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Matteo Pericoli is an architect, author, illustrator, and teacher. After graduating from the Politecnico of Milan in 1995, he moved to New York, where he worked at Richard Meier & Partners Architects and other firms. In 2010, he founded the Laboratory of Literary Architecture, a cross-disciplinary exploration of literature as architecture. His illustrated books—to name a few—include Manhattan Unfurled; London Unfurled; The City Out My Window: 63 Views on New York; and Windows on the World: 50 Writers, 50 Views. Pericoli currently lives in Turin, Italy.
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HIGHLIGHTS

SCENES FROM THE NEWS
See more images of the new Sandy Hook School, in addition to an expanded gallery of Denise Scott Brown’s photography from the Venice Architecture Biennale exhibition Wayward Eye. [NEWS]

RAINBOW TOWER DRONE FOOTAGE
Get a bird’s-eye view of the Torre Arcobaleno in Milan with this drone-filmed video showing the tower’s urban context. [SNAPSHOT]

MICRO-UNIT MOVIE
After reading this month’s story on Carmel Place, watch a video of the architects explaining the design of the building as well as the fabrication and installation of its micro-unit apartments. [BUILDING TYPE STUDY]

FEATURED HOUSES
Find photos, credits, and specifications for new residential projects in this monthly online-only feature. [HOUSES]

ARCHITECTURAL RECORD 125 years

EDITOR’S LETTER VIDEO
Watch a conversation about RECORD’s past between editor in chief Cathleen McGuigan and former editors Mildred Schmertz and Robert Ivy.

UP CLOSE WITH THE COVER
Take a closer look at this month’s panoramic cover, illustrated by Matteo Pericoli.

WORST BUILDINGS
Last month, nearly 100 readers submitted their nominations for the worst buildings of the last 125 years. Now, click through the gallery to see some of them.

READERS RESPOND
Do you agree with our lists of the Best Buildings and Cult Classics? Let us know what you think in the comments section at the bottom of every article!

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Across the Decades With Architectural Record

A trio of editors discuss the changing world as reflected in the magazine’s pages.

To mark RECORD’s 125th anniversary, the two living former editors in chief joined me for a conversation about RECORD’s past and present. Mildred Schmertz, FAIA, who has an MFA from Yale in graphic design as well as an architecture degree, came to the magazine’s art department in 1957, moved on to be a writer and editor and finally was made the first woman editor in chief, from 1985 to 1990. The late Stephen Kliment succeeded her, and then Robert Ivy, FAIA, arrived as the top editor in 1996. When he left to become CEO of the American Institute of Architects in 2011, I was hired to take the helm. Following are highlights from our talk about the magazine’s history under our collective watch, which stretches back 59 years.

Cathleen McGuigan: Mildred, you were at RECORD for 33 years and have the longest view of the magazine. What was its mission when you began, and how did you see it shift from the late 1950s to 1990?

Mildred Schmertz: The mission has been the same for 125 years, and it’s simple: to serve architects in the profession, to keep their loyalty, and to attract advertisers because of the size and quality of our readership.

Robert Ivy: I agree the fundamental mission really hasn’t changed. I would just add to that: we inform and inspire our audience; architecture is both an art and a science. But the world has shifted and changed dramatically over the period of time that Mildred and I and you have been involved—everything from the explosion of digital technology to globalization, climate concerns, and social questions. We’ve all responded in one way or another to all of that through the publication.

CM: When I got here, there was no question that this was a publication of tremendous authority. But we also very consciously tried to frame the issues that affect architecture that Robert just mentioned. We have kept our eye on cities, and have been covering other topics the profession is confronting, such as diversity and the collaborative, interdisciplinary world that architects now work in. Yet we’re doing all this in the context of presenting the best projects that reflect our time. That’s still the core of our mission.

RI: We have always had a curatorial role—making selections of projects that we think are going to interest people for a variety of reasons. The good examples are ultimately more interesting than the bad. So, what we have typically done is hold up the best examples and said, “Look at this.”

MS: Something that RECORD would simply never do, which some other magazines have done, is take a building that is poor or mediocre and boot it around. The building itself isn’t that important really, in the culture, and it always seemed to me very crude to make that kind of attack.

RI: Unless there’s a rationale for doing it. Architects have said for years, “Why isn’t my project in RECORD? I’ve done a school, and really, it’s good.” And the merely good isn’t a rationale for publication either. Because all architects should be doing good work. So the question is, what is the lesson in it? Does it have a point of view? What can it share beyond meeting the criteria that any project in any community should meet.

CM: We look for projects that embody a specific idea, that reflect something new or innovative. We’re looking for excellence, but of course that’s subjective. It’s a group of editors making selections based on what we think is the best work out there.

Let’s switch gears, and talk about digital content. Robert, the digital revolution started when you were editor, and it has had a huge impact on us, because it enables us to do daily journalism. It helps us stay on top of key issues. We are seeing stories break and then evolve, and the process complements what we do in the magazine. And yet print is still very important to us, and to our audience.

RI: What digital has allowed you to do is bring news forward in a way that we could not. Mildred and I had the luxury of time. We were able to choose, make selections for an audience, with the luxury to work those issues out, get the photography, acquire the writer, and do all those things print demands. But on the Web, you’re out there daily, with the latest, putting all those things together in a true publication which is now more than a magazine.

CM: Let’s talk about the shifts in relevant topics over the years. Robert, under your tenure, there was a real response to globalism. With expanding global markets for architects, you began to cover China intensively—you started the quarterly ARCHITECTURAL RECORD CHINA in Shanghai in 2005, and during this time there was also a new focus on sustainability.

RI: Part of the magazine’s role is to try to catch the wave of development and thought. And in the years that I was active, there was this explosion of international travel and knowledge, and architects were finding work in other parts of the world, not just in China.

British architects had a moment of real creativity, and you could’ve made a whole publication out of Japan alone. As editors, we recognized...
that that was something that was relevant to our community, and we would create issues devoted to, in some cases, a country.

In China’s case, it was particularly powerful, because we watched the explosion of the whole country as Chinese architects were training in the United States, going back to China and changing creatively what had been a fairly staid design and construction environment. American architects were going over and doing exciting things, including building whole cities from the ground up.

CM: Mildred, what were the big issues the magazine confronted in the years that you were here?

MS: For a long stretch when I was at RECORD, we celebrated modernism. We showed it all the time, and reached as far as we could. The next great change was, of course, the Postmodern movement. And I can say at this point that it was a great joy, because we’d gotten tired of the modern movement, and when I say we, I mean us, editor-writer folks.

The world has shifted and changed dramatically over the period we’ve been involved, from the explosion of digital technology to globalization, climate concerns, and social questions.

Some of the Postmodernists did work of great appeal—I mean they drew well. Michael Graves, Charles Moore—they had started to draw in new ways, and instead of scorning traditional architecture, they were looking at it again but incorporating its values in an inventive way. I don’t know whether we had any theory; all we knew was that we were going to grab all that we could, because it looked terrific in the magazine.

CM: Robert, when you took over, Postmodernism was on the wane, and we’d already had the deconstructivist burst.

RI: As I was coming into the role, we saw the convergence of the digital revolution with material prosperity. I was here during a period of unparalleled money. We had a license to build anything the human mind could conceive because we were freed from this orthogonal framework, of what had been the drawing board and became computer-aided design. It was as if someone had thrown a bomb.

And, so, architects were developing computer programs, using software from the aerospace industry. And, all of a sudden, the forms of buildings began to change. Architects were freed, and we had buildings that began to look like a snail or a slug or an exploding flower, or something like that.

For a period of time, buildings were extremely exuberant and defied any sort of label. And that created what came to be known as iconic architecture, from starchitects like Frank Gehry and Zaha Hadid and Santiago Calatrava, where basically architecture became a form of urban sculpture as well as habitation.

And, what evolved somewhat later, were people—young people in particular—asking, why these icons? In publications like ours, which had been purveying them and putting them on our covers—because they made great covers and subject matter—they kept saying, what about the community?

CM: We’re still incredibly impressed with spectacularly beautiful, exotic buildings, but a magazine like RECORD doesn’t have to settle on one point of view. It really is a reflection of all kinds of architecture. We love the mix and the plurality, and we can celebrate all of that. But it’s true that many younger architects seem to have different values, and we listen to them and try to reflect that.

RECORD in its long history was up against at least three other magazines in the U.S., plus the British and Italian magazines. It was a larger field for print, and now it’s a larger field in terms of digital coverage.

But RECORD was always steadily in the middle. It wasn’t Progressive Architecture, and yet it reflected a pretty broad spectrum of what was going on. Do you agree with that?

RI: Oh, I do. Absolutely.

MS: The magazine in my day was more than the so-called starchitects. The monthly collection of buildings contained work, such as a collection of schools, that was well designed and well described. It should be acknowledged that, besides showing greatly imaginative work, what made the magazine even better is that it paid attention to the very good everyday architectural performance.

RI: And, Cathleen, that’s an important point about the nature of the publication—it has always struck a balance, presenting not only the edge of the wave. It’s always had this pragmatic underbelly and has hoped to relate to the architects, designers, and people in the construction arena who actually go out and do the work. And so it’s never been completely about the latest trend but about design excellence, and also technical knowledge. It’s never been just flash and dash.

CM: And being more than just flash and dash is more important than ever. RECORD’s role is arguably even more significant in a world where, every morning, people turn on their computers or look at their phones and see a whole bunch of little postage-stamp-sized images of buildings, from all over the world, and think they know architecture from looking at those teeny pictures!

What we continue to do, which you both talked about, is to curate the best buildings of our time and select images that most accurately and beautifully reflect the experience of the building. We send writers to report on projects and we produce first-hand stories in layouts with plans and specifications, with all the information and insight that RECORD has been providing for decades. There really is no better way to publish the experience of what makes a great work of architecture.
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It’s almost like a war zone. Nothing like this has ever happened in human history. Everybody in China has been moved.
— Ai Weiwei, on China’s construction boom, at the Asia Society in Switzerland.

A New Chapter for the Sandy Hook School

BY MIRIAM SITZ

ON AUGUST 29, just under 500 students started their academic year at the new Sandy Hook School in Newtown, Connecticut. New Haven–based architects Svigals + Partners led the design of the 86,800-square-foot K-4 school, working closely with the community, Consigli Construction of Hartford, and a bevy of consultants to create an inviting, colorful, and secure new campus filled with light and art. “The intent of this building is to offer a warm and comfortable environment for students,” said Newtown Superintendent Dr. Joseph V. Erardi, Jr. at a media event on July 29, “and [the architects] hit a grand slam with that.”

Following the mass shooting on December 14, 2012, that took the lives of 20 children and six staff members, Sandy Hook students were transferred to the nearby town of Monroe. After a town referendum, the old ’50s-era school was demolished in the fall of 2013, and Svigals + Partners, selected by the state after an open RFQ process, began meeting with a 50-member committee to understand the community’s values and needs.

“In a certain way, we needed to keep at bay the history that gave rise to this architecture,” says design principal Barry Svigals. “We tried to keep our eyes on our charge—to bring our best work to the project.”

Nature emerged early on as a theme for the $50 million project. Set against a dense backdrop of woodlands, the building’s undulating facade of machiche and garapa timber planks references the surrounding forested landscape, while three gabled “houses” rising from the roof recall steeples peeking through the trees. Fieldstone along the base of the wood rainscreen nods to New England vernacular style. Toward the back of the school, the architects used four colors of concrete block and incorporated red-, orange-, and yellow-colored fins around rear windows “to give everything a joyful or colorful touch,” explains project manager Julia McFadden.

Three footbridges, leading to the building’s main and secondary entrances, span a sloped rain garden, which, in addition to filtering roof runoff, provides a topographic and spatial buffer between the school’s front windows and...
parking. This bioswale is just one of the many safety features discreetly folded into the project, says managing partner Jay Brotman: “It’s about controlling where people can go.”

Inside, the two-story building is conceived as a small town organized around a wide hallway—the “main street”—that runs the length of the building. At the school’s primary entrance, the hall widens to a sunny, double-height atrium. Floor-to-ceiling glazing of the back wall allows views, from both the ground floor and a second-floor catwalk, of an outdoor amphitheater. Decorative metal trees crisscross the windows, which are colored in autumnal hues at the top, while a kinetic sculpture by artist Tim Prentice hangs from the atrium’s ceiling, swaying gently.

The firm envisioned the three classroom wings as individual neighborhoods. Brightly colored overhangs above each classroom door recall front porches and visually break up the hall. Interior doors connect pairs of classrooms—yet another subtle safety feature which McFadden says school staff requested. “It helps teachers feel like they’re not isolated,” she says. At the ends of upstairs hallways, “tree house” breakout spaces allow students to look out into the edge of the forest behind the school. “You also get a fabulous view to the

“Tree houses” anchor the ends of each classroom wing. courtyard,” says Brotman, adding that “natural observation points are an element of security design that we looked to include as much as possible.”

There are more specific safeguards too, such as a manned surveillance gate at the small road leading to the school, a “heightened level of resistance” on first-floor glazing, and “different measures of hardening on certain walls,” says Brotman. (He, like all those involved with building the school, avoids specifics about the building’s security systems.)

The students also played a direct part in the design. “We have in all our projects, to varying degrees, a connection to the kids who are going to be in the building,” says Svigals. At a workshop, the architects asked the children to trace the shadows of natural elements like twigs and leaves. Those drawings were digitized and carved into wooden panels that adorn the building’s exterior, “reminiscent of when you carve a heart into a tree,” says Svigals. Adds Brotman, “When people see reflections of themselves in the building, they actually feel a part of it.”

While the school is filled with references to nature, the town, and the students, there is no specific memorial to the 2012 tragedy. (A local commission is working to establish a permanent memorial elsewhere in the community.) Yet the school’s history is never far from the minds of those involved. At the July preview of the new facility, Newtown First Selectman Patricia Llodra said, “Let me state unequivocally that we would trade, in a minute, this beautiful new school for the more familiar and aged Sandy Hook School built in the ‘50s if we could just change the past.”
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EPA Issues Final Formaldehyde Rule

BY ANNA FIXSEN

THE BRIGHT white trailers started arriving in late 2005, weeks after Hurricane Katrina laid waste to hundreds of thousands of homes along the Gulf Coast. The unadorned FEMA-issued units didn’t look like much—aluminum siding outside, veneer-clad cabinetry inside—but, to their displaced occupants, the trailers were a godsend.

“It had that great brand-new smell that I thought was just wonderful,” said Jennifer Donelson of Gulfport, Mississippi, in a 2008 interview with a Sierra Club member. “I had never had anything brand-new before.”

But the smell that had symbolized a fresh start made Donelson, her family, and hundreds of others sick. “It could almost knock you down,” remembers Becky Gillette, the Sierra Club volunteer, who also lived in Mississippi.

The symptoms weren’t subtle: burning eyes and throat, nausea, nosebleeds, and a relentless cough known to residents as “trailer cough” or “Katrina crud.”

Gillette’s neighbor, who lived in a FEMA trailer, had a suspicion the symptoms were caused by formaldehyde—a carcinogenic chemical commonly used in the composite wood products that make up flooring, furniture, cabinetry, and other elements of interiors.

Beginning in April 2006, Gillette, in partnership with her Sierra Club chapter, tested 69 trailers and found the vast majority had formaldehyde levels exceeding what was considered safe. Testing by the Environmental Protection Agency (EPA) and the Centers for Disease Control and Prevention confirmed the findings.

But in subsequent years, the federal government did little to standardize and regulate formaldehyde in building products. In the meantime, the chemical was found at toxic levels again in FEMA trailers supplied to victims of Iowa’s floods in 2008, and, last year, in Chinese-made laminate flooring from Lumber Liquidators—a product that was probably installed in tens of thousands of homes across the U.S., according to a report by 60 Minutes.

On July 27—nearly a decade after the first FEMA-trailer scandal—the EPA issued its final regulation to safeguard the public from the chemical. The rule, which Congress directed the EPA to finalize, calls for domestic and imported composite wood products—including hardwood plywood, medium-density fiberboard, and particleboard—to be labeled as compliant with Title VI of the Toxic Substance Control Act and to be monitored by third-party certifiers. After the rule is published in the Federal Register—a process that could take several weeks—panel producers will have one year to comply, according to an agency spokesperson.

“The new rule will level the playing field for domestic manufacturers . . . and will ensure that imported products . . . will meet the new standard,” said Jim Jones, an EPA official, in a statement.

The EPA emission standards mirror rules set forth by the California Air Resources Board (CARB), legislation that went into effect in 2009. Prior to the California regulations, formaldehyde emissions from composite wood panels and finished goods were commonly as much as 20 times higher than the new standards.

The emission standards for the EPA rule are nearly identical to the CARB formaldehyde standards, primarily targeting the use of urea-formaldehyde resins (UF). The rules for hard-wood plywood with both a veneer and a composite core would limit formaldehyde emissions to no more than 0.05 parts per million (ppm), while thin medium-density fiberboard could emit up to 0.13 ppm. As with the California standards, composite wood product producers, importers, and distributors, must also have their products tested regularly by a third-party monitor.

There are, however, a few changes to the CARB rules, including requirements for additional record-keeping. The EPA rule also obliges manufacturers to disclose the results of their quality-control tests—meaning that the public, via a Freedom of Information Act request, could access the information.

The wood industry is supportive of the new rule. According to the Engineered Wood Association, the new rule “prevents inconsistencies that could have resulted with state-by-state regulations.” The president and CEO of the American Wood Council, Robert Glowinski, said the new legislation is “consistent with good product stewardship.”

But environmental advocates are more cautious. “It looks to me like the EPA has done a pretty good job,” says Tom Lent, the policy director at the Healthy Building Network, “but the devil in these things is enforcement.”

“Our position was to move the industry away from formaldehyde entirely, given that we felt it was starting to develop some good alternatives,” says Lent, citing the fact that some manufacturers have introduced soy-based adhesives in lieu of formaldehyde.

One portion of the rule that is cause for concern, says Lent, is an extended seven-year grace period for laminated products, a time frame, according to the EPA, that is “more realistic.”

“It’s not exactly kicking the can down the alley, but it makes it a long runway before this actually starts taking effect,” says Lent. “If you are just starting a hospital project, this is probably good news, but for everyone with a faster timeline, you still need to figure out how to avoid formaldehyde emissions.”

According to the EPA, the rule will impact nearly 1 million small businesses. But, because of the CARB standards, many are already compliant. “There will be more impact on regional manufacturers who haven’t been paying attention to the California market,” predicts Lent. “Hopefully, the rule will have a big impact on Chinese companies.”

While the burden of the new EPA ruling falls primarily on the shoulders of composite wood manufacturers, ultimately, according to Lent, the architectural profession needs to set the bar higher for healthy building products and create a market for formaldehyde-free alternatives.

“Anything you can pull off [to reduce emissions] is going to positively affect a life,” says Lent. “The work we do as specifiers, architects, and interior designers is even more important than the footprint of the individual project.”
A Modest Proposal for Luis Barragán’s Estate

BY MIRIAM SITZ

BROOKLYN-BASED CONCEPTUAL artist Jill Magid spent years plotting the perfect proposal—the location, the rock, the words—but what she had in mind was a bit different from most. On September 9 at the San Francisco Art Institute, Magid will exhibit a 2-carat diamond ring, created by compressing the cremated remains of Mexican architect Luis Barragán, to represent her proposal to the owners of his professional archive: open Barragán’s legacy to the public.

When the Pritzker Prize–winner died in 1988, his estate was divided between two close business colleagues. Barragán’s library became the museum Casa Luis Barragán—a UNESCO World Heritage Site since 2004. But the rights to the architect’s papers, drawings, and photographs have proved a more complicated matter. After Barragán’s beneficiary committed suicide in 1993, the archive was sold for a reported $3 million to Rolf Fehlbaum, chairman emeritus of his family’s furniture company, Vitra, and his wife, Federica Zanco, an Italian architectural historian. The couple shipped Barragán’s estate to Vitra’s headquarters in Birsfelden, Switzerland, where it has remained ever since, accessible only to Zanco, a few scholars, and an assistant.

Magid launched her investigation of Barragán in 2013, negotiating with his descendants and the Mexican government for a year before gaining access to the architect’s remains in 2015. This spring, she visited Zanco in Switzerland to explain her art project and to propose with the ring—a body of work in exchange for the body of the architect.

“You say it should go back to Mexico. Back to whom? Under what circumstances?” Zanco told The New Yorker, following her meeting with the artist in May. Though she has praised Magid and her project, Zanco remains protective of her rights to the work—and of its sanctity. She continued: “You agree [to allow people to use photos], and then you see them in a spread in a fashion magazine for something about how pink is the new color for spring.” Zanco has yet to accept Magid’s proposal.

Following the exhibition’s opening in Kunst Halle Sankt Gallen in Switzerland, The Proposal—which includes Magid’s documents and correspondence related to the project, as well as a video of the exhumation of Barragán’s remains—will be on view at the San Francisco Art Institute through December 10.
Yale’s Beinecke Library Restored

BY FRED A. BERNSTEIN

The Beinecke Rare Book & Manuscript Library at Yale University, designed by Gordon Bunshaft of Skidmore, Owings & Merrill, is a modernist masterpiece. Its rectangular volume is enclosed in sheets of marble, thin enough (at 1\(\frac{3}{8}\)”) to transmit light. That means the interior of the building glows by day. But it also posed “a major challenge,” says Bill Mahalko, who, as project architect for Chicago’s HBRA Architects, oversaw a 16-month, $70 million renovation of the building. New Haven’s Newman Architects was architect of record.

“The thermal qualities of the marble are similar to those of single-pane glass,” says Mahalko. “It’s not a good insulator.” In cold weather, condensation formed inside the building, which houses some of the world’s most precious volumes—including a Gutenberg Bible.

When the building reopens on September 6, it will look the same on the outside as it did when it was completed in 1963. But its mechanical systems have been entirely revamped, solving the condensation problem and many others. Bronze display cases on the main level were sealed and fitted with environmental controls. (Previously, ambient air passed right through the cases.)

The architects restored the library’s dramatic “book stack” (a six-story glass volume within the larger volume) and reconfigured the administrative spaces below the building’s plaza. An Isamu Noguchi sculpture garden, sunk into that plaza, has been returned to its original condition.

The building already contained two classrooms, below grade but visible from much of its interior. It now contains two more, designed by Mahalko to blend in with Bunshaft’s architecture. One of the classrooms houses an antique printing press and other equipment, allowing students to explore the physical properties of books.

HBRA was led for many years by Thomas Beeby (now the firm’s chairman emeritus), whose best-known building is the aggressively Postmodernist Harold Washington Library in Chicago. The firm’s ground-up projects generally hew to traditional styles, “but in the restoration area, we do a lot of modernist work,” Mahalko says.

The firm began working on the Beinecke library back when Beeby was dean of the Yale School of Architecture (1985 to 1991), completing a number of small projects culminating in the recent commission. Beinecke library director Edwin Schroeder said, “The renovation ensures that the Beinecke library will remain a world-class center for teaching, research, and scholarship for decades to come.”

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Film Festival Celebrates Design

BY ANNA FIXSEN

LIKE JASON BOURNE, this summer’s blockbusters seem to have suffered from a case of cinematic amnesia. Filmmakers resurrected *Ghostbusters* and *The Jungle Book* while moviegoers endured a second dose of *Independence Day* and an impressive fifth helping of Mr. Bourne. Thankfully, New York’s Architecture & Design Film Festival this month promises to screen some original—and architectural—flicks. The annual showcase, now in its eighth edition, will feature a lineup of more than 30 feature-length and short films, all focused on architecture and design.

The festival will kick off with the world premiere of *Eero Saarinen: The Architect Who Saw the Future*. Directed and produced by Peter Rosen, the film explores the life and work of the Finnish American architect through stunning cinematography (by Saarinen’s own son, Eric) and interviews with a host of experts.

Other selections are more offbeat. *The Happy Film*—a Tribeca Film Festival favorite—follows designer Stefan Sagmeister (at times prancing through New York in a pink bunny suit) and his existential quest to achieve happiness. Another film, called *Where Architects Live* and based on an exhibition at the 2014 Salone del Mobile of the same name, ushers viewers into the inner sanctums of Shigeru Ban, Daniel Libeskind, the late Zaha Hadid, and more. Who isn’t itching to see where David Chipperfield sleeps?

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[NEWSMAKER]

Michael Miner

BY ANNA FIXSEN

FRANK LLOYD WRIGHT once said that it is “just as desirable to build a chicken house as to build a cathedral.” Filmmaker Michael Miner took that to heart but, instead, built an unrealized doghouse of Wright’s design. Miner now wants to rebuild another forgotten FLW work—this time, a pavilion in Banff, Alberta. The building, a low-slung rustic timber structure with a cantilevered roof and art glass windows, was completed in 1914 and served as a gathering point for tourists visiting the national park. Due to extreme winters and flooding, the building deteriorated and was demolished 25 years after it opened. A sports field now occupies the site. Miner hopes, through grassroots fundraising by his nonprofit, the Frank Lloyd Wright Revival Initiative, to give the reconstructed pavilion back to the town. The reconstruction, which Miner estimates will cost $2.2 million Canadian dollars, has won preliminary support from the town council and is the subject of a feasibility study. RECORD spoke with Miner about the project.

How did you first fall in love with FLW’s work?

Ironically, I had a girlfriend who was very much into Frank Lloyd Wright when we dated. At least something good came out of the relationship.

Yeah, something, exactly. I had the opportunity, after that particular relationship broke up, to take a three-year road trip, and I got to visit many of Wright’s buildings. I was so taken by the experience, I did a series of Wright films. Why did you establish the Frank Lloyd Wright Revival Initiative?

As I experienced Wright’s buildings and saw some restoration efforts, I thought there was a better way to do it. We evaluated all the buildings that had been demolished and decided which would be relatively easy to build and relatively inexpensive. In 2013, I visited Banff with my wife and dog, and we approached the town council about resurrecting the Pavilion. Have you had naysayers?

Of course, even when I posted on my organization’s Facebook page, we had a couple of people who were like, “So are you going to call them Wright-inspired buildings?” I said, “No—this is not a cheap imitation. We are using Wright’s plans, except with modifications that are inescapable because of modern building codes. So you have the original plans? We do. These plans are in the archives of Canada and Ottawa. We have all of the working drawings and all of the specifications. I was talking to Eric Lloyd Wright [FLW’s grandson], and said if we want to do this exactly as Wright intended, we have to have a horse and cart for 75 cents an hour to get the wood to the site.

What was your pitch to the town?

My initial pitch was that it would be good for tourism, and it would right a historical wrong. I talked to the town planner in 2013 and it went nowhere, but earlier this year I got a call from the Canadian press because the town had a new redevelopment plan. Have you enlisted an architect?

We have not. Right now, we’re fundraising, and the next thing will be a call for architects. We want a lead Canadian architect for both the politics and for the practicality. Ironically, this is what FLW did then—he was not licensed to practice in Canada, so his Canadian student, Francis C. Sullivan, was his architect of record. And the Revival Initiative would fund the project?

I have no intention of taking any government money from America or Canada whatsoever. I don’t like the idea of begging for money—I like the idea of everyone having a stake in it and feeling like they are part of it.

Competition Reimagines the New York State Pavilion in Queens

The National Trust for Historic Preservation and People for the Pavilion have revealed the winners of a contest to redesign Philip Johnson’s New York State Pavilion, on the site of the 1964–65 World’s Fair. The first-prize entry, designed by Seattle architects Aidan Doyle and Sarah Wan, uses the existing structure as a base for an elevated, glass-enclosed park.

Harvard Art Museums Launch Online Bauhaus Collection

On August 15, the Harvard Art Museums launched a new online resource that allows the public to access more than 32,000 Bauhaus-related objects and records in the museum’s collection, including paintings, drawings, prints, and photography. The digital repository will also be the subject of an exhibition on the movement’s Centennial in 2019.

Memorial to Lynching Victims Unveiled in Alabama

The Equal Justice Initiative (EJI), a legal-rights organization in Montgomery, Alabama, has unveiled designs, created in partnership with Boston-based MASS Design Group, for a memorial honoring the victims of the more than 4,000 racial lynchings in United States history. Planned for six acres of vacant land in downtown Montgomery, the memorial will include a museum at the EJI headquarters.

Snøhetta to Design Banque Libano Francaise HQ in Beirut

Snøhetta has been selected to design the Banque Libano Francaise headquarters in Beirut, the firm’s first commission in Lebanon. The building will feature exterior terraces and interior elements such as stepped seating areas, private glass-box meeting rooms, and elevated lounges.

ABI Remains in Positive Territory

July finished with a positive Architecture Billings Index (ABI) mark of 51.5 points (any score above 50 indicates an increase in billings). This marks the sixth consecutive month in which the ABI has remained in positive territory. The projects inquiry index dipped slightly to 57.5, down 1.1 points from June’s score.
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CIRCLE 248
After more than six decades, even homes designed during the peak of Modernism are starting to look dated. Seattle-based Olson Kundig recently revived a classic example from 1951, perched high up in the hills of Berkeley, California. “It was a solid midcentury house, with a strong parti,” says principal Tom Kundig. “Our challenge was to maintain the spirit of the building.”

The original architect, John Ekin Dinwiddie, is one of the now-forgotten practitioners in the Bay Area who were pushing the envelope. The house he designed for his sister-in-law caused consternation among the neighbors on this closely packed hillside, overlooking the East Bay and San Francisco. Dinwiddie organized the building around the view, designing the living room as a long, fully glazed bar with the panorama of the Bay in front and a quiet courtyard in back. On the south end of the bar, he placed a wing with the dining area, kitchen, and maid’s quarters; he bracketed the north end with a two-story volume with bedrooms on both

The original pale pink stucco and redwood siding was replaced with cedar siding stained black (above). Levels and clad two impressive walls in Southwestern stacked-stone veneer that is very evocative of the era. But the house’s most startling element is an 8-foot-wide circular metal canopy, inset with a thick glass disc, that shades the front door. (It’s worth mentioning that Dinwiddie studied architecture with Eliel Saarinen at the University of Michigan in the 1920s and briefly partnered with Erich Mendelsohn while the German émigré taught at the University of California, Berkeley.)

When the new owners, a couple with a young child, purchased the house in 2010, it was largely in its original condition, save for a subpar kitchen renovation from the 1980s. Over the years, it had fallen into considerable disrepair—the sliding door in the living room had been caulked shut. “The clients liked the building, but wanted us to stabilize it and take the underlying thought a step further,” says Kundig. “That midcentury idea of open-
The living area is a long bar with views of the Bay in front and a courtyard in back (above). A stacked stone wall is a signature element of Dinwiddie’s design (bottom, left). A circular metal canopy inset with a thick glass disc shades the entrance (bottom, right).

ing up to the garden is still a tenet today. But now we’re more transparent between those parts and pieces.”

The house, which has a concrete-slab and spread-footing foundation with wood and steel framing, was gutted and rebuilt. The design team augmented the two wings, increasing the building’s 4,000 square feet to 4,300 square feet; substantially reconfigured the bedrooms and bathrooms; and removed the wall between the kitchen and dining room to create one continuous family gathering place. For energy efficiency, the architects switched out the single-paned glazing for aluminum-framed double-paned windows and immense sliding doors, carefully matching the glazing units’ dimensions to the grid established by the existing structural columns.

The defining architectural features—the transparent living room, stacked-stone walls, geometric sun shades, and round canopy—are all as they had been. The architects also restored the ground level’s concrete flooring, removing the ceramic field tile that had been installed in the intervening years.

But there are also a few light touches that particularly show the hand of the most recent architect. The two-story volume features two narrow recessed windows, set at an angle, that provide light but also privacy from neighbors to the north. The newly enlarged front door (now 5 feet wide and 9 feet tall) is outfitted with an industrial-chic lockset from Kundig’s own hardware line. And the original pale-pink stucco and redwood siding is now all vertical cedar siding, stained black.

“I wanted to articulate the diagram of the house—the solid ends with the transparent interior—more emphatically,” says Kundig. “I’m engaging this person who is no longer with us, in the language that has been passed down through generations, trying to understand what he was saying about how to live.”
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The answer to the August issue’s Guess the Architect is Otto Wagner, who completed the Post Office Savings Bank in Vienna in 1912, the year his work appeared in Record (May 1912, page 485). The building, commended for its modern lines and use of aluminum, translucent glass block, and reinforced concrete, also featured furniture designed by the architect.

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Cuisine Art

Like a carefully composed dish, SFMOMA’s In Situ restaurant was crafted with layers of texture by Aidlin Darling Design.

BY LYDIA LEE

A MUSEUM is all about curation. It now seems that a museum restaurant should also be curated, at least according to chef Corey Lee, who had an inspired concept for the San Francisco Museum of Modern Art’s new flagship eatery. At In Situ, every dish is from the menu of a top culinary outpost elsewhere. For instance, the restaurant’s changing menu might include Wylie Dufresne’s shrimp grits from New York’s wd~50 and a dessert of wood sorrel and sheep-milk yogurt by René Redzepi from Copenhagen’s Noma. Given the eclectic origins of the offerings, the backdrop could have defaulted to a gallery-like sterility. But local firm Aidlin Darling Design created a space that is very much in situ, with subtle details that delight the visual palate.

Aidlin Darling Design

SFMOMA recently unveiled a major addition and renovation by Snøhetta (Record, May 2016, page 142), which located the 6,300-square-foot restaurant in former café and event spaces off the lobby of the original 1995 Mario Botta building. The dark-toned room smoothly segues from the museum’s entry, which has a black and gray granite floor. According to chef Lee, “I didn’t want the space to feel like a typical restaurant, but an extension of the museum where food happened to be served.”

Inside, the floor is concrete, the ceiling is black expanded metal mesh, and the walls are finished in white paint, dark gray acoustic felt, and cement scratch coat. “The idea was to

More than 66 feet long, a wood-slat canopy spans the lounge and dining areas, leading toward an artwork by Tucker Nichols on the rear wall (opposite and top). Blackened half-inch-round steel rods define the entry (right).
In shades of white, a mural by Rosana Castrillo Diaz (above) visually shifts depending on the light. A cement scratch coat adds texture to the dining room (below).

create a raw shell, with a mediating layer, and a few carefully placed elements,” says principal David Darling, so “the food becomes the final art in the space.”

Custom-crafted furnishings reinforce the artful qualities. Inspired by the rough-hewn work of British sculptor David Nash, bar-height tables made from salvaged cottonwood have craggy undersides that speak to San Francisco’s penchant for natural wood, without devolving into cliché. Overhead, slender blackened-steel pipe pendants are an homage to The Lightning Field by Walter De Maria. An expansive ceiling installation of wood slats by the architects is a riff on a food-drying rack.

In keeping with the museum’s mission of making art accessible, the architects devised a range of casual seating areas for 130 people (two-thirds of the space is for walk-in customers). In addition to the bar tables, there is a low-slung lounge as well as a long window seat that overlooks the street. The dining area features simple tables with ash tops and sculptural Osso chairs by Paris-based designers Konan & Erwan Bouroullec. Partially screened by a wall clad in cold-rolled steel plate, the kitchen provides glimpses of the craft involved in creating edible works of art.
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CIRCLE 194
Parametrics and Power

How the social, economic, and political forces that impact architecture are moving to shape the future.

BY MICHAEL SORKIN

AMERICA IS having a Frank Capra moment. Not one of those uplifting finales but the scene in It’s A Wonderful Life where George Bailey (builder of affordable housing, savings and loan owner of unimpeachable generosity and ethics, honorer of veterans, monogamy incarnate!) hallucinates (on a trip induced by Clarence, his guardian angel) what might have happened to his beloved Bedford Falls had he never been born and the evil Henry Potter supplanted him as the town’s leading citizen and spirit. It’s a picture of unmitigated darkness, filled with “cocktail bars, casinos, and gentleman's clubs,” ripe with poverty, crime, misery.

Sound familiar? This could be Trump’s America, evoked in his doom-laden convention speech depicting our prospective future, and in the version of the country he has spent so many decades constructing in reality: those cocktail bars, casinos, and clubs. With the help of many of our leading practitioners—from Philip Johnson to Der Scutt to Adrian Smith—Trump has done more building than any politician since Jefferson (even if Trump University is a little more virtual and a little less rigorous than the University of Virginia, and Mar-a-Lago a skosh glitzier than Monticello).

The candidate is Exhibit A for architecture’s inextricable ties to the social and economic forces that produce it: architecture is always going to the same place as everything else. Ours is not an autonomous discipline operating in a free field. Rather, it’s ever engaged in a deepening struggle to find the terms of its own distinction and necessity, especially now, as the designed environment expands its remit to cover the whole world, and the gap between the body and technology grows increasingly blurry. Building always marks and measures space, equity, and possibility, but it’s losing any clear-enough idea of how to perform as we race toward total urbanization on a planet at the point of asphyxiation.

Civilizations are marked by their priorities, and ours are too given over to prisons, malls, and McMansions and too little to good housing for all, complete and sustainable communities, green energy, rational mobility, structures of succor. Politics programs our architecture. The emblem of Trump’s agenda is a piece of architecture—that absurd pharaonic wall he bruits for the Mexican border. His whole project trumpets control, and his mantra is shared by many an architect: just leave it to me!

Trump’s sensibility is deeply old-fashioned: he makes buildings, things. Far scarier than tacky, grandiose building, however, is a spatial agenda being advanced by famously liberal Silicon Valley: the “smart” city. The phrase creeps me out. I worry that we’re being sold a bill of goods by huge corporations looking to embed sensors in every sidewalk, window, and wall to create “responsive” environments in the name of unsnarling traffic, conserving energy, and keeping megacities going, but which will be used, at best, to continue compiling consumer and behavioral profiles to sell us stuff—and, at worst, to surveille every inch of the earth to call down drone strikes on designated miscreants or raids by ICE on those 11 million “illegals,” based on some biometric fantasy of alienness. Data are not neutral. Metadata can be the devil’s work.

We—and our architecture—should be smarter than this, beginning with clearly knowing the limits of our intelligence and who it truly serves. As architectural practice becomes more and more technologized by CAD, BIM, scripting, and parametrics, our possibilities both expand and contract. Like so many other industries fleeing to cheaper pastures, architecture has let outsourcing become the norm. The economic impact is not clear-cut as a global matter (the free trade debate remains unsettled), but the homogenizing effects of single-supplier technology and the standardization of techniques and details augurs the worst effects of globalization—a world of oppressive sameness, in which we’re duped by a fantasy of customization, of difference applied to buildings like tattoos, their screen-blinded inhabitants narcotized by Angry Birds.

I’ve just gotten back from China, always exhilarating and depressing. Thrilling for the massive scale of the construction of clean and spacious apartments and for the ten-tacles of glistening infrastructure that spread in all directions. Depressing for the monstrous homogeneity, the repression, the cut corners, the dumb worship of consumption, and the toxic environment (my asthma got so bad I had to come home early). While I was there, though, I was on a couple of panels with Patrik Schumacher, the Lather of parametricism, and we came to amiable blows. Avowing the medium to have become the universal style via a risible mock-Darwinian inevitability, his pitch is both heroic and vague. Heroic for its ardent truthliness but vague for its inability to truly distinguish his computational parameters from those that have informed architecture from that first primitive hut and—even more so—vague for the willful refusal to answer the question of just which values should set the process in motion. And this is the origin point of architecture’s inescapable politics: whose parameters trump.
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The World, As Seen by Denise Scott Brown

A photography exhibition on view at the Venice Architecture Biennale chronicles the architect’s fascination with capturing the beauty and banality of cities.

By Anna Fixsen

In the popular imagination, Denise Scott Brown is immortalized in a single image from 1966: with the Las Vegas Strip in the distance, she strikes a defiant pose—hands on her hips with a smirk as wide as her stance.

“I was hamming,” Scott Brown, 84, says of the photograph. “I learned from one of my professors at Penn that if you have passion, your students won’t know it unless you ham your passion. You have to really put it on.”

“It’s been made into an emoji,” she adds.

This photograph may encapsulate Scott Brown’s cult status as both architectural and feminist icon, but it also alludes to her enduring relationship with photography. An exhibition on view this fall as part of the Venice Architecture Biennale at the Palazzo Mora, designed and curated by Scott Brown, chronicles two formative decades in which she documented cities—from Venice, Italy, to Venice, California.

“I am not a photographer,” Scott Brown writes in the exhibition text. “I shoot for architecture—if there’s art here, it’s a byproduct. Yet the images stand alone. Judge what you see.”

The exhibition, called Wayward Eye, begins with Scott Brown’s early expedi-

Scott Brown documented Las Vegas with the eye of both an urbanist and semiotician, capturing the city’s hodgepodge of signs and architecture (above). Most iconic are her twin portraits of herself and her husband, Robert Venturi (middle and right, respectively).
Scott Brown refuses to privilege one image over another: six smaller photographs abutting the black-and-white image depict acrobats on Venice Beach in California, tumbling through the sky—just like the Italian pigeons.

Scott Brown finds joy in these formal juxtapositions. In another sequence, the prows of Venetian gondolas mirror an image of vertical surfboards poking out of California sand. “The relationships are so important—one plus one is more than two,” Scott Brown says of the exhibition’s oversized collaged panels. She continues, “That’s urbanism: jamming them together and not studying them separately.”

Urbanism also informed Wayward Eye’s plan, which takes inspiration from Venice itself. Towering panels—teeming with images—are oriented around the gallery’s central space, an area Scott Brown refers to as the campo, or town square. Just off the campo, viewers enter the next decade of Scott Brown’s Grand Tour—the American Southwest.

Shortly after Robert’s untimely death in 1959, Scott Brown left Penn to teach at the University of California, Berkeley, and later UCLA. “By the time I was in California, I was shooting like crazy,” she says. This time she focused on the hallmarks of the region’s arid automobile cities—vernacular buildings, car culture, neon signage, “Things that would shock you and open up your eyes and might make you aesthetically more sensitive,” Scott Brown says.

She took a special interest in Las Vegas, along with her second husband and architectural partner Robert Venturi, under the unlikely proposition, “Could Las Vegas be educational?”

One portion of the exhibition depicts an array of blazing signs lining the Las Vegas Strip, advertising casinos, bars, and hotels. Such urban portraiture laid the groundwork for her legendary studio course and book with Venturi and Steven Izenour, Learning from Las Vegas. She showed the slides to her students for years.

Another section of the show features sun-bleached daytime shots that seem to radiate the desert heat reflecting from freeways and car lots. Los Angeles is a tangle of telephone wires, while staid images of the Mojave Desert recall the vastness of Scott Brown’s first love—the South African veld.

It is tempting to compare many of these images to those shot by Ed Ruscha in the early ‘60s. But where Ruscha’s images of gas stations and swimming pools present a visual poker face, Scott Brown’s greet the viewer with a wink. A Las Vegas sign advertising “Termite Pest Control” is positioned adjacent to one that reads “Free Aspirin Ask Us Anything.” In another image—the photographic opposite of her own iconic Las Vegas portrait—she styled Venturi from the back à la Magritte, in a black suit, silhouetted against the Strip.

The Grand Tour never really ended for Scott Brown. Though she no longer travels, and an iPhone has replaced the old Alpa, her photographic approach remains unchanged. “You don’t think, you shoot,” she says. “Because by the time you’ve worked out with yourself why you want that thing, it’s gone.”
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Double Take
Hou de Sousa’s resourceful and flexible approach is propelling the firm into the spotlight.

BY DAVID SOKOL

IN 2007, Harvard GSD students Nancy Hou and Josh de Sousa decided to take their three-year relationship to the next level. The couple enjoyed supporting one another during their undergradu-ate coursework at Cornell and their first jobs, but they had not designed together until a Bjarke Ingels–led class chal-

lenged them to invent a new building type for Dubai. If Hou and de Sousa today—both 34 and married for the past year—remember that proposal (a hybridized resort, desalination plant, and farm) with a chuckle, they re-

main grateful for the lesson in collaboration. “What we pro-

duced as a team was better than what we could do separately,” de Sousa says.

So there was no hesitation in 2010 to launch a studio in Ecuador, where Hou’s restaurateur parents requested creative direction for a new spot called Dim Sum Bar. Although stably employed in recession-era New York—de Sousa at Joel Sanders Architect and Hou at Stephanie Goto—they packed their bags for Quito.

Hou says of Dim Sum Bar, “We had to work with a lot of existing conditions,” among them preurchased chairs, a minefield of structural columns, and her father’s mandate “that it has to feel like a Chinese restaurant.” Following the local custom of design-build delivery, they also served as general contractor on the project. They found solutions that overcame the multiple limitations—a series of partitions provide organizational logic, accommodate a local preference for private dining, and evoke traditional Chinese doors, for example. Hou de Sousa also used CNC fabrication to create the screens, and then painted the perforations to spell out the restaurant name.

Hou’s parents then tapped the designers for their next restaurant, Happy Panda. The architects continued their design explorations by digitizing the 12th-century Chinese scroll painting Qingming Shanghe Tu to make wallpaper and shaping the ceiling into an inverted pagoda with CNC-cut plywood and muslin. “It was a complete-

ly new education in construction and materiality,” de Sousa says of the two projects.

Dim Sum Bar and Happy Panda transformed a single trip into three years of steady business with other clients, but New York proved irresistible, and Hou de Sousa resettled there in late 2013. Residential renovations paid the bills initially and, in time, competitions presented a creative outlet as well as a marketing channel for the couple, who otherwise branch at self-promotion.

Submitting proposals paid off almost immediately. For the Folly Program and City of Dreams contests conducted in 2015 for New York’s Socrates Park and Governors Island, respectively, Hou de Sousa earned shortlist positions by repur-

posing plastic shopping bags as skins for temporary pavilions. In the span of one week this spring, the studio triumphed in another pair of competitions. Raise/ Raze reassembled several hundred thousand plastic balls—first used in a ball pit instal-

lation at the National Building Museum last year—into a modular block system inside a former trolley station in Washington, D.C. And this year’s Folly Program victory, on display through December, attaches a lumber space frame to a shipping con-

tainer already on-site. Scrap material salvaged from the Socrates property rests within the exposed structure like shingles.

Hou and de Sousa attribute their recent achievements to their attention to constructability and budget—lessons learned in Quito, which are being ap-

plied to three Manhattan apartments currently at or near completion. The partners also conjecture that the par-

ticipatory nature of their designs helped secure their recent wins: for Raise/Raze, visitors could reconfigure the plastic modules into whatever seating or sculp-

ture they imagined, and the Socrates installation serves purposes ranging from shelving to shelter from the elements. “Right now, we think that flex-

ible, interactive systems can help architecture remain relevant in an accelerating world,” de Sousa says. Func-

tioning more as systems than objects, the projects, he says, “mute our own voices and pass the micro-

phone to the public.”
This special anniversary edition of Record on the Road will take place at recently renovated Harris Hall at the USC School of Architecture. The evening will be highlighted by a panel discussion featuring leaders in the field of design discussing their latest projects and the trends they see shaping the future of architecture, and attendees can earn up to two CEUs.

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The Cult of Destruction

Obsolescence: An Architectural History

Reviewed by Aleksandr Bierig

While all buildings are subject to the decay and ruin brought by time, historian Daniel Abramson is concerned in this book with a different culprit: obsolescence, or the process of becoming “obsolete.” In his analysis, this term refers to structures demolished for having outmoded mechanical systems, or insufficient rentable space, or a suddenly unappealing stylistic expression, among many other factors. Such buildings might have survived were it not for shifting economic standards, desires, or tastes. Abramson’s overriding concern—as in much of his previous work—is how architecture functions within capitalism, a system which operates by “creative destruction,” as economic historian Joseph Schumpeter first phrased it in 1942.

This relentless transformation, Abramson argues, is at odds with a core principle of Western architecture: solidity.

The opening chapter concerns the term obsolescence itself, which emerged during the era of whirlwind office-building speculation in early 20th-century Chicago and New York. Perhaps the most spectacular example was Manhattan’s 20-story Gillender building, demolished in 1910 after a mere 13-year existence. It was replaced by a larger and more profitable structure—a process then becoming widespread in major city centers. Interest groups, like the National Association of Building Owners and Managers (NABOM), began producing reports to track the rapid destruction of buildings in such overheated real-estate climates and lobbying the government to recognize the new pressures that beset investors. By 1931, amendments to the Federal tax code allowed building owners to write off the age of their properties as a function of an obsolescence that had come to seem inevitable. Because the new rules favored building owners, their underlying logic was never again challenged.

Meanwhile, the application of “obsolescence” began expanding. A 1951 planning commission judged Boston’s entire East End neighborhood “obsolete” due to perceived deficiencies in its housing stock. This decision, however, relied less on strictly economic standards than on politically motivated concerns. Though the effect was the same—clearing space for new development—its causes were different. If obsolescence happened to office buildings in New York and Chicago because of a volatile real-estate market, it was applied to Boston’s East End by opportunistic politicians.

In the second half of the book, Abramson moves away from precise case studies toward a vast reinterpretation of 20th-century architectural history. After World War II, he argues, the fear of obsolescence created an anxiety that haunted practically all of architectural thinking in the developed world. Flexible space is a central theme, identified in many different forms: the well-known exhibition hall projects of Mies van der Rohe, as well as designs for expandable hospital complexes, or even visionary projects like Archigram’s Plug-in City. In Abramson’s reading, each of these attempts to plan for future change were, in fact, defensive measures set against constantly changing needs leading to premature destruction. Such schemes revealed a profession newly apprehensive about the longevity of its built work.

The final chapter turns to contemporary trends in reuse, preservation, and sustainable design. If we follow recent emphasis on these themes, obsolescence has now itself become obsolete, in favor of a new ethos of durability. But by Abramson’s own analysis, such a position is at distinct cross-purposes with the engine of economic growth that remains at the center of capitalist society. To grow is still to displace existing material with new material, to encourage obsolescence.

Perhaps we have to look beyond economics. Obsolescence throughout the 20th century was not only an economic problem but a material one—predicated on the assumption of abundance—that destruction might always be followed by redevelopment. Even if the loudest voices today refer to “sustainability,” the very way we fill space in contemporary society, from air-conditioning systems to urban sprawl, relies upon the continuation of almost limitless energy use for what are often the most banal daily activities. Without addressing these larger and most insidious problems, we now threaten ourselves with an entirely new kind of obsolescence.

Aleksandr Bierig is a Ph.D. student at Harvard University.
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**Gown and Town**

**Pedagogy and Place: 100 Years of Architecture Education at Yale,** by Robert A.M. Stern and Jimmy Stamp. Yale University Press, May 2016, 668 pages, $100.

Reviewed by James Gauer

**If you want to know** the history of the Yale School of Architecture, you'd be hard pressed to ask anyone more knowledgeable than Robert A.M. Stern, its dean from 1998 until this past July. Published to mark the 100th anniversary of the first class to graduate from Yale’s professional program in 1916, *Pedagogy and Place* is a tribute to the erudite and prolific author to his alma mater and academic home for the last 18 years. Written in collaboration with Jimmy Stamp, whose witty musings on architecture have appeared in *The Guardian, Smithsonian,* and *Wired,* its 668 pages make it a weighty tome. Fortunately the weight is leavened, despite the pedantic title, by unexpectedly lively text and carefully curated archival images. Given the visual nature of the subject, it’s disappointing there aren’t more.

Organized in 10 chronological chapters, *Pedagogy* begins with an account of Yale’s early attempts to emulate the Ecole des Beaux Arts. Subsequent chapters describe the surprisingly slow shift to Bauhaus-inspired modernism, then to Brutalism, Postmodernism, and all that has followed, including a downward slide in the school’s reputation prior to Stern’s arrival as dean.

The extensively researched narrative includes stories of both the school and the people who shaped it. The star-studded roster of deans, professors, studio critics, and students includes Raymond Hood, George Howe, Eero Saarinen, Paul Rudolph, Louis Kahn, Vincent Scully, Richard Rogers, Norman Foster, Charles Gwathmey, Charles Moore, Zaha Hadid, and Deborah Berke (the new dean of the architecture school), to mention just a few.

The chapters spanning the ’60s are especially noteworthy. “A Time of Heroics, 1958–1965” chronicles Rudolph’s contributions as professor and chairman, as well as architect of the controversial Art & Architecture Building. “Architecture or Revolution, 1965–1971” describes Moore’s iconiclastic reaction to Rudolph’s formalism. Among the more entertaining passages is an account of Moore’s attempt to de-emphasize Yale’s traditional ties to New York where, he complained, “the profession was addicted to glamour . . . the New York offices would come recruiting at Yale . . . and I would say ‘Don’t you go to Pratt and to Cooper Union and to schools around New York?’ and they would say, ‘We get our draughtsmen from there. We come to Yale for our future partners.’”

In the final chapter, Stern reflects candidly on his years as dean. He remembers the disdain—from modernists who feared he might turn Yale into a bastion of historicism—that initially greeted his appointment, but the success of his tenure has largely silenced his critics. He sidestepped the style wars by assembling a faculty that mixed cutting-edge practitioners like Frank Gehry, Peter Eisenman, and Greg Lynn with classically minded colleagues such as Leon Krier and Demetri Porphyrios. He also put the school on firm financial footing, renovated the derelict A&A Building, upgraded the quality of both students and teachers, and established a curriculum that stresses fundamental principles, thereby giving Yale’s previously tarnished reputation an impressive new luster. It’s a noble legacy.


Catie Marron, chairman of the board at Friends of the High Line in New York, has collected 18 thoughtful essays on urban squares to follow her previous book, *City Parks: Public Places, Private Thoughts* (2013). Prominent writers such as Ann Beattie, Adam Gopnik, and Zadie Smith, along with other contributors such as architect David Adjaye and filmmaker Jehane Noujaim, reflect on the meaning and character of some of the world’s most beloved and distinguished public places. Each is illustrated by evocative color photographs, many in lush two-page, full-bleed spreads.

This seductive hardcover anthology is nicely organized in three thematic sections: “Culture,” introduced by *New York Times* architecture critic Michael Kimmelman; “Geopolitics,” by *New Yorker* editor David Remnick; and “History,” by *New Yorker* staff writer and National Book Award winner George Packer. Their keen observations alone would make the book worth reading.

In some of the most engaging essays, personal history intersects with metropolitan history. Adam Gopnik recounts both the evolution of Paris’s Place des Vosges and his memories living there with his family, having crepes and omelets at Ma Bourgogne, the café frequently by the fictional detective Maigret. Zadie Smith offers a bittersweet recollection of her time in Rome, bracketed by self-consciousness as a tourist in Piazza Della Madonna Dei Monti and trauma as a resident whose apartment in Piazza Sforza Cesarini was destroyed by fire. Alma Guillermoprieto, who grew up in Mexico City, contrasts a childhood memory of Christmas in the Zócalo, which seemed “infinite in its sweep and grandeur,” with a more recent Yuletide visit when she found the plaza’s historic splendor obscured by an enormous and incongruous ice-skating rink.

As the only architect among the authors, David Adjaye’s contribution is of particular interest. With an eye to dispelling Western myths and stereotypes about Africa and to reconciling modernity with indigenous culture, he recalls a pilgrimage to the Djemma el-Fnaa, the “bustling heart” of Marrakesh, and offers this insight: “Space only becomes truly public when people recognize it and utilize it as such. Great public space cannot be built as much as curated.”

Readers looking for in-depth information on architecture and planning may be disappointed, but that’s not really the point of *City Squares.* It is instead a celebration of these quintessential outdoor rooms as civic settings for the rituals and dramas of urban life.

James Gauer, an architect and author based in Victoria, B.C.; Chicago; and San Miguel de Allende, Mexico, contributes regularly to RECORD. He received his M.Arch. from Columbia University.
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By Julie Taraska

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Hitting a High Note

The gift of a splendid complex and public park creates an oasis for the Greek people in austere times.

BY VICTORIA NEWHOUSE
Experimentation with forms, materials, and means of sustainability has been a constant throughout Renzo Piano's career. For the Stavros Niarchos Foundation Cultural Center (SNFCC) in Athens, he pushed the envelope of all three, and the result is a stunning hilltop complex that includes an opera house, a new home for the National Library of Greece, and a 42-acre park.

The building is composed of two large volumes, separated by a spacious open-air agora, that sit on a structure of reinforced concrete with some steel elements. All of this is embedded in a 100-foot-high man-made hill, which provides dramatic views of the sea and the city. Piano, who was chosen in 2008, replaced the master plan by Cooper Robertson, which had left the site flat, with his own scheme, literally bringing a new dimension to the project. The architect referenced the near-
by mountains and their marble quarries in creating the artificial hill,
and then excavated it deeply to insert the structure.

The official opening awaits the library’s transfer of its fabulous
collection, which, in addition to nearly 2 million books and periodicals,
includes 9th- and 10th-century parchment manuscripts as well as
the 13th-century one that was the first in the Byzantine and
Mediterranean world to replace parchment with paper. In the meantime,
completion of construction was celebrated in June with four
days of free festivities that attracted 115,000 people. The event provided a brief respite from the six years of painful austerity suffered by
Greece in order to qualify for the $300 billion bailout by the European
Union. The festival’s title, Metamorphosis: the SNFCC to the World,
reflects the conviction of Andreas Dracopoulos, copresident and director of the Stavros Niarchos Foundation (SNF)—which made the
prodigious gift to Greece—that the new complex symbolizes the nation’s transformative capabilities.

The cultural center is in the middle-class Kallithea neighborhood,
just two miles south of the Acropolis and only a few hundred feet from
scenic Faliro Bay. Except for the opera and some library services, the
facility will be open to the public gratis. Among its public amenities is a new 42-acre park with a large lawn that can be used for art installations, and nine playgrounds, designed by Deborah Nevins & Associates of New York; it features drought-resistant Mediterranean vegetation and covers most of the site, climbing up the hill and onto the library’s green roof.

Signaling the complex’s presence—and clearly visible from the surroundings—is a huge but seemingly weightless 107,600-square-foot white canopy, tapered like an airplane wing, which floats above the opera house. Created with Expedition Engineering, the British firm that also executed the seismically resistant structure, it is made of ferro-cement, a thin shell of reinforced mortar over a layer of metal mesh and closely spaced steel rods. Low wages in Greece and generous funds from the SNF enabled the fabrication of this material, ruled out in any significant quantity in developed countries since the 1950s because of its labor intensity. The canopy not only supplies shade but also supports solar panels (one of many factors behind the project’s targeted LEED Platinum designation, which would be a first in Greece).

Below the canopy on the opera house roof, a vast, outdoor terrace is the most spectacular of the complex’s numerous public spaces. Accessed by two dedicated glass elevators as well as by an uphill path through the park, this high point offers panoramic views of the sea, the Acropolis, and the surrounding city, while capturing welcome breezes. At ground level, a 1,300-foot-long, 100-foot-wide canal reinforces the relationship with the sea. Seeming to extend to infinity, the ribbon of water reflects the entire length of the complex and visually ties together its components. Beside the channel, a broad promenade, lined with plane trees, leads to the agora.
SHOW TIME
The elegant 1,400-seat horseshoe-shaped auditorium can be acoustically adjusted with specialized curtains (above). The lobbies of the opera house (right) and library, with its currently empty shelves (top, right), signal their respective functions through the glass-fin walls surrounding the agora. The hanging mobiles are by Susumu Shingu.

From the agora, looking into the towering, clear-glass-fin walls, the program within each wing is visible: broad balconies identify the opera house and multiple levels of bookshelves call out the library. The 80-foot-high, narrow opera house lobby (with a box office, coat room, and bar) bustled with crowds during the June festivities. The flawless poured-in-place concrete of the walls here and the perfect alignment of the marble floor slabs are among many examples of the extraordinarily high quality of workmanship throughout the complex.

Across the agora from the opera house is a public lending library, combined for the first time with the scholarly National Library. Each has generous spaces, many filled with natural light. Numerous colorful seating arrangements invite social exchange and visitors with laptops. However, with little tradition of library usage in Greece, these expansive spaces may initially exceed demand.

In the entranceways to both wings, balconies suspended from the ceiling are fabricated in the same materials: white-painted steel, glass balustrades, and oak handrails, floors, and ceilings. Animating both lofty spaces are brightly colored paper mobiles by the Japanese artist Susumu Shingu and “Perroquet” aluminum light fixtures by Renzo Piano Building Workshop (RPBW), which are white at the opera, and gray at the library.

In the opera house, the lobby’s informality gives way to the plush elegance of a traditional 1,400 seat auditorium. The curved walls are clad in deep-red-stained anigré veneer, and balcony fronts are natural American cherry; seats sport a brighter red fabric. (There is also a more modern-looking 450-seat experimental theater located at the southern side
A PIAZZA WITH A VIEW
The opera house roof under a ferro-cement canopy (opposite, top) offers spectacular views of the city and the Acropolis, while a glazed viewing space (above) cantilevers above the complex. The four-day public opening in June (right) drew 115,000 people.

1 AGORA
2 PARKING
3 PROMENADE
4 CANAL
5 FERRO-CEMENT CANOPY
6 PHOTOVOLTAIC ARRAY
7 OPERA AUDITORIUM
8 EXPERIMENTAL THEATER
9 LOBBIES
10 THE "LIGHTHOUSE"
11 GREEN ROOF PARK
12 RESEARCH LIBRARY
13 PUBLIC LIBRARY

PHOTOGRAPHY: COURTESY SNFCC (TOP); © YIORGIS YEROLYMBOS/SNFCC (OPPOSITE, BOTTOM)
of the main auditorium.) Judging by a recent performance with piano accompaniment of Cellia Costea’s “Vissi d’Arte” from Tosca, the theater’s acoustics are excellent. RPBW’s first opera house design promises to be a smashing success.

In 2007, the SNF responded to the Greek government’s call for a new home for the opera and the National Library by promising to assume all design and construction costs, which totaled nearly $842 million. In 2009, despite the nation’s worsening financial situation, the foundation confirmed its commitment with the understanding that, when completed, the complex would be handed over to the Greek government, which would own and run it (at an annual cost at present of approximately $40 million). Now, eight administrations later, with the possibility that the government may be unable to assume this financial responsibility, the SNF might temporarily pick up the tab. In addition to the SNFCC’s aesthetic and practical merits, it is undoubtedly an inspiring symbol of belief in the future of Greece.

*Mediterranean Garden*
The 42-acre park, the largest in Athens, features native plants and slopes gently upward to cover the library with a green roof. It is targeted to be the first LEED Platinum project in Greece.

*Victoria Newhouse’s Chaos and Culture: RPBW Creates the SNFCC in Athens will be published by the Monacelli Press in May 2017.*

**Credits**

**ARCHITECT:** Renzo Piano Building Workshop, in collaboration with Betaplan (Athens) – G. Bianchi, partner in charge; V. Laffineur, associate in charge, design team

**ENGINEERS:** Expedition Engineering/OMETE (structural); Arup/LDK Consultants (m/e/p, sustainability, acoustics, lighting, security, IT); Theater Project Consultants (theater equipment); Front (facade)

**CONSULTANTS:** Deborah Nevins & Associates/H. Pangalou (landscaping); C&G Partners, M. Harlé/J. Cottencin (signage); Faithful+Gould (project and cost management)

**GENERAL CONTRACTOR:** Salini Impregilo Terna

**CLIENT:** Stavros Niarchos Foundation

**SIZE:** 950,000 square feet (building)

**COST:** $842 million

**COMPLETION DATE:** June 2016

**SOURCES**

**CONCRETE:** ET Beton, Lafarge

**METAL/GLASS CURTAIN WALL, PARTITIONS:** Unifor, Tosoni

**GLASS:** Saint-Gobain, AGC, Guardian

**SKYLIGHTS:** Schüco

**LIGHTING:** Zumtobel, Artemide, Luceplan, iGuzzini, ERCO, Bright, Ares, SILL Lighting, Bruck Lighting, ETAP Lighting, Reggiani, Luxo
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COOL FOR SCHOOL
Celebrating 125 Years

LOOKING BACK

In the 125 years since ARCHITECTURAL RECORD's inception, radical changes have indelibly shaped not only the built world but also the culture of the discipline and the personality of the magazine. In the following pages, our editors take stock of what has passed: we single out 125 of the top buildings constructed during the span of RECORD's existence (both the celebrated and the lesser known); we present leading architects' reflections on projects that have influenced their own work; we commemorate structures that were demolished; and we highlight critics whose voices have sharpened the magazine's perspective. With these special features, we chronicle our history and pay tribute to architecture's ongoing evolution.

PHOTOGRAPHY: COURTESY INTERNET ARCHIVE

DAVID STOTT BUILDING, DETROIT, IN METROPOLIS OF TOMORROW
BY HUGH FERRISS, 1929
Record’s Top 125 Buildings

A selection of the most significant works that defined architecture in our era.

To commemorate ARCHITECTURAL RECORD’s 125th anniversary, our editors have chosen to honor 125 of the most important works of architecture built since the magazine’s founding in 1891. This was not an easy task. We started by polling a group of distinguished critics and scholars for nominations, but the final list is ours. While many inclusions are obvious, others may be surprising, or a little controversial—as are some omissions. And, we know, all 125 might not make the list at RECORD’s next big birthday: time inevitably changes not only our tastes, but how we understand history.
Of the many masterpieces sprung from the eccentric and utterly individualistic mind of Antoni Gaudí, this is perhaps the most serene. Called La Pedrera (the Quarry) for its undulating sculpted and self-supporting stone facade, the apartment block is an orchestrated symphony of natural forms that cover or color nearly every surface of the interior courts and passages, and erupt in the fanciful landscape of its famous roof. —Carol Willis
1913
**Woolworth Building**
New York
Cass Gilbert

1924
**American Radiator Building**
New York
Hood & Fouilhoux

1924
**Schröder House**
Utrecht, Netherlands
Gerrit Rietveld

1926
**Lovell Beach House**
Newport Beach, California
Rudolph M. Schindler

1926
**Bauhaus Building**
Dessau, Germany
Walter Gropius

1927
**Stockholm Public Library**
Stockholm
Gunnar Asplund

1928
**Ford River Rouge Complex** | Dearborn, Michigan | Albert Kahn Associates

Albert Kahn’s first building at River Rouge was an assembly plant for warships, but he went on to help Henry Ford realize his vision of an integrated manufacturing complex for cars. Kahn added such structures as a glass-making plant, a cement plant, a steel mill, and a motor-assembly building. One Kahn innovation was organizing the site into superblocks to ease reconfiguration and expansion. —Joann Gonchar

1929
**Lovell Health House**
Los Angeles
Richard Neutra
1929
Barcelona Pavilion
Barcelona
Ludwig Mies van der Rohe

1930
Kiehhoek Housing
Rotterdam
J.J.P. Oud

1931
Maison de Verre
Poissy, France
Le Corbusier

1930
Chrysler Building
New York
William van Alen

1931
Villa Savoye
Poissy, France
Le Corbusier

1929
Viceroy’s House
New Delhi
Edwin Lutyens

1931
Empire State Building | New York | Shreve, Lamb & Harmon

It is the most indispensably iconic symbol of the skyscraper type and of New York for a world audience beyond the professional culture of architecture. It was the world’s tallest building for longer than any other structure (1931–74). I have always admired its overall form, silhouette, and profile as a masterly solution by its Beaux Arts-trained architect, Thomas Lamb, as the main designer. He modeled it partly on French medieval churches with dominant towers, such as the 12th-century Cathedral of St. Lazare at Autun, which he admired from his travels as a student. In this way, the Empire State connects to a long tradition of monumental architecture. —Joseph Siry
1933
Paimio Sanatorium
Paimio, Finland
Alvar Aalto

1939
Fallingwater
Bear Run, Pennsylvania
Frank Lloyd Wright

1939
Rockefeller Center
New York
The Associated Architects: Reinhard & Hofmeister; Corbett, Harrison & MacMurray; Raymond Hood, Godley & Fouilhoux

1939
Johnson Wax Building
Racine, Wisconsin
Frank Lloyd Wright

1948
Casa Luis Barragán
Mexico City
Luis Barragán

1949
Eames House | Los Angeles |
Charles and Ray Eames

I’m not so sure if it was the architecture, the wonderful displays of the Eameses’ folk objects, or a combination of the two that I loved so much when I saw their house years ago. But I also suspect that it might have been Ray Eames herself. She served me and two other guests breakfast with candles and three perfectly arranged strawberries. At the time, I just felt that the house was an extension of her.

—Mary McLeod
1951

**Farnsworth House** | Plano, Illinois | Ludwig Mies van der Rohe

This is one of the great villas of the 20th century—the ultimate “machine in the garden”—where you place a man-made, fabricated, industrial object of great beauty within the garden greenery. It was actually kind of a culmination of things Mies had been doing at IIT, perfecting how to put steel together. He put the house right by a huge tree, very purposely. This idea of marrying nature and the building, you see, he had done before with the Tugendhat House in Brno. The Seagram Building continues this idea, but within a cityscape. —Phyllis Lambert

1952

**Säynätsalo Town Hall**

Saynätsalo, Finland
Alvar Aalto

1952

**Unité d’Habitation**

Marseilles, France
Le Corbusier

1952

**Lever House**

New York
Skidmore, Owings & Merrill

1952

**United Nations Headquarters**

New York
International Committee of Architects (including Oscar Niemeyer and Le Corbusier), Wallace K. Harrison, chairman

1955

**Chapelle Notre Dame du Haut**

Ronchamp, France
Le Corbusier

1958

**Seagram Building**

New York
Ludwig Mies van der Rohe, Philip Johnson

1959

**Solomon R. Guggenheim Museum**

New York
Frank Lloyd Wright
Frank Lloyd Wright, an inspiration to Paul Rudolph, broke the box, but he broke it horizontally. It was Rudolph, a master of space and the section, who broke it vertically: the section of the A+ A building is a Robie House plan turned vertically, its 36 levels making the building a stepladder through interlocking volumes. Space is vectorial and experiential, and, once Postmodernism was dispatched, the building proved to be an exciting lesson for generations of architecture students.

—Joseph Giovannini
1964
Marina City
Chicago
Bertrand Goldberg

1966
Whitney Museum of American Art
New York
Marcel Breuer and Associates

1965
Salk Institute for Biological Studies | La Jolla, California | Louis Kahn

This is Kahn’s answer to the urbanistic vision of Renaissance Italy, combined with a magical fountain channeling water across the space to the ocean in a move that recalls gardens of Mughal India and Renaissance villas like Tivoli and the Villa Lante. It is an inspired synthesis and reformulation that never disappoints, no matter how many times you visit. The Salk is arguably the defining work of the greatest American architect. —Marvin Trachtenberg

1967
Habitat 67
Montreal
Moshe Safdie

1967
National Center for Atmospheric Research
Boulder, Colorado
I.M. Pei & Partners

1967
Ford Foundation Building
New York
Kevin Roche John Dinkeloo & Associates

1967
Montreal Biosphere
Montreal
Buckminster Fuller
1967
Gwathmey Residence and Studio
Amagansett, New York
Charles Gwathmey

1971
San Cataldo Cemetery
Modena, Italy
Aldo Rossi

1972
Kimbell Art Museum | Fort Worth | Louis Kahn
At the Kimbell, Kahn has achieved a magical synthesis between the calm order of the museum’s naves and the heroism of the concrete roof, merging vault and beam in order to convey both natural and artificial light. The diagonal movement between the galleries takes you from one painting to the next in the smoothest manner possible, the rigid order of architecture being totally dissolved on the way.
—Jean-Louis Cohen

1972
Munich Olympic Stadium
Munich
Frei Otto and Günter Behnisch

1973
Sydney Opera House
Sydney
Jørn Utzon

1973
Museo di Castelvecchio
Verona, Italy
Carlo Scarpa

1972
Centraal Beheer
Apeldoorn, Netherlands
Herman Hertzberger

1977
Centre Georges Pompidou
Paris
Renzo Piano and Richard Rogers
The brilliance is in taking over the old factory to develop a social services and recreation facility for members of the union. Instead of tearing down a classic steel structure, she chose to modify and expand it with two towers. Along with the factory sheds, the complex is turned into an extraordinarily active social village. This is Bo Bardi’s greatest work.

—Anthony Vidler
One of the earliest monumental expressions of computer-aided design, the Guggenheim Bilbao breaks nearly every rule in the book. It’s compositionally messy. It is extravagantly wasteful of space and materials. But it works, because the composition of the volumes, the management of spatial, processional, and visual axes are wonderfully inflected to the site. —Sarah Williams Goldhagen
1999

**Gallery of Horyuji Treasures | Tokyo | Yoshio Taniguchi**

This building epitomizes the grace and elegance of contemporary Japanese architecture. You approach the building through a contemplative pond, and then it reveals itself layer by layer. It holds treasures from one of the most important Buddhist temples of Japan, but it’s as much about the process of getting there as being in the presence of these holy objects. There’s a sense that you’re making a transition from a mundane, secular world to one worthy of these venerated artifacts. The exquisite materials and attention to detailing are Taniguchi’s signature. —Naomi Pollock

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2000

**Diamond Ranch High School**

Pomona, California

Morphosis

---

2000

**KKL Luzern**

Lucerne, Switzerland

Ateliers Jean Nouvel

---

2001

**Sendai Mediatheque**

Sendai, Japan

Toyo Ito & Associates

---

2001 and 2016

**Tate Modern I and II**

London

Herzog & de Meuron

---

2003

**Jubilee Church**

Rome

Richard Meier & Partners

---

2003

**30 St Mary Axe**

London

Foster + Partners
2004
21st Century Museum of Contemporary Art | Kanazawa, Japan | SANAA
This is the most innovative museum design I know. It is completely original in its approach to museum spaces, which accommodate all kinds of contemporary art, with galleries of different shapes and heights, including one that is a perfect cube. All but two have skylights, which can be adjusted according to the level of illumination needed, and windows in several galleries look onto corridors, where light streams in from the exterior, so the building has a feeling of transparency. —Victoria Newhouse

2004
Millau Viaduct
Millau, France
Foster + Partners

2004
Seattle Central Library
Seattle
OMA

2004
Chichu Art Museum
Naoshima, Japan
Tadao Ando Architect and Associates

2005
Madrid Barajas International Airport, Terminal 4
Madrid
Rogers Stirk Harbour + Partners

2006
Apple Store, 5th Avenue
New York
Bohlin Cywinski Jackson
It’s such an extraordinary building—so extraordinary in its structure. It’s like that great polyhedron in Albrecht Durer’s engraving Melencolia I of 1514. No one has ever done that architecturally. The way that the structure works is amazing, the way you come into it and come up the steps, the whole trajectory of coming into this great polyhedron. Koolhaas relates very much to the culture of Portugal in the way he uses details such as the Portuguese tiles and the very strong colors in some of the practice rooms and the beautiful curtains by Petra Blaisse. —Phyllis Lambert
This may be Siza’s absolute masterpiece. The tension between continuous movement—the dream of so much modernist museum design, as in the Guggenheim—and the need for orthogonal rooms is resolved in one of the richest museum experiences anywhere: interconnected yet restful. The ramping corridors that link one floor to the next are expressed on the facade as distinct elements and are works of intense visual experience. The entrance sequence for the museum is ingeniously engineered into an impossible site, between the riverside highway and a cliff. —Barry Bergdoll

**2008**

**Iberê Camargo Foundation** | Porto Alegre, Brazil | Alvaro Siza

**Cathedral of Christ the Light**
Oakland
Skidmore, Owings & Merrill

**2008**

**Beijing Capital International Airport, Terminal 3**
Beijing
Foster + Partners

**2009**

**Herning Center of the Arts**
Herning, Denmark
Steven Holl Architects

**2009**

**Neues Museum Renovation**
Berlin
David Chipperfield Architects

**2010**

**MAXXI National Museum of XXI Century Arts**
Rome
Zaha Hadid Architects
More than six years after its opening, SOM’s Burj Khalifa remains the world’s tallest completed skyscraper. The 2,717-foot-high, 163-story building has a tri-lobed plan that makes the tower appear like a stalagmite that grows naturally out of the earth. But the shape is also the product of the integration of architecture and structure; the three wings buttress the central concrete core. This gives way to an internal steel structure at the 156th floor that carries the mostly unoccupied spire to its tip. —Joann Gonchar
2013
**Heydar Aliyev Centre | Baku, Azerbaijan | Zaha Hadid Architects**

Here Hadid had a project with enough scope to prove her long-evolving theses about architecture as a topographical field and about the interaction of the building with the ground around it. The building grows from a field highly articulated with ramps, gardens, and pools. By verticalizing its curving plan, the building becomes a mountainous topography of fluid form and space. The design also realizes the promise of the computer as an agent of architectural liquefaction, bending even the technology of the standard space frame into enveloping curves. —Joseph Giovannini

2014
**GL Events Headquarters | Lyon, France | Studio Odile Decq**

2014
**Novartis Building 337 | East Hanover, New Jersey | Rafael Viñoly Architects**

2013
**Shenzhen Bao'an International Airport, Terminal 3 | Shenzhen, China | Studio Fuksas**

2015
**Matmut Atlantique Stadium | Bordeaux, France | Herzog & de Meuron**

2015
**Shanghai Tower | Shanghai | Gensler**

**Acknowledgements**

Architectural Record would like to thank the following experts for their nominations:

25 Cult Classics

Lesser-known architectural landmarks acclaimed by various scholars and critics.

A cluster of buildings cited by critics and historians for the “Top 125 Buildings” since 1891 didn’t make it onto our final list. But these distinctive works of architecture are singular in their use of a formal language or their inventive exploration of materials—and some are just over the top. Most of them are outside the United States and, because they are harder to visit, may have received less attention. Yet they have left an indelible mark on the minds of those who know them, whether by personally visiting the sites or by savoring their presentations in history books, architectural journals, or online. Not all those qualifying for this category have been included: we stopped at 25. But if you have more suggestions, keep them: our 150th anniversary is coming up.

1911
Palais Stoclet
Brussels
Josef Hoffmann

1921
Einstein Tower
Potsdam, Germany
Erich Mendelsohn

1922
Schindler House
West Hollywood, California
Rudolph M. Schindler

1923
Notre-Dame du Raincy | Le Raincy, France | Auguste Perret and Gustave Perret

Akin to the Sainte-Chapelle in Paris, a defining work of the French Gothic movement is updated in the abstract language of reinforced concrete, with its walls filled by brilliant, modern stained glass.

—Marvin Trachtenberg

1927
Rusakov Workers’ Club
Moscow
Konstantin Melnikov
1928
**Kingswood School Cranbrook**
Bloomfield Hills, Michigan
Eliel Saarinen

1929
**E1027**
Roquebrune-Cap-Martin, France
Eileen Gray

1930
**Open-Air School** | Amsterdam | Johannes Duiker

Here you find ultimate transparency in one of the most extensively glazed Modernist buildings of the period. The architecture also creates an intense communal experience for the children at the school. It is a subtle and yet startling insertion in an Amsterdam neighborhood. — Barry Bergdoll

1928
**De Bijenkorf Store** | Rotterdam | Willem Marinus Dudok

Dudok reinterprets a department store as a civic monument, with its trademark campanile and rooftop café terrace crowning the Russian-influenced neo-Constructivist composition, faced in precision brickwork. Ultimately more compelling than Dudok’s more familiar Hilversum Town Hall (1931), it was also similarly influenced by Frank Lloyd Wright: the top-lit atrium running through the entire height of the store is evidently derived from Wright’s Larkin Building of 1904. — Kenneth Frampton

1931
**Van Nelle Factory**
Rotterdam
Brinkman & Van der Vlugt
1932
The Triple Bridge
Ljubljana, Slovenia
Jože Plečnik

On the shores of Lake Pampulha, Niemeyer built his most poetic structure, thanks to his intimate relationship with the engineer Joaquim Cardoso—who helped him design the thin concrete shells. Also important was the contribution of the painter Cândido Portinari, whose azulejos-tile compositions give the interior the magic of Brazilian Baroque churches. In its refined simplicity, the chapel is probably the best embodiment of the 20th-century ideal of synthesis of the arts.
—Jean-Louis Cohen

1936
Casa del Fascio
Como, Italy
Giuseppe Terragni

1938
Kröller-Müller Museum | Otterlo, Netherlands | Henry van de Velde

In the astounding landscape of birch trees outside Otterlo, the Kröller-Müller Museum’s series of pavilions appears as a work of sculpture at the same time that it provides serene connections between the art on display and its surroundings. The poetry of arriving on white bicycles—provided to visitors to make their way along paths through the park—is unforgettable. —Barry Bergdoll

1950
Il Girasole
Rome
Luigi Moretti

1943
Church of Saint Francis of Assisi | Pampulha, Brazil | Oscar Niemeyer

On the shores of Lake Pampulha, Niemeyer built his most poetic structure, thanks to his intimate relationship with the engineer Joaquim Cardoso—who helped him design the thin concrete shells. Also important was the contribution of the painter Cândido Portinari, whose azulejos-tile compositions give the interior the magic of Brazilian Baroque churches. In its refined simplicity, the chapel is probably the best embodiment of the 20th-century ideal of synthesis of the arts.
—Jean-Louis Cohen
1960
The Chemosphere
Los Angeles
John Lautner

1964
Frey House II
Palm Springs, California
Albert Frey

1965
Shrine of the Book
Jerusalem
Armand Phillip Bartos and Frederick John Kiesler

1966
St. Catherine’s College | Oxford, England | Arne Jacobsen

I consider this to be Jacobsen’s masterpiece. Here he keeps the traditional Oxford quadrangle, and yet there’s a sense of something new happening—a kind of syncopated layering from the buildings to the lawn and where hedges act as walls, creating outdoor rooms. The architecture is beautifully scaled and each detail meticulously worked out. The dining room is noteworthy because it is grand, with a certain sense of ritual, but remains completely unpretentious. And of course each element was designed by Jacobsen—including the chairs, cutlery, and lamps. —Mary McLeod

1966
Church of St. Peter | Klippan, Sweden | Sigurd Lewerentz

The building lies hugger-mugger on the ground, black brick and black mortar. When you get inside, it is all the same aside from the baptismal font, which is a large, pearly mussel shell. And when you get there, the floor starts to slide down, creating the effect of the ceiling rising, with the heavens opening above you. I don’t aspire to be religious, but it is the most sacred space I know in 20th-century architecture—the only one, I might say. —Robin Middleton
1972
Gallaratese Housing
Milan
Aldo Rossi

1976
Bagsværd Church
Copenhagen
Jørn Utzon

1996
Santa Maria Church | Marco de Canaveses, Portugal | Alvaro Siza
The church is just two great square towers with a simple rectangular building behind. Inside, the ceiling curves into the north wall, and on the other side it is a horizontal slit, so you see the city at a distance. It's sculptural, but such a simple sculptural form—not baroque at all. It’s an oasis: as you enter, you are taken away from the city. The thing that I find so extraordinary in Siza’s work is that he’s so conscious of the vernacular but uses it in abstract ways. —Phyllis Lambert

1998
Jean-Marie Tjibaou Cultural Center
Nouméa, New Caledonia
Renzo Piano Building Workshop

2002
Yokohama International Passenger Terminal
Yokohama, Japan
Foreign Office Architects
My Favorite Building

Record asked a dozen leading architects to tell us which single building had the biggest impact on their thinking and design. Some of their answers may surprise you.

NORMAN FOSTER

The period that I find most inspiring is the 19th century. We see its can-do mentality in the work of many people of the time, whether they were tunneling under rivers or throwing bridges across ravines and gorges. And we see it in the example of Joseph Bazalgette, who built the London sewer network. He used the project as an opportunity to create underground public transportation, and managed to transform infrastructure into a work of great civic beauty with the construction of the Thames embankments.

If I were to sum up that spirit with one building, it’s Joseph Paxton’s Crystal Palace for the Great Exhibition of 1851—which was not created by an architect, but a gardener. It was an extraordinary act of competence that required the ability to create a new industry for a building, which had to be designed and constructed almost overnight, at an epic scale, and with what I suspect would have been breathtaking beauty. It is the building I would most like to have visited.

Such buildings as the Crystal Palace had a romance that was absolutely contagious and enthralled the public. Although industrialization had some appalling social consequences, these works show an incredible optimism. Today, those of us who are privileged to engage in projects on that scale in other parts of the world still find that belief in the future, a belief that has not become jaded and cynical. What I’m invoking in the heroic works of the 19th century is really that attitude of mind.

THOM MAYNE

I went to USC in the late ’60s—when the school was anti-history. I came away with very little knowledge of even the major characters—Mies, Corbusier. So I was largely self-taught. After I began my practice, I went through a Kahn phase, a Rudolph phase. Remember, I was still a kid. I became fascinated by James Stirling, and I went to England and saw all his work. My list of influences was enormous. That being said, if I had to name a single building, it would be the Centre Pompidou. It had this incredible influence on me, in terms of the intensity of the research that went into it. I had two friends from UCLA who were working on the building, and I visited them at the office. There were dozens of blue-foam models of the gerberettes [custom cast-steel elements]. I was completely bowled over by the seriousness of the investigation. I didn’t go home and start making buildings that look like the Pompidou. That’s not my architecture. I was interested in its aspirations, in its ambition—the notion of challenging the Louvre, the museum as supermarket. It was a completely new model, architecture shaping how we understand culture. I had an exhibition there in 2006. Designing the show, we put everything on a glass floor. We didn’t touch the walls. We were reverential.
**RICHARD MEIER**

I had the pleasure of spending the night at **Fallingwater**, as a guest of Edgar Kaufmann Jr. It must have been the early ‘60s. But I have the experience in my head as though it was yesterday. It starts when you drive up—seeing it, not seeing it, then seeing it again. The whole approach is brilliant. There’s not a thing that’s accidental, that’s not a part of the plan. It’s total. Later, when you walk the site and see how the house is perched on this rock over the waterfall, it’s truly magnificent. I had a bedroom that was maybe 7 feet by 10 feet. It was intimate—but so is the whole house. From photos, you think it’s a big building. It’s not. The living-dining room makes people come together. But, of course, that room explodes onto the terrace over the waterfall—part of an unbelievable series of spatial experiences. It’s like the Guggenheim Museum: it’s amazing from the outside, but the interior space is even more amazing. I haven’t been there since, but it’s still with me. If I could achieve something like that, I’d be very happy.

**DENISE SCOTT BROWN + ROBERT VENTURI**

If you ask Bob, “What is your favorite building?” he will say the Hagia Sophia. If you ask him, “What is your favorite Modern building?” he will say the **Villa Savoye**.

For me? I remember, at the age of 2, standing with my parents on an empty lot looking at blueprints. We had moved from Zambia to South Africa and were building a house. It was by Norman Hanson, who had made contact with Le Corbusier and then returned to do fantastic International Style houses in Johannesburg. We built that house and I lived there until I was 12. For that reason, the memories other kids have about attics and creaky staircases I have about flat roofs and lally columns. I remember a porthole window, watching the light come through it, and the circle of sun moving across the room as I lay on my parents’ bed in the late afternoon. I harbored a love of early Modernism then, and I am still an early Modernist—and, by the way, so is Bob. Bob is the most dour functionalist I’ve ever come across—even more than me. We really just added one more function—communication through decoration—to the functions of early Modernist buildings.

**FRANK GEHRY**

Going back to my absolute roots in architecture, I would say the **Shosoin Treasure House** in Nara in Japan. When I was starting out in architecture in L.A., the Japanese influence was strong. I first saw the Shosoin repository in person when I got the Pritzker Prize [in 1989], at the Todai-ji Temple next door, but I had known it for a long time. It’s from the 750s. The Ise Shrine, Katsura Palace, Kiyomizu-dera temple were all required study, like the great buildings of past western culture that we revere. The Kiyomizu is on a hilltop—it’s really a hard climb up. I’ve been there twice. The substructure that anchors the temple to the hillside is a major architectural accomplishment. The Shosoin is a warehouse—it’s much simpler. It’s in the log cabin style called **zekura** and shows the elegance and simplicity of Japanese building. Mesmerizing for a beginner.
Fumihiho Maki

For me, the building that inspired the most fundamental thoughts on architectural issues is the Municipal Orphanage in Amsterdam, by Aldo Van Eyck, completed in 1960. The first reason is that the building clearly shows how to construct a dynamic whole out of a thoughtful composition of generic elements—in this case, a spatial unit in and around which children live and play. Van Eyck says this idea was inspired by villages in Africa, but it could be any village, as Bernard Rudofsky illustrated in Architecture Without Architects, some years ago [1964]. Van Eyck has beautifully realized this concept using a modern architectural vocabulary. The second reason is that the building clearly shows the importance of guiding sight lines in the organization of space. Humans tend to act after first seeing; thinking and feeling come later. I have not seen such a beautiful analysis of the relationship between sight line and space before or since. These two issues are eternal ones, and the Orphanage is a skillful and didactic example of how modern space is driven by them. It continues to inspire my work to this day.

Jacques Herzog

Tough question. I don’t want to sound arrogant, but I have never been influenced by a specific building. And I think Pierre would give you pretty much the same answer. We look closely at many buildings, and we see a lot of beauty in many of them. We’ve never really admired one building specifically. Last year, I wrote a text about my visit to the Farnsworth House. I was ready to admire it for its beauty, but I discovered many things that made no sense. The truth is, it’s not as great as everybody thinks. I wrote a very critical text. Still, I learned from the house, because it activated my perception. Active perception is what you create out of what you see. It makes you become conscious and critical. Perception therefore also has a political and erotic side. Your perception is more important than the object being perceived—more important than any specific building.

Rafael Moneo

The Córdoba Mosque, which I first visited as a student, has been a continuous lesson to me for more than half a century. The building is a theological experience. The Islamic sense of an indecipherable god is present there. The essence of architectural space is expressed in that forest of columns, many of which were Roman. That’s not about recycling—it’s about the unfolding of history. When the mosque was enlarged, the formal rules that created the building allowed it to grow without losing its essence. Of course, in the 16th century, there was a very radical intervention—an entire cathedral was placed inside the mosque! But even that didn’t destroy it—the combination of the Islamic and the late Gothic only adds to the sense of history. A building that can accept something so different is a marvel. I think you are looking at one of the most successful buildings in all of architectural history. And there is no one architect associated with it. It’s about architecture, not about a single architect. That idea has stayed with me throughout my entire career.
TADAO ANDO

There are many buildings that have remained in my heart and that I still think about from time to time. If I had to choose one from among them, it would have to be Le Corbusier’s Ronchamp Chapel. The great master who laid the foundations for Modernism created the space by truly unleashing his genius late in his career. Here, he paradoxically demonstrated the limitless possibilities of Modern architecture by creating the unrestrained sculptural form of concrete in an apparent rejection of the trajectory of his earlier work. At the same time, he proved, with the almost violent space of rich light, that architecture can be made through the pursuit of light alone. It is a rare work that has, from the moment of its birth, brimmed with the power to last throughout time, like the spaces of classical architecture. I had the opportunity to witness a Mass when I visited the building for the second time, in my 20s. People were praying intently, shoulder to shoulder, under the beautiful yet intense light. To this day, that scene has been an inspiration for me in my pursuit to create architecture as a place for people to gather.

RENO PIANO

I’m in trouble, because so many buildings have influenced me. When I see a building for the first time, I don’t focus on what I don’t like; I focus on what I do like. So I absorb things from many buildings. But if I have to pick one, it would be Brunelleschi’s Dome of Santa Maria del Fiore, in Florence. I spent two years in Florence as a student, in ’58 and ’59, and I’ve always loved the story of Brunelleschi. This man started not as an artist but as a craftsman, apprenticed to a goldsmith; soon he was making clocks, which meant working with weights, with balance, and with movement. Then he became an architect, designing buildings using the knowledge he acquired making clocks. I’ve been convinced that you might start as a craftsman, then become more of an artist, possibly, but it’s almost impossible to do the opposite. As for the cupola itself, it was very inventive; the lantern at the top acts as the keystone of the dome. It’s a very radical idea. Brunelleschi made a model of the dome, which sat in the piazza. And it stayed there for years—because it took him years to persuade people that it would work. It’s a lesson in stubbornness. It taught me about the art of believing in what you are doing and defending your idea. The dome is beautiful, but so is the story behind it.

TOYO ITO

I visited the Cabanon de Vacances several years ago for the first time. I was deeply impressed by the fantastic architectural concepts drawn from such a modest cabanon, created by the master of 20th-century architecture in his last years. It is often the case that architects lose their creative energy in their later years. I wish to express my deepest admiration for Corbusier’s affluent architectural creation as he aged. I also admire his powerful works in Chandigarh and Ahmedabad in India.

Dome of the Florence Cathedral | 1436 | Filippo Brunelleschi | Florence

Chapelle Notre Dame du Haut | 1955 | Le Corbusier | Ronchamp, France

Cabanon de Vacances 1952
Le Corbusier
Roquebrune-Cap-Martin

Interviews conducted by Fred Bernstein, with Chris Foyes and Cathleen McGuigan.
25 Lost Treasures

Too many significant works of architecture from the last 125 years have been demolished or changed so radically as to be unrecognizable.

BY ROBERT A.M. STERN

As an Architect committed to the preservation of buildings from the near as well as the distant past, I have come to the conclusion that the architecture profession as a whole is not often as committed as I am. The general public is surprised to find few architects on the barricades, fighting to protect endangered notable buildings from the past. For practicing architects, there appears to be a cycle: the current generation does not value the one before it, but it does tend to look with sympathy on the work of the generation before that: consider Victorian houses—reviled by Beaux-Arts and modernist architects in almost equal measure, but now treasured by Postmodernists.

The Paul Simon song tells us that there are 50 ways to leave your lover. Here is my short list of ways to lose a beloved landmark:

1. Political reasons and acts of terrorism. In today’s climate, these can’t be ignored, as we learned on 9/11/2001. In 2015 we lost Palmyra, in Syria.
2. Greed. We often assume that more money can be made with something new.
3. Narcissism. Too many architects think that their new designs will be better than those from the past.

Sometimes this leads to death by emasculation, as in the case of the Four Seasons Restaurant in the Seagram Building: how much of it will survive Seagram owner Aby Rosen’s direction now that its grace notes, including the furniture and the serving pieces, have been auctioned off? On the other hand, some buildings, never meant to last, have been rebuilt with all the best intentions. Take Mies van der Rohe’s German National Pavilion for the Barcelona International Exposition of 1929. I have trouble with these reincarnations. The Barcelona Pavilion was only known through photos; not one architect or historian of consequence had ever actually visited it. But it was rebuilt in the 1980s. When I saw it, I found to my dismay that it was not as I “knew” it from black-and-white photos. For example, the colors—bright reds and greens—were a shock, and not a good one. The scale seemed off. I have seen it twice now and wish it had remained lost. I prefer my memories.

1. World’s Columbian Exposition of 1893, Chicago

Planned by Daniel Burnham; landscaping by Frederick Law Olmsted. Demolished 1894. The Chicago World’s Fair was a dream. If only it could have lasted! But it did have an afterlife, as it were; Burnham’s plan inspired the City Beautiful movement that led to glorious public architecture and place-making around the country as well as popular resorts like Luna Park at Coney Island. Thankfully, I have childhood memories of the latter before it was partially consumed by fire and the rest destroyed by post–World War II urban renewal. Significantly, a bit of the Chicago exhibition has endured in Charles Atwood’s Palace of Fine Arts, which was saved and eventually rebuilt to serve as the Museum of Science and Industry.

2. Larkin Building, Buffalo


Although it is familiar from grainy black-and-white photos, the Larkin Building itself seems not to have been much visited by architects or scholars. Consequently, most of us did not learn that it was clad in bright red brick until near the end of its life, when Wright captured it on color movie film. Wright’s great monument to labor was not torn down to make way for something else; it was demolished because it had outlived its original purpose, and the city of Buffalo did not see its value as an artifact.

3. Imperial Hotel, Tokyo


This hotel, which expressly catered to non-Japanese visitors, was a triumph of engineering—it withstood the 1923 earthquake in Tokyo. But it was also a brilliant essay in synthetic form, combining an academic classical plan with highly inventive decorative detail. It was torn down to make way for a bigger “more modern” building, killing the goose that laid the golden egg; the new hotel is hardly one for the history books or a tourist attraction. Fortunately, part of Wright’s building has been reconstructed in an outdoor architecture museum at Nagoya.
4. Midway Gardens, Chicago
One of Wright’s undervalued masterpieces, this entertainment venue was designed when German-style beer gardens were very popular in Chicago. Like the Imperial Hotel, Midway Gardens revealed Wright as a master of academic planning and a synthesizer of exotic forms such as those of the Viennese Secession. But World War I and its anti-German feeling, followed by Prohibition, gave it little chance to survive. Certain buildings have short, unhappy lives.

5. Madison Square Garden, New York
McKim, Mead, & White. Built 1890. Demolished 1925.
This great first building to contain multiple establishments, all devoted to entertainment, was designed by Stanford White, who was fatally shot in its roof garden in 1906. The Garden entered a slow decline until Prohibition, and finally real-estate pressures did it in. The full-block site on Madison Square became too valuable as the largely residential area gave way to large-scale office towers.

6. Madison Square Presbyterian Church, New York
Here is another short-lived building. In spite of its dazzling design, lavishly detailed inside and out, the church only lasted 13 years, at which time it was torn down to make way for an expansion of the Metropolitan Life Insurance Company. Its six pale green granite columns were rescued by architect Donn Barber for his Hartford Times Building (1920).

7. Pennsylvania Station, New York
This was a great building, at once classical and modern. The beneficiary of the introduction of electrically powered trains, it was a landmark in the evolution of transportation typology. Brilliantly orchestrated pedestrian circulation paths led from the main entrance and from the side streets, where Venice-like bridges allowed travelers to cross sunken roadways designed to accommodate taxis and automobiles. The grandeur of the ticket hall, modeled on Rome’s Baths of Caracalla, was railed and complemented by the equally grand iron and glass waiting room, which brought natural light down to the train platforms below. Again, evolving real-estate patterns led to a great building’s downfall. Again, the profession sat on its hands—most architects seemed unconcerned or were outright dismissive about what they deemed to be a stylistic warhorse. Notably, along with certain enlightened citizens, architectural young Turks saw the building’s value and picketed against its destruction. Alas, they were unable to save it.

8. Low House, Bristol, Rhode Island
As plans were being drawn up for the destruction of Penn Station, this great iconic temple of a house, featuring an interesting half-level cross section that was largely unknown until historians tackled the archives in the 1980s, was torn down. Ironically, those responsible—descendants of the original owners—wanted something more “modern.” It is interesting to note that George Nelson and Gordon Chadwick, architects who were antitraditional to the core, saw its value and designed a house for Otto Spaeth in East Hampton, New York, in 1955 that was directly inspired by MM&W’s cottage. The Spaeth house still stands.

9. Dodge House, Los Angeles
This was Gill’s largest house. Like so many of his other buildings, it seemed very similar to those of Adolf Loos, through there is no evidence of any connection between the two. The Dodge House sat on King’s Road, across from the Schindler house (now home to the MAK Center for Art and Architecture), so it was part of a very important local scene. Undeterred by protests led by Denise Scott Brown, the city ordered its destruction to make way for a school, but nothing was ever built on the site. What a waste.
1. Schiller Theater Building, Chicago
With few exceptions, Sullivan’s work was not appreciated in the post–World War II era and only began to be venerated with the publication of John Szarkowski’s *The Idea of Louis Sullivan* in 1956. Sadly, the book was not enough to save this masterwork. It seems that most architects in Chicago were more interested in Mies and believed that less Sullivan was more.

2. Chicago Stock Exchange, Chicago
Another victim of real-estate development, its death sentence led to the Exchange’s being picked apart in pieces, with museums benefiting from its fragments. But a room here, the iron-work of an elevator there—is that preservation?

3. Masonic Temple, Chicago
It was once Chicago’s tallest building (302 feet high), and featured a nine-story atrium. When construction of a new subway threatened its foundations, the building was torn down and replaced by a two-story “taxpayer.”

4. Richfield Tower, Los Angeles
At the time the tower was in jeopardy, people had no sense of an Art Deco style. In fact the style had not even been named until English art historian Bevis Hillier started to write about it in the 1960s. Without proper classification, it seems its preservation had no “hook” on which to hang calls for support.

5. American Federation of Labor Medical Services Building, Philadelphia
A superb urban building. Kahn followed up on his design for the hermetic Yale Art Gallery in New Haven (1953) with these elegant, windowed facades. But the building didn’t survive the construction of the Vine Street expressway.

10. Singer Building, New York
Probably the tallest building to have been torn down anywhere, its needle-like tower was not deemed useful in an age of superscale blockbuster office buildings such as Skidmore, Owings & Merrill’s U.S. Steel, which replaced it on Liberty Street. When its likely demolition came to the attention of the just-established New York City Landmarks Preservation Commission, the group took no action—it seems that the preservationists were afraid that the new ordinance would be tested in court and might not survive. So this 612-foot-tall, slender pencil tower on a broad base, anticipating those now going up in Manhattan, came down.

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16. Riverview High School, Sarasota, Florida
A few houses by Rudolph, the towering talent of the first American generation of Modernists, have been lost, and his Orange County Government Center in Goshen, New York (1971), is threatened, although his Art and Architecture building at Yale University (1963) was restored in 2008. Riverside, one of his two high school buildings in Sarasota, met the wrecking ball despite a protest and imaginative proposals for its reuse. Here a number of architects were engaged in an effort to save the building, but bureaucratic intransigence carried the day.

17. Orinda House, Orinda, California
One of the great works of the Postmodern era has been swallowed up by a remodeling that reduces it to the status of a pickle slice in a ranchburger. The house lifted California domestic architecture from the compositional laxity of Bay Area coziness to the level of classical discipline derived from a careful study of Louis Kahn’s architecture.
18. Two Columbus Circle, New York
Originally known as the Huntington Hartford Gallery of Modern Art, the palazzo-style marble-clad structure was criticized when it was built for not being modern (or orthodox modern)—especially by Ada Louise Huxtable in The New York Times. By the time the Museum of Art and Design wanted to take it over in 2000, most architects and critics seemed unwilling to recognize that tastes had changed. What Huxtable and others thought was a travesty of modernism in early 1960s was now seen as a transgressive harbinger of stylistic change—at least by some—but not by the museum and its architect, Allied Works, who, preferring the coziness of orthodoxy, reduced an icon to a bland box.

19. New Haven Coliseum, New Haven, Connecticut
A great loss. This was the perfect emblem of the heroic scale of architecture in the 1950s and 1960s—of postwar America’s optimism. Lording it over an interstate highway, it was designed to also be a good citizen of the surrounding streets, but the plans for a market at the ground level were never realized. When the size of the hockey rink was deemed functionally inadequate, the building came down.

20. Addition to the Observatory Dining Hall at the University of Virginia, Charlottesville, Virginia
Today, the architecture created by my Postmodern generation is highly vulnerable to death by distaste. My own building at the University of Virginia, a dining hall, was torn down because the university needed a bigger facility to accommodate freshman dining. The new structure is as bland as the original one we had been asked to camouflage with our own building. Needless to say the university didn’t come back to me.

Asked what happened to House III, Peter Eisenman said, “It’s gone.” The powerfully composed construct was as much a built compositional theory as an idea of inhabitation. Peter’s houses were not always designed for domestic bliss.

22. Bronx Developmental Center, New York
This major building by Meier, prominently sited on the Hutchinson River Parkway, was distinguished by its shiny gray aluminum-clad exterior. That and its efficient plan for housing mentally and physically challenged children made it absolutely the building of the year when it opened. But, as patterns of health care evolved, the state agency sold the building to a developer, who reskinned it and turned it into an office building. It is the major loss for my generation.

23. American Folk Art Museum, New York
This is such a sad, ironic story: one architect, Diller Scofidio Renfro (DSR), and its client, the Museum of Modern Art (MOMA), claimed it could not accommodate the building or even its facade as part of an expansion. Maybe the Folk Art wasn’t that good as a museum, but the architects and MOMA should have kept the bronze (tombasil) facade—even since the uniformity of the glass box for the rest of the museum is unrelenting. DSR could have done better.

24. Luna Park, Coney Island, Brooklyn
This was one of the best amusement parks ever, a fantastic use of brilliantly illuminated historical architecture. A stepchild of the World’s Columbian Exposition, it made clear that monumental architecture did not preclude popular appreciation or the possibilities for good-time placemaking.

25. Stardust Resort and Casino, Las Vegas
One of the earliest motels on the Strip, it was certainly the quintessential one, glorified by its great illuminated sign. Stardust represented the Las Vegas of the era just before Robert Venturi, Denise Scott Brown, Steven Izenour, and a bunch of Yale students analyzed the Strip as if it were ancient Rome. Since then, several more layers of Las Vegas have been created and replaced. Someday the Strip will become an archeological dig like Schliemann’s Troy.
Pungent and Pithy

A brief history of architectural criticism in Record.

BY SUZANNE STEPHENS

FIFTY YEARS AGO, in the 75th-anniversary issue of RECORD, editor in chief Emerson Goble addressed an issue he was constantly asked about—why the magazine wasn’t as critical as it had been in its early years. “We are charged with not having the nerve,” he wrote in July 1966. Before giving his reasons, let’s look at the magazine’s beginnings, when its critics would “give ‘em hell,” as Goble put it.

When RECORD was founded in 1891, it aimed for a general audience as well as a professional one. Its critics Montgomery Schuyler, a newspaper journalist, and Russell Sturgis, an architect and historian, straightforwardly assessed the pluses and minuses of a building or urban enclave, according to aesthetic and, to a degree, functional criteria. Schuyler castigated heavy-handed eclecticism—what he called “architecutre”—with its mishmash of styles. He considered proportion and scale, as well as how the program and structure were expressed on a building’s exterior. Sturgis’s more traditional aesthetic emphasized a Ruskinian predilection for the play of light and shadow—“the doctrine of the beauty of the penumbra,” as he called it. Yet Sturgis also welcomed the functional expression of structure in new buildings going up in the 1890s. He approved the steel-framed “rationalism” of the Bayard Building in New York by Louis Sullivan (with Lyndon Smith) but regarded the brick arches under the cornice as an “anomaly” (July–September 1898).

Both Schuyler and Sturgis tended to critique a building by scrutinizing the facade as if it were a two-dimensional composition they were viewing while standing on the sidewalk in front. When Schuyler also wrote about the Bayard Building, he barely discussed the interiors, nor did he mention the plainer sides of the 13-story high-rise (January–March 1899). He commended the terra-cotta on the main facade, which revealed the skeleton, and pointed to the way the different parts of the program—

FORM FOLLOWS FUNCTION

When Louis Sullivan designed the Bayard Building (1899), both Montgomery Schuyler and Russell Sturgis commended the expression of the steel-frame structure with terra-cotta cladding in the pages of RECORD. Schuyler also pointed to the architect’s clear reading of the building’s functional uses in Sullivan’s articulation of the base (lobby), shaft (offices), and mechanical services (top).
lobby in the base, offices in the shaft, mechanical services under the cornice—were signified in the design.

Sturgis’s negative critique of Frank Lloyd Wright’s Larkin building in Buffalo stands out as an aesthetic diatribe (April 1908). He also relied on a compositional reading, using only photographs, since he, an aging critic, was too sick to visit Buffalo. Wright’s innovative skylit interior needed to be experienced in person: its architectonic play of mass, void, and space was never described by Sturgis. At least RECORD published interior photographs in the critique and Wright’s own extensive presentation of his philosophy and work a month earlier.

While some architectural journalists traveled in those days—to Chicago to visit the World’s Columbian Exposition in 1893 and see the latest skyscrapers there—RECORD writers stayed close to their New York base. The metropolis was undergoing a major transforma-

“...The [Cairo] is a box, and the combined owner and architect has done nothing to mitigate its boxiness.”

tion, and, as tall buildings zoomed up, the critic’s viewpoint changed: he or she could examine them from afar, mid-distance, or close up, as did Schuyler in writing about the Woolworth Building (February 1913). He commended its design, by Cass Gilbert, for the Gothic-style vocabulary in which crenellations and gargoyles gave the 792-foot-high tower a sense of scale in relationship to the entirety and to the human body.

During that time, “Architectural Aberrations,” unsigned denunciations of eclectically styled structures, spiced up the magazine’s pages. A scholarly analysis later attributed the 26 essays to Schuyler, based on writing style. About the 12-story Cairo apartment house in Washington, Schuyler wrote anonymously, “The building is a box, and the combined owner and architect has done nothing to mitigate its boxiness. Upon the whole, we decidedly prefer the side, where he has not pretended to do any architecture, to the front, where he has made his unsuccessful pretensions in that direction” (March–June 1895). The last “Aberrations” was published in April 1912, and critiques in general became rarer as RECORD turned more and more to straight reportage of design, history, and techniques. Although Sturgis called the Larkin Building “ugly,” RECORD early on devoted several articles (in addition to the extensive presentation in March 1908) to Wright’s revolutionary sense of space and his blurring of the boundaries between inside and out. This kind of exploration of modernist principles continued during the next few decades, complemented by its increasing coverage of European architects’ open-plan and functional precepts. Editorial pages brought increased attention to spare, unornamented, efficient design defined by improvements in materials such as concrete, steel, and glass. In the 1930s, under the influence of managing editor Lawrence Kocher, RECORD increasingly published expository
articles on new building techniques, modular housing, and community planning (for more details about the architect and editor Kocher, see April 2016, page 46).

In those years, criticism did not stop, but the strong pro and con assessments were harder to find. As Goble would later point out in his July 1966 essay, the growth of the advertising base in the early 20th century, which valued circulation figures among practicing architects, spurred a shift from the lay audience to a professional one. Goble argued that RECORD benefited from the increased use of photographs, plans, and sections rather than the "more limited ideas of criticism." In another essay in that anniversary issue, he contended that the selection of projects was a better form of criticism than the "fireworks of really negative attack." Editors exercised critical judgment in their selection: "Every building that is published—good, bad, or indifferent—involves some element of criticism."

Mildred Schmertz, editor in chief of RECORD from 1985 to 1990 (and on the staff for 33 years), wrote an article for Harvard Design Magazine in 1996 explaining why RECORD avoided those critical fireworks. "There was so much competition among architectural magazines to be the first to publish a 'high-profile' project," that "the architect will pick the magazine he wishes the work to appear in and withhold the graphics [plans and sections] from the competing media." During most of Schmertz's years with RECORD, there were four architecture magazines, each with its own identity: Architectural Forum, which was known for its urbanistic hue; Progressive Architecture, which forged a strong reputation for publishing avant-garde design; The AIA Journal, which featured education and practice articles as well as pieces about other topical concerns; and then RECORD, known best for a thoroughgoing coverage of state-of-the-art design and technical matters.

In spite of a certain reluctance to antagonize architects, RECORD still welcomed screeds from the outside world. The famed public intellectual and architecture critic for the New Yorker, Lewis Mumford, brought a new kind of evaluation to RECORD in midcentury. Instead of just looking at a building as a composition, he placed architecture within the larger context of regional and city planning, urban design, and housing. In a series, "The Future of the City," published in installments in 1962 and 1963, Mumford lambasted architects for creating taller and taller buildings and in-
creasingly referred to the city as “an amorphous, overmechanized, urbanoid mass, lacking both esthetic identity and social character” (November 1962).

Mumford advocated strong urban planning—but not the sort propounded by Jane Jacobs, a former editor at Architectural Forum, who published the supremely influential book The Death and Life of Great American Cities in 1962. Mumford berated her for having a “pathological aversion to good urban design” (October 1962). “In order to avoid officious municipal demolition and regulation, she would return to Victorian laissez faire; in order to overcome regimentation, she would invite chaos,” he wrote. “She lacks an image of the modern city,” RECORD went on to commission more articles with a polemical tone. In December 1972, Michael Sorkin, who had just received his M.Arch. from M.I.T., wrote an essay, “Radical Alternative,” on the concerns of his generation: “A thoroughly radical position takes issue not with the form of the object . . . but with the process that generated the decision to make and use it.” Practitioners should be interested in “process not product,” Sorkin emphasized.

If RECORD was still reluctant to criticize architects who might get angry and withhold drawings in the future, it nevertheless gave Sorkin a platform in September 1986 to take apart the recent work of Philip Johnson and his partner John Burgee. Writing on the Crescent, a mixed-use development in Dallas, Sorkin demonstrated a pithy irreverence toward Johnson’s modus operandi: “No need to undergird formal enthusiasm with theory or relevance, to struggle for elaboration: the historic grab bag yields images for any occasion, an endless series of snapshots, history without memory.” Sorkin’s criteria for judging architecture, like Mumford’s, involved an urbanist viewpoint, if with a more subversive tone. Compared to the theory rife in the pages of academic architectural journals during these years, where key concepts such as semiotics, structuralism, and deconstruction were bruited about, Sorkin’s language was always lively and lucid.

Sorkin’s essays still appear in RECORD (page 00). At one point, Robert Ivy, the editor in chief from 1997 to 2010, assigned alternating monthly columns to him and to Robert Campbell of The Boston Globe. Other critics, such as Sarah Williams Goldhagen, have been enlisted to write under the current editorship of Cathleen McGuigan.

Last year, RECORD gave space to a spirited debate between Sorkin and Blair Kamin of The Chicago Tribune on a controversial proposal to build the Lucas Museum of Narrative Art on a prominent lakefront site in Chicago. When Beijing-based MAD Architects proposed a white, undulating scheme for the museum, Sorkin praised it for being “evocative of the light, simple, tensile structures of a Frei Otto tent” (January 2015). Kamin shot back in an essay in the next issue, including Sorkin in the group of Lucas museum proponents who “want to party like the recession never hit. Superrich clients! Icons! The Bilbao effect!” (The irony of including Sorkin in the crowd he so long impugned was not lost on certain readers.) Kamin hated the scheme for its misplacement on an “overburdened stretch of lakefront . . . fouling it with new levels of crowding and congestion.”

The Lucas Museum has now folded its tent and left Chicago, but the debate was healthy, no matter which side you took. While the architecture community may wonder if criticism is disappearing (along with print magazines and newspapers), there are, fortunately, strong and informed voices today, on paper and online. And the critical discussion can only be good for the profession and the public.
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Hindsight may be 20/20, but the picture is not so clear when looking to the future. Still, RECORD asked leading figures from a rising generation of architects—who will be shaping the built environment for years to come—to do just that. What will be the biggest issues facing architects in the next 25 to 50 years? We also address how new materials and new technologies like driverless cars might transform our buildings and our cities. And will the way we teach and train architects change with the changing times? The following pages offer some predictions, but no crystal ball.
Visions of the Future

A group of prominent architects discuss their forecasts for the decades ahead.

**MY PHRASE** for the civilization we now live in is post–Fordist network society. Architecture needs to converge around ideas for this new era—the paradigm of parametricism—as it did around Modernism in the 20th century. We need to enhance the capacity of the discipline, not only in terms of technological sophistication, but also by taking a more scientific approach with respect to social processes.

Cities will be the superbrains of our civilization. Enhanced research-and-development activity means that people will have to network and communicate all the time, and so we will make cities that are dense, open, permeable, and mixed. Each building is a device that invites, structures, and frames interactions, and so the primary task of future architects will be communication design. At the same time, the division of labor into specialisms will continue. Architects will be in charge of the overall layout, aesthetic articulation, and semiology of a building, but they will distribute all technical elements to others, including engineers, programmers, and contractors.

If the core competency of architects is to translate the life process of an institution into space and form, and to make sure that the final product communicates as expected, architecture must develop a more sophisticated account of the built environment as a system of signification. For that, we need to upgrade the discipline's intellectual capacity. Architectural theory will need greater rigor, like that found in economics or the social sciences, and it will need to flow more directly into the work of the practicing architect.

We will also see a greater role for artificial intelligence in the creation and operation of the built environment, and the emergence of responsive environments—intelligent buildings that can signal dynamically what is going on within. This expands the communicative potential of architecture, and also feeds hard data back into an enhanced disciplinary dis-

**“We will see the emergence of intelligent buildings that can signal dynamically what is going on within.”**

**THE WAY** we practice architecture will be totally different in the future—not just because tools and contexts change, but because the young people studying today are absolutely different from my generation.

First, there are the number of women entering the profession. There are now more female students in architecture schools than men. This will alter the profession because women don’t manage their time, or relate to the client and architecture, in the same way as men. At the moment, there are not many women running offices, but in the next 25 years, they will be there.

Another factor is that today’s young people don’t want to be salaried employees. They want their own companies. They want to learn by doing, to be hands-on in making things. They are highly adaptable and think in terms of individuals and small groups’ sharing a platform. Big firms have to be very structured, like a machine, and we know that big machines are not efficient anymore. A two-person start-up can invent a new way of doing things. It has to happen in architecture.

In the school I founded, Confluence, I push the students to be entrepreneurial. That doesn’t mean they will necessarily build buildings. When you are educated in architecture, you are able to face very complex questions and work at many scales. It’s a unique way of thinking. We could apply it to many problems in commerce and society. Some companies are already involving writers, anthropologists, and philosophers to help them to think differently and evolve their business. Why not architects?
WE FACE a new challenge as architects, learning who will be in the driver’s seat in the shaping of our cities as they evolve. The private sector has jumped into what formerly were the arenas of the government and local authorities. For example, we’re at the edge of seeing how transportation and infrastructure will change over the next 25 years. It most certainly will not look the way it does now. One area that will need policy and will not be led by the private sector is housing. As urban populations explode, we have to get ahead of housing.

Incredible things are right at our doorstep, and they will have a powerful impact on urbanism and architecture. We’re on the precipice of reimagining the city and how it serves its citizens. This offers opportunities for new typologies, and for being able to think in a more avant-garde way about what the public needs and how to maintain the identity of a city. This is going to be at the forefront of our agenda.

“We’re on the precipice of reimagining the city and how it serves its citizens.”

IN TERMS of tall buildings, there will always be people who will want to go higher. We are reaching a point, however, where it is economically unfeasible, despite being technically possible. Our firm has designed a mile-high tower that could get built, but it probably will be a losing financial proposition.

While supertall towers often become national symbols, their value extends beyond their country’s borders. Eventually the whole industry benefits from what we’ve learned. Take glass, for instance. We can now build glass walls that are stronger than concrete block. And while we were at Skidmore, Owings & Merrill, we designed a positive-energy building, the Pearl River Tower, which would have produced more energy than it consumed, but the Chinese power grid was not capable of accepting the power generated by the building. Someday, that won’t be the case.

THE TECHNOLOGICAL revolution that has propelled Silicon Valley is almost exclusively focused on the virtual world. Looking ahead, I think we will see more advances in the physical realm, from driverless cars to solar infrastructure to new building materials that could totally transform architecture.

Already, nanotechnology is giving us a handful of carbon materials with almost magical properties. Take graphene, which is a monofilament carbon material that is 200 times more conductive than copper, 100 times stronger than steel, and more transparent than glass. It’s even potentially abundant. It’s just becoming available at the manufacturing level, and I believe it will become commercially available within a decade. It’s so much better than anything we know today. It can be used to create completely transparent window photovoltaics, and spans and dimensions that seem like magic. Nanotechnology gives us possibilities that we could only dream about.

We will also see 3-D printing at an industrial scale. Computer programs have enabled architects to design with great precision and complexity, but at the end of the day, designs have to get built. When 3-D printing becomes fully commercially available, it will create amazing new opportunities. Instead of having to schlep a lot of materials to a site, you will bring a handful of printers and print the building components, all of which will be incredibly strong. Any architectural form will be not only possible but also financially feasible.

I foresee architects’ getting more involved in the “back of house” aspects of a city too—all the infrastructure that makes a city work. There is still a divide in the built environment: building types that are “deserving” of architecture—like cultural venues, corporate headquarters, and luxury condos—but what about the power plants, the waste-management facilities, the water-purification plants, the parking garages, the highways? All of those are seen as engineering challenges, with little thought put toward how to integrate them into the urban environment. These facilities can make a positive contribution to a city. One of our current projects, a power plant in Copenhagen, will have an alpine ski park on its roof. It will open in 2017. We are very interested in finding ways to turn infrastructure into a positive contribution to the urban landscape.
WE ARE living in an urban age. People are moving to cities for opportunities for jobs, education, health, and other basic services. And cities have the critical mass for knowledge creation, something that will be more crucial in the development and formation of wealth in the broadest sense of the word.

The problem is what we call the “3S menace”: the scale, speed, and scarcity of means with which to respond to this phenomenon. There is no historical precedent. Out of the 3 billion people living in cities today, 1 billion are under the line of poverty. By 2030, out of an anticipated 5 billion city dwellers, 2 billion will be under the poverty line. That means we will have to build a 1 million-population city per week over the next 15 years.

If we don’t solve this equation, people will not stop coming to cities. They will come, but will live in awful conditions. The result will be a humanitarian and health crisis rife with social friction—a crisis that will become in the midterm, if not the short-term, a security threat.

We do not have enough knowledge to solve the 3S menace. Even if we had the tools to solve it, we would end up creating an environmental crisis.

The carbon footprint, the water consumption, and the undesired emissions to build for 1 million people a week, using current building techniques, will end our planet.

President Obama and U.N. Secretary General Ban Ki-moon, have said that the future terrorist threat will be the consequence of climate change. The 3S menace is an environmental, political, and social problem. And it’s a problem for everybody, not just the developing world.

Thanks to design’s power of synthesis, architects have the opportunity to translate into form all of the conflicting forces at play and provide solutions for the complexity of contemporary society. In front of these challenges, we need to be creative enough to identify strategic opportunities and translate them into proposals and projects of public space, public transport, multitask infrastructure, open incremental housing. With good design, the involvement of patient capital—that looks for predictability more than profitability—and the right rule of law could turn cities into a vehicle of development.

These issues are difficult—and difficult questions require professional quality, not professional charity.

WE HAD a client who ended up with less space than he originally thought he needed because the house we designed had expansive views and an amazing quality of daylight. The idea was to get closer to nature, to experience those external phenomena. And for that, what matters isn’t the quantity of space but the boundary condition, and open and flexible arrangements. With a better boundary condition, the space one actually occupies can be more intimate.

Throughout most of history, architecture has been about nature in opposition to the man-made environment. But there is a gradual shift with new technology and new attitudes that seek closer alliances. I have a theory that two 20th-century inventions changed our understanding of inside and outside. One was the X-ray, which made it possible to see inside the body, and the second was psychoanalysis, which allowed us to explore the internal mechanisms of our mind.

Since then, we have been trying to lessen the boundary between internal and external conditions. The idea and the degree of enclosure needed, both physically and psychologically, has changed. Now that we can do more with less material, with high-performance enclosures getting thinner and lighter, we can embrace natural elements. By incorporating natural ventilation and sunlight—by working with and not against the forces of nature—our buildings become more sustainable. These trends, of needing less space and less separation from nature, will continue as technology advances and our perception enlightens.
THE PRACTICE of architecture is going to change. Architects will reverse slide from their specialization in aesthetics and reclaim their expertise in problem-solving. We will need to be broad-minded generalists, and firms will need to have a more expansive view of what architects can do. We can combine art and technology, and do it in a way that solves real problems.

Our firm is continuing to research what building a city means, and not forgetting the artistic side, while capitalizing on technology. How can we create areas with density, links to public transportation, spectacular public spaces, and an inclusiveness that embraces many kinds of people? How can we create higher-quality buildings, with better performance, that don’t cost an arm and a leg? The most sustainable thing is not an array of photovoltaics on the roof; it is a building people love and care about and don’t have to renovate every 20 years. If we can do all of this successfully, we can make a huge difference.

WE NEED to promote social connectivity in ways that will keep our cities safe and livable. I fear that with greater wealth disparity, we are losing connections between people who come from different walks of life. I’m optimistic that architecture can find ways to reconnect communities. To do that, architects will need to be more engaged with the public and will need to find ways for people to become active participants in designing their environments. Public engagement is not something we’re taught to do in architecture school, but we need to learn it.

We are also going to have to rethink our civic assets—including police stations, libraries, community centers, and even streets—and redefine what they are in order to get the most out of them. A library can become a place to get job assistance or mental-health services. A police station could also be a community center. We’re going to have to reinvent all of these things, and think of ways they can be networked together. A city that is more cohesive will be more resilient, even regarding climate change. When things start happening, we’re going to have to take care of each other. And to do that, we have to know each other.

“THE NEED FOR HIGH-QUALITY BUT ECONOMICAL BUILDINGS WILL BECOME MORE CRITICAL.”

We always need to remember that good architecture takes time. It’s about learning local realities, studying climatic conditions, and then working with the community to create a successful design. In the African context, I cannot afford to be too quick or “fashionable.” If you take this approach, you will destroy more than you create, and communities will turn their backs on architecture. We should take care never to neglect the foundation of architecture: to serve humanity.

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**THE FUTURE** of architecture is figuring out what happens where the physical and the digital intersect. Buildings are becoming smarter and more networked. Yes, some of the “smart building” technology starts out benefiting the rich—as toys to entertain wealthy consumers—but it will eventually reach many more people.

I recently visited the Villa Tugendhat, in Brno. I went expecting to see really cool Mies. I found myself fascinated by the air conditioning. The whole facade of sliding glass disappears into the basement. The slot where it goes is a giant diffuser, and in the basement there’s a rudimentary cooling system, with these four bins of wildflowers. Throughout the day, cool air with different scents blows through the house. I was amazed at all the technology cooked up for this one family. Yes, it was superbourgeois, but that stuff trickles down eventually.

So buildings will change, in ways that no one can predict exactly. How buildings are delivered will change in ways I’m much more certain of. I’ve had the opportunity to work with the HoloLens, which are glasses that project augmented reality onto whatever you’re looking at. It’s not virtual reality, which I hate, but something much more useful. Put them on at a construction site, and you see what you’re supposed to be building. And as you move your head around, you’ll see it in 3-D. In a few years, construction sites will be paperless. The workers will be wearing goggles preloaded with information provided by architects. I’d bet the farm on it.

**I’M ALWAYS** hesitant to predict the future. We see the future best from the perspective of history. Looking at China, I think there are still lots of opportunities. Every second- and third-tier city here wants to be Shenzhen, to grow very fast. But we’re using the same set of tools to plan our cities that we did 25 years ago. We need new methodologies. Instead of building new cities, though, we should go back and rebuild the ones we have. I’d like to see the new city built on top of the existing one.

Architects must change too. Traditionally, we would wait to get a commission and then provide a service. There are other ways to practice, though. We can go out and find our projects—research where we live and work, and find problems that require solutions. This means identifying key moments where we can intervene and make a difference. It means actively engaging with our cities. Right now URBANUS is working with a community in Shenzhen that is being threatened by development. It’s actually a 500-year-old village in the middle of a city that everyone says is just 36 years old. It has been there for hundreds of years, changing all the time, and is now surrounded by a giant new city. We used social media to reach out to people living in this urban village, as well as to architects, planners, and researchers. It’s very powerful. We couldn’t have done this five years ago.

People in China continue to move from the countryside to the cities. But a lot of work needs to be done in rural areas. The countryside has always nurtured our culture; it’s where our poets, painters, and philosophers went to find inspiration. In the Confucian system of governance, smart kids from the countryside would take the exams, go to the cities for education, and get posts in different places. But they always came back to the countryside. We need to do that again—to bring people back to the villages, not just as tourists, but to live there and contribute.

**“In a few years, construction workers will be wearing goggles preloaded with information provided by architects.”**

**SOU FUJIMOTO**
Sou Fujimoto Architects
Tokyo

**IN THE FUTURE,** biotechnology will allow us to blur the line between the natural and the man-made. I can imagine structures that are half grown and half built. We could not say that buildings contain plants, because buildings and plants would grow together: the process of building and growing would be fundamentally the same. I think this would completely change our understanding of architecture. This is my dream.

Interviews conducted by Fred Bernstein, Chris Foges, Jenna McKnight, Josephine Minutillo, and Cliff Pearson.
The Road Ahead

Autonomous vehicles are on their way—but what will their arrival mean for density and sprawl?

BY SARAH AMELAR

The race to develop driverless vehicles is zooming full-speed ahead, engaging all the major car companies—as well as Google X, Apple, and various start-ups. Though schemes for self-driving date back to the 1920s, with resurgences in the ’50s and ’80s, this once-far-fetched pursuit is attaining real-world feasibility. Google X, a leading player now known as X, has logged over 1.7 million miles in its autonomous test cars on public roads. States including California, Florida, and Michigan have enacted legislation to permit such trials. Although a recent fatal accident with a Tesla test car drew widespread attention, it was statistically an extremely rare self-driving event. In fact, the day when a phantom chauffeur will charge an electric vehicle on its own, analyze the route, exchange up-to-the-moment information with other cars on the road, and pick you up for work—or your kids for school—is no longer sci-fi fantasy. Many of the manufacturers expect fully autonomous vehicles (AVs), requiring no human supervision or backup drivers, to hit the market around 2020—letting you sleep, read, work, or entertain guests as an unmanned sedan ferries you door to door.

Meanwhile, questions are emerging about how AVs could change the form and structure of cities, towns, and roadways. Much of the research—at venues including MIT, IIT, and Carnegie Mellon University—has examined this autonomy in tandem with other evolving trends and technologies. Exploiting the joint potential, self-driving seems a natural fit with electric powering; hyperconnectivity; sharing models (as in Zipcars, urban bike fleets, and cyber-facilitated car pools); and operative algorithms, akin to the dispatch programs that optimize elevator service based on passenger destinations.

“Autonomous vehicles promise to have dramatic impact in blurring the distinction between private and public modes of transportation,” says professor Carlo Ratti, director of MIT’s SENSEable City Lab. “After taking you to work, ‘your’ car could give a lift to someone else in your family—or to anyone in your neighborhood, social-media community, or city—rather than sitting idle.” While the average automobile in the U.S. is unused an estimated 95-percent of the time, a robo-vehicle has the potential to reposition itself continually, with network-optimized efficiency, from one passenger to the next. Theoretically, self-driving could lend everyone—including the blind, elderly, and very young—unprecedented mobility, providing a shared system of individually customized, on-demand travel with a fraction of the cars currently on the road.

A major consequence could be a radical reduction in parking space. And slots could be packed tight, given robotically nimble maneuverers, not to mention the area saved when no one needs to exit or enter a parked vehicle—ever. (After dropping you off, the car would “valet” itself.) Even curbside spots could become unnecessary, allowing for narrower streets—an efficiency boosted by sensing-and-reaction mechanisms that permit AVs close driving distances, increasing road capacity. The gains could be huge. As Ratti puts it, “Parking infrastructure in the United States covers around 5,000 square miles—an area [43-percent] larger than Puerto Rico.” The freed-up land could be converted to creative and socially enriching uses, providing for art or recreation—as demonstrated temporarily on international Parking Day, or more permanently through initiatives in cities that include Seoul. Such reclamation opportunities, how-
ever, only apply where parking occupies open lots or dedicated structures.

Self-driving could also fundamentally change intersections and traffic signals. A recent MIT study proposed an air traffic-inspired slot system that dispenses with traffic lights and stop signs. Instead, vehicles communicate electronically, enabling them to cross intersections safely without stopping or idling, thereby improving traffic flow and energy expenditure.

But predictions vary. John Eddy, an Arup principal who advises municipal transit agencies and other clients on the planning implications of self-driving, cautions, “There’s an expectation that a huge amount of land will come available thanks to driverless cars—but not so fast! We can’t wipe the maps entirely clean of parking, and one great unknown is the space needed for all the pickups and drop-offs. Besides, public policy will play a significant role in how the land actually gets reallocated.” As for the communal aspirations for AVs, he points out that extensive ride pooling is possible today, even without automation, yet many people prefer—or can afford—not to do it,” he observes. “Yes, enthusiasm for it may be growing, but a complete transformation would require a profound societal change, as well as policies that incentivize sharing versus not sharing.”

Perhaps the most compelling aspect of driverless roads is the promise of vastly increased safety. “Statistically, the least reliable part of a car is the driver,” says Chris Urmson, who until last month headed Google’s Self-Driving Project. “And 1.2 million people are killed in car accidents every year.” By many estimates, 90 percent of them involve human error. Though autonomous driving has seen relatively few incidents, its greatest safety hurdles come in the transition window, when manned and unmanned vehicles still share the road (as with the Tesla accident in May). And AVs need further advancement to address such complications as potholes, snow, reflections, construction obstacles, bicyclists, and pedestrians—not to mention technology failures, if systems go down or get hacked.

Assuming the ongoing progress addresses such shortcomings, and policy keeps pace, it’s unclear if the new autonomy will promote urban density—or suburban sprawl—or both. “Arguments can be built for both options,” says Ratti. As he points out, density is by nature more efficient, allowing for better resource sharing, but swifter, easier, more relaxing and productive commutes could make suburbia more accessible and desirable. Speculative optimism pervades visions of a brave new driverless world, yet we could realize many of the forecasted benefits now, without AVs. And if parking were minimized, generating a bounty of land, there’s always a risk of development that doesn’t turn parking into parks or otherwise serve the collective good. As for increased density versus sprawl, we could conceivably end up with both. Clearly, the time has come to lay the groundwork for an AV revolution. The impact of self-driving, as Ratti concludes, “will come down to societal decisions about how we really want to live.”

**Density allows for better resource sharing, but easier commutes could make suburbia more desirable.**

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**MIXED BLESSING** A driverless revolution could increase urban density or, conversely, suburban sprawl—or both.

**JOY RIDING**

Self-driving was once a pie-in-the-sky pursuit, as suggested by this late ’50s image, created for an electric company advertorial.

**PHOTOGRAPHY:** COURTESY ARUP (TOP); © ADVERTISING ARCHIVE/COURTESY EVERETT COLLECTION (BOTTOM)
Material Futures

Designers and architects are going back to basics to develop an innovative palette of building blocks for generations to come.

BY BRADLEY QUINN

MATERIALS HAVE undergone a radical transformation. All over the world, a fresh crop of tech-savvy, socially engaged architects are seeing traditional options with new eyes. Factors such as geopolitics and mass migration are fueling demands for lightweight, labile materials, while the need for emergency supply chains requires multifunctional building blocks that can be assembled on the fly. Just as conventional resources are being rediscovered or repurposed, digital technologies pave the way for smart interiors and facades. Modern materials are no longer passive; they can function as sensory components that harvest energy, interface with their surroundings, and respond to the surfaces around them. As architects combine parametric tools and traditional craftsmanship, they are discovering materials that limit neither and sometimes amplify both.

Widely known for his preference for humble materials and appreciation of craft, Swiss architect Peter Zumthor was just one of the participants who identified a shift toward “handmade architecture” at the International Architecture Biennale in Venice this summer. According to Zumthor, the industry is slowly returning to simple, unfinished materials such as wood, stone, clay, and thatch. Recent innovations in timber technology indicate that Zumthor is right, especially since engineered wood products such as CLT (cross-laminated timber) have evolved to become significant building materials. In the hands of Thomas Robinson, founder of LEVER Architecture in Portland, Oregon, CLT and glue laminated timber are rising to new heights as they are used to construct LFRS (lateral force resisting systems), beams, and tall columns. Robinson’s 12-story mixed-use Framework tower is slated for construction in Portland’s trendy Pearl District next year. “The post-tensioned wood rocking shear walls in the Framework project are the primary expression of the facade and drive the plan,” says Robinson. Additionally, Robinson reports that his firm’s Albina Yard project in North Portland features the first structural use of domestically fabricated CLT panels in the United States.

New York architect Toshiko Mori designed a multiuse cultural center in Senegal that was completed last year ( RECORD, June 2015, page 82). Grasses growing on-site were harvested...
and dried to fashion the structure’s sloping thatch roof, which collects rain and channels it into water reservoirs that then drain into covered cisterns. “Traditional techniques were used to make the roof,” says Mori. “The materials and craft are known to everyone, so repairs can be made readily.”

German architect Anna Heringer also turned to local resources, discovering that mud may have potential for modern structures. Heringer first used mud bricks in 2007 to build a school in Bangladesh, and today cites it as an example of a readily available global resource. More recently, the architect’s installation at the 2016 Venice Biennale, which comprises 25 tons of mud from locally sourced clay, demonstrates age-old techniques viable for the 21st century: rammed earth, mud-casein wall colors, and zabur, a technique of shaping through layering the mud by hand.

Seaweed, too, is slated to join the ranks of grassroots materials. German designer Julia Lohmann is pioneering prototypes and installations that explore its applications for architecture and design. “As I experiment with naga kombu and other types of seaweed, I discover it has the strength and robustness typical of building materials,” Lohmann says. Her experiments with stretching dried seaweed over a cane frame resulted in a freestanding installation, revealing the material’s potential for building temporary structures. At the same time, Danish architect Kasper Guldager Jensen, GXN director and partner at 3XN and coauthor of Building a Circular Future, is exploring the value of biobased building materials produced from seaweed and agricultural waste such as tomato stems and flax fibers. “Both biological and technical materials should be up-cycled,” Jensen says. “Creating man-made material ecosystems is the ultimate design challenge.”

Such grassroots resources are often derived from reclaimed materials or elements created from recycled sources. Lauded for its versatility and strength, recycled paper can be used to make acoustic panels, wall and floor tiles, and load-bearing structural components. Based in the Netherlands, the designers behind Newspaper Wood reverse the norm of pulping wood to make paper: they recycle newspaper to create an alternative to wood. Lightweight and strong, the newspaper used to fabricate the material is compressed so densely that its layers resemble wood grain when cut.

Nature provided the inspiration for a modular system of building components based on grains and granular particles. Karola Dierichs and Achim Menges, both architects teaching at the Institute for Computational Design in Stuttgart, Germany, used recycled plastic that had been extruded into pellets as raw material for the injection-molded components they designed. Their modular system of star-shaped...
granular particles can be assembled in layers to build freestanding structures without requiring binding agents, framework, or forms. Distinct Element Modeling (DEM) simulations were used to analyze the structural performance of the recycled material, revealing that the system is robust enough to create load-bearing structures without requiring any additional support.

Although technologically fuelled components may appear to be a direct counterpoint to low-tech, traditional materials, there is scope for the two to coexist. Based in Vienna, Veech x Veech integrates advanced media technologies into everyday architectural materials to create programmable surfaces and immersive interiors. Ready-made products, such as luminous textile panels, are installed alongside components crafted from acrylic-based solid surface materials developed to showcase digital images and animations. When Veech x Veech designed Al Jazeera’s new broadcast studio in the Shard in London last year (record, August 2015, page 131), it created sensory skins that display graphics, regulate lighting, and absorb sound. According to Stuart Veech, who cofounded the practice with Mascha Veech-Kosmatoschf, “The integration of materials and technologies enabled us to blur the boundaries between the real-time, analog studio environment and immersive digital spaces, subsequently going beyond the norm of the existing black-box studio.” Technologies like these can make every environment interactive, yet often rely on traditional materials to construct panels and surfaces to contain them.

New materials, whether derived from organic sources such as seaweed or fabricated from recycled plastic, will conserve resources and up-cycle waste. As such technologies are integrated into buildings, traditional materials and digital systems may converge to create responsive environments. The very same craftsmanship and conventional constituents that are highly valued today promise to play key roles in the interactive architecture to come.

Author, academic, and industry strategist, London-based Bradley Quinn is an expert on emerging technology and advanced materials. His books include The Fashion of Architecture.
Changing Course

Architectural education is diversifying, with more options for students.

BY JONATHAN MASSEY

Walk into any of the 154 architecture schools certified by the National Architectural Accrediting Board and you are likely to encounter students working long hours in the design studio, learning their craft in small groups through desk crits and pinups. It’s a scenario with roots in the 19th-century tradition of the Ecole des Beaux Arts. Combined with rigorous professional requirements, this approach makes becoming an architect an extended and expensive proposition, entailing from five to eight or more years of full-time study, with heavy course loads. Factor in internship and licensure exams and you’ve got an endurance course: the average time from starting a degree to becoming a licensed architect is 11 years. Architecture, and architectural education, are still to some degree a gentleman’s game geared to people well endowed with time, money, and social capital.

High barriers to entry skew the demographics of architecture by steering away talent, especially among women, first-generation college students, and people from historically underrepresented ethnic groups. Recognizing this, the organizations regulating access to the profession have changed procedures. Nineteen schools now incorporate work experience and test preparation into degrees to provide an “integrated path to architectural licensure,” and the National Council of Architectural Registration Boards has changed its internship requirements to recognize a broader range of activities and give candidates an earlier start.

But these are small steps, and there’s substantial pressure to make the field more accessible and equitable. I see two primary methods for changing this: building new pipelines into the profession and exploiting the efficiencies of online tools.

The discipline starts losing a diversity of talent early on. Having completed a study on inclusion in architecture last year, Harvard professor Toni Griffin suggests that we need to introduce the field early to future architects by addressing middle- and high-school students from underrepresented backgrounds. To this end, the National Organization of Minority Architects runs youth summer camps and workshops through its Project Pipeline, while the University of Michigan’s Taubman College of Architecture and Urban Planning has joined forces with the Detroit public schools to launch a one-semester college-level introductory program. The Equity by Design committee of San Francisco’s American Institute of Architects chapter uses research and conference workshops to promote gender equity in both academia and practice.

Recruiting and retaining people who aren’t interested in a gentleman’s profession also requires changing curricula to foster awareness of architecture’s relevance to matters of common concern. This is the work of Design Futures, an annual workshop founded in 2013 by Dan Etheridge and Barbara Brown Wilson, to train students in public-interest design, and of the Feminist Art and Architecture

THEN AND NOW. Design studios in the early days of Columbia University’s Graduate School of Architecture, Planning and Preservation, shown in Record in July 1900 (top). Now, students at the Taubman School of Architecture at the University of Michigan (left) seem more immersed in various media, if more casual in attitude.
Collaborative, a group of young historians generating teaching materials that emphasize women’s contributions and the insights of feminist scholarship.

A bigger impending change is technology-driven. San Francisco’s Academy of Art University, Lawrence Technological University in Southfield, Michigan, and Boston Architectural College offer accredited architecture degrees either fully or partially online, allowing students to fit education around work and family. So far, these programs generally replicate the methods and scales of on-campus education, with class discussion moving into chat forums and desk crits conducted in video calls. Across higher education, though, providers ranging from established universities to specialized for-profits, such as General Assembly, which was begun in New York, are offering new formats. MOOCs, or Massive Open Online Courses, present course materials and assignments online, with students evaluating the work of their peers. And since people need new knowledge and skills at multiple points during their careers, fields such as interaction design and teaching are issuing microcredentials—certificates recognizing that the bearer has demonstrated competency in a specific topic or expertise.

MOOCs and microcredentials have low completion rates, however; so far, in architecture, they function primarily as free or low-cost loss leaders that recruit students into traditional degree programs. But market analysts predict an “unbundling” in which students move from signing up for the degree program as a complete package finished in a short period right after high school (the traditional college-degree model) to a service consumed in different ways throughout a career. An exercise at Stanford University’s d. school imagined the future university as a lifelong “open loop” between study and work, with a self-paced curriculum in which partici-

pants move forward not at set time intervals but when they demonstrate competency through exams and completed projects. Marketplaces such as LinkedIn, which use peer endorsements and other data to represent competency in specific areas of skill, may begin to supplant degrees in some fields.

Since most architecture degrees are connected to professional licensure, these changes will be slower to affect architectural education than other fields. But we can expect many architecture schools to combine on-campus learning with online courses, allowing students to learn at variable paces and lower costs. The key to significant change is innovation in the design studio, which owes its uniquely powerful teaching to a high cost in time, space, and staffing. The information-rich, multituser platform afforded by building information management (BIM) software suggests that cloud-based platforms can support more efficient ways to learn and to evaluate design. Architect and Yale University professor Peggy Deamer sees BIM as a framework for introducing students to architecture as a collaborative art embedded in markets for products and services. Future practitioners educated in this kind of complex and dynamic design medium may be better equipped to navigate the labor market. Ultimately, the strongest incentives for people to pursue architectural education are higher earnings and a better work-life balance. Many people practice architecture without becoming licensed. They work in a firm with other licensed practitioners, partner with someone who can stamp drawings, or operate outside the service model embedded in AIA-approved contract documents. Some of the strongest design research in the professional and post-professional degree programs at California College of the Arts, where I am dean of architecture, comes from experimental studios that adopt tech-sector approaches.

In our Creative Architecture Machines studio, students make prototypes of automated fabrication systems for building components, generating intellectual property for commercial use rather than bespoke “instruments of service” for clients. Architecture offers ample room for innovation, not only in design but also in the models of practice and methods of preparation through which we equip students to transform the built environment.

America’s Top Architecture Schools 2017

Record presents the ratings of the top 10 undergraduate and graduate programs in the U.S., compiled by DesignIntelligence. We discuss some of the highlights of this year’s findings. BY ANNA FIXSEN

HERE’S A professional pick-me-up: architecture is one of America’s most prestigious professions—the seventh-most, to be precise. In fact, according to the Harris Poll, a whopping 87 percent of Americans would encourage their child to pursue the occupation.

In spite of that flattering public opinion, the profession still has many hurdles to vault—diversity, gender equality, long working hours, and mounting student debt, to name a few. But, to borrow the words of Le Corbusier, architecture is a “learned game,” and where that learning begins, in today’s academic institutions, is ground zero for tackling some of those issues.

Fortunately, the future is looking bright: according to the latest survey conducted by the architectural-research organization DesignIntelligence, which polled more than 2,000 firms and 2,785 students, enrollment in architecture schools is steadily on the rise, in tandem with job prospects and salaries. Both firms and schools are increasingly addressing issues pertaining to sustainability and climate change. The study also found that more than 90 percent of architecture students surveyed were satisfied with their education.

“When I started interviewing firms in the ’90s, there was a feeling that firms and educators weren’t on the same page. I don’t get that sense anymore,” says DesignIntelligence’s editor in chief, James Cramer. “If there is going to be a strong profession in the future, there need to be strong architecture schools today.”

Published in the following pages are Record’s annual rankings of the best architecture schools in the United States, as well as other key takeaways from the survey.
**The Top 10 Undergraduate Programs**

1. Cornell University
2. California Polytechnic State University, San Luis Obispo
3. Syracuse University
4. Rice University
5. Virginia Polytechnic Institute and State University
6. University of Texas at Austin
7. Rhode Island School of Design
8. Pratt Institute
9. Auburn University
10. Southern California Institute of Architecture

**The Top 10 Graduate Programs**

1. Harvard University
2 (TIE) Cornell University
3. Massachusetts Institute of Technology
4. Columbia University
5. Yale University
6. University of California, Berkeley
7. University of Michigan
8. Syracuse University
9. Rice University
10. University of Pennsylvania

**COMPARISON OF PREVIOUS RANKINGS: UNDERGRADUATE**

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**COMPARISON OF PREVIOUS RANKINGS: GRADUATE**

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*Where more than one school receives the same number of votes, one of the schools will show no numerical ranking.

**The Rankings are Shifting . . . Slowly**

At first glance, RECORD’s 2017 rankings of America’s top architecture schools do not differ dramatically from last year’s. In fact, eight of the top 10 in both undergraduate and graduate categories appeared on the 2016 list. Cornell has once again taken the No. 1 position for undergraduate architecture programs, while Harvard—as it routinely has been—is the top graduate school. “It’s kind of amazing that there were no big surprises,” says Cramer of the results. “I call it steady and strong and fairly consistent.”

But the rankings haven’t been completely static. In the undergraduate survey, the Southern California Institute of Architecture (SCI-Arc) and Pratt Institute moved up into the 8th and 10th positions respectively, nudging Carnegie Mellon and the University of Southern California out of the top 10. Meanwhile, on the graduate school list, Syracuse University and the University of Pennsylvania rose to the top 10, displacing Washington University and Virginia Tech.

If you are a prospective student, however, the numbers are only one side of the coin: “The rankings are just a single perspective,” Cramer says. “The most expensive schools are not the necessarily the best for you. The top-ranked schools aren’t necessarily the best for you.”

Indeed, school administrators rank the institutions differently from architectural professionals, according to the survey results. For graduate programs, three schools that didn’t make the top 10 list (the University of Minnesota, SCI-Arc, and Princeton) were named as part of the top five most admired schools by deans and chairs.

**Trends in Enrollment and Curriculum**

According to Cramer’s research, schools are experiencing an enrollment uptick—albeit slight—in both undergraduate and graduate architecture programs. Over the years, he says, diversity has increasingly become a pressing issue in architecture schools. Women do make up approximately half of architecture students but, while there is plenty of room to grow, schools are making efforts to attract a more racially diverse student body. “We see [diversity] being talked about all
the time. I don’t think schools are in denial about it,” he says.

New priorities are also surfacing in the curriculum. “With all the new technologies architects are using, there is a curious twist developing,” says Cramer. “I am talking about time and prioritizing that time to think about the entrepreneurial aspects of the profession—value propositions, and the impact that good design can have on our cities.” This increasingly forward-looking approach has led to a burgeoning focus on sustainability and climate change, as well as technology.

There has also been a notable trend toward community-focused design. Last year, for example, Pratt Institute introduced an M.S. in Urban Placemaking and Management, focused on creating successful

Architecture-Student Survey

This year, 2,785 students responded to DesignIntelligence’s survey about their satisfaction with architectural education. Of this group, 59 percent of the respondents were undergraduates. Of that percentile, 51 percent were enrolled in a B.Arch. program, 17 percent are seeking a B.A. in architecture, and 20 percent a B.S. The remaining 28 percent of respondents were enrolled in graduate programs, and, of those, 87 percent are pursuing an M.Arch.

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<th>62% Excellent</th>
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<td>30% Above average</td>
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How they grade the quality of their program overall

81% plan to take the Architect Registration Examination

Believe they will be well prepared for their profession upon graduation:

97%

What they’ll do after graduation

56% Work in a private practice

2% Be self-employed

3% Work for a corporation

3% Pursue an advanced degree in architecture

1% Work in government

1% Volunteer or work for a nonprofit or community-service organization

3% Other

3% Pursue an advanced degree in something other than architecture

9% Undecided

3% Work in academia
**Skills Assessment**

The academic programs that practitioners deem strongest for each skill area:

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### CONSTRUCTION METHODS & MATERIALS

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### COMPUTER APPLICATIONS

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These charts reflect combined accredited B.Arch. and M.Arch. programs.

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**Programs Most Admired by Deans and Chairs**

This year, DesignIntelligence polled 215 deans and chairs for their rankings of architecture schools.

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**Methodology**

DesignIntelligence sent surveys to CEOs, managing partners, and human-resource directors asking about their findings in hiring architecture graduates. The respondents could select up to 10 National Architectural Accrediting Board-certified undergraduate and graduate programs in each category. Each survey response was checked for authenticity and validated by the research staff at DesignIntelligence. In cases of dubious or unreliable information that could not be confirmed, researchers eliminated the questionable return. Researchers also confirmed that the person responding to the survey was in a hiring capacity. In addition to the architectural component of DI’s research, the study includes rankings and satisfaction surveys for the professions of interior design and landscape architecture. This information is published annually in DesignIntelligence’s eponymous reports, along with a comprehensive list of the firms and employing organizations participating in the research.
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Welcome to My House

From superblocks to revamped office and industrial spaces to new structures that combine supportive and market-rate housing, home takes on a whole new meaning in the 21st century.

BY JOHN KING

Visit any prosperous city these days, particularly in the U.S., and here’s what you’ll see: an abundance of housing on the rise. Glass towers with zippered balconies in some neighborhoods, stucco-clad apartment blocks in others. Angled boxes that slide three or four units into neighborhoods where single-family houses were the norm, and boldly patterned slabs amid the parking lots and warehouses of faded industrial zones.

But no matter the city, no matter the design style of choice, I’ll wager that you also hear concerns that this construction isn’t enough. All these new structures with their roof decks and bike rooms and dog-washing stations are too rarely accompanied by ones that put roofs over the heads of the average worker. Or seniors on tight budgets. Or couples with no real recourse, if they lose their current home, than to end up on the streets.

This is the dilemma we face today. The need for housing is so profound—across all spectrums of society—but government hasn’t caught up and financial resources are scarce. However, potential remedies do exist.

Nobody knows this better than architects—the ones with a social conscience, at any rate—who are exploring forms of living arrangements that might expand the options and pull down the costs. Micro-units are the current rage, compounds of efficiently minuscule, though not necessarily cheap, apartments geared to singles who don’t mind eating out six nights a week. Some architects are exploring the idea of newly constructed “group housing,” with communal kitchens and ADA-compliant bathrooms for each batch of small “suites.” Cohousing is an older example—distinct housing units designed and managed to allow families to share responsibilities and common space. Millennials today enjoy concierge service and group activities in co-living buildings. The ever-hopeful forays into modular or prefab housing are another—that confidence that someday, somebody will crack the nut and bring cheap construction methods to the masses.

Tiny houses, anyone?

All these ventures are laudable because, realistically, the best answer is: offer as many answers as possible. Unfortunately, American cities today would rather put up roadblocks than clear the way for innovation. That’s certainly what I’ve observed in San Francisco, where residents of wealthy towers portray themselves as environmentalists while they file lawsuits to keep other towers from crowding their views. Meanwhile, so-called “progressive” activists in 2016 went to the ballot in an unsuccessful effort to block any new market-rate housing from being built in the heavily Latino Mission District. Their rationale was that if you stopped new development there would be no more gentrification (so much for the laws of supply and demand, or the fact that developers were attracted to the Mission because of the gentrification that already had occurred).

“Housing is the ultimate architectural problem of our time,” says Mark Macy, a San Francisco architect who won praise for cultural spaces designed with then-partner Mark Jensen before starting his own firm in 2008, focused on housing. “We need innovations—but innovation is considered risky, so banks hesitate, even if you can show there’s a market.”

In 2013, Macy worked with developer Build Inc. to conceive a 21st-
From left to right: Frits van Dongen reintroduced the superblock for a housing development in Seoul’s Gangnam District. With an initial conceptual design by OMA, FAA + XDG Architects designed new buildings for living, working, retail, and education on the roof and in the interior of a former storage hall in Paris. Designed by PLP Architecture, the Collective Old Oak in West London is currently the world’s largest co-living space. Morris Adjmi Architects created a 33-unit condo building by developing a mirror image of a historic red-brick and terra-cotta warehouse in New York. Designed for low-income families, 1180 Fourth Street in San Francisco features a courtyard for sports and film screenings.

century market-rate version of a large Victorian house after it had been split into smaller residences: within the six-story complex in San Francisco’s South of Market district, there’d be 28 “group houses,” with 470 beds divided among 235 “suites” of under 250 square feet. Each suite would have a tiny bedroom and cooking area, while each “house” included more enticing (and code-compliant) facilities.

Think of post-collegiate dorms, or micro-units taken to the next level. But by the time the complex was approved last fall, the numbers had frayed beneath the weight of city fees geared to conventional housing and higher lending fees. What will break ground in 2017 looks the same on the outside—but inside there will be 119 conventional units, mostly studios, holding 172 bedrooms in all.

Even if governments and neighbors are willing to let experimentation reign, there are the financial hurdles. The logic behind cohousing is compelling, but conventional mortgages defined by the notion of individual ownership don’t fit a “product” that by its nature is communal. The issue isn’t whether they provide good homes—more than 150 have been developed in the United States since the late 1980s: it’s whether banks can be convinced to fund construction or underwrite mortgages of something that’s not the norm.

Factors like these help to explain why so many new housing complexes seem interchangeable. There are a limited number of easily financed housing models, each one producing variations on the same monochromatic theme, marketed to niches that are more complex in real life than on a developer website. The generic approach shrugs off geography as well: a five-story chunk of infill market-rate housing, wood frame above concrete base, is likely to take the same form in Minneapolis or Albuquerque, Dallas or Denver, no matter the climate or terrain.

This isn’t how things should be in our world, where the deceptively simple notion of “household” has atomized in recent decades. But then, such one-size-fits-all thinking has always come up short—or at least it has since 1944, when the Museum of Modern Art asked in the catalogue for its Built in USA, 1932–1944 exhibition: “Isn’t it socially and architecturally preferable to plan each neighborhood for the various needs of many kinds of individuals and families, rather than for any one special income group and family type?”

The appropriate response is yes, of course. That’s why it is exciting, despite all the bureaucratic and corporate obstacles, to see architects striving to produce innovative and urbanistically appropriate living options across the social, cultural, and economic spectrums.

This can mean the addition of new housing in historic districts, such as the richly rigorous Corner House by DSDHA in London (page TK), or the redevelopment of Denver’s South Lincoln housing project as the Mariposa District, an ongoing effort that increases the number of apartments from 270 to 800, half of them subsidized for low-income residents. There’s a different architectural firm for each block, to provide a varied landscape across the 18-acre site. As a whole, it blends the edges into the surrounding neighborhood of single-family houses.

Architecture also can turn heads. In South Korea, the long-discredited notion of superblocks is being reinterpreted sculpturally for public housing by Dutch architect Frits van Dongen; in New York, Bjarke Ingels’s Via 57 West (page TK) strives to recast the residential skyscraper as a notched, silvery pyramid. In San Francisco, 1180 Fourth Street— the portal building to the redevelopment district where the Golden State Warriors will build their new arena—is a 150-unit complex of low-income family apartments designed by Mithun and Kennerly Architecture.

Again, there’s no single solution. Nor can worthy architecture overcome decades of federal neglect and local inertia. In San Francisco, I can show you a dozen affordable-housing projects designed by local architects for local nonprofit developers that any city would be proud to have. I also can show you clusters of tents filled by homeless people.

But good architects can produce good models, attractive and tactile structures showing us that the future needn’t be as frustrating as the recent past. With luck, those models will be noticed—and emulated—more and more in the years to come.

John King is the San Francisco Chronicle’s urban design critic and author of Cityscapes 2: Reading the Architecture of San Francisco.
Within New York’s recent architectural renaissance, Via 57 West—appearing like a giant silver sailboat along the Hudson River on Manhattan’s far West Side—is an anomaly. Sure, luxury residential towers by a slew of A-list architects are going up at a record pace in the city. And while most are nice enough, and indeed an improvement on the bland, white-brick piles of decades past, not many examples from the current crop are really pushing the envelope. Via 57, on the other hand, with its pyramidal shape and sweeping roof-cum-facade, is a radical departure from the apartment block typology.

So how did it get built? To hear Bjarke Ingels tell it, it happened by chance. But after several not-so-chance meetings beginning in 2007 with Douglas Durst, developer of the 709-unit, 831,000-square-foot Via 57, Ingels had his first major commission in the U.S. With it came the opportunity to open a New York office—now 200 strong—of his Copenhagen-based Bjarke Ingels Group (BIG), and to bring his BIG ideas, exemplified in projects like the sloping, bow-shaped, 475-unit 8 House in his native Denmark, to a still conservative New York real-estate market.

For the developer, that kind of dynamic architecture is perhaps just what was needed to draw potential tenants to a difficult location. Hemmed in by a Con Ed power station, a sanitation garage, and the noisy West Side Highway, the site is also a 15-minute walk to the closest subway station—an unappealing hike by Manhattan standards. “Residential was not our first thought for this lot,” says Jordan Barowitz, vice president and director of external affairs for the Durst Organization, which originally considered putting a data or health-care facility there.

How the building physically got built is surprisingly straightforward, given its complex geometry—which starts as a rectangle at the base and whose three walls...
(rather than the four of an actual pyramid) come to a point 467 feet above the ground. In order for that to happen, the largest wall, facing southwest, takes on a hyperbolic paraboloid shape. That unitized facade is composed of 1,200 curved stainless-steel cladding components, each unique and fabricated off-site, that were abrasive-blasted for a textured finish. Ranging in size from 25 to 30 feet wide, they are clipped onto tracks that run up and down the simple post-and-beam concrete structure.

Building that twisting surface may have been easy enough, but designing it from inception to execution was a challenge. “That element infused so much coordination among so many consultants, from cleaning and building-maintenance concerns to water management,” says BIG partner and project leader Beat Schenk. “But it is the heart of the building.”

Scooped out of its midsection is a generously proportioned and beautifully landscaped courtyard—what Ingels calls an “oasis” in the midst of less than idyllic neighbors. And it is just that. With sunset views of the Hudson, the courtyard offers communal grills for outdoor barbecues or purpose-built tables for a game of chess.

The list of amenities gets longer inside the building: a community room, pool, basketball court, gym, and a game room complete with skee ball, air hockey, and poker tables, to name a few. That comes at an additional $80-a-month fee on top of what are pricey rents—starting at $3,700 for a studio—even for New York. Of the 709 units, just
MAKE A POINT
The building’s apex, at the northeast corner, reaches 467 feet above the ground. The 31st floor is the last containing apartments. Above that, where the perforations in the facade get larger, are mechanical units (left). The twisting geometry is a hybrid between a tower and a courtyard building (opposite, bottom).
ARCHITECT: Bjarke Ingels Group – Bjarke Ingels, Thomas Christoffersen, partners in charge; Beat Schenk, project leader
ARCHITECT OF RECORD: SLCE Architects – Luigi Russo, managing principal
ENGINEERS: Thornton Tomasetti (structural); Dagher Engineering (m/e/p); AKRF (environmental); Langan Engineering (civil); Philip Habib & Associates (transportation)
CONSULTANTS: Starr Whitehouse (landscape); Vidaris (building envelope); Enclos (facade); Cerami & Associates (acoustics); Nice Kern (wayfinding); Van Deusen & Associates (vertical transportation); Brandston Partnership (lighting); CPP (wind engineering and air quality)
GENERAL CONTRACTOR: Hunter Roberts Construction Group
CLIENT: The Durst Organization
SIZE: 831,000 square feet
COST: withheld
COMPLETION DATE: August 2016

SOURCES
METAL FACADE PANELS: Contrarian Metal Resources
GLASS: PPG
ROLLING DOORS: Cookson
WOOD CEILINGS: 9Wood
CUSTOM WOODWORK: PGS Millwork
SURFACES: Caesarstone, Wilsonart
PLUMBING: Grohe, TOTO, Moen, Kohler, Elkay
EXTERIOR LIGHTING: Selux, BEGA, Jesco, Inter-Lux
INTERIOR AMBIENT LIGHTING: Kibisi, Lumenpulse, Bartco, Bec Brittain, Selux, Flos, Zaneen, Delta Light, Lucifer Lighting Company, Louis Poulson, Bega, ALW, Vode, Acolyte, iGuzzini
WALLCOVERINGS: Wolf Gordon (corridors); Guardian (elevator cabs)
ELEVATORS: Fujitec
BAMBOO PANELING: Plyboo
FELT PANELS AND CURTAINS: Kvadrat
PAINT: Benjamin Moore
TILE: Daltille (pool, bathrooms); Allstate (fitness area)
RESILIENT FLOORING: Globus Cork
CARPET: Interface
The lobby brings elements of the sidewalk, including the concrete floor and brick walls, into the building (opposite, top). Each apartment has a bay window or private outdoor space (opposite, bottom, left). Amenities include a billiards room (opposite, bottom, right). Units opening on to the courtyard have an expansive feel and striking views (above).

Over 200 had been spoken for by the start of last month after going on the market in May. According to Barowitz, “That’s an average absorption rate for rentals in Manhattan.” Some floors are still under construction, though tenants began moving in earlier this summer. The pace may pick up when retail tenants, including the American Kennel Club and Landmark Theatres—bringing up to eight movie screens to the building—move in next year.

A third of the units overlook the courtyard, each of them with a private terrace or balcony. Ingels, in fact, calls the building a “courtscraper”—combining features of a classic European courtyard building and a skyscraper. That manipulation of scale, however, has both advantages and drawbacks. The upper-level units—the highest occupiable floor is the 31st (above that, where the building reaches its summit, is mechanical space)—feel expansive and have stunning views. Deeper inside, however, translating that compact European building type to a long New York City block has resulted in endless corridors. Some studio units at the end of the hallway on the south side, where the building curves in, fall victim to the compressed floor plan there. The rest of the layouts, which BIG did not design, are fairly standard—it’s not spacious luxury for which tenants are paying a premium.

If you’re a kid with a lot of start-up or hedge fund money, who takes an Uber to work in the morning and enjoys a round of virtual golf when you get back at night, this may be the perfect place to call home. But even the highest-concept architecture can’t overcome deficiencies of location or aspects of the development that are out of the architect’s control. Still, it was a rare achievement that Via 57 got built, and Ingels has succeeded in creating an instant icon on the New York skyline.
House of Commons

A fresh design elegantly combines commercial space with market-rate and affordable housing.

BY MEGUMI YAMASHITA
n the streets of Fitzrovia, in central London, the locally based architecture firm DSDHA has created an intriguing introduction to this urban neighborhood. As its name suggests, the Corner House sits smartly at the junction of the foodie haven Charlotte Street and tranquil Tottenham Street, a stone’s throw from bustling Oxford Circus. Among a hodgepodge of 18th-century houses with narrow frontages, postwar industrial buildings, and glossy contemporary offices, the Corner House succeeds in discovering freshness solidly rooted in timelessness.

DSDHA had previously collaborated with the client, Derwent London, on its growing portfolio of property in the Fitzrovia area. The architects’ past projects, from schools to residential buildings, have demonstrated their flair for functionality. Corner House, an apartment building, goes more deeply into the crafting of each interior space, resulting in a discreet architecture of quality and elegance.

In the face of skyrocketing rents in the capital and a deficiency of new social housing, local planning authorities offer incentives to developers to build affordable housing, requiring a certain number of such units in large developments. Camden Council, the authority overseeing the site of Corner House, was particularly eager to encourage the building of these units, which are sold or rented with government subsidies. DSDHA’s six-story building incorporates two of these affordable-housing units as well as nine market-rate apartments, including a luxurious penthouse, and commercial space on the ground floor.

Corner House is a building with three subtly different facades—the main ones on Charlotte and Tottenham Streets, and a third on the tiny Tottenham Mews—each presentation of the building a variation on a refined material language. The tone of brick and proportional massing changes to reestablish the three historical addresses on the site and create three separate entrances to the building: a commercial entrance and separate entries for the market-rate and affordable housing. This allows the building to escape the feel of a large combined city block while trying to avoid the politically charged “poor door” by presenting the respective doors on different elevations of the building.

What is striking at street level is the architects’ attention to detail and craft. Tom Greenall, associate director at DSDHA, describes how Derwent London was keen to use brick to give the building a “resolutely residential” character, in contrast with glazed, more corpo-
1 ENTRANCE
2 COMMERCIAL
3 TERRACE/GARDEN
4 KITCHEN/LIVING/DINING
5 BEDROOM
6 BATH
7 LIVING

GROUND-FLOOR PLAN
SECOND-FLOOR PLAN
FOURTH-FLOOR PLAN
rate developments. After deep analysis of Fitzrovia’s modern and historical facades, a dark charcoal and light gray brick were chosen. The practice collaborated with Petersen, a Danish brick company well known for its handmade and “water-struck” bricks, which give each masonry unit an individual character and irregularity. DSDHA used these bricks to create a load-bearing structure with traditional lime mortar, in harmony with its historical context. Although this required intense craftsmanship and longer construction times, it minimizes the building’s concrete frame and foundations, as well as reducing the need for complex movement joints.

The translation of formal 18th-century facades into this contemporary counterpart is handled with grace and originality. The brickwork is stepped to form asymmetric reveals.

FIFTH-FLOOR PENTHOUSE PLAN

SIXTH-FLOOR PENTHOUSE PLAN

INSIDE AND OUT  Dark metal punctuates the facades (opposite, left) and carries into the interiors (opposite, right and this page, left), culminating in an elegant stair, just beyond the main residential entrance (above).

credits

ENGINEERS: Elliott Wood (structural); GDM Partnership (services)
CONSULTANTS: Core Five (quality surveyor); Gardiner & Theobald (project management); BWC Fire (fire)
GENERAL CONTRACTOR: Knight Harwood

CLIENT: Derwent London
SIZE: 19,400 square feet
COST: withheld
COMPLETION DATE: October 2015

SOURCES

MASONRY: Petersen
METAL PANELS: Rheinzink
TIMBER FLOORING: Dinesen
WINDOWS: Schüco
with a subtle hierarchy of sizes between each row of openings. The top-floor windows are angled inward to create a shifted and distorted reflection from the exterior, adding to the details that make this facade striking while exercising restraint.

DSDHA’s attention to openings and admission of light is central to making the interiors welcoming. The internal planning provides every apartment with windows on two or more elevations, and the building nimbly negotiates the requirements of surrounding buildings’ right to light under London’s building code.

The crowning jewels of the Corner House are two faceted pavilions for the top-floor penthouse, which nestle into the city’s rooftops. Using the envelope established by right to light, the pavilions open up seductive spaces in a modern “attic.” These more contemporary features are also intensely hand-crafted. Custom-made scored zinc cassettes are fitted together to form each facet, allowing rainwater to drain behind the roof surface and obviating the need for any visible gutters.

The architects also designed metal railings and decorative grilles, giving the exterior a subtle opulence, with echoes of its historical context. This language of dark metal continues into the interiors and common spaces of the building. The triumphant feature is the metal staircase, carefully positioned to be directly in view as soon as you enter the main residential door. The staircase was made in small sections and welded on-site, to achieve an illusion that the stairs have been folded from a continuous sheet of metal. A process of hand-bending and hand-rolling the metal was used to create a balustrade with swan-neck junctions. It is at these points that the practice has shown its willingness to invest in details to create a richer whole.

The Corner House sets a high bar for a contemporary intervention into a complex historical site. Affordable units are typically rather standardized; DSDHA’s intelligent and innovative integration of lower-cost units into this building leads the way for higher-quality, bespoke subsidized housing in central London. DSDHA has created a persuasive balance of affordable and luxury, past and present, solidity and elegance, to create a quietly alluring building.

Megumi Yamashita, originally from Japan, is based in London and writes about architecture and design.
CROWNING GLORY
Two zinc-clad faceted pavilions top the penthouse apartment (right), which spills out onto generous terraces. Its attic-like interior is amply daylit (opposite), thanks to a design that has windows on at least two exposures in all units.
PUBLIC FACE
Cladding in fiber-cement and standing-seam metal unite and distinguish the 18 residences in this hilltop development.
Top Flight

A complex explores siting and massing to downplay density and elevate quality of life.

BY DEBORAH SNOONIAN GLENN

In housing-strapped Los Angeles, city officials are counting on multifamily developments, as well as small-lot single-family homes, to boost capacity and stabilize soaring prices. But most developers squeeze as many units as possible onto sites to maximize profits, giving no thought to aesthetics, common areas, or context. The resulting eyesores have ranged from forgettable to out of place to outright offensive, and often they exacerbate local traffic and parking problems. Not surprisingly, they’ve soured many Angelenos on the very idea of higher-density housing.

Blackbirds is a refreshing departure from the norm. Local architect Barbara Bestor designed this crisp and cheerful cluster of small-lot houses—which can be built with minimal setbacks, on lot sizes as small as 600 square feet—in Echo Park, one of L.A.’s oldest neighbor-
ARCHITECT: Bestor Architecture – Barbara Bestor, principal; Stacey Thomas, project architect; Danielle Yip, Henry Cheung, Bianca Gavrila, team
CONSULTANTS: Nishkian Chamberlain (structural); Shamim Engineering (m/e/p); Rothman Engineering (civil); Mia Lehrer+Associates (landscape)
GENERAL CONTRACTOR: Pacific Empire Builders
CLIENT: LocalConstruct
SIZE: 36,600 square feet (total lot); 1,360–1,930 square feet (range in size of houses)
COST: withheld
COMPLETION DATE: August 2015

SOURCES
CLADDING: Titan Sheet Metal with Carlisle, JamesHardie
ROOFING: Titan Sheet Metal with Carlisle, Owens Corning
WINDOWS AND DOORS: Arcadia
GLAZING: C.R. Laurence (glass railing), Solar Industries (skylights)
PAINTS AND STAINS: Benjamin Moore, Minwax
SOLID SURFACING: Corian
TILE: American Universal; Daltile
PLUMBING: Kohler, Hastings Tile & Bath, Hansgrohe, RÖHL

SITE PLAN

1 TRAIL UNITS
2 PERCH UNITS
3 BREWER UNITS
4 NEST UNITS
5 “PARKING PARK”
Blackbirds is tucked into an eclectic neighborhood of single- and multifamily houses (opposite). Balconies add living space to the compact interiors (above). Residents gather informally in the courtyard, which doubles as a parking area.
DETAIL ORIENTED

Built-ins add storage where needed, and skylights above the staircases bring daylight deep into the interior (right). Kitchens are open to the main living area to create a seamless, casual flow (opposite, top). Bestor added glazing wherever possible to take advantage of expansive views (opposite, two).

plan became the organizing principle for the project,” she explains, as each unit’s public spaces were oriented to open onto this communal area, while bedrooms and private spaces snag city or mountain views, depending on their orientation.

The plaza also doubles as a parking court, since only six of the 18 houses have two-car garages. “L.A. codes require two parking spots per single-family house, but leaving some parking uncovered got us a lot more space for common use here,” Bestor notes. Landscape architect Mia Lehrer softened the hardscaping with native and drought-tolerant plantings, and varied the concrete pavement’s surface finish to visually distinguish the central courtyard, parking spaces, and walkways, a subtle space-defining technique that registers on an almost subliminal level. A parking area may seem like an unlikely place for residents to socialize, but it’s usually only about half full, leaving plenty of room for informal barbecues. One-car households are common at Blackbirds, thanks to greater reliance on biking, public transit (there’s a bus stop nearby), and ride-sharing services such as Uber.

And none of the two-car garages open directly into the houses but require a quick walk outdoors to each main entry, a move made palatable by L.A.’s forgiving climate. “Since the idea behind Blackbirds was to build community, we didn’t want neighbors to just disappear inside,” says Bestor.

The differentiated forms, massing, and cladding of the dwellings help them look cohesive but not cookie-cutter. Three houses stand alone at streetside, next to the plaza entry, while the rest are grouped to look like what could be two-family houses until you get up close to them. (The units are actually separated by 6-inch gaps, which are obscured by flashing that matches the white metal or black fiber-cement siding.) The white triplex unit along the site’s northern edge, which is higher in elevation than the southern one, is topped by a simpler shed roof. “We designed it as a ‘Phase 2’ project in case it couldn’t get built this time around,” Bestor notes. It was she who coined the development’s name early in the project, noting that the angles of the black peaked roofs recall birds in flight.

All this finessing took much more effort than the average plug-and-play housing development. “I wish more of the floor plans could have been standardized,” Bestor remarks dryly. But the complicated topography made repetition nearly impossible; in many cases, floor plates for adjacent units don’t even sit at the same grade. She also made tweaks for the middle triplex units, since they have less glazing and fewer windows.

The interiors are hardly gargantuan, ranging in size from 1,360 to 1,930 square feet for two or three bedrooms. But soaring ceilings, ample skylights, and glass-backed built-in bookcases that form one wall of the staircases make them feel much larger. A sense of simple luxury also emerges from the stripped-down material palette of concrete, tile, wood, and glass, and from a handful of upscale touches like Carrara marble countertops and lighting fixtures by Brendan Ravenhill. All houses have at least one type of outdoor space, such as a small front patio or a cantilevered roof deck.
Blackbirds sold briskly after its 2015 opening, with sales prices ranging from $795,000 to $1.05 million—much higher than anticipated at the outset. But that’s the market in Echo Park these days; its vibrant restaurant and retail scene and its proximity to a booming downtown have made it one of L.A.’s most coveted places to live. And not-in-my-backyard fears expressed by a handful of neighbors that the project would clog their streets have not materialized. “We could have built more homes on the site, but doing so would have caused too much traffic,” Bestor says. No single development in L.A. can fix its housing shortage or sky-high home prices, but Blackbirds proves that higher-density housing can be distinctive, contextual, low-impact, and profitable. “Buyers here paid a premium for well-thought-out spaces,” says Bestor. “Investing in design, as LocalConstruct did, is a worthwhile effort.” With any luck, future projects in L.A. will follow its lead.

Deborah Snoonian Glenn, a former senior editor of RECORD and of This Old House, lives in Los Angeles, where she writes about architecture.
Bell Phillips Architects’ Greenwich Housing in South London provides 22 single-story homes for elderly and disabled people, and it is a hit with residents. They talk enthusiastically about the qualities of light and space, as well as things others might take for granted, such as their ability to get into a shower easily. But the public housing project’s greater significance comes from its wider context. While London is in the grip of a housing crisis, with soaring prices, rising demand, and supply constrained by development rules that limit outward and upward expansion, Greenwich Housing shows that architectural ingenuity can uncover latent opportunity for densification, at a reasonable cost.

The houses are arranged in short rows and split across six small publicly owned, underused parking lots. The topography of the sites varies—some are on hilly ground, others on flat—but all are irregularly shaped and hemmed in by neighbors ranging from modernist apartment blocks to petite Victorian row houses. Bell Phillips developed a standard house type that could be applied to each of these conditions, and to other sites later, with no alteration other than the color of the brickwork.

Single-story houses were demanded both by the program and by neighbors’ rights to light, but the architect was anxious to make a clear distinction between these urban dwellings and the folksy retirement bungalows that blight suburbia. “‘Bungalow’ is a loaded term,” says director Hari Phillips. “We wanted to make these houses cool rather than twee, and give them some prominence in the streetscape so they don’t seem shy about themselves.”

This has been achieved by the use of heavyweight brick facades and the manipulation of the butterfly roof form of each house, which comprises four mono-pitched sections of varying height, all falling to a central valley and clad in a taut skin of reddish-brown standing-seam zinc.

The front facade is a continuous band of masonry, with recessed porches marking individual entrances. It establishes a strong horizontal datum and gives each group of houses a collective presence greater than the sum of its parts. Above each entrance, the steepest mono-pitched roof section pops up to form a crisply folded zinc cowl, framing a deep-set window and adding height and variety to the roofline. Another roof section rises above the brickwork at the back,
where each house has a small private garden. As all six sites are overlooked by surrounding buildings or from higher ground, the choppy sea of metallic peaks and troughs makes an intriguing fifth elevation.

In planning the 968-square-foot, two-bedroom houses, the architects were required to follow extensive guidelines covering the width and position of doors, wheelchair turning circles, and other accessibility concerns. They were also mindful that residents may spend extended periods at home and would benefit from a variety of spatial conditions, daylight levels, and views. Their first instinct was to emulate the efficiency of a single-story house built by Richard Rogers for his parents in 1969 (now a London outpost of Harvard’s GSD). There, bedrooms are entered directly off an open-plan living area, fully glazed at both ends. But contemporary fire regulations required that Bell Phillips insert a corridor between the kitchen and bedrooms; this potentially dead space is used to accommodate deep storage closets that are useful to downsizing residents.

The main bedroom overlooks the garden, while the second faces the front and might be used by guests or overnight caregivers, or as a hobby room. The open-plan living area comprises three distinct spaces. At the front, a dining room is brightly lit by the lantern window above the door, and the ceiling follows the sloping roofline to give an internal height rising to 11 feet. It adjoins a central galley kitchen, with a more intimate, low-ceilinged seating area beyond.

CURB APPEAL The simple brick structure is topped by large, cowl-like windows clad in zinc that bring daylight deep into the rectangular units (above). The 22 units of 968 square feet apiece are spread out across six sites (below).
A couple stands within the recessed entry of their unit (left). The one-story housing is located within the context of tall apartment buildings and small Victorian houses (above). The distinctive butterfly roof offers an intriguing fifth elevation (opposite). A galley kitchen is sandwiched between the living and dining areas (below, left).
Each space reflects detailed consideration of the needs of older people. The architects decided against including an entrance lobby, which would retain heat when the door is opened but might hinder residents with reduced mobility. Likewise, a tall window next to the door provides a generous view of the street, which might counter feelings of isolation. If residents prefer to close the draperies for privacy, good daylight is maintained by the high-level window.

The benefits of Bell Phillips’s careful work will be felt not just by residents, who now enjoy suitable accommodation, but also by the young families who move into the larger spaces they vacate, making better use of existing housing stock. And for those who fear that London’s housing crisis is insoluble, the project offers reassurance that conditions of scarcity create fertile ground for architectural creativity.

credits

ARCHITECT: Bell Phillips Architects - Tim Bell, director in charge; John Lineen, project architect
ENGINEER: Richard Jackson (structural)
GENERAL CONTRACTOR: Newlyn
CLIENT: Royal Borough of Greenwich
SIZE: 21,000 square feet
COST: £5.6 million
COMPLETION DATE: September 2015

SOURCES

BRICK: BEA Building Products
WINDOWS AND DOORS: John Watson Doors
ROOF: VM Zinc
East Side Lofts | Frankfurt | 1100 Architect

Soul Sister

A new structure completes an unfinished century-old building by replicating its scale and adding some funk.

BY MARY PEPCHINSKI

PHOTOGRAPHY BY NIKOLAS KOENIG
Housing is in demand in Frankfurt-am-Main, yet loft living, or adapting obsolete manufacturing structures for open-plan residential use, remains a novelty, due in part to a dearth of century-old industrial buildings near the downtown area. But in 2009, when 1100 Architect was asked to convert the Lencoryt Building—formerly offices and a textile factory and now a historic monument—into dwellings, the designers felt a change was in order. “Some said lofts would not work, because this city is conservative,” says Gunter Weyrich, principal of the New York-based firm, which has a branch in Frankfurt, “but people are more open than many antici-
The new facade replicates the Lencoryt Building's scale without imitating its landmark design (above). Units open to a courtyard (left). Interiors in Lencoryt reveal traces of the past, like the exposed wood roof truss (opposite, top). Units in the new building feature floor-to-ceiling windows (opposite, bottom).

The east harbor district, where the project is located, has attracted artists and creative businesses. It includes a jumble of commercial and port-related enterprises sprawling north from Coop Himmelb(l)au’s new European Central Bank tower. Completed in 1913, the Lencoryt Building, with 60-foot-deep interiors and generous fenestration, is a rare surviving example of the city's industrial architecture prior to World War II. Designed to be double its built size, it would have occupied the southwest corner of a block, with a long facade fronting the harbor. World War I intervened, and only the first phase, an L-shaped building facing a side street with a wing extending into a courtyard, was realized. Despite continuous use, its exterior was dilapidated and its once splendid lobby...
had been altered beyond recognition.

To convert it to residential use, a variance was obtained, and a second building, conforming to the planned 1913 footprint, was added. Together, the Lencoryt Building and the new one became the East Side Lofts. Although both have two vertical circulation cores servicing a below-grade garage, the Lencoryt features ground-floor offices, with studios and one-bedrooms on floors one to five, while the new section has shops below and units ranging from one-bedrooms to triplexes above. Duplex penthouses take up the remaining parts of floors five and six. Despite similarities, all involved—client, architect, and Frankfurt’s historic preservation office—felt that two distinct facade solutions were necessary.

“Because many of the Lencoryt Building’s facade elements had been lost, we wanted to bring it back to life” says Gerrit Heidenfelder, the local preservationist overseeing this project. Working from historical documents, the architects restored original details made from rust-toned sandstone and cast concrete, such as the three- and four-story-high Corinthian columns; reconstructed the slate-clad mansard roof; and repaired the lobby’s carved oak doors, mosaic floors, and smoke-toned marble walls. Only double-glazing was permitted for the deeply recessed windows, placed in rebuilt wood frames.
CONTEMPORARY FACE. Penthouses connect to roof terraces (left). The new facade displays plasticity and rhythm in a bold choice of color (opposite).
To harmonize between the two, the architects felt that the new facade, like the historic one, should also display similar plasticity and rhythm, without imitating the landmark design. Because it was closer to the harbor and round-the-clock activity, the new facade required additional thickness to accommodate sound insulation.

The architects arranged fiber-cement panels to create a faceted surface extending from the 93-foot-high roof ridge to the base. Adjacent to the Lencoryt Building, the triple-glazed fenestration duplicates the dimensions of the older building. Facing the harbor, it becomes more irregular to compensate for the shift in the building's section. Platinum-gray diagonal bands are printed on some of the white panels, and when viewed from afar, they appear like horizontal folds casting elongated shadows across the surface.

According to Weyrich, a surprising number of older residents elected to live in the East Side Lofts because they desired an urban setting, although the ability to custom design one's unit may have been appealing too. The lofts were sold as raw spaces; for additional fees, 1100 Architect adjusted plans to suit individual needs. As a result, almost all of the 88 units, ranging from 480 to 2,200 square feet and with interior ceiling heights from 10 to 13 feet, have unique layouts. Most at mid-section have 7-foot-deep balconies facing the courtyard, while the penthouses, some with 25-foot-high interiors, connect to roof terraces.

Two penthouse units, in the old and new sections respectively, displayed dove-toned, highly polished screed floors in combination with oak parquet, and kitchens (installed near the facade for natural illumination) that open onto continuous living-dining areas. The unit in the new section feels brighter, and the facade's deep canary-yellow window jambs provide a warm contrast to the surrounding industrial landscape. The unit in the Lencoryt Building is dimmer, yet traces of the past, including the exposed wood roof truss, a restored fan window, and entry via the revived lobby, make for a cozier ambience.

Completed in 2015, the East Side Lofts not only brings variety to Frankfurt's housing market, it enriches this urban landscape. Whereas the Lencoryt Building's refurbished facade preserves historical memory, the new exterior, when glimpsed from the harbor edge, appears like a site-specific artwork or a giant sail shifting gently in the wind. “We don’t have graffiti problems with these buildings,” says Weyrich. “I guess people like them.”

Berlin-based Mary Pepchinski is an author and architect who teaches at the University of Applied Sciences in Dresden, Germany.
Living Small in the Big City

A building of micro-units introduces a new housing typology for New York’s changing demographics.

BY JOANN GONCHAR, AIA

ew York is infamous for its small living spaces—an apartment so teeny that its occupants must use the oven for storage, or a tenement so tight that the bathtub is in the kitchen. But now New Yorkers have the chance to live in something truly small—if much more functional—with the completion of Carmel Place, a building with 55 apartments ranging from 260 to 360 square feet, in Manhattan, designed by Mimi Hoang and Eric Bunge, founding principals of nARCHITECTS.

The project is the product of a pilot program launched in 2012 by Michael Bloomberg, then mayor. Its goal was the creation of a model for reasonably priced housing for New York’s growing number of one- and two-person households. The competition brief asked teams to submit schemes for a city-owned 4,700-square-foot sliver of a site adjacent to a leafy park in the Kips Bay neighborhood. It called for a rental building that was at least 75 percent “micro-units”—apartments that are smaller than the standard studio. To make the project viable, certain zoning regulations were waived, including one in place since 1987 mandating that apartments be at least 400 square feet.

The developer, Monadnock, which has built a number of affordable and market-rate residential buildings in New York, approached Bunge and Hoang about entering the competition. The pair wanted to ensure that the tiny living spaces would be “humane,” says Bunge. “We thought, ‘We have to be part of the conversation.’” For its part, Monadnock was motivated by the challenge of making compact apartments that “felt good” and were more than merely “livable, but far better than the usual studio,” says Frank Dubinsky, the company’s vice president.

The team’s resulting $12.95 million building, developed with a nonprofit partner, the Lower East Side People’s Mutual Housing Association, has units arranged to create a nine-story, 35,000-square-foot structure that subtly steps in plan and section so that it reads like what Bunge calls a “micro-cosm of the skyline,” or as four miniature towers, each 11 feet wide and clad in a different shade of gray brick.

SKYLINE IN MINIATURE Carmel Place’s 55 apartments, fabricated in a factory in Brooklyn, have been stacked to create a building that subtly steps in plan and section to form four minitowers (left and opposite). Each is clad in a different shade of gray brick.
credits

ARCHITECT: nARCHITECTS – Eric Bunge, Mimi Hoang, principals; Ammr Vandal, associate principal; Tony-Saba Shiber, Daniel Katebini-Stengel, Cheryl Baxter, Albert Figueras, Prathyusha Viddam, Gabrielle Marcoux, Amanda Morgan, Zach Cohen, Matthew Scarlett, Matthew Wilson, Alexis Payen, Christopher Grabow, Alex Tseng, Nancy Putnam, project team
CONSULTING ARCHITECT: Willis DeLaCour (competition phase)
CONSULTANTS: DeNardis Engineering (structural); A. Joselow (m/e/p); Langan Engineering (civil, landscape)

GENERAL CONTRACTOR: Monadnock Construction
CLIENT: Monadnock Development, NYC Housing Preservation and Development
SIZE: 35,000 square feet
COST: $12.95 million
COMPLETION DATE: May 2016

SOURCES
BRICK: Glen-Gery
CURTAIN WALL: YKK AP
GLASS: JE Berkowitz
CABINETWORK: Spectrum Kitchens
PAINTS AND STAINS: Benjamin Moore
ELEVATORS: Kone
Completed in May, Carmel Place reveals little of how it was constructed: its steel-and-concrete apartment modules, along with 10 more for the stair and elevator core, were fabricated in a Brooklyn factory to take advantage of the benefits of off-site construction (see story, page tk). The modules were then stacked over the course of four weeks in late spring 2015 on top of a poured-in-place foundation and steel-framed first floor. The exterior bricks were laid on site, even though the project schedule potentially could have been shortened had the skin been completed in the factory. The architects opted for this method in order to bridge the joints between the units and emphasize the minitowers rather than the individual apartments, explains Bunge. “We were not interested in expressing the modules,” he says.

Inside, the apartments are indeed compact, but they seem—especially when viewed without the clutter of actual tenants’ possessions—light and airy. This feeling of spaciousness is in no small part due to the units’ 9-foot 8-inch-high ceilings and their 8-foot-tall sliding windows with almost invisible glass balustrades, which create the impression that the occupants can step directly outside. The finishes, including glossy white cabinets, back-painted glass backsplashes, engineered stone countertops, and blond wood floors, contribute to the fresh, clean look, as do the smart, vaguely Danish Modern furnishings that come with many of the apartments.

Although on the whole the units are very intelligently laid out, there are a few idiosyncrasies. One is a capacious bathroom that takes up nearly a quarter of a 360-square-foot corner apartment and claims two of its four windows. The room’s overly generous size in comparison to the living space is the result of an emergency-exiting requirement that dictated the location of the bathroom door, explain the architects.

But such awkward instances are rare, and Monadnock is betting that the apartments’ intelligent layouts and sleek aesthetic—along with a host of services and shared amenities—will attract tenants. These perks include free Wi-Fi, a cleaning and errand service, a gym, bike storage, game room, and top-floor community room with a roof deck overlooking the park. There is also the welcoming bamboo-paneled lobby with seating nooks, where Bunge imagines residents having Thanksgiving dinner. He says its 83-by-9-foot dimensions are perfect for a table long enough to seat 100 residents and guests.

This idea of community may be a bit farfetched, but the apartments
SHAPE SHIFTERS
Many of the units come with furnishings designed to perform multiple functions, such as the Murphy-style bed (below right), which folds out over the sofa (left) from a wall unit. The dining table (below left) converts to a narrow desk. The apartments have 8-foot-tall sliding glass windows protected by glass balustrades, which give residents the impression they can step directly outside.

are nevertheless clearly in demand. As of early August, about three quarters of the building’s 32 market-rate apartments had been leased, even though their $2,446- to $3,195-per-month rents are more expensive on a square-foot basis than most Manhattan studios. (At the start of this year, the median rent for a studio in the borough was $2,395.) According to Dubinsky, the tenants include empty nesters, people who are in the city only from Monday through Friday, and new graduates with their first jobs. “Micro-units aren’t only for millennials,” he says.

The remaining 23 apartments have long been spoken for: eight of the units are reserved for formerly homeless veterans, and 14 have been awarded, on the basis of a lottery to which 60,000 people applied, to low- and middle-income residents. They pay from $914 to $1,490 per month. One unit is occupied by the building’s superintendant.

Carmel Place clearly demonstrates that micro-units can be livable, even desirable, if they are thoughtfully designed. And they are sure to proliferate, especially now that the city formally modified the building code earlier this year to allow apartments that are smaller than 400 square feet as part of buildings with a mix of larger-unit types. But micro-units may not turn out to be the affordable housing solution that promoters contend they will be—especially if they inflate per-square-foot rents. It’s still too early to determine if the compact living spaces will ameliorate, or exacerbate, the city’s housing problems.
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ARCHITECT: Fentress Architects
ASSOCIATE ARCHITECTS: Davis Davis Architects
LANDSCAPE ARCHITECT: Civitas, Inc.
GENERAL CONTRACTOR: Hensel Phelps Construction Co.
INSTALLER: Valley Crest Landscape Development

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Pushing Prefabrication

From entire buildings to discrete components, the use of off-site construction is expanding across multiple building types.

By Russell Fortmeyer

THE LOS ANGELES structural engineer Richard Bradshaw talks about his first experience with large-scale prefabricated construction in terms that are less than affectionate. “It never really made sense to me,” he says now, more than 45 years later. Bradshaw worked with architect Welton Becket, who was collaborating with United States Steel and the Walt Disney Company to build a hotel, the Contemporary Resort, for Disney’s theme park in Orlando.

The three collaborators conceived the hotel, which opened in 1971, to demonstrate the potential for prefabrication in steel construction. U.S. Steel manufactured the nearly 500 rooms for the building’s main trapezoidal tower in a purpose-built factory on Disney property a few miles from the site. There, workers not only built the individual room chassis—each approximately 9 feet high, 15 feet wide, and 30 feet long—but also installed interior finishes and furniture, including the television set. Once the modules arrived at the site, they were craned directly into the superstructure and hung on cables from its top bracing. To this day, each room is suspended above the still-operating hotel’s central atrium.

Like many prefabrication projects, the Disney hotel had several aims. These included accelerating construction, saving money, and illustrating Walt Disney’s vision of the city of the future. But “this was the end of their experiment,” says Bradshaw. Prefab at this scale did not immediately take off, he says, because of the immense investment needed to establish a nationwide factory network; the lack of predictable, precise execution in the precomputer era; and relatively low labor costs for conventional construction.

However, the dream certainly isn’t dead. For if the aims of prefabrication in architecture remain the same, the ways in which architects harness its potential now vary widely. Contemporary prefabrication operates at several scales, including that of specific systems like mechanical and plumbing distribution, building components such as facade units, and individual modular spaces like bathrooms, in addition to entire buildings. Prefabrication also represents a substantial share of new single-family residential construction.

Building typologies with significant programmatic repetition—hotels, multifamily housing, and student housing—still reap the greatest benefits from prefabrication. In 2004, the Dutch architecture firm Concrete conceived of its first prefabricated hotel project,
for the citizenM hotel brand. The Amsterdam hotel included a concrete core of elevators, stairs, and service risers and a concrete superstructure plinth upon which modular guest rooms, built by the Polish manufacturer Polcom, were stacked. The architects designed the rooms so that a single fully furnished module fit within a shipping container, for ease of transport.

The chain now has nine hotels. On a recently completed 370-room citizenM near the Tower of London, contractors stacked 30 units a week, shortening construction time by several months when compared to a conventionally built hotel. The brand’s newest project, currently under construction and slated to open in 2017 on New York’s Lower East Side, features 300 prefabricated guest rooms on top of a three-story concrete plinth. Concrete worked with local firm Stephen B. Jacobs Group to take their concept through construction. To save time, building department inspections for the rooms are being conducted in Polcom’s factory, with city inspectors from New York, so when each module arrives on-site, it is ready for installation.

“We didn’t start with the idea of making it prefabricated,” says Concrete’s Erikjan Vermeulen, the firm’s head of architecture. “We started with the idea of creating a better experience with less money, designing smarter space in a room of limited size, and then giving that saved space back with a ground-floor living room where people could socialize.” The original citizenM concept featured conventionally built infill corridors, but Vermeulen says that created too many unknowns on-site that delayed construction. The new hotels incorporate the corridor into the room module. On-site, the contractors connect the plumbing, mechanical, and electrical services for each module; the highest floor of the concrete plinth—usually at level three—includes the building services equipment that feeds upward through the 15-story guest room tower. Prefabrication helped San Francisco–based architect David Baker to reduce on-site construction time by nearly a year on a housing project in Union City, California. Baker’s client needed to accelerate construction to qualify for public money for transit-oriented development. So the architect took a modular approach for the 243 units, which include live-work lofts and one- and two-bedroom apartments.

Working with Guerdon, a manufactured-housing fabricator in Boise, Idaho, Baker conceived of the project, called Union Flats, with wood-framed modules 15 feet, 4 inches wide, 11 feet high, and up to 74 feet long to maximize shipping efficiency. Two modules create two one-bedroom apartments mirrored across a corridor through the middle, while three modules are needed for two-bedroom apartments in a similar configuration. To vary the floor plan, contractors can cut the modules in half through the corridor on-site.

As with the citizenM hotel rooms, inspections are conducted in Boise, so the units can
remain locked throughout installation to avoid damage to the interiors. Each module’s framing sits within a steel chassis. Once this is set into place, structural tabs on the modules are fastened to adjacent modules to create a consolidated structural system.

“Before the recession, we had a number of modular projects, but then framers needed jobs and costs came down for conventional construction,” Baker says. “Now, modular wood-framed construction is competitive again with union-labor costs in many cities.” In a factory, even union labor often costs less, he says, and the controlled conditions lead to higher quality, simpler construction methods, and fewer hazards compared to on-site circumstances. Although Baker is currently working on several modular projects, he believes prefabrication can sometimes have a negative impact on design, since shipping constraints prescribe dimensions, and connections for building services often dictate kitchen and bathroom placement.

Prefabrication can also compromise the appearance of a modular housing project, especially if the design emphasizes the technology’s inherent repetitiveness. Baker notes that the Union Flats project looks indistinguishable from the conventionally constructed housing project his firm designed across the street. Since the units arrive on-site as waterproofed boxes wrapped in a single-ply membrane, a variety of cladding systems can be applied after they are stacked to conceal the joints between modules.

The biggest challenge to prefabrication is the irregularity of sites in dense urban environments, says Baker, since maximizing leasable living space often outweighs construction-cost savings from standardization. In dense cities, instead of full dwelling units, prefabricated kitchen and bathroom modules make the most sense, he says.

Baker also recommends that owners and architects weigh potential construction-cost savings against the expense of a large on-site crane, which often accounts for the single-most significant construction expense for multifamily housing. “If you’re good at it, you’re lifting four units a day, but if you’re really good, you can lift 12 units a day,” Baker says, noting that at Union Flats they averaged between 11 and 12 modules a day. He predicts that prefabricated multifamily housing could one day displace conventionally built apartment buildings in California, given the endemic housing shortages in the state.

Modular construction is also making inroads in health-care facilities, but not in the manner one might expect. Prefabrication has not been widely adopted for hospital-patient rooms. However, architects have found that some individual systems within these complex buildings lend themselves particularly well to prefabrication.

Designers with NBBJ’s Columbus, Ohio, office initially developed a prefabrication approach to patient toilet rooms, head walls, casework, and building-services utility racks for the Miami Valley Hospital in Dayton, which opened in 2010. The client was interested in the idea of the universal patient room, where standardized systems and architecture could serve a variety of clinical situations, from intensive care to basic medical-surgery nursing units. But after studying the potential for a fully prefabricated room—akin to the citizenM hotel approach—and finding scant possibility for savings, the architects worked with construction manager Skanska toward more discrete prefabricated components to realize savings of time and money.

“We learned many lessons on Miami Valley,” says Tim Fishking, an NBBJ principal. The biggest lesson was minimizing the need for...
warehouses to temporarily store prefabricated components prior to on-site installation. So for its second prefabrication project, the OhioHealth Riverside Methodist Hospital, which opened in 2015 in Columbus, NBBJ worked with the contractor to streamline the schedule to engender a “just-in-time” approach for the prefabricated systems. This allowed elements like head walls and utility racks to be shipped to the site for the 224-bed, 437,000-square-foot neuroscience, vascular, and cardia-care hospital as soon as they were ready.

At Riverside, whole mechanical and electrical distribution racks were laid out in the prefabrication shop based on the hospital’s corridor design and GPS coordinates established on the construction site. Joints in the racks aligned with the radius of the corridor’s curve, so each 20-foot-long and 8-foot-wide section could be transported to the site and then hung from the ceiling and attached to adjacent sections to create continuous runs of services such as chilled and hot water, oxygen, nitrogen, and fire sprinklers. “You didn’t have this scenario of ‘who got there first’ that forces trades to reroute their work around others,” says Fishking. “It also improves the owners’ ability to maintain the facility, because they know each rack is identical.”

Prefabricated systems and components at Riverside also included single-stall toilet rooms, head walls in patient bays and exam rooms, utility racks above the operating rooms, plumbing zone valve boxes, and even entry canopies. The project was complete six months before the planned opening date, an accomplishment Fishking attributes, in large part, to prefabrication.

Ryan Hullinger, also a principal in NBBJ’s Columbus office, says successful prefabrication depends on getting it right in virtual design. “So much work has to go into testing patient rooms for dozens of clinical scenarios to ensure it works in those situations,” says Hullinger, who also recommends extensive physical mock-ups.

Some of the firm’s upcoming hospital projects include extensive renovation, where Hullinger envisions even more benefits for a prefabrication approach. “A typical hospital-wing renovation includes demolition and significant downtime while you build new rooms,” he says. “With prefabrication, you could build the patient rooms off-site during the demolition phase and vastly reduce that...
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downtime.” It’s similar to the schedule savings on new construction projects, where site preparation often occurs in parallel with the factory fabrication work.

With the renewed interest in prefabrication, it’s sometimes easy to overlook the fact that unitized facade systems remain the most common form it takes in buildings. But some industry experts believe that prefabrication is also the answer for facades with complex geometries that would otherwise have to be achieved through time-consuming on-site labor. Technologies such as 3-D printing or robot-enabled construction could pave the way for envelopes with even more exuberant shapes and a higher level of intricate detail. But, regardless, the aims will be the same as they have always been—to build faster, better, and more cheaply.

Russell Fortmeyer leads sustainable design for the Los Angeles office of Arup and teaches at the Southern California Institute of Architecture.

HEALTHY APPROACH. NBBJ’s OhioHealth Riverside Methodist Hospital (top) incorporated prefabricated patient room head walls and toilets (middle and bottom) to shorten construction and simplify multi-trade coordination.

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Learning Objectives
1 Describe how project teams are using prefabrication as an alternative to traditional construction methods and explain how the approach can save time and money, and reduce construction waste.
2 Outline which building typologies and components are best suited for prefabrication.
3 Explain why off-site construction can result in better-performing buildings and safer construction sites.
4 Discuss the role of virtual construction and digital technology in prefabrication.

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The Dryline (BIG U) addresses the vulnerability to coastal flooding with a protective ribbon in Southern Manhattan. Embankments that add green areas and spaces beneath elevated roadways are built out with pavilions for public use. New York, NY

LafargeHolcim Awards Silver 2014 – $50,000 USD. Lieu de vie on the new Paris-Saclay university campus hosts a mix of activities including indoor and outdoor sports facilities, food outlets and various public spaces across more than 4,000 sq m of floor area. Using rough materials, robust and long lasting techniques, the “urban shell” is organized vertically with its different activities superimposed on one another, using the roof as a panoramic playground for football and basketball games. Paris, France

Pleura Pod is a wall that is composed of multiple layers that are made out of natural or recycled materials. Cambridge, MA

Global LafargeHolcim Awards “Innovation” Silver 2009 – $50,000. Self-contained day labor station is a minimal physical urbanistic intervention with maximum social equity and neighborhood enhancement effects. San Francisco, CA

For more information: application.lafargeholcim-awards.org
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**Courses**

1. **Twenty-First Century High-Performance Limestone Plaster**
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2. **Insulated Metal Panels On the Roof**
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7. **Reflective Roofs and Urban Heat Islands**
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The aesthetics and performance of an exterior material are prime elements that every design professional investigates when selecting an exterior finish. For those who are seeking environmental benefits, materials must meet high-performance attributes, particularly in the areas of energy savings, moisture control, and material components that are not harmful to the environment. It may be surprising that architects are discovering that a new material with environmental performance values that exceed codes is also an ancient material. High-performance limestone plaster, or HPLP, is a new term for an ancient material composed of natural hydraulic lime, hydrated lime, and elongated sand. Through research, third-party testing, and quality controls, HPLP exterior cladding is available using the same materials as historic high-performance lime plasters.

Architects are using this product to achieve the highest of environmental building ratings in contemporary architecture and as a material that radiates light and permanence, while providing energy savings, moisture control, breathability, and strength.

**RAW MATERIALS MATTER: UNIQUE ST. ASTIER LIME**

To get the quality needed to meet the durability, breathability, and flexibility required for use at the renovation of the Michigan State Capital, preservation architect Eugene C. Hopkins, FAIA, principal at HopkinsBurns Design Studio, chose a hydraulic lime plaster from St. Astier in France. He recommended the use of lime plaster because it is an authentic and proven material, saying, "We tested the original plaster and mixed the same ratios of sand and

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**Twenty-First Century High-Performance Limestone Plaster**

Historic exterior finish material meets modern environmental performance criteria

Sponsored by THERMOCROMEX | By Celeste Allen Novak FAIA, LEED AP, BD+C

The architect achieved a smooth, monolithic exterior at this art center in Miami by selecting a high-performance limestone plaster cladding.
lime using a three-coat application. We also
installed horsehair in the brown coat. The pre-
vious system lasted for 100 years so why mess
it up?" Preservationists choose lime from St.
Astier because of its unique geologic location.
The purity of hydraulic lime from St. Astier
guarantees a product that provides high-
performance environmental benefits. The
Louvre, Westminster Castle, and Notre Dame
are just some of many famous buildings that
were constructed using St. Astier lime.

The lime deposits at St. Astier are located
between the French cities of Montaceix and
Neuvic sur l’Isle (approximately 6.2 miles).
This geological layer is more than 328 feet
thick. It was formed during the Upper Creta-
ceous period (approximately 75 million years
ago) by marine sediment (mostly crustacean
and corals). The sea in the basin was not
subject to severe currents, and this allowed
the formation of a uniform and undisturbed layer
of calcareous rock infiltrated mainly by silica,
with insignificant traces of other elements.
This characteristic of the rock is unique in
Europe and is the reason why the lime used
for historic preservation is so reliable. It has
the highest concentration of lime without
any impurities. Archeological evidence shows
that since the time of the Romans, this lime
was used in buildings. In 1833, Louis Vicat,
a French engineer and authority in hydraulic
limes, began industrial production of the lime
at St. Astier for use all over the world.¹

Fast forward to the 21st century and to
architects who want to choose this high-
performance historic material without the
labor-intensive applications with horsehair
brushes, multiple coats, and long drying
times. HPLP is manufactured with strict
product control of the materials that include
lime and sand components. It can be applied
in one coat, sprayed onto a variety of sub-
strates in a one-coat finish with quick drying
times. The basic components of high-
performance limestone plaster include:

Hydrated Lime
Limestone is a calcareous rock that is extracted
from the St. Astier quarry and crushed to
create quicklime. During a highly controlled
production process, water is added to create hy-
drated lime. A calcareous rock is a term used to
identify a sediment, sedimentary rock, or soil
type that is formed from, or contains a high
proportion of, calcium carbonate in the form
of calcite or aragonite.

Natural Hydraulic Lime
Hydraulic lime is the product of burning and
slaking limestone. Natural hydraulic lime, or
NHL, refers to the hydraulic properties of
the selected lime product as a raw material
with no additions, such as cement. The 21st
century production process for HPLP is essentially
the same as the one used since ancient times.

The scientific knowledge of the manufacturer
and modern quality control have, however, the
favorable effect of producing reliable materials
with constant performance. The method and
the energy used in the burning process are the
determining factors in the quantity of silica that
combines with calcium oxide (CaO) to form cal-
cium silicates (CS). This produces the environ-
mental and durable performance of the finished
products. Burning takes place in vertical kilns at
temperatures not above 1,832 degrees Fahrenheit
(1,000 degrees Celsius). The most efficient
fuel with the least residuals is a high-quality
anthracite coal imported from Wales and used at
St. Astier. Continuous checks are made to mea-
sure the efficiency of the burning (CO₂ tests),
which are essential to regulate the hydration
that follows. Hydration or slaking is a controlled
hydration process. This process is so precise that
virtually no quick lime (less than 1 percent) or
impurities will be present at the end.

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Celeste Allen Novak, FAIA, LEED AP BD+C,
is an architect, writer, and planning consultant in
Michigan with a special focus on sustainable and
universal design and rainwater collection systems.

www.celestealennovakarchitect.com

Limestone plaster was directly applied to new CMU and existing precast concrete along with
frame/sheathing wall assemblies to achieve uniformity in texture and color at the Dallas Fort
Worth International Airport (DFW).

CONTINUING EDUCATION
As an all-in-one air, vapor, and water barrier with continuous thermal insulation, insulated metal panels (IMPs) for roofing are an ideal way to meet today's increasingly stringent building codes.

The prefabricated units, when installed correctly, can contribute significantly to the building enclosure's thermal performance levels, while simultaneously enabling fast-tracked construction and lower field labor costs.

Made from rigid foam injected into two sheets of metal, Phil Kazba, FCSI, CCS, AIA, SpecGuy Specifications Consultants, Mount Dora, Florida, describes IMP roof and wall systems as providing the closest-to-perfect solution for uniform temperature, moisture, air, and water vapor control.

Originally developed for large industrial facilities requiring space conditioning, growing interest in continuous insulation performance, partially driven by the codes, has helped propel IMPs into the architectural realm, making it a suitable choice for arenas, schools, office buildings, fire stations, transportation hubs, and airport facilities.

"The panels are relatively lightweight, installation and erection is relatively fast, and the panels function as a structural deck, insulation, and finish system all-in-one package that can span over supports/purlins," reports Richard S. Koziol, AIA, NCARB, principal, Wiss, Janney, Elstner Associates Inc., Northbrook, Illinois.

The Windy City architect also sees IMP roofing systems as best suited for steel-frame build-

The Hope Lake complex, pictured here in Cortland, New York, used standing seam insulated metal roofing panels as a perfect all-in-one air, vapor, water, and thermal solution to cover an indoor water amusement park with high moisture in the air.

Insulated Metal Panels
On the Roof

An all-in-one building enclosure solution

Sponsored by Metl-Span

Learning Objectives
After reading this article, you should be able to:
1. Describe the advantages of insulated metal roofing panels for roofing as an all-in-one air, vapor, and water barrier solution, along with the continuous insulation requirements mandated by many codes.
2. Compare the benefits of IMP roofing to common roofing alternatives.
3. Identify the growing importance of a high-performing building enclosure and how IMPs support this goal.
4. Discuss a number of best practices for the optimized design and installation of IMP roofing systems.

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

AIA COURSE #K1609C
GBCI COURSE #0920010022
ings having a minimum roof pitch of 1:12 and steeper, and for roof geometries that are simple and straightforward.

“One of the most apparent advantages of the IMPs over other roofing methods is the significant reduction in installation steps and trades responsible for installation of the roof,” states Todd Wolf, principal, building science specialist, BCRA Nexus, Tacoma, Washington. “In certain climates and environments, this reduction also translates into less exposure of other building components to the elements, with a faster dry-in period and less sensitivity to the weather conditions during installation.”

And because the panels are attached by a simple pre-engineered combination of clips, fasteners, and substrate, they are not subject to failures resulting in incompatibility amongst components, moisture within the system, application temperatures, or similar failure modes present in membrane roofing, according to Kazba.

“Virtually maintenance-free, IMPs are subject to very occasional inspection to verify substrate movement or improper fastening have not led to joint or flashing displacement,” he adds.

EVALUATING ALTERNATIVES
In comparing IMPs to other roofing alternatives—namely built-up roof membranes, EPDM (ethylene propylene diene terpolymer) rubber roofing, and modified bitumen (modbit)—IMPs offer a number of advantages.

For starters, the above-mentioned roofing materials either have an adhesive or the plys must be touch applied, thereby creating an unpleasant odor, which can be disruptive when retrofitting an existing operating building.

Even more serious, torch-applied modbit is known to cause leaking and moisture infiltration in cases where the moisture barrier is improperly installed, says Sam Williamson, co-founder, KBHomeSpecialists, Glasgow, Scotland.

“In the case of EPDM, the main issue is it is still a relatively recent innovation, and finding workers who are skilled enough to install the system correctly can be difficult,” he explains. “On the contrary, IMPs can be installed very easily and are far more resilient than rubber EPDM.”

While built-up systems offer a high level of waterproofing, they come along with higher installation costs, a slower installation schedule, and are more susceptible to wind and water damage.

Of course, another significant factor is a noted difference in life expectancy. Whereas built-up, modbit and EPDM will last between 15 and 20 years, metal roofing offers more than 40 years with little maintenance. Once modbit and EPDM start to fail, the insulation begins absorbing moisture, at which point the materials have little to no insulation value.

In fact, IMPs really stand out when it comes to insulation, lending higher R-values per inch, as compared to the alternatives. Take a standard thermal transmission test, at an average 75 degrees Fahrenheit, for example. The R-value of a 2-inch IMP clocks in at 14.28, at 4 inches the R-value is 28.6, and a 6-inch IMP has an R-value of 42.9. To compare, a 3.5-inch layer of fiberglass insulation registers an R-value of 11, and 6 inches offers an R-value of 19.

Another disadvantage with fiberglass is the R-value becomes compromised when compressed. This inconsistency in the fiberglass thickness, coupled with an added requirement for manual labor to secure it to the frame, leaves a noted margin of error. Furthermore, fiberglass insulation has a facing on the interior side, which is vulnerable to damage when exposed to a building’s interior.

Conversely, IMPs have an advanced polyurethane core sandwiched between two metal skins, capable of delivering a consistent, long-term R-value. When properly installed and sealed, the insulation becomes encapsulated by metal trim, effectively creating an impermeable membrane around the panel.

THE BUILDING ENCLOSURE
When considering an IMP roof, an important factor is the fact that it is capable of supporting a high-performing building enclosure, which has evolved into a sought-after building feature in recent years.

“The amount of energy, and consequently heat, that is lost through poorly insulated roof and walls is staggering. Building owners have
no problem getting heat into their facilities, but keeping it there is another matter entirely,” notes Williamson.

Consequently, “a thermally efficient, well-sealed enclosure is paramount to a building’s overall energy efficiency,” states Richard Keleher, AIA, CSI, LEED AP, senior architect, The Thompson & Lichtner Company, Canton, Massachusetts. “In fact, it is the first thing that should be done when planning for energy efficiency.”

Offering energy savings between 20 percent and 40 percent, particularly in climates with extreme cold or heat, properly sealing the envelope has become a big focus for today’s buildings.

Recognizing the criticality of the building enclosure, the U.S. Army Corps of Engineers actually requires its buildings to undergo whole building air leakage testing, in addition to meeting ASHRAE’s 90.1 standard for a tight building enclosure. While somewhat less aggressive, the International Energy Conservation Code (IECC) has also jumped on the bandwagon, requiring air tightness levels at 25 percent less than ASHRAE 90.1. Based upon the U.S. Department of Energy’s latest Status of Energy Code Adoption map earlier this year, 23 states have adopted some form of the 2012/2015 IECC air leakage standard, which permits air leakage compliance through either the air tightness of the individual components or through the continuity of the entire air barrier assembly, as verified through a whole building air leakage test.

“When performing a whole building test, both the components, and more importantly, the continuity of transitions between components and materials, is of paramount importance,” relates Wolf. “The IMPs our firm has tested have an advantage over other building components and assemblies during a whole building air leakage test in that the metal on the panels is an excellent air barrier material, and the panel assemblies are frequently designed and fabricated to interlock in a tongue-and-groove method with sealant along all of the groove edges.”

“When the panels are properly installed with continuous seals at panel joints and proper roof-to-wall transitions, the effective air leakage rate is reduced to near ASHRAE’s tight building standard of 0.10cfm/sf of air leakage at a pressure differential of 75 Pa,” he adds.

A key detail for achieving a thermally efficient building enclosure is having the insulation on a continuous plane with minimal joints and seams to prevent thermal bridges where insulation can escape, explains Koziol. Because IMP roof systems typically have a single-layer plane of insulation with a sealed side and end joints or laps for moisture resistance, as well as thermal efficiency, they are a very good option for energy savings.

Putting things into perspective, IMPs offer close to three times the insulation efficiency as a field assembled glass fiber system, according to the Glenview, Illinois-based Metal Construction Association (MCA). As delineated in MCA’s Selection Guide for Insulated Metal Panels (available as a free download at www.metalconstruction.org/download.php/education/downloads/user_file_5), to achieve an R-value of 20 with an IMP, only a 2½-inch to 3-inch thickness is required, whereas the same R-20 with glass fiber—along with a separate liner, sub girt, and fascia—will require an approximate 7½-inch-thick roof or wall system.

The guide also points out that IMP thermal performance is enhanced because there is no metal conductance from exterior to interior skin.

“The materials used on the roof have a huge impact on how energy efficient it is, and IMPs are easily one of the best choices,” confirms Williamson.

Of course, this is assuming the IMP system is properly detailed and installed. Along these lines, penetrations through the roof should be kept to a minimum because flushing them for long-term durability and water tightness can be challenging, according to Koziol.

Besides compromising energy efficiency, Jim Halle, exterior envelope superintendent, Gilbane Building Company, Albany, New York, points out that without a complete thermally efficient building envelope, the building will not function correctly. “The external elements will cause water infiltration and condensation within the building. This will cause deterioration of interior materials, mold, and insect infestation, preventing the building from being commissioned correctly.”

Of course, the key to certifying a high-performance enclosure is ensuring that the air, water, vapor, and thermal systems are all in place, which is where the major benefits of IMPs really shine with their all-in-one solution.

In terms of better understanding how all these components work within the IMP membrane, Joseph Lstiburek, Ph.D., P.E., principal, Building Science Corporation, Westford, Massachusetts, explains that a typical IMP roof provides air, water, and vapor control above the thermal control layer, which prevents rain, air, and vapor from entering into the assembly from the outside. A membrane below the insulation keeps the air and vapor from penetrating the assembly from the inside. This approach works in all climate zones and in all interior environments.

However, for this to all work properly, there must be continuity between the walls, roofs, and slabs, which means that the roof to wall—and wall to foundation, for that matter—must connect to the control, air, vapor, and thermal layers.

Lstiburek also notes that prefabricated IMP roofs contain the same control layers as site-built roofing systems. This includes the exterior surface controlling water, air, and vapor; the interior surface controlling air and vapor; and drying occurring to both the exterior and interior.
**Thermal Performance and Code Compliance**

Detailing and air barriers aside, an important aspect of IMP specifications is understanding how its thermal performance characteristics factor into building code compliance.

For starters, insulation requirements are consistently increasing over the past few code cycles. For example, the 2006 IECC’s prescriptive insulation requirements for metal building roofs in ASHRAE 90.1’s Climate Zone 5 include one layer of faced R-19, 6-inch fiberglass batt insulation, draped over purlins, with R-5 thermal blocks at each purlin. The 2009 IECC requires two layers of faced R-13, 4-inch fiberglass batt insulation—for a total of 8 inches in insulation thickness—draped over purlins, with R-5 thermal blocks at each purlin. And the 2012 IECC mandates the same requirements as the 2009 IECC, plus one layer of R-11, 3½-inch fiberglass batt liner system, installed between purlins, for a total insulation thickness of 9½ inches, plus thermal blocks.

As a result, continuous insulation—defined as insulation that is continuous across all structural members without thermal bridges, other than fasteners and service openings—is a growing priority with building enclosures.

Offering both continuous insulation and better “material-to-assembly” performance than other systems, when all is said and done, IMPs are a strong option for meeting code compliance.

Helping to promote strong thermal performance is the fact that IMPs are designed to minimize thermal bridging. In particular, the panel faces are separated by a thermal control layer, and the panel mounting clips are attached over the thermal control layer.

Returning to the issue of conforming with the latest building codes, a number of avenues are available to designers, including prescriptive, envelope trade-off, and energy cost budget compliance options.

Starting with the prescriptive approach, where the R/U-values of the components and assemblies are submitted based upon ASHRAE 90.1 tables, IMPs deliver better U-values than most other materials. With single-source responsibility for both the thermal and weather envelope, and the fact that multiple layers of insulation/cavity-filled roofs are not necessary to achieve required insulating values, consequently saves time and money.

For the envelope trade-off option, which permits envelope components/assemblies below code requirements—as long as they are offset by other above-code components/assemblies—IMPs’ exceptional U-values offer the opportunity to “save” on other lower-rated envelope components, such as windows or doors. This also presents greater design flexibility, as specifiers are not locked into certain products or assemblies.

As for the third energy cost budget approach, which allows use of any components/assemblies—just as long as the building uses less energy than the prescriptive solution—this supports tradeoffs between envelope and other systems. With the use of IMPs, a high-performing envelope gives more flexibility with the energy consumption levels expected of other building systems.

It’s important to note that the second and third options do require modeling to demonstrate performance-based compliance. Common software programs include eQuest, a user interface for DOE-2 software developed by U.S. Department of Energy, and Energy Plus—a newer DOE program. In terms of IMPs supporting code compliance, MCA has its own IMP technical committee currently investigating ways to directly include IMPs in future ASHRAE 90.1 standards as its own unique construction type.

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The first issue of Architectural Record—then a quarterly—was published in 1891. Its goal was to provide a forum to: observe and report on trends and events in the design and construction of buildings; reflect and critique these trends; and, in the process, inform and educate architects as a means to advance the profession and practice of architecture.

The inaugural issue included a long essay on the Romanesque Revival in New York City, New York, which featured the recently completed Market and Fulton National Bank Building pictured here. The building is firmly representative of its era, incorporating the building technologies and products that were commonly available at the time. This course will briefly

Learning Objectives

After reading this article, you should be able to:

1. Discuss the history of the suspended ceiling and describe recent innovative products that improve occupant comfort by providing both sound absorption and sound blocking in one ceiling assembly.

2. Explain recent advances in hand-drying technology, and review new product category rules that the industry has developed to improve the verifiability and transparency of product performance evaluations for all manufacturers.

3. Define the latest innovations in high-performance glass, and explain new digital tools for comparing, optimizing, and selecting glass products.

4. Describe the health, comfort, energy, security, and durability benefits of opening glass walls, both when they are open and, equally important, when they are closed.

5. Identify the sustainability, durability, and green attributes of terrazzo, the original recycled material.

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trace the evolution of five of these technologies over the 125 years since the facility opened to the public: suspended ceilings; hand-drying systems; window glass; opening glass walls; and terrazzo. The course will look at where these technologies stood in 1891, how they have changed and developed over the intervening years, and what innovations are currently driving each market segment forward.

SUSPENDED CEILINGS: THEN AND NOW
As long as we’ve had buildings, we’ve had ceilings—some as simple as the underside of the floor or roof, others as elaborate as the coffered ceiling of the Pantheon, the frescoes of the Sistine Chapel, or the murals in the main reading room of the Library of Congress. And historically, once a ceiling was installed—no matter the shape, material, or decoration—it stayed in place. There was no reason to move or adjust it, and there was nothing above it that needed to be moved or adjusted either.

That all began to change in the late 1800s, when indoor plumbing, heating systems, and electricity became more common in buildings. At the turn of the century, these systems were typically run through or along walls and floors, and the ceiling remained relatively untouched. This would certainly have been the case for the Market and Fulton National Bank, which would have used plaster, mosaic, tile, or perhaps tin for its ceilings. But early in the 20th century, as these new systems continued to multiply and evolve, it became clear that a fresh approach was needed to deal with them—an approach that both concealed these systems for aesthetic reasons, and provided access to them for maintenance and repair. The suspended ceiling was born.

The first patent for a suspended ceiling was filed on May 28, 1919 for a system that was built using interlocking tiles. The only way to access the plenum above these tiles—where many of the new systems were now housed—was to start at one edge of the ceiling, or at a designated “key tile,” and then remove adjacent tiles, one at a time, until the desired place to access the plenum was reached. In spite of the time and cost of this approach, it remained the dominant suspended ceiling system for close to 40 years with expanded performance attributes, such as sound control and fire resistance. In 1958, the patent for an accessible suspended ceiling was filed. The new system allowed access to the plenum from any point and, with many variations and updates, remains the system we use today.

The new system worked well. It was inexpensive to install and maintain, provided ready access to the plenum and endless flexibility for reconfiguring the space below, and suited the sleek, modern look favored by mid-century architects. That’s why we still see so many suspended ceilings today. But changing aesthetic aspirations, combined with increasingly challenging performance requirements, have been driving significant innovation across the ceiling industry in recent years. The monolithic look is still highly popular, and has been expanded through an evolution of innovative installation and configuration choices from staggered panels to completely concealed suspension systems that still allow access to the ceiling plenum and provide architects with virtually limitless options for reimagining the “fifth wall” of a space.

At the same time, ceiling systems are now capable of integrating a range of additional components and systems—from light fixtures to data management systems to trim and transition products—that make it easier to specify complete ceiling solutions that can offer an integrated visual and save a project time and money. Parallel to these developments, there has also been rapid change in the performance characteristics of ceiling systems, especially in the realms of both acoustics and sustainability. The net result is a new era for the suspended ceiling, almost 100 hundred years after the first patent was filed.

HAND DRYERS: THEN AND NOW
The first patent for perforated roll toilet paper was filed in 1891, but the hand-drying technology used in the Market and Fulton National Bank building was undoubtedly cloth towels, the sanitation method of choice for several preceding...
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decades. That all changed with the introduction of paper towels in 1907, which gradually took over from cloth and became the dominant hand-drying technology in restrooms across the country—a technology that remains in widespread use today.

Electric hand dryers have a shorter but, in many ways, more dynamic history. The earliest patent was filed in 1921 for an invention that “…relates to improvements in drying apparatus and has for its object to provide a simple and efficient apparatus for delivering a blast of heated air for drying the face, hands, or hair of a person, or for drying jewelry, metal parts, glassware, or other articles.” The dryers that were manufactured based on this patent were called “electric towels” and were used in restrooms, barbershops, and factories across the country. They also established the “heated air” technology used by a range of hand-drying companies that emerged over the ensuing decades. While innovative at the time, this approach was noisy and inefficient, taking up to a minute to dry hands and wasting energy in the process. But it would still take more than 70 years for the next big breakthrough in hand dryers to occur: in 2001 when an American company introduced high-speed jets of air that blow water off of hands rather than just evaporating it.

This innovation swept the industry, driving continuous improvements in both features and performance such that today’s most advanced hand dryers are not only exponentially faster than their predecessors, they also include a wide range of features that provide far greater design flexibility: sensor-activated, touchless controls; adjustable speed and sound; HEPA filtration systems; adjustable heat settings; and multi-voltage options. These dryers are also far more energy efficient and environmentally responsible, with at least one leading manufacturer going so far as to develop full life-cycle assessments for its products following ISO 14040 standards.

While many of the elements circa restrooms in 1891 are still familiar today, the way we dry our hands is radically different—and the industry that has driven these changes continues to innovate, pushing restroom design and performance in exciting new directions, including fully integrated sink systems with soap, faucet, and dryer all mounted on the sink deck that are just now being introduced to the market.

GLASS AND GLAZING: THEN AND NOW

Although glass artifacts from more than 5,000 years ago have been found in Egypt, the Romans appear to be the first to have used glass for windows, perhaps as early as the 1st century CE. These early windows were small, irregularly made, and not very transparent. They were probably manufactured by blowing an elongated balloon of molten glass and cutting off the ends to create a glass cylinder that was then split and flattened to create what has subsequently been referred to as “broadsheet” glass. Like many technologies from the Roman era, manufacturing glass for windows declined during the Dark Ages, but began to pick up again in the early 14th century, when a new technique for making glass was introduced by French glass makers. “Crown” glass, as the new material was called, was also made by blowing molten glass, but this time into a sphere rather than a cylinder.

The latest advancement in restroom design: the integrated sink system that combines on one sink deck all of the green elements of high-speed, energy-efficient dryers and touch-free soap dispensers with the water-saving capacity of sensor-activated, low-flow faucets to create the next generation in green restroom design.

GLASS AND GLAZING: THEN AND NOW

Appearance Comparison

Choose a Sky Condition

<table>
<thead>
<tr>
<th>Sky condition</th>
<th>Visual appearance of glass</th>
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<tbody>
<tr>
<td>Full Daylight</td>
<td><img src="image" alt="Full Daylight" /></td>
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<tr>
<td>Cloudy Day</td>
<td><img src="image" alt="Cloudy Day" /></td>
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<tr>
<td>Clear Sunrise</td>
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<tr>
<td>Clear Night</td>
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</tbody>
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Choose a View

Choose an interior or exterior point of view in which to simulate your glass.

View from Exterior | View from Interior

Visualization tools, like the one pictured here, represent a significant advancement in helping architects select glass products, allowing designers to virtually “see” and compare the aesthetic properties of glass through photo-realistic images of both exterior and interior applications.
“Manufacturers make outrageous claims every day. It’s greenwashing at its worst. Not Excel Dryer. They set the bar for transparency and sustainability.”

PENNY BONDA | (eco) impact Consulting, FASID, LEED FELLOW

Penny Bonda is known as the “mother of green interiors.” She is a pioneer in the industry with extensive expertise in environmental design and international sustainability practices. Excel Dryer is proud to partner with Penny and (eco) impact on an updated Next Generation Green Restroom Design CEU course designed to help architects specify the most cost-effective, hygienic and environmentally friendly restroom with today’s latest technology.

NEW AIA CEU - Contact Us Today to Schedule a Lunch and Learn!
The end of the sphere opposite the blowing pipe was then cut off while still molten and spun into a circular sheet of glass. Roughly the size and shape of a bottle base today, these small pieces of glass were typically installed in lattice frameworks made out of lead. Crown and broadsheet remained the dominant forms of glass making until polished plate glass—produced by a casting process, rather than by blowing—was introduced in the late 18th century. Then, in 1834, a new, advanced cylinder sheet process for making broadsheet glass was introduced, allowing much larger sheets to be produced. This, in turn, drove a burst of innovation in glass features and performance that continues today: monolithic glass using body tints to control energy were first introduced in the 1950s. During the energy crisis of the 1970s, glazing really started to focus on how to become more energy efficient. The first coatings started with a reflective aesthetic in the 1960s, then evolved in the late 1980s to vacuum deposition coatings called soft coats. These coatings allowed for more visible light and an expanded color palate, as well as improved energy efficiency. Since then, vacuum deposition coatings have continuously improved to meet modern design goals. The glass industry continues to innovate with new technologies like dynamic glazing.

With such a wide and constantly growing range of glazing options available to architects, a key 21st century innovation has been the creation of digital tools that can help designers evaluate and select the precise glass product they want quickly, easily, and accurately. These tools now exist, allowing architects to: customize the performance properties they desire; visualize the glass they want from a variety of perspectives in a variety of weather conditions; evaluate and compare glass performance (light transmission, u-value, solar heat gain coefficient) for a variety of alternatives; calculate energy performance; and export the results to a BIM model. All within a seamless process designed to save architects time, while also giving them the flexibility to explore a wide range of glazing options and alternatives, some of which they may not have considered before.

GLASS WALLS: THEN AND NOW

In 1891, exterior walls didn’t move, slide, or fold, and they certainly weren’t made of glass. A few experimental glass wall examples had been constructed in England (Oriel Chambers in 1864 and 16 Cook Street in 1866), but they...
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- All glass system with no floor track.
were just that: experiments. And while cast iron facades—in some ways, the first curtain walls applied to nonresidential buildings—had been introduced several decades earlier, they were not in widespread use. Steel framing for larger buildings was becoming common, but it had not yet freed up the exterior wall from its role in structurally supporting the building. As a consequence, solid walls with punched openings for windows—like those in the Market and Fulton National Bank—were the norm. It would take more than 50 years for framing and glazing technologies to evolve and then combine into the glass curtain wall systems that dominate commercial building construction today; notably, with the design and construction of the Lever House building (Skidmore, Owings and Merrill) in New York City, New York, in 1952, and its many imitators and followers. But, even though today’s curtain walls provide virtually limitless design potential matched with a wide range of high-performance characteristics, they still remain fixed in place, even when parts of the glazing might be able to open and close.

Parallel to the development of the glass curtain wall, two other technologies also took off in the 1950s in terms of popularity and use: folding interior partitions for commercial and institutional buildings, and sliding glass doors for residential applications. Both involved the development of new materials for panels and frames. Perhaps even more important, both also involved significant innovation in the track and hardware configurations that actually allow these panels to fold and slide—all while meeting increasingly rigorous demands in terms of durability, ease of use, acoustic and thermal performance, aesthetics, and security.

Combined, the technological and system innovations in the folding partition, sliding glass door, and curtain wall industries laid the technical and conceptual groundwork for one of the latest advances in exterior wall design and construction: walls that are made of glass but that also fold, slide, and move.

**TERRAZZO: THEN AND NOW**

Terrazzo was created in the mid-16th century when Venetian mosaic workers discovered a way to reuse marble remnants left over from their mosaic projects. With odd-size chips, they began to build terraces (“terrazze”) around their living quarters, giving birth to a new flooring product and providing its name at the same time.

During the following centuries, the process for creating terrazzo floors remained relatively unchanged, and the craftsmen who created them remained remarkably cohesive, clustering in and around the Friuli region of Italy. The first terrazzo in the United States was laid by these Italian craftsmen in 1890—one year before the Market and Fulton National Bank was featured in *Architectural Record*—in the Vanderbilt residence in New York. But, while this was a prestigious commission, terrazzo remained a niche product until the decades following World War I, when terrazzo became a flooring of choice in the United States, overtaking and replacing the use of marble mosaics. Architects in the 1920s suddenly recognized the design potential of terrazzo for the smooth, curvilinear art deco/modern styles of the period. In addition, the invention of the electric grinder in 1924 radicalized the industry; providing a finer finish, greater speed, increased accuracy, and lowered costs, all contributing to the spread of terrazzo across the United States. During the same period, metal divider strips were introduced, which allowed the creation of highly artistic and intricate patterns and designs in terrazzo floors, and also accommodated expansion and contraction of the surface to help minimize cracking.

The next evolution within the industry occurred in the 1970s with the introduction of polymer-based terrazzo, also referred to as “epoxy thin-set” terrazzo. This material provided a wider selection of colors, a thinner and lighter finished product, faster installation times, high impermeability and strength, and less susceptibility to cracking. Epoxy thin-set has become the norm for terrazzo today. Other systems include: sand cushion, bonded, monolithic, polyacrylate, and rustic. With much higher performance and sustainability characteristics than were possible in the past—and with its combination of beauty, durability, and low maintenance—terrazzo is now undergoing renaissance as a flooring product that provides both significant life-cycle benefits and virtually endless design flexibility.

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PRODUCT REVIEW
125 Years of Product Innovation and Evolution

Armstrong® Ceiling Solutions

Total Acoustics™ performance from Armstrong Ceilings
Noise can impede concentration, healing, and learning. Total Acoustics™ ceilings feature the ideal combination of both sound absorption (NRC) and sound blocking (CAC)—complete noise control and design flexibility for every space. Rated good, better, best so you can easily choose the ceiling that’s right for your spaces.

Guardian Glass North America

Guardian CrystalBlue™ glass
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NanaWall Systems

NanaWall Opening Glass Walls
NanaWall Systems provides a wide range of opening glass walls for commercial environments that stand up to the daily commercial grind, as well as the challenges of wind, water, extreme temperatures, forced entry, impact, and structural load.

Excel Dryer, Inc.

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Terrazzo: The Art of Craft
Terrazzo fits any design plan from elegant simplicity to complex art patterns. With an unlimited color palette, varied aggregate choices, and state-of-the-art water-jet strip cutting, terrazzo is a designer’s dream. Terrazzo’s antimicrobial, durable, sustainable, and easy-to-maintain surface makes it the premium choice in flooring.
The majority of employees spend over half their time on individual focus work and another large percentage on the telephone. Their environment should support these activities, but instead, workplace design trends are steadily eliminating many methods of controlling acoustics. While the proportion of open plan and occupant densities grow, partitions are lowered or omitted, absorptive finishes are forgone in favor of exposed surfaces, and closed rooms are built using demountable walls, reducing room-to-room isolation.

Whether such decisions are made for the sake of aesthetics, sustainability, or short-term budget goals, they all reduce acoustic performance. The situation is compounded by improvements in construction materials, mechanical, and office equipment, which have lowered the ambient—or background—sound level. The resulting ‘pin-drop’ environment allows conversations and noise to easily be heard and understood, even from a distance. What ambient sound remains does not exhibit the correct mix of frequencies needed for speech privacy, noise control, and comfort.

Sound-masking technology is used to distribute an engineered sound throughout a facility, raising its ambient level in a controlled fashion. While adding more sound to a space might seem to contradict the goal of achieving effective acoustics, the premise behind this solution is simple: it covers up noises that are lower in volume and reduces the disruptive impact of those that are higher by decreasing the magnitude of change between the baseline and any peaks in the space. Conversations are also either entirely covered or their intelligibility is reduced. Hence, occupants perceive treated spaces as quieter and more private.

Most people have experienced this type of effect—for example, when washing dishes at the kitchen sink while trying to talk to someone in the next room. The listener can tell the other person is speaking, but it is difficult to understand exactly what is being said because the running water has raised the ambient level in their area. In fact, everyday examples are virtually endless: the drone of an airplane engine, the murmur of a crowd in a busy

Mind the Gap
Using sound masking in open and closed spaces
Sponsored by LogiSon Acoustic Network | By Niklas Moeller

Learning Objectives
After reading this article, you should be able to:
1. Discuss common issues affecting the acoustic performance of closed rooms.
2. Describe the impact of background sound levels on occupant comfort and productivity within both open and closed spaces.
3. Explain sound masking’s role in achieving construction savings and preserving flexibility.
4. Increase speech privacy and reduce noise disruptions in the workplace.

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

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restaurant, or even the rustling of leaves in the wind. They all have the potential to mask sounds the listener would otherwise hear.

Of course, when introducing a sound to a workplace, it is vital to ensure that it is as comfortable and unobtrusive as possible. Though most compare the sound of a well-designed and professionally tuned masking system to that of softly blowing air, it actually follows a nonlinear spectrum or ‘curve,’ which is defined in third-octave bands and typically ranges from 100 to 5,000 hertz (Hz), or as high as 10,000 Hz. Unlike ‘white noise’ or ‘pink noise’—terms often, but incorrectly, used in this context—this curve is specifically designed to balance acoustic control and occupant comfort. A successful implementation involves achieving both goals, in equal measure.

**MYTHS AND MISCONCEPTIONS**

Over the past decade, there have been tremendous advancements in sound-masking technology, increasing performance, expanding functionality, and opening the door to new applications. Yet, certain outdated design practices persist, often to the detriment of speech privacy, noise control, and overall acoustic comfort. One such custom is the exclusion of sound masking from closed rooms, such as private offices, meeting, and audio/video conferencing rooms.

Several reasons are used to justify this type of design. The first is an historical remnant from the days when sound masking was first adopted to help with the obvious acoustic challenges encountered in an ever-growing number of open plans. This initial application led some to conclude that masking was only intended for these areas.

However, this opinion was also reinforced by a significant technical impediment. Early sound-masking systems exclusively used a centralized architecture, which is very limited in terms of its ability to offer local control over the masking sound. Large zones spanned numerous private offices and other closed rooms, with little opportunity to adjust the volume within each space (i.e., only via transformer taps located on the loudspeakers) and no control over frequency. The resulting inconsistencies in volume and spectrum impacted masking performance and occupant comfort, leading both vendors and dissatisfied customers to conclude that the technology simply could not be applied in closed spaces.

Despite the fact that modern networked sound-masking architectures address these deficiencies by providing fine control over both volume and frequency within small zones (i.e., of one to three loudspeakers), some still argue that masking is best left to open plans.

Beyond its historical foundations, there are a few other reasons consistently cited for excluding closed rooms from sound-masking designs. One objection is the idea that these spaces do not require masking because they are afforded sufficient speech privacy and noise control via physical isolation. Another is the concern that sound masking will interfere with communication, either within the room itself or over audio/video conferencing equipment.

In fact, if handled properly, there are numerous advantages to including sound-masking coverage for closed rooms: greater consistency of acoustical characteristics across the facility, higher occupant satisfaction, increased speech privacy and protection from noise disruptions, construction savings, and the preservation of flexibility for future renovations.

**WALL CONSTRUCTION**

Closed offices and meeting rooms are built with the intention of providing occupants with both visual and acoustic privacy. While the first goal can easily be achieved, the latter often proves elusive because of the many ways in which sound can transfer from one space to another.

In the attempt to create sufficient speech privacy, one might specify walls with high sound transmission class (STC) ratings. However, STC ratings are lab tested and frequently overstate real-world performance by 5 to 10, or more, points. Site-tested field STC or noise isolation class ratings are better gauges, but unfortunately, only testable after the fact.

**Continues at ce.architecturalrecord.com**

**Niklas Moeller** is vice president of KR Moeller Associates Ltd., manufacturer of the LogiSon Acoustic Network. He has more than 25 years of experience in the sound-masking field.
Moisture Control with Spray Foam Insulation
How a single product can provide multiple barriers in one step
Sponsored by Icynene | By Peter J. Arsenault, FAIA, NCARB, LEED AP

The design of building enclosures entails some very particular requirements that mandate attention to detail. Specifically, barriers of multiple types are needed to restrict air, water, vapor, and thermal transfer. This usually means that a wall assembly requires multiple products to address each one. An emerging alternative is to use a single product with multiple properties, thus eliminating construction steps and reducing labor and material costs accordingly. To work fully, that means the product or material has to demonstrate proven abilities to resist heat, water, and air movement through it in addition to providing a truly continuous installation in order to assure uninterrupted performance. Such a product exists in spray foam insulation systems that have been tested and proven to provide the multiple levels of protection needed in a single-product application. At the same time, it can allow more design freedom due to the custom, field-applied nature of the system. Hence, it is becoming a popular
alternative among architects compared to a reliance on multiple, separate barrier products for air, water, vapor, and thermal transfer.

**OVERVIEW OF SPRAY FOAM INSULATION**

Spray foam insulation products have been successfully used in buildings for decades. Part of their appeal is that in addition to providing excellent thermal insulation capabilities, they can also provide a protective barrier that significantly reduces air leakage, minimizes airborne moisture transfer, and reduces bulk water transport. Since it is sprayed in place, almost monolithically, there are no seams or joints, thus creating a truly continuous layer in roof, floor, and wall assemblies. This continuity can be maintained particularly well in exterior wall continuous insulation designs, where the spray foam can be applied to the outside face of exterior sheathing, not just between the studs. These performance characteristics can not only satisfy building code requirements for weather-resistant barriers, they can also optimize energy efficiency by fully restricting heat flow and air leakage. From a design standpoint, spray foam insulation allows for plenty of architectural options. Unlike rigid board insulation products, it can be sprayed in place to conform completely against virtually any building geometry or shape, including curved and rounded forms.

**Common Types of Spray Foam**

Typically, spray foam insulation is polyurethane based and referred to as spray polyurethane foam (SPF). As a manufactured product, it can be formulated in different types and in different densities, producing correspondingly different characteristics. For buildings, it is usually classified as one of the following:

- **Low-density foam** weighs around 0.5 pounds per cubic foot (0.4–0.75 available) when installed. It is typically an open-cell product, which remains somewhat flexible in place and achieves R-values comparable to fibrous insulation on the order of R-3.7 per inch or so. Low-density spray foam is fairly vapor permeable and typically does not qualify as a water barrier. Further, low-density foam can only be used in interior applications, such as filling stud or joist cavities, not for exterior continuous insulation.

- **Medium-density foam**, as the name implies, is heavier and more rigid than low-density spray foam, coming in at about 2 pounds per cubic foot, or roughly four times heavier than low-density material. Its other defining characteristic is the closed-cell nature of the insulation when mixed. Since it becomes a series of small bubbles (cells) of trapped insulating gas (a blowing agent), the thermal performance is directly enhanced, resulting in a noticeable increase in R-value up to R-7.1 per inch. The makeup of medium-density spray foam also allows it to serve as a full air barrier, according to the Air Barrier Association of America (ABAA). Further, in terms of water vapor permeance, it tests and qualifies as a weather- and water-resistant barrier since very little water vapor passes through it.

Based on the differences between these two types of spray foam, it is clear that medium-density spray foam insulations offer the superior water- and moisture-barrier characteristics, the ability to be used as exterior continuous insulation, and much better thermal performance per inch of thickness. Collectively, this means that medium-density, closed-cell spray foam insulation provides the performance of four products in one: insulation, air barrier, vapor retarder, and water-resistant barrier. This combination of traits means it has the potential to save time and money during construction by eliminating the number of products installed or avoiding the need to cut and fit board-type insulation. Once the building is occupied, it also significantly reduces air leakage, minimizes water and moisture transfer, and optimizes energy efficiency.

**Spray Foam in Exterior Walls**

All of these attributes make medium-density, closed-cell insulation over wall sheathing, it not only provides a superior insulation installation, it helps enhance the rest of the wall assembly as well. First, it should be noted that expanding spray foams or low-density foams create the irregular and bulbous forms that many people associate with spray foam insulation. However, medium-density foam is different in that it can be installed fairly precisely and in very controllable thicknesses. That means it creates a smooth and predictable surface that is ready to receive cladding over it.

Installing spray foam insulation is much simpler than installing rigid foam boards, which require fasteners, cutting, and waste. Spray foam has its own adhesive properties that keep it securely attached in place once applied and avoid waste. Of course, not all buildings are designed to be rectilinear, and even those that are often have some unique or irregular conditions along the walls. Rigid insulation boards are necessarily rectilinear and don't bend or adapt easily to irregular conditions in a wall assembly. Therefore, they may not be a practical or realistic choice for certain buildings. By contrast, spray foam insulation conforms directly to the surface it is being applied to regardless of shape, geometry, or irregularities. That means that it fully covers and seals over the underlying construction to provide a truly continuous, uninterrupted insulation layer and protective barrier. It also means that buildings designed with intentional curves, domes, arches, angles, or other non-rectilinear shapes no longer need to suffer from lower performance because of limitations from other insulation types. For example, a curved surface would be very difficult if not impossible to cover properly with rigid foam board insulation. Mineral fiber batts or blankets do curve and may be used in wall cavities, including curved surfaces. However, they
do not provide the same performance in terms of insulation level per inch, water resistance, or air resistance. Spray foam insulation provides excellent performance in all of those areas since its characteristics are not limited or influenced by the shape of the building.

Wall Assembly Integration
Of course, the method of securing and attaching cladding material needs to be acknowledged. Connectors or anchors for attaching cladding, whether for thin systems such as metal or fiber cement or thicker systems such as ties for brick and masonry, can be a factor in the wall assembly. Rigid foam boards are commonly available in 2-foot widths for the purpose of fitting above and below, such connectors or anchors that are spaced 2 feet apart vertically. Often, that means that there can be a horizontal gap along the joints of the foam boards, which compromises the full insulating performance of the system. This can be exacerbated if there are unusual details or irregular shapes along the wall, which alter the spacing of the cladding connectors and result in imprecise field cutting of the insulation. Spray foam insulation, on the other hand, covers and seals around all connectors and attachments completely. There is also greater flexibility with regard to attachment placement and configuration since a slightly bent or misaligned anchor can still be sprayed around without requiring realignment. This all minimizes the disruption in the continuity of the insulation, reducing it to only the actual thickness of the attachment materials.

Overall, medium-density spray foam covers the wall construction completely and creates a much more uniform layer of continuous insulation and barrier against air and weather. In the process, it seals completely around cladding attachments as well as covers over all of the joints and seams of substrates, such as exterior gypsum board. When applied around windows and doors, it makes smooth, continuous, and well-sealed transitions at heads, sills, and jambs, while conforming to flashings and other transition membrane components. If the walls have curved or other non-rectilinear shapes, the on-site spray application is ideal in that it can conform to any shape or feature of the wall system. Finally, manufacturers have recognized the need to demonstrate fire resistance and have successfully tested medium-density, closed-cell insulation in wall assemblies as part of showing code compliance for fire ratings.

**THERMAL RESISTANCE**
Spray foam products are most commonly known for their insulating properties, which is appropriate since they provide an excellent solution for insulating buildings thoroughly and completely. In buildings that use framed exterior walls constructed of either metal or wood studs, it is common to think in terms of insulating between the studs. But each of those studs is a break in the insulation that collectively can reduce the thermal performance of the wall by 20, 30, or even 50 percent. This is because the studs and other elements no longer have the thermal resistance of the insulation but instead act as a thermal bridge, allowing heat to flow more freely between inside and outside. Add in the thermal bridges that occur along floor lines or around major structural elements, such as columns, beams, piers, etc., and it is clear that a truly energy-efficient building needs a different approach to insulation.

Based on the above, the principle of continuous insulation in the building enclosure has been adopted in building codes, voluntary standards, and best practices. In exterior wall systems, that typically means a layer of exterior continuous insulation is installed outside of the exterior sheathing such that it covers over the outer surface of everything behind that sheathing too—the studs, the floors, the structure, etc. This dramatically increases the effective thermal performance of a wall since all or most thermal bridging is eliminated. Furthermore, the temperature of the framed wall and structure can approach the temperature of the living space if the right amount (thickness) of continuous insulation is used. That means that during cold outdoor conditions, most or all of the wall will be not only warm, but more likely to remain dry since condensation will not likely occur. During hot outdoor conditions, a majority of the wall will be dry and cool. Such environmental conditions translate into a wall under less long-term temperature and moisture stress, which leads to greater more durability and longevity of the wall.

**Vapor Barriers**
There is an additional benefit of having full exterior continuous insulation using closed-cell foam, particularly in cold climates. The codes recognize that insulated walls need an interior vapor barrier/retarder to prevent warm, moist air from entering into the wall assembly, condensing, and causing the potential for damage, rot, mold, or other issues. The type of vapor retarder required or prohibited by the code is based on the climate zone where the building is located and the classification listed in the codes based on perm ratings and material. The lower the perm rating, the less water vapor that passes through the material. The code classifies vapor retarders as follows (per 2015 International Building Code [IBC] Section 1405).

- **Class I** vapor retarders have a very low perm rating of less than or equal to 0.1 and include materials such as sheet polyethylene or non-perforated aluminum foil.

Medium-density, closed-cell spray foam insulation adheres to substrates and seals completely around cladding anchors, such as brick ties and other penetrations.
ability to function as a water-resistant barrier. For purposes of this article, while we are addressing both water and air infiltration resistance, we will stay with the insulation-testing definition of “water-resistant barrier,” abbreviated as WRB.

A number of sheet, roll, and spray-on products have been developed to provide the requisite performance of a WRB. Each of those products have their own limitations, including their own seams or joints, the need for a separate construction step, and the ability to be compatible with other wall materials and products.

**SPF as a Water-Resistant Barrier**

Medium-density, closed-cell spray foam products have been tested as WRBs and demonstrated that they are capable of shedding water and limiting moisture intrusion. Many such products have been evaluated according to the code requirements and criteria for WRBs, and are officially designated as water-resistant barriers accordingly. Since there are no joints to tape or overlapping practices to maintain, water-barrier performance is more easily assured on the construction site with spray foam insulation since it forms a continuous film. In this case, not only is exterior continuous insulation provided, but water that penetrates past the cladding system and is forced by pressure toward the interior meets the spray foam’s exterior surface. The water-resistant nature of the medium-density spray foam is such that this water will drain down along the surface and not continue progressing into the wall assembly where it could cause damage. Such a moisture control system is particularly important to have in coastal or high-precipitation areas where driving rain is common.

Of course, the exterior wall needs to be designed to ensure that this water is actually diverted back outside of the cladding. This is usually accomplished by following an exit path and flashing system incorporated at strategic points in the wall assembly. For example, the typical path that driving rain would take in a masonry veneer cladding over a metal framed wall would be for the water to make its way to a drainage plane on the inside of the masonry or the face of a WRB spray foam surface.

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Low-permeability spray foam is recognized by building codes to have vapor-barrier qualities that can reduce the need for other interior vapor retarders.

- **Class II** vapor retarders have a moderate perm rating greater than 0.1 but less than or equal to 1.0, as found in kraft-paper-faced fiberglass batts or certain vapor-barrier-tested paints and closed-cell spray foam insulation.
- **Class III** vapor retarders have a higher perm rating of greater than 1.0 but less than or equal to 10.0 and are common of most latex or enamel paints.

The code goes on to say that there are exceptions to the otherwise required Class I or Class II vapor retarder in colder climates. One of those is the use of minimum R-value levels (based on climate zone) of continuous insulation on the outside of a framed wall. Further, it specifically states that “only Class III vapor retarders shall be used on the interior side of frame walls where foam plastic insulating sheathing with a perm rating of less than 1 is applied...on the exterior side of the frame wall,” (2015 IBC Section 1405.3.2). Note that in this code section, medium-density SPF is considered equivalent to foam plastic insulating sheathing and also applies here.

In essence, this language is saying that there is no need, in fact there might be harm, in using a higher-rated Class I or Class II vapor retarder in walls that have foam insulation that already provides that attribute. Since medium-density, closed-cell spray foam insulation applied on the outside (or inside) of the exterior sheathing meets this criteria, there is no need for anything but common latex paint or the equivalent on the inside, finished surface of the wall. This not only means that there is less concern about moisture condensation inside the wall assembly, it also means that the wall has more potential to dry out quickly in the event any wayward moisture does make it there since wall drying is permitted both to the interior and exterior.

**WATER AND MOISTURE CONTROL**

Exterior wall cladding materials (whether masonry, metal, composites, or others) typically do not completely prevent moisture or rainwater from entering into a wall. Some cladding materials are porous, while those that aren’t commonly have seams or joints that are limited in their ability to keep out water. In fact, some systems, which are commonly referred to as rainscreen cladding systems, are specifically designed to allow water to enter behind the cladding and drain harmlessly away out of the bottom. While this is good for the cladding, it may not be good for the rest of the wall if it isn’t properly treated. That is why building codes require a weather-resistant barrier behind cladding to protect the integrity of the rest of the assembly and prevent degradation of building materials due to rust, corrosion, rot, etc. In practice, this barrier really ends up needing to resist water, and spray foams are tested on their
Mass Timber in North America
Expanding the possibilities of wood building design
Sponsored by reThink Wood

It’s been a while since a major category of building materials inspired the kind of widespread enthusiasm currently being shown for mass timber. Around the world, designers are leveraging the strength, stability, and design flexibility of products such as cross-laminated timber (CLT) to push beyond wood’s perceived boundaries, achieving building heights and spans that would have once required concrete, steel, or masonry for structural support.

For many, it’s the combination of aesthetics, structural performance, and opportunity for innovation that have proven irresistible. But mass timber also offers a host of other advantages:

Lighter carbon footprint: Mass timber products allow the use of a renewable and sustainable resource as an alternative to more fossil-fuel-intensive materials. Designers of ‘tall wood’ buildings have been especially focused on the reduced carbon footprint achieved by using wood, which aligns with the goals of Architecture 2030. Reducing carbon is also a priority for many public buildings and schools.

Construction efficiency: Mass timber construction is fast, and speed correlates to revenue, whether the project is an office, school, student residence, condominium, or hotel. Bernhard Gafner of structural engineering firm Fast + Epp, says that, in his firm’s experience, a mass timber project is approximately 25 percent faster to construct than a similar project in concrete. Noting the advantages for urban infill sites in particular, he says it also offers 90 percent less construction traffic (trucks delivering materials) and requires 75 percent fewer workers on the active deck, making for a much quieter job site.

The fact that mass timber weighs less than other materials also has a number of potential benefits, including smaller foundation requirements and lower forces for seismic resistance. Discussing the new Design Building at the University of Massachusetts, for example, structural engineer Robert Malczyk of Equilibrium Consulting, says, “The seismic force is proportionate to the weight of the building.”

Photo courtesy of LEVER Architecture
Mass timber systems are a complement to light wood-frame and post-and-beam construction.

If this building were designed in concrete, which was considered, the weight would be six times more than the mass timber design.\

**Fire and life safety:** Structurally, mass timber offers the kind of proven performance—including fire protection and seismic resistance—that allows its use in larger buildings. It also expands the options for exposed wood structure in smaller projects.

**Occupant well-being:** An increasing number of studies focused on wood’s biophilic aspects have linked the use of exposed wood in buildings with improved occupant health and well-being.\(^1,2\)

This course is intended for architects and engineers seeking current information on mass timber, including products, research related to structural performance and life safety, and available resources. It answers common questions regarding strength, fire protection, and durability, and highlights examples of mass timber buildings in different occupancy groups to illustrate both design trends and the extent to which mass timber has captured the imagination of North American building designers.

**WHAT IS MASS TIMBER?**

Mass timber is a category of framing styles typically characterized by the use of large solid wood panels for wall, floor, and roof construction. It also includes innovative forms of sculptural buildings, and non-building structures formed from solid wood panel or framing systems of six feet or more in width or depth. Products in the mass timber family include:

**Cross-Laminated Timber (CLT)**

CLT consists of layers of dimension lumber (typically three, five, or seven) oriented at right angles to one another and then glued to form structural panels with exceptional strength, dimensional stability, and rigidity.

Panels are particularly cost effective for multi-story and large building applications. Some designers view CLT as both a stand-alone system and product that can be used together with other wood products; it can also be used in hybrid and composite applications. CLT is well-suited to floors, walls, and roofs, and may be left exposed on the interior for aesthetics. Because of the cross-lamination, CLT also offers two-way span capabilities.

CLT can be manufactured in custom dimensions, with panel sizes varying by manufacturer. There are several CLT suppliers in North America, with more anticipated. The species of wood used depends on the manufacturing plant location.

The 2015 International Building Code (IBC) and 2015 International Residential Code recognize CLT products manufactured according to the ANSI/APA PRG-320: Standard for Performance Rated Cross-Laminated Timber. Under the 2015 IBC, CLT at the required size is specifically stated for prescribed use in Type IV buildings. However, CLT can be used in all types of combustible construction—i.e., wherever combustible framing or heavy timber materials are allowed. The National Design Specification\(^8\) (NDS\(^8\)) for Wood Construction is referenced throughout the IBC as the standard for structural wood design, including CLT. The 2012 IBC does not explicitly recognize CLT, but the 2015 IBC provisions for CLT can be a basis for its use under alternative method provisions.

For more information on CLT, the *U.S. CLT Handbook* is available as a free download at www.rethinkwood.com.

**Nail-Laminated Timber**

(NLT or Nail-lam)

NLT is created from individual dimension lumber members (2-by-4, 2-by-6, 2-by-8, etc.), stacked on edge, and fastened with nails or screws to create a larger structural element.

NLT is far from new—it’s been used for more than a century—but is undergoing a resurgence as part of the modern mass timber movement. Commonly used in floors, decks, and roofs, it offers the potential for a variety of textured appearances in exposed applications, and wood structural panels can be added to provide a structural diaphragm. NLT has also been used to create elevator and stair shafts in midrise wood-frame buildings.

NLT naturally lends itself to the creation of unique roof forms. Because panels are comprised of individual boards spanning in a single direction, both singly curved and freeform panels can be created by slightly offsetting and rotating each board relative to the others. This allows the complex geometry of curved roof and canopy structures to be realised with a simple system.

Advantages of NLT include the ability to use locally available wood species and the fact that specialized equipment generally isn’t necessary. An NLT system can be created via good on-site carpentry, though some suppliers do offer prefabrication, and this can have benefits depending on the scale and complexity of the project. Prefabricated NLT panels typically come in sizes up to 10 feet wide and 60 feet long, with wood sheathing preinstalled. When detailing NLT systems, designers need to account for moisture movement.

The IBC recognises NLT and provides guidance for structural and fire design. No product-specific ANSI standard is required, as the structural design of each element is covered by the NDS and applicable grading rules. NLT can be used in all types of combustible construction.
Glued-Laminated Timber (glulam)

Glulam is composed of individual wood laminations (dimension lumber), selected and positioned based on their performance characteristics, and then bonded together with durable, moisture-resistant adhesives. The grain of all laminations runs parallel with the length of the member.

Glulam has excellent strength and stiffness properties, and is available in a range of appearance grades for structural or architectural applications. While typically used as beams and columns, designers can use glulam in the plank orientation for floor or roof decking. With careful specification and design that considers the flatwise structural properties (see APA reference below), deep glulam sections can be placed flatwise as decking similar to NLT.

With the flexibility of glulam manufacturing, glulam ‘panels’ can be used to create complex curvature and unique geometry. When used in such innovative floor and roof panel configurations, glulam is seen as an extension of the mass timber product family and sometimes referred to as GLT.


Dowel-Laminated Timber (DLT)

Dowel-laminated timber panels are a next-generation mass timber product commonly used in Europe. Panels are made from softwood lumber boards (2-by-4, 2-by-6, 2-by-8, etc.) stacked like the boards of NLT and friction-fit together with dowels. Typically made from hardwood lumber, the dowels hold each board side-by-side, similar to how nails work in an NLT panel, and the friction fit lends some dimensional stability to the panel.

There isn’t a prescriptive code path for the use of DLT under the current IBC, and the NDS doesn’t provide published design values or equations for calculating capacities of wood dowel joints. To calculate capacities, the Timber Framers Guild provides some information. However, because nothing is referenced in the code, the use of DLT would require approval by the Authority Having Jurisdiction on a case-by-case basis.

Among the advantages of DLT, acoustic strips can be integrated directly into the bottom surface of a panel. This can help a designer achieve acoustic objectives, while keeping the wood exposed and allowing for a wide variety of surface finishes.

With growing interest in DLT, continued product innovation is likely, along with increased availability to U.S. building designers.

Structural Composite Lumber (SCL)

SCL is a family of wood products created by layering dried and graded wood veneers, strands, or flakes with moisture-resistant adhesive into blocks of material, which are subsequently re-sawn into specified sizes. Two SCL products—laminated veneer lumber (LVL) and laminated strand lumber (LSL)—are relevant to the mass timber category, as they can be manufactured as panels in sizes up to 8 feet wide, with varying thicknesses and lengths, depending on the product and manufacturer. Parallel strand lumber (PSL) columns are also commonly used in conjunction with other mass timber products.

The manufacture of SCL is standardized. However, while SLC is included in the NDS, design values are provided by the manufacturers. International Code Council Evaluation Service (ICC-ES) evaluation reports and APA product reports are available to assist with structural design capacities and specifications.

Wood-Concrete Composites

Mass timber systems vary widely, and hybrids are an option for wood high-rises, very long spans, or other project-specific requirements. No material is perfect for every job, and it’s important for designers to choose a combination of materials that effectively meets the performance objectives.
At a product level, most of the panels described above can be made into a wood-concrete composite by applying a concrete topping in such a way that the two materials act as one.

One example is the University of Massachusetts Design Building described later in this course (see Schools), which includes CLT/concrete composite floors. According to architect Tom Chung of Leers Weinzapfel Associates, the team relied on the CLT panels for the building load requirements. However, the composite action between the CLT and concrete provided extreme stiffness and minimal deflection which, along with an insulation layer between the materials, provided good acoustic separation between floors.

WHEN IS MASS TIMBER APPROPRIATE?
Because of its strength and dimensional stability, mass timber offers a low-carbon alternative to steel, concrete, and masonry for many applications. A complement to other wood framing systems, it can be used on its own, in conjunction with other wood systems such as post-and-beam, or in hybrid structures with steel or concrete. Mass timber is not necessarily a good substitute for light wood-frame construction, only because dimension lumber framing offers such a compelling combination of performance and cost where permitted by code. For this reason, building types where designers typically default to forms of construction other than light wood-frame—including offices, public/institutional buildings, schools, and taller mixed-use occupancies—may offer greater appeal for mass timber than low-rise commercial or residential buildings, though examples of the latter do exist.

“We’re seeing a lot of interest in mass timber for midrise buildings such as hotels and high-end offices that would have typically used concrete or steel,” said Lucas Epp of StructureCraft, a specialty timber engineering and construction company known for innovative wood structures. “In addition to the warmth of exposed wood, people are discovering that it’s a viable option for creating high-performing and cost-competitive structures.”

Thomas Robinson, whose firm is designing three mass timber projects in addition to Albina Yard and Framework, sees particular potential in multifamily housing and other building types that lend themselves to modular prefabrication. “The time spent upfront designing and perfecting a building system can be leveraged in projects where you have repeatable elements,” he says.

Office/Mixed-Use
For office environments, the aesthetic of mass timber can be a particular draw, resulting in higher rents and longer-term tenants.

MASS TIMBER: AN EFFICIENT SOLUTION
In addition to the structural, aesthetic, and environmental advantages, mass timber can be an efficient and practical solution to design challenges.

With prefabricated panels, mass timber construction is fast—approximately 25 percent faster than concrete, according to Bernhard Gafner of Fast + Epp, based on his firm’s experience. Gafner says it also results in 90 percent less construction traffic and 75 percent fewer workers on the active deck, making it well-suited to urban infill sites.

Because mass timber is lighter than steel and concrete, it can be a good solution for sites where poor soil is an issue.

There is also a trend toward the integration of services into prefabricated elements, such as panels and trusses. The fact that the labor is done off-site means greater quality control and a less hectic job site.

The Radiator in Portland, Oregon—a five-story, Type IIIA project completed in 2015—is part of a surge of mass timber offices in the Pacific Northwest. Designed by PATH Architecture for the Kaiser Group, gravity loads for the 36,000-square-foot structure are handled through a system of glulam beams and columns, while a mass timber deck with wood structural panels creates the structural floor diaphragm, and dimension lumber walls sheathed with wood structural panels provide shear capacity. Beams, columns, and the underside of the floor decking are all left exposed, contributing to the interior’s contemporary industrial character.

Further expanding the possibilities, the seven-story, 220,000-square-foot T3 building in Minneapolis, Minnesota, includes a mix of glulam columns and beams, NLT floors, and a concrete core. Architect Michael Green, a long-time advocate of using wood to reduce the carbon footprint of buildings, calls the Type IV project “a game changer for the commercial building industry and a milestone for mass timber construction in the United States.” In addition to its carbon benefits, Green cites the ability of modern wood products to bring warmth and beauty to the interior, while promoting a healthy indoor environment.

Demonstrating some of the efficiencies associated with mass timber, the wood structure of T3 took an average of nine days to erect per 30,000-square-foot floor. More than 100 truckloads of glulam and NLT panels arrived as they were needed at the project site, with steel connections preinstalled, allowing the structural components to be assembled quickly. The project team estimates that it is 30 percent lighter than a comparable steel design and 60 percent lighter than post-tension concrete.

Public and Institutional
Reasons to use mass timber in public and institutional buildings are similar to those for offices and schools, including carbon footprint, and wood’s biophilic effects. The aesthetic possibilities are also exciting to many designers.

In the United States, examples include Chicago Horizon, a Type IV public pavilion designed by Ultramoderne for the Chicago Architecture Biennial. Elegantly crafted, this award-winning structure includes a CLT roof supported on 13 glulam columns distributed in a radial pattern to address lateral loads and uplift. The pavilion represents the first use of exposed CLT in the city of Chicago, providing local precedent for the approval and use of mass timber for government and public assembly applications. In addition, the two-way slab roof is the first of its kind, suggesting new opportunities for open-layout buildings made from CLT. The planned long-term use of the building as a commercial vendor and public assembly space is a significant and sustainable

Image courtesy of Michael Green Architecture
that during the first few weeks the new building was being used, a teacher commented to me that people were remarking on the freshness of the air in the classrooms. Anecdotal, I know, but it squares with the scientific predictions of health benefits of using wood (especially unfinished wood) in building interiors.”

Common Ground High School is Type VB Construction, fully sprinklered, and was designed under the 2005 Connecticut State Building Code.

Another example, the Design Building at the University of Massachusetts – Amherst (UMass), features an exposed glulam post-and-beam structure, CLT decking and shear walls, CLT/concrete floors (rigidly connected by glued-in steel fasteners), and a ‘zipper truss’ roof spanning a two-story-high common space.

One challenging aspect of this project was that it started as a steel design. Keen to make the building a showcase for sustainability, the university made the decision to use wood part way through the design process.

Noting that he may have made different choices had he started with wood, architect Tom Chung of Leers Weinzapfel Associates said, “Generally, mass timber doesn’t have to radically change the design concepts we already use; we can accomplish what we are already familiar with in steel and concrete. Steel post-and-beam can be done as glulam post-and-beam. Concrete/masonry shafts can be done in CLT. Steel/concrete floors can be CLT/concrete floors. A steel deck roof can be a CLT roof. Steel braces can be glulam braces. For the UMass project, we went step by step, asked ourselves what the precedents were and how we could go about maximizing the use of timber.

“If the project started out in wood and the primary objective was to design the most efficient mass timber building, then the shape and massing may have been more along the lines of a conventional ‘box,’ which is the shape of most of the mass timber structures built so far. But since there were other important design objectives, the UMass building has unique angles and cantilevers that required steel in addition to wood. Our goal was to use the most appropriate materials to meet the structural objectives at hand.”

Chung also said that educating code officials is an important part of the process. The UMass project team was in constant communication with a Massachusetts state building inspector and, because the building represented a new type of construction, also went before the Massachusetts state board of appeals for official approval. The project was approved after the team was able to demonstrate its performance capabilities as well as the long history of mass timber structures in Europe and Canada.

Scheduled for completion in 2017, the UMass project is a combination of Type IV and IIB Construction.

Multifamily and Hospitality
In the United States, a recent example of a multifamily mass timber building is a four-story CLT hotel, Candlewood Suites at Redstone Arsenal, an Army base near Huntsville, Alabama. Developed and designed by Lendlease, the hotel is part of the Privatization of Army Lodging (PAL) program, created to provide quality private-sector lodging for soldiers and their guests. Compared to typical PAL hotel of 54,891 square feet, Lendlease says the new 62,688-square-foot CLT hotel was erected in 37 percent less time, with a 44 percent reduction in structural person hours. In terms of structural performance, the hotel’s location on a military base meant it also had to meet Anti-Terrorism and Force Protection standards.

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This course provides an overview of the urban heat island effect that impacts almost all major cities across the globe. The course suggests that urban heat islands pose a significant problem, negatively affecting the world economy, environment, public safety, and human health. Based on a review of the available strategies to mitigate the negative consequences of the heat island effect, the course also suggests that reflective roofs offer the most feasible and cost-effective way to immediately start improving conditions in urban heat islands. Finally, the course suggests that cool reflective roofs, when designed and installed correctly, may provide many years of useful service, while reducing heat island impacts at the same time.

WHAT IS AN URBAN HEAT ISLAND?
As urban areas across the globe have grown in size and density, significant changes have taken place in their landscapes. Buildings, roads, parking lots, and other infrastructure have replaced open land and vegetation. Surfaces that once were permeable and moist have become impermeable and dry. These changes cause urban regions to become warmer than their rural surroundings, forming “islands” of higher temperatures in the landscapes.

It is important to note that the heat island effect occurs both on the surface and in the atmosphere. By noon on a hot summer day, the sun can heat urban surfaces, such as roofs and pavements, to temperatures 50 to 90 degrees Fahrenheit hotter than the air. In turn, these surfaces radiate additional heat into the atmosphere, causing a similar but not as extreme increase in air temperature. This atmospheric heating becomes more pronounced after sunset, as urban surfaces continue to radiate heat into the surrounding air.

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New and Upcoming Exhibitions

Timber City
Washington, D.C.
September 17, 2016–May 21, 2017
This new exhibition at the National Building Museum will challenge the notion that wood is an antiquated building material, demonstrating the wide range of benefits offered by cutting-edge methods of timber construction, including surprising strength, fire resistance, sustainability, and beauty. Curated and designed by Yugen Kim and Tomomi Itakura, founding partners of the Boston-based architectural design firm ikd, the exhibit will examine the recent boom in timber construction worldwide and highlight U.S.-based projects, including the two competition winners of the recent Tall Wood Building Prize, sponsored by the U.S. Department of Agriculture. Visit nbm.org.

Tracing Displacement and Shelter
New York City
October 1, 2016–January 22, 2017
This upcoming exhibit at MoMA will explore how architects and designers have considered the meaning of shelter in light of global refugee emergencies. Works on display will examine such trends as the strengthening of national borders in response to influxes of migrants and the growing need for affordable, adaptable mobile housing for transient populations (currently estimated at over 60 million). For more information, visit moma.org.

Ongoing Exhibitions

Roberto Burle Marx: Brazilian Modernist
New York City
Through September 18, 2016
The Brazilian artist and landscape architect Roberto Burle Marx (1909–94) undertook projects ranging from the mosaic pavements on the seaside avenue of Rio de Janeiro’s Copacabana Beach to the multitude of gardens that embellish Brasilia (one of several large-scale projects he executed in collaboration with famed architect Oscar Niemeyer). This exhibition at the Jewish Museum explores the richness and breadth of the artist’s practice—from landscape architecture to painting, sculpture, theater design, tapestries, and jewelry. Visit thejewishmuseum.org.

Fast Forward: The Architecture of William F. Cody
Los Angeles
Through September 25, 2016
William F. Cody’s architectural practice was prolific and diversified, and engaged a celebrity clientele that included Walt Disney, Frank Sinatra, and Bing Crosby. His projects ranged from residential homes and condominiums to commercial centers, industrial complexes, and city and community master-planning. Although a majority of Cody’s built work was concentrated in California and Arizona, he had commissions in Texas, Nevada, Colorado, Hawaii, Mexico, Honduras, and Cuba. This exhibition is the first comprehensive overview of Cody’s architecture based on primary archival research. It is a tribute to one of the “giants” of the midcentury modern movement and celebrates Cody’s centennial. Visit aplusd.org.

Narcissus Garden at Johnson’s Glass House
New Canaan, Connecticut
Through November 30, 2016
To celebrate the 110th anniversary of the great architect’s birth and the 10th anniversary of the opening of his most famous residence to the public, Philip Johnson’s Glass House hosts an installation by Japanese artist Yayoi Kusama. Narcissus Garden, initially created for the 33rd Venice Art Biennale in 1966, has been incorporated into the 49-acre site around the Glass House. The piece consists of 1,300 steel spheres floating on a newly restored pond, providing a dramatic view leading up to the house. For more information, visit theglasshouse.org.

Oskar Hansen: Open Form
New Haven, Connecticut
Through December 17, 2016
Oskar Hansen: Open Form traces the evolution of Hansen’s theory of open form from its origin in his own architectural projects to its application in film, visual games, and other artistic practices. Hansen was a member of Team 10, the architectural group that formed the first critical voice against the modernist orthodoxy of the Athens Charter and the followers of Le Corbusier. In his open-form theory, Hansen proposed parting ways with the model of the all-knowing expert and advocated for the participation and change in hierarchy between an artist and viewer. The exhibition, at the Yale School of Architecture, is divided into seven sections exploring Hansen’s theories. For more information, visit architecture.yale.edu.

Model Behavior: Snøhetta at SFMOMA
San Francisco
Through January 14, 2017
This exhibition explores the design process behind Snøhetta’s expansion of the San Francisco Museum of Modern Art. Architectural models, sketches, an interactive app, and a narrated walk-through of the building reveal how Snøhetta responded to the built environment and cultural context of the expansion-to-be and arrived at the space that opened on May 14 of this year. At SFMOMA. For more information, visit sfmoma.org.

Lectures, Conferences, and Symposia

MaisonObjet
Paris
September 2–6, 2016
This biannual lifestyle show at the Paris-Nord Villepinte Convention Centre will highlight the offerings of more than 3,000 brands in decoration, design, furniture, accessories, textiles, fragrances, and tableware for luxury retail, interior design, and architecture. For more information, visit maison-objet.com.

Post-Brexit: Creating the Future
London
September 7, 2016
Post-Brexit: Creating the Future, which aims to stimulate discussion about how a new era in British creativity can be started post-Brexit, is hosted by the design and planning coalition New Narratives. The event will feature a series of short talks by architects, designers, and artists, followed by an open discussion in which all attendees will be encouraged to participate. Speakers at the event include Patrik Schumacher, director of Zaha Hadid Architects; John McRae of Orms; and art advisor Manick Govinda. Visit newnarratives.co.uk.

London Design Festival 2016
London
September 17–25, 2016
First staged in 2003, the London Design Festival has since become one of the world’s largest conferences for design of all kinds, ranging from interiors to that of the city. This year’s festival, oriented around the theme “design is in the detail,” will feature experiments such as a wide wooden structure by Allison Brooks Architects called The Smile, an installation about contemporary urban living presented by MINI, and numerous partnership events, networking opportunities, and panels on trends in engineering and design. For more information, visit londondesignfestival.com.

Cersaie
Bologna, Italy
September 26–30, 2016
The annual international exhibition of ceramic tile and bathroom furnishings, held at the Bologna Exhibition Center, will feature Lord
Fire and Nice.

Norman Foster, who will give the keynote address on Tuesday, September 27. The trade show will highlight the latest architectural and interiors products and innovations of more than 900 exhibitors from nearly 35 countries, and include additional materials such as marble, natural stone, and wood. Visit cersaie.it.

Archtober 2016
New York City
October 1–31, 2016
Archtober is New York City’s Architecture and Design Month, the sixth annual festival of architecture activities, programs, and exhibitions taking place during the month of October. It presents special tours, lectures, films, and exhibitions that focus on the importance of architecture and design in everyday life. The many participating organizations aim to raise awareness of the important role of design in New York and to build a lasting civic and international recognition of the richness of its built environment. For more information, visit archtober.org

International Bauhaus Colloquium
Weimar, Germany
October 26–29, 2016
The 13th International Bauhaus Colloquium at the Bauhaus-Universität Weimar is titled Dust and Data. It will reflect on the near century-long history of the Bauhaus at its original sites in Germany—Weimar, Dessau, and Berlin—as well as the history of its international reception. Just as in the Bauhaus and post-Bauhaus years, architecture is again entangled in geopolitical transformations on a global stage. The conference, through the lens of architectural history and methods, will address contemporary political transformations including migration, climate change, and violent conflict. Visit bauhauskolloquium.de.

Women in Architecture Forum & Awards
New York City
November 2, 2016
Record will present the magazine’s third annual awards program to recognize and promote women’s design leadership. The afternoon symposium will be followed by a reception honoring this year’s award winners in five categories: design leader, new-generation leader, innovator, activist, and educator or mentor. Visit arwomeninarchitecture.com.

Architectural Record Innovation Conference East
New York City
November 3, 2016
Join RECORD for a single-day conference on architecture and making in the post-digital age. Innovation East (the East Coast counterpart to the summer’s conference in San Francisco) will bring together imaginative and forward-looking figures to exchange ideas about the built world of today and the future. Speakers and participants will range from architects practicing outside the discipline to principals of large firms, and from materials experts to graphic designers. Attendees will leave the conference inspired by brave and original approaches to some of the most relevant problems in the industry. For more information, visit ariceast.com.

NeoCon East
Philadelphia
November 9–10, 2016
NeoCon East, a design expo and conference for commercial interiors on the East Coast, will return to Philadelphia for its 14th edition. This year’s NeoCon East will feature partnerships with a host of regional design organizations, as well as current products and services—ready to specify—across a spectrum of vertical markets. Visit neoconeast.com

World Architecture Festival 2016
Berlin
November 16–18, 2016
This year’s World Architecture Festival, in addition to awarding prizes for building projects both completed and proposed, will include a robust roster of seminar speakers—including Richard Rogers and Moshe Safdie—who will touch on large-scale topics relating to housing: housing in dense cities, housing for refugees, housing and luxury, housing and energy efficiency, and more. There will also be panels focused specifically on the revitalization of post-Wall Berlin and architecture tours of the area running on all three days of the festival. Additionally, there will be on-site “live crits,” where architects and designers can receive feedback on their project ideas in real time. Visit worldarchitecturefestival.com.

Competitions

AIANY COTE Awards 2016
Submission deadline: September 16, 2016
Established in 2014 by the New York chapter of the AIA’s Committee on the Environment, this awards program recognizes results-oriented projects that are socially and environmentally responsible, promote sustainable design in the urban context, and reveal the process behind innovation. Visit aianycoteawards.org.

Death & the City: Tokyo Vertical Cemetery
Registration deadline: September 23, 2016
In the Shinjuku district of Tokyo, architectural research group arch out loud challenges design-
ers to develop proposals for a vertical cemetery that explores the relationship between life and death within the city. Examining this condition can afford designers the opportunity not just to efficiently respond to the issue of space but also to look into the cultural identity that this program can project. For more information, visit archoutloud.com.

**Fentress Challenge: Airport of the Future**
*Submission deadline: October 1, 2016*

Students who enter this contest, sponsored and judged by Fentress Architects, must submit a design for the airport terminal of the future, specifically one that responds to present-day issues and dynamics in airport design and air travel. Designs ought to be flexible and consider security while also responding to long-term trends like globalization and urbanization. A traveler’s curbside-to-airside experience is also a major consideration. Winners will receive cash prizes and a paid fellowship, as well as international exposure. Visit fentressarchitects.com.

**Architecture at Zero 2016**
*Registration deadline: October 28, 2016*

The competition challenge is to create a net zero energy student housing project at the San Francisco State University campus. The competition has two components. First, entrants will create an overall site plan to accommodate the 784 housing units, student services, dining center, child-care facility, and parking, detailed in the Challenge Program. Second, entrants will design one building, in detail, to indicate net zero energy performance. The competition is open to students, architects, landscape architects, urban planners, engineers, and designers anywhere in the world. Up to $25,000 will be awarded to student and professional winners. Visit architectureatzero.com

**Laka Competition ’16: Architecture that Reacts**
*Submission deadline: November 1, 2016*

The architecture organization Laka invites designers from around the world to submit ideas for architecture that can dynamically respond to current needs and circumstances, focusing on designs that are socially engaged and capable of reacting to unpredictable conditions and environmental, natural, and social risks. Proposals should constitute an ideological interpretation of modern technological solutions, taking into consideration social and economic determinants. They should promote social revitalization and increased safety and freedom for their users. For more information, visit lakareacts.com.

**eVolo 2017 Skyscraper Competition**
*Registration deadline: January 24, 2017*

Established in 2006, the annual Skyscraper Competition recognizes outstanding ideas that redefine skyscraper design through the implementation of novel technologies, materials, programs, aesthetics, and spatial organizations along with studies on globalization, flexibility, adaptability, and the digital revolution. The competition is an investigation of public and private space and the role of the individual and the collective in the creation of a dynamic and adaptive vertical community. There are no restrictions in regard to site, program, or size. For more information, visit evolo.us.

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

The University Of Kansas Department of Architecture invites applications for Studio 804, a comprehensive one-year, fully hands-on design-build experience for students who are at an advanced stage in their studies and committed to the continued research and development of affordable, sustainable and inventive building solutions. Students enrolled in Studio 804 work full time to design and build a new building every year. The widely-published program, under the direction of Distinguished Professor Dan Rockhill, has produced nine LEED Platinum buildings, three of which are Passive House-certified. To learn more, visit studio804.com and architecture.ku.edu/studio804. We accept transfers, 4+2 grads, B.Arch grads, M.Arch grads, or professionals — anyone who wants to be a better architect by having had the experience of designing and constructing a sophisticated building in its entirety from the ground up.
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Ornamental Metal Institute of New York
Steel Institute of New York
RISING ABOVE a gritty swath of rail lines leading to and from the Porta Garibaldi Station in Milan, an eye-catching urban landmark has made another comeback from a state of disrepair. Studio Original Designers 6R5 Network, an almost 50-year-old local firm, joined forces with five partner companies, as well as the city council and Italian railway authorities, to restore vibrant tilework to the hourglass-shaped Torre Arcobaleno. The firm first revitalized the water tower in 1990, when Milan hosted the 14th FIFA World Cup, by adding colorful tile. It was an “old, worn, and ugly industrial artifact,” says executive associate Francesco Roggero, originally made of plain concrete and dating back to 1964. “We turned it into a point of reference, a vivid element in the hectic and active community of Milan,” says Roggero. Returning to the project 25 years later, in time for Expo 2015, the studio and its collaborators cleaned, replaced, or repaired all of the Rainbow Tower’s 11,000-square-foot surface. At 115 feet tall, the structure is covered in some 100,000 4-inch-square ceramic tiles in 14 colors, creating a pattern, says the firm, that “fits in with the new, feverish activity of the area.” —Miriam Sitz
Round design, Surround cool

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