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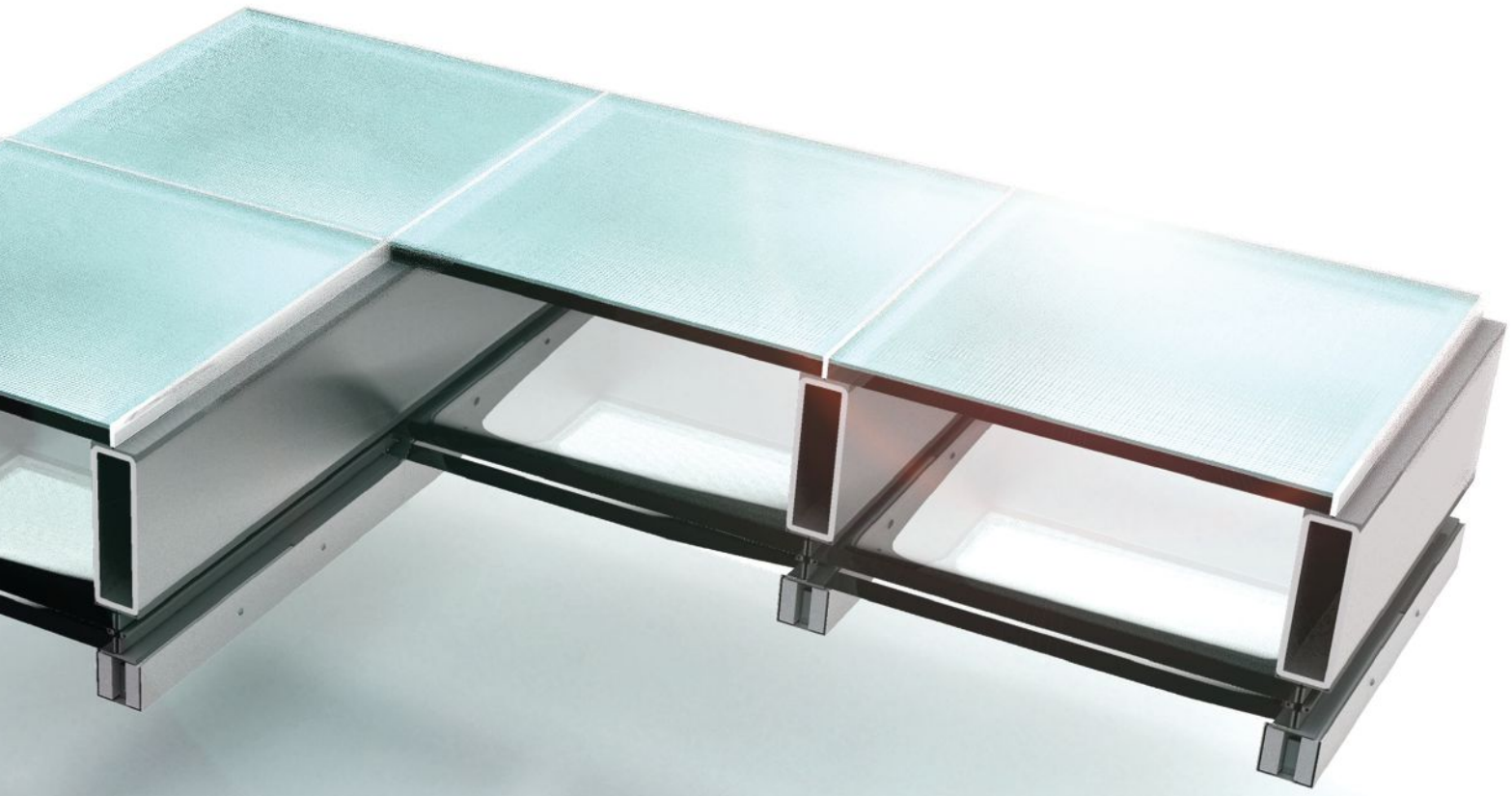

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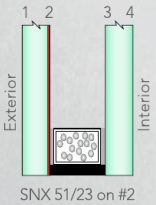

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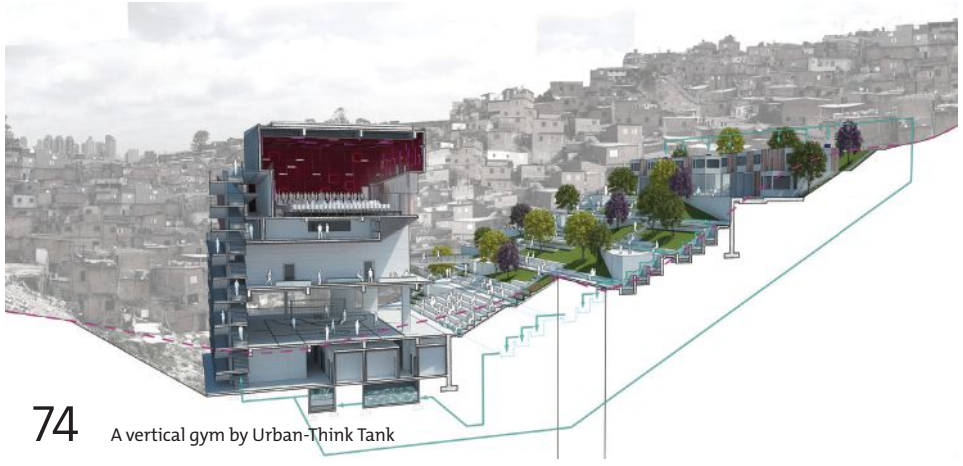

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STAR TRACK

From Las Vegas's star-studded cast of gaming resorts to New York landmark **Yonkers Raceway**, casinos are becoming synonymous with innovative design. This historic 1890s racetrack bet its future on a 21st-century overhaul of its **Empire City Casino** by New York-based **Studio V Architecture**. With a philosophy of exploring architectural expression based on contemporary technology, the award-winning firm capped its redesign with a space-age *porte-cochère* of steel latticework clad with ETFE Teflon-coated film. The innovative entrance stunningly reinvents the casino's image and marks the first U.S. application of this cutting-edge material—showing a building need not be conventional to be a good bet.

Architect: Studio V Architecture

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ETHICS, GEOPOLITICS, AND ARCHITECTURE

SHOULD ARCHITECTS BE HELD ACCOUNTABLE FOR THE POLITICS OF THEIR CLIENTS OR THEIR COUNTRY? THE ROYAL INSTITUTE OF BRITISH ARCHITECTS SEEMS TO THINK SO.

THE POLITICS OF PLACE-MAKING ARE AN IMPORTANT CONSIDERATION WITH EVERY PROJECT, EVEN WHEN THEY'RE NOT SELF-EVIDENT.

I DON'T THINK of architecture as an especially political discipline. Sure, there are the (typically quiet) politics of place-making, which are an important consideration with every project, even where they're not self-evident. Every building embodies some point of view or other, often deriving from the economics of its development or the power-base of its owner. Consider the differences between, say, a corporate high-rise and an urban nonprofit SRO.

But architecture usually doesn't play much of a role on the grand stages of legislation and diplomacy, other than as a dramatic backdrop or as the occasional political football, à la the Eisenhower Memorial.

So a recent flurry of news stories involving the Royal Institute of British Architects (RIBA), the Israeli Association of United Architects, the International Union of Architects (UIA), and Israeli settlements in occupied Palestinian territory came as a big surprise. In March, RIBA's governing body, RIBA Council, passed the following motion:

> Since the Israeli Association of United Architects (IAUA) has paid no regard to the UIA Resolution 13 of 2005 and 2009, the RIBA calls on the UIA, as the international guardian of professional and ethical standards in our profession, to suspend the membership of the Israeli Association of United Architects, until it acts to resist these illegal projects, and observes international law, and the UIA Accords and Resolution 13.

And just what is the UIA Resolution 13? It "condemns development projects and the construction of buildings on land that has been ethnically purified or illegally appropriated, and projects based on regulations that are ethnically or culturally discriminatory, and similarly it condemns all action contravening the fourth Geneva Convention."

In other words, the U.K.'s architecture association called on the profession's international parent organization to discipline its counterpart in Israel. Why? Because a voting majority on RIBA Council opposes the settlements—"these illegal projects"—and wants to hold Israeli architects accountable.

Talk about a hot-button issue. The settlements have been condemned by the U.S. government and the United Nations as a major obstacle to peace between Israel and the Palestinians. RIBA's motion comes on top of U.S. Secretary of State John Kerry's recent statement (which he subsequently walked back) that Israel risks becoming an "apartheid state" if it fails to develop a two-state solution with the Palestinians. And the motion has provoked protests from Daniel Libeskind, AIA, Richard Meier, FAIA, and other notables in the U.S.

Far greater minds than mine have tried and failed to make sense of the Israeli–Palestinian conflict. I'll spare you my opinion on the matter. But I will offer a thought on the RIBA motion itself, drawn straight from the Golden Rule and the Sermon on the Mount: "Judge not, that ye be not judged."

Regardless of one's position on the occupied territories, it is plainly unfair to hold the entire architecture community in Israel accountable for the settlements, because not every architect in the country has been involved in their design and construction. Moreover, some must disagree with the underlying policy.

Did the IAUA move to suspend RIBA when Zaha Hadid, Hon. FAIA, agreed to design the Heydar Aliyev Center in Baku, Azerbaijan? After all, her client was Ilham Aliyev, who succeeded his father Heydar as president of the oil-rich country—a country that watchdog Amnesty International describes as "plagued by endemic corruption" and *Washington Post* editorial page calls "authoritarian."

Individuals and groups of individuals make bad choices, but that's no reason to condemn an entire community.

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FRONT

LOST IN THE WOODS

Lebbeus Woods was one of the most influential architects who never built. His renderings verge on science fiction, a strange vantage point from which he critiqued even stranger realities of war, environmental disaster, and political strife. "Lebbeus Woods, Architect" is on view at The Drawing Center in New York through June 15.

¡BIENVENIDO A MIAMI!

ZAHA HADID'S FIRST SKYSCRAPER IN THE U.S. IS A BREAKTHROUGH IN HIGH-END, HIGH-RISE DESIGN.

FOR AN ARCHITECT who occupies a Z-dimension all her own, Zaha Hadid, Hon. FAIA, has seldom constructed high along that Z axis. She has built many multilevel and mid-rise institutional buildings, but very few towers. That is about to change.

This June, developers break ground on One Thousand Museum, a super-luxury condominium tower on Biscayne Boulevard in Miami, with views across Biscayne Bay to Miami Beach.

The project is no less Zaha at this unprecedented scale. A concrete exoskeleton structures the perimeter of the tower in a web of lines that integrates lateral bracing within the structural support.

With structure at the perimeter, the interior floor plates are almost column-free, allowing maximum variation in floor plans. The curving lines of the exoskeleton mean that each succeeding floor plan is slightly different from the last. On the lower floors, terraces occupy the corners; on the upper floors, the terraces are tucked in from the edges.

A duplex penthouse occupies the top two residential floors. The ultimate floor features an aquatic center, leisure area, and event space. There is commercial space at the base, along with several levels of parking. At grade, the tower is ringed by pools and gardens.

Zaha Hadid Architects project director Chris Lepine says that the structure—which appears as if it were eroded from a solid—reads from top to bottom as one continuous liquid frame. The tower represents a line of research in high-rise construction that explores a fluid architectural expression consistent with engineering for the entire height of the structure.

The dynamism of the structure is expressed in an integrated whole that avoids the frequent typology of a tower resting on a base. "We had this idea of a fluidity that is both structural and architectural," Lepine says.

Instead of simply cladding a steel frame, the architects have designed expressive formwork, which can be reused as construction progresses up the tower. The concrete will be painted so that its finished surface is also the architectural finish.

"A lot of innovation comes in how we build the formwork," Lepine says.

Hadid started One Thousand Museum after being commissioned to design Collins Park Garage, a parking garage and public plaza now also in working drawings. So, there will soon be two notable Hadid structures in Miami as Hadid finally breaks into large-scale construction in the United States. JOSEPH GIOVANNINI

One Thousand Museum is a 62-story, 83-unit tower and Hadid's second major project in Miami.

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Q+A: ROSA SHENG

THE CHAIRPERSON OF THE MISSING 32% PROJECT WANTS TO KNOW WHY WOMEN COMPRISE HALF OF THE NUMBER OF ARCHITECTURE SCHOOL GRADUATES, BUT NOT HALF OF THE NUMBER OF LICENSED ARCHITECTS.

For the full Q+A, visit *architectmagazine.com*

IT'S NO SECRET that men outnumber women in the design profession, and even more so in senior leadership roles. But where did the women architecture students go? This winter, the Missing 32% Project, an organization with roots in AIA San Francisco, asked why architecture firms are largely headed by men and what firms can do to promote equity. Nearly 2,300 people—60 percent women, 40 percent men—responded to the online survey. Results are due out this summer. Chairperson Rosa Sheng, AIA, a senior associate in Bohlin Cywinski Jackson's San Francisco office, spoke with ARCHITECT on the challenges women face in the profession.

32%

MORE SYMBOLIC THAN STATISTICALLY ACCURATE, THE DIFFERENCE IN THE PERCENTAGES OF WOMEN ARCHITECTURE STUDENTS AND WOMEN WHO ARE LICENSED ARCHITECTS.

SOURCE: THE MISSING 32% PROJECT

What are the survey's goals?
The survey is trying to figure out where choke points occur in the progression of one's career path as an architect—mainly for women, but for men as well. One of them is licensure, which I think is kind of a non-factor ... but when you couple that with the biological clock, and people begin having families, [it's easy to get] distracted. Many firms require that you get licensed in order to advance, which makes sense for liability reasons.

What are other choke points?
Once you do get licensed, there's a certain expectation [that you will steadily advance] to a titled position, such as a director, associate, or project manager. There's potential for disenchantment if you see your male cohorts being supported and promoted more. Naturally, there are more men in the field, and men gravitate towards men as far as mentorship, [whereas] there are fewer women role models to begin with.

What other challenges do women in architecture face?
Women in architecture are expected to convey confidence and command respect, in an assertive way. However, if you're perceived as too nice or eager to please everyone, you're viewed as incompetent. But if you're too aggressive in trying to get your point across, you're seen as difficult to work with. Through the years, I've had to learn the political dance of knowing when and how to say the things that you want to get done. When you focus on the goals that support the common good, it's easier to rally people than if you appear like you are speaking just for yourself.

Do your male peers put the same pressure on themselves?
It depends. Everybody that works at our firm works really hard, but when push comes to shove, it's the whole primary caregiver question. It's usually the mother [who has to leave to take care of the kids]. In architecture, there is a stereotype that you have to stay late and work really hard. We're basically underselling ourselves when we're giving our services away for free by working those late hours.

What is the gender pay gap in architecture?
We don't know yet, but we will be investigating this during our survey analysis.

Should coworkers discuss their pay?
Equity in pay and the Paycheck Fairness Act is one way to go about equity in compensation. Firms can support pay equity by providing transparent criteria for determining raises and promotions. Women can acquire negotiation skills, be clear and assertive about their expectations for compensation, and complement it with research about a comparable salary for a person in the same position, performing similar tasks. WANDA LAU

JOHN LEE

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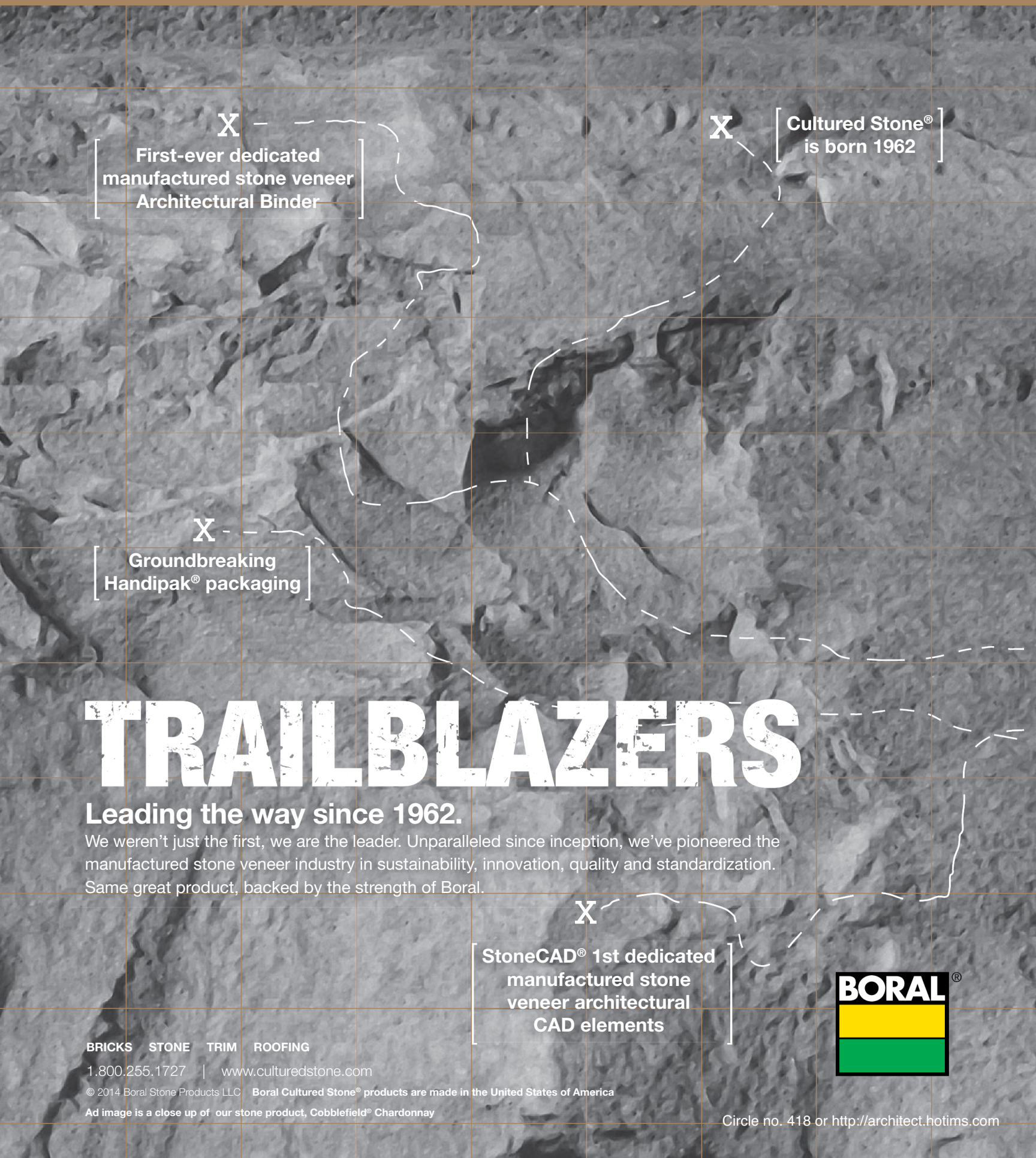

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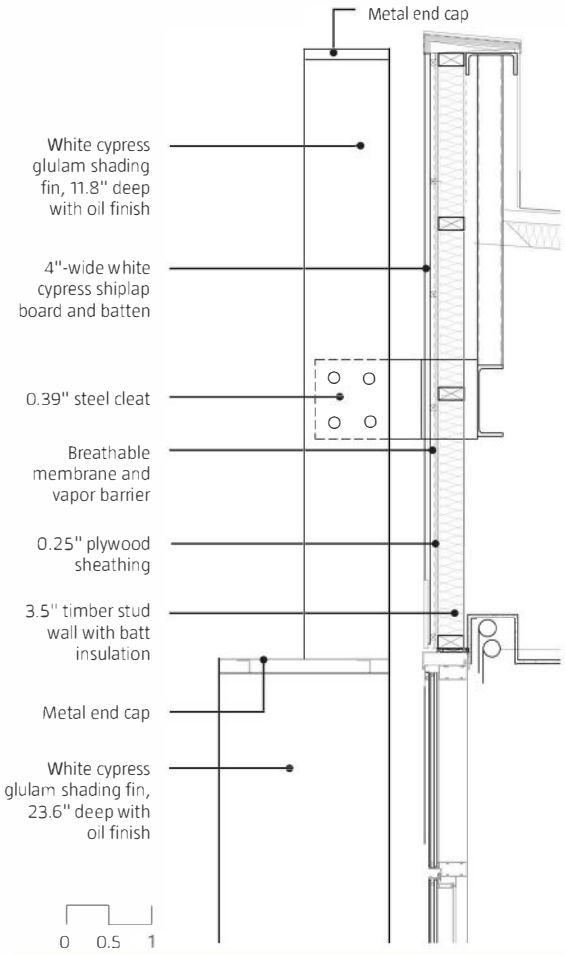

DETAIL:
NEXUS WALLAN GP SUPERCLINIC

BOLD, ORIGINAL, and non-institutional were the objectives behind the Billard Leece Partnership's design of the 17,200-square-foot Nexus Wallan GP SuperClinic in Australia's Wallan township.

For the clinic's raked glue-laminated (glulam) timber fins and cladding, the Melbourne-based firm selected white cypress, a native species favored for its durability and natural resistance to pests.

Australia's building codes mandate that 80 percent of a structure's north, south, and east façades are shaded at the height of solar exposure. The fins' dimensions were tweaked to maximize shading and minimize heat-load. Final lengths range from 20 feet to 31 feet; depths vary between 11.8 inches and 23.6 inches.

"At the end of the day," says project architect Daniel Rafter, "we were able to exceed the requirements by working with the achievable depths available in the glue-laminated products." LOGAN WARD

Learn more about the Billard Leece Partnership's design and specifications for the wood cladding and diagonal fins at *architectmagazine.com*.
The Detail series of innovative material-assembly solutions is proudly supported by reThink Wood.

BATTERSEA STATION POWERS UP

Utility plants around the world are an increasingly attractive target for developers: Not only are several of these buildings Art Deco landmarks, most of them occupy valuable urban waterfront property. The most visible of these adaptive-reuse projects is London's Battersea Power Station, a decommissioned coal-burning plant on the Thames. Gehry Partners and Foster + Partners are teaming up to design residential and retail aspects of the project. Five mixed-use buildings (including one so-called Flower building) designed by Gehry Partners will frame one side of a new promenade, whereas Foster + Partners will design a single building called The Skyline for the other side of the street.

CONTINUING EDUCATION

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Not only does this Organized Living–sponsored course teach you how to build high-quality storage systems for clients, it also covers how Americans with Disabilities Act requirements and universal design concepts affect storage-system design. *(1 AIA)*

WAREHOUSE STRONG, BALLROOM PRETTY

The Elite Crete Systems course on resinous flooring systems has architects covered. *(1 AIA)*

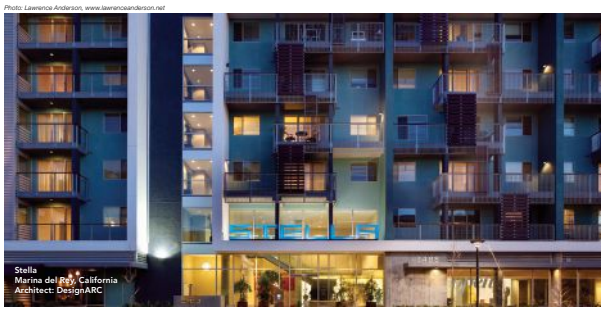
THE GREAT OFFICE AWAKENING

This course by Waldmann Lighting explains how architects can use light and space to contribute to workers' well-being in the form of flexible workstation-centric lighting. *(1 AIA/HSW)*

TOP: TONY MILLER; BOTTOM

Cross Laminated Timber

Taking wood buildings to the next level



Multi-Story Wood Construction

A cost-effective and sustainable solution for today's changing housing market

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MATERIALS MATTER (3 part series)

Measuring the environmental footprint of wood, concrete and steel is a big factor in designing sustainable buildings.

FIRE PROTECTION IN WOOD BUILDINGS

Wood buildings can be designed to meet rigorous standards for performance, which is why the International Building Code (IBC) allows the use of wood in a wide range of building types—including structures that are taller and have more area than some designers realize.

CROSS LAMINATED TIMBER

Review the advantages of cross laminated timber over other building materials in terms of speed and efficiency of construction, design flexibility, environmental performance and other factors.

DESIGN IS IN THE DETAILS

This course outlines the informed design, specification, detailing, and quality control during construction, installation, and maintenance that are collectively key to achieving maximum durability in today's wood construction.

MULTI-STORY WOOD CONSTRUCTION

Cost-effective, code-compliant and sustainable, mid-rise wood construction is gaining the attention of design professionals nationwide, who see it as a way to achieve higher density housing at lower cost—while reducing the carbon footprint of their projects.

WOOD SCORES A+ FOR SCHOOLS & STUDENT HOUSING

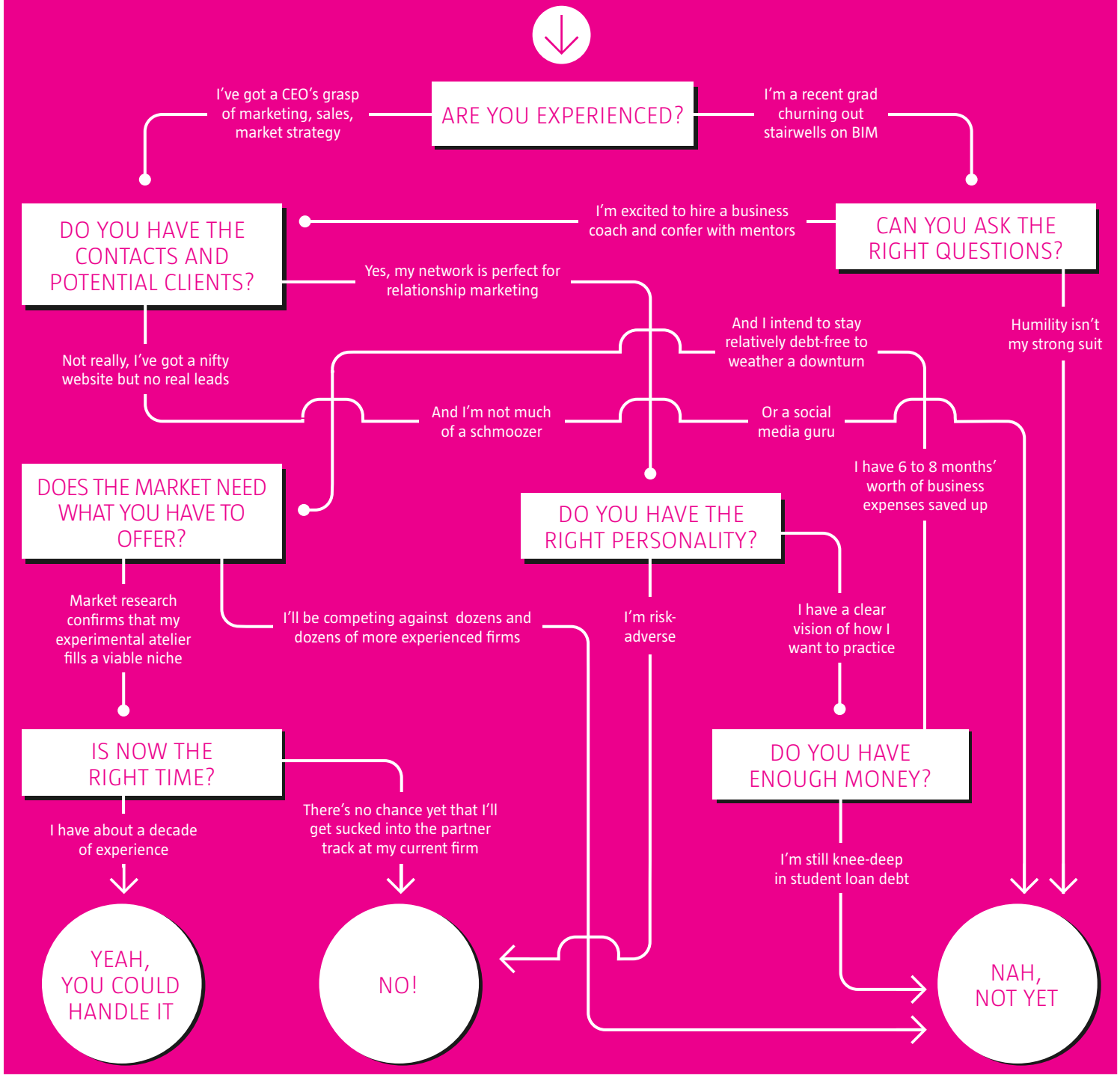
Many designers have turned to wood-frame construction because it typically costs less while meeting all code and safety requirements—and because it offers advantages such as speed of construction, design versatility, and a light carbon footprint.

Visit **www.rethinkwood.com/education** to view all CEUs.

reTHINK WOOD

UP AND RUNNING:
SHOULD I START MY OWN ARCHITECTURE FIRM?

A career in architecture can have many trajectories, but one common arc is starting your own practice. As an aspiration, it seems reasonably straightforward. But realistically, there are many practical and ideological questions to ask before hanging out your shingle. Here's a guide to making the big call. NATE BERG



For more Up and Running, a new monthly series on starting your own firm, visit *architectmagazine.com*.

ARCHITECT

A 50

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Which architecture firms are outclassing their peers in quality of work? Are the biggest firms always the biggest achievers? Who's really at the forefront of sustainable design? Our list will reveal all in the September issue of ARCHITECT magazine.

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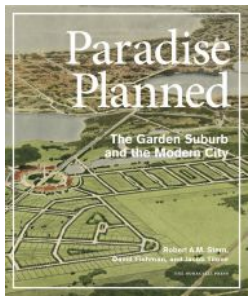
PARADISE GLOSSED



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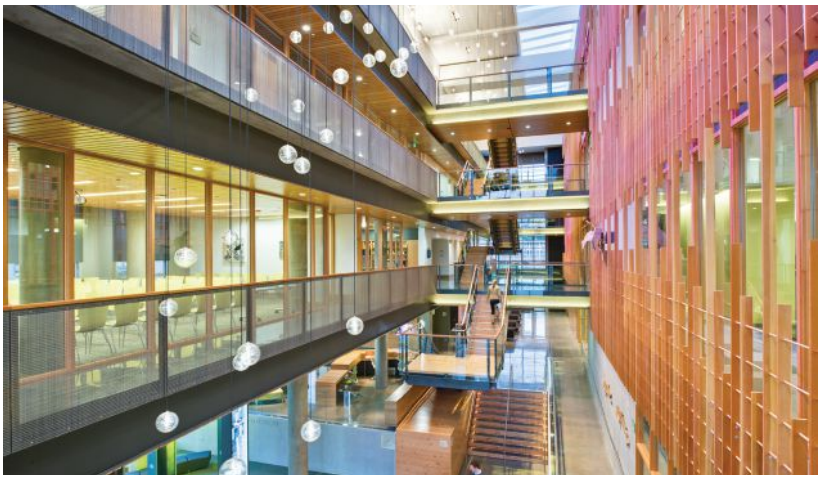
IN THE MID-1700S, British landowners started rebuilding the peasant villages on their estates to make them look less, well, peasant-y. Soon there were new developments outside London that strove for the ideal of nature in the city, *rus in urbe*. Thus was born the garden suburb, lavishly chronicled by David Fishman, Jacob Tilove, and Robert A.M. Stern, FAIA, in their doorstop of a book, *Paradise Planned: The Garden Suburb and the Modern City* (The Monacelli Press, December 2013). The curved, leafy streets and historicist house styles of the garden suburb appeared everywhere: posh enclaves like Shaker Heights, Ohio, and Beverly Hills, Calif., but also working-class Queens, N.Y. Stern & Co.'s contention, writ large over more than 1,000 pages: Between big-lot subdivisions and dense towers of condos, there's an appealing third way, and it can be found in our past. AMANDA KOLSON HURLEY



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Recent Work: Ford Alumni Center, Eugene, Ore. (top right); John J. Hemmingson University Center, Spokane, Wash. (right)

CHRIS SCHNEIDER

Every month we dedicate this space to work that architects have uploaded to our online Project Gallery. Publish yourself at *architectmagazine.com/projects.*

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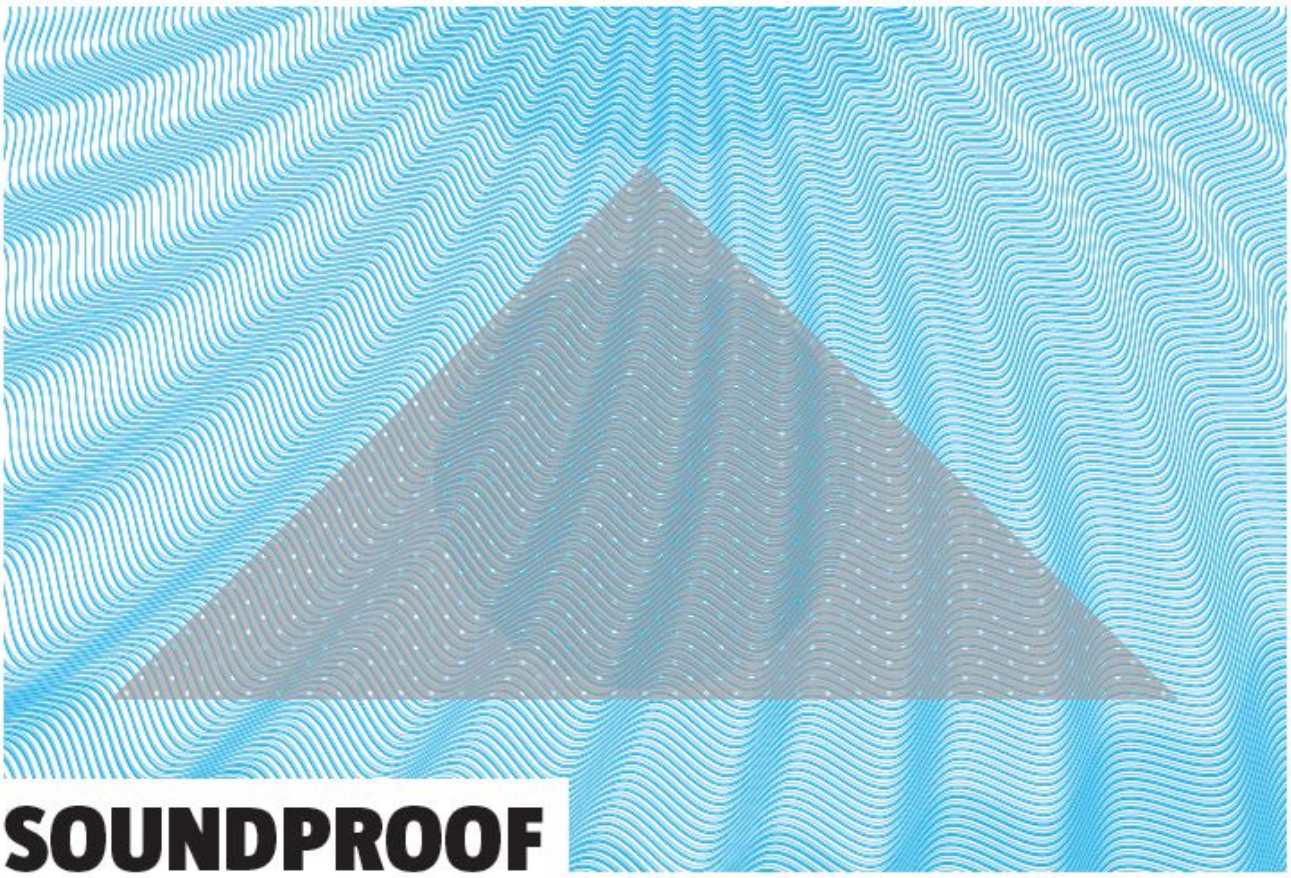

SOUNDPROOF

RESEARCHERS AT DUKE UNIVERSITY CAN MAKE AN OBJECT INVISIBLE TO SOUND WAVES BY USING PERFORATED PLASTIC SHEETS AND AIR.

WANT TO ERASE those sound-muddling columns? Researchers at Duke University hear you. Working with metamaterials—substances that are engineered to possess properties not found in nature—they developed a way to keep sound flowing through inanimate objects. The team reported earlier this year that it was able to "hide" a small sphere from sound waves by rerouting them over the object by concealing it within a pyramid-shaped stack of perforated plastic plates. The result? The sphere (and plates) behaved like a flat, horizontal surface.

"It's interesting and a little bit surprising that one relatively simple structure can hide any object as long as it fits [under the plastic] in the space provided," says Steven Cummer, one of the research's three authors and a professor of electrical and computer engineering at Duke.

Here's how it works: The structure needs to slow sound waves that are moving perpendicular to the plates but not those travelling parallel to them. That's because the sound waves travel a shorter distance by not passing through the pyramid. Instead, they run into a 1.6mm-thick sheet of plastic that lines the pyramid's core, shielding the object and reflecting the waves.

To make that reflection appear as if it happened off of a flat surface rather than the plastic shield, 1.7mm-diameter holes in each plate slow the perpendicular waves while the air gaps between the stacked plates allow the parallel waves to move at virtually the same speed as they would if unobstructed. The plastic structure appears to the sound waves almost like air but with a higher density due to the perforations that ultimately slow them down, Cummer says. That causes the waves to emerge from the structure at the same time as if they had reflected off of a flat surface.

The technology is versatile. The plates could be made out of any rigid solid, such as metal or foam. And because the sound waves can't penetrate the pyramid's interior cavity, the shrouded object's dimensions are irrelevant, as is the sound-wave distribution with which it is being hit.

In architecture, the research could one day lead to products that help mitigate acoustic disruptions in auditoriums caused by structural beams and columns. However, the team is keeping an open mind. "We're not aiming at any particular application but simply showing the kinds of interesting tricks that can be done," Cummer says. **HALLIE BUSTA**

"IT'S INTERESTING AND A LITTLE BIT SURPRISING THAT ONE RELATIVELY SIMPLE STRUCTURE CAN HIDE ANY OBJECT [FROM SOUND WAVES] AS LONG AS IT FITS IN THE SPACE PROVIDED."

—STEVEN CUMMER, PROFESSOR OF ELECTRICAL AND COMPUTER ENGINEERING

STUART DAY

March 2014

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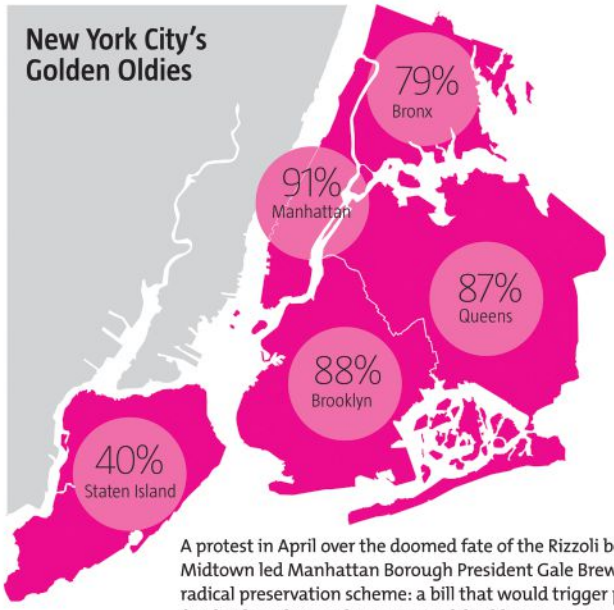
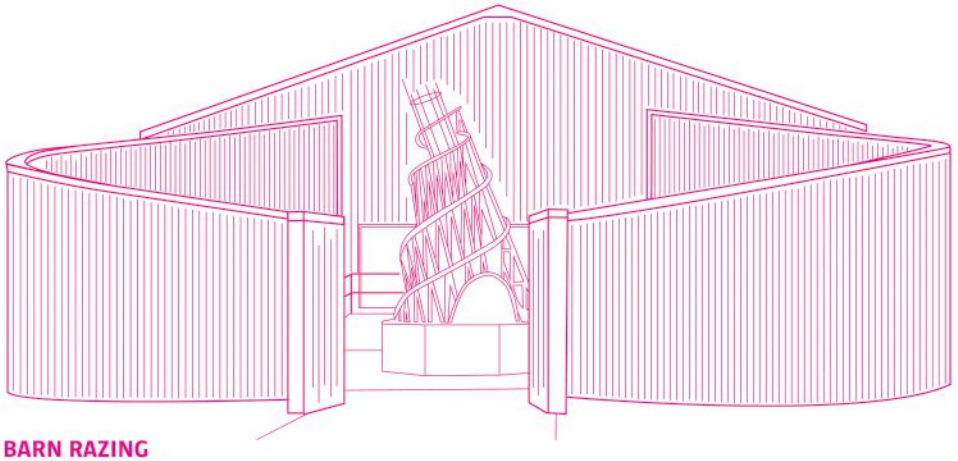
New York City's Golden Oldies



SOURCE: NYC DEPARTMENT OF FINANCE

A protest in April over the doomed fate of the Rizzoli bookstore in Midtown led Manhattan Borough President Gale Brewer to propose a radical preservation scheme: a bill that would trigger preservation review for the demolition of any New York building over 50 years old. City data compiled by *Crain's New York Business* show that the rule, if passed into law, would cover 80 percent of all New York buildings.

ADP NATIONAL JOB GROWTH IN THOUSANDS



BARN RAZING

Citing "prohibitive" restoration and maintenance costs, Rice University in Houston tore down the campus's Martel Center, better known as the Art Barn. In 1969, at the request of arts patrons John and Dominique de Menil, Howard Barnstone and Eugene Aubry, FAIA, created the moveable structure in 10 weeks to house a temporary exhibition at the Museum of Modern Art before transporting it to Houston. Mark Lamster, architecture critic for *The Dallas Morning News*, called the demolition "an act of obscene vandalism." Rice University plans to plant grass in the Art Barn's place.

March Jobs Report

New construction jobs reported by the U.S. Department of Labor's Bureau of Labor Statistics

9,100	+	3,200	+	6,700	+	5,100	=	**24,100**
Residential Construction		Heavy and Civil Engineering		Nonresidential Construction Jobs		Architectural and Engineering Services		Total Construction Jobs Added

STEP UP

Peter MacKeith, Assoc. AIA
Dean, Fay Jones School of Architecture
The University of Arkansas

MacKeith, a longtime professor of architecture at the Sam Fox School of Design & Visual Arts at Washington University in St. Louis, will lead Arkansas's departments of architecture, landscape architecture, and interior design. He will also head up two Fay Jones outreach components: the University of Arkansas Community Design Center and the Garvan Woodland Gardens.

Gregory Hodkinson
Chairman
Arup

William E. Rushing Jr.
President
American Concrete Institute

Carl Knutson, AIA
Design director and principal, Washington, D.C.
Perkins+Will

Lynn Richards
President and CEO
Congress for the New Urbanism

Richards comes to the organization from the U.S. Environmental Protection Agency's Office of Sustainable Communities, where she served as policy director. Prior to that, she worked with environmental groups in former Soviet republics to increase their political effectiveness and served as a 2012 Loeb Fellow.

STEP DOWN

Tania Salgado, AIA
Principal
RNL

Tom Wuertz, AIA
Principal
RNL

Ron Izzo, AIA
Associate principal
RNL

Three higher-ups at RNL left the firm to launch their own venture, Handprint Architecture, late in April. While Handprint will also serve Denver and the Rocky Mountain West region, its three founders mean to bring an intimate approach to their work on commercial, civic, and higher-education projects. The trio boasts more than 50 years of experience between them, including such notable projects as Denver's Spire tower and several buildings for Metropolitan State University of Denver.

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AIAVOICES

THINKING SYSTEMICALLY | ENERGY'S FIRST DEAN

Harrison Fraker, Assoc. AIA, is the 2014 Topaz Medallion recipient, an award administered jointly by the AIA and the ACSA for excellence in architectural education. Fraker, who co-founded the Center for Environmental Study at Princeton University in 1972 (now part of the Princeton Environmental Institute), has spent the last 40 years pushing architects and students to focus on ecology, energy, and environmental stewardship—first at Princeton Energy Group and Harrison Fraker Architects, and then as dean at the University of Minnesota School of Architecture and the UC Berkeley College of Environmental Design. "Architecture, as urbanism, is a systems challenge," Fraker says. "It's about design, but just as much about design that integrates research."

ARCHITECTURAL EDUCATION HAS THE PRIVILEGE OF COMMUNICATING the core body of knowledge that informs making good buildings. Schools of architecture have an essential teaching responsibility. There are many ways to do that, and there is a constantly evolving set of questions of what pedagogy should include. At the same time, the universities—in which these schools of architecture sit—should be generating new knowledge, questioning assumptions, and acting as incubators for innovation. That is the task of the university. When we do both of those things well, education fulfills its mission for society.

After Rachel Carson's *Silent Spring* [1962], the first Earth Day in 1970, and Barry Commoner's *The Closing Circle* [1971], architecture's environmental impact was still uncertain. Neither architects nor engineers really knew how buildings used energy. Tracking energy flows became a huge need. Our first Center for Environmental Study project was to put 100 sensors in three houses in Twin Rivers, N.J.; to plot how much energy was used in the refrigerator, by lights, for heating, and for cooling; and to judge performance. The key finding? Air filtration is critical to energy performance, which we discovered by finding all of these thermal bypasses from basement to attic. Knowing this, we instrumented 10 more houses. Three underperformed, not because of air filtration but because their windward location on the site increased their air infiltration losses.

Later, in my deanships, partly by luck and partly by instinct, I was able to incorporate my interest in systems, energy, and design into my new responsibilities—everything from the art of fundraising to recruiting and retaining faculty who could both teach core design concepts and effectively engage the city.

Finding a group of like-minded people in the early 1970s was a bit of a challenge, but an alternate club existed—one that focused on the environment. At the very beginning of my career, I taught an introductory course on design process at Princeton that included a two-week module on "the environmental imperative," which centered on the then-old but newly discovered idea that buildings act as environmental filters. The students got it immediately—and understood that the envelope wasn't just a formal thing. It is so gratifying to see now, 40 years later and after so much work by my colleagues and me, that that idea is fundamental to architectural education. *—As told to William Richards* AIA

IT'S ALMOST TIME TO GO!

CHICAIAGO!

AIA Convention 2014: June 26–28, Chicago

To register online visit aia.org/convention

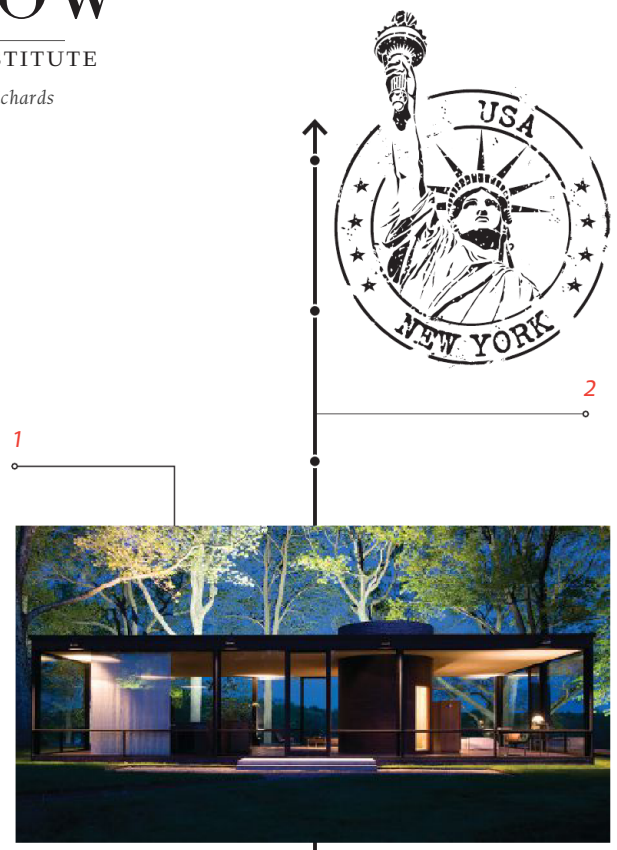
AIANOW

ACROSS THE INSTITUTE

Edited by William Richards

1. In A Fog. Philip Johnson completed his near-lifelong residence, the Glass House in New Canaan, Conn., 65 years ago. But it was never just about one iconic home. His 49-acre property evolved to include more than a dozen other structures that he designed over half a century as well as three existing vernacular buildings that Johnson and his partner, David Whitney, adapted. To visit, then, is to enter a singular work of landscape urbanism that, like any good "city," thrives on the friction between old and new. From May 1 to Nov. 30, the artist Fujiko Nakaya will present "Veil," an engulfing fog that morphs according to the microclimate. It's Nakaya's take on transparency and opacity, sure, but it's also a way to explore environmental causality.

↗ Learn more at *theglasshouse.org.*



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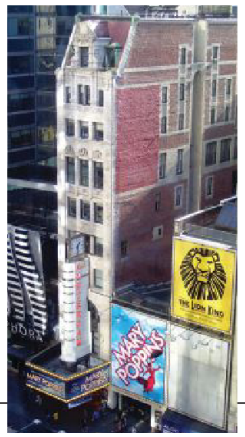

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2 *Big Cities, Big Ideas.* Look, if you're going to call your conference "Big Cities, Big Ideas," you should probably hold it in New York, the biggest U.S. city. Join the AIA Committee on Design, May 15–18, for its annual conference, which will cover the Big Apple's economic and architectural transformation over the last decade. Special attention will be paid to resilience in proposed waterfront development plans and the city's long-term strategies for rising water levels. While you're there, look into the AIA Retail and Entertainment Knowledge Community's special event on May 15 (see below).

↗ Learn more at *aia.org/cod.*

3 *In With the Finns.* Finnish immigration to the United States historically centered on a few cities, none more intensely than Minneapolis. It's fitting, then, that from May 10 through Aug. 17 the Minneapolis Institute of Arts hosts "Finland: Designed Environments," which correlates commercial activities and social rituals with specific design strategies and forms in architecture and planning. In addition to that legacy, the exhibition will focus on objects and projects completed over the last 15 years and highlight Finland's emerging firms, including K2S Architects, Hollmén Reuter Sandman, and Verstas.

↗ Learn more at *artsmia.org.*

4 *Next Chapters.* One of the Bloomberg-era success stories in New York City is the 42nd Street Theater District corridor, which, in a decade's time, architects have transformed from a derelict and depressed economic zone into a vital and vibrant entertainment district and international tourism draw. Join the AIA Retail and Entertainment Knowledge Community for a full report on May 15 at the historic New Amsterdam Theatre, completed in 1903 by Herts & Tallant and restored in 1997 by Hardy Holzman Pfeiffer.

↗ Learn more at *aia.org/rekc.*

5 *Knowing No Bounds.* American architects are perceived in the global marketplace as capable of adding value to projects. And international projects are often ideal vehicles for American architects to drive positive change in developing economies. One of several pre-convention workshops at the 2014 AIA National Convention, "When Change Means Going International," will highlight the cultural and practical transactions that happen all the time across (and beyond) U.S. borders through policy and practice as well as in eight specific international markets.

↗ Join the AIA International Committee on June 25 by registering at *convention.aia.org.*

CHICAIAGO!

AIA Convention 2014: June 26–28, Chicago

5

IMAGE 3: THE GLASS HOUSE AT DAWN, PHOTO: STACY BASS. | IMAGE 4: WIKIMEDIA COMMONS; PHOTO BY BEYOND MY KEN

NOTICE

of AIA Candidates & Convention Business Items

CANDIDATES FOR INSTITUTE OFFICERS

Elections for the Institute's 2015 First Vice President/2016 President-elect, two 2015–2016 Vice Presidents, and 2015–2016 Secretary will be held at the 2014 AIA National Convention and Design Exposition, which will take place June 26–28, 2014, in Chicago. If no candidate for First Vice President or Secretary obtains a majority of the votes cast during the initial round of voting on June 26–27, a run-off election will take place on June 28, 2014. The following members have declared themselves candidates for national office.

2015 First Vice President/2016 President-elect

Don Brown, FAIA
AIA Birmingham

Russell Davidson, FAIA
AIA Westchester+Hudson

Gabriel Durand-Hollis, FAIA
AIA San Antonio

2015–2016 Vice Presidents (two will be elected)

William Bates, AIA
AIA Pittsburgh

Francis M. Pitts, FAIA
AIA Eastern New York

Edward Vance, FAIA
AIA Las Vegas

2015–2016 Secretary

Jerome L. Eben, FAIA
AIA New Jersey

John A. Padilla, AIA
AIA Santa Fe

THE INSTITUTE'S ANNUAL BUSINESS MEETING WILL BEGIN PROMPTLY ON SATURDAY, JUNE 28, AT 8:15 A.M. DELEGATES WHO FAIL TO CLAIM THEIR VOTING KEYPADS AND TO USE THEM TO REGISTER THEIR PRESENCE AT THE START OF THE MEETING WILL NOT BE ABLE TO VOTE AT THE MEETING.

PROPOSED BYLAWS AMENDMENTS

The AIA Board of Directors is sponsoring amendments to the Institute's Bylaws, scheduled for consideration by the delegates at the annual business meeting in Chicago, on June 28, 2014. Bylaws amendments require approval by an affirmative two-thirds majority of the votes cast (or accredited to be cast) by delegates at the meeting, determined in the manner prescribed in Section 9.011 of the Bylaws.

Bylaws Amendment 14-A – Institute Governance
If approved, the amendments would restructure and reduce the size of the Board of Directors and create a Strategic Council.

The Board would remain responsible for the general management of the Institute's affairs. The Strategic Council would advance the profession of architecture by informing the Board and other Institute bodies of important professional issues and opportunities.

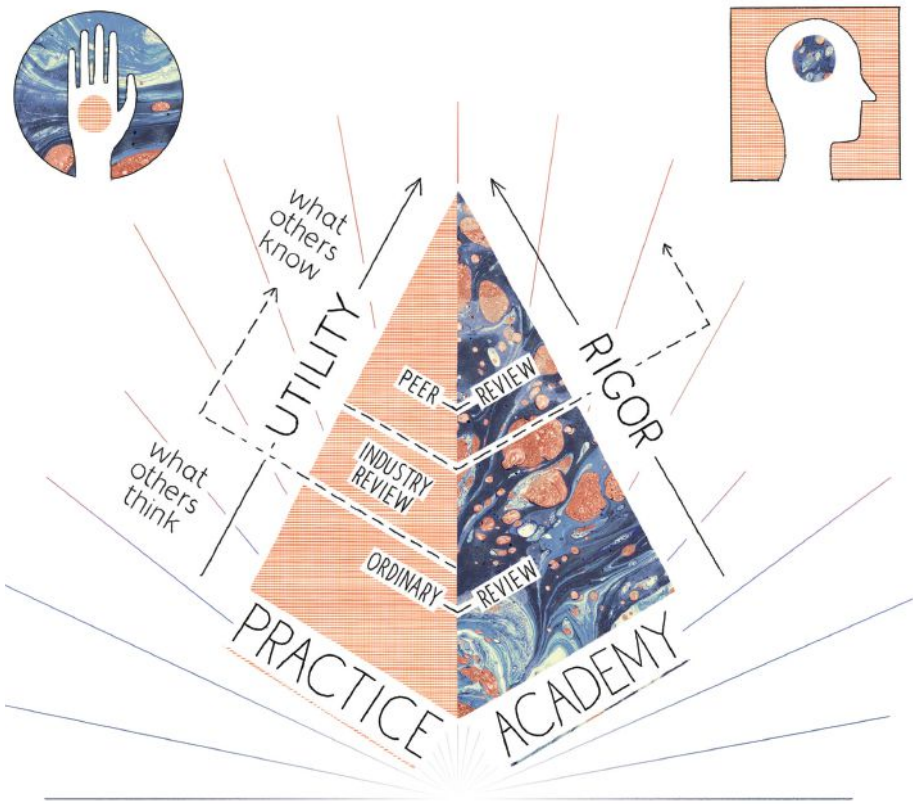
RESOLUTIONS

The delegates at the 2014 AIA National Convention and Design Exposition will also be asked to consider resolutions, which require approval by a majority vote of the delegates present and voting. To view the candidate speeches, visit www.aia.org/speeches. For candidates' statements, and the full text of the proposed Bylaws amendments and resolutions, visit the AIA Convention Web site, www.aia.org/business.

AIAKNOWLEDGE

BRAIN TRUST | RELIABLE RESEARCH IS A BOON FOR ALL

IMAGINE TWO architects talking about the amount of natural light needed in an Alzheimer's clinic and the need for reliable research. How do they know if they can trust the array of data sets and reports in front of them? How can they assess the potential impact of natural light on patients, the kinds of glazing that are available, the thermal effects of that glazing, or any number of other cascading questions?



Not easily, it turns out. Research comes in different forms—and some of it might not even qualify as research at all. The process of verifying research represents one of the most prominent gaps between the practice of architecture and the architectural academy. The two different systems proffer two different ways of confirming what's reliable and what's not.

In the academy, shared knowledge driven by peer review supports a research agenda that an architect or instructor may use to qualify for tenure, create multi-semester studio projects, or simply illustrate a point about weight loads, for instance. In architectural practice, on the other hand, knowledge is a commodity and a utility that drives the enterprise of design and project delivery.

Knowledge—defined here as information that enriches and advances architecture—can and should be produced by different means. But is there a way to standardize the process by which that knowledge is deemed trustworthy, accurate, and therefore useful to academicians and their students as well as to practitioners?

In 2012 and 2013, the AIA held two research summits at which attendees addressed the knowledge gap between the academy and practice. Recognizing that there must be two ways of verifying research and knowledge—because architecture's academy and its practice are necessarily two different worlds—there must also be two hierarchical, multistep processes rendered as two different worlds (and, for the purposes of illustration, as triangles). Both show the steps that must be taken to verify research.

So what's the big problem? Why does practice-based research differ so wildly from academy-based research? It's the added step of "industry review" on the practice side. And industry review is a product of architects publicly sharing their knowledge within the architecture, engineering, and construction (AEC) industry for comment. Research based on this type of peer review is reliable, but practitioners may choose to proceed on the basis of relatively speculative findings. While the findings are applicable, they may not be established within a strict application of scientific method.

All is not lost, though. There's a third triangle that accounts for the one thing both practice-based and academy-based research crave—trustworthiness—and voilà, you have an integrated research pyramid. So how do you evaluate trustworthiness? The CARS methodology (credibility, accuracy, reasonableness, support) comes in handy here:

Credibility
- Author and credentials listed
- Well-edited in terms of grammar and spelling
- Positive well-balanced tone
- Relevance

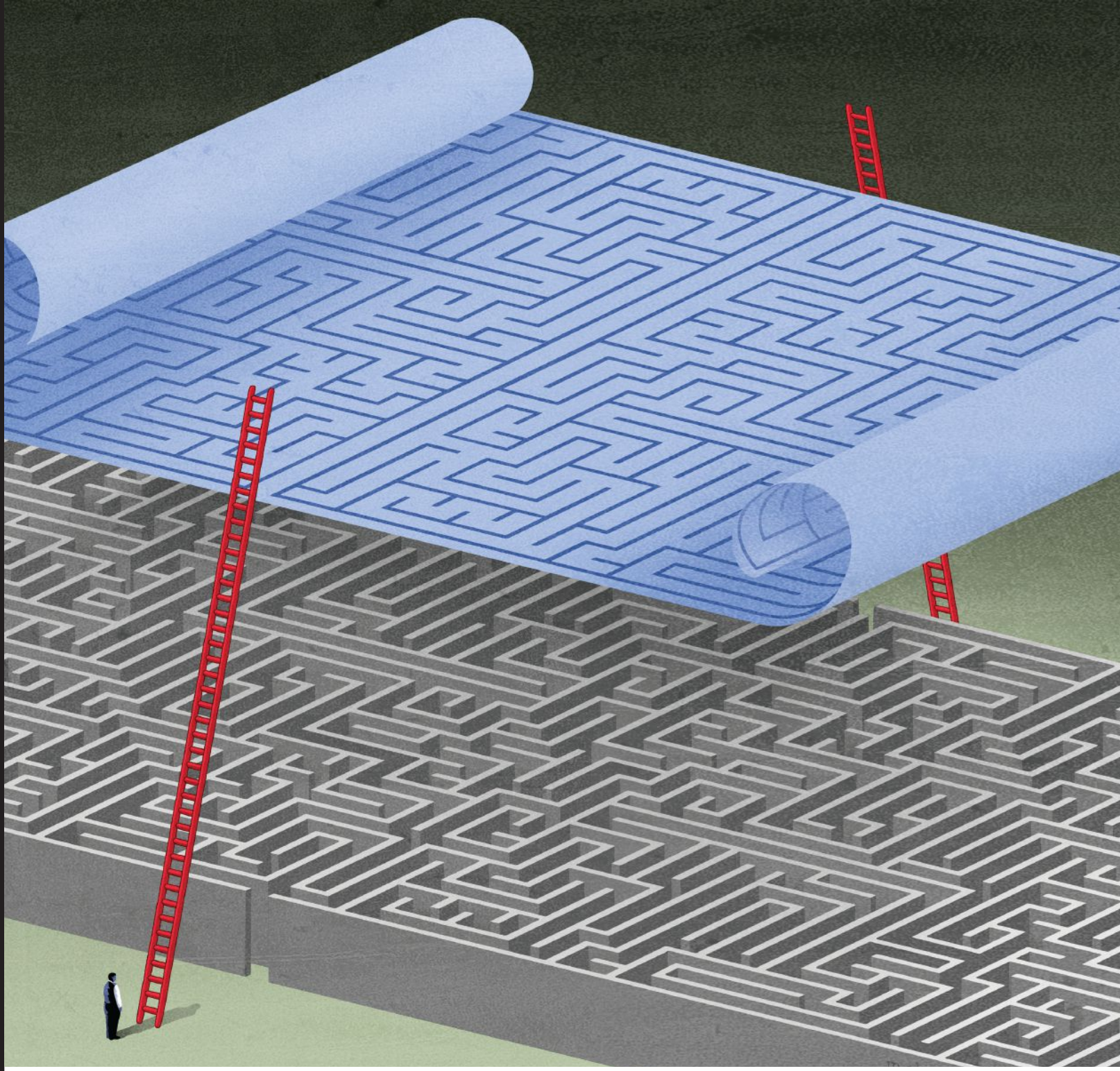
Accuracy
- Date
- Recently published or considered seminal
- Succinct
- Original

Reasonableness
- Tone or language that implies unbiased attitude
- No conflict of interest
- Specific points of fact
- Reliable

Support
- Source for data or statistics provided or referenced
- Documentation provided or referenced
- Corroborating sources listed
- Well-balanced point of view

The research conducted in both practice and academic settings depends on different educational contexts as well as professional experiences. But devotion on the parts of the practicing architect and the academician to determine trustworthiness can maintain the richness that each research environment offers. It can also establish the integrity of knowledge-based research so that architects may pass through the different stages of their careers with a set of universal skills. *—Richard L. Hayes, Ph.D., AIA*

ILLUSTRATION: MICHAEL LIRKHAM



Cultural Shift

Getting licensed may get easier.

ARCHITECTURAL INTERNS TODAY ARE A MOBILE, TECH-SAVVY, AND professionally driven group. They are also confronted with a clunky, obtuse, and often lonely process to become registered architects. Even the National Council of Architectural Registration Boards (NCARB), which oversees the Intern Development Program (IDP), notes on its website that the path to licensure can be "tricky."

Interns use terms like "opaque," "confusing," "time-consuming," and "expensive" when referring to the licensure process. Individual experiences range from situations where interns are matched in study groups (with firm-provided dinners for lengthy evening study sessions) to the polar opposite, in which interns slog through alone with no support, incentive, or encouragement from their employers.

When asked what would be an ideal situation, many emerging professionals point to having both the guidance needed to complete all 5,600 IDP hours and the financial support to help get through the exams. Incentives such as raises and promotions once the exams are passed don't hurt either.

Large- and medium-size firms with a culture of licensure support have developed internal structures and programs to meet their unlicensed workers halfway. They pay for exams, provide study materials, approve tuition reimbursements to pay for additional study aids, and allow time off to prepare for the exams.

Joel Brygger, AIA, who started as an intern at Minneapolis-based Cuningham Group Architecture, credits a proactive attitude on the part of management and his own personal initiative as the key components of his positive experience.

"Exposure to different project types, to various phases of design, and even to conversations that are beyond the interns' pay grade raise the competence level of the entire firm, pushing younger designers more quickly toward a professional mindset," Brygger says.

Similarly, Austin, Texas–based McKinney York Architects values licensure and is dedicated to creating a healthy culture based on professional development. Recognized with an IDP Firm Award in 2012, seven of the 12 team members at McKinney York are licensed architects—and the others are all in the process of becoming licensed.

McKinney York partner Michelle Rossomando, AIA, who is charged with integrating the licensure process into the daily workings of the firm, says that the small things add up: submitting IDP hours quarterly, requiring firm-wide construction-site visits, and establishing rotating responsibility for 15-minute presentations during weekly staff meetings over lunch. "The interns get leadership experience this way and learn from everyone in our studio," Rossomando says.

Nonetheless, many interns are left to their own devices when it comes to logging hours and preparing for exams. Jack Murphy, Assoc. AIA, argues that younger architects are primarily driven by design. "Young people will trade stability for more muscular design opportunities, meaning they're likely in offices with more speculative work or a less established internal structure," Murphy says. "This favoring of design opportunity over 'professional advancement'—for lack of a better term—then slows the use of the internship program and the need to be licensed."

Murphy also thinks that proposed changes to make the process more transparent and streamlined are good in principle, but he defends rigor as a necessary part of the plan. "It should be difficult to become a licensed architect," he says, "but the last thing I need in my life is another app to help me through this."

Mary Stuckert, who wrapped up her studies at the Harvard Graduate School of Design in January and has completed two-thirds of the required IDP hours, notes that she had to figure out the process for herself. "I want to start my own firm eventually, so it is essential that I get this done," says Stuckert, who interned at numerous firms, only some of which signed off on her hours. Echoing Murphy's comments, Stuckert noted, "I found that in the boutique design firms the principals are less focused on cultivating the professional development of interns."

Matthew Tierney, a graduate student in the University of Minnesota School of Architecture's progressive Master of Science in Architecture and Research Practices concentration (MS-RP), is on a different path than many of his peers—one that integrates education, firm experience, and licensure. In the fall of 2013, while a full-time student in the MS-RP program, Tierney worked at Perkins+Will, one of the school's research practice partners, as part of the firm's Social Responsibility Initiative on a healthcare project in western Kenya.

"The support from the university and the firms is essential for me as I move through the internship and licensure process in a collapsed amount of time," Tierney says.

The MS-RP concentration benefits Perkins+Will and the university's other research practice partners, too. "One firm principal called me to say how surprising it was to see an intern calling meetings, talking to their consultants, and running tutorials," says Renée Cheng, AIA, head of the School of Architecture at Minnesota, speaking about Tierney's experience. "Matt led many meetings to discuss how he was thinking about the software he developed—going way beyond the project."

Other Minnesota students benefit from this reciprocal relationship by sitting at the table with firm leaders and being asked to think about, and respond to, issues typically reserved for architects later in their careers. Early awareness of advanced issues, the thinking goes, means earlier development—as well as architects who can hit the ground running much sooner than their peers.

"[Our] program is pushing for a cultural shift," says Cheng. Ideally, she says, students will graduate having completed all of their exams and with 2,200 hours logged in their IDP registers. And thus far, the students in the program have responded positively. And while Cheng emphasizes that the experiment with an expedited path to licensure is great, she insists that the leadership skills that the students receive in the process are invaluable.

In January 2012, NCARB announced a three-phase rollout plan for IDP 2.0, addressing its critical part in the young architect's life. This new plan re-categorized the eight sanctioned "work experience settings" needed to get the required 5,600 hours into three groups: practice of architecture, supplemental experience, and other work settings.

Then, in October 2013, NCARB announced that it would streamline the IDP process to ensure that the time needed to complete it continues to drop, as it has since 2010, after slowly trending upward for the last 25 years. NCARB also began analyzing the feasibility of a licensure-at-graduation model—an action item at the 2014 Emerging Professionals Summit in January attended by AIA, NCARB, AIAS, ACSA, and NAAB leadership, as well as emerging professionals from around the country.

In December 2013, NCARB announced the "New Era for the ARE" initiative, set to launch in fall 2016, in which six practice-based exams (rather than the current "content-based" seven) will focus solely on practice management, project management, and project design. "We are hoping that by the time ARE 5.0 launches, new IDP categories will be similarly grouped to support and supplement the exam sections," says NCARB CEO Michael Armstrong.

Effective Jan. 1 of this year, interns may now log IDP hours straight out of high school for valid work regardless of the time spent on a project, and receive credit for valid experience acquired over winter and spring breaks while in accredited university programs. And in March, NCARB proposed a modification to its IDP six-month reporting rule that would for the first time allow credit for older unreported experience for a longer time period at 50 percent value. These changes respond to the realities of the marketplace and the variety of opportunities for interns to gain valid work experience while meeting requirements for licensure in the majority of U.S. jurisdictions. As part of the larger picture, NCARB is also funding communications efforts to encourage public debate. Ultimately, engaging interns and supporting them with tools to become leaders will—as Joel Brygger, Renée Cheng, and others argue—raise the competency level of the entire profession.—*Catherine Gavin* AIA

ILLUSTRATION: MICHAEL GLENWOOD

AIAPERSPECTIVE

DESIGN THINKING

PHOTO: WILLIAM STEWART

WHAT DO PARKING LOTS, A LIBRARY, AND A MISSISSIPPI FEDERAL judge have in common? Design thinking, in three parts:

Reimagine. Consider the unloved surface parking lot. Could this blight on the landscape be reimagined in a way that meets the need for parking, yet at the same time be tamed as a catalyst for transit-oriented development? The Rauch Foundation, a nonprofit based in Garden City, N.Y., thinks so. Rauch launched a design competition last year that focused on structured parking at four Long Island Rail Road suburban train stations.

Recognizing that the automobile is destined to be a fixture of suburban commuting for some time to come, Rauch asked several architectural firms to apply design thinking to come up with parking structures that would not only accommodate cars but could also—improbably enough—be places for people. Parking garages as an engine for reimagining what suburbia might be in the 21st century? Ideas blossomed! That's design thinking, opening windows to previously unimagined possibilities.

Renew. Ludwig Mies van der Rohe's Martin Luther King Jr. Memorial Library in Washington, D.C., holds pride of place near the National Portrait Gallery. More admired than loved, the building has in recent years been the subject of a fierce debate between preservationists and library patrons who advocated its demolition, arguing that it is outdated and inflexible, with a steel, brick, and glass envelope that is architecturally undistinguished.

How do we square this circle in a way that would please preservationists and patrons alike? Design thinking.

As part of Washington's ongoing investment in upgrading its library system, which has to date produced stunning results, the city shortlisted 10 architecture firms to bring new life to its main library—and to respond to the latest ideas about how libraries function as knowledge and community centers while respecting (if not enhancing) Mies's love of light and spaciousness.

Chosen from among the 10 proposals, the Dutch firm Mecanoo will partner with Washington's Martinez + Johnson Architecture to design what Mecanoo principal Francine Houben promises will be a place that people will love so much they "even bring their books from home to read in the library." That's also design thinking—to redefine a library to be a communal crossroads as well as a book repository.

Remarkable. In January, the Honorable Debra M. Brown became the first African-American female U.S. District Judge in Mississippi, garnering a 90–0 vote in her Senate confirmation. Brown received her bachelor's degree in architecture from Mississippi State University, and her judgeship positions her to affect lives in a very special way.

"The pedagogy of architectural design education emphasizes and teaches organizational principles and hierarchical skills, enabling a student to rationally and logically analyze and solve complex problems … both socially and technically," said Michael Berk, AIA, director of the College of Architecture + Design at Mississippi State, as quoted in the school's student paper *The Reflector*. For Berk—and certainly for me—design education "also balances this rationalism with intuition and compassion."

And if that's not the true mandate for a judge interpreting the law—to balance rational thought with intuition and compassion—then I'm not sure I know what their charge should be.

Design thinking is a powerful tool that only a handful of people are fortunate enough to wield. Inside or outside of the profession, those people change lives for the better. AIA

Helene Combs Dreiling, FAIA
2014 President

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INNOVATIONS IN HVAC DESIGN

A combined heat and power plant: the gas engine drives a generator to produce electricity while the waste heat is used to warm and cool the building. Photo credit: Bilfinger

LEARNING OBJECTIVES

After reading this article you will be able to:

1. Discuss the latest innovations in energy-efficient commercial HVAC components and systems.
2. Explain the codes, standards, and guidelines that govern HVAC design, installation, and maintenance.
3. Describe how smart building strategies and automation systems can reduce energy costs, improve building operations, and support sustainability efforts through seamless integration.
4. Refer to case studies showcasing innovative HVAC solutions.

CONTINUING EDUCATION

CREDIT: 1 LU

COURSE NUMBER: ARmay2014

Use the learning objectives above to focus your study as you read this article.

Visit http://go.hw.net/AR514Course1 to read more and complete the quiz for credit.

By Kristina Kessler

Increasing energy costs, pressure on energy resources, tightening energy efficiency regulations, and demand for high-performance buildings are driving the market for higher efficiency heating, ventilation and air conditioning (HVAC) systems for commercial buildings.

INTRODUCTION

HVAC refers to the equipment, distribution system, and controls that provide heating, ventilation, and air conditioning for buildings. HVAC systems are the main energy consumers in commercial buildings, accounting for approximately 44% of all commercial buildings' energy consumption. Last year, commercial and industrial buildings used approximately 50% of the energy in the U.S. economy at a cost of over $400 billion.

Additionally, HVAC systems impact building occupants´ health, comfort, and productivity. Improving HVAC performance not only saves energy, but promotes a healthier, more comfortable workplace.

By 2035, 75% of U.S. buildings will be new or renovated, according to the U.S. Department of Energy, offering ample opportunities to incorporate high-efficiency HVAC systems. Some of the most energy-efficient buildings are not necessarily new, but have demonstrated a return on investment in smart technologies, such as the Empire State Building after an extensive retrofit begun in 2009.

Improved component technologies, advanced control methods, and networked-based tools are leading to a paradigm shift in the way commercial HVAC systems are designed, operated, and managed.

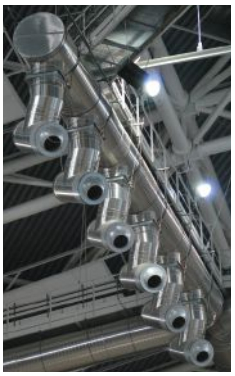
Trends and incentives propelling this shift include:

- Greater transparency in the responsible use of building resources by businesses
- Zero Net Energy designs as a means of competitive advantage
- Alternative energy sources such as solar power and daylighting
- LEEDv4 standards, which address 21 different market sector adaptations
- Federal tax incentives to the tune of $1.80 per square foot for buildings whose energy performance reaches or exceeds 50% less than ASHRAE 90.1-2001 standards

HOW IT WORKS

An HVAC system is a group of components with heating and cooling combined in the same system because they share the same ductwork for distributing conditioned air.

Air conditioners force refrigerants to continuously evaporate and condense in a closed system of coils.



Forced ventilation is used to control indoor air quality.

The AC part of a HVAC system uses refrigerant evaporation to produce cool air and move it in two directions: indoors and outside. Air conditioners force refrigerants to continuously evaporate and condense in a closed system of coils. The refrigerant chills the indoor air, and the resulting gas is continually compressed and cooled for conversion back to a liquid. Unwanted heat created by compressing the gas is evacuated to the outdoors by condenser coils and a fan. Components include an evaporator that receives the liquid refrigerant, a condenser that facilitates heat transfer, an expansion valve that regulates refrigerant flow into the evaporator, and a compressor pump that pumps refrigerant through the system. Air conditioners regulate air temperature with a thermostat, reduce the level of humidity in the air, and filter airborne particulates.

The most common central cooling system is a split system, which includes an outdoor cabinet containing a condenser coil and compressor, and an indoor evaporator coil, usually installed in conjunction with a furnace or air handler. The air handler provides forced ventilation used to control indoor air quality. Natural ventilation is either wind driven or buoyancy driven due to density differences of interior and exterior air.

A heat pump can be reversed to either heat or cool a space.

The heating part of a HVAC system uses a furnace or heat pump to produce heat. All furnaces consist of burners that deliver and burn fuel, heat exchangers, a blower, and a flue that acts as an exhaust for gaseous by-products. A heat pump is an air conditioner with a valve that allows the refrigerant flow to be reversed so that the condenser becomes the evaporator and vice a versa. Powered by electricity, this cycle refrigeration system can be reversed to either heat or cool a specific space. It use a compressor to circulate refrigerant that absorbs and releases heat as it travels between an indoor air handler and an outdoor unit called a heat pump.

HVAC systems provide buildings with clean and odor-free conditioned air where air temperature, humidity, and movement are within certain comfort ranges. Standards outlining air quality are established by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

To ensure ideal energy-efficient cooling, the AC unit needs to be correctly sized.

The volume of air required to heat, cool and provide good indoor air quality is calculated based on heating, cooling, and ventilation loads. Load calculations are made based on a number of factors: square footage of the structure, building design and orientation to the sun, construction materials and insulation, uses, number of employees, etc. The output capacity of heating and cooling systems is measured in thousands of British thermal units (Btus). Typically, a ton of cooling is needed for a 1,000-square-foot space.

To ensure ideal and energy-efficient heating and cooling, it is important to calculate a proper HVAC unit size. If the unit is sized too small, it may run constantly without providing the desired temperature; if sized too large, it will short-cycle and use excessive energy.

A key to energy efficiency is how efficient the equipment is over a wide range of operating conditions. Climate, landscape, uses, and internal operating environments (i.e., number of employees and type of work done) need to be considered in equipment selection. Of equal importance is how adaptive, proactive, and communicative the equipment is.

Improved building modeling software, reduced cost of computing power, availability of low-cost and durable sensors, and advances in the field of material science have enabled a wide variety of commercial HVAC installations on the market.

ADVANCED TECHNOLOGIES

Novel technologies and strategies are providing heating and cooling more efficiently by optimizing the performance of critical components to offset the energy consumption of HVAC systems.

Smart Refrigerant Distributors sense and direct proper amounts of refrigerant to each evaporator circuit, ensuring against maldistribution in evaporators, which lowers capacity and efficiency.

Thermoelectrically Enhanced Subcooling. Thermoelectric (TE) devices convert electricity to a thermal gradient for efficient cooling for small temperature lifts or cooling loads. A subcooler incorporating TE devices lowers the temperature of condensed refrigerant and can raise overall system capacity by 20%.

Ground Source (Geothermal) Heat Pumps use a ground-coupling system to transform a conventional water-source heat pump to tap the thermodynamic properties of earth and groundwater to heat and cool buildings. The groundwater serves as a heat source during winter and as a heat sink for cooling during summer.

With the exception of direct-expansion-type ground-source heat pump systems, the technology requires less refrigerant than conventional air-source heat pumps or air-conditioning systems and can reduce cooling energy by 30 to 50% and heating energy by 20 to 40%.

Integrated Heat Pumps (IHP) can be ground or air sourced and provide space heating, cooling, water heating, and sometimes exhaust air heat recovery. When integrated into a single piece of equipment, these technologies can provide

50% or greater annual energy savings for space conditioning, dehumidification, and water heating.

Heat Exchangers enable buildings and equipment to transfer heat from one space to another. Optimized heat exchanger designs are being integrated into new products and space conditioning systems. HVAC optimized heat exchangers can result in performance improvement for heat exchanger capacity of 5% or a 2% reduction in energy consumption.

HVAC radial air-bearing heat exchangers are drop-in replacements for air-cooled heat exchangers in an existing HVAC or refrigeration application. They are ten times smaller than current state-of-the-art CPU coolers, quiet in operation, immune to dust fouling, and cost competitive. The potential impact of this technology is an estimated 30% reduction in electricity consumption.

Variable Refrigerant Flow (VRF) systems use refrigerant as their cooling and heating medium. A compressor unit, typically located on a roof, is connected through refrigerant lines to multiple indoor fan coil units, each individually controllable by its user. By operating at varying speeds, the units work only at the needed rate. They are a good option for buildings with varying loads and different zones.

The system is capable of simultaneously cooling one area while heating another, and can transfer heat from spaces being cooled to spaces being heated and vice versa. Required outside air is usually delivered with a separate HVAC unit, commonly called a dedicated outside air system (DOAS).

VRF systems include self-diagnostics and monitoring points, as well as the ability to communicate with a wide variety of other building systems with non-proprietary building automation communication protocols. They are small, modular, and can be installed without a crane. Preliminary findings suggest that VRF systems can achieve 34% and higher HVAC energy cost savings.

Low Global Warming (GWP) Refrigerants are alternative refrigerants that can be used in new and existing commercial HVAC and refrigeration equipment. They offer low "global warming potential" (GWP)—the tendency to trap heat in the atmosphere for decades—as well as other desirable performance and safety features. Promising low-GWP chemicals include fluorinated olefins that react rapidly with atmospheric compounds and thus will not remain for long periods.

Desiccant Enhanced Evaporative Air Conditioning (DEVap), an ultra-efficient air conditioning system, is a desiccant enhanced evaporative air conditioner that combines the benefits of liquid desiccant and evaporative cooling technologies into an innovative "cooling core." DEVap uses a saline solution that is safer for the environment than traditional coolants.

DEVap decouples cooling and dehumidification performance, resulting in independent temperature and humidity control. The energy input is largely switched away from electricity to low-grade thermal energy that can be sourced from fuels such as natural gas, waste heat, solar, or biofuels. Yearly combined source energy for the thermal and electrical energy required to operate DEVap is expected to be 30 to 90% less (depending if the climate is humid or dry) than state-of-the-art direct expansion cooling.

Solar Air Conditioning uses solar radiation to heat water to drive thermally activated cooling systems such as absorption or liquid-desiccant systems. Solar air conditioning units offer environmental benefits such as lower grid demand and load shifting during peak usage, reduced electricity costs compared to conventional vapor-compression systems, fewer power outages, off-the-grid capabilities, and reduced greenhouse gas emissions.

Solar air conditioning uses solar radiation to heat water to drive thermally activated cooling systems. Photo credit: U.S. Army Environmental

Solar units come in hybrids and chillers. Hybrid systems combine photovoltaic technology (PV) with direct current (DC), automatically switching between solar and battery power as needed. In hybrid mode, the systems charge their batteries when the sun is shining; when it isn't, they run on a backup battery while charging their batteries via alternating current (AC) power.

Solar-powered absorption chillers, also known as evaporative coolers, heat and cool water through evaporation and condensation. Chillers cool the air by blowing it over water-saturated material, and solar energy powers the fan and motor.

Solar Ventilation Preheating systems use transpired collection panels to absorb solar radiation and transfer heat to ventilation air. This process offsets the use of natural gas or electricity to raise the ventilation air temperature to suitable building conditions when heat is needed.

Sound Wave Cooling. A relatively new concept, cooling with sound waves could lead to a new generation of energy-efficient cooling systems. Thermoacoustic compressors compress or expand gases with high-intensity sound waves: compressing gases generates heat, while letting the gases expand, cools. The effects can be harnessed to produce powerful and efficient heat engines, including heat pumping systems such as air-conditioners, refrigerators, and heating systems.

Thermoacoustic engines typically have no moving parts, making them simple, reliable, and less costly to operate. They can be powered by low voltage from solar cells, batteries, or operated on standard line voltage. They can convert almost any heat source, such as the waste heat from an internal combustion engine, directly into sound waves that can be used to pump heat. Acoustic waves can also oscillate an armature within a magnetic field to produce electricity.

Chilled beams cool a room by circulating air through ceiling-mounted chilled water coils. Photo credit: Halton

Chilled Beam systems cool a room by circulating interior and/or outdoor air through ceiling-mounted chilled water coils and redistributing the air back into the room. There are three types of chilled beam systems: passive, active, and multi-purpose, which can incorporate IT systems, electrical wiring, lighting, motion-detection sensors, and sprinklers.

High-Efficiency HVAC Units are rooftop units (RTU) that can reduce building energy needs by half without reducing HVAC effectiveness.

The technology uses variable speed controls on the refrigerant compressor, valves, and fans to efficiently heat or cool designated spaces as needed by blowing conditioned air through central shafts and ceiling spaces. The units capture and reuse heat, cold, and humidity from a building's exhaust air and use waste heat from the compressors to reheat air that has been purposely over-cooled.

Modular Micro-Channel Absorption Chillers are powered by readily available alternative or waste heat sources (excess solar thermal, heat exhaust, or cheaper natural gas) instead of electricity, and can directly replace legacy HVAC chillers. They are very efficient at converting heat into cold. In addition to air conditioning, the technology can be dual-purposed for space heating.

Variable Speed Mag-Lev Chiller.
This chiller compressor technology offers quieter, more efficient cooling at lower partial loads than rotary-screw chillers due to its ability to reduce friction, operate at variable speeds, and integrate with diagnostics and monitoring systems.

Variable speed chillers equipped with magnetic levitation (maglev) bearing compressors eliminate the metal-on-metal friction of traditional compressors and can be incorporated as partial compressor-only retrofits, or as full chiller upgrades for systems at the end of their useful life.

Condensing Boilers, which can be fuelled by gas or oil, are water heaters that pre-heat the cold water entering the boiler with the waste heat in the flue gases. Since condensing boilers extract more of the heat energy released by the combustion process, they can offer an increased efficiency of over 87% compared to conventional boilers.

Visit http://go.hw.net/AR514Course1 to read more and complete the quiz for credit.

QUIZ

1. HVAC systems account for what % of the energy used in commercial buildings in the U.S.?
   a. 10–15%
   b. 20–25%
   c. 30–45%
   d. 50–65%

2. The AC part of a HVAC system uses refrigerant _____to produce cool air.
   a. condensation
   b. evaporation
   c. reduction
   d. oxidation

3. A heat pump is:
   a. a device that circulates steam.
   b. a device that pumps condensate back to a boiler.
   c. a type of compressor.
   d. an air conditioner with a valve that allows the refrigerant flow to be reversed so that the condenser becomes the evaporator and vice a versa.
   e. all of the above.

4. Standards outlining air quality are established by:
   a. ASME
   b. ISPE
   c. ASHRAE
   d. LEED

5. Btus stands for:
   a. British thermal units
   b. British tons per unit
   c. British temperature units
   d. Bio-thermal units

6. Typically, a ton of cooling is needed for a:
   a. 100-square-foot space
   b. 1,000-square-foot space
   c. 10,000-square-foot space
   d. 100,000-square-foot space

7. VRF stands for:
   a. Visual Resources Facility
   b. Variable Roof Frequency
   c. Variable Refrigerant Flow
   d. Variable Route Frequency

8. Desiccant Enhanced Evaporative Air-Conditioning (DEVap) decouples cooling and _____ performance.
   a. dehumidification
   b. humidification
   c. steam
   d. hot water

9. Energy Recovery Ventilation Systems (ERV) use _____to pre-heat and pre-cool incoming outdoor ventilation air in HVAC systems.
   a. biomass
   b. site-recovered energy from building exhaust air
   c. gas or oil
   d. fluorinated olefins

10. BACnet is:
    a. ASHRAE's Thermal Environmental Conditions for Human Occupancy
    b. ASHRAE's Data Communication Protocol for Building Automation and Control Systems
    c. ASHRAE's Field Testing of HVAC Controls Components
    d. ASHRAE's Specifying Direct Digital Control Systems

SPONSOR INFORMATION

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SUCCESS STORY: TOWSON CITY CENTER, MARYLAND

How do you make a building built in the 1960's century conform to 21st century standards in energy and space efficiency? This was the challenge with the vacant eye-sore in the heart of Towson. After gutting the entire building, it was discovered that each floor had only nine feet of ceiling clearance. A heavily-ducted HVAC system was not an option.

The solution? A Mitsubishi Electric Cooling & Heating VRF zoning system with low-profile indoor unit fan coils to provide individualized zoning.

Because of the modular design of the VRF system, the 15 outdoor units were placed on the roof which freed up 12,000 square feet on the 13th floor. As a result, a floor that had once been a mechanical room became leasable space. And, 70% of the shaft required by the previous outdated system was filled in, significantly increasing usable space on each floor.

Not only was space saved, but energy needs were dramatically reduced as well. Mitsubishi Electric's VRF zoning system provided 11 LEED® energy points, and resulted in a $422,000 rebate through Baltimore Gas & Electric's Smart Energy Savers Program.

By saving energy and space, Mitsubishi Electric brought the Towson City Center into the 21st century. And beyond.

PROJECT SUMMARY

Building Type:
- 15-story Office with 170,000 sq. ft.

Equipment Installed:
- R2-Series Air-source Outdoor Units
- Wall-mounted and Ceiling-concealed Indoor Units
- LonWorks® Interface
- GB-50 Central Controller
- CITY MULTI® Controls Network (CMCN)

System Capacity:
- 272 Tons of Simultaneous Cooling and Heating

Results:
- LEED Silver with 11 Energy Points from Mitsubishi Electric HVAC
- $422,000 Energy Rebate
- Fully Leased

Get more details about Towson City Center and see how Mitsubishi Electric solved other HVAC design challenges at **MitsubishiPro.com.**

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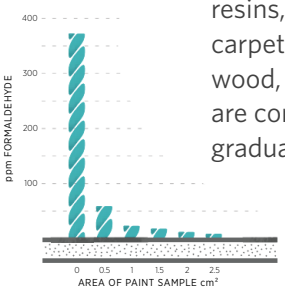
Let's go back a few hundred years.
In the past, air circulated freely through gaps in walls, windows and doors. And while we've become better over the years at sealing interior environments, we've also sealed in everything, from aldehydes, to mold and mildew and even unpleasant odors.

Why these problems are such a problem.
Used in producing plastics, synthetic resins, upholstery, carpet and pressed wood, aldehydes are compounds that gradually "off-gas", resulting in emissions. Mold and mildew can irritate skin, eyes and respiratory tracts and cause staining, rotting, and bacterial odors. And while odors from pets, cooking, smoke and other sources may not pose health problems, they can make indoor spaces unpleasant.



Aldehydes are emitted from carpet and other products over time.†

The science behind the technology.
It starts with odor eliminating technology that deconstructs carbon molecules, neutralizing and dissipating odors. Then, new formaldehyde reducing technology* helps to transform airborne aldehydes into water molecules and harmless inert gas, reducing these VOCs from potential sources like insulation, carpet, furniture and fabrics. And finally, antimicrobial agents inhibit the growth of mold and mildew on the paint film and related bacterial odors, addressing these issues before they can become a problem.

The bold innovation for reducing interior odors and improving indoor air quality.


Special compounds deconstruct carbon molecules to dissipate odors.

Technology so advanced, all you need is a roller.
Perhaps what's most amazing about this technology is that it comes by the gallon. For more than 147 years, Sherwin-Williams has consistently engineered innovative coatings like this zero VOC product that balances bold ingenuity with aesthetic appeal. And that's why we call it - HARMONY.


Innovation that is the result of more than 147 years of R&D.

And oh yeah, it's paint.

*Formaldehyde Reducing Technology is currently available in flat and eg-shel sheens. The length of time Harmony actively reduces odors and formaldehyde depends on the concentration, the frequency of exposure and the amount of painted surface area.

†Based on methods:
ISO 17226 Determination of formaldehyde content in leather by High Performance Liquid Chromatography
ISO 16000-3 Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air

CENTER

Designer Harvey Probber in his 1948 Sling Chair, now being reissued by design brand M2L. Selected for MoMA's 1951 Good Design exhibition, the chair's bent-wood frame and sling back make it ideal for kicking back. M2L will also bring back a selection of Probber's celebrated modular contract seating. *m2l.com* Circle 100

PRODUCTS

MIDCENTURY MODERN REVIVALS

THE LATEST PIECES TO ESCAPE THE ARCHIVES OF LEGACY FURNITURE MAKERS ARE ROOTED IN THE MID-20TH CENTURY. DESPITE SOME SUBTLE TWEAKS, THESE ICONS STAY TRUE TO THEIR DESIGNERS' VISIONS.

Text by **Hallie Busta**

LC5, CASSINA

Cassina collaborated with the Fondation Le Corbusier to revive the LC5 sofa with new finishes and proportions more closely resembling its original form. First designed by the architect in 1934 with Pierre Jeanneret and Charlotte Perriand for Corb's Paris apartment, the piece was edited by Cassina in 1974 to be one size and with a chrome frame. In its latest update, the sofa is offered as a two- or three-seater (shown), and the large, plush cushions are supported by a metal frame available in seven colored varnishes as well as polished chrome. *cassina.com* Circle 101

MEXIQUE, CASSINA

Designer Charlotte Perriand crafted her 1952 Mexique table as a compact desk for student dorms at the Cité Internationale Universitaire de Paris. Cassina is reissuing it in 15" (shown) and 27.5" heights. The top comes in solid walnut or oak and the metal legs have a black matte finish. *cassina.com* Circle 102

621 SIDE TABLE, VITSŒ

Dieter Rams designed his 621 side table in 1962. The re-issued model is injection-molded in either black plastic that includes 80% post-consumer waste or in off-white plastic (shown). Two sizes are offered and each is coated with a UV-resistant, textured polyurethane finish. *vitsoe.com* Circle 103

SU COLLECTION, EMECO AND NENDO

Emeco is bringing the form of its iconic 1944 Navy Chair to a collaboration with Japanese design studio Nendo. The Su Collection of seating and tables is made from eco-friendly materials, including recycled polyethylene for the seat and recycled aluminum legs (both shown). *emeco.net* Circle 104

ALBERO, POLTRONA FRAU

Italian designer Gianfranco Frattini conceived this sculptural shelving system in the late 1950s; it anchors to the ceiling and swivels 360-degrees. A nonslip rubber foot grips the floor. Eight to 12 shelving modules can be affixed to the walnut veneer frame using a pinion joint. *poltronafrau.com* Circle 105

EAMES SHELL CHAIR, HERMAN MILLER

The 1950 design is being reissued in its original glass fiber thanks to an eco-friendly fabrication process used in the auto industry. Glass-fiber strands are blown onto a wireframe in the shape of the chair's shell. Excess strands are vacuumed from the air. Offered in nine colors. *hermanmiller.com* Circle 106

CRITIQUE

THE ART OF THE AERIE

AS A SPATE OF TOWERS RISE IN NEW YORK AND ELSEWHERE, MANY ARE LESS THAN CONVINCING IN THEIR VERTICAL UPLIFT. HERE'S WHAT CONTEMPORARY ARCHITECTS HAVE FORGOTTEN ABOUT BUILDING TALL.

Text by **Witold Rybczynski, Hon. FAIA**
Illustrations by **Thomas Danthony**

I'M WALKING DOWN Fifth Avenue, approaching Grand Army Plaza. It's March and the bare trees offer a clear view of the tall buildings on the other side of Central Park. The skyline from this vantage point in Manhattan is newly dominated by One57, Christian de Portzamparc's skinny 75-story tower, under construction on West 57th Street. This oligarchs' aerie will be the tallest residential building in the city, but with its curved top, it's about as poetic as an elongated Braun toothbrush.

Most of the tall buildings in my view are equally banal. The tops of the two dark towers of Skidmore, Owings & Merrill's Time Warner Center, adorned with a few mysterious slots, are as blankly expressive as Darth Vader's helmet; Norman Foster, Hon. FAIA's Brancusi-like Hearst Tower is abruptly truncated when it reaches the 46th floor; and the less said about the pedestrian Trump International Hotel and Tower, the better. The silhouette of Robert A.M. Stern, FAIA's 15 Central Park West is the best of the bunch, but its rather pallid rendition of a prewar apartment building doesn't exactly make my heart sing.

Things get a little better along Central Park South. If you ignore the garish red neon sign on its roof, the Art Deco Essex House is pretty interesting, though not as striking as the Hampshire House next door, which starts with a series of stepped terraces facing the park and terminates in a châteauesque roof and two tall chimneys. And if I look to the north I can just make out the two tempietto-topped towers of the San Remo. All three buildings date from the 1930s, when American architects such as Emery Roth (the San Remo), Caughey & Evans (the Hampshire House), and Frank Grad (the Essex House) knew something that most contemporary architects seem to have forgotten: how to celebrate tallness.

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I SUPPOSE THE AMNESIA began with the International Style, which insisted that all buildings, short or tall, have a flat roof. What is easy to forget is that in the 1950s, when the Lever House and the Seagram Building were built, modernist towers in New York were relatively rare, and amid a lively roofscape of steeples, temples, domes, and assorted pitched roofs, the stolid boxes had a certain stylish aplomb—like someone showing up at a black-tie dinner in sneakers. But skylines composed entirely of flat-tops are deadly.

That most American city skylines today are animated—especially at night—is probably due to the lingering influence of Post-Modernism. While Philip Johnson and John Burgee, FAIA's Chippendale highboy top on the Sony Tower appears pretty tame today—it doesn't hold a candle to the San Remo—Johnson did push skyscraper design in a more creative direction. I recently saw his and Burgee's "Gothic" PPG Place in Pittsburgh which, while not as evocative as Cass Gilbert's steeple-like Woolworth Building, has stood the test of time remarkably well. So has their Pennzoil Place in Houston, still one of their best skyscraper designs.

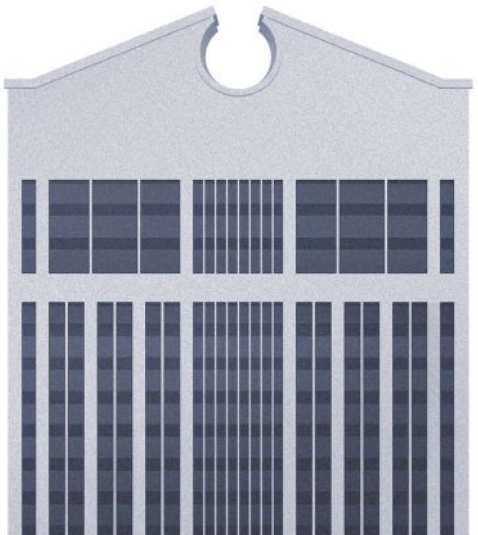
Of course, PoMo itself didn't last, and architects turned in other directions. Perhaps the two most striking skyscrapers of the early 2000s are Foster's 30 St Mary Axe in London and Jean Nouvel, Hon. FAIA's Torre Agbar in Barcelona, both circular in plan and both rocket-like in form. Still, the fact that these buildings are popularly known as "the Gherkin" and "el supositori" (the suppository), respectively, suggests that the public sees them as odd rather than uplifting.

Renzo Piano, Hon. FAIA, topped the New York Times Building (2007) with a crown by extending the sunscreen six stories into the air beyond the roof. From afar, the delicate corona is barely visible, but what is conspicuous is a 298-foot-tall mast—not an antenna but a sculpture. Since most tall buildings are topped by actual transmission towers, putting a nonfunctioning mast on a building strikes me as an ineffectual gesture. It does get the New York Times Building into the record books (as the fourth-tallest building in the city), since the top of the mast reaches an elevation of 1,046 feet, which is exactly the height of the mast of the Chrysler Building.

William Van Alen, the architect of the Chrysler (completed in 1930), integrated that building's mast into the design; he didn't simply stick it on top. But that is exactly what SOM did at One World Trade Center. There, the mast—a real antenna this time—reaches the 1,776-foot mark, making this the tallest building in the United States, at least according to the Council on Tall Buildings and Urban Habitat,

WOOLWORTH BUILDING (LEFT)
Completed: 1913
Architect: Cass Gilbert

SONY TOWER
Completed: 1984
Architects: Philip Johnson and John Burgee



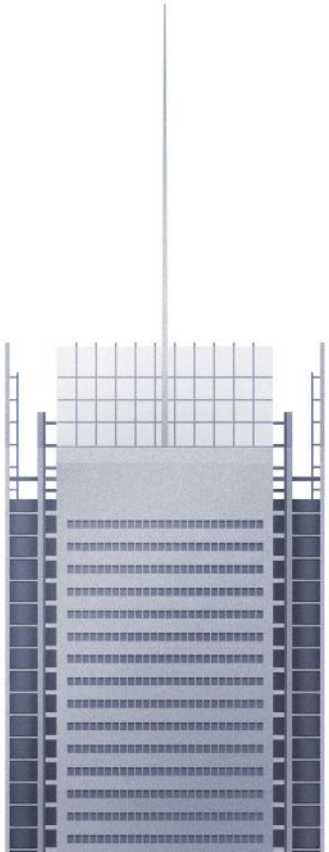
which adjudicates such things. Tall it may be, but its insubstantial exclamation mark appears lackluster compared to the robust sculptural mast atop the Empire State Building, say, or Chrysler's lyrical pinnacle. Peter Sagal, the host of National Public Radio's *Wait Wait ... Don't Tell Me*, had it right late last year when he called One World Trade Center's so-called sculptural antenna "the comb-over of architecture."

With the London Shard (2012), Piano adopted a different strategy. He made the entire building into a spike, something that Foster had explored in the earlier (unbuilt) Millennium Tower in Tokyo. The Shard strikes me as oddly insubstantial, perhaps because the façades are composed of overlapping planes. The first spiky high-rise was surely Frank Lloyd Wright's proposed mile-high skyscraper, the Illinois, an impressive 1956 drawing of which is currently on display in the Museum of Modern Art's "Frank Lloyd Wright and the City" exhibition. But unlike Foster and Piano, Wright did not make his spire smooth. Instead, he introduced a series of jagged setbacks as the building got progressively taller, which is a more effective strategy: The building appears to push its way up into the sky. Had Wright's mile-high skyscraper been built, I doubt it would have acquired a jokey nickname. People don't make fun of buildings they admire.

WHY DO SKYSCRAPERS of an earlier period—even unbuilt ones like Wright's—seem so much more convincing in their verticality than today's designs? I think these earlier architects understood that the essence of a skyscraper was uplift. They had studied church and cathedral spires, and the role of proportion, details, and silhouette in creating the impression of upward thrust. Christopher Wren's church spires offer a veritable tutorial. As Geoffrey Scott explained in his classic, *The Architecture of Humanism*: "A spire, when well designed, appears—as common language testifies—to soar. We identify ourselves, not with its actual downward pressure, but its apparent upward impulse. ... *We transcribe architecture into terms of ourselves*."

John Mead Howells and Raymond Hood understood soaring when they designed the effervescent top of Chicago's Tribune Tower, which is based on the Late Gothic "Butter Tower" of Rouen Cathedral. So did Eliel Saarinen, whose masterful second-place entry in that 1922 competition achieves the vertical thrust of Gothic architecture while dispensing with Gothic forms. The pinnacles and subtle setbacks of Saarinen's design influenced Hood in his later tall buildings, such as the American Radiator Building on Bryant Park, the Daily News Building, and his masterpiece of skyscraper design, the RCA Building at Rockefeller Center, now called the GE Building.

It's difficult to point to skyscrapers today that measure up to Hood's achievement. The Burj Khalifa, designed by Adrian Smith, FAIA,



NEW YORK TIMES BUILDING
Year completed: 2007
Architect: Renzo Piano Building Workshop and FXFowle Architects

EXPERIENCING BOLD DESIGN BEGINS WITH A STRIKING ENTRANCE

2013 ANNUAL DESIGN REVIEW

Trahan Architects' Louisiana Sports Hall of Fame and Northwest Louisiana History Museum project took a contemporary approach that combined bold and practical elements into an imaginative modern design. The architects looked to CRL-Blumcraft® 1301 Series 'All-Glass' Entrance Systems that contain the slimmest door rail profile in the industry, allowing for virtually uninterrupted glass viewing areas to elevate the high-concept building's modern aesthetic. 1301 Series Entrance Doors are the original. Often imitated but never matched, this system provides the most glass with the least metal of any entrance door system on the market.

This award-winning project serves as just one example of C.R. Laurence 's ability to provide architects and designers with well-engineered products for a wide range of projects of varying sizes, aesthetics, timelines, and performance criteria.

PROJECT: Louisiana Sports Hall of Fame and Northwest Louisiana History Museum
SPECIFICATION: CRL-Blumcraft® 1301 Series Entrance System with Floating Header and PA100 F Series Panic Handles
AWARD: ARCHITECT's 2013 Annual Design Review: Bond Category - Best Cultural Project

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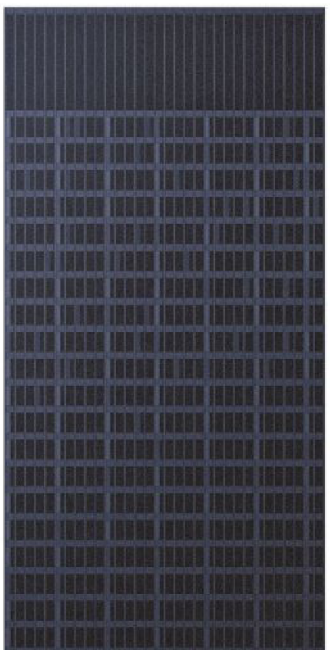
HAVING EXHAUSTED THE REPERTOIRE OF FUNNY SHAPES, SOME SKYSCRAPER DESIGNERS HAVE RECENTLY TURNED TO "CUT-AND-PASTE ARCHITECTURE."

and SOM, and completed in 2010 in Dubai, comes close to capturing the upward impulse that Scott alluded to. But photographs of the façade (I haven't visited the building) suggest a degree of standardization and repetition—and an absence of scale as the building rises—that risks producing an impression of monotony. Still, the Burj Khalifa is more convincing than the other skyscrapers that have cropped up in Dubai or Shanghai and Beijing, with their twisting and turning, bending and leaning, shimmying and shaking.

Having exhausted the repertoire of funny shapes, some skyscraper designers have recently turned to "cut-and-paste architecture," as *The Guardian* referred to the Office for Metropolitan Architecture's De Rotterdam project. Retro Miesian boxes are deconstructed and reassembled in slightly haphazard fashion, like so many giant toy blocks. SHoP Architects takes a similar approach in their B2 Bklyn project, as does Frank Gehry, FAIA, in three 80-story towers proposed for Toronto. Reviving midcentury modernism in this mannered fashion is bizarre to say the least.

Today's skyscrapers can amaze, surprise, shock, and sometimes even frighten. But they do not engage us in the way that Scott described. They make us feel puny rather than uplifted. He might have called it the architecture of inhumanism.

SEAGRAM BUILDING
Year completed: 1958
Architect: Ludwig Mies van der Rohe and Philip Johnson



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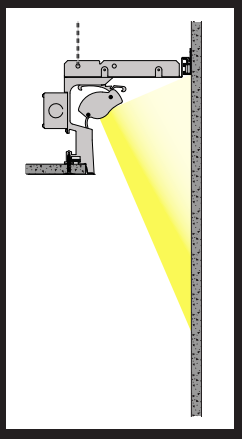

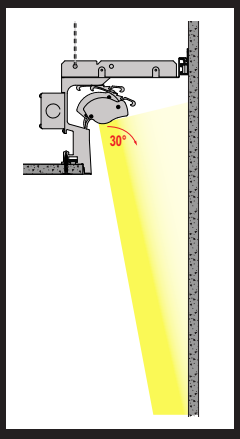

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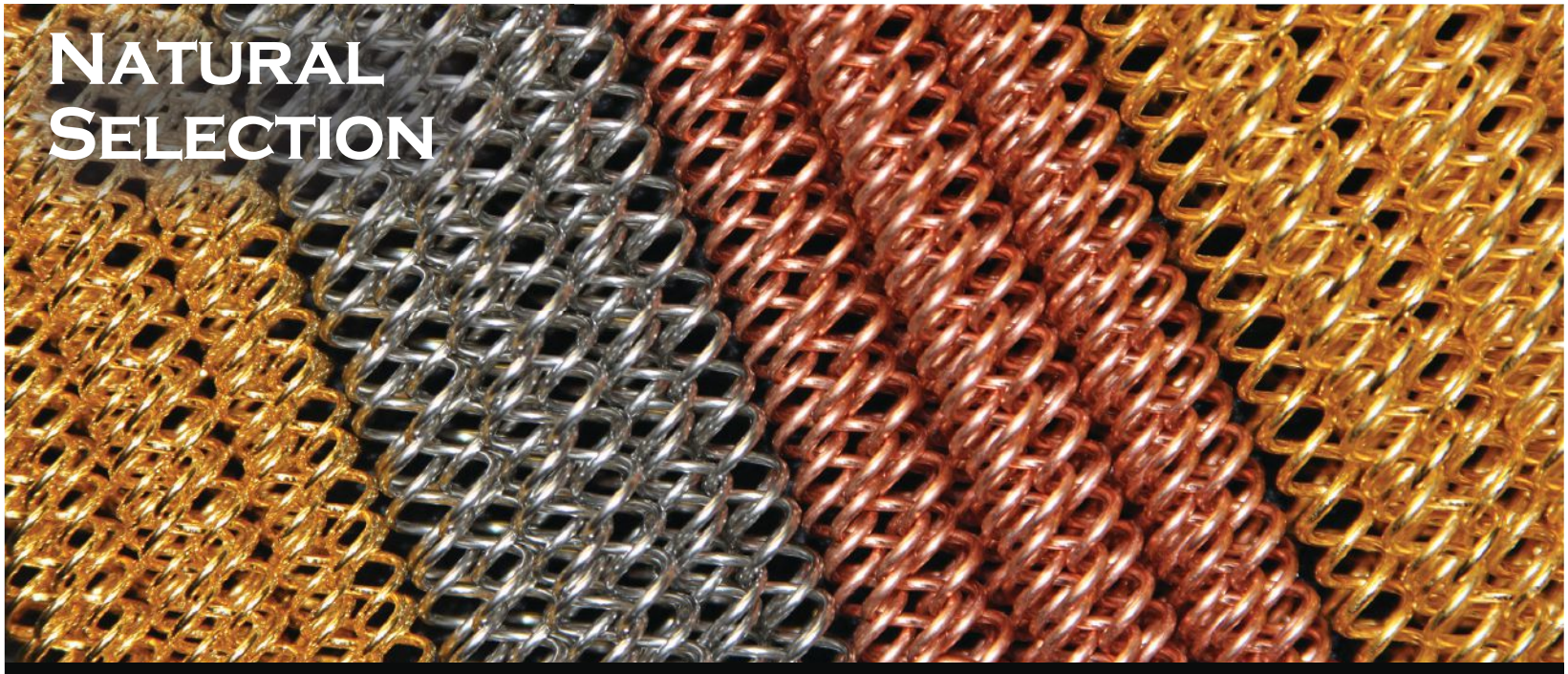

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DETAIL

WRITTEN IN LIGHTS

TO HIGHLIGHT THE RELEVANCE OF LIBRARIES IN THE 21ST CENTURY, MARBLE FAIRBANKS CREATED A DYNAMIC SKYLIGHT THAT SHOUTS IT FROM THE ROOFTOP.

On a sunny day at the Glen Oaks branch library in New York, passersby can watch the word "search" emerge from the upper right corner of the parapet, enlarge to full height at noon, and then steadily disappear into the upper left corner.

Text by **Logan Ward**
Photos by **Eduard Hueber/ArchPhoto Inc.**

BEFORE THERE WAS GOOGLE, public libraries were the primary portal to the wide world of information. New York architecture firm Marble Fairbanks reminds us that they still serve this purpose for many people by incorporating the word "search" above the entrance of the 18,000-square-foot, LEED Gold–certified Glen Oaks branch library in Queens. But rather than using painted letters or signage, the firm lets natural light do the talking.

On dark or cloudy days, the northern façade's curtainwall is blank and unassuming. But on clear days, sunlight streaming through the back glazing of its parapet projects the word "search" onto the curtainwall glass a few feet away. The luminous effect is dynamic, changing continuously each hour and each season.

The projected letters begin compressed beyond legibility in the curtainwall's top right corner at sunrise. Throughout the morning, they drift to the left, extending to a full height of nearly 5 feet at noon, when the sun reaches its highest point in the sky. Then the letters slowly compress and disappear into the curtainwall's top left corner. In the winter, the letters follow a similar path, though their projected height is halved because of the sun's lower transit. "We wanted to highlight the ephemeral qualities of digital information by relating it to the ephemeral qualities of light," says firm partner Karen Fairbanks, AIA.

To test the design concept and determine the parapet's geometry, Fairbanks and her team built a 1½-inch-to-1-foot scale model using foamcore, acetate, and artificial light. Ultimately, they determined that the back, or inboard, face of the 4-foot 6-inch parapet wall would have a sharp 65-degree slope from the horizontal. The angled glass in the parapet is supported by a custom steel structure and aluminum frame built by the general contractor for the library, Summit Construction Services Group.

During the design process, the team used Autodesk Maya software to simulate the letters'

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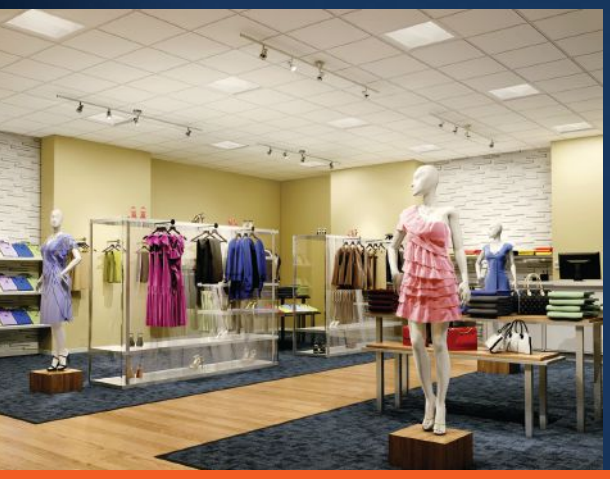

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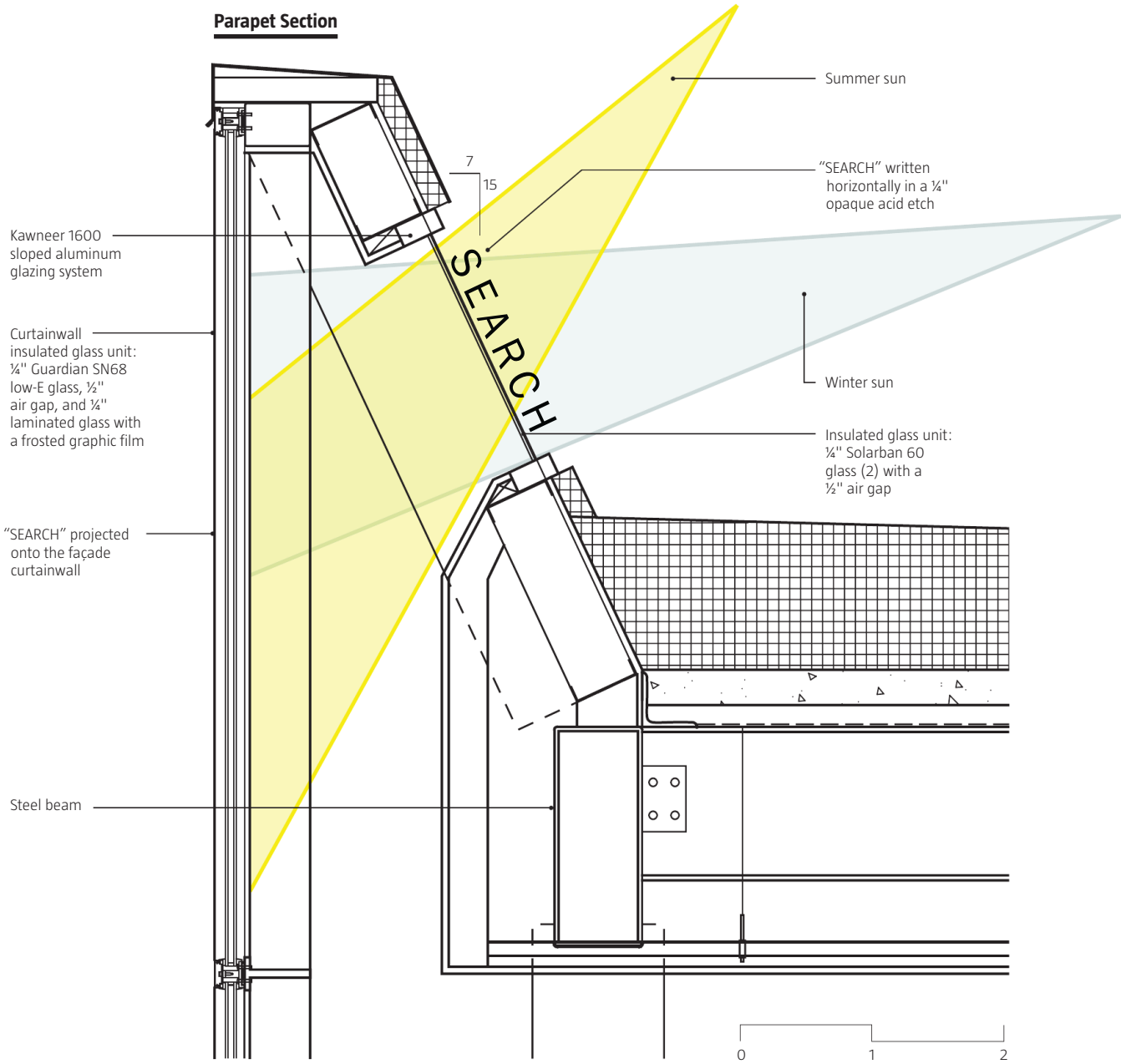

change in appearance in accordance with the sun's position. They built one more physical model, this time at half scale and made with foamcore and a sample of the actual glazing, to fine-tune the text resolution through trial and error. Marble Fairbanks designed the custom typeface of the stenciled letters, which are 20 inches tall with a stroke thickness of 3 inches and edges feathered with a halftone pattern.

The firm sent the digital files to Pedricktown, N.J.–based J.E. Berkowitz Architectural Glass, which applied an opaque acid etch on the Type 3 insulated glass unit that contrasts sharply with the transparent glass of the stenciled letters.

When projected, the word "search" appears suspended between the parapet glass and the 6-foot-tall curtainwall façade, rising above the second-story children's section. "Sometimes you see double letters," Fairbanks says. "As you move around the façade, what you see changes." She and her colleagues were pleased to discover other serendipitous effects, including the reflection of letters off the translucent façade glass and back down into the children's section, where they fall on desks and tables.

Supplied by Pulp Studio, in Los Angeles, the curtainwall glazing, which is insulated, has a translucent finish to intensify the graphic's visibility and to help mask the parapet structure and lettered glass beyond.

When the building opened last fall, Fairbanks says that community members were intrigued by the glowing, beckoning "search" and curious about why the letters change shape, position, and legibility. "For children, it's kind of a science project," she says. And if they want answers, they merely have to step inside the library and search.

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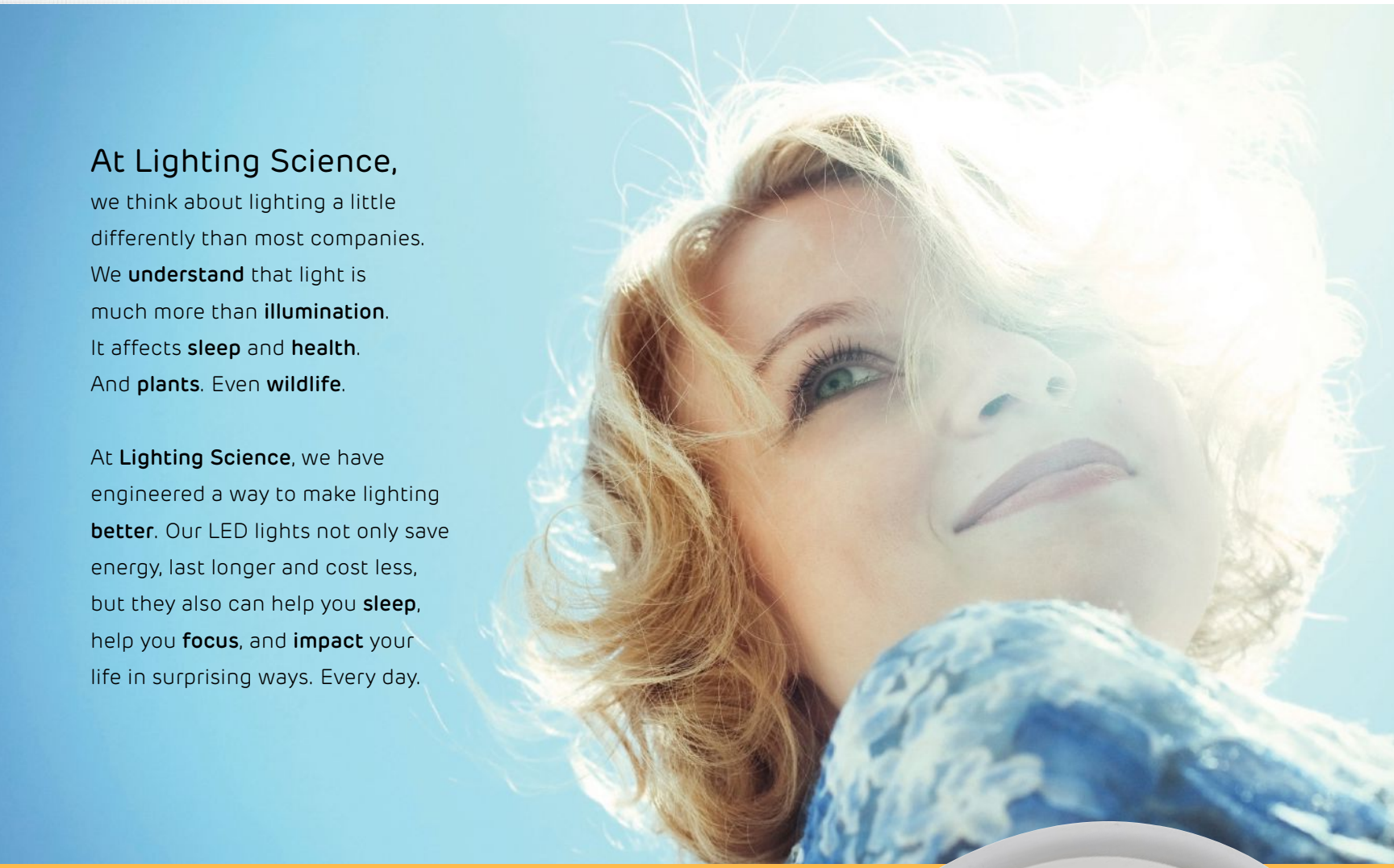

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NEXT PROGRESSIVES

GOING TOP DOWN

URBAN-THINK TANK, BEST KNOWN FOR ITS VERTICAL GYMS IN THE CARACAS BARRIOS, HAS A NEW STRATEGY FOR BUILDING IN THIRD WORLD SLUMS.

Text by **Amanda Kolson Hurley**
Portrait by **Stefan Jermann**

WHEN I CALL HIM, Alfredo Brillembourg is eating lunch in Zurich, on a terrace beside the lake, the Swiss Alps on the horizon. He describes the scene to me in detail and with evident delight. Maybe he's trying to stress how different Zurich is from Caracas, Venezuela, where he lived for many years. Or maybe he's just being charming—an essential quality if you want to build what and where he does.

Brillembourg (pictured above left), who is Venezuelan-American, and his partner Hubert Klumpner (above right), from Austria, founded Urban-Think Tank (U-TT) as an architecture firm in 1998 to empower the poor through design. It was before the architecture world at large showed any interest in slums or informal urban settlements. For years, amid rising poverty, crime, and corruption, they fought to build social projects in Caracas's barrios—home to about 60 percent of the city's population. Today they are professors of architecture and urban design at ETH Zurich. Both appreciate how ironic it is that their current city is consistently ranked as one of the world's most livable, while Caracas, their former home, languishes near the bottom of the same rankings.

Improbably, Zurich has become the incubator for their activism, which has moved into a new phase. Tired of chasing after funds and frustrated by the one-off nature of their interventions, they have switched their focus from building good projects to building a pipeline that can deliver them at scale. "We went from bottom-up, street-vendor architecture ... to the highest level" of decision-maker, Brillembourg says, whose firm has partnered with national governments and organizations like the World Bank. The question that U-TT is trying to answer, Klumpner tells me, is "how can we [connect] academia, industry, governments, and banks on a larger model, to get projects done?"

In other words, having reached the limit of their bottom-up approach, they decided to give top-down a try. In fact, the impulse to scale up their work is at least a decade old, going back to their first vertical gym in Caracas's Barrio La Cruz. The consummate U-TT idea, the gym is tactical, replicable, and programmed to the max—to make the most of scarce land in a dense city, and to justify the considerable effort required to build anything in what Brillembourg calls "a completely crazy place."

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(For instance: the client of that first gym, former district mayor Leopoldo López, is currently being held in a military jail.)

Several more vertical gyms were planned in Caracas, but they got mired in local politics and contractor graft. After years of fitful building, two more finally opened in the Sucre and Baruta barrios. Like the one in La Cruz, these gyms stack layers of amenities—a running track, ball court, weight-lifting zone—onto small, hemmed-in sites. The structures are based on a simple prefabricated system. U-TT would rather provide a flexible kit of parts than give form to a polished object (an approach that would fail, anyway).

"You have to understand you may not realize your project in its entirety," Brillembourg says. He's talking about working in the slums of the Global South, but he's also offering a manifesto for the role of the architect in the 21st century. "You have to give the framework, and help a building to happen. It's only putting it on the ground that matters."

IN THE EARLY 2000S, the Caracas government planned to build a new road connecting the hillside barrio of San Agustín to the city center. The road would have displaced 30 percent of the barrio's residents, many of whom had sunk capital into their homes by adding an extra floor. U-TT suggested a far less invasive measure: inserting a cable-car line into the existing fabric of San Agustín. Luckily, Hugo Chávez, then the Venezuelan president, liked the idea, and the Metro Cable opened in 2010. Its gondolas can move 1,200 people per hour. Though that's a fraction of what a bus line might have carried, the trip to downtown Caracas, which used to take two hours, now only takes 15 minutes. The benefit to local residents is enormous.

Most of the $300 million spent on the 2-kilometer system actually went to the stations, which were supposed to have different community functions: a medical clinic, a supermarket, a vertical gym. But while that vision of "a string of pearls filled with social content at each station" didn't entirely pan out, Brillembourg says that he is still satisfied. "It's working fine," he says. "People are very happy."

Like all U-TT's projects, the Metro Cable was self-initiated. Relationships were what got it built. As the architects won over residents and workshopped ideas with them, they curried favor with officials—and were helped by some lucky connections, as the design writer Justin McGuirk recounts in his forthcoming book *Radical Cities*. McGuirk writes about the first time he saw Brillembourg and Klumpner "in action" in a Caracas barrio, striking up conversations, playing a game of basketball with some kids. It is not a job for the shy or ill-at-ease. "The activist architect is an extrovert or he is nothing," McGuirk writes.

Only an extrovert could talk his way past the security force at Torre David, the unfinished Caracas skyscraper that's now home to some 3,000 squatters. U-TT spent a year studying how they had formed their own self-regulating community in the husk of the 45-story tower, furnishing their apartments and setting up convenience stores and hair salons, despite the lack of elevators and other basic services.

McGuirk, in the role of curator, invited the studio and its collaborator, photographer Iwan Baan, to create an exhibition on Torre David at the 2012 Venice Architecture Biennale. In Venice, the team set up a restaurant similar to one in the tower, called Gran Horizonte. Members of the design-world elite snacked on arepas while looking at Baan's photos of life inside the tower. The piece won the Golden Lion and helped make the Torre David famous.

It was canny of U-TT to engage Baan, a brilliant photographer. Klumpner and Brillembourg use as many platforms as they can to influence the public and decision-makers: Photographs, lectures, articles, books, films. Daniel Schwartz, a U-TT researcher, has a background in journalism and photography. His colleague Alexis Kalagas also worked as a journalist before joining the office. "We both chose to work at U-TT because we believe in the importance of bridging the divide between the built environment and social issues," Schwartz writes of himself and Kalagas in an email.

LAST SUMMER, Klumpner and Brillembourg led a design/build workshop in the Khayelitsha township of Cape Town, South Africa, where ETH Zurich students developed a modular prototype for a two-story shack. The emphasis was on economy and replicability, a toolkit rather than an ideal form. U-TT wants to "massify" such solutions, Klumpner says, through partnerships. Of course, so does every social-impact architect. It's getting beyond the demonstration phase that is the movement's next frontier.

Someone will cross that frontier, and why not U-TT? The firm is working with the Emerging and Sustainable Cities Initiative, which advises second-tier cities in Latin America and the Caribbean on development. The initiative is led by the Inter-American Development Bank and receives funding from the Swiss government. U-TT detailed one of its architects, Lea Ruefenacht, to work at the bank's Washington, D.C., office for a year, coordinating an urban renewal project in Port of Spain, Trinidad and Tobago. Embedding a designer in a development bank won't awe the jury at Venice, but it may be the most progressive thing U-TT has done yet.

THIS PAGE: U-TT; OPPOSITE PAGE: DANIEL SCHWARTZ/U-TT&ETH

Opposite: A vertical gym under construction in the El Dorado barrio of Caracas. **This image:** An interior of the first vertical gym, in Barrio La Cruz in Caracas.

Clockwise from top left: The Metro Cable line that runs from the San Agustín barrio to the center of Caracas, which U-TT proposed as an alternative to a new road; the modular prototype house in the Khayelitsha township of Cape Town, South Africa, developed by ETH Zurich, U-TT, and the South African nongovernmental organization Ikhayalami; Torre David, the unfinished Caracas skyscraper populated by squatters that U-TT has studied as an example of a vertical community; and the proposed CIASMB Music Center for Social Action in Caracas, designed by U-TT as a combination music school and performance space.

DANIEL SCHWARTZ/U-TTÐ BOTTOM LEFT: U-TT/SLIK

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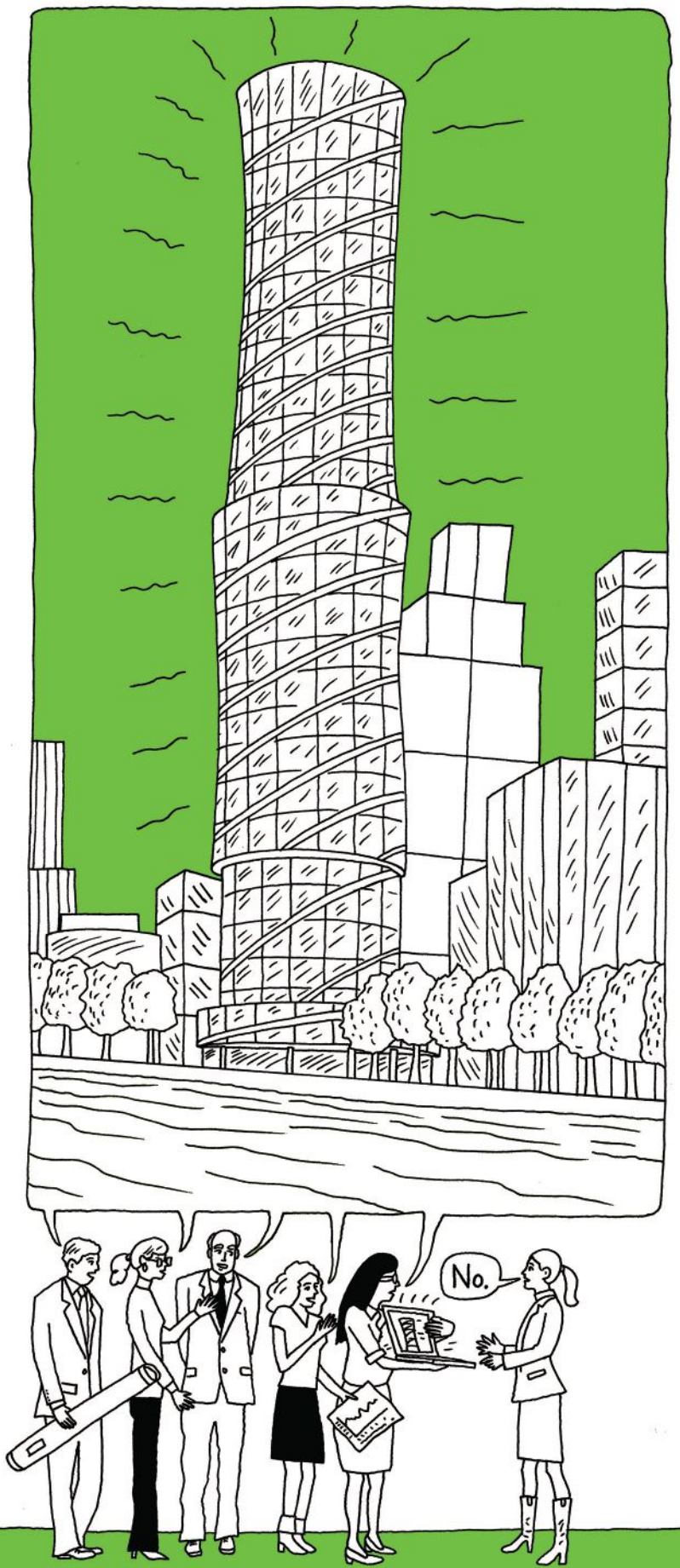
BEST PRACTICES

MASTERING THE POST-LOSS DEBRIEF

THERE'S NOTHING WORSE THAN LOSING A COMPETITION THAT YOU THOUGHT YOUR FIRM WOULD WIN. EXCEPT FOR FAILING TO FIND OUT WHY.



Text by **Rich Friedman**
Illustrations by **Peter Arkle**

IN THE BUSINESS DEVELOPMENT REALM, it can literally be a $1 million question: Why did we lose this project? As a firm, you might have been scoping out the opportunity well in advance of the Request for Proposal (RFP) and thought that you were well positioned. You felt confident that you knew the competition, had a solid presentation, and more than sufficiently had answered the questions "Why us?" and "What value do we bring to the project?"

Many firms don't make time to gather feedback from a prospective client about why they lost a project, even though they may have spent thousands of dollars in quantifiable and opportunity costs, such as the time spent by firm staff pursuing the commission.

That's a major mistake. Conducting a debrief sends a strong message to clients that you care. It communicates that you don't take them for granted and, most importantly, that you want to win the next competition. Also, if done correctly, the data that you glean from a debrief can inform—and improve—several aspects of your marketing and business development processes. You can gather competitive intelligence, pre-position for future opportunities, and get feedback on your team's

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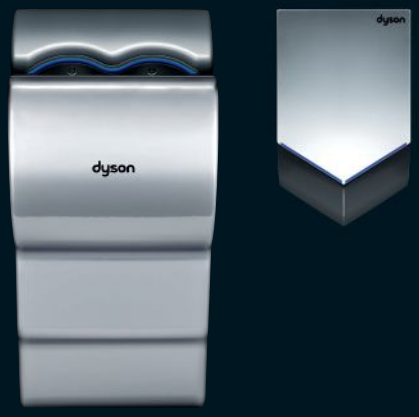

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presentation, messaging, and use of technology.

Firms that have engaged in post-competition debriefs know how awkward they can be if not done well. For starters, firms should ask open-ended questions and prioritize them if the interview will be short. Here are several questions that are especially effective:

- What were the most important criteria during the selection process?
- How could the RFP response have been improved? (Was it clear? Did it sufficiently answer questions and pressing issues?)
- If our firm was shortlisted, why? What stood out? What concerns were there, if any?
- How did our firm perform during the interview process? (Ask for specifics about each of the presenters and their content and style.) Was the presentation compelling? And if not, how did it miss the mark? Did the presenters connect with the audience, and if not, why not?
- What led to the winning firm's selection? How did that firm differentiate itself from the competition? What other factors influenced the decision?
- How did our firm's fee compare to that of our competitors?
- What advice can you offer our firm when we pursue future opportunities with you?

In my experience, there are four main mistakes that firms make when conducting loss debriefs.

- They may let too much time pass. As time moves on, details on both sides tend to get fuzzy.
- They may have the wrong person conduct the debrief. If the person isn't curious enough, takes negative feedback personally, or is too technical or project-focused, the results won't be useful.
- They may ask questions that are too general, or don't ask enough open-ended questions or difficult, probing, follow-up questions.
- And, finally, they may not act on the feedback.

Given the challenges of conducting loss debriefs, some firms choose to outsource this critical task to an independent third party, especially when dealing with strategically important clients and projects. That may make sense if there is a compelling enough economic upside of applying the data to future pursuits and to overall marketing and business development strategy. It may also make sense if clients would feel more comfortable providing constructive criticism to an independent third party that specializes in conducting research and may thus be more apt to ask probing questions.

Indeed, a consultant may have greater success than you or a member of your firm in landing an interview with the client. For example, in 2013, participation rates for loss debriefs that my company, Wayland, Mass.–based Friedman & Partners, conducted averaged 86 percent. Remember, it may be yet another expense to budget for, but the nuggets you gain from a loss debrief can oftentimes pave the way for future successes with that client and others.

However your firm chooses to handle a competition debrief, it should be considered an essential part of your business development strategy, designed and implemented in a way that will improve your chances of landing the next big project.

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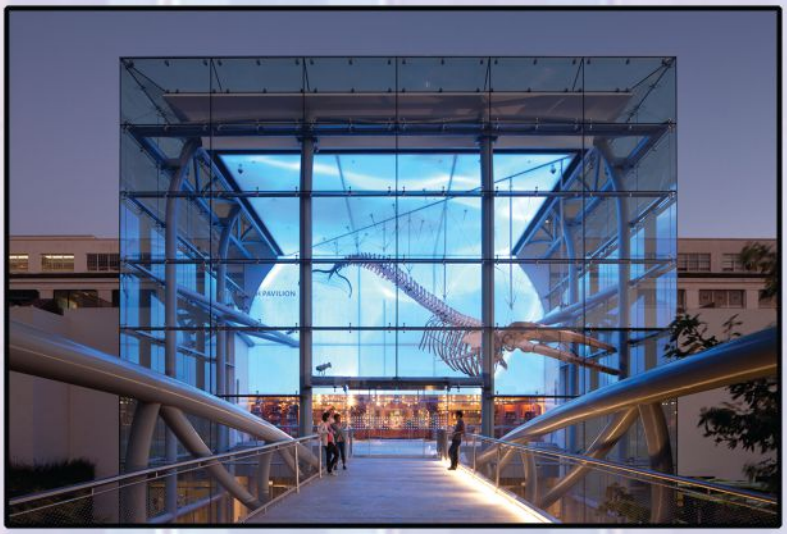

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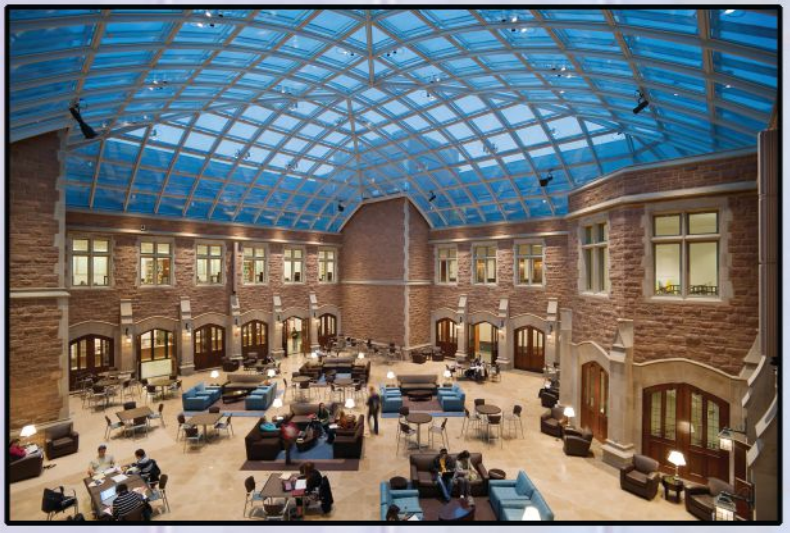

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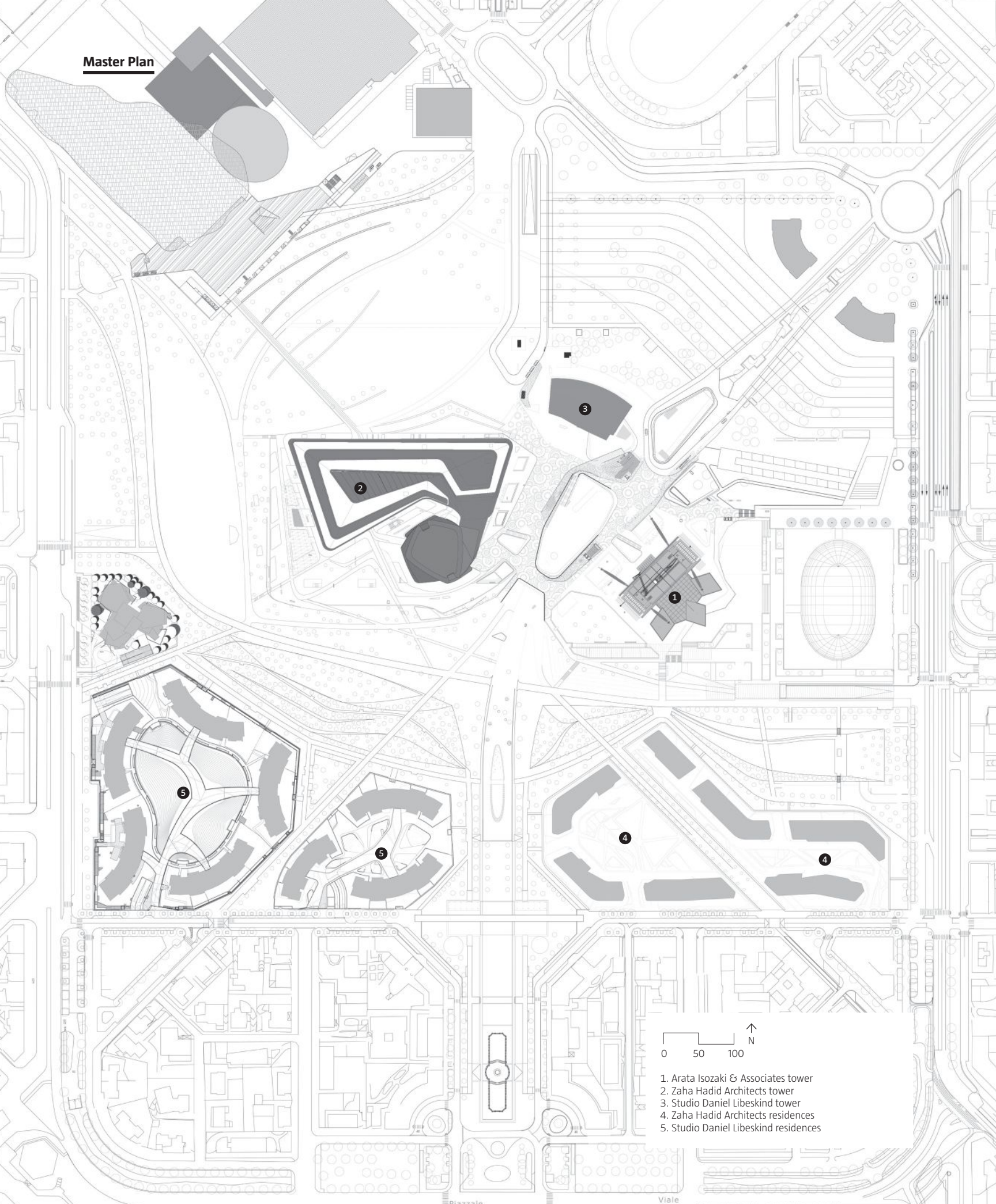
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1. Arata Isozaki & Associates tower
2. Zaha Hadid Architects tower
3. Studio Daniel Libeskind tower
4. Zaha Hadid Architects residences
5. Studio Daniel Libeskind residences

CITYLIFE

A NEW NEIGHBORHOOD IS TAKING SHAPE IN MILAN, AND IF THE FIRST COMPLETED STRUCTURES—APARTMENTS BY ZAHA HADID AND DANIEL LIBESKIND—ARE ANY INDICATION, IT COULD BE A MODEL FOR URBAN DEVELOPMENT IN THE UNITED STATES.

Text by **James Russell**
Photos by **Michele Nastasi**

STAND IN A NEW PARK taking shape northwest of downtown Milan and allow your eyes to be overstimulated by two startling apartment complexes on either side. On one side, a crenellation of cockeyed penthouses tops five slab buildings. Bulging terraces crease their surfaces into stiff drapes. Turn the other way and take in curvaceous structures that evoke departing cruise ships with sleekly undulating white balconies.

This sounds like a stylistic fistfight amid the genteel apartment buildings and dignified red-tile-roof villas of the affluent surrounding neighborhood. Though the assertive architecture demands attention, the 600 units of luxury housing—the first phase of an ambitious mixed-use megaproject called CityLife—stir together elements of both traditional and modernist urbanism. A brave new world? It's more of a well-bred mutt—delivering the lifestyle expected of high-end, market-rate housing, while taking calculated risks in both design and urbanism.

Moving the Fiera di Milano—the giant complex of trade-fair pavilions that annually plays host to shows like the Salone Internazionale del Mobile—to a Massimiliano Fuksas, Hon. FAIA–designed compound on the outskirts of the city in 2005 freed up a 90-acre tract with transformative potential just 3 kilometers from the famous Duomo. A decade ago, two large insurance companies, Generali and Allianz (which formed a development corporation also called CityLife) won the right to develop the site in a competition, thanks in part to a master plan by New York's Studio Daniel Libeskind, London's Zaha Hadid Architects, and Tokyo's Arata Isozaki & Associates. The plan turns most of the site into curving bands of lawn alternating with forest (42 acres of it public), with groups of commercial and residential structures floating like "archipelagos" amid the greenery, as Daniel Libeskind, AIA, put it on a recent tour.

The strong desire for a parklike setting in densely built-up central Milan meant that the surrounding gridded and diagonal streets extend into the site only as pedestrian paths. They get swept into the curving swaths of lawn and forest designed by the London-based landscape architecture firm Gustafson Porter. Vehicles dive underground to below-grade levels accessible at the site's edges so that cars are all but invisible at CityLife, even though the development will ultimately park 7,000. "We exceeded the minimum requirement for open space by about 15 to 20 percent," says Studio Daniel Libeskind principal Yama Karim. "We saw that as shaping a better environment for the development."

The greenery flows into a vast plaza in the middle of the site that fluidly unites three showpiece office towers: a 50-story slab by Arata Isozaki, Hon. FAIA, with gently undulating glass walls; a twisting 43-story tower by Zaha Hadid, Hon. FAIA, that will rise out of a winglike shopping-galleria base; and a curving 30-story tower by Libeskind. A stop on a new subway line (under construction) feeds the development from beneath the plaza.

The towers don't acknowledge each other, even though they rise high above the city's predominantly low-rise fabric. The assemblage may be ambivalently iconic, but Libeskind sees it as representing Milan's polycentric nature. The towers form gateways along the axis of boulevards that head toward the site from several directions. The commercial center won't be complete until 2016 or later.

A SWATH OF FOREST intended to restore a native Lombardian ecology will divide the commercial archipelago from the two residential groupings completed last fall. Here, both Hadid and Libeskind arranged several apartment buildings (condo units for sale, with a few rentals) loosely around a large green courtyard, leaving gaps between the buildings to frame views to the neighborhood or park. This scale is common in suburban European developments. In American terms, it falls between Miami-style tower developments and suburban garden apartments. Walkways feed bi-level lobbies through the generous courtyard greenery.

The ensembles by the two architects share an underlying DNA, which is why they play well urbanistically. The deeply modeled façades and the layering of materials form a richly textured street wall at the southern end of the site where the shortest buildings (five and six stories) face the neighborhood's low-rise residential mélange. Apartments as tall as 13 and 14 stories face toward the development's interior, where their size is large enough to engage the office towers.

Libeskind's 308 apartments in eight buildings stand around the courtyard like the monoliths at Stonehenge. Though each building arcs gently in plan, Libeskind's team achieved the richly sculpted effect by dramatically shaping the balconies, which form vertical creases that wander back and forth as they rise, overlaid by trellises made of a wood-polymer composite. "Outdoor living in an urban environment is so precious and sought after," Karim says. Many of the balconies are big enough for a family dining table. The crisp corners and surgical flatness of the surfaces come from large ceramic panels, striated to evoke travertine, that are glued and hooked to the concrete and masonry walls.

The plans are generous but conventional, mostly with the separate kitchens Italians prefer, rather than the combination of living, dining, and shiny trophy kitchens often found in high-end American developments. Layouts idiosyncratically reconcile the buildings' exterior gyrations, and many apartments are floor-through and access two balconies. Double-height living rooms open up city panoramas in duplex penthouses.

The seven buildings and 300 units designed by Hadid wrap one large funnel-shaped courtyard sliced by a diagonal public passage. The

Above: The residences by Studio Daniel Libeskind are sited around a courtyard; gaps between the buildings offer glimpses of the surrounding context. **Below:** A rendering of the three office towers designed by (from left to right) Zaha Hadid Architects, Studio Daniel Libeskind, and Arata Isozaki & Associates. The Isozaki tower is nearly topped out.

undulations of the balcony faces play off varied ribbon windows with their sloping jambs and alluring (and expensive) radiused corners. Some surfaces get an overlay of wood-plank insets, inkblots that have spread across the white-painted metal panels in 1970s supergraphic shapes. They domesticate the courtyard-facing sides of the building, according to Maurizio Meossi, the project manager at Zaha Hadid Architects.

Though the buildings kink here and there, Hadid sticks to a conventional slab form that encloses disciplined, functional floor plans, where many rooms align their long sides to the windows and balconies. Living rooms typically open to city or park views; bedrooms and other private spaces face the courtyard. The rounded-corner sinuosity of the lobby promises sculptural drama, but that's saved for units shaped by the exterior's curves and for duplex penthouses, where setbacks in the building carve bullet-shaped bays and prowlike balconies.

CITYLIFE MAY FEEL ARTIFICIAL for a while with its isolated building groupings strangely suspended between "walkable urbanism"—though here you stroll to a mall rather than a corner store—and lush, modernist tower-in-the-park suburbanism, a type Americans often find impersonal but which Europeans appreciate in contrast to the dark and noisy historic city.

The generosity of the balconies seamlessly extends the interiors outdoors, which you rarely feel in today's U.S. projects. The buildings themselves create extra value by deserving to be part of the view. In contrast to the asphalted surroundings and vinyl-windowed cheapness of even high-end American developments, these assemblages dynamically engage the greenery and kaleidoscopically choreograph sun and shadow through the day. CityLife courtyards are worthy amenities, not parking-lot leftovers. American residential developers should take note: They could learn a thing or two from CityLife.

Above: The taller of Libeskind's residences are sited toward the center of the master plan in order to increase the scale closer to the planned towers. **Below:** The residential complex designed by Zaha Hadid Architects is more curvaceous in form than Libeskind's, with wood inlays set around the concrete structure.

Above: The Libeskind residences are clad in tile and wood-composite lattices and topped by penthouse duplexes. **Opposite top:** A double-height lobby in the Libeskind residences allows for access from both the lower roadway—sunken to avoid cluttering the site with vehicular traffic—and the landscaped courtyard above.

Opposite Bottom: A perimeter wall denotes the southern edge of the CityLife site in front of the Zaha Hadid Architects–designed residences; access to underground parking is indicated by articulated canopies. **Below:** The curves of Hadid's non-orthogonal windows continue in the pedestrian lobby, which is accessed from the central courtyard.

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Text by **Philip Nobel**
Photos by **Peter Aaron/Esto**

THERE WAS A TIME not long ago when a building such as TEN Arquitectos' new business school for Rutgers University in Piscataway, N.J., might have gotten by on its crisp good looks and structural exhibitionism alone. As a taste for such things took hold overseas in years past—and as an architecture of seductively picturesque risk increasingly became the norm—aesthetically and fiscally conservative America lagged very far behind.

We were deprived then, as the late Herbert Muschamp often noted, of examples of this nascent architecture of "desire." It followed that desirous critics were often moved to give a pass to the few projects in that contemporary mode that did get built here: A delight in a building's boldness and apparent novelty trumped any concerns about the means deployed and sacrifices made to realize the desired effects.

Thankfully, that time has passed: We've all seen this stuff before.

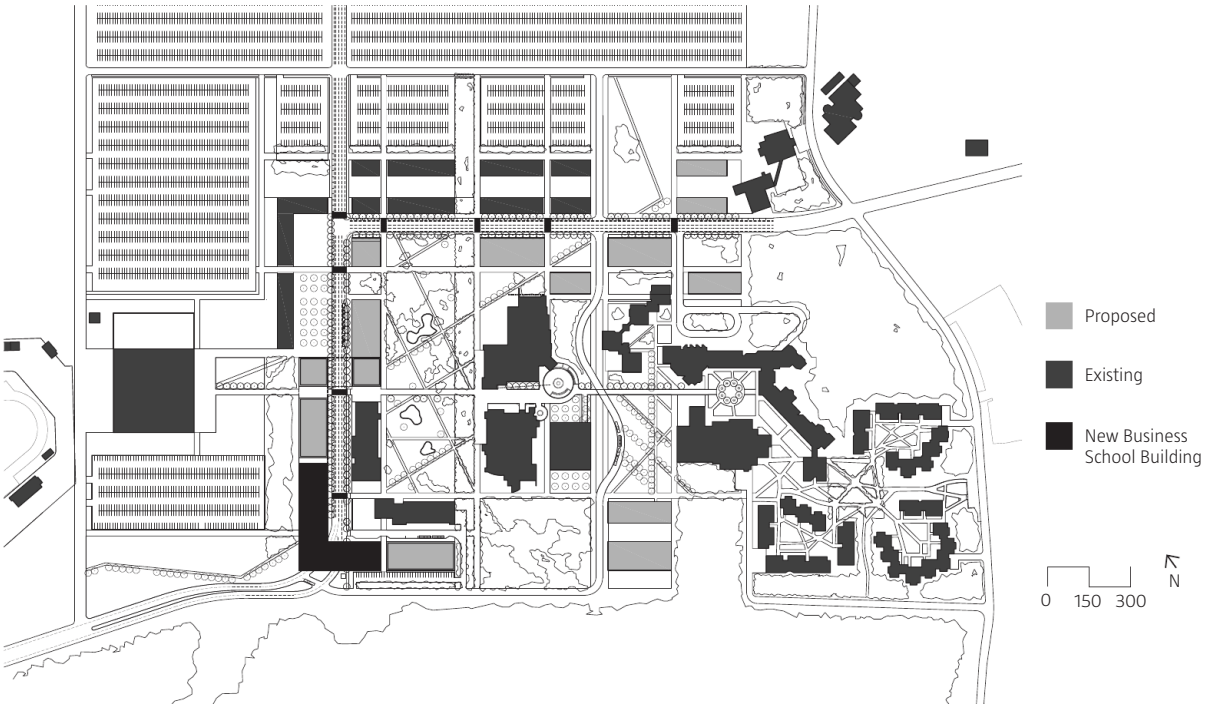
So let's ignore for the moment the wide, bent, road-spanning bridge of Enrique Norten's business school building; the 10 cheekily canted columns that hold the top floor in place 60 feet in the air as it travels between anchoring wings; the frank baring of its photo-white bones through glass walls where the building faces the exurban satellite campus for which it serves as icon and gate; the racy texturing of the opaque skin and the resulting near-total blindness of the building where it faces away.

Let's ignore every camera-friendly move that, before we became inured through overexposure, might have made us say "Wow" or "Cool" or even "Gee whiz! I want that"—noting, however, that the greatest pressure on a design to incorporate such features is, very often, the mercantile drive to elicit those exact feelings of transient awe and desire. First from clients, to secure the buy-in; then from donors, to secure the funds; later to aid in capturing the attention of harried editors and impressionable writers; eventually, perhaps, to dazzle colleagues; and, always, to arrest the consuming gaze of civilians—future clients!—as they flip through a magazine like this one.

By that standard, this is a job well done. And as such it is typical of the work of Norten's firm, which thoughtfully uses novel forms and suites of effects. "We didn't want another box in the landscape," says Norten, Hon. FAIA, of a landscape for which his firm began preparing the master plan in 2009. And he didn't give his clients a box, outside, or in. To the architects' great credit, the interior spaces of the building are in fact very cool.

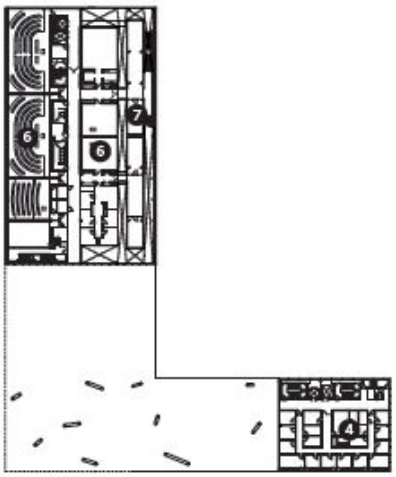
And functionally so. The trend among contemporary business schools is to give precedence to spaces for collaborative work. Here, those "non-programmed" spaces, as Norten calls them, generate the logic of the whole. A series of open lounges and labs, and a stack of conference rooms enclosed by fogged glass, inhabit a tall, narrow zone just behind the fully glazed, amply fritted, campus-facing wall of the main wing. Then—across

Campus Master Plan

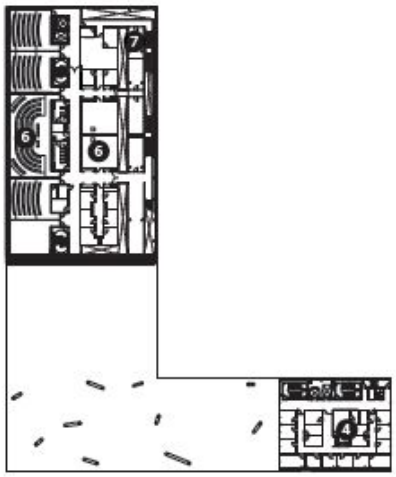


Previous spread: The new business school serves as a gateway to the Rutgers campus, part of a master plan also designed by TEN Arquitectos (at left). **Opposite:** The building's southwest corner, supported by canted columns, bridges a road onto the campus. Three-dimensional metal panels from Centria clad the west and south façades. **Top:** Seen here from the southeast, the elevations facing the interior of the campus incorporate curtainwalls from Jangho with glass from Oldcastle BuildingEnvelope. **Above:** The north end of the L-shaped building is also glazed, placing the internal trusswork and structure on display.

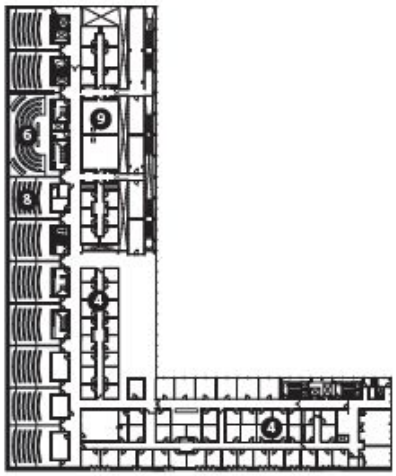
Third-Floor Plan



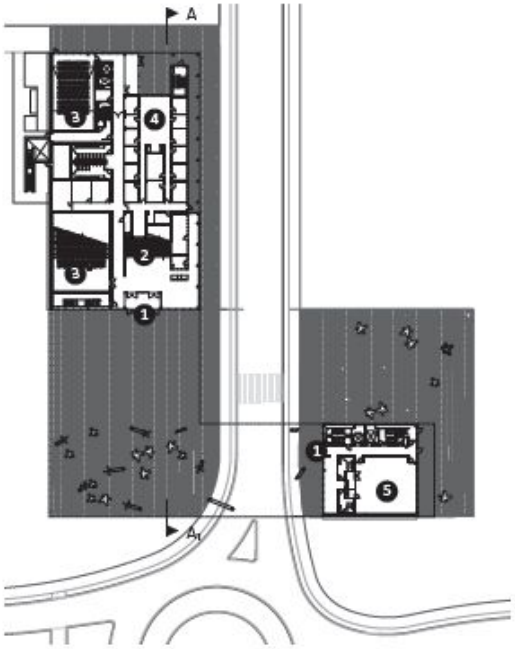
Fourth-Floor Plan



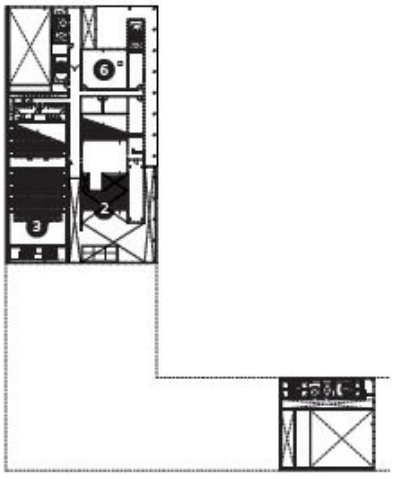
Fifth-Floor Plan



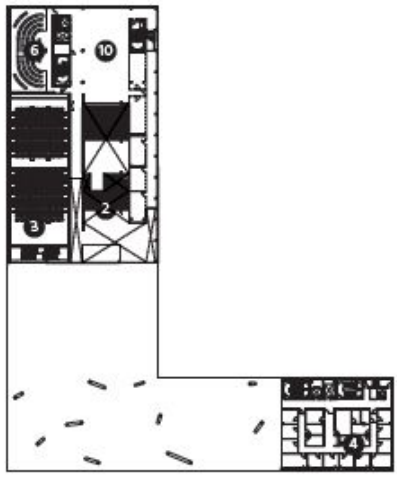
Ground-Floor Plan

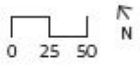


First-Floor Plan

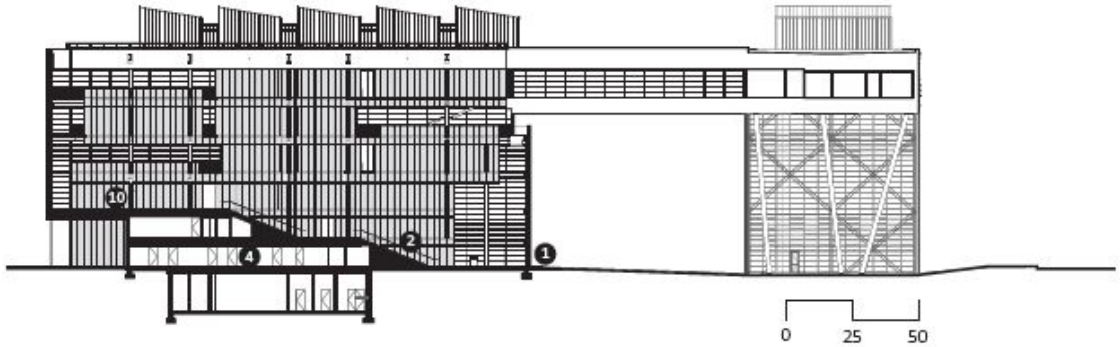


Second-Floor Plan

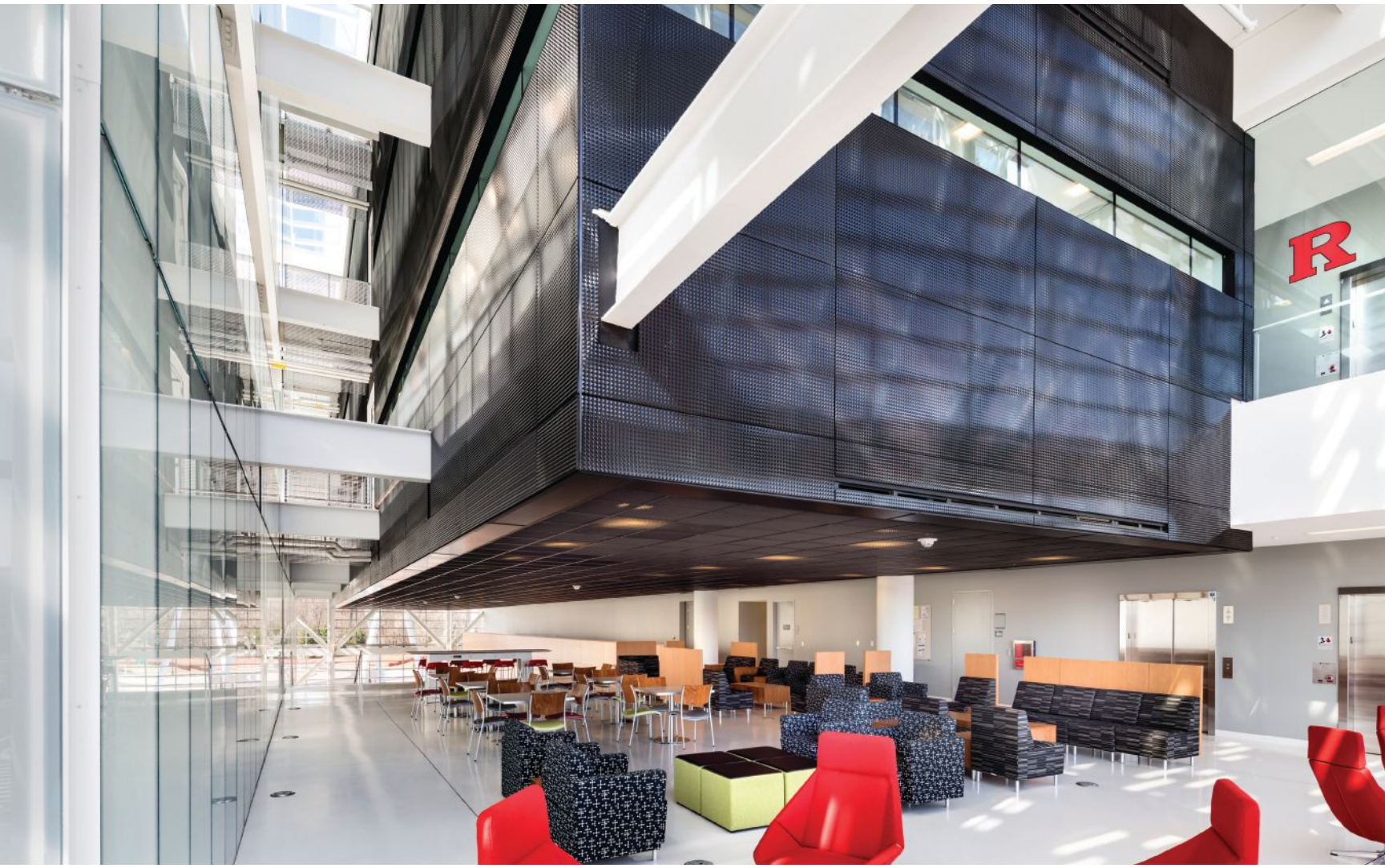




Section A–A1



1. Entrance
2. Grand stair
3. Lecture hall
4. Office
5. Multipurpose room
6. Classroom
7. Breakout room
8. Computer lab
9. Conference room
10. Lounge



a light-giving slot—offices and small classrooms are hung in a second discrete volume, the exposed surfaces of which are wrapped in shiny black-plastic sheets studded with little pyramids. That funky material also marks one side of the main corridor in an abutting third zone, where elevators, plumbing, larger classrooms, and the school's enormous main auditorium find their home, backing up to the building's great, blind wall facing the outside world.

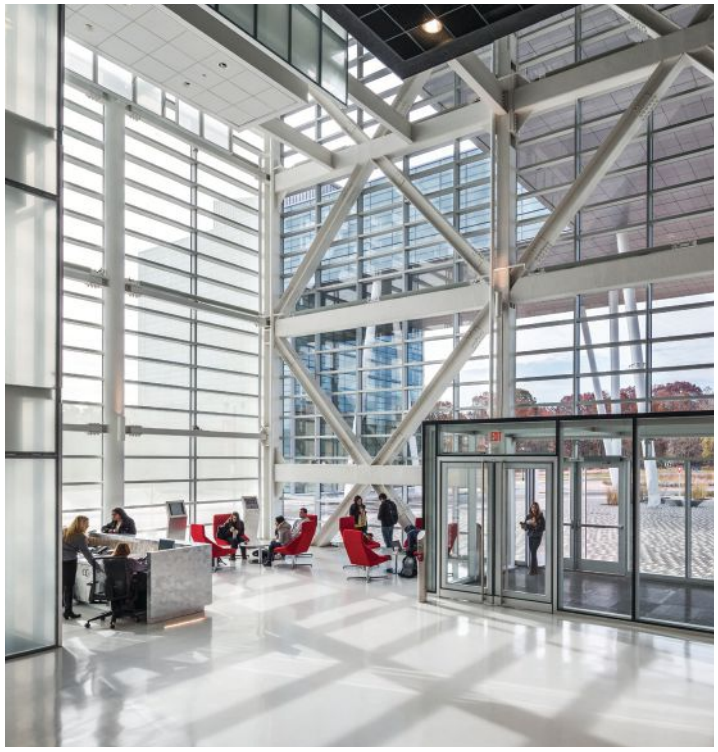
It's a smart organization of space, and one that is readily apparent coming in the front door, past the sitting area and greeting desk, where the gently sloped main stair—designed, and used, for gathering—takes you up two levels to nearly meet the ceiling in an intelligently, even lovingly, compressed lounge area. It's the first of so many examples, from the airy platforms opening off the suspended stairs that knit the "non-programmed" zones together so well, to the more formal resting nooks, with their carved Corian benches, that are to be found outside the smaller classrooms within the carefully scaled, black-wrapped middle zone.

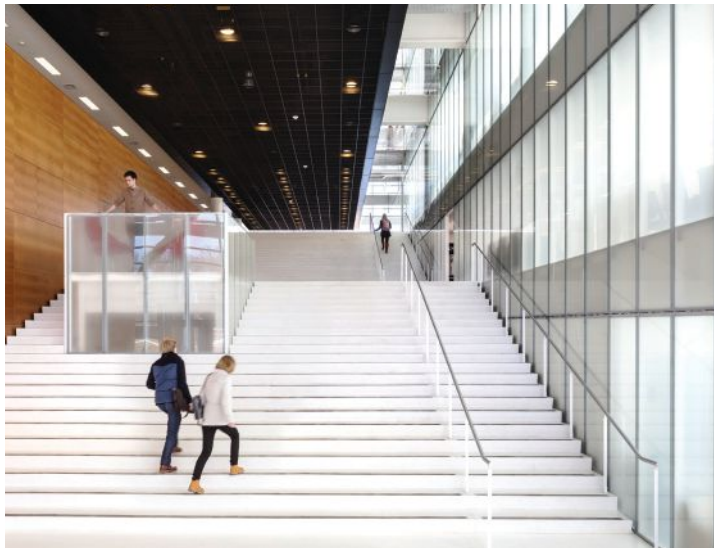
"We were always trying to find little opportunities for people to just sit and be there," Norten says. And in that he and his team have succeeded; the building is alive inside, and the students are taking the architects' cues and running with them.

There is always a "but" in this sort of building, where glamour has a voice in the process of design, where the production of desire, the ensorcelling of clients or donors or press, however useful in the early stages of a project, is given shape and made permanent in the construction itself. Now we return to the big move: that big bridge up there on its big, beautiful columns. From the road, approaching, and especially when rounding the traffic circle as one prepares to take the turn in, and under, and through, that feature of the building does an excellent job of signposting the campus—as it was intended to do, serving here the broader purposes of TEN Arquitectos' master plan.

But having carved that space out of the larger mass to give the building such an eye-catching roadside presence, there must also have been an incredible pressure to use that portico to aggrandize the pedestrian entrance—placing it there even if parking is elsewhere and not easily reached, and even if students will approach the building from the opposite direction (toward the glazed elevations that face the center of campus).

So we have here really two buildings, interpenetrating: A grandiose one, its forms derived in part by the need to impress through images, generating an architecture that has mostly served its purpose before the groundbreaking. And living under the same roof—gaining little benefit from the drama outside—a neat, bright, smart series of accommodating spaces. It is a building that seems well-tempered to the needs of its users, apart from the nagging suspicion that, after paying the price charged for an architecture of desire, they will be inclined to sneak in through the back door.





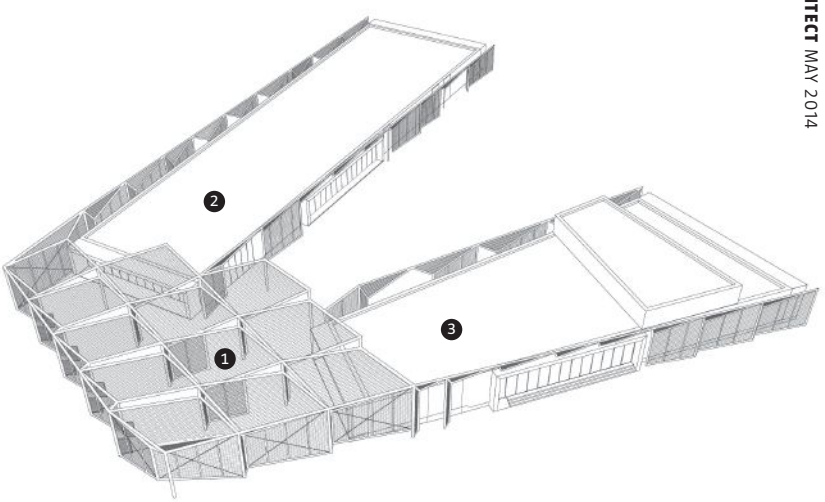
Previous spread: A lounge at the top of the main staircase is the first "non-programmed space" that visitors encounter in the building, and it sets the tone for the interior strategy. **Top left:** The main pedestrian lobby is located under the bridge, in the western wing of the building. **Above left:** The main stair leads from the lobby to the lounge. Acoustical wall panels from Armstrong mitigate sound in the hard-surfaced space. **Above right:** The perimeter stair located on the eastern, glazed side of the building. **Opposite:** Additional lounge and breakout spaces are located throughout the building, especially around the main atrium in the western wing.

ZOOLOGICAL PARK OF PARIS

BERNARD TSCHUMI HAS REIMAGINED PARIS'S BELOVED BUT CRUMBLING 1934 ZOO IN A WAY THAT IMPROVES THE EXPERIENCE FOR BOTH THE VISITORS AND THE ANIMALS.

The main entrance to the zoo directs visitors between two new ticketing halls, and underneath a canopy of chain-link panels.

Entry Pavilion Diagram



1. Entry canopy
2. Store
3. Ticketing

Interview by **Aaron Betsky**
Photos by **Iwan Baan**

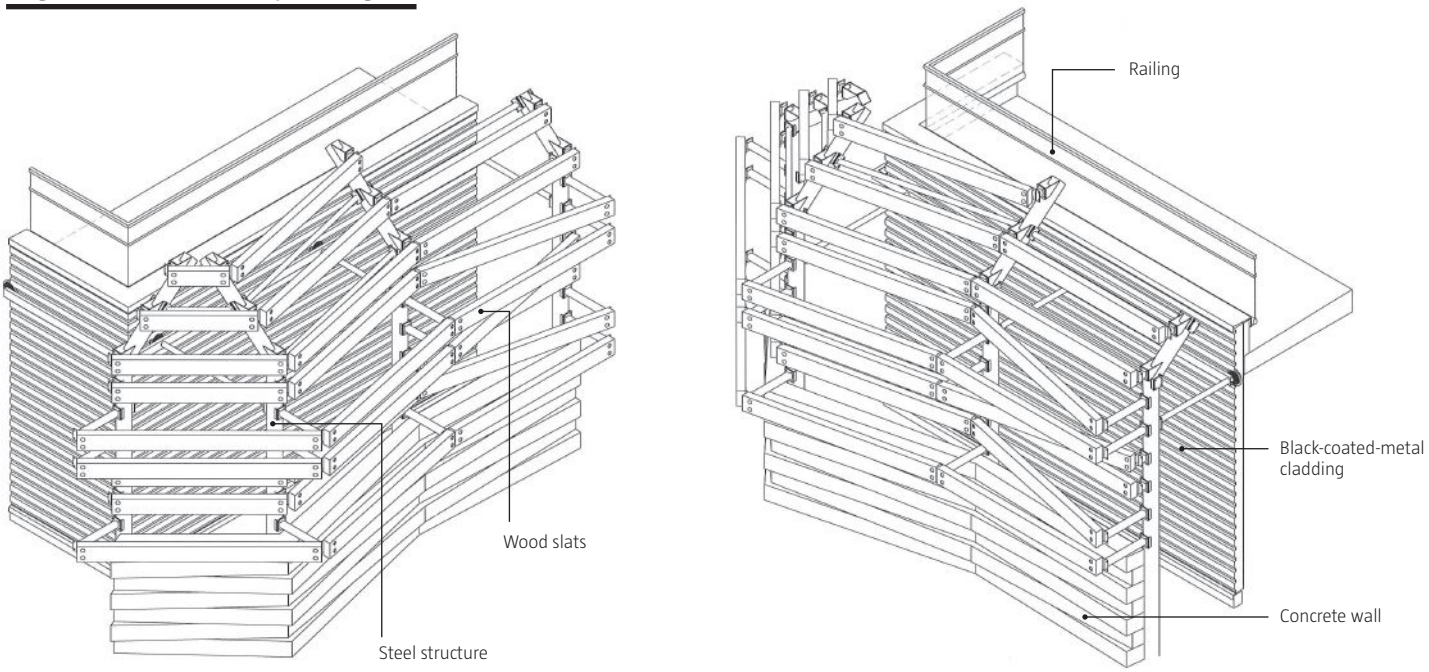
LAST MONTH, the Parc Zoologique de Paris reopened after a six-year renovation by Bernard Tschumi Architects. A branch of the National Museum of Natural History, it is commonly referred to as the Zoo de Vincennes, because it is located in the Bois de Vincennes, a 2,459-acre park on the city's east side. When the zoo opened in 1934, it was notable for presenting the animals without cages, in a semblance of their natural environment. Tschumi was tasked with maintaining this philosophy, and with preserving such landmark features as the Grand Rocher, a 215-foot artificial mountain. Today, the park is home to more than 180 species from around the globe, including piranhas, lemurs, penguins, and a lion named Nero.

The situation you found was a rather idiosyncratic zoo, as I understand it.
Bernard Tschumi, FAIA: In 1934, the French opened this zoo, which had a few interesting characteristics, like those huge artificial rocks. Unfortunately, the zoo was not very well maintained and about six years ago, it had to close and to be completely reformulated, both for biological reasons—the concept of a zoo has completely changed—and also for security reasons. The place had become really dangerous.

Both for the animals and for the people, I take it.
Exactly. Some of the artificial rocks were falling on the heads of people and animals. The Museum of Natural History, which is in charge of the zoo, decided to organize a competition between three large general contractors. One of them, called Bouygues, called me and said: "Would you like to be our architect?" And so we started to work for a little bit with them, and we were selected, and then we started to work for real.

It's not exactly the world's largest zoo. It seems fairly compact.
Absolutely. You make a very good point. It's about 45 acres. That means that certain animals, elephants for example, are not there, because elephants

Large Animal Enclosure Façade Diagram



need too much space. So the species were selected in relationship to the amount of space that they had at their disposal.

You felt that the architecture for the people and the animals should be the same, as much as possible, rather than there being one system for each.
Correct. The idea was not trying to make a sort of architectural acrobatics for people and a different thing for the animals, but rather, to look for common denominators. In a zoo, by definition, you're going to have aviaries. You're going to have tropical greenhouses. There are also a lot of technical buildings—places where the animals sleep and eat. They are fairly utilitarian buildings, especially considering the budget that we had. So for these, I developed a system of screens, continuing my own interest on the idea of double envelopes. Here we have a functional envelope and a visual envelope, the latter of which is made of wooden beams that are organized in a sort of random disorder so that they become a very informal background to the nature.

The first thing I thought was: "Bernard Tschumi has gone wild." I am used to your work having a rather rigorous order to it, and I couldn't think of another project where you had used such apparent randomness.
Well, I think you got it right. Everything was worked on using the most rigorous conceptual development, and we arrived at minimalist solutions, but this time the intention was to arrive at a design which would be a background, not a foreground. Much of the idea of a zoo is about a landscape, it's what zoo people call biozones. For example, the planting—which was done by a very interesting landscape architect named Jacqueline Osty—tries to find a species of trees that looked like the Sahara, that looked like the tropics, like Patagonia. In other words, it's re-creating a sort of ecosphere and so the architecture had to voluntarily take a back seat. But I also was interested in the notion of the double envelope, where one is functional and the other is the visual envelope and that one is the one which is random and disorderly.

Since you started from this notion that the visual language for people and the animals should be the same, did that sort of indicate that where they met was in a zone that was not the kind of logic-ordered zone of the urban environment?
It's rather an environment that would displace you somehow. Whether you are a person or an animal, when you go to places—whether it's the restaurant or the house of the rhinos—they are actually using the same architectural components. I was trying to say that there's no such thing as an architecture which is 4,000 years of history, which is the architecture of humans, and then there's another sort of shelters for animals, which are also preconceived ideas. I was trying to avoid that in both cases.

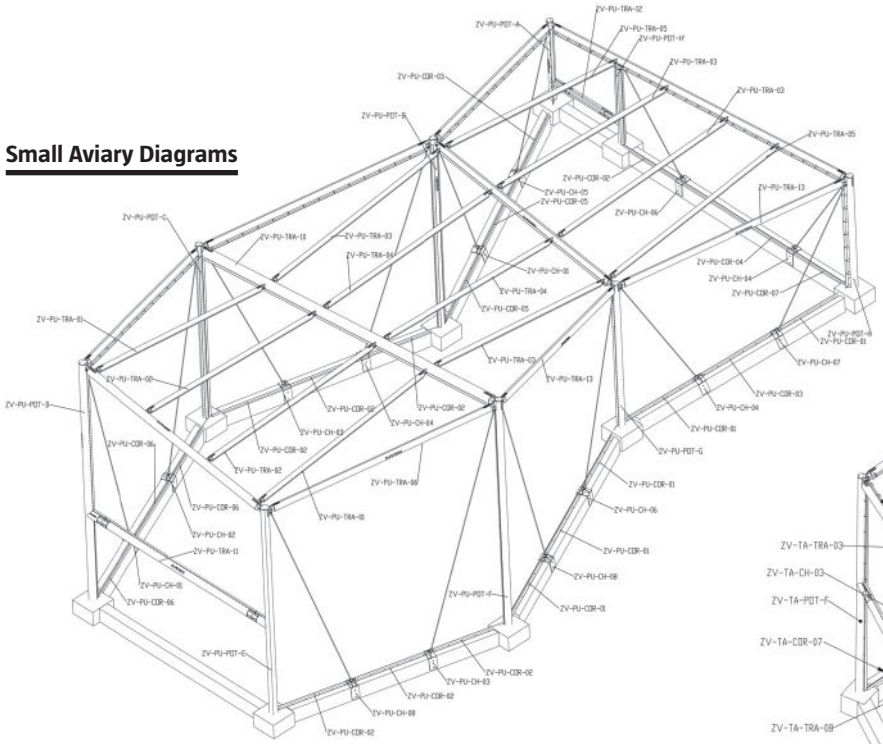
What does it say, conceptually, that the rhino enclosure and the restaurants are the same? It seems to go back to the idea of your Follies—this notion that similar forms can address or host different functions.
It's interesting you say this. Who knows? The Follies were a highly elaborate work of elements that were almost like a construction game. The zoo itself is much freer, much more random. The Follies are really markers—they articulate the space around them, while at the zoo, it's exactly the opposite. Each of the random wooden envelopes are there, not to activate the space, but rather to define it as a background. So it's an anti-La Villette, with a few conceptual points in common.

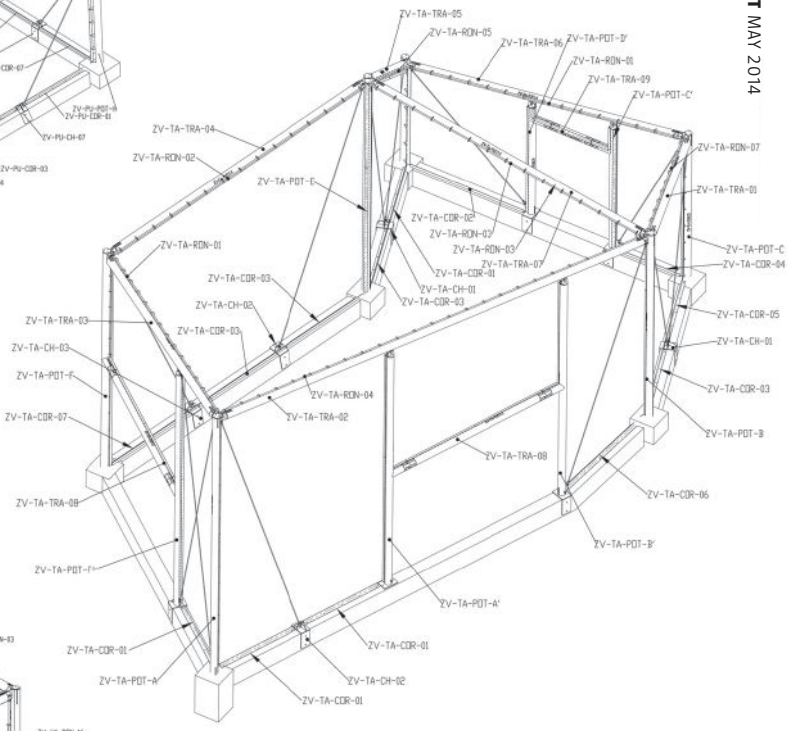
It seems that the objects at the zoo shift and change themselves, depending on their function as well as their situation.
The aviary structures are quite important because a lot of animals—small mammals, monkeys, or birds—are in aviaries. Even small children are in aviaries that are used for education. The entrance of the zoo is, itself, like a very large aviary for the visitors. These structures do have a lot in common with the Follies—it's a combination of parts that give you an incredible variety of geometries.

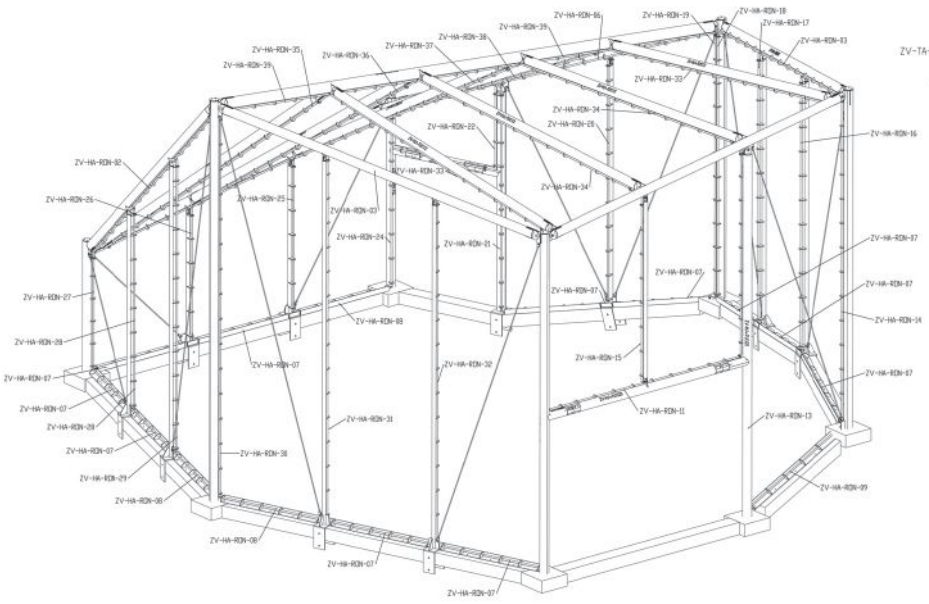
The large-scale animal enclosures, such as those for the zoo's 16 giraffes, feature a corrugated metal envelope covered in a loose latticework of wooden slats. Beyond, the museum's iconic Grand Rocher is one of the fake rocks that were part of the original 1934 design for the zoo.

Above: Tschumi's team used a kit of parts to create different geometries for each of the zoo's freestanding aviaries. **This image:** A much larger aviary tucked behind artificial rock anchors one corner of the park.

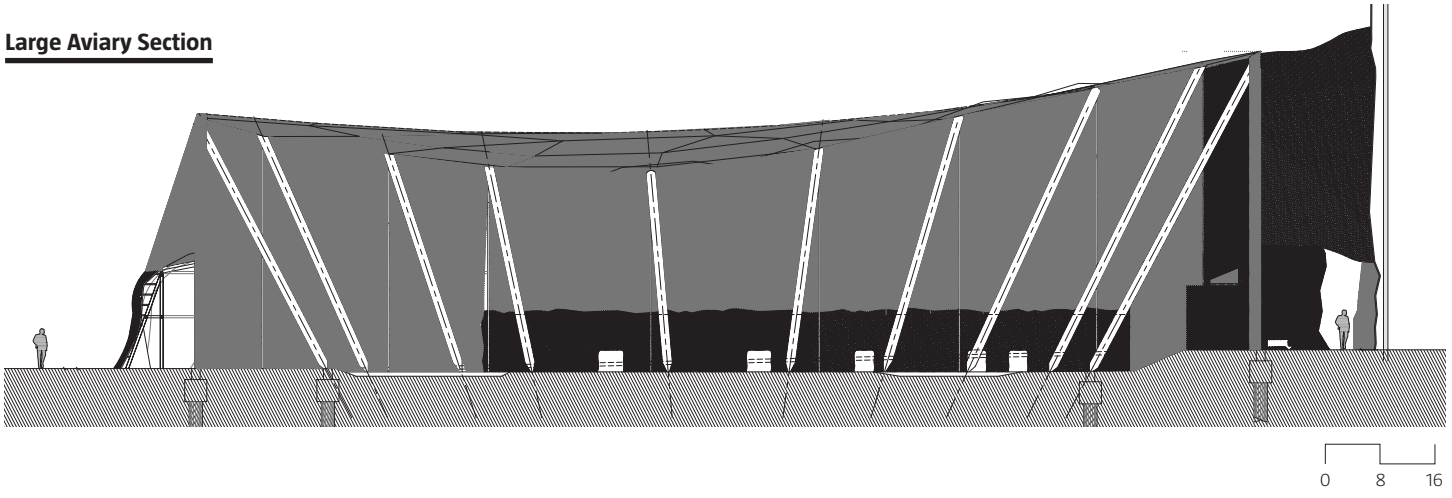
Small Aviary Diagrams





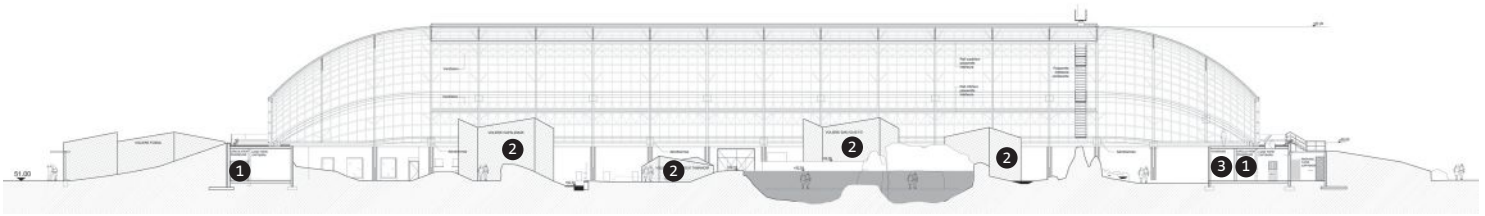


Large Aviary Section



The small aviaries are made from black steel tubes overlaid with transparent wire mesh. Tschumi's 300-foot-long greenhouse (at left) contains plants and animals native to the rainforest.

Greenhouse Section



1. Zookeeper circulation
2. Small aviary
3. Vivariums

0 25 50

The greenhouse seems to be a bit outside of this system because its form and skin are unified. It is an object, a very clear object.
Yes, I would agree with you. Absolutely. The greenhouse is slightly different—the enormous size of it, over 300 feet long, 75 to 80 feet high, means that the cost factor becomes such that you then have to totally rationalize the amount of material that you have in order to make it as efficient as possible. So that's not surprising that we find geometries, which are not that different from some that were invented in the 19th century. The only difference here, the glass is curved—cold curved. It's simply … it's forced into place and, of course, it's using all of the most up-to-date cooling and warming systems that one can do with greenhouses today, but the plate is not quite the same as what I discussed earlier with the aviaries and with the wooden slats. The thing they do have in common is the relationship between each of the small aviaries and the larger greenhouse. The small aviaries are just like fragments that are thrown into the landscape, some that go inside the greenhouse, some that stay scattered on the outside. And the scale shift between the main aviary, which is a huge area, and the small—and between this huge greenhouse and the small aviaries—I find a very interesting sort of correlation.

Zoos are, by their nature, didactic educational institutions. How do you address that, when so much of your work here has been about discoveries and layering, rather than the kind of didactic exposition of things?
Well, amusingly enough, when I got the commission, I thought of the new Acropolis Museum and I felt uneasy: Isn't having giraffes in a zoo, away from their natural home, the same as having the Elgin Marbles at the British Museum? And then I realized, first of all, regarding the giraffes, these giraffes had been in Paris for about eight generations—they were probably more Parisian than most of the people looking at them. Secondly, I think the intent of trying to show the animal in as close as possible to their native environment is a way to make people aware of how fragile that environment is. It has more to do with education than with event making.

You talk about the double skin, and you use that in places like the giraffe housing. But you also seem to be exploring the concept of filters, which seem to operate as an alternative to the double skin condition.
Well, the two work together. If you have a double or triple skin, some of the surfaces, some of the membranes can be absolutely opaque, waterproof, or airproof, while some others can be porous. Some let the light through, some stop the light, some filter the light. So, each of these envelopes at the zoo has its own characteristic and that you play with. The materiality of the envelope is quite important to me, in order to establish its character and its conceptual presence.

I have to ask: Did you go to zoos as a child?
Yes, in particular to this zoo as a little child. You know, I lived in Paris until about age 6 or 7 and the zoo had an incredible rock called the Monkey's Rock—and boy, did I love it. As you see, it's a full urban zoo. It's a zoo where you hear sirens and garbage trucks. It's quite big still.

And did you go to other zoos to prepare for this?
Yes, I went to a few zoos, but I also read a fantastic book called *Constructions Animales* by Bruno Corbara. It's someone who wrote the interesting treatise about how different species of animals build their nest or their burrow. It absolutely fascinated me to discover that animals, like architects, make a distinction between tabula rasa and genius loci, and you can distinguish animal construction by that division. You realize how much building, to animals, has to do with seduction and seducing your other mates, which I thought was very appropriate to architecture.

Inside the greenhouse, tropical animals are housed within aviary structures similar to the ones outside.

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VAULT HOUSE

JOHNSTON MARKLEE TAKES A CURVACEOUS APPROACH TO REINVENTING THE BEACH HOUSE PARADIGM.

Text by **Mimi Zeiger**
Photos by **Eric Staudenmaier**

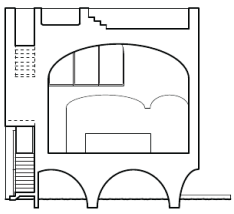
ARCH. DOME. VAULT. The terms are relics of architectural history, but in Southern California they are also the building blocks of suburbia, where Mission-style McMansions flaunt endless stucco arches and vaulted foyers. Principals Sharon Johnston, AIA, and Mark Lee of Los Angeles–based Johnston Marklee, however, have updated the archaic and used vaults to rethink a beach house in Oxnard, Calif., just north of Malibu.

Designed for Steven and Jerri Nagelberg, a couple who split their time between the shore and downtown L.A., Johnston Marklee's scheme addresses a typology common to beachfront communities: Narrow and deep houses sit flank-to-flank along the sand, and while the living room and second-floor master suite of each look onto the ocean, the rest of the house is typically a dim warren.

"At the outset of the design, we asked ourselves how to bring light, air, and a view all the way into the house," Lee says. Rooms in Johnston Marklee's 3,600-square-foot scheme are organized so that one flows into another, from the all-glass beachfront façade to the street, allowing for glimpses of the Pacific throughout the house. The architects pushed the second-floor master suite back from the waves—allowing the living room to fill the whole front of the house—and carved out a courtyard into the middle of the plan. The result is that every room has access to the outdoors.

Vaulted ceilings of different sizes and curvatures define each room, from the kitchen to the guest bedrooms. The office created a 6-foot-long model in order to show the clients and the contractor how the curves come together, but construction was straightforward; the vaults were formed out of wood framing and dropped from the floor plate. "We are interested in using simple geometries to create complex effect," Lee says. "We design in Rhino, but we could have designed the house using a compass."

Section A–A₁



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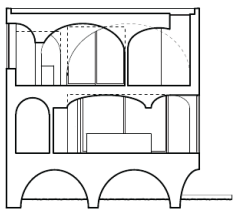

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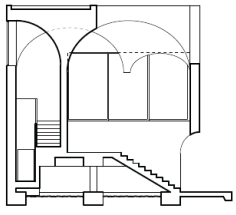

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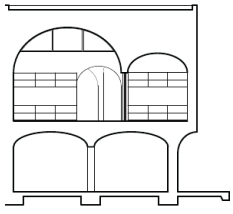
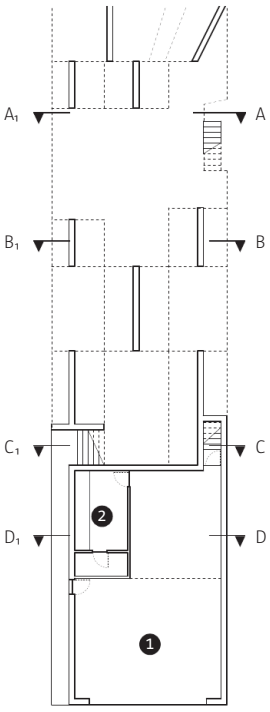
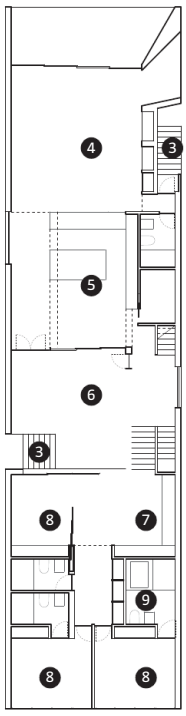


Previous page and opposite: The house's smooth white form is achieved using GrailCoat on the exterior—the elastomeric, cementitious membrane doesn't require control joints or metal flashing. **This image:** The limited, mostly white, materials palette continues throughout: limestone floors inside and out, painted drywall for the interior walls and vaults.

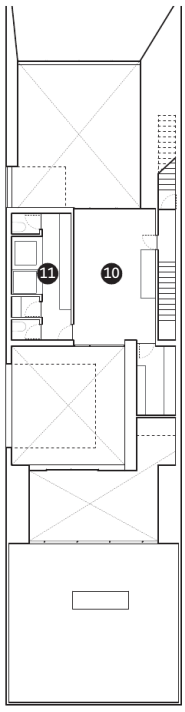
Beach-Level Plan



First-Floor Plan



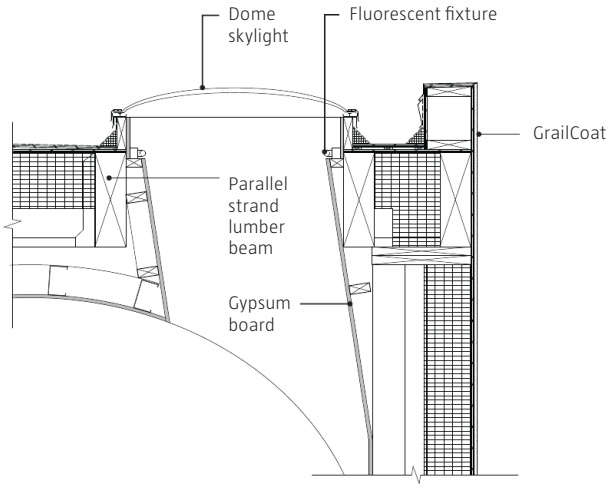
Second-Floor Plan



1. Garage
2. Utility room
3. Entrance
4. Living room
5. Kitchen/dining
6. Courtyard
7. Multipurpose room
8. Guest bedroom
9. Bathroom
10. Master bedroom
11. Master bathroom

Opposite: The home's central courtyard has direct access to the beach via a side staircase. **This image:** In addition to providing light and outdoor living space, the courtyard divides the home into a family volume, seen here with the master suite stacked over the kitchen, and guest volume, seen in the photo opposite.

Skylight Detail



Top: The double-height living room window is visible throughout the house. **This image:** The variation of the vaults allows for different gradients of light over the curved surfaces.

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CityLife, page 86

Project CityLife, Milan
Design Architects Zaha Hadid Architects, London (tower and residences); Studio Daniel Libeskind, New York (tower and residences); Arata Isozaki & Associates, Tokyo (tower)
Developer CityLife
Size 90 acres

Rutgers Business School, page 92

Project Rutgers Business School, Piscataway, N.J.
Client Rutgers University
Architect TEN Arquitectos, New York and Mexico City—Enrique Norten, Hon. FAIA (principal-in-charge); James Carse (project manager); Barbara Wilks, FAIA, Andrea Steele, AIA, Erik Martinez, Joe Murray, Shary Tawil, Wook Kang, Vahid Musah, Erik Lang, AIA, Melany Wimpee, Julian Palacio, AIA, Jae Hun Hor, Ricardo Umansky, David Maestres, Assoc. AIA (project team)
Associate Architect Richard Bienenfeld Architect
M/E Engineer WSP Flack+Kurtz
Structural Engineer WSP Cantor Seinuk
Civil and Geotechnical Engineer Langan Engineering
Construction Manager Structure Tone
General Contractor Century 21 Construction
Landscape Architect W Architecture and Landscape Architecture
Lighting Designer Horton Lees Brogden Lighting Design
Exterior Wall Front
Roofing Wiss, Janney, Elstner Associates
Vertical Transportation VDA
Acoustics Lally Acoustical Consulting
Geothermal Consultant Concord Engineering Group
Cost Estimator Davis Langdon
Size 143,000 square feet
Cost $85 million (building, geothermal, and campus improvements)

Material and Sources

Carpet Bentley Prince Street *bentleyprincestreet.com*
Ceilings Armstrong *armstrong.com*
Concrete County Concrete *countyconcretenj.com*
Flooring Johnson Screens *www.johnsonscreens.com*; Key Resin *keyresin.com*
Glass Oldcastle BuildingEnvelope *oldcastlebe.com*; Vetrotech Saint-Gobain *vetrotechusa.com*
Insulation Roxul *roxul.com*
Metal Centria *centria.com*; Mohawk Metal *mohawkmetalsales.com*
Millwork Educational & Laboratory Systems *allcustomwoodwork.com*; Ideal Lockers *ideallockers.com*
Paints and Finishes Albi *albi.com*; Sherwin-Williams *sherwin-williams.com*
Roofing Carlisle *carlisle-ccw.com*; Siplast *siplast.com*
Seating Sedia Systems *sediasystems.com*
Site and Landscape Products Escofet *escofet.com*; Landscape Forms *landscapeforms.com*
Windows and Doors Erie Architectural Products *erieap.com*; Jangho Curtain Wall *janghogroup.com*

Zoological Park of Paris, page 100

Project Zoological Park of Paris, Paris
Client Chrysalis/Muséum National d'Histoire Naturelle
Architect Bernard Tschumi Architects, New York and Paris—Bernard Tschumi, FAIA (director); Joel Rutten, Chris Lee, Kate Scott (co-directors)
Associate Architect Véronique Descharrières
Mechanical Engineer Setec Bâtiment
Structural Engineer, Aviaries Hugh Dutton Associés
Landscape Planner Atelier Jacqueline Osty et Associés
Project Management Synthèse Architecture with Bernard Hemery
General Contractor Bouygues
Wood Specialist Engineer Johannes Natterer
Scenography El Hassani and Keller
Size 15 hectares (1.61 million square feet)
Cost €165 million ($228.4 million)

Material and Sources

Animal Equipment Equip'Horse, Fauna Research
Aquarium Usine Coutant
Aquarium Design Ocean Project *oceanprojects.fr*
Earthenware Tiles Groupe Cerabain *cerabain.com*
Fake Rocks AAB *aab-fr.com*
Fences Dirickx Procede
Fire Protection CDPI
Foundations Alpharoc *www.alpharoc.fr*
Geosciences Fugro
Greenhouse Construction Richel *www.richel.fr*
Interior and Exterior Sprinklers Sirev *www.sirev.fr*
Joinery Entr'axe
Landscaping Agrigex, Vertdeco Sarl; Dynamique Environement (natural environment rehabilitation)
Low-Voltage Electricity Lafont
Metalwork Leveque Metallerie
Park Games and Environment Enrichment GPE
Plaster and Painting Alazard
Pool La Celtique *laceltiquetp.fr*
Resin Floor Resinov
Security Systems, Protective Nets, and Lifelines JFP Protection *jfpprotection.com*
Signage Boscher Signaletique Image
Special Foundations Soletanche Bachy Pieux *soletanche-bachy.com*
Structural Metals Construction Metalliques Charondiere *charondiere.com*
Structure Design Office ASI-AS Ingénierie, ETI *eti-ingenierie.fr*
Textiles Esmery Caron *esmery-caron.com*
Water Study Office Enertek

Vault House, page 113

Project Vault House, Oxnard, Calif.
Client Steven and Jerri Nagelberg
Architect Johnston Marklee, Los Angeles—Sharon Johnston, AIA; Mark Lee (principals); Katrin Terstegen (project manager); Andri Luescher, Nicholas Hofstede, Anna Neimark, Anton Schneider, Yoshi Nagamine, Ryan Roettker (project team)
Interior Designer Associates III
Structural Engineer William Koh and Associates
General Contractor RJP Construction & Painting—Raymond Puzio
Lighting Designer Light Studio LA (art lighting); Luminesce Design—Heather Libonati
Coastal Hazard and Wave Runup Study Geosoils
Audiovisual Consultant Chapman AV System
Facilitator SC Planners
Geotechnical Consultant Earth Systems Southern California
Size 3,600 square feet
Cost Withheld

Material and Sources

Acoustical System Baswaphon *baswaphon.com*
Appliances Kalamazoo Outdoor Gourmet *kalamazoogourmet.com*; Miele *mieleusa.com*; Sub-Zero *subzero-wolf.com*
Bathroom Fixtures Hansgrohe *hansgrohe-usa.com*; Kohler *kohler.com*; KWC *kwc.us.com*; Vola *vola.com*
Cabinets Poggenpohl *poggenpohl.com*
Countertops Caesarstone *caesarstoneus.com*
Exterior Wall Systems GrailCoat *grailcoat.com*; stucco
Flooring Limestone
Lighting C.W. Cole & Co. (custom fixtures) *colelighting.com*
Masonry and Stone Daltile (limestone) *daltile.com*
Structural System Concrete deck and grade beam, driven piles (foundation), structural steel, wood framing
Windows and Doors Fleetwood *fleetwoodusa.net*

For full project credits, visit architectmagazine.com

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Electrix	69	90	www.electrix.com	
Ellison Bronze	63	258	ellisonbronze.com	800-665-6445
Glen Raven Custom Fabrics, LLC	64	219	futureofshade.com	
Glen Raven Custom Fabrics, LLC	65	406	trade.sunbrella.com/build	
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Invisible Structures, Inc.	10	246	www.invisiblestructures.com	800.233.1510
Kolbe&Kolbe	51	32	www.kolbecommercial.com	800.955.8177
Lightfair	112	-	lightfair.com	
LightLouver	23	213	lightlouver.com	866.929.8991
Lighting Science Group	73	223	www.lsgc.com	
Lithonia Lighting	71	161	www.Lithonia.com/Breez	
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Lutron	C4	401	www.lutron.com/LED	877.DIM.LED8
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Major Industries	41	190	majorskylights.com	888-759-2678
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Mitsubishi Electric Cooling & Heating	51-55, 57	232, 289	MitsubishiPro.com	
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NewMat USA	85	295	http://www.pglights.com	631-253-9277
Nichiha USA	11	233	nichiha.com/colorexpressions	866.424.4421
Ornamental Metal Institute of New York	12	177	www.ominy.org	212-697-5554
Owens Corning	81	255	owenscorning.com/sciencedoesntlie	
Quality Edge	40	186	matterhornmetalroofing.com	
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Technical Glass Products	C2-1	37	fireglass.com/clearfloor	800.426.0279
U.S. Green Building Council	22	86	usgbc.org/LEEDOn	
VT Industries	76-77	40	VTDoors.com	800-827-1615 ext512

FIRST AWARD

1962 P/A Awards Jury
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PAST PROGRESSIVES

CITY OFFICES, URBAN LINCHPIN

PHILADELPHIA'S MUNICIPAL SERVICES BUILDING, BY VINCENT KLING, WON HIGH PRAISE FOR ITS CONTRIBUTION TO BROADER URBAN DESIGN.

Text by **John Morris Dixon, FAIA**

EVERY P/A AWARDS JURY reflects the design concerns of its time. In the early 1960s, the focus was on the relationships of buildings to each other and to adjoining open spaces. Urban design—dealing with physical form—was then emerging as a discipline distinct from statistics-driven city planning.

In bestowing a First Award on Philadelphia's Municipal Services Building, the 1962 jury praised the way the structure provided for 500,000 square feet of city offices. But jurors were equally impressed with how it related to public plazas being opened up around the adjacent City Hall.

The proposed building was an 18-story tower with a cross-shaped plan. A lofty glass-walled lobby occupied a small street-level footprint, and office floors above cantilevered out four ways. A gracious stair led down to departments requiring the most public access on a concourse below, which was linked to underground transit.

While presenting an image of civic dignity, the building was clearly deferential to the massive City Hall. The relationship was underscored by cladding its curtainwalls in a similar gray granite. Its more than 1,600 identical stone-framed windows were prefabricated for insertion into the building's frame.

When commenting on award-winning projects, P/A juries often expressed reservations about prevalent trends. That year, juror Arthur Drexler welcomed a turn away from projects that resembled "industrial artifacts," toward works that "look like buildings, and look as if they were meant to last." This building, completed in 1965, appears to have survived in fine condition, continuing to fulfill its original purpose.

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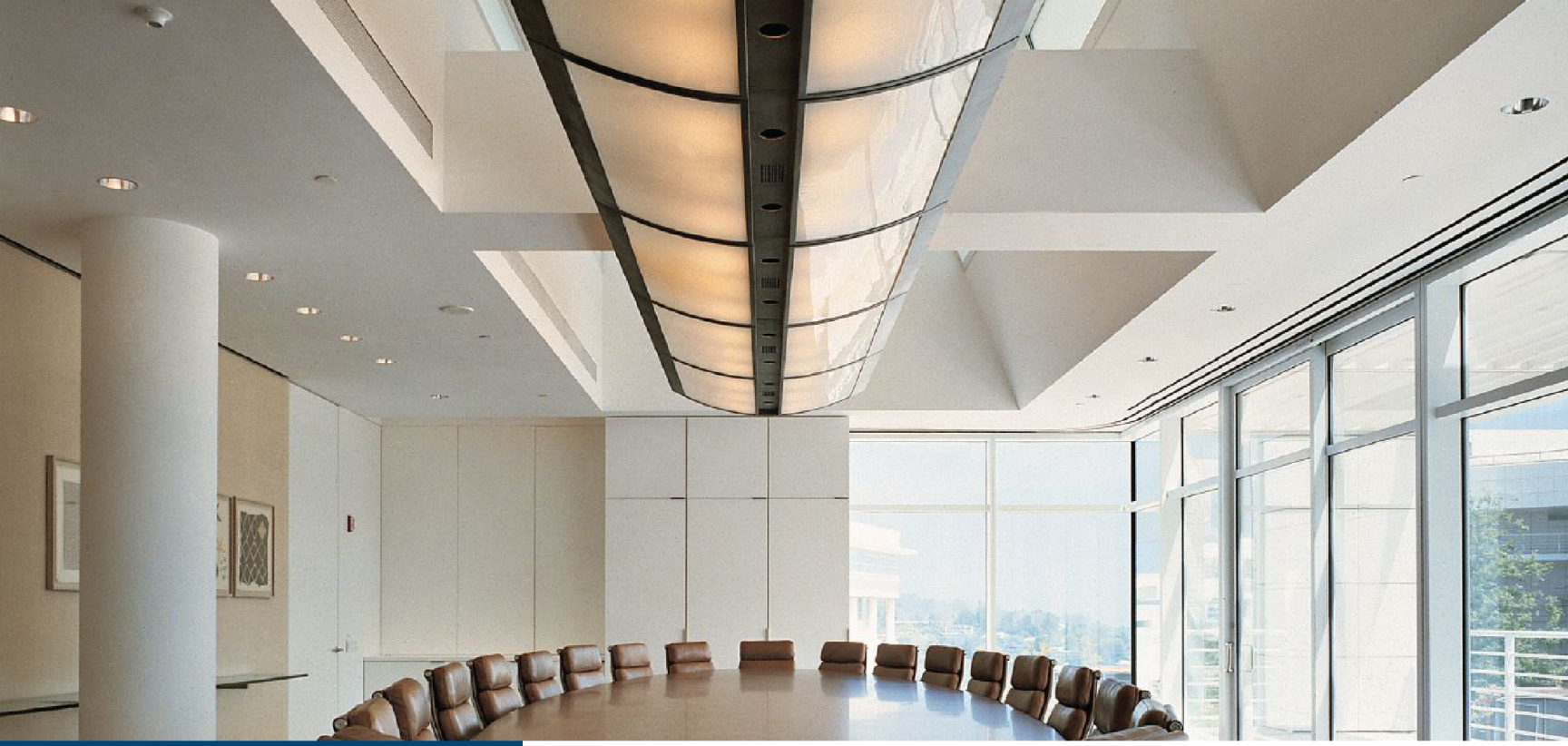

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