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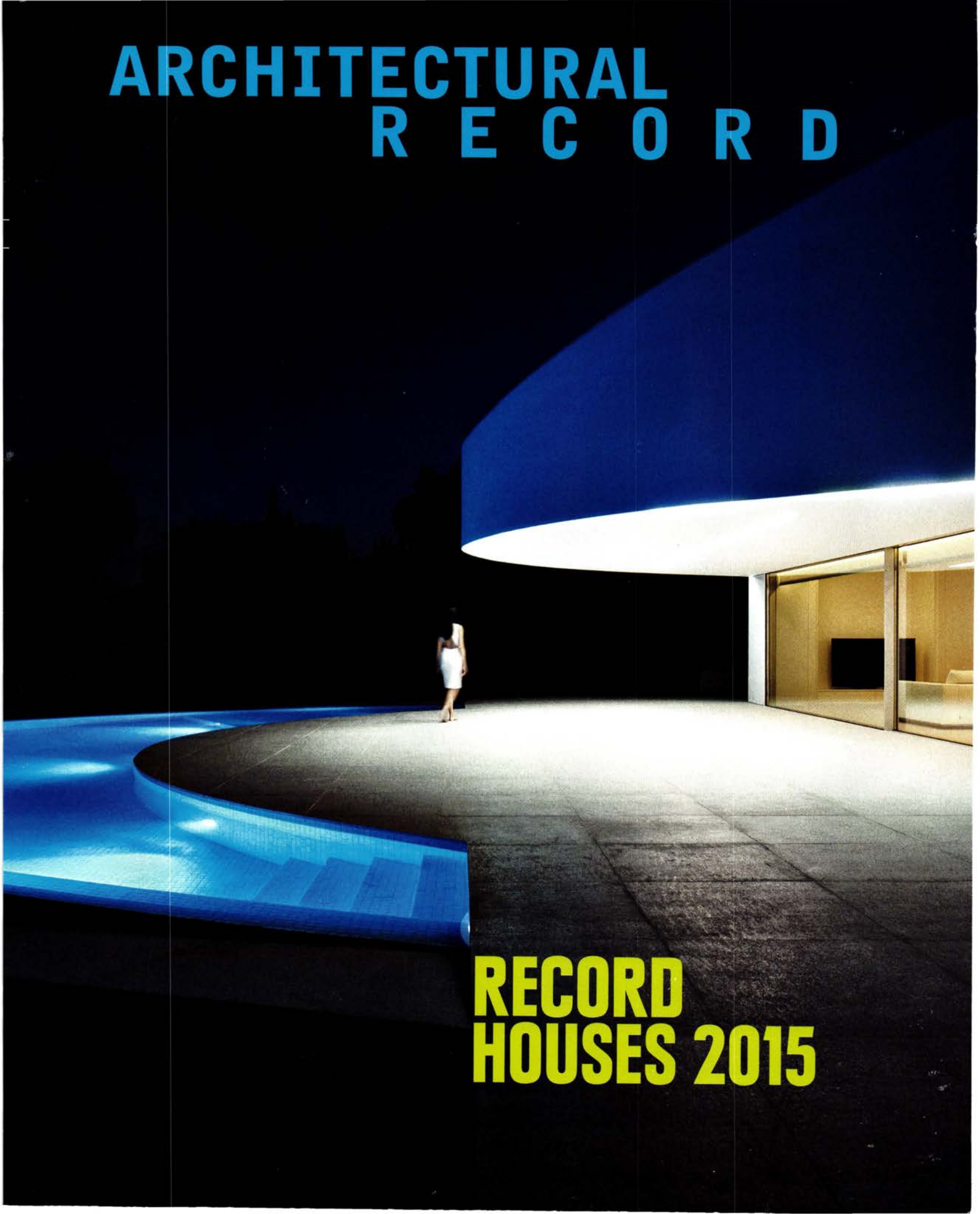

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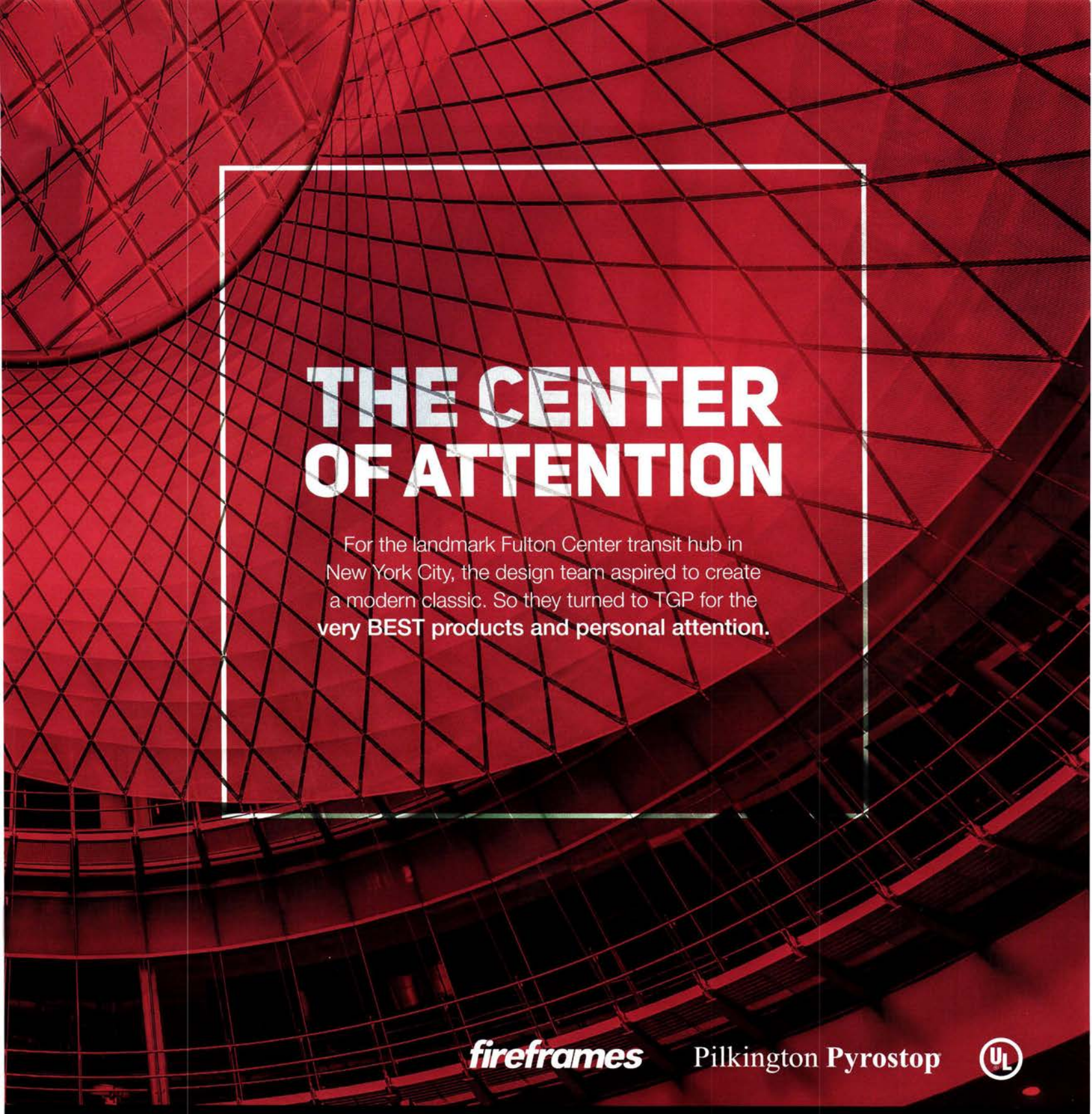
Location: New York, NY
Architect: Grimshaw Architects, James Carpenter Design Associates
Products: Fireframes® Curtainwall Series frames with Pilkington Pyrostop®



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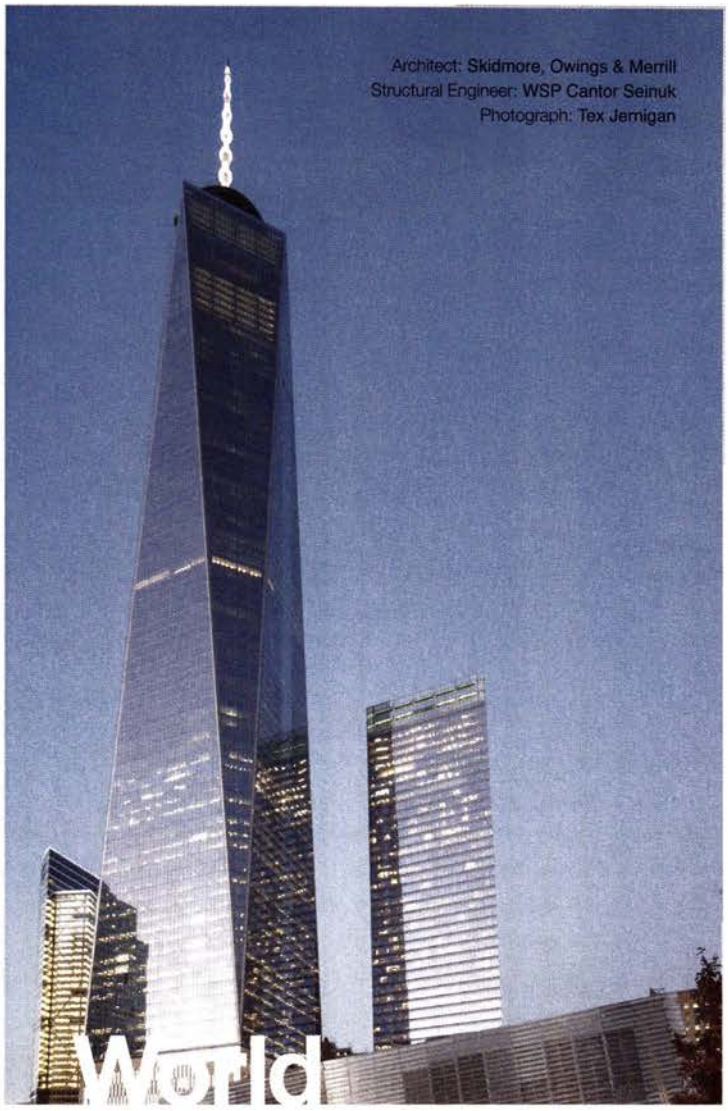

View

While the world watched, **One World Trade Center** grew in both height and symbolism, its 1,776-foot crystalline form bringing unmatched views back to Lower Manhattan. A redundant structural steel frame, the result of creative collaboration between **Skidmore, Owings & Merrill** and **WSP Cantor Seinuk**, ensures that its safety is as substantial as its stature. Read more about it in **Metals in Construction** online.

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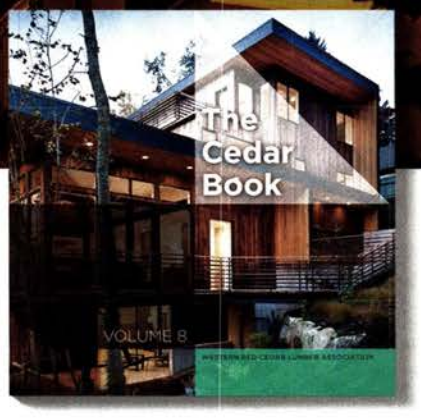

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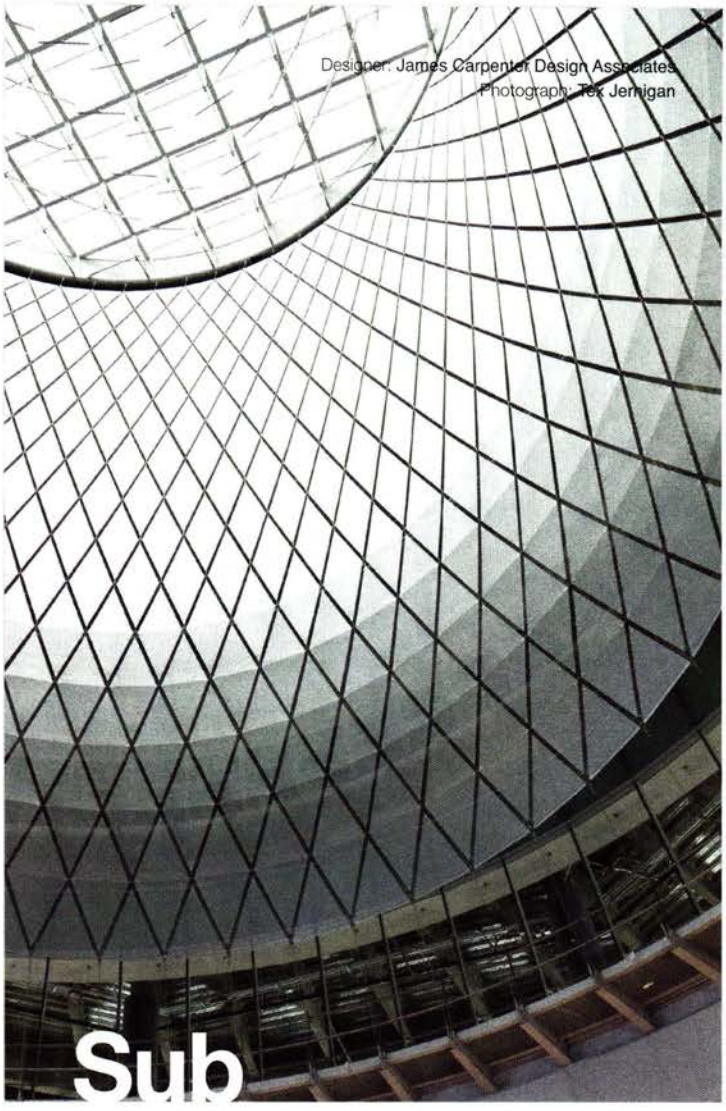

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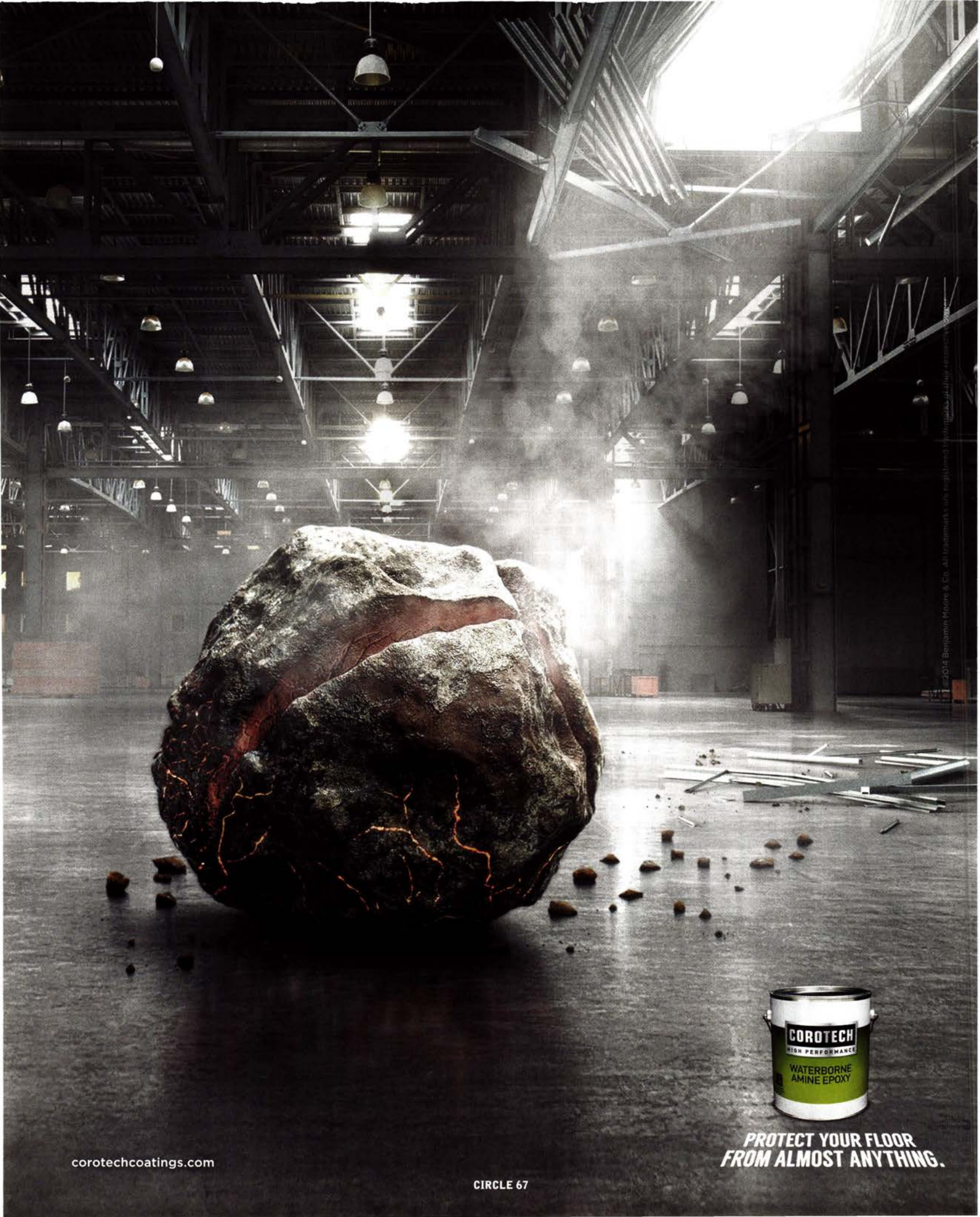
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ON THE COVER: BALINT HOUSE, BY FRAN SILVESTRE ARQUITECTOS. PHOTO BY DIEGO OPAZO.

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After the Bubble Burst

Has the average new house changed since the recession—and what will the future look like?

IT IS APRIL, and at ARCHITECTURAL RECORD, our thoughts turn to houses—the beautiful, innovative custom dwellings, featured in the pages ahead, where architects experiment with form and materials on a domestic scale and push design ideas in often radical new directions.

But before we get to RECORD Houses—and the best designs of the year—let's pause to look at the broader scene for quotidian residential building in the U.S. today. With the bursting of the housing bubble now behind us, and the economy continuing to brighten, has the residential market bounced back? Not quite, according to Dodge Data & Analytics, which predicts new housing starts will not return to pre-recession levels anytime soon.

But one aspect of the residential sector is growing: the average size of the new single-family house. It has reached an all-time high of 2,600 square feet, compared to 2,300 square feet 10 years ago. One big reason: there are more supersize dwellings than ever. Houses between 3,000 and 4,000 square feet now account for almost 22 percent of new construction, up from 15.6 percent in 2005, while houses of 4,000 square feet or more are now 9 percent, up from 6.6 percent in 2005. If you thought the popularity of McMansions was waning because of the subprime-mortgage crisis, think again.

A recent article on theatlantic.com looked at another surprising residential phenomenon: the resurgence of suburban sprawl. In Las Vegas, where housing was especially hard-hit in the recession, developers are pushing out into the desert again to construct new communities of thousands of high-end homes. Despite seemingly greater public awareness about sustainability and smart growth, many home builders believe the market is still strong for ever-larger houses in new developments, with longer commutes to city centers. Gas is cheap right now, so let's party like it's 1999.

But ARCHITECTURAL RECORD has been exploring the flip side of that trend in recent months, in a series of symposia focused on the rapid growth of multifamily housing in city centers around the country. RECORD on the Road, as we call these live events, has showcased the work of architects who are designing new buildings—or adapting old structures—to house the wave of Millennials and empty-nesters who want to live downtown in cities like Houston and Washington, D.C. These new urbanites are embracing density and mixed use. They like living near restaurants, cafés, shops, and venues for sports, culture, and entertainment. They want the option to walk, bike, or take public transportation rather than be totally dependent on a car. Houston added 20,000 units of multifamily housing last year, as did Washington, D.C.

For many of these enthusiastic city dwellers, owning a house is seen as a burden. While the baby boomers may migrate to the city to downsize, the generation under 35 often doesn't want to take on a mortgage or even a car. Their apartments can be small as long as they have plenty of urban places to hang out, work out, and socialize. The big question for the future of the single-family house—and the suburban ideal that often comes with it—is whether this cohort will want to raise their families as so many of their parents and grandparents did: with a house, and a yard, and a neighborhood school. Or will that version of the American dream slowly become obsolete?

There is, of course, another kind of dream house, unique and inventive, that is tailor-made for someone in the top 1 percent rather than purchased off the rack by those in the middle of the 99 percent. We admit that's what RECORD Houses usually are, no matter what the larger economic or social climate of the moment. These are designs to savor, and most of us will never get to live in places like them—though one featured in this issue is a pair of guesthouses in the Tyrolean Alps you can rent (page 68). RECORD Houses tend to be built, often as second homes, by adventurous clients who give their architects the opportunity to explore unusual materials and forms—and, importantly, to engage the specific context and natural surroundings of the site. This year's crop is especially provocative—just check out the mirrors and the curves. No, these places don't hold the key to housing society at large, but as works of architecture, they have the power to intrigue, inspire, and capture our imagination. ■

Cathleen McGuigan

Cathleen McGuigan, Editor in Chief

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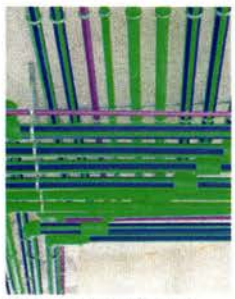

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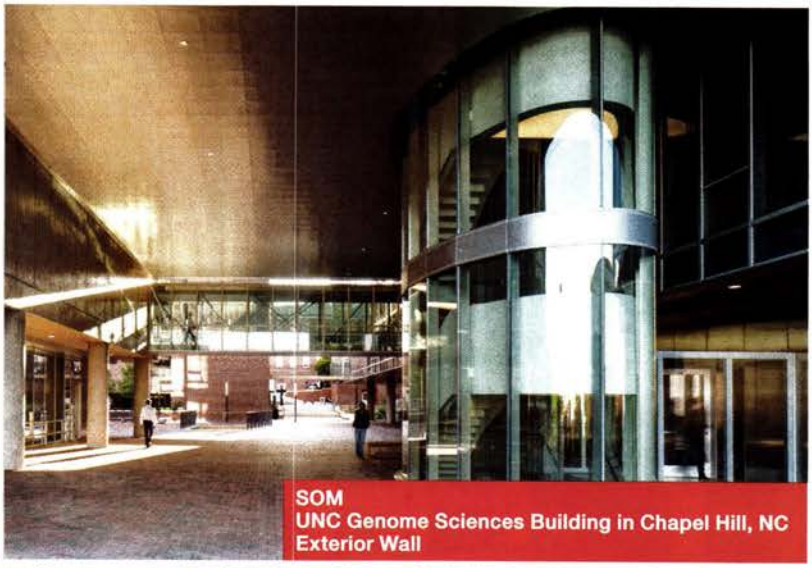

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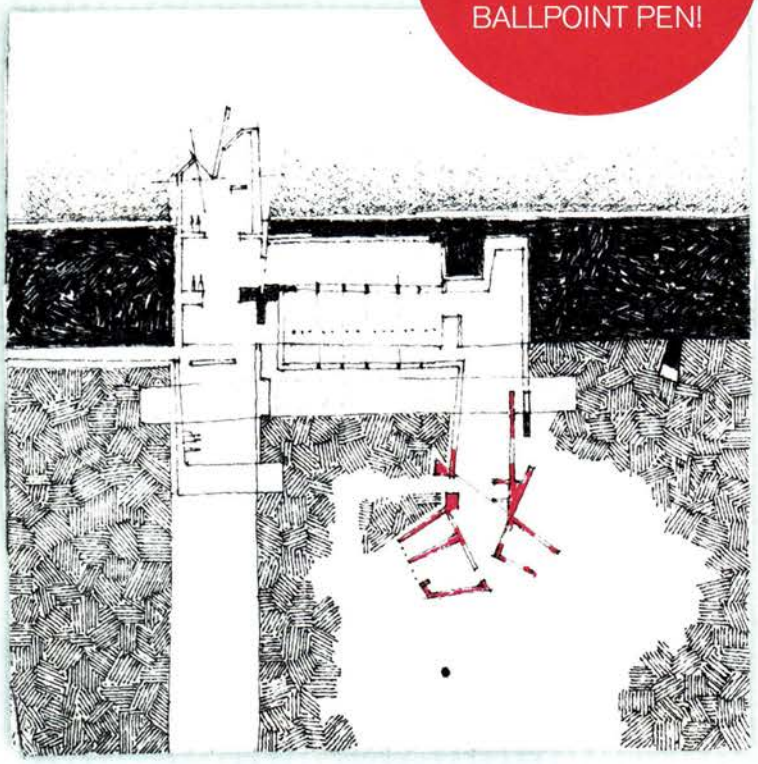
The sketches of the winners and runners-up will be published in the September issue of Architectural Record and shown online in the Archrecord.com Cocktail Napkin Sketch Gallery.

HOW TO ENTER:

- Sketches should be architecture-oriented and drawn specifically for this competition.
- Create a sketch on a 5-inch-by-5-inch white paper cocktail napkin.
- Use ink or ballpoint pen.
- Include the registration form below or from the website.
- You may submit up to 6 cocktail napkin sketches, but each one should be numbered on the back and include your name.
- All materials must be postmarked no later than June 30, 2015.
- You scan and email your entry to ARCallforEntries@construction.com



2014 winner and sketch: David Fox, E. Fay Jones

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perspective

You cannot think about architecture without thinking about its relationship to the street.

–Renzo Piano, who designed the new Whitney Museum in New York, speaking at a lecture at Columbia University, March 11, 2015

Frei Otto Wins Pritzker, Dies at 89

BY ANNA FIXSEN

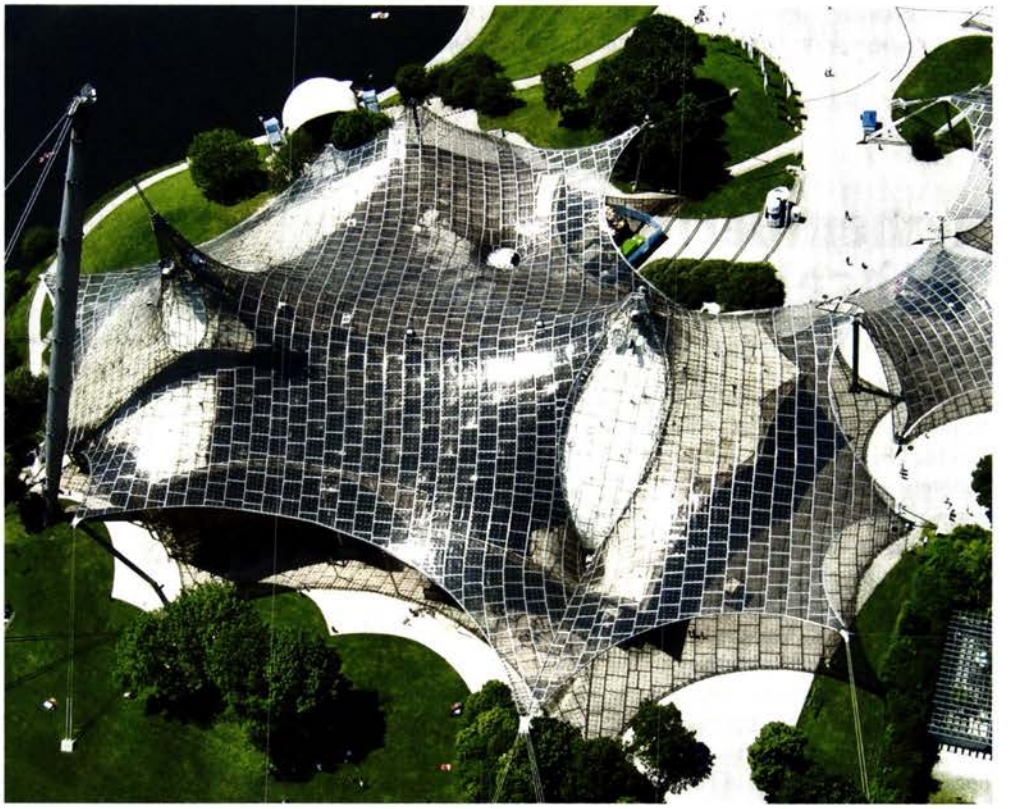
GERMAN ARCHITECT Frei Otto, renowned for his lightweight tensile structures, was named the winner of the 2015 Pritzker Architecture Prize March 10. The abrupt announcement came a day after Otto died, at the age of 89, in Germany.

"Throughout his life, Frei Otto has produced imaginative, fresh, unprecedented spaces and constructions," wrote the jury in their citation. "He has also created knowledge. Herein resides his deep influence: not in forms to be copied but through the paths that have been opened by his research and discoveries."

Otto learned of his award earlier this year when the prize's executive director, Martha Thorne, traveled to his home in Warmbronn, Germany, a city near Stuttgart.

Otto's works include a diverse array of constructions and installations that broadened the architectural possibilities of grid shells, pneumatic structures, canopies, and lattices. He is best known for his cable-net structure for the German Pavilion at Expo 67 in Montreal and an expansive canopy for the 1972 Munich Olympics, which stretched over the Games' stadium, pool, and public areas.

Like his unconventional work, Otto's training took an extraordinary path: he was initially prevented from studying architecture because he was drafted into the German army during World War II. As a prisoner of war in France, Otto became, in effect, camp architect, learning to work frugally with minimal materials. After the war, he studied architecture at the Technical University of Berlin, and, in 1952, founded his own office in that city.



Frei Otto (left) was best known for his tent-like roofing system for the 1972 Munich Olympics. The work marked a stark departure from Germany's heavy traditional architecture.

Otto, who was fascinated by natural forms –from soap bubbles to spider webs–had a collaborative and wide-ranging approach to research and design, and frequently worked with philosophers, scientists, historians, and also his wife, Ingrid.

"He merged architecture and engineering as a collaborative process," says German architect Stefan Behnisch. "Today everyone talks about integrated design process, but I think it goes back to Frei Otto." In fact, Otto collaborated with Behnisch's father, Günter, for the Olympic-park roof. As a child, Behnisch remembers visiting his father's office, sitting in on meetings, and watching the iconic canopies go up.

"The construction of the Olympic facilities is when Germany showed a different face to the world," says Behnisch. "The architecture of the Third Reich was very monumental, but Frei created, with other postwar architects, a very contrary image. He showed architecture could be light, that architecture could be playful."

Unlike many past Pritzker laureates, Otto didn't fill the classic starchitect bill–his influence was more understated, manifest in a vast body of research. Winner of the 2014 Pritzker Shigeru Ban, who partnered with Otto to design the Japanese pavilion at the 2000 Hannover Expo, wrote, "His achievements, rather than just being his 'works,' have become

Visit our online section at architecturalrecord.com/news.

Otto designed the Diplomatic Club in Riyadh, Saudi Arabia, in 1980.

the 'grammar' of structural design, unnoticed, and we architects are only now realizing that we unconsciously base our designs on his grammar."

Otto served as a professor at the University of Stuttgart from 1964 until 1991 and published numerous works on architecture and engineering. In 1964, he was named the director of the influential Institute for Lightweight Structures at the University of Stuttgart. Over the years, Otto received many accolades, including the Aga Khan Award for Architecture (1980), the Grand Prize of the German Association of Architects and Engineers (1996), and the Royal Institute of British Architects Gold Medal (2005).

The Pritzker prize will be presented to a representative for Otto at an awards ceremony at the Frank Gehry–designed New World Center in Miami Beach on May 15. Otto is the award's 40th laureate.

"I will use whatever time is left to me to keep doing what I have been doing, which is to help humanity," Otto said when he was alerted of the news earlier this year. "You have here a happy man." ■

Remembering Michael Graves

BY FRED A. BERNSTEIN

SPEAKING AT a symposium in New York last November, Michael Graves described a dream in which he got to take Michelangelo through the Metropolitan Museum of Art. "We went up to the roof. There was this shiny rabbit. And Michelangelo said, 'What's that?' I said, 'That's what our culture does today.' He said, 'I came back at the wrong time.' And I woke up."

Michael Graves, who died in March at his home in Princeton, New Jersey, might have lived at the wrong time; certainly the Renaissance would have provided a more sympathetic context. Instead, Graves, who was born in Indiana, studied at Harvard during the Gropius-Sert years, when architectural history was off the table. He later spent a year in Italy as a Rome Prize–winner at the American Academy. As he put it, "I went to the school of self-taught." During his 55-year career, he managed to design 350 buildings and thousands of products—numbers Michelangelo would envy.

But that was far from his only distinction. Another is that he created a business (now called Michael Graves Architecture & Design) that has a good chance of surviving him, a rarity for architecture firms with one name on the door. In a profession sorely lacking for business acumen, Michael Graves had a lot of wisdom to impart.

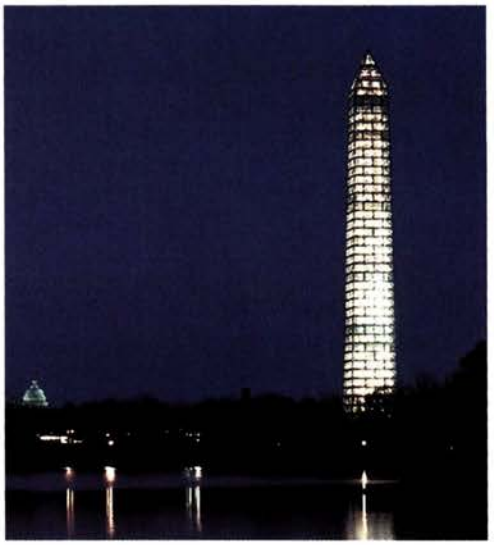
He was also the only living American architect to have an architecture school named for him. The Michael Graves School of Architecture, at New Jersey's Kean University, will be heavy on hand-drawing; students won't use CAD until the second year. With his name came his philosophy.

Another distinction: after an infection left him paralyzed from the waist down, in 2003, Graves began designing products for the disabled, as mundane—and yet as essential—as heating pads and bathroom grab-rails. Graves's disability didn't drag him down; instead, it gave him purpose.

Yet another: he managed to design buildings dripping with historical allusions, yet somehow he survived the downfall of Postmodern-

ism. Why? It may be that Graves's buildings were so much about his personal aesthetic—like Gaudi's and Frank Lloyd Wright's—that they escaped categorization. But Graves was better with surfaces than spaces; he was an excellent muralist, but taking his aesthetic to three dimensions wasn't easy. Money helped: his Municipal Building for Portland, Oregon (1982), done on a shoestring, will never be more than a billboard, while later projects, including the Resorts World Sentosa Complex in Singapore (2010), are Gesamtkunstwerks. Graves could work at any scale.

Some Graves buildings look cartoonish: his Team Disney building even used the Seven Dwarfs as caryatids. But he could also be restrained, as he was with the Target Wing at the Minneapolis Institute of Arts. Like most architects, all he wanted was the chance to build. At the November symposium, he harrumphed about the popularity of Frank, Zaha, and Rem. Later, he said he had only done one building in the last year. "One building," he said. "I'm ready for the next one." ■



Michael Graves (left), designed the scaffolding for the restoration of the Washington Monument (top) and an expansion of the Minneapolis Institute of Arts (above).

PHOTOGRAPHY: COURTESY MICHAEL GRAVES ARCHITECTURE & DESIGN (BOTTOM, 3); FREI OTTO (TOP).

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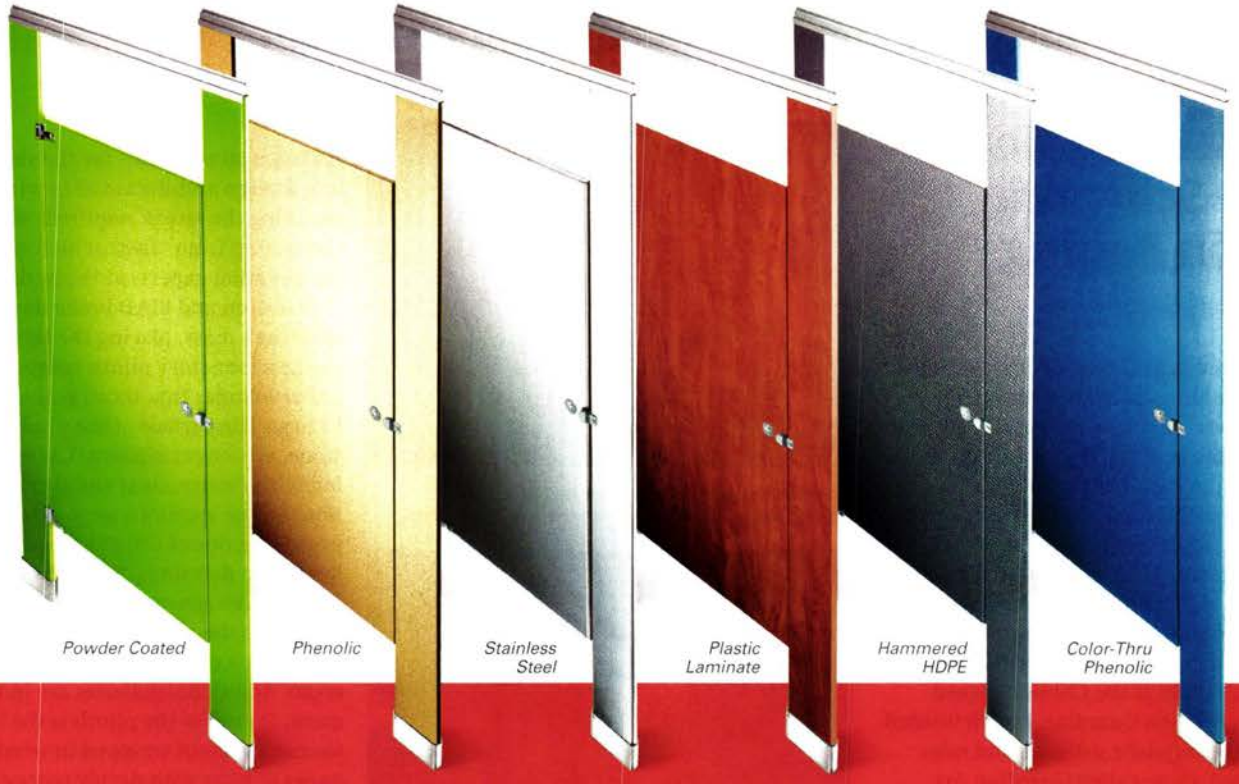

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CIRCLE 66

The Aura of Light

BY ZACHARY EDELSON

THE SENSE of daylight and shadow was so pervasive at the Milan-based firm Argot ou La Maison Mobile's exhibition at the 2014 Venice Architecture Biennale, visitors thought that the architects punched skylights through the Arsenale's historic ceiling. But what appeared to be a brilliantly daylit room was actually an illusion created by a new lighting system that simulates natural sunlight with unprecedented levels of fidelity.

The technology—developed over the last 10 years by Paolo Di Trapani, a physicist at the University of Insubria and founder of the Como, Italy–based CoeLux—comprises skylight- and windowlike constructions made up of polymer sheets imbued with LEDs and a thin layer of transparent nanoparticles that simulate the effect of the earth's atmosphere on sunlight. The resulting CoeLux panels seem to picture a bright solar disk amid blue sky. This faux sun appears fixed in the sky, as the real sun would, so that one's movement in a room doesn't cause it to visibly shift its position. Di Trapani is quick to note that, unlike similar lighting products, this requires the careful detailing an actual skylight would to be like "a window, a real opening."

CoeLux units were installed in a hospital in Milan.

The manufacturer recently completed a trial installation in the radiosurgery room at a hospital in Milan. Hospitals, where patients can be confined in windowless rooms for extended periods, are eager to explore the product's health benefits. Beyond medical applications, Di Trapani says potential applications range from the revitalization of underground spaces to office towers with large floorplates.

Currently, CoeLux is available in three versions, each with a particular light quality and shadow angle: CoeLux 60 reproduces a bright, vertical tropical angle of light with a 60-degree beam; CoeLux 45 mimics a Mediterranean sky with a 45-degree ceiling beam; and the wall-mounted CoeLux 30 simulates a warm Nordic sun with a 30-degree-angle beam relative to the horizon.

CoeLux plans U.S. distribution shortly. There is one caveat: the units need to be deeply recessed to provide the desired illusion. A panel of 20 square feet requires a 3-foot ceiling depth. While Di Trapani acknowledges that this is a challenge, he feels the rewards are worth it. According to him, CoeLux allows architects to "put nature onstage, to play with the sun, the sunbeams, the rays, the shadows, and all color." ■

New Auction House by Ole Scheeren Rises in Beijing

BY FRED A. BERNSTEIN

OLE SCHEEREN helped create perhaps the most aggressive building on the Beijing skyline—the CCTV tower, which he designed with Rem Koolhaas before opening his own firm, Buro Ole Scheeren, in 2010. Now Scheeren hopes to become known for a less divisive contribution to the Beijing scene—an auction house headquarters that, despite its 600,000 square feet, treads lightly on its site, and which may represent a way forward for foreign architects in China under a culturally conservative regime.

Scheeren's client is the Chinese-owned auction house China Guardian, which wanted more than the requisite galleries and sales rooms. Indeed, its so-called Guardian Art Center, scheduled to open in 2016, will include a 120-room hotel—and a library, bookshop, lecture hall, and restaurants.

The building is rising on one of Beijing's most famous commercial streets, Wangfujing, near the National Art Museum of China and a few blocks from the Forbidden City. Developers had been trying for 18 years to win approval to build on the site. Scheeren says, "We had to demonstrate how we had carefully embedded the project in this very historic and sensitive context." His partner on the project is the Chinese-government-owned Beijing Institute of Architectural Design (BIAD).

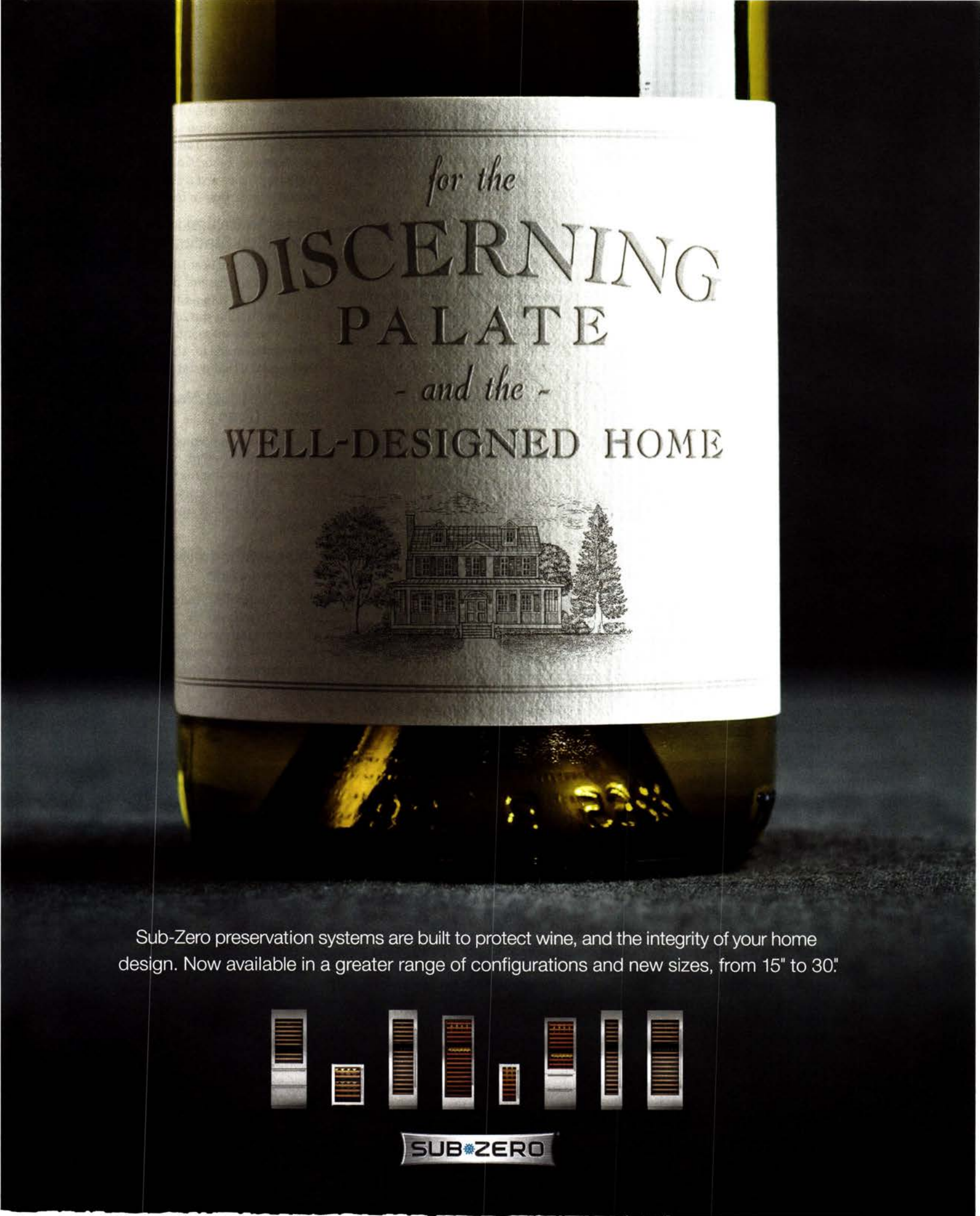
The Guardian Art Center, in addition to serving as an auction house, will include shops and a 120-room hotel.

Zhang Yu, BIAD's chief architect, says he had seen 30 proposals for the site by local and foreign architects fail to win approval. Breaking the streak required getting the thumbs-up from "five architecture and five preservation experts at the national level."

Scheeren and BIAD broke down the building's mass, placing the largest galleries inside a four-story plinth composed of staggered volumes that recall Beijing's mazelike *hutongs*. The surface of the plinth is gray stone, echoing traditional Chinese masonry, but with thousands of small circular perforations whose locations were determined by projecting one of China's most important landscape paintings, the 14th-century *Dwelling in the Fuchun Mountains*, onto the elevations.

Within the plinth are exhibition spaces, including a column-free 18,300-square-foot room. Additional galleries are in the basement. On top of the plinth is the hotel, a four-story donut wrapped in window-size panes of glass with deeply recessed joint lines, making the panes appear to float. A small tower in the courtyard will contain an art library, a lecture hall, and an artists' lounge.

For Scheeren—most of whose current projects are condo towers—the Guardian Art Center could be a stepping-stone into a new area of practice: designing for cultural institutions. It also suggests that his decision to move to Beijing in 2004—rather than build in Asia as an outsider, like many western architects—is paying off. ■



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[NEWSMAKER]

Ihsan Fethi

BY WILLIAM HANLEY

IN A VIDEO that provoked outrage as it made its way across the Internet in February, men in military clothing ransacked Iraq's Mosul Museum, toppling statues of ancient rulers from their pedestals before pounding the figures—some replicas but others original—with sledgehammers. Last month, reports came that three historic sites in northern Iraq had been bulldozed: the colonnades and archways of Hatra, which had held off attacks by the Romans, and the ruins of Nimrud and Dur-Sharrukin—both capitals of the Assyrian empire nearly 3,000 years ago. At press time, the full extent of the damage is still unknown.

The ancient city of Hatra (left) is among the sites reportedly damaged by ISIS. Architect Ihsan Fethi (right) fears more destruction.

As the self-proclaimed Islamic State of Iraq and Syria (ISIS) has occupied a large swath of territory in the Middle East, the group has horrified the world with images of murder and brutality as well as an expanding and systematic campaign of cultural destruction. ISIS fighters have targeted mosques, shrines, churches, museums, and other sites for obliteration, damning them as idolatrous under their strident Islamist rhetoric and striking irrevocable blows against humanity's collective cultural patrimony.

Architect and historic conservation specialist Ihsan Fethi has chronicled the loss of historic art and architecture in his native Iraq for decades and is closely monitoring the current situation. Director of the Iraqi Architects Society, he has consulted with international organizations on the region's heritage sites and called on the United Nations to classify their willful destruction as a crime against humanity. Fethi, who teaches at Philadelphia University in Amman, Jordan, spoke with RECORD about the unprecedented speed and extent of the damage by ISIS and what might be done to protect significant historical objects in the future.

Iraq has lost a heartbreaking amount of historic architecture in recent decades. What distinguishes the ISIS campaign?

The amount of destruction they have managed to do in the last year is amazing. They have an organized agenda to raze anything that is contrary to their skewed view of what Islam thinks of art. It has resulted in the tragic and irreversible destruction of some of the most important monuments in northern Iraq.

In Mosul, they destroyed mosques with shrines that were revered by all of the population. But they also destroyed pre-Islamic statues that could hardly be considered idols. They are museum pieces—nobody's worshiping them!

That said, don't listen to what they declare—even ISIS is finding a market for looted items.

How have you been getting information about historic sites in ISIS-occupied territory?

I have many former students who report every now and then if they can get to a place where they can send e-mail or use a mobile phone. But at this point, many of my students have fled. I am also in touch with various cultural officials all over the country.

What can be done now to protect other sites?

Nothing. Nothing can be done. I know it sounds really infuriating. The only way to safeguard the remaining sites is to kick ISIS completely off the map.

But to liberate Mosul could also mean the absolute destruction of the city and its historic urban fabric, which dates back 1,000 years. The only way I can think of to save some of the architecture is to blockade the city, provide the ISIS fighters with some kind of escape, and take the fight elsewhere. Otherwise, we will have a major disaster.

We have lost a lot, but I think there are lessons to be learned from this situation.

What should we take away?

We should think seriously about emergency measures that national governments can take if they feel there is an imminent danger of this kind of destruction. At a UNESCO meeting in Bahrain last month, I suggested the institution of a World Heritage Shelter in Paris where, if a government feels its major museums are vulnerable, they can quickly transfer objects to a secure temporary location with conservation resources until the situation is cleared. But in Iraq, the destruction has been so shocking. It's so sudden. You are at a loss for words. ■

William Hanley is a New York City–based writer.

For the complete interview, visit architecturalrecord.com/news.

noted

AIA Selects 2015 Diversity Program Honorees

The American Institute of Architects has selected Urban Design Regional Action for Minorities (UDream) and Sorg Architects as 2015 honorees of its Diversity Recognition Program. The award recognizes those committed to inclusion in the design profession.

Foster to Design Main Qatar World Cup Stadium

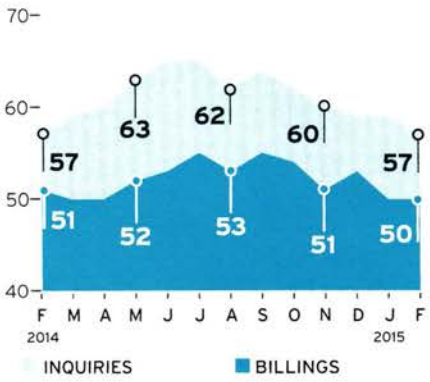
Foster + Partners beat David Chipperfield, Mossessian & Partners, and Mangera Yvars Architects in a competition to design the main stadium for the 2022 World Cup in Qatar. The 80,000-seat Lusail Stadium is one of several planned for the tournament, including Zaha Hadid's Al Wakrah stadium.

Pratt Institute Names Design School Dean

Pratt Institute appointed Anita Cooney dean of its School of Design, effective this month. Cooney, a Pratt alumna with more than 20 years of design experience, had served as the school's acting dean since its establishment last July.

Chipperfield to Redesign Met Museum Wing

David Chipperfield Architects has been selected to redesign the Metropolitan Museum of Art's modern- and contemporary-art wing in New York. The renovation will allow for more gallery and storage space and double the size of the museum's roof garden.



ABI Improves in February

The Architectural Billings Index (ABI) increased in February with a score of 50.4, from 49.9 in January (scores above 50 indicate an increase in billings). The ABI has been positive for 10 of the past 12 months, indicating that the design sector is, says the AIA's chief economist, "on solid footing." The new-projects inquiry index was 56.6.

PHOTOGRAPHY: © NICO TONDINI/GETTY IMAGES (FAR LEFT); IHSAN FETHI (LEFT)

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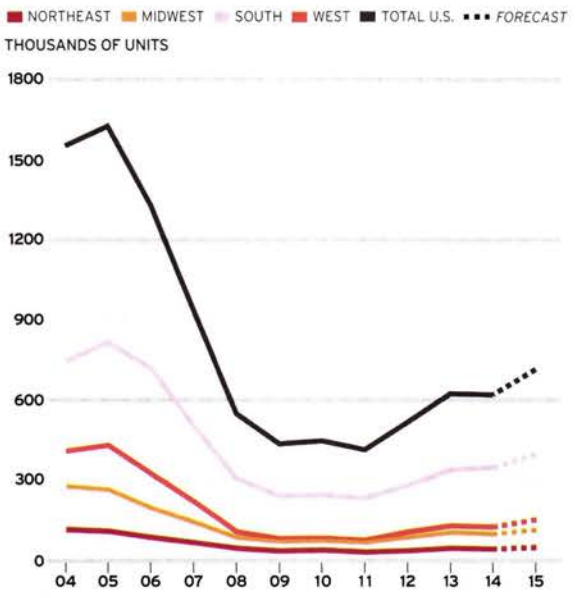
Data from Dodge Data & Analytics

MARKET FOCUS
SINGLE-FAMILY RESIDENTIAL

In the aftermath of the housing market bust, single-family residential construction is making a slow and steady comeback. However, activity in this sector isn't likely to return to pre-recession levels anytime soon.

Single-Family Starts by Region

In addition to U.S. total and 2015 forecast figures



Top Metro-Area Markets

Ranked by single-family residential starts for 2014

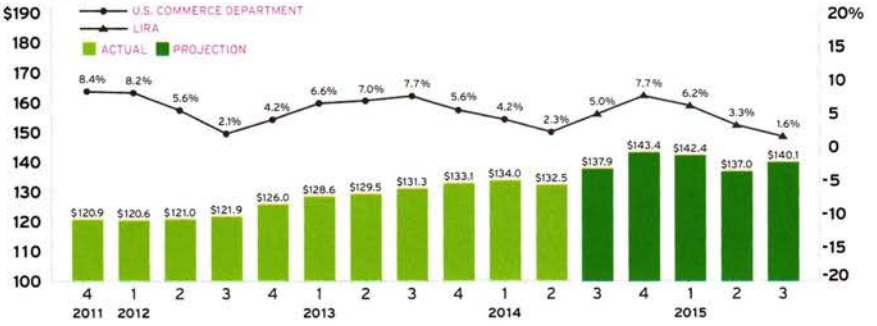
	REGION	Dwelling Units
1	HOUSTON	37,346
2	DALLAS	24,997
3	ATLANTA	16,292
4	AUSTIN	12,027
5	PHOENIX	11,519

Shulman Home and Studio, Los Angeles, Raphael Soriano/Lorcan O'Herlihy Architects, page 112.

The Dodge Index for Single-Family Residential Construction 1/2014 – 1/2015

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

Leading Indicator of Remodeling Activity (LIRA) Fourth Quarter 2014

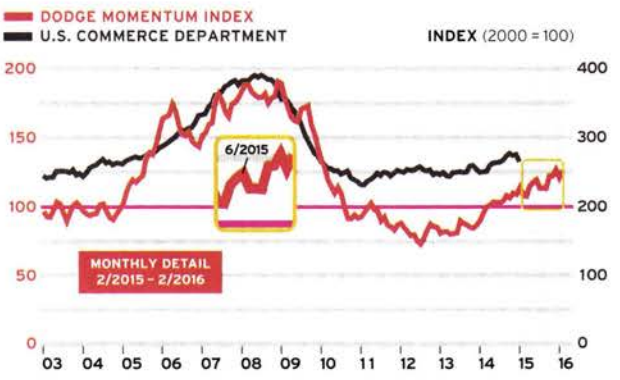


Note: Historical data from the third quarter 2014 onward is based on the LIRA and will remain so until the Census Bureau releases annual revisions on July 1st. Source: Joint Center for Housing Studies of Harvard University.

MOMENTUM INDEX CONTINUES FITFUL CLIMB

After a drop the previous month, the Dodge Momentum Index rose 4.3% in February, to 126.3. Despite some recent volatility, the index is 17% higher than it was a year ago.

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



CoreLogic Measure of Completed Foreclosures

	COMPLETED FORECLOSURES
DECEMBER 2013	46,000
DECEMBER 2014	39,000
% change	-15.2%

S&P/Case-Shiller Home Price Index: Single-family

INDEX (JANUARY 2000=100)

	20-METRO AVERAGE
DECEMBER 2013	165.6
DECEMBER 2014	173.0
% change	+4.5%

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

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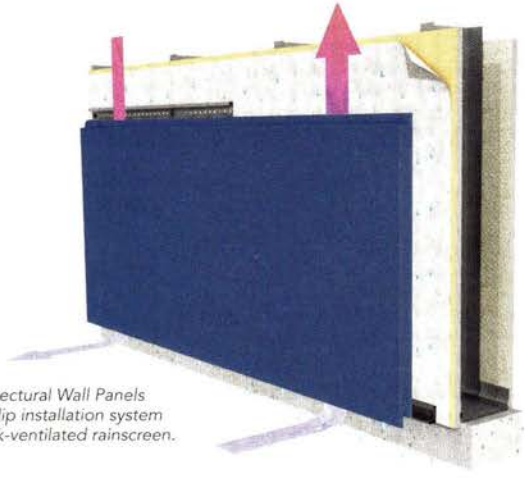

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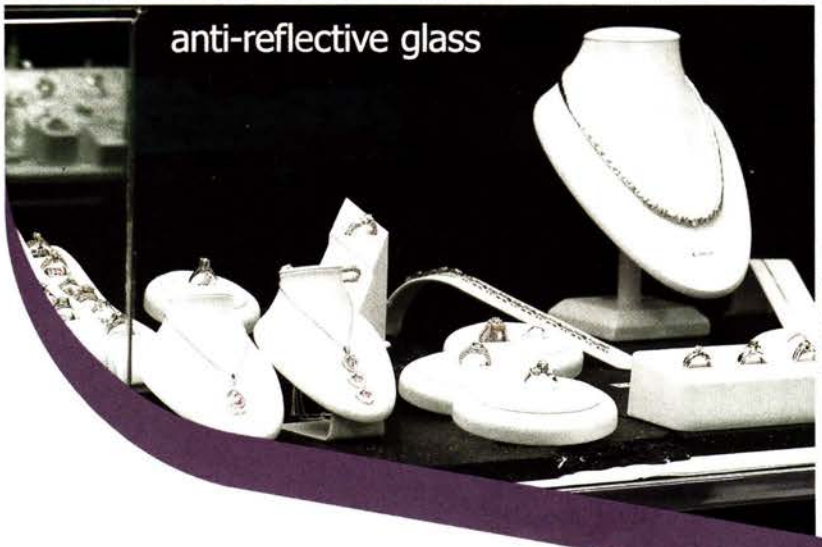

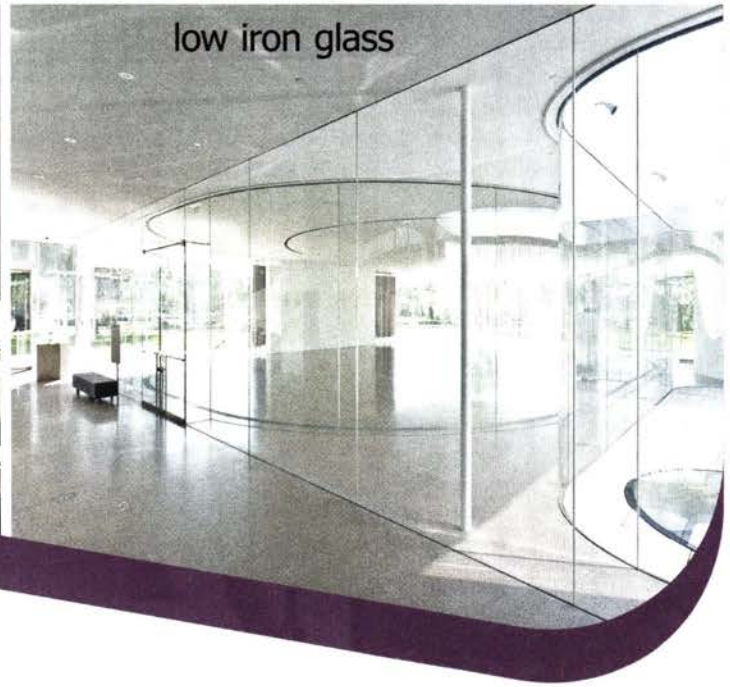

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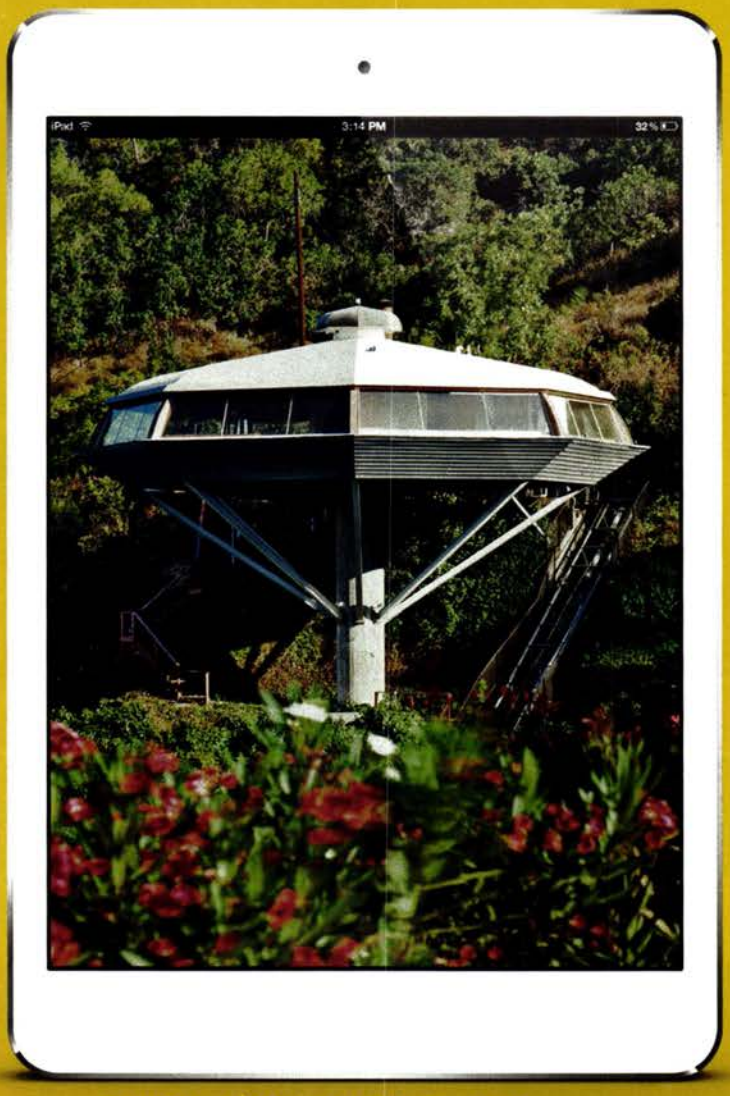

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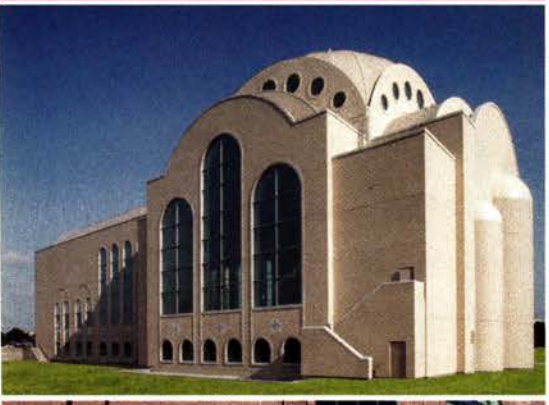

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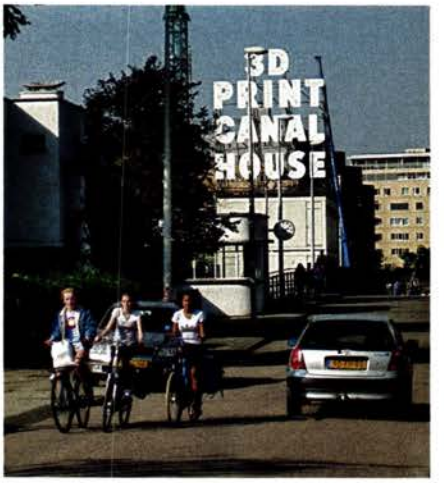
The Fine Print

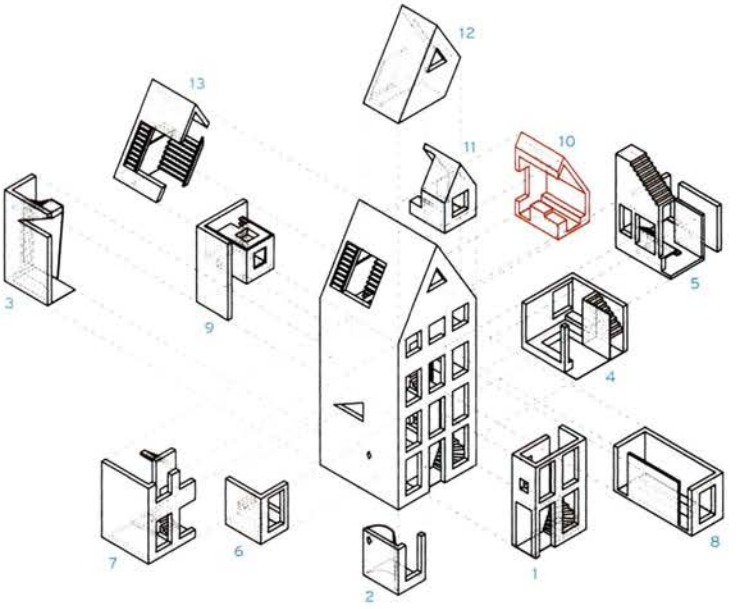
Three design teams employ three different methods to arrive at 3-D printed structures.

By Anna Fixsen

IN THE summer of 1908, Thomas Edison filed a patent for a contraption that could construct a house—bathtubs and all—with a single pour of concrete. Although such aspirations may seem amusing today, Edison's goals aren't far off those of contemporary research involving the 3-D printer. Three ongoing architecture projects on three continents demonstrate different approaches to this technology. If successful, they will have far-reaching implications for the design and construction industry.

Perhaps the most prominent example is the 3D Print Canal House, a project started by Amsterdam-based firm DUS Architects in January 2014 and funded, in part, by the city.





When complete, DUS Architects' canal house will resemble a traditional Dutch home (top, left; and clockwise). The firm has encouraged the public's involvement, inviting visitors to see the printer in action. The house is printed piece by piece. A chunk of one room (above, and in chart at right) features an intricate tessellation-like pattern.

1	ENTRANCE	6	KITCHEN	11	MINIHOUSE
2	BATHROOM	7	OFFICE	12	SPA
3	LIBRARY	8	OFFICE	13	GARDEN ROOM
4	SITTING ROOM	9	TREE-HOUSE		
5	DINING	10	MINIBAR		

Using a beefed-up version of an Ultimaker desktop 3-D printer (the Kamermaker, as it's called, is approximately 20 feet tall), the firm is printing large architectural components of the house with a bio-based "ink" made primarily of linseed oil. When completed, these components—which have openings for wire and cables—will be filled with a lightweight concrete to connect them. To date, they have printed one room, and, this month, DUS plans to unveil a second machine that will print even larger pieces and enable the team to print 24 hours a day.

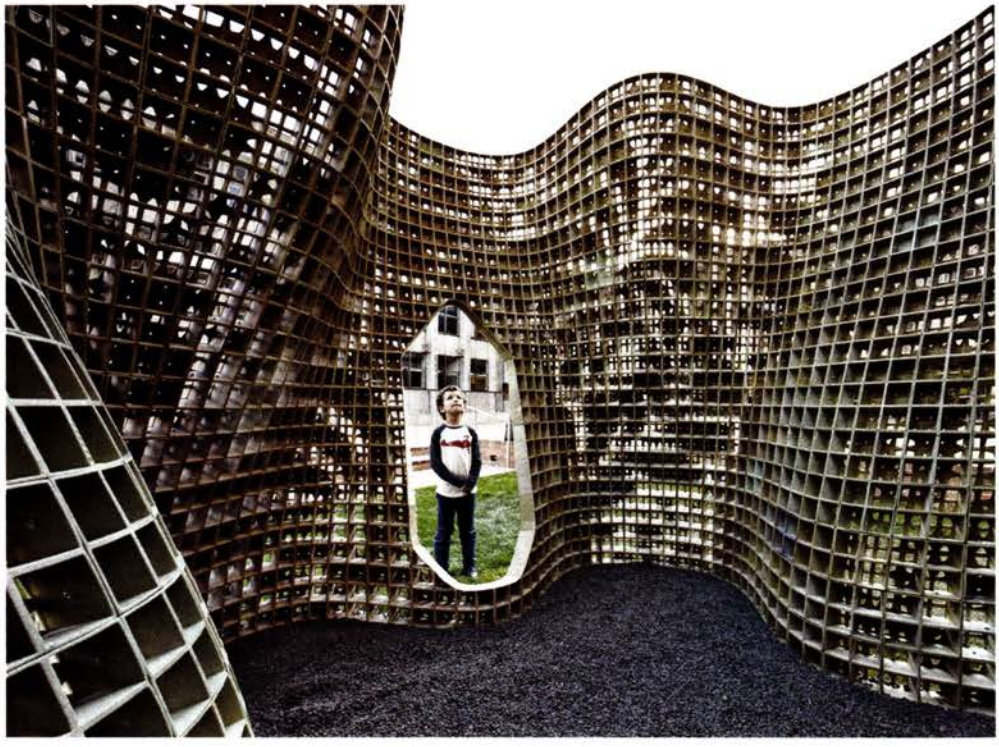
"As a firm, our dream is that people can go online, download their ideal house, and customize it on demand with no hassle, so that the luxury of made-to-measure architecture becomes available to the masses," says DUS partner Hedwig Heinsman.

Since DUS began the project in earnest barely a year ago, the architects say they have increased the printer speed by 400 percent. Currently, the team is experimenting with the molecular makeup of the ink and incorporating additives such as wood chips, which creates a product similar to particleboard. They are also printing molds and testing the tensile properties of the house's components.

Meanwhile, 5,500 miles away in Shanghai, WinSun Decoration Design Engineering is taking DUS's utopian ideal to an extreme. Last summer, *Computer World* reported that the company can print 10 squat one-room houses in 24 hours from a mix that includes

PHOTOGRAPHY: © OLIVIER MIDDENDORP

View additional images at architecturalrecord.com.



construction debris. This printer is a whopping 20 feet tall, 33 feet wide and 132 feet long. In January, with an even larger printer, they fabricated a five-story apartment building and a neoclassical mansion. WinSun could not be reached for comment.

Unlike the Chinese and Dutch projects, a research team at the University of California, Berkley, is developing small 3-D printed tile-like "bricks" to build rooms and other small structures. In March, the team unveiled Bloom, a lacy 9-foot-tall pavilion made from a specially developed polymer of Portland cement, vegetable oil, and sawdust. Composed

of 840 individual bricks, each assigned a number and bound together with stainless-steel fasteners, the pavilion can easily be dismantled and reassembled. After the pavilion's stint at Berkley, it will be displayed in Thailand at the headquarters of Siam Cement Group (SCG), the company that sponsored the project.

The team is working to push their product to market. With the studio's 11 printers, they can make approximately 30 bricks daily, but, unlike the Chinese firm's, this team's objective is not necessarily speed or increasingly large printed components—instead they see value in the resolution and craftsmanship that smaller pieces afford.

"Other companies are making architectural-sized machines with the assumption that architectural-sized machines will produce architecture," says Ronald Rael, the associate professor who led the Berkeley project. "There's a lot of craft in this. It's not simply that the robot is doing all the work." ■

A team at UC Berkeley unveiled the world's first freestanding powder-printed cement 3-D structure (top and bottom, left; above). The pavilion, called Bloom, is made up of 840 individual bricks, which form a lacy floral pattern when joined together. The pavilion is 9 feet tall and has a footprint of 144 square feet.

PHOTOGRAPHY: © MATTHEW MILLMAN

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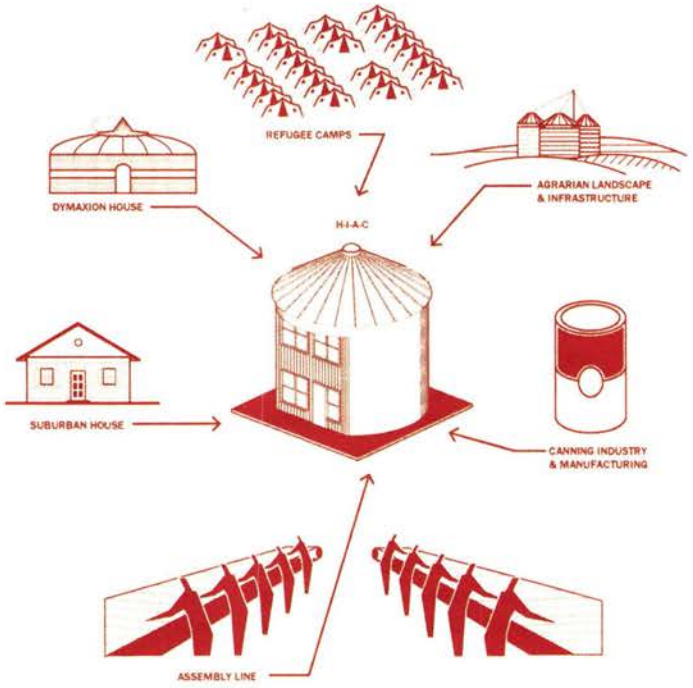
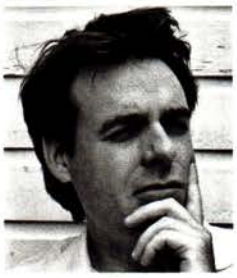
CIRCLE 17

All Systems Go

Austin + Mergold finds unconventional beauty in conventional materials.

BY ANNA FIXSEN





Jason Austin (top) and Aleksandr Mergold started their eponymous landscape, architecture, and design firm in 2007. Their broad range of projects, situated in rural contexts, include a dock house on Lake Mead in Pennsylvania (below), a research project, "House in a Can," that aims to create housing from disused grain silos (center), and a combined cistern and public artwork at a local brewery in Lancaster, Pa.

WHEN IT COMES to architecture, the firm Austin + Mergold, based in Philadelphia and Ithaca, New York, doesn't see a lot of sense in reinventing the wheel.

"I like the word *spolia* a lot," says principal Aleksandr Mergold, referring to the reuse of discarded building materials in late antiquity. "We often imagine ourselves like the guys in Rome recently sacked, going through the rubble," he says. "But we are going to the Home Depot."

It's a fitting metaphor for the firm, which selects materials often snubbed—vinyl siding, corrugated metal, concrete block—to create beautiful structures in rural contexts. Their primary line of inquiry, explains cofounder Jason Austin, is "How do we work with existing systems rather than invent new ones?"

Austin and Mergold, who grew up in central Pennsylvania and Tashkent, Uzbekistan, respectively, met as undergraduates at Cornell. After receiving their B.Archs, Austin went to SOM, while Mergold went to the graphic design firm Pentagram. Following several years in the field and a return to school—Austin to the University of Pennsylvania for landscape architecture, Mergold to Princeton for his M.Arch—the two, eager for something new, reconnected in 2007 to start their practice.

When the recession hit, much of the pair's work came to a screeching halt. But they found another kind of success with unusual projects: a competition entry for the 2008 London Festival of Architecture of colorful geometric jelly molds; Philadelphia-rowhouse-inspired birdhouses. In 2010, they were among the recipients of the Architectural League of New York's Prize for Young Architects.

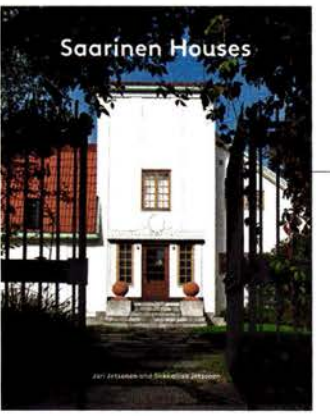
As the economy thawed, Austin + Mergold reconsidered the context in which they were working—central Pennsylvania—observing the increasingly hazy distinction between rural and suburban zones. They reclassified these liminal areas on a continuum of "sural" and "rurban." Perhaps one of the best examples of this idea is a conceptual project called House in a Can, which would convert disused grain silos into houses, partly by adding porthole windows, photovoltaic panels, and balconies.

In 2013, they won a competition to transform a 700-gallon stormwater cistern at a brewery in Lancaster, Pennsylvania into a public artwork. *The Lancaster Bundle*, as it is called, is a structure of rods and poles evoking the hops on the municipal flag, and *fasce*, a Roman symbol of magistrate power. Further intellectual and architectural explorations led to a series of structures called Sural Walls. Their Sural Ark, a large boatlike structure made of lumber and vinyl siding, won the Architectural League's 2014 Folly competition, with the prize of a residency.

Today, Mergold teaches at Cornell AAP and Austin at Drexel University. As the firm evolves, they hope to focus on fewer projects but have no desire to sacrifice breadth. "Our different trajectories of art, architecture, design, and landscape make us versatile," says Austin. "We're not one-trick ponies." ■

IMAGES: © NIKOLE BOUCHARD (LEFT AND BOTTOM); COURTESY AUSTIN + MERGOLD (MIDDLE AND TOP, RIGHT 2)

Father and Son, Together and Apart



Saarinen Houses, *by Jari Jetsonen and Sirkkaliisa Jetsonen. Princeton Architectural Press, October 2014, 224 pages, $50 (hardcover).*

Reviewed by Jayne Merkel

THIS BEAUTIFULLY illustrated book covers most of the houses designed by Eliel Saarinen, with his partners and members of his family, and by his son, Eero, both with Eliel and with associates of his own. It is important because most writing about Eero pays far too little attention to the influence of his father or to the collaborative nature of both their practices.

The authors, a photographer and an architect, know about cooperative family ventures, since they are married and have done several books together.

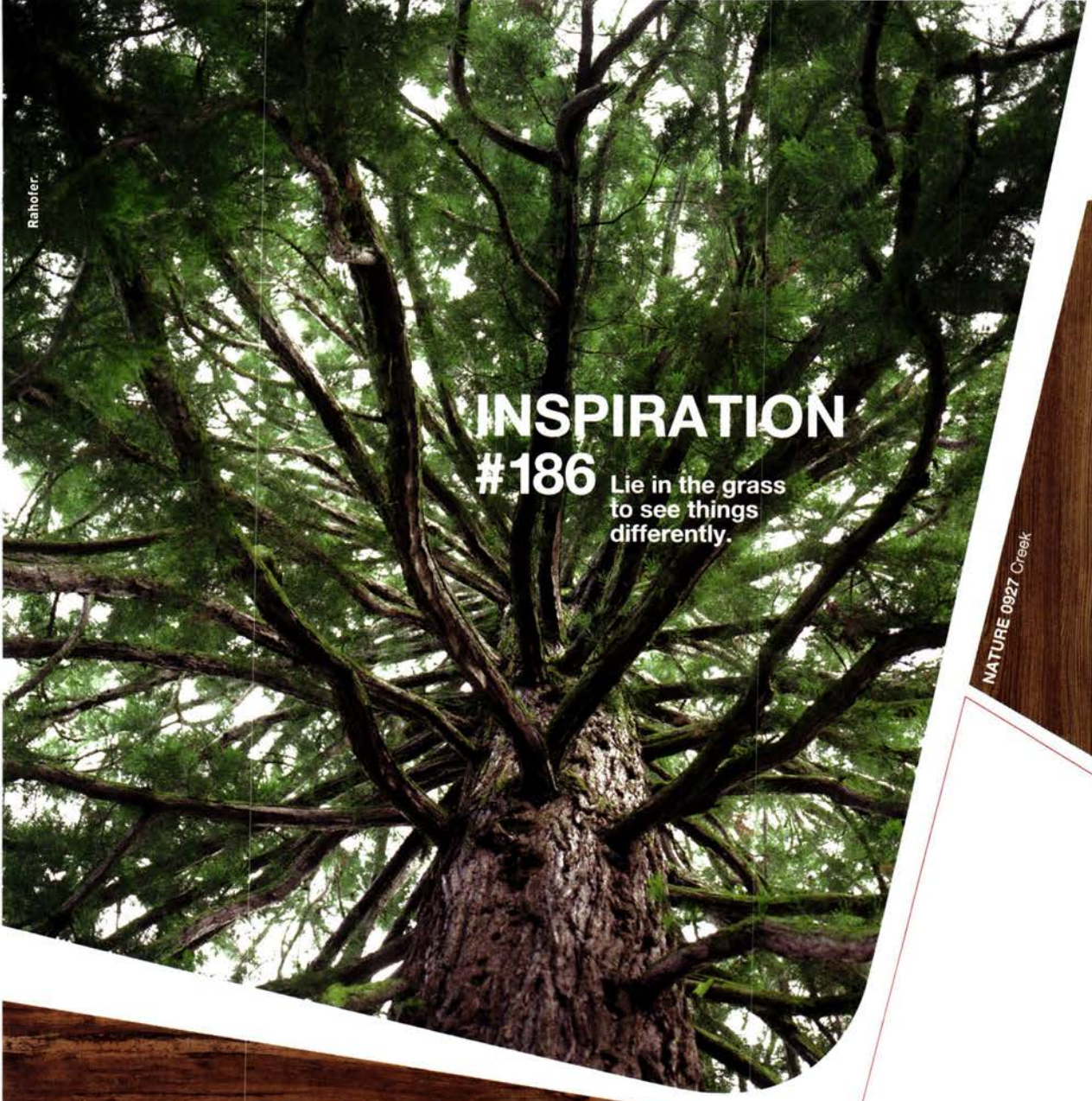
This book shows how the Saarinens' work evolved from its National Romantic origins in Finland at the beginning of the 20th century to the heyday of midcentury Modernism. The Saarinens contributed to both movements significantly. The villas that Eliel and his colleagues designed in Finland were masterpieces of the Arts and Crafts movement in Scandinavia. And the houses Eero designed in America embody the transition from his father's mode to one directly derived from the mechanical technology that he learned while designing the General Motors Technical Center outside Detroit (1955).

Some of the houses are well known. Three are even museums—Eliel's Hvitträsk, on a lake outside Helsinki (1902), the Saarinen House at Cranbrook in Michigan (1930), and Eero's Miller House in Columbus, Indiana (1957). But the book also includes 10 Finnish villas from the early 20th century, some Modern houses in the Midwest by the Saarinen Swanson and Saarinen firm from the 1930s and '40s, and a house Eero built for his mother on his own property in Michigan after Eliel's death.

Most interesting, perhaps—because they are not widely known and have lessons to teach for urban planning today—are some rowhouses that Eliel designed as part of his plan for the Munkkiniemi-Haaga area of Helsinki in 1916. These large, gracious homes combined the advantages of urban and suburban dwellings and provided inspiration for those that Eliel designed at Cranbrook. They are integrated with their natural settings and yet occupy the landscape economically enough to provide excellent models for development now.

A touching final essay by Eero's daughter, the landscape architect Susan Saarinen, describes the dynamics of "a family where art and design were" not just "a common topic of conversation at the dinner table" but a way of life. This book provides a window into that life. ■

Jayne Merkel is a contributing editor of RECORD *and the author of* Eero Saarinen *(Phaidon, 2005), which chronicles the work of both Saarinens.*



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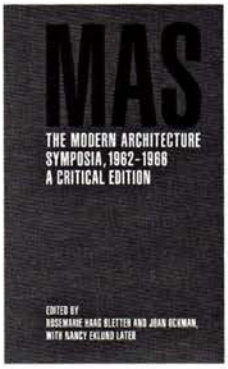
CIRCLE 19

MAS: The Modern Architecture Symposia 1962-1966: A Critical Edition, *edited by Rosemarie Haag Bletter and Joan Ockman, with Nancy Eklund Later. Yale University Press, February 2015, 348 pages, $80.*

Reviewed by Suzanne Stephens

THIRTY YEARS after the legendary show *Modern Architecture: An International Exhibition* at the Museum of Modern Art (MoMA), its curators, Henry-Russell Hitchcock and Philip Johnson, launched a series of symposia assessing the development of this new architecture. Whereas the MoMA show was accompanied by a book, the symposia had to wait almost 50 years for the proceedings to be published. It is like opening a time capsule—and a compelling one.



The three Modern Architecture Symposia (MAS) took place at Columbia University in May 1962, 1964, and 1966, and were organized by Columbia historian George Collins and the director of Avery Library, Adolf Placzek. They brought together a formidable ensemble of scholars and critics from a range of institutions to examine three decades (not in strict order): the first, 1918 to 1928; the second, 1929 to 1939; and finally the third, 1907 to 1917.

Since the symposia took place, they have been called a convocation of the gods of architectural history and criticism—Rudolf Wittkower, Vincent Scully, Colin Rowe, Sibyl Moholy-Nagy, James Marston Fitch, Catherine Bauer Wurster, Edgar Kaufmann Jr., William Jordy, Eduard Sekler, Alfred Barr, and others, including, of course, Hitchcock and Johnson. Even young historians-in-waiting, Robert A.M. Stern and Christian Otto, gave presentations. But few were privy to the details except for invited architects, curators, critics, and students. (This writer, newly on the editorial staff at *Progressive Architecture*, cajoled her way into the 1966 meeting.) So it has been a question: was it as significant as the roster of participants makes it sound? This book shows the answer is a resounding yes. Illuminating essays by editors Rosemarie Haag Bletter (who attended two sessions as a graduate student) and Joan Ockman (a former director of Columbia's Temple Hoyne Buell Center for the Study of American Architecture) add to its heft.

Don't expect, though, a "Wasn't it swell?" nostalgic recap of the International Style. The book provides testimony to a many-sided debate: Maholy-Nagy, outspoken critic and professor at Pratt, blamed Gropius and Breuer for the "slow death of architecture and urbanism" in the U.S. in the 1930s. Elizabeth Mock Kassler, the director of MoMA's department of architecture from 1942 to 1946, argued that the International Style resulted in "no buildings of intrinsic value in this country."

Bletter provides an account of the considerations determining the scope of each symposium, with footnotes revealing often amusing backstories. The first one discussed functionalism and expressionism; the second, regional and national aspects of this new architecture. The third session analyzed the influences of such movements as De Stijl and Deutscher Werkbund.

Ockman puts this period of architecture within the larger context of intellectual history, including architecture's turn to theory. The MAS provide a synoptic history of those years: candid comments show the give-and-take as the gods growled at each other and debated the mythical status of modernism—as a style, an urbanistic solution, and a social concern. One wishes for more illustrations of the buildings, but this is a fascinating immersion in the MAS mysteries. ■

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Retrofit Solution for Soft-Story Buildings

Thousands of San Francisco building owners are now required by law to seismically retrofit multi-unit (at least five) soft-story, wood-frame residential structures that have two or more stories over a "soft" or "weak" story.

These buildings typically have parking or commercial space on the ground floor with two or more stories above. As a result, the first floor has far more open areas of the wall than it actually has sheathed areas, making it particularly vulnerable to collapse in an earthquake.

That was the case in both the Loma Prieta and Northridge earthquakes, which is why cities in California, including Berkeley and Oakland, have recently passed similar legislation and many others, including Los Angeles, are now considering it. San Francisco's ordinance affects buildings permitted for construction before January 1, 1978.

One solution to strengthen such buildings is the Simpson Strong-Tie® Strong Frame® special moment frame. Its patented Yield-Link™ structural fuses are designed to bear the brunt of lateral forces during an earthquake, isolating damage within the frame and keeping the structural integrity of the beams and columns intact.

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Another key advantage of the Simpson Strong-Tie special moment frame is no field welding is required, which eliminates the risk of fire in San Francisco's older wood-framed buildings."Field welding is not a good thing, particularly in an existing building because the chance of fire is just too great. A bolted solution is much safer."

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Watch a video about San Francisco's retrofit ordinance at **strongtie.com/softstory.**

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CIRCLE 59

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The answer to the March issue's Guess the Architect is **PHILIP JOHNSON**, who designed the Amon Carter Museum in 1961. In 1977, he and partner John Burgee expanded it; then, in 2001, Philip Johnson/Alan Ritchie Architects enlarged and reworked the museum yet again. For more details, including the winner, go to architecturalrecord.com.

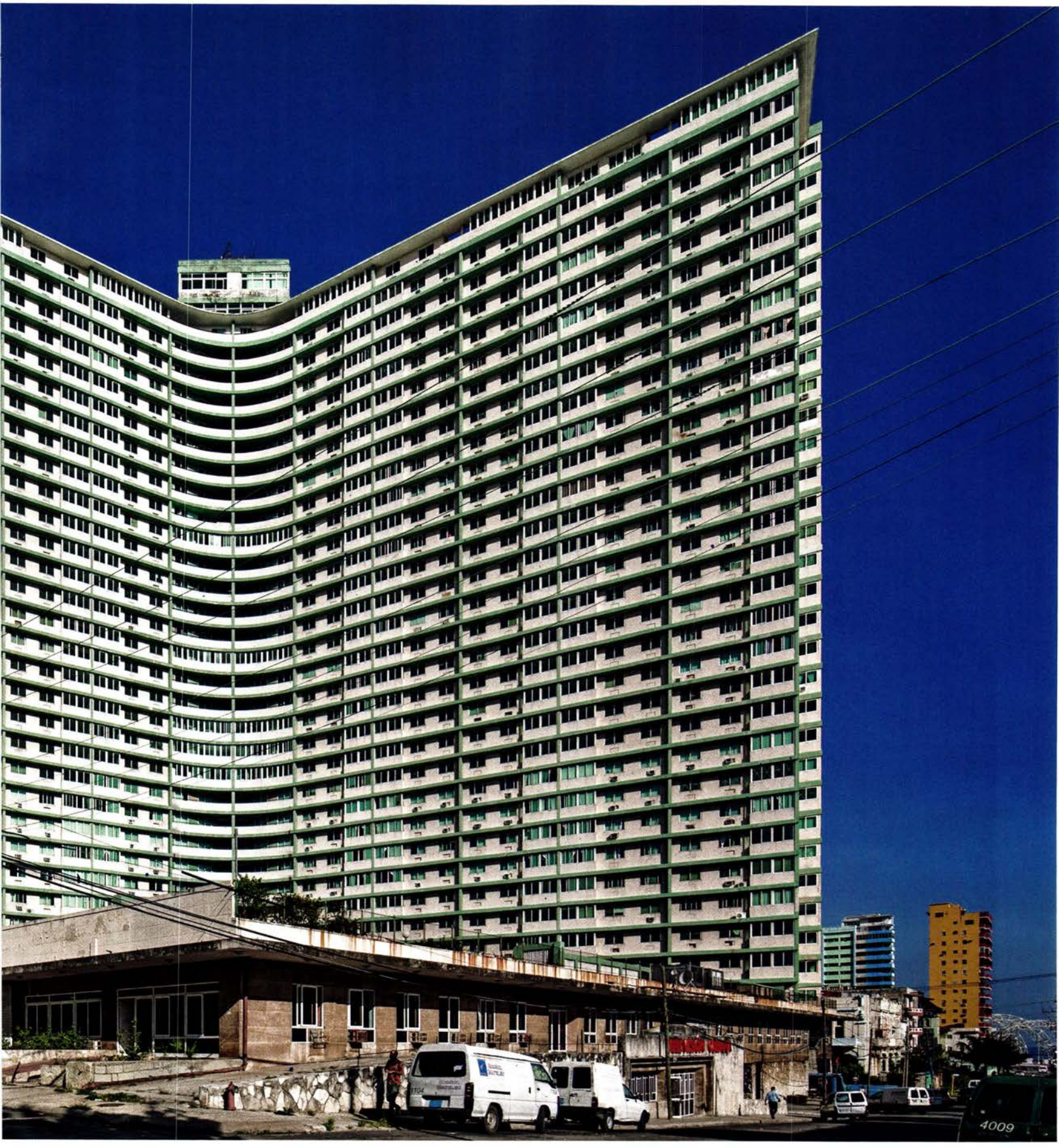
By entering, you have a chance to win an iPad mini.
See the complete rules and entry form online at architecturalrecord.com.

PHOTOGRAPHY: ALAN WEINTRAUB/ARCAID.CO.UK; STEVE WATSON (BOTTOM)

Latin America's Moment Arrives Again

Sixty years ago, the Museum of Modern Art in New York presented *Latin American Architecture Since 1945*, turning attention to a part of the world that seemed ready to assume a major role in architecture and design. Military coups and economic turmoil in the 1960s and '70s, though, put an end to such optimism. Now the region is a dynamic force once again, and the museum has mounted an ambitious exhibition, *Latin America in Construction: Architecture 1955–1980*. São Paulo–based Leonardo Finotti took new photographs of many of the buildings in the show (running through July 19).

Edificio FOCSA, 1956
Ernesto Gómez Sampera and Martín Domínguez
Havana, Cuba

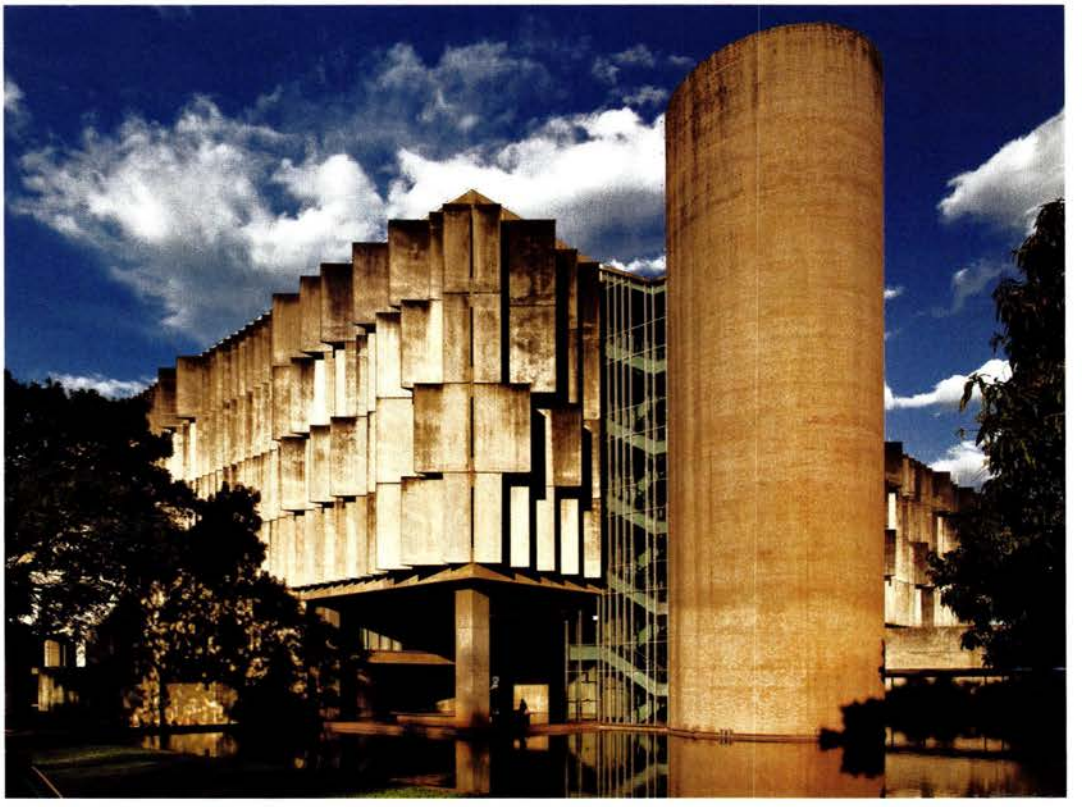

4009


BANCO
Hipotecario

National Congress, 1957–64
Oscar Niemeyer
Brasília

< Banco de Londres y America del Sur, 1959
Clorindo Testa and SEPRA
[Sánchez Elía, Peralta Ramos, and Agostini]
Buenos Aires

DNIT [formerly DNER], 1974
Rodrigo Lefevre
Brasília



< Benedictine Monastery, 1964
Gabriel Guarda, Martín Correa
Santiago, Región
Metropolitana, Chile

< Cristo Obrero Church, 1960
Eladio Dieste
Estación Atlántida, Uruguay

Edificio Sede CVG, 1968
Jesús Tenreiro
Ciudad Guayana, Venezuela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CIRCLE 43

Bathing Beauties

Designer Philippe Starck and Duravit re-team to present two new bathroom collections.

By Josephine Minutillo

IT HAS been over a quarter of a century since Philippe Starck designed his first fixture for Duravit. In that time, the French star also delivered the five-story Duravit Design Center—complete with a giant toilet-bowl structure that serves as an observation deck—in Hornberg, Germany, where the company was founded nearly 200 years ago.

It was in that bold building, deep in the fabled Black Forest, that Duravit presented its latest collaborations with Starck, during its biennial Design Days event in early February. The two new collections, Cape Cod and ME by Starck, are now available.

Inspired by sandy beaches and untamed nature, the gently curved sinks and tubs of the Cape Cod series utilize a proprietary ceramic material that allows for especially thin yet impact-resistant basins. The sink consoles are offered with chrome frames and either high-gloss white or wood storage; the Vintage Oak version is one of a kind, with irregular edges reminiscent of driftwood. For a uniform and harmonious look, Cape Cod can be combined with selected toilets and bidets from the earlier Starck 1 and Starck 2 lines, as well as with the other new-for-2015 series, ME by Starck.

The minimalist ME by Starck toilets, bathtubs, shower trays, and sinks also feature a delicate edge for an almost rimless appearance. (ME is the first Duravit range in which the urinal—designed for use in private and public bathrooms—boasts the innovative rimless technology.) All of the washbasins in this line can be coated with the company's WonderGliss for ease of cleaning.

ME coordinates perfectly with the L-Cube bathroom furniture collection designed by Christian Werner, also introduced at the 2015 edition of Design Days.

CIRCLE 200

The ME by Starck collection (top, left and right) of ceramic fixtures complement the L-Cube bathroom furniture range (also shown), designed by Christian Werner. Designer Philippe Starck (middle). Cape Cod sink consoles (above) are available in Vintage Oak, American Walnut, European Oak, White Beech, and high-gloss white.

PHOTOGRAPHY: COURTESY DURAVIT; © JEAN-BAPTISTE MONDINO (MIDDLE, RIGHT)

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CIRCLE 58

Home Improvement

From a cutting-edge faucet system to a light fixture that doubles as wall art, these residential products range from the practical to the purely decorative.

By Sheila Kim

Humidifier

Dyson's Air Multiplier technology, which was first introduced in the company's bladeless fans, is being applied to humidifiers. Launching this coming fall, the units utilize an ultraviolet cleansing system to kill 99.9% of bacteria in the water before using the multiplier technology to distribute clean mist evenly into a space. The minimalist standing ring comes in three colors. dyson.com **CIRCLE 201**

CP-155 LS Sliding Door

European company Reynaers has opened a North American headquarters and manufacturing facility to produce its slim-profile aluminum windows and doors, such as CP-155 LS, locally. This monorail sliding-door system, shown on the lower level of a house in Switzerland by Daluz/Gonzalez Architekten, can span up to 12' high or wide (up to a 900-pound limit), maximizing vistas while maintaining wind- and watertightness. reynaers.us **CIRCLE 202**

eUnit Kitchen

Precise control of water temperature and volume doesn't have to be reserved for baths and showers. Dornbracht's eUnit Kitchen applies Smart Water technology to kitchen sinks for tasks ranging from washing to filling pots. Two knobs adjust flow and temperature, which are digitally displayed on a control unit that also records preferred settings. Other conveniences include a foot sensor that allows for hands-free operation and a button-controlled electronic drain. dornbracht.com **CIRCLE 204**

ShowerSelect Square Thermostatic Trim

Hansgrohe's new sleek thermostatic trim offers just the essentials. Measuring 6⅛" square x ¾" deep, the faceplate houses two push buttons for easy switching between showerhead and hand shower, a 2"-diameter dial that controls the thermostatic cartridge, and an anti-scald safety stop. Also available in a single-function format, the trim is finished in chrome. hansgrohe-usa.com **CIRCLE 203**

products residential

Choreograph
Enabling homeowners to change the look of a shower in less time than it takes to tile, Kohler's new series of solid-colored, textured, or faux-stone-wall finishes is made from the company's Serica material. The proprietary composite material combines crushed stone and fiber reinforcement for durability and ease of maintenance. Choreograph also comprises joints (for corners, outside edges, and seams that are easier to clean than exposed caulking), integrated storage, and on-wall shelves and seating. kohler.com CIRCLE 205

Set
Playing with light and shadow, this wall fixture from Vibia comprises five blocks, only one of which holds the LED light source; the other four can be positioned to refract, reflect, and break up the beams to create a unique composition. Available in matte mink or matte white lacquer, the blocks are 4" deep and range in width from 4" to 8¾". Multiple Sets can be combined for more dramatic effect. The 11W LED is dimmable from 1 to 10V. vibia.com CIRCLE 206

Sakura Collection
Newly added to Fireclay Tile's Handpainted series, this collection consists of 12 organic patterns that reflect Japan's landscapes and culture, from a repeating fan pattern and wavelike allusions to mountain ranges to a field of ginkgo leaves. The tiles are 70% recycled clay and available in a soft palette of natural and neutral hues, in 8" square and 6" x 12" formats, and are suitable for both wall and floor applications in wet zones. fireclaytile.com CIRCLE 207

P`7350 Kitchen
Six years ago, Porsche Design Group collaborated with Poggenpohl on a high-end kitchen defined by clean lines, handle-free fronts, and a slick aluminum frame. This follow-up continues to emphasize precision engineering: mitered cabinet fronts meet mitered frames, and brushed-aluminum trims accentuate vertical lines. The kitchen is offered in three neutral colors with matte or lacquer finish, as well as in gray walnut. poggenpohl.com CIRCLE 209

Perception Recessed/ Semi-Recessed
This popular Villeroy & Boch medicine-cabinet line now includes recessed and semi-recessed versions. The units feature an electrical outlet and switch, magnifying mirror, magnetic strip for holding grooming tools, mirrored interiors, and optional LED lighting integrated into the doors. villeroy-boch.com CIRCLE 208

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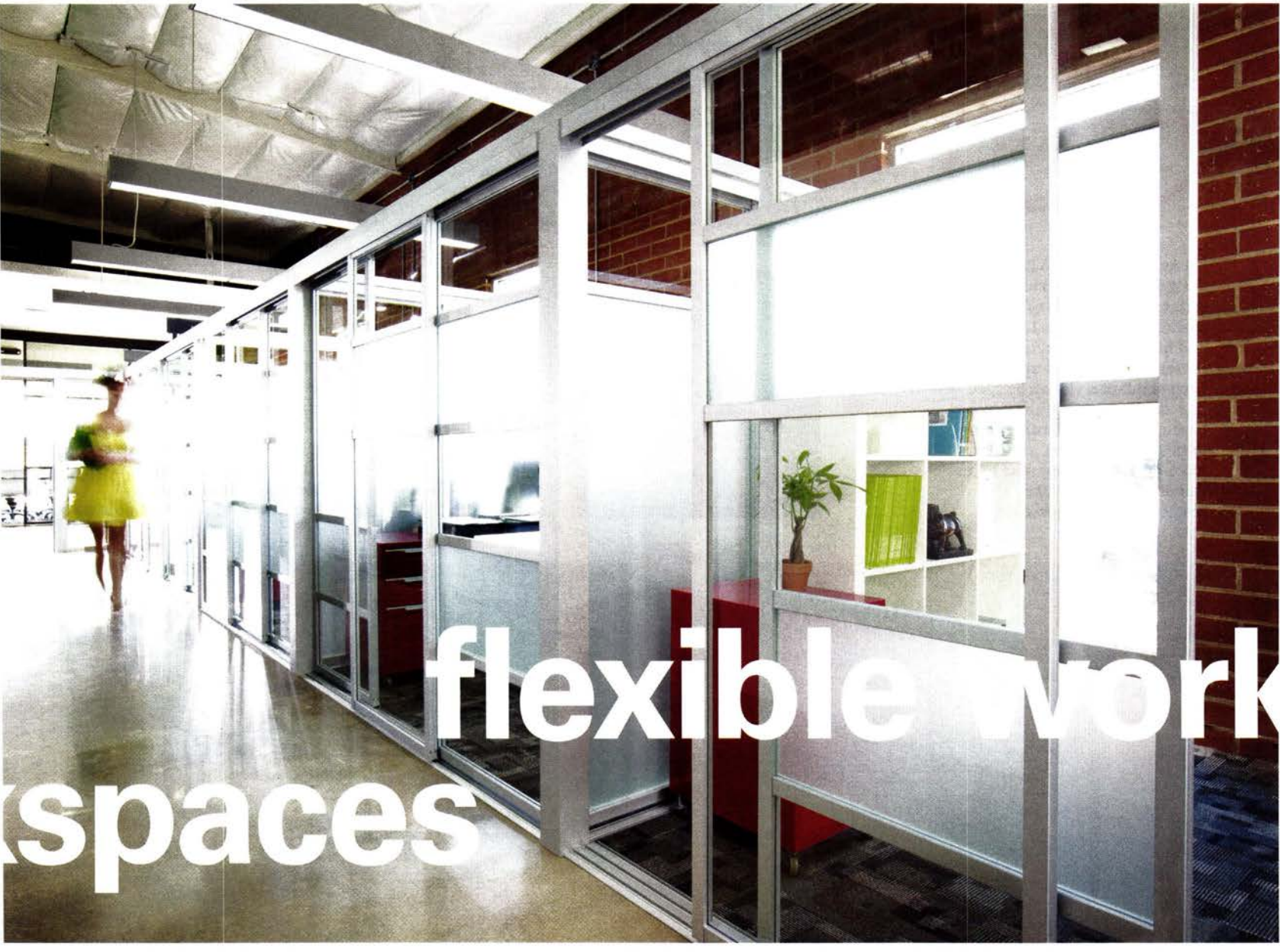

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spaceplus.com

CIRCLE 63

products residential

Slims Collection

Tel Aviv–based Studio Beam designs and makes to order this series of five light fixtures whose shades are reduced to laser-cut and hand-soldered metal skeletons, presenting a cagelike appearance. Each pendant style can be specified in a variety of powder-coat hues, features a complementing-color light socket and cord, attaches to a black or white canopy, and takes standard E26-size bulbs.
studio-beam.com CIRCLE 210

Farmhouse Collection

New Hampshire–based Carlisle Wide Plank Floors has been focusing on custom flooring for 48 years but has now introduced a number of stock product lines. One such series is the Farmhouse collection of distressed white oak solid or engineered wood. Finished with hand-scraped edges, the planks are available in random lengths of 2' to 12', as well as random widths of 6" to 10", in a choice of six stain colors. wideplankflooring.com CIRCLE 211

New Classico Styles

Caesarstone has expanded its Classico quartz surfaces with new styles and colors that evoke today's popular materials. For instance, Raw Concrete (left) and Fresh Concrete mimic the coarse appearance of their namesake, while Bianco Drift and Woodlands emulate granite. The slabs are nonporous and resistant to heat, stains, and scratches. Available in a choice of 15 edge profiles. caesarstoneus.com CIRCLE 212

Mock Rock

Inspired by the natural rock fireplace in her own home, interior designer Ghislaine Viñas collaborated with Flavor Paper to present a cartoonish version as a wall covering. The varying rock shapes with thick outlines come in Opal (above), Dolomite, Epidote, or Sodalite colorways, and are printed with water-based latex inks on a choice of two substrates: Terralon Type II commercial or Nolar.
flavorpaper.com CIRCLE 214

Cabo Soft Slide Shower Door

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crlaurence.com CIRCLE 213

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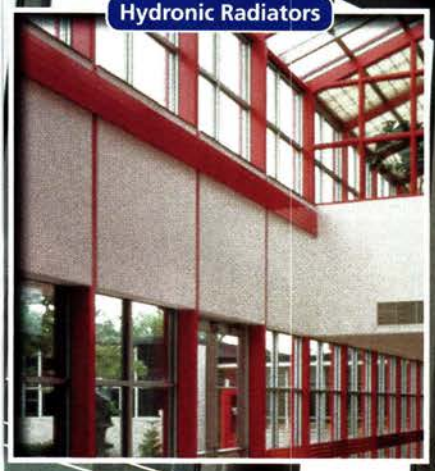

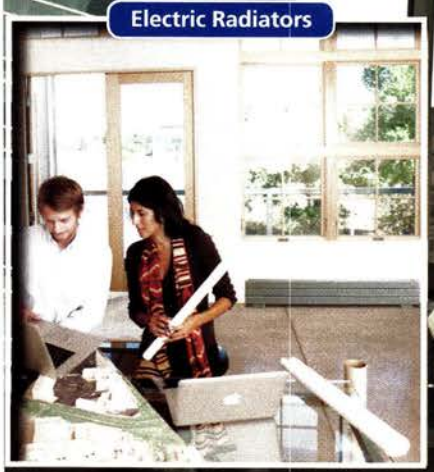

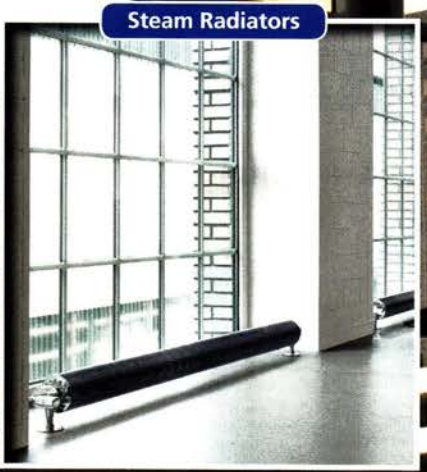

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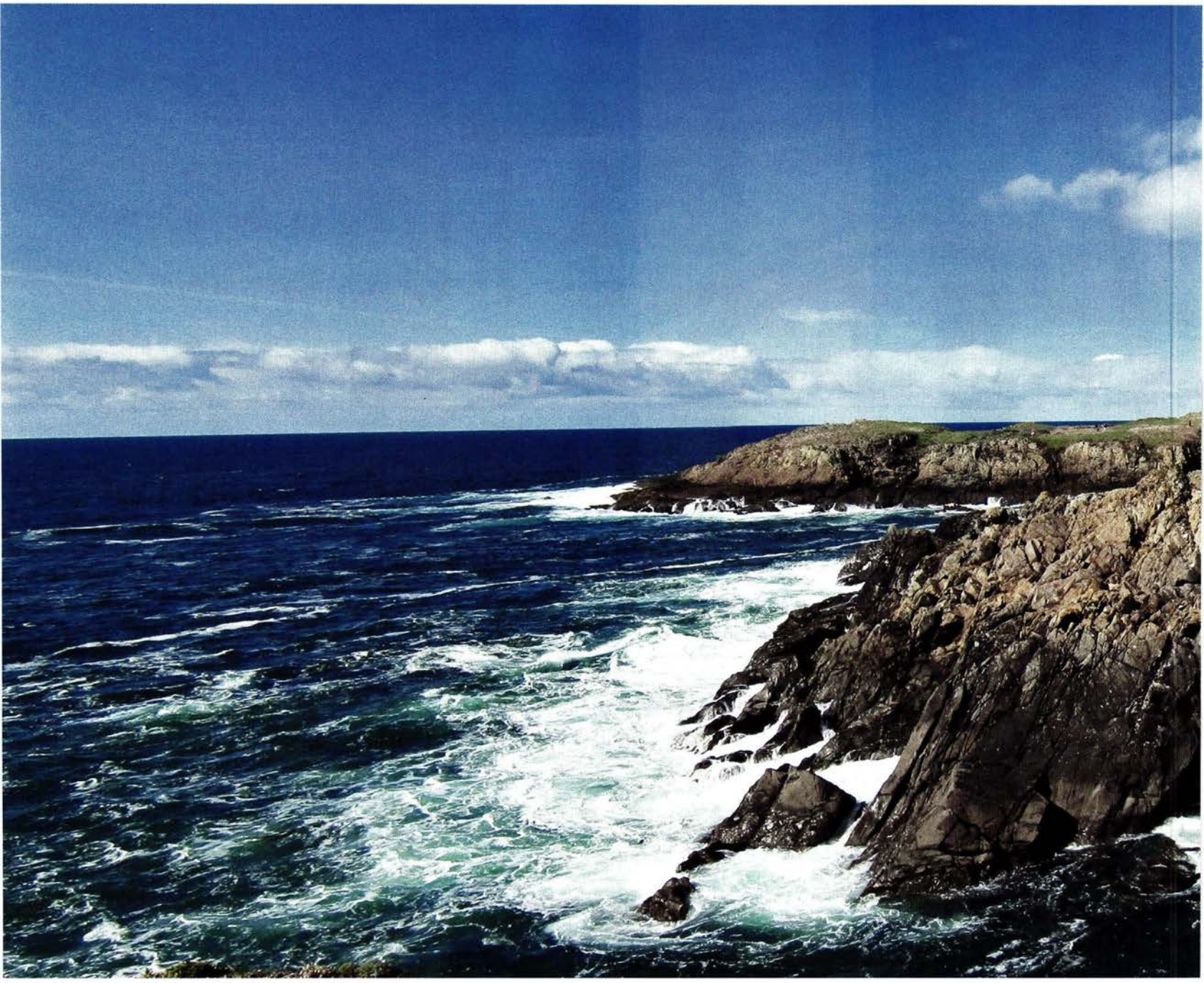


An Earthly Paradise

In planning, design, and sustainability, the Sea Ranch, now 50 years old, was far ahead of its time.

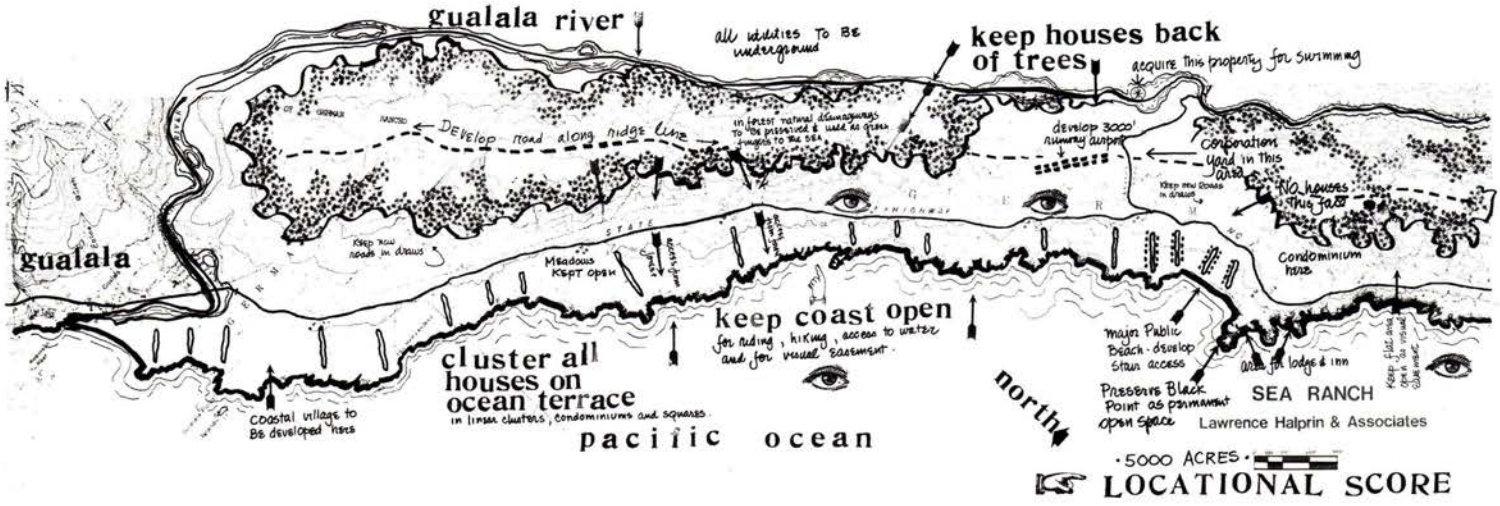
BY CATHLEEN MCGUIGAN

PHOTOGRAPHY: © JIM ALINDER

IF YOU DRIVE north from San Francisco, along the wildly beautiful Sonoma coast beyond the Russian River, you eventually arrive at the Sea Ranch. Stretching along 10 miles of rugged cliffs that hover above the crashing waves of the Pacific, this enclave of weathered weekend houses began as a unique experiment in design. Scattered over 4,000 acres, the community was planned in the idealistic spirit of the 1960s—it was a satellite, in a way, of the countercultural capitals of Berkeley and San Francisco, 100 miles to the south. Even the name—the Sea Ranch—conjured up a romantic utopia and spoke to the primacy of the natural surroundings, while the simple early houses, clad in boards or shingles, with shed roofs, nestled self-effacingly into the windswept meadows or forest hillsides. The highly prescribed architecture of the development meant that the structures were "not to be married to the site but to enter into a limited partnership with it," as the original architects put it.

Those prescriptions were filed as detailed covenants with the property's title in May 1965. Now, as the Sea Ranch celebrates its 50th anniversary, both newcomers and longtime residents are still grappling with the ideals set forth by its original planner, Lawrence Halprin (1916–2009), the landscape architect. He had been hired by Oceanic Properties, the Hawaii-based developer that bought the timber and grazing lands for $2.3 million in 1963, to plan a new town of second homes. Halprin's enchanting hand-drawn sketches

ISN'T IT ROMANTIC? Condominium One, in all its rustic majesty, presides over an outcropping above the Pacific.



depict his careful study of the Sea Ranch's winds, tides, sunlight, wildlife, and vegetation, and contain the powerful central ideas of the community he envisioned. His principles were based on both natural and human ecology. He wanted to maintain the landscape, with its grasses and old cypress hedgerows—and to ban non-native plants and suburban-style lawns and to "avoid prettiness." Even more important, his plans called for siting the unprepossessing houses in clusters that allowed open views of the sea and left large parts of the meadows as untouched common land for the community. "The usual curvilinear 'cutesy-pie' subdivision plan is anathema," wrote Halprin, who was inspired by the model of the kibbutz and a belief that the Sea Ranch should attract a diverse socioeconomic group of residents.

Halprin recommended to Oceanic the first architects to build on the land, which had been mostly populated by sheep: Joseph Esherick and the young Berkeley firm of Moore

COUNTERCULTURE A Halprin drawing (top)—which he termed a "Locational Score"—expresses the fundamental principles of the community; the Sea Ranch in 1965 (above), before the grasses, cypress, and other natural plantings took over the grazed land; Driftwood Village (left), the dance and sculpture workshop on the beach at the Sea Ranch, on July 6, 1968. Opposite, top: (from left) Richard Whitaker, Donlyn Lyndon, Charles Moore, and William Turnbull in front of Condo One at the time of the AIA Twenty-five Year Award; one of the original barns that helped inspire the architecture (opposite, bottom).

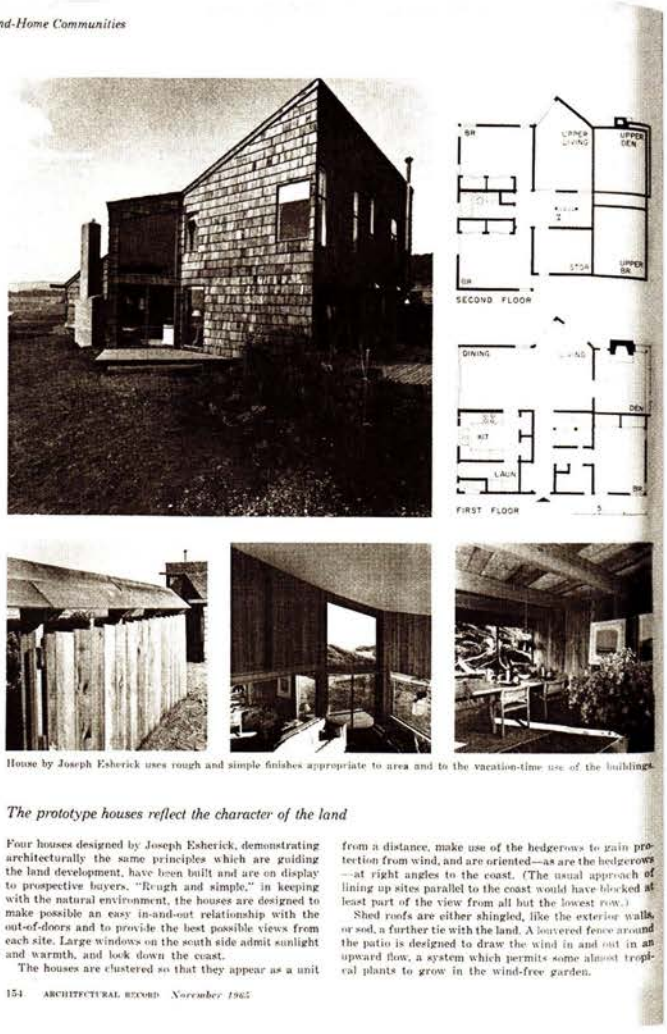
Lyndon Turnbull Whitaker (MLTW), whose design for the famous Condominium One brought them wide acclaim. Just the idea of a condo in the country was radical; the original plans called for others, but this 10-unit building was the only one realized. Designed for a high, exposed outcropping, the building is a series of strong, clustered orthogonal forms—but with shed roofs—that march in a procession down a slope overlooking the sea. Built around a courtyard, no two condos are alike. In his essential book *The Sea Ranch: Fifty Years of Architecture, Landscape, Place, and Community on the Northern California Coast* (2014, with photography by Jim Alinder), former MLTW principal Donlyn Lyndon, FAIA, describes how he and his partners—Charles Moore, William Turnbull, and Richard Whitaker—experimented with the design of the complex volumes by stacking sugar cubes from the office coffee service. The exterior was clad in vertical redwood boards, left to weather like the old ranch barns, while the multilevel light-filled interiors, with their stunning views, revealed the heavy timber structure in ways that were both powerful and playful.

In contrast to the rustic majesty of Condominum One, which won the AIA Twenty-five Year Award in 1991, Esherick designed six modest houses, in a loose composition along a sheltering hedgerow in the meadow. With roofs sloping into the wind, they are deceptively simple. The smallest, he built for himself: its footprint is a mere 875 square feet, but with the ingenious creation of multilevel spaces, it feels both spacious and cozy. In a laudatory article about the Sea Ranch in November 1965, ARCHITECTURAL RECORD described how the bioclimatic studies of wind and solar radiation had inspired the structures' design.

Yet Esherick's houses were a little out of step with the era. While some critics applauded the simple wood-clad timbered dwellings—cousins of the Bay Area's regional modernism—they were hardly considered cutting-edge. As the late critic Donald Canty points out in an essay in Lyndon's book, these buildings of natural materials, designed in response to the environment, were at odds with the sophisticated "object" houses of high modernism. Canty reports that a colleague at *Architectural Forum*, where he was then an editor, dismissed Esherick's work as "stick architecture."

Not that Halprin and his colleagues would have been likely to care about such criticism. In the early days of the Sea Ranch, their utopian ideals were still playing out. The communal values—with residents coming together for consensus on common issues—were expressed in the interdisciplinary workshops that Halprin and his wife, the choreographer Anna Halprin, now 94, held at the Sea Ranch, where the couple built a house, designed with Moore and Turnbull. Anna created dances that involved ordinary people to whom she gave movement instructions, and in a project called Driftwood Village in 1968, participants danced around simple structures on the Sea Ranch beach. Photographs documenting that event and others like it were shown in an exhibition at the Graham Foundation in Chicago last year and make the Sea Ranch look like a countercultural summer camp for grown-ups.

But there was a paradox. For all the open, egalitarian philosophy behind the community, there was, inevitably, the scent of elitism wafting through the Bishop pines. Not only was it composed of second homes, but it was caught up in a



Second-Home Communities

House by Joseph Esherick uses rough and simple finishes appropriate to area and to the vacation-time use of the buildings.

The prototype houses reflect the character of the land

Four houses designed by Joseph Esherick, demonstrating architecturally the same principles which are guiding the land development, have been built and are on display to prospective buyers. "Rough and simple," in keeping with the natural environment, the houses are designed to make possible an easy in-and-out relationship with the out-of-doors and to provide the best possible views from each site. Large windows on the south side admit sunlight and warmth, and look down the coast.

The houses are clustered so that they appear as a unit from a distance, make use of the hedgerows to gain protection from wind, and are oriented—as are the hedgerows—at right angles to the coast. (The usual approach of lining up sites parallel to the coast would have blocked at least part of the view from all but the lowest row.)

Shed roofs are either shingled, like the exterior walls, or sod, a further tie with the land. A louvered fence around the patio is designed to draw the wind in and out in an upward flow, a system which permits some almost tropical plants to grow in the wind-free garden.

154 ARCHITECTURAL RECORD *November 1965*

bitter state-wide controversy over beach access. Amazingly, when the Sea Ranch was being planned in the early 1960s, only 100 miles of California's 1,300-mile-long coastline was accessible to the public, and environmentalists feared this private patch of paradise would block beach access. Years of legislative and court battles put a damper on most new development here. By the time the issue was finally resolved in 1981—and public trails were cut through the property down to the shore—land values had soared. The Oceanic company sold out, and future development tended to stray from the Halprin concept of modest houses clustered together.

Today, there are about 1,800 houses, and many of the newer ones barely adhere to the letter, much less the spirit, of the covenants. Yes, they may be clad in gray wood, but some are the faux light gray that comes from paint, not time

LIMITED PARTNERSHIP Esherick's own modest, ingenious house (top); a page from ARCHITECTURAL RECORD's report on the Sea Ranch in 1965, with another Esherick house (bottom); a new house by Norman Millar and Judith Sheine (above) uses concrete and Cor-Ten but embraces the spirit of the place.

and weather, and many are large and ungainly.

Yet the architect Donlyn Lyndon, 79, who lives part-time at the Sea Ranch, is an active keeper of the flame; so are other homeowners in the Sea Ranch Association, which holds democratic Halprin-style workshops about the future of the place (not necessarily with dancing on the beach). Lyndon has continued to design houses that embody what he and his colleagues intended in scale and craftsmanship. Just as heartening is an innovative new dwelling that *doesn't* faithfully comply with the dominant material palette but is simply good architecture: a handsome house designed by Norman Millar and Judith Sheine that fits beautifully into its cliffside site, clad in concrete and Cor-Ten.

Despite the imperfections of its evolution over half a century, the influence of the Sea Ranch is unmistakable. Long before the current popularity of vernacular modernism and the push for sustainable architecture, the houses and planning here exemplified the power of design inspired by place. Brian Mackay Lyons, the award-winning Nova Scotia–based architect, who worked for Charles Moore from 1980 to '82, was a frequent visitor in those days. "Our work wouldn't be possible without the Sea Ranch," he says. And the land-management plan that RECORD extolled in 1965 as "dynamic conservation" was far ahead of its time. Though mankind's footprint on the land has occasionally been clumsy, the beauty of the wild acres of meadows and forests, the sea and the sky, triumph over all. ■

PHOTOGRAPHY: © JIM ALINDER (OPPOSITE, 2, AND THIS PAGE, TOP); JUDITH SHEINE (MIDDLE); ARCHITECTURAL RECORD (BOTTOM)

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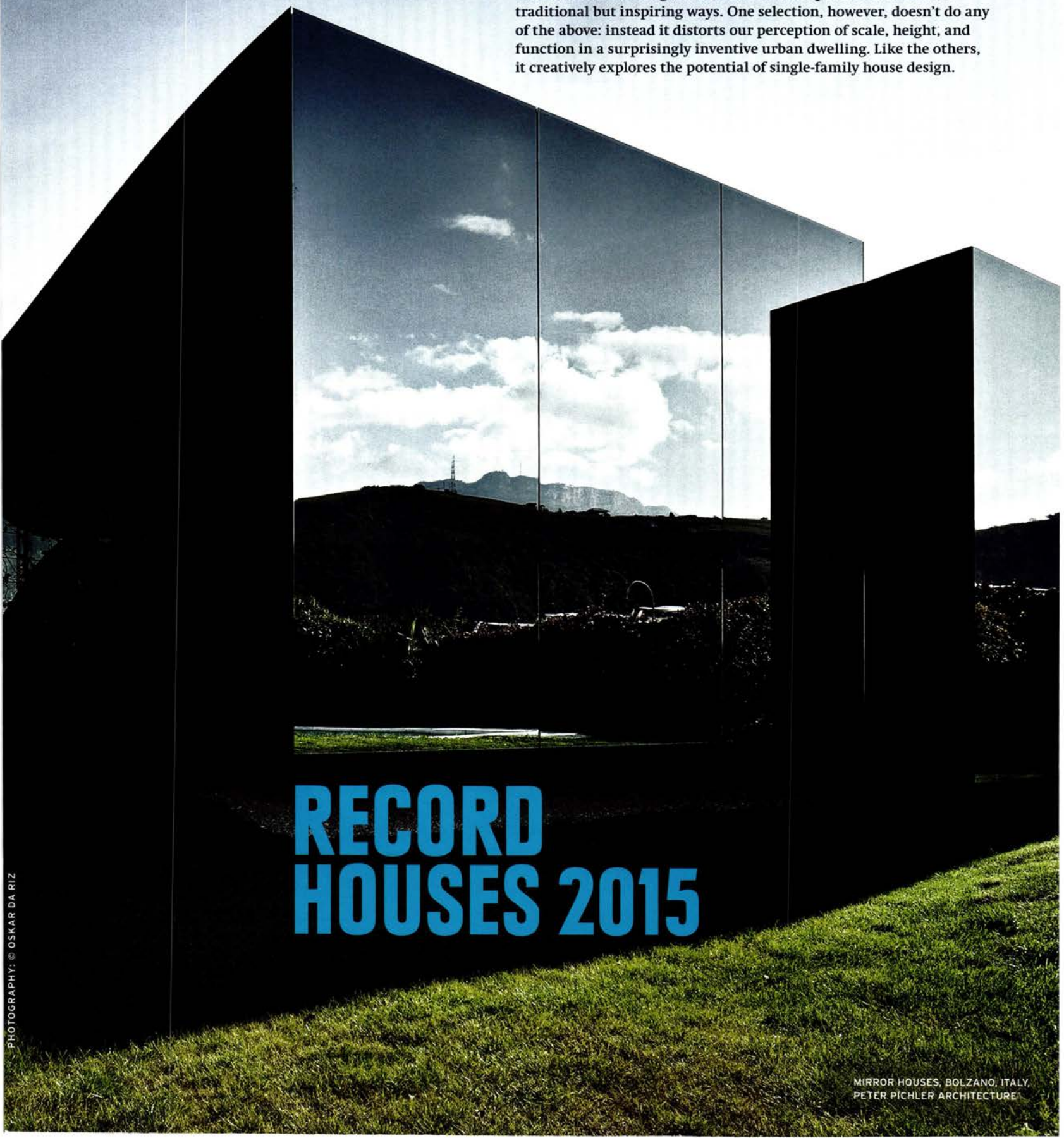
CIRCLE 21

Every year, RECORD looks for houses that advance the architectural discipline—they push the limits of spatial concepts and materiality or refine the existing vocabulary in imaginative ways. Just see this year's choices: one house is clad in solid-surface material; another reflects its surroundings with polished stainless steel; a third literally mirrors its environs, using glass. While the latter two dissolve architecture within natural settings, other houses here open out to nature in traditional but inspiring ways. One selection, however, doesn't do any of the above: instead it distorts our perception of scale, height, and function in a surprisingly inventive urban dwelling. Like the others, it creatively explores the potential of single-family house design.

RECORD HOUSES 2015



PHOTOGRAPHY: © OSKAR DA RIZ

MIRROR HOUSES, BOLZANO, ITALY, PETER PICHLER ARCHITECTURE

Mirror Houses | Bolzano, Italy | Peter Pichler Architecture

TWO OF A KIND

A pair of attached houses that reflect their Tyrolean setting make the most of little space.

BY CHRIS FOGES

PHOTOGRAPHY BY OSKAR DA RIZ

ON REFLECTION The new houses back up against a swimming pool shared with the preexisting main house. The rear facade is made of toughened glass bonded to an inner layer of regular mirror glass and has a ventilated cavity behind it.

After 30 years in their farmhouse outside Bolzano, in northern Italy, and with their children grown up, Josef Ebner and Angela Sabine Staffler found themselves with surplus space and decided to convert part of the property for rent. So they created two apartments in their existing house (where they still live) and a pair of mini-residences in a new building, catering to tourists who flock to the mountains of South Tyrol. Though the couple had no particular intention that architecture should itself be a draw, recalls Ebner, they wanted "something special" and called in architect Peter Pichler, who had recently established his own office in Bolzano after working for Zaha Hadid.

Permission from the local authorities to develop the site imposed a strict limit on the interior volume of the new building–sufficient for two dwellings, each 430 square feet, with a ceiling height of 9 feet–and required that it should sit just yards from the farmhouse. The location allowed the new houses to face a private access road and apple orchards beyond, but meant they would back onto the family's pool and block the view from the farmhouse's garden. Consequently, the clients' only brief was that the building should be "there but not there"; the design should make a positive contribution to the landscape, while somehow receding from view.

Pichler's response was simple but effective. The wood-framed houses, which share a party wall, are cantilevered off a poured-in-place concrete basement, so they appear to float 6 inches off the ground, and are subtly distinguished by slight offsets in plan and section. By cladding the garden facade in six identical mirrored-glass panels, Pichler lent the boxy form an abstract character reminiscent of a Donald Judd sculpture. The flatness of the surface is given life and depth by its surroundings. In the daytime, the facade compensates for the lost mountain vista to the southeast by reflecting hills to the northwest. At dusk, the building becomes more enigmatic still. As the mirrored glass gathers the last of the setting sun, it is also backlit by soft rectangles

of electric light emanating from concealed windows.

Guests arriving at the front encounter a building with a livelier, more open character than the laconic back would suggest. Pichler brushes off any suggestion of figurative references, but the structure does call to mind a pair of eyes looking out at the landscape. The fully glazed front reveals all-white interiors, in contrast to the black aluminium skin on the two sides. Projecting decks and canopy roofs make upper and lower eyelids whose gentle curves are picked up and amplified in tapering horizontal glazing on the side walls.

Along with the spline curves of the undulating roofline, the north and south side elevations trace a gradient from the orthogonal regularity of the back facade to the lighter, looser front and the landscape beyond, says Pichler. Parametric software used to generate construction information saved time and money even on a building of this size, reports the architect, and allowed the close collaboration with fabricators necessary to achieve the desired precision.

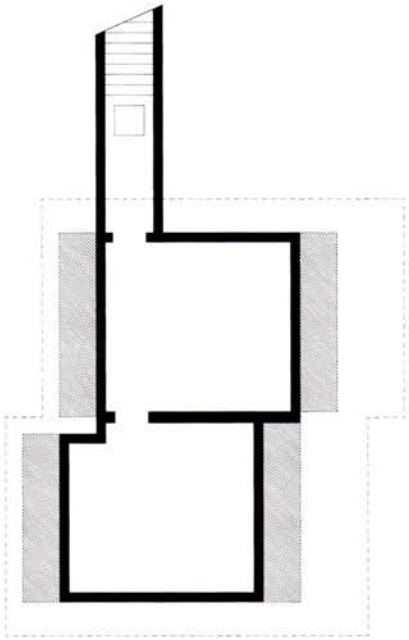
The level of care evident in the fine tolerances and complexity of material junctions imbues the apparently simple interiors with a quiet finesse. Tracks for tight-pleated drapes and sliding doors to the bedroom, closet, and bathroom are discreetly buried in the drywall ceiling, while the frame of the front facade's glass wall is set flush with a poured resin floor that extends out onto the deck. The larger moves express the same sense of precision: cantilevering the roof beams from solid timber panels in the side walls means that no columns interrupt the glazed corners. And in each compact bedroom, Pichler exploited the 3-foot depth of the roof to carve out a skylight above

FLOTATION DEVICE
Each of the 430-square-foot units is essentially one space, with sliding doors and drapes that can close off the bedroom, bathroom, and closet. The wood-framed houses are cantilevered off a concrete base and seem to hover 6 inches off the ground.

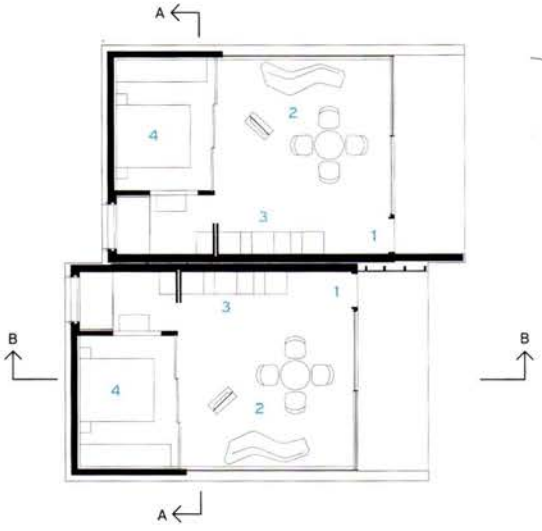
FLUID DYNAMICS
The north and south sides of the houses, as well as the roofs, are clad in black aluminum (left), which contrasts with the white interiors and porches (opposite). The roof's spline curve, a favorite of architects fluent in parametric design, and the smile-like curves of the two sides add a sensual touch to the more rigid geometry of the front and back.

1 ENTRY
2 LIVING/DINING
3 KITCHEN
4 BEDROOM
5 BASEMENT

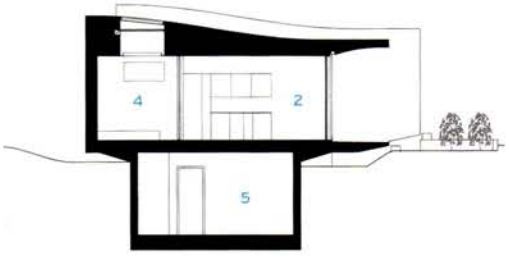
SECTION A - A



BASEMENT



GROUND FLOOR



SECTION B - B

0 10 FT. 3 M.

the bed, increasing the sense of space without eating into the precious volume allowance.

At 110 square feet, the bedroom is smaller than standards would ordinarily allow but was permitted here, as the house is considered one single room. The sliding wood-veneered partition allows inhabitants to sleep cocooned behind it if they choose, or wake up to the play of light and shadow across the faces and fissures of the mountains beyond the orchards.

It is in this prospect that the true purpose of the twin houses becomes clear. Stringent environmental regulations and a contemporary concern for comfort demand a plethora of mechanical and electrical equipment and a highly insulated envelope. But with a great glass sliding door opening each unit to the breeze, the houses offer their temporary residents a taste of something like Thoreau's rougher-hewn Walden cabin, whose simplicity and intimate scale fostered his sense of connection to the environment. In their outward appearance, the Mirror Houses do little to blend in with their surroundings—the opposite, in fact—but, from the inside, the building seems almost to disappear, registering only as a frame for the view. "There but not there," one might say. ■

credits

ARCHITECT: Peter Pichler Architecture – Peter Pichler, Simon Rice, Giancarlo Pellegrini, Erietta Papadopoulos, project team
ENGINEERS: SP3 Engineering (structural); Mayr Hansi (m/e/p)
CONSULTANT: Mauroner OHG (lighting)
FACADE CONTRACTOR: Metallritten
BUILDER: Bernard Bau
CLIENT: Angela Sabine Staffler and Josef Ebner
SIZE: 860 square feet
CONSTRUCTION COST: withheld
COMPLETION DATE: November 2014

SOURCES

MIRROR GLASS: Eckelt
ALUMINUM DOORS: Schüco
SLIDING ALUMINUM DOORS: Skyframe
CHAIRS AND TABLES: Konstantin Grcic for PLANK
INTERIOR AMBIENT LIGHTING: Artemide

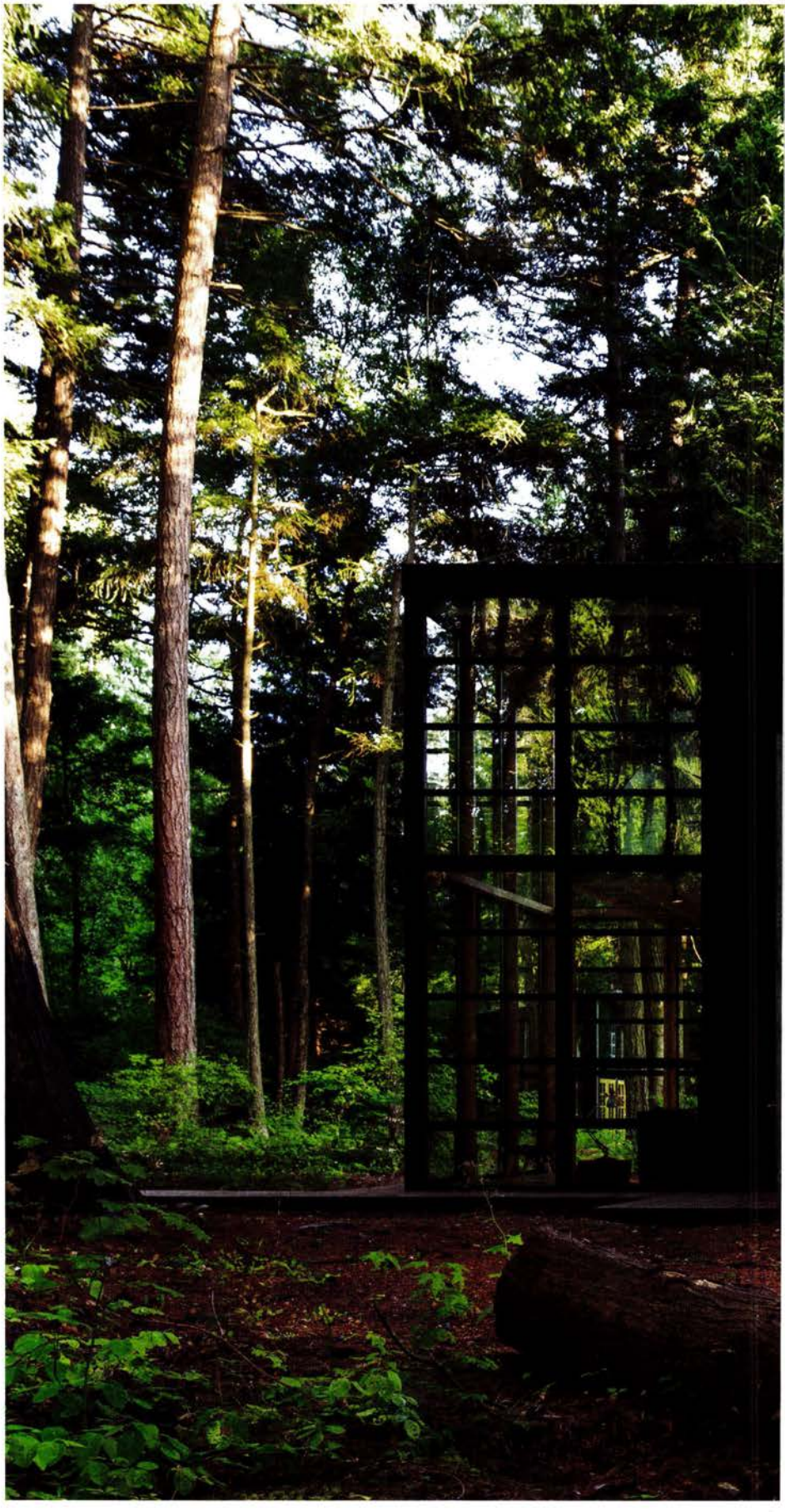
The Lightbox | Point Roberts, Washington
Bohlin Cywinski Jackson

FOREST RETREAT

Designed for an architectural photographer, a house with an innovative spirit delivers modernism on a budget.

BY LAURA RASKIN

PHOTOGRAPHY BY NIC LEHOUX



To drive to Point Roberts, Washington, you have to cross the United States–Canada border twice, making a U-turn above the 49th parallel: its peninsula juts into the water south of Vancouver, separated from the rest of the United States by the Strait of Georgia.

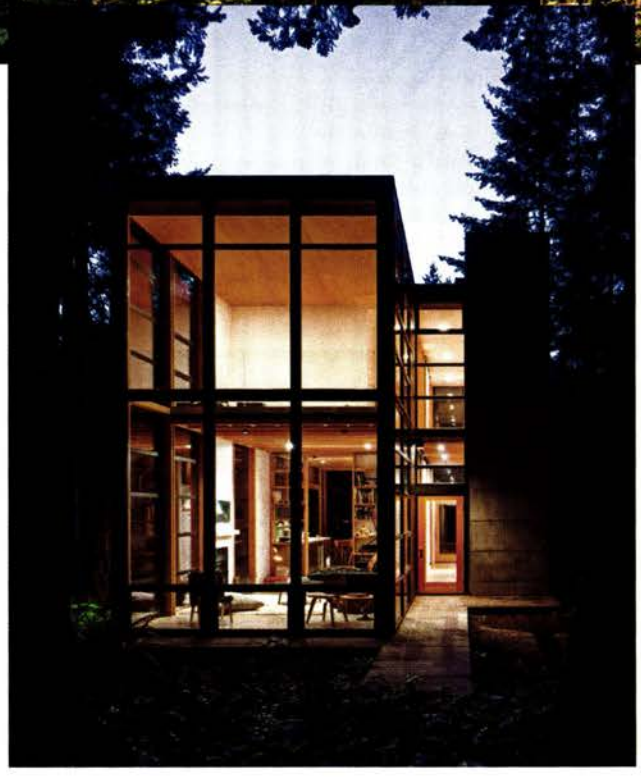
On the southeastern tip of the exclave, Bohlin Cywinski Jackson (BCJ)—known for its tectonic residences whose clarity of form and materials often have ample budgets—has designed what could be thought of as a contemporary Case Study house, built for $210 per square foot. The client was the firm's longtime collaborator, architectural photographer Nic Lehoux, who shares the residence with his partner and their toddler daughter. The rectangular, charcoal-colored two-story wood house is sited in an existing clearing in a dense old-growth forest. A combination of a balloon frame structure and platform structure made of off-the-shelf dimensional lumber, it is defined by two volumes that appear "zipped" together. Internally, they are divided by a hallway running east–west. BCJ principal Robert Miller also designed a ramp that will extend this datum line outside and guide visitors from the road to the house. The walkway and a deck are under construction.

"It's been a lifelong interest to generate modernism on a budget," says Miller, whose childhood bookshelves were filled with his father's issues of *Mechanix Illustrated* and *Popular Mechanics*. "I think I memorized every page. When an opportunity like Nic's comes along, it takes me back to those deep-seated interests." For Lehoux's house, Miller concentrated on eliminating anything unnecessary, assembling without cutting and fabricating, and creating a "special moment in space that rivals a child's treehouse or a fort," he says.

The southern volume is a glass box, interspersed with economical fiber-cement panels for energy savings and to maintain privacy. In it, Miller stacked bedrooms and private

View additional images at architecturalrecord.com.

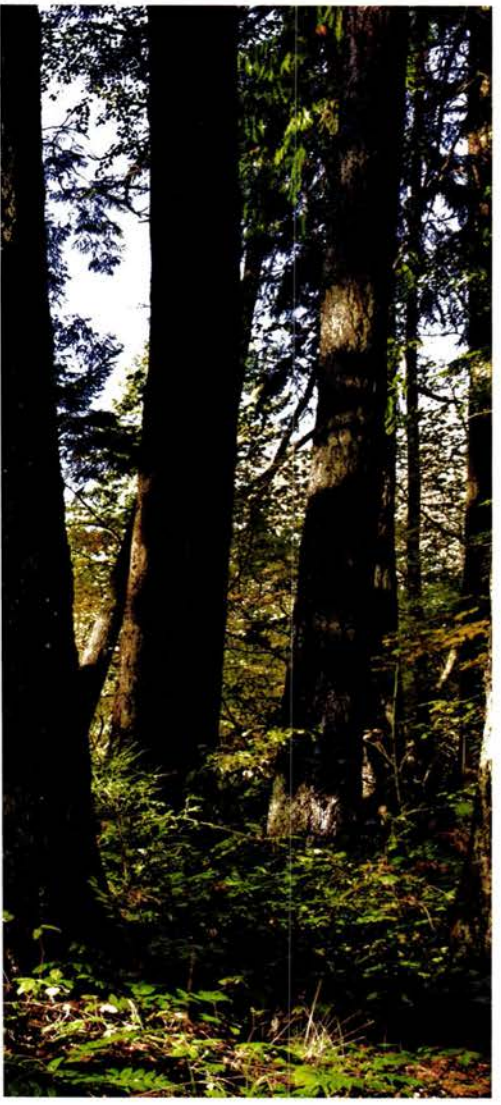
SHADOW AND LIGHT The northern facade is clad in shiplap cedar and painted with durable pine tar. A glassed-in living room and mezzanine blur indoors with the outdoors.



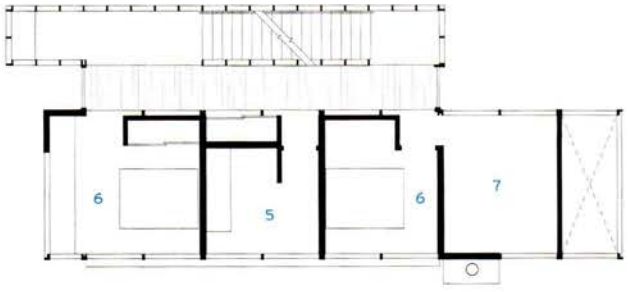
spaces on top of the kitchen and living room. Dappled, ever-changing light streams through 5-foot-wide glass panes set in an aluminum system. The living room, to the east, seems to be floating in the forest. Above it, a glass balustrade protects a second-floor mezzanine. The feeling of being enveloped in the forest is heightened by the fact that the windows extend a couple of inches above the slightly dropped hemlock ceiling. This space was originally going to contain the master bedroom until Lehoux realized that the view—and the feeling of being in a treehouse—was too magical to waste on a room used for sleeping (the master bedroom is instead at the western end of the house).

In contrast, the house's northern volume is mostly solid, clad in shiplap cedar and painted with *svarttjära*, a traditional durable Swedish coating made from pine tar. Narrow glazed incisions amplify the horizontal form, which contains a stair connecting the two floors. Wood slats make up a wall that encloses the stairwell, topped with an operable skylight, and similar slats are used to screen off the living room from the hallway, in a nod to Japanese design. "It gives a sense of openness and privacy at the same time," says Miller.

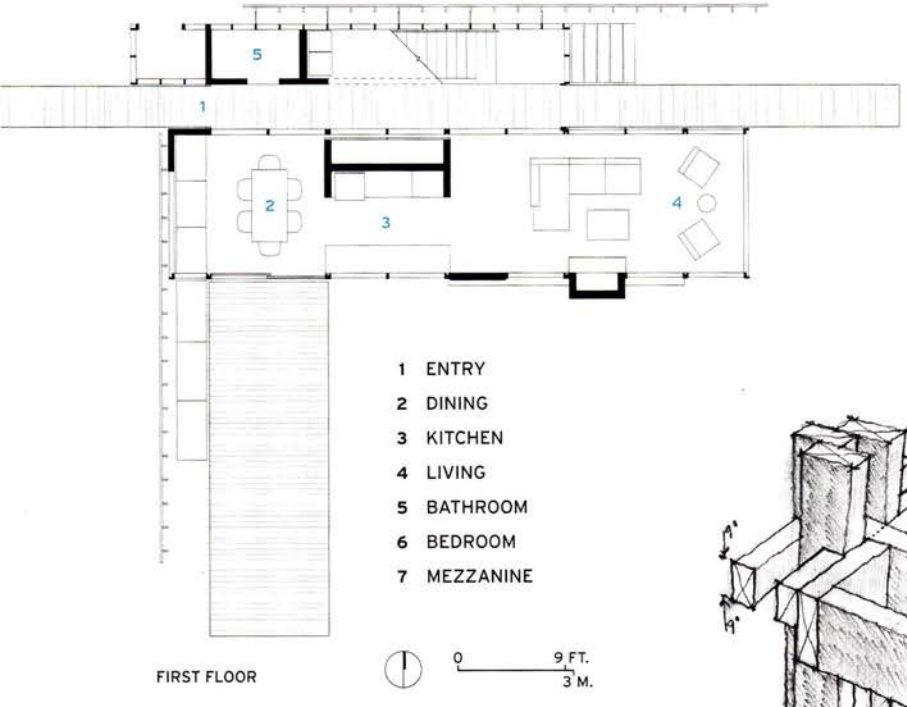
Called the Lightbox, in part because of Lehoux's profession and also because it glows at night, the house contains many references—to Charles and Ray Eames's house in Pacific Palisades, California; the DIY hippie houses of Christiania, in Copenhagen (particularly one made of recycled windows); and the farm buildings and pole barns of Miller's native northwestern Pennsylvania. "Seven or eight years ago, [Miller] gave me this magazine called *Rural Builder*," says Lehoux, who grew



CLEAR VIEW
The architects combined windows with economical fiber-cement panels (above). The house is most transparent at the southeastern end (opposite, bottom), where the owner and his family have a private view of the woods from a living room (right) and mezzanine level: a dropped hemlock ceiling amplifies the verticality of the trees (top, right). In the living room, a polished concrete floor maintains a minimalist language.



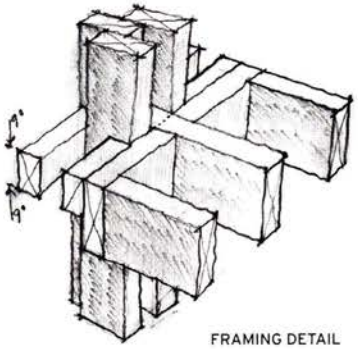
SECOND FLOOR



1 ENTRY
2 DINING
3 KITCHEN
4 LIVING
5 BATHROOM
6 BEDROOM
7 MEZZANINE

FIRST FLOOR

0 9 FT.
3 M.



FRAMING DETAIL

up in rural Quebec. "I thought, 'There's a man after my own heart.'" Adds Miller: "You have to have an appreciation for it. No one's more creative than farmers. They always have to be innovating."

Lehoux, who might be in New York one week and Afghanistan the next, splits the rest of his time between Vancouver and Point Roberts. He discovered Point Roberts when an assistant urged him to visit; he came on a rare stormy day in June of 2004. "I was smitten," he says. He looked at several properties for sale before he came upon the 80-by-140-foot lot he now owns. He paid $17,000—a steal compared to Vancouver prices—in cash the day after seeing it (he later bought an adjacent lot plus one across the street, where he plans to build a studio, also designed by BCJ). After developers failed to build a golf course behind the property, 400 acres were turned into a land trust. Lehoux calls this his "backyard"—its forested paths, leading to the beach, have views of the Strait of Georgia and the San Juan Islands.

Not long after Lehoux purchased the property, Peter Bohlin, a founding principal of BCJ, came to see it and told Lehoux that he wanted to design a house for him. "I said, 'Peter, I would like nothing more, but I can't afford one of your houses,'" recalled Lehoux. "'I will live vicariously by shooting them for the foreseeable future.' I think that was an interesting challenge for them." Lehoux ended up trading photography for design services, with a result—in scale, proportion, and siting—that is quite similar to Bohlin's original sketch. "It's also thanks to a lot of ideas that Robert brought," says Lehoux.

The pared-down flexible system used for the Lightbox is one that Miller believes could be applied to 5,000 square feet just as well as 200. "It is a careful balance of elegant proportions and scale. The luxury, if you call it that, is not in layers of marble but in being immersed in the forest," says Miller. ■

credits

ARCHITECT: Bohlin Cywinski Jackson – Peter Bohlin, Robert Miller, principals; Jeremy Evard, project manager; Kyle Phillips, associate; Patricia Flores

ENGINEER: PCS Structural Solutions

GENERAL CONTRACTOR: HBHansen Construction

CLIENT: Nic Lehoux

SIZE: 1,650 square feet

CONSTRUCTION COST: $346,500

COMPLETION DATE: 2015

SOURCES

FIBER-CEMENT PANELS: James Hardie

WINDOWS: Marlin Windows

GLASS: PPG

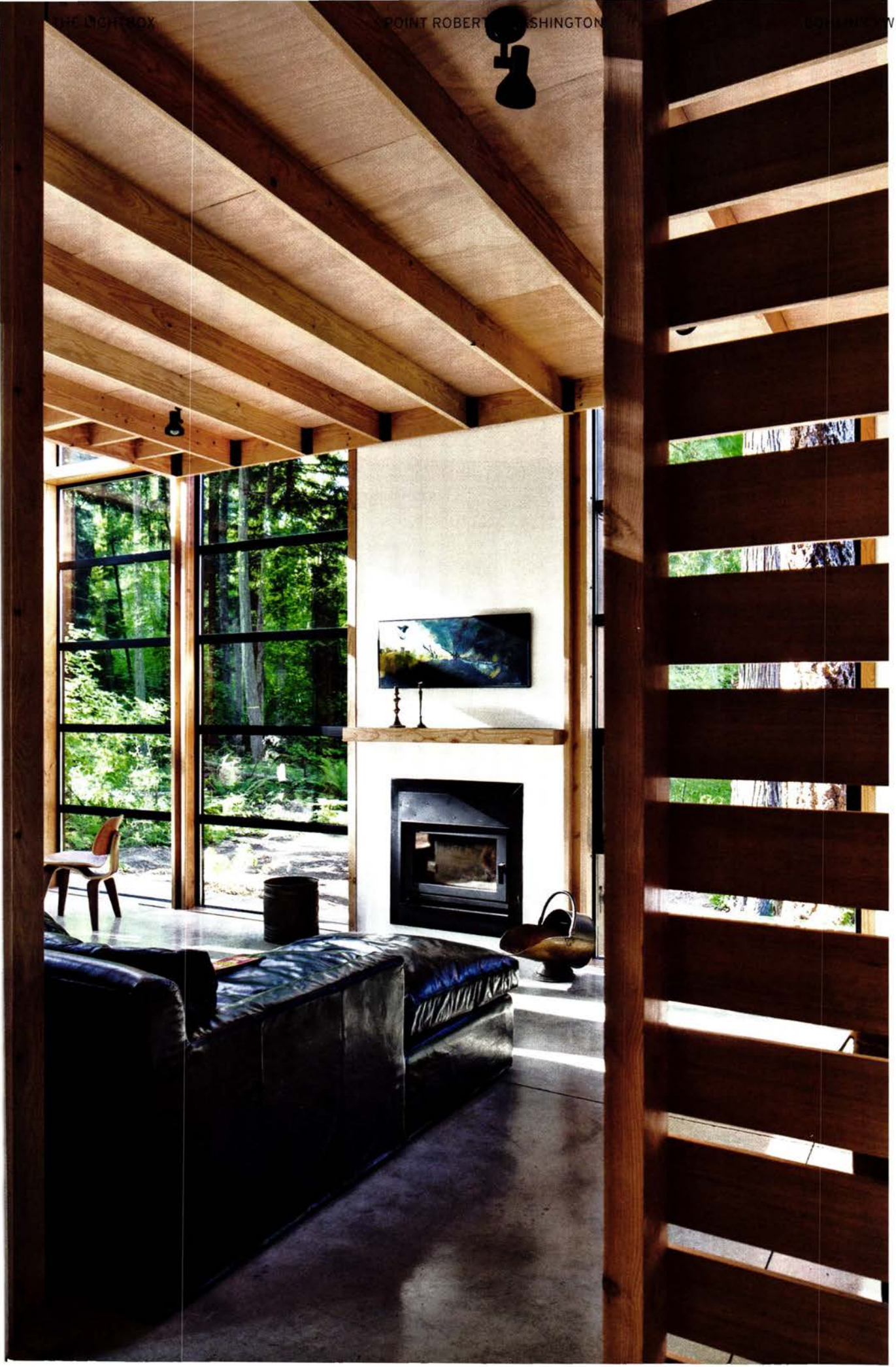
BLACK PINE-TAR STAIN: Auson

DOWNLIGHTS: WAC Lighting

SLIDING DOORS: Fleetwood

SKYLIGHT: Velux

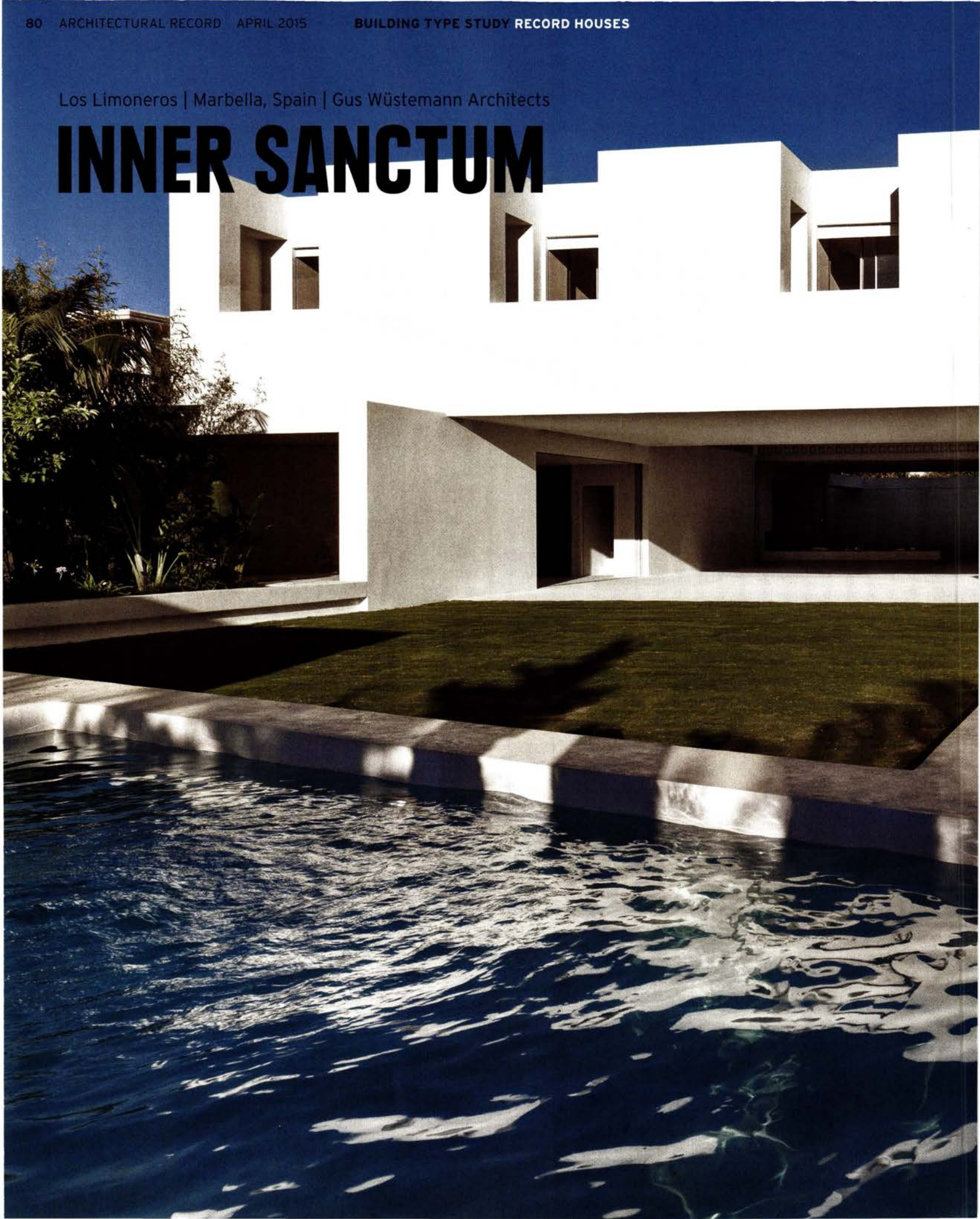
RECYCLED RADIATORS: Ecorad

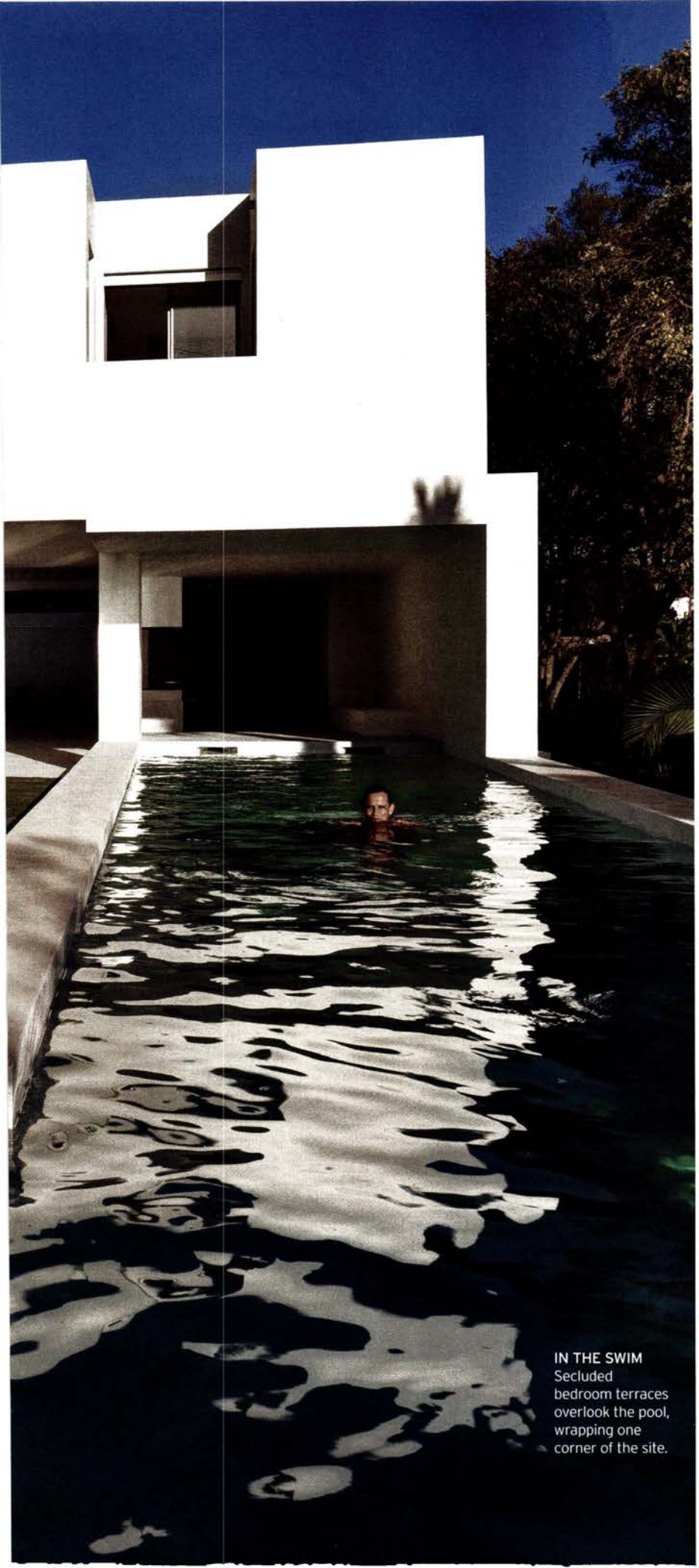


SCREENING ROOM
A barn door made of hemlock slats can screen off the kitchen from the hallway and front entrance. Similar slats create a sense both of privacy and openness throughout the house, including the living room (left). The utilitarian use of wood throughout the house adds warmth, particularly to the living spaces.

Los Limoneros | Marbella, Spain | Gus Wüstemann Architects

INNER SANCTUM





IN THE SWIM
Secluded bedroom terraces overlook the pool, wrapping one corner of the site.

A pristine, thick-walled house in southern Spain affords privacy yet openness through its interplay of void and mass.

BY SUZANNE STEPHENS

PHOTOGRAPHY BY BRUNO HELBLING

The mandate was clear: design a house that offers privacy from the outside world but opens up to gardens and terraces within its confines. The solution was a familiar one for the setting in Andalusian Spain, where inward-facing patio houses speak of a Moorish heritage. However, in conceiving a vacation retreat for a family of four in Marbella, on the palmy Costa del Sol, Swiss architect Gus Wüstemann has avoided the arcaded courtyards and red-tile roofs typical of the region. He has kept the general idea, but emphasizes the abstracted masses and voids seen in his other work, such as the muscular concrete residence Two Verandas in Zurich (RECORD, April 2013, page 96). The client, a European businessman, had been coming to the resort for 20 years to enjoy golf and spend time with friends and family. When he decided to build a new home there, he was drawn to the strong geometries and complex play of light and shadow in Wüstemann's architecture.

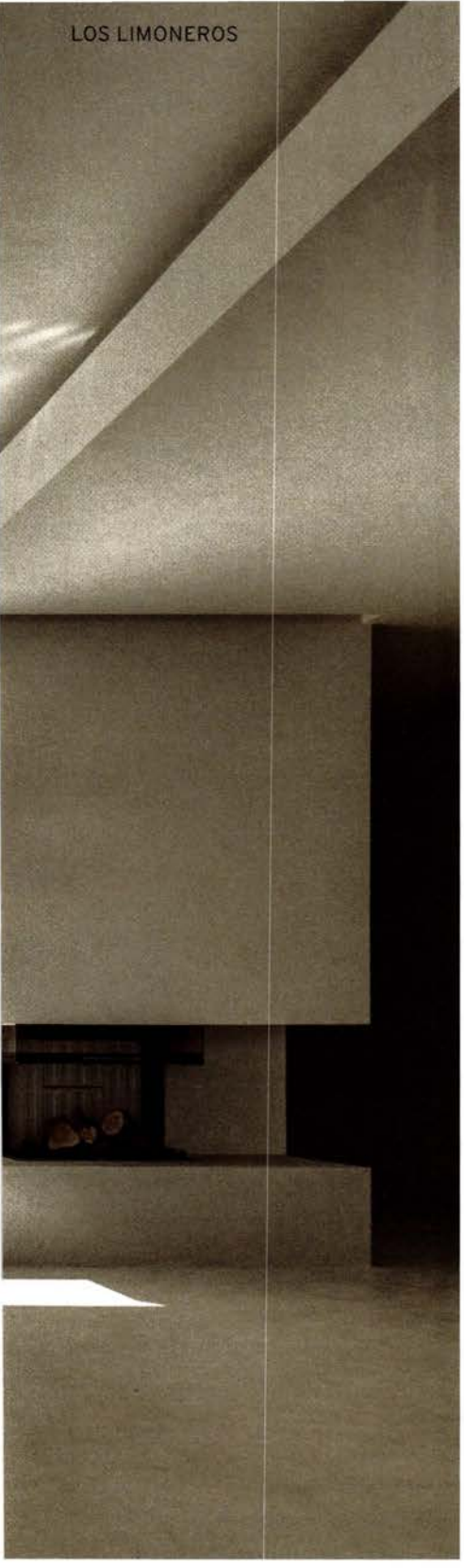
While Marbella's sunny weather, sandy Mediterranean beaches, and breaking surf account for its popularity, the picturesque village had fewer than 1,000 residents right after World War II. During the 1960s and '70s, it became the haven for the so-called jet set, a migratory social flock of aristocrats, showbiz people, and rich political exiles. Attracting such "beautiful people" as Prince Alfonso von Hohenlohe, Sean Connery, and former Cuban dictator Fugencio Batista y Zaldivar, Marbella grew as others followed: today the population is over 140,000. It is good to be able to withdraw behind garden walls.

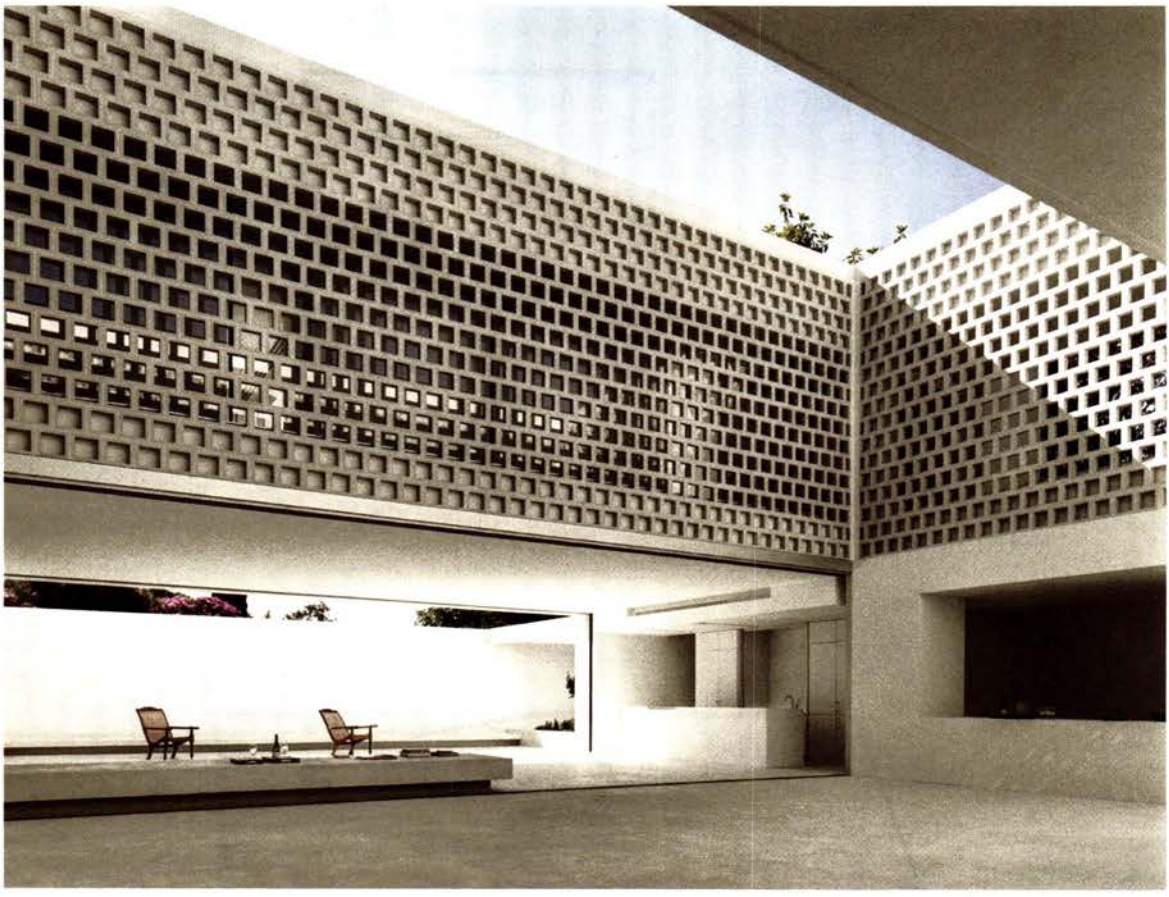
Wüstemann's plan recalls those that Mies van der Rohe developed in his elegant linear-court house projects of the 1930s and '40s—only here, as the architect puts it, "much of the program for the house is hidden on the periphery." Its concrete frame with white plastered masonry infill walls gives it an implacable and impenetrable solidity. Following the outline of the property—a parallelogram in a compact residential area—you might say the 6,200-square-foot house evokes, on a small scale, fortresses such as the nearby 10th-century Moorish Sohail Castle.

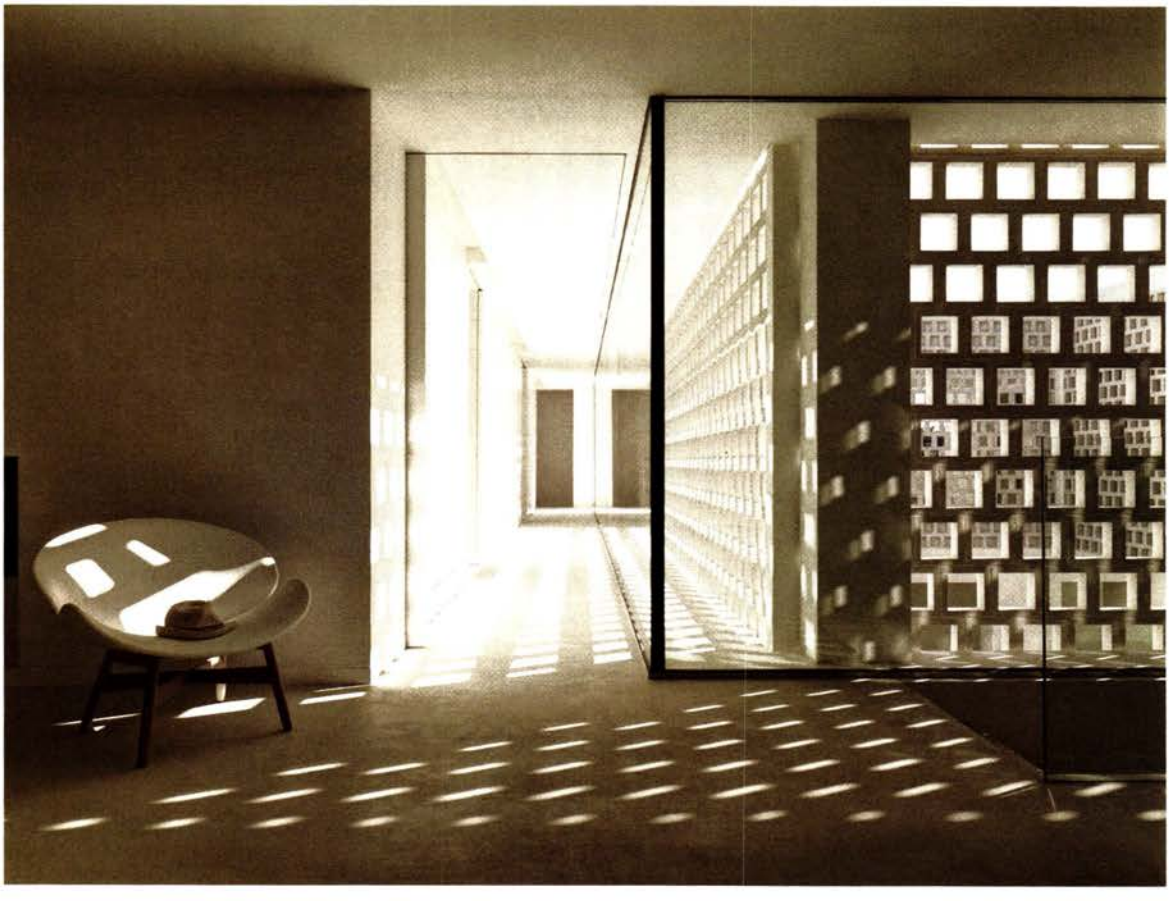
The neighbors at first didn't see this historic connection. Since it diverged from the Spanish Mediterranean or classical-style vocabulary typical of Marbella's villas, they asked the client if it was going to be a hotel or a department store. As the owner tells it, they even expressed concern to the local government that the design represented a violation of the residential zoning. No, it was simply a house.

Stepping through the protective entrance behind the thick walls enclosing the site, you are surprised to find yourself in a light-filled living and dining area contained in a glazed bar. It extends the width of the house, stretching

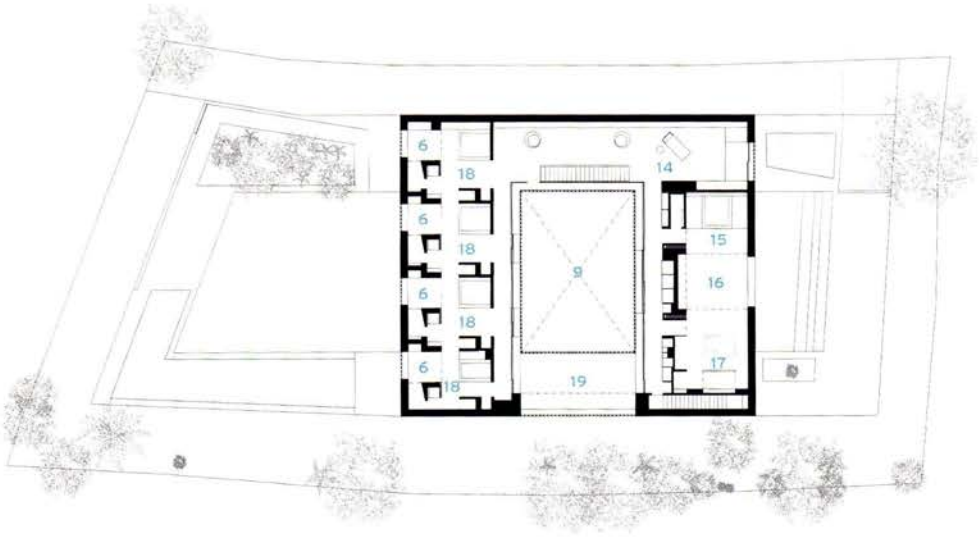
View additional images at architecturalrecord.com.



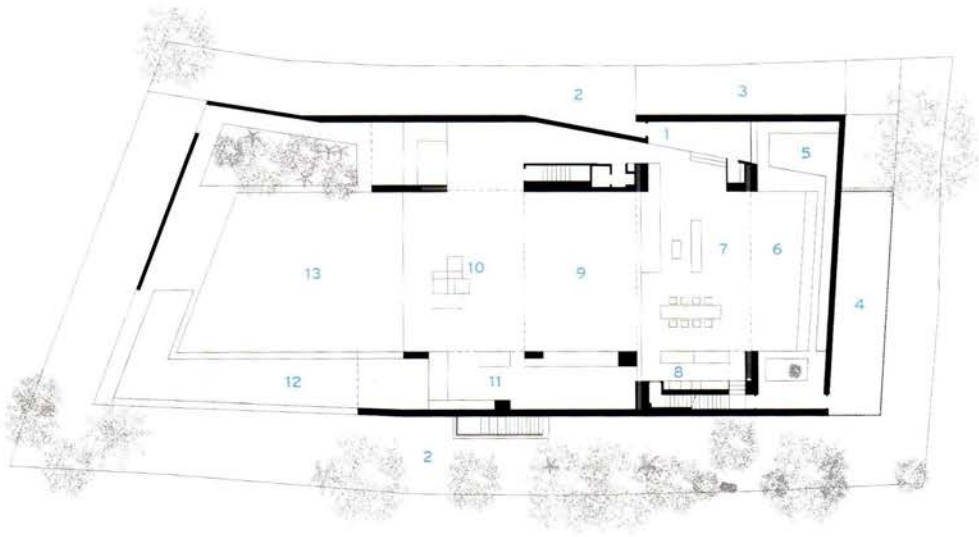




THE PATIOS HAVE PATIOS From the living room (above), the view west to the mountains is framed by the receding composition of reinforced-concrete floor slabs and post-tensioned beams. The open-air courtyard (top, right) is surrounded on the upper level by a precast concrete screen that filters sunlight into the corridors leading to the bedrooms and other family spaces (right). On the roof, 83 square feet of solar panels (not shown) help supply energy for the house's radiant floors and hot water.

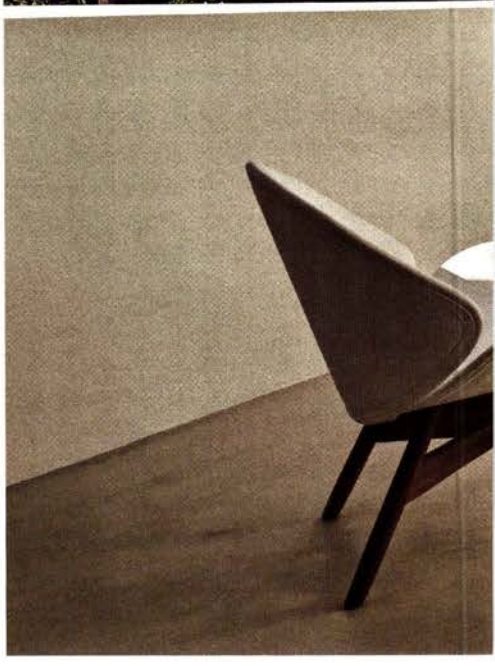


SECOND FLOOR



GROUND FLOOR

0 16 FT.
5 M.



1 ENTRANCE HALL
2 GARDEN
3 PARKING
4 GARAGE
5 POND
6 PATIO
7 LIVING ROOM
8 KITCHEN
9 COURTYARD
10 PORCH
11 BAR/LOUNGE
12 POOL
13 GARDEN
14 LIBRARY
15 MASTER BEDROOM
16 MASTER TERRACE
17 MASTER BATH
18 BEDROOM
19 TERRACE

credits

ARCHITECT: Gus Wüstemann Architects – Gus Wüstemann, principal; Silvia Pujalte, Eftychia Papathanasiou, Joan Pau Fernandez, Jan Kubasiewicz, Manuel Greter, Mariana Marques da Silva, Sandy Brunner, design team

ENGINEER: Alicia Huguet (structural, m/e/p)

CONSULTANT: Numo Almeida (landscape)

GENERAL CONTRACTOR: ADP Empresa Constructora

OWNER: withheld

SIZE: 6,200 square feet

CONSTRUCTION COST: withheld

COMPLETION DATE: July 2014

SOURCES

PRECAST CONCRETE SCREEN: SAS Precast Concrete

METAL FRAME WINDOWS, SLIDING DOORS: Panoramah

CEMENTITIOUS SURFACE: Top Ciment

ELASTOMERIC FINISH: Acriton

from the entrance vestibule on the north to a minimal kitchen on the south wall—so minimal, in fact, that it is hard to find the stove (concealed by a movable counter) or other culinary appurtenances.

Long sliding glass walls open the indoor living spaces to a patio and a small pond immediately to the east, and to a grassy lawn and swimming pool to the west. Looking in this direction, where the house's receding columns and beams frame vistas and define the various interior and exterior areas, you can catch a glimpse of the Sierra Blanca Mountains. As the spaces unfold, boundaries blur between inside and out. "We just move the furniture outdoors when it gets warmer," says the client on a 65-degree winter's day. Not all of it moves, however: Wüstemann has created nooks with built-in benches and podiums of masonry covered with a smooth cementitious coating—as integrated with the architecture as built-ins are in the habitations of Le Corbusier.

Leaving the living area and walking west to the lawn and garden, you pass through an open court, a spatial void that is the center of the house. Bound on the four sides of the second level by expansive grills of slender precast-concrete brick, the court seems enclosed by modern-day Moorish *mashrabiyas*, which filter light into the corridors leading to the bedrooms, library, and media room. Where the upper bedroom wing overlooks the lawn, an L-shaped pool, and a lemon grove, Wüstemann has carved deep niches, much like the syncopated crenellations of a medieval fort, to provide secluded sunporches for the occupants and guests.

In boiling down the elements of both historic and modern motifs to their essentials, Wüstemann avoids obvious replications of any particular style. His unremitting approach to clean details reveals his architectural training at Zurich's rigorous Swiss Federal Institute of Technology. Yet the fact that he has offices in Barcelona as well as Zurich explains his more casual Mediterranean sensibility and underlies the house's subtle combination of control and *la buena vida*. ■

FROM THE TERRACE
Private open spaces abound. An upper-level terrace connects the master bath (above) to the master bedroom (not shown) and frames the view to the east.

Pound Ridge House | Pound Ridge, New York | KieranTimberlake

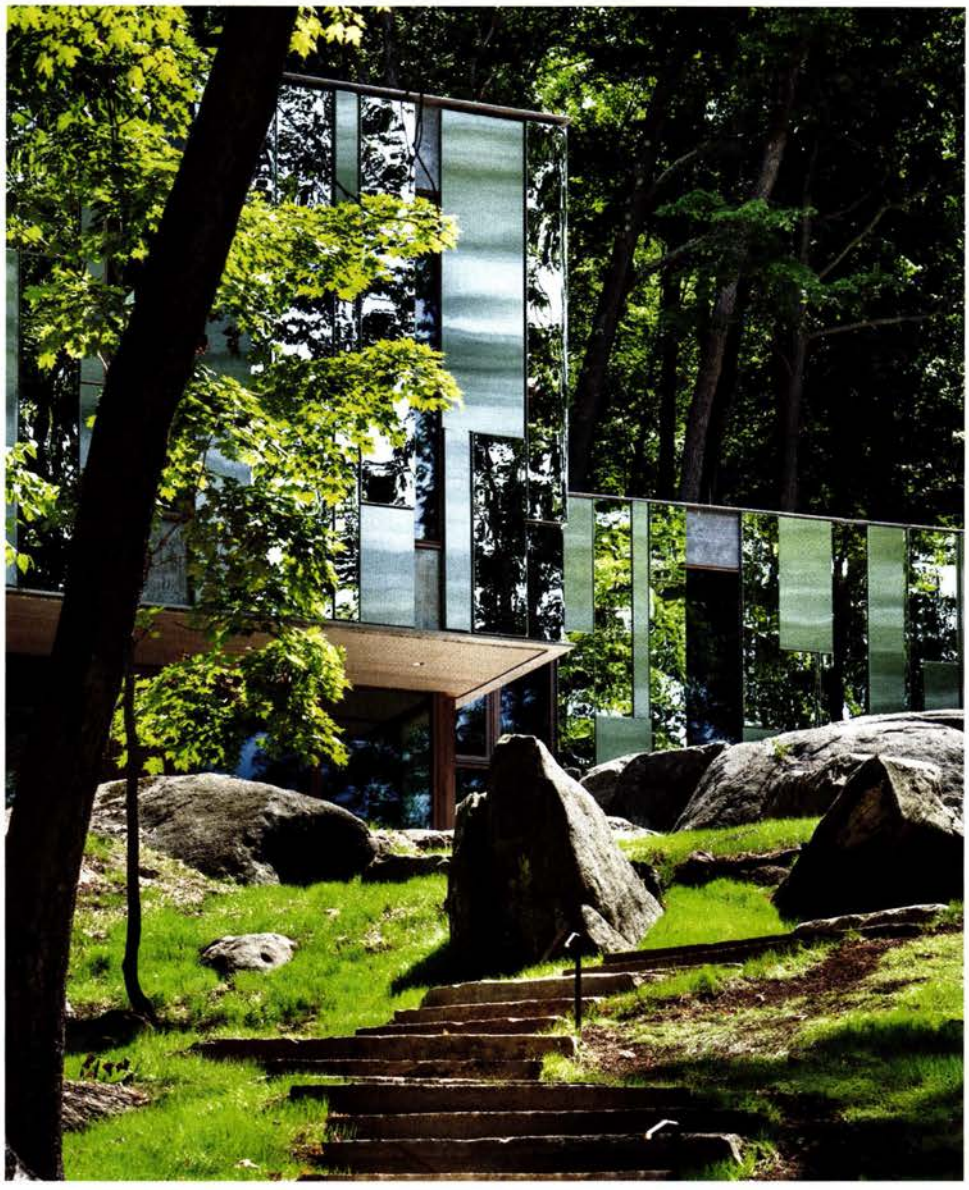
ON THE ROCKS

A house wrapped in a sophisticated skin mirrors its surroundings and engages a challenging topography.

BY JOANN GONCHAR, AIA

PHOTOGRAPHY BY PETER AARON/ESTO

MIND THE GAP The house consists of two rectangular volumes built on a pair of boulder-defined plateaus. The two halves are connected by a glazed bridge that crosses a narrow ravine.



In spite of high-profile projects like the U.S. embassy now under construction in London, Philadelphia-based architecture firm KieranTimberlake still sometimes accepts commissions for challenging single-family houses. "They are an opportunity to try out things that would be tougher on a larger project," says design partner Stephen Kieran.

A key example is the Loblolly House (RECORD, April 2007, page 140), a weekend home for Kieran's family on Taylor Island in Maryland, where he explored how far the concept of off-site fabrication could be pushed. But with the firm's first completed house since Loblolly—a year-round residence for a mutual fund manager and his wife who works in film production—the focus was the effect of the changing seasons and different weather and atmospheric conditions on the architecture. "Time was a big design element for us," says Kieran of the latest house built on a wooded, 33-acre site in Pound Ridge, New York—a bucolic town about 50 miles north of Midtown Manhattan.

Here the primary medium for architectural exploration was the building skin—a rainscreen composed of metal panels with a variety of finishes that reflect light and the surroundings in different ways. But before designing the house and its unusual envelope, the architects had to first identify the best place to build within their client's property, a process that was far from straightforward. Although the parcel was large, it was strewn with boulders and interlaced with wetlands. It was also steeply inclined, rising about 100 feet from the road to the ridge—the geologic feature that the name Pound Ridge refers to.

Within this difficult terrain, the architects were drawn to a pair of "rooms" defined by rock outcroppings near the site's highest point. The two small, level areas were positioned one below the other and separated by a narrow ravine. The spot, according to Kieran, provided the opportunity to create a house that "sits lightly on the ridge but is grounded."

Without any blasting, KieranTimberlake was able build a dwelling of more than 5,000 square feet by inserting a rectangular volume into each plateau. They are clad primarily with the metal panels, but also in bluestone masonry, which has a coloring sympathetic to the boulders on the site. A two-story structure, comprising a double-height entry stair hall, the garage, and bedrooms, sits within the lower rock formation, while the upper one holds a one-story living and dining wing. The stair hall serves as the linchpin between the two elements, which are connected by an approximately 17-foot-long glass-enclosed bridge.

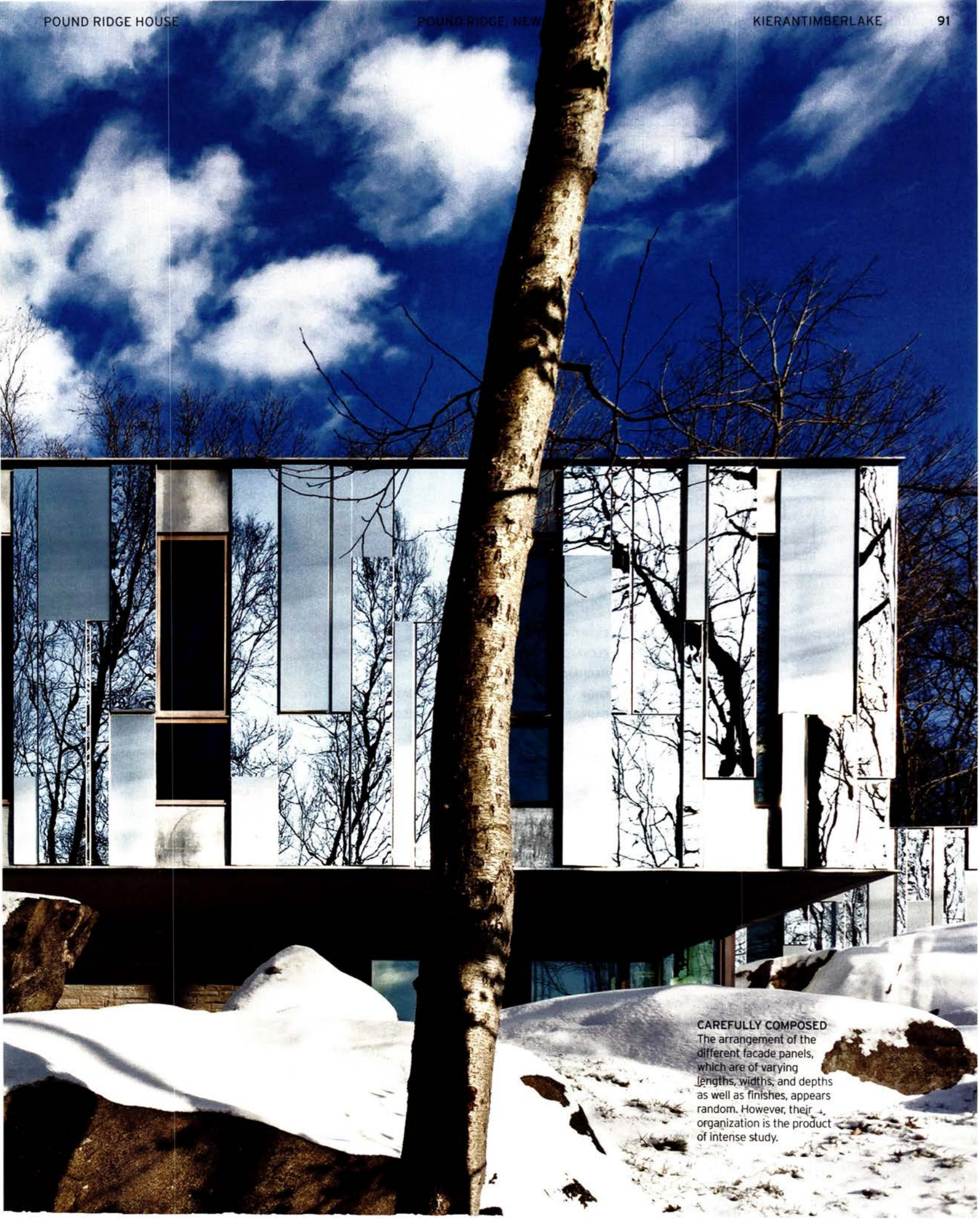
The main, 12-foot-tall living space features white oak ceilings and floors and full-height windows carefully positioned to provide dramatic views of the site's distinctive topography. Kieran explains that the strategy for placement of these apertures was much the same as the approach the owners would later use for hanging their art collection, which includes works by Giovanni Battista Piranesi, M.C. Escher, and Frank Stella. "We were very curatorial about it," says Kieran. The architects were just as deliberate with the placement of skylights above the bedroom wing's hallway. The slot-like openings create a rhythm of direct and reflected sunlight that animates the long, narrow space.

DISAPPEARING ACT
The house is clad in several materials that each reflect light and the surroundings differently. Mirrorlike panels of highly polished stainless steel are used at the corners, like one near the front door (above) and one near the garage (opposite). The treatment makes the house's edges almost vanish.

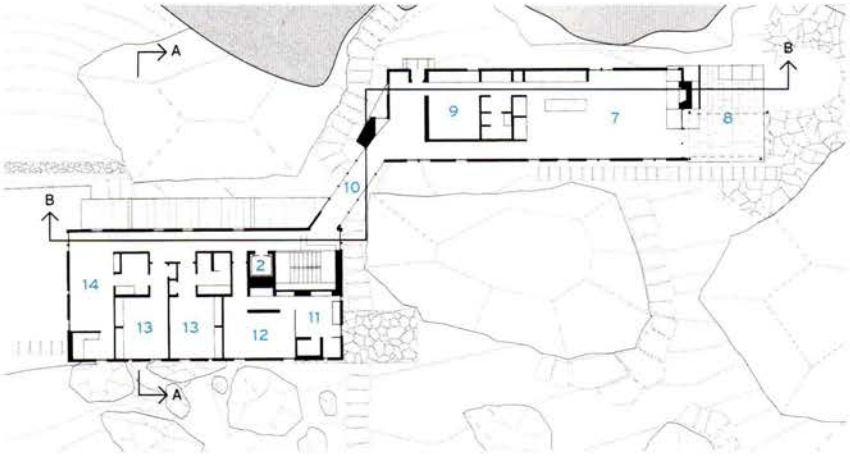
These interior elements make for an elegant and very livable house. But the project's standout feature is its exterior skin. The different facade materials—brushed and polished stainless steel (both over an aluminum honeycomb core), lead-coated copper, and the glass of the windows—produce a varied surface that simultaneously reflects the surroundings and transforms the building envelope into an ever-changing abstract pattern. The cladding performs almost as camouflage, especially at the corners, where the use of the mirrorlike stainless-steel panels makes the building's edges practically disappear.

The overall arrangement of the cladding panels, which are of varying lengths, widths, and depths, seems random.

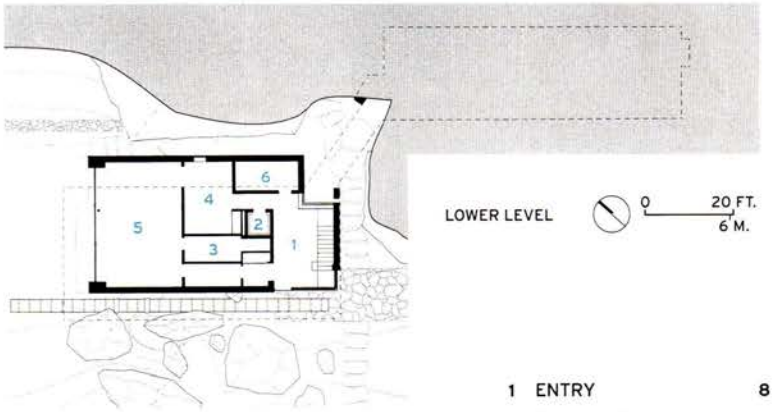
View additional images at architecturalrecord.com.



CAREFULLY COMPOSED
The arrangement of the different facade panels, which are of varying lengths, widths, and depths as well as finishes, appears random. However, their organization is the product of intense study.

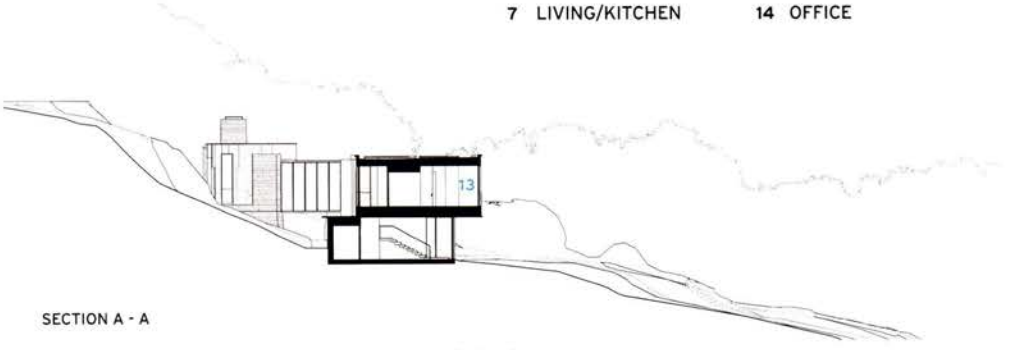


UPPER LEVEL



LOWER LEVEL 0 20 FT. 6 M.

1 ENTRY
2 ELEVATOR
3 MECHANICAL
4 SHOP
5 GARAGE
6 WINE CELLAR
7 LIVING/KITCHEN
8 TERRACE
9 MEDIA ROOM
10 BRIDGE
11 MASTER BATH
12 MASTER BEDROOM
13 BEDROOM
14 OFFICE



SECTION A - A

0 20 FT. 6 M.

SECTION B - B

credits

ARCHITECT: KieranTimberlake – Stephen Kieran, design partner; Jason E. Smith, partner in charge; Jon McCandlish, project architect; Trevor Horst, architect

CONSULTANTS: CVM (structure); Reed Hilderbrand (landscape); Kellard Sessions (civil/site planning); Filament 33 (lighting)

GENERAL CONTRACTOR: Prutting & Company

CLIENT: Michael and Olga Kagan

SIZE: 5,250 square feet

COST: withheld

COMPLETION DATE: September 2014

SOURCES

STAINLESS-STEEL PANELS: Lamcel

WINDOWS AND ENTRANCES: Duratherm

ROOFING MEMBRANE: Sarnafil

CONTROLS AND SHADES: Lutron

KITCHEN: Eggersmann

SITE PLAN

However, the elevations were the product of intense study, according to Jason Smith, partner in charge of the project. The goal was to waste as little of the stainless and copper sheet material as possible and minimize the number of the highly polished panels (which were the most expensive), while providing richness and diversity.

All this attention to the skin produced more than just a stunning aesthetic effect. The cladding is part of a thermally robust and nearly airtight envelope system that includes structural insulated panels (SIPs). The house, which was designed with Passive House strategies (see page 120) in mind, also incorporates radiant heating, a geothermal system, and an energy-recovery ventilator. Kieran likes to compare the Pound Ridge project to Philip Johnson's Glass House, completed in 1949 in nearby New Canaan, Connecticut. Johnson's house is visually open to its environs, since it has no interior partitions and is entirely enclosed, on all four sides, in floor-to-ceiling single-pane glass. In contrast, the triple-glazed windows on the KieranTimberlake house make up only 13 percent of the building enclosure. Like the midcentury project, the Pound Ridge house is an example of a "dwelling within nature," says Kieran, but one without "the same energy consequences." ■

SUSPENDED IN AIR The two-story entry hall (below, left) features a stair with cantilevered white oak treads seemingly inspired by M.C. Escher, whose work the clients collect. The stair hall, where they display a mixed-media piece by another favorite artist, Frank Stella, serves as the linchpin between the bedroom wing (below, right) and the main living space (opposite). White oak floors, full-height windows, and carefully positioned skylights lend the interiors a light and airy feel.

Balint House | Valencia, Spain
Fran Silvestre Arquitectos

SMOOTH OPERATOR

Gentle curves and seamless surfaces give a Mediterranean house an enigmatic allure, with spaces that flow indoors and out.

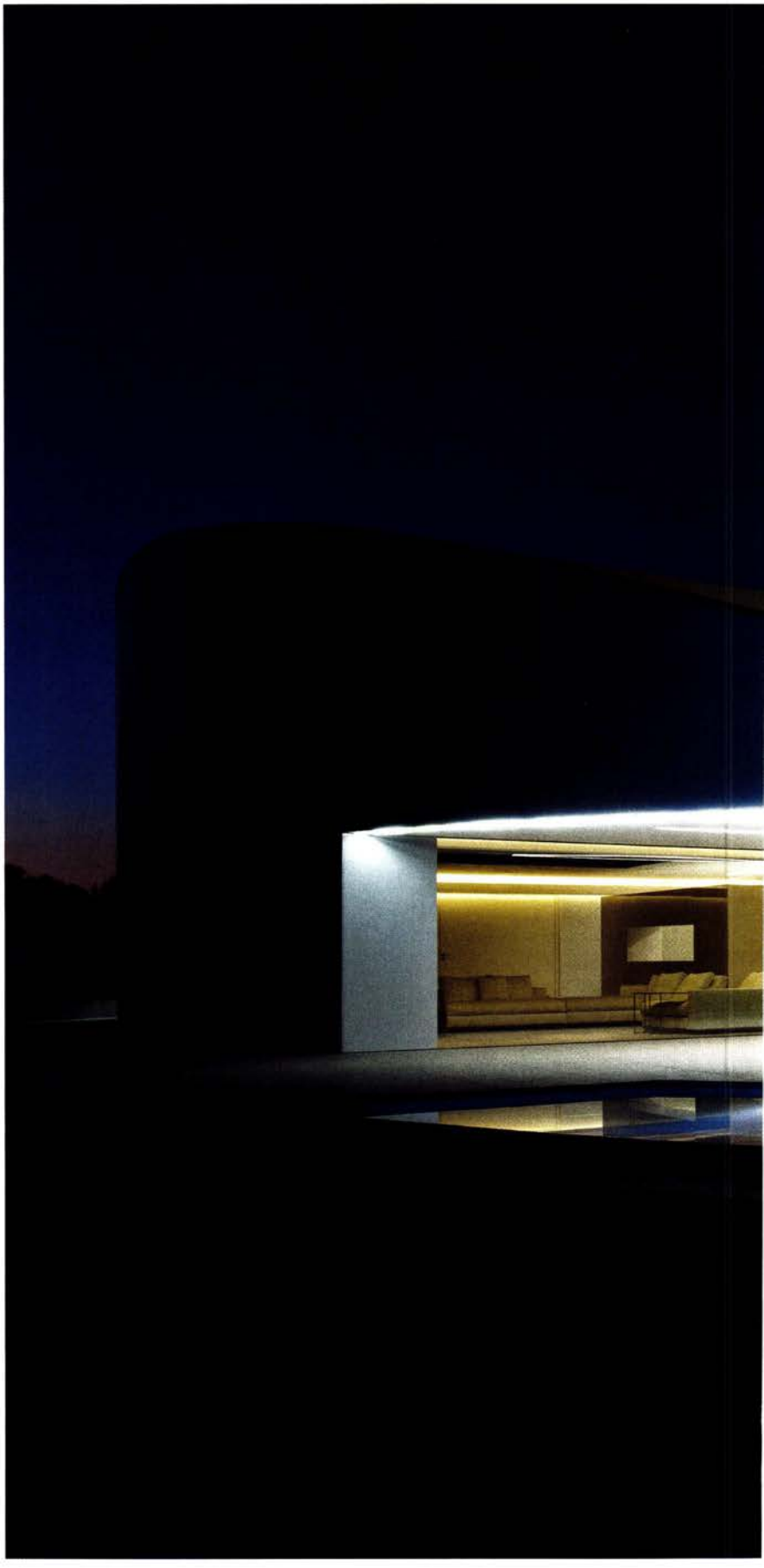
BY DAVID COHN

PHOTOGRAPHY BY DIEGO OPAZO

Located on a third of an acre facing a golf course outside Valencia, Spain, the Balint House proves that the most unexpected designs can arise from confronting obstacles. In this case, the problem was a municipal ordinance that limited new houses to one story and a sloping roof. Seeking to squeeze more square footage out of the small site for his clients, a couple with two children, local architect Fran Silvestre came up with the idea of an arched roof, rising high enough to include a full "attic" floor of bedrooms while still satisfying code. "We rounded off the shape a little, and everything started coming together," says Silvestre.

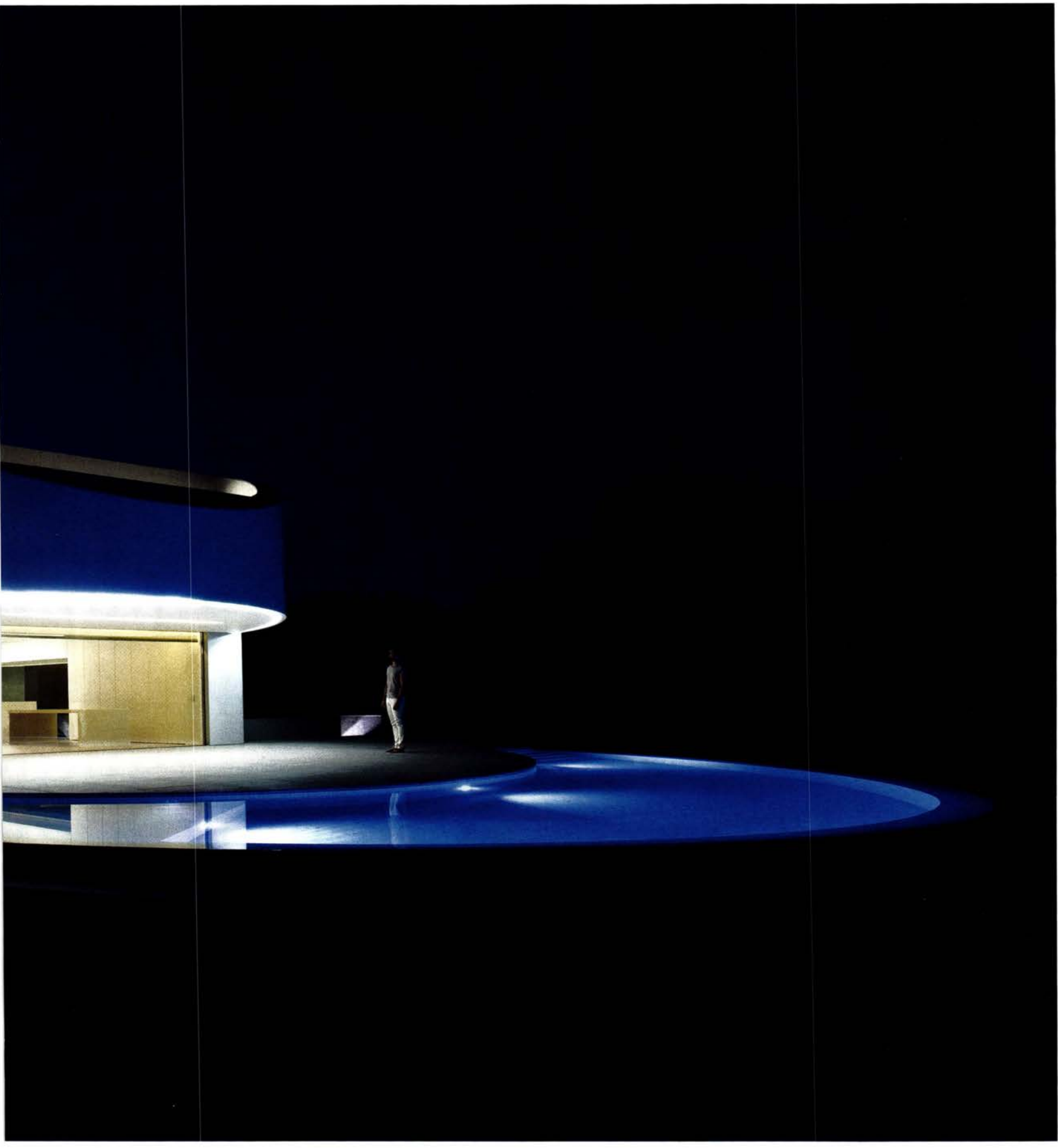
The resulting elliptical structure, with a swooping roof and deep cantilevers over its two symmetrical ends—one facing the street, the other overlooking a pool terrace and the golf greens—could not be more elegant or succinct. It is a solution to which nothing can be added or taken away. The cantilevers protect the large glazed openings below them from the strong Mediterranean sun and provide balconies for the bedrooms, while the curving walls pull the house away from the side yards so it won't crowd the lot. "It's a kind of streamlining," Silvestre suggests.

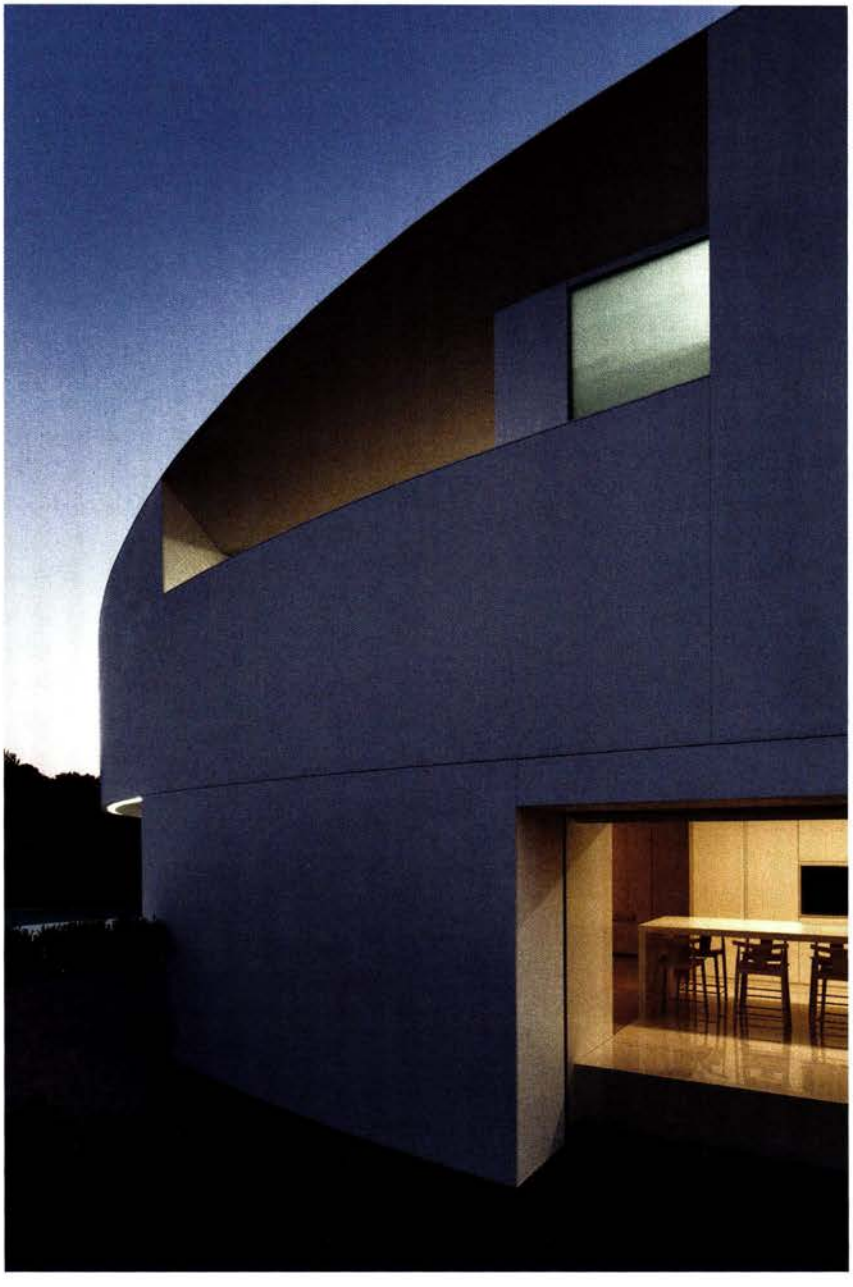
Inside, the ground-floor living spaces are completely unencumbered by interior walls, opening views straight through the house. Silvestre articulates the different living zones by organizing them around a central double-height stair hall, creating a sense of interior depth and vertical release in the otherwise ethereal space. The hall rises to a rectangular skylight at the highest point of the roof. Gray smoked-glass balustrades on the stairs and the upper-level



MACHINE AESTHETIC The 5,400-square-foot house reads as an elegant industrial object, especially when lit up at night. A curving swimming pool responds to the elliptical form of the house.

View a video at architecturalrecord.com.

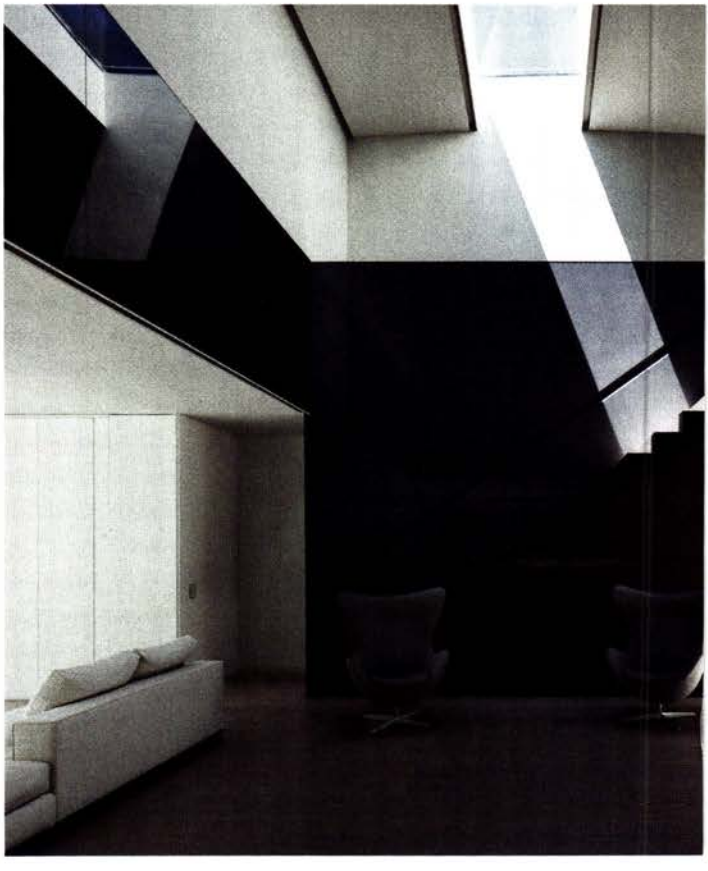




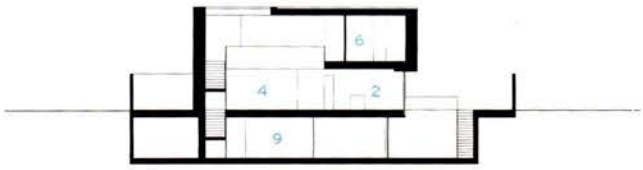
corridor around the opening contrast with the ground floor's white finishes. Sunlight penetrates the skylight to cast a brilliant, shifting rectangle of light across bleached-wood floors, while the glass balustrades catch glittering reflections of outdoor views.

The only interior divider on the ground floor is a long cabinet that stops just below the ceiling, separating the kitchen from the hall. With the clean lines of the kitchen's island and classic pieces of modern furniture such as Arne Jacobsen's Egg Chair, selected by interior designer Andrés Alfaro Hofmann, the interiors inevitably draw comparisons to the open living spaces of Mies van der Rohe's Farnsworth House or Philip Johnson's Glass House. But Silvestre adds the vertical thrust of the stair hall to his fluid, horizontal spaces and solves the privacy problems of sleeping areas with a conventional bedroom floor upstairs. A full basement includes guest rooms that overlook a sunken light court facing a side yard. The resulting design is uncompromisingly direct and minimal, bringing together in one neat package the familiar elements of the single-family house.

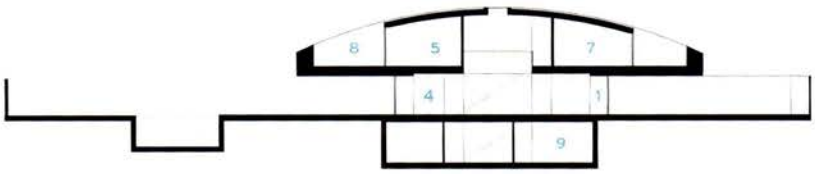
The project required some structural sleight-of-hand to arrive at this simplicity of line. The entire house stands on four columns, which rise two stories through the short lateral walls to support the roof's concrete vault. The bedroom floor is suspended from this vault via high-strength concrete panels hidden in the partitions. By routing plumbing and other services through the building's thick side walls, Silvestre could leave the ground floor ceiling completely free of interruptions. To counter the horizontal thrust of the vault, a concrete tension ring girdles the building at the level of the balcony balustrades. The two overhangs are counter-



LIGHT SHOW
A cantilevered balcony on each side of the house offers views to either the pool (opposite, top) or the golf course. The balconies also shade ground-floor spaces from the strong sun. Silvestre recessed the glazing in the kitchen (opposite, bottom left) for the same reason and used skylights to bring daylight into the two-story-high hall (below). Dark smoked-glass balustrades on the second floor provide a visual counterpoint to the white interiors.

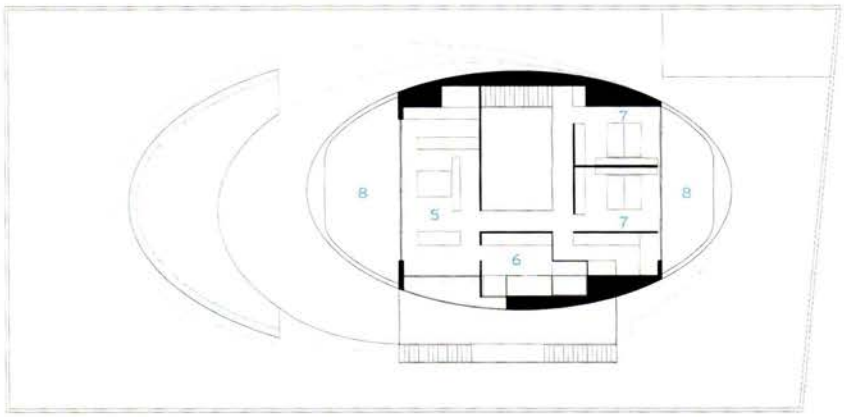


SECTION A - A

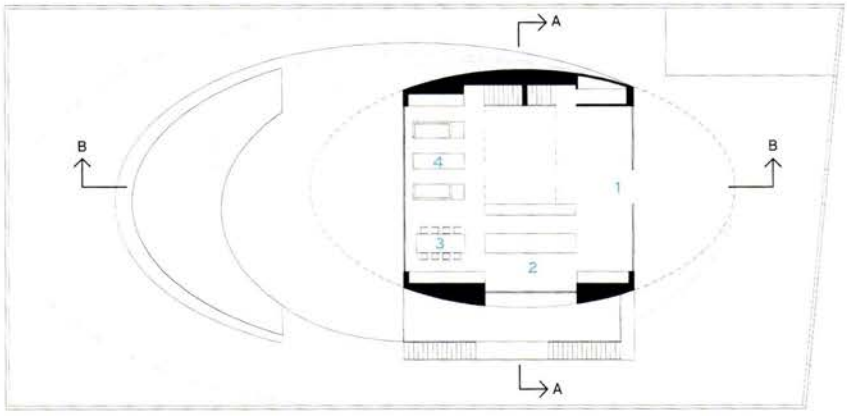


SECTION B - B

0 16 FT.
5 M.



SECOND FLOOR



GROUND FLOOR

0 16 FT.
5 M.

1 ENTRY
2 KITCHEN
3 DINING
4 LIVING
5 MASTER BEDROOM
6 MASTER BATH
7 BEDROOM
8 TERRACE
9 BASEMENT

balances, extending up to 18 feet.

Silvestre studied various finishes for the curved exterior walls and roof, including stucco, ceramic tile, and stone, before selecting man-made solid surface for its smoothness, hidden joints, and resistance to water. Though most often used in kitchen counter tops, it is certified for exterior applications in Spain. The material was mounted directly on an aluminum subframe without backing, as its high bauxite content makes it compatible with aluminum's thermal expansion rates. Panels of it were curved slightly at the factory without thermal forming or molds, and clipped onto the aluminum to achieve their final curvature.

Silvestre points out that, despite the unusual form of the house, its surfaces curve in only one direction, not the two a dome or computer mouse does. "We built the model for the design using only two pieces of cardboard," says the architect. "I've found that if we can't build what we're thinking about in a model, it will be very difficult to build in reality."

With the Balint House, Silvestre breaks from the rectilinear lines of previous works, such as his Atrium House (RECORD, April 2013, page 84) and the Vegamar Wine Boutique (RECORD, September 2014, page 86), and puts his daring structural innovations center stage. He gives much of the credit for this audacity to his client, a dealer in building products, who chose the design over two more conventional schemes. "He's a self-made man who wanted an identity of his own," says Silvestre. "He told us he liked this design because he'd never seen anything like it." With its fluid white forms of no identifiable material and a wing-shaped pool that wraps around the terrace like a spreading wave, the house has the relaxed feel of a luxurious yacht docked by a greensward. ■

credits

ARCHITECT: Fran Silvestre Arquitectos – Fran Silvestre, principal; Fran Ayala, Ángel Fito, Adrián Mora, Jordi Martínez, Maria Masiá, project team

INTERIOR DESIGNER: Alfaro Hofmann

ENGINEERS: David Gallardo | UPV (structural)

CLIENT: Florin Bortos Balint

SIZE: 5,400 square feet

CONSTRUCTION COST: withheld

COMPLETION DATE: August 2014

SOURCES

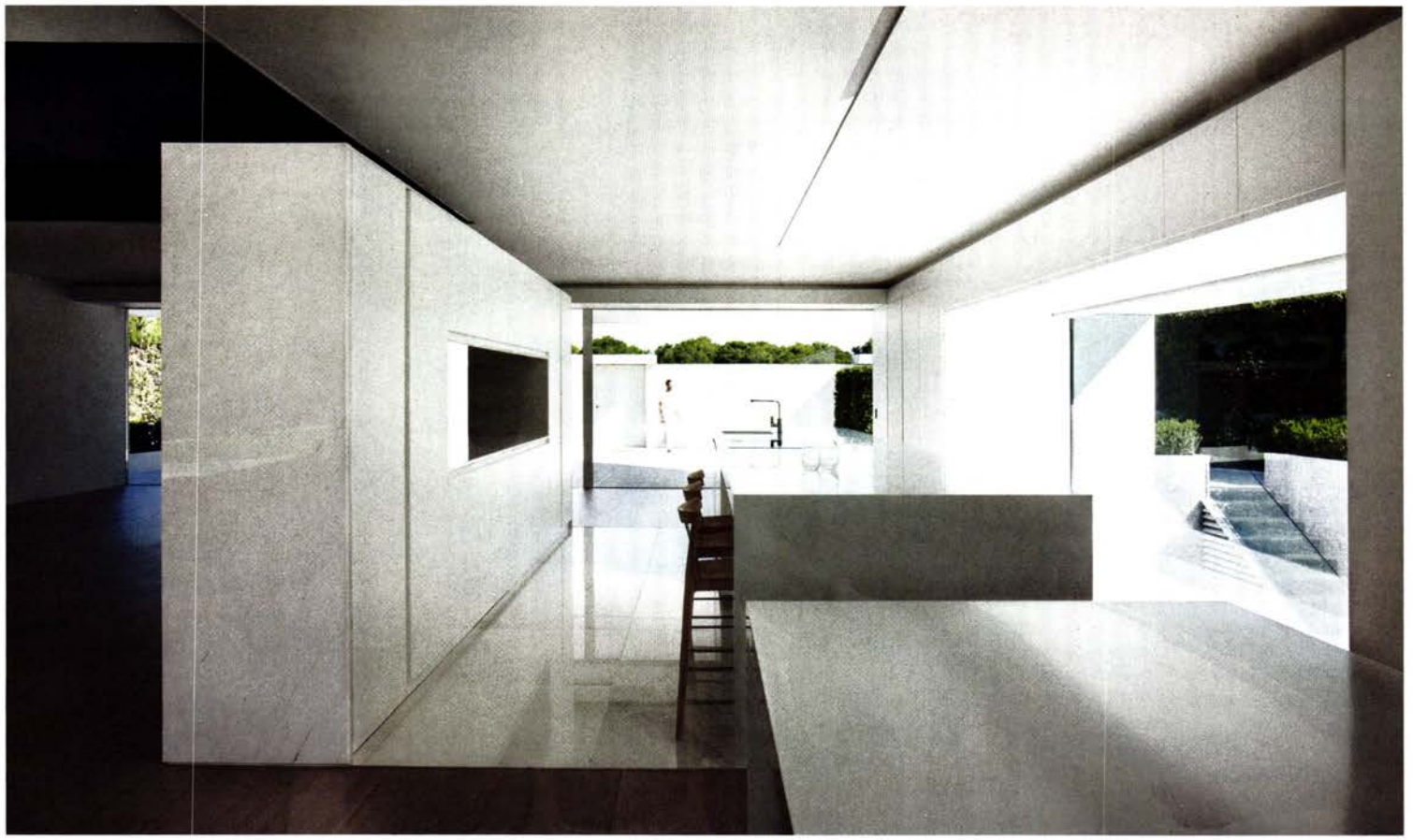
SOLID-SURFACE EXTERIOR PANELS: Krion by Porcelanosa

ANODIZED ALUMINUM WINDOWS: Shüco

TEMPERED GLASS: Dekovent

SOFA: Minotti

ARMCHAIR: Egg Chair by Arne Jacobsen for Fritz Hansen



SEE THROUGH The structural design eliminated columns from the interiors, creating a seamless flow between the living room and the outdoors. The only partition on the first floor is a cabinet separating the kitchen from the hall.

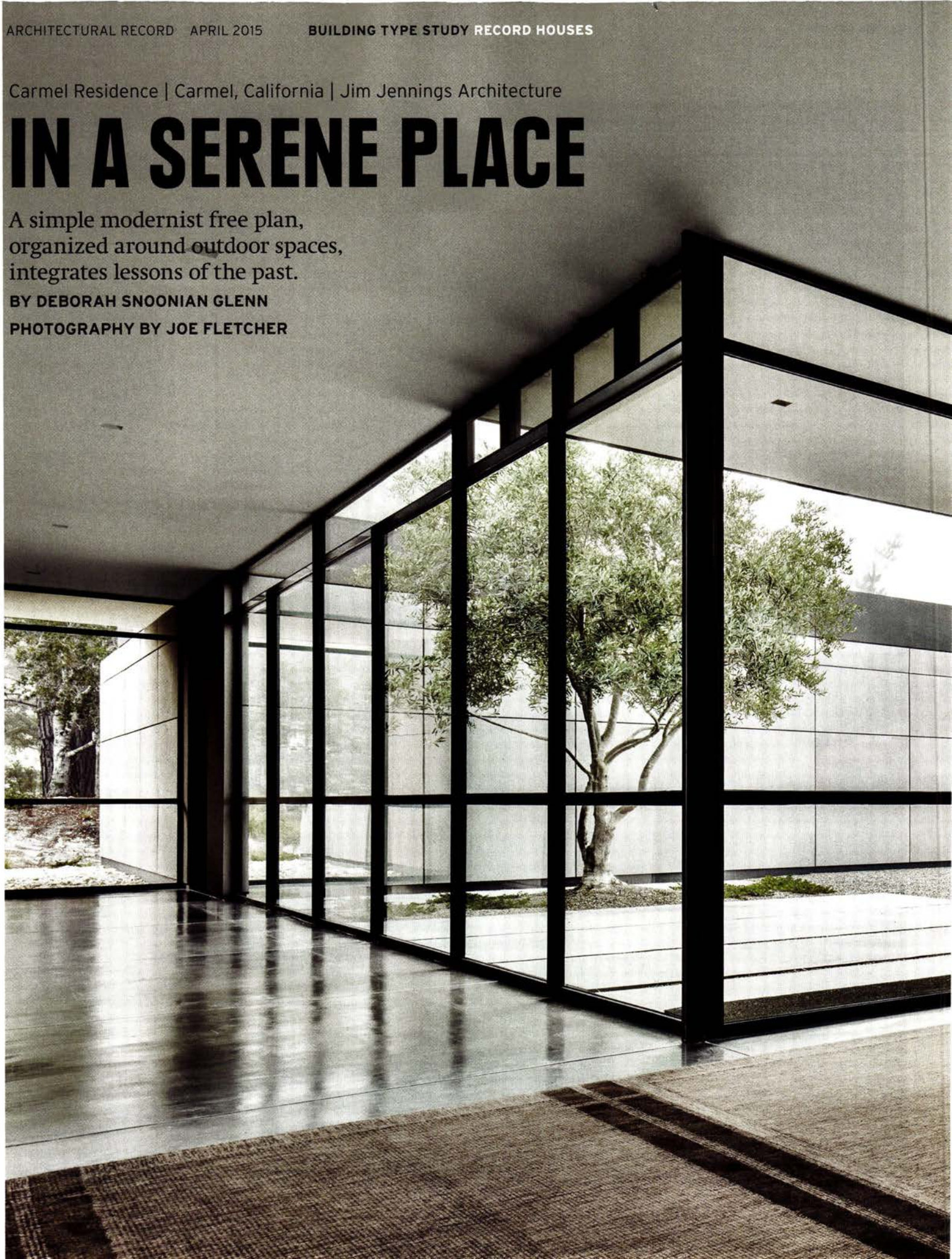
Carmel Residence | Carmel, California | Jim Jennings Architecture

IN A SERENE PLACE

A simple modernist free plan, organized around outdoor spaces, integrates lessons of the past.

BY DEBORAH SNOONIAN GLENN

PHOTOGRAPHY BY JOE FLETCHER



ELEGANT ENTRANCE The foyer opens onto a 40-by-80-foot hall that connects public and private spaces. A three-car garage (at rear in photo) is concealed by concrete panels that clad roll-up doors.

San Francisco architect Jim Jennings began his studies as an engineer—not a big surprise considering that his modernist architecture, which includes the award-winning Visiting Artists House in Sonoma County (RECORD, April 2003, page 148), demonstrates a through-line of formal elegance and rigorous clarity.

Moreover, an engineering feat—a prefabricated structural system that "liberated the floor plan," Jennings says, by eliminating the need for shear walls—enabled the form of his latest project, in northern California. The single-story, 6,900-square-foot house, a quiet triumph of right angles and rectilinear motifs, rests as a solid, serene presence on a ridge within a nature-filled private development.

The setting is as worthy of contemplation as the house itself, five acres located in the Carmel Valley, a renowned wine-growing region tucked into the Santa Lucia Mountains. Monterey Bay is to the north, and a coastal climate causes constant weather changes, with fog creeping in over the hills. Here Jennings embedded a calm, protective perch for observing these phenomena.

The owners are a retired couple who split their time among New York, Florida, and California. "We knew we wanted a modern house in the old-school sense, inspired by the International Style," recalls the wife. "I don't like circles or curves." After hearing about Jennings through friends, the two gave him the basic program, which included space for entertaining visitors and for an adult son. After Jennings toured the property, he took the couple to see a house he'd designed in Napa Valley, which, he says, "is configured to create a series of exterior spaces that interlock it to the site." The trip sealed the deal.

Though his Carmel Residence doesn't resemble Le Corbusier's prototypical Dom-ino House, it shares some of its DNA, especially the way it relies only on the columns and roof for support. Here, the structure is a steel moment frame, designed and fabricated locally. Its rigid, bolted connections between beams and columns transmit lateral forces directly to the ground, so that walls can simply define interior spaces. Beams, square tube columns, and light-gauge joists were delivered to the site cut to size and predrilled with bolt holes, and the entire structure was assembled in just seven days.

On the exterior, a fascia of dark paper-based composite panels emphasizes the structure's horizontality and helps it blend into its surroundings. A short, inclined driveway leads up to the gravel parking court; the house bounds this area on three sides. With its opaque cladding of ½-inch precast concrete panels, you might think you'd stumbled upon a private art gallery or a chic little hotel. A tree standing sentry near a glazed stretch of facade tips you off to the entrance, and the inscrutability fades as you approach it. The owners originally wanted the front of the house to have more glazing but had second thoughts when they realized a large space was required for vehicles (a fire truck must be able to turn around),

COURTLY MIEN
The concrete-panel cladding (above) is attached to the facade with an air gap behind it, a strategy that fosters interior comfort in the northern California climate. Landscape architects Bernard Trainor + Associates used native grass and drought-tolerant plants deftly to mediate the transition between house and wilderness (opposite, top). The concrete-and-gravel patio off the dining area (opposite, bottom) provides a crisp ledge for looking at the landscape.

View additional images at architecturalrecord.com.

ENCOUNTERING NATURE In the living area (above) and elsewhere, glass walls swing open to let breezes sweep through. A hot-water radiant heating system is embedded in the polished concrete floors (opposite, top), finished to look like worn leather. A guest bedroom (opposite, bottom) looks out to a wall of Carmel stone.

FLOOR PLAN

0 16 FT.
5 M.

1 ENTRY COURT
2 ENTRY
3 AUTO COURT
4 GARAGE
5 UTILITY/STORAGE
6 KITCHEN
7 DINING
8 LIVING AREA
9 LIBRARY/MEDIA
10 LIVING TERRACE
11 MASTER SITTING AREA
12 MASTER BEDROOM
13 BATH
14 BEDROOM
15 OFFICE
16 TERRACE

which they felt would detract from the views. "Jim was right to suggest less transparency here," says the husband.

The foyer is placed at the house's midpoint and opens into a sun-dappled hallway, the spine that connects the public and private spaces. This circulation path and nearly every room combines glazed sections and solid partition walls, the latter often topped by clerestories. "Five acres of land gets you a lot of privacy, so we used glass whenever possible," Jennings says. A grid of mullions and muntins visually breaks down the expanses of glass and frames well-composed views that range from spectacular (one vista extends all the way to Monterey Bay) to intimate (partly enclosed by a rugged wall of native Carmel stone).

Much like the natural world around it, the architecture succeeds in achieving a harmonious and calibrated balance. The skillful layout and well-proportioned rooms make for a home that feels ample and generous but not sprawling. Materials and finishes in earthy grays, taupes, and rusts are a tranquil backdrop on sunny days but add warmth and texture when fog rolls in. And, despite allowing views outdoors from almost anywhere, solid walls and built-ins also keep the spaces humanly scaled and often block views that are less than graceful (a golf course, its clubhouse).

Both Jennings and his clients describe their working relationship as highly collaborative and symbiotic, and the list of superlatives that the couple uses for their new home is long. But none of them could have predicted how well it's been received within the development, where modern-style dwellings are not the norm. During a meeting with the design review committee, the chairperson told the group, "This is the kind of architecture we should be building here." And neighbors have offered praise or confessed, "I didn't think I'd like your house, but I love how it turned out." ■

Deborah Snoonian Glenn, a former senior editor of RECORD *and* This Old House, *lives in Los Angeles, where she writes about architecture.*

credits

ARCHITECT: Jim Jennings Architecture – Jim Jennings, principal; Paul Burgin, project architect; Daniel Osborne, project designer

INTERIOR DESIGNER: Kay Kollar Design

ENGINEERS: Ficcadenti Waggoner and Castle Structural Engineers (structural); L&S Engineering & Surveying (civil)

CONSULTANTS: Bernard Trainor + Associates (landscape); Dodt PLC (lighting)

GENERAL CONTRACTOR: Carroll & Strong Builders

CLIENT: withheld

SIZE: 6,900 square feet

CONSTRUCTION COST: withheld

COMPLETION DATE: September 2014

SOURCES

STEEL MOMENT FRAME: Blue Sky Building Systems

GLASS: Guardian Industries

FASCIA PANELS: Richlight

SOLID SURFACING: Corian

Yamate Street House | Tokyo | Taichi Mitsuya & Associates + UNEMORI ARCHITECTS

A TALL ORDER

A Japanese architect stacks the atelier and dwelling of a local artisan to mesh with the urban environs.

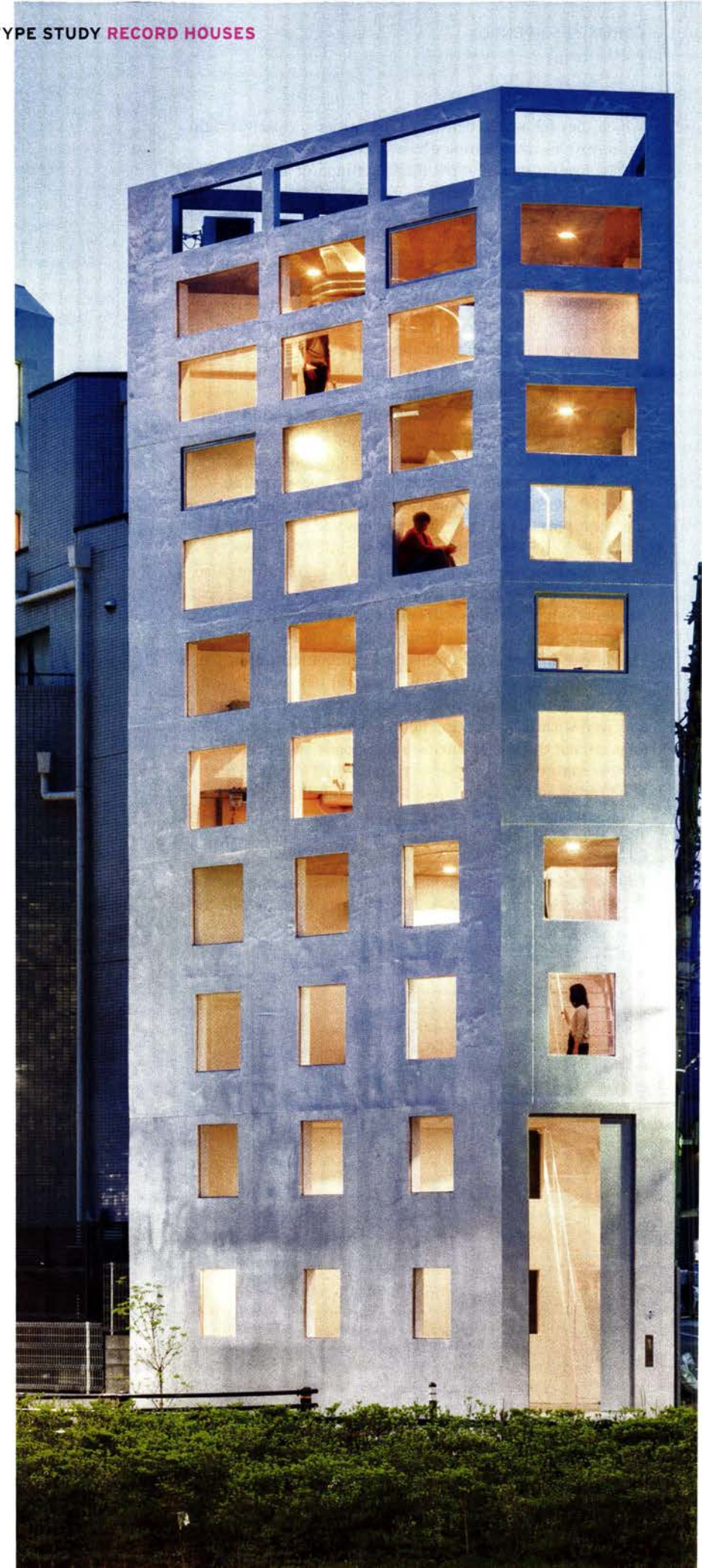
BY NAOMI R. POLLOCK, AIA

PHOTOGRAPHY BY SHINKENCHIKU-SHA

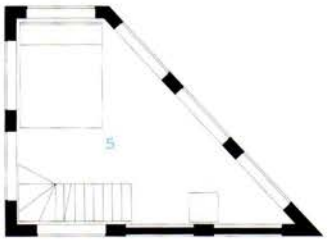
A six-lane ring road encircling central Tokyo, Yamate Street is hardly a place for a private house. But when it comes to home-building in the "Big Mikan" (Japan's counterpart of the Big Apple), empty land is good land—even a tiny triangular lot wedged between a heavily trafficked boulevard and a narrow side street. The first realized work of architect Taichi Mitsuya (in collaboration with UNEMORI ARCHITECTS), the Yamate Street House occupies just such a site. Encased by bands of windows, the 54-foot-tall single-family dwelling blends inconspicuously with the high-rise office and condominium buildings nearby.

Looks can be deceiving. Devised for a 30-something leather accessories designer, the building began with a bag: after creating a tote for Mitsuya, the client sought the architect's advice and eventually hired him to design a five-story building to house his residence and studio. "Four floors made sense to us, but the client wanted to separate his atelier and living space," says Mitsuya. To satisfy his client's request and the site's shape, the architect stacked the rooms. Progressing from common to private, each occupies one of the building's 194-square-foot levels. Linked by lightweight steel stairs, the sequence starts with a garage at grade, followed by the atelier above it, then the kitchen/dining floor, bath and living areas (divided by a curtain), the bedroom, and a roof terrace.

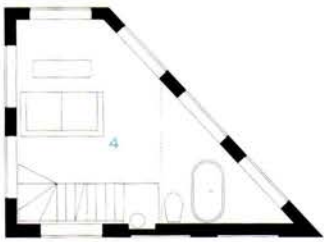
Though the building footprint maximizes the permissible coverage of the 258-square-foot site (surplus from the widening of Yamate Street in 2011), the legal 98-foot height limit was more than the house needed. This allowance gave Mitsuya the freedom to manipulate the building section. By differentiating floor-to-ceiling heights, he imparted to every



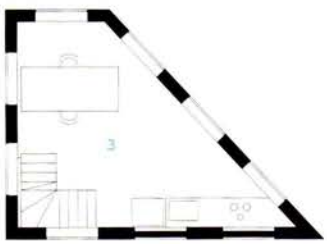
VERTICAL FOIL Reflecting light into the interior, silver paint coats the building's exterior. Devoid of scale-defining sashes, the windows read as wall openings that widen as the building ascends. The double-height door, sized to harmonize with the broad avenue in front, serves as the house's main entrance, with stairs that lead directly up to the owner's atelier.



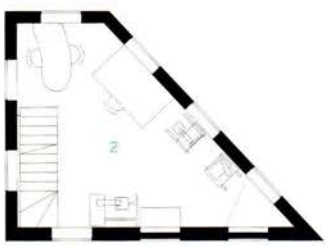
FIFTH FLOOR



FOURTH FLOOR



THIRD FLOOR



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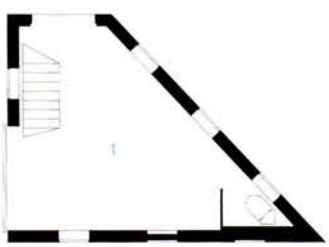
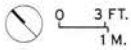


FIRST FLOOR



1 PARKING
2 ATELIER
3 KITCHEN/DINING
4 LIVING ROOM/BATH
5 BEDROOM

level a distinctive character. As the building rises, the ceilings become progressively lower and the rooms more intimate. Entered through a giant door, the 12-foot-high garage could be converted to retail use at a scale in keeping with the street. At the other extreme, a 7-foot-high ceiling makes the bedroom a cozy retreat.

Correlating with the height reductions, the number of steps needed between floors decreases. Shorter stairways not only saved precious inches, they enabled the architects to change the disposition of space on each level. By locating the longest run along the north wall, the design team was able to orient the ground floor toward Yamate Street, while placing the shortest run against the west wall left plenty of room for a double bed on the top floor.

As the stairs climb, the relationship between inside and out also evolves. The sound of accelerating automobiles gradually fades, and privacy increases, as one progresses up and away from the street. At the same time, daylight and views improve, culminating at the terrace, where the city view fans out in every direction.

These transitions from the ground level to the roof are largely a function of the double rows of windows wrapping each floor—the reason the house appears to hold more than five stories. "I didn't want the building to stand out," explains Mitsuya. On each floor, two windows are operable for natural ventilation while the rest hold single panes of fixed glass. The openings differ in size, becoming shorter and wider toward the roof. Thanks to the broadening of the windows, the views of sky and daylight coming in steadily increase, making the small spaces seem bigger.

Stepping out incrementally at each level, the shifting proportion of the windows relates inversely to the house's reinforced-concrete frame. Toward the top of the building, its load lightens, the solid walls decreasing and the voids increasing, with the narrowest openings being at the base and the widest ones at the apex. In clean, diagrammatic terms, the elevations document the building's weight-bearing strategy. But this is just about the only straightforward aspect of the structural system.

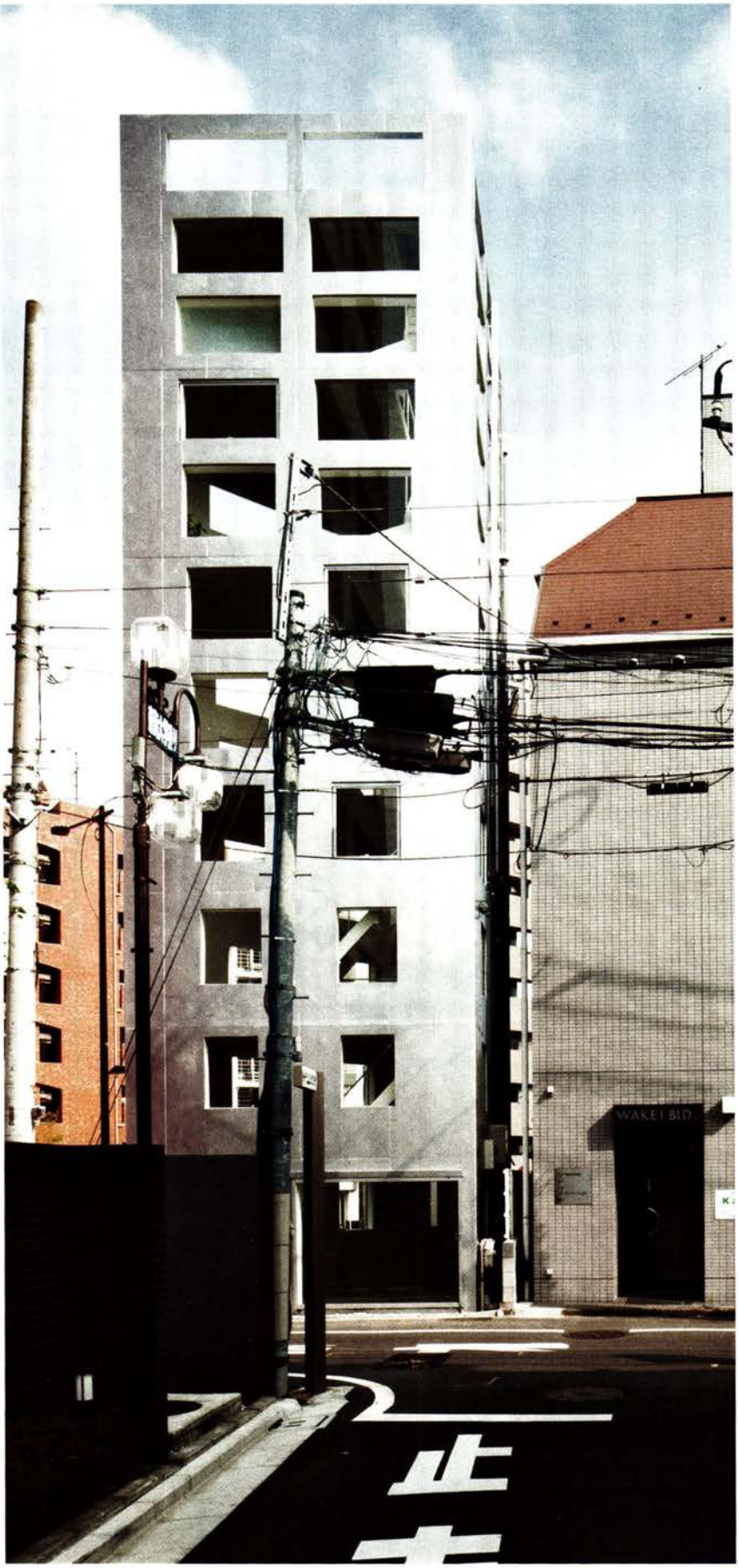
credits

ARCHITECT: Taichi Mitsuya & Associates – Taichi Mitsuya, principal; UNEMORI ARCHITECTS
ENGINEER: Low Fat Structure (structural)
CLIENT: withheld
SIZE: 964 square feet
PROJECT COST: withheld
COMPLETION DATE: April 2014

SOURCES

WINDOWS: SUS Corporation (metal frames); Central Glass Co. (glass); Best, Inc. (hardware)
WOOD FLOORING: Kyoei Lumber
PAINT: Nissin Sangyo Co. (heat insulation coating)
BATH FIXTURES: Toto (toilet); Hibino (tub)
LIGHTING: Panasonic (downlights)

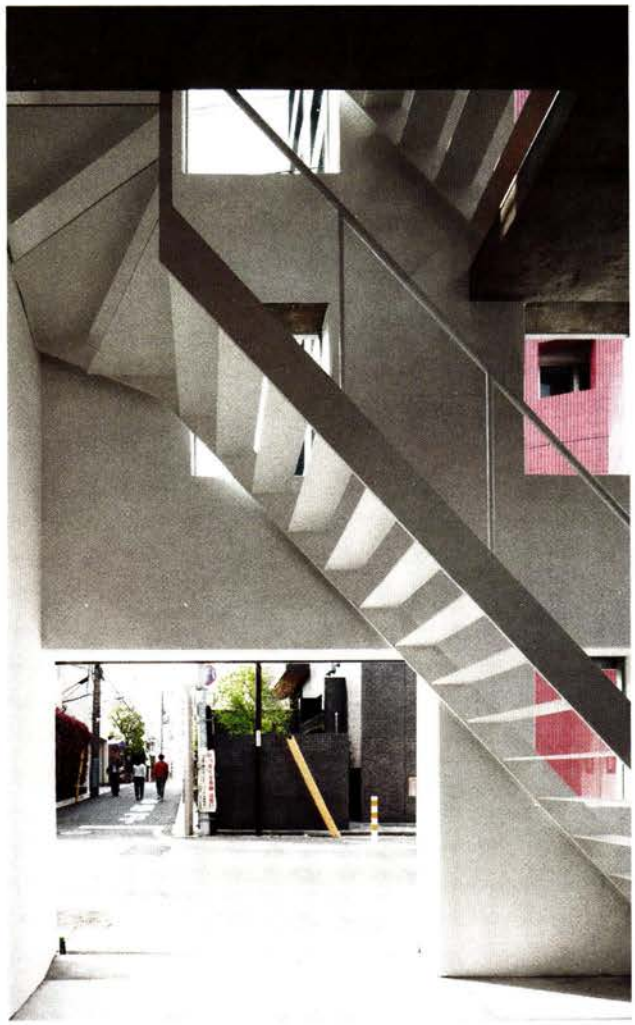
A STEP ABOVE
Consistent with the light-filled, airy interior, thin steel stairs connect the client's atelier and dining area (left), blending his studio and residence into one fluid, vertically stacked space. Compensating for the absence of built-in closets and cabinetry, the client hangs his leather-working tools on the walls and uses shelves he inserted inside the deep window recesses for additional storage or display.

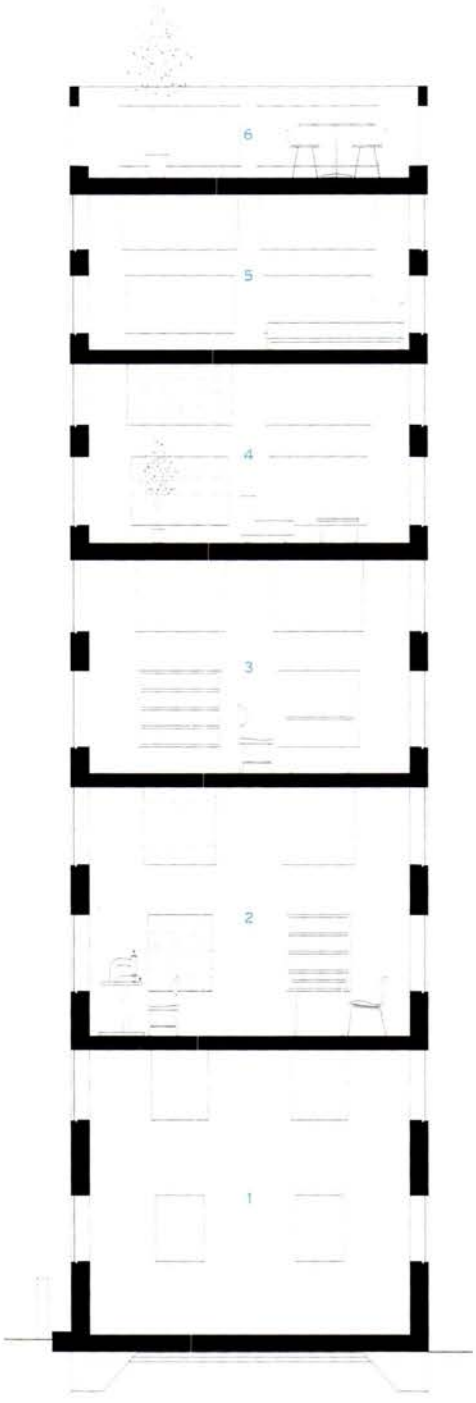


Due to the floor plan's irregular geometry and the stairs' changing orientation (which shifts the center of gravity at each level), the engineer faced complex calculations. The site's dimensions also made aspects of construction difficult. Because of poor soil conditions, the building required twelve 59-foot-deep piles. Only one company in all of Tokyo had the mini-machinery needed for the confines of the exceptionally small site. And, even for them, this was the tightest job they had ever undertaken, according to Mitsuya.

Size was also a driving force behind the minimal interior finishes and built-in furnishings. The design team applied insulating paint to the walls for climate control, but left the concrete ceilings exposed, embedded with downlights. For flooring, Mitsuya chose concrete at grade and maple almost everywhere else. He used water-resistant ipe for the bath/living level—a curious arrangement intended to separate moisture from mold-vulnerable bedding. While Mitsuya did not skimp on bath fixtures, the kitchen is spare, containing only a counter with a cooktop, sink, and small refrigerator. For storage, the architect left the client to his own devices.

When construction finished, the neighborhood kids were shocked to learn that the tall building is actually a home, but the adults barely batted an eye. "They are used to weird houses," explains Mitsuya. In Tokyo, when it comes to designing a place to live, the sky is truly the limit. ■





SECTION A - A

0 3 FT.
1 M.

1 PARKING
2 ATELIER
3 KITCHEN/DINING
4 LIVING ROOM/BATH
5 BEDROOM
6 ROOF TERRACE

ROOMS WITH VIEWS
The five-story freestanding building (opposite, left) features a garage entrance on the street (opposite, right). Meanwhile, inside, the ceiling heights get lower, but daylight and views improve as you ascend narrow stairs that lead up from the garage (bottom) to the atelier (right), followed by the kitchen and dining level (above left and right), the bath-cum-living area (second row from the top, left and right) and finally the roof terrace (top).

Shulman Home & Studio | Los Angeles
Raphael Soriano/Lorcan O'Herlihy Architects

PICTURE PERFECT

A photographer's midcentury house, little changed over the decades, is sensitively restored for a young family.

BY SARAH AMELAR

When the Shulman House, high in the Hollywood Hills, was designated a Los Angeles Cultural-Historic Monument in 1987, its nomination came from none other than critic Esther McCoy, doyenne of Southern California Modernism. She cited the 1950 home as the last surviving unaltered example of Raphael Soriano's prefabricated steel-frame buildings. Originally with grounds by landscape architect Garrett Eckbo, the house was also significant for its longtime owner—legendary architectural photographer Julius Shulman—who captured the work of Richard Neutra, the Eameses, and many other talents, beginning in the midcentury period.

For Shulman's own 2,200-square-foot house and separate 1,000-square-foot studio, it's unknown exactly why he chose Soriano—a Case Study architect, though not among the most famous. Certainly the two had become colleagues early on. "And I suspect my father knew there wouldn't be the great clash of wills that he would have had with Neutra," speculates the photographer's daughter, Judy McKee, who was 6 when she moved into the new house with her parents. Her father remained there for 59 years, until his death at age 98, in 2009, keeping the design—a cluster of glassy single-story, rectangular volumes—largely intact.

In the intervening decades, the natural backdrop also saw little change. Overlooking a land conservancy, Shulman's 0.8-acre lot retained unspoiled views of the rugged mountains, where he fondly remembered camping as a Boy Scout. But deferred maintenance took a toll, and by the time the property's new owners, a young couple, hired Los Angeles–based Lorcan O'Herlihy Architects (LOHA) in late 2010 to undertake the house's first renovation, it had frayed significantly. Its plywood interior paneling was peeling, the cork lining its entry area was brittle, the bathrooms and kitchen were tired, and the heating system flagged, raising essential questions about how to bring this Modernist work undiminished into the 21st century. "We just wanted the house to be respected," recalls McKee. "We were very careful about whom we sold it to. There were people who wanted to turn

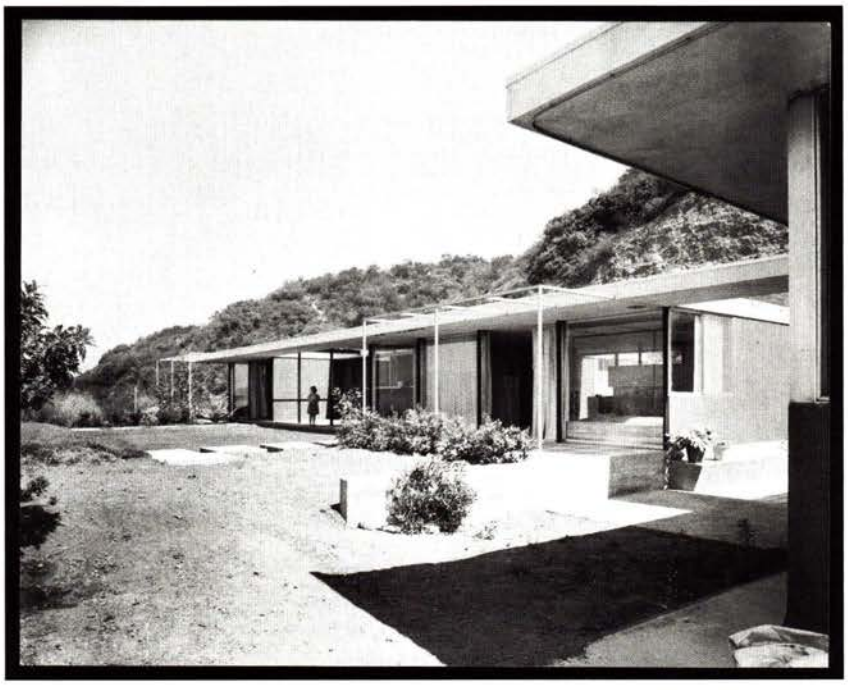
PHOTOGRAPHY: © IWAN BAAN

OPEN HOUSE While corrugated steel sheathes the house's entry side, its private faces (above) are enclosed in sliding-glass panels. The two screened-in patios were added sometime after the home's original construction. LOHA restored them, using more advanced and durable materials.

the garage into a huge kitchen. We would have none of that."

Given the property's cultural and historic status, the city's Office of Historic Resources (OHR) also had a say in its modification. "We needed to consider what was extant and could be preserved, and what could be restored or replaced in kind," says Lambert Geissinger, historic-preservation architect at the OHR, which adheres to the Secretary of the Interior's Standards for Rehabilitation. "For a single-family residence that's still a home, not a house museum, we have some flexibility in balancing the preservation of historic character with accommodating upgrades, or the ways people live now." Among the elements OHR sought to preserve were the building exterior, including its flat, uninterrupted rooflines; the original window frames; and interior cork surfaces.

O'Herlihy, who'd renovated two Neutra houses, had the advantage of having visited Shulman, then in his 90s, when he lived here. By that point, exuberantly wild grounds, dubbed "Julius's jungle" by its owner, had long since subsumed Eckbo's gardens (which McKee recalls as "beautiful, but too perfect" for her father). In tandem with O'Herlihy's renovation, landscape architect Mia Lehrer tamed the setting without reinstating the original design, for which no known documentation exists.



The indoor-outdoor lifestyle that Shulman's photos famously portrayed was essential to his own home, but he wanted transitional zones—screened-in patios—between the interior and great outdoors, with its insects, lizards, raccoons, and coyotes. Soriano, by all accounts, strongly opposed those veiled volumes, certain they would obstruct the house's crisp lines. But they were added, McKee believes shortly after the project's completion. And though "I cannot say with absolute certainty," she continues, "I am quite sure Soriano was involved. The patios fit so perfectly and unobtrusively into the design of the house. Also, Soriano remained a good

INSIDE JOB Rather than refurbish Soriano's fir built-ins (right), LOHA reinterpreted and redesigned them (below). Shulman's carpeting is gone, exposing existing concrete floors, now resurfaced to a silky finish; the entry zone's cork floor tiles previously extended farther into the living room. The midcentury grounds (opposite, bottom), later overgrown by the owner's "jungle," were created by Garrett Eckbo; the recent landscape design is by Mia Lehrer+Associates (opposite, top).

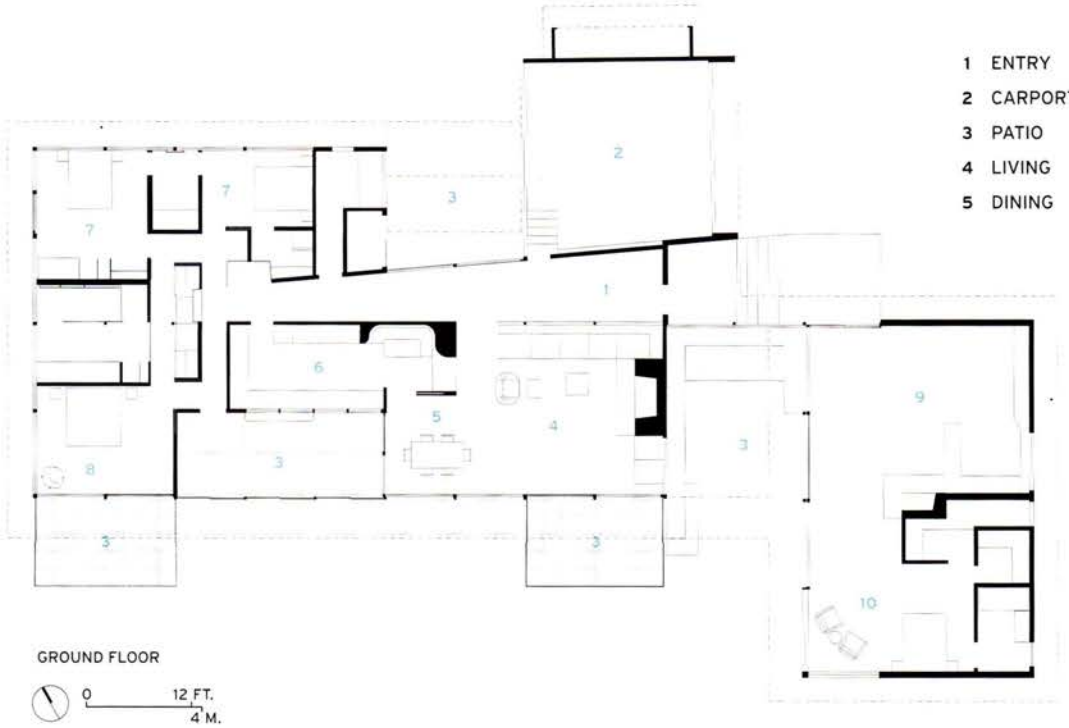
PHOTOGRAPHY: © IWAN BAAN (BOTTOM AND OPPOSITE, TOP); © J. PAUL GETTY TRUST. JULIUS SHULMAN PHOTOGRAPHY ARCHIVE, RESEARCH LIBRARY AT THE GETTY RESEARCH INSTITUTE (TOP AND OPPOSITE, BOTTOM)

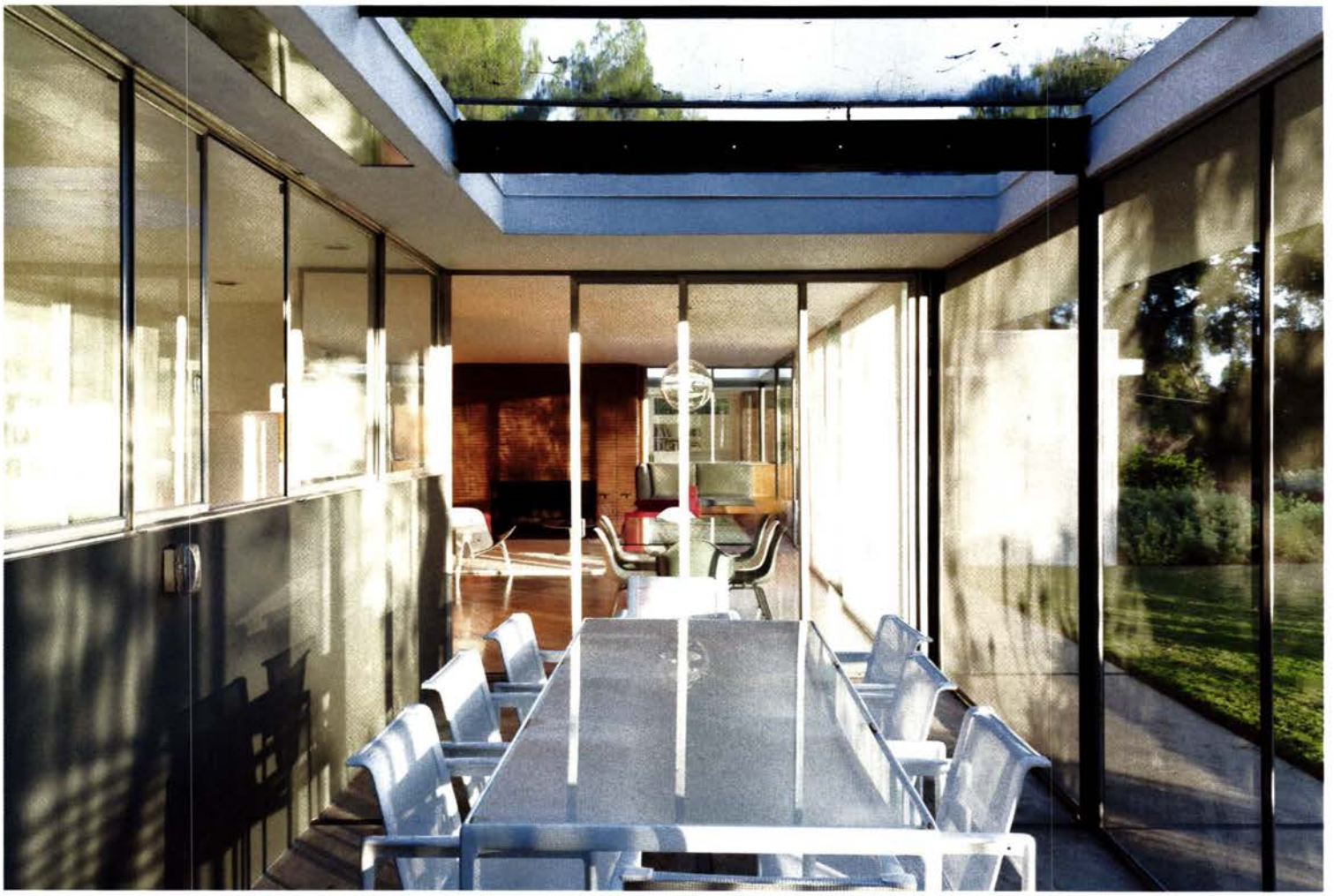
friend to us all, which wouldn't have happened had my dad gone around him."

Without the constraints of making a house museum, O'Herlihy chose to keep the "screen boxes." LOHA restored the exterior, including corrugated-steel siding, and meticulously refurbished the original aluminum window and sliding glass door frames. Inside, the team removed shag carpeting and resurfaced concrete floors—adding a thin, microfinished topcoat—now exposed and silky. Without changing room sizes or locations, LOHA modernized the bathrooms and the previously remodeled kitchen, replacing in kind the entry-area cork. Rather than restore Soriano's built-ins, including living room cabinets and daybeds, the architects had OHR permission to reinterpret them. Retaining original proportions and material choices, they designed streamlined fir cabinetry that subtly integrates combined heating-and-cooling units. LOHA's strategic and efficient division of the house into climate-control zones allowed for smaller mechanicals, removed from the flat roofs: a major accomplishment.

The optimistic values of Modernism championed affordable, modestly scaled, easily constructed homes, but the rising desirability of midcentury work today tends to recast it with more luxuriant qualities. Accordingly, the renovation of this house, with its sleekly elegant surfaces and iconic midcentury furnishings (more upscale than Shulman's), presents a sparer, more pared-down, and refined minimalism than the original.

Yet it's also a place where young children now frolic as McKee once did—and the spirit of Shulman lives on. Though not OHR-required, his darkroom (without equipment) remains an unrestored artifact. And a recently acquired collection of his photos animates the interior, with a one-of-a-kind relic on the coffee table: coming full circle, it's Shulman's home-made booklet documenting construction of the house. ■





IN 'N' OUT The studio (opposite), which now includes work and guest quarters, offers views down the walkway that threads in and out of the "screen boxes" (top). LOHA's new built-ins, as between the kitchen and living-din ng areas (above), accommodate heating-cooling units.

credits

ARCHITECT: Raphael Soriano (1950); Lorcan O'Herlihy Architects (renovation) – Lorcan O'Herlihy, Donnie Schmidt, Lisa Pauli

CONSULTANTS: MNS Engineering (mechanical); A&C Electrical; Franceschi Engineering (structural); Mia Lehrer+Associates (landscape)

GENERAL CONTRACTOR: Above Board Construction

CLIENT: withheld

SIZE: 4,000 square feet

PROJECT COST: withheld

RENOVATION COMPLETION DATE: November 2014

SOURCES

SCREENS: Lumicor (rigid panel); Twitchell (mesh fabric)

TILE: Expanko (cork); Heath Ceramics (ceramic)

LIGHTING: Gammalux; WAC Lighting

PLUMBING: Aquabrass; Dornbracht; Kohler

KITCHEN: Poliform; Gaggenau; Miele; Blanco

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Adapting to New Environs

As Passive House certification gains ground in the United States, the standards are modified for North America's diverse climate conditions. By Michael Cockram

PHOTOGRAPHY: © JEREMY BITTERMANN

THE PASSIVE House concept for ultra-low-energy buildings first developed in the United States during the 1970s energy crisis, only to be adopted and refined into a codified certification system in Germany, after funding in this country dried up. But, like a prodigal son, Passive House has reemerged in the U.S., with use of the certification system steadily gaining ground over the last decade. Currently, there are more than 140 U.S. projects that have met the rigorous German-born standards. Satisfying the stringent criteria requires airtight, super-insulated envelopes that are shaped by ambitious performance goals.

Growing interest in Passive House certification, applicable to new construction, renovation, and a diversity of building types, helped prompt the U.S. Department of Energy (DOE) to form a partnership, in 2012, with the Passive House Institute U.S. (PHIUS), the nonprofit organization responsible for certifying Passive House projects in this country. The DOE also funded a study to reshape the existing standards and adapt them to the varied U.S. climate. The result of the study is the PHIUS+ 2015 standards, just released in March.

The original standards made sense in the relatively consistent maritime climate of north-central Europe, says Katrin Klingenberg, executive director of PHIUS. "But in the context of the extreme climates of the U.S., designers were sometimes forced to choose strategies that had unintended consequences," such as overheating from too much glazing, she explains. The new standards also represent PHIUS's further divergence from the criteria set by its parent organization, the Passivhaus Institute (PHI) in Darmstadt, Germany. The two broke contractual ties in 2011.

The original Passive House standards, devised to minimize energy loads, were balanced on just three pillars: a space-conditioning limit of 4.75 Btu's per square foot per year; a source energy cap (usually the total electrical demand) of 38,000 Btu's per square foot per year; and an airtight envelope criterion of no more than 0.6 air changes per hour at 50 Pascals of pressure. The revamped standards maintain these three pillars, but expand them.

While it is too early to say what the impact of the new North American requirements will be, the German standards have made their mark on a variety of projects in the U.S., including houses, apartment buildings, and even a laboratory. One example is In Situ Architecture's Skidmore Passivhaus in Portland, Oregon. Completed in 2013, the single-family house, made up of two shed-roofed cedar-clad volumes, met the original benchmarks by creating a super-insulated shell. It consists of a hefty frame of 2-by-8 wood studs that is filled with cellulose insulation and wrapped with 3 inches of rigid insulation. And since the Pacific Northwest receives a relatively small amount

SKIDMORE PASSIVHAUS In Situ Architecture's house in Portland, Oregon, is clad in cedar rainscreen panels over a well-insulated wood frame. Glazing on the north-facing, street facade (opposite) is limited, while it is more generous on the south-facing facade (above), in order to capture desirable solar gain. Motorized external shades can be deployed to prevent overheating.

Some are concerned that the new standards will add complexity and make certification more cumbersome.

of annual solar radiation—much like Germany—the architect was able to open the house's living areas to the sun with copious south-facing glazing. Motorized external shades help prevent overheating.

The succinct set of requirements in the German standards were extremely appealing to In Situ's principal, Jeff Stern, who is concerned that the new standards will add complexity and make certification more cumbersome. "One of the things that was attractive about Passive House was the clarity and simplicity of the criteria," he says.

One illustration of the intricacies of the overhauled standards is an expanded set of targets for heating and cooling. Instead of setting just an annual space-conditioning limit, the new Passive House system also takes into account peak loads (often referred to as design temperatures), to help optimize the envelope and the building systems. In place of one uniform cap for both heating and cooling, the new standards establish four thresholds: annual heating loads, annual cooling loads, peak heating loads, and peak cooling loads—each specific to the building's location.

Some architects working with the Passive House system have already been considering such factors. Peak loads were extremely important for the Santa Fe, New Mexico, firm NEEDBASED when it designed a recently completed house in a senior cohousing community in Taos, where design temperatures are almost the same as Chicago's.

To cope with these extremes, and create a house that exceeded Passive House requirements by 30 percent, Jonah Stanford, the firm's principal designer, shaped the three-bedroom, 1,750-square-foot house to take advantage of the plentiful desert sun during the winter but be protected from potential overheating during the summer. The Southwest Modern–style dwelling has flat roofs and deep overhangs to shield its south-facing triple-glazed windows.

It also has a high-efficiency air-to-air heat

TAOS HOUSE This desert house (top and above) has overhangs that protect it from unwanted heat gain. Architects from NEEDBASED supported the projecting elements with steel portal structures that do not penetrate the envelope, helping prevent thermal bridging.

PHOTOGRAPHY: © AMADEUS LEITNER

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exchanger—standard equipment on Passive House projects—which adds fresh air to the tightly sealed building and recovers thermal energy. There are two types of such heat exchangers. One is a heat recovery ventilator (HRV), which, in winter, passes heat from the exiting interior air to the incoming fresh air. In summer, it recovers coolness from the exiting air. Another type is an energy recovery ventilator (ERV). It performs the same function as an HRV but also exchanges humidity. ERVs are commonly used in humid climates, where moisture needs to be removed for comfort. But the Taos house has an ERV because the winter air can be uncomfortably dry. It recovers indoor moisture and adds it to the incoming air.

The Taos project was designed to surpass Passive House standards because it also targeted Net Zero Energy (NZE) status, which was achieved by generating an equivalent of the home's annual electrical needs on-site with grid-connected photovoltaics (PVs). PHIUS recently instituted an add-on certification for NZE, and one goal of the DOE-funded study was to adjust the Passive House criteria to create a path to NZE. "It makes sense to use Passive House to take efficiency as far as possible while considering economic payback, then generate the remaining demand with renewables," Stanford says. The Taos house required only nine PV panels—a 1.7 kilowatt system.

The report leading to the new standards also emphasized the need for making Passive House more cost-effective—too often, projects invested in elements that had limited payback, according to the study. Toward that end, the study's authors, including consulting and research group Building Science Corporation, and PHIUS, used software developed by the National Renewable Energy Laboratory (NREL) to evaluate the cost-effectiveness for an array of variables, from window types to building orientation. The researchers also used the NREL tool to generate the four heating and cooling targets (for peak demands and annual loads) for 100 locations in North America. This function is being incorporated into the new design and verification tool WUFI Passive. It will help designers balance heating and cooling strategies for the most cost-effective design. The software is free.

MCKEESPORT DOWNTOWN HOUSING In their conversion into housing of a 1920s YMCA building in McKeesport, Pennsylvania, architects from Thoughtful Balance specified 7 inches of closed-cell foam insulation for the inside of the building's brick walls, helping preserve the historic facade.

This new analytical tool could have been useful for the architects from Pittsburgh-based Thoughtful Balance when they began working on the conversion of a 1922 YMCA building into 84 units of affordable housing in McKeesport, Pennsylvania, for those at risk of homelessness. Their client was stunned by the projected cost of HVAC upgrades and utility bills. So, in the absence of the new cost-analysis software, the designers commissioned an engineer's report that showed that Passive House strategies could reduce energy bills by as much as two thirds.

The renovation, completed last year, included adding 7 inches of closed-cell foam insulation on the inside of the brick walls. The approach produced high R-values (about 6.5 per inch) and preserved the classical facade. It was also cost-neutral when factoring in the savings of avoiding elaborate mechanical systems, according to project architect Laura Nettleton. However, the renovation demonstrates the challenges of certifying a historic structure without substantial invasive modification to seal its envelope. The building missed its blower-door-test benchmark for airtightness and therefore didn't achieve certification.

New construction projects may not have to deal with existing-envelope problems, but they often present substantial programmatic challenges. This is especially true for certain building types such as laboratories, which typically consume huge amounts of energy. Last year, the University of Chicago's Warren Woods Ecological Field Station—located east of Chicago in Berrien County, Michigan—became the first Passive House–certified laboratory in the U.S. Because there were already several Passive House labs in Europe, the designers, Belfast, Maine–based G•O Logic, elected to certify the building through PHI in Germany.

G•O Logic configured the building to take advantage of the heat generated by the equipment-heavy lab, which is located in the shaded northwest corner of the 2,100-square-foot building. They then designed the ductwork to move excess heat to the rest of the facility in winter. Night-flush ventilation and an air-to-air heat pump cool the building in the summer.

Notably, PHI adjusts the requirements for source-energy loads to compensate for special building types like labs. But it still requires that the envelope perform up to the standard criteria should the use of the building change in the future.

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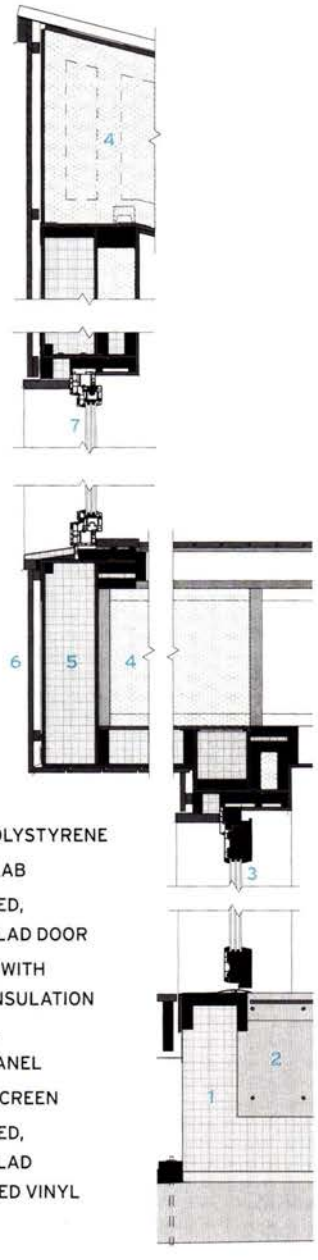
Architects from G•O Logic designed a field station (below) for the University of Chicago, in Berrien County, Michigan, so that its laboratory (right) serves as the heat engine for the rest of the building. The excess heat produced by the research equipment is captured and ducted to the other rooms.



1 EXPANDED POLYSTYRENE
2 CONCRETE SLAB
3 TRIPLE-GLAZED, ALUMINUM-CLAD DOOR
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5 STRUCTURAL INSULATED PANEL
6 CEDAR RAINSCREEN
7 TRIPLE-GLAZED, ALUMINUM-CLAD UNPLASTICIZED VINYL WINDOWS

WARREN WOODS
WALL SECTION DETAIL

0 3 FT.
1 M.

insulation perimeter component. The element is made from 8-inch-thick expanded polystyrene (EPS) with a high level of compressive strength. The continuous L-shape makes an airtight joint at the slab edge. A layer of EPS under the slab creates a container and permanent formwork that is filled with 14 inches of gravel and then topped with a slab. The insulated slab-and-gravel-fill assembly makes a deep thermal mass that is especially beneficial in keeping the building cool, according to project architect Timothy Lock. The wall assembly includes both structural insulated panels (SIPs) and interior 2-by-6 framing filled with cellulose insulation; the roof structure consists of 30-inch-deep trusses filled with cellulose insulation.

The firm advocates designing beyond the standard. For example, there was no Passive House requirement for distributing the excess heat from the lab to the rest of the facility. But with the help of the project's mechanical engineer, the architects developed a system for doing so, knowing it would improve the building's performance.

So, with savvy designers producing good buildings using the old standards, why make a change? PHIUS's Klingenberg believes that the new standards will ensure the optimization of both costs and efficiency. "There's only so much capital available," she says. "But if we're going to deal with climate change, we'll need to make new projects more efficient and bring existing buildings to a similarly ambitious standard." ■

Michael Cockram is a freelance writer and the director of Browbird Design in Fayetteville, Arkansas.

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Learning Objectives

1 Describe the goals of the Passive House certification system.

2 Outline the arguments for adapting the certification system for North America.

3 Outline the original certification criteria and explain how the new criteria are different.

4 Discuss the challenges faced by several design teams using the original Passive House system in extreme climates and explain how these challenges were overcome.

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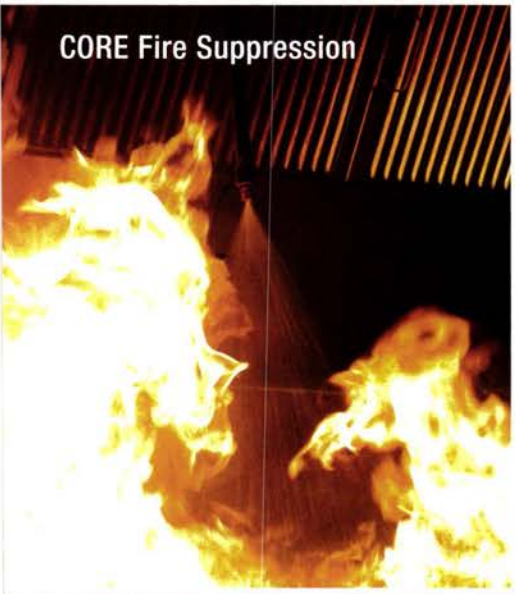

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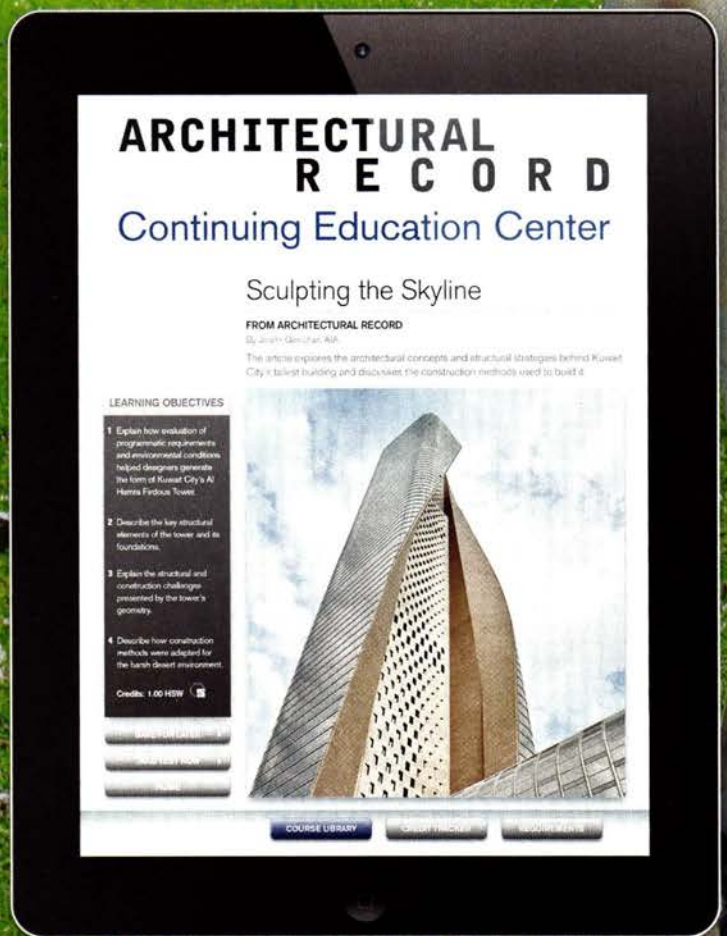

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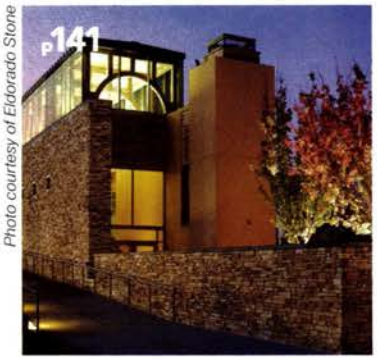

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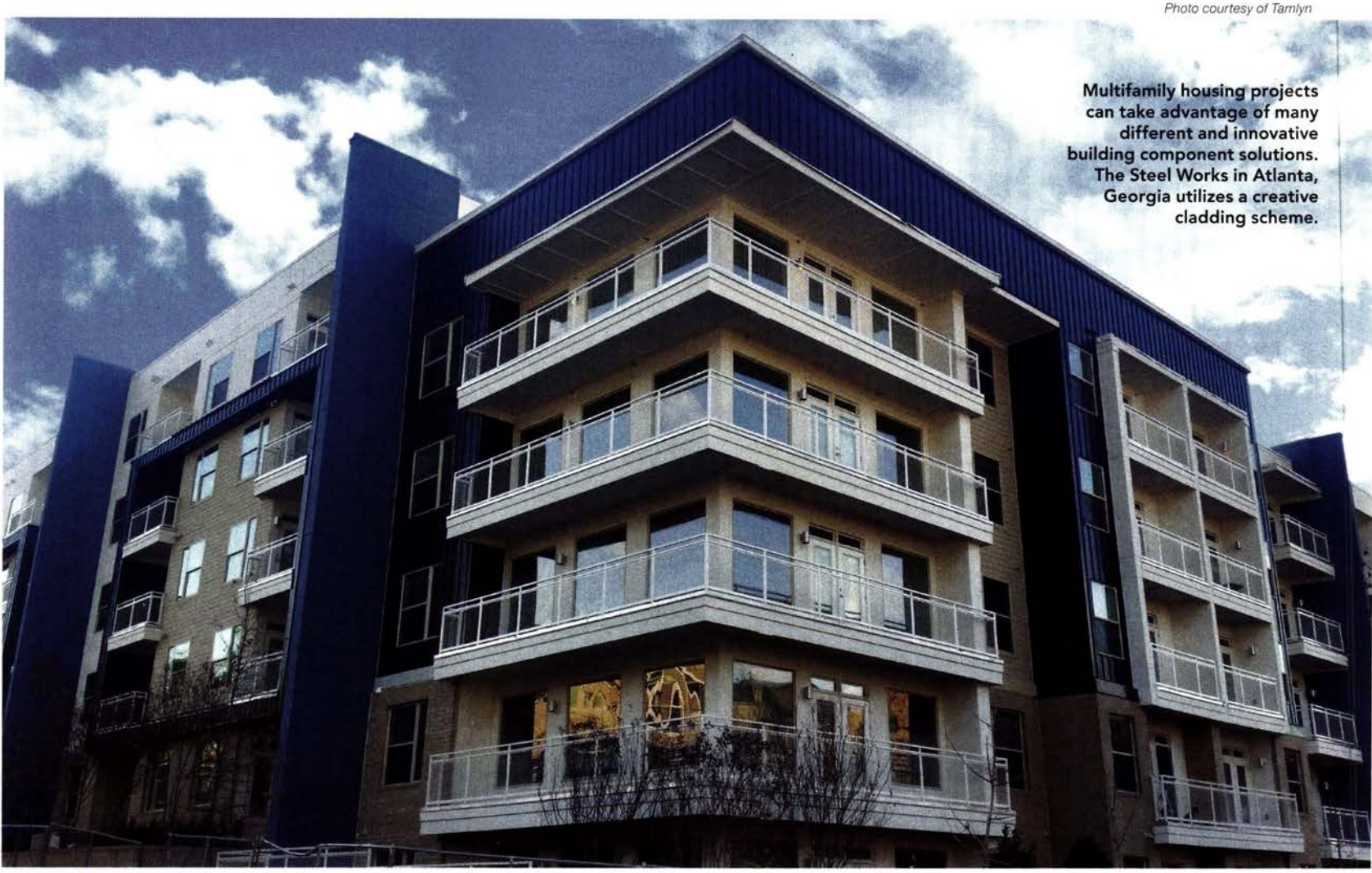

Multifamily housing projects can take advantage of many different and innovative building component solutions. The Steel Works in Atlanta, Georgia utilizes a creative cladding scheme.

Building Technologies Update for Multifamily Housing

New products and systems help produce greener and better-performing buildings with enhanced design options

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

Multifamily construction and renovation projects continue to garner a lot of attention whether they are rental apartments or purchased condominium units. The reasons for this attention seem to be driven by a number of different social, economic, and practicality-based decisions that buoy their continued popularity. Many urban areas are growing in population, creating denser development that combines commercial uses with residential choices in the same building or block. Changing demographics can mean that multifamily housing with all-inclusive maintenance and amenities appear better suited to changing lifestyles and personal budgets. Interest in greener living is causing some people to look at smaller living spaces with less driving or commuting time compared to life in a suburban-sprawl, car-centered environment. And there remains a fair bit of business interest in multifamily real estate from both U.S. and foreign investors. Regardless of the motivation, it becomes incumbent on architects to design multifamily buildings that can respond to the needs and consumer preferences of those spurring the activity. It is equally important to create buildings that use the best and most appropriate building technology to achieve a well-constructed, durable, and efficient end result. Doing so involves an understanding of the availability and workings of building products and systems that can not only meet those criteria, but also contribute to a well-designed, greener, higher-performing building.

GREENING OF MULTIFAMILY HOUSING

In 2013, an independent study[1] was conducted by the firm of Strata Research to "better understand renter purchasing criteria and the importance of sustainability-related apartment features to the overall purchase decision. In order to achieve this, Strata Research was commissioned to test renters' awareness and importance of various environmentally friendly features, as well as determine their willingness to pay an extra premium if these features were included." Their findings were quite significant. First, out of their sample of over 1,000 interviewed renters from across the

United States, they found that 77 percent believe it is important that their apartment is green. The factors driving this response included cost efficiency (33 percent), protecting the environment (26 percent), and doing their part (25 percent). Further, 65 percent stated that energy efficiency is important and 57 percent value an apartment with environmentally friendly features. In fact this is important enough to renters that 72 percent said that they are willing to trade off an important apartment feature (such as extra storage space or high ceilings) for green features.

Some of this consumer green awareness and preference certainly comes from the general media and interest in sustainable lifestyles. It likely also comes from developers and property owners who have been promoting green buildings for the marketing appeal, the added earnings potential, and, we would hope, the commitment to also do the "right thing." But it also certainly comes from the growing availability of programs that promote green multifamily housing. The LEED program of the U.S. Green Building Council[2] has certainly been embraced by the multifamily housing market with prominent displays of the LEED logo and information on many new and renovated buildings. Recently, ENERGY STAR added multifamily housing[3] to their categories of buildings that can be reviewed using their popular Target Finder and Portfolio Manager programs to benchmark a building's energy performance against similar buildings in the same geographic area. Adding to the interest by developers and owners is the recent availability of lower interest rates from Fannie Mae[4], the national mortgage organization, for multifamily properties with a green building certification, such as LEED or ENERGY STAR.

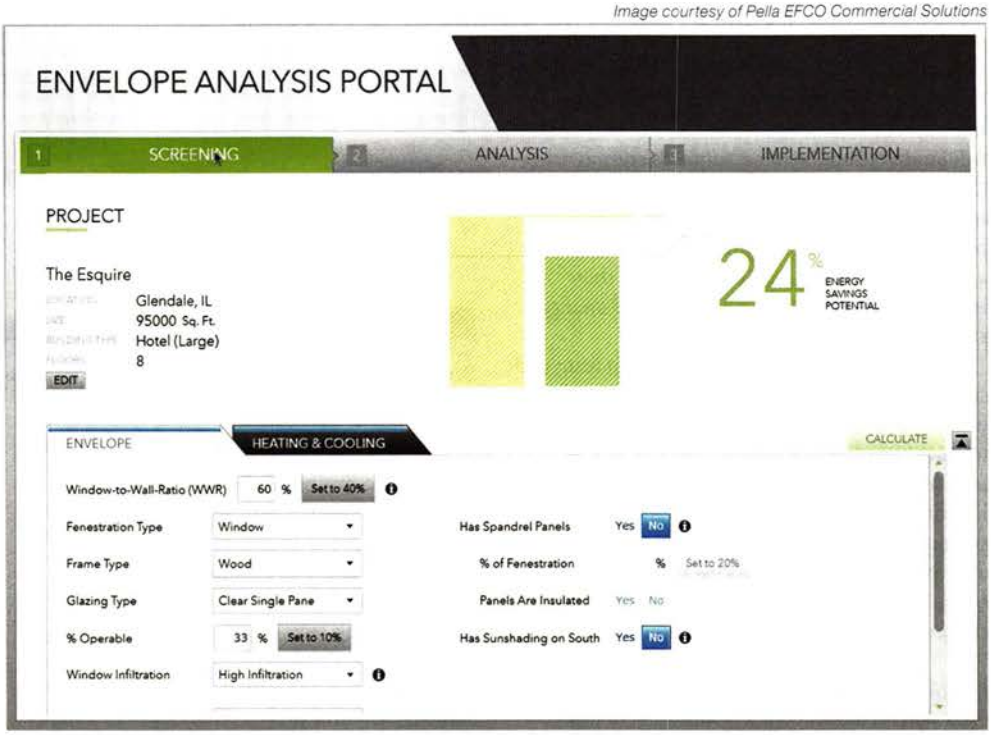
All of these preferences and actions converge on the design of a new or renovated multifamily housing project since design professionals need to be aware of these drivers to best serve developer clients and end users. But how does this all really play out in a project? It often comes down to a series of design decisions made all along the way related to the building enclosure, the interior, and the integration of innovative technical advances. These decisions will affect the sustainable nature of the building since they will affect different green categories such as energy efficiency, acoustics, indoor air quality, durability, and material choices. In this light, we will review a variety of new or updated building components and services that can help with making some of the best design decisions in multifamily housing projects.

BUILDING ENVELOPE ANALYSIS

The envelope or exterior construction of all buildings directly impacts the energy performance and related energy costs. Therefore, conducting an analysis of a new or existing building envelope is one of the first and best steps a design team can take to understand how to achieve an energy-efficient and environmentally friendly building. This is especially important in the renovation of existing buildings, particularly if the building is being converted from some other use (i.e. warehouse, school, etc.) into multifamily housing that has become very popular in many areas. This analysis can be done in-house by architectural firms using available computer modeling software or by working with manufacturers who have customized software to analyze the options of different systems in a given building envelope system. Either way, a baseline building can be modeled, while the relative changes can be compared using specific envelope designs, types, and options.

One common and critically important component of building envelopes is fenestration. Hence, it is not surprising that some window manufacturers have embraced its importance and seek to partner with design professionals on conducting a building envelope analysis. Doug Phelps, Director of Commercial Business Development for Pella EFCO Commercial Solutions, points out that they work with designers on a "whole building analysis which is truly unique from the component approach. This way, we're able to analyze and run 'what-if' scenarios to compare potential envelope improvements in terms of energy savings,

Image courtesy of Pella EFCO Commercial Solutions



An envelope analysis using software applications, helps building teams to input a wide range of variables and conditions for existing or new buildings. This information can then be used to develop a strategy for potential energy savings.

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Learning Objectives

After reading this article, you should be able to:

1. Identify and recognize the trends in the multifamily residential market that are driving consumer preferences and owner action toward green building practices.
2. Investigate the design potential and innovative opportunities to create high-performing building envelopes in multifamily buildings.
3. Assess the functional contributions of innovative products and systems that can improve indoor environmental quality and energy efficiency.
4. Determine the opportunities for integrating home automation components that can enhance comfort, energy use, and convenience.

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occupant comfort, and building aesthetics. Every project has specific goals, and we are able to support the project team with flexible, real-time analysis." He also notes that this interest in full analysis came from occupants commenting that their spaces felt more comfortable after replacing windows. By adding the analysis of occupant comfort as part of the envelope analysis, it is also possible to quantify that improvement while showing projected energy savings for the building.

This process is available to any design team and supported by the national, independent energy engineering firm, The Weidt Group. According to David Eijadi, Principal in Charge of Energy for The Weidt Group, "The envelope analysis identifies potential problem areas and offers solutions to make buildings more energy-efficient and comfortable. In the process it leverages some of the best technology available in software for computing hourly energy simulations."

Air and Water-Resistive Barriers (WRBs)

One significant part of a building envelope is its ability to be sealed completely. Hence, building codes require barriers be incorporated into envelope assemblies to prevent unwanted air infiltration and water penetration. Water-resistive barriers (WRBs) are commonly used that are synthetic, non-woven building wrap products. The high-performance advantages of this modern solution include a barrier that is more breathable, more durable, and more easily sealed along the seams. Further, this type of synthetic WRB can also double as a continuous exterior air barrier, meeting the code requirements for both in a single layer.

Using a high-performance building wrap in a multifamily housing project takes advantage of several innovative characteristics. First, as an engineered product, it creates a weather barrier behind exterior cladding to protect the sheathing and reduce water intrusion into wall cavities. This is important since all exterior cladding will likely allow some degree of water intrusion at some point. It is also particularly important in rainscreen assemblies where water is expected to enter behind a cladding material and is allowed to drain away. Second, as a vapor permeable or breathable product it will allow water or moisture to escape, thus allowing any damp or wet materials to dry in a relatively short amount of time. During this drying, WRBs can maintain their water resistance because they are constructed with pores that are large enough to allow moisture as a vapor to pass through but too small for water as a liquid to pass. Third, as an air barrier, a WRB will be an energy-efficient means to stop air infiltration and exfiltration through walls.

A further innovation has come about by enhancing building wraps to serve as an effective drainage plane set back from the cladding with a gap. The conventional means to create a drainage gap in a framed wall system is to use furring channels or strips. The alternative is to use a drainable WRB building wrap that provides its own integrated method of drainage. For example, at least one manufacturer creates this gap by bonding 1.5 mm propylene spacers to a high-performance WRB building wrap. This depth is large enough to provide a true drainage space between the sheathing and cladding material, allowing it to act as a full rainscreen system in miniature, without the added labor or cost. Further, it will work with all types of cladding systems, particularly those that can be moisture sensitive such as wood or fiber cement siding.

Images courtesy of Tamlyn

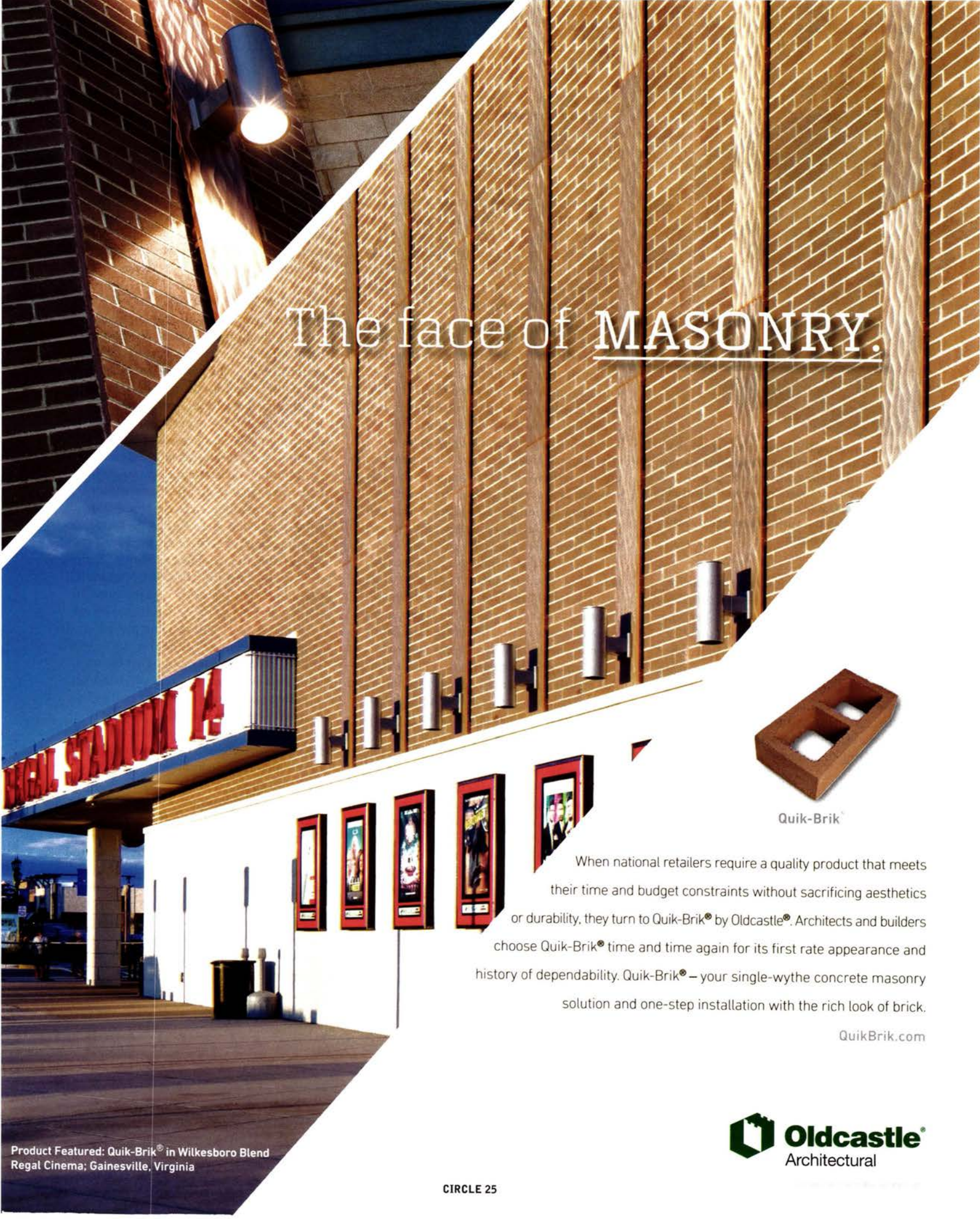
Strategically located spacers provide an intended drainage gap on synthetic, non-woven, breathable water-resistive barriers.

When specifying WRBs or building wraps for multifamily housing projects, it is important to recognize that there are literally dozens of building wrap products available with wide variations in performance and cost. They can also vary in water resistance, drainage efficiency, water vapor transmission or breathability, ability to impede air flow, durability, tear resistance, cold weather flexibility, flammability, and smoke developed ratings. Beyond that, however, it is important that the WRB can be sealed properly and fully along the seams without undue penetrations from staples or nails. Some manufacturers offer full sealing systems that avoid the use of nails and staples and instead use a compatible adhesive, sealant, or tape. Equally important are the details of how the WRB deals with openings in the wall such as doors and windows. Being able to flash and seal the WRB properly with window and door flashing materials will assure that water draining down the face of a drainable WRB will flow away properly and not behind other building elements into the wall.

Continuously Insulated Wall Systems

An innovative trend in multifamily housing projects has been the increased use of coordinated, high-performance wall systems with multiple components from a single manufacturer. According to John Cicciarelli of Oldcastle® Architectural National Masonry Sales, "Over the past few years, we've seen two innovations in multifamily housing projects: an increase in high-performance wall systems and an uptick in masonry veneers being specified." In many cases, this system approach gives the designer the benefit of a total wall assembly that allows for better insulation solutions for increased energy efficiency. One such system uses a continuous insulating foam layer over a prepared substrate, typically in a framed wall, that is formed specifically to accept veneer stone or masonry products. In this way, it provides a full layer of continuous insulation outside of the framing while solving the common problem of how to best finish the exterior surface. The insulation in such systems can achieve thermal resistance R-values above R-13 and also provide an integrated moisture management design. The exterior finish can be selected from the wide range of veneer stone colors and patterns that are on the market or from the equally broad range of masonry and brick products. Of course, the finish stone or masonry products need to be selected to be compatible with the patterned insulation that is designed to receive them.

This type of wall system can be used on either new or existing buildings. In new construction, the framed wall assembly would need to be complete to the sheathing or substrate level with the appropriate air and water-resistive barrier in place as needed. In a renovation, existing cladding may be able to remain if it is fairly flat and intact. Otherwise it may need to be removed and the substrate adequately prepared. Then the installation of the formed foam insulation takes place using specially designed fasteners and screws. Next, the selected veneer stone or masonry is set into the formed openings of the insulation in a pre-selected pattern and held in place by friction between the foam panels and the manufactured teeth of the veneer. As in most veneer installations, anchors are used to affix



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Product Featured: Quik-Brik® in Wilkesboro Blend
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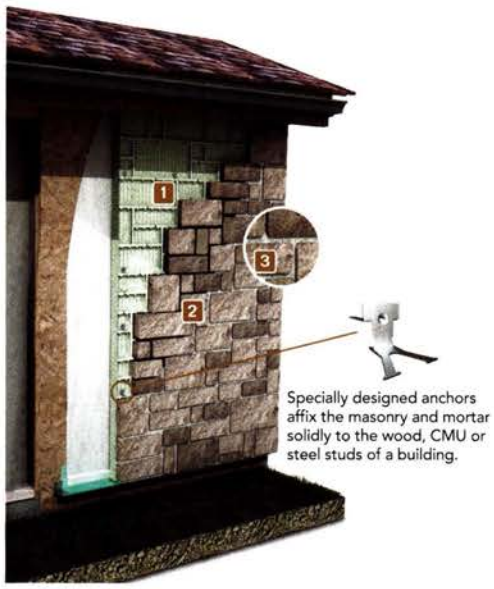


In this exterior wall system there are three elements: 1) the patterned insulation panels are installed, 2) the corresponding, pre-selected stone or masonry veneer is installed, and 3) a specifically designed Type-S mortar is used to finish the surface and achieve the needed bond strength.

the masonry and mortar to the substrate or structure of the building. The wall is finished using a Type-S mortar to assure proper bond strength, adhesion, flexibility, and stability. When finished, the wall is lighter in weight than a full masonry or stone wall, provides a full layer of continuous insulation, and offers a broad range of finished appearance choices. Further, the nature of the masonry and mortar makes the exterior surface more durable and longer lasting than some other cladding choices as well.

MULTIFAMILY ACOUSTICS

In a multifamily housing unit, good acoustics are important to ensure noise control between residential units or between indoors and outdoors. This has increasingly been recognized as a part of indoor environmental quality in green building standards but also as part of a general quality of life aspect associated with multifamily living. Occupants expect a reasonable sense of separation from neighbors that is necessary for comfort and privacy. Acoustically designed and installed walls and floor/ceiling assemblies can substantially decrease sound transmission through them and improve residents' satisfaction, which often leads to less turnover and fewer expenses associated with filling vacancies.

One of the common means of measuring sound transmission through walls is to test an assembly for its Sound Transmission Class (STC) rating. In simplest terms, it is a measure of how many decibels of sound are absorbed or reduced (i.e. sound attenuation) when sound passes through an assembly. The higher the STC rating, the more sound attenuation, meaning a quieter environment on the other side. There are many common design choices to achieve some degree of sound attenuation in framed interior walls that use gypsum board over studs with sound-absorbing insulation between the studs. The STC ratings typically improve as more attention is paid to details such as penetration offsets, sealants, and separation of studs from gypsum board using resilient channels. A fairly new option has also become available in the form of noise-reducing gypsum board which is specifically designed to reduce airborne sound transmission between two adjoining spaces when used in wall or floor/ceiling assemblies. This type of product features a viscoelastic polymer layer placed between two specifically formulated dense gypsum cores that collectively dampens sound energy. The result is a combination that significantly improves sound attenuation and is ideal for systems requiring high STC performance, such as multifamily housing.

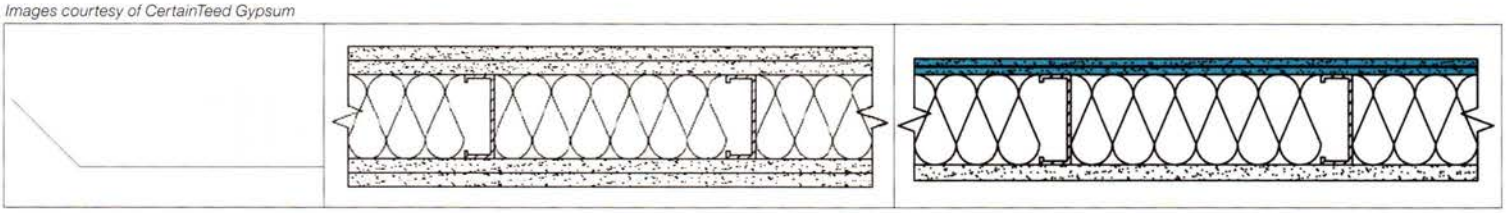
Noise-reducing gypsum board is an excellent acoustic solution for meeting STC ratings without the need for techniques such as isolation clips or resilient channels. Clips and resilient channel can easily be short-circuited during the construction process and even afterwards, during picture hanging or pressing of heavy objects against the wall, negatively affecting acoustic performance. These risks are eliminated when using noise-reducing gypsum board, thus providing more consistent acoustic performance. If used in systems with resilient channels, noise-reducing gypsum board can reduce the negative effect of short circuits. It can also help reduce material usage versus traditional multi-layer gypsum systems. The high acoustic performance of noise-reducing gypsum board makes it possible to build effective noise-reducing walls with a single layer of material, gaining valuable square footage from thinner walls, and saving both construction time and material cost. Less material used also means a more sustainable structure in keeping with green building practices.

WINDOW PERFORMANCE

Windows are an integral and important part of any multifamily wall system and as such, they need to address a variety of design criteria. The desire to provide views and natural light needs to be balanced with energy efficiency in the wall system. To achieve the best energy efficiency and overall performance, a window system should be selected based on the performance of the total unit, not just the components. An option to consider in low- to mid-rise buildings with larger window sizes is a wood-framed window rated to meet AAMA performance classification CW. This performance level assures that the window can withstand design pressures from wind of at least 30 pounds per square foot (psf) and in some cases on the order of 50 psf or higher. It also assures that the windows will seal and prevent drafts in most situations while holding up to wind and weather conditions on upper floors of buildings. Aluminum-clad wood windows are often used where design flexibility is desired, where the warmth of wood will complement other interior woodwork, where low-maintenance exteriors are important, or in older existing buildings that require an authentic look.

The glass options for windows have increased significantly in the past few decades but often choices can be limited by the window system used. For residential multifamily situations that prefer the aesthetic and energy performance of wood over other choices, the glazing choices do not necessarily need to be limited. It is now possible to specify and select up to triple glazing for wood-framed windows for greater energy efficiency and sound

Images courtesy of CertainTeed Gypsum



Noise-reducing gypsum board uses a polymer layer between two thin, dense, gypsum cores to achieve higher acoustical performance—so much so that a single layer can perform as well or better than a double layer of traditional gypsum board.

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High-performance, double-glazed, aluminum-clad wood windows were used to achieve energy performance in the Burlington Apartments in Portland, Oregon, designed by Ankrom Moisan Associated Architects. For even greater energy efficiency, triple-pane windows and doors are available as shown on the right.

control. Further, the insulating glass units can be treated for greater heat or solar gain resistance and the insulating space filled with inert gas such as krypton. Altogether, a triple-glazed, krypton-filled, wood-framed window can deliver thermal performance values on the order of a U-factor as low as 0.16 or an R-value of approximately R-6.25.

EXTERIOR JOINING

Among the details to address on exterior walls, the means to join or connect cladding materials along joints, corners, and seams is worthy of design attention. Some products, such as masonry, have their own, well-established means of dealing with these details. Other products such as cladding panels or siding, require a separate trim product to deal with those transition areas. A design trend in this regard is to achieve clean modern lines that have become popular with younger generations and more urban multifamily projects. Hence, it has become common to see the use of extruded aluminum shaped trim pieces that make strong design statements while assuring the proper functioning of the cladding material.

Selecting aluminum trim can be based on its capability as a resilient material that can adjust and flex to meet the needs of building material expansion and contraction. From a design perspective, it is extruded in a wide variety of profiles, allowing for choice in appearance from recessed to pronounced. Manufacturers have made many different sizes available, allowing the trim to be used with multiple panels from different sources. And, it is available in multiple finishes including primed, clear anodized, and pre-painted.

Different aluminum trim profiles are available for different placement locations.

Photo courtesy of Tamlyn

Extruded aluminum trim can be used in multifamily buildings to connect and secure exterior cladding in horizontal, vertical, corner, and transition locations while helping to create strong design statements.

Horizontal and vertical reveal pieces can be coordinated for a consistent appearance that maximizes or minimizes the lines between cladding panels. Outside and inside corners can similarly be treated to accent a corner condition or help it to blend in with the rest of the building. Transition pieces are available that connect special corner conditions and the junction of soffits to walls. When properly used and installed, these products not only provide for a complete, finished design appearance, they help with the overall performance and durability of the exterior cladding as well.

STONE VENEER

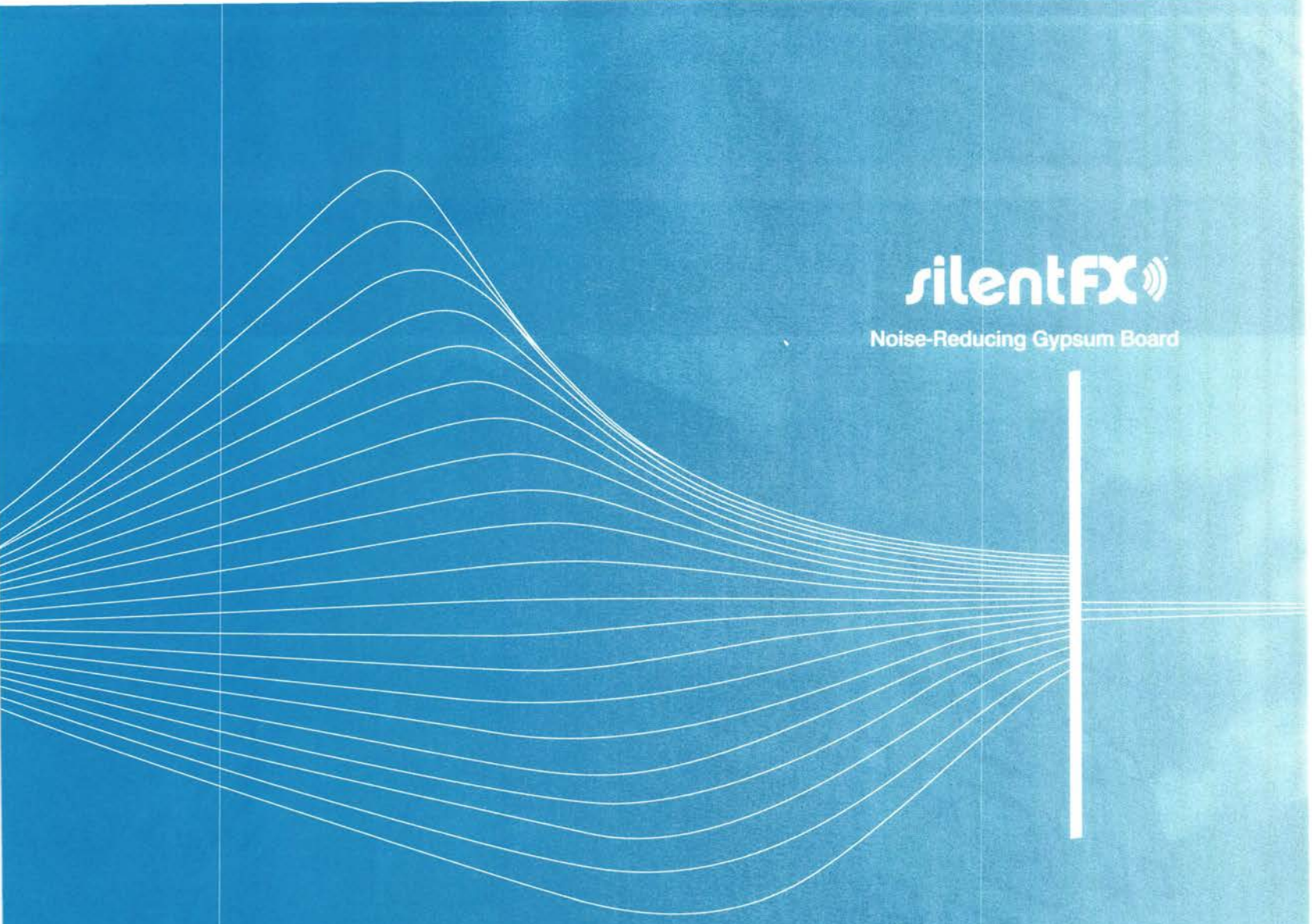
A fast-growing type of exterior wall treatment that has been specified on multifamily housing in recent years involves the use of masonry veneers. We have already discussed how they can be used as part of a wall system, but the details of the veneer itself warrant some further discussion. Masonry veneers are comprised of thin pieces of stone or brick but give the appearance of solid masonry without the weight or cost. Stone veneers provide a natural surface exposed to the weather that allows the finished building to emulate the great aesthetics of solid stone or brick but in fact they are non-structural. This means they install much quicker than natural stone or brick due to their simplified installation process with much less weight and potentially less cutting.

The options on the market for veneer masonry are broad and varied. Available choices range from a standard smooth or split face unit to veneers that look just like natural stone in varying sizes. The range of colors of the finished units is equally extensive and includes stone earth tone colors of grays and browns, a range of brick reds and oranges, and even white cast stone products. It is worth noting that these products have advanced considerably since they were first introduced several decades ago such that many have integral color worked into their makeup so the product color is consistent throughout each unit. The shapes and sizes are also varied to allow for details to be more authentically addressed.

See endnotes in the online version of this article.

Continues at ce.architecturalrecord.com

Peter J. Arsenault, FAIA, NCARB, LEED AP, *is an architect and green building consultant who has authored over 100 continuing education and technical publications as part of a nationwide practice. www.linkedin.com/in/pjaarch*



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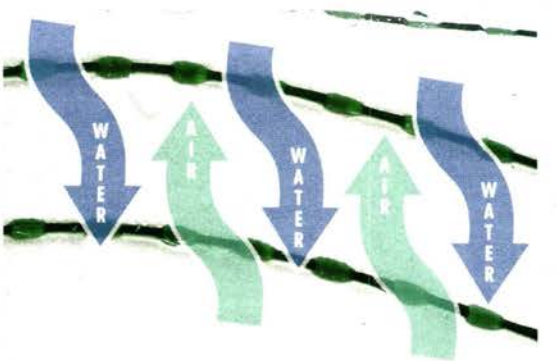

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Photo courtesy of Eldorado Stone

Hospitality and retail facilities rely heavily on design to convey the intended character and appeal to customers.

What's New in Retail and Hospitality Design

Some new products help create more compelling places both inside and out

Sponsored by EarthWerks®, Eldorado Stone, Hawa Americas Inc., Mitsubishi Electric Cooling & Heating, NanaWall Systems, National Terrazzo & Mosaic Association (NTMA), and TOTO USA | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*

The retail and hospitality sectors of the economy are known for a good bit of volatility based on many local, regional, national, and even international factors. Designing buildings and spaces for clients in these sectors requires an understanding that change is constant and budgets may be limited. Most companies engaged in retail sales (i.e. the sale of goods to the public) often have a specific marketing or branding approach that they seek to have reflected in the design of their spaces, particularly if there are multiple locations, for a consistent appearance or message. Companies engaged in hospitality (i.e. the sale of services for accommodation, events, entertainment, etc.) may have similar marketing concerns, but also often expect the design of their facilities to directly influence their customers' experience. Faced with real competition on all sides, both physical and virtual (i.e. over the internet), these clients turn to their design teams to help give them something they can use as a competitive edge. The design professionals that are on top of current trends and emerging products can usually respond well and thus blend good design with successful business operations.

OVERVIEW

What can help a retail or hospitality facility stand out from the crowd? Sometimes it is all about design. A specific look that is clean, contemporary, and artistic may convey the preferred image to appeal to customers such as the iconic Apple electronics stores. On the other hand, a more traditional appearance may be embraced and even embellished to evoke images of a particular location such as a mountain ski resort. Either way, the design techniques used to achieve the desired character of a specific building will rest with the architects and

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Learning Objectives

After reading this article, you should be able to:

1. Identify and recognize selected general trends and factors that influence the design and construction of retail and hospitality buildings or spaces.
2. Assess innovative product and system offerings that can be used to enhance building design and improve the green and sustainable characteristics of facilities.
3. Investigate ways to incorporate specific building technologies and green building strategies into retail and hospitality facilities.
4. Determine ways to save on materials, space requirements, and water usage while still producing well-designed spaces that are also handicapped accessible.

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Photo courtesy of Hawa Americas Inc.

Multiple panels of sliding doors can be used to separate spaces when needed or open up to connect them and disappear into wall pockets or niches.

interior designers to work through and resolve. The approach, details, and implementation of any design, however, will be a direct contributor to the way any customer views not only the built space, but the company itself.

Some influences can be just as real, but sometimes a little less visible such as green building techniques. According to a 2013 report by McGraw Hill Construction in partnership with Waste Management, entitled *Green Retail and Hospitality SmartMarket Report: Capitalizing on the Growth in Green Building Investments*[1], owners of retail and hotel establishments are reporting growing levels of green building activity. The report is based on a study of 79 retail, 30 hotel and 22 restaurant owners. This study defined a green building project as one built to LEED or another recognized green building standard, or one that is energy-efficient, water-efficient, improves indoor air quality, and/or engages in material resource conservation. By this definition, the percentage of retail owners that have taken a green approach in over half of their building projects rose from 18 percent in 2011 to 38 percent in 2013 and is expected to rise to 52 percent by the end of 2015. Hotel owners show an even greater investment in green building—the percentage of those owners that have taken a green approach in over half of their building projects rose from 28 percent in 2011 to 48 percent in 2013, and is projected to rise to 64 percent in 2015.

Owners note strong business benefits from green building investments and green O&M practices, helping to drive this growth. Most notably, they report the following advantages when comparing the performance of their green buildings to traditional buildings:

- Annual operating cost reductions were reported by 66 percent of retail owners (at an average reduction of 8 percent) and by 51 percent of hotel owners (at an average reduction of 1 percent)
- Energy use reductions were reported by 58 percent of retail owners and 67 percent of hotel owners at an average reduction of 15 percent for both
- Asset value increases were reported by 61 percent of retail owners (at an average increase of 7 percent) and by 71 percent of hotel owners (at an average increase of 11 percent)
- Return on investment (ROI) increases were reported by 67 percent of retail owners (at an average increase of 8 percent) and by 85 percent of hotel owners (at an average increase of 14 percent)

While operating cost reductions and value increases are the most reported reasons for going green, there are several other factors considered highly important in their decision-making process. Among them is brand protection or enhancement—they find that green is a good image to embrace. Additionally, human impact benefits for employees were a less tangible but important factor among 44 percent of retail owners and 50 percent of hotel owners. Over half of those participants in both sectors report that improved environmental health and well-being has a strong impact on their decision to make future green investments. Further, 70 percent of retail owners see meeting government regulations and standards as a key factor in their decision to do green projects in the future, while 70 percent of hotel owners consider water use reduction an important factor in that decision.

With all of the aforementioned in mind, we will look at three general design techniques that can help with both the general design and branding of a retail or hospitality facility while also contributing to their green building potential. First we will examine the issues of each and then look at specific applications.

1. CONNECTING SPACES FOR FLEXIBLE USES

Flexibility of space in retail and hospitality settings can often go a long way to enhance operations, image, sustainability, and budgets. Recognizing that different spaces may not always be used at the same time for the same purpose, or that the size of a space may need to vary to accommodate different events or needs, designers often look for ways to incorporate doors or entire walls that can move to alternately enclose or connect spaces. This can reduce the overall size of a building and in the process reduce its need for materials and energy. There are primarily two types of design opportunities here—sliding or folding doors and operable exterior walls.

Sliding and Folding Doors

The use of interior sliding or folding doors in single or multiple panels can not only allow access between spaces, they can create appropriately sized, transformative spaces for events, displays, or operations. When closed, sliding or folding multiple door panels produce privacy on demand. When opened by users or facility staff, larger spaces can be easily created. The door panels can be made out of a variety of materials with some manufacturers focusing on minimizing the hardware used in order to allow the door panel material to remain as unobstructed as possible. The hardware used can be either steel or aluminum with some recycled content. Glass in various forms for the door panels is popular since it can introduce natural or borrowed light. This means that the space being enclosed does not need to be dark simply because the doors are shut. If privacy is needed, then it is entirely possible to use glass that is translucent, tinted, or otherwise treated to achieve the desired effect.

There are several common operational options for this type of large-format door system. Top-hung, straight sliding doors are a great option for renovation and new construction as top-hung sliding systems can more easily accommodate floors that may not be completely level or uniform. Significantly for design, sliding doors save space by not protruding into the room which also creates the sense of more open space.

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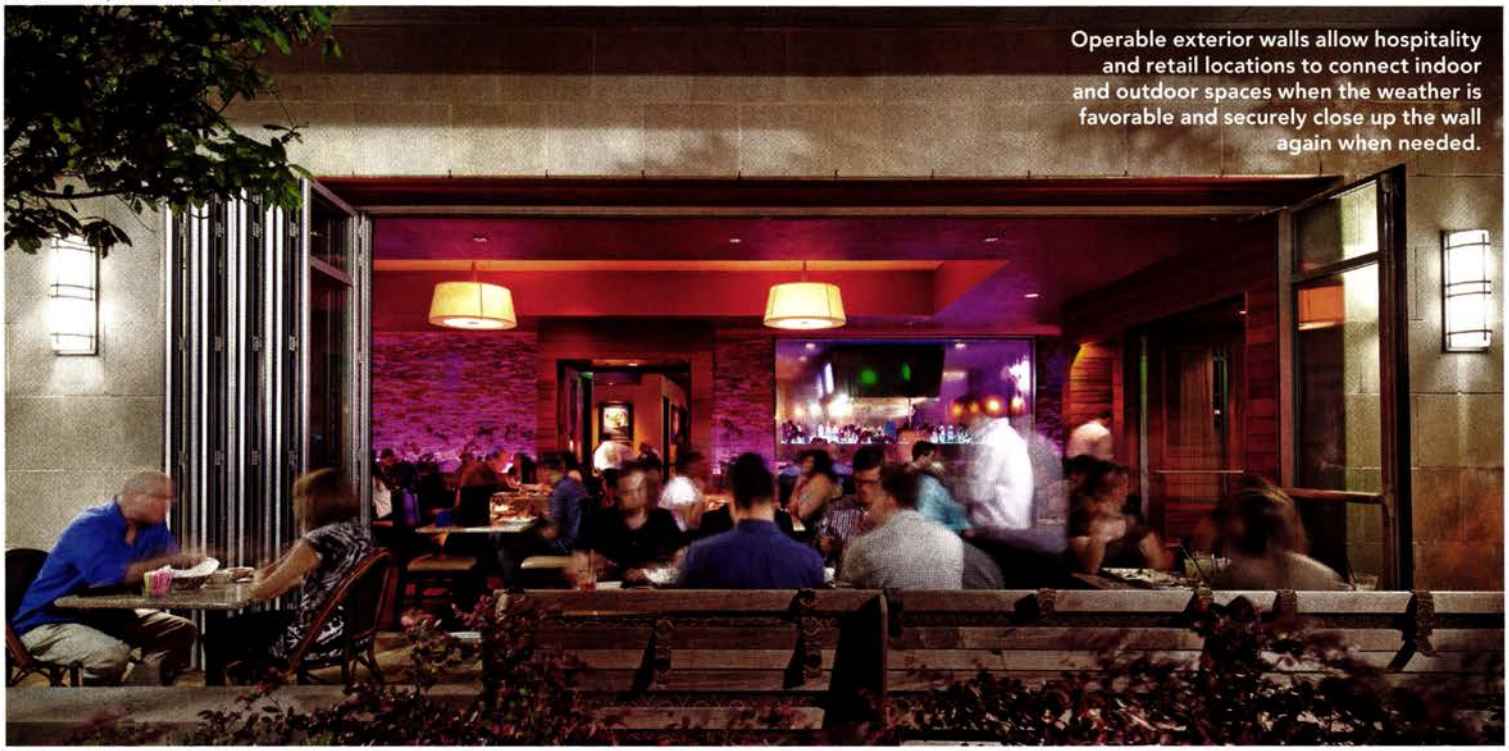

Operable exterior walls allow hospitality and retail locations to connect indoor and outdoor spaces when the weather is favorable and securely close up the wall again when needed.

Some straight sliding top-hung systems can accommodate door panels over 1,000 pounds and still be fairly easy to install. A variation on straight sliding hardware systems is one that employs a belt system to allow the operation of one panel which simultaneously moves additional panels. This type of telescopic system maintains a leading panel and when that panel is moved, the additional panel(s) also follow along. Similar to the telescopic approach, a symmetric system is available which consists of two bi-parting panels that meet in the middle. With a belted symmetric system it only takes movement of one panel to move the opposite panel into place.

Instead of sliding, the door panels can fold using panels that are hinged together. They still rely on top hung hardware to guide their movement so that once folded, they can slide to one or both sides of an opening. The bottom guide hardware may be optional dependent on the system. There is also a sliding and stacking option with panels that move independently of each other. When opened fully, the folding panels can be slid so that they are stacked up or can be hidden behind a wall or in a niche.

Operable Exterior Walls

Beyond moveable doors, it is possible to consider making entire walls operable. When fully glazed panels are used, this approach offers designers the ability to create flexible spaces that are able to seamlessly bring the outdoors in, provide daylighting and natural ventilation, and capitalize on beautiful views. It also allows indoor spaces to expand to the outdoors when the weather is inviting and the use patterns require it. Operable glass walls are available that, when closed, provide the needed high levels of energy performance, weather tightness, and security in addition to welcome daylight and regulated solar gains. In the open position, they provide natural ventilation and flexibility of spaces by creating seamless flows between indoor and outdoor spaces. Either way, opening glass walls have been shown to stand up to the daily commercial building demands, as well as the challenges of wind, water, extreme temperatures, forced entry, impact, and structural load. Commonly, operable glass walls are full height or match standard door heights, although they can also be used in shorter heights for large continuous window applications as well. They range in overall size from as small as 9 feet wide up to as large as 300 feet wide.

Operable glass walls use door-sized glass panels that can be readily opened or closed on demand, making them part of the building envelope. Like any other type of building fenestration, this system does not carry any structural load from the building, but is reliant on being appropriately attached to the building and operates within a structurally supported opening. In design situations where large operable window or glazed door areas are desirable for both green building and occupant reasons, the performance of these systems is clearly critical. Large opening glass walls with thermally broken frames and low U-factor glazing eliminate the high solar heat gain or heat loss that may come with increased opening size. Because of the large opening sizes, the corresponding large perimeter area, and multiple joints between panel sections, the manufacture and production of these systems requires considerable diligence and attention to detail in order achieve performance levels that are required for green buildings. Hence, it is incumbent on manufacturers to provide independent testing on their products to determine the results for thermal performance, penetration of wind or water, security, and acoustical characteristics. This combination of large-format operable glazing coupled with high-performance construction offers architects a design alternative that is not available through other fenestration options.

2. NATURAL, DURABLE SURFACES

Hospitality and retail buildings are intended to attract a lot of people to them. With all of those people come demands on the walls, floors, and other surfaces related to foot traffic, activities, cleaning, and ease of maintenance. In institutional or industrial settings, the appearance of these materials is sometimes less important, but in retail and hospitality settings the functional demands and the appearance need to work hand in hand to be successful. The longer these materials last, the more sustainable and green the building can be. We will focus on two specific material options that can be considered, manufactured stone veneer and terrazzo.

Manufactured Stone Veneer

Stone has been a preferred building material for centuries. It not only speaks to environmental awareness, it evokes a sense of connectivity to nature. The problem today with full-depth stone work is that it can be very expensive to incorporate and difficult to find skilled

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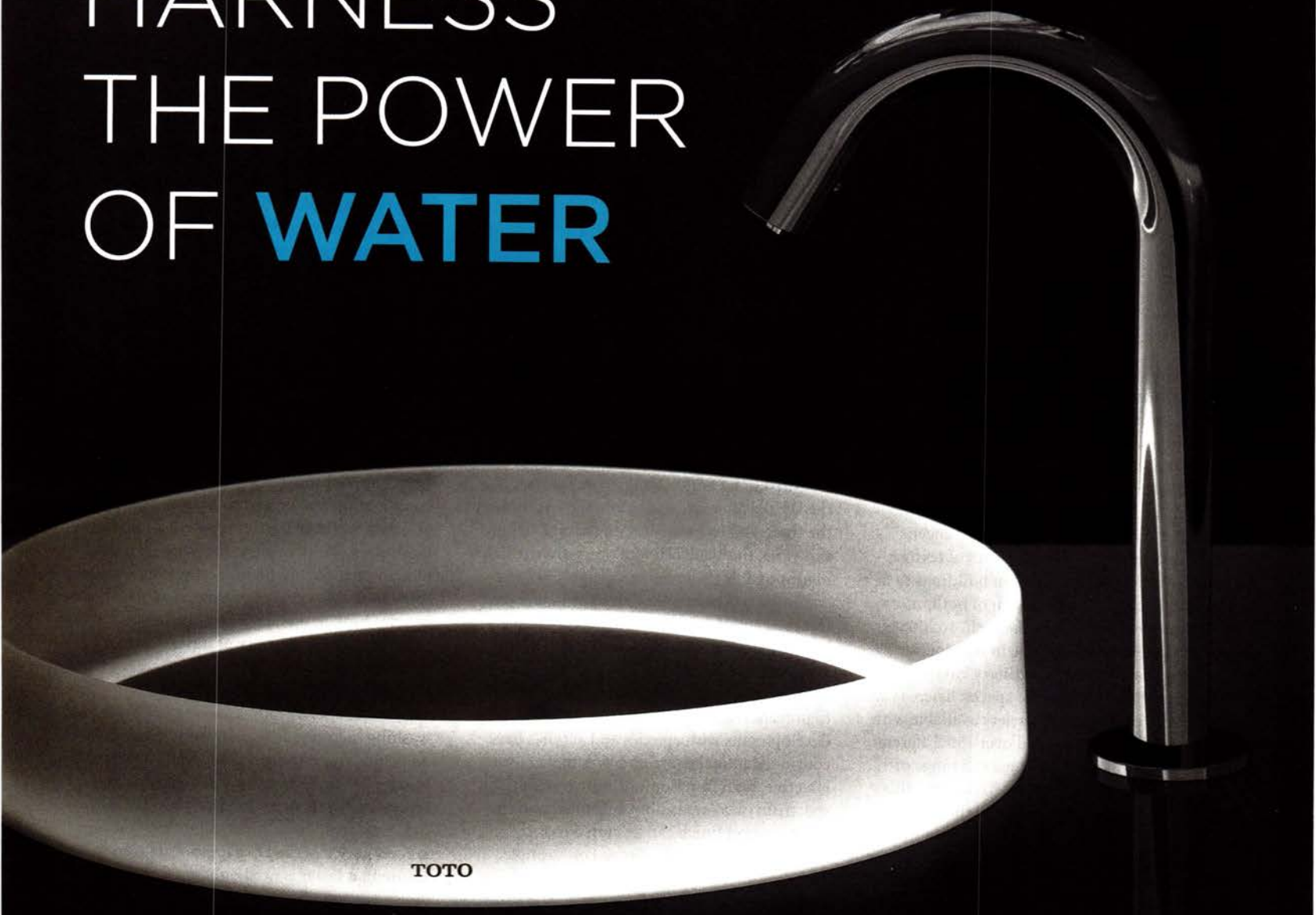

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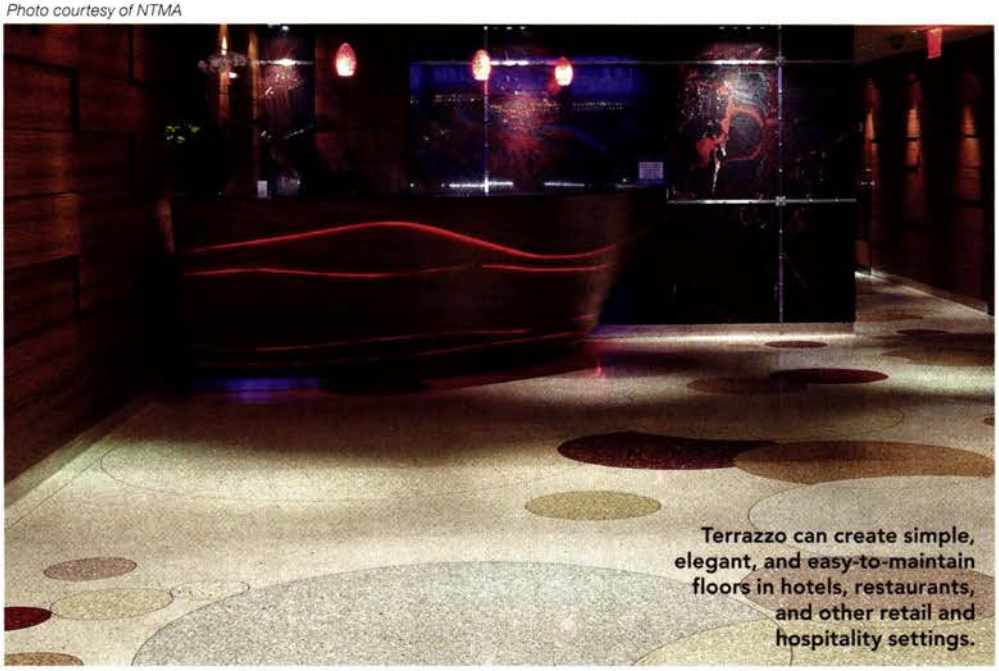


Terrazzo can create simple, elegant, and easy-to-maintain floors in hotels, restaurants, and other retail and hospitality settings.

tradesman to install it properly. A much better alternative is to use manufactured stone veneer which is lighter in weight, less expensive than full-depth stone, and much easier to install. Further, the manufacturing of it has progressed to the point where it is very difficult to tell any difference between the look of full-depth stone and the appearance of manufactured stone veneer.

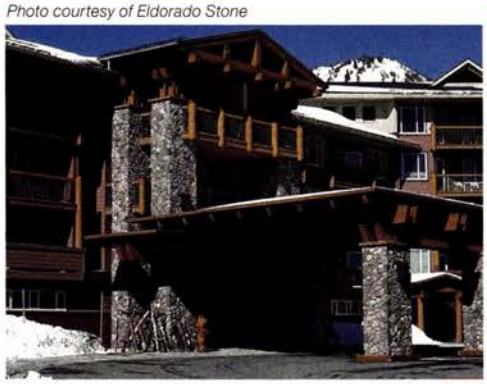
Stone's inherent characteristics of texture and warmth have been used on buildings to help define and highlight the design of both interior and exterior wall surfaces. As such, architects and designers have been able to incorporate products that transform ordinary environments into unique and memorable spaces. There is an abundance of choice and variety available with dozens of stone profiles and over 150 different colors on the market offering a full range of palettes, shapes, and textures. To achieve this range, some manufacturers mold their products from natural stone and then hand paint them with layers of iron oxide dyes to create a unique results such that no two stones are the same. Compared to natural stone, manufactured stone veneer provides the advantages of lower weight, easier installation, less waste, controllable color palettes, and lower price.

Terrazzo Surfaces

Another natural and durable material that is having a bit of a resurgence in high-use buildings is terrazzo. Terrazzo is a floor and wall finish that descended directly from simplified forms of centuries-old styles of marble mosaics used in Venice. It was first created when resourceful Venetian mosaic workers discovered a way to reuse marble remnants. With odd-size chips, they began to build terraces around their living quarters. Over time it has evolved into an environmentally friendly material that combines extraordinary design potential, optimum durability, and low maintenance. Terrazzo has also been shown to be the lowest-cost flooring material available based on its life cycle.

During the 1920s terrazzo became popular in the United States as Italian immigrants brought the trade and techniques with them. During this time, the availability of brass divider strips made possible the creation of highly artistic and intricate patterns and designs in terrazzo floors. Divider strips had often been used, beginning with wood and evolving to marble along with zinc metal and even plastic, allowing for expansion and contraction of the surface to prevent cracking. In more recent years, new developments with epoxies and acrylics have continued to make terrazzo ever more cost effective, high functioning, and versatile. The spectrum of colors is now unlimited and the make-up and finish can be suited to meet a variety of building situations. For example, rustic terrazzo is a uniformly textured surface designed for exterior use in which the matrix is depressed to expose the chips. There are also newer thin-set and epoxy-based terrazzo options which are less labor intensive and provide greater design flexibility.

Photo courtesy of Eldorado Stone



The use of materials such as manufactured stone veneer conveys a strong design message while remaining cost effective and durable.

Architects and designers have been taking advantage of the unlimited color palette and state-of-the-art water jet cutting techniques available with terrazzo to create visually stunning environments. Custom patterns and even corporate logos can easily be incorporated within a terrazzo floor. Intentional color transitions and design patterns can create an immediate visual impact by reinforcing a variety of themes and offering navigational clues throughout the building. Terrazzo is also antimicrobial, non-porous, and easily cleanable using a damp mop with neutral cleaners leaving no harsh odors to irritate people.

3. WATER CONSERVATION

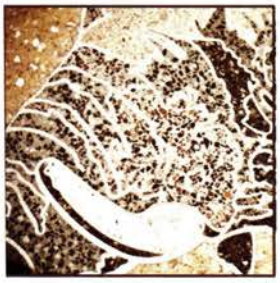
Retail and hospitality facilities can be very high users of water, particularly if they attract a lot of people on a daily basis who need to use restrooms or take showers. In the interest of serving customers, these businesses don't want to unnecessarily deprive anyone of water for washing. But in the interest of water conservation and green building design, they also don't want to have any water wasted or used beyond what is necessary. In response, a number of plumbing fixture manufacturers have created some innovative and appealing products that provide high design, conservation, and a feeling of fullness in the delivery of water.

Faucets and Showers

Busy restrooms include sinks where people are washing their hands regularly and frequently. As people come and go, the turning on and off of water is prone to waste, particularly if the faucets aren't turned completely off. Hence, the very common automatic, motion-sensing faucets have emerged as a logical solution to assure that water is used only as needed when hands are actually present for washing. Further, as a "touchless" fixture, hygiene is improved by eliminating the transfer of germs or bacteria from one user to another.

One downside to these automatic faucets has been their need for electrical power and wiring. The actual electricity usage may be small, but the need for wiring, circuitry, and connections requires coordination during design and construction and may be particularly difficult to achieve in some renovation projects. In response, manufacturers have offered alternatives such as solar-powered faucets that rely on borrowed light from electric light fixtures. One of the latest innovations though is an automatic faucet that uses the energy from

Kalahari Resorts Wisconsin Dells
Photo by David Markley



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CONTINUING EDUCATION

RANDOLPH BROOKS FEDERAL CREDIT UNION (RBFCU)

Location: San Antonio, Texas
Architect: Chesney Morales Architects/Planners & Associates

Photo courtesy of NTMA

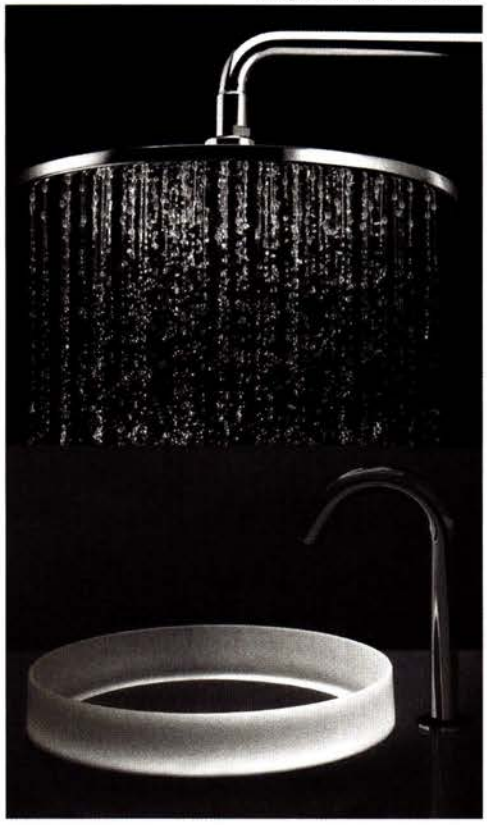
The award-winning terrazzo installation in the Randolph Brooks Federal Credit Union (RBFCU) is the result of an intense, yet collaborative, tug-of-war between the terrazzo contractor and designers to push the limits on terrazzo artistry. A 16-foot pictorial medallion, the centerpiece of the installation, depicts iconic images of Texas history—the Alamo, the state flag, the state capitol, the Guadalupe River, a Texas Ranger, Randolph Air Force Base—in 54 color combinations of epoxy terrazzo. "There's really nothing quite like it," says Sonya McDonald, senior VP of planning and market development at RBFCU. "It's an eye-catching and unique piece that takes people's breath away. People are accustomed to seeing art on the walls, but most have never seen such a high level of intricate artistic design built into the floor." A 2013 Honor Award winner in National Terrazzo & Mosaic Association's (NTMA) annual search for outstanding examples of terrazzo craftsmanship, the project vividly demonstrates the design potential of terrazzo flooring systems. In the planning stages of the project, the designers and architect had a vision for the medallion they wanted to create. What they didn't know was what was technically feasible, or how refined the details could be, explains Lawrence Di Filippo of Venice Art Terrazzo Company of San Antonio, the contractor on the project. "You can dream but it's not necessarily possible," Di Filippo says. "They tried to stretch us." Working closely with the architect and designer, Di Filippo's team and the manufacturer collaborated to rein in and simplify where reality demanded. In other areas, details could be added and further refined. The result was beyond what designers had hoped. "I'm starting to think there's nothing terrazzo can't do," says project architect Debra Babcock, with Chesney Morales Architects/ Planners & Associates of San Antonio. "I love working with it. If you can think of it, it can be done." She recommended terrazzo for its design capabilities as well as its permanence. "Terrazzo will outlast the rest of us," she says, noting that although terrazzo is often seen as the flooring of choice for airports, "it can be so much more than that. You can get extreme detail out of it."

For the building's main lobby, corridors, and an elevator lobby, 3/8-inch epoxy thin-set terrazzo in eight colors was specified. Outside, rustic terrazzo sidewalks and stairs lead to a plaza where the corporate logo is inlaid in a landscape of hills, sky, jets with jet streams, and birds in a ground-and-polished sand-cushion terrazzo system in seven more colors. Precast terrazzo benches frame the plaza. As a final flourish to the graphic design, the artists' and design architect's signatures are engraved in the lobby floor and in the medallion. "The whole job is graphics, no plain terrazzo," says Di Filippo. "It tells a story everywhere you go."

running water to power itself. It is designed such that the flow of water spins a high-efficiency turbine to create and store power in a rechargeable capacitor. It's truly a sustainable form of energy in that every use powers the next one. Further, it is a great way to reduce maintenance and the cost of operation without routine battery replacement. This same water turbine approach has been applied to automatic flush valves in toilets and urinals with similar water, energy, and cost saving results.

In hotels, spas, and other hospitality settings, showers that are used by guests are a primary plumbing fixture of concern. Here the intent is to provide a positive showering experience but with only the amount of water necessary. A whole range of showerheads and flow restrictors have been available for some time to address this with varying degrees of results and satisfaction. One common complaint is that the flow feels too restricted with water drops feeling small and spray-like or too intense, almost needle-like in their delivery. A recent innovation to overcome some of the limitations of other showerheads has been the use of air injected into the water stream to create more voluminous droplets. Properly done, this results in the feeling of a full, rich shower while using less water in the process. Hence, the user can receive a luxurious shower experience while respecting the water supply.

Images courtesy of TOTO USA



Plumbing fixtures such as showerheads and faucets are available for retail and hospitality settings that conserve water, provide a fully enhanced washing experience, and offer great design options.

See endnote in the online version of this article.

Continues at ce.architecturalrecord.com

Peter J. Arsenault, FAIA, NCARB, LEED AP, *is an architect and green building consultant who has authored over 100 continuing education and technical publications as part of a nationwide practice. www.linkedin.com/in/pjaarch*

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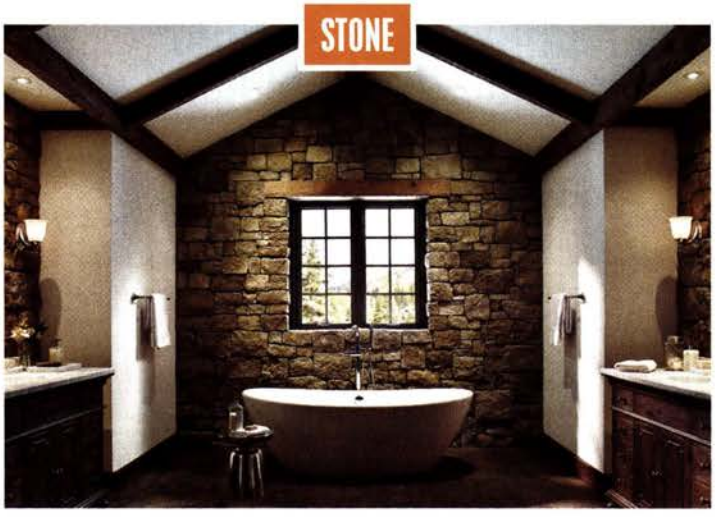

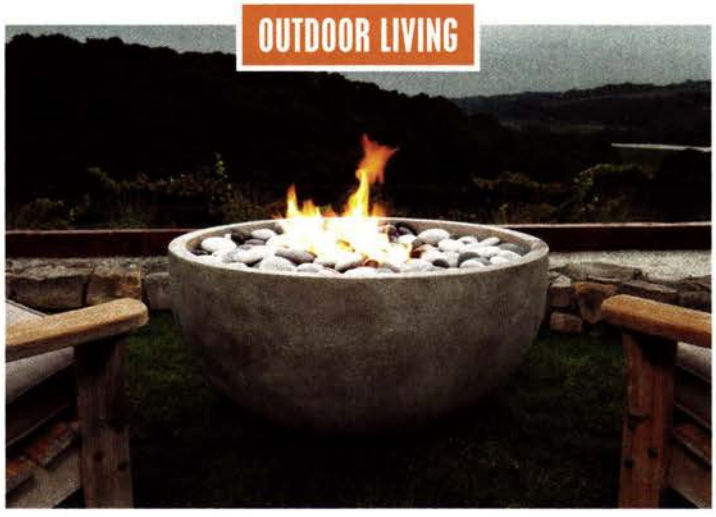

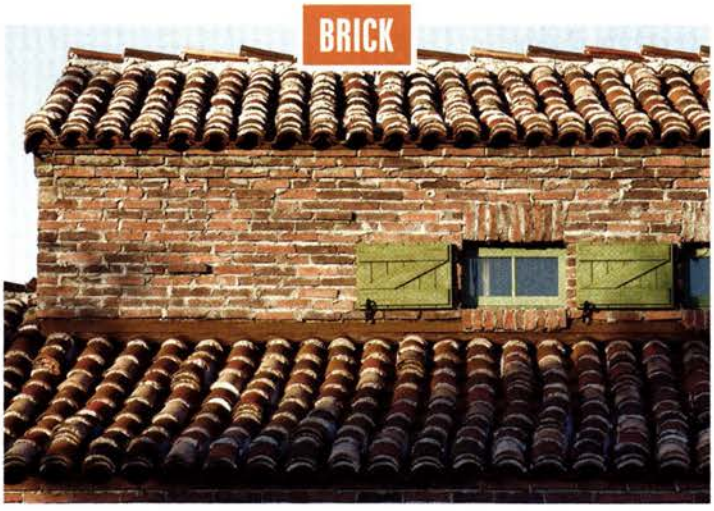

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CIRCLE 70

Many in the building community rely on house wraps, or weather-resistant barriers (WRB), to prevent moisture entry into the wall cavity.

Photo courtesy of Kimberly-Clark

Effective and Affordable House Wraps

New textured and breathable weather-resistant barriers maximize drainage capabilities and protection against water and air infiltration

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Moisture intrusion. It has bedeviled builders and homeowners for centuries. Moisture in the building envelope can cause problems for the structure and its occupants, including rot, mold, mildew, and microbial growth. Left untreated, unwanted moisture can jeopardize a building's integrity, leading to customer dissatisfaction, callbacks, and, in some cases, even structural failure, litigation, significant claims against builders, and expensive repairs and remediation. Compounding the problem is that even severe moisture damage can occur without telltale signs.

In recognition of the potential pitfalls associated with moisture intrusion, building codes are becoming stricter with regard to moisture management, and building architects and owners more attuned to the often onerous implications of improper moisture control. Many in the building community rely on house wraps, or weather-resistant barriers (WRB) to prevent moisture entry into the wall cavity and to create continuous protection around the structure, covering gaps, cracks, and other holes between the sheathing and the cladding. Over the years, house wraps have evolved, with some of today's versions better able to also protect against air infiltration and easily drain any water that has penetrated the wall cavity, and allow water vapor to escape the home—all at an affordable price. This article will highlight the basic characteristics of house wraps, compare the various types of house wrap products on the market, and identify the features to consider in properly specifying a house wrap in a residential structure.

HOUSE WRAPS: THE BASICS

While many builders and homeowners assume that the siding on a house is sufficient protection against water infiltration, this is not the case. Even perfectly installed, high-quality siding cannot perform that task, as water, particularly wind-driven rain, will inevitably find its way through gaps and cracks in the wall assembly.

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Learning Objectives

After reading this article, you should be able to:

1. Discuss the ways in which house wraps contribute to moisture management and enhance green building goals.
2. Compare various types of weather-resistant barriers in terms of their ability to effectively minimize moisture and air infiltration and allow drainage of water in the wall cavity.
3. Identify the key considerations in the proper specification of a house wrap product to ensure occupant health and safety and consistency with sustainability objectives.
4. Explain how to overcome potential problems in the installation process in order to maximize the effectiveness of the specified house wrap material.

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That goes for all claddings—reservoir claddings like stucco as well as wood, insulated vinyl, or fiber cement all have the potential to hold trapped moisture.

Over the years, it has become common practice to install a weather-resistant barrier (WRB) between the sheathing and the cladding as a second line of defense in moisture protection. A WRB, or house wrap, is a lightweight synthetic material which, if properly designed and installed, will protect the structure from weather, moisture, and other environmental damage over time. Specifically, a house wrap has a threefold task: stop liquid water intrusion; be sufficiently vapor permeable to promote drying of the wall cavity while allowing water vapor to escape outside of the structure; and prevent air infiltration into the structure. In other words, an effective house wrap will assure that bulk water is not admitted to the wall cavity, and any water that does breach the barrier is quickly drained, allowing the wall system to dry out, and drafts are avoided—all of which work to favorably impact structural integrity, the service life of the building, indoor air quality, and energy costs. Permeability is a key consideration as, if water is left to collect within the walls, not only is the possibility of mold increased, but the built up moisture will almost certainly compromise the R-value of the insulation. To be considered effective, a house wrap product should possess a relatively high moisture vapor transmission rate.

If they are properly sealed, house wraps can also serve as an effective air barrier. In fact, preventing air leakage can be a key part of a house wrap's contribution to sustainable building.

According to Franklin & Associates in a study prepared for the American Plastics Council, house wraps are "quite effective at reducing air infiltration." As the U.S. Department of Energy (DOE) maintains, because some 50 percent of heating and cooling energy for homes stems from air infiltration, it follows that blocking that infiltration has the potential to reduce energy usage and related greenhouse gas (GHG) emissions. While the study acknowledges that the evidence is "highly variable and dependent on many factors," the amount of air house wraps can likely block falls in the range of 10 percent to 50 percent of the infiltrated air, with "the reduction in energy consumption of a typical house in the U.S. as a result of applying house wrap is estimated to be 12 to 60 million Btu per year. Over a period of 30 years, these values become 360 to 1,800 million Btu."[1]

The DOE, in fact, cites house wraps as the most common air barrier material, and notes that sealing the house wrap joints with the manufacturer's tape can boost the material's performance by some 20 percent.[2] House wraps can also help the home to qualify for and maintain ENERGY STAR® certification.

Photo courtesy of Kimberly-Clark

Most structures, regardless of whether they are stick built or metal framing, commercial or residential, single or multi-level, should use some type of weather-resistant barrier. House wraps are necessary protection in all wood-framed residential structures and most are applicable in multifamily residential structures up to five stories high—beyond that height limit a commercial-grade wrap is needed as typical house wraps are subject to tearing from wind forces. The exterior of the structure should also be taken into consideration when selecting a house wrap. Reservoir claddings that absorb and store water such as stucco, brick, and stone all pose serious concerns in regard to water penetrating into a wall assembly—walls should be built with an air space behind these types of cladding.

TYPES OF HOUSE WRAPS

There are several types of WRB—asphalt felt, Grade D building paper, plastic house wrap, and liquid-applied WRB, among others. Tar paper, or felt as it is now referred to, was the preferred choice of WRB many years ago. Felt has evolved from a heavy, unwieldy material to a lighter, water-resistant material. While some builders prefer it, felt is still relatively heavy, and is susceptible to punctures, and the fact that it traditionally comes in 3-foot-wide rolls makes it somewhat cumbersome and time consuming to install. Advocates note that if wet, felt is absorbent and will gradually dry. Most often used in the western U.S. and under stucco, grade D paper is a lighter-weight, lower-cost asphalt-saturated paper. Grade D paper has a minimum water-resistance rating of 10 minutes, with many manufacturers far exceeding the minimum requirements. Still, if Grade D paper becomes and stays wet, rot may occur. Liquid-applied WRBs are another option. Sprayed or rolled on sheathing, they form a coating that is air tight and resistant to water penetration. One drawback with liquid-applied materials is their high cost relative to other alternatives. A consistent thickness must be achieved, adequate attention paid to detailing, the proper cure time observed, and protective clothing worn during the application process. Air and water resistant, liquid-applied materials vary as to vapor permeability effectiveness.

Installing a WRB between the sheathing and the cladding is a second line of defense in moisture protection.

Modern House Wraps

In use for more than four decades, plastic house wraps provided an alternative to asphalt-saturated felt. Because WRBs come in rolls that are wider than asphalt—9 to 10 feet being the industry standard—they can be installed more quickly and easily. Fabricated from woven or non-woven polyethylene or polypropylene in various processes, a plethora of modern house wraps are available with a range of water resistance, water permeability, performance and durability characteristics. House wraps can be woven or non-woven, which are typically sheets bonded together chemically, thermally, or mechanically. They can be further categorized as perforated or non-perforated. While some house wraps are manufactured for natural permeability, others rely on small holes to provide permeability. In other words, to achieve water vapor transfer some house wraps have micro-perforations while others are micro-porous, having the technology to allow water vapor to diffuse through the fibers of the fabric itself, helping to remove trapped moisture within the structure.

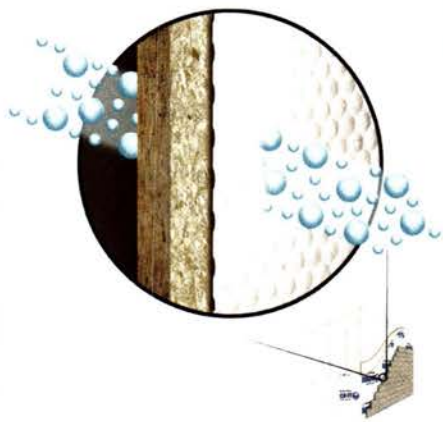
Unlike non-wovens, most woven products typically achieve vapor permeability though the use of micro-perforations. While micro-perforations do add to a material's breathability, they tend to compromise its resistance to liquid water penetration and air flow, presenting the possibility of water damage and negative implications for the integrity of the insulation and associated energy costs.

Next-Generation House Wraps

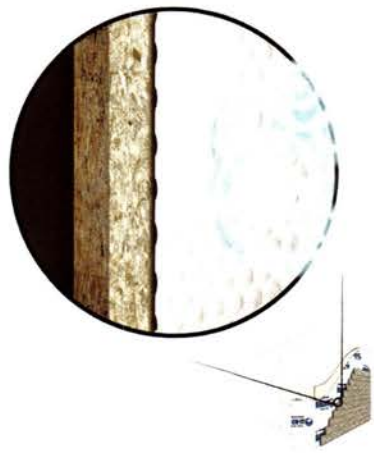
In contrast to traditional house wraps that only provided a water-resistive layer that could trap water in the wall cavity, the emphasis today is on drainable house wraps which provide a drainage gap that allows water to exit the wall cavity as quickly as possible, resulting in a dramatically better removal of water from a wall system.

Next-generation house wraps do not sacrifice breathability for liquid water resistance, or vice versa, with manufacturers claiming these materials can prevent water penetration while providing a breathable barrier technology that allows moisture vapor from inside the home to escape, maintaining a dry building structure for long periods of time. Breathability in a house wrap is critical particularly when considered in light of the fact that, in an average household, occupant activities from breathing to bathing

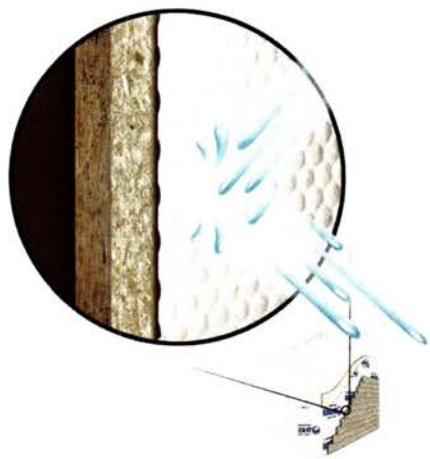
Images courtesy of Kimberly-Clark



The vapor-permeable membrane allows moisture in the building to escape, protecting the structure from rot and mold.



As an air barrier, a house wrap helps to reduce heating and cooling cost.



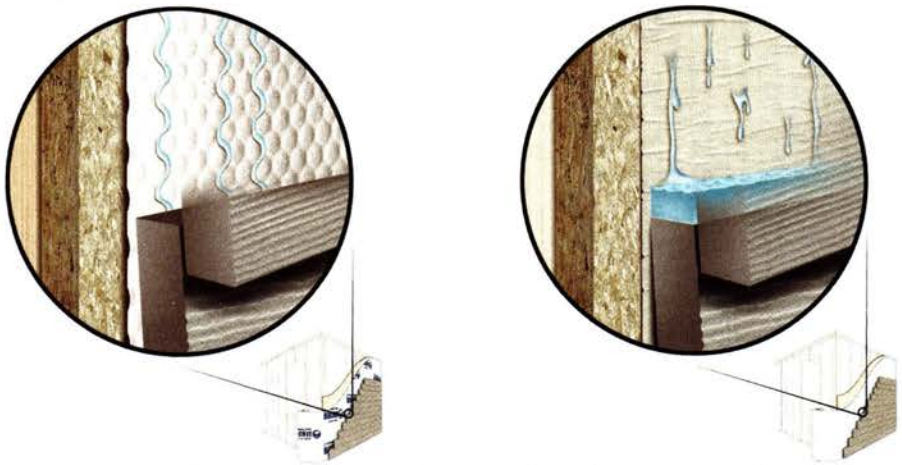
House wraps act as a barrier, keeping wind-driven rain and other water from reaching the sheathing.

to cooking emit up to 6 gallons of moisture a week—that water has to go somewhere. If the house wrap does not breathe properly, the moisture will escape through the walls, and enter the wall cavity where it is stopped and trapped if the house wrap is non-breathable, the result of course being the potential for degradation of many commercial insulation products as well as for rot, mold, and eventually, structural failure.

Products fabricated in the form of cloth-like, non-woven water-resistant barriers use a patterned, grooved, dimpled, or otherwise textured surface to create a breathable barrier and improve water drainage within the wall. Rather than lie flat against the siding, the vertically textured material forms a thin air space that acts to encourage the channeling of any liquid that reaches the siding of the home to quickly drain out to the ground. These textured house wraps have achieved impressive drainage rates, with some demonstrating a 98 percent efficiency in liquid drainage.

As can be seen in the above comparative illustration in which house wrap is attached to oriented strand board sheathing on top of 2x stud framing, textured house wrap is superior to non-textured in terms of water drainage. The textured material channels water away from the wall structures to the ground, while water vapor condenses on non-textured house wrap and runs down, pooling on top of the siding or in the folds and wrinkles of the wrap. This trapped moisture can lead to mold and rot of the wall assembly.

images courtesy of Kimberly-Clark



Textured house wrap (figure on left) protects homes by channeling water away from wall structures and to the ground. On non-textured house wrap (figure on right), water vapor condenses on house wrap and runs down, pooling on top of the siding or in the folds and wrinkles of the wrap. This moisture can lead to mold and rot of the wall assembly.

While this level of performance may signal a product that is prohibitively expensive, that is not the case. Textured house wrap can be a mid-price product when the manufacturer has a firm control of costs, particularly when the product is fabricated in the manufacturer's own mills—an arrangement with favorable implications not only for pricing but for quality control as well.

Photo courtesy of Kimberly-Clark

Next-generation house wraps resist water and air intrusion into the structure and allow water vapor to escape from the wall cavity, leading to more energy-efficient, sustainable homes.

Foam Sheathing and House Wrap

Foam sheathing is not an air barrier or a weather barrier. While foam sheathing may be an adequate, low-cost method for achieving the R-values required by the 2012 IECC, because it does not provide an effective water-resistant barrier, it fails to protect the structure in a comprehensive manner. Even when properly installed and taped, foam sheathing lacks the shingling effect necessary to keep water from seeping through the edges of the tape and into wall assemblies. Once those wall assemblies get wet, the ambient humidity both inside and outside the structure can make them tough to get dry, resulting in rot, mold, and eventual structural failure—all problems that have resulted in skyrocketing insurance claims that continue to plague builders. Some consider it best practice to install an effective WRB that can provide weatherization and breathability benefits that help maintain the as-constructed R-value of the home insulation. The right, properly installed house wrap can provide a superior air barrier to foam sheathing by itself, which can expand and contract in the heat and cold, causing tape seams to fail, which allows the air barrier to be broken.

As the building community becomes more aware of the advantages, the use of house wraps will increase in the coming years. Driven by building codes, regulations governing building envelope systems, and the move to construct energy-efficient homes and upgrade existing insulation systems, house wraps in fact are expected to see a surge in growth globally, according to consulting firm Frost & Sullivan, in its recent report entitled "Analysis of the Global House Wraps Market." The firm found that the house wraps market earned revenues of $696.4 million in 2013 and estimates this to reach $1.05 billion in 2018, with user preference for the non-perforated house wraps projected to increase during the forecast period. Manufacturers providing a wide range of products with optimum price-performance stand to gain as do those with "efficient after-sales services, including on-site support, extended warranty programs, and product workshops will provide opportunities for market participants to speed up customer acquisition."[3] The study goes on to state that "the energy to manufacture house wrap for a single house is only 1.2 to 1.8 million Btu depending on the type of polyolefin used," and that "compared to the energy savings resulting from the application of house wrap, the average 'pay back' period ranges from only 7 to 54 days."

See endnotes in the online version of this article.

Continues at ce.architecturalrecord.com

Evaluating the Carbon Footprint of Wood Buildings

Reducing greenhouse gases with high-performance structures

Sponsored by reThink Wood

Worldwide, there has been increasing focus on the carbon footprint of buildings and recognition that design professionals are uniquely positioned to reduce greenhouse gases in the atmosphere by creating high-performance structures.

According to Architecture 2030, which was established more than a decade ago in response to the climate change crisis, buildings are "the problem." The building sector consumes nearly half of all energy produced in the United States, 75 percent of the electricity produced is used to operate buildings, and, in 2010, the building sector was responsible for nearly half of U.S. carbon dioxide (CO_2) emissions. However, buildings also offer a solution. By 2035, approximately 75 percent of the nation's building stock will be either new or renovated (from a 2010 baseline). This transformation offers a significant opportunity to reduce the carbon footprint of the built environment.

Continues at ce.architecturalrecord.com

Architecture 2030 objectives are making many designers pay greater attention to the materials used to construct buildings and the benefits, carbon and otherwise, of using wood from sustainably managed forests instead of products that are fossil fuel-intensive.

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Learning Objectives

After reading this article, you should be able to:

1. Examine the natural cycle of carbon absorption and storage, and the role of forests and wood products in mitigating carbon emissions.
2. Discuss the role of wood products sourced from sustainably managed forests in the design of sustainable, environmentally positive buildings.
3. Explain the low embodied energy of wood products, and how this translates into avoided carbon emissions throughout their life cycles.
4. Compare the carbon benefits of example buildings based on the results of two calculators.

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

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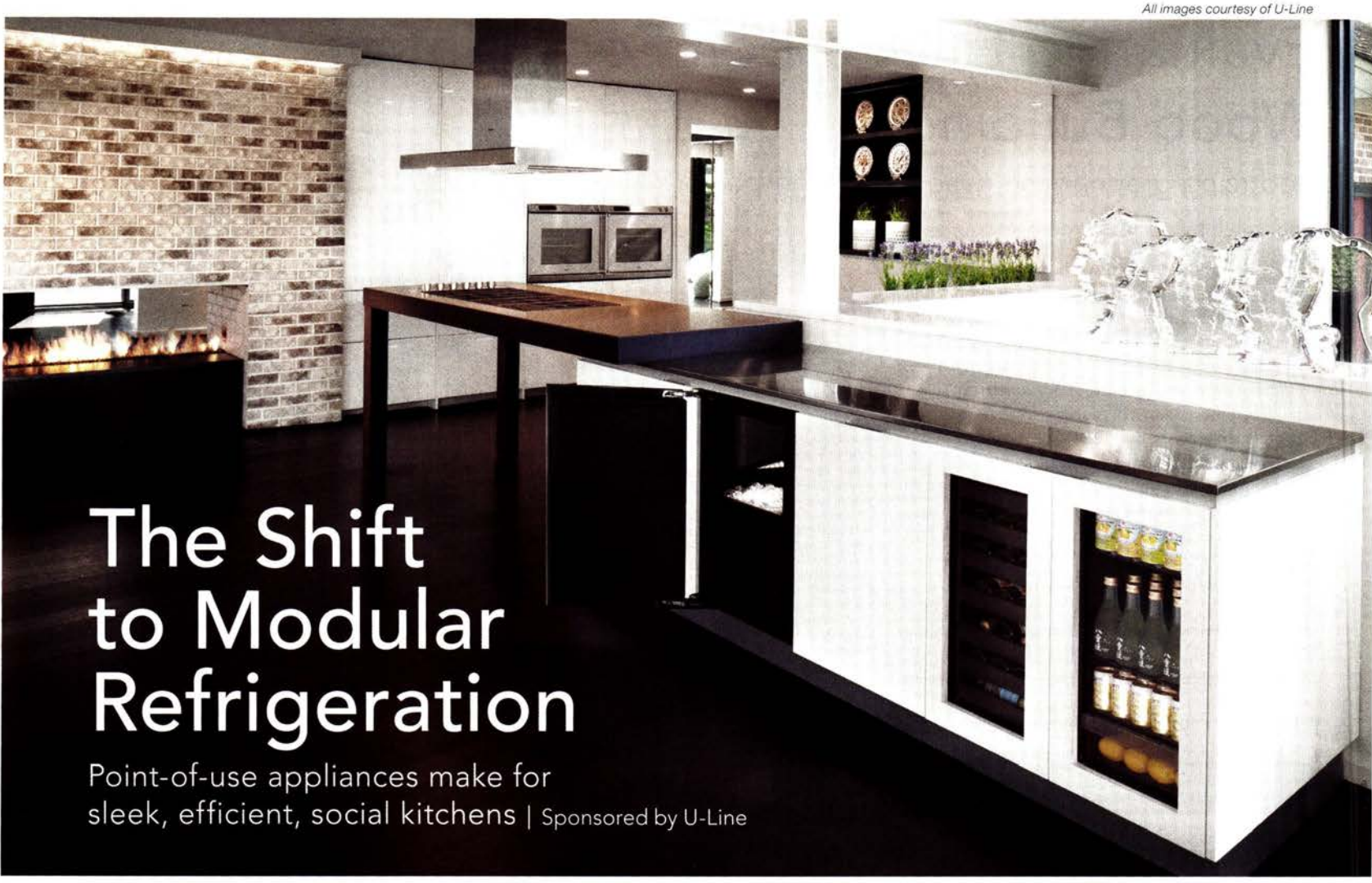
Updated April 2015, based on continuing education article from March/April 2013 issue of GreenSource

All images courtesy of U-Line



The Shift to Modular Refrigeration

Point-of-use appliances make for sleek, efficient, social kitchens | Sponsored by U-Line

Kitchen envy. It strikes at the sight of a sleek, well-designed, efficient kitchen. With their striking cabinetry, textured countertops, and premium appliances, today's kitchens can be showpieces if not outright status symbols. Realtors tell us that the kitchen is often a key selling point in the purchase of a home and that remodeling a kitchen gives homeowners the greatest return on their investment. Admittedly, the kitchen has come a long way. Traditional kitchens were small and self contained, primarily utilitarian spaces devoted to meal preparation and clean up and sealed off from the rest of the home. Social activity around food was the exclusive province of the dining room.

Kitchens have evolved. In the past two decades, the trend towards larger, multipurpose kitchens has taken root. The kitchen is the new living room, the communal center of the home, as walls are removed to create the feeling of more space, and add a holistic quality to a house's layout. Today's trends are towards a more transitional design aesthetic, and a more open kitchen design. Accompanying those trends are a rethinking and redeployment of the traditional role of refrigeration in the home kitchen.

This article will discuss the latest economic, social, and demographic developments that are impacting kitchen design and the role of modular refrigeration. Also covered will be the ways in which modular refrigeration contributes to the creation of functional spaces that reflect the changing domestic landscape.

MODULAR REFRIGERATION—WHAT IS IT?

The traditional big box refrigerator is experiencing dramatic changes. Many designers and consumers are opting to "disassemble" it, and locate the pieces strategically throughout the kitchen and elsewhere. Instead of a typical 84-inch unit, smaller refrigerator columns or fully hidden refrigerator drawers are being separated from the traditional freezer, opening up more counter space. In use since the 1990s, modular refrigeration gives users the flexibility to preserve the right product, in the right place, at the right temperature. This may involve a refrigerator drawer in the kitchen island, say, or an 18-inch solid door refrigerator set to market mode to store fruits and vegetables near a prep sink, or a beverage center and clear ice machine in the wet bar, allowing for maximum customization for a particular lifestyle. Models with front ventilation systems offer the greatest flexibility as they can be installed undercounter, in island applications, outdoors, wet bars, offices, etc., without the need for additional airflow. According to informal testing by manufacturers, switching from a traditional big box refrigerator to several smaller modular units does not result in a loss of refrigerator, freezer, or ice capacity.

ABOVE: Modular refrigeration allows for a completely customizable kitchen space. This efficient kitchen choreography helps ensure a flow that accommodates today's trend towards zone kitchen design.

THE KITCHEN TRIANGLE—THE TRADITIONAL APPROACH

To gain a better understanding of the impact of modular refrigeration, it is important to first understand the traditional kitchen triangle and its role in kitchen design. The kitchen work

triangle is an ergonomic design principle, and a traditional approach to configuring a kitchen space. It is defined by the imaginary lines that connect the three main kitchen work sites—the refrigerator, the sink, and the stove—and is intended to optimize the distance between them while reducing traffic in the work zone. In the classic kitchen triangle, each leg of the triangle should be between 4 and 9 feet. The total length of all three legs should be between 12 and 26 feet. Countertops should not intersect any leg of the triangle more than 12 inches. Major traffic flow should not move through the triangle.

Kitchen layouts based upon the kitchen triangle are intended to keep the distance between the points workable—neither too close nor too far apart—so that kitchens will be easy to use. As can be seen in the accompanying illustration (see the online version of this course), there are several variations of the theme. In the L-shape configuration, the work area is protected. There is ample storage space and dining areas can be accommodated. Corners, however, become wasted space. The U-shape is the most efficient work triangle. There is significant counter space. However, corners and walls, here again, make for wasted space and this configuration can make for a dark kitchen, rather than an open concept light kitchen. Many newer kitchens incorporate an island. In addition to offering additional counter and cabinet space, the island configuration also becomes a gathering space, promoting convivial communication and sociability. Two cooks can work easily at an island, which is ideal for preparation of family meals and including children in the process. A simple line configuration offers the advantages of an open layout and a good traffic flow; however, cabinet and counter space is limited. Finally, the galley kitchen, so typical in smaller homes and apartments, can provide inefficient kitchen choreography and can be problematic. While all appliances and cabinets are within easy reach, traffic flow is poor, and the space is too cramped to accommodate multiple cooks or to serve as a comfortable gathering spot.

Modular freezer units maintain frozen goods without freezer burn.

Seamlessly integrated refrigerators are now separated from the traditional fridge/freezer, opening up more counter space and extending the preservation of food and beverages.

MODULAR REFRIGERATION PRODUCTS—OPENING UP TRADITIONAL KITCHEN DESIGN

Single unit refrigeration as we know it has pros and cons in modern kitchens. It clearly identifies the space as a kitchen, and works well if the kitchen is small and it is placed within the minimal number of steps between the sink and the oven/stove. If only one person is working in the kitchen and there is little or no traffic through the triangle work area, the traditional fridge is fine. However, the traditional fridge doesn't allow users the flexibility to put items where they are most useful, nor is it efficient when there are multiple cooks or users in the kitchen at once. Not always practical in larger kitchen spaces, the traditional big box refrigerator forces us out of our natural instinct to work and organize in zones, and it takes up potential counter space.

Modular refrigeration units are a breakthrough in the sense that they obviate the need for the traditional kitchen triangle, enabling the kitchen to be more aligned with contemporary trends and personal preferences.

CONTINUING EDUCATION

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Learning Objectives

After reading this article, you should be able to:

1. Discuss contemporary trends in kitchen design as they reflect the health and welfare of home occupants.
2. Define the influence of the current social movement of aging in place and how it impacts kitchen design and layout and the senior population.
3. Describe the impact of evolving technology and energy efficiency on kitchen appliances.
4. Explain the social and economic advantages of modular refrigeration and how it contributes to green building goals and the well-being of families.

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A strategically placed beverage center chills drinks to their proper temperature, while cutting down on interference with traffic flow in the kitchen.

Because modular refrigeration products can be placed anywhere in the kitchen, they suit storage and design needs while providing greater convenience for the homeowner. In fact, refrigeration units can be installed in areas that would have previously been difficult to access, such as islands and pantries.

A kitchen is naturally divided into zones—cooking, prepping, clean up, daily use, baking, freezer, and entertainment—each of which supports different behaviors, users, and situations. Modular refrigeration is intended to complement this design approach and is focused on the way the kitchen is used for entertaining, daily living, and meal prep, as well as on maximizing storage efficiency for varying lifestyles. While not a substitute for the full-size refrigerator and freezer, modular units are a specialized point-of-use refrigeration option that is meant to accommodate today's evolving kitchen design trends and the changing nature of the domestic landscape and the way in which the kitchen space is utilized.

There are several situations in which modular refrigeration can enhance layout and workflow. Units can be placed to preserve food and beverages near corresponding work areas. Modular refrigeration provides a more accessible area devoted to snacks and juices for children, which can take up significant space in the traditional fridge; or, modular units can be used exclusively to produce and preserve ice or wine for the beverage center, for example. A fridge placed near the edge of the kitchen will mean kids can grab a snack or adults a bottle of wine without interrupting meal preparation or traffic flow in the kitchen. Users who entertain frequently might opt for an "overflow fridge" to be utilized for parties or during the holidays. The result is still ergonomic, as the arrangement of units reflects the use and flow of the evolved kitchen space. The following schematic (see the online version of this course) shows a plan for distributing the modular refrigeration units to support the workflow.

Temperature-controlled storage for delicate items, adjustable interior configurations, and hygienic food storage features are some of the characteristics that help make modular units popular among home chefs.

DESIGN OPTIONS WITH MODULAR REFRIGERATION

Modular refrigeration units are available with options that support today's lifestyle choices.

Adjustable pre-programmed food and beverage modes. Temperature management systems provide users with the ability to choose settings that correspond to the types of foods and beverages that they maintain. Pre-programmed systems are available in which the user can choose from various modes that might include deli, market, root cellar, pantry, beverage, and polar mode. Deli mode (34°F - 40°F), for example, would recreate the showcase conditions of a delicatessen where proper preservation enables lunch meats, cheeses, and other delicacies to stay fresher and last longer. Market mode (34°F - 40°F) is for fresh fruits and vegetables, while the root cellar (45°F - 55°F) maintains crispness and preserves freshness of root vegetables without getting too cool. Factors like unstable temperature, light, bugs, and moisture all affect the extended preservation of dry goods, many of which are purchased in bulk. Pantry mode (34°F - 70°F) is intended to extend the life of dry goods like flour, seasonings, and grains through an environment that maintains a stable temperature and ideal moisture level. Polar mode (-5°F - 5°F) maintains everyday frozen goods, like ice cream, without the hassle of freezer burn.

Alternatively, the temperature can be adjusted based on personal preferences within each mode. Temperature settings typically range from 34°F - 70°F.

Adjustable shelves. In many modular refrigeration units, tempered glass shelves can be individually adjusted vertically for optimum space utilization.

Custom combination units. Many manufacturers offer the ability to create a customized configuration, combing refrigeration and wine, or wine and ice. Varying sizes and configurations are available for a wide range of situations from an all-in-one unit for extended-stay guests, or as a refreshment center when entertaining, or as a typical kitchen workhorse.

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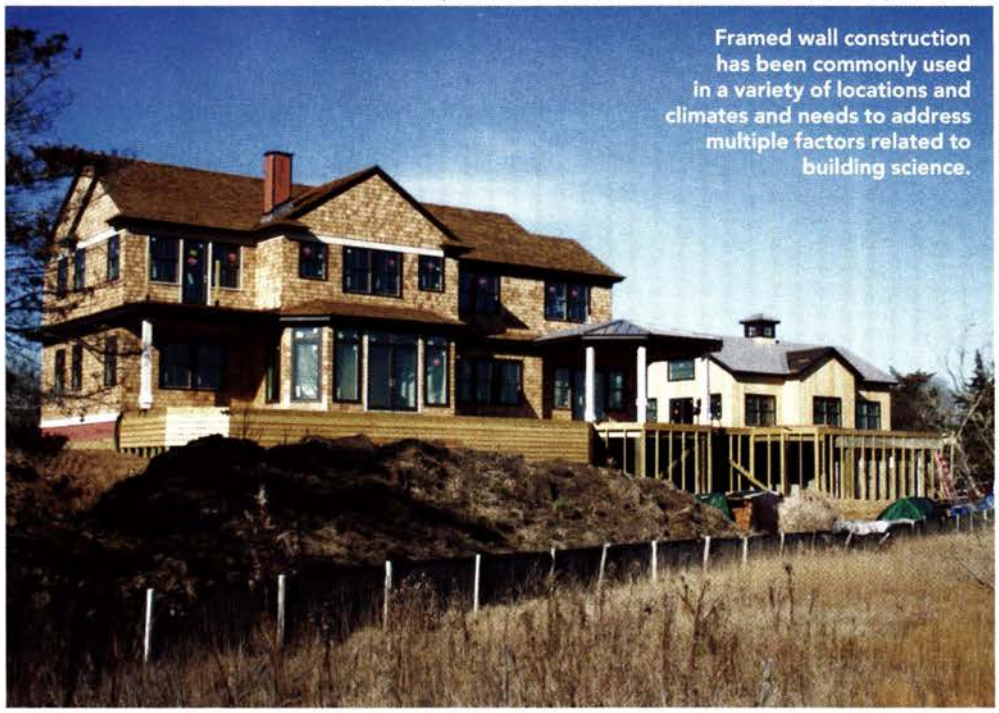
The Science Behind Building Envelope Design in Framed Wall Assemblies

Photo courtesy of CertainTeed Insulation and Sunset Green Home, Southampton, New York



Framed wall construction has been commonly used in a variety of locations and climates and needs to address multiple factors related to building science.

Addressing air tightness, thermal control, and moisture management to maximize comfort and prevent problems

Sponsored by CertainTeed Insulation | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*

Constructing exterior walls using framing systems, whether metal or wood, continues to be a very common and popular technique across the United States. Materials that are readily available and construction methods that have been well understood for decades allow lightweight walls to be easily constructed in residential, commercial, and even industrial buildings. However, exterior framed walls are an important part of the building envelope and if they are not designed and installed to address all of the forces at play in them, serious problems can arise. Breaches in thermal insulation, air barriers, or vapor/water barriers can cause water, air, and moisture to penetrate the wall system, causing deterioration. Further, if the conditions are right, then mold can form which has been widely identified as a health hazard. In severe cases, structural failure can occur. Hence, design professionals must address framed exterior walls as part of the larger building envelope. They also need to have knowledge of some of the science behind exterior framed walls, particularly how materials will integrate and perform in a given wall assembly. Through an informed design process and discriminating product selection, architects and other professionals can then produce effective, functional, and long-lasting exterior framed walls, avoiding the problems of poor wall design.

FRAMED EXTERIOR WALLS OVERVIEW

At the most basic level, exterior framed walls are part of the building envelope that define the boundary between inside and outside. Inside, buildings contain conditioned space, meaning that the air is heated, cooled, or at least filtered. Outside, the weather and other environmental conditions dominate. The wall provides the separation between the two. The opaque wall areas provide the full degree of separation while openings (e.g. doors, windows, etc.) are used to allow passage of people, air, light, etc. as needed or desired.

In creating this building envelope separation, we impose a lot requirements on a framed wall assembly. First, it needs to provide the appropriate degree of strength and rigidity, whether in response to imposed building loads, wind loads, or use requirements. This is usually achieved by a combination of framing member size, sheathing, and structural reinforcing as required. But we all know that other materials are required to create the full separation. To address interior needs, insulation is required to control heat flow, air barriers are needed to restrict unwanted air flow, and vapor barriers are required to prevent airborne moisture from entering into the wall assembly. On the exterior, the wall assembly needs to provide complete rain and weather protection. Throughout, building codes and standards will dictate

Photos below courtesy of CertainTeed Insulation

Different types of insulation are available to restrict thermal flow in framed walls including batts, blown in, and spray foam insulation products.

material performance requirements including fire containment and control in some cases. And of course, the owner and design team will care about the economics of the system not to mention the final appearance and other considerations such as wall thickness and how that integrates with the rest of the building construction. Altogether, a framed wall assembly is a collection of a lot of different materials that need to come together to meet all of these different requirements and will directly impact the long-term comfort of the occupants, energy use of the building, and even the quality of the indoor environment.

A properly designed and specified framed wall assembly delivers on the promise of overall integrity through a scientific analysis of materials and an understanding of the compatibility of different components of the assembly. Among the more significant factors is the clear continuity of each of the needed barriers (thermal, water, air, vapor) so that breaches do not occur and undermine the performance or integrity of the wall. But we are probably all too aware that defects and even failures in wall systems can and do occur. Why? There are known causes in both the design of walls and in their construction. For a designer, a lot of technical information has become available in recent years that can seem contradictory at times, making a clear design decision seem difficult to discern. Sometimes new or unproven systems or materials are specified without fully reviewing them only to discover too late that they do not live up to expectations. In other cases, failures may occur because different materials were incompatible or not properly integrated or interfaced into other construction systems. And there is also the thought that a single product can take care of a particular need without providing any back up or contingency in the design in case something does go awry.

There is another more basic, and common, mistake that can be made by design professionals too, namely to ignore climate differences found in different locations. A framed wall assembly that works just fine in one location may produce significantly different results in another. That is why energy codes and standards, along with government agencies, have identified and adopted climate zones as the basis for building envelope design across the United States. There are eight identified climate zones ranging from very warm and humid in the south to much colder and dryer in the north, and plenty of variations in between. Before any design, construction, or permitting processes start, the proper climate zone must be identified for a given building and the assembly developed to match that zone accordingly.

Photo courtesy of CertainTeed Insulation

Numerous demands are placed on exterior framed wall construction to provide structure, protection from the elements, and integrity of materials over time.

Once bidding and construction begin, there is often the temptation to "value engineer" alternatives into the constructed building. Now in some cases value engineering can be a legitimate and useful tool. But improperly applied to frame wall assemblies, it may only save short-term construction costs at the expense of reduced long-term performance and potential cost exposure later on. During construction, quality control of the installed work is needed to achieve the intended results of any wall assembly and the only way to assess that is through routine inspection of the work as it progresses. This can help eliminate any questionable construction practices or work that is inconsistent with the contract documents, but it can also reveal any installation or procedural errors that can create defects that impact the performance of the wall.

Continues at ce.architecturalrecord.com

Peter J. Arsenault, FAIA, NCARB, LEED AP, *is an architect and green building consultant who has authored over 100 continuing education and technical publications as part of a nationwide practice. www.linkedin.com/in/pjaarch*

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Learning Objectives

After reading this article, you should be able to:

1. Identify and recognize the characteristics of different types of framed wall construction related to thermal, moisture, and air control.
2. Investigate the types of exterior wall issues and failures that need to be overcome in order for walls to perform as intended.
3. Assess the options available to design exterior framed walls that can control heat transfer, moisture, air infiltration, and mold prevention.
4. Design wall assemblies and specify products that can be used in a variety of building types to meet green building standards and code requirements.

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

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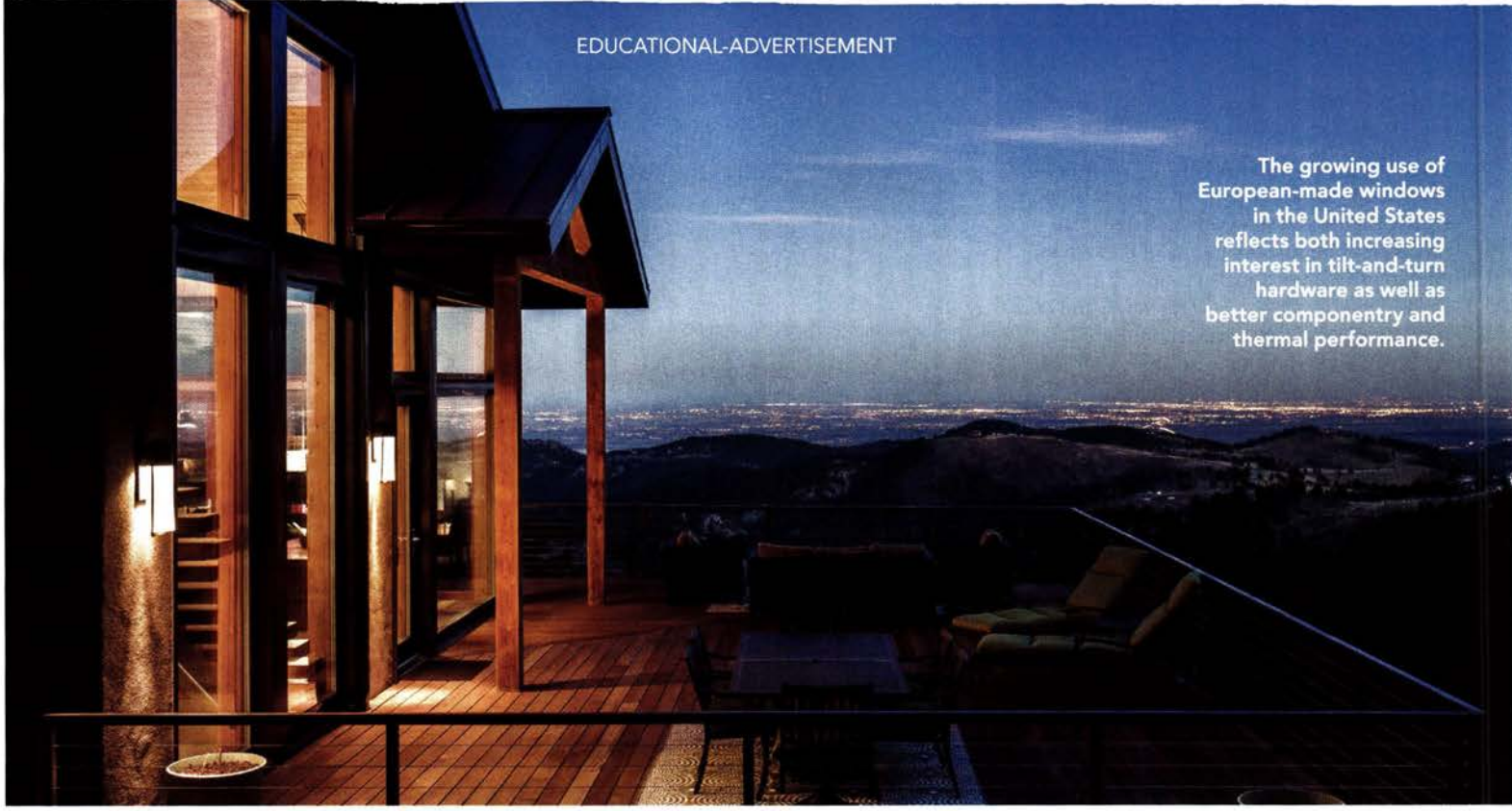

The growing use of European-made windows in the United States reflects both increasing interest in tilt-and-turn hardware as well as better componentry and thermal performance.

Photo courtesy of Zola European Windows

European Windows Boost U.S. Performance and Design

Enhancing design flexibility and bringing performance to the next level with European windows

Sponsored by Zola European Windows | *By C.C. Sullivan*

Architecture is about making form, right? Not so fast, says Peter Zumthor, the Swiss gold-medal architect known best for his thermal bath in Vals. In London a few years ago, Zumthor said, "Architecture is not about form, it is about many other things: the light and the use, and the structure, and the shadow, the smell and so on."

Le Corbusier said it in even stronger terms: "Architecture is the masterly, correct and magnificent play of masses brought together in light."

To bring natural light indoors to illuminate massing, materials, and other features requires openings and fenestration in the right proportion and arrangement. More than that, one needs windows that achieve the same levels of craft and quality as the building assemblies custom-designed by the architectural team. "Architecture is made of memory," says California architect and author Anthony Lawlor. "The slope of a roof, the shape of a window, and the color of a door contain the record of the minds that conceived them and the hands that crafted them."

Appreciation of craft and demand for better performance have led to the importing and fabrication of European window technology across a growing area of the United States. Unlike European automobiles (or even beer) where one might argue the product's prestige and premium cost overshadow any real performance advantages, the trend toward using more European windows is 100 percent performance driven. Prestige tends to be subsidiary to the quest for real improvements in occupant comfort, operability, energy savings, and appearance.

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Learning Objectives

After reading this article, you should be able to:

1. Describe the features and measures of high-performance European windows including the types of windows available for energy-efficient, sustainable buildings.
2. Explain how glass selection and gas fills impact window and building performance including heat gain, light transmission, and energy efficiency.
3. Discuss how window sizing and installation detailing can boost window performance significantly beyond the NFRC ratings.
4. List the areas of focus for Passive House standards, and the ways that European windows may help meet the rigorous standards.

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

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Performance Data

- High CRI (80) LEDs, excellent color rendering, 50,000 hours, 24-volt DC, weatherproof, plug & go

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WR | GREEN

Invisible Structures

Grass flexible plastic porous pavement.

Product Application

- Fire lanes
- Overflow parking lots
- Access roads

Performance Data

- 5,721 psi compressive strength
- 100% grass coverage

www.invisiblestructures.com
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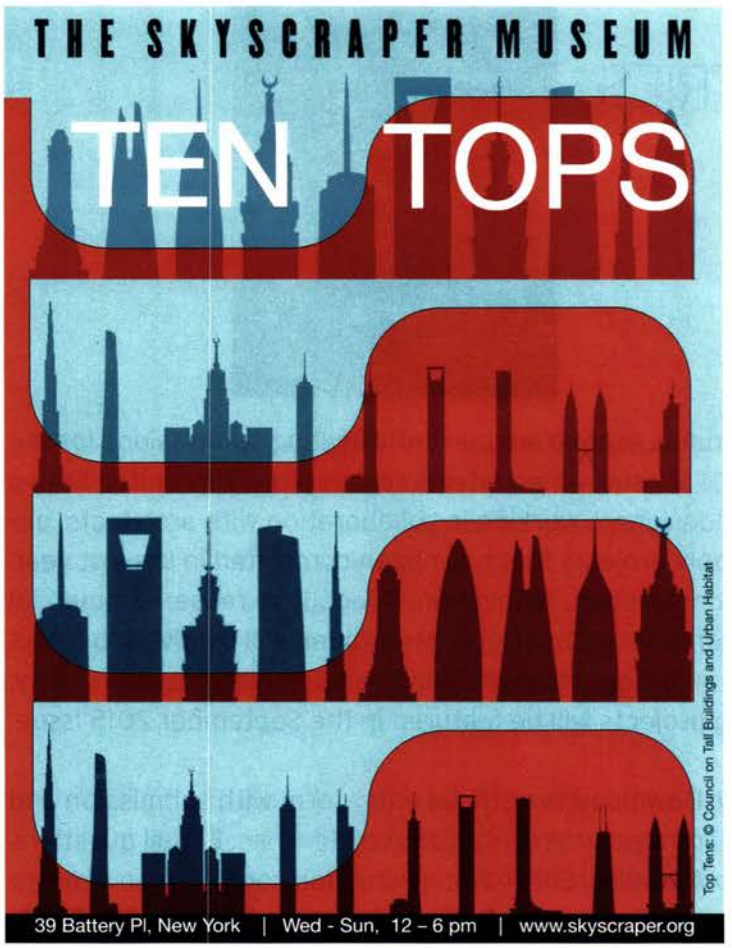

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ARCHITECTURAL ZERO-THRESHOLD SHOWER DRAINS

Infinity Drain – Made in USA

Versatile linear drain systems for shower enclosures and outdoor applications. Drain systems for any waterproofing technique, any length and any flooring material.

Product Application

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- Meets ADA requirements for handicap showers

Performance Data

- Linear Drain Guide: InfinityDrain.com/Installation

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516.767.6786 | Info@InfinityDrain.com

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Product Application

- BioInnovation Center, New Orleans, LA
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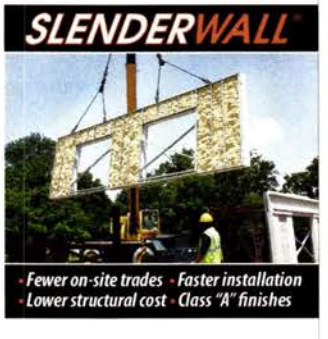
- Westin Luxury Hotel, Virginia Beach, VA
- US Army Legal Headquarters, Ft. Belvoir, VA

Performance Data

- Compliant with all IECC/ASHRAE energy codes



www.slenderwall.com
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Circle 96

2015 CALL FOR ENTRIES
Record Kitchen & Bath

The editors of ARCHITECTURAL RECORD are currently accepting submissions for the **2015 Record Kitchen & Bath** competition. Entry is open to any registered architect who has completed an innovative residential and/or commercial kitchen or bath project in the last year. We are looking for projects that feature unexpected materials, address unique client needs, or are designed in a manner that allows these utilitarian spaces to be functional, sustainable, and beautiful. Winning projects will be featured in the September 2015 issue.

The fee is US$50 per entry. Download the official entry form with submission and payment instructions at architecturalrecord.com/call4entries. E-mail questions and submissions to ARCallForEntries@construction.com. (Please indicate **Record Kitchen & Bath** as the subject of the e-mail.) **Submissions are due May 29, 2015.**

2015 CALL FOR ENTRIES
Record Interiors

The editors of ARCHITECTURAL RECORD are currently inviting submissions for the **2015 Record Interiors** issue. All architects registered in the United States or abroad, as well as interior designers working in collaboration with architects, are welcome to submit interiors-only projects that have been completed in the last year. The projects may be new construction, renovation, or adaptive reuse; commercial or residential; domestic or international. Special consideration will be given to works that incorporate innovation in design, program, building technology, sustainability, and/or materials. The winning projects will be featured in the September 2015 issue.

The fee is US$75 per entry. Download the official entry form with submission and payment instructions at architecturalrecord.com/call4entries. E-mail questions and submissions to ARCallForEntries@construction.com. (Please indicate **Record Interiors** as the subject of the e-mail.) **Submissions are due May 29, 2015.**

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New and Upcoming Exhibitions

Hypostyle
Los Angeles
April 2–May 17, 2015
The Southern California Institute of Architecture (SCI-Arc) presents Hypostyle, a site-specific installation by architect Henry N. Cobb. Hypostyles have traditionally been constructed as halls where highly ordered arrays of vertical supports populate roofed spaces that are conceptually limitless–but to widely varying effect. The hypostyle in this SCI-Arc Gallery installation is an experiment. Far from intending to demonstrate or test a general theory, its purpose is to discover the experiential consequence of populating a hypostyle not with columnar solids but with planar elements joined to form vertical constructs that shape figural spaces in between. For more information, visit sciarc.edu.

Saving Place: 50 Years of New York City Landmarks
New York City
April 21–September 13, 2015
The Museum of the City of New York presents an exhibition exploring the roots and impacts of a transformative landmark-preservation movement that has been an engine of New York's growth and success. This movement developed over many years but was galvanized by large historic losses in the early 1960s, most notably the demolition of Pennsylvania Station in 1963. Through original documents, drawings, paintings, photographs, building pieces, and more, the exhibition surveys how the landmarking movement developed in New York. For more information, visit mcny.org.

Guggenheim Helsinki Now
Helsinki
April 25–May 16, 2015
A free exhibition with a strong event series, *Guggenheim Helsinki Now* will reveal to the public the final designs submitted by the six teams in the Guggenheim Helsinki Design Competition. It will also feature 15 designs awarded honorable mention by the jury. Visitors to the exhibition will be invited to explore interactive installations that present analyses and interpretations of the data compiled from all 1,715 submissions to the competition. At the Kunsthalle Helsinki. For more information, visit guggenheim.org.

Designing Healthy Communities: Active Design and Its Impact
Atlanta
April 26–July 19, 2015
The design of the physical environments in which humans live, work, and play greatly impacts health and wellbeing. Too often, however, design supports unhealthy rather than healthy habits and practices. Architects, interior designers, and urban planners are responding to this problem with active design, an approach to the development of buildings, streets, and neighborhoods that makes daily physical activity and healthy foods more accessible and inviting. Held at the Museum of Design Atlanta, Designing Healthy Communities will explore the specific active-design strategies that are used to promote physical activity and healthy living. The exhibition will highlight real-world examples of these through case studies, videos, models, and interactive activities. For more information, visit museumofdesign.org.

Fay Jones and Frank Lloyd Wright: Organic Architecture Comes to Arkansas
This online exhibit documents the development of the notable architects' affiliation. Both men were proponents of "organic architecture"–the harmonious and seamless relationship between the built environment and nature. The digital exhibit consists of nearly 150 photographs of the architects' work, families, and colleagues; correspondence, lectures, musings and writings; and other media. To view the digital exhibit, visit digitalcollections.uark.edu/cdm/landingpage/collection/joneswright.

Ongoing Exhibitions

The Architectural Image, 1920–1950: Prints, Drawings, and Paintings from a Private Collection
Washington, D.C.
Through May 3, 2015
Between 1920 and 1950, architecture changed more profoundly and more rapidly than during any similar timespan in history. The changing tastes, theories, and obsessions of that era were often documented by prominent artists. The National Building Museum is currently presenting an exhibition of 70 prints, original drawings, and paintings from this period in architectural history, all drawn from the collection of David M. Schwarz, a prominent Washington, D.C., architect. The works reveal

an enduring fascination with architectural and engineering imagery and offer glimpses of the artists' personal impressions of the built environment. Included in the exhibition are works by artists Howard Cook, Louis Lozowick, and Charles Turzak. For more information, visit nbm.org.

Sink or Swim: Designing for a Sea Change
Los Angeles
Through May 3, 2015
Through the work of a select group of architectural, fine art, and news photographers, *Sink or Swim* casts an eye on both the problem of climate change in densely populated coastal regions and of contemporary design as a means to navigate the changing landscapes. It explores the story of resilience, from adaptation for human survival to ambitious infrastructure planning, in some of the world's richest and poorest coastal communities. Curated by architecture writer and radio host Frances Anderton with the Annenberg Space for Photography, *Sink or Swim* features newly commissioned and archival works by photographers Iwan Baan, Stephen Wilkes, Paula Bronstein, Jonas Bendiksen, and Monica Nouwens. Images show highly complex coastal flood mitigation in the Netherlands, controversial sea walls in Japan, and innovative homes and community buildings by leading architects including Thom Mayne, Toyo Ito, and Shigeru Ban. For more information, visit annenbergspaceforphotography.org.

David Adjaye: Form, Heft, Material
Munich, Germany
Through May 31, 2015
Held at Haus der Kunst, this exhibition focuses on David Adjaye, one of the most celebrated architects working today. He is known for a broad spectrum of notable projects from houses and libraries to museums and larger-scale urban master plans. Rather than fostering outmoded traditions, he looks to reinterpret location-based architectural motifs and cultural norms to create projects that reveal and rethink societal patterns and modes of behavior, resulting in ingenious outcomes that speak to the time in which they are made and address contemporary concerns. For more information, visit hausderkunst.de.

Book for Architects
New York City
Through July 5, 2015
Wolfgang Tillmans's installation at the Metropolitan Museum, *Book for Architects*, is on view for the first time since its debut at the 2014 Venice Architecture Biennale. Over a period of 10 years, Tillmans—who was born in Germany in 1968—photographed buildings in 37 countries on five continents to produce *Book for Architects*. The 450 photographs are presented in a site-specific two-channel video installation projected onto perpendicular walls, showing architecture through the eyes of the artist. Tillmans seeks to express the complexity, irrationality, madness, and beauty found in quotidian buildings, street patterns, and fragments of spaces. For more information, visit metmuseum.org.

dates&events

Lectures, Conferences, and Symposia

2015 SAH Annual International Conference: Chicago at the Global Crossroads
Chicago
April 15–19, 2015
The Society of Architectural Historians (SAH) will celebrate its 75th anniversary at this conference, which includes lectures, round-table discussions, and 36 paper sessions covering topics in architecture, art and architectural history, preservation, landscape architecture, and the built environment. SAH is committed to engaging conference attendees with public programming that includes more than 30 architectural tours, a plenary talk, and a half-day seminar addressing Chicago's waterways and neighborhoods. For more information, visit sah.org/2015.

Gabriela Rendón: Social Property and the Urgency of a New Urban Practice
New York City
April 21, 2015
In this lecture at the School of Visual Arts, architect and urban planner Gabriela Rendón will present the notion of social and spatial justice, drawing examples from the urban interventions and research done by Cohabitation Strategies (CohStra), the non-profit cooperative for socio-spatial research, design, and development she cofounded in 2008. With operation centers in cities across Europe and North and South America, the cooperative aims to understand the agents affecting urban areas and provide cross-disciplinary frameworks to catalyze transformative urban interventions. For more information, visit sva.edu.

Competitions

Robert A.M. Stern Architects Travel Fellowship
Submission deadline: April 10, 2015
The RAMSA Travel Fellowship is a $10,000 prize awarded yearly by Robert A.M. Stern Architects for the purpose of travel and research. The prize is intended to nurture emerging talent and is awarded to an individual who has proven insight and interest in the profession and its future, as well as the ability to carry forth in-depth research. For more information, visit ramsa.com.

Re-thinking the Future Awards 2015
Submission deadline: April 15, 2015
The RTF Awards is a globally recognized architectural event, with 50 categories and 20 esteemed judges around the world. Last year's winners include Bjarke Ingels Group & DIALOG, HOK Houston, UNStudio, WOW Architects, FGMF Arquitects, BIOME Environmental Solutions, LMN Architects, and more. With additional categories this year, it's a chance to be distinguished as among the best in the profession. For more information, visit re-thinkingthefuture.org.

Competition Innatur 4
Registration deadline: April 28, 2015
OPENGAP organizes this ideas competition that seeks innovative, cutting-edge proposals committed to architecture finding synergies between nature and a building itself. The competition is open to all architects, designers, architecture students, and people around the world interested in the topic. For more information, visit opengap.net.

E-mail information two months in advance to recordevents@construction.com.

ARCHITECTURAL RECORD

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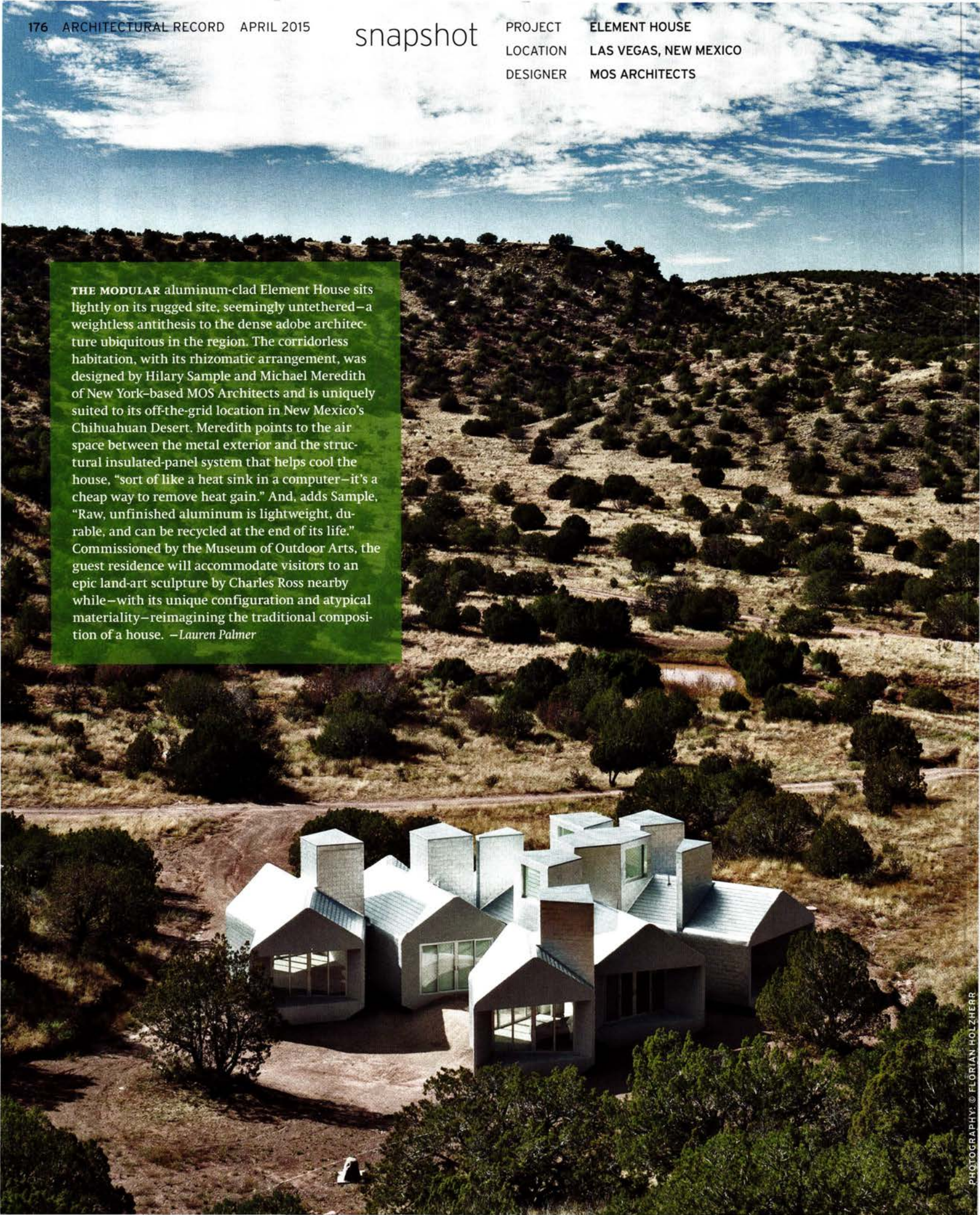
snapshot

PROJECT **ELEMENT HOUSE**
LOCATION **LAS VEGAS, NEW MEXICO**
DESIGNER **MOS ARCHITECTS**



THE MODULAR aluminum-clad Element House sits lightly on its rugged site, seemingly untethered—a weightless antithesis to the dense adobe architecture ubiquitous in the region. The corridorless habitation, with its rhizomatic arrangement, was designed by Hilary Sample and Michael Meredith of New York–based MOS Architects and is uniquely suited to its off-the-grid location in New Mexico's Chihuahuan Desert. Meredith points to the air space between the metal exterior and the structural insulated-panel system that helps cool the house, "sort of like a heat sink in a computer—it's a cheap way to remove heat gain." And, adds Sample, "Raw, unfinished aluminum is lightweight, durable, and can be recycled at the end of its life." Commissioned by the Museum of Outdoor Arts, the guest residence will accommodate visitors to an epic land-art sculpture by Charles Ross nearby while—with its unique configuration and atypical materiality—reimagining the traditional composition of a house. *—Lauren Palmer*

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