sites.
2. Differentiate between four types of automated parking systems.
3. Describe how automated parking systems make parking structures more safe and secure for patrons and their property.
4. Identify the environmental benefits that can be realized when projects include automated parking systems instead of conventional surface lots or multistory parking structures.
5. Demonstrate how reducing parking space can result in building more billable units and offering customized amenities.

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AIA COURSE # K2001F

For cities, and professionals involved in developing buildings and spaces within cities, the size of a parking space is problematic from both a basic cost and opportunity cost perspective. Either way you look at it, it is expensive, because the land used for parking must be paid for and could be used more cost-effectively.

One of the factors driving the pervasive number of parking spots found in urban areas are policies called mandatory minimum parking requirements. Mandatory minimum parking requirements dictate the number of parking spaces that must be included in commercial and residential projects. In the 2005 book by UCLA urban planning professor Donald Shoup titled *The High Cost of Free Parking*, he provides some background on the mandatory minimum policies: "Planners thought the solution would be to require new buildings to have 'enough' to satisfy the demand. It seemed like quite a miracle; it did not cost the city anything, and it hid the cost of parking." The costs of the parking spots were incorporated into the development costs of a project and could be significant. In Los Angeles, for example, Shoup explained that the mandatory parking space can increase the cost of a new shopping center by 67–93 percent.

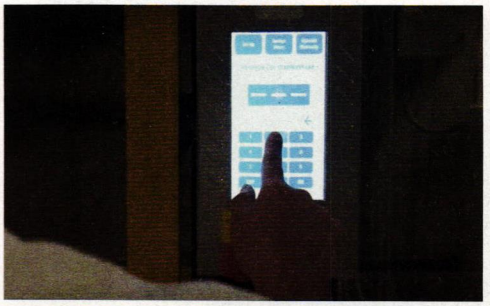
Beyond the cost of development, these minimum parking policies have left urban areas with large expanses of parking space that may be better used in different ways, especially if the area is well-served by public transportation.

Across the nation, cities are beginning to reevaluate their mandatory minimum parking policies, and some have eliminated them altogether. But, experts caution, just because the cities are not mandating parking in some areas does not mean it is not needed. According to the IBISWorld report published in May 2019, urbanization has been on the rise, resulting in greater demand for parking garages. Another consideration is funding. Lenders often take into account the available tenant parking to make the building more attractive for renters and purchasers.

Luckily, there is another solution that can enable projects and cities to meet rising parking demands in a significantly smaller footprint. The solution is an automated parking system.

INTRODUCING AUTOMATED PARKING SYSTEMS

An automated parking system flips the conventional design of a parking structure and the less-than-efficient experience of parking on its head, providing a solution that parks more cars in less space and often speeds up the parking process altogether. It accomplishes all of these things by using a combination of lift and conveyor technologies that lift, slide, and store vehicles vertically and horizontally inside the automated parking structure. Where conventional parking practices required 320 square feet per vehicle, an automated parking solution can safely store a car in as little as 170 square feet (8.5 feet by 20 feet). A 2017 Bisnow article titled "This Company Is Bringing Fully Automated Parking Coast to Coast," author Alec Berkman writes, "Countries like Germany, Japan and China, which faced land constraints earlier or more severely than the United States, have already invested heavily in these systems."



With an automated parking system, drivers retrieve their cars using a kiosk or issued fob.

There are four different types of parking systems, offering varying degrees of automation, accessibility, and parking capacity. From least automated to most automated, they are: a manually operated system, a semi-automated system, and fully automated systems that arrange cars either horizontally or vertically.

Manually Operated Parking Lift

A manually operated parking lift is a solution for increasing the parking capacity of a valet parking area. These highly adaptable, customizable car stackers offer a maximum of two levels, allowing valets access to a second-story tier to increase the number of cars they may park in their allotted area. The experience of the patron (customer driver) is no different when a manually operated system is used, as the driver will drop the car off to the valet, who parks it, and then receive the car from the valet, who retrieves it. These systems can make retrieval quicker and easier for the valet rather than parking some distance away and retrieving the vehicle, which improves the overall parking service provided.

Continues at ce.architecturalrecord.com

This manually operated parking lift increases the parking capacity of a valet parking area, allowing access to a second-story tier.

***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.*

Glass partitions create private, enclosed workspaces while promoting daylighting, transparency, and flow.

All photos courtesy of The Sliding Door Company

Maximizing Value with Interior Glass Door Solutions

Interior glass walls and doors gain traction in workplaces and multiunit studios and lofts

Sponsored by The Sliding Door Company

Driven by a need for distraction-free areas, great daylighting and acoustics, and easily demountable and reconfigurable floor-plate solutions, interior glass partition designs are gaining traction in today's workplace settings. And in the multiunit/multifamily market, sliding glass doors are enabling owners to create additional spaces inside lofts and studios while also preserving daylighting within the living unit.

Enhanced product features such as non-90-degree-angle glass partitions, track-free designs, and ADA-compliant hardware are making these solutions even more attractive to designers and owners.

Before delving into the specifics of glass door and wall solutions, it is helpful to understand the evolution of workplace designs trends and how the industry arrived at its current set of operational needs.

THE SWINGING PENDULUM

As the world heralded in a new millennium, disappearing cubicles began making way for large open spaces aimed at optimizing corporate collaboration and teamwork. The idea was that physical proximity with employees all in one open space would promote a higher level of inspiration and sharing of ideas.

"The trend was to squeeze more people into a space with hopes that as people sit closer to one another, they will wind up speaking more often, collaborating better, and enjoying their shared workspace together," relates Jonathan Wasserstrum, founder and CEO, SquareFoot, New York.

The endeavor was a noble one, but unfortunately, the noise and distractions inherent in these settings seemed to backfire as productivity levels actually decreased.

CONTINUING EDUCATION

AIA Continuing Education Provider — 1 AIA LU/ELECTIVE

Learning Objectives

After reading this article, you should be able to:

1. Discuss the challenges created by open-plan designs and the need for a variety of workspaces, including private areas with good acoustics and visual privacy.
3. Review design strategies and case studies illustrating how interior glass walls and doors create aesthetic, daylit areas for private, focused work.
4. Highlight the health and wellness, productivity, and employee satisfaction benefits of daylighting and how glass systems promote this.
5. Describe noted co-working trends and the popularity of interior glass walls and partitions that offer a balance between open collaborative spaces and locked offices where needed.
6. Identify growing interest in glass walls and doors in studios and lofts, and how these systems make these units more rentable.

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AIA COURSE #K2001C

In fact, a 2017 survey of 700 respondents by enterprise software strategist William Belk found that 58 percent of workers need more private spaces for problem solving, and 54 percent reported that their office environment is "too distracting."

"The biggest complaint we hear is the noise in open environments and the inability to concentrate," confirms Jonathan Glance, AIA, NCARB, partner, vice president, LGA Partners.

Another more comprehensive project by researchers at the University of Sydney who studied the University of California at Berkeley's Post-Occupancy Evaluation database of 42,764 observations collected from 303 office buildings found that enclosed private offices had the overall highest satisfaction rate, whereas open office plans had the lowest.

In discussing this study in a *Forbes* article, "Why Your Open Office Workspace Doesn't Work," David Burkus, best-selling author and keynote speaker writes, "The desire for more collaboration among employees was shared by all, but those in open office plans may not have found it to be worth all of the stress and distraction from the bombardment of noise."

In a similar vein, eye-opening results emerged from Harvard researchers who studied 150 employees in two Fortune 500 companies for several weeks before and after moving to a new open-plan office. The overall face-to-face time decreased by approximately 70 percent and email use increased by as much as 50 percent. The outcome was that the employees were actually collaborating 4 hours less per day in an environment that was created with the goal of fostering collaboration.

Elegantly spelling out the challenge of open office designs in a *Chicago Tribune* article titled "The Open Office Plan is a Disaster," office design expert Jeff Pochepan writes, "The office—once a place where your cubicle seemed semi-shielded and dedicated to your needs, a place where you could even hang a 'Do Not Disturb' sign or at least signal that being at your desk meant head-down work mode—has morphed into something resembling a buffet at dinner time, where first dibs determine whether you will secure a relatively quiet workspace or be resigned to another morning of wearing headphones at the communal work bench to get anything done."

He adds that completely open offices also present a business privacy issue as phone calls, emails, and screens can all be observed, and in the worst case, even sabotaged if one has a highly competitive team.

At Serendipity Labs, glass partitions and room dividers help break out the co-working space into a mix of open, collaborative areas and more private zones.

These challenges have sent the pendulum back the other way, with today's workforce seeking a balance of open, shared spaces and quiet, private areas for concentration work. Inherent in these designs—and the current workplace culture—is giving employees the freedom of where to work based upon the task at hand.

"The evolution from the cubicles of the 1970s and 80s through the dark interior spaces of the 90s to the co-working environments of the past decade illustrates an increasing emphasis on providing diverse environments within the workplace," relates Joshua Zinder, AIA, LEED AP, managing partner, JZA+D, Princeton, New Jersey. "The cafe, the lounge, the conference room, the office, even the sofa—in the mobile era, our work moves with us. Variety of environments and amenities is 'king.'"

Echoing a similar sentiment, Jesse James, senior project manager, Stantec, Chicago, says, "Our days are filled with times of energy and collaboration, heads-down reports, meetings, sit-down work, social events to promote community—it all varies hour by hour. The spaces we build need to reflect that and allow employees to choose their environment."

Practically speaking, when a handful of people in an open layout need to discuss something, it can be very distracting for others. Consequently, having options for smaller spaces to gather for impromptu collaboration is ideal, says Beth Ann Christiansen, senior project interior designer, HOK, New York.

"Variety is the spice of life, and so too is variety the key to a successful workspace," adds Brent Zeigler, AIA, IIDA, president, director of design, Dyer Brown, Boston. "A space that supports a mix of heads-down work areas and collaboration spaces will always be the most successful."

A current interesting example is DMAC Architecture's new office in Chicago. In gutting the space down to the shell, areas with ceilings shorter than 8 feet were discovered. Embracing these newly discovered "surprise" areas, the architects captured them as "in-between" spaces, which are now used as private lofts where employees can take private calls, rehearse presentations, or work on designs.

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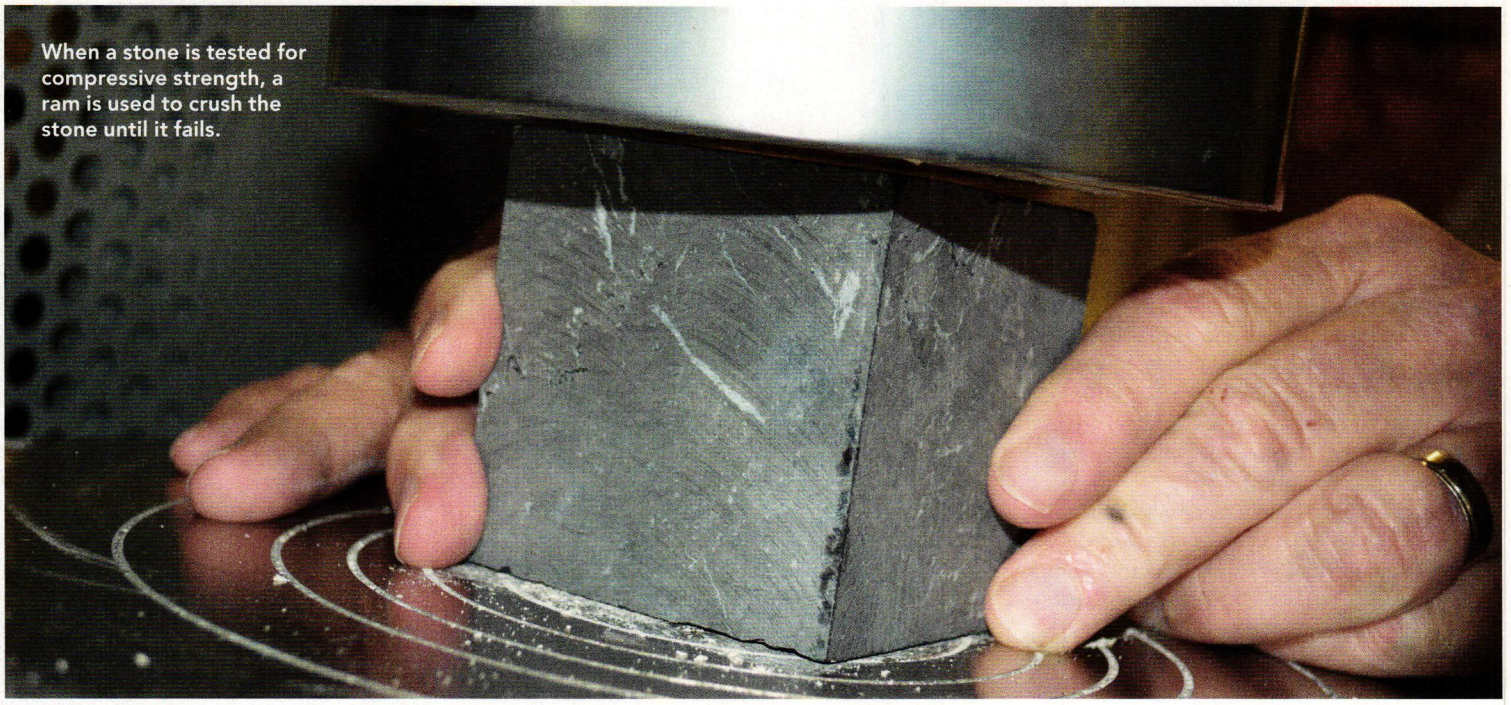
All images courtesy of Natural Stone Institute



When a stone is tested for compressive strength, a ram is used to crush the stone until it fails.

The Importance of Testing When Specifying Natural Stone

Educating design professionals about which ASTM and ANSI tests to specify for every common natural stone application

Sponsored by Natural Stone Institute

Natural stone refers to stone that is quarried from the earth. Though it may be cut into shapes, including slabs and tiles, and a resin or sealer may be applied to its face, the internal fabric of the stone is unchanged.

It is important to understand what natural stone is not. Engineered products that are made from aggregates bound together with cementitious or resin binders do not meet the definition of natural stone.

Prized for its beauty, strength, and longevity, natural stone is one of the oldest building materials, and its applications are limited only by the imagination. Inside, stone can be installed as flooring and countertops, as well as in vertical applications such as wall cladding. Other options include mantels, fireplace surrounds, bath surrounds, and furniture.

Stone has just as many exterior applications. It is used extensively in landscaping, serving as pavers, walkways, walls, and other structures. Historically, stone served as the structure for many buildings; today, it is more typically used as non-structural cladding.

Dimension stone is stone that has been cut or sawn into specific shapes. How dimension stone is finished—whether honed, polished, or flamed—affects the stone's appearance. Many types of natural stone, including granite, marble, and limestone, can be fabricated into thin panels and used on the exterior of buildings.

HOW NATURAL STONE IS CLASSIFIED

When specifying natural stone, it is important to understand the material's inherent characteristics so that you make an appropriate choice for the application. Knowing about the stone's chemistry as well as how it was formed provides some basic information about how the stone will perform.

Natural stone can be divided into two broad categories based on its chemistry, or mineral composition. Calcareous stones are made of calcium carbonate and tend to be vulnerable to acids, even mild ones like lemon juice. Common types of calcareous stones include marble, limestone, travertine, onyx, and occasionally types of sandstone.

CONTINUING EDUCATION

AIA Continuing Education Provider **1 AIA LU/HSW**

Learning Objectives

After reading this article, you should be able to:

1. Explain why and how ASTM test standards help ensure safety and quality of a natural stone application.
2. Describe which ASTM and/or ANSI tests are applicable to interior, exterior, and walking surface applications.
3. Discuss how to interpret test results and their implications for material selection.
4. Create a plan using relevant test data to select the proper stone for specific applications to ensure a safe occupied space.

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AIA COURSE #K1912G

	Sedimentary	Metamorphic	Igneous
Calcareous	Limestone Travertine Onyx	Marble	
Siliceous	Sandstone	Slate Quartzite Serpentine Soapstone	Granite Basalt

Natural stone comes in a variety of colors and patterns that tell us the story of the stone's origins.

Siliceous stones are made of silica or silicates. These minerals make up close to 95 percent of the earth's crust and include such common minerals as quartz, feldspar, and mica. Siliceous stones tend to be strong and resistant to acids; examples of siliceous stones include slate, quartzite, granite, and most types of sandstone.

Natural stone also can be categorized by how it is formed. Sedimentary stones are formed from preexisting rocks or the bodies of once-living marine organisms. Many sedimentary stones start out as sediments carried by rivers or glaciers that are deposited in lakes or oceans. The particles are "stacked" layer by layer; when trapped and buried, the particles become compacted and cement together. Common examples of sedimentary stones include sandstone and limestone.

Metamorphic stones are created through a combination of heat, pressure, and time. Metamorphic stones start out as sedimentary, igneous, or earlier metamorphic stones, but over a long period of time and under intense heat and pressure the crystals rearrange themselves or react with fluids that enter the rocks. Metamorphic stones, which include such common varieties as schist, gneiss, quartzite, and marble are usually denser and more compact than their earlier forms.

Igneous stones have their start as molten material that originates from deep within the earth near active plate boundaries. The lava is exposed to great heat and pressure, then cools as it rises to the surface. Lava that cools very slowly forms large grains, while igneous stones that cool quickly have a fine-grained or glassy texture. Igneous stones include gabbro and basalt; many of these are included in the granite group because they perform similarly to granites.

This brings up an important point. The stone industry uses commercial definitions for dimension stone types. Although these certainly overlap with scientific and geologic definitions, there are some differences.

The scientific descriptions focus primarily on a stone's geographic locality and mineralogical composition, while commercial descriptions focus on workability and general performance of the stone. Hence, the commercial industry groups stones according to those which behave and perform similarly. While the stone industry recognizes all rock types, they consolidate them into just 10 groupings of stones: granite, limestone, marble, onyx, quartzite, sandstone, serpentine, slate, soapstone, and travertine.

We can use the two categories of chemical composition (calcareous and siliceous) and the three categories of formation (sedimentary, metamorphic, and igneous) to create a matrix to help organize the various stone types. Stones within each category have properties that are generally predictable. Later in this course, we will see how the design professional can use this matrix to create a plan to guide future specifications.

All stones are unique; consequently, expect variation in the properties and behavior between stone products, even if they are of the same type. While this variation makes stone an appealing and stimulating material, it also adds challenge. Research is critical, as the specifier must understand a stone's strengths, vulnerabilities, and limitations.

There are several factors to consider when specifying natural stone. The first and most obvious is aesthetics. Will the stone help achieve the desired look? A stone's aesthetic is determined by its inherent properties—color, grain size, and veining, for example—but also by how it is cut and finished. For example, a highly honed or polished finish will impart a more refined look.

Performance is just as important as aesthetics. Will the stone perform adequately for the desired application? For example, if the stone is to be used as a countertop, will it resist staining and hold up to abuse from steel knives? If installed on a building exterior, will it hold up to the elements?

It is also important to choose stone that is available in the dimensions and quantities desired, and within the allotted timeframe. Since by its nature stone is a heavy material, it is preferable to source it locally or regionally, although this is not always possible. Some highly desirable stone types—certain marbles, for instance—are only found in a few places in the world. In another example, most travertine used in the United States used to be imported almost exclusively from Italy and a few other countries.

Finally, cost is a factor. Even if the stone is the perfect material from an aesthetic and performance standpoint, it may not fit within the project's budget.

Though all of these considerations are important, this course focuses on performance, and the design professional's role in obtaining and interpreting information about how a given material will perform.

ASTM STANDARDS

Did you know that ASTM C1799 states that test results for stone should not be more than three years old? One of the most important resources for the design professional is the set of standards and testing procedures developed by ASTM International and the American National Standards Institute (ANSI). These standards guide the natural stone industry and help protect end users; in fact, most architectural specifications require that stone meet certain specified ASTM or other testing standards before it will be accepted for use.

ASTM publishes about 25 documents related to natural stone. These are organized into four categories: Standard Guides, Standard Materials Specification, and Standard Test Methods. Standard Guides documents provide basic information and definitions of terms used in the stone industry. The Standard Materials Specifications are specific to each of the commercially defined groups of dimension stone—marble or travertine, for example.

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Balanced acoustical design benefits building occupants.

All photos courtesy of Armstrong Ceiling Solutions

Putting People First

Create confidential spaces and take speech privacy to the next level

Sponsored by Armstrong Ceiling Solutions | *By Rebecca A. Pinkus*

The quality of a perceived indoor environment depends on several different factors, from lighting and thermal comfort to air quality and acoustics. Of these factors, acoustics often tends to be tricky to get right. Noise and sound transfer can be difficult to measure and challenging to control. In offices, for example, employees may notice that their workspace is too loud or that conversations are difficult to have, or, alternatively, that certain spaces are too quiet. In health-care facilities, noise affects both patients and staff, and good acoustical design is very important. The same holds true for schools, where noise may make it challenging for students to hear the teacher, which can impact both teaching and learning.

Many indoor environments have acoustical complaints that extend beyond ambient noise or high noise levels, and instead focus on issues of confidentiality and speech privacy. In any space where confidential information is being shared—whether financial data, patient information, private office conversations, or student conversations with teachers—privacy is essential.

Increased awareness of products that promote confidentiality and speech privacy can help specifiers create balanced construction designs in their spaces, and in turn make those spaces happier, healthier, more productive environments for the building occupants.

BALANCED ACOUSTICAL DESIGN FOR SPEECH PRIVACY AND CONFIDENTIALITY

Acoustical performance can often be challenging to get right during construction. One reason for this is that sound reverberation and absorption levels of a room can change once furniture is placed in the space. Another reason is that sound levels can vary throughout the day as building occupants engage in different activities. For example, in an office environment with high sound absorption may be too quiet for private offices. However, if sound is not blocked or absorbed well, activities such as team meetings may lead to

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Learning Objectives

After reading this article, you should be able to:

1. Describe current construction practices that impact speech privacy, overall confidentiality, and enhance the health, safety, and welfare of building occupants.
2. Define and apply the specific acoustical measurements for speech privacy and confidentiality in closed-plan spaces, and understand how they impact occupant well-being.
3. Discuss how acoustical ceiling solutions can create balanced acoustical design that protects occupant confidentiality in a variety of applications.
4. Explain how new high-sound-blocking ceiling panels can be used to quickly and economically provide high levels of speech privacy and confidentiality to existing spaces, thus helping designers meet relevant health and safety standards.

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Modern workplace design often presents acoustical challenges when it comes to speech privacy.

noise and voices carrying through the space and distracting other employees.

The acoustical setup of a space will affect how information is exchanged, whether in an office building, hospital or clinic, or school. In each of these environments, the transfer of information is important. If a listener cannot hear what the speaker is saying or has trouble processing that information because the space is too noisy, that is a problem.

But what about situations where unintended listeners can hear and understand conversations not meant for them? Or, if they cannot hear the full conversation, they can hear the tone of voices? Whether the information is personal or sensitive, confidentiality is an inherent requirement, especially in office, health-care, and education environments. Speech privacy, which is the ability to control verbal communication within a shared occupied space, is increasingly being recognized as a very important design priority in commercial spaces.

When people are concerned that they will be overheard, they may be less likely to share information, and that can be problematic. For situations like a workplace, medical facility, or school, people should feel comfortable to speak freely. Likewise, nearby occupants should be protected from hearing information not meant for them, especially if it is confidential.

Offices, health-care facilities, and schools are a few common indoor environments where speech privacy is important to the well-being of building occupants, and these spaces all vary in their unique design needs. For example, a commercial office may require an acoustical environment that provides employees with the quiet they need to concentrate and the speech privacy required to ensure they feel comfortable discussing private matters. Schools, on the other hand, may require a higher level of privacy to ensure that confidential subjects can be discussed without being overheard. Likewise, health-care facilities such as hospitals and clinics need acoustical design that ensures patient confidentiality to meet the Health Insurance Portability and Accountability Act (HIPAA) standards for verbal privacy. Finally, schools have acoustical design needs not only to buffer and absorb noise within and between classrooms but also to control noise in corridors and ensure quiet and privacy in administrative offices. In each case, the acoustical environment can impact the health, safety, and welfare of occupants.

Office Environments: Open and Private Spaces

Studies on employee satisfaction of workplaces routinely report that the biggest concerns occupants have with their workplace designs are distracting noises and poor speech privacy. In 2005, the Center for the Built Environment (CBE) at the University of California, Berkeley conducted a post-occupancy evaluation (POE) that included 23,450 respondents from 142 commercial buildings with the goal to determine how building occupants perceived their acoustical environments. Key results showed that occupants in private offices and open environments were significantly more satisfied with speech privacy and noise levels than were occupants in cubicles. Two of the most common concerns from people working in cubicles were that they could hear conversations from other employees and they were concerned about having their private conversations be overheard. This study reported that more than 50 percent of occupants in cubicle environments felt that poor acoustics and lack of speech privacy negatively impact their ability to do work.[1]

Most workplaces tend to have several different spaces to provide flexible work environments that meet the many different needs of office employees. And each of these spaces usually requires various acoustical ceiling and wall solutions to best address the challenges of the spaces. By specifying acoustical products that address different performance needs for each space while also maintaining the desired aesthetic, specifiers can design spaces that are both beautiful and acoustical. Three typical office designs are open-plan (focus) areas, open-plan (collaboration) areas, and closed-plan (privacy) areas.

Continues at ce.architecturalrecord.com

Rebecca A. Pinkus, MTPW, MA, *is a Toronto-based communication consultant, writer, editor, and historian of technology. Her work focuses on the intersection of technology, environment, and human health. She has contributed to more than 40 continuing education courses and publications through Confluence Communications.*

Ongoing Exhibitions

Fringe Cities: Legacies of Renewal in the Small American City
New York
Through January 18, 2020
This exhibition at the Center for Architecture, curated by MASS Design Group, explores four small cities that have been severely impacted by urban renewal. It examines the role of design in mapping and selling strategies for urban renewal, taking a deep dive into Easton, Pennsylvania; Saginaw, Michigan; Spartanburg, South Carolina; and Poughkeepsie, New York, to understand the local impact of those strategies and hear from organizations working to address the legacies. For more, go to centerforarchitecture.org.

Zurich: Cooperatives Reinvent Social Housing
Paris
Through January 19, 2020
In an exhibition at Cité de l'Architecture du Patrimoine of more than 30 projects, Zurich's unique approach to social housing is shown. Present since 1907 in Zurich, housing co-ops now own about one-third of rental housing. Certain lifestyle and environmental issues have forced these owners to rethink the art of building and living in the city. For more, see citedelarchitecture.fr.

Nature–Cooper Hewitt Design Triennial
New York
Through January 20, 2020
Over 60 projects featured in this exhibition at the Cooper Hewitt Smithsonian Design Museum demonstrate how designers are collaborating on inventive solutions to the environmental and social challenges confronting humanity. For more information, see cooperhewitt.org.

The Whole World a Bauhaus
Karlsruhe, Germany
Through February 16, 2020
The effects of the short-lived design school extended beyond Germany. This final installment, at ZKM | Center for Art and Media, of the traveling exhibition shows Bauhaus works from the following cities: Buenos Aires; Casablanca, Morocco; Mexico City; Moscow; and Santiago, Chile. See more at zkm.de/en.

Cold War and Architecture
Vienna
Through February 24, 2020
The exhibition, at the Architekturzentrum Wien, highlights building activity in postwar Austria, when Vienna under occupation became a central stage in the Cold War, carrying the competition of systems into architecture. It focuses on previously unexamined artifacts, creating a more thorough picture of postwar modernism. See more at azw.at.

Lectures, Conferences, and Symposia

Women in Design 2020 + International Conference
Mumbai
January 8–10, 2020

The HECAR Foundation has organized this three-day event focused on women in practice. Speakers include Billie Tsien, Annabelle Selldorf, Martha Thorne, Meejin Yoon, and RECORD editor in chief Cathleen McGuigan, along with many others. For more information, see wid2020plus.org.

Interior Design Show Toronto
Toronto
January 16–19, 2020
Canada's largest design exposition and conference brings together leading international designers, new products, furniture, and avant-garde concepts, catering to trade construction, design professionals, and design-savvy consumers. The event takes place at the Metro Toronto Convention Centre. For more information, go to toronto.interiordesignshow.com.

Rolex Arts Weekend
Cape Town
February 8–9, 2020
The weekend of events, open to the public, will feature talks, readings, exhibitions, and performances and include the work of 2018–19 matched pairs from the Rolex Mentor and Protégé Arts Initiative, Sir David Adjaye and

Mariam Kamara among them. At Baxter Concert Hall. For more information, go to rolex.org/rolex-mentor-protégé.

Competitions

Ceramics of Italy Tile Competition
Deadline: January 17, 2020
Hosted by Confindustria Ceramica and the Italian Trade Agency, the 27th annual competition awards North American architects, designers, and students for their outstanding projects and creative applications of Italian ceramic and porcelain tile. An international jury of design experts will select winners in four categories: Residential, Commercial, Institutional, and Student. This year, a People's Choice Award will also be awarded by the public via an online voting platform. Winners will receive a trip to New Orleans, where they will present their work at Coverings 2020 in April. More at tilecompetition.com.

LafargeHolcim Awards for Sustainable Construction
Deadline: February 25, 2020
The LafargeHolcim Awards seek projects from professionals and ideas from the next generation that combine sustainable solutions with design excellence through architecture, engineering, urban planning, materials science, construction technology, and related fields. Free submissions, with a total of $2 million in prize money. See lafargeholcim-awards.org.

Urban Confluence Silicon Valley Open Design Competition
Deadline: April 3, 2020
International artists, architects, urban planners, landscape architects, lighting designers, and students may submit ideas for a structure intended to be a symbol of Silicon Valley. The competition seeks a transformative design complete with dramatic lighting, a net zero energy approach, and an impressive physical presence. Three finalist teams will each be given a $150,000 stipend to refine their proposals. For more information, go to urbanconfluencesiliconvalley.org.

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

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Reqs: Master of architect or closely rltd grad deg in architect & 2 yrs exp in the following: research, design, doc & admin of architecture projs includ residential & commercial projects, competitions & install; building codes (IBC & IRC) & NYC Zoning Resolution; construct detail design & material properties; AutoCAD, Rhino, Grasshopper, Adobe suite, rendering & sustainable analysis progs; proj 3D visualiz & model; proj budget. Licensure not req'd.

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snapshot

PROJECT OVER VIEW
LOCATION PITTSBURGH
ARCHITECT FREELANDBUCK

PHOTOGRAPHY: © CHILDREN'S MUSEUM OF PITTSBURGH

AT THE Children's Museum of Pittsburgh, 2017 Record Vanguard firm FreelandBuck is teaching a lesson in trompe l'oeil. Its installation, *Over View*, lives on the first floor of the institution's new addition, MuseumLab, a hands-on learning space within a renovated Carnegie library dating to the 1890s. For the piece, the firm created a new version of the historic building's leaded-glass ceiling, which had been torn out, using 3,000 square feet of a plastic-based printed fabric stretched across an aluminum frame above a multipurpose gallery. The three intricately cut layers create the perception of a soaring atrium when, in actuality, the feature dips down into the room several feet, lower than the original ceiling height. While the majority of the museum (comprising both renovated structures and new construction by Koning Eizenberg Architecture) caters to younger children, the new expansion—which also houses a middle school—was designed to appeal to adolescents. "We were aiming for something more mature in terms of how it engages the kids," says Brennan Buck, principal at FreelandBuck, hoping that "the idea of illusion and representation" would capture their attention. *Kara Mavros*