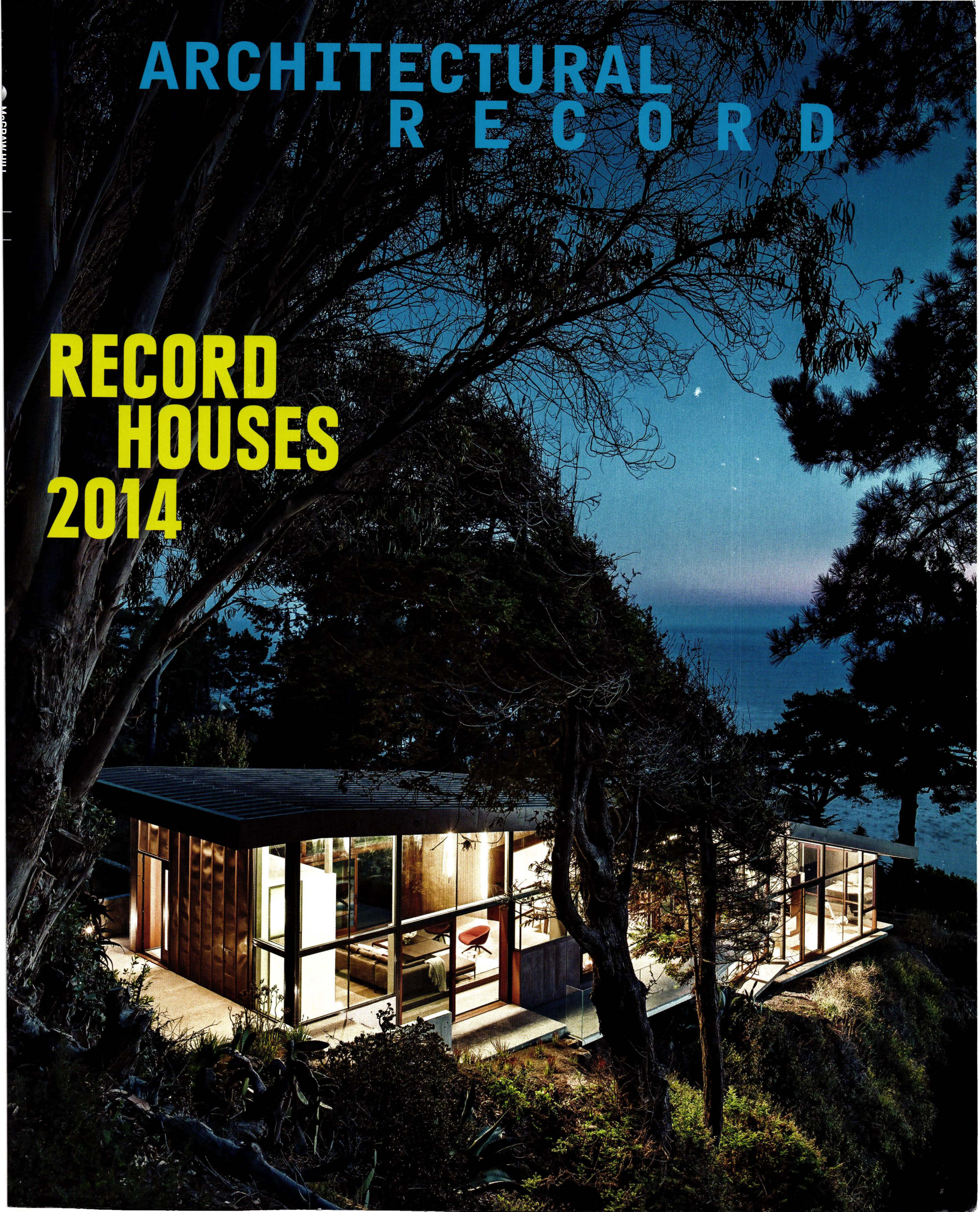
ARCHITECTURAL RECORD

RECORD HOUSES 2014



From the Publisher

Laura Viscusi

DEAR FRIENDS,

Spring is truly here, it seems, and opportunity is springing up all over like tulips. (And the beautiful houses catalogued in this issue.)

That's not just in the media world. It's what's happening around the country for winning building product manufacturers and service providers who kept their profile high through lean times.

This is reassuring for many of you, but especially beneficial for category leaders. Your consistency and accountability are what gain you business—and recognition.

As a leader in delivering architects top-notch information on the industry's best projects and products, *Architectural Record* has gained a leadership profile, too. So much so that we've received an honor for the many honors we've earned.

Sound crazy? Just crazy enough to be true: On March 14th, Associated Business Media, or ABM, the association of business information and media companies, bestowed upon *Architectural Record* an unprecedented award for "Outstanding Editorial Achievement" in honor of the outstanding number of awards we have received from them over the past 50 years—including the Grand Neal in 2012—more than any other business publication, period.

The Neals, as many of you know, are the most prestigious editorial awards for business-to-business media. Named for Jesse H. Neal, they honor excellence in editorial, reporting, individual articles and overall superiority. ABM said *Record* has a "record number of wins," adding, "Since its first win in 1967, *Architectural Record* has maintained a constant presence at the Neal Awards, culminating in a Grand Neal victory in 2012."

I couldn't be more proud to report that Cathleen's team is keeping the tradition strong. This year, we earned finalist status in very competitive categories: "Best Technical Content," "Best Single Issue of a Magazine," "Best Theme Issue of a Magazine or Newspaper" and won for "Best Use of Social Media." The Social Media award is a real coup because it shows we are staying ahead of these fast-paced times and our 400,000 Twitter followers agree.

These are truly honors for our field. But we know they matter to our advertisers and readers, too. Just as your leadership shows, it's about decades of consistency and accountability—but also our commitment to change and innovation.

Whether it's the latest in building materials and methods or capitalizing on social media to benefit the architectural profession, we're working with our readers—and your needs—top of mind.

Sincerely,

ARCHITECTURAL RECORD | 2014 Editorial Calendar

Issue Date/ Close Dates	Features, Themes, Building Type Studies	Products/ Building Science	Continuing Education	Special Sections
January Reservation: Dec. 1, 2013 Materials Due: Dec. 6, 2013 **Juried Issue** AR Excellence in Advertising Competition *Advertise to enter*	Schools of the 21st Century: K-12 School Design	Flooring (wood, resilient tile, stone, carpet), K-12 products	Sustainable modular school design	Schools of the 21st Century
February Reservation: Jan. 1 Materials Due: Jan. 6 **Juried Issue** AR Excellence in Advertising Competition *Advertise to enter*	Renovation, Restoration, Adaptive Reuse	HVAC (heating, cooling, fans)	Preservation & Sustainability	Record Lighting: Projects and Products
March Reservation: Feb. 1 Materials Due: Feb. 6 **Juried Issue** AR Excellence in Advertising Competition *Advertise to enter*	Government Buildings	Building Envelopes	Architect-led design-build	
April Reservation: March 1 Materials Due: March 6	Record Houses Awards Issue	Ceilings	Material Innovation	
May Reservation: April 1 Materials Due: April 6 **Bonus Distribution** Lightfair, June 1-5, Las Vegas Readex Study	Healthcare	Walls (movable panels, systems) Lighting: Lightfair Preview	Project Related	Record Lighting: Projects and Products
June Reservation: May 1 Materials Due: May 6 **Bonus Distribution** AIA Convention, June 26-28, Chicago AR Excellence in Advertising Awards	AIA Theme Hospitality Good Design Is Good Business Design Awards	Glass & Glazing	Resilient buildings and landscapes for a changing climate	
July Reservation: June 1 Materials Due: June 6	Office Buildings	Hardware	Innovations in wood structure	
August Reservation: July 1 Materials Due: July 6	Mass Transportation Structures	Landscape	Project Related	Record Lighting: Projects and Products
September Reservation: Aug. 1 Materials Due: Aug. 6	Record Interiors Awards Issue	Kitchen & Bath	Project Related	Kitchen and Bath Portfolio
October Reservation: Sept. 1 Materials Due: Sept. 6 **Bonus Distribution** Architectural Record's Innovation Conference, Oct. 3, New York Greenbuild, October 22-24, New Orleans	Multifamily Housing	Windows & Doors	Building Envelopes	
November Reservation: Oct. 1 Materials Due: Oct. 6	Colleges & Universities Top Architecture Schools Ranking	Sun Controls	Project Related	Record Lighting: Projects and Products
December Reservation: Nov. 1 Materials Due: Nov. 6	Best Projects & Products Design Vanguard Museums & Performing Arts	Record Products	Project Related	

Abbreviated edition; for more details, contact your rep. Calendar subject to change.

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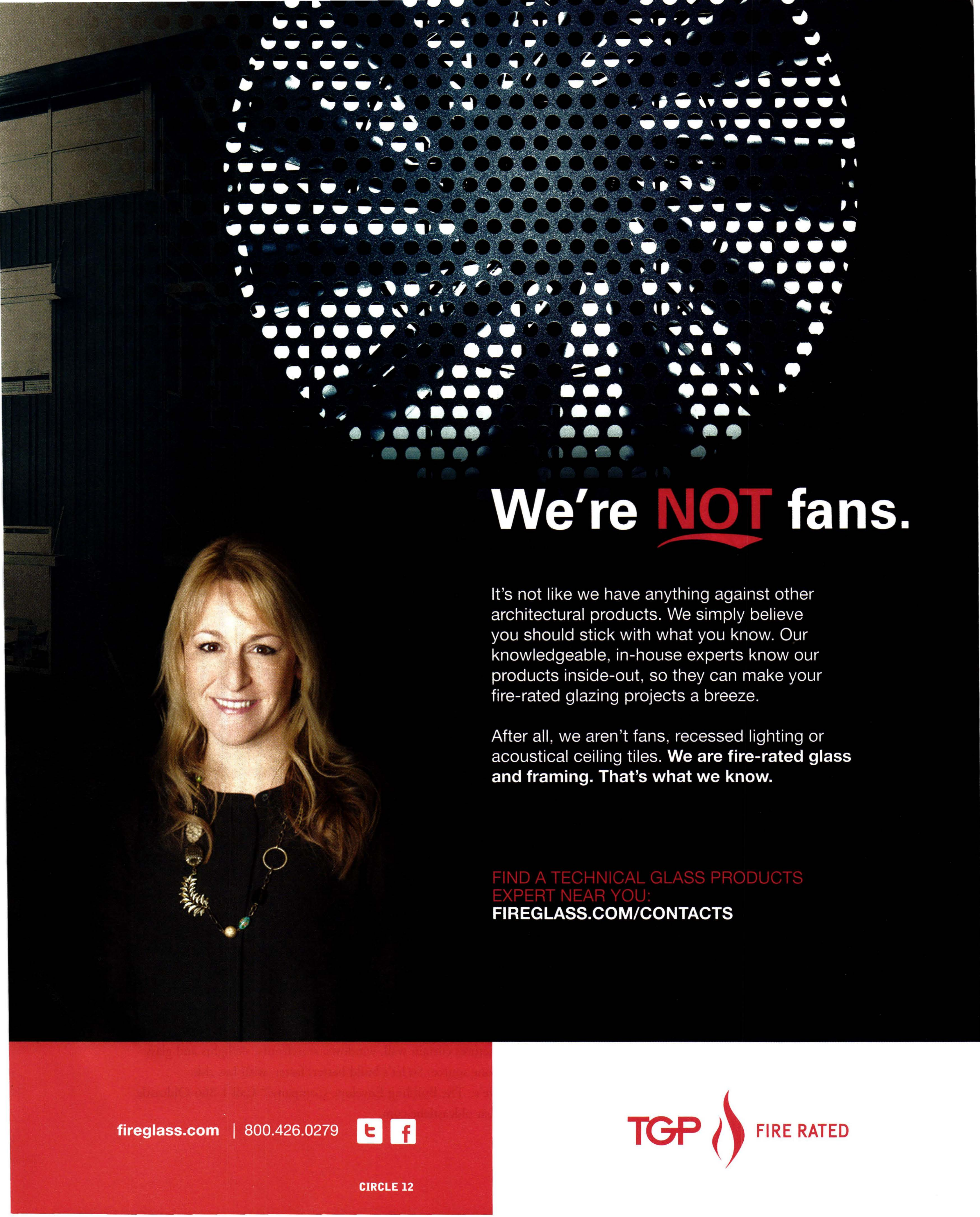
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ARCHITECTURAL RECORD

04 2014 RECORD HOUSES

NEWS

DEPARTMENTS

FEATURE

BUILDING TYPES STUDY 945 RECORD HOUSES 2014

ARCHITECTURAL TECHNOLOGY

THIS PAGE: DUTCHESS COUNTY RESIDENCE, MAIN HOUSE, BY ALLIED WORKS ARCHITECTURE. PHOTO COURTESY DOUG AITKEN

ON THE COVER: FALL HOUSE, BY FOUGERON ARCHITECTURE. PHOTO BY JOE FLETCHER

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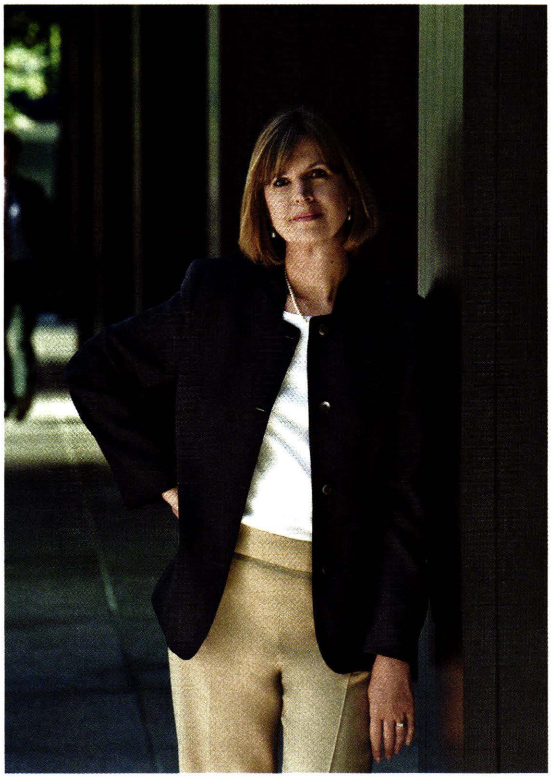
How We Live, Now and in the Future

RECORD Houses connect to their surroundings–or create their own environment



T.S. ELIOT may have thought April was the cruelest month, but here at ARCHITECTURAL RECORD, we look on the bright side because it's time for our annual RECORD Houses awards. Now in its sixth decade, the Houses issue is always full of surprises, with our selection of the best new projects by architects who experiment with form and materials on a domestic scale, often in spectacular settings.

Renzo Piano never designs houses (not counting the Diogene, a tiny–8 foot by 10 foot–prototype of a sustainable cabin he produced for Vitra last year). But now he has built a retreat in Colorado's Rocky Mountains for a private client (page 104). Despite the project's grand size, the architect liked the essential intimacy of creating spaces for human habitation, and he broke down the scale of the house into a village-like cluster to enable it to nestle into its mountain site.

With a design far more modest in size but in an equally stunning location, San Francisco architect Anne Fougeron ramped up the drama of the Buck Creek House by cantilevering the master bedroom off the Big Sur cliff where it perches, high above the Pacific (page 118). And Rick Joy–an impresario of houses that both stand up to and fit in with the harsh beauty of the American West–has built a dwelling in Sun Valley, Idaho, that artfully juxtaposes stone, metal panels, and wood against a rugged backdrop (page 88).

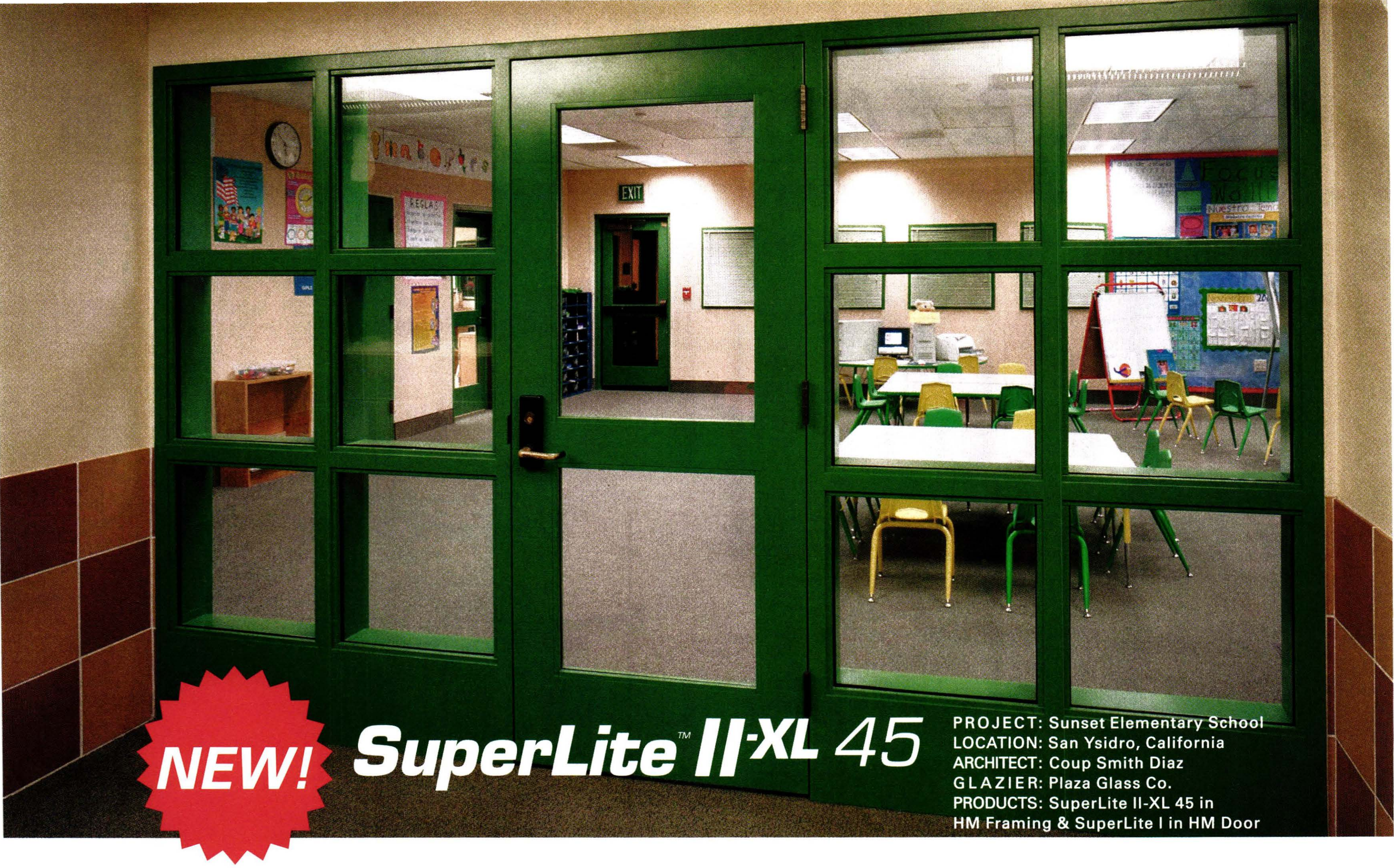
Other houses in this issue look inward, creating their own force fields of privacy along with tension between inside and out. The concrete slabs of Brazilian architect Marcio Kogan's Casa P seem to float within a magical walled garden in São Paulo, while lush greenery embraces the hard-edged concrete forms of Sebastian Mariscal's Phoenix House in California. Estudio Entresito's dynamic white dwelling snakes through a suburban Madrid garden, and Paul de Ruiter's Villa Kogelhof looks as if it just landed on a windswept moonscape in the photographs, though in fact the Dutch site is currently being reforested. And in upstate New York, Brad Cloepfil has designed a house for art collectors that seems to disappear altogether, its exterior walls dematerializing when the work of video artist Doug Aitken is projected on them.

Fantastic art, gorgeous landscapes, innovative design–these, we know, are dream houses for most people, and nothing like the housing stock in which most of America lives. We do know the average size of new houses is ballooning again–after a recession-induced slowdown–with the mean square footage at 2,679 in 2013, up from 2,362 in 2009, according to the National Association of Home Builders (NAHB). New houses tend to have more bedrooms (almost half of them have four), more bathrooms, and a "great room." But while houses are getting bigger–and more expensive–they are not getting better. Sustainability, for example, does not rank high on buyers' checklists, except for features that save energy costs. "We have not seen a strong demand just out of pure environmental responsibility," says NAHB's chief economist, David Crowe.

Still, we believe many of the ideas presented in the following pages have the power to inspire architects who are designing houses at every scale and for every budget. The connection to the surroundings, the use of honest materials, a functional plan, and the pursuit of refined detailing are first principles found in the best architecture. And the daring design and superior craftsmanship reflected in RECORD Houses–as we know from our long history of publishing the best of the best–can influence the future of how Americans build and live. ■

Cathleen McGuigan

Cathleen McGuigan, Editor in Chief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IN THIS ISSUE

Appliances for Multifamily Residential Units

Credit: 1 HSW

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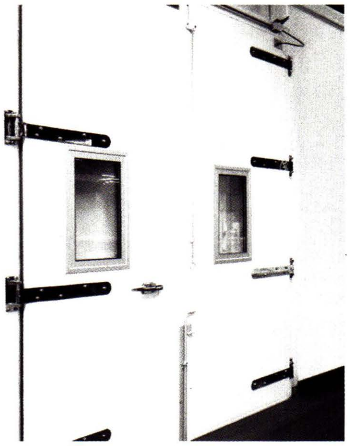

Cold Storage Door Systems

Credit: 1 HSW

Sponsored by Chase Doors

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Subfloor as a Hidden Asset

Credit: 1 HSW

Sponsored by Huber Engineered Woods

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Life-Cycle Assessments for Appliances

Credit: 1 HSW

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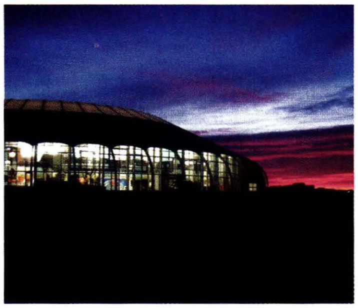

Sustainable Buildings on Demand

Credit: 1 HSW, 1 GBCI CE Hour

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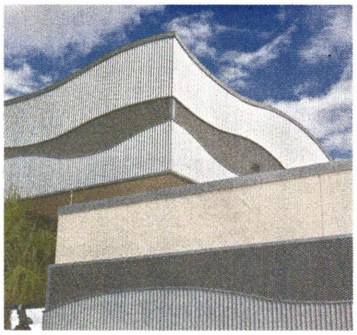

Metal Exterior Walls

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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, 2014.

Winner 2013, Gregory Klosowski, Pappageorge Haymes Partners, Chicago

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For more information and official rules visit: www.architecturalrecord.com/call4entries

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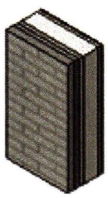

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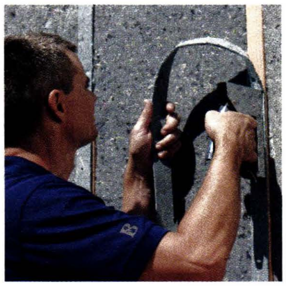

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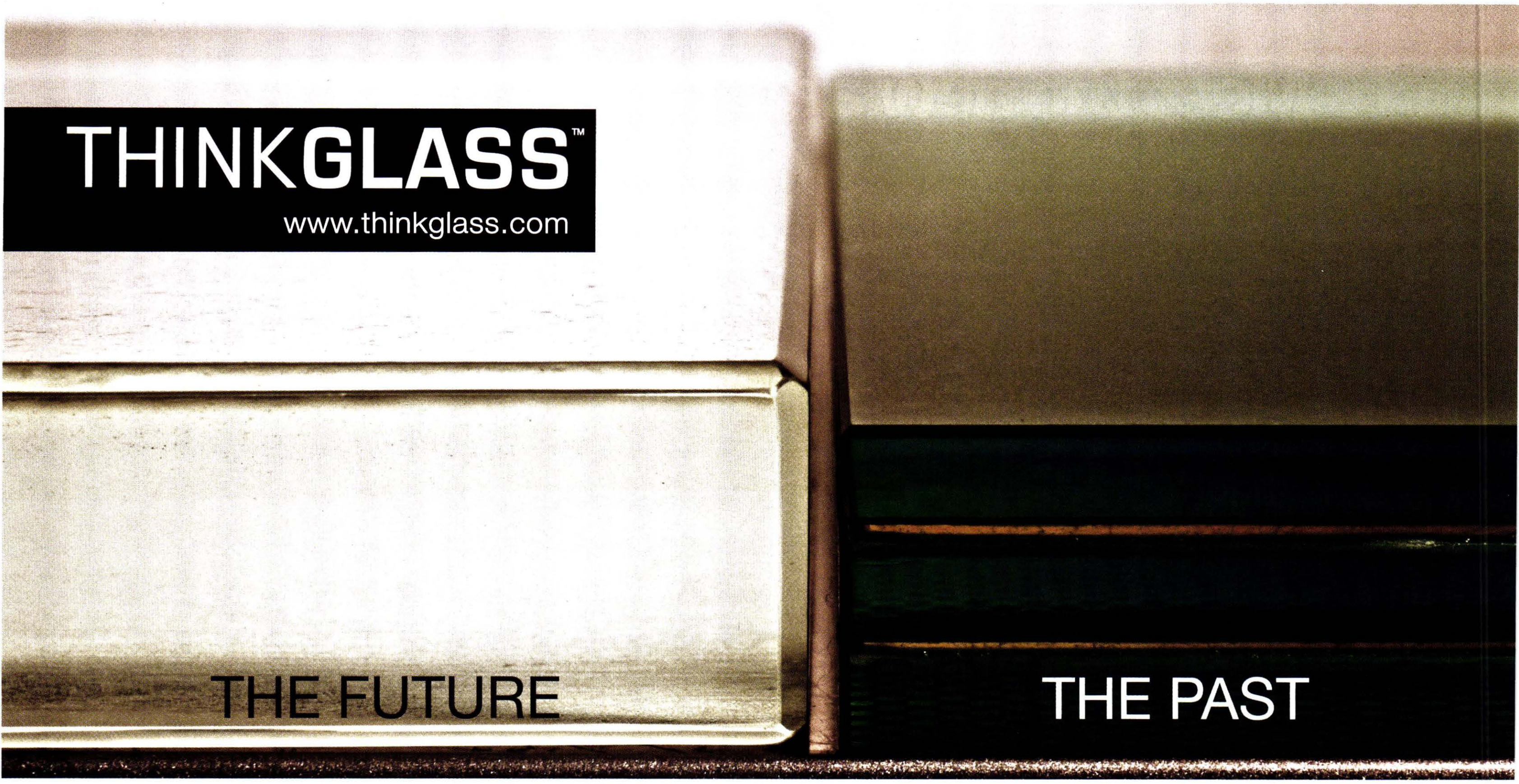

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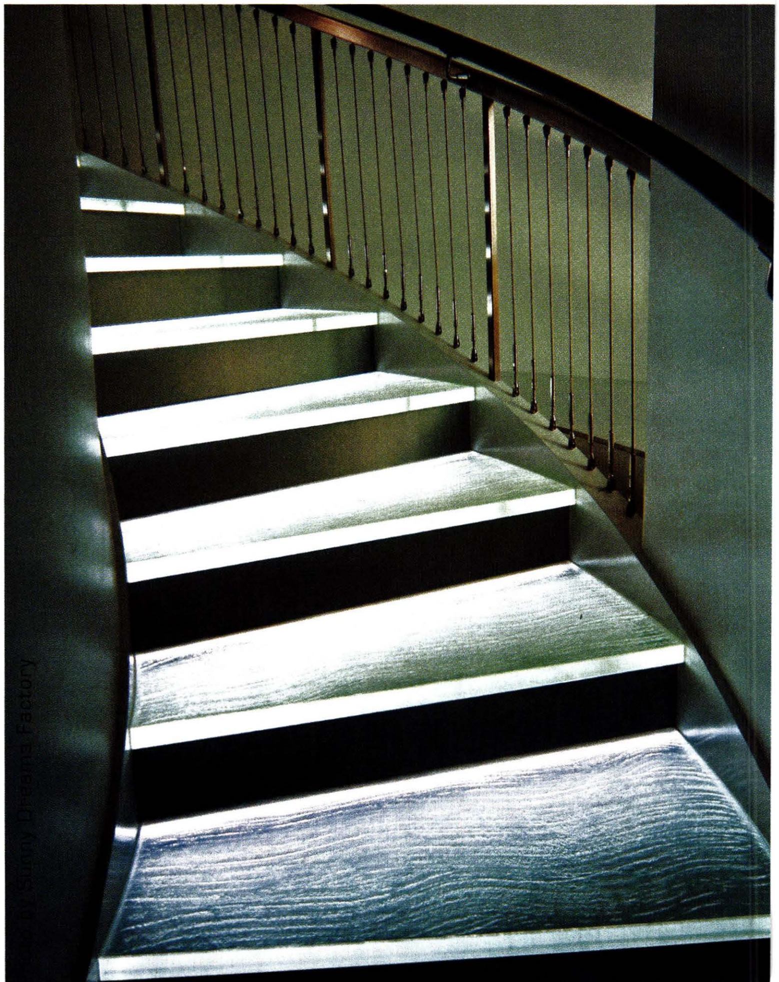


perspective

I have nothing to do with the workers. I think that's an issue the government – if there's a problem – should pick up. Hopefully, these things will be resolved. – *Zaha Hadid, who designed the Al-Wakrah stadium in Qatar, responding to the news of migrant-worker deaths related to World Cup construction work.* The Guardian, *February 25.*

Shigeru Ban Wins 2014 Pritzker Architecture Prize

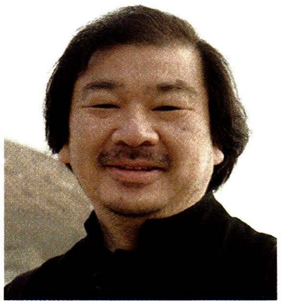
BY SUZANNE STEPHENS

In 2012, Shigeru Ban (below) designed an atelier for children's art classes and temporary housing in Onagawa, Japan, for tsunami and earthquake survivors (above).

PHOTOGRAPHY: COURTESY YASUSHI TAKEUCHI (TOP); FLICKR USER VISIOKRONIK (BOTTOM)

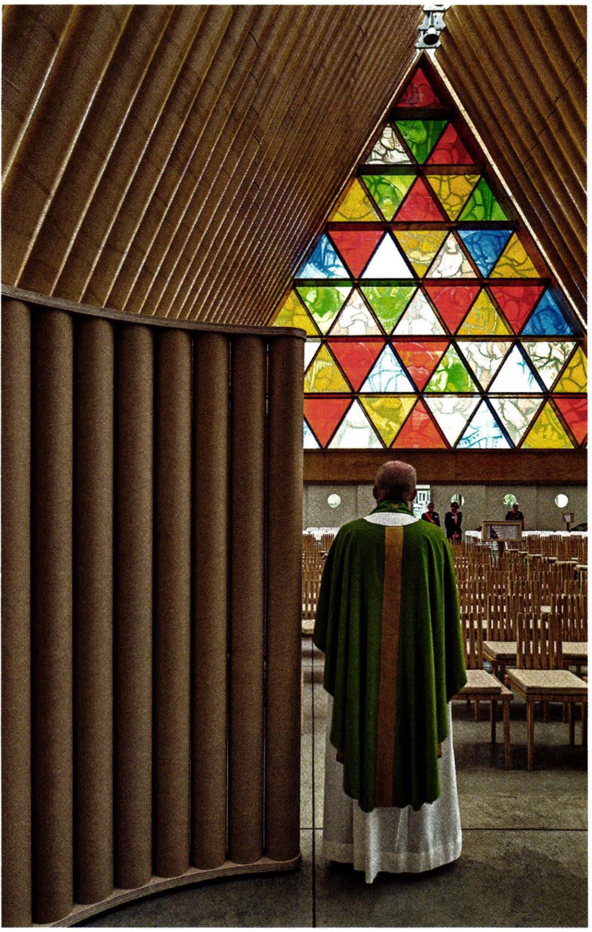
ON MARCH 24, when the Hyatt Foundation, which sponsors the Pritzker Architecture Prize, announced it had given Shigeru Ban the award for 2014, few in the architectural community were remarkably surprised. Since opening the Tokyo firm Shigeru Ban Architects in 1985, Ban (who now has additional offices in Paris and New York) has followed a bipartite career characterized both by inventive, socially conscious responses to emergency relief situations and a varied modernist approach to private, institutional, and commercial projects.

Born in 1957 in Tokyo, Ban attended Southern California Institute of Architecture (SCI-Arc) before getting his degree from the architecture school of The Cooper Union for the Advancement of Science and Art in 1984. He then returned to Tokyo, where he practiced and taught. In 1995, Ban made a name for himself by creating the temporary Takatori Catholic Church, formed of paper tubes, in Kobe, Japan, after its earthquake that year. Since those early days he has turned into the go-to architect for disaster relief, as his recent work attests. His Container Temporary Housing in Onagawa, Japan, for the survivors of its tsunami and earthquake of March 2012 creatively turns shipping containers into living quarters. And, just last year, his Cardboard Cathedral, another temporary structure of paper tubes, opened in Christchurch, New Zealand, (RECORD, November 2013, page 54), as part of its rebuilding effort after a February 2011 earthquake.



The Pritzker jury, seemingly mindful that, in earlier times, the award, which began in 1997, tended to go to glamorous design types (Philip Johnson, Richard Meier, Richard Rogers, Norman Foster, Renzo Piano, etc.), cites Ban for his "contributions to humanity" as well as excellence in design. Ban's

Visit architecturalrecord.com/news for additional coverage and a video interview with Shigeru Ban.



The roof of Ban's Cardboard Cathedral in Christchurch, New Zealand, is made of paper tubes (left). The upper level of the Picture Window House (RECORD, April 2013, page 128) has a trusslike web of columns, beams, and braces (above). The Metal Shutter Houses, an 11-story condominium in Manhattan, has perforated shutters and glass bifold doors (shown open, right).

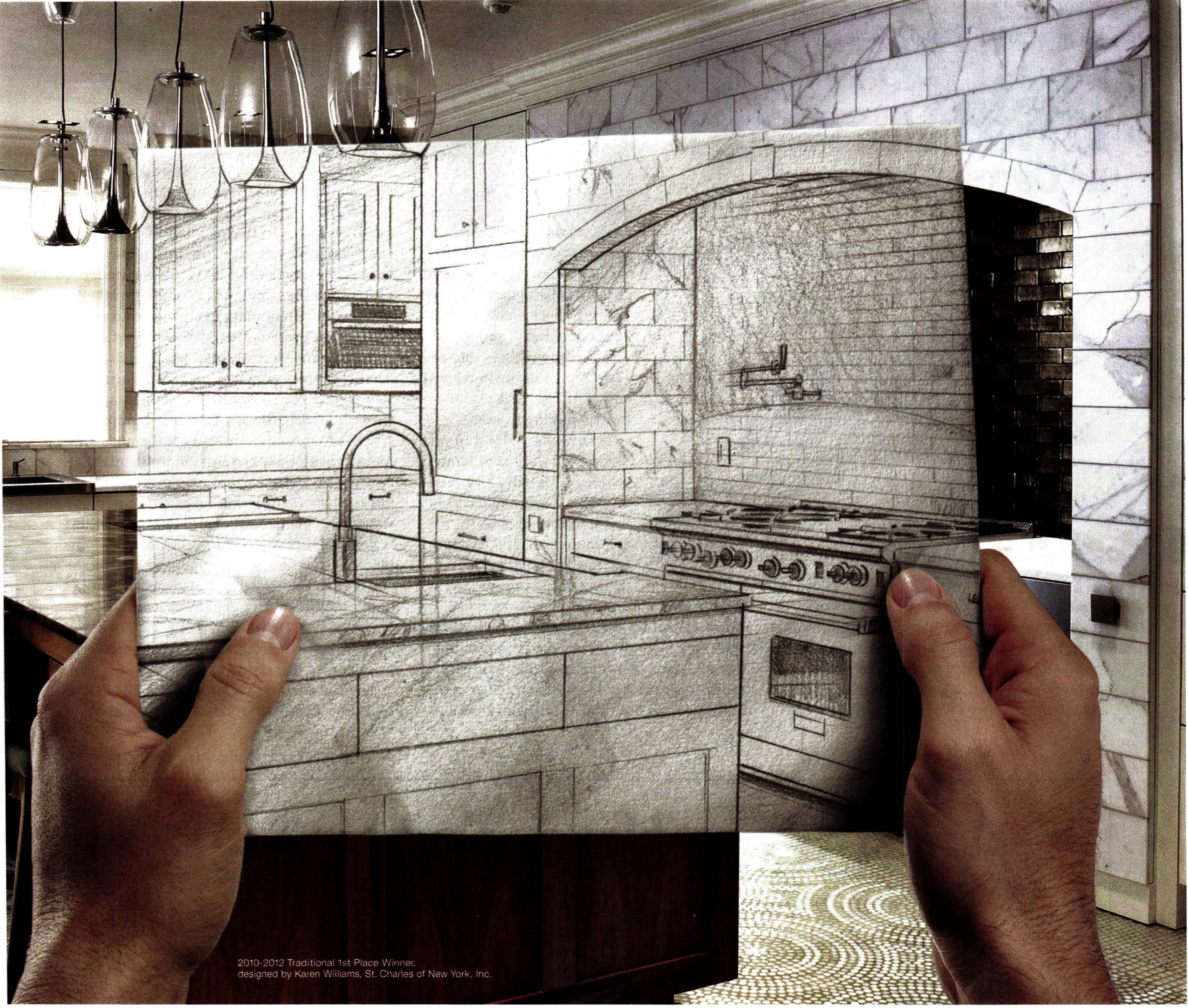
PHOTOGRAPHY: © PATRICK REYNOLDS (TOP, LEFT); HIROYUKI HIRAI (TOP, RIGHT); MICHAEL MORAN (BOTTOM)

efforts have "expanded the role of the profession," the jury notes, due to the laureate's interaction with governments, public agencies, philanthropists, and local communities.

Ban's career also includes private commissions for permanent structures such as those for two RECORD Houses covered in 2001 and 2003. In these more elaborate projects, Ban often develops materials and techniques explored in his emergency relief work. For example, regarding his Naked House (RECORD, April 2001, page 148), the Pritzker jury cites Ban's exploitation of modest materials and techniques such as clear corrugated plastic to create a "sophisticated layered composition" with an "efficient environmental performance." In New York, Ban completed the Metal Shutter Houses (RECORD, September 2011, page 90), where steel doors roll open and bifold doors fold up so that the facade disappears–another example of a technical strategy harnessed to good design.

The Pritzker Prize winner also has designed museums such as the Paper Art Museum in Shizuoka, Japan (2002), the more controversial Centre Pompidou-Metz in Metz, France (RECORD, July 2010, page 82), and is currently completing the Aspen Art Museum in Aspen. Because of Ban's commitment to sustainability and use of renewable and locally produced materials in both lower- and higher-budget projects, the jury found further reason to choose him for the coveted prize of $100,000, which will be presented in June in Amsterdam.

The Pritzker jury includes architects, clients, critics, and academics–Ban himself was a juror from 2006 to 2009. Currently, Lord Peter Palumbo is the chair, and jury members are Alejandro Aravena, Justice Stephen Breyer, Yung Ho Chang, Kristin Feiress, Glenn Murcutt, Juhani Pallasmaa, and Ratan Tata, with Martha Thorne as executive director. ■


2010-2012 Traditional 1st Place Winner,
designed by Karen Williams, St. Charles of New York, Inc.

Denver Union Station is a "Game Changer"

BY DAVID HILL

An opening in the SOM-designed canopy frames the historic station, at left.

THE NEON SIGN on top of Denver's historic Union Station says "Travel by Train," a reminder of the bygone era when up to 80 trains a day would stop at the busy depot. In recent years, however, the building's grand waiting room has sat empty except for the few Amtrak passengers waiting to catch the California Zephyr to Chicago or San Francisco.

Today, Union Station, in the city's Lower Downtown neighborhood, is on the cusp of a major transformation. The Beaux Arts–style depot, built in 1914, is being restored and converted—by Denver firms Tryba Architects and JG Johnson Architects—into a 112-room boutique hotel with shops, offices, and restaurants, opening in July.

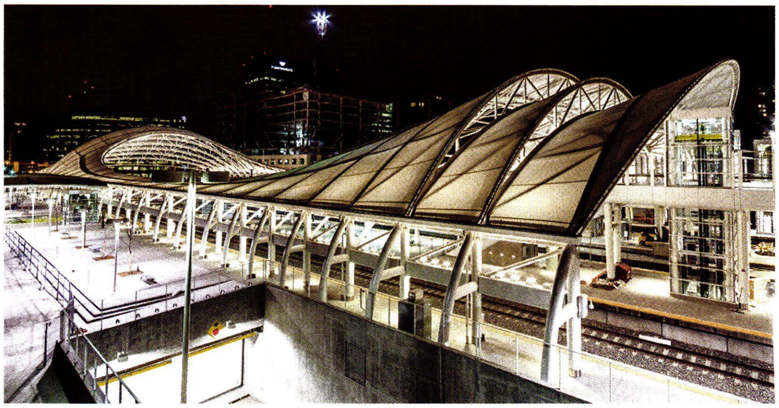
Meanwhile, in the rail yard behind the station, Skidmore, Owings & Merrill (SOM) has created a multimodal transit hub for buses, light rail, commuter rail, and Amtrak service. The $500 million public-private project is a milestone for sprawling Denver, which has embraced transit in a big way. The metropolitan area's first light-rail line opened in 1994, and 10 years later, voters approved a $6.5 billion transit program for an additional 122 miles of commuter and light rail. Starting in 2016, Union Station will be the hub for four new commuter lines, including one to Denver International Airport. That "Travel by Train" sign suddenly seems relevant again.

The project's signature elements, designed by SOM's Roger Duffy, are a curvy white-fabric canopy that hovers over the train platform and a surprisingly cheerful 980-foot-long underground bus terminal, which opens on May 11. The bus station doubles as a pedestrian concourse that connects an existing light-rail station on the western edge of the 19.5-acre site to the train platform and the terminal.

A framework of steel tubes, painted glossy white, supports the 500-foot-long canopy. The structure flares dramatically at the ends and has a long scooped-out section in the middle—a response, Duffy says, to a requirement that views of the historic station remain unobstructed. "One is skeletal and light, the other is heavy and robust. I think they're very complementary," he says. The opening, which Duffy calls the "sky hole," also meant that he didn't have to add an expensive ventilation system. Given Denver's 300-plus days of sunshine, complete protection from the elements was deemed unnecessary.

The adjacent bus terminal, with 22 bays, replaces a smaller station several blocks away.

PHOTOGRAPHY: © RYAN DRAVITZ



Ventilation towers for the underground bus station are located next to the light-rail platform (left). A 500-foot-long fabric canopy shades the train platform (right).

PHOTOGRAPHY: © RYAN DRAVITZ (RIGHT); PAUL WEDLAKE (LEFT)

Bus stations are typically drab, but SOM's design makes use of terrazzo floors, yellow tile, and skylights to create an underground space that feels more like an airport concourse than a subterranean transit facility. "It's a really uplifting, positive experience. I think it brings a sense of nobility that you often don't get," says Kristopher Takacs, SOM's Union Station project manager.

Above the terminal is a two-block-long pedestrian plaza with a pavilion at each end—one near the light-rail station, the other near the train platform—connecting commuters to the bus station. (Hargreaves Associates is collaborating with SOM on the site's landscape design.)

Even before it is completed, the transit hub has already triggered more than $1 billion in private mixed-use development on adjacent property, much of which was also part of the city's old rail yard. "It's not just an architectural project," Takacs says. "It's a city-building infill project. People want to be in the next great neighborhood, which is right next to a transportation hub." Takacs estimates that there are 14 development projects in the area currently under construction or in the planning stage.

Urban planner Ken Schroeppel, who blogs about the city's wave of redevelopment and teaches at the University of Colorado at Denver, adds: "Certainly Union Station is the juggernaut of development in downtown Denver at the moment. And that's saying a lot, considering how much building is going on throughout the city's urban core." Like others, Schroeppel is quick to call Union Station a "game changer" for a city that has already become a model for urban revitalization. "This is going to change the way people in Denver feel about their city," he says. ■

[SPOTLIGHT]

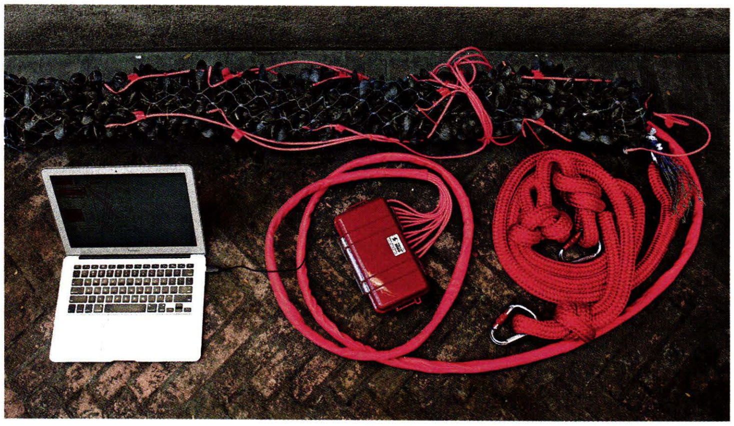
David Benjamin Breaks the Mold

BY LAURA MIRVISS

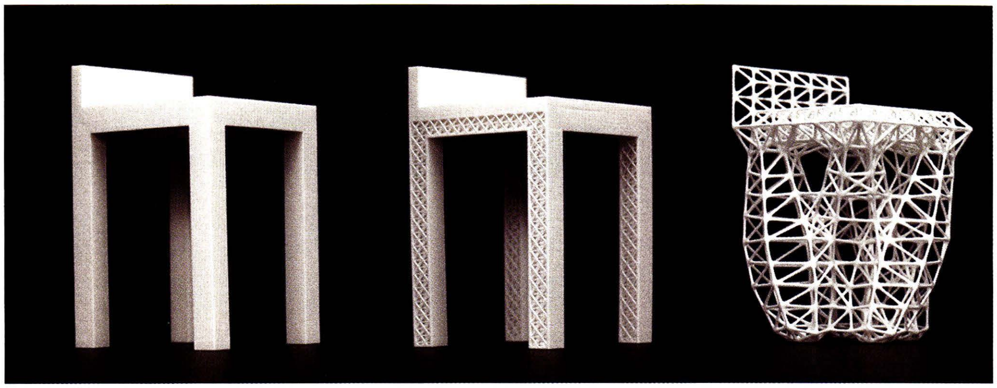
DAVID BENJAMIN, the principal of Brooklyn-based firm The Living, is not one for convention. His research interests—mussels, slime mold, bone growth, to name a few—are not exactly mainstream. But his unusual design approach—the application of biological systems to architecture, coupled with a geeky knack for programming—has led to collaborations with a string of big-name clients, including 3M, Airbus, Autodesk, and Kanye West, on mostly experimental and research-based projects.

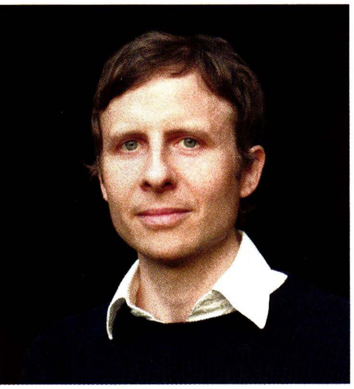
Since the founding of his practice in 2006, little of Benjamin's work—developing new materials that use synthetic biology and writing design-modeling software—would be categorized as architecture, at least in the traditional sense.

But two recent commissions—a new building at Princeton and the MoMA PS1 Young Architects Program 2014 summer installation in its Queens, New York, location—are allowing the firm to segue into more traditional architecture projects for the first time. The PS1 scheme, in particular, has garnered considerable buzz for its unusual building materials: compostable bricks made out of corn stalks and mushrooms, which are being fabricated by Ecovative, a manufacturer of mushroom-based alternatives to plastics. "I do feel that the next generation of people, like my students, are interdisciplinary by nature," says Benjamin, who tapped a handful of current pupils at Columbia, where he both teaches and received his M.Arch., to assist with the PS1 project. "Today's problems demand it: if you want to build with a compostable material, you have to get into the science of it, the engineering of it, the life cycle."

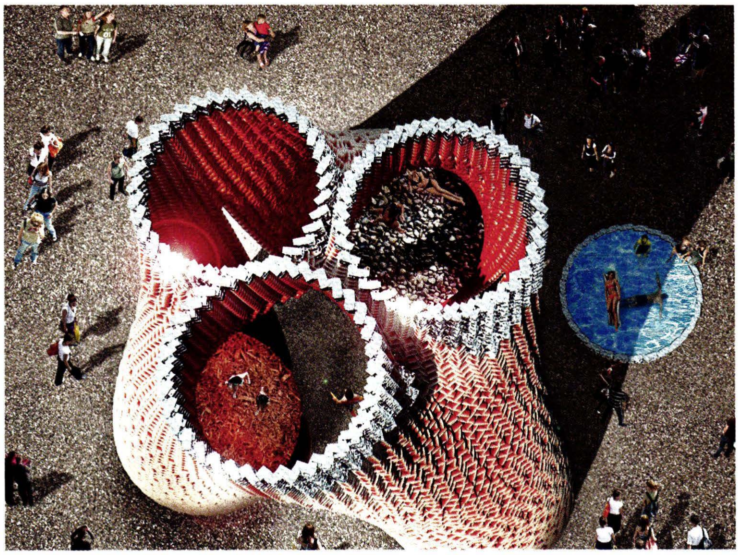


Living Light, an installation in Seoul, charts air quality throughout the city (top, right). *Mussel Choir*, commissioned for the Venice Biennale in 2012 (right), uses sensors on live mussels to track water quality. A permanent version will be installed in New York's East River this summer. The Living rethinks the geometry of a chair (below). The firm's winning design for MoMA PS1 includes 10,000 compostable bricks (bottom, right).





David Benjamin



This thinking has resulted in a slew of offbeat projects meant to raise public consciousness about the environment. Notable examples include a permanent pavilion in a public park in Seoul that employs LEDs and data streamed from government sensors to map air quality throughout the city, and an upcoming installation in New York's East River in which living mussels' shell apertures reveal pollution.

Benjamin says technology can help architects think about sustainability and optimizing performance at the beginning of the design process, rather than as an afterthought. He is currently working with Autodesk on new visualization software that generates thousands of permutations of a particular design, with charts comparing numerous metrics including fluid dynamics, weight, and structural performance. Says Benjamin, "The idea is to give you the DNA of the design."

Contrary to critics' claims, he says, such computation systems serve to enhance architects' creativity. For example, as an experiment, his firm is currently applying research on bone growth—and how bones' shape and density carry weight and handle stress—to rethink the design of a chair. ■

PHOTOGRAPHY: COURTESY THE LIVING

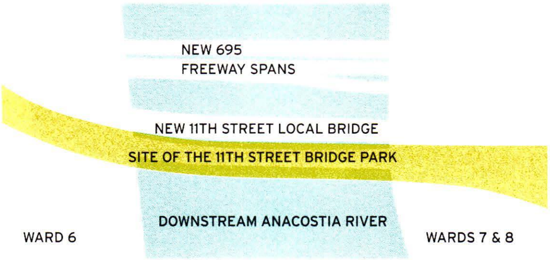
View additional images at architecturalrecord.com.

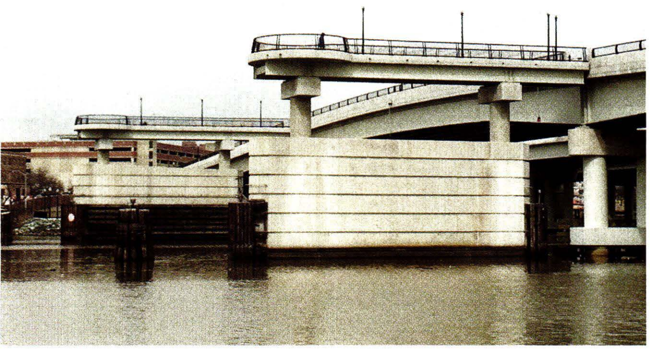
A Public Park Could Elevate D.C.

BY AMANDA KOLSON HURLEY

ON MARCH 20, a Washington, D.C., nonprofit launched a national design competition to turn the remains of a highway bridge that spans the Anacostia River into a public park. The proposed 11th Street Bridge Park would connect the Washington Navy Yard, where there has been a recent explosion of growth and development, and the Anacostia neighborhood to the east. Built on top of piers left over from the bridge, it will cost about $25 million.

The competition is being organized by the group Building Bridges Across the River at THEARC, in collaboration with D.C.'s Office





The map shows the site of the planned park (top). The bridge as it looks today (above).

of Planning and Department of Transportation. Organizers expect interest to run high. The chance to build "D.C.'s High Line" over the water is hard to resist, and the project tackles the big issues that preoccupy designers right now: social equity, public health, and ecology. Scott Kratz, who is directing the plan, says that by early March he had already fielded inquiries from the Bjarke Ingels Group and James Corner Field Operations, among other leading firms.

The competition brief asks teams of architects and landscape architects to design a park that is 1,000 feet long and up to 120 feet wide, and to include an environmental-education center, performance and play spaces, urban agriculture, a restaurant, and launches for kayaks and canoes. Because the center channel of the Anacostia is navigable, the bridge park will have to allow 28 feet of clearance for boats in its middle, but it won't need to rest flat—it could dip, swerve, or cantilever. "We're a city of rivers, but nobody defines [Washington] as such," Kratz notes. "Why shouldn't we engage our waterfront, like Paris or San Antonio?"

Kratz, who recently left his job as a vice president of the National Building Museum to work on this initiative full-time, has held almost 200 community feedback meetings over the past three years. Surprisingly, he found that residents of impoverished Ward 8, which includes Anacostia, expressed the same wishes for the park as people on the booming Southwest waterfront and around Capitol Hill. "Every single programming idea we're baking into the design competition, we've heard again and again from residents on both sides of the river," says Kratz.

Perhaps even more surprising is the makeup of the jury. Kratz and veteran competition advisor Don Stastny have assembled a range of experts. The five-person panel includes Howard Frumkin, dean of the School of Public Health at the University of Washington; Toni Griffin, architecture professor and the director of the J. Max Bond Center at the Bernard and Anne Spitzer School of Architecture at the City College of New York; landscape architect Carol Mayer-Reed; Michaele Pride, a professor of architecture at the University of New Mexico; and Harry G. Robinson III, dean emeritus of the School of Architecture and Design at Howard University.

Kratz has raised about $550,000 so far and hopes the design competition will spark excitement among donors. Pending an economic-impact analysis, he expects to ask the District government for half of the $35 million needed (the $25 million expected construction costs plus a $10 million endowment to help cover operations and maintenance). If all goes according to plan, Bridge Park will open in 2017.

To enter the competition, teams must submit their qualifications and a short essay on their design approach by April 22. Six to eight teams will be selected for Stage 2, and each will bring on a structural engineer and a lighting designer before four teams are chosen to go on to Stage 3. The winning team will be chosen in October. ■

noted

RIBA Honors Architects Tod Williams and Billie Tsien

The Royal Institute of British Architects (RIBA) presented Tod Williams and Billie Tsien with International Fellowships, a lifetime honor that allows them to use the initials "Int FRIBA" after their names and signifies the "inspiration and influence of their work."

State Department Breaks Ground on Suriname Embassy

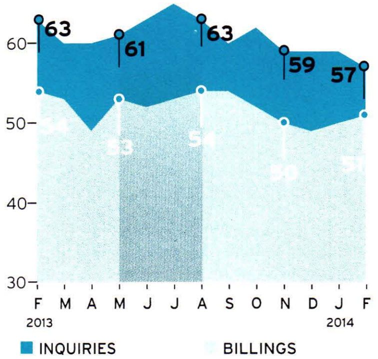
In March, the U.S. Department of State commenced construction on a multi-building embassy complex in Paramaribo, Suriname, designed by Zimmer Gunsul Frasca Architects (ZGF). It also announced that Moore Ruble Yudell Architects & Planners will design a new embassy in Chad.

Selldorf Architects Selected for San Diego Museum Expansion

The Museum of Contemporary Art San Diego (MCASD) has selected Selldorf Architects to design an expansion of the La Jolla, California, location. An expansion will maximize gallery space and allow for the presentation of temporary exhibitions alongside galleries dedicated to the museum's permanent collection.

Stoss and SHoP Win Project to Redesign Downtown Dallas

The team beat finalists Ricardo Bofill and OMA+AMO to reunite downtown Dallas with the neighboring Trinity River by introducing an alternating "grid-green" development that will transform 176 acres into three new "dynamic mixed-use" neighborhoods.



ABI Continues on Positive Trend

The American Institute of Architects (AIA) reports that the February Architecture Billings Index (ABI) score was 50.7, up slightly from a mark of 50.4 in January. "The unusually severe weather conditions in many parts of the country have obviously held back both design and construction activity," said AIA chief economist Kermit Baker.

IMAGE COURTESY BUILDING BRIDGES ACROSS THE RIVER AT THEARC (TOP); PHOTOGRAPHY: © SCOTT KRATZ (BOTTOM)

perspective**stats**

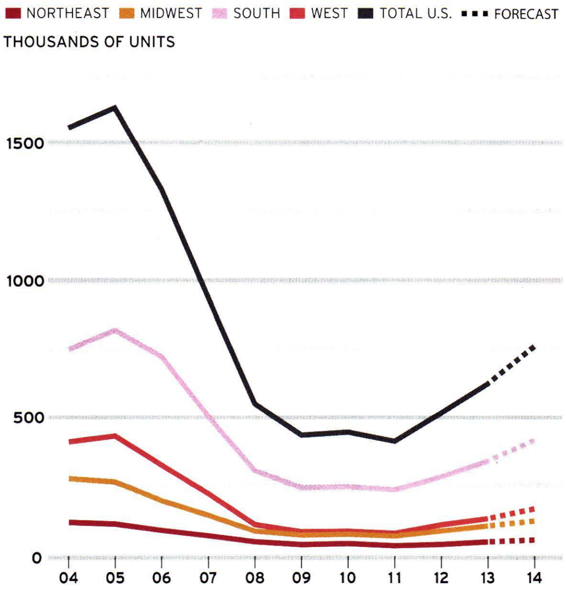
Data from McGraw Hill Dodge Analytics and other sources

MARKET FOCUS
SINGLE-FAMILY RESIDENTIAL

The recent rise in mortgage rates could dampen this year's housing recovery. However, employment growth and the U.S. economy's overall improvement should sustain the market's upward momentum.

Single-Family Starts by Region

In addition to U.S. total and 2014 forecast figures



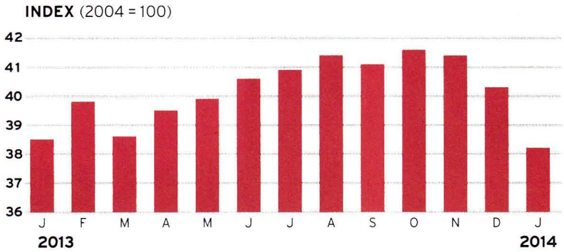
Top Metro-Area Markets

Ranked by single-family residential starts for 2013

	REGION	DWELLING UNITS
1	HOUSTON	34,199
2	DALLAS	22,824
3	ATLANTA	14,490
4	WASHINGTON, D.C.	13,230
5	PHOENIX	12,759

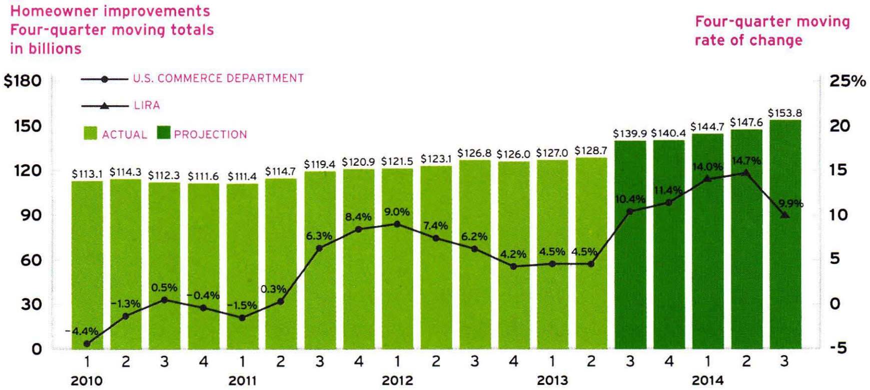
A House in the Woods, Upstate New York, William Reue Architecture (ARCHITECTURAL RECORD, March 2014, page 55)

The Dodge Index for Single-Family Residential Construction 1/2013 – 1/2014



The index is based on seasonally adjusted data for U.S. single-family construction starts. The average dollar value of projects in 2004 serves as the index baseline.

Leading Indicator of Remodeling Activity (LIRA)
Fourth Quarter 2013

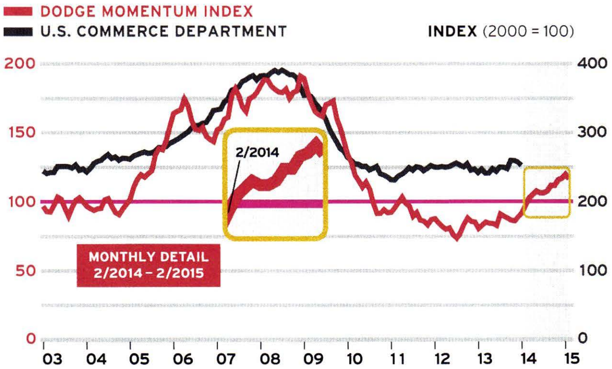


Note: Third-quarter 2013 estimate does not include Census Bureau data, because third-quarter data collection for home-improvement spending was affected by the October 2013 government shutdown. Source: Joint Center for Housing Studies of Harvard University

MOMENTUM INDEX SLIPS

In February, the Dodge Momentum Index fell 2.6% to 116.5. Despite this decline, which is likely to be a brief pause in an otherwise upward market, the index is still almost 20% above its level a year ago.

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



CoreLogic Measure of Completed Foreclosures

	COMPLETED FORECLOSURES
DECEMBER 2013	45,000
DECEMBER 2012	52,000
% change	**-13%**

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

INDEX (JANUARY 2000 = 100)

	20-METRO AVERAGE
DECEMBER 2013	165.69
DECEMBER 2012	146.08
% change	**+13.4%**

PHOTOGRAPHY: © STEVE FREIHON

McGraw Hill Dodge Analytics tracks projects from predesign through construction to capture hard construction costs, square footage, and other key statistical information.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CIRCLE 66

A Prism for Viewing a Master

The Houses of Louis Kahn, *by George H. Marcus and William Whitaker. Yale University Press, 2013, 269 pages, $65.*

Reviewed by Susan G. Solomon

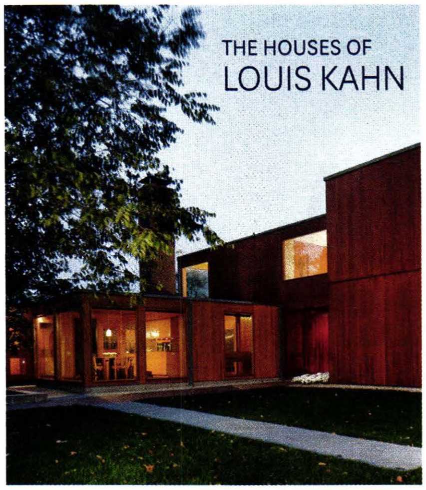
WHILE READING this outstanding book, I kept remembering the Bill Clinton 1992 election campaign that was defined by the phrase "It's the economy, stupid." I had to keep myself from shouting, "It's the houses, stupid!" Marcus and Whitaker have not only directed superb scholarship to the study of Kahn's houses—both built and unbuilt—but have shown that the houses can be a lens on a broader understanding of Kahn's philosophy, his interpretation of Modernism, and his appreciation of the vernacular. They show how Kahn evaluated clients and how he designed spaces that would allow each house to become a personalized ideal—a home.

The authors write in an engaging manner, skillfully weaving critical quotes—from Kahn, clients, and previously unpublished letters—into a masterful narrative. This is a heroic feat, given the exhaustive documentation from which they largely drew—the Kahn Collection housed at the Architectural Archives of the University of Pennsylvania. Whitaker, who is curator of that archive, and Marcus, who teaches the history of design at Penn, made wise and insightful choices of what to include. They have pulled forth many gems of information augmenting our view of how Kahn perceived contemporary architecture. They note periodicals that Kahn might have seen when he worked for Paul Cret in 1930 (such as the September *L'Architecte* and the October ARCHITECTURAL RECORD) and that he jumped at a last-minute chance to visit Le Corbusier's Ronchamp and La Tourette in 1959 after he spoke at CIAM. A fascinating chapter deals with Kahn's interiors. It is revelatory and gives us a glimpse of how the architect worked with commercial products and furniture of his own design to craft interiors.

The authors have sagely let their nine case histories for the built projects stand alone. These are short and to the point: how and why Kahn got each commission and how the design development progressed. They have chosen excellent photographs that mix archival pictures, many of them by John Ebstel, a favorite photographer of Kahn's, and recent images by Matt Wargo.

Studying Kahn can be a perplexing endeavor. Marcus and Whitaker have answered the question of where to begin with it. By integrating the historical and architectural context with Kahn's own history and his residential design, they have provided the perfect book for students who are just beginning to investigate Kahn and, for those who have studied him for years, an enlightened source. ■

Susan G. Solomon is the author of Louis I. Kahn's Jewish Architecture: Mikveh Israel and the Midcentury American Synagogue.



Architecture Onstage: the Metropolitan Opera's *Werther*

Large shifting rectangular frames generate a moving spatial dynamic in a new set design.

BY SUZANNE STEPHENS

In Act II, rectangular frames tilt up stage right to define a town square in Massenet's *Werther* at the Metropolitan Opera in New York.

PHOTOGRAPHY: © KEN HOWARD/METROPOLITAN OPERA

MOST OF THOSE thronging to the Metropolitan Opera's new production of Jules Massenet's *Werther* in New York this winter went to hear tenor Jonas Kaufmann's mellifluous singing as the protagonist and the plush sounds of mezzo-soprano Sophie Koch as Charlotte. There was yet another aesthetic to witness in this tragic love story. Operagoers could also appreciate the choreographic performance and efficiency of the set, which mechanically slid and shifted in different directions within the defined space of the three-dimensional stage. In recent years, the Met has frequently explored the spatial dynamic of onstage architectural elements to heighten dramatic action, most notably (and controversially) with Robert Lepage's production of Wagner's *Ring Cycle* in 2011 with its 90,000 pounds of rotating machinery (RECORD, March 2011, page 35). Such creative explorations show that the intricate play of two-dimensional and three-dimen sional space based on static and active elements–even if confined by the proscenium–might make an uninitiated audience more susceptible to architectonic notions developed in the outside world.

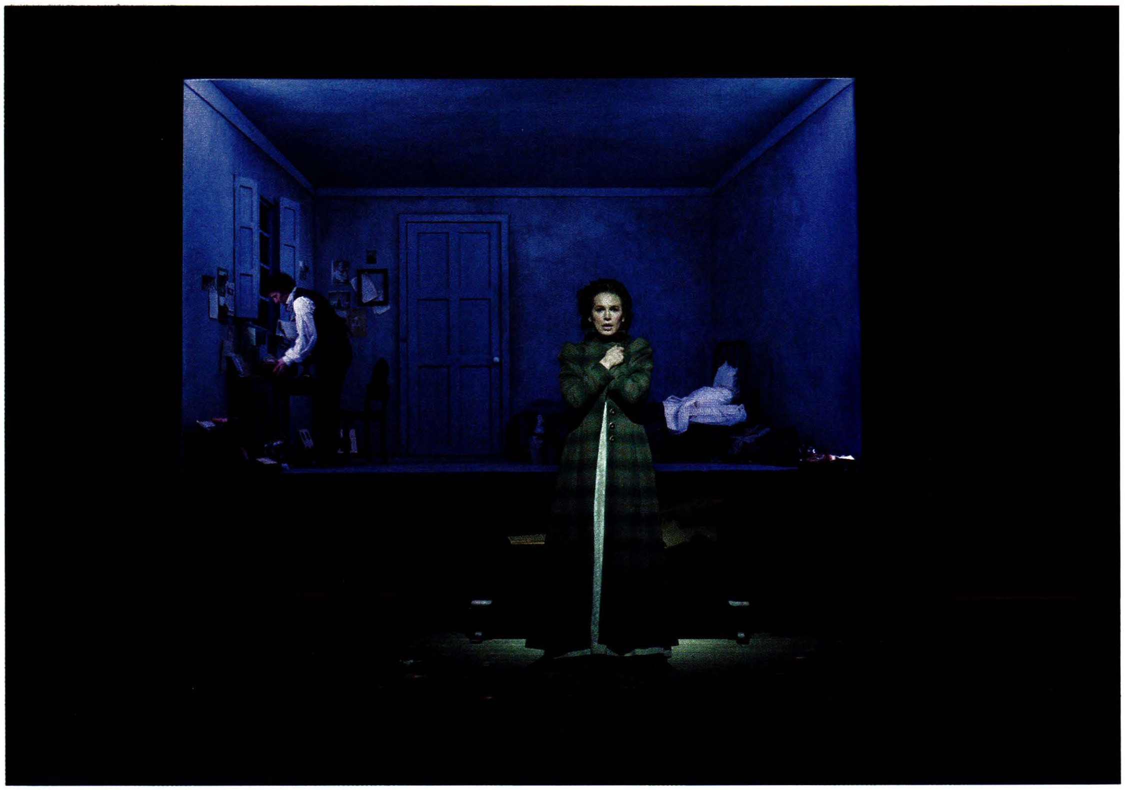
Werther, directed by Richard Eyre, with sets designed by Rob Howell, exploits the dramatic movement possible in stage design with fewer (and less scary) challenges than the *Ring*'s gigantic contraption. In developing the overall concept for *Werther*, Howell had his own motive: to create convincing surroundings where the romantic plot could unfold within the voluminous dimensions of the Met's stage. "I looked for a way to provide a picture but reduce the space, so that the interaction between two human beings could occur," he says.

The basic architectural device Howell developed is a series of large rectangular painted aluminum frames that diminish in perspective as they retreat upstage. The rectilinear elements tilt up, stage left, in the first act and angle in the other direction in the second act. All the while, they are separated from each other so that leafy tree branches pop through pergola-like openings for scenes at a house and in the town square of the German village where the opera takes place. During a brief ballroom scene between the two acts, the floor plane levels. The thick frames glide imperceptibly together to form the tall paneled walls of a grand hall, over which evanescent images of interior decor by video designer Wendell Harrington waft.

The third and fourth acts more dramatically emphasize the dimensional possibilities of the moving rectangles. In Charlotte's drawing room, the frames become bookshelves, receding enfilade; then, at the end of the scene, they quickly retreat laterally to signal a sudden shift in the mood of the plot. "Werther's world starts exploding. We wanted to convey this with bookshelves that fly up and offstage at the same time," says Howell, adding, "The scenery underpins that emotion." By the fourth act, Werther is at the end of his rope in his messy study—a small, brightly lit box seeming to levitate in the darkness upstage. Then it catapults forward, floating 4 feet above the floor to skim over the furniture of the previous act. Guided by tracks, the mysteriously looming mise-en-scene again heightens the drama for the gloomy ending.

Since Eyre placed the period of the opera in the late 19th century, when Massenet lived, instead of the late 18th century of Goethe's novel, on which the opera is based, *The Sorrows of Young Werther* (1774), the production's costumes and furnishings had to be moved up a hundred years. Howell was inspired by the paintings of the Danish artist Vilhelm Hammershoi (1864–1916), whose spare, linear furniture and austere monochromatic interiors have a haunting quality.

The elements of the set move dynamically within the shallow space of the stage to alter the mise-en-scene according to the mood.



If there is one disappointment in the set design, however, it would be that the actual furnishings don't look austere and haunting enough: swaglike canopies and garden parasols in the first two acts are too light and *gemütlich*, in a Pottery Barn sort of way, to fully complement the overall architecture of the framing elements.

Nevertheless, the mobility of the architectural sets and the spatial dynamic created expose operagoers to the architectonic possibilities of design on any stage—including that of real life. ■

In the ballroom scene (top), the rectangular frames shift to form paneled walls with decor provided by video images. During the final act, Werther's study (left) is propelled toward the audience.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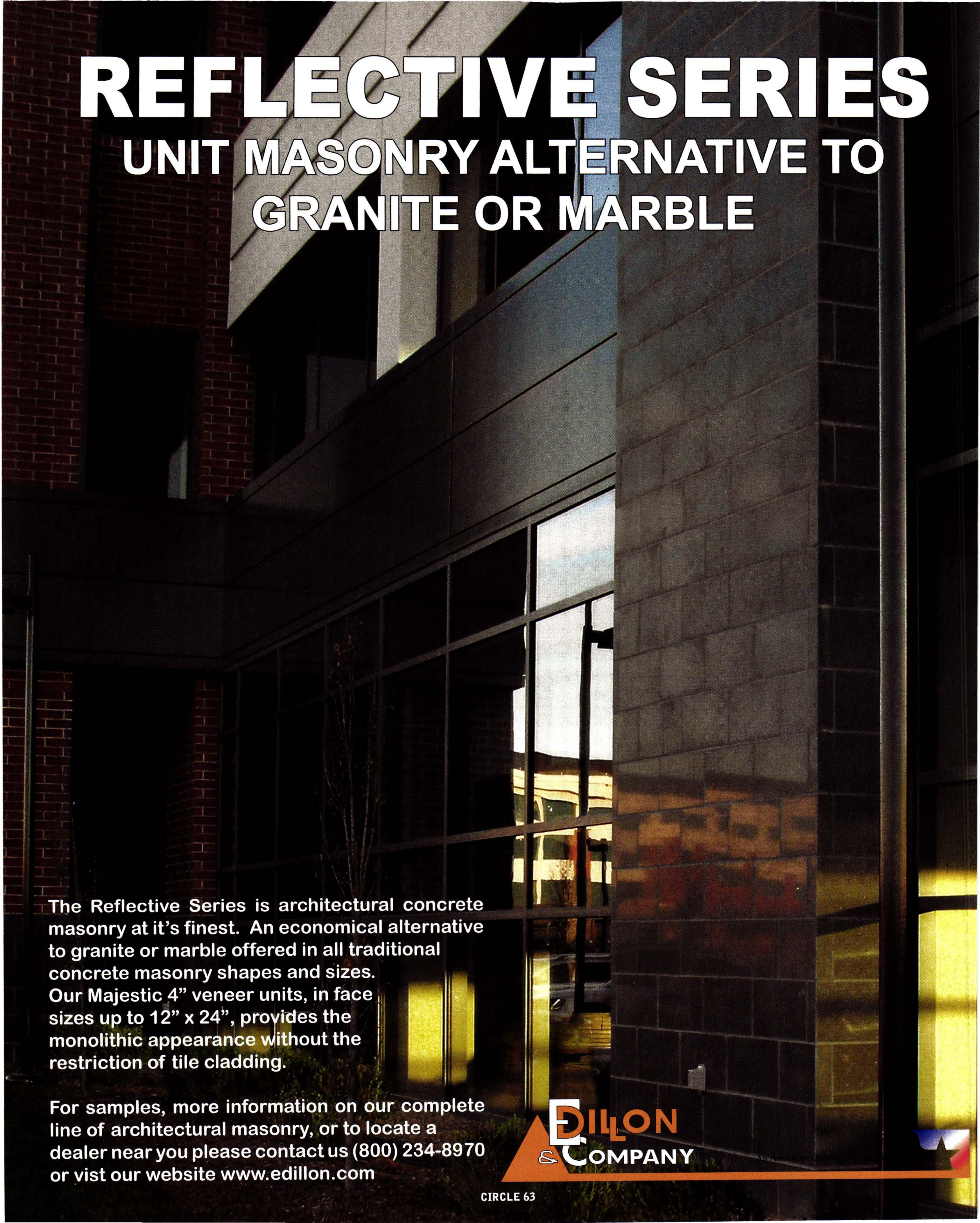
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CIRCLE 63

Converging Networks

As building-control apps go mainstream, home-automation providers explore wireless options.

BY PETER FAIRLEY

THE APPLE Store isn't a place you would typically look for residential building components. But you can find a new Wi-Fi-enabled lighting system from Philips called HUE there. This screw-in LED replacement for traditional bulbs can be easily controlled for color, color temperature, and intensity from a computer or smartphone. Google's recent $3.2 billion purchase of the Palo Alto, California–based Nest Labs and its web-accessible programmable thermostats, smoke detectors, and carbon monoxide detectors is yet another development turning the notion of home automation—often a complex configuration of wires and cables linked to devices with rigid protocols—into a viable option for new construction and also renovation projects.

"This is the advent of the 'Internet of Things'; everything is going to be controlled through Wi-Fi," says lighting designer and electrical engineer Christopher Thompson, who runs the Seattle design firm Studio Lux. As a result, says Thompson, "Home automation is undergoing a huge shift."

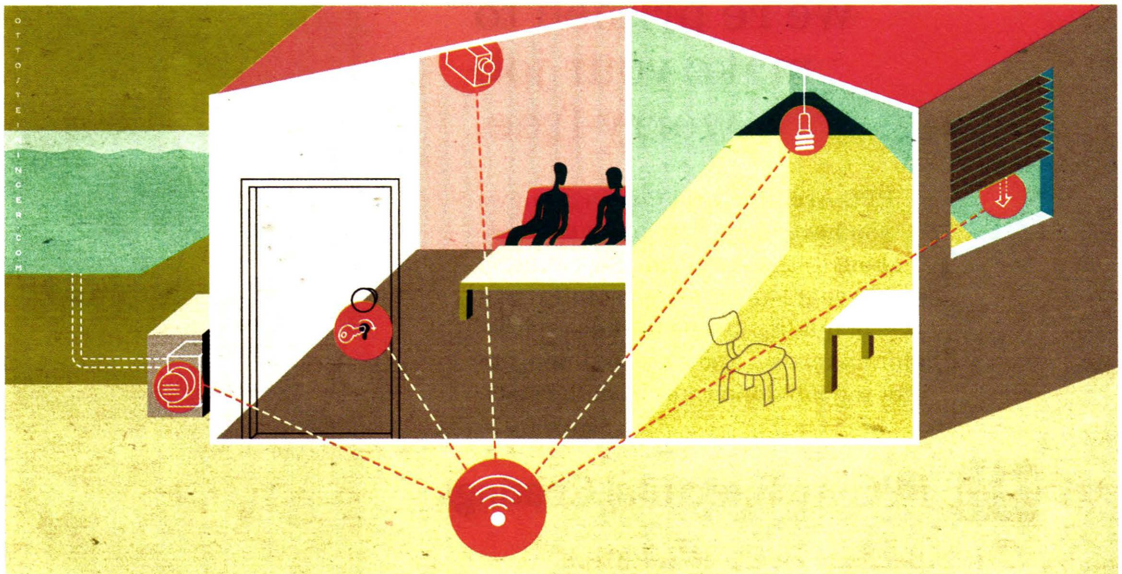

ILLUSTRATION: © OTTO STEININGER

Improved wireless networks are enabling providers of whole-home systems to remotely control a wider array of devices and functions. Suppliers are also striving to simplify the operation of their systems to meet homeowner requests to control everything via smartphone and tablet—the new universal remotes.

Lutron was among the first to connect the whole house without wires in the mid-1990s, when it launched a radio-frequency (RF) system called RadioRA that relied on a rack-mounted central hub to relay messages between the wireless control units and light switches. At the time, it was developed to be a second-tier solution for retrofit jobs where running wires would be too costly.

Many home-control providers are moving beyond the fixed hub-and-spoke network model to manage more than lighting and shades, adding climate control, security, home entertainment, appliances, even locks to their offerings. According to Tom Barnett, the residential marketing director at building-controls solutions manufacturer Crestron, interference from neighboring wireless devices makes it difficult for hub-and-spoke configurations to deliver the uninterrupted bandwidth required to control a diverse array of devices. Barnett notes that the Wi-Fi networks used for home Internet connectivity, for example, offer great bandwidth but notoriously poor reliability.

As a solution, the Crestron InfiNET EX wireless system relies on a mesh network, which turns every automated component into a miniature hub. This is said to assure that the message will get through when the user presses a button on the remote control, explains Barnett, even if its signal can't reach the base station directly. For instance, a signal will be picked up and passed along by the controller on bedroom shades to whatever components the shade controller can reach, and the message will bounce to the base, kicking off a programmed set of actions. (Barnett claims that pressing a particular button even sends his dog upstairs because, when the lights and TV go off downstairs, it knows it's time for bed.)

Meanwhile, Lutron has developed a fifth-generation RF system, upgrading its fixed-hub network with what the company claims is an extremely stable and interference-resistant band frequency. According to engineering manager Matt Swatsky, the new technology, dubbed Clear Connect, can encompass more than 10,000 square feet as reliably as a wired system.

In a recent vote of confidence for remote accessibility, luxury homebuilder Toll Brothers announced it is offering the Control4 system—controllable from a variety of devices—as a buyer option.

Still, there are circumstances where some clients remain unwilling to cut the cord. When Portland, Oregon–based architects Allied Works designed a home (see RECORD Houses, page 74) in a rural New York State location for a couple with a substantial art collection, the design team decided to go with a wired system. The country home's sophisticated system operates, among other things, museum-grade climate controls that protect the art from temperature and humidity swings. Allied Works principal Kyle Lommen says they went with a wired system because technical support would be slow in coming if a wireless system went down.

Wired systems are already giving way to hybrid configurations, and Lommen predicts that, in the future, those will ultimately give way to completely wireless and Internet-based solutions. The firm is already considering a wire-free whole-building system for the 160,000-square-foot National Music Centre in Calgary, Alberta. The direction, says Lommen, is clear. ■

Journalist Peter Fairley focuses on energy and the environment.


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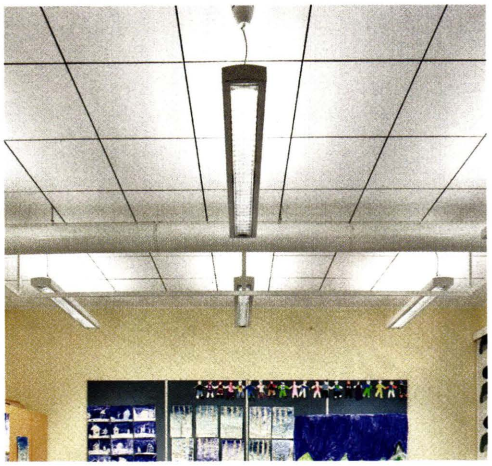
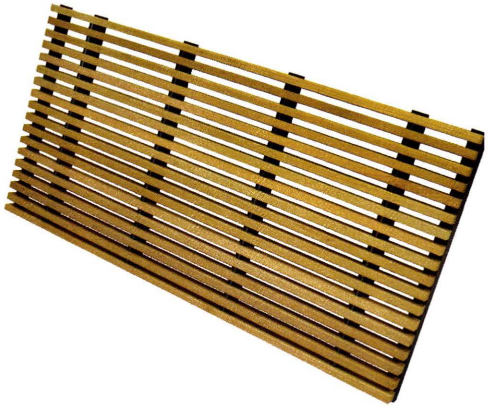
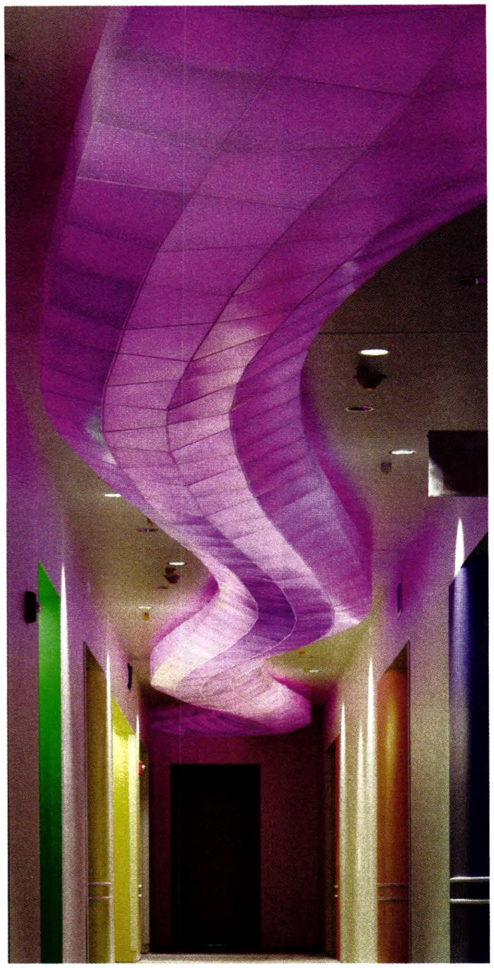
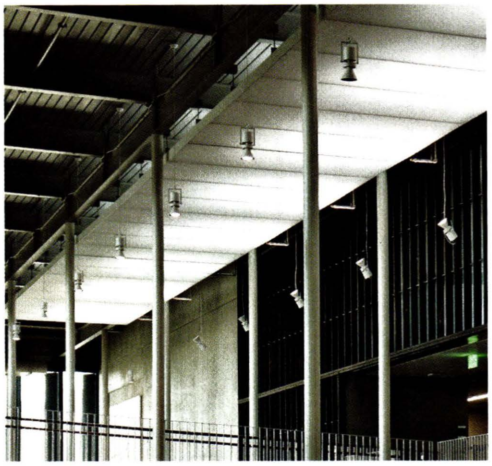
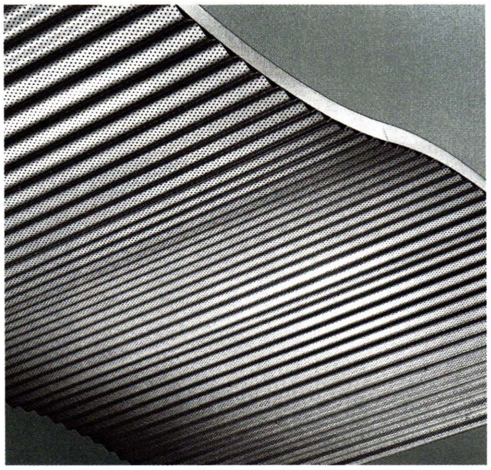
ACOUSTICAL OR PURELY DECORATIVE, RECENTLY INTRODUCED CEILING SYSTEMS AND COMPONENTS COME IN A WIDE VARIETY OF MATERIALS AND STYLES. **BY SHEILA KIM**











Hygienic Plus

Rockfon rockfon.com

Ideal for controlled environments such as laboratories and food prep areas, Hygienic Plus ceiling tiles are composed of water-repellent stone wool, which prevents the growth of bacteria due to its lack of nutritional value for microorganisms. The material's inherent properties also contribute to a high fire-resistance rating and sound absorption. Available in 2' square or 2' x 4' units. CIRCLE 210

LightFrame

Sefar Architecture sefar.us

LightFrame combines a slim aluminum frame with a stretched fluoropolymer textile-membrane front and translucent film on its back to evenly diffuse light from any source above, as well as optimize sound absorption below it. Available in a standard size of 98½" x 59", the modules can also be custom-sized and installed to cover large swaths or to create ceiling clouds, such as these inside St. Edwards University Library in Austin, Texas. CIRCLE 214

InteGrille

Rulon Company rulonco.com

InteGrille panels feature tegular edges that enable architects to easily install the units onto new or existing suspended grid systems. Each 2' square, 2' x 4', or 2' x 6' panel consists of maple, ash, poplar, red oak, or cherrywood, finished in a variety of light to dark stains. Three slat depths are offered: ¾" deep slats are wood-backed, while 1⅜" and 2" deep slats are connected via dowels. CIRCLE 211

Serpentina Waves with Corrugated Panels

Armstrong armstrong.com

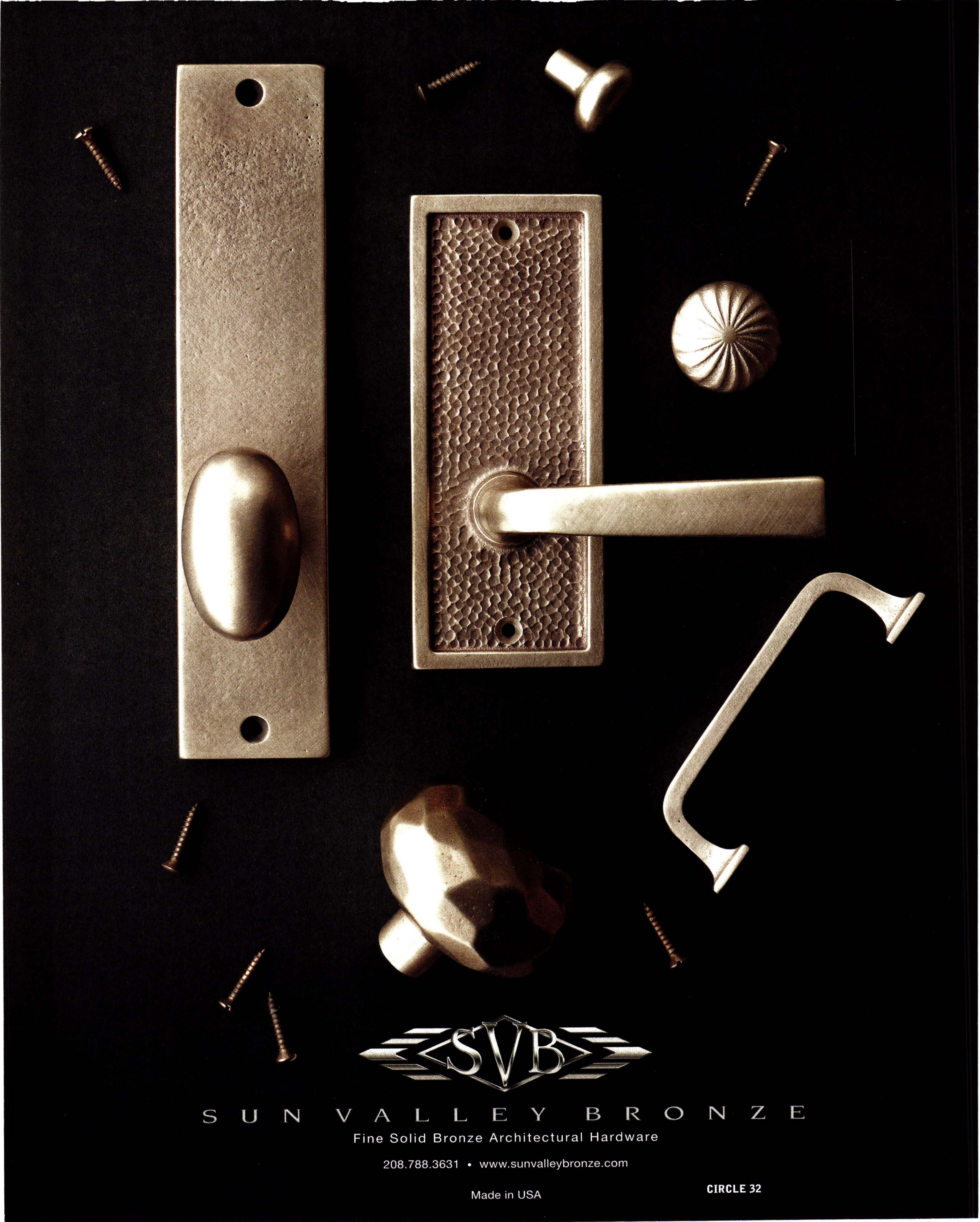
Armstrong has added a corrugated-aluminum panel option to its Serpentina Waves curved ceiling system. The panels measure 4' square or 12' square and can be specified in a hill, valley, or hill-valley combination shape, with a plain or perforated face. The panels are backed in acoustical fleece and finished in 13 standard colors including platinum, gun metal, white, or tech black. Custom colors are also available. CIRCLE 213

Cellular Resin Ceiling Clouds

Seeyond Architectural Solutions seeyond.com

Customized or ready-to-ship cellular resin ceiling clouds from Seeyond can be used as a decorative, lighting, or concealing element—or all of the above. For a corridor inside the recently completed Baystate Children's Hospital Specialty Center in Springfield, Massachusetts, Steffian Bradley Architecture designed a cloud with integrated LED lighting to add visual impact. The 102' long, 4' to 5' wide sinuous tessellated installation is made up of 16" x 18" modules, while its color-changing LEDs are programmable and remote-controlled. Architects can also specify Seeyond's cellular resin—which has a high strength-to-weight ratio—for wall facings, non-load-bearing walls and room enclosures, and column covers. CIRCLE 212

For more information, circle item numbers on Reader Service Card or go to architecturalrecord.com/products.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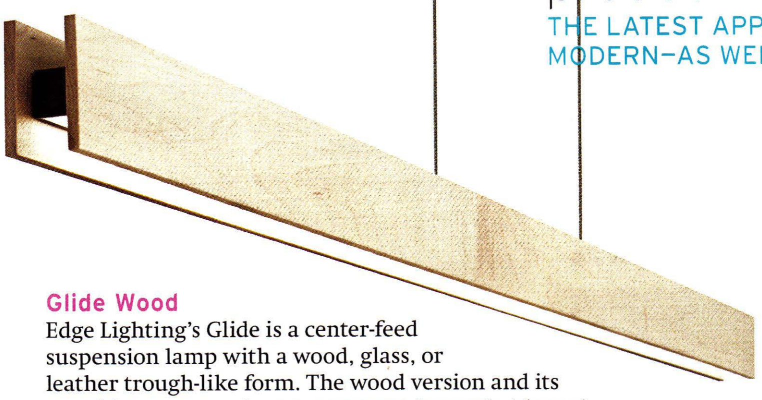
THE LATEST APPLIANCES, FIXTURES, AND FINISHES CATER TO MODERN—AS WELL AS HIGH-TECH—HOMES. BY SHEILA KIM



Glide Wood

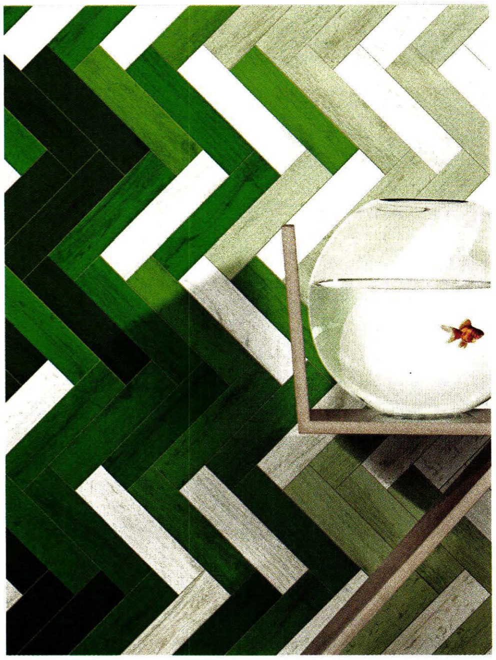
Edge Lighting's Glide is a center-feed suspension lamp with a wood, glass, or leather trough-like form. The wood version and its matching rectangular canopy come in maple (shown), walnut, cherry, white oak, or white oak with an "espresso" finish. Available in lengths from 36" to 72", Glide uses warm-white (3,000K or 2,700K) LEDs behind its flat 1"-wide lens for direct illumination with a 100° beam spread, and optional Lutron low-voltage dimmer. edgelighting.com CIRCLE 200

Attika Sink

The antithesis of the discreet undermount sink, Blanco's Attika makes a bold design statement with its elevated, geometric rim, while also helping to reduce excess splashing onto adjacent work surfaces. Constructed of 18-gauge stainless steel, the deep rectangular basin has softly rounded corners and comes in two sizes: 20½" x 18½" x 8¼" and 26¾" x 17¾" x 10". blancoamerica.com CIRCLE 201

Axxis Plus Compact Washer

Bosch's Axxis Plus (left) is an efficient washing machine in more ways than one: its compact body occupies a 24" x 25" footprint, yet fits up to 17.6 pounds of clothes; it features a quick 15-minute cycle for small-load washes; and it claims to exceed Energy Star requirements by up to 20%. Installable stacked or side by side with its accompanying dryer, the unit also employs anti-vibration technology that reduces spin-cycle shaking up to 30%. bosch-home.com CIRCLE 204



U-Color Tiles

As many tile companies have been doing in recent years, new Italian brand 41zero42 draws on wood flooring for its porcelain series U-Color (above), but saturates the faux-bois pieces with vibrant color using a cold glazing process. The tiles, each measuring 3" x 12", can be laid out in a range of configurations to create patterns such as herringbone; vertical, horizontal, or barber stripe; and brick. The line offers 60 standard colors, but customizable hues number in the thousands. Available in the U.S. through Stone Source. stonesource.com CIRCLE 202

Multi-Slide Doors

Just launched at the International Builders' Show in February, this new multi-slide door system by LaCantina Doors enables designers to create extended openings, blurring the line between indoor and outdoor space. Whether closed or open, the doors blend in with their surroundings thanks to narrow stile and rail profiles, optional wood-finish fascias that complement interiors, and low-profile, self-draining sills. lacantinadoors.com CIRCLE 203

Kitchens by Goldreif

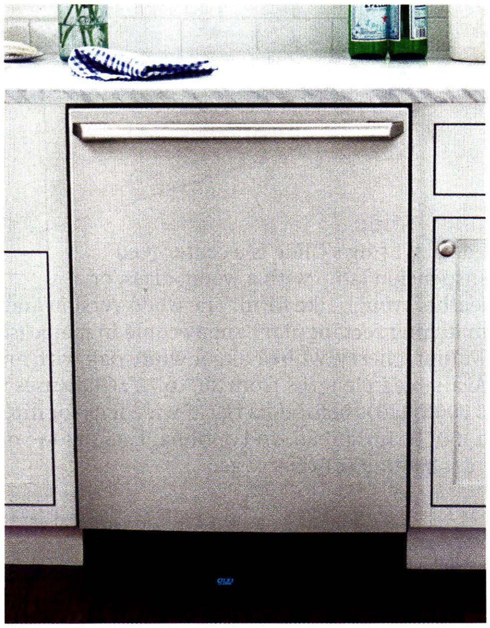
German kitchen brand Goldreif has been around since 1929, but it is only now arriving in the U.S., courtesy of another kitchen maker. Poggenpohl has launched Goldreif's three cabinet collections, which encompass a total of 113 door styles in wood, veneer, laminate, and acrylic, among other finishes. The Profile line (below) features a clean aesthetic with complementing linear pulls; the minimalist Pure range utilizes milled recesses to keep fronts uncluttered; and the Classic series implements traditional touches such as bezel detailing. poggenpohl.com **CIRCLE 205**

French-Door Double Oven

Newly launched at KBIS, Viking Range's French-Door Double Oven (left) takes cues from commercial kitchen counterparts by introducing convenient side-swing doors that can be operated by one hand. The result is a more accessible appliance that is easier to use, clean, and configure due to the shallower doors. The 30"-wide, 4.7-cubic-foot oven features the company's patented Vari-Speed Dual Flow convection system for efficient and even cooking, an infrared broiler, and three adjustable racks. Meanwhile, the oven front can be specified in 12 finishes, including stainless steel, to complement any kitchen style. vikingrange.com **CIRCLE 209**

Mezzo Fireplace

On trend with the smart-home technology craze, Heat & Glo's Mezzo gas fireplace (right) integrates WiFi connectivity, allowing homeowners to power the unit on or off, adjust levels, activate child safety locks, and monitor the fireplace remotely using an app on a smartphone or tablet. Available in three widths—36", 48", and 60"—Mezzo can be specified as a single-sided or see-through unit, with frame fronts in a range of color and finish options.
heatnglo.com **CIRCLE 208**



EW24ID80Q S Dishwasher

Generating noise levels as low as 45 dBA, this Electrolux dishwasher is an exceptionally quiet machine, yet still a workhorse. It combines SatelliteSpray—a rotating wash arm that provides 400% more coverage than a traditional arm—with variable water pressure and versatile racks to ensure thorough and efficient cleaning. With its controls concealed inside the door, the washer features an LED projection onto the floor that indicates the remaining time. electroluxappliances.com **CIRCLE 206**

Starck 1 Washbasin

Longtime Duravit collaborator Philippe Starck continues to create new bath collections as well as additions to his previous lines for the brand, such as a ceramic basin (above) for the Starck 1 series. The gently contoured bowl sweeps up in one corner to form a hand-sanded volcano-like faucet surround, ideal for the designer's single-hole tap. The unit measures $18\frac{1}{8}$"-square. duravit.us **CIRCLE 207**

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The answer to the March issue's Guess the Architect is Skidmore, Owings & Merrill (SOM), which designed the Jin Mao Tower in Shanghai in 1999. At the time it was China's tallest tower. Since then SOM and its design partner at the time, Adrian Smith, completed the world's tallest tower, the 2,717-foot-high Burj Khalifa in Dubai in 2010. For more details, including the winner, go to archrecord.com.

By entering, you have a chance to win an iPad mini.
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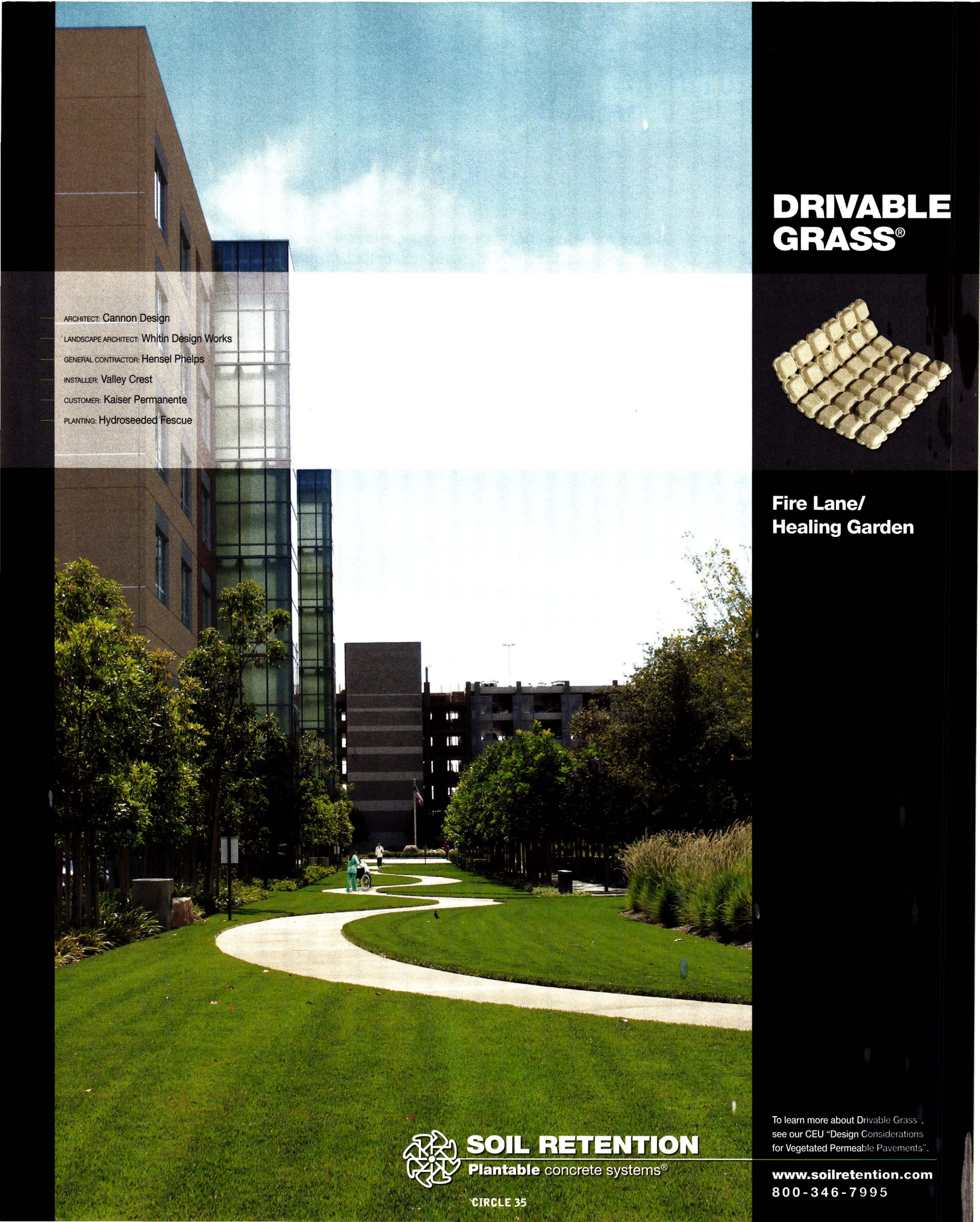
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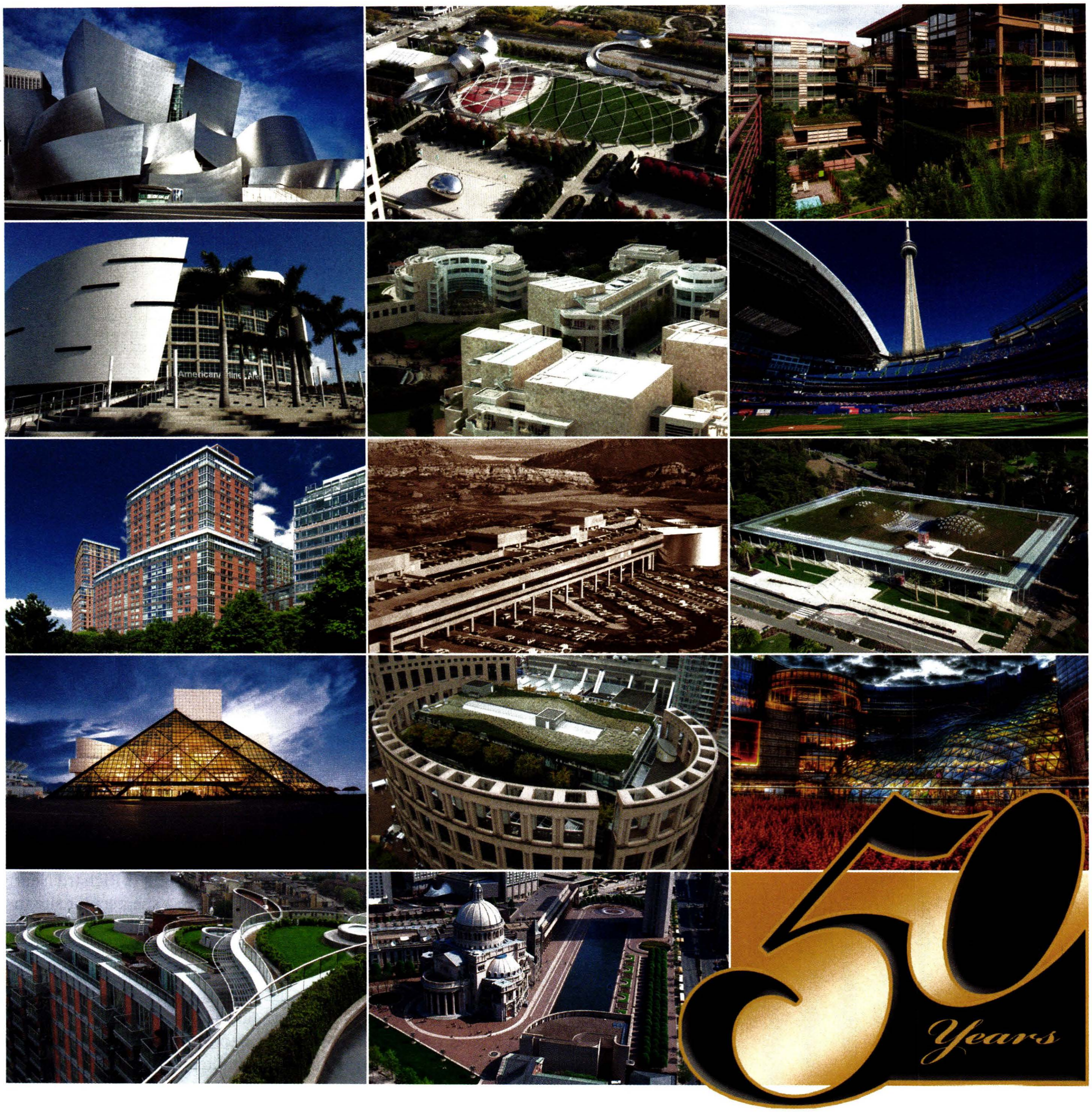

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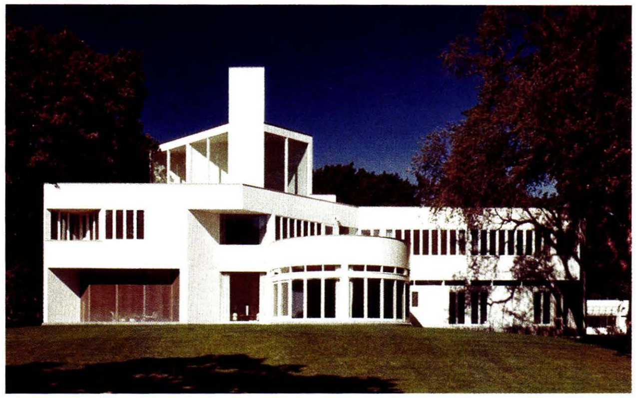
CIRCLE 34

Endangered Species

Under-appreciated and usually smaller than today's McMansions, modern houses from the 20th century are disappearing from the architectural ecosystem. Some champions, though, are finding ways to save them.

BY SARAH AMELAR

AT RISK
Romaldo Giurgola's 1970 Dayton Residence in Wayzata, Minnesota (right, top and bottom), was purchased for a reported $10 million in 2012. The new owners plan to build a larger alternative, though they are considering options other than demolition, including moving the Giurgola house off-site.



DESTROYED
The Hulse Pavilion in Atlanta (below), designed by Anthony Ames, was a RECORD House in 1978. The original owner died in 2012, and the property was sold. Despite protests, the new owners razed the Pavilion and main house, also by Ames (not shown) last November.

THE AMERICAN DREAM does not always align perfectly with the goals of architectural preservation. "Though certain homeowners consider themselves custodians of important works of architecture, most people draw the line somewhere between the greater good and their individual property rights," points out Sue Mossman, executive director of Pasadena Heritage, a preservation nonprofit and advocacy group. "'My home is my castle' is an idea so embedded in our culture," she adds, "and any government intervention in that realm comes with a degree of tension."

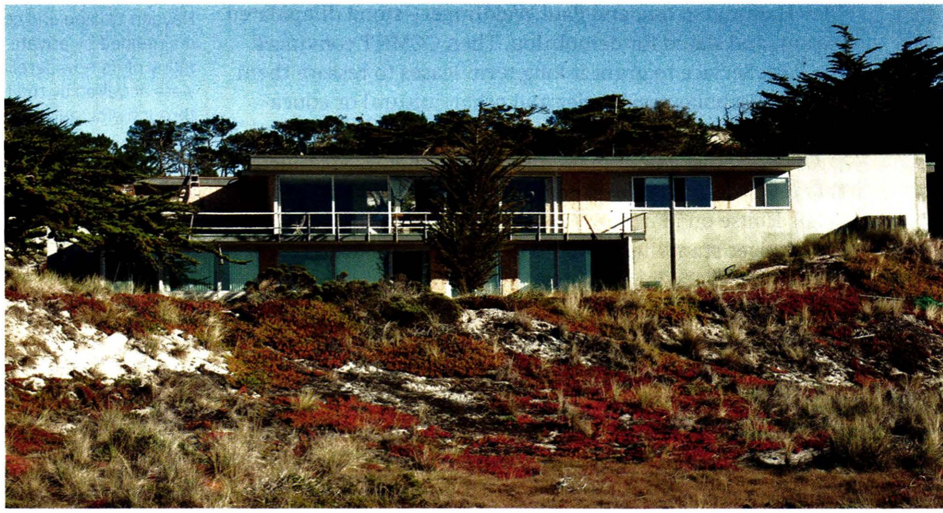
In recent years, wrecking balls have hovered perilously close to modern homes by Rudolph Schindler, E. Fay Jones, and Frank Lloyd Wright, as well as key works by lesser-known talents. Currently, the survival of the 1958 Richard Neutra–designed Connell House, tailored to a spectacular site in Pebble Beach, California, has been the subject of a two-year battle; and the owners of a 1966 residence in Coral Gables, Florida, by one of the region's leading midcentury Modernists, Alfred Parker Browning, are suing the city for upwards of $7 million for denying them the option to raze it. The cliché of homeowners' or greedy developers' bulldozing architecturally remarkable houses, obliterating the cultural heritage to make way for McManors or McChateaus, reflects widespread reality.

The opposite of today's bigger-is-better mindset, the Modern movement championed efficient design and modest scale–which leaves irreplaceable buildings of that era susceptible to death by teardown, particularly if they occupy large or otherwise coveted sites. Adding to that predicament, crisp midcentury designs "don't look so good with the wear or patina of age the way, say, a Colonial would," observes Dana Robbat, president and cofounder of Friends of Modern Architecture in Lincoln, Massachusetts. "So, when they're neglected or tired, they look very tired–and that makes them even more vulnerable."

But even condition and size are not always at issue. One well-maintained yet endangered house is the 8,500-square-foot 1970 home Romaldo Giurgola built in Wayzata, Minnesota–the upscale community where Frank Lloyd

PHOTOGRAPHY: © ROLLIN R. LAFRANCE/COURTESY MITCHELL|GIURGOLA ARCHITECTS (TOP AND MIDDLE); E. ALAN MCGEE (BOTTOM)

AT RISK
Preservationists are campaigning to add Richard Neutra's decaying 1958 Connell House in Pebble Beach, California (left and below), to the National Register of Historic Places to deter the current owner from demolishing it.



Wright's 1914 Little House was razed in 1972 (sending its great living room to the Metropolitan Museum of Art and other fragments to collections across the country). Giurgola's clients were members of the Dayton family, Minneapolis-based department store magnates with an exemplary history of architectural patronage. But for the latest owners, this pure-white, geometrically striking house is only their temporary quarters while they build a home more to their taste elsewhere on the lakefront site.

The fate of this icon, bought in 2012 reportedly for nearly $10 million, hangs in the balance as the owners' representatives evaluate moving it off-site. Though interested parties have come forward, the costs and logistical challenges may prove overwhelming. (Relocation of the small Gehry-designed Winton Guesthouse [architecturalrecord.com/news] from a far more accessible site on the same lake, in 2008, required cutting it into eight pieces and trucking them out separately.)

For the Giurgola house, a teardown permit has not yet been requested, according to Irene Stemmer of the Wayzata City Council–appointed Historic Preservation Board. "And before demolition can occur, our board gets to photograph each property inside and out," she adds. "But we can't go in to save a place. We can talk to owners, we can encourage them to renovate, but that's it. Last year, we lost 13 significant houses." (Municipal policies vary widely. Progressive leadership in Coral Gables has reversed this common hierarchy, giving final authority on demolition permitting to its preservation officers instead of its city council.)

Clearly, moving a building is a costly act of last resort, sacrificing location specificity. But such a Herculean feat will transport Frank Lloyd Wright's 1954 Bachman-Wilson House from its original New Jersey site, plagued by rising waters, to safe ground at the Crystal Bridges Museum in Bentonville, Arkansas (architecturalrecord.com/news).

Though other cultural or academic institutions have occasionally rescued endangered houses, sometimes the very parties expected to defend a precious architectural legacy jeopardize its future. The Museum of Modern Art—entangled, this past year, in controversy over its proposed demolition of the American Folk Art building—was instrumental in the loss of an extraordinary house, the 1963 Long Island home of architect Gordon Bunshaft. His sole residential work, the design dovetailed with the art collection it displayed. After Bunshaft's widow bequeathed it to MoMA, along with the paintings and sculpture, the museum emptied out the art and sold the place in 1994 to Martha Stewart, without preservation protections. The sad story ended with the building's demolition in 2004 by the next owner (architecturalrecord.com/recordhouses).

In an equally startling maneuver, the University of Arkansas at Fayetteville's 1998 master plan showed the 1950 Hantz House, an early E. Fay Jones work, replaced by a parking lot. And this is a university with a school of architecture named for Jones, its most celebrated alumnus and longtime faculty member. Though the latest campus expansion plan reverses this travesty, the privately owned Hantz House and neighboring 1951 Durst House (designed by the architec-

PHOTOGRAPHY: COURTESY RICHARD AND DION NEUTRA PAPERS, COLLECTION 1179, PHOTOGRAPHS OF THE CONNELL HOUSE, BOX 971, FOLDER 7, UNIVERSITY OF CALIFORNIA, LOS ANGELES (TOP); © MICHAEL DAWSON (BOTTOM) ture school's founder, John G. Williams) made the Historic Preservation Alliance of Arkansas's 2013 list of the state's Most Endangered Places. Encroaching large-scale construction (with site blasting) and erosion of the steep hillside where these two small houses are perched have compromised their condition. Even though the pair's owner is committed to preserving them, their situation remains fragile.

Among the most interesting models for reclaiming endangered homes is the work of the nonprofit Cape Cod Modern House Trust (CCMHT). Since 2006, it has salvaged midcentury dwellings owned by the Cape Cod National Sea Shore, structures acquired incidentally when the National Park Service consolidated this mostly wild land in 1961 (RECORD, August 2005, page 60).

The significance of this remote seacoast area in the evolution of Modernism dates back to the 1930s, when self-taught architecture buffs began creating modest houses, influenced by local tradition and cutting-edge work abroad. Later, the influx of immigrants teaching at Harvard and MIT brought such architects as Walter Gropius, Marcel Breuer, and Serge Chermayeff to the town of Wellfleet. Many built summer retreats here: humble rather than showy experiments in Modernism, some are scattered within the National Sea Shore. Several were lost through neglect, while the remaining few—by such locally known talents as Charles Zehneder, Olav Hammarstrom, and Paul Weidlinger—stood dilapidated, vacant, and slated for demolition. Then CCMHT convinced the Park Service to grant it long-term leases to restore them for artist/scholar residencies and other cultural or educational uses.

Occasionally, a house is so recent and widely acclaimed that few would imagine its demise. Yet the 1988 Berkowitz-Odgis House on Martha's Vineyard that Steven Holl designed is no longer standing. About four years ago, its most recent owners hired the local firm of Hutker Architects to renovate and expand the interior space. Without changing the height or footprint, the architects designed a lower level that would solidly fill in where the original, almost shacklike beach house had hovered lightly on stilts above the sand. Other "bones" of the original exposed skeleton would also have been enclosed. Soon after construction began, engineers

The opposite of today's bigger-is-better mindset, the Modern movement championed efficient design and modest scale.

working with the architect deemed the existing building "structurally unsound and poised to fail, with rot and decay through and through," says project architect Greg Ehrman. So the owners demolished the original house. They later halted reconstruction, eventually placing the property (and a set of plans) on the market. There it has languished. The original house is gone—and it's unclear that preservation protections could have altered the outcome.

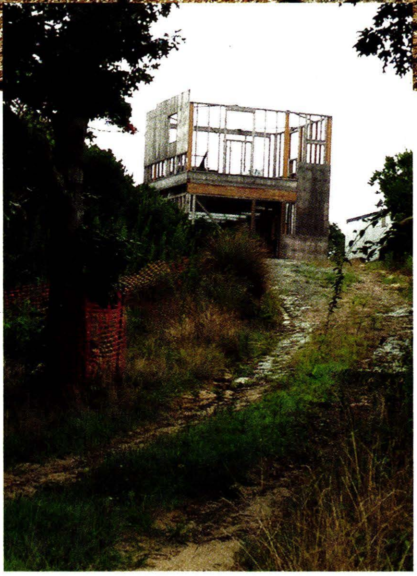
In general, historic or landmark designations can be sought at national, state, and/or city levels, but they are typically

SAVED Even without a formal preservation mandate, some residents are keeping up their historic houses on their own initiative. In Cape Cod, the Halprin House (above), designed by Hayden Walling and completed in 1960, is well maintained by private owners—in contrast to many of its now derelict contemporaries, which were acquired by the National Park Service through eminent domain and lack funding for upkeep.

SAVED Last summer, the Cape Cod Modern House Trust (CCMHT) finished restoring the Hatch Cottage (below and bottom), designed by Jack Hall in 1960. Owned by the National Park Service and recently added to the National Register of Historic Places, the house lacked funds for upkeep and fell into further disrepair until the CCMHT intervened. All houses on this page are featured in the forthcoming book *Cape Cod Modern*.

PHOTOGRAPHY: © RAIMUND KOCH/CAPE COD MODERN (TOP AND BOTTOM); COURTESY NOA HALL/CAPE COD MODERN (MIDDLE)


FOR THE **STILE CONSCIOUS**
BOSS ARCHITECTURE | LINGER



DESTROYED
Steven Holl's 1988 Berkowitz-Odgis House (above and left) on Martha's Vineyard was demolished after engineers deemed it "structurally unsound." During construction of the new house, designed to resemble the original, the owners abandoned the project and put the property up for sale.

reserved for buildings more than 50 years old. And the final word usually rests with local ordinances, should they exist. But none of these classifications guarantees against demolition.

The most powerful preservation tool is the conservation easement, a legal agreement on top of such a designation, providing protection, in perpetuity, against destruction or incongruous change to an historic property. Since the easement is permanently attached to the deed, however, many people are hesitant to restrict themselves, potentially making a sale more challenging. But the provision suits owners who consider the house's ongoing preservation a top priority.

Unprotected homes that have been lost include Lloyd Wright's 1959 Moore House, on California's Palos Verdes Peninsula, and Anthony Ames's 1984 Hulse Residence and 1978 Hulse Pavilion, in Atlanta (RECORD, mid-May, 1978, page 72). Witnessing the destruction of a house you designed can be a painful experience for an architect. As Ames wrote in an open letter in late 2013, after the Hulse compound had been razed (following the death of his client), "The house was sold, pillaged, left for dead, and then demolished by the new owners. I was surprised, saddened, and angry by this insensitive, mindless, and premature destruction."

Some houses at risk, however, have parachuted to safety at the eleventh hour. For example, Schindler's 1940 Van Dekker House, in Woodland Hills, California, was derelict (though structurally sound) after decades of neglect by its longtime owner. As with many severely rundown houses, a valid issue was whether the restoration costs would price Schindler's house out of its local market. After beginning the extensive work required, one buyer put it back on the market. The house's future looked grim. But a chance meeting connected it with the rare buyer who could make this demanding project economically viable: a local LEED-certified construction management expert, named Frank Gamwell, who has his own building crews and a track record of restoring historic properties. "I love that house and can't wait to live there," he said a month ago, after rhapsodizing over the "gorgeous copper, textured like embossed leather" that he is fabricating to precisely replicate the original roof surface.

Undeniably, the right match between house and owner are essential to a happy ending. ■

BEING SAVED
Rudolph Schindler's long-neglected 1940 Van Dekker House (below and bottom) in Woodland Hills, California, is making an unexpected comeback. Frank Gamwell, who has worked in construction management for decades, bought the house in late 2013 and is using his own construction team to restore the property.

PHOTOGRAPHY: © PAUL WARCHOL (TOP, LEFT); ART DESIGN & ARCHITECTURE MUSEUM, UC SANTA BARBARA (TOP, RIGHT); FRANK GAMWELL (BOTTOM, RIGHT)

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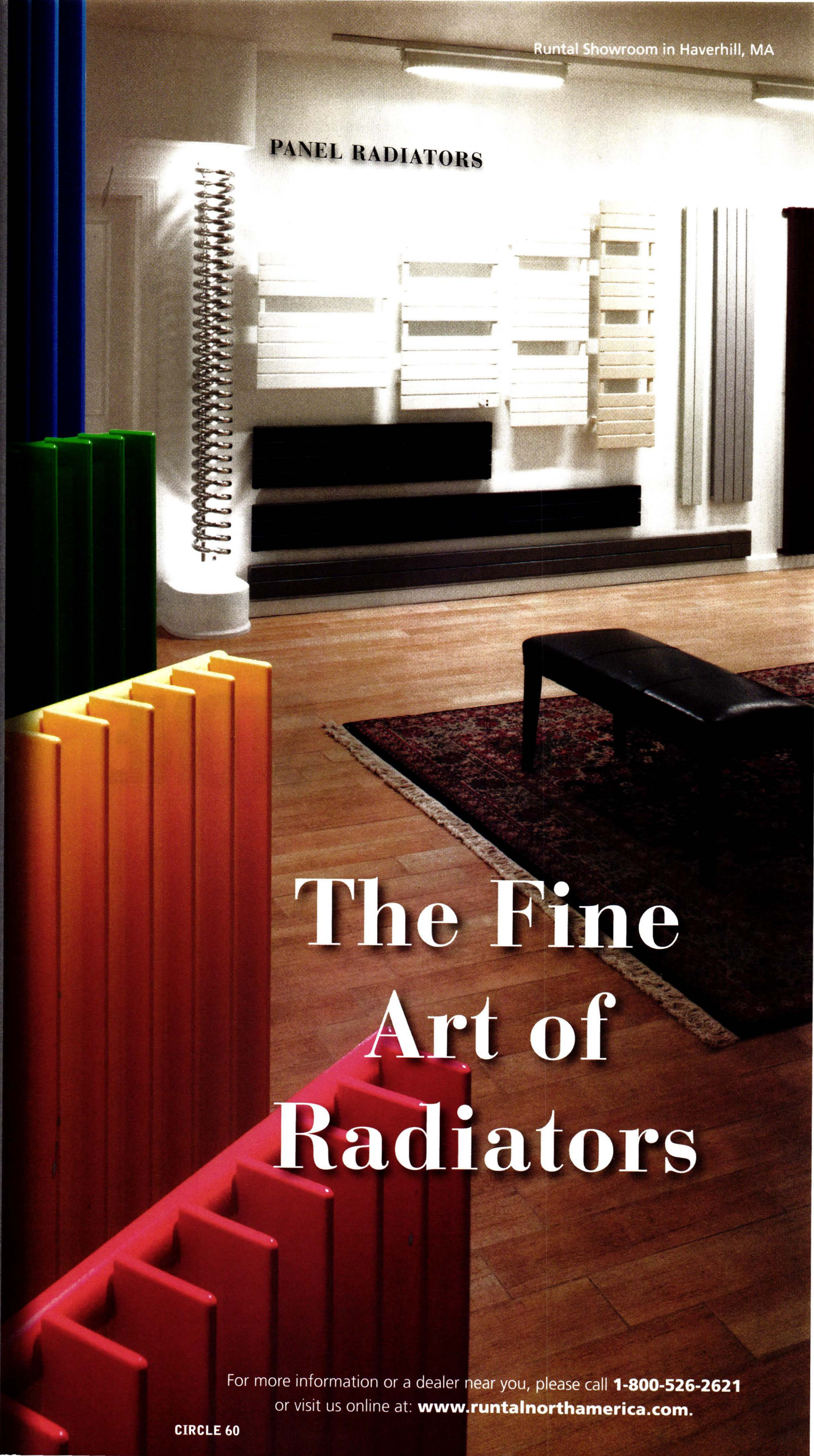
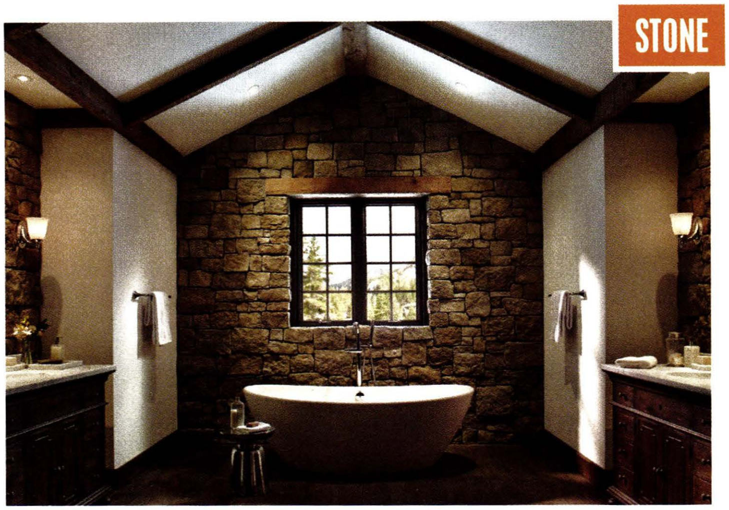


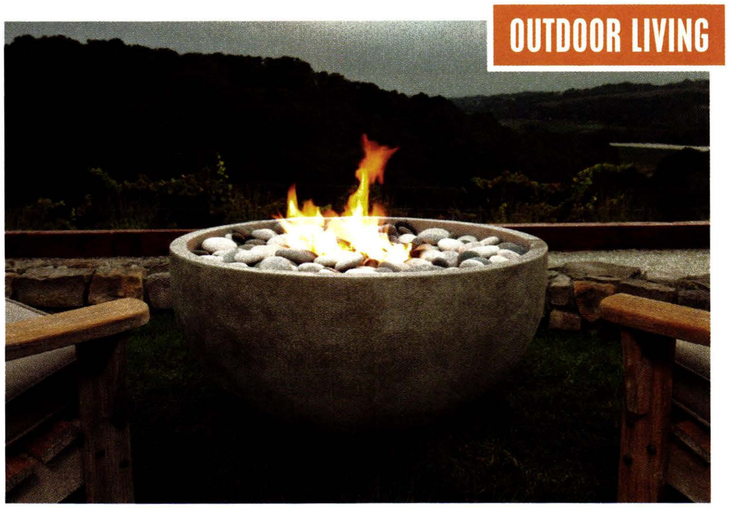
CIRCLE 60

ELDORADO

IS MORE THAN

STONE


STONE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CIRCLE 33

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RECORD HOUSES 2014

IT IS SO TRUE: in selecting RECORD Houses, the editors are often drawn to taut modernist planes, spaces that flow indoors and out, elegant details, and crafted materials. These tend to arrive in rectilinear packages, like the floating concrete volumes of Studio MK27's Casa P in São Paulo (this page). Yet . . . not all the time. This year, a number of architects came up with schemes that veer away from the type, with steeply angled roofs, winding plans, and twisting or split volumes. Even some rectilinear houses break the mold: one has an exterior surface that dematerializes behind video images; another seems to hover above the site. While certain architectural attributes crop up year after year, the ones that offer a fresh spin demonstrate the building type as an inexhaustible mine for exploration and inspiration.

What if the architecture became a black hole?" pondered artist Doug Aitken after he was invited to plan a permanent installation for a collector's rural property in upstate New York. "What if the house became a place where time could speed up and slow down?"

Aitken shot video of the hills, meadows, and woods around the site—as well as a sunrise or two—for a little more than a year while the house, by Brad Cloepfil and his firm, Allied Works, was still in the design phase. He edited the scenes into a season-scrambling montage: a lingering shot of grasses in summer, a close-up of an autumn leaf, snow-covered branches, and so on in a long, continuous loop. Then he worked with the architect to project the work onto the completed house, wrapping its exterior.

The effect erases all but the abstract geometry of the architecture, replacing the house with glowing impressions of the landscape that have their own sense of time. "I love the idea of being there in winter, and on the structure there's an image of a snowbank, but then suddenly, it accelerates into an Indian summer," says Aitken.

Cloepfil's architecture can appear equally mercurial. The project began with a 400-acre estate owned by a couple with a large art collection. Allied Works designed an "art barn" for the property to house rotating exhibitions of work from their collection, and then a guesthouse (RECORD, April 2009, page 86) tucked into the woods. For the main house, the firm chose a site on a hill at the head of a meadow with panoramic views of the landscape and, to the west, the Catskill Mountains.

The 6,200-square-foot house is a two-story steel structure with a basement. Its two angular volumes stack on top of one another to create a squared-off figure eight—or as the firm describes it, an "orthogonal helix"—that wraps around two light wells. The form is

Dutchess County Residence, Main House |
Dutchess County, New York | Allied Works Architecture

SCREEN PLAY

A home for a family and their art collection transforms into a work in its own right—and still feels like a comfortable weekend house.

BY WILLIAM HANLEY

simple, but difficult to read in its entirety from any one sight line, giving it a dynamic, shifting appearance as you move around it. "I've always thought about the house as a knot binding itself together with the landscape," says Cloepfil. The structure also ties together the project's sometimes conflicting purposes: to show the art collection—and, in the case of the Aitken work, *be* the art—while providing a comfortable weekend house with great views of the countryside. It's a first-world problem par excellence, but one that the designers solved deftly.

Every room contains objects from the owners' collection and reflects their distinct but wide-ranging taste. To accommodate large-scale work, the designers placed double-height spaces—a family room, living room, and foyer—at the points where the second floor crosses over the first. At the center of the house, a formal entry opens onto a slender stair—made from wood and reflective stainless steel—that curves in counterpoint to the building's angular form. Upstairs, a work by Mel Bochner is integrated into the glazing around one of the light wells. Strings of sequential numbers rubbed into translucent glass panes, *To Count: Intransitive*, 2011 (view images at architecturalrecord.com), is a permanent version of a performance work originally done with soapy windows. To support all of the art on view in the house, a 24-inch-high utility space between its two stories contains the electrical, climate control, and security systems needed to meet conservation—and insurance—standards.

But the house doesn't feel like a museum. Allied Works balanced the drama of the open spaces with a restrained, domestic scale. Downstairs, a lower-ceilinged kitchen, dining room, and library slip in between the double-height spaces. Circulation flows around smaller, rectangular volumes set between rooms. They contain ancillary spaces—for bathrooms, a fireplace, storage, electrical and mechanical systems—and provide moments of compression that allow the interiors to feel open but not vast.

The three bedrooms upstairs are modest in size by the standards of a big-budget country home—the scale is more apartment than manse—though the house is appointed with a furniture collection to rival the art (Allied Works designed the beds and a dining room table). The bedrooms cantilever 40 feet over an entry court on one side and an outdoor living room with views of the mountains on the other. Michael van Valkenburgh Associates, the landscape architect for the estate, selected graphic, heavily veined marble slabs for the patios and pool deck, but the size and siting of the outdoor spaces keep the hefty material from appearing too severe.

During the design process, the tension between the collection and the architecture was most pronounced when it came to the facade, with the client asking for more wall space and Cloepfil advocating for glazing to maximize views. The compromise they found gave the building a distinctive skin. The entire house is covered in glass panels. Some are back-painted, to conceal structural bracing that supports the cantilevers and to provide interior walls for hanging art. Other panes are etched with vertical stripes. And, at key points, the glass is transparent to open commanding perspectives on the landscape.

The facade reflects the countryside and the sky on every

PHOTOGRAPHY: JEREMY BITTERMAN/ © ALLIED WORKS ARCHITECTURE (THIS SPREAD AND PREVIOUS)

Take a video tour of this project at architecturalrecord.com.

TAKING IN THE SITE
The angular but snaking volumes of the Dutchess County Residence allow indoor and outdoor spaces to overlap—with the bedrooms cantilevering over both the entry (above) and a patio in the rear of the house. Polished stainless-steel screens and a glass skin reflect the surrounding landscape.

credits

ARCHITECT: Allied Works Architecture – Brad Cloepfil, design principal; Kyle Lommen, principal in charge; John Clappi, project architect

INTERIOR DESIGNER: Lisa Frazar, Studio Frazar

ENGINEERS: Robert Silman Associates (structural); Paggi, Martin & Del Bene (civil); The Salamone Group (m/e/p)

CONSULTANTS: Michael van Valkenburgh Associates (landscape); George Sexton & Associates (lighting)

GENERAL CONTRACTOR: Berkshire Wilton Partners

SIZE: 6,200 square feet

COST: withheld

COMPLETION DATE: 2012

SOURCES

CURTAIN WALL: Schüco

CLEAR GLASS: Viracon

ETCHED GLASS: Cricursa

MOISTURE BARRIER: Bituthene Waterproofing Membrane

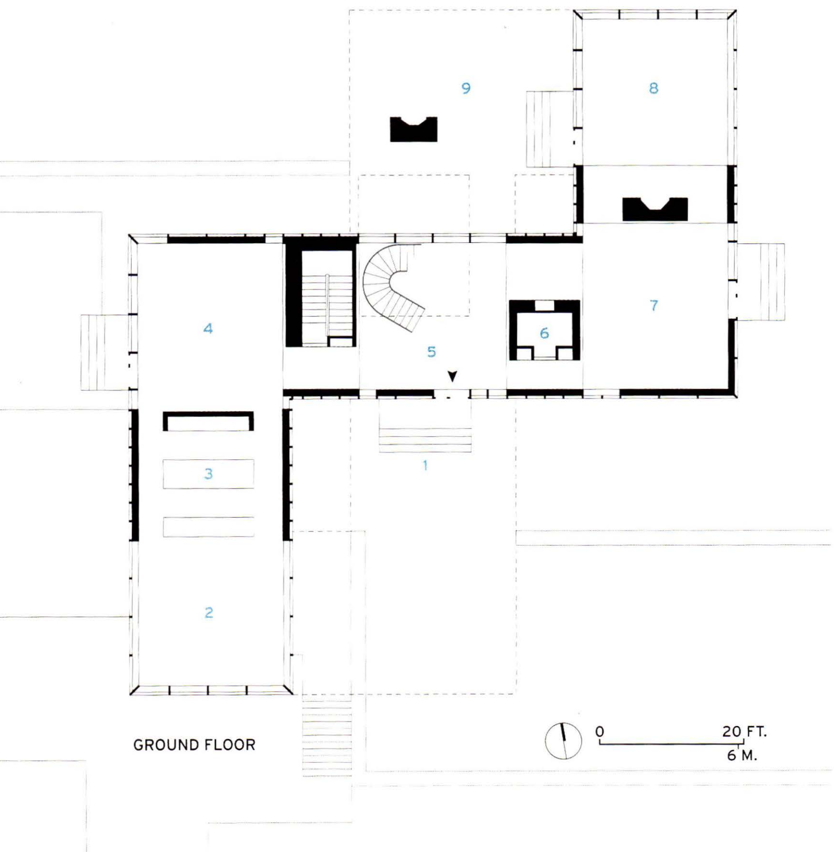
LIQUID ROOF MEMBRANE: American Hydrotech

FOLDING GLASS DOORS: Nana Wall Systems

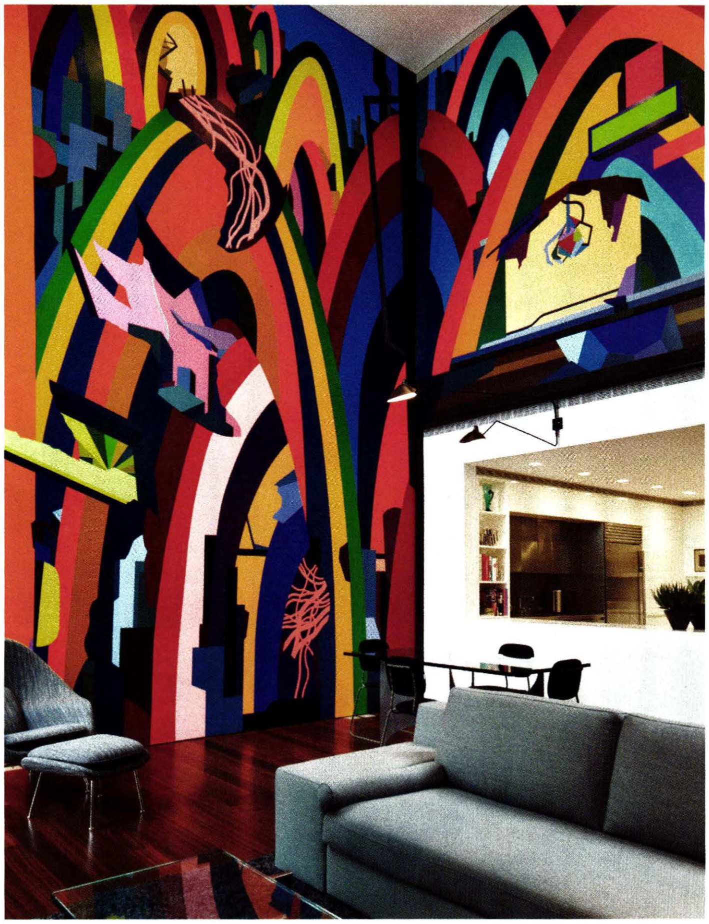
PAINTS AND STAINS: Benjamin Moore

SECOND FLOOR

1 ENTRY
2 FAMILY ROOM
3 KITCHEN
4 DINING
5 FOYER
6 POWDER ROOM
7 LIBRARY
8 LIVING ROOM
9 PATIO
10 MASTER BEDROOM
11 LIVING/GUEST ROOM
12 BEDROOM
13 TERRACE
14 LIGHT WELL (WITH MEL BOCHNER WORK)



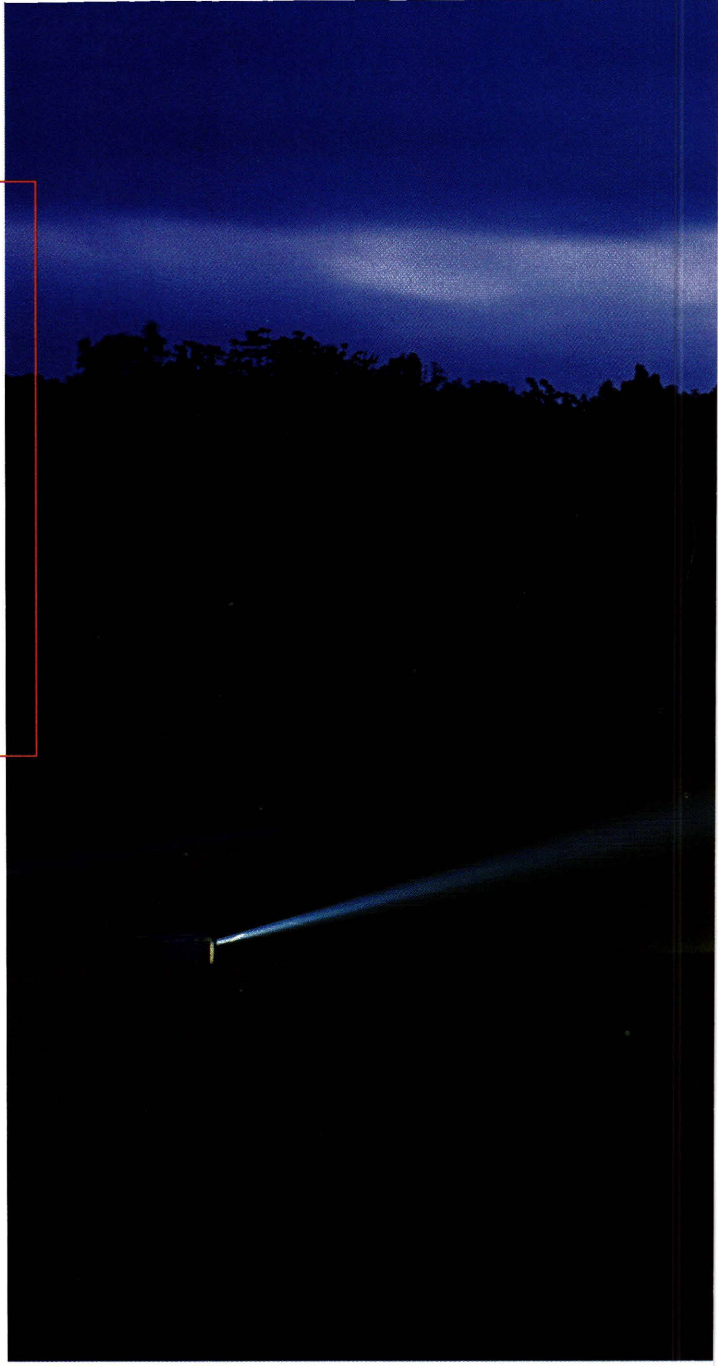
GROUND FLOOR



ART AND LIFE
The clients commissioned a mural by Franz Ackermann for a double-height family room (opposite, top). Heavily veined Linac marble gives a second-floor bathroom graphic visual punch (opposite, bottom). In the entry hall, Cornelia Parker's lightbox, *Blue Shift*, 2001 (shown unilluminated on this page), is set into a wall, while Rob Pruitt's *People Feeder: 4*, 2010, a stack of painted tires topped by a candy dish, stands under a twisting stair with stainless-steel balusters. Orange extension cords dangle down from *Untitled (One Wheel Chandelier)*, 2004, a work by Jason Rhoades, which hangs above the stair.

CLOSE-UP: LIGHTING THE LIGHTHOUSE

Doug Aitken tailored his work *Lighthouse*, 2007, to the geometry of the Dutchess County Residence. After projection tests with the glazing selected by Allied Works and the homeowners, the artist collaborated with the firm to position 17 custom-calibrated projectors around the site, each enclosed in a doghouse-size stainless-steel shed designed by the architects. Blackout shades lower to create near-uniform conditions on the facade, while a large portion of a basement-level electronics room is dedicated to the system that runs the piece. According to the clients, its performance can be spotty, but, they add, managing the complex technical requirements and maintenance is just part of owning an ambitious work, and the effect is well worth the effort. For Aitken, it marks a departure from his public architectural installations. Unlike his large-scale work for urban museum facades (including one at the Seattle Art Museum, also designed by Allied Works), *Lighthouse* is visible only to the owners and invited guests who make the pilgrimage to see it. "It's a strangely hallucinogenic space that's out there in the landscape like an earthwork," says Aitken.



side, contributing to the house's slippery, mirage-like profile. Its illusory aspect is heightened when the sun goes down, and the Aitken projections turn on, overwriting the form almost completely. "The natural light and what it does to the house goes away, and this other light comes up," says Cloepfil. "The house has this whole other conversation with the landscape."

This is not the first country house to orchestrate its own vanishing—Philip Johnson's Connecticut home comes to mind. But if the Glass House took Modernist transparency to its fetishistic conclusion, the Dutchess County House updates the impulse to disappear for a digital culture. Less of a transparent box, it is an iPhone screen—a magic piece of glass with a tangible material presence that also creates the illusion of expansiveness with its capacity to display seemingly boundless imagery. The house provides both architect and artist with a device for presenting their distinct responses to the site using the same glossy surface. It also gives the clients a surprisingly cozy place to spend time with the landscape—and their art. ■

PHOTOGRAPHY: BRIAN DOYLE/COURTESY 303 GALLERY,

PHOTOGRAPHY: JASON SCHMIDT/© ALLIED WORKS ARCHITECTURE

POINTS OF VIEW
Rachel Harrison's gloppy sculpture adorned with a Chinese take-out menu, *Signature Roll*, 2010, holds its own in front of a double-height living room window with views to the Catskill Mountains (right). Rudolf Stingel's painting, *Untitled (Plan B)*, 2008, anchors the opposite wall. Doug Aitken's video projection, *Lighthouse*, 2007, envelopes the house, shown from the northeast (above) and the southwest (opposite, top and bottom).

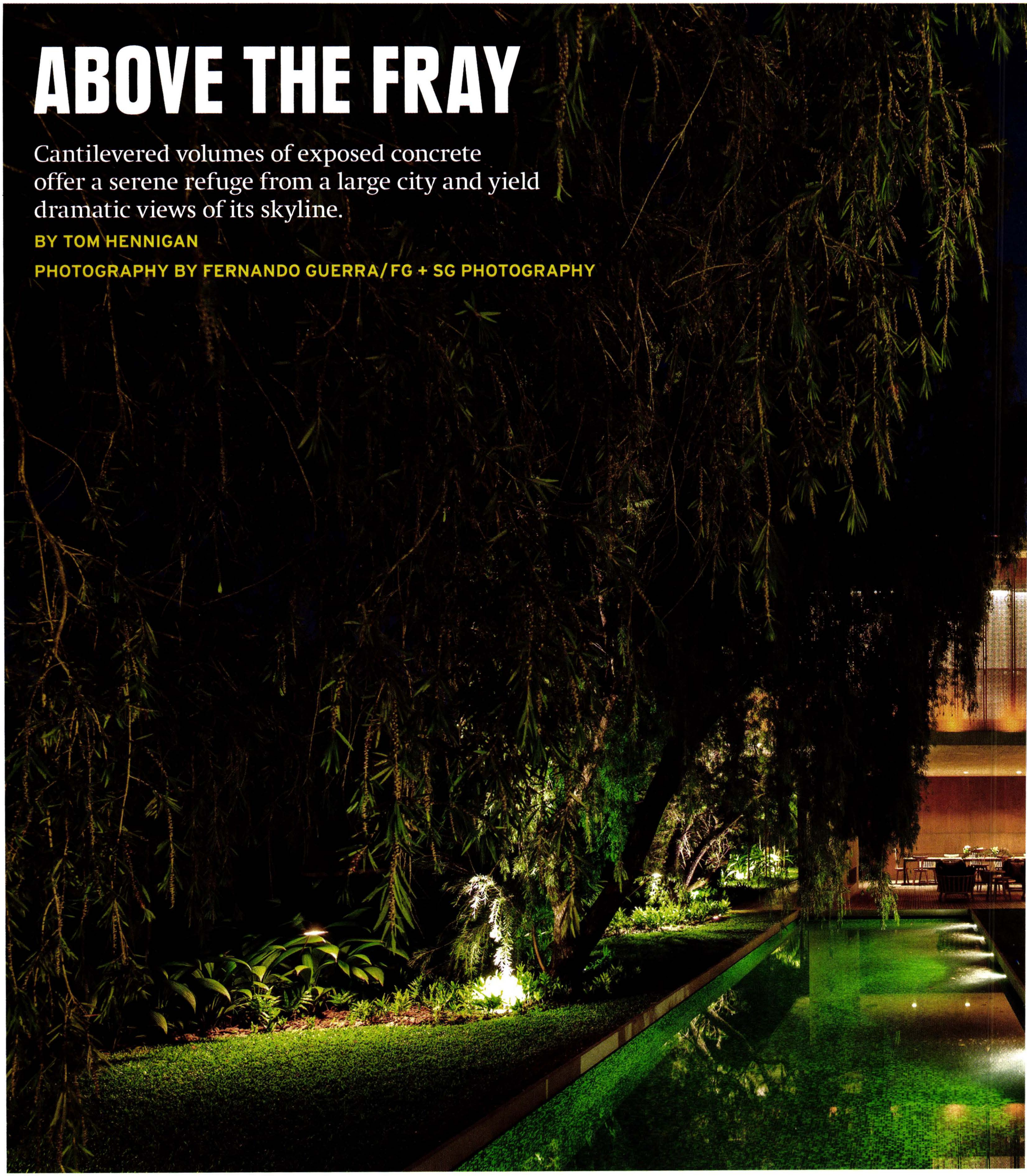
Casa P | São Paulo | Studio MK27

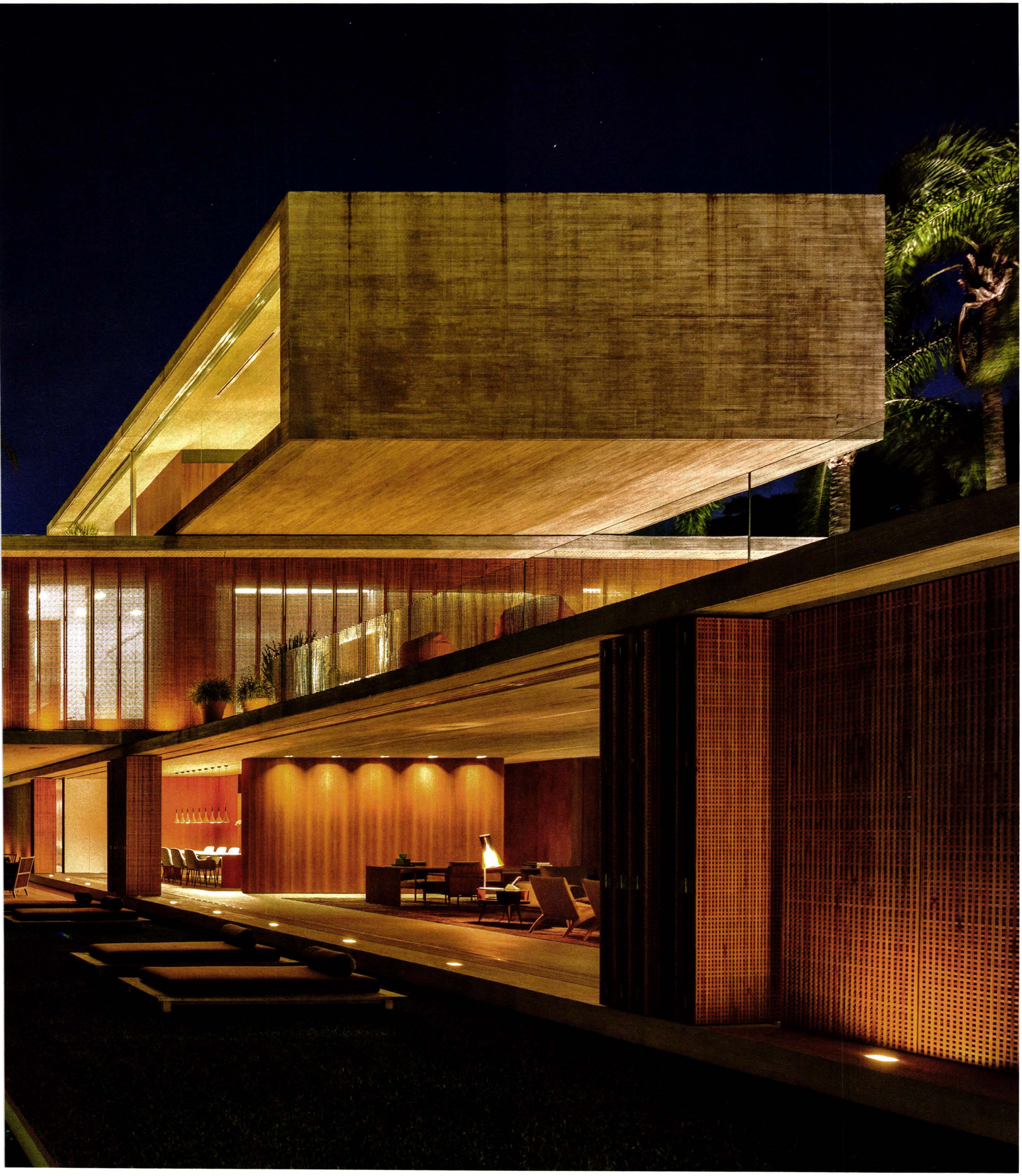
ABOVE THE FRAY

Cantilevered volumes of exposed concrete offer a serene refuge from a large city and yield dramatic views of its skyline.

BY TOM HENNIGAN

PHOTOGRAPHY BY FERNANDO GUERRA / FG + SG PHOTOGRAPHY





It is no surprise to learn that, before turning his hand to architecture, Marcio Kogan directed films. A cinematic quality pervades Casa P, which he designed for a family in the hilly suburb of Morumbi, overlooking the architect's native city of São Paulo. Here on a sinuous residential road, Kogan's constructivist fantasy stands out among the large houses of random styles sheltered behind high walls. Consisting of three concrete volumes stacked on top of each other, Casa P gains visual drama from the rotation of the middle one at 90 degrees to those above and below it. With this strategy, Kogan has initiated a dynamic dialogue between the trio of spatial entities, creating an interconnected set of stages and moods, from a covered terrace on the ground to an enclosed aerie at the top.

The volumes of the 8,320-square-foot house decrease in size in ascending order, with a stair (plus elevator) providing the axis around which they rotate. The more formal living rooms dominate the ground floor, separated from the service areas by a stair hall. Along with the master bedroom, the middle level contains three bedrooms en suite, and perched on top in the smallest, highest floor is a spacious family den.

Looking out from the master bedroom on the middle level, the viewer's gaze is drawn by the long rectilinear terrace on the roof of the lowest volume and outward under the soffit of the overhanging top floor to the skyscrapers on the horizon of South America's largest city. "This widescreen vision of architecture and the world," says Kogan, "is one of the things I brought from film to architecture."

In creating the cantilevered volumes of the house, Kogan relied on exposed poured-in-place concrete rather than masonry walls painted white, which he'd tried earlier in his career. He considers the rough surfaces to be better suited to the poor air quality of this traffic-choked city.

"Exposed concrete is almost eternal," he notes. It is also a material closely identified with the São Paulo Brutalist school of the post–World War II period, which counts among its luminaries the late female architect Lina Bo Bardi and Pritzger laureate (2006) Paulo Mendes da Rocha.

This connection is important for Studio MK27, which sees itself as part of the tradition of Brazil's modernist architec-

FLOATING MASSES
Marcio Kogan stacked the three differently sized concrete volumes to create sheltered verandas and expansive terraces (previous pages and below). At the top, the family room (opposite, top) overlooks the city. On the sloping site, a stair at the southwest corner of the ground level (opposite, bottom) leads down to the subterranean garage and other service spaces.

ture and strives in its work to give a contemporary reading to the city's design heritage.

Because of the load-bearing walls, the interiors are free of columns, which provides a powerful sense of spatial clarity throughout the house–especially apparent in the expansive living room on the ground floor. Here, floor-to-ceiling glass panels in the elongated walls slide out of sight. The covered terrace opening to the garden illustrates the studio's goal of a "perfect dialogue between indoors and outdoors."

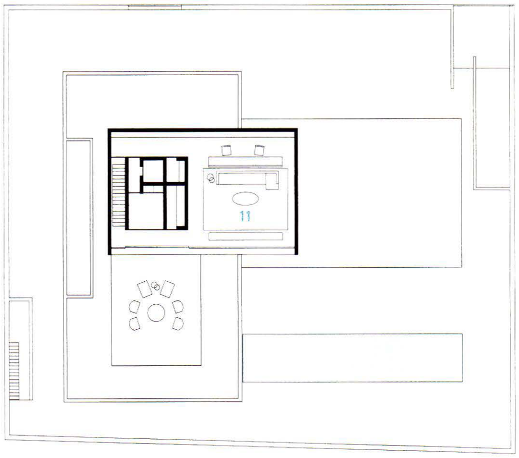
This dialogue is continued in the extensive use of a Kogan signature item–the mashrabiya, the Arab wood screen brought to Brazil by the Portuguese. In Casa P, the mashrabiyas extend continuously along the length of the lower two volumes, providing privacy and ventilation in a metropolis located on the Tropic of Capricorn.

The wood weave of the screens also tempers the roughness of the exposed concrete, as does the extensive use of the Brazilian hardwood, ipé, for the floors. Ipé is also used for two enclosures, nested within the ground level and the third floor respectively: one, a three-sided, intimate dining space within the strong horizontal planes of the larger living area; the other, a child's play area within the family room.

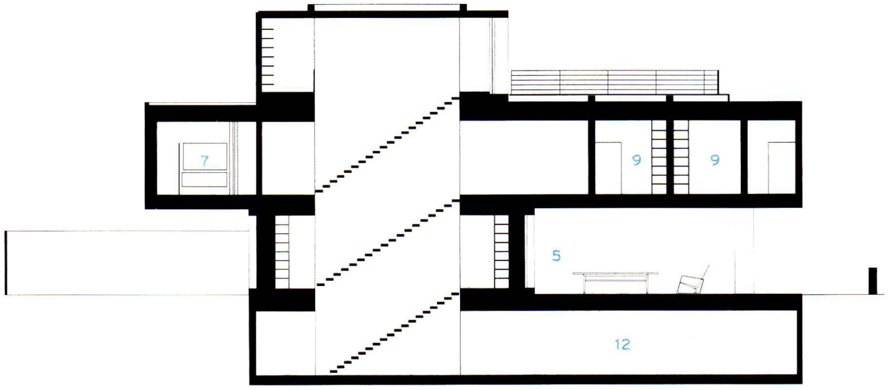
The clients hired Kogan for his "extremely rationalist" solutions, as he puts it. Both members of the couple are business executives–with a small child–who brought their own passion for architecture to the project, says the architect.

For the design team, the greatest challenge was how to maintain the house's sense of discretion and minimalism while meeting the clients' exacting demands for modern

View additional images and video at architecturalrecord.com.



THIRD FLOOR

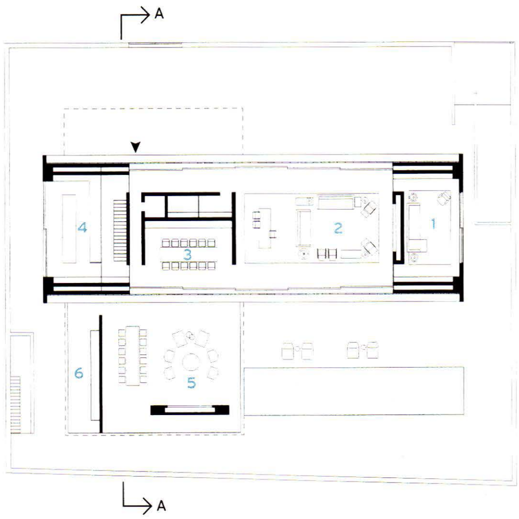


SECTION A - A

0 16 FT.
5 M.

1 HOME THEATER
2 LIVING
3 DINING
4 KITCHEN
5 DECK
6 BARBECUE
7 GUEST ROOM
8 MASTER BEDROOM
9 BEDROOM
10 STUDY
11 FAMILY ROOM
12 GARAGE

SECOND FLOOR



GROUND FLOOR

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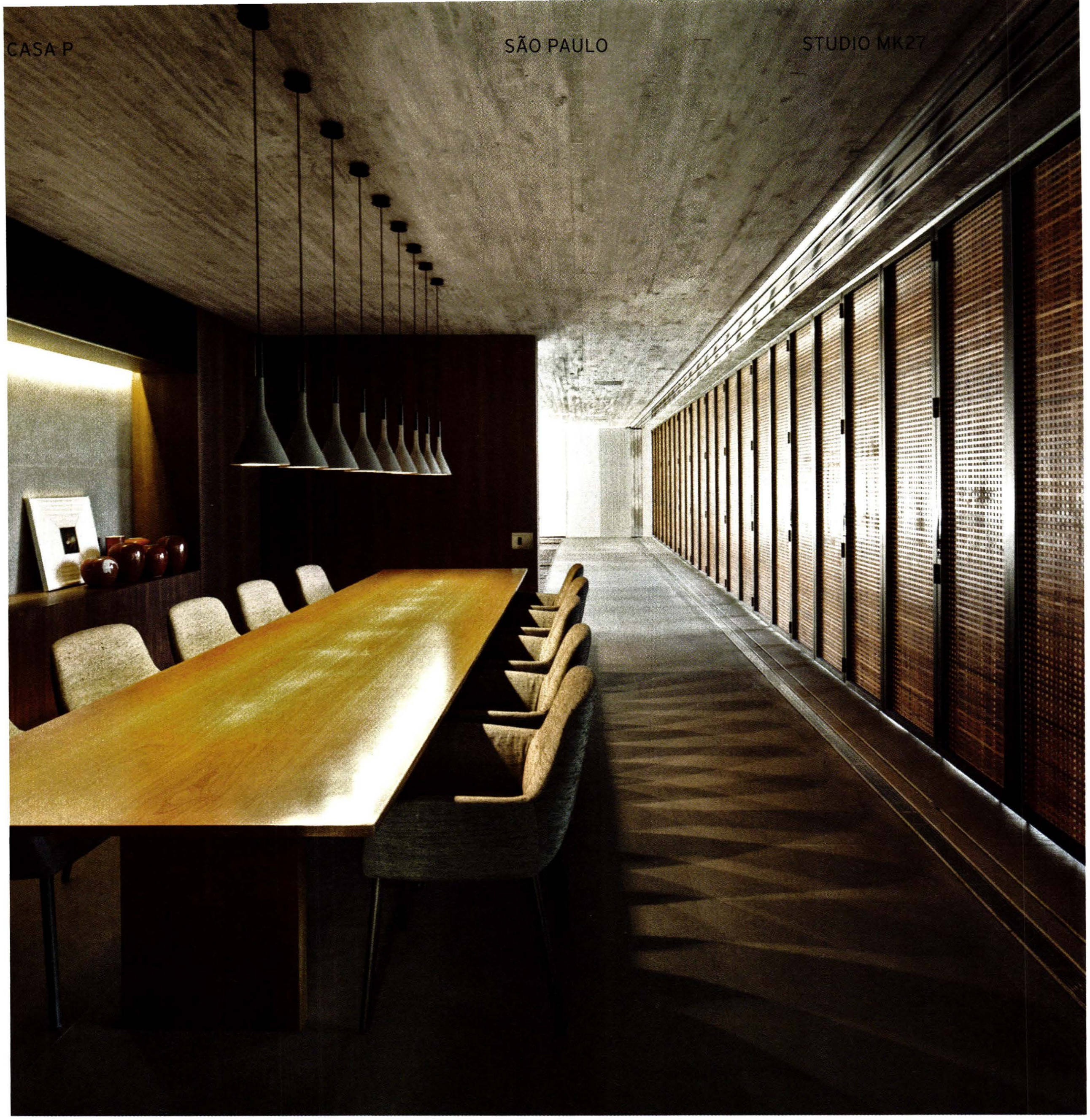


CLEAN PLANES
Ipé wood partitions enclose the dining area (left). Mashrabiya screens divide the indoor and outdoor dining areas. When these are opened (opposite), the living area becomes part of the terrace and pool, an integration of space emphasized by the lean and simple architect-designed furnishings.

comforts. This involved hiding an extensive state-of-the-art heating and air-conditioning system within the building's structure.

The house also displays phenomenal and often playful attention to the practicalities of living. Studio MK27 claims to have devised 2,000 custom designs, many of which appear in the house, such as pop-up electrical outlets and chutes taking dirty linen from the second-floor bedrooms to the basement service area. "Attention to technical detail is in our DNA," says Kogan. "Clients bring us their desires and dreams, and we try to materialize them," he adds.

The final result demonstrates the firm's ability to meet these needs with a sense of cool drama. Sweeping interior spaces reveal views of other rooms along with lush, serene outdoor areas, not to mention panoramic vistas of the city. With every room manifesting a wow factor, Kogan has designed a house to make anyone feel like a movie star. ■

Tom Hennigan is the South America correspondent for the Irish Times, *based in São Paulo.*

credits

ARCHITECT: Studio MK27 – Marcio Kogan; Lair Reis, co-architect; Diana Radomysler, interiors; Carolina Castroviejo, Oswaldo Pessano, Suzana Glogowski, Mariana Simas, Carlos Costa, Laura Guedes, collaborators

ASSOCIATE ARCHITECT: Fernanda Neiva

ENGINEER AND GENERAL CONTRACTOR: CPA

CONSULTANT: Renata Tilli (landscape)

SIZE: 8,320 square feet

COST: withheld

COMPLETION DATE: July 2012

SOURCES

METAL PANELS: Art Steel

METAL FRAME: Kiko Esquadrias

WOOD FURNISHINGS: Plancus

LIGHTING : Lumini

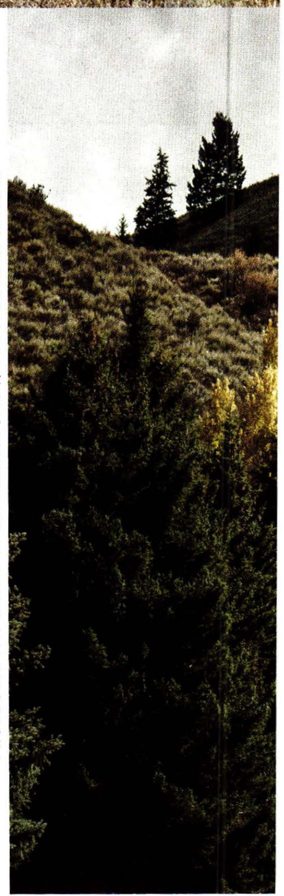
HOUSE DIVIDED
Rick Joy's Sun Valley House has two wings, with roofs raked in opposite directions. These wings are angled and crooked so that its rooms capture the best views of the rugged landscape. The configuration also creates a sheltered entry court (above) at the southern end and provides a ground-level terrace with a stair to a rooftop deck at the northern end (opposite).

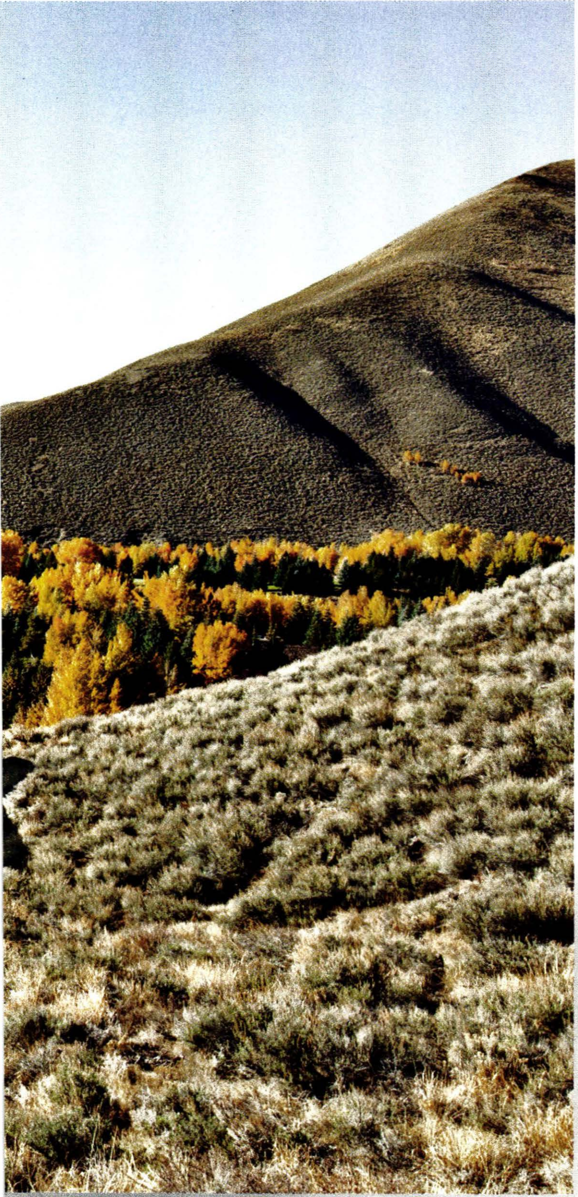
When asked if his latest project, a vacation home in the Idaho resort town of Sun Valley, is at all based on a local vernacular, Tuscon-based architect Rick Joy bristles. "I don't really think that way," he says. Nevertheless, the starting point for the 7,900-square-foot house, built at the edge of a golf course and a brush-covered hillside, seems to have been a long, low-slung volume topped with an archetypal vernacular element: a gabled roof.

But Joy has manipulated this traditional form considerably. He's split the volume along the roof ridge to create two wings: a western one that is two stories, with its lower level partially submerged in the sloping terrain, and an eastern wing that is single-story and sits atop the flattest part of the 1.5-acre site. The two elements have been set at an angle to each other and subtly crooked to form a sheltered, wedgelike entry court.

The configuration also provides his clients—an outdoorsy retired couple who had been visiting Sun Valley for decades—the best vantage points for taking in the rugged landscape. From the guest bedrooms (for their grandchildren and children) and from the living room, they can see the ski trails on Bald Mountain. From the kitchen and dining room, they are able to appreciate a set of sawtooth-shaped peaks. And from the master bedroom, they can practically reach out and touch a sage-covered hillock that rises just a few feet beyond a sliding glass door. A roof deck positioned above the intersection of the two wings is shielded from the golfers on the nearby course but affords a full panorama of the house's surroundings. The twisting configuration, explains Joy, "is all about the views."

PHOTOGRAPHY: © JEREMY BITTERMAN (TOP); JOE FLETCHER (RIGHT)





Sun Valley House | Sun Valley, Idaho | Rick Joy Architects

A SPLIT WITH TRADITION

Making the most of its spectacular setting, a house in a mountain resort town cracks open an everyday form.

BY JOANN GONCHAR, AIA

MATERIAL WORLD
Much of the house is enclosed in masonry walls, exposed inside and out, made of a local granite (above). The roofs and remaining walls are framed construction, clad in a rainscreen system of interlocking steel panels (opposite, top and bottom).

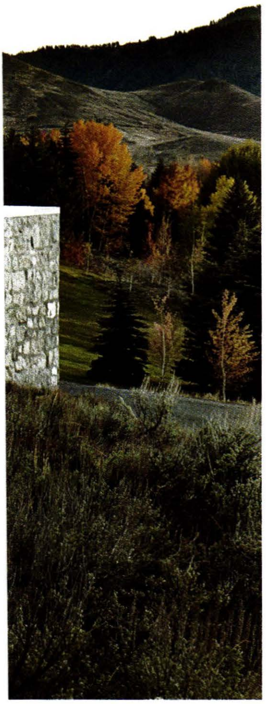
The project's biggest challenge, says the architect, was creating a building that is light on the land but is also rooted in it. He satisfied these seemingly incongruous goals by enclosing those parts of the house that are cut into the slope in rubble walls. The stone, granite from southern Idaho, is exposed inside and out.

The rest of the structure is clad with bronze-toned-steel roof and wall panels and is framed primarily in Douglas fir, but also includes exposed wide-flanged steel elements. "It was a little like adding onto an existing building," says Joy of his strategy for combining the masonry walls and the lighter-weight framed system.

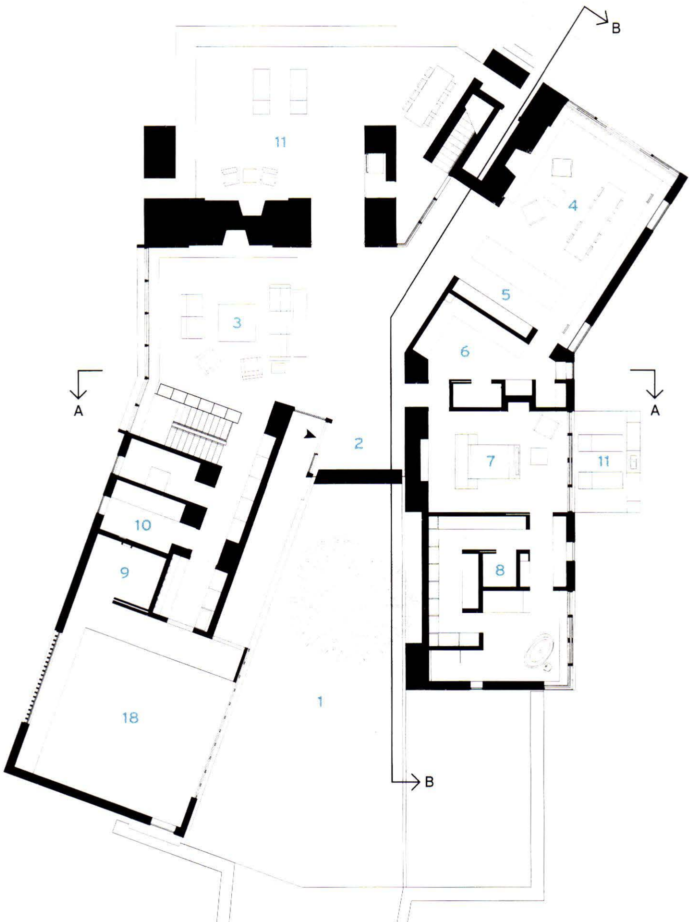
Indeed, the stone elements feel almost as though they've been there for a very long time, or are part of the terrain. Except when the ground is covered with snow, the granite's browns, yellows, and silvers pick up the hues of the sage and other surrounding vegetation, much in the same way the rammed-earth houses Joy is known for seem to meld with their Southwest desert environs.

The forms of the Sun Valley House are far from outlandish. However, the cranked configuration made it demanding to build. But despite its tough geometry, the house is extremely well executed. Joy gives much of the credit to the project's Seattle-based general contractor, Schuchart/Dow, and its managing partner, Jim Dow. The firm is currently working on houses designed by Olson Kundig, Lake Flato, and Bohlin Cywinski Jackson. "Jim goes out of his way to work on real architecture," says Joy.

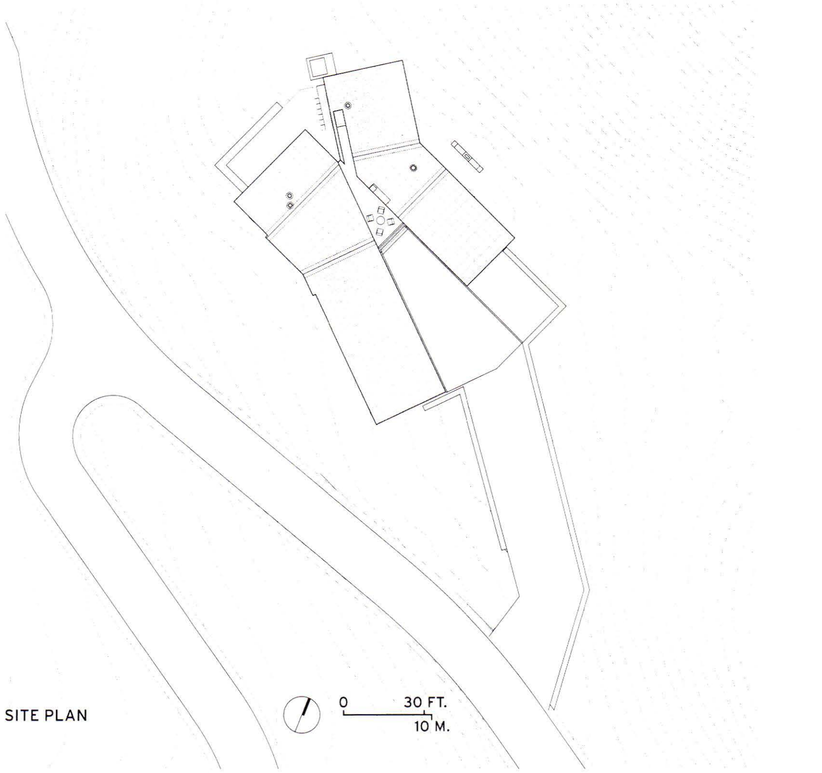
One example of a particularly exacting element is the roof on the western wing. The bend in its plan produced an almost imperceptible valley over the living room and necessitated a fanned configuration for the rafters, which in turn



JOE FLETCHER (RIGHT, TOP AND BOTTOM)

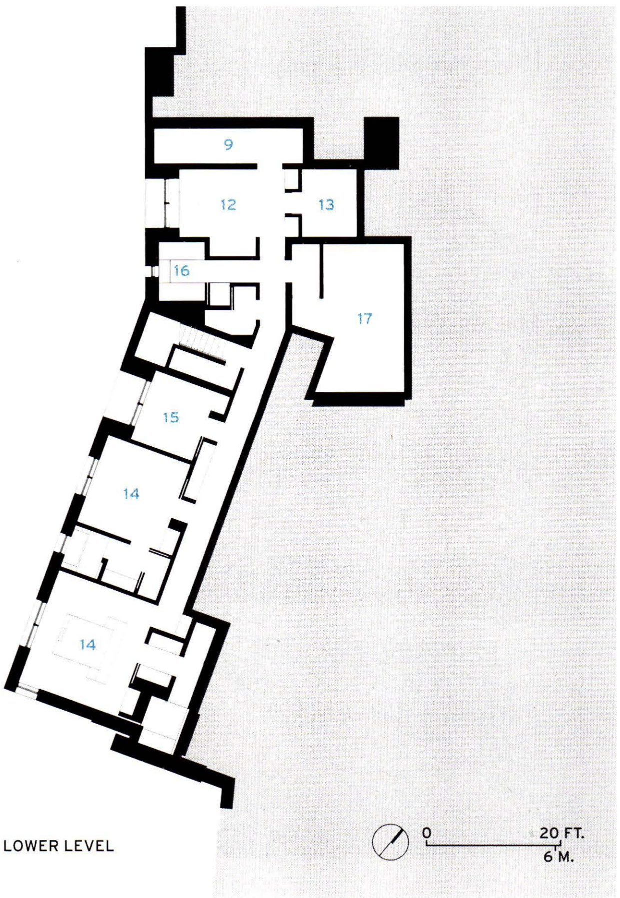


GROUND LEVEL

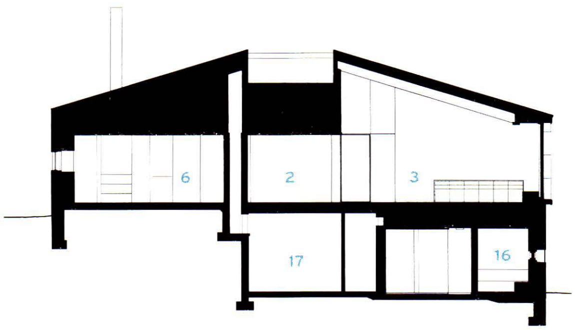


SITE PLAN

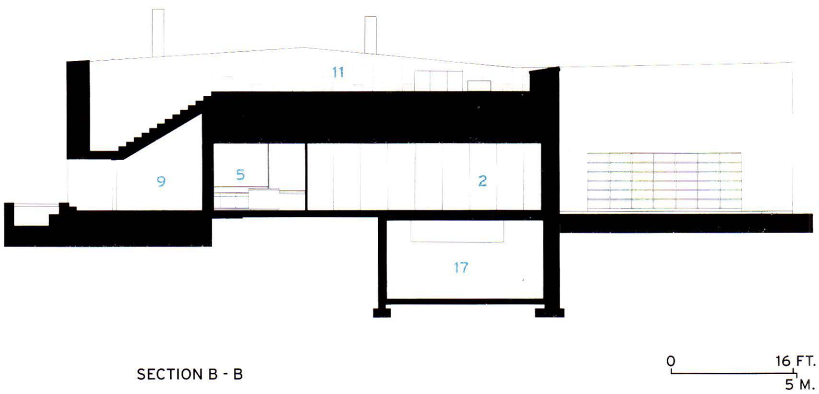
1 ENTRY COURT
2 ENTRY
3 LIVING
4 DINING
5 KITCHEN
6 PANTRY
7 MASTER BEDROOM
8 MASTER BATHROOM
9 STORAGE
10 LAUNDRY
11 TERRACE
12 PLAYROOM
13 BUNK ROOM
14 GUEST BEDROOM
15 YOGA ROOM
16 SAUNA
17 MECHANICAL
18 GARAGE



LOWER LEVEL



SECTION A - A



SECTION B - B

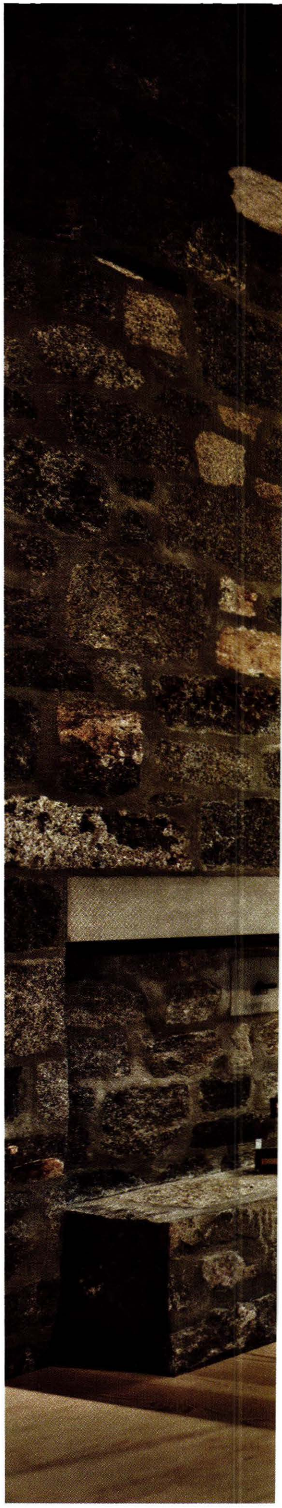
The cranked configuration made the Sun Valley House demanding to build. But despite its tough geometry, the house is extremely well executed.

meant that no two were the same length, points out Dow. He estimates that carpenters were able to cut and install only about six rafters per day. The building has many other ingenious but tricky details, such as cast-on-site concrete lintels that support the weight of the stone above while appearing to float over the openings they frame. The stone walls also have remarkably crisp corners, the inherent roughness of the material notwithstanding. "Stone and wood can be quite rustic, but this is pretty refined," says Dow.

Adding to the sense of refinement and precision are the approximately one-inch reveals that separate elements from each other: the cedar door and window frames from the stone, the stone from drywall soffits, and the soffits from the anigre millwork. The gaps are not purely aesthetic, however. Some function as supply and return vents for the forced-air mechanical system. It works in concert with radiant heating and cooling and 20 geothermal wells drilled 220 feet below the driveway. The performance of this climate-control system, which Dow describes as "complex but efficient," is further improved by features such as the

NATURE IN FOCUS
Most of the windows frame far-off vistas. The exception is the sliding glass door in the master bedroom. It offers a view of a brush-covered hillock that rises just a few feet away. The rafters and the flooring, both of Douglas fir, run in the same direction and lead the eye outside.

PHOTOGRAPHY: © JOE FLETCHER



CHANGE IN SCALE
In the house's two main living spaces (bottom and opposite), the exposed rafters soar as high as 20 feet. A much lower (9 feet tall) drywall ceiling establishes an intermediary circulation zone (top), where the two rooms' geometries meet.

heavily insulated stone walls, 17 inches thick on average, and automated exterior shades that protect the living room's west-facing bank of windows from solar gain.

On a recent winter day, when the mountains and the valley were covered with a blanket of snow, the house was quite comfortable, even cozy. "Cozy" applies not only to the indoor temperature, but also to the character of the spaces—a surprising outcome given the size and height of the ground-floor rooms (the ceilings soar to 20 feet in some places). Joy admits that the house, at almost 8,000 square feet, is larger than he generally prefers. But the clients wanted to be able to host family and friends, he explains. And he points out a second rationale for the scale: it matches the majesty of the landscape. ■

PHOTOGRAPHY: © JEREMY BITTERMAN (OPPOSITE, TOP); JOE FLETCHER (ABOVE AND OPPOSITE, BOTTOM)

credits

ARCHITECT: Rick Joy Architects – Rick Joy, principal in charge; Matt Luck, Howard Chu, project managing architects; Howard Chu, Claudia Kappl, project designers; Natalia Zieman, Luat Duong, Bruno Vidal, Stephanie Griffith, Patrick Ruggiero, Eleni Koryzi, Sarah Dickerson Luck, project team

CONSULTANTS: Harris Engineering (structure); Michael Boucher Landscape Architecture (landscape); Concept Lighting Lab (lighting)

GENERAL CONTRACTOR: Schuchart/Dow

SIZE: 7,900 square feet

COST: withheld

COMPLETION DATE: October 2013

SOURCES

EXTERIOR STEEL PANELS : Professional Roofing

EXTERIOR PANEL COATING: Arkema

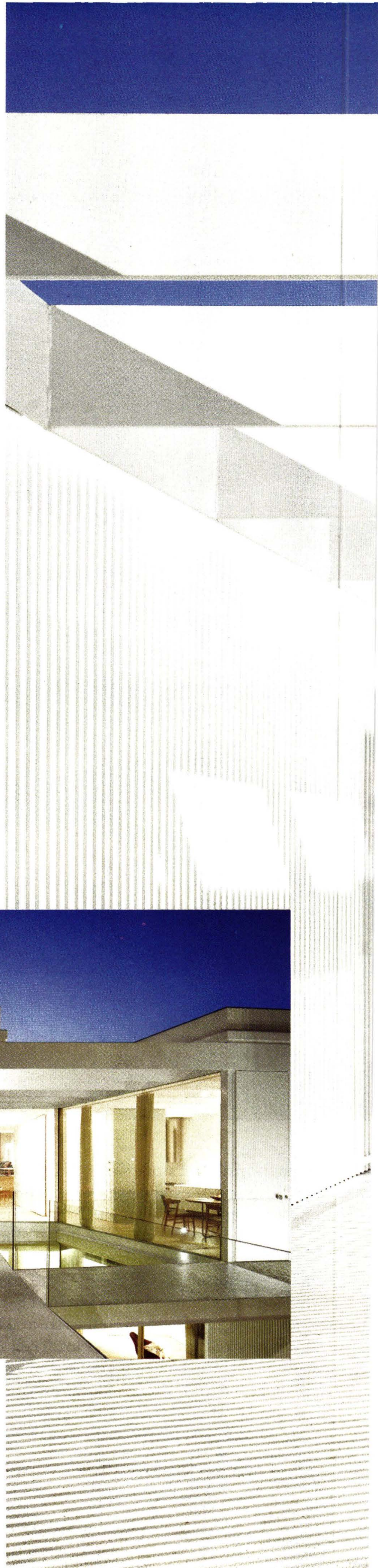
DOORS AND WINDOWS: Duratherm

GLAZING: Viracon

WOOD FLOORS: Dinesen

LIGHTING CONTROLS: Lutron

REFRIGERATOR: Sub-Zero



#house#1.130 | Madrid | Estudio Entresitio

DOWN THE GARDEN PATH

A house on a tight suburban site provides a series of choreographed views through landscaped spaces and pavilion-like rooms.

BY DAVID COHN AND ROLAND HALBE

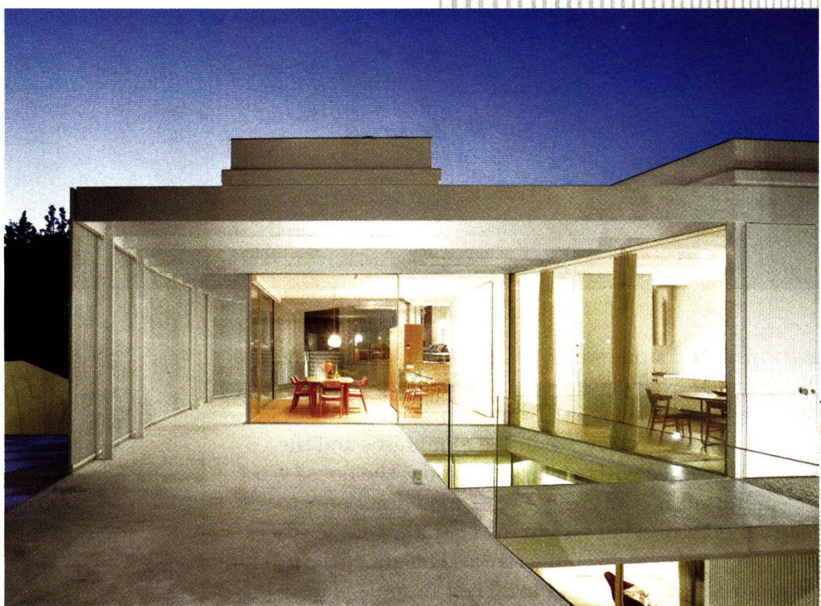
PHOTOGRAPHY BY ROLAND HALBE

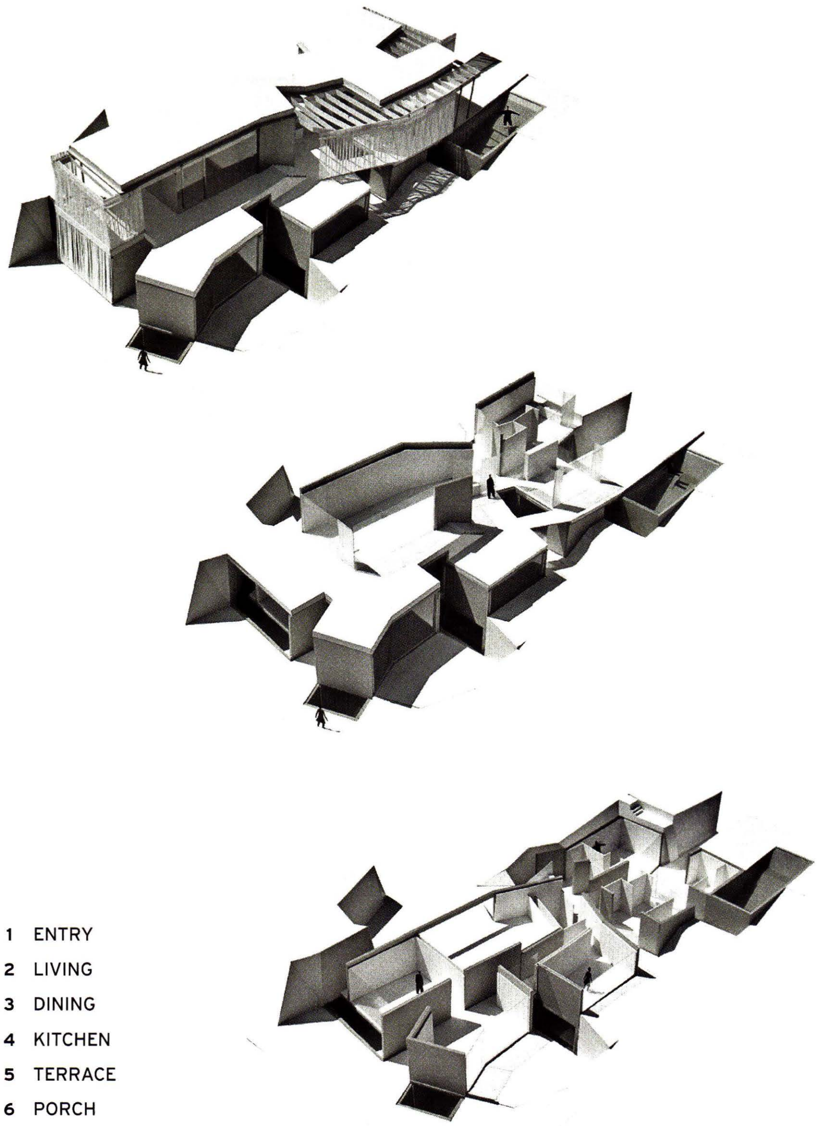
The interweaving of indoor and outdoor spaces in #house#1.130, by Madrid architect Estudio Entresitio, recalls the condensed landscapes of classical Chinese gardens in Suzhou: tightly framed vistas are crossed in close succession by multiple spatial events–glazed pavilions, light wells, bridges, terraces, beds of vegetation, a covered pathway angling slightly out of view. Like many of those Chinese gardens, this 6,200-square-foot house is shoe-horned onto a small site (in this case, a quarter-acre plot in a leafy Madrid suburb) and hemmed in on either side by neighboring houses (occupied by the client's mother and sister, respectively). So the house turns inward, its principal spaces and circulation paths looking back and forth among themselves. The project's odd name is a code the architect uses to maintain the client's anonymity.

The parcel originally formed part of the yard of the mother's rather conventional mansion, an oasis of greenery that the architect felt was important "to give back to the site," says José María Hurtado, a partner in Entresitio together with his sister, María Hurtado (currently teaching at the New Jersey Institute of Technology), and César Jiménez. The firm kept the house low to the ground, following the 10-foot slope down from the street, and covered its various levels–including the main roof–with planting beds.

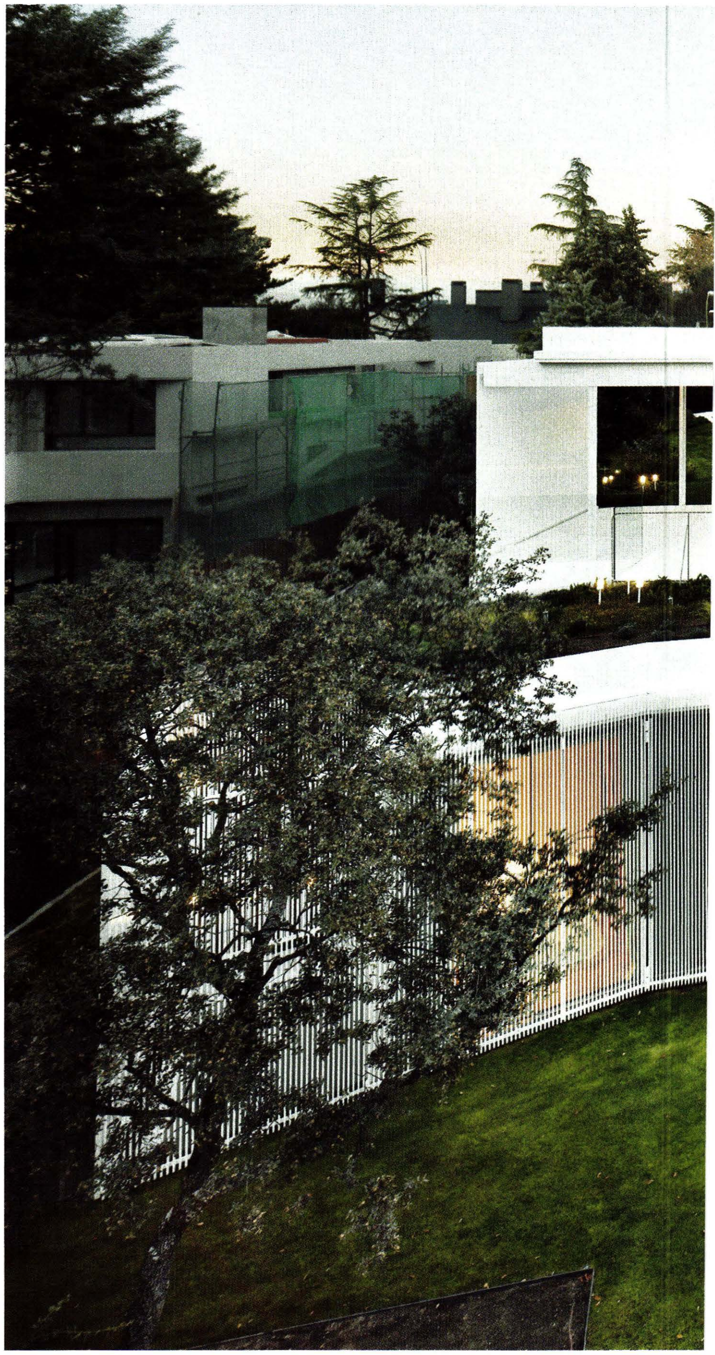
Hurtado explains that interior spaces were placed "in their best location," in terms of orientation and views. The larger footprint of the lower floor, housing bedrooms and the garage, forms a kind of plinth, topped with terraces and planting areas that serve the living spaces above. Living spaces are aligned along the long southern exposure, with large windows protected by motorized vertical louvers that the architect custom-designed (it also served as a contractor

SITTING PRETTY
With its glazed walls and vistas across light wells and terraces, the dining room (right and below) looks as if it were a freestanding pavilion in an abstract garden.

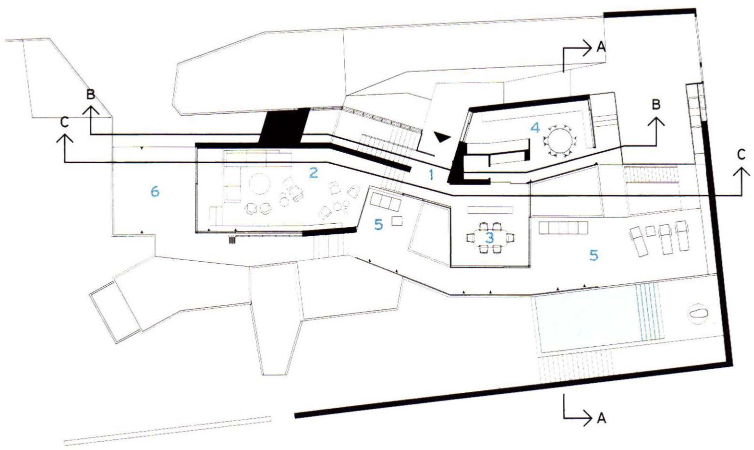




1 ENTRY
2 LIVING
3 DINING
4 KITCHEN
5 TERRACE
6 PORCH
7 MASTER BEDROOM
8 GARAGE
9 FAMILY
10 BEDROOM



LOWER LEVEL



UPPER LEVEL

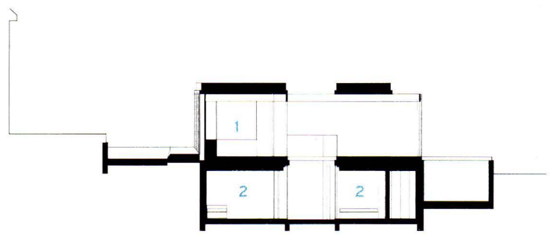
for the house). The kitchen and other service spaces are located on the northern facade, where translucent polycarbonate panels enclose the staircase and garage.

The architect divided the upper floor into two zones, with the main entry in between. The living room overlooks the trees at the back of the parcel. At the front, the dining room—an almost independent pavilion of floor-to-ceiling glass—is set in a handsome court with a covered terrace and pool presided over by one of the site's original holm oak trees. Connected by indoor and outdoor passages, and separated by a terrace and light well to the lower level, the two zones are given a sense of unity by the regular rhythm of the exposed steel crossbeams supporting the roof. These extend beyond the walls in many places to form pergolas and create a counter-rhythm to the staccato shadow patterns cast by the vertical louvers.

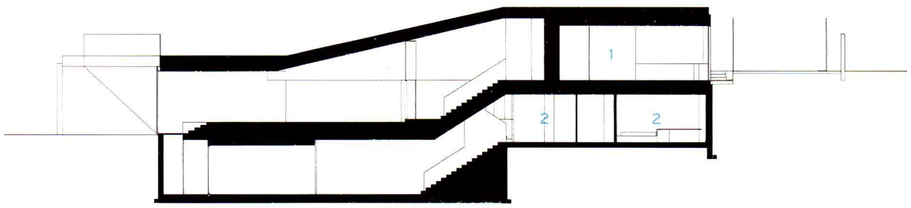
On the lower levels, the light trenches that cut into the terrain follow and reinforce the paths of circulation spaces inside. They bring daylight to the children's bedrooms under the dining room wing and to the servants' quarters in the basement, under the master bedroom. "Most of the bedrooms are like cabins in a garden, with a patio on one side and greenery on the other," Hurtado explains. On both of the main floors, the various spaces push in and out at different angles along the southern facade. With its white metal louvers and white corrugated concrete walls (finely cast using formwork invented by the architect to match the vertical striation of the louvers), the overall composition of setbacks and pavilions recalls a whitewashed village on a hillside, an effect that should become more pronounced as the rooftop gardens grow.

The ribbons of greenery, which extend below-grade to the light wells and run up a ramp to the roof, are just one element in the design's multidimensional knitting together of inside and out. In its first proposal to the client, the architect developed this strategy even more intensely. It was based on a honeycomb of hexagonal rooms and patios that was systematically distorted in size and shape according to

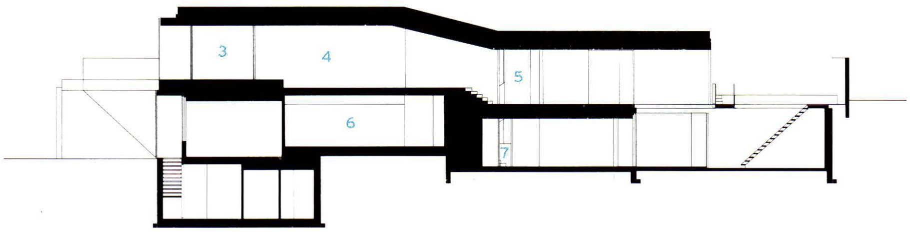
SITE SPECIFIC
Set on a quarter-acre suburban plot bordered by existing houses belonging to the client's mother and sister (top and far left in photo), the new house steps up and down in response to the sloping site. Operable metal louvers on the south facade protect living spaces from the full impact of the sun, while solar panels on the roof over the living room reduce fossil-fuel consumption.



SECTION A - A



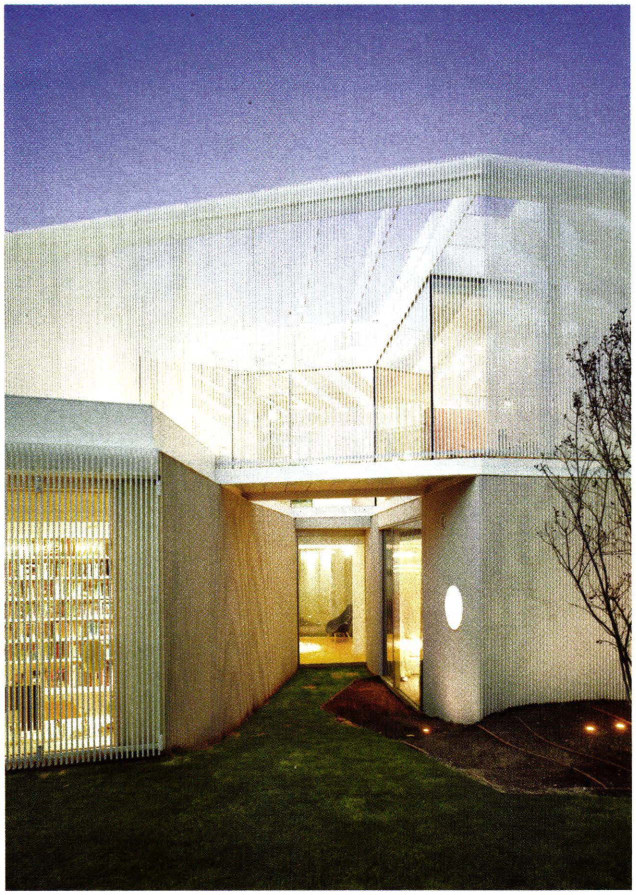
SECTION B - B



SECTION C - C

0 16 FT.
5 M.

1 KITCHEN
2 BEDROOM
3 PORCH
4 LIVING
5 ENTRY
6 GARAGE
7 FAMILY



programmatic requirements. Each distortion created adjustments in adjacent hexagons, following a mathematical system known as a Voronoi diagram. The proposal pursued a line of investigation that the architect had begun in previous projects, such as the San Blas Health Care Center in Madrid (RECORD, December 2007, page 81), where it scattered 14 miniature patios through a matrix of corridors, waiting areas, and examination rooms.

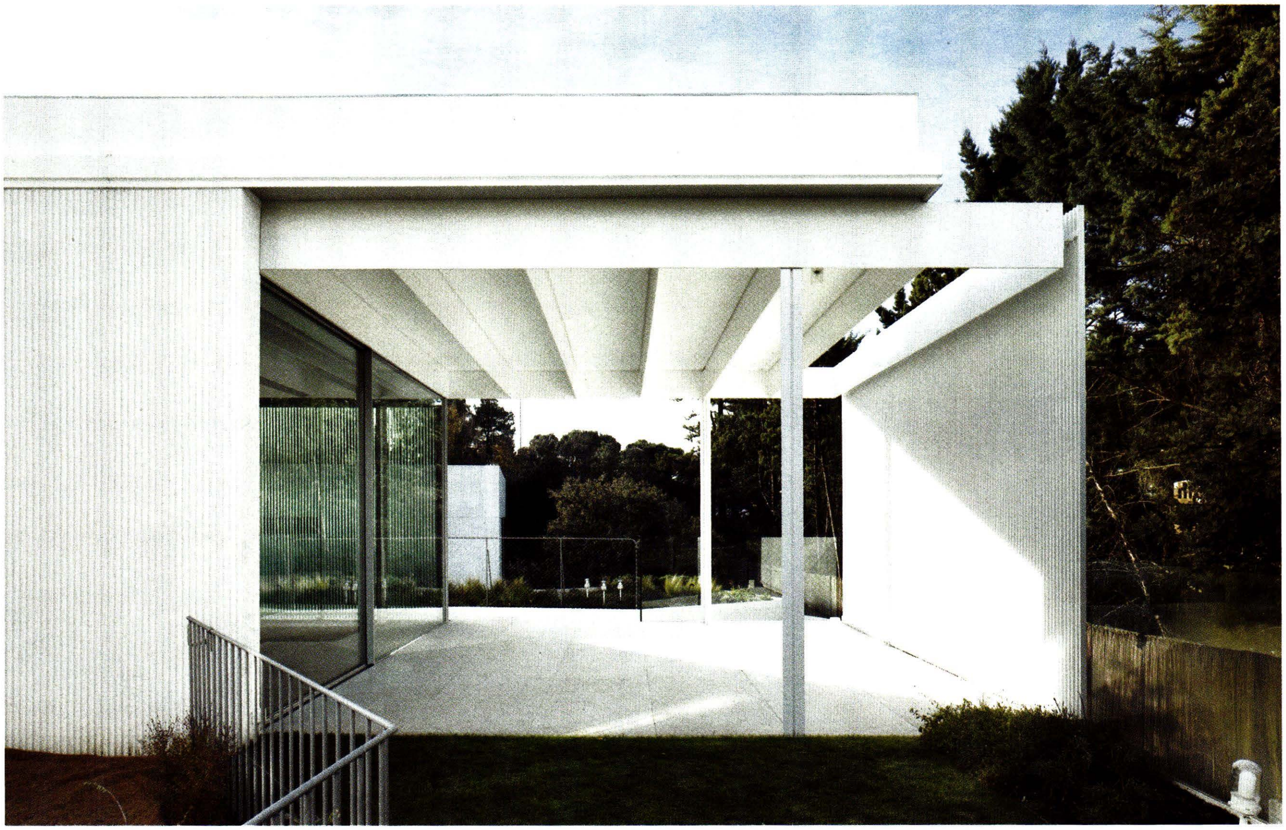
When the client balked at this radical design, the team eliminated the interior patios and transformed spaces into more conventional rectangular rooms, although the jostling of volumes and angled walls retains traces of the bubble-like hexagons, transmitting a sense of pressure and distortion, like puzzle pieces pushed together on an undersized game board.

While the complexity of the design produces a few awkward spots–excessively long and narrow corridors on the bedroom level, for example, and a rather tight entry foyer–its spatial richness compensates for these drawbacks.

With its roots in the hexagonal plan, the project belongs to a growing trend in Spain of designs based on the conglomeration of independent cellular units, as

PLEASE TOUCH
The architect used texture as an important element, matching smooth glass balustrades and translucent polycarbonate panels at the entry (opposite, bottom) and picking up the rhythm of vertical louvers (opposite, top) in corrugated concrete on the south side of the house (this page).

SHADY CHARACTERS
The house's exposed steel structure extends beyond the living room (above) to cover a porch (right) topped by planting beds. Over part of the south-facing terrace, cross beams serve as a pergola outside (opposite), while casting shadows indoors.



seen in Luis Mansilla and Emilio Tuñón's MUSAC Museum in León, Spain (RECORD, March 2005, page 108). This cellular strategy actually dates back to Spain's Organicist movement in the late 1950s and '60s, when architects such as Fernando Higueras and the team of Ramón Vázquez Molezún and José A. Corrales, inspired by Frank Lloyd Wright, built houses with spreading, horizontal plans that fused landscape and building. But while the Organicists used the extended eaves of low hip roofs to create deeply shaded spaces as a response to Spain's harsh summers, the stark white forms and sheer glazed walls of the #house#1.130 are closer to the original spirit of the Modern movement, their clearly modeled volumes resplendent under a nourishing sun. ■

credits

ARCHITECT: Estudio Entresitio – María Hurtado de Mendoza, César Jiménez de Tejada, José María Hurtado de Mendoza, partners; Miguel Crespo, Marco Plazzogna, Anne-Dorothée Herbot, Mia Molato, project team

ENGINEERS: María José Camporro (structural); Geasyt (m/e/p)

LANDSCAPE CONSULTANT: Planta Paisajistas

GENERAL CONTRACTOR: Triplicado SL

SIZE: 6,200 square feet

COST: withheld

COMPLETION DATE: April 2013

SOURCES

SELF-COMPACTING CONCRETE: Cemex

ALUMINUM-FRAME WINDOWS: Minimal

POLYCARBONATE PANELS: Palplastic

GREEN ROOFS: Aimad

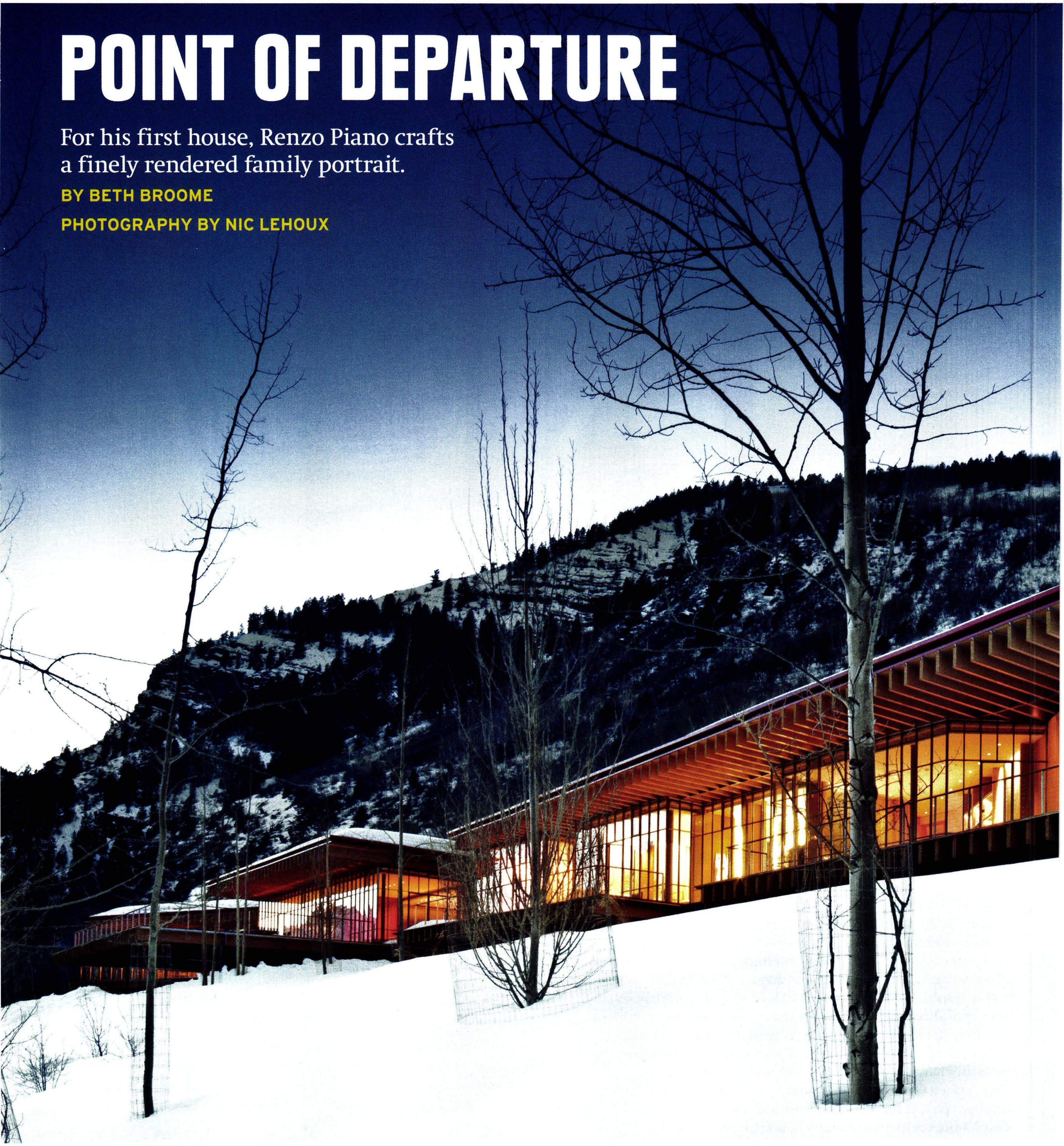
House in the Rockies | Colorado | Renzo Piano Building Workshop

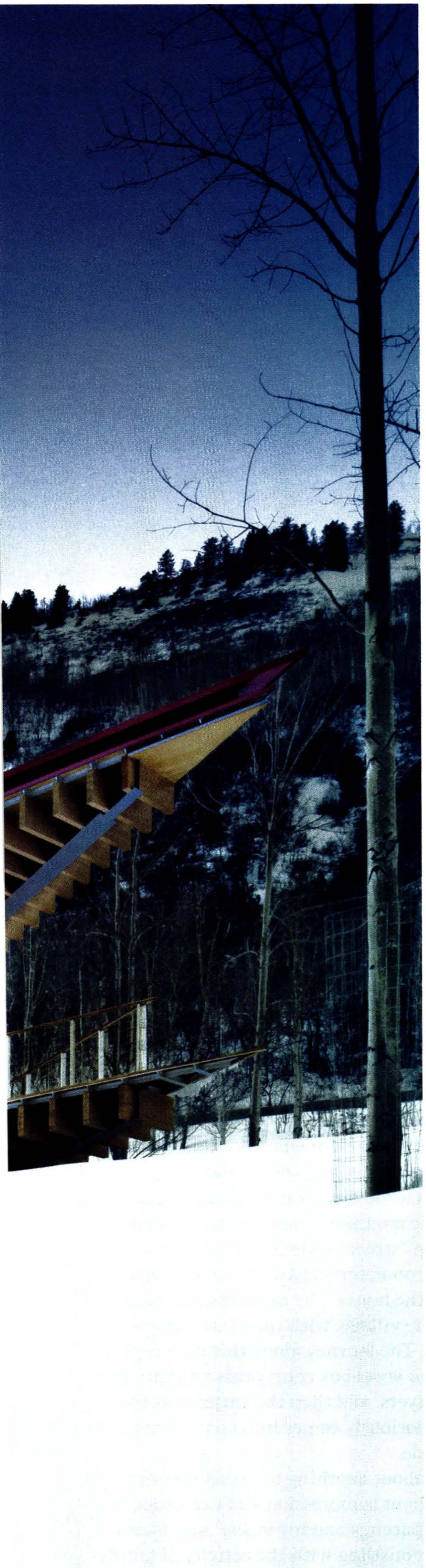
POINT OF DEPARTURE

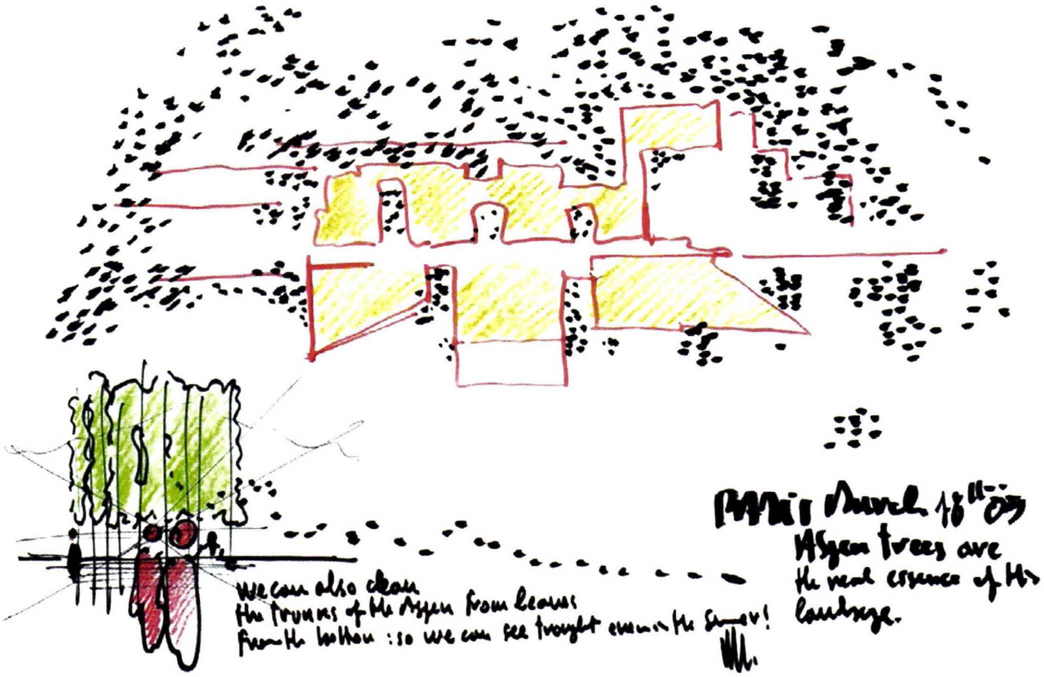
For his first house, Renzo Piano crafts a finely rendered family portrait.

BY BETH BROOME

PHOTOGRAPHY BY NIC LEHOUX







GOOD BONES
The steel and Douglas fir structure is exposed throughout the interiors and flows outside, supporting broad overhangs. Its 18-inch grid carries over to the facade which, with its laminated insulated glass and thermally isolated stainless steel mullions, forms a robust envelope. The house terminates in prow-like acute angles at the east and west ends, maximizing views to the valley below.

Renzo Piano never wanted to build a house. With a portfolio of museums, towers, and other award-winning buildings across the world, his mind was elsewhere. But in 2005 a friend approached the architect asking if he would design a home for his family in Colorado's Rocky Mountains. Piano was resolute: he had never done residential work and had no intention of starting now. Hoping to entice the architect, the friend invited him to visit the site—a 183-acre ranch on a mountainside along a breathtaking valley veiled with aspen and scrub oak—via Google Earth. "That was the end," says Piano. "I went flying in a little spaceship and then landed on that mountain with a light touch, floating a bit above the ground—then we started to dream together."

Within days, Renzo Piano Building Workshop (RPBW) partner in charge Giorgio Bianchi was on-site with the client and his wife. Piano visited soon after, joining the search for the center of the future house—a ritual country people have practiced for centuries, he notes. "You walk the property with your hammer in your right hand, in your left hand you have a stick and, almost inevitably, after a few hours, you have your place." "The land forms a kind of panettone," says Bianchi, referring to the Italian sweet bread as he describes a bubble-like rise on the site, between a meadow and where the mountain shoots up. Here the party found the spot. Proclaiming it the axis mundi, they tapped the stick into the ground.

Piano became intrigued by the potential of a project outside the large, institutional realm. While the programmatic needs of a house are straightforward, "Everything about it is more subtle, more personal," he says. "It's about the culture and desires of the specific person. The clients have to tell you about the emotion they want to communicate. Then you have to translate this into a building."

The husband and wife, who have grown children, had a straightforward brief: "Please build us a house where we live outside but don't get wet when it rains." And they hoped to capture the essence and simplicity of traditional Japanese design. But Piano spoke in terms of rhythm, of music and poetry, which at first threw them off. "But he was right," acknowledges the husband. "In the end, it was a more holistic experience we were after—that of quiet and vibration. The millions of details achieve that objective."

Through a gate and past the caretaker's residence and a large barn, the drive

meanders below the house's decks shooting out toward the valley, and then winds up to the entrance on the east. Except for the emphatic red metal roofs—which Piano painted his trademark ruby red to inject color as well as highlight the fragmentation of the house—the glass and wood forms nestle quietly into the slope. And, in winter, the roofs disappear under a blanket of snow.

The architects say they were drawn to timber by the fact that the west was built out of lumber. "America has had a tradition of building beautifully with wood," says Piano. "This house is a little homage to that." Honey-colored Douglas fir, which flows from the exterior to the interior walls, ceilings, and floors in a silken veneer grade is hardly the stuff of pioneer days, but it imbues the house with a glowing warmth. Using one primary material gives the building integrity and a sense of coherence, notes Piano. Another goal was to show how the house was made "without being too exhibitionistic," he says, referring to the wood and steel structure, which is expressed—with restraint—both inside and out.

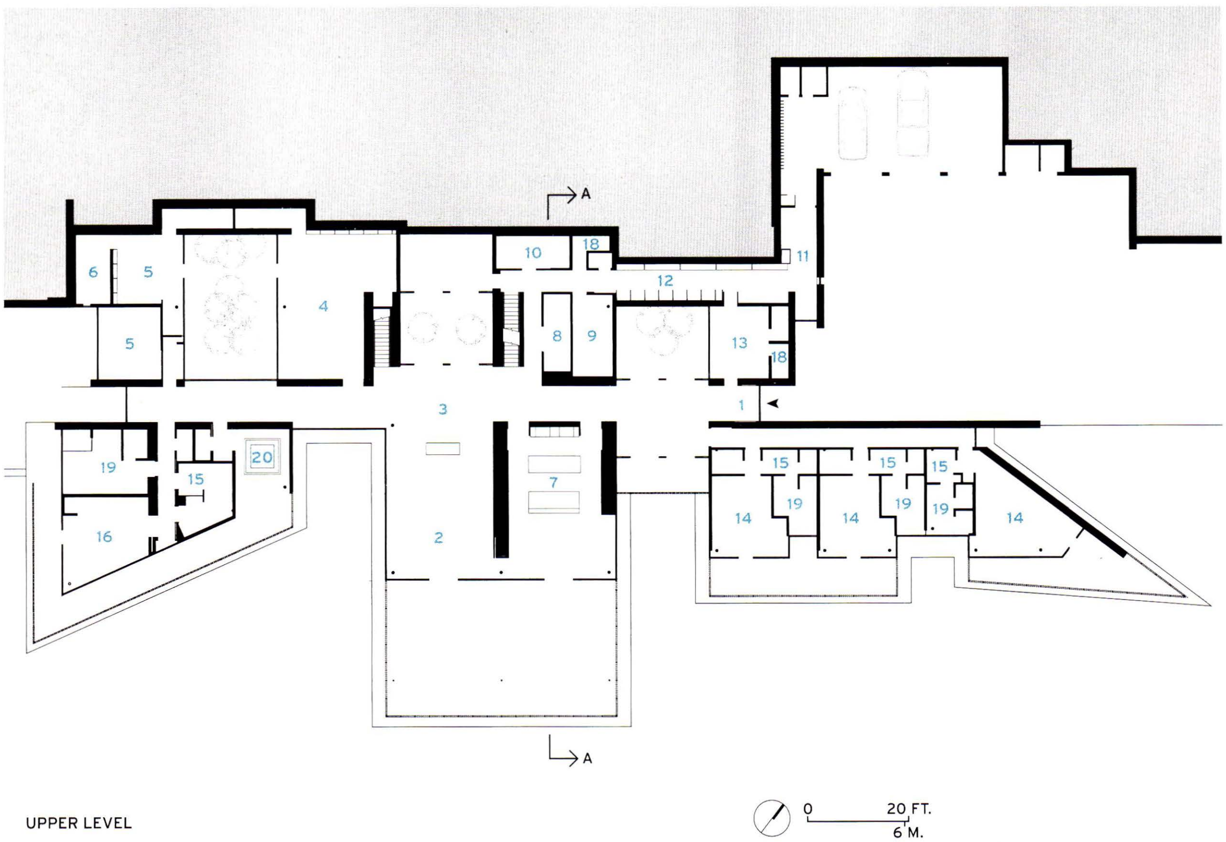
Not wanting a single monolithic building, the architects conceived the 13,800-square-foot house as a composition of seven volumes that correspond with the programmatic elements and are articulated by the separate roofs. "The form took shape as we maximized the views out to the south," says Bianchi. Initially, the team envisioned the roofs as a system of wings lifting out toward both the north and south. But local building-height limitations prevented them from using steep pitches on the valley-facing side. So, instead, they designed flat roofs there, and used steeply pitched ones for the two upper-level guest suites, emphasizing the views toward the slope. The plan is simple and rational. A broad 130-foot-long central corridor runs east to west, connecting the various elements: the "kids'" wing and guest rooms, the living spaces, and the master bedroom, whose acutely angled facade directs the gaze from the living room out to a dramatic mountain bookending the dale. At its center, this main "street" widens into a "piazza" that functions as a dining room, setting an informal tone and marking the heart of the house. The organization, points out Piano, is like a little village, with the central spine connecting the pieces. The journey along this path is punctuated by glimpses into jewel-box courtyards and through the house's multiple layers, and then the surprise as the tableau of the valley gloriously comes into view through the long south-facing facade.

"We're not talking about anything too cerebral or complicated. We're talking about compression and expansion of the space, about transparency and intimacy," says Piano. When the house is not bustling with the activity of family

POP TOP
The brightly hued standing-seam roof (opposite) caps a standard membrane system. "I love the idea of the red color flying between the aspen trees," says Piano. A 510-foot-long concrete wall behind the house redirects avalanche debris flow. The kitchen and living room open out onto a broad deck (above). A courtyard (right) visually links his-and-hers studies with the library. (A second-level guest suite can be seen on the right.)

1 ENTRY
2 LIVING ROOM
3 "PIAZZA"
4 LIBRARY
5 STUDY
6 MEDITATION ALCOVE
7 KITCHEN
8 PANTRY
9 LAUNDRY
10 DAY ROOM
11 MUDROOM
12 SPORTS EQUIPMENT
13 PASSAGE WITH GUEST CLOAK
14 BEDROOM
15 DRESSING
16 MASTER BEDROOM
17 GUEST SUITE
18 POWDER ROOM
19 BATH
20 JACUZZI DECK
21 SPA
22 EXERCISE AREA
23 CRAWL SPACE ACCESS
24 AUDIOVISUAL
25 STORAGE

SECTION A - A



UPPER LEVEL

WOOD CRAFT
Douglas fir, which clads the exterior, extends inside in a buttery veneer grade, with a minimum of 15 rings per inch (opposite). Holes in the steel beams lighten them visually. The team eschewed the option of value-engineering the finished quality of the structure behind dropped ceilings, where it is not visible.

and friends, a penetrating silence inside breeds introspection. At the same time, you are linked to the outside world through a sequence of planes that begins with the facade—a sublime Italian custom stainless-steel window system that forms the walls. The next layer is the stand of aspen, which shifts moods as it crosses the seasons with sprightly greens, flaming autumnal displays, and, in winter, lacy scrims. The final plane is the majestic peaks beyond.

The desire for this layered effect helped determine the house's 18-inch grid (a three-month discussion, say the architects), which is reflected in the mullion spacing. With too much glass, the first plane would be lost. And 18 inches granted more freedom than, say, 16 inches. The rigor of the dimensional grid and the tightness of the tolerances are mind-blowing. The centerlines between the deck boards align with the centerlines of the mullions, which align with the centerlines between floor planks, which align with the centerlines of the glue-laminated wood beams, which align with the standing seams on the metal roof. "When you try to have the world line up, it answers the questions but presents a lot of problems," says Patrick Leeds, formerly with the executive architect Harry Teague, sounding a pragmatic note. "Where it comes to bear is in construction and whether we have contractors who are OCD enough." They did. The result is that the connections and component pieces fade and you are left with an essence, which is the emotion—a calming frisson—that rings through the house.

With its museum projects, RPBW is known for understated design and "putting the art first." Here, too, the architects have deferred to the program: the owners wanted an open, warm environment that matched their outlook and lifestyle. After all, notes Piano, "a house is not a mirror of the architect. It is a portrait of a family." ■

credits

ARCHITECT: Renzo Piano Building Workshop - G. Bianchi, partner in charge; S. Doerflinger, C. Trentesaux, V. Laffineur, T. Sahlmann, team; O. Aubert, C. Colson, Y. Kyrkos, models

EXECUTIVE ARCHITECT: Harry Teague Architects - Patrick Leeds, project architect; Galen Hoover, Eric Westerman, team

ENGINEERS: Robert Silman (structural); Beaudin Ganze (m/e/p); SGM (civil)

CONSULTANTS: Front (facade); Fisher Marantz Stone (lighting); Deborah Nevins (landscape); Designrealization (interiors)

GENERAL CONTRACTOR: Shaw Construction

SIZE: 13,800 square feet

PROJECT COST: withheld

COMPLETION DATE: December 2010

SOURCES

CUSTOM STAINLESS STEEL WINDOWS, DOORS, HARDWARE: Capoferri Serramenti

GLASS: Saint-Gobain, Pilkington

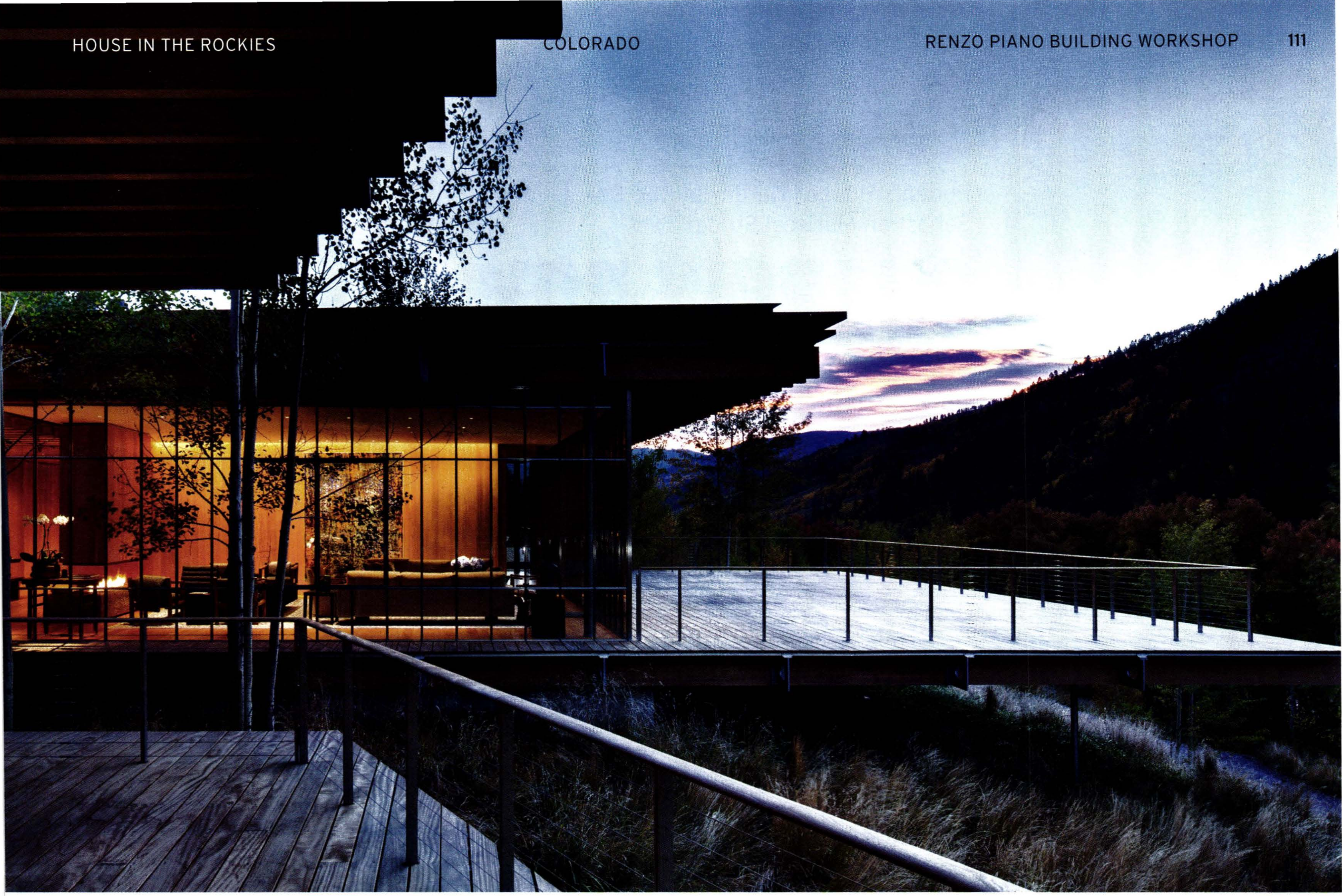
KITCHEN: Bulthaup, Gaggenau

LIGHTING: Lucifer, Phillips, Nulux, Zumtobel, Bega, B-K

LIGHTING CONTROLS: Lutron

PLUMBING: Toto, Dornbracht, Agape

EPDM ROOFING: Versico Roofing Systems



INSIDE OUT
The living room (right) is visible from the master suite's deck (above). The clients desired high ceilings, but Piano insisted on compressing the headroom, which brings an intimacy to the interiors. At its midpoint, the central axis widens into a "piazza" (opposite), dominated by a walnut dining table and benches, crafted from a single log by New York-based Hisao Hanafusa. At the left, a hearth made from boulders found on the site marks the house's center.

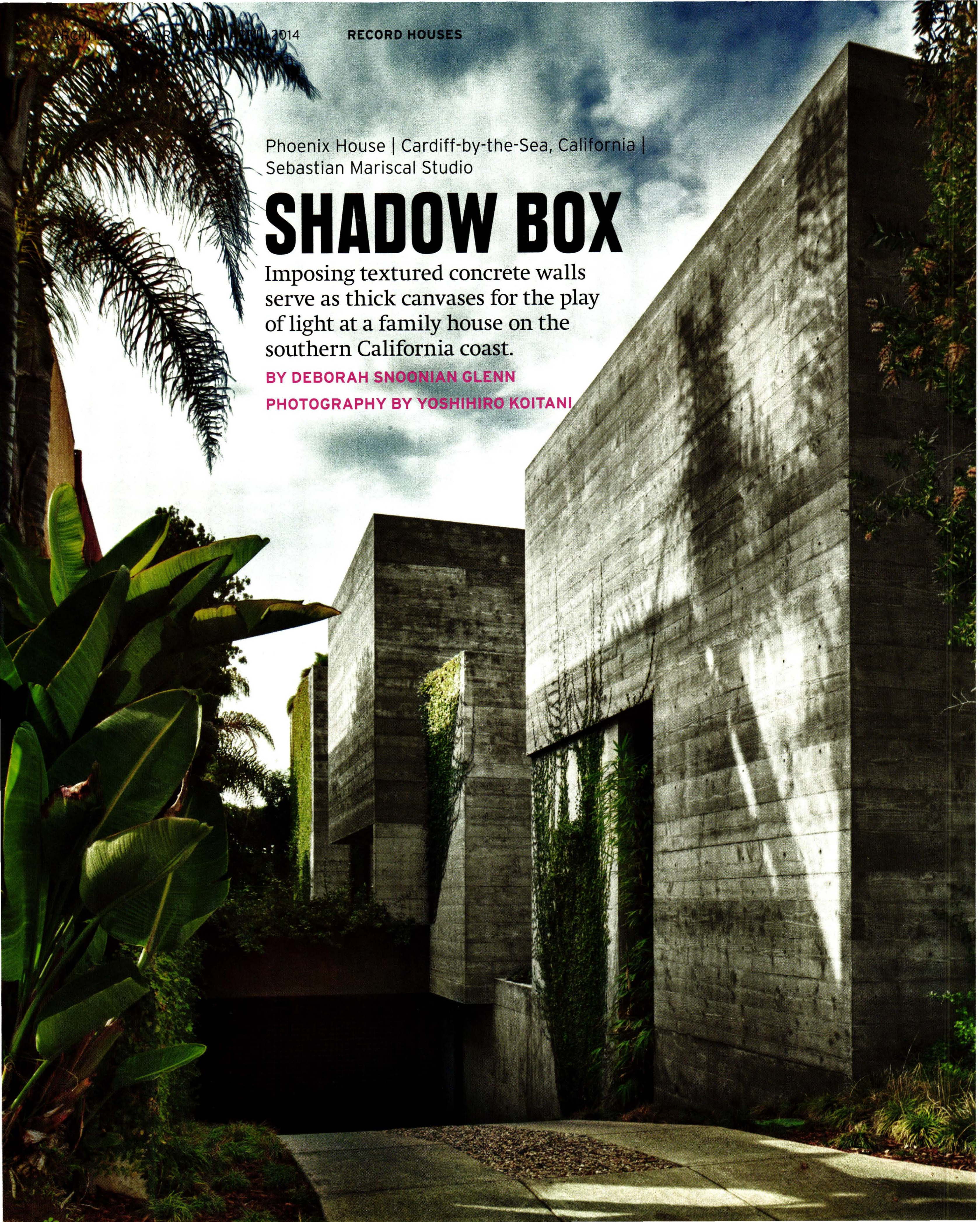
Phoenix House | Cardiff-by-the-Sea, California | Sebastian Mariscal Studio

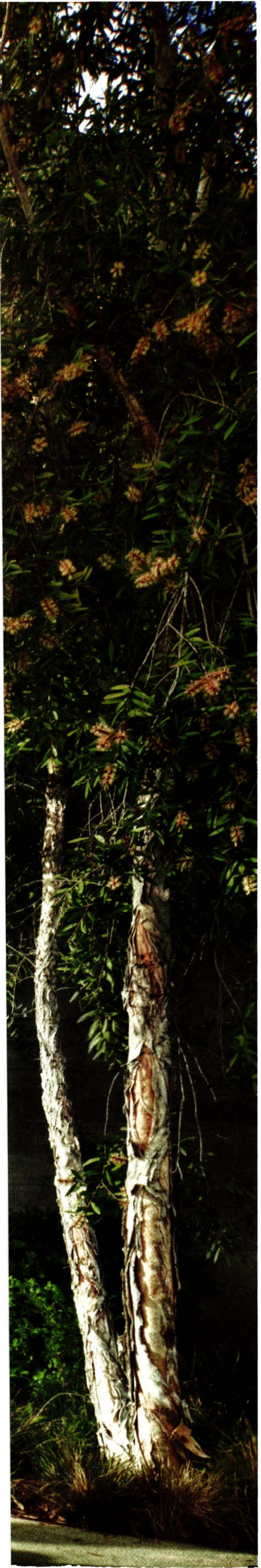
SHADOW BOX

Imposing textured concrete walls serve as thick canvases for the play of light at a family house on the southern California coast.

BY DEBORAH SNOONIAN GLENN

PHOTOGRAPHY BY YOSHIHIRO KOITANI





Concrete can wear many faces. In the wrong hands it goes cold and clinical, the stuff of a thousand Brutalist eyesores. But when made with skill, it becomes something else entirely, imbued with a tactile allure that's well suited for residential projects. This allure is largely responsible for the quiet, contemplative power of Phoenix House. In a seaside town some 25 miles north of San Diego, architect Sebastian Mariscal formed a structure of richly textured concrete that employs adroit massing, a carefully considered floor plan, and a diverse collection of outdoor spaces in a design that eschews grandiosity for intimacy.

It's fitting that the owners, a married couple with three sons, felt drawn to this indestructible material. In October 2007, their traditional-style house fell victim to one of several wildfires that ripped through the San Diego area that fall. During the gut-wrenching months that followed, they considered buying a turnkey condo downtown or relocating to a different city entirely. Instead, they found themselves drawn to Cardiff-by-the-Sea, a century-old community with narrow winding streets featuring a dense and eclectic mix of homes clinging to bluffs along the Pacific Ocean. "We wanted a house that was a complete departure aesthetically from where we'd lived before, and we had the freedom to build one here," said the husband.

Familiar with Mariscal's residential work in San Diego, where the architect once lived, the owners approached him. They asked for a warm, minimalist home to complement their collection of contemporary art, with a floor plan to accommodate their youngest son (now in high school) and the older two as guests, and space to add an elevator later if needed. Then, after finalizing the program, they gave him more or less free rein to design it. "These are the clients you dream of having," the architect says.

Mariscal has made a name for himself by ginning up clever solutions for tricky

RESIDENTIAL ESCAPE Vines growing on the driveway facade soften the house's hard-edged volumes (opposite). On the west side of the house (above), the master bedroom and bath spill out to the pool, while the living and dining rooms overlook it from the second floor.

SPLIT PERSONALITY The fine grain of Douglas fir formwork adds texture to concrete walls, which continue on the inside of the main entry (above) from the outside. While the house presents a mostly solid exterior to its neighbors, it opens up to the elements with an entry courtyard (opposite, bottom), interior gardens, and voids bringing air and light to areas such as the dining room on the second floor (opposite, top).

building sites, such as multifamily housing projects in southern California (RECORD, December 2007, page 96); here he exploits the strengths of a narrow, deep hilltop lot. For Phoenix House, he inverted the typical floor plan, tucking the bedrooms beneath the common areas so that the latter snagged the ocean views. And instead of designing it as a monolithic mass, he broke it down into distinct volumes joined by stairwells and bridges. Within and between these volumes, he carved out openings to let in light and create voids that form decks, patios, and seating areas—nearly every room has direct access to one. Though unconventional, the layout coheres as a series of gallery-like spaces that are themselves works of art, worthy of exploration.

Outside, finding the entry feels a bit like discerning the head of a hiking trail. "I like to hide houses from the street," Mariscal admits. "I design from the inside out, so I never think about curb appeal." Staggered stepping stones wind through surrounding vegetation, then pass beneath a concrete overhang on their way to the entry. Where the tree canopy opens up to reveal the sky, a sliding mahogany door materializes at the path's end. Behind that door sits the double-height vestibule, its main light source a wall of glass veiled by bamboo. This entry space is shadowy and sanctuary-like—there's an urge to lower one's voice—but steers clear of stuffy formality. From there, the glow of day-

credits

ARCHITECT: Sebastian Mariscal Studio – Sebastian Mariscal, principal; Jeff Svitak, Pavlina Ilieva, project managers; Kuo Pao Lian, Mauricio De La Pena, project team

INTERIOR DESIGNER: Klara Valent

ENGINEER: DCI Engineers (structural)

CONSULTANTS: Rana Creek (landscape); Claudia Kappl (lighting)

GENERAL CONTRACTOR: RGB Group

SIZE: 4,300 square feet plus basement

CONSTRUCTION COST: withheld

COMPLETION DATE: July 2012

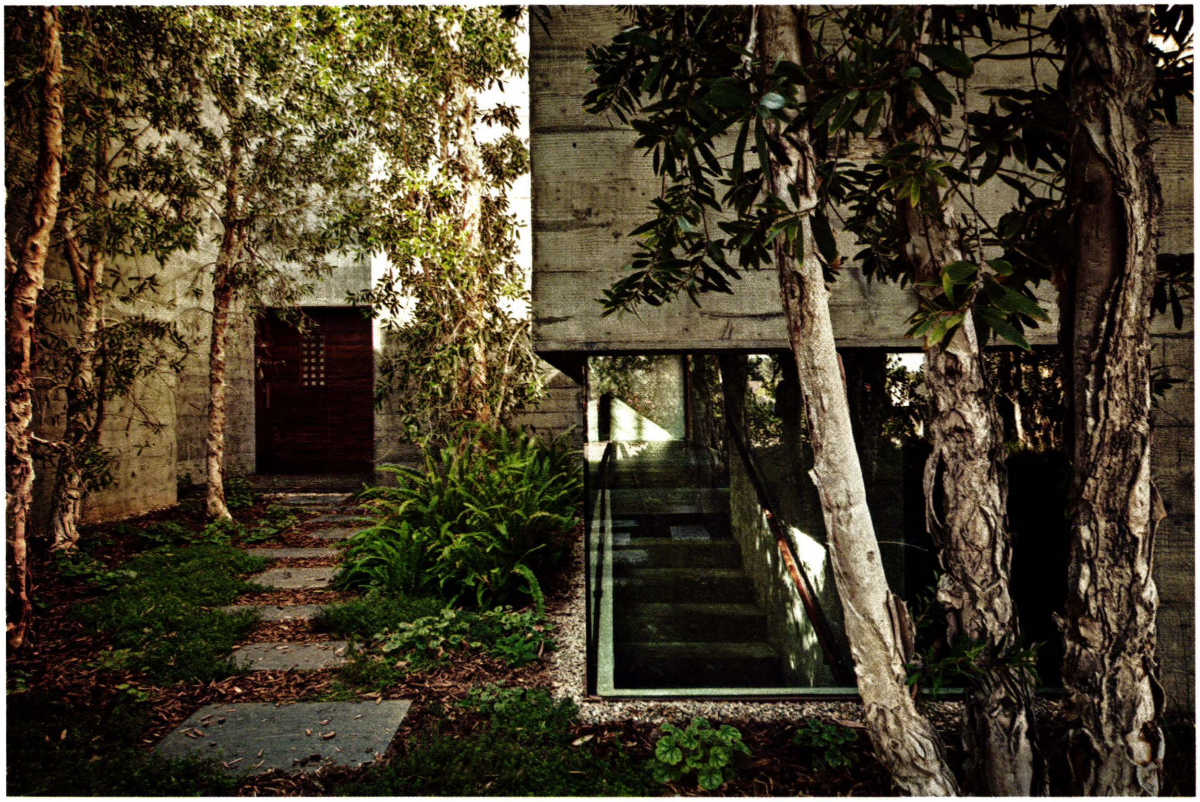
SOURCES

WOOD-FRAME WINDOWS: ArchiSpec

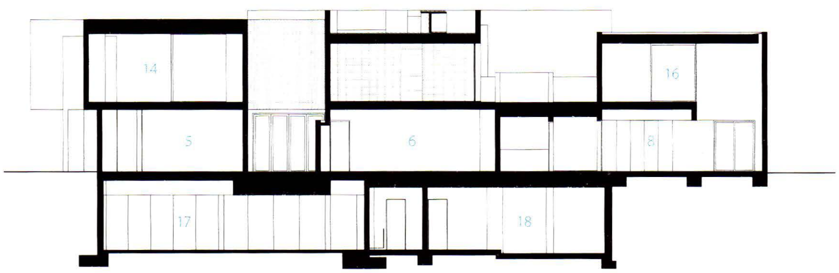
GLASS: A&A Glass

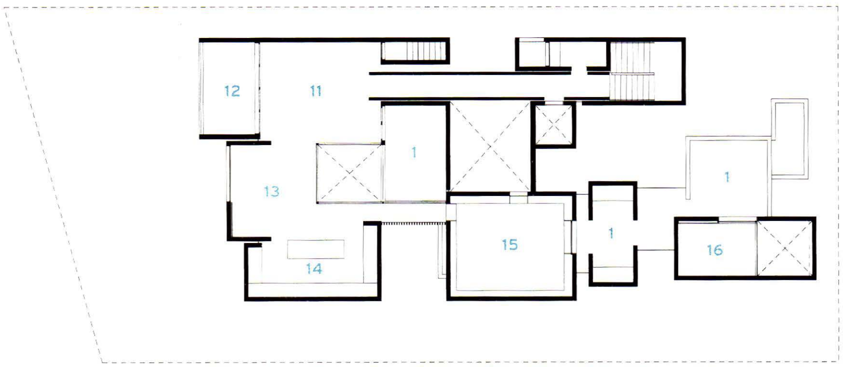
CABINETS AND WOODWORK: Evanko Cabinetry

PHOTOVOLTAIC SYSTEM: Adroit Solar



1 GARDEN
2 GALLERY
3 MASTER BEDROOM
4 MASTER SHOWER
5 MASTER CLOSET
6 PLAYROOM
7 GYM
8 BEDROOM
9 PATIO
10 POOL
11 LIVING
12 DECK
13 DINING
14 KITCHEN
15 LIBRARY
16 STUDY
17 GARAGE
18 THEATER


SECTION A - A

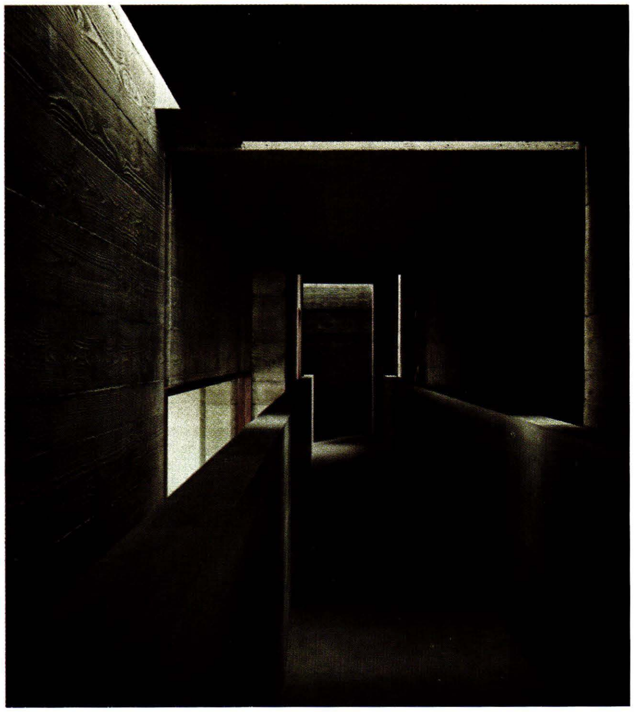

SECTION FLOOR


FIRST FLOOR

light from the stairwell invites a climb to the second-floor common spaces.

In a nod to traditional design, ceiling heights are lower in transitional spaces and higher in the areas they lead to. "Each part of a home should feel like a distinct experience," Mariscal says. "Too many houses today are open-plan boxes with undifferentiated spaces." By keeping the interior palette—limited to concrete and a handful of materials—stripped back to essentials, he highlighted the impeccable craftsmanship and a pervasive calmness and order.

The reinforced-concrete structure was both an aesthetic choice and a functional one (see sidebar, page 117). By day it prevents heat gain—so much so that the house has no air conditioning; by night it releases warmth as the temperature dips. The hot-water radiant heating system embedded in the



floors is powered by a geothermal pump. Solar panels provide 30 to 40 percent of the home's energy needs.

For all its heft and groundedness, the house offers a number of dynamic effects. Its facade acts as a giant screen for information from outside; depending on the weather, hour, and season, sunlight might cast rainbows on the rough walls, bathe them in an orange glow, or dapple them with shadows. The owners are fond of snapping smart-phone pictures of these fleeting moments and sending them to Mariscal.

These moments—memories captured—underscore Phoenix House's powerful way of engaging its residents. Mariscal's formal and material innovations here are laudable, and the human scale and warmth of the spaces within make these achievements all the more potent. Or, as the wife puts it, "It's nothing like anywhere we've lived before, but we feel so comfortable here." ■

Deborah Snoonian Glenn, a former editor of RECORD *and* This Old House, *lives in California and writes about architecture and other topics.*

DARK PASSAGE
Sharp contrasts between light and shadow animate a bridge connecting the stairway to the living spaces (opposite). A double-height bedroom for the clients' youngest son is illuminated from a skylight and has access to a small patio.

CLOSE-UP: CONCRETE

The distinctive look of Phoenix House's walls is the result of an exacting design and construction process. Each wall was painstakingly drawn in elevation with 12-, 10-, 8-, and 6-inch widths of rough-sawn Douglas fir boards used to build the cast-in-place formwork. The board widths were staggered to suit the scale of each space. After the first pour, concrete seeped out between the boards, so the team built a vise-like rack to squeeze them tightly together during curing and also adopted a daily routine of spraying the wood with water to avoid shrinkage and warping. The concrete was left untouched when the forms were removed, leaving behind a wood-grain imprint on its surface, a ghost of the creation process.

Fall House | Big Sur, California | Fougeron Architecture

CLIFF HANGER

A volumetric copper and glass form sidles up to the edge of a bluff overlooking the Pacific Ocean.

BY LAURA RASKIN

PHOTOGRAPHY BY JOE FLETCHER

WORLD'S END The house steps down the bluff, responding to its topography and providing a protected perch from which to take in the view.

Driving to Big Sur on coast-hugging Highway 1—say, south from San Francisco—you have to be cautious. It's not just that the switchbacks give the ride the feeling of being in a James Bond movie, but that it is impossible not to be subsumed by the scene outside the windshield: the verticality of the lush and hoary mountains and the plunging cliffs that spike up again from below the surface of the Pacific Ocean.

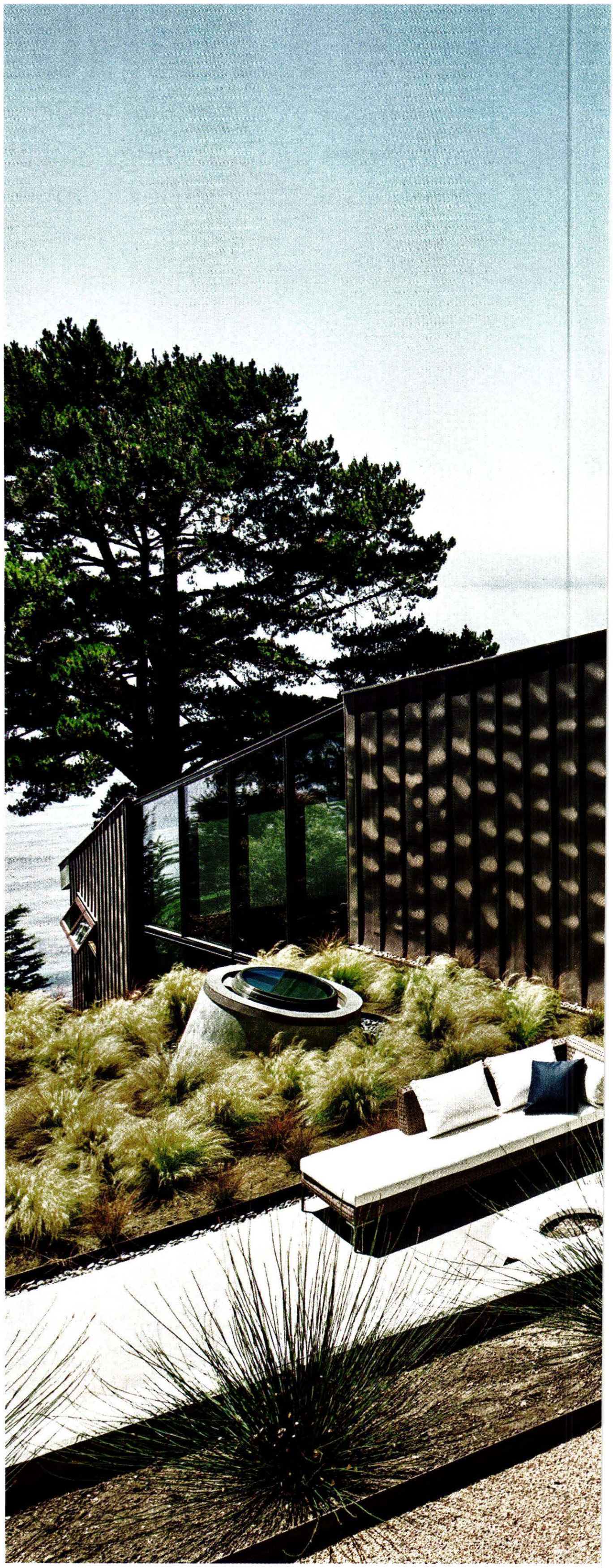
Anne Fougeron, the San Francisco–based architect, understands that architecture cannot compete with this landscape. As she has written, in contradiction to the history of our claim on the West: "Placing form on wilderness is a radical act. It is not about creating harmony. Nature's tensions are too dynamic to be balanced and too sprawling to be tamed by human artifact."

It was Fougeron's success in conceptualizing and gently positioning an earlier, rectilinear house in a wooded valley in Big Sur—the Jackson Family Retreat (RECORD, April 2005, page 188)—that endeared her to the clients of her recent nearby project. A Chicago-based executive and his family had been looking for property in the area since the late 1990s—he fell in love with Big Sur when he attended prep school in Monterey in the 1970s—and in 2006 they finally purchased a triangular 1.5-acre site on a bluff with a 250-foot drop to the ocean. "We wouldn't have closed without [Fougeron] onboard," he says. The couple knew that they didn't want a dark stone and redwood cabin like the ones so prevalent in the area, but something daylight-filled, with a low profile, and made of a mix of materials.

Fougeron conceived a copper-clad and glass volumetric form set into and hugging the cliff. As it subtly zigzags down the slope with its slanting roofline, it resembles, according to the architect, the curve of the Pacific banana slug, her inspiration. "The clients loved the weird shape. That was the big move," she says. "But it had to feel as if it really was a house. It is modern in its conception but warm in its materiality." The structure is invisible from the road (the sacrosanct view from Highway 1 is protected), but its drama—a cantilever on two sides that thrusts the nose of the house out over the bluff—is only slowly revealed as you descend the site on foot.

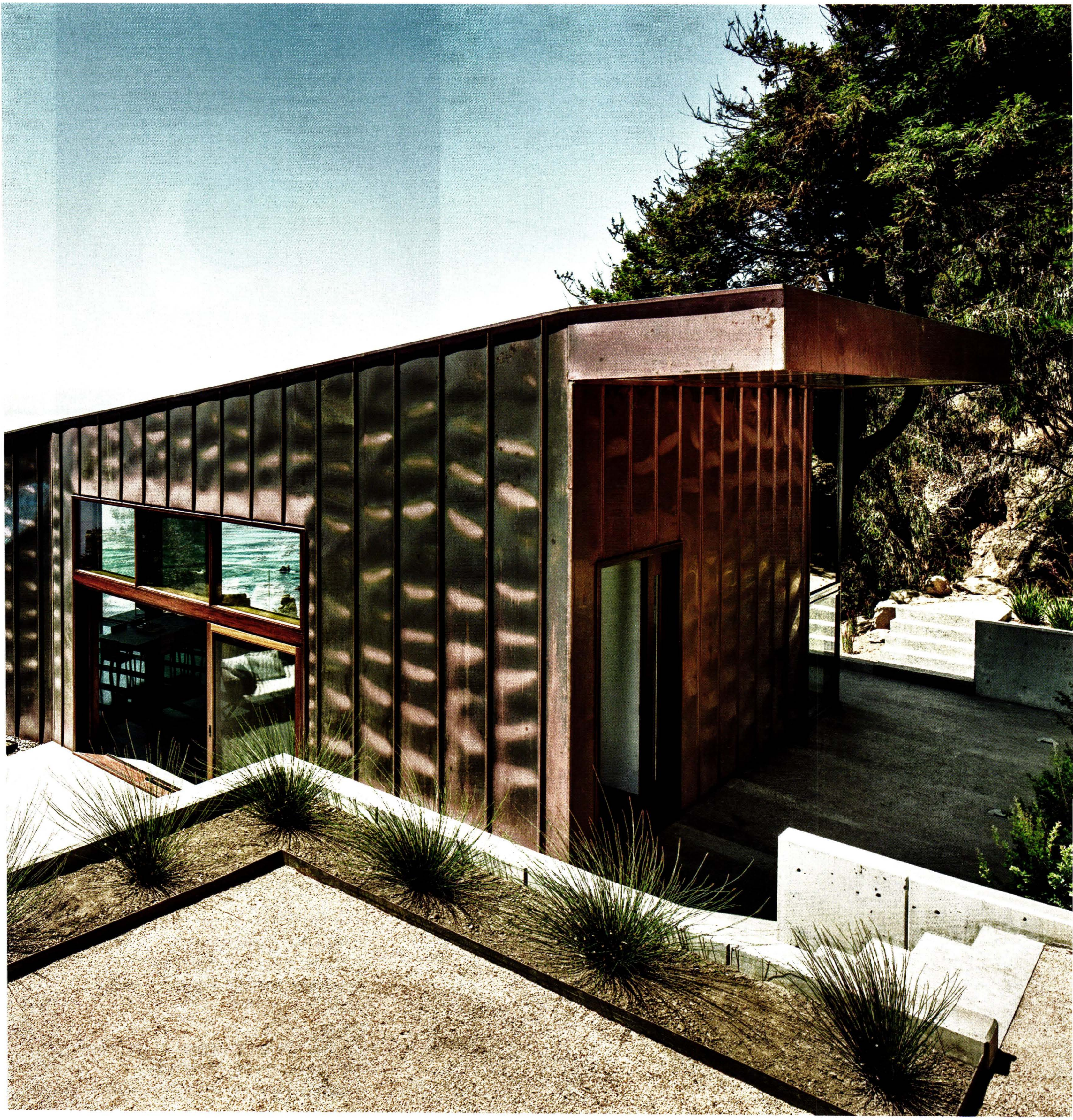
The highest volume, entered from the driveway, contains an open-plan living room and kitchen, wrapped in warm mahogany on the south-facing walls and set off by limestone floors. To the north, the facade is almost all glass—large panels set in a robust but elegant custom steel-framing system. This allowed the architect to create vast glazed openings to border the ocean and coastline, as well as have them withstand 70-to-80-mile-an-hour winds. To provide visual relief from the relentless theater of the view, Fougeron opened the living room to a quiet sunken terrace to the south, protected by the natural berm and retaining wall behind it.

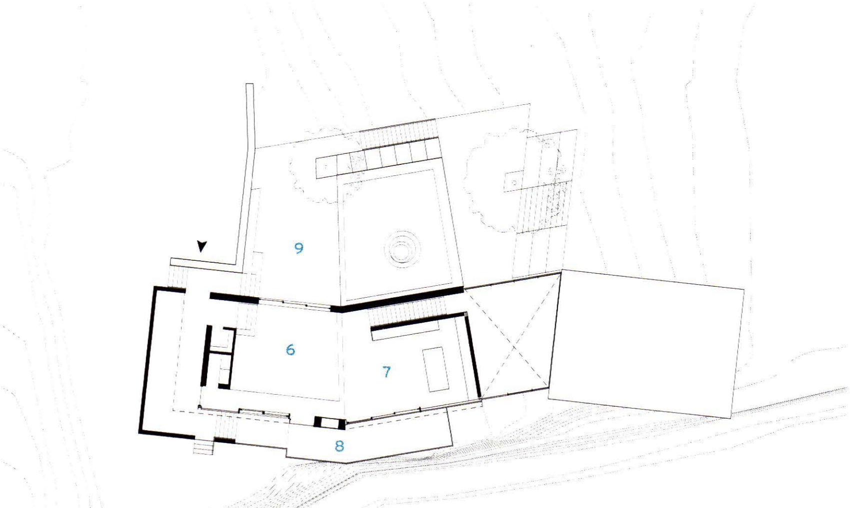
A nearly all-glass library unites the living room and kitchen on the upper part of the slope with the master suite on the lower, and alerts visitors of their journey into the more private wing. The placement of roof glazing required workers to wear rappelling gear and was one of many mo-



NATURAL CONTOURS
The house is clad in standing-seam copper, which holds up well against the sun and wind and sets an informal tone. "The thing I like about copper is that it changes over time, so the house transforms itself," says architect Anne Fougeron.

View additional images at architecturalrecord.com.

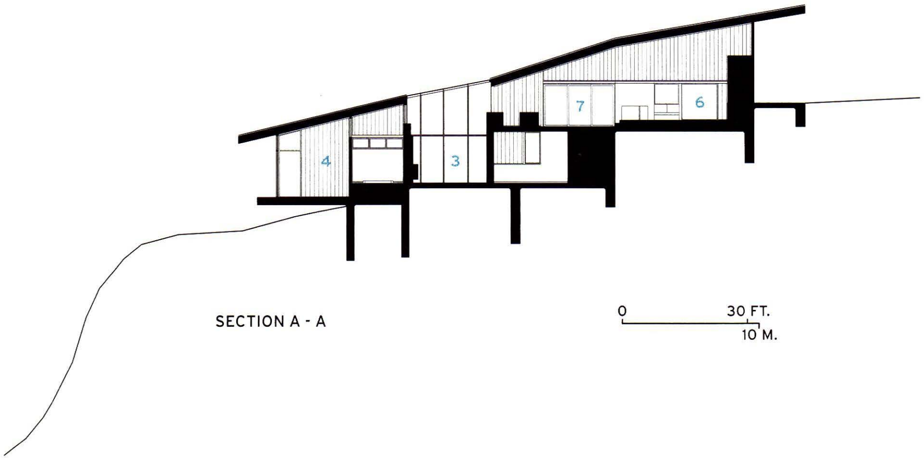




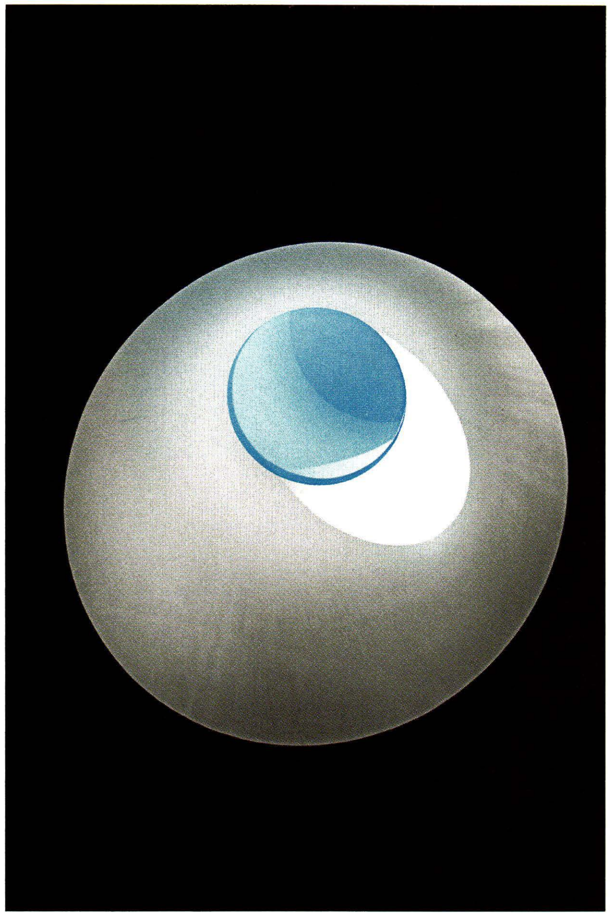
UPPER LEVEL

1 BEDROOM
2 STORAGE
3 LIBRARY
4 MASTER BEDROOM
5 PATIO
6 LIVING ROOM
7 KITCHEN/DINING
8 DECK
9 DRIVEWAY

LOWER LEVEL



SECTION A - A



credits

ARCHITECT: Fougeron Architecture – Anne Fougeron, principal; Ryan Jang, project architect; Todd Aranaz, project manager

ENGINEER: Paul Endres, Endres Ware Architects Engineers

CONSULTANT: Blasen Landscape Architecture (landscape)

GENERAL CONTRACTOR: Thomas George Construction

SIZE: 3,800 square feet

COST: withheld

COMPLETION DATE: May 2013

SOURCES

CUSTOM STEEL: Coastal Fabrication

SOLID SURFACING: Corian (bathrooms)

WINDOWS (WOOD FRAME AND SLIDING DOORS): Quantum Windows & Doors

GLAZING: Solarban

LIGHTING: Delta Light (downlights); Halo (task lighting); Sistemalux, B-K (exterior); Lutron (controls)

HARDWARE: Valli & Valli (locksets); Doug Mockett & Co. (pulls)

FREE FALLING
English-born, Berlin-based artist Christopher Winter's *Swing (Para Visions)*, 2006, hangs in the living room (right). "I wanted something unexpected and thought-provoking, like the house itself," says the client. The master bedroom (bottom) cantilevers out over the bluff, making the view of the coastline the primary focus. In a nod to Le Corbusier, Fougeron designed a protruding oculus that funnels daylight into a below-ground bathroom (opposite). Above ground, the sculptural form sticks out of the green roof in front of the driveway (see page 120).

CLOSE-UP: FIRM ANCHOR

Says Paul Endres, an engineer who has worked with Fougeron for 20 years: "It was one of the most complex projects we've done." The Fall House is set 12 feet back from the edge of a bluff—an "erosion line" that should keep the structure safe for at least 100 years, if not more. The bedroom wing cantilevers from that line, with all of the structural support occurring behind it. Other gymnastics ensure that the house isn't going anywhere: it has a concrete pier-and-grade beam foundation with pilings 10 to 30 feet deep, the deepest of which are placed at the precipice of the cantilever. A series of double moment frames with c-shaped flanges intersect at certain points, and are also sloped at angles. "Usually moment frames go in a single direction and can't run into each other," says Endres. In order to get the complicated configuration to work, "We drilled holes and rammed rods through moment frames. I haven't seen that used professionally before," he says.

EDGE CONDITION Rather than disturb the smooth plane of the roof's horizontal surface (left), the architect placed circular vents in the fascia (not shown). A glass library (above) has two views: one of sky and sea, the other of an intimate terrace.

ments when the challenging site scared the project's construction manager, Thomas George, according to Fougeron. "He thought I was crazy to do this," but "we didn't want structural columns everywhere." Five perforated steel beams in the glass roof connect to a beam that sits on the bearing wall. They also disappear enough to help create the effect of a planetarium, a perfect spot to observe the sparkling view outside, day or night. But it's the master bedroom that is the grand denouement. "They wanted this to be a sanctum at the end of the house," says Fougeron. With floor-to-ceiling windows (no doors, to limit temptation and accidents), it seems to hover in the sky over the ocean, with a 12-foot cantilever to the west and north.

The simplicity of the house's form belies the feats of engineering that were required to anchor it to the precarious site, ensure it could withstand earthquakes and erosion, and protect the environment around it (see sidebar). A below-ground concrete bunker is perpendicular to the grade-level volumes and contains bedrooms, storage, and mechanical systems while serving as an enormous anchor.

In addition to the northern glass facade, a connection to the outdoors is maintained from east to west, all the way from the living room through to the master bedroom, because of interior fenestration near the ceiling. Initially, Fougeron was concerned about the views' overwhelming the intimacy of the interiors, and proposed alternating clear and frosted glass panes. "Then, one day, we were at the construction site," explains the client, "and after both of us stared at the beautiful ocean view for about 10 minutes, she said, 'You know, maybe "overwhelming" isn't such a bad thing.' " ■

Villa Kogelhof | Kamperland, Holland | Paul de Ruiter Architects

PUTTING DOWN ROOTS

A Dutch design team infuses a sweeping, minimalist aesthetic into a home with an ambitious sustainable program.

BY TRACY METZ

PHOTOGRAPHY BY JEROEN MUSCH

In a gravity-defying act of daredevil modernism, a villa in the Dutch province of Zeeland seemingly floats above the surroundings it was named after—the former 60-acre Kogelhof farm. In its uncompromising radicalism, this clear, linear house would stand out anywhere, but, among the brick houses and tarred barns dotting this rural part of the Netherlands, it is truly an anomaly.

The client, Ton Zwijnenburg, an international potato and onion trader, purchased the land from a local farmer under the auspices of a national restructuring initiative called "red for green" developed for agricultural areas in decline. Through this program, the Dutch government grants one building permit for each 10 acres of land, on the condition that the buyer transform the remaining property into a public nature preserve.

The project's agenda was as ambitious as the concept is simple. Zwijnenburg wanted the house to be a clean, transparent abstract form with no distracting elements, such as windows, on the skin. The architect, Paul de Ruiter, was intent on making the glass box energy neutral. They both managed to get their way in a feat of engineering that, says de Ruiter, "took an hour to think up and six years to execute."

During three of those years, Zwijnenburg lived in a tiny camper next to the building site on weekdays. For bathing, he used a new Z-shaped pond the project's landscape architect Bosch & Slabbers created by excavating 2,472,000 cubic feet of

soil. The firm devised the 1,312-foot-long-by-98-foot-wide man-made lake as an inviting habitat for birds and fish, reusing the dug-up earth to vary the flat site with gentle hills. They also planted 71,000 young trees.

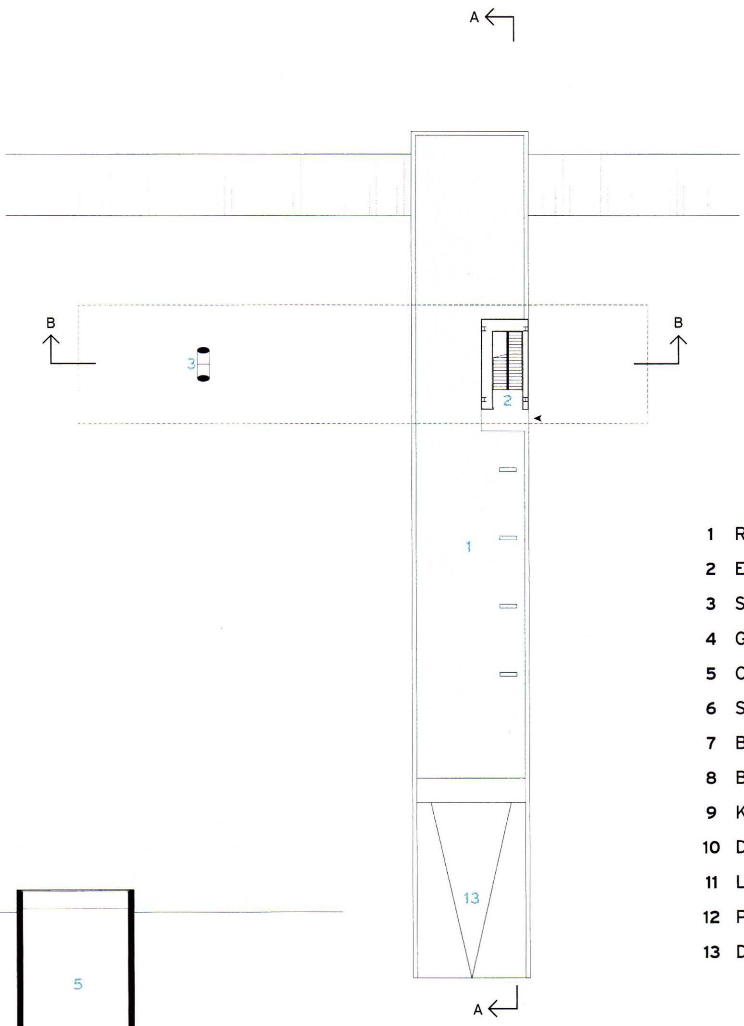
The 7,700-square-foot house consists of two perpendicular volumes connected by a concrete core with a glazed entrance at grade. One is tucked beneath a 2-foot-deep reflecting pool and houses an office, storage, full bath, and a garage for Zwijnenburg's tractor and four cars. The small water feature, positioned to overlook the larger Z-shaped pond, was added to enhance views from the house as well as to conceal the home's plumbing, electrical, and HVAC. The upper volume, a glazed Vierendeel truss structure, hovers above the ground and accommodates the primary living, dining, and sleeping spaces. The improbable cantilever created by the structural arrangement is buttressed by a V-shaped steel support located 82 feet from the core.

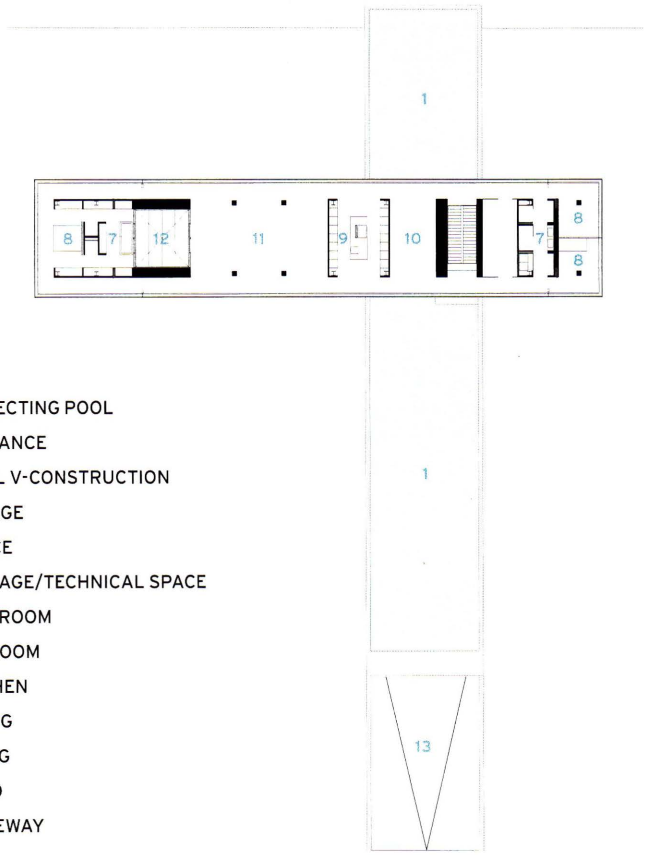
De Ruiter applied a similar sweeping approach to the interior of this home for a family of four that includes two teenagers, and it is every bit as cool and collected (that is, maniacally tidy) inside as it is outside. By his own admission, Zwijnenburg is neurotic about cleaning up and organizing. "Even my cars are organized by size and color," he says. Interestingly, he selected de Ruiter for the project on the basis of an underground parking garage the architect had designed in Rotterdam. "I've always been fascinated by functional, minimalist architecture, especially in America," Zwijnenburg says. "I like big open spaces with no clutter."

The rooms upstairs are delineated according to the structural bays. The master bedroom is at one end, followed by its bath suite and an internal open-air patio, accessible from both the master bath and living room beyond—a scheme that maintains an uninterrupted curtain wall. The kitchen, dining area, and children's rooms align to complete the floor plan. Modern classics by the likes of Eileen Gray and Le Corbusier constitute the home's sparse furnishings.

The aesthetic does not compromise the architect's goal to build a net zero–ready house, however. To that end de Ruiter is employing both active and passive means. The facade is made of dual-glazed low-iron, low-E glass insulated with

OVER EASY
Lightly touching down on publicly accessible land, which is in the process of being reclaimed by its owner, Villa Kogelhof comprises two perpendicular wings: a glazed living space above grade and a garage-cum-office level below a reflecting pool (previous spread and opposite). In lieu of a private garden, the house has an internal patio open to the master bath on one side and living room on the other (this page).

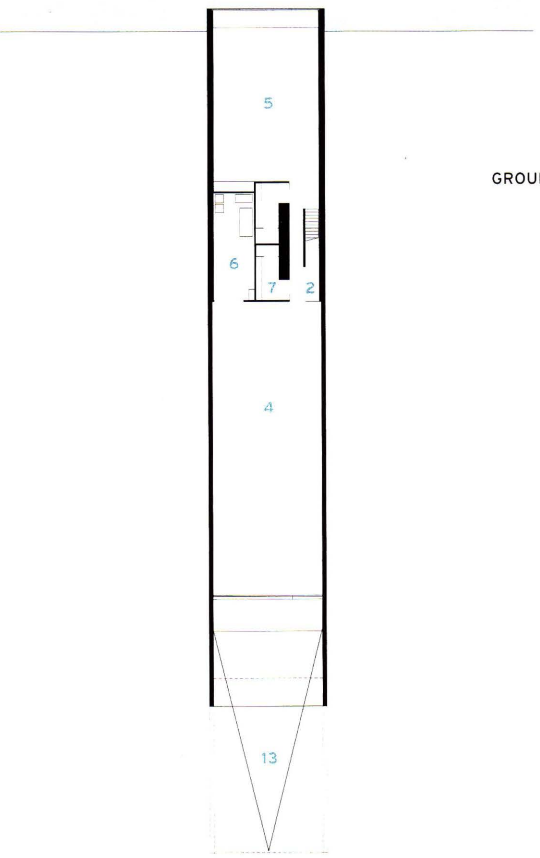


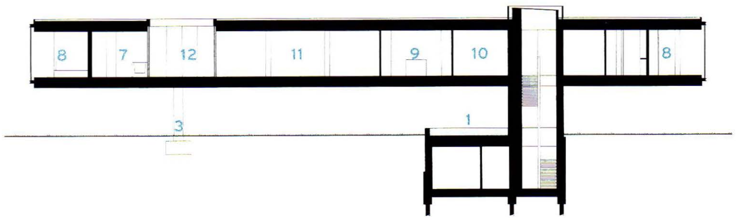


1. REFLECTING POOL
2. ENTRANCE
3. STEEL V-CONSTRUCTION
4. GARAGE
5. OFFICE
6. STORAGE/TECHNICAL SPACE
7. BATHROOM
8. BEDROOM
9. KITCHEN
10. DINING
11. LIVING
12. PATIO
13. DRIVEWAY

GROUND FLOOR

SECOND FLOOR





SECTION B - B

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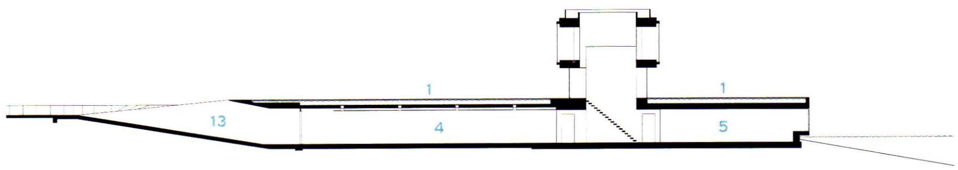

BASEMENT

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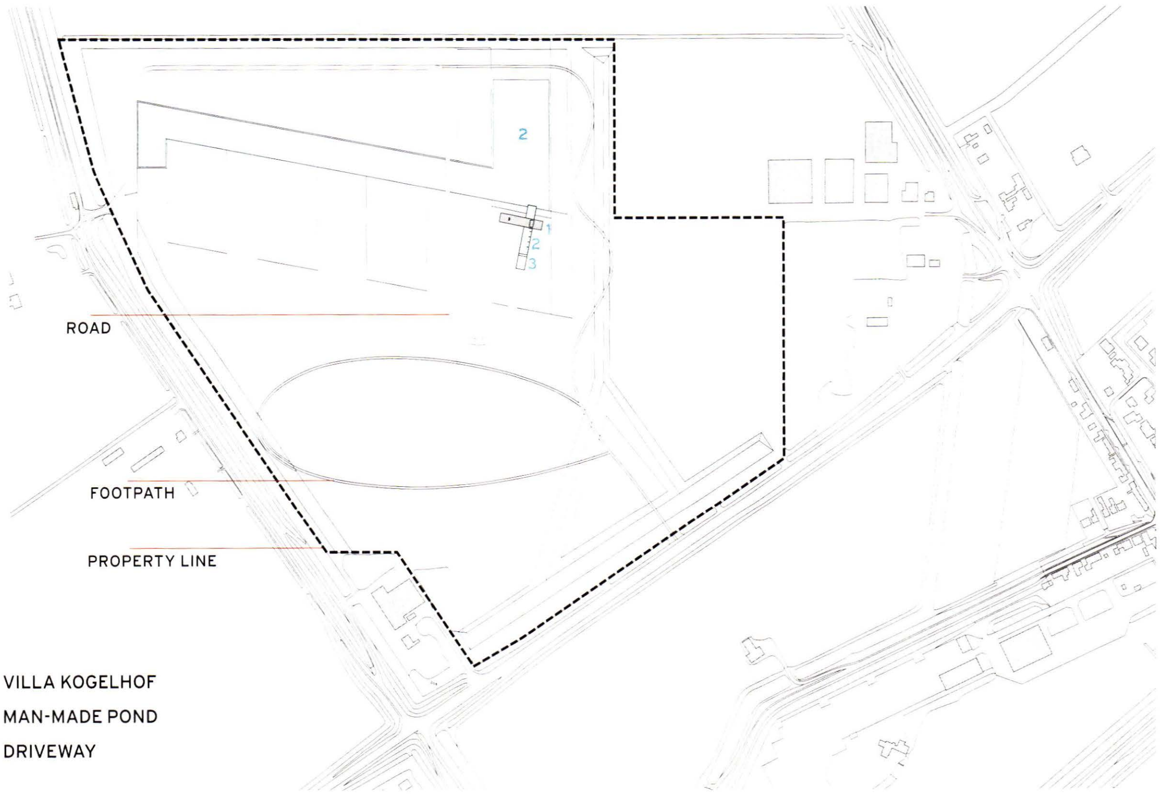
SECTION A - A

0 30 FT. 10 M.

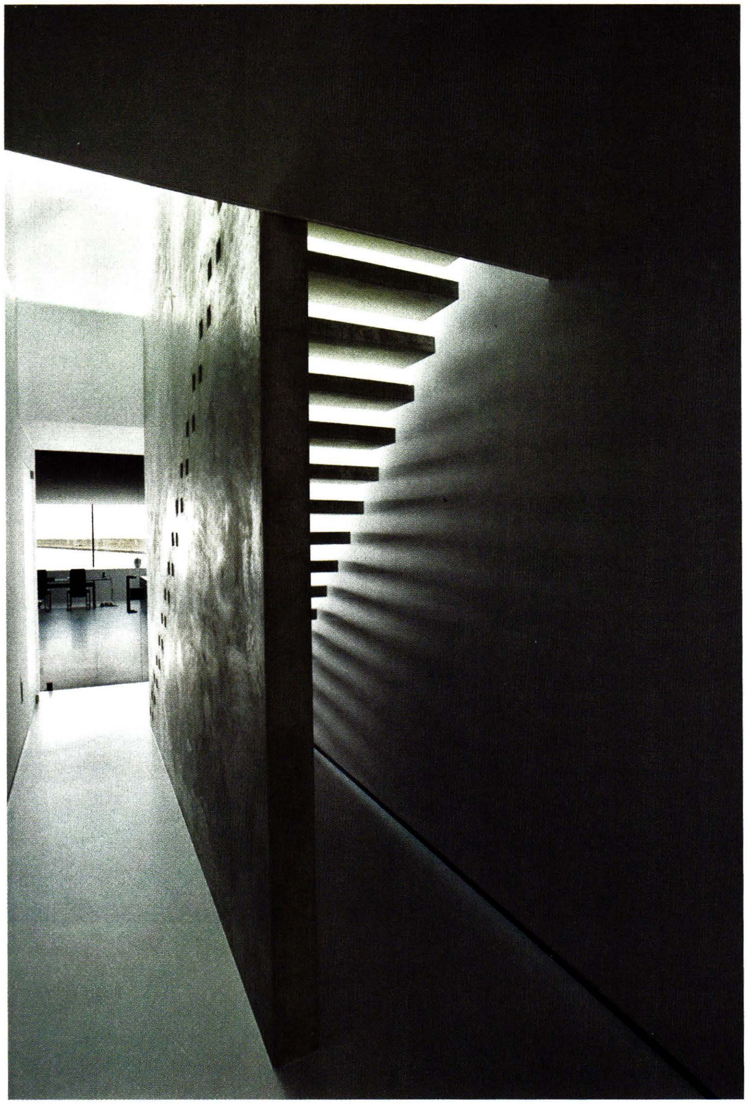


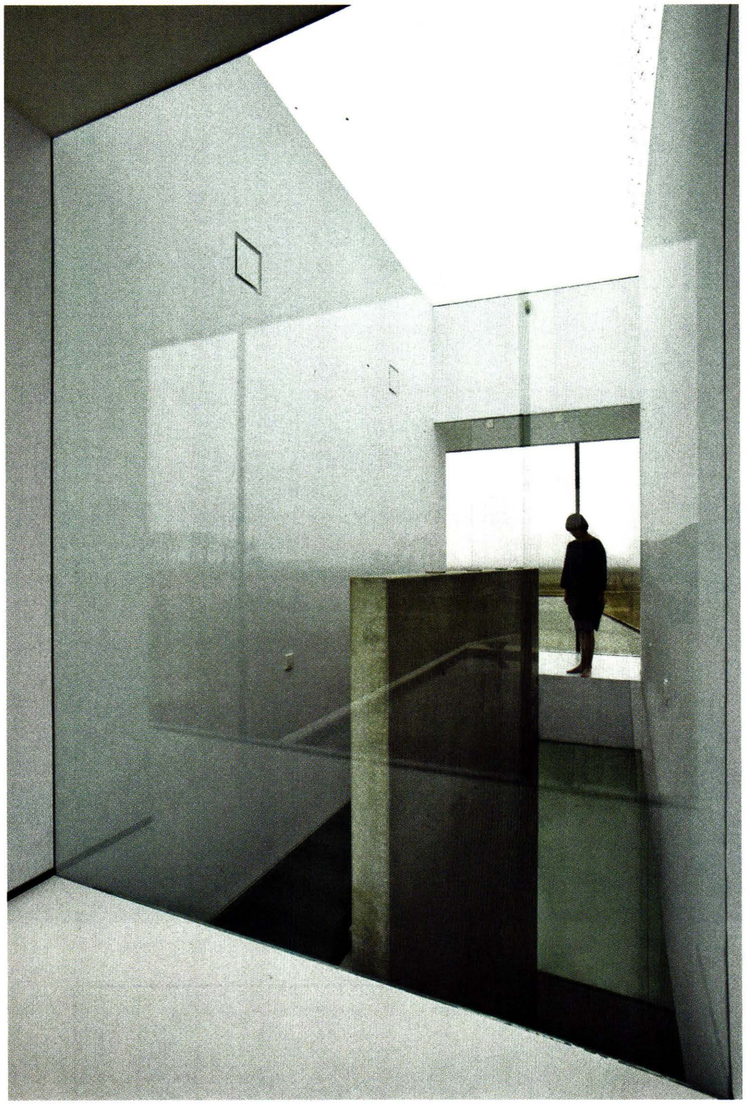
1 VILLA KOGELHOF
2 MAN-MADE POND
3 DRIVEWAY

SITE PLAN

0 500 FT.
150 M.

TRUSS WORTHY
The rooms of the living level are arranged to align with the building's structural bays, maintaining an uninterrupted curtain wall and views from every vantage point (above). The glazing is applied to a steel frame around the outside of the curtain-wall opening, erasing the boundaries between indoors and out.





Argon gas. The 11-foot-tall glass panels, fastened with U-shaped clips to a steel frame on the building's exterior, slip past the 9-foot-high curtain-wall opening and seem to disappear beyond the floor and ceiling edges, erasing the line between indoors and out, like an infinity pool. Sunshades, seven inches behind the glazing, provide an additional air barrier, aided by a dedicated ventilation system that draws solar heat buildup outside. Meanwhile, a heat pump maintains comfortable temperatures throughout the year, and will get a boost during winter months from a soon-to-be-installed freestanding stove fueled by wood pellets—to be produced from the trees on the property (when they mature).

A work in progress, Villa Kogelhof is not yet producing as much energy as it consumes. Photovoltaic panels on the roof currently meet some of its demands. But the house won't be fully net zero until these are supplemented by the installation of a wind turbine, planned for the near future.

Such apparent independence can be deceiving. Surrounded by a surreal landscape that is at once wild and calculated, private and public, Zwijnenburg muses that there are times at the Villa Kogelhof when, "One is able to cherish the illusion that you are the only person in the world." ■

CORE VALUES
A skylit concrete core (above, left and right) connects both levels.

credits

ARCHITECT: Paul de Ruiter Architects – Paul de Ruiter, principal/project architect; Willem Jan Landman, project leader; Noud Paes, Marieke Sijm, Willeke Smit, design team

ENGINEERS: Broersma bv (structural); Arup, Smits van Burgst (building physics); Studio Bouwhaven (costs); Intek, ITN (installations); Si-X (glazing); Meijers Staalbouw (steel structure)

CONSULTANTS: Bosch Slabbers (landscape architect); InventDesign (lighting)

GENERAL CONTRACTOR: Bouwbedrijf J. van de Linde

SIZE: 7,700 square feet

COST: $3.5 million

COMPLETION DATE: January 2013

SOURCES

STEEL STRUCTURE: Meijers Staalbouw

CLADDING: Kingspan (metal panels); Thiele Glass (curtain wall)

House Tour

LONGBOARD PREMIUM SOFFIT & SIDING

MAYNE COATINGS CORPORATION

It's a unique product on the market. Longboard is a premium product that is a non-combustible alternative to wood and easily achieves that clean, contemporary look that so many designers want. Long-term durability is one of the defining features of this maintenance-free product. Longboard is also a green product from start to finish. We're an environmentally responsible company that produces environmentally responsible products. The production facilities at Mayne Coatings Corp. are state of the art and custom built located in Langley, British Columbia, Canada. We've taken a very old, well-known building product—aluminum—and gave it a make over.

This custom-built home overlooking Cultus Lake in Chilliwack, BC, Canada, was designed by Site Lines Architecture and built by Mike Lobe Construction. Longboard was ideal for this contemporary design and offered the weather resistance needed for west coast environment.

Aldea Homes designed and constructed this house in Burnaby, BC, Canada, using Longboard aluminum soffit and siding in place of wood.

PRODUCT
Longboard Premium Soffit & Siding

PRODUCT APPLICATION
Cladding system
Siding & soffit

PERFORMANCE DATA
15-year non-prorated finish warranty

CONTACT INFORMATION
Mayne Coatings Corp.
27575 50 Ave.
Langley, BC, Canada V4W 0A2
604.607.0198
info@longboardproducts.com

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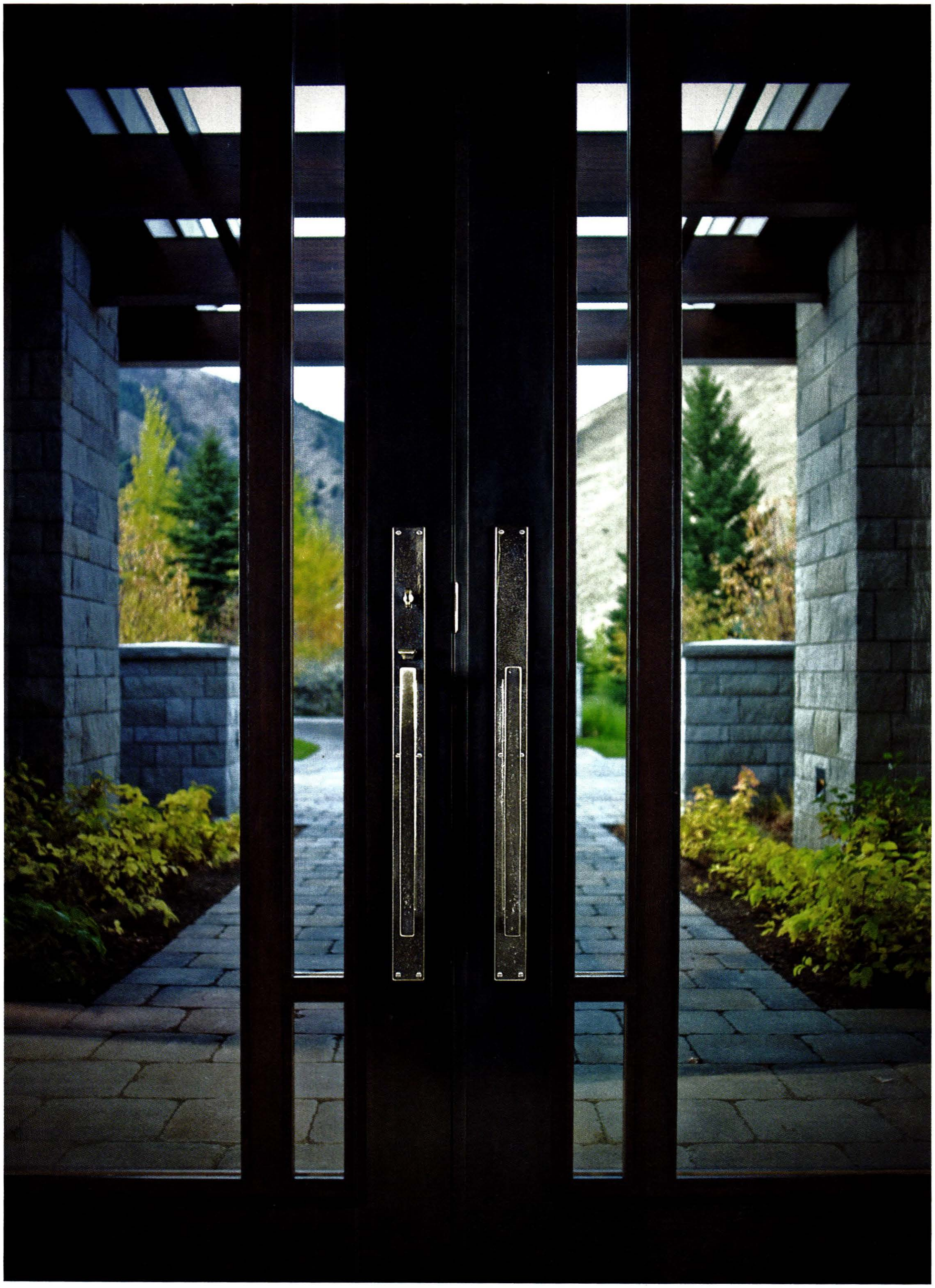
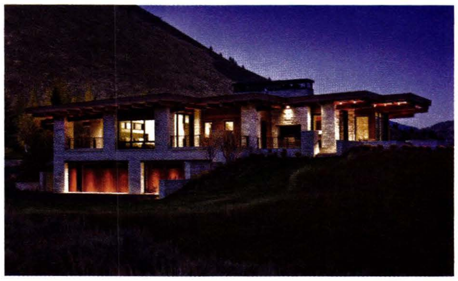
House Tour

SOLID BRONZE METRO COLLECTION

ROCKY MOUNTAIN HARDWARE

This project, in the mountains of Southern Idaho, embodies contemporary design by incorporating natural materials to create a seamless tie between the home and its environment. Rocky Mountain Hardware's solid bronze Metro Collection was selected in white bronze with a dark patina finish as a key design element to add a vibrant tactile texture to the blackened steel clad doors and quarter sawn walnut cabinets. Rocky Mountain Hardware offers a wide assortment of products and finishes designed specifically to complement the natural tie between contemporary design and organic details. To learn more, please visit our website www.rockymountainhardware.com





Contemporary home incorporates bronze hardware in White Bronze Dark throughout project from entry and interior door hardware to cabinet hardware.

PRODUCT

Bronze Architectural Hardware

PRODUCT APPLICATION

Door hardware, cabinet hardware, accessories

PERFORMANCE DATA

Lifetime guarantee on bronze products

50-year guarantee on lock components

Handcast in USA of 90% recycled content

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Rocky Mountain Hardware
1020 Airport Way
Hailey, ID 83333
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CIRCLE 45

Moving Up in the World

Structural gymnastics help ultrathin, ultra-tall residential towers for the ultrarich make their mark on the Manhattan skyline.

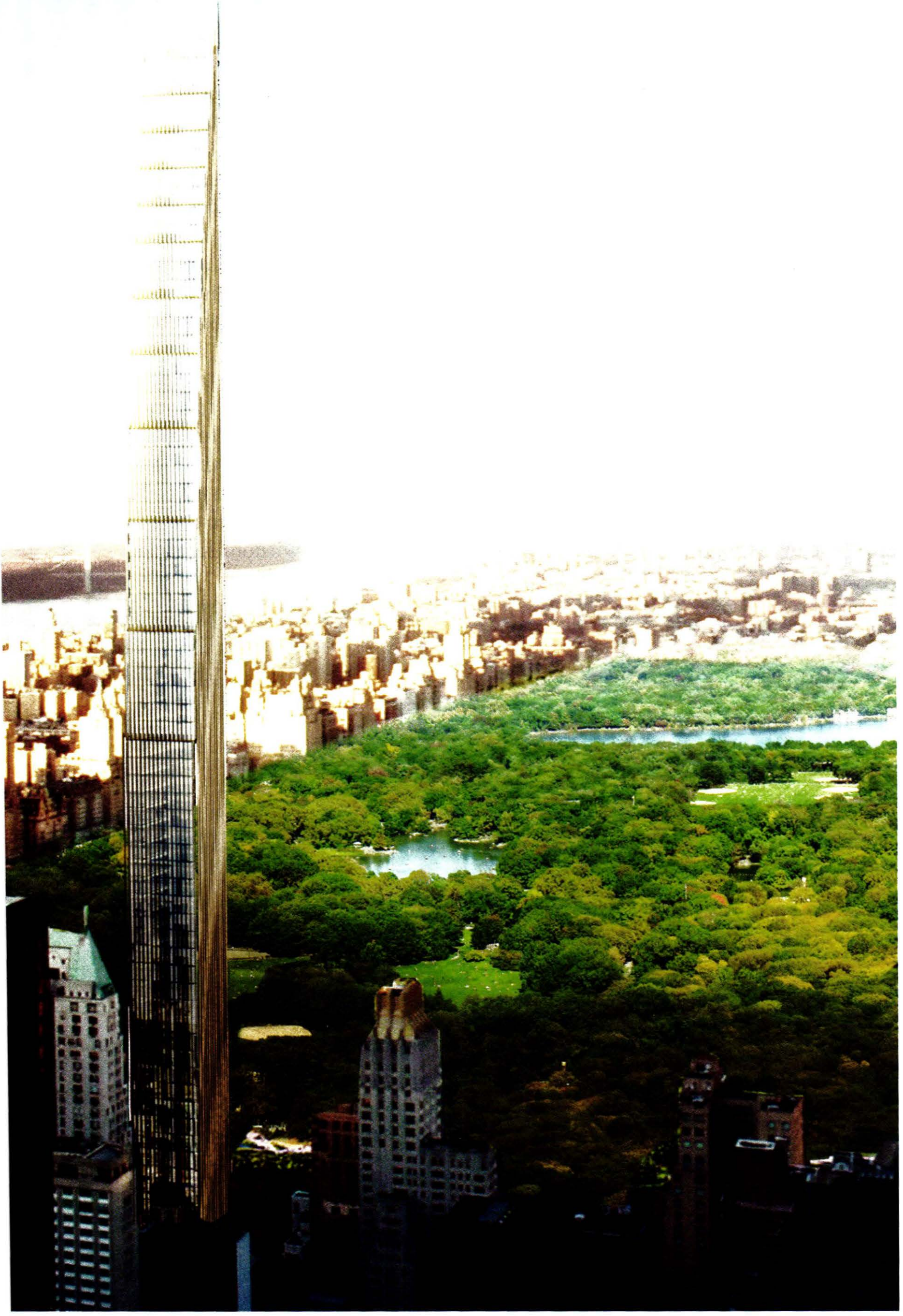
By James S. Russell, FAIA

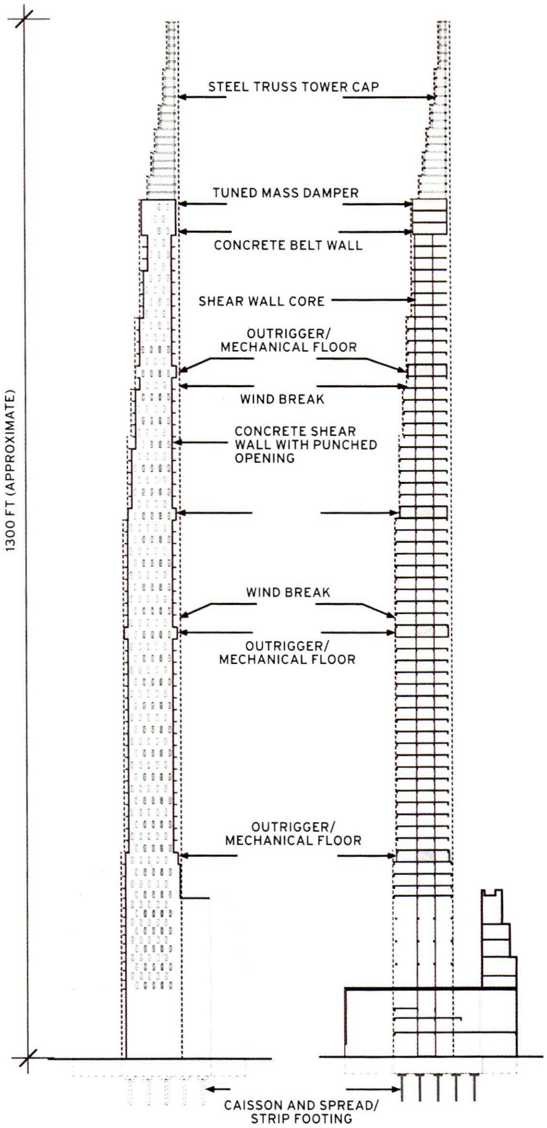
IN NEW YORK CITY these days, residential towers cannot be too slim or too tall. The improbably slender form of One57, now fully enclosed, is the furthest along of a new crop of super-thin, supertall, super-luxe residential towers. Designed by Atelier Christian de Portzamparc for Extell Development Company, with glass panels of blue, pewter, and silver, it rises 1,004 feet, hundreds higher than even its tallest neighbors.

Just blocks away, CIM Group and Macklowe Properties' 432 Park Avenue will top out at even greater height, 1,396 feet. The square floor plan, extruded without setbacks in concrete with punched windows, has reached about 45 stories. It is as proportionally pristine as a Sol LeWitt sculpture—an image of "pure strength," says its architect, Rafael Viñoly. Nearby, SHoP Architects is still refining its design for the 1,350-foot-tall building planned for 111 West 57th Street. So far, it is the slimmest of about a dozen super-skinny, supertall towers planned or under construction in New York. The ultrathin buildings are intended to lure buyers willing to plunk down as much as $95 million for a home perched high in the sky.

"These towers are going up in neighborhoods that are distinctive and have

IMAGES: © JAMES S. RUSSELL (LEFT); SHOP ARCHITECTS (ABOVE)





STRUCTURAL DIAGRAM
111 West 57th Street

tall-building zoning capacity yet have only small parcels available," says Carol Willis, the founder of New York's Skyscraper Museum. "Evolving technology and unprecedented price points make these buildings work," she says. Though super-slims are for now unique to just a few Manhattan neighborhoods, high-rise living worldwide will benefit from the innovations that make these super-slims possible.

Codes define a slender building as one that is more than seven times as high as the narrowest side at its base. In the Skyscraper Museum's recent show *Sky High and the Logic of Luxury*, Willis exhibited towers she calls super-slender—those with at least a 1:12 ratio. The slenderness ratio of 111 West 57th is a startling 1:24.

ZONING SCULPTS FORM

Regulatory requirements, especially zoning, substantially influence the design of the super-slims. Several will rise in a special Midtown Zoning district that permits high density and the transfer of "air rights"—subtracting unused development square footage from atop existing buildings and adding it to a new tower. All of the super-slims involve such transfers. And even though their assertive profiles on

ONE57 Now fully enclosed, a 1,004-foot-tall tower designed by Atelier Christian de Portzamparc at 157 West 57th Street (opposite) is the furthest along of New York's recent crop of super-skinny, supertall residential buildings.

111 WEST 57TH STREET At 1,350 feet, the tower that SHoP has designed for a Midtown site (above) will not be the tallest of the planned buildings. However, with a slenderness ratio of 1:24, it will be the thinnest tower. The architect has made the building conform to the permitted zoning envelope with a series of shallow setbacks at the top. Just below the expressive crown, the tower will have a tuned mass damper, which will reduce the acceleration of the building as it sways in the wind.

the skyline and the shadows they will cast have sparked protests, most are being built "as of right." In other words, they are on sites that lack height limits and do not require additional zoning or design review.

Not all of the city's ultra-skinny towers are being built in Midtown Manhattan. An 830-foot-tall, 57-story tower with a slenderness ration of 1:11 is under construction at 56 Leonard Street in the TriBeCa neighborhood. The building, designed by Herzog & de Meuron, will have floors cantilevering as much as 25 feet, creating the impression that they are precariously stacked. It will be able to grow so much taller than its mostly low-rise neighbors because Alexico Group, the project's co-developer with Hines, acquired air rights from the entire block.

In most parts of the city, towers must not penetrate the "sky exposure plane," which defines a buildable envelope that slopes away from the street, to permit sun access. For 53 West 53rd Street—a 1,050-foot-tall hotel and condo tower soon to begin construction next to the Museum of Modern Art (MoMA)—architect Jean Nouvel tapers the building's spire to fit within a pair of sky exposure planes converging from two streets. Similarly, 432 Park Avenue confines itself to the zoning envelope by rising from the center of the through-block site without setbacks.

432 PARK AVENUE
The tower designed by Rafael Viñoly, under construction (left), will ultimately be almost 1,400 feet tall (right). Although it has no setbacks, the building conforms to its allowed zoning envelope by rising from the center of its through-block site. Unenclosed floors spaced at intervals allow the wind to pass through the tower and lower overall lateral forces.

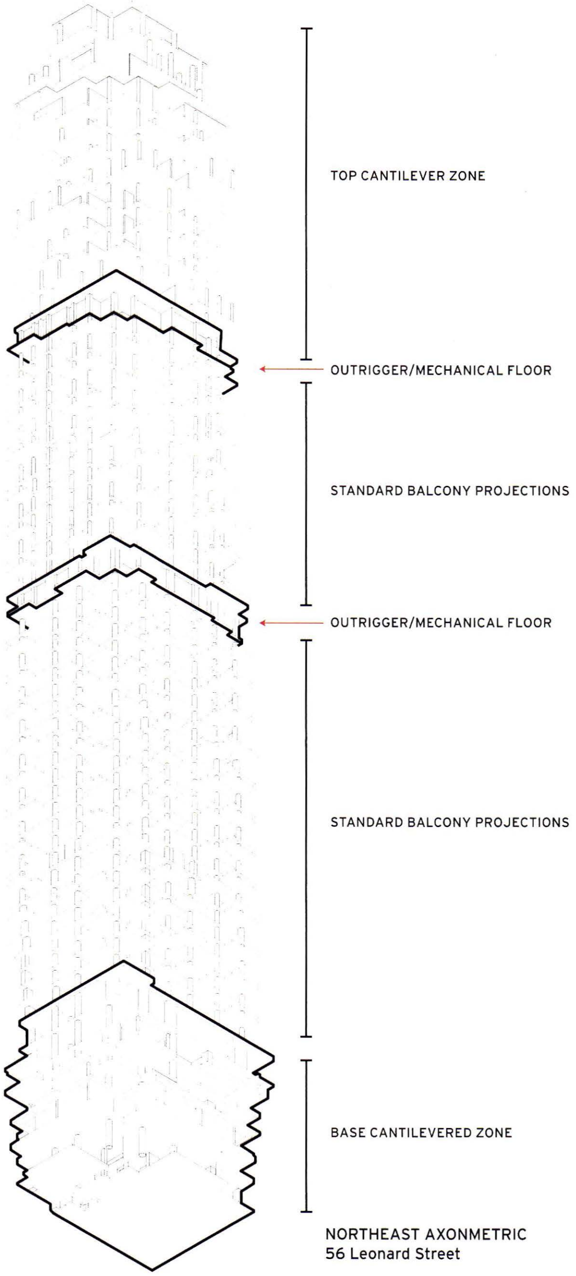
At 111 West 57th Street, SHoP has opted to move its tower away from the street in order to stay within the permitted envelope while minimizing required setbacks. As part of an agreement with the city's Landmarks Preservation Commission, the tower will rise from the courtyard of Warren and Wetmore's 1925 Steinway office building, which will be turned into apartments as part of the project. The new tower's highest floors must still be set back, but SHoP makes the most of the requirement, creating an expressive stepped crown. Bronze window mullions turn into finials to visually dissolve the top of the building into the sky. "We wanted to make a New York City building, so we worked with the zoning to express the dictated setbacks yet take it further," says SHoP partner Chris Sharples.

STRUCTURE AND STIFFNESS

Addressing the unique structural aspects of ultra-slender towers without sacrificing too much sellable space to elevators, stairs, columns, and shear walls is the key challenge, explains Silvian Marcus, the director of building structures at WSP. The firm is the structural engineer for most of Manhattan's super-slims.

According to Marcus, high-strength concrete (around 14,000 psi) is essential in slender towers. Concrete mixes have improved a great deal in recent years, he says, with additives enhancing workability. Fly ash, a byproduct of coal combustion, is increasingly used to replace a large portion of Portland cement in these mixes, because it offers strength without the substantial heat normally generated during cement-curing, which can cause cracking. (It also reduces the landfilling of the ash, which can contaminate surroundings.)

IMAGES: © KRISTINE LARSEN (LEFT); DBOX FOR CIM GROUP & MACLOWE PROPERTIES (RIGHT)



NORTHEAST AXONMETRIC
56 Leonard Street

Surprisingly, wind loads are not as much of a design challenge as the oscillations those forces induce are. Building codes dictate stiffness to protect occupants and avoid distortions that crack windows or cause leaks, but codes do not require steps to counter the discomfort people feel when sway acceleration is too great (measured in fractions of g-force, or milli-gs). Such discomfort may sound trivial, but Marcus says minimizing acceleration is essential to habitability. WSP designs to approximately 18 milli-gs for winds that would be encountered over a 10-year period and as little as 5 milli-gs for more frequent low-velocity winds. That standard dictates a host of responses that affect building mass, structural configuration, and whether dampening devices are needed.

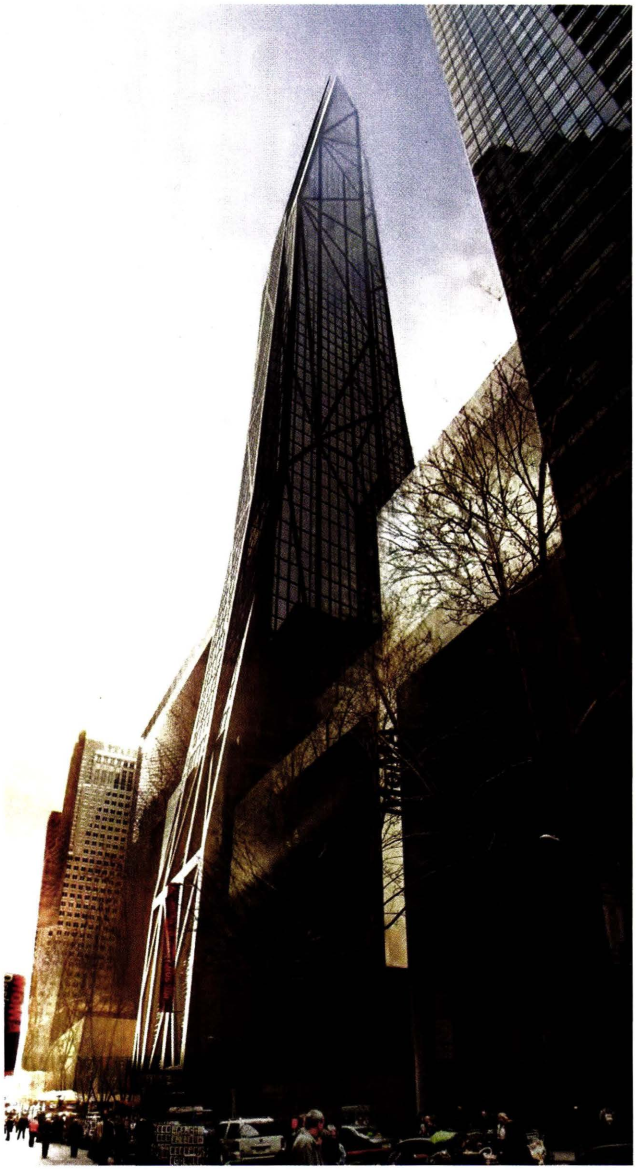
56 LEONARD STREET
Some of the dozen floors already poured (above, left) give an indication of the cantilevers that will project from the 830-foot-tall tower (above) designed by Herzog & de Meuron. Its most daring cantilevers will project from 10 full-floor penthouses at the top of the building.

CORE PRINCIPLES

The simplest tactic to combat those forces is to add weight, especially at the top of the building, but Marcus says that's just a first step. The engineer must engage the building's entire structural system by strengthening the connection of the core to the perimeter columns and shear walls. To stiffen 111 West 57th Street, WSP thickened the shear walls that run the full length of the east and west exterior walls to as much as 3 feet, and linked them to the core with deep beams.

The building's 15½-foot floor-to-floor heights left plenty of space above the ceilings to conceal the stiffening beams. The dimension not only suited the engineer's purpose: the floor-to-floor height also coincides with the maximum code-permitted run of the exit stairs. That allows the floor space given over to the core to be minimized, especially as the two required exit routes are nested atop each other in a "scissor" configuration. The generosity of the resulting 12-foot-high finished ceiling has become a selling point.

Marcus varies core-and-perimeter tactics to suit the architectural intention of each building. The exterior of Viñoly's 432 Park Avenue is structural poured-in-place concrete that acts as a tube. (With white cement and careful attention to forming, the tube is also the finished architectural surface.)



53 WEST 53RD STREET The top of the hotel and condo tower that soon will begin to rise next to the Museum of Modern Art tapers to fit within a pair of sky exposure planes that converge from two streets. The building, designed by Jean Nouvel and developed by Hines, relies very little on its core for stiffness since it has a diagrid concrete structure exposed on the exterior.

Even with monumental 10-foot-square windows, the tube is stiff enough to permit a 30-foot column-free zone between the exterior and the central core.

At 53 West 53rd Street, Nouvel aligns the elevators and stairs along the west wall, where the building abuts an office tower. Marcus says the structure "relies very little on the core" because of the extremely stiff concrete diagrid exterior that slopes to a pinnacle at 1,050 feet. The floor layout leaves a large unimpeded area for MoMA galleries at the base.

At 56 Leonard, WSP stiffens the structure by placing the core's perimeter wall outside the hallway that wraps the elevators and stairs. Enlarging the core increased the building's rigidity enough to minimize interior columns. As the building rises, the outer core wall vanishes. Shear walls wrap mechanical floors to further stiffen the building. They are set back 3 feet from the perimeter, behind a glass-louver facade.

Despite their prominence, the Leonard Street building's cantilevers neither contribute nor detract from the stiffness of the tower. Marcus calls them a "local problem" structurally, handled in a number of ways, with exposed, varying floor-slab thicknesses expressing the forces they resist. In full-floor cantilevers, short walls within the building envelope and columns at the far edge of the cantilever lock top and bottom slab together to attain rigidity without diagonal braces. They are essentially Vierendeel trusses, say the designers.

CONFUSING THE WIND

Buildings with a slenderness ratio of 1:10 or more demand additional steps to reduce acceleration, such as dampers installed near their crowns. At One57 and 432 Park these take the form of tuned mass dampers, which consist of weights (typically between 500 and 1,200 tons) suspended from springs. Some buildings, including 56 Leonard, rely on a tuned liquid damper. It has a compartmentalized pool filled with water. In both types, the mass moves more slowly than the building sways, dampening the acceleration.

Marcus also slows accelerations by reducing wind forces on the buildings. The setbacks at 111 57th "confuse" the wind, reducing pushing forces on the windward side and the suction forces on the leeward side. As the design is refined, the architect will probably include gaps in the facade to let wind pass through the building, lowering the overall force.

Viñoly provides unenclosed floors at intervals up 432 Park Avenue's facades. The spaces between columns let the wind pass, and also offer Marcus the opportunity to conceal stiffening columns and beams that cannot be accommodated on occupied floors. A curved enclosure protects the core and mechanical equipment.

Commercial towers have, until now, led tall-building innovation. But as more skyscrapers house residential uses, including luxury hotels, the building type's appeal will push architects and engineers toward further collaborative refinement and innovation. "We are in a continuous search for improving materials and systems," Marcus says. "To reach higher into the sky, we take small steps." ■

James S. Russell, FAIA, is a New York–based architecture critic and journalist. He is author of the book THE AGILE CITY: BUILDING WELL-BEING AND WEALTH IN AN ERA OF CLIMATE CHANGE.

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Learning Objectives

1 Outline architectural and structural tactics that can maximize occupiable space in very tall, very slender buildings.

2 Explain how zoning criteria and building codes shape very tall, very slender buildings.

3 Explain how very tall, very slender buildings can be made to resist lateral forces.

4 Describe strategies and technologies that engineers can deploy to dampen sway acceleration in very tall, very slender buildings.

AIA/CES Course #K1404A

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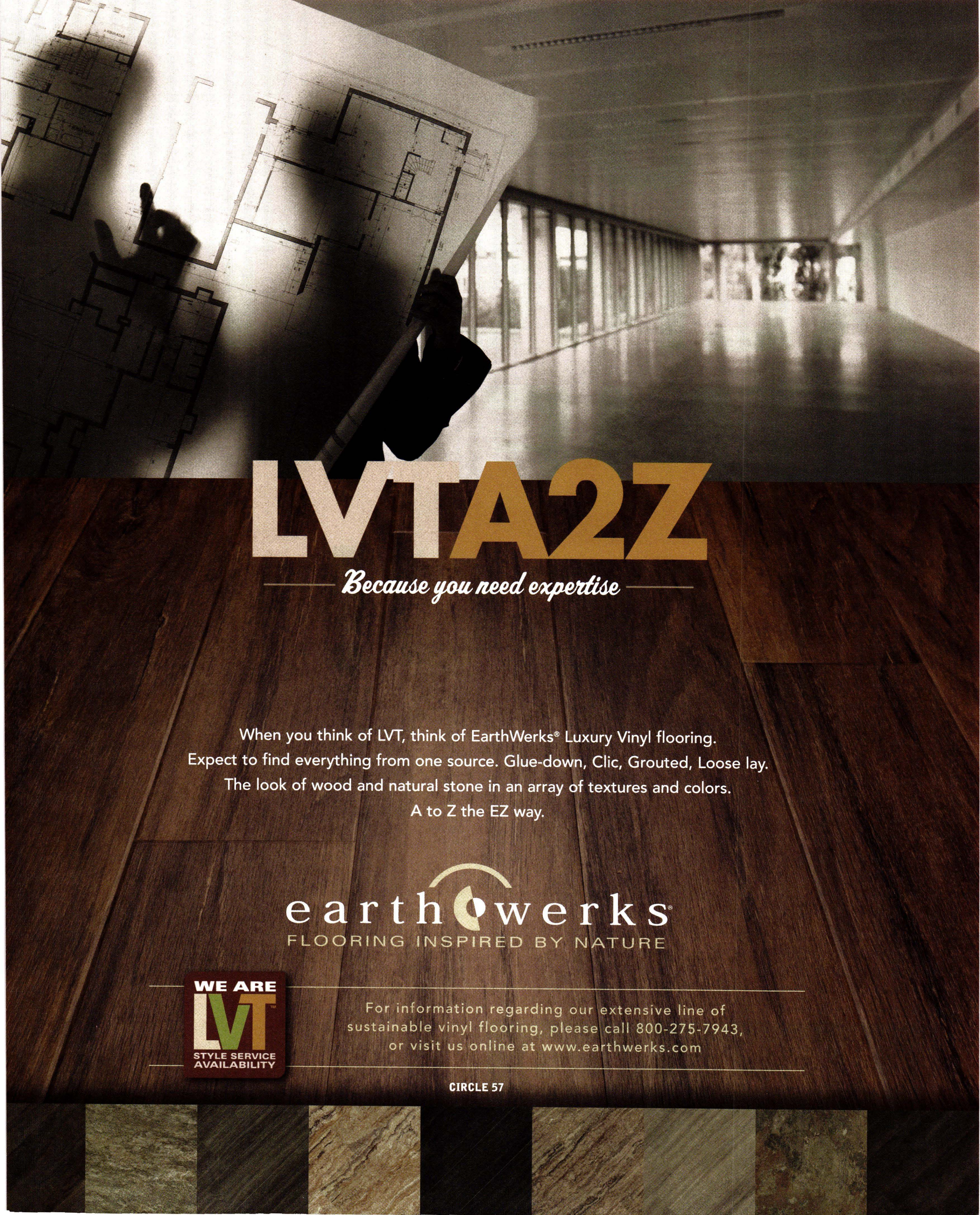
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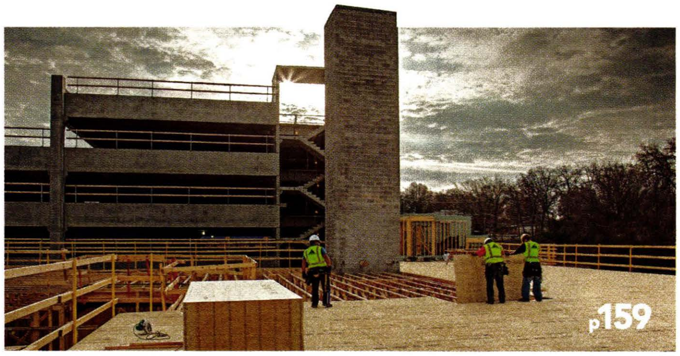

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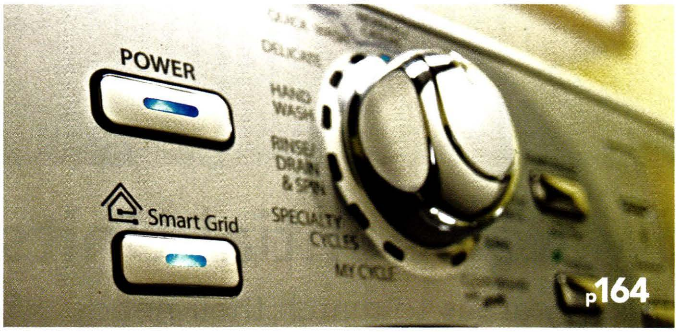

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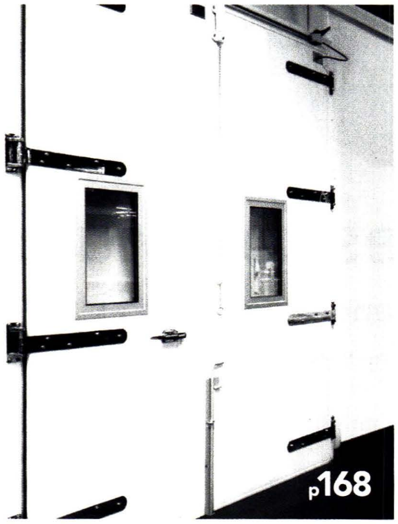

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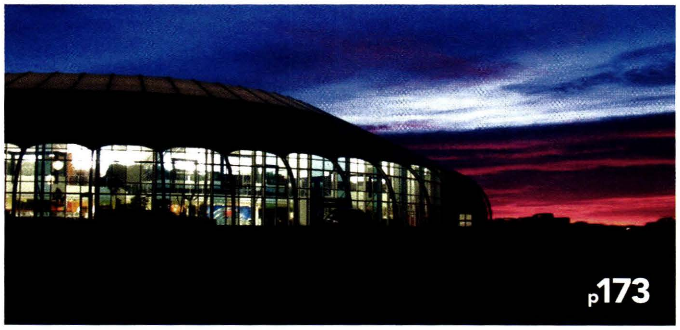

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All photos courtesy of Electrolux

Apartment and condo dwellers include an increasing number of baby boomers and higher-income households that are seeking quality appliance design.

Appliances for Multifamily Residential Units

Providing renters and buyers with kitchens and laundry areas to match their needs

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

Increased demand for multifamily housing has been observed as a recent trend influenced from several areas. Homeowners hurt by the real estate market are seeking to rent instead of buy. People moving back into the central city areas are looking for condominiums or co-op housing living arrangements. Sustainable and "walk-able" communities rely on higher-density living arrangements combined with mixed-use "living centers."

Whether renting or buying, these multifamily building residents are looking for quality design throughout their living unit—particularly in the kitchens, bathrooms, and laundry areas. At the same time, developers and property managers responsible for the long-term care of these buildings require durability, reliability, and efficient performance. By selecting and incorporating the most appropriate kitchen and laundry appliances in new or renovated multifamily housing, architects can meet both the quality and performance needs of the people and enhance the overall design of the individual living units.

TRENDS IN MULTIFAMILY HOUSING

The trend toward an increasing need for multifamily housing is anticipated to continue into the foreseeable future. Several national organizations that focus on different aspects of multifamily housing have been tracking relevant information and offer their own insights into current and future trends.

National Apartment Association (NAA)

Self-described as "America's leading advocate for quality rental housing," the NAA's stated mission is to serve the interests of multifamily housing owners, managers, developers, and suppliers and to maintain a high level of professionalism in the multifamily housing industry—all to better serve the rental housing needs of the public. The NAA is actually a federation of more than 170 state and local affiliates with 63,000 individual members representing 6.8 million apartment homes throughout the United States and Canada. Founded in 1939, their members represent all facets of the multifamily housing industry: apartment owners, management executives, developers, builders, investors, property managers, leasing consultants, maintenance personnel, suppliers, and related business professionals.

The NAA published a 2014 forecast in their December 2013 monthly magazine *Units* indicating that across the 100 largest metropolitan areas in the U.S., completed

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apartment units are expected to climb to about 231,000 units in 2014. That is an increase over the 187,000 units brought to market in 2013 and a notable jump from only 78,000 completed new units when the market bottomed out in 2011. While NAA cautions that new starts may drop slightly for a variety of reasons, they also indicate that class A rental growth is strong and the high-end market in coastal communities is expected to increase. There is also a concern expressed that some communities need to address challenges of rental affordability. Overall, then, the market in 2014 is expected to be very good, albeit perhaps not the best year on record.

The NAA has also reviewed information from other sources including an article titled "Aging Boomers to Boost Demand for Apartments, Condos and Townhouses" printed in the *Wall Street Journal* in January 2014, written by Ben Leubsdorf. The specific trend cited is that the aging baby boomer population could have a dramatic effect on the U.S. residential real estate market in the coming years.

As this demographic group continues to reach retirement age, it is anticipated that many will move out of the houses where they raised families and move into smaller apartments, condominiums, and townhouses. While this is a normal transition for people of such age, the sheer number of baby boomers means that a potentially massive shift in the nation's housing demand could take place.

Based on these demographic trends, the article anticipates that the U.S. should see a stronger rebound in multifamily construction than in single-family construction in the years to come. Cited is Kansas City Federal Reserve Board senior economist Jordan Rappaport who is quoted as saying, "By the end of the decade, multifamily construction is likely to peak at a level nearly two-thirds higher than its highest annual level during the 1990s and 2000s."

National Multi Housing Council (NMHC)

Based in Washington, D.C., the NMHC represents the interests of the larger and most prominent apartment firms in the U.S. The individual members of this organization include the principal officers of firms engaged in all aspects of the apartment industry, including ownership, development, management, and financing. Teaming with the NAA as a joint legislative partner, NMHC claims to serve as the apartment industry's primary advocate on legislative and regulatory matters. They also conduct apartment-related research, produce strategic information on business-related issues, and promote the desirability of apartment living.

The NMHC defines a rental apartment building as one with five or more units and, on that basis, they recognize 17.3 million individual apartments currently operating in the U.S. They go on to point out that nearly 89 million Americans rent their housing. To put that in context, this number represents almost one third of all Americans and over 14 percent of all households. In economic terms, the value of this entire apartment stock is $2.2 trillion with rental revenues from apartments totaling almost $120 billion annually. Further, the management and operation of apartments are responsible for approximately 550,000 jobs. The NMHC estimates that construction of apartment communities in the last five years has added an average of 210,000 new apartment homes per year. The value of this new construction has averaged more than $32 billion annually, providing jobs to over 270,000 workers.

From a market trend perspective, NMHC has determined that apartment living now attracts a wide variety of people including those that prefer to rent even though they could readily afford to buy. In fact, they reference findings that households earning $50,000 or more a year make up a quarter of all apartment renters. They also recognize that changing preferences and demographics have put the U.S. on the verge of some fundamental changes in the way housing is pursued, including a trend away from the suburban single-family house. Citing Professor Arthur C. Nelson, presidential professor and director of Metropolitan Research at the University of Utah's College of Architecture and Planning, the NMHC indicates that in order to meet emerging housing demands between now and 2020, half of all new residences built will need to be multifamily rental units. This perspective is clearly a shift away from the trend of automobile-dominated "suburban sprawl" of the past 65 years or so.

CONTINUING EDUCATION

EARN ONE AIA/CES HSW LEARNING UNIT (LU)

Learning Objectives

After reading this article, you should be able to:

1. Identify and recognize the trends in the multifamily residential market that are driven by market changes and a demand for green and sustainable housing units.
2. Determine the applicable ENERGY STAR® criteria and standards for appliances in apartments and condominiums.
3. Recognize the trends in appliance design and manufacturing that are driving convenience, durability, and green and sustainable performance.
4. Specify and design appliance installations for new construction and renovation multifamily projects that sustainably reduce energy and water consumption.

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The ENERGY STAR program has prompted appliance manufacturers to create well-designed products that are also very energy efficient.

Institute of Real Estate Management (IREM)

This international organization is an affiliate of the National Association of REALTORS made up of industry professionals connected to real estate management. As such, the IREM focuses on ethical business practices, seeks to maximize the value of investment real estate, and promotes excellence in management through education and information sharing. As an organization, they serve both the multifamily and commercial sectors.

In the IREM weekly web publication "Real Estate Management News," they track trends and other relevant information for their members. Using their own sources and other industry news sources, they recently listed a December 2013 article from *NuWire Investor* written by Bendix Anderson titled "'Hipsters' Fueling Rental Market" based on information from independent sources RealtyTrac and Real Capital Analytics. This article points out that many investors have begun turning their attention away from prime residential development locations and instead are looking at the fringe areas.

These up-and-coming neighborhoods are referred to as "hipster" locations that attract young, upwardly mobile renters and pedestrian commuters. The article cites that these trendsetting neighborhoods can be found within such cities as Pittsburgh, Norfolk, Minneapolis, and Seattle. Daren Blomquist, vice president for RealtyTrac, is quoted as saying "The culture surrounding the 'hipster' lifestyle has a major impact on local real estate markets, and mostly in a positive way. A neighborhood branded as hipster is likely to see property values and rental rates rise while vacancies and foreclosures decline."

The implied expectation is that as more restaurants, bars, coffee shops, and other amenities move in to serve the younger residents, the value of these neighborhoods will rise even more. In real terms, this trend implies opportunities for the transformation of dubious urban areas into vibrant, attractive, sustainable, and thriving neighborhoods with a mix of multifamily housing and urban amenities.

IREM has also recognized and embraced the trend of green buildings and sustainable design in multifamily housing. They have launched their own IREM Sustainability program to help property managers and others strive for more efficient buildings, improve financial performance, boost property values, and make a positive environmental impact.

In support of this program IREM has created a dedicated website that is comprised of three integrated parts: a web-based platform, a challenge competition, and a new property-level certification. Powered by software known as Green Per Square Foot, the platform provides energy and sustainability management tools for free and immediate access to data that makes it easier to take action toward greening a building portfolio.

TRENDS IN APPLIANCES FOR MULTIFAMILY HOUSING

The trends cited in multifamily housing indicate a diversity of users with a variety of needs and expectations. It is important then that architects, developers, and property managers are aware of that variety and determine what criteria applies to each individual multifamily building project. This is particularly true in the details of kitchen and laundry area design, and appliance manufacturers have recognized this as well. Accordingly, there are some relevant trends in the design and manufacture of appliances that play directly into the need for choices and options for renters/owners and property managers.

Energy Efficiency and ENERGY STAR®

Perhaps the most notable appliance trend is to do more with less energy. The desire for increased energy efficiency and the resulting reduced energy costs have become fairly universal across all user groups and building owners. This is particularly true when buildings are participating in green building programs such as the IREM Sustainability program, the USGBC LEED® rating system, Green Globes, or the ENERGY STAR® program for buildings.

As a sign of this overall trend, it is worth noting that in February 2014, the EPA announced crossing a milestone of 100,000 low- and high-rise multifamily housing units that have earned the ENERGY STAR label to date. This is significant since new and substantially rehabilitated multifamily housing units that earn the ENERGY STAR label are constructed to be at least 15 percent more efficient than units built to minimum code requirements. Altogether, the ENERGY STAR-certified multifamily programs support green building and sustainability goals while helping property owners save energy and money; the energy efficiency of appliances plays directly into this achievement.

Rental units can benefit from appliances selected to meet the needs of tenants.

Since the 1970s, appliances have been targeted by federal law to meet specific energy performance standards in order to be sold in the U.S. just as automobiles need to meet emission and fuel consumption requirements in order to be sold here. The reason is simple—according to the EPA, 13 percent of the energy used in a typical home can be attributed to just four common appliances—the refrigerator, dishwasher, clothes washer, and clothes dryer. Furthermore, another 11 percent is consumed by other miscellaneous appliances and equipment in a home such as cooking appliances like ranges, microwaves, etc. As a result of these mandates, appliance design and performance has been steadily improved such that appliances now use on the order of 70 to 80 percent less energy today than they did in the 1970s.

Beyond minimum performance mandates and building performance overall, the ENERGY STAR program includes rating systems for many residential appliances. The familiar blue and white ENERGY STAR label has become a recognized symbol for energy efficiency that is earned by demonstrating performance through verifiable testing. The program is completely voluntary but has been embraced by many appliance manufacturers as a means to distinguish their products in the marketplace and demonstrate their commitment to energy efficiency.

In order to qualify to earn and display the ENERGY STAR label, appliances must be tested at qualified independent labs which report the results back to the manufacturer to submit to the EPA. The label indicates that the tested appliance uses 10-50 percent less energy than standard models that only meet the federal minimum standards (the actual percentage varies depending on the appliance type). This is often accomplished by using advanced technology in the products which still allows the appliance to perform its intended function but uses less energy in doing so. Just as modern automobiles are rated to use less energy than their older counterparts, modern ENERGY STAR-labeled appliances still provide the same or better operation but with a demonstrated reduction in energy use.

Both the federal minimum standards and ENERGY STAR requirements are updated periodically in response to trends and improvements in technology. Since the ENERGY STAR program is based on exceeding the federal minimum standards, it becomes more stringent when the federal standards are made more stringent. In 2014 for example, federal minimum energy conservation requirements for refrigerators have been raised, meaning that the baseline for ENERGY STAR requirements for 2014 are also elevated. However, recognizing this increase, achieving ENERGY STAR label status has changed such that a 10 percent energy savings over the updated minimums is required under the 2014 program (Version 5.0 for Residential Refrigerators and Freezers) compared to a 20 percent energy savings over the previous minimum standards.

▶ Continues at ce.architecturalrecord.com

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Subflooring is the key to long-term floor performance.

Subfloor as a Hidden Asset

The key to long-term performance is what's beneath the finished floor

Sponsored by Huber Engineered Woods

When it comes to building assets, some of the most valuable are covered during the construction process. Such is the case with subflooring, a structural layer of support—and often the only layer—between the joists and the finished floor. Anyone with floors that squeak, creak, move, sag, or separate knows the effects of a faulty subfloor. In addition to user dissatisfaction, subpar subflooring can contribute to multiple performance failures resulting in costly callbacks, reworks, and even legal suits. Consequently, it behooves architects to understand the fine points of what constitutes a good subfloor. This article will discuss both appropriate subfloor materials and why they matter and the right installation and subfloor preparation to assure long-term floor performance. Lastly, we will discuss different finished floor installations that help to ensure optimal long-term performance.

WHY PERFORMANCE MATTERS

Everything in a structure rests on the subfloor. Once installed, it cannot be changed easily. According to a 2007 J.D. Power New Homebuilder Customer Satisfaction survey, half of all new homeowners complain about squeaky hardwood floors.

Today, the demands placed on a subfloor are growing ever more stringent. Modern floor plans and designs are putting greater demands on subfloor strength and stiffness than in years past because of details such as open floor plans and stone or granite counters. Designers are increasingly specifying high-end finishes, and they absolutely require a high-quality subfloor. Large-format ceramic tiles and thin engineered planks, for example, need a subfloor that is stiff and consistent, while wide-plank solid boards demand high moisture resistance and superior nail holding ability. Designers who are ignorant of or fail to meet these needs are setting themselves up for failures ranging from loose or cracked tiles to swollen and cupped hardwoods—problems that in turn lead to expensive and time-consuming warranty claims.

CONTINUING EDUCATION

EARN ONE AIA/CES HSW LEARNING UNIT (LU)

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

1. Describe the effect of a subfloor on a finished floor.
2. Compare three types of subflooring materials in terms of performance.
3. Discuss the effects of moisture on the quality of a finished floor.
4. Explain installation procedures of subflooring under hardwood, ceramic tile, light metal gauge, and radiant heating flooring.

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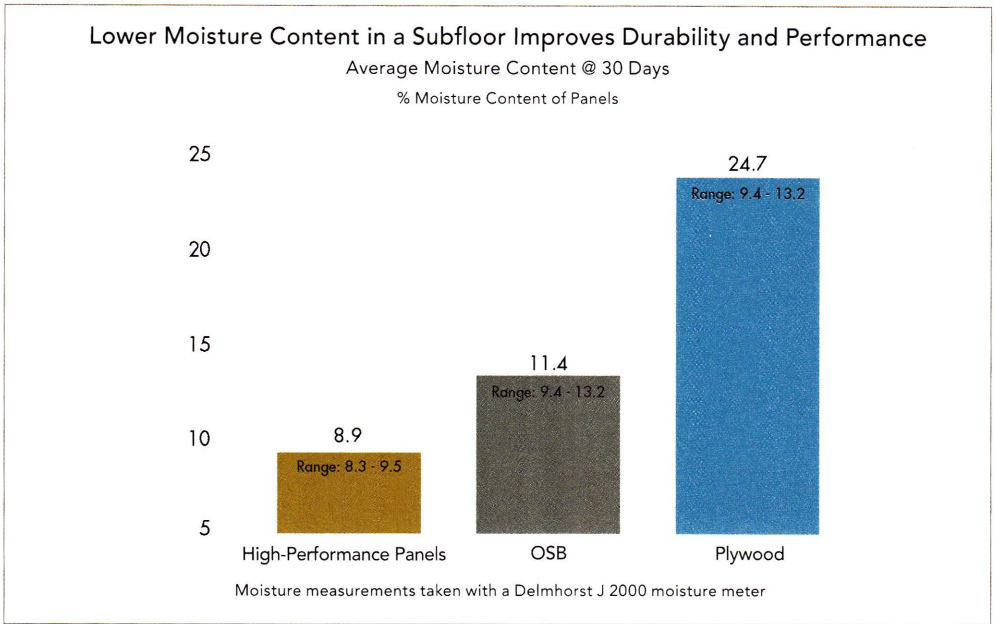
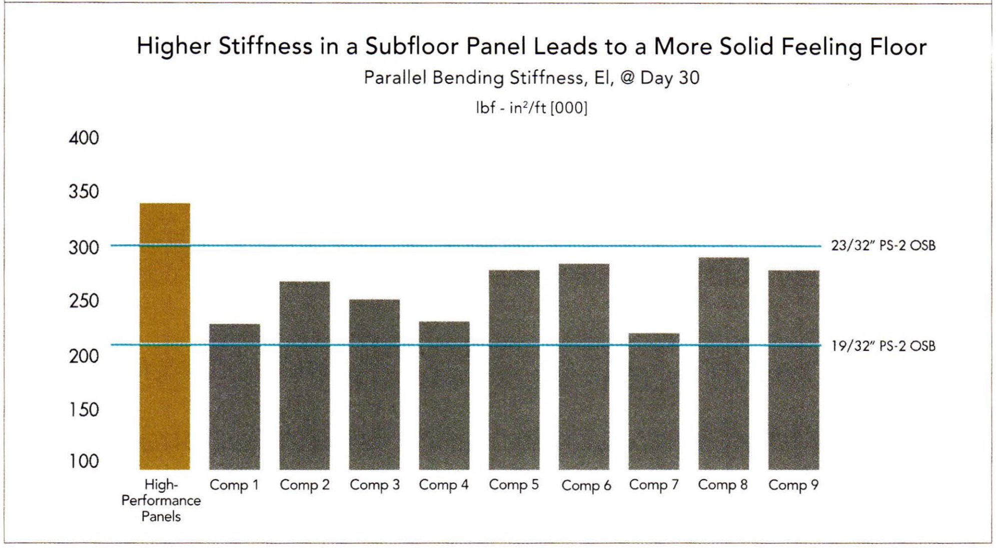
SUBFLOORS—PARAMETERS OF PERFORMANCE

While every flooring installation is unique and has its own specific requirements for subfloor preparation, performance is primarily a function of three main criteria: moisture resistance, stiffness, and fastener holding strength. Choosing the right material for a subfloor could mean the difference between a successful job or one that is plagued by problems. The most common subfloor materials are plywood, conventional oriented strand board (OSB), and high-performance subfloor panels. High-performance panels are engineered and certified to exceed OSB and plywood PS-2 standards for strength, stiffness, and fastener holding power. In addition, high-performance panels generally have the lowest moisture absorption rate in the industry, leading to better on-site performance especially when weather is an issue. This goal is reflected in building code standards and borne out in tests.

Approved testing and inspection agencies for wood structural panels, specifically OSB, all test and inspect to the same Department of Commerce PS-2 standard; this standard has become a minimum in today's construction practices. High-performance panels are designed to exceed the PS 2 minimums. Such panels will be stamped with an Evaluation Service Report (ESR) number or some other identifying mark. ESRs are reports issued by evaluation services, like the International Code Council (ICC) Evaluation Service. For example, one high-performance panel adheres to ESR 1785, which indicates a commitment to higher standards than those qualified under PS-2 for bending strength, bending stiffness, planar shear strength, axial compression strength, and stiffness. This high-performance panel provides designers with as much as 62 percent better design bending strength than PS-2-level plywood and OSB, 28 percent better design bending stiffness than PS-2-level OSB, and 16 percent better than PS-2-level plywood.

One subfloor manufacturer constructed a panel exposure deck that compared thirteen ¾-inch subfloor products, exposing them to the elements for 30 days to gauge their performance under harsh conditions comparable to an actual jobsite. Product samples were analyzed for three key indicators of performance and after 30 days and 6 inches of rain, the high-performance panels ranked highest on average in all three categories. As can be seen in the accompanying charts, high-performance panels achieved the best average results, maintaining a much lower average moisture content which is critical for the integrity of the panel and the ability to deliver strength and fastener holding for hardwood floors. The much higher moisture content shown in the OSB and plywood panels can and does often lead to panel degradation. In fact, after 30 days some of the OSB panels showed stiffness levels below PS-2 code minimums, and others approached code minimums for a 19/32-inch panel.





The difference between high-performance panels, plywood, and OSB is due to several factors. More wood is packed into high-performance panels, which produces a more dense, much stronger panel that securely grips fasteners. Resins also play a very vital role in the engineering of OSB and plywood. Typical manufacturers use powder or liquid based phenol formaldehyde resins that glue strands or veneers together with a secondary, weaker bond. These bonds are more susceptible to moisture due to the sodium content in the resins. Some high-performance panels utilize a premium, advanced resin as their primary binder that reacts chemically with the natural moisture in the wood, creating a much stronger covalent bond with the strands. This bond provides deep and long-lasting moisture protection throughout the panel. In high-performance products, wood strand orientation and size are carefully monitored to achieve maximum strength, stiffness, and fastener holding power. And, unlike other panels that may be sanded on only one side, high-performance panels are sanded on both sides to ensure consistent thickness so every panel lays flat and installs easily.

The result is a stronger, higher-density panel that performs well in the field. High-performance subfloor panels are a little heavier than standard OSB, but they cut and accept fasteners the same as other panel products. Doug Steimle, a project manager for Steven Schaefer Associates, a structural engineering firm based in Cincinnati, says "I don't go into a project without specifying subfloor panels that exceed the minimum PS-2 requirements. If the client chooses to remove them from our specs, he's well aware of the risks that causes to the building's performance."

A closer look at the performance parameters will give a more complete understanding of the problems that may arise.

Moisture Resistance

A common cause of flooring problems is excessive moisture content in the subfloor at the time the finish floor is being installed. Possible consequences include swollen panel edges and degradation of the panels' fastener holding ability. A typical hardwood floor that absorbs too much of this moisture can expand and buckle.

There is a difference in plywood and OSB moisture content regarding applying finished flooring. For instance, plywood tends to buckle, warp, and delaminate when exposed to excess moisture, while OSB swells more around the perimeter. Manufacturers have tried to address perimeter swelling with edge seals, but site-cut edges limit that protection. Joe Pusateri of Elite Homes in Louisville, Kentucky, feels that moisture-related issues can be sufficiently troublesome to scheduling. "In the past, we had to add a day into our building scheduling to repair the damaged plywood spots caused by the moisture-related issues," he says. Once they began using high-performance products they were able to remove that step in their building process, which saved them time in the long-run.

Moisture problems can be complicated by a high relative humidity or exposure to rain during construction. On a jobsite, rain and foul weather are a reality, with the average jobsite receiving rain three times during construction. In some areas of the country, snow and ice are a certainty as well and can expose projects to even more moisture. Better moisture resistance helps reduce the rate of water absorption into the panel, even under harsh weather conditions. Brice Craig, of Craig Builders in Charlottesville, Virginia, says one of the things he finds most noticeable about high-performance subflooring is what happens on the jobsite after a rain storm. "I know I'm not going to have any problems with the product because you get to the site and just see puddles of water sitting on top of subflooring," he says.

Chance Miller, whose family has been building homes in the New Orleans area for four generations, concurs. "If I'm using regular plywood or OSB flooring and it rains before the roof is installed, those panels absorb that water, and I no longer have a truly flush flooring system," says Miller. He compares that to high-performance flooring that has water-resistant sealing on all sides and offers a warranty just in case and it becomes a no-brainer.

Moisture-resistant resins play a part in the effectiveness of high-performance subfloors.

Stiffness

When comparing floor systems with the same structural framing, using a stiffer subfloor panel provides a more solid-feeling floor system with a greatly reduced chance of squeaky wood planks and cracked ceramic tiles. Stiffness is a function of the panel thickness and type, as well as of the spacing between underlying joists or trusses. High-performance panels are designed to enable stiffer floors which, in turn, make for more satisfied homeowners. It is important to note that because of their higher strength and stiffness values along both axes (parallel and perpendicular), high-performance panels offer added insurance to designers regardless of the layout. This is particularly important in case a panel gets incorrectly installed parallel with the joists instead of perpendicular to the joists.

Fastener Holding Strength

How well a hardwood floor resists pulling away from the subfloor depends heavily on how well it's fastened. The denser the subfloor, the more friction it places on the fastener, and the more force will be required to loosen the fastener. High-performance panels offer a 10 percent better calculated fastener holding power than PS-2 standard of plywood or OSB, which translates directly to a decrease in the number one complaint of homeowners: squeaky floors. As can be seen in the chart on the previous page, after 30 days of exposure, high-performance panels performed significantly ahead of OSB and plywood.

INSTALLATION—THE OTHER HALF OF THE EQUATION

In addition to selecting the right subfloor material, the other part of the equation for good performance is ensuring the right installation. Even the best subflooring will have performance issues if it is installed incorrectly.

Expansion Gap

The panel manufacturer's recommendations for spacing and fastening should be followed. Typical panel spacing and fastening requirements over truss/joist systems call for approximately 1/8-inch expansion gap around the perimeter of each panel, which is consistent with National Wood Flooring Association (NWFA) recommendations. Note that this is commonly achieved along the 8-foot edge using self-spacing tongue and groove profiles, but the 4-foot cut edge must be carefully reviewed to ensure proper spacing since it is often missed in the field. If there is not sufficient expansion space, a circular saw can be used to cut in the specified space. Some manufacturers offer instructions on the surface of the panel to educate installers on the proper spacing for the panels.

Over Joists, Trusses, and Dimensional Lumber

Regardless of the finish floor, glue as well as deformed shank nails or screws should be used for fastening to ensure greater floor performance. Gluing helps eliminate nail-popping and floor squeaks. Manufacturers generally recommend adhesives that conform to industry standard APA AFG-01 or ASTM D 3498, while high-performance panel manufacturers also recommend that the

High-performance subfloor panels ensure maximum strength for complex floor support layouts, helping to guard against mistakes by installers.

Both glue and mechanical fasteners should be used for a solid installation.

adhesive be solvent or polyurethane based. Using a construction adhesive on floor joists as well as at tongue and groove joints will help increase the stiffness of a floor system.

Before each panel is placed, a line of adhesive should be applied to the top of the joist. Check the panel manufacturer's instructions to ensure compatibility of the adhesive with the subfloor, but note that polyurethane or solvent-based adhesives often form stronger bonds with some types of panels. To prevent skinning of the adhesive prior to attachment of the panel, only enough adhesive should be spread for one or two panels. A 1/4-inch to a 3/8-inch bead of adhesive should be applied to all joist surfaces. For wide surfaces, use a double bead or a serpentine pattern. A double bead is required for the end of the joints as well, and a bead of glue is recommended to run through the groove of the panel to provide a more monolithic structure.

Screws or deformed shank nails will draw the floor and joist together. Naturally, all mechanical fasteners need to engage the underlying framing, an obvious recommendation that in practice does not always occur. If the installer is using a nail gun, he may not realize if the nail hit the joist squarely. Appearances can be deceiving, and installers say that even though subfloors look to be properly nailed down, they may not be. Many times rows of nails can be seen as much as 1/4 inch off the joist. Subfloor products with a fastening guide can help minimize these problems. Some manufacturers provide guides that show the exact location of the joists or trusses below, with directions in both English and Spanish.

Mechanical fasteners should penetrate framing members at least 1 inch. Apply fasteners 3/8 inches from panel edges. Space fasteners 6 inches o.c. on supported edges (4-foot ends) and 12 inches o.c. at intermediate support locations. Ensure that all corners are securely fastened. Note: 1-1/8-inch panels spaced 48 inches o.c. should be fastened 6 inches o.c. at intermediate support locations.

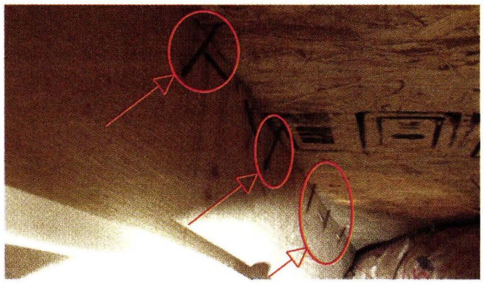
Over Concrete Slab

There are three methods used to attach subfloors to concrete slabs—direct attachment, sleeper systems, and floating floors. All methods require the preparation of the slab. For best results, the slab should be covered with a minimum 6 mil preferred polyethylene sheeting. The polyethylene sheet should be spot glued to the slab with an adhesive that will bond to both concrete and plastic. All joints in the polyethylene sheeting should be lapped a minimum of 4 inches. These laps should also be glued to ensure an adequate moisture seal. The plastic should extend up the sides of the walls a few inches, with the excess trimmed after the subflooring is installed. In this method, the panels can be placed directly on the polyethylene sheeting. Panels should be properly spaced at edges and ends according to the manufacturer's directions and fastened with masonry nails, concrete fasteners, or powder-actuated fasteners. Again, manufacturer's directions should be heeded for instructions on how far to place fasteners from panel edges.

Alternatively, the subfloor panels can be applied directly to a sleeper system. If installing the subfloor panels over a sleeper system, all edges should be fully supported. This can be achieved using blocking or a tongue and groove profile.

After the slab is correctly prepared, the sleeper system should be installed with 2x4s laid flat. Manufacturers generally recommend joist spacing of 16 inches o.c. Subfloor panels should then be laid on the joist system with the long dimension across the joists. All panels should cover at least three joists. Manufacturers' directions on spacing panels and fastener types should be followed closely.

Whether by code or by the building's designer, multifamily residential structures frequently have strict sound requirements for floors in order to cut down on noise from the units above. Many times, these requirements do not allow a subfloor to be fastened mechanically to the concrete substrate. One solution in a solid plank floor installation is a "floating floor," an isolated floor system that sits on top of the concrete without glues or nails or screws and is held in place entirely by its own weight. The typical profile involves a concrete substrate, on top of which is a sound isolation mat, and then two layers of subflooring panels that are both glued and nailed to each other. Plywood is susceptible to delamination in this type of application because if it is not fastened directly to the substrate, it can undulate and lift, compromising the viability of the entire floor system.



Fasteners missing joists create squeaky floors and expensive callbacks. A fastening guide helps installers.

Continues at ce.architecturalrecord.com

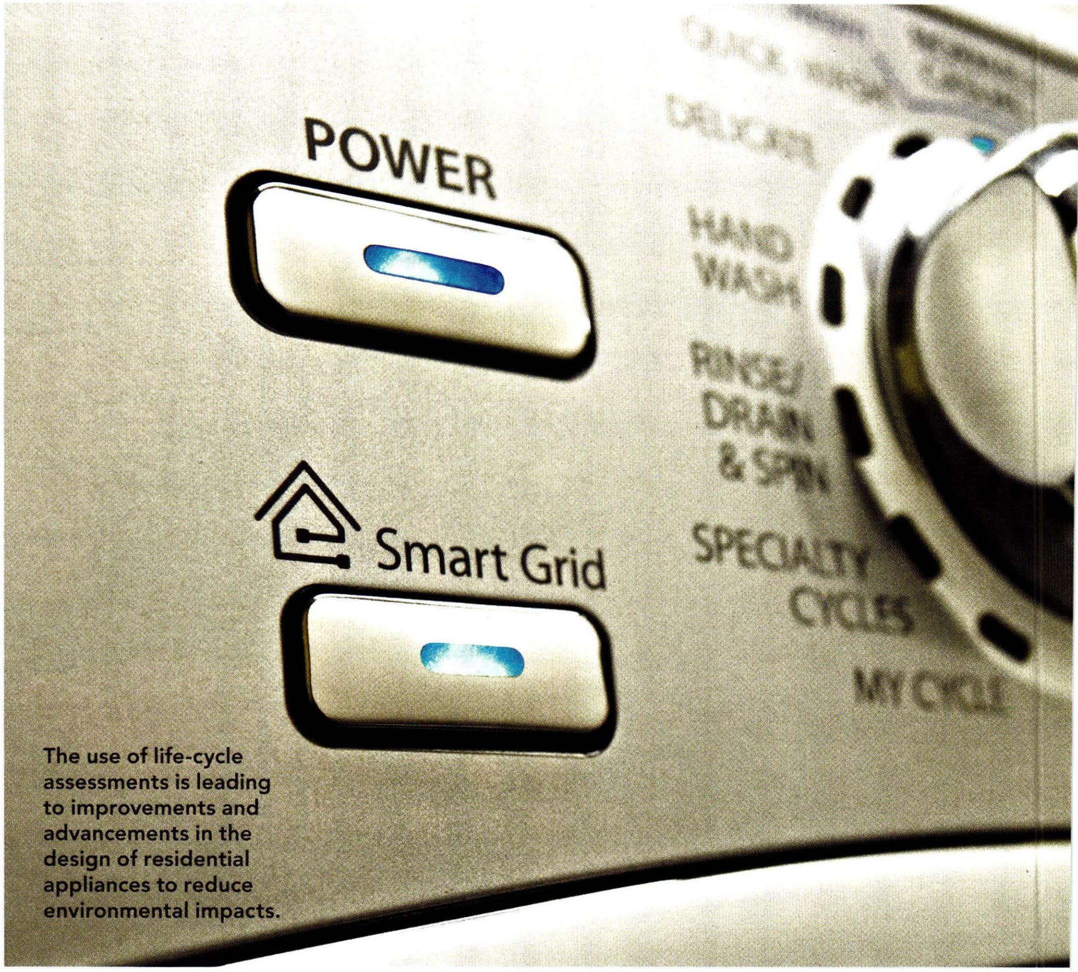
Life-Cycle Assessments for Appliances

Full life-cycle analysis reveals transparency in environmental impacts

Sponsored by Whirlpool Corporation

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

All images courtesy of Whirlpool Corporation



The use of life-cycle assessments is leading to improvements and advancements in the design of residential appliances to reduce environmental impacts.

The standards for good green building design and construction are beginning to recognize the total environmental impact of products and materials specified and used in buildings. As commonly defined, an environmental impact related to building products is any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products, or services. These impacts start as soon as raw materials are acquired and then incorporated during manufacturing to create a building product.

In the case of residential appliances, the biggest environmental impacts may occur when a product is being used in a residence. Specifically, energy and water are consumed when using the appliances, which deplete water and fossil fuel sources and contribute to the carbon footprint of the user. The disposal of products at the end of their service life likewise contributes to environmental impacts through the use of energy to transport them from the location of use and relocate them, plus the impact of disposal in landfills, incineration, or other methods. Because of these recognized impacts over the full life of products and materials, there has been increasing interest in finding a reliable method for quantifying, comparing, and documenting the comprehensive environmental impacts related to specific building products. The process and methodologies to analyze the environmental impacts at each stage of the product's life cycle is based on a standardized life-cycle assessment (LCA) process. The development of standardized LCA methodologies has led to the standardization of reporting their results. As such, these reports are quickly becoming the standard for identifying and communicating the total environmental impact of products, including appliances in buildings.

LIFE-CYCLE ASSESSMENT OVERVIEW

A life-cycle assessment (LCA) is an analysis of every component and phase of a product's life—from the selection of raw materials to the end of its useful service life. The recognized international definition is the "consecutive and interlinked stages of a product system, from raw material acquisition or generation of natural resources to the final disposal." The life cycle begins with the so-called "cradle" of the product—the extraction or acquisition of raw materials and the transportation of the materials to the manufacturing site. Next, the manufacturing phase occurs where labor, equipment, and energy are used to transform the raw materials into the building material or product. Once completed, it is deemed to be at the "gate" and ready for shipping. The finished products then move into the construction phase by being transported to the jobsite and incorporated into the building construction.

After installation of the products when the building is placed into service, the products

CONTINUING EDUCATION

EARN ONE AIA/CES HSW LEARNING UNIT (LU)

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

1. Identify and differentiate emerging practices involved in quantifying the total environmental impacts of building materials and products.
2. Investigate the life-cycle assessment (LCA) and environmental product declaration (EPD) processes and their relevance to green building design.
3. Explore the use of LCAs and EPDs as part of a decision-making process for selecting products to meet green building certifications.
4. Demonstrate the ways that appliances can contribute to positive life-cycle analyses and national green programs.

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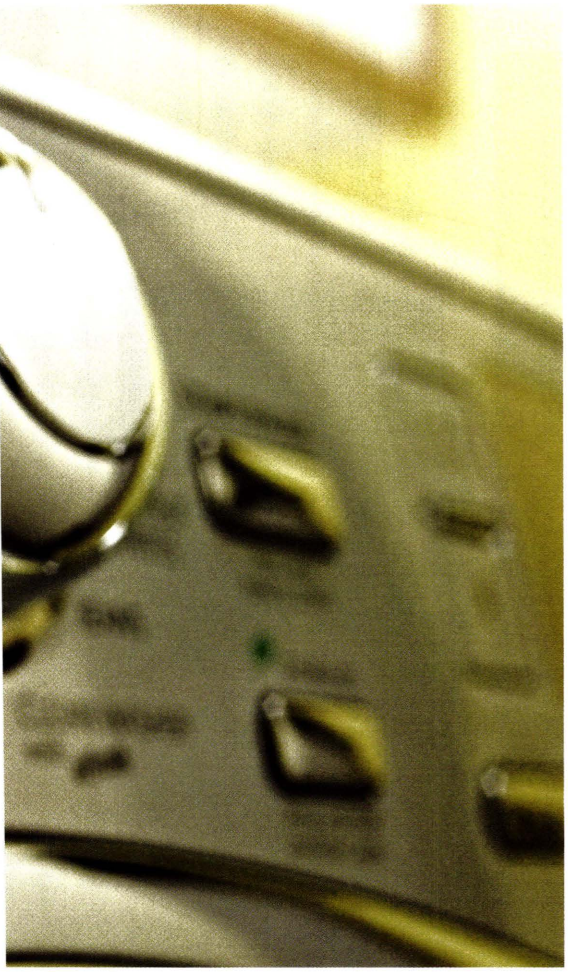
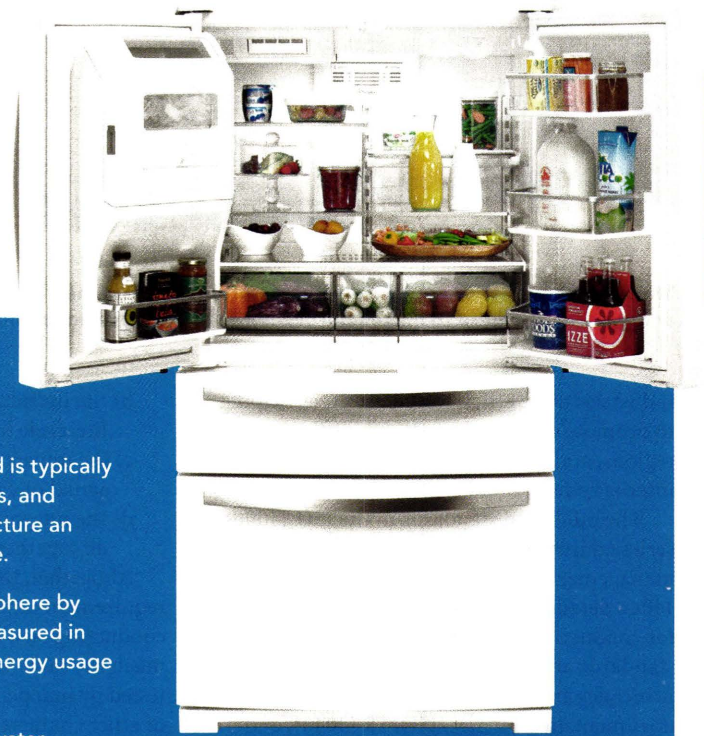


live out their use phase, using fossil fuels and water to perform their functions in the case of household appliances. Finally, at the end of the useful service life of either the building or the product, then the end-of-life (so-called "grave") phase emerges where decisions about disposing, recycling, or re-using are made. Some LCAs are more focused and are developed with a specific goal and purpose. Some examples include a cradle-to-gate analysis, which is concerned about the things that a manufacturer has direct control over. Other examples include an economic input-output analysis, social LCAs, and comparative LCAs. Overall, the idea behind any LCA is to analyze the selected product holistically, as opposed to looking at only parts of the product and their environmental impacts.

Previously, the evaluation of environmental impacts over the life of a product relied purely upon manufacturer claims. Now, however, independently conducted life-cycle assessments based on established standards have emerged as important tools for comparing environmental attributes between similar products. This has come about through the development of several fundamental standards and guidelines, which are basic to an understanding of the LCA process including the following:

International Standards

The International Organization for Standardization (ISO) (www.iso.org) has become recognized around the world for establishing standards for a variety of different industries and methodologies including the development of LCA standards and rules. Since the founding of the ISO in 1947, they have published more than 19,500 International Standards covering almost all aspects of technology and business. This organization, while an independent body, is actually a network of national standards organizations from many countries. In the U.S., the American National Standards Institute (ANSI) is the member body that participates in and contributes to the standards that are promulgated under ISO. A process of global consensus is employed for these voluntary standards with the intentions of creating industry standard specifications for products and services, helping to make



Historically, refrigerators consumed more energy than other appliances. Current models use the same energy as a 60-watt light bulb with improving energy efficiencies.

COMMON IMPACT CATEGORIES FOR APPLIANCES

Primary Energy Demand: A measure of the total amount of primary energy extracted from the earth measured in mega joules (MJ). Primary Energy Demand is typically expressed in energy demand from both non-renewable and renewable resources, and is a direct result of the life-cycle inventory (LCI). While energy is used to manufacture an appliance, the vast majority (80-90 percent) is consumed during the usage phase.

Global Warming Potential: Potential of heat to be trapped in the earth's atmosphere by greenhouse gas emissions, such as carbon dioxide and methane. Commonly measured in equivalent metric tons of CO_2. Typically this is linked directly to the amount of energy usage since most energy consumed comes from fuels that emit greenhouse gases.

Acidification Potential: Potential to cause wet or dry acid deposition in soils and water systems, which can reduce alkalinity and cause damage to plant and animal populations. The calculation of the indicator takes into account the chemical pathway of NO_x and SO_2 emissions related to the life cycle of the appliance. Raw material extraction can contribute to this impact as well.

Eutrophication Potential: Potential to over-fertilize surface waters, leading to proliferation of aquatic photosynthetic plant life, which distresses habitat for other aquatic life and alters the overall profile of the water body. The indicator is calculated by taking into account the natural pathway and consequences of the nutrient arrival to an aquatic environment. This can occur in the raw material phase or in the usage phase of appliances that use water that may require detergents, which can contribute to this impact.

Ozone Depletion Potential: Potential to cause depletion of the earth's ozone layer, which would lead to increased exposure of the earth's surface to ultraviolet light. The largest impact in appliances can come from the use of blowing agents used for insulation sprayed into the appliance during its manufacture.

The use of LCA allows appliance manufacturers to assess their existing line of appliances and determine where to make improvements that reduce environmental impacts.

industries more efficient and effective, helping to promote consistency between different regions, and breaking down barriers to international trade.

The published standards in the ISO 14000 series address a broad range of environmental management. Specifically, the document ISO 14044 details the requirements and guidelines for conducting an LCA. Other related ISO standards and publications address LCA principles and framework (ISO 14040), data documentation format (ISO/TS 14048), and illustrative examples (ISO/TR 14047, 14049). They are all based on the premise that "a compliant LCA addresses the environmental aspects and potential environmental impacts (e.g. use of resources and the environmental consequences of releases) throughout a product's life cycle from raw material acquisition through production, use, end-of-life treatment, recycling, and final disposal (i.e. cradle-to-grave)." They also go on to identify four phases in a standardized LCA study:

a) the goal and scope definition phase including identification of those things to be specifically included
b) the inventory analysis phase also called a life-cycle inventory (LCI)
c) the impact assessment phase looking at the actual or calculated impacts
d) the interpretation phase pulling it all together.

Altogether, these documents provide the ISO requirements and provide detailed guidelines for conducting an objective life-cycle assessment. In much the same way that building products are tested by independent laboratories for any range of other characteristics, an ISO-compliant LCA can be conducted by an independent third party following the requirements of the standard, thus ensuring that accepted methodologies were used to perform the LCA and that the results should be consistent with LCAs that follow the same methodologies.

Impact Categories

In an ISO-compliant LCA, environmental impacts are broken out and organized into different specific impact categories to describe the effects during a product's life cycle (or individual phases) on specific areas of concern. These impact categories include things like fossil fuel depletion (embodied energy), global warming (carbon footprint), water depletion, metal depletion, and various air pollution impacts. The ISO standard requires that specific environmental impact categories must be measured and included in the LCA and subsequently reported on. Other categories can be added beyond these basic minimums. (See sidebar "Common Impact Categories for Appliances" on the previous page.)

Product Category Rules (PCR)

A product category rule (PCR) is relevant only to a specific type of product or material meaning it is written for all products/materials within its category (i.e. roofing or flooring or appliances, etc.). With a PCR in place, the method for conducting and reporting the results of an LCA in an EPD is standardized for products within the category. This ensures that all products in a certain product category, regardless of manufacturer, are measured the same way in each life-cycle phase. The PCR defines the specific impact categories that must be addressed and determines the common functional units of measurement (e.g. square feet, BTUs, tons, etc.) so direct comparisons can be made between individual products. To be in compliance with the ISO standards, all impacted stakeholders must have an opportunity to participate in the development of the PCRs. At present, there is not a large number of PCRs since they can be expensive and time consuming to develop. However, this is starting to change, and more PCRs are being developed each year for different categories of building materials and products including some for specific appliances.

Environmental Product Declaration (EPD)

The ISO acknowledges an Environmental Label as a "claim which indicates the environmental aspects of a product or service." It goes on to clarify that an environmental label or declaration may take the form of a statement, symbol, or graphic on a product or package label, in product literature, in technical bulletins, in advertising, or in publicity, among other things. In practice, EPDs are published by the product manufacturers, usually as a summary document for each product or class of products they are making a declaration about.

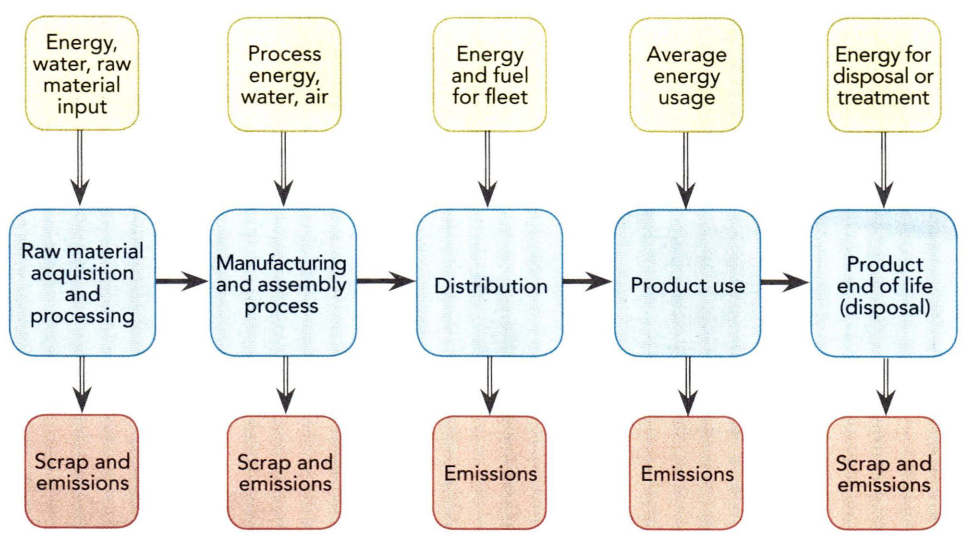
Once the LCA for a product or class of products is completed following ISO 14044, other ISO documents take over for the EPD preparation. There are standards for three types of EPDs: Type I prepared by independent third parties; Type II, which are self-proclaimed; and Type III prepared by a program operator. A program operator can be a company or a group of companies, industrial sector or trade association, public authorities or agencies, or an independent scientific body or other organization. In most cases it is a Type III EPD that is prepared, hence ISO 14025 is the primary standard used since it establishes the principles and specifies the procedures for developing both the specific programs and the actual declaration documents for Type III environmental declarations. Type III environmental declarations are primarily intended for use in business-to-business communication, but their use in business-to-consumer communication under certain conditions is not precluded. The document specifically establishes the use of the ISO 14040 series of standards related to LCA as the basis for Type III environmental declarations. The series also references other ISO standards including ISO 14020, which defines general principles of all EPDs of all types.

When completed, a standardized EPD is the ultimate outcome of an ISO 14044-compliant life-cycle assessment for a particular product following the appropriate PCRs. In essence, it summarizes all of the basic materials and processes required over the life cycle of that product, from raw material extraction, through manufacturing, transport, use, and end of service life recycling or disposal.

An EPD presents the summary of the quantified environmental data for products or systems. EPDs are voluntarily developed by manufacturers or trade associations, but since they are typically verified, at least in part, by independent third parties, their purpose is to provide reliable and comparable information regarding the environmental performance of similar products in a product category. EPDs enable architects, building owners, and other members of the design team to make direct comparisons of the environmental attributes—such as carbon footprint and embodied energy—of similar products. Hence, products can be assessed when they may have the same traditional attributes (e.g. performance, cost) but need to be selected and specified based on minimizing negative environmental impacts. EPDs are used often for comparison of two (or more) products to determine where the differences lie in the product or the process of its life cycle.

When it comes to reporting impact categories in the EPDs, ISO 14025 requires eight categories at a minimum with the PCRs defining additional impact categories, if any, that must be included. Of course, EPDs can always report more impact categories than required by the PCR. Architects should consider which impact categories are of greatest interest for their projects. For instance, while carbon footprint is likely always a concern, in the arid Southwest, impact on water resources might be of particular concern.

To help consumers optimize the energy their appliances use, some appliances have smart phone apps that control the duration and the time that appliances run.



The process of conducting an EPD looks at the inputs and outputs of each phase of a product's life cycle.

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Cold Storage Door Systems

Attention to detail is required to achieve effective thermal performance

Sponsored by Chase Doors | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*

All photos courtesy of Chase Doors

Doors used for cold storage operations are a specialty product designed for energy and workflow performance.

Cold storage is a large and growing industry in the U.S. and other developed nations around the world. Primarily used for storing and distributing perishable food items such as meat, dairy products, poultry products, fruits, nuts, and vegetables, these facilities have become essential to the availability of these foods. Currently estimated at over 16 billion cubic feet worldwide, they take the form of public, private, and semi-private refrigerated warehouses.

Cold storage facilities are also found as an integrated part of many building types including supermarkets, retail locations, restaurants, food processing plants, institutional facilities, cold storage warehouses, food service operations, prisons/correctional compounds, and warehouse distribution centers. The construction of these facilities is fairly straightforward, relying on thickly insulated walls and appropriately sized cooling systems to deliver the required refrigerated temperatures. From an architectural standpoint, the flow of people and equipment into and out of these cold storage rooms or buildings becomes the key design issue. Central to that issue is an understanding of the options for doors and their construction in these cold storage locations.

COLD STORAGE OVERVIEW

Keeping things cold while in storage has been a design challenge since the 1800s in this country. Without any modern day refrigeration, ice was the main source of cooling and was harvested during winter for use year round. For it to last, it was stored underground or in enclosures filled with things like sawdust for insulation. The emergence of the household "ice-box" and the selling of blocks of ice by truck in cities meant that perishable food could be kept cool, although not particularly well controlled in homes. It also created a demand for more perishable food and for stores and warehouses to have the same capacity to keep larger quantities cool.

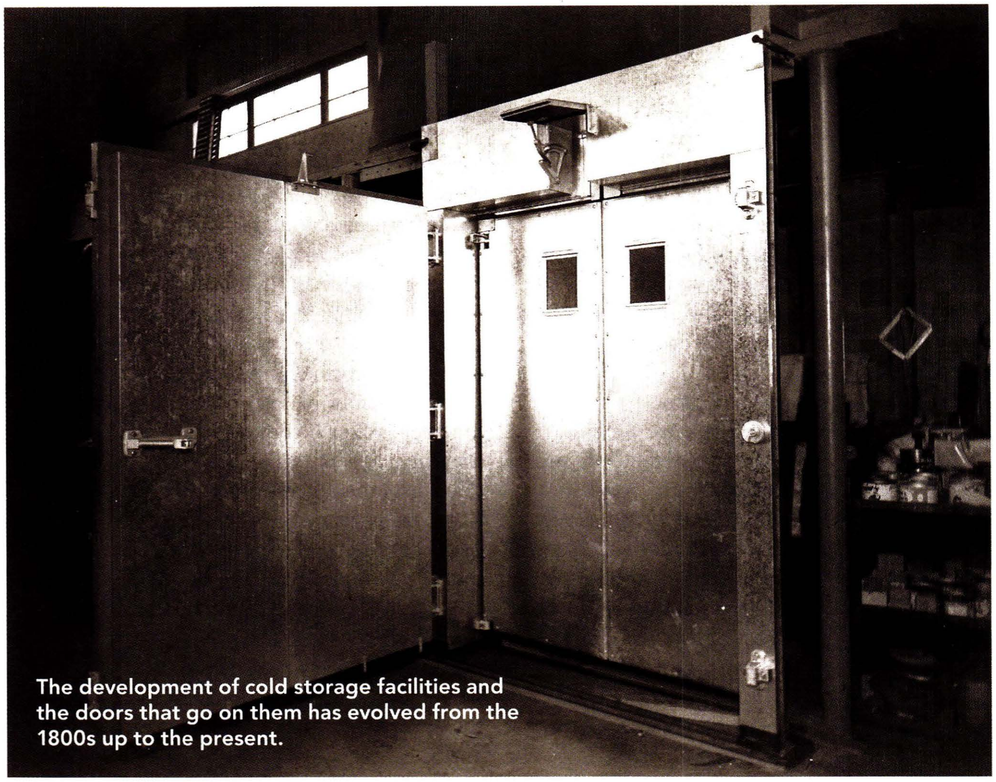
Trade Associations

The wave of inventiveness and creativity touched off by the Industrial Revolution included the development of mechanical means to cool a defined space or box. This became popular enough that by 1904 the American Society of Refrigeration Engineers (ASRE) was founded initially for the purpose of promoting the technology of refrigeration for appliances, railroad cars, trucks, etc. In 1959 they merged with the American Society of Heating and Air-Conditioning Engineers (ASHAE) which was actually founded in 1894—10 years earlier than ASRE—to form the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). We know ASHRAE today as a large, international organization with a mission to advance the arts and sciences of heating, ventilating, air-conditioning, and refrigeration. While we may think of them only for the HVAC systems in buildings, the "R" for refrigeration has clearly long been a core part of what these engineers and other members do. In fact their core publications include the 2010 *ASHRAE Handbook: Refrigeration*, which covers the design of refrigeration equipment and systems for applications other than human comfort including cooling, freezing, and storing food; industrial applications of refrigeration; and low-temperature refrigeration.

Not surprisingly, other organizations were created and grew during the same timeframe as ASHRAE. The International Association of Refrigerated Warehouses (IARW) came into existence in 1891 when a number of conventional warehousemen began storing perishable food to meet market demand. They soon realized the increased challenge and complexity of operating temperature-controlled storage facilities compared to typical warehouses without temperature control. This organization has grown to the point where today, IARW aggressively promotes best practices in temperature-controlled warehousing. As an organization they promote relevant research, industry benchmarking, member networking, and education for members and the public. They are politically active in that they also advise members of legislation and regulations affecting the food industry while assisting members in complying with U.S. and international regulations. In recent times, they have also become quite focused on l ogistics in terms of moving, shipping, or distributing the goods that they are storing into and out of those warehouses.

As the design and construction of cold storage facilities became more focused on how to best insulate and construct these facilities, those involved in that work saw the need to come together as well. In 1978, a small group of insulation contractors began to discuss creating an association representing contractors who serve the specific needs of the cold storage industry. Within a year, the National Association of Cold Storage Insulation Contractors was incorporated, its founding Board of Directors was named, and its purpose and objectives were defined. In 1987, the name was changed to the International Association of Cold Storage Contractors as they expanded to include members from the UK and elsewhere. In 2002, another name change was made to create the current International Association for Cold Storage Construction (IACSC) in order to invite a broader membership base while providing equal status for all. Today, they are made up of general contractors, cold storage construction contractors, and suppliers all focused on the best means for constructed refrigerated facilities.

In 2005 the IARW and IACSC began to see the benefit of working with other related trade organizations. These included The World Food Logistics Organization (WFLO) whose members were focused on the logistics portion of cold storage and distribution. Together, they also recognized the benefit of teaming with the International Refrigerated Transportation Association (IRTA) that provided refrigerated trucking and other shipping means. By the close of 2006, the boards of all four of these organizations created the Global Cold Chain Alliance (GCCA), an umbrella organization creating partnerships among associations, governments, institutions, and private companies spanning each link of the cold food storage and distribution chain. GCCA officially launched in April 2007 and now acts as the platform for communication, networking, and education, serving as the focused voice of the cold chain industry. Many members of any one of these four organizations under the GCCA umbrella also enjoy joint membership with one or more of the others.



The development of cold storage facilities and the doors that go on them has evolved from the 1800s up to the present.

Modern Cold Storage Facilities

Designing cold storage facilities today involves a distinction between general building construction and cold storage construction. A

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Learning Objectives

After reading this article, you should be able to:

1. Assess the development of cold storage facilities, standards, and organizations focused on improving performance and operation.
2. Compare the design needs of different cold storage facilities to the common types of cold storage doors currently available.
3. Identify the options for the construction and fabrication of cold storage doors in common applications.
4. Determine the installation differences between typical types of cold storage doors.

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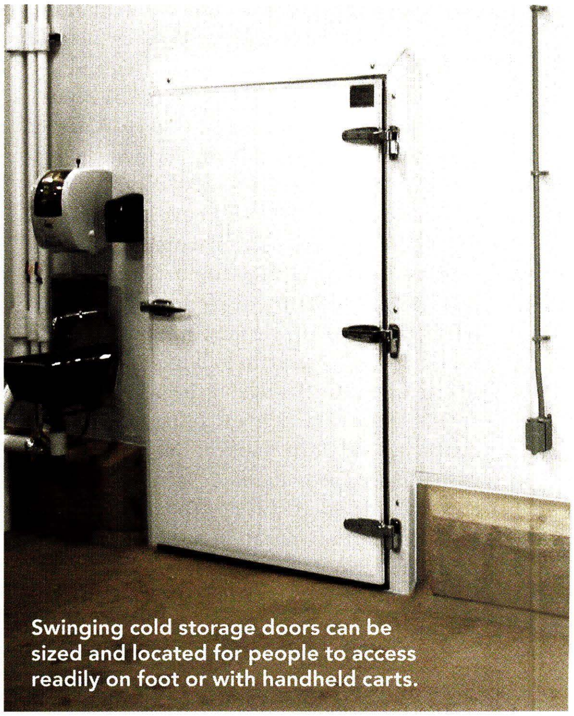
building may contain some cold storage inside it which typically means that the cold storage enclosure is made from pre-fabricated sandwich panels with spray foam between metal faces. These panels then determine the size, height, and thermal performance of the cold storage system with the surrounding building which is fulfilling other purposes. In cases where the entire building is the cold storage facility, it may well be that the walls, roof, and floor of most or even all of the building are the critical enclosing components and they must be designed and specified accordingly.

Beyond the distinction of using a freestanding internal enclosure or a building enclosure, cold storage in general falls into two overall categories identified by size. A small facility is defined as one under 3,000 square feet even though this is equivalent to the size of a house. In practice these small enclosures range in size from a walk-in refrigerator or freezer of a few hundred square feet typically found in restaurants up to larger-capacity units found in supermarkets or institutions with a large food preparation operation. From a regulatory standpoint, these smaller walk-in facilities are subject to the Energy Independence and Security Act of 2007 (EISA). This comprehensive legislation added to and amended the previous Energy Policy and Conservation Act (EPACT) first passed in 1975 and revised several times through 2005. Part of the provisions of these current regulations include a definition of the terms "walk-in cooler" and "walk-in freezer" which mean "an enclosed storage space refrigerated to temperatures, respectively, above, and at or below 32 degrees Fahrenheit that can be walked into, and has a total chilled storage area of less than 3,000 square feet."

The EISA legislation goes on to address some very specific aspects regarding the construction of any walk-in cooler or walk-in freezer manufactured on or after January 1, 2009. First they must have automatic door closers that firmly close all walk-in doors although there is an exception for doors wider than 3 feet 9 inches or taller than 7 feet. Second, they must have strip doors, spring hinged doors, or another method of minimizing infiltration when doors are open. When it comes to the construction of the units, they must contain wall, ceiling, and door insulation of at least R-25 for coolers and R-32 for freezers, except for glazed portions of doors or structural members. Floors of freezers must be insulated to at least R-28. There are also specific provisions for the refrigeration equipment types, and efficiency in the interest of saving or reducing electrical energy used. Nonetheless, the legislation clearly recognizes the significance of the basic construction of the enclosure and attention to detail at the doors in terms of conserving energy.

Large facilities over 3,000 square feet are not covered by the provisions above, but they are subject to energy efficiency standards for buildings when they comprise most or all of a warehouse or similar building. This is particularly important when you consider that refrigerated spaces are being controlled to an interior temperature of 34-36 degrees Fahrenheit while freezer storage is controlled to 0 to 20 degrees Fahrenheit. That means as a practical matter, these larger facilities likely want to meet the same or better R-values as stated above to create efficiency in energy use and to control operational costs. It is common for these large facilities to bump up the R-values to R-32 for refrigerated storage and R-48 for freezers. It is also likely that a large facility will require multiple doors that are larger in size to allow not only walk-in operation but drive-in operation of forklifts or other equipment. The best rule of thumb in this case is that these doors should be made to match the thickness and performance of the walls (e.g. R-32 and R-48). Beyond that, since these doors are the only source of thermal interruption and usually the only operable item, it is worth spending time to focus on the details of the options, types, and fabrication of these doors.



Swinging cold storage doors can be sized and located for people to access readily on foot or with handheld carts.

Cold storage doors are custom fabricated in different sizes and types with multiple options available.

Swinging Doors

Single- and double-panel swing doors are commonly used for walk-in applications where strong environmental control is necessary. Swinging cooler and freezer doors provide time-proven performance for new or existing applications and are suitable for both interior and exterior applications. Typically they are used for personnel walk-in doors and are sized accordingly, but much larger swinging doors are possible that can allow machinery or equipment to pass through as well. Because the door swings out into the path of travel, the facility design needs to account for both this door swing and the travel clearances required for people or

COLD STORAGE DOORS—OPERATION AND FUNCTIONS

The smooth and efficient operation of a cold storage facility is not only important for running a successful business operation, it is often regulated by the U.S. Department of Agriculture (USDA), the National Sanitation Foundation (NSF), and/or the local health department. Therefore, a variety of design issues must be addressed.

Among the first things an architectural design needs to reconcile is the workflow of the products being moved in and out of the refrigerator and freezer enclosures. Providing adequate clearance for people and equipment to move is as important as the area required for the actual storage. That means that the location and clearance for doors needs to be thought through in concert with the client or user that will be operating the location. Among the issues to work out when trying to optimize the design and layout are:

- What type of traffic will be going through the door? (i.e. personnel, rolling carts, pallet jacks, motorized pallet jacks, or forklifts)
- What is the traffic flow pattern going through the opening? (head on, turning a corner to get in, etc.)
- What is the opening size in relation to the product passing through the opening? (i.e. how much clearance is needed? Two inches is the suggested minimum)
- What is the resultant best opening size? (width and height of opening)

All of these items, but particularly the traffic flow and pattern in a facility, help determine the best door type and style to use. The right selection can ensure unimpeded travel so people or forklift operators don't have to stop or unduly adjust what they are doing every time they come to a door. It also ensures that the installation is safe for the employees working at the facility and allows for the door to perform properly as intended by the manufacturer. Since there are three basic door types to choose from, we will look at each one separately in more detail.

equipment when entering/exiting.

While swinging doors in general are commonly used for many building applications, it is the details of these cold storage swinging doors that make them different. This is particularly true when it comes to the air and temperature sealing the perimeter of the door. The type of gasket used in particular is extremely important not only to comply with EISA regulations but to minimize the energy loss overall. Magnetic gaskets with a push in flexibility are one option that provides superior positive sealing since they can accommodate "out of square" or irregular conditions more readily than traditional compression gaskets. Similarly, a sweep sill gasket will prevent thermal infiltration along the bottom of the door. In cases where the door frame is installed flush with the floor line, there can be no need to embed a sill in a concrete floor. Further, if cam lift hinges are used that raise the door when opened, it provides reduced friction on the floor seal and eliminates the need for sloped floors.

In addition to these details there are some other things to be aware of that are options for a swinging cold storage door. First is the use of electric heating in the door or the sill to prevent the build-up of condensation or ice around the perimeter of the door. Such heating needs to be very low wattage and be regulated so that it uses just enough energy to be useful but no more than is needed. If a window is included in the door as an option, there may also be a need to provide some electrification there to prevent condensation or moisture buildup. In regards to hardware, there are choices in types of hinges depending on the size and operation of the door to consider. There are also options on the release latch including some that can be released from the inside even if the door is padlocked on the outside. And of course there are options for finishes. Most doors are finished with metal to comply with sanitation requirements as well as provide a solid measure of durability. These include stainless steel, aluminum, or galvanized steel in a textured or smooth finish.

Sliding Doors

The common alternative to swinging doors is the use of single or double sliding doors that hang on a track in front of the cold storage enclosure. Horizontal sliding doors are best suited for high-use and heavy-duty applications particularly where forklifts and other equipment are used. They are usually designed for high cycle, abusive applications and are considered a true "workhorse" door. From a design standpoint, the horizontal sliding function of the door means that a door swing area does not need to be factored in. However the external wall area adjacent to the door opening obviously needs to be kept clear so that the door can operate properly—it does not recess into the wall since that would compromise the thermal performance of the enclosure. A single sliding door would need to have the wall clearance the full width of the door on the side that it slides toward. If bi-parting doors are selected, then half the width of the door needs to be kept clear on each side of the opening.

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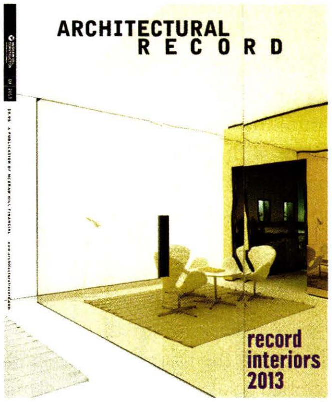
Peter J. Arsenault, FAIA, NCARB, LEED AP, *practices architecture, consults on green and sustainable design, writes on technical topics, and presents nationwide on all of the above. www.linkedin.com/in/pjaarch*

2014 CALL FOR ENTRIES Record Kitchen & Bath

The editors of ARCHITECTURAL RECORD are currently accepting submissions for the **2014 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 2014 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@mhfi.com. (Please indicate **Record Kitchen & Bath** as the subject of the e-mail.) **Submissions are due May 30, 2014.**

2014 CALL FOR ENTRIES Record Interiors



The editors of ARCHITECTURAL RECORD are currently inviting submissions for the **2014 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 paid to works that incorporate innovation in design, program, building technology, sustainability, and/or materials. The winning projects will be featured in the September 2014 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@mhfi.com. (Please indicate **Record Interiors** as the subject of the e-mail.) **Submissions are due May 30, 2014.**

Photo courtesy of Sprung Instant Structures, Inc.

Illuminated, permanent and habitable, this structure is an example of a tension-membrane building at sunrise.

Sustainable Buildings on Demand

Originally engineered to solve the problems of relocatable or temporary shelter, tension-membrane structures are now a sustainable choice for permanent, habitable structures, providing fast, energy-efficient and affordable building solutions.

Sponsored by Sprung Instant Structures, Inc. | *By Celeste Allen Novak, AIA, LEED AP*

Tension-membrane buildings provide an opportunity for a new sustainable design approach for any building program that requires column-free and open-span floor plates. New tension-membrane buildings are sited in deserts as well as snow-covered mountains with segmented grace. These buildings can provide instant, cost-effective alternatives to conventional construction, for facilities that range from dormitories, churches, and offices, to gymnasiums. Tension-membrane structures have been around since the 1960s, often used by the military. When oil and gas companies required shelters for both arctic and desert climates that could be easily transported across the world, engineers developed an energy-efficient portable building system.

Their solution has been refined and developed into a new building type—permanent, habitable tension-membrane structures. These buildings can be erected quickly and cost-effectively, maintaining similar performance and aesthetic values to conventional structures, but with a lower cost basis of 35 to 50 percent. Architects who have worked with these forms can attest to the difference and quality of these durable, affordable, flexible and energy-efficient buildings.

This article will review the aesthetics and attributes of tension-membrane buildings and provide information on how they can fit into a sustainable design portfolio in any climate, delivering energy efficiency and durability for clients who need affordable and immediate building solutions with an optional insulation package.

In the introduction to the *Whole Building Design Guide*, a program of the National Institute of Building Sciences, Richard Rush is quoted as defining an integrated building system by only four systems: structure, envelope, mechanical and interior.

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Learning Objectives

After reading this article, you should be able to:

1. Identify and design the components of a permanent, habitable tension-membrane structure.
2. Review the sustainability engineered into these monolithic structures including energy efficiency, daylighting, and fire safety.
3. Integrate components such as windows, doors, lobbies, and interior partitions within a self-supporting framed structure all within a system that is designed for the maximum reduction of construction waste and transportation costs.
4. Discuss the flexibility, cost-effectiveness, and durability of these structures.

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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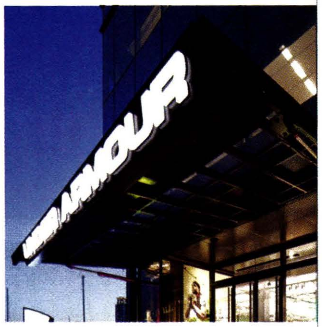

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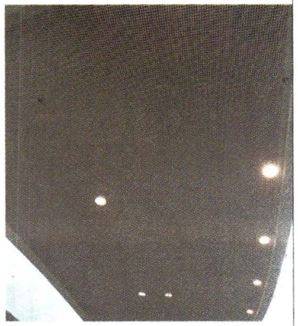

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Pyrok, Inc. introduces the Vogl seamless, perforated, sound-absorbing gypsum board system. Available in many round, square, and linear perforation patterns. The perforated gypsum boards are taped with the unique Vogl joint taping system and then painted. Photo: Johns Hopkins University, Brody Learning Center, Baltimore, MD.

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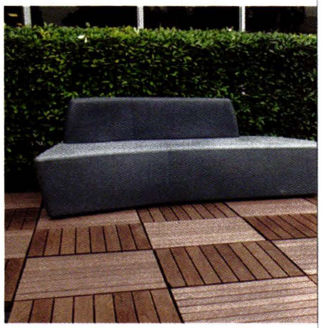


Tournesol Siteworks

Boulevard Wood Tiles are FSC-certified, thermally modified red oak. Incredible 25+ year durability, resistant to warp and twist. A viable domestic alternative to South American Hardwoods.

Product Application:

- 24-in. x 24-in. structural wood tiles
- 1 and 5/4 x 6 decking and siding
- Wide range of dimensional lumber

Performance Data:

- Rated 25+ year-exposed (Grade 1, EN-250-2)
- Beautiful, natural deep color, patinas to silver

tournesolsiteworks.com
800.542.2282 **Circle 152**

LANDSCAPING, SITEWORK

GRASS POROUS PAVING

WR | G

Invisible Structures

Grasspave2 flexible grass porous pavement.

Product Application:

- Fire lanes
- Parking
- Access roads

Performance Data:

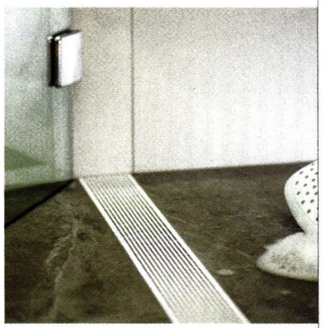
- 5,721 psi compressive strength
- 100% grass coverage

invisiblestructures.com
800.233.1510 | **Contact:** Sales **Circle 153**

MECHANICAL SYSTEMS, HVAC, PLUMBING

LOW-PROFILE LINEAR DRAIN SYSTEMS

WR



Infinity Drain

Versatile linear drain system works for showers, pools, patios, balconies, and storm drainage, providing an architectural aesthetic and limitless possibilities.

Product Application:

- Offering the only site adjustable linear drain
- The most decorative top grate options
- Up to 5 finish options available

Performance Data:

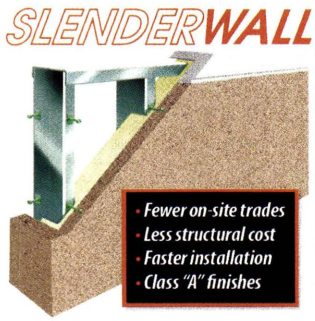
- Custom fabrication available
- Made in USA

InfinityDrain.com
516.767.6786 | **Contact:** Info@InfinityDrain.com **HD Expo Booth #1214** **Circle 154**

ROOFING, SIDING, THERMAL & MOISTURE PROTECTION

ARCHITECTURAL CONCRETE CLADDING

WR | G | NEW



Easi-Set Worldwide

Ultra Hi-Performance Slenderwall is a 28 lb./sf award-winning architectural precast concrete and steel-stud exterior panel system wind-load tested to 226mph.

Product Application:

- BioInnovation Center, New Orleans, LA
- Hilton Gardens, Montreal, Quebec, Canada
- Westin Luxury Hotel, Virginia Beach, VA

Performance Data:

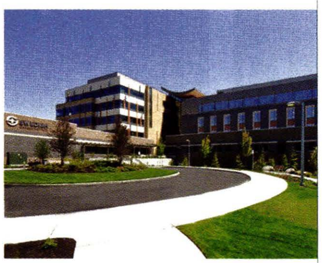
- Continuous closed-cell foam insulation and optional factory-installed windows
- H2Out Pressure Equalized Joint Rainscreen

www.slenderwall.com
800.547.4045 | **Contact:** Arthur Miles **Circle 155**

ROOFING, SIDING, THERMAL & MOISTURE PROTECTION

INTRODUCING PANEL

G | NEW



Envolution™ by Metl-Span®

Envolution™ combines the look of finished precast concrete with the exceptional thermal efficiency of insulated metal panels in the new Cast-Wall panel.

Product Application:

- Clarian Saxony Medical Center, IN; Atlantic Dodge, FL; Kia, Nova Scotia

Performance Data:

- Factory-cured Cast-Cote® finish defends against weather and impact
- Can be installed in virtually any weather condition

www.envolution.com
877.585.9969 | **Contact:** Doug Pickens **Circle 156**

ROOFING, SIDING, THERMAL & MOISTURE PROTECTION

SELF-CLEANING GUTTER SYSTEM

WR | G

Rainhandler

Rainhandler Gutter converts roof runoff to rain-sized drops, spread in a 3-ft. swath away from the structure. Call/email for specification.

Product Application:

- Single-family homes
- Garden apartments and condominiums
- Commercial—schools, libraries, offices, etc.

Performance Data:

- No cleaning or maintenance unlike conventional gutters
- 3-ft. spread confirmed by independent lab

www.rainhandler.com
800.942.3004 | **Contact:** Jackie Nguyen **Circle 157**

New and Upcoming Exhibitions

Bernard Tschumi
Paris
April 30–July 28, 2014
Following exhibitions devoted to the work of Jean Nouvel, Thom Mayne, Richard Rogers, and Dominique Perrault, the Centre Pompidou hosts the first major European retrospective of the architect and theorist Bernard Tschumi. Since the late 1970s, Tschumi has been redefining architecture through a series of conceptual arguments rooted in film, literature, visual arts, and philosophy. The exhibition showcases some 350 drawings, sketches, collages, and models, many of them never shown previously. The installation, designed by the architect, also features archival documents and films. For more information, visit centrepompidou.fr.

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

Ongoing Exhibitions

Almost Anything Goes: Architecture and Inclusivity
Santa Barbara, California
Through April 13, 2014
The Museum of Contemporary Art Santa Barbara (MCASB) welcomed six prominent Los Angeles–based architects to present original designs that are anything but architecture. The spirit of inclusivity in this exhibition is owed to a set of conditions conspicuous in Los Angeles, including a recession-driven dearth of building projects, new digital technologies, growing ecological concerns, and a renegade spirit of experimentation unburdened by the weight of tradition. For more information, visit mcasantabarbara.org.

UMMA Table & Objects
Los Angeles
Through April 20, 2014
The SCI-Arc Library presents an installation of Florencia Pita's work, *UMMA Table & Objects*, originally commissioned for the University of Michigan Museum of Art. The installation explores the provocations and intersections of digital technology, material experimentation, and ornament in the work of the Argentina-born, Los Angeles–based architect and designer. It traces the evolution of Pita's design ideology through installation pieces, urban design, tableware, furniture, and architecture, as well as small adornments. For more information, visit sciarc.edu.

How Architects, Experts, Politicians, International Agencies, and Citizens Negotiate Modern Planning: Casablanca Chandigarh
Montreal
Through April 20, 2014
Held at the Canadian Centre for Architecture, this exhibition suggests a new historiography of modern urbanism based on two major experiments from the early 1950s: new residential neighborhoods in Casablanca, Morocco, planned by Michel Écochard and a team of young French and Moroccan architects, and

Chandigarh, the new capital of Punjab in northern India, conceived by a team consisting of Le Corbusier, Pierre Jeanneret, Maxwell Fry, Jane Drew, and local architects and planners. The exhibition aims to foster fresh discussions about cities in multiple locations outside western geopolitical and cultural boundaries. For more information, visit cca.qc.ca.

The Space Between
New York City
Through May 17, 2014
The Space Between, an exhibition of new work by photographer Marc Yankus, will be on view at the ClampArt gallery. The exhibition–Yankus's fourth solo show at the gallery–explores the fine line between urban reality and architectural fiction through surreal portraits of buildings. *The Space Between* presents images subtly altered to show a New York City that exists on an aesthetic plane where imagination and documentation meet. For more information, visit clampart.com.

Frank Lloyd Wright and the City: Density vs. Dispersal
New York City
Through June 1, 2014
This exhibition at the Museum of Modern Art celebrates the recent joint acquisition of Frank Lloyd Wright's extensive archive by MoMA and Columbia University's Avery Architectural and Fine Arts Library. Through an initial selection of drawings, films, and large-scale architectural models, the exhibition examines the tension in Wright's thinking about the growing American city in the 1920s and '30s, when he worked simultaneously on radical new forms for the skyscraper and on a plan for low-density urbanization of the American landscape titled Broadacre City. For more information, visit moma.org.

Lectures, Conferences, and Symposia

Culture Lab Detroit
Detroit
April 24–26, 2014
Culture Lab Detroit will host its second annual series of events focused on the theme of regenerative design in urban areas. The events–including community classes, portfolio reviews, and a panel discussion–provide opportunities for learning and conversation with internationally recognized design leaders including David Stark, David Adjaye, Fernando and Humberto Campana, and Theaster Gates. The symposium also seeks to increase awareness of Detroit's creative community

internationally, and inspire new projects within the city. For more information, visit culturelabdetroit.org.

ARCHITECTURAL RECORD
Innovation Conference
Los Angeles
May 21, 2014
ARCHITECTURAL RECORD brings its acclaimed Innovation Conference to Los Angeles, a city known for blurring the boundaries among urbanism, architecture, and landscape. Topics range from the merging of landscape and architecture to the growing influence of Mexico's architects and the integration of contemporary art, technology, and design. Confirmed speakers include Thom Mayne, Brad Cloepfil, Michel Rojkind, Thomas Phifer, and Tatiana Bilbao. At Walt Disney Concert Hall. For more information, visit construction .com/events/2014/innovation-la.

Competitions

Competition Innatur 3
Registration deadline: April 29, 2014
For the third staging of this international competition, Spanish organization Opengap seeks cutting-edge proposals for a space that will promote understanding of nature through architecture and sensitivity to a landscape to be chosen by the participant. Projects must promote that objective, and each participant may propose the location of his or her project. The first-place proposal will receive a €2,000 prize, and will be published on Opengap's website. For more information, visit opengap.net.

The Third Annual *Urban Omnibus* Writing Competition
Submission deadline: May 12, 2014
The third annual *Urban Omnibus* writing competition explores the topics of common ownership, private property, and the sharing economy. With this competition, *Urban Omnibus* —an online journal published by the Architectural League—invites writers to infuse the discourse around structural economic change with narrative, theory, history, or humor. The jury will select one first-prize essay, whose author will receive an award of $500. Up to two second-place winners will receive prizes of $250 each. Winning submissions will also be published on *Urban Omnibus*. For more information, visit urbanomnibus.net.

ISARCH Awards
Registration deadline: June 30, 2014
The ISARCH Awards are international awards for architecture students to promote and recognize university projects on an international scale. The ISARCH Awards also aim to encourage young people to join the debate on architecture, contributing their unique vision and opinions. The competition is open to all architecture students who have graduated within the three years preceding the competition deadline. Jury members include Patrik Schumacher and Odile Decq. The three winning projects will receive prizes worth a total of €7,000. For more information, visit isarch.org.

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

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