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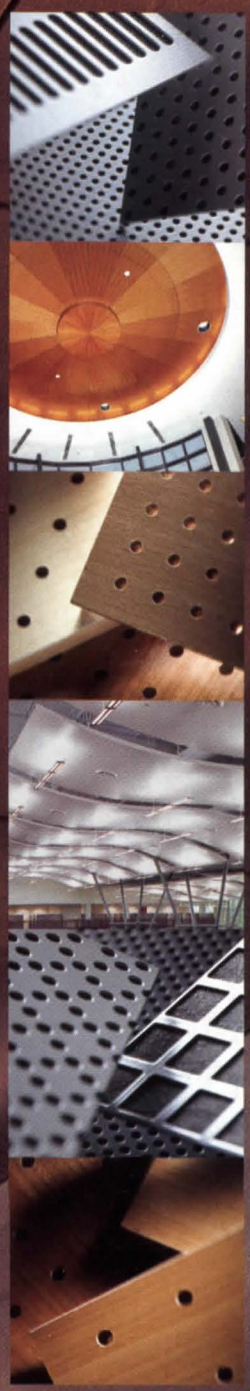

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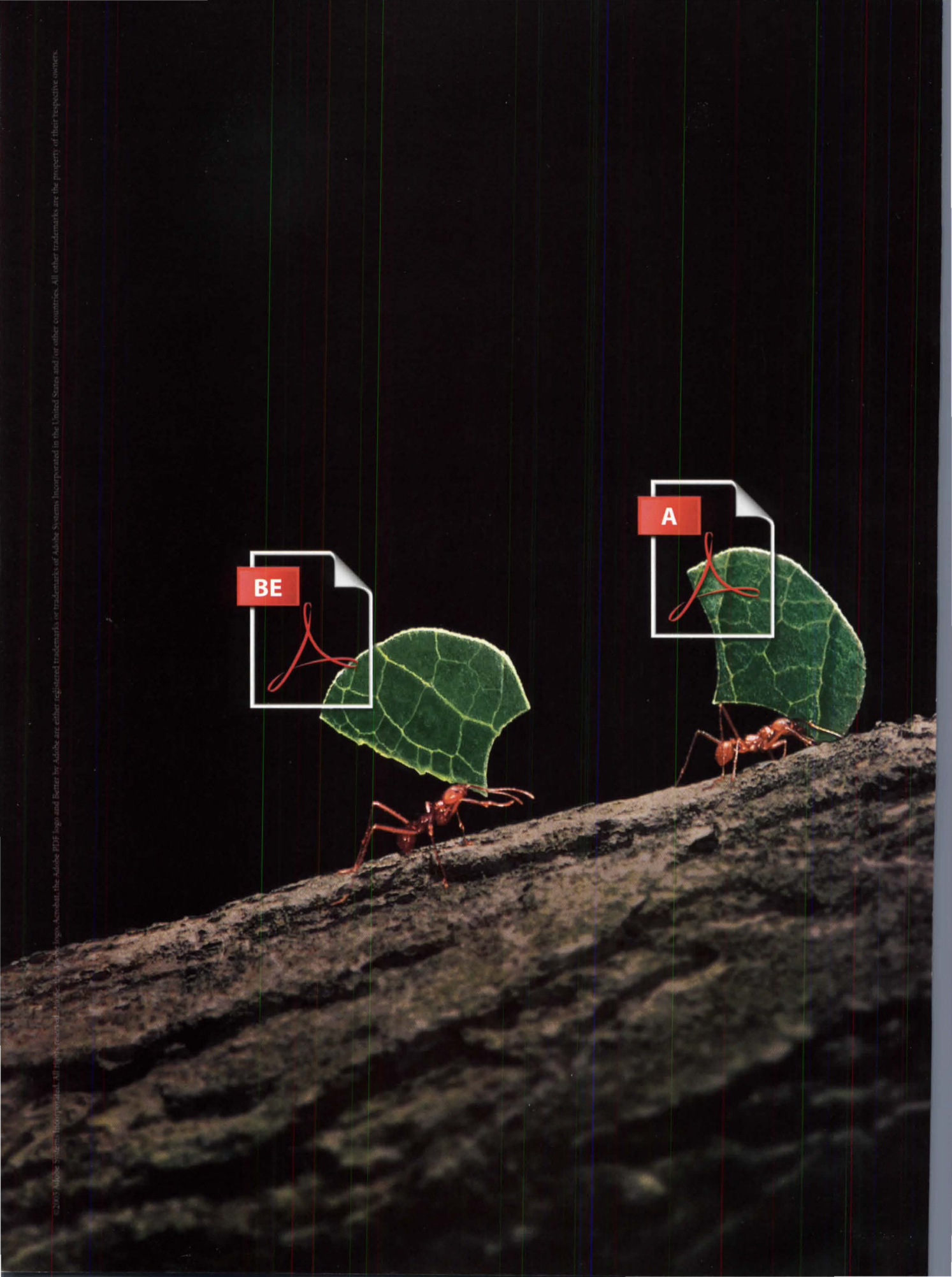

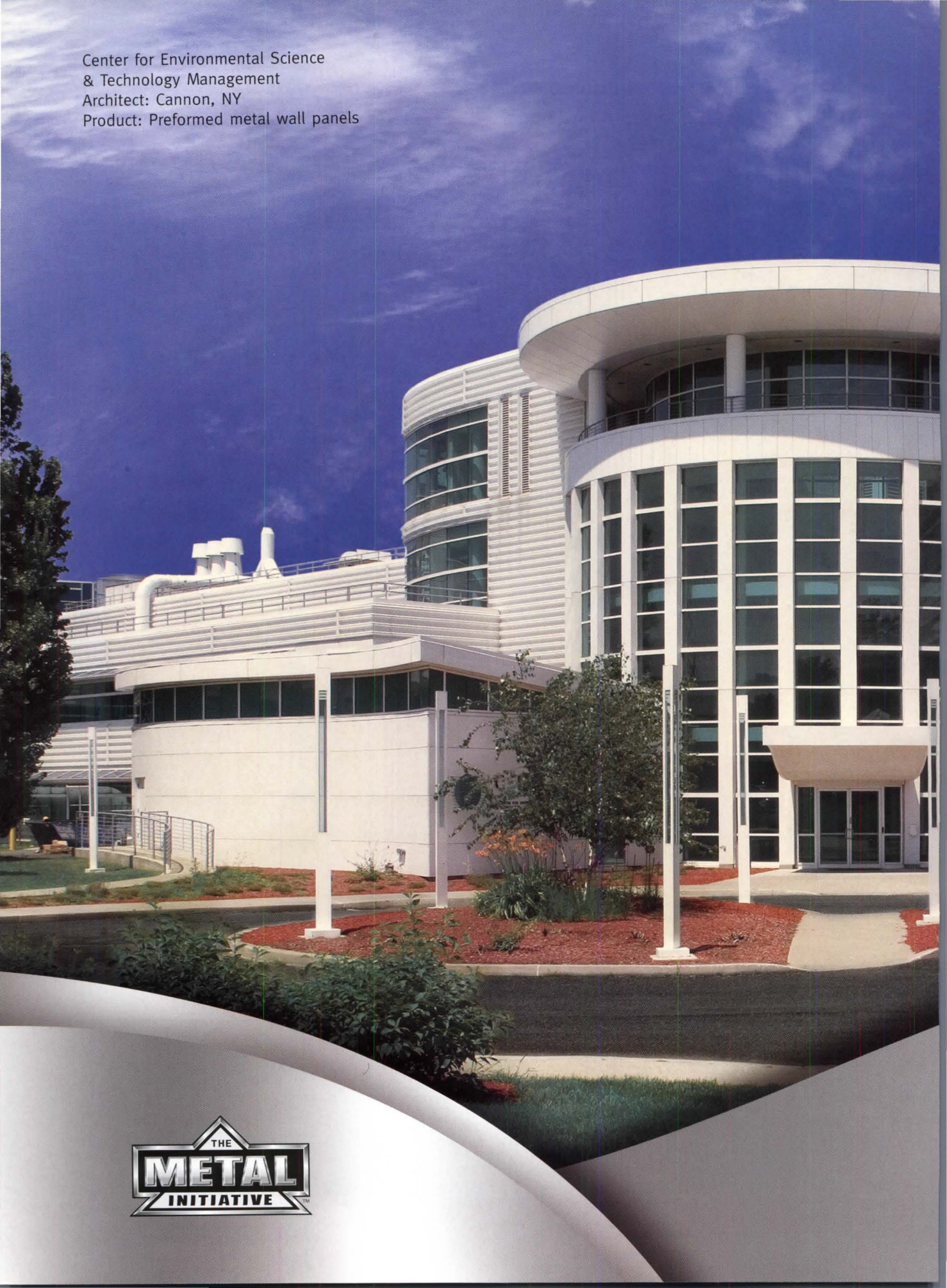
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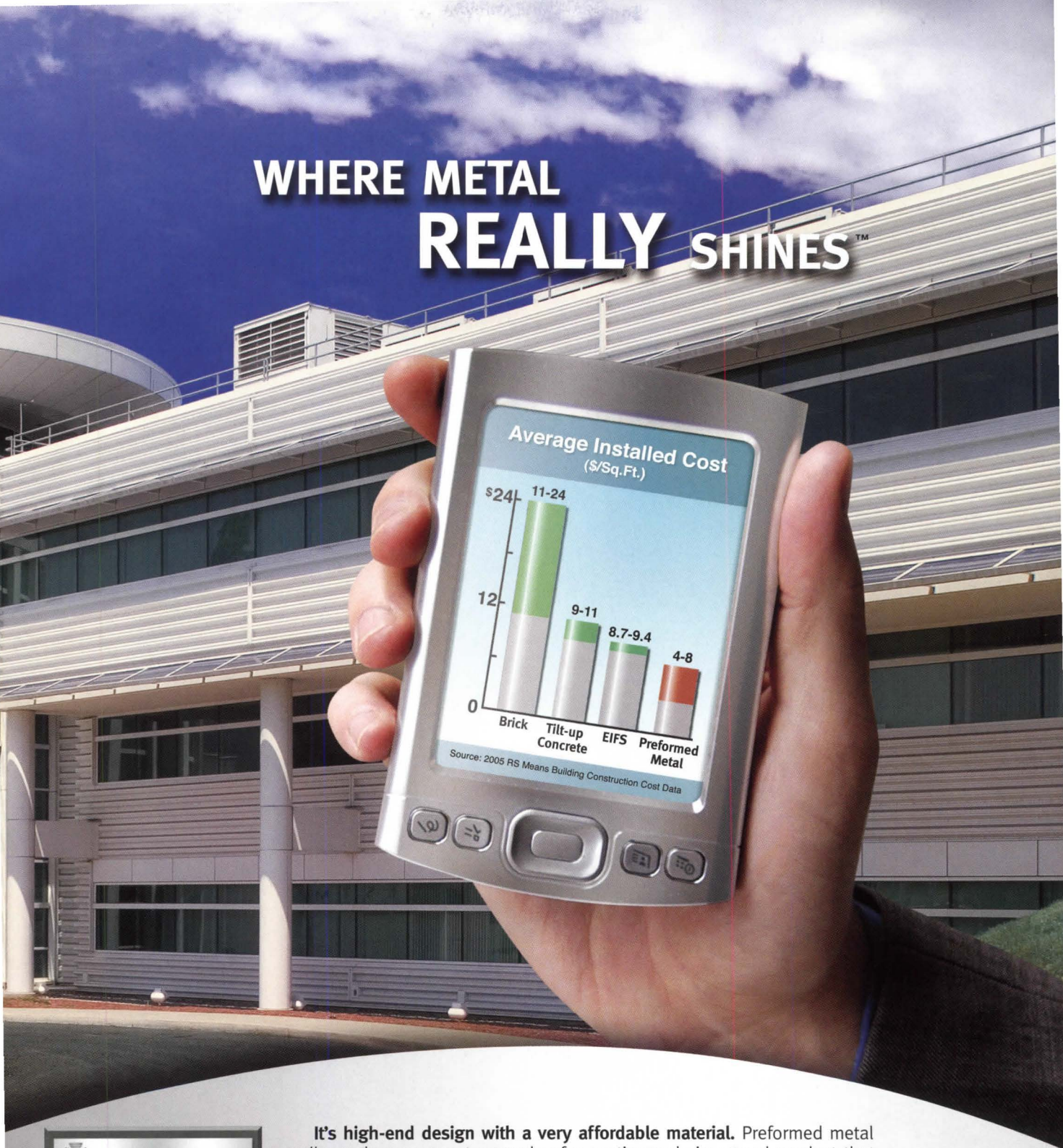

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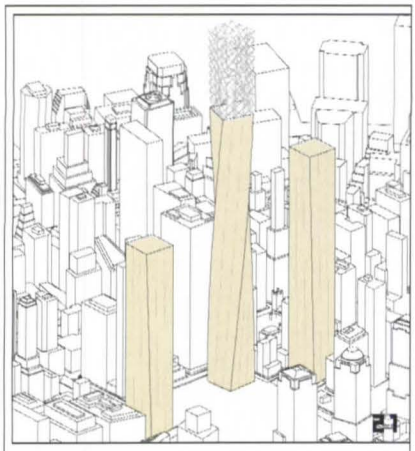
36 A walkway into Germany's colorfully glazed Federal Environmental Ministry in Dessau by sauerbruch hutton architects leads past an old industrial building that has been expanded with a swooping brick-clad addition and turned into the agency's library.



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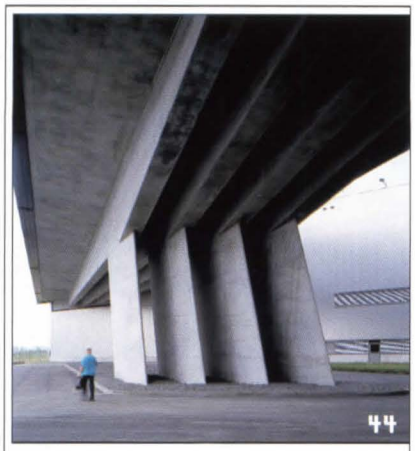

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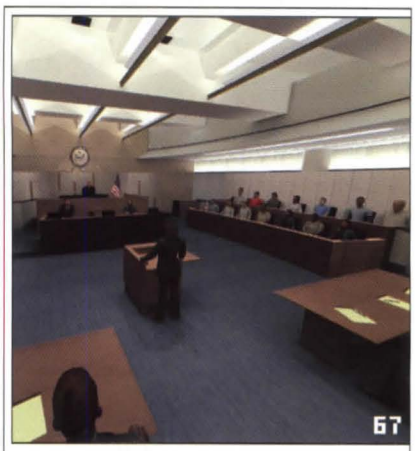

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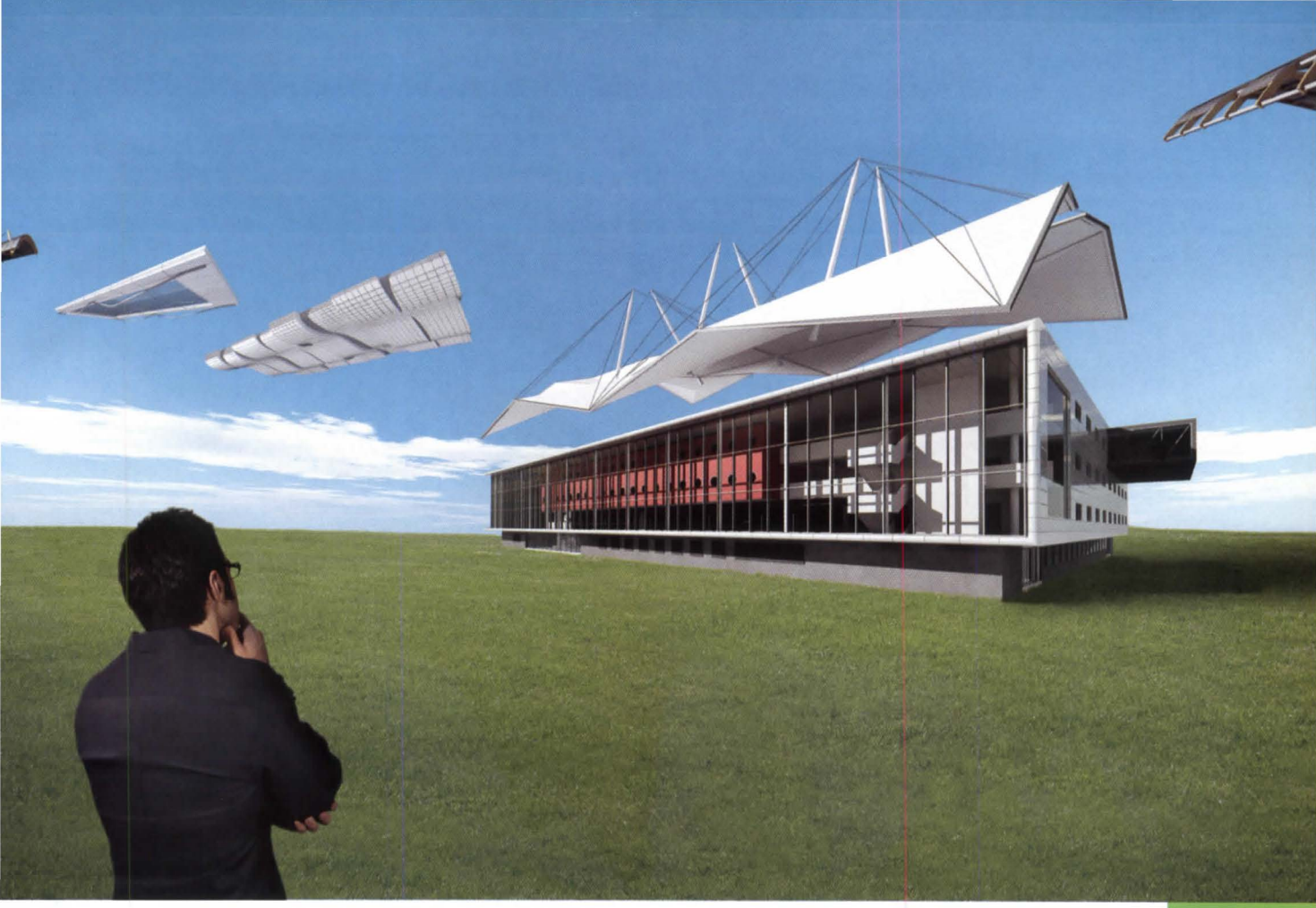

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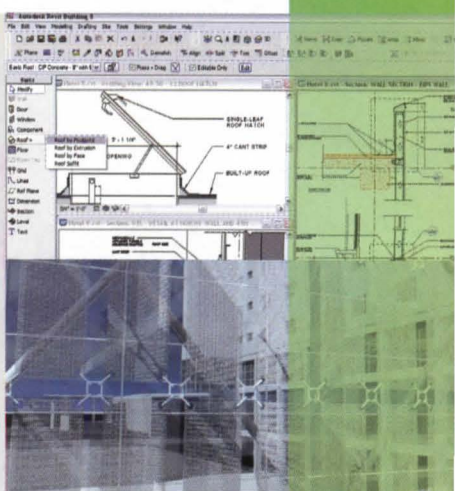

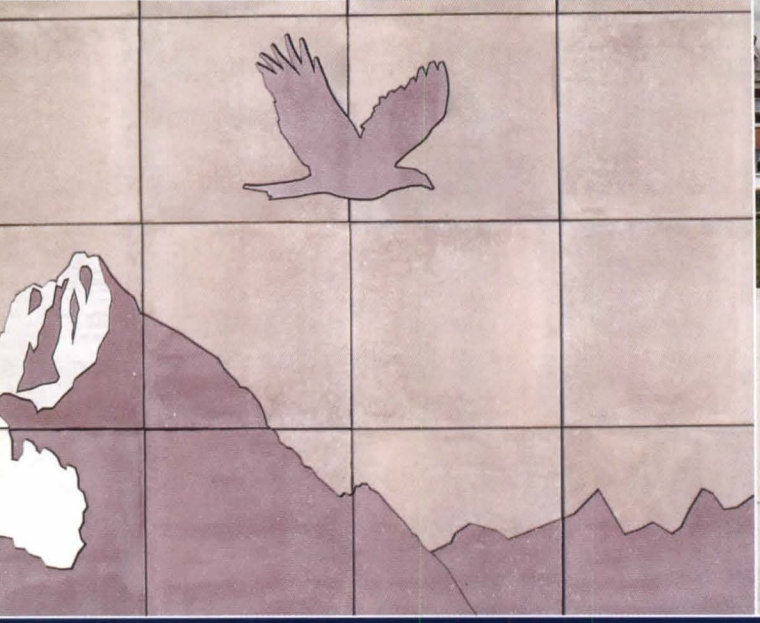

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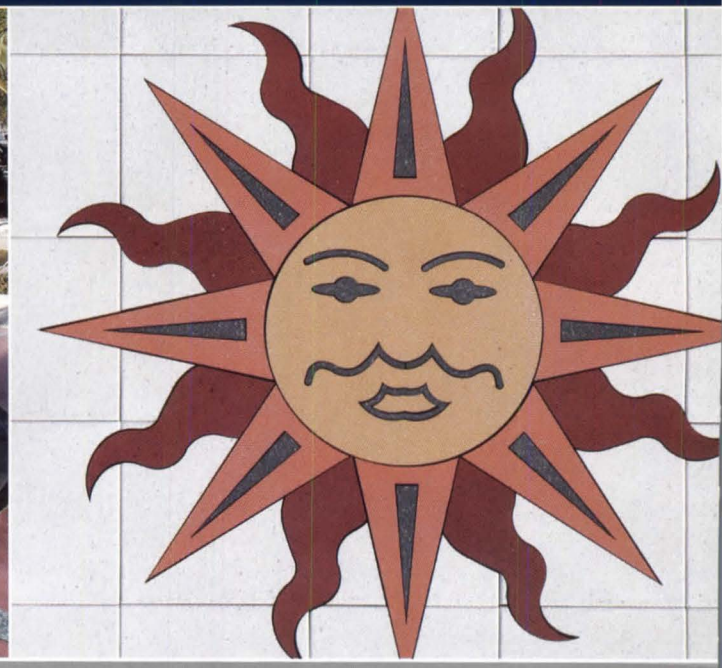

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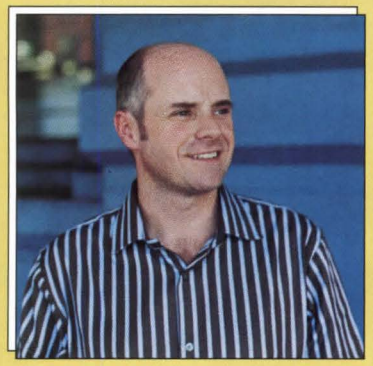

CONSTITUTIONAL TYRANNY

BY C.C. SULLIVAN

Great news for ambitious developers and likeminded politicians: As of late June, it's *constitutionally okay* to invoke eminent domain in the name of boosting your local economy. (Cue: Joyous shrieks from economic development groups.) Does that mean that we should, as a society, allow the seizure of homes and businesses in order to improve the lot of a township or county?

Very rarely. Instead, for most Americans, the meaning of the recent Supreme Court decision in *Kelo v. City of New London* is that we should vote carefully for our political representatives and protest loudly when we disagree with their planning and policymaking. In the faded Connecticut town of New London, an act of pure tyranny forced the unlucky Susette Kelo—a middle-class woman living in a middle-class neighborhood—to fight through to the highest court in the land merely to assert her right to live where she grew up. A local referendum might have saved her, but her elected officials, in cahoots with powerful private forces and trying desperately to please a major pharmaceutical company, plowed over her house and those of her neighbors, their guns ablaze with fictional projections about inching up local tax proceeds and employment levels.

We've seen this all before. In Detroit circa 1980, the Poletown neighborhood was strafed to make way for a big GM auto plant. Michigan's Supreme Court allowed the use of eminent domain where there was: (1) no evidence of blight; and (2) no truly public use intended—two preconditions always invoked in precedents.

That was bad news for everyone: The Poletown decision, like the New London verdict, meant that "one's ownership of private property is forever subject to the government's determination that another private party would put one's land to better use," the Michigan judges wrote in a later decision. In fact, those words came in a reversal: a case in which a Wayne County airport tried to expand into adjoining neighborhoods. Although the huge project would have generated thousands of jobs and hundreds of millions in taxes, those benefits could not outweigh the owners' rights except under very specific conditions, said the state court.

Not so in New London. All the local leaders had to do was foresee higher tax revenues, and soon their chums in private economic development were redlining homes to make way for fashionable condominiums, luxury offices, and a trendy hotel. As urban planner and educator Jerold S. Kayden wrote recently, "It is important to draw a distinction between the *constitutionality* and the *wisdom* of using eminent domain for economic development." (The emphasis is original to his excellent article in the current issue of *Harvard Design Magazine*, published pre-*Kelo*.) Kayden's words make this point powerfully: The only way that the Susette Kelos of the world can consider their property sacred is to elect wise leaders—those who promise to forever protect their citizens from tyrannical planning.

CULTIVATING DESIGN-SAVVY GOVERNORS

More sensible planning on a regional level requires attention from wise governors, too, as the National Endowment for the Arts knows. Last month, the NEA announced its new "Governors' Institute on Community Design," an effort that—like the NEA's successful, 20-year-old Mayors' Institute on City Design—will push political leaders to better direct new development.

If the record of the mayoral program is any indication, this first major initiative launched by NEA's director of design, Jeff B. Speck, is a strong move. Building upon the progress some states have made with smart-growth, sustainability, and "livability" programs, Speck will bring governors to one-day workshops conducted by design experts and former state leaders. There, the NEA and an unexpected partner—the EPA—will work to persuade state officials to fight sprawl, protect watersheds, improve transit planning, and elevate the quality of public design in everything from housing to parks.

The key for the NEA (and each state) is to effect change in a timely way. But Speck has a tiny budget that will only let him schedule a few workshops each year. Too bad. The Governors' Institute has vast potential, and NEA's chairman, Dana Gioia, should push for better funding of his admirable new program.

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BJÖRN WALLANDER

letters

Talk on the block

Peter Eisenman's creation [June 2005, page 38] seems yet another of his overintellectualizations and an effort to convince people of what Berlin's Holocaust memorial should mean, when in fact it ends up looking very much like a giant Nazi video game.

Constantine L. Tsomides
Newton Upper Falls, Massachusetts

A $32 million heat sink in the middle of Berlin: Why couldn't they just have planted $32 million worth of trees and hired a landscape architect to organize them in a grid format?

Dan Lawrence
Gaffney, South Carolina

A world of trouble

Great editorial on the World Trade Center fiasco [June 2005, page 15]. The elegance of the design for the Drawing Center building is in sharp contrast to the overall site "master plan" and its results. The recently published latest scheme for the first tower only amplifies your points.

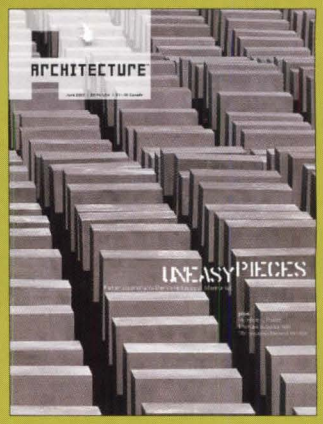
Adam Gross
Baltimore

AN OPEN LETTER ABOUT THIS PLAN FROM N.E.A. DESIGN DIRECTOR JEFF B. SPECK IS AT WWW.ARCHITECTUREMAG.COM.

Get out of town

Richard Carson's Protest, "The Tyranny of the Urban Majority" [June 2005, page 87], is just a warmed-over version of the tiresome 'red state versus blue state' schism. In his bigoted, vitriolic tirade, Carson attempts to defend McMansion development not by outlining its benefits but by painting its detractors as SUV-driving, Starbucks-swilling "urbanists." If he wants to blame urban dwellers for a litany of ills, then he'd better back it up with some citations, and leave the fatuous name-calling to the politicians.

Kate Voshell
San Francisco



06 | 2005

In answering his own question, Richard Carson says, yes, gluttonous urbanists owe him and his ruralist brothers money. Urban areas pay more in federal taxes than do rural areas, which receive more federal money. I ask the author to deduct a portion of that difference from our bill.

Mark Zatopek
Austin, Texas

Double the fun

Your May 2005 issue was great. In one issue, trendy clashes with bad-boy wit via Robert Venturi and Denise Scott Brown—a manifesto reducing the mode of the day, "neo"-modernism, to a mere style revived from the past and proliferated by the loyal flock. And then, throw in Bernard Tschumi, the champion of twentieth-century situations and manifestoes. I have renewed my subscription with enthusiasm. Keep up the spirited debate.

Stephen Berry
Youngstown, Ohio

CORRECTION

The Great Harbor Design Center [July 2005, page 42] was cancelled and should not have been identified as a commissioned project.

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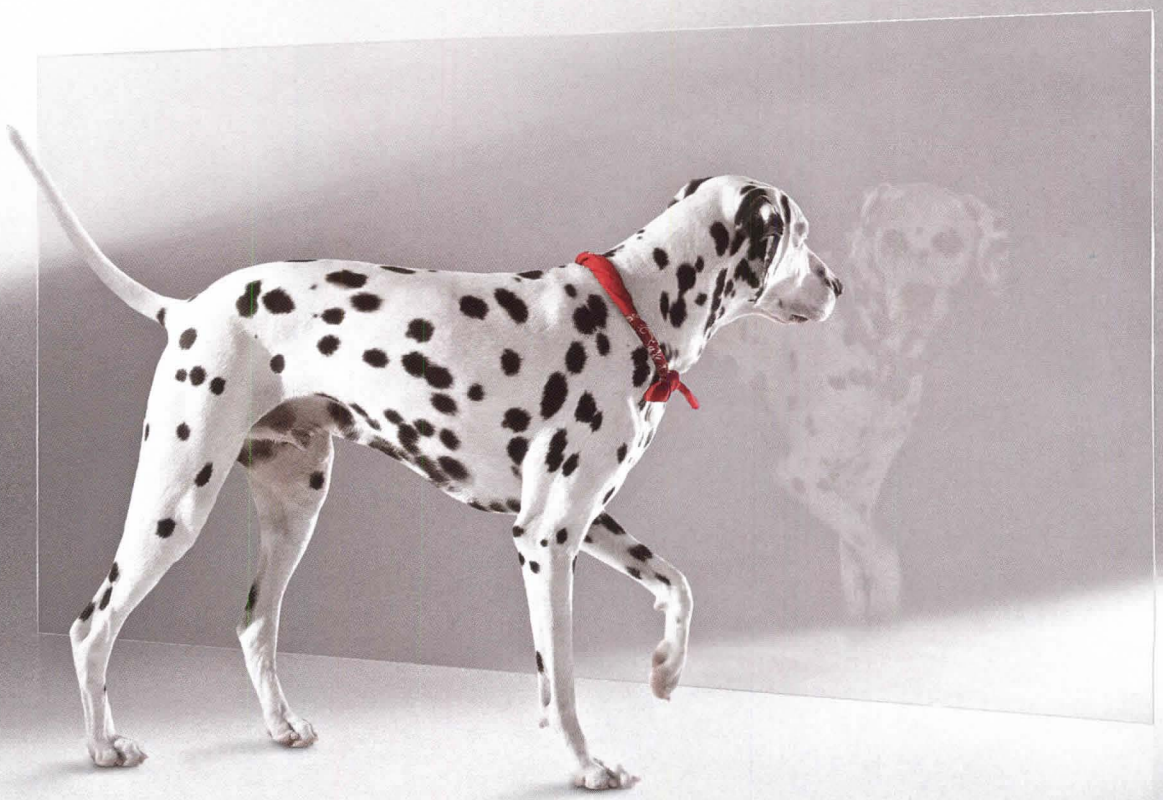

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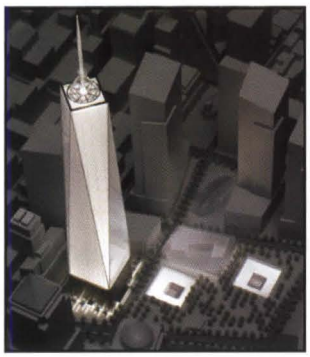

As has been widely reported, the redesign of the Freedom Tower, the centerpiece of the World Trade Center (WTC) site redevelopment in Lower Manhattan, was unveiled in late June. Sent back to the drawing board by the security-conscious New York Police Department two months prior, Skidmore, Owings & Merrill partner David Childs's revised design features a deeper setback from the street (90 feet instead of 25) and a 200-foot-tall, nearly windowless steel-and-reinforced-concrete base, designed to better withstand truck bombs and other threats.

The most volatile aspect of the new design, however, was the critical backlash. The architectural community took one look at the new scheme, drew in a collective breath, and came out swinging.

Nicolai Ourousoff, architecture critic for the *New York Times*, wrote that the redesign "evokes a giant glass paperweight with a toothpick stuck on top," but at the same time expressed compassion for Childs, who "was forced to redesign the tower on the fly." Other critics showed no such sympathy, and architecture blogs were host to a flood of vitriolic remarks.

But despite this outpouring of negative rhetoric, the Lower Manhattan Development Corporation (LMDC), responsible for the redevelopment of the WTC site, remains stubbornly optimistic. "This design has been received favorably in many circles," counters Stefan Pryor, president of the LMDC. "As the governor and mayor have suggested, it represents the iconic symbol that people are looking for to restore the Manhattan skyline. We are confident that its reputation will only grow in strength as time goes on."

On a site that inspires so much emotional response from local and national onlookers, designing a building that is readily and universally accepted is an impossible feat. Now that the final design has been set, it's clear that the controversy and tension surrounding the site casts a longer shadow than the 1,776-foot Freedom Tower itself ever will. **Katie Gerfen**

Renzo Piano's Zentrum Paul Klee opened to the public earlier this summer, nestled among the cornfields along the agricultural edge of Bern, Switzerland. The undulating glass-and-steel roof gives the $86 million, 28,000-square-foot museum the appearance of three rolling hills, reminiscent of the painter's minimalist abstract forms. The ticket desk and an auditorium for lectures and musical performances occupy the largest volume; a permanent collection of 4,000 of the Bern artist's works resides in the center; and offices are situated in the third.

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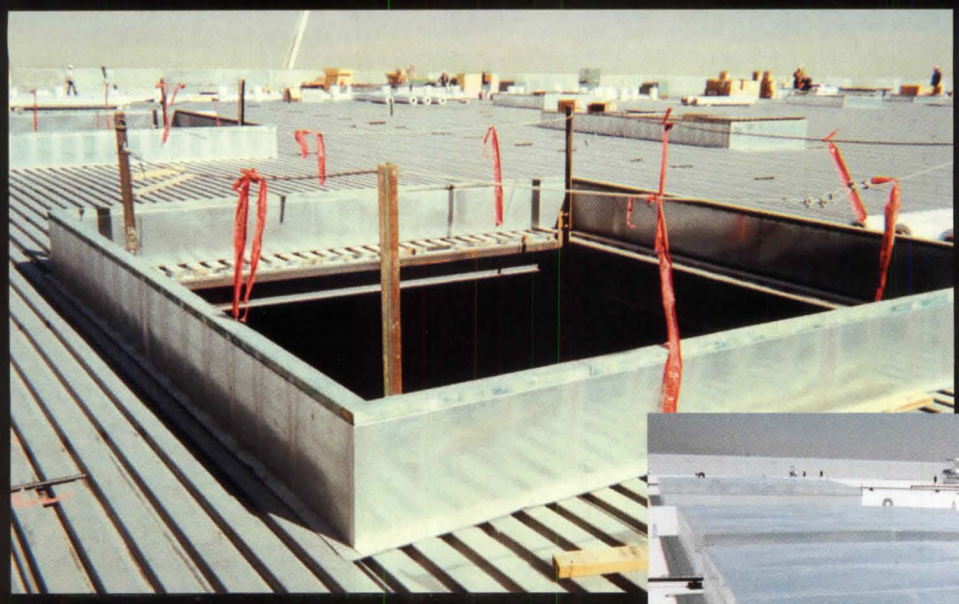

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BUILDING COSTS GOING BALLISTIC?

The road to the construction site is often a rocky one, but that's going to be true in more ways than one, judging from producer-price index figures released in late July by the Bureau of Labor Statistics. According to Ken Simonson, chief economist for the Associated General Contractors, the construction trades—and, by association, architects and their clients—are going to have a rough time in coming months, as spiking costs for certain materials are passed on to building owners and developers, while costs for other critical materials waver unpredictably.

The Bureau's statistics paint a challenging picture: Dizzying climbs in the price of materials like cement (more than 12 percent over the past year due to increased demand and flat supply) accompany highly volatile prices for crude oil—the petroleum-based derivatives of which sway construction costs in everything from the making of plastic piping to gassing up the tanks of delivery trucks. "Nobody knows where crude prices are going," Simonson observes. "And a lot of trucking companies are already adding fuel surcharges."

Amid this turbulent ride comes a drop in steel prices, triggered by reduced costs for ore and scrap—the latter down 22 percent in the past year. And while this is good news, it's expected to do little to quell fears of price volatility, especially since "the contractor doesn't have much time to shop around," Simonson says. **Robert Klara**

RICHARD SOLOMON, 1943–2005

Noted architect and educator Richard Solomon, who headed up Chicago's Graham Foundation for Advanced Studies in the Fine Arts, died July 14 from complications of cancer treatment. He was 62.

Educated at MIT and Yale, Solomon had served as Graham's director since 1993. An influential and intrepid institution, the 49-year-old foundation funds architectural projects, research, and publications such as a study of Quonset huts in Alaska and, last year, a contest to re-envision Chicago's lakefront, which yielded submissions such as a floating park. Under Solomon's leadership, the foundation also gave millions of dollars to numerous preservation projects.

"Richard will be long remembered for his wisdom, fairness, optimism, and undauntable spirit," the Graham Foundation eulogized on its web site. "His broad vision and universal interests transformed the work and lives of innumerable people in Chicago and around the world."

Prior to taking the organization's helm, Solomon served as editor of the Chicago-based *Inland Architect* magazine and taught architecture at the University of Illinois. He was in private practice between 1977 and 1984. **Robert Klara**

COURTESY GRAHAM FOUNDATION

- On July 25, Santiago Calatrava and his client, developer Christopher T. Carley, announced plans to build a mixed-use high-rise tower near Chicago's Navy Pier. If it passes the city's planning commission in its current form, the 115-story, $500 million tower will be 2,000 feet tall when measured to the top of its 542-foot spire. At that height, it would best both the Sears Tower (1,729 feet) and the proposed Freedom Tower in Manhattan (1,776 feet) to become the nation's tallest building.

- The British Antarctic Survey has chosen the London–based team of Faber Maunsell and Hugh Broughton Architects for the Halley VI research station to be built on the Brunt Ice Shelf in Antarctica. The competition-winning design (March 2005, page 32), which features ski-like feet, can be moved by bulldozers in case it needs to be relocated. On-site assembly of components prefabricated in England is expected to start in early 2007 during the region's two-month-long summer, and will culminate in a handover to scientists in December 2008.

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[→] Las Vegas is going green. In June, Nevada Governor Kenny Guinn signed into law a bill requiring all new state-funded projects to meet LEED certification or equivalent standards, effective immediately. Buildings that attain a silver rating will be eligible for tax credits or abatements for up to ten years after construction. Following in the footsteps of Washington, which adopted similar standards in April, Nevada is only the second state to adopt such a codified sustainable-building standard.

[→] The AIA has selected New Orleans and Alexandria Township, New Jersey, for an expansion of its Sustainable Design Assessment Team, a community-assistance program (June 2005, page 19). The goal is to help these locales, in addition to five other cities chosen in April, to improve their environmental, economic, and social sustainability.

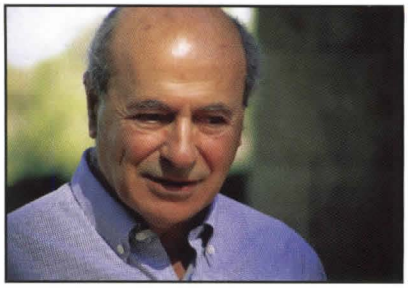
[→] Last month, the ASID released a report that evaluates the personnel and project makeup of small- and medium-sized interior design firms. It was determined, after a survey of 405 firms, that two-thirds of all interior design businesses in the United States are sole practitioners or small firms, and that about half of all the commissions these firms undertake are renovation projects, while about 80 percent are residential. The report is available for purchase at www.asid.org.

[→] Robert Murase, a noted landscape architect in the Pacific Northwest, died on July 18 at the age of 66. A former professor at the University of Oregon, he was best known for his design of the Garden of Remembrance in Seattle. Murase completed dozens of projects characterized by a Japanese influence over the course of his 40-year career. The designer's 23-year-old Seattle- and Portland-based firm specializes in urban design, planning, and landscape architecture.

[→] In late July, Holland, Michigan–based contract furniture giant Haworth announced the appointment of Franco Bianchi, formerly director of Haworth's operations in Italy, as president and CEO. He succeeds Dick Haworth, who will remain with the company as chairman of the board.

COURTESY PIERRE EL-KHOURY ARCHITECTS

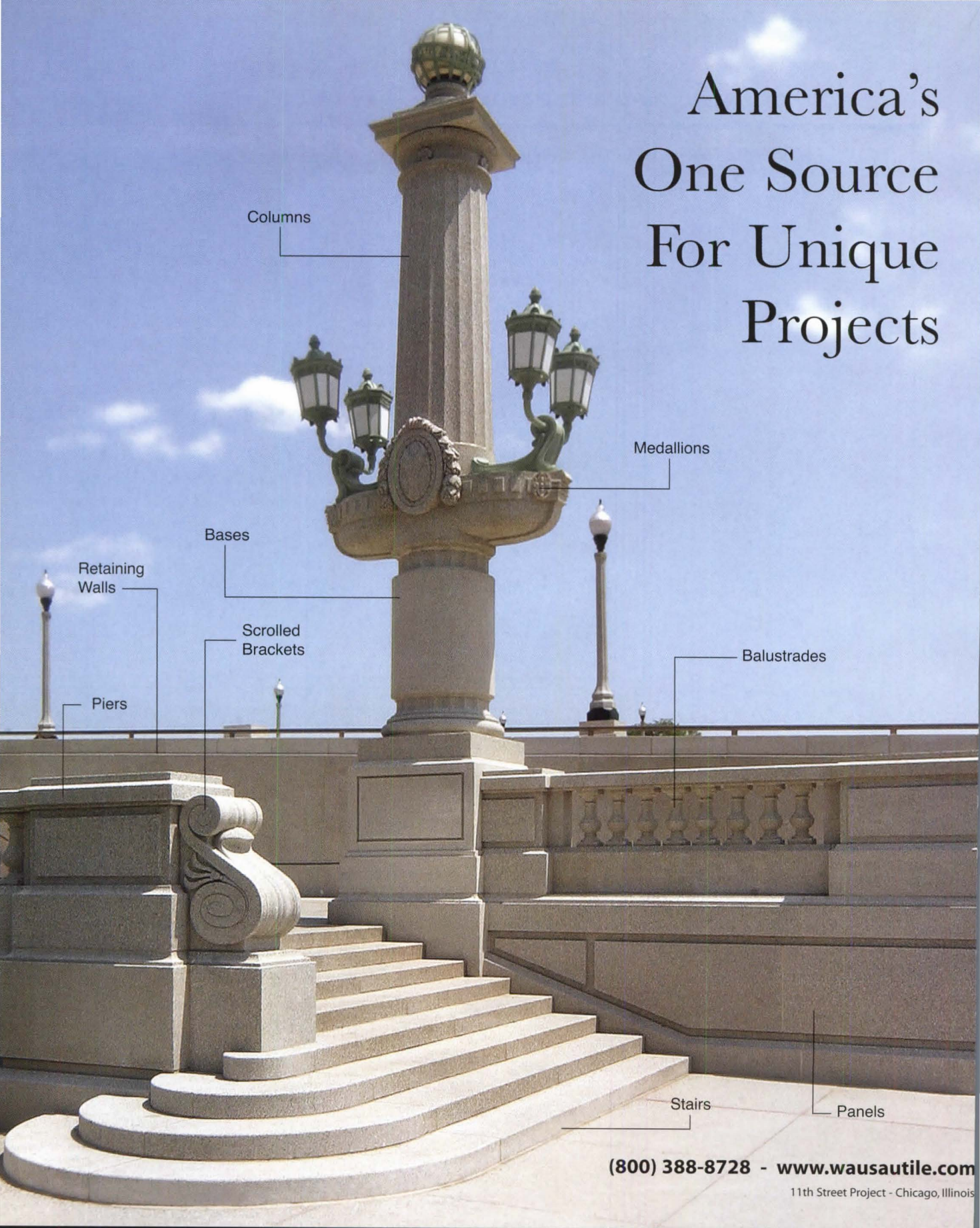
PIERRE EL-KHOURY, 1930–2005



One of Lebanon's most prolific and respected architects, Pierre El-Khoury, died last month at 75. Sheikh Pierre, as he was called, was trained at the École des Beaux Arts in Paris, and like many architects of his generation, developed a portfolio that included modernist work as well as more traditionally inspired projects, including a number of preservation efforts.

For Khoury, it was the site that presented the main challenge in a design. His own 1959 home in Yarze, Lebanon, vies with Wright's Fallingwater for its skillful integration with its distinctive natural setting. He also had an abiding interest in places of worship, having designed several churches, monasteries, and convents. The Basilica of our Lady of Harissa, a monumental, swooping mountaintop structure that juts out over the Jounieh Bay in the capital, is one of Khoury's most notable projects. He did maintain a mastery of diverse building types, however. His Roumieh Prison with its elaborate interconnected set of triangles and hexagons exemplifies the architect's breadth of ability.

Khoury was also a celebrated urban planner, having both designed new towns and participated in the renewal of a number of Beirut neighborhoods. While he did ascend to the post of minister of public works in the 1980s, it was conceiving unique solutions for each new site that propelled him. Of the more than 200 different projects he authored, there are few cookie-cutter solutions among them. In the end, his most significant legacy is arguably the many younger architects he mentored, whose own buildings now dot Beirut's cityscape. **Bay Brown**

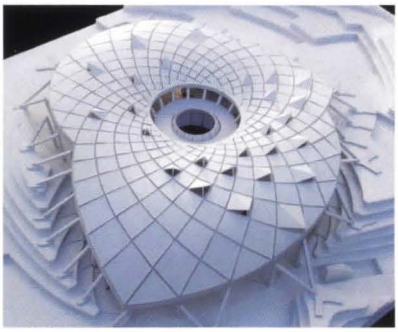


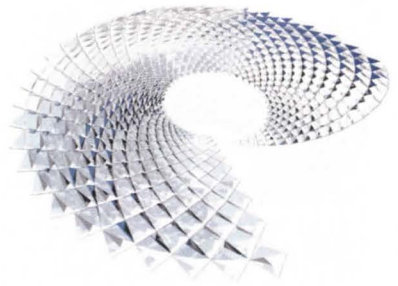
GREEN DESIGN: ALL SKIN AND NO BONES?

In the rush to sustainability, designers have ignored what holds it all together: *structure*. by Lance Hosey

The relationship between envelope and structure has informed every significant architectural development in every culture since the dawn of construction. Today, sustainable design has become a strong force in global architecture, but so far it has concentrated on only one of these systems and neglected the other. In the last decade, considerable progress has been made with façade technology: phototropic sunshades, energy-producing cladding, light-activated glass, thermally activated metals, and even pollution-absorbing paint. Skins can now react and adapt to changing climate conditions, while on the interior, environmental innovation has concentrated on M/E/P systems and material content, which mostly affect occupant health and comfort and energy performance, having little impact on visible architecture. But under the surface, structure has not changed much. By focusing almost exclusively on the skins of buildings, while virtually ignoring their bones, proponents of sustainable design have overlooked one of the most important determinants of architectural form.

Many very talented engineers have been silent on the topic of sustainable structural design, and the U.S. Green Building Council (USGBC) is not particularly vocal either—its LEED rating system treats structure only indirectly, through guidelines for material use. Not surprisingly, projects certified through LEED rarely show much structural innovation; likewise buildings honored by the AIA's Committee on the Environment (COTE) are typically built around conventional structural frames.





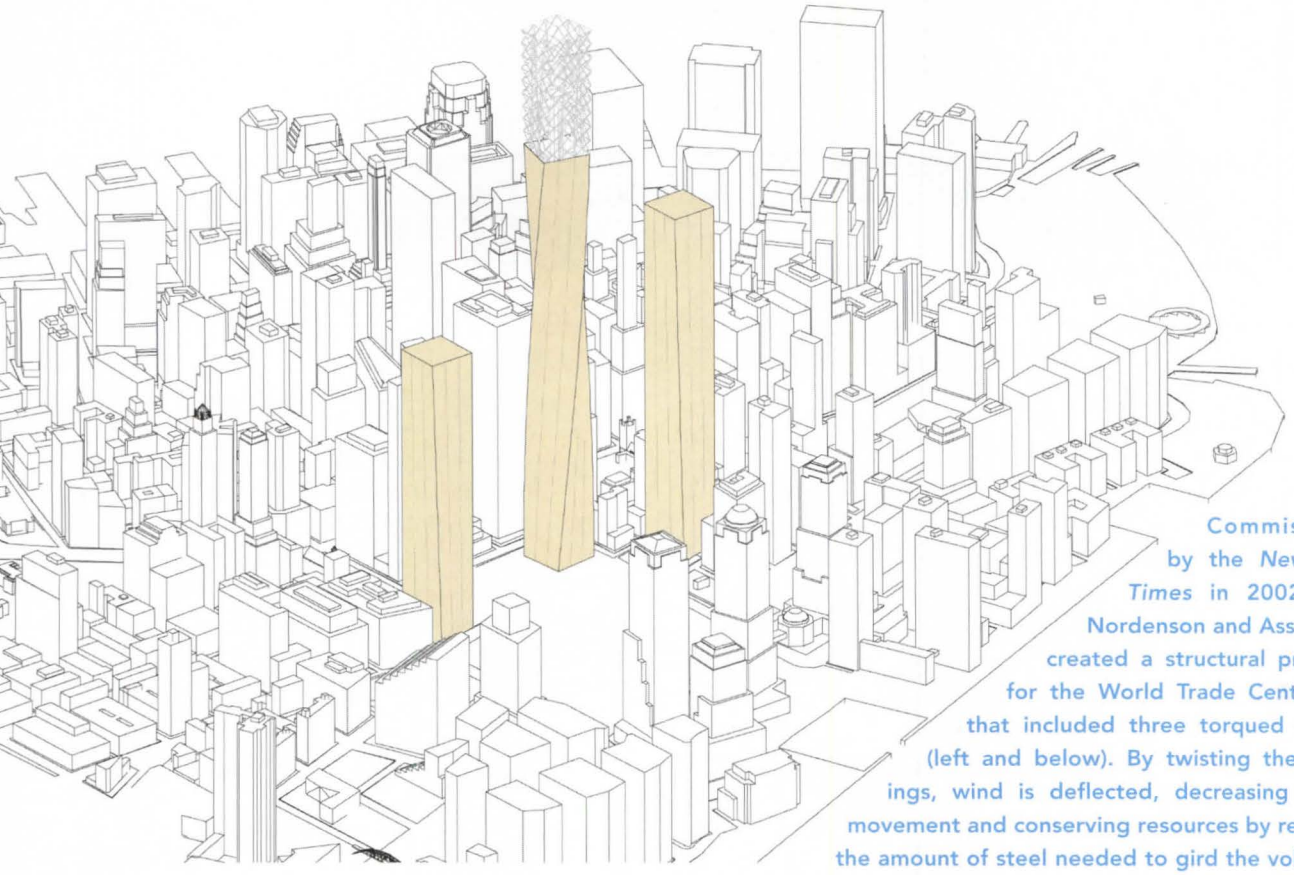
Designed by Grimshaw Architects, this education center now under construction is part of the Eden Project, a high-tech botanical garden in England. The wooden structure gains dynamic stability through its swirling lattice, echoing the morphology of the very plants in Eden's biomes.

SUSTAINABILITY TRUMPS DESIGN

Portuguese engineer Fernando Branco, author of the article, "A Structural Engineer for the 21st Century," says that the primary goal of sustainable structures is to reduce the amount of new material used in buildings in order to avoid depleting resources unnecessarily. He argues for two strategies—increasing longevity by using durable materials and avoiding virgin harvesting by specifying recycled products. (A third approach, using demountable and reusable building elements, has also been practiced by architects like Australian Glenn Murcutt.) Yet these methods don't exactly inspire architects to think about form and space. In general, many designers remain indifferent to green building as most strategies do not represent an aesthetic agenda. In other words, sustainable design seems to be more about sustainability than design.

The structural potential of sustainability has yet to be explored fully. If a primary goal is to use fewer resources, one way to accomplish this is to rethink the relationships between material and form. Environmentalist and retailer Paul Hawken, author of *The Ecology of Commerce*, describes sustainability as "doing more with less," a statement not so different from Mies van der Rohe's mantra, "Less is more." The similarity is ironic, since many green designers see modern architecture's rejection of traditional passive design strategies as a fundamental source of the problems they are now trying to correct. However, like modernism, sustainability can transform new structural technologies into an architectural vocabulary.

In common practice, standard structural members (columns, beams, studs, and the like) are overdesigned, not just in size, but also in shape, to aid assembly. The rectangle, the most common shape in construction, is inherently inefficient for carrying loads. We build orthogonally not to enhance performance but because production techniques, such as metal extrusion, favor simple forms. The modernist fascination with simple geometry was not about efficient design—it was about efficient fabrication. As Mies himself wrote in his 1924 essay, "Industrialized Building," "the industrialization of buildings constitutes the core problem of our time." By embracing plate glass and steel sections, he glorified the production of materials. In this sense, the modernist edict should have been "form follows *industry*."

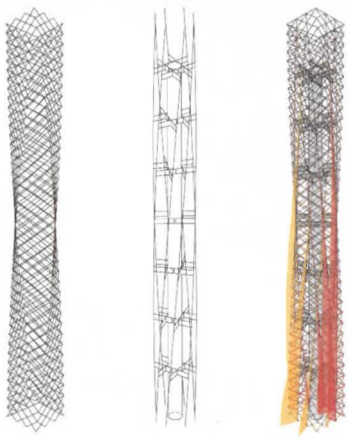


Commisioned by the *New York Times* in 2002, Guy Nordenson and Associates created a structural proposal for the World Trade Center site that included three torqued towers (left and below). By twisting the buildings, wind is deflected, decreasing lateral movement and conserving resources by reducing the amount of steel needed to gird the volumes.

A FABRIC-FORMED ALTERNATIVE

The machine aesthetic's forms do not match their functions. The stress and strain on a beam is not consistent along its length, so an extruded section is unnecessary and, from an environmentalist point of view, wasteful. Varying the beam's shape is more efficient for performance.

This is exactly what Mark West, director of the Centre for Architectural Structures and Technology at the University of Manitoba in Canada, is doing in his experiments with fabric-formed concrete. While concrete itself is capable of taking on virtually any shape, it is limited by conventional formwork, which is rigid and modular. However, textile molds can achieve forms that are at once more complex and cheaper and easier to assemble. For a typical beam, this technique uses up to 300 times less volume and weight in formwork material and half the concrete of an equivalent rectangular beam. The resulting fluid form, according to West, "places material only where it is needed and uses that material at optimum stress levels at every point along its span." With such methods, form finally does follow function.



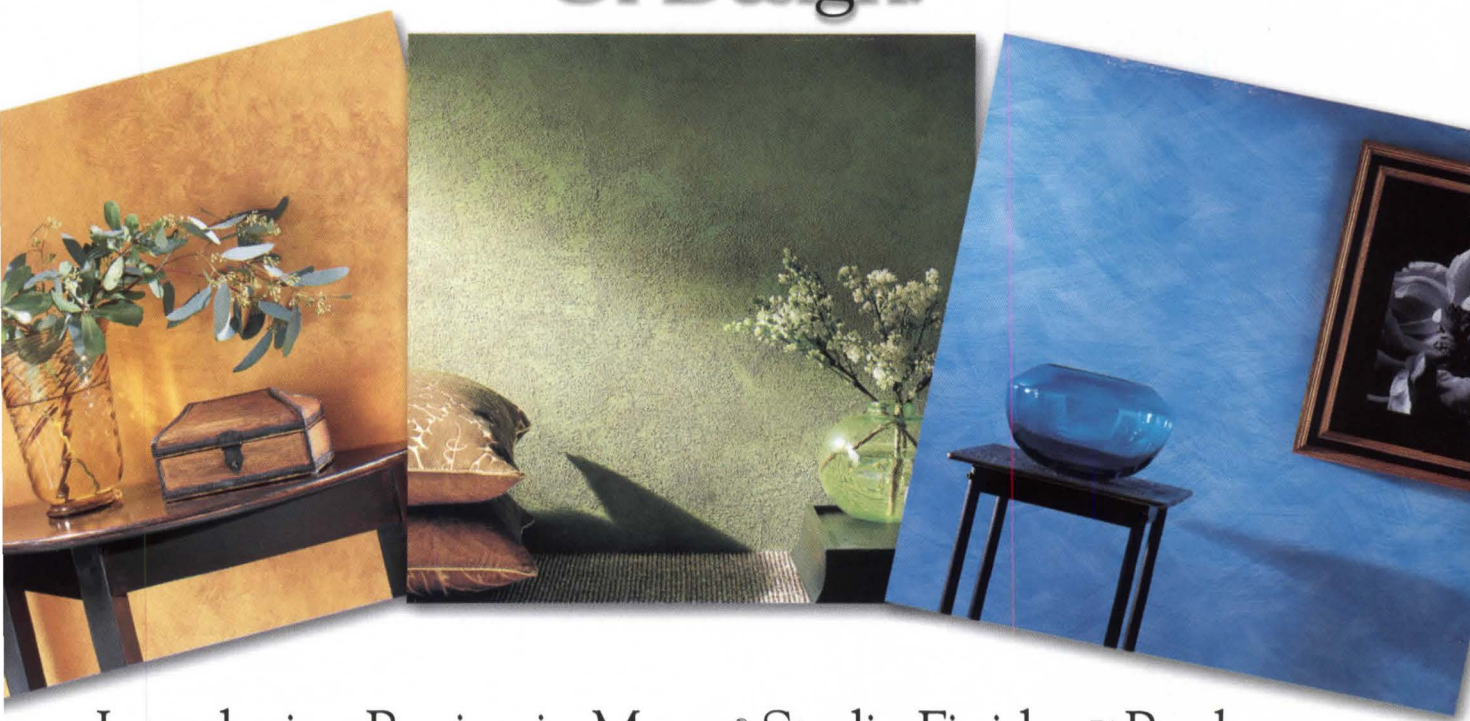
The goal of such techniques is self-sustaining form—geometry that enhances structural and material integrity through the conservation of resources. The idea in itself is not new: Nearly two centuries ago at the University of Virginia, Thomas Jefferson used form to reduce material and increase strength in his famous serpentine brick garden walls, whose undulating shapes required only one layer of brick instead of two. And while conventional wisdom holds that the architecture of Antonio Gaudí was merely expressive skin wrapping simplistic bones, in actuality his understanding of geometry was visionary. The twisted columns of the Sagrada Familia, for example, are a tour de force of structure and material. Yet, these examples from history seem to have escaped the notice of most green designers. This is curious, given that many environmentally minded architects are influenced by R. Buckminster Fuller, whose concept of "ephemeralization" called for the minimizing of materials.

ENGINEERING NEW FORMS

Examples of these strategies among contemporary designers are rare but compelling and mostly come from engineers, not architects. New York structural engineer Guy Nordenson has combined vertical and lateral load systems by experimenting with torqued forms not unlike Gaudí's. In his projects with Nicholas Grimshaw, Richard Rogers, and Shigeru Ban, Craig Schwitter of Buro Happold's New York City office has explored ways to optimize volume through alternative materials like the timber thinnings he used in the Weald & Downland Museum in Sussex, England. Grimshaw's Eden Project, a state-of-the-art botanical garden in Cornwall, England, is a recent example of these new forms. In the first

Elements.

Of Design.



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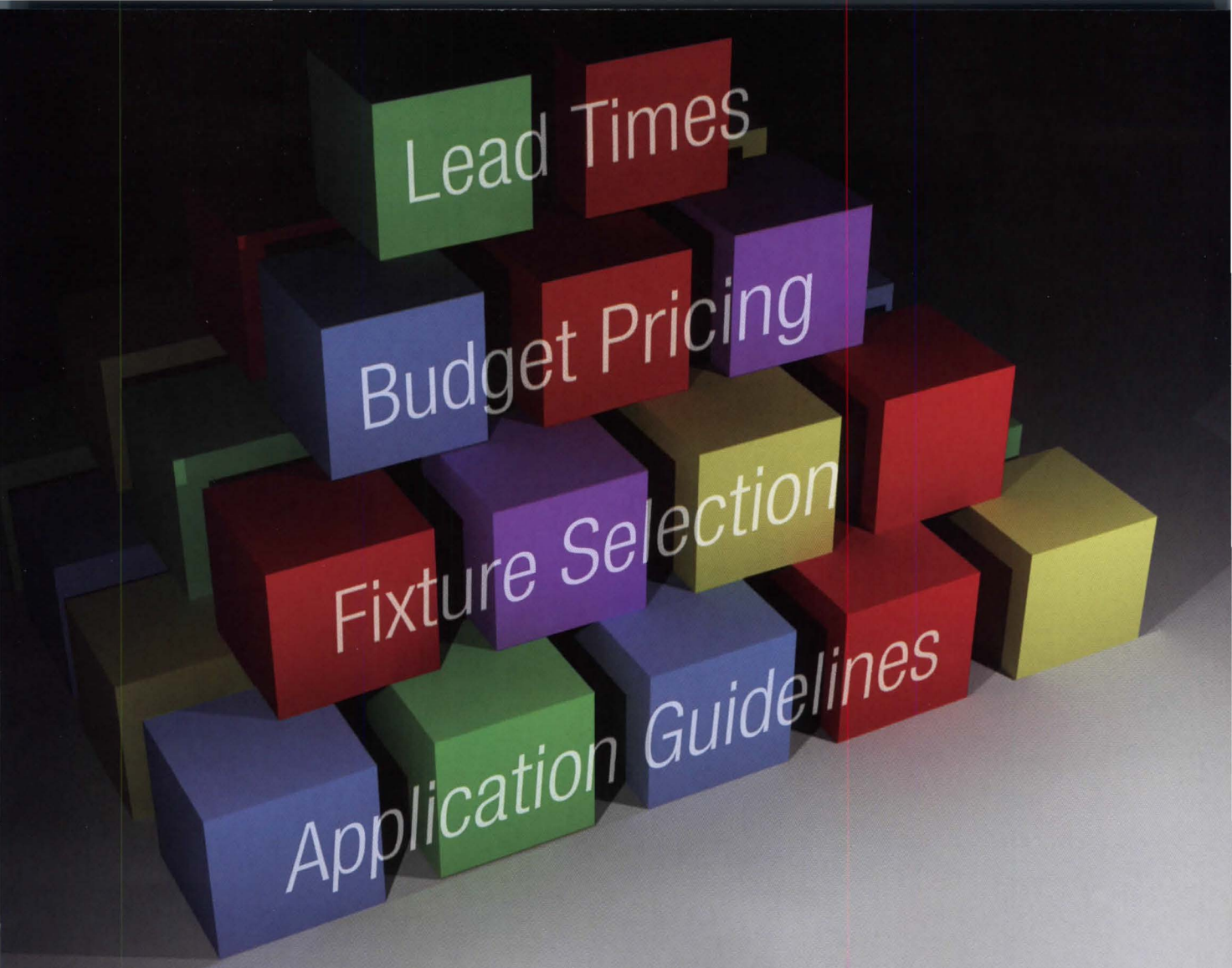
In a University of Manitoba project, a lightweight, ribbed T-beam (left) is cast from fabric, using considerably less concrete than a rectangular beam designed for equivalent strength. For the Weald & Downland Museum in England, designers used simple bent oak laths to efficiently span a large workshop area (right).

phase, eight interwoven domes built of steel icosahedral space frames and clad in a lightweight ETFE polymer foil rely on one another's "shell action" for strength. The vast structures pick up where Fuller's geodesics left off. An even more visually striking building is currently being constructed at Eden; developed along with engineers from Buro Happold and SKM Anthony Hunts, Grimshaw's education center achieves dynamic stability through novel form, a swirling lattice emulating spiral plant morphology. The architect's reference to the project as "an exercise in efficiency" is modest, for the project represents the future of architecture.

But sustainability may never realize its full potential as an architectural agenda until it addresses the question of structure. By inventing ways to optimize the relationship between form and material, designers can both respect natural resources and create novel geometries that could revolutionize architecture.

Architect Lance Hosey is a principal with the Washington, D.C.–based architecture firm Envision, a practice focused on environmental innovation.

LEFT: MARK WEST



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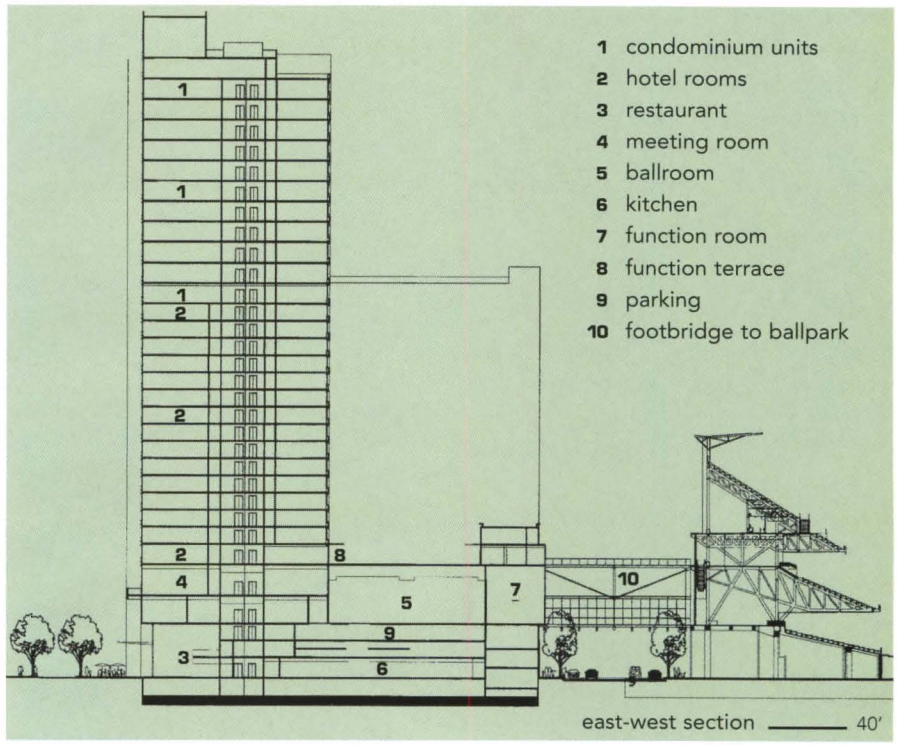
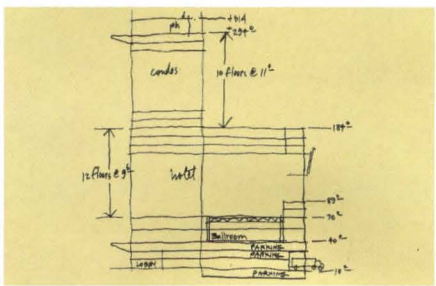
RESIDENTIAL HOTELS: RETURN OF A GOLDEN OLDIE

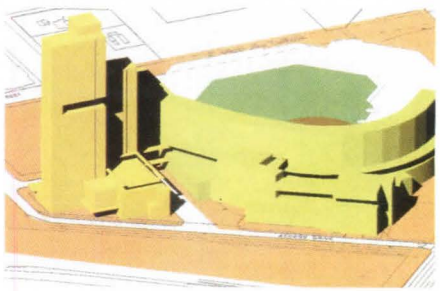
Witness the revival of an old mixed-use hybrid—but one with plenty of new challenges. by Robert Klara

When the Glenn Miller Orchestra struck up its signature tune *Pennsylvania 6-5000* at New York City's Hotel Pennsylvania during the sultry summer of 1940, most people in the audience knew that the song's name was also the hotel's phone number. But the title was actually a whole lot more personal than that: It was also the phone number of Miller himself, as well as that of his brass and string sections—because the band members didn't just play the hotel, they lived there, with their families, full time.

Today, the notion of taking up residence inside a hotel seems lost to Miller's era; somewhere along the line, hotel living went the way of tube radios and Packards. Yet recent years have witnessed a resurgence of the idea—either in the form of renovations or new developments—this time within a mixed-use model. From New York City's Trump International Hotel and Tower by Costas Kondylis and Partners with Philip Johnson (1997) to the imperious new InterContinental Boston Hotel and Residences designed by Elkus/Manfredi Architects (set to open in 2006), it's increasingly clear that the wealthy are, once again, choosing the concierge desk as their new front stoop.







While the envelope of Hornberger+Worstell's Omni San Diego suggests homogeneity, a complex program lies within. Shared amenities (including access to a ballpark) cluster on the bottom six floors; hotel rooms stretch up to level 21; and condominiums occupy the floors above.

GO WEST

That's been true on the eastern seaboard, at any rate, and in Chicago too, where the Park Hyatt by architect Lucien Lagrange has hosted condominium residents on its upper floors since opening in 2000. Now, however, a number of high-profile developments on the West Coast have clearly signaled residential/hotel mixed-use as a phenomenon with national implications, which has given a number of design firms an early and vigorous education about the demands and vagaries of this retro breed of housing stock.

"The Pierre and the Waldorf had this model in Manhattan 60 or 70 years ago, but it didn't hit the West Coast until recently," observes Mark Hornberger, principal with the San Francisco-based firm of Hornberger+Worstell, which recently completed the 32-story Omni San Diego, boasting 500 hotel suites and 37 condominium units in a mixed-use melange that thematically links internal amenities like party suites with external ramp access to a new sports arena. And in Las Vegas, there's Bergman, Walls & Associates' hotel and condominium tower for Donald Trump, which, at 64 stories, will be the tallest on the Strip when it opens in late 2006.

Meanwhile, over in San Francisco, more mixed-use projects are joining the skyline: The St. Regis Hotel by Skidmore, Owings & Merrill (SOM)—featuring 260 hotel rooms and 102 condominium units in a 42-story tower set to open in 2007—and the Four Seasons Hotel and Residences, open since 2001. And if the owners of the Fairmont get their way, that historic hotel will have nearly 40 percent of its rooms converted into condominiums in a few years.

Why is mixed-use back in vogue? Matthew Hall, a director with New York City-based Millennium Partners, developer of the Four Seasons in San Francisco, says it's a combination of sociodemographic trends and hard-

core financial realities very similar to what's been seen in East Coast cities for a number of years. "People are moving back into cities, and by branding with a hotel, we can provide the very best in *luxury services* to full-time residents," he claims. "In addition, it's very difficult for a stand-alone hotel to get financing now. But by having the revenue of the condo sales, the banks understand we're going to generate income quickly so we can pay down the loan."

THE RESIDENTIAL STEPCHILD

For architects, the residential hotel has presented both new opportunities and unique challenges that serve to fully engage a firm's creative energy. "Architecturally, what I find really compelling about these hybrid towers is that they allow you to develop a richness and much more elegant proportions than you'd have with a single-use office building," says Craig Hartman, design partner with SOM, whose St. Regis tower (right)—"a woven tapestry of precast skin wrapped around a glass shaft, topped by a glass crown that glows like a lantern"—seems to erupt from behind the 10-story Williams Building, a 1906 masonry structure that's been grafted onto the project.

Yet even as mixed-use buildings like these are allowing architects to push certain boundaries, they also press a unique set of demands on the designer's shoulders. Architects, in sum, have found themselves in a bit of a Catch-22: The new buildings must find ways of sharing amenities in a manner that will benefit both uses, yet also maintain distinct identities that do not impinge on each other. "What you must do is allow the hotel to have its identity and not have the residential be the weak stepchild," Hornberger points out. "But you also have to boost the rate of residential occupancy by offering linkages with the hotel. It's a very complex program."

In the San Diego Omni, for example, service elevators that rise from the hotel's kitchens also reach up into the residential core on the top nine floors of the building, enabling permanent residents to enjoy hotel perks such as room service, party catering, and laundry delivery. Hornberger's team also provided residents with elevator access to the hotel's restaurant, bar, meeting rooms, health club, and lower garage. "This building is what I call an 'urban resort,'" Hornberger offers. "It's something that can function as a business and meeting hotel, but it also has the feeling of a resort for residents."

A SEPARATE PEACE

As architects take pains to make sure the residential use doesn't play second fiddle to the glamorous hotel spaces, they've also learned an important corollary to that rule: Keep them separated.

SOM's St. Regis San Francisco will stack hotel and condominium units in a 42-story tower, attached to a 1906 building housing a restaurant.

Even as amenities are shared, the need for physical demarcation is critical, explains Hartman. "You need connections *and* separation," he says. "The connections provide services for the guests, but the separations have to do with the need for distinct identities."

As at the Omni, St. Regis residents can order room service and reach the ground-floor restaurant without going outdoors. But residents paying several million dollars for a dwelling don't necessarily want to cross paths with the hotel's hoi polloi (even if they're the type who can cough up $649 a night for a room). Which is why the condominium owners have their own entry point and hotel guests have their choice of two others. Hotel guests stay in rooms up to the 21st floor, while floors 22 through 40 are exclusively residential. The historic Williams Building houses a spa and restaurant for hotel guests, while its roof serves as a collective social area for the full-time residents of the tower. "One of the technical challenges of building like this isn't just ways of finding discreet entry points, but to make the core elements of the tower compact and efficient," Hartman says.

At the Omni, while residents can make ready use of lower-level hotel amenities like meeting rooms and a health club, they also have their own pool, spa, and barbecue/entertainment area with a fireplace on the 22nd floor that guests cannot reach. The architects have additionally furnished physical evidence of the boundary between residences and hotel by notching the building from the 22nd to the 33rd floors to allow for a set of recessed balconies in the residences. Hotel units, by contrast, lie behind a continuous curtain wall. This distinction is effective, yet remains subtle because the entire structure is uniformly clad in honed limestone, insulating glass, and tinted aluminum. The result is a multitasked high-rise that wears a single uniform. "This is a contemporary contextualist building that's trying to speak to the new side of San Diego," Hornberger says. "It reflects the programmatic uses internally, but it reads like an integrated whole rather than a set of separate uses that are simply stacked up."

That is, literally and figuratively, quite a tall order. But Hornberger has evidence that his building has achieved those goals. Upscale residential units in the city were going for $800 a square foot just a few years ago. Today, the Omni San Diego is fetching $1,200. Meanwhile, over at Millennium's Four Seasons, Hall cites another reason why his hotel is in demand by full-time residents, and it's one that works today just as well as it did 60 years ago. "People can always live in another luxury building," he says, "But then they don't get to say, 'I live at the Ritz.'" A

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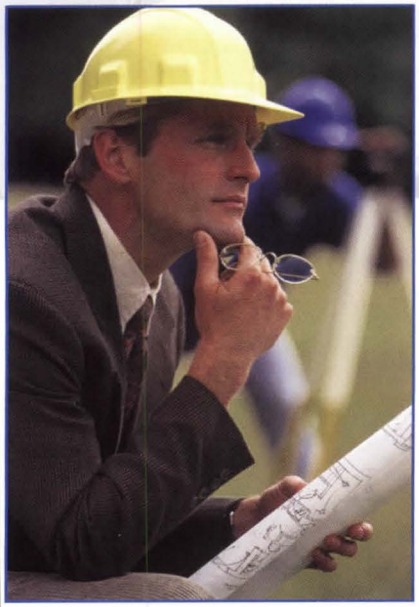

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OVERHEAD: WHEN LESS ISN'T MORE

BY HUGH HOCHBERG

Some people regard overhead as a necessary evil, and perhaps it is. Others consider it an unnecessary evil, which in some cases it may also be. (Some find the subject so boring that this might be as far as they read.) But if one considers overhead to be an investment in a firm's future, thinking about it can be quite helpful.

When overhead is considered as the expenses necessary to acquire and support current project activity, to a very real degree, **less is more**. That is, decreasing overhead increases profit, at least in the near term. Taken to the extreme, a firm could conceivably reduce its overhead to cover only the bare, immediate necessities—rent, utilities, basic supplies—and considerably elevate its profit. But at what longer-term cost?

What's it like to work in such an environment? No company time or expense on professional development, training programs, or identifying the right talent for the firm. And nix that aggressive marketing campaign. Review some projects? The work is good enough without spending **nonbillable time** on it. Holiday party? Strategy meetings? Sorry. Too much billable work to do.

DEFINING OVERHEAD

The term overhead describes the total of a design firm's **indirect expenses:** indirect labor, rent, office supplies, and anything else not chargeable to specific projects, but not such things as bonuses and retirement-plan contributions. Overhead for given practices will range from a low of 70 percent of direct labor cost to a high of 250 percent, and typically averages about 150 percent. The **overhead factor** expresses overhead as a decimal (0.70, for example) and is calculated by dividing total overhead expense by direct labor expense.

HINT: IT'S AN INVESTMENT

Considering the equation, **revenue – expense = profit**, it's easy to see that cutting overhead increases a firm's take. But what about other measures of success? The quality of a firm's work and services declines without investing in its people. Its ability to capitalize on improved capability diminishes if it doesn't acquire new technologies and learn to use them. The capacity to benefit from strong culture and teamwork dissolves without non-project-focused activities. Since a design firm is so much a result of what it eats, without identifying **preferred market sectors** and clients and positioning the firm to get work from them, the firm is shaped by others (that is, not necessarily the preferred clients).

For firm principals who agree that part of overhead invests in their firm's future, the question is how much to invest and where. The obvious, and perhaps best, answer is to invest in whatever will best position the firm—in terms of quality, culture, delivery, markets, image, profitability—where its leaders want it to be. A more detailed answer might categorize each investment "opportunity," like this:

➪**Marketing.** Think strategically and ahead three to five years about the clients and projects you want to serve. The more your preferred future differs from the present, the more of the firm's marketing effort (and budget) needs to go toward *strategic moves*. Concentrate on deepening your understanding of the world that affects those clients, and develop a presence in their networks; involve people from various levels in the firm in such efforts. Determine what your firm must do to bring value to those clients.

➪**Training.** A practice's success not only depends on doing projects for the "right" clients—those who share your values and appreciate the results of your efforts—but also on having the right talent to apply to those efforts. Training increases the firm's current proficiencies.

➪**Professional development.** Addressing the single most glaring deficiency in the profession today, leadership development not only helps firms expand the capability and perspective of talent but also equips people for additional roles and higher levels of responsibility.

➪**Profitability.** Firms can invest in profitability by optimizing the project-delivery process, improving the capabilities of team leaders and members, and providing tools for tracking project performance.

➪**Technology.** Put aside the temptation to be the first on the block with the latest technology and instead concentrate on the application side. Get specific about how technology will improve the value you provide to your clients. If a boost to value isn't there, think twice about the investment.

➪**Culture.** Firms require a strong organizational foundation to assure the right resources are in the right place at the right time—and that people are applying them and collaborating to benefit from them. Having a strong culture reinforces values and increases individuals' comfort with one another, improving collaboration.

➪**Facilities.** Ironically, much great architecture comes from talented, passionate architects working in mediocre facilities. But given the same ingredients and great work spaces, the fruits of those efforts are even better—and more attractive to clients and talent. Firms large and small, whether design-oriented or production-oriented and in large cities and rural settings, incur facilities costs (rent, amortization of leasehold improvements, maintenance, repairs, and utilities) of about 5 percent of net revenue. When such outlays exceed 7 percent, it is a factor that can erode profitability and limit the firm's ability to reward its people and reinvest in itself. When the costs fall short of 4 percent, there's either a sweetheart lease—or less-than-adequate investment.

Whether it's rent, training, or technology, overhead should be viewed as an investment in where architectural leaders want to take their firms. How much to invest in various overhead components will vary from firm to firm; the key is seeing it as a chance to help shape the firm's future.

Consultant and author Hugh Hochberg works with design firms on behalf of The Coxe Group, Seattle.

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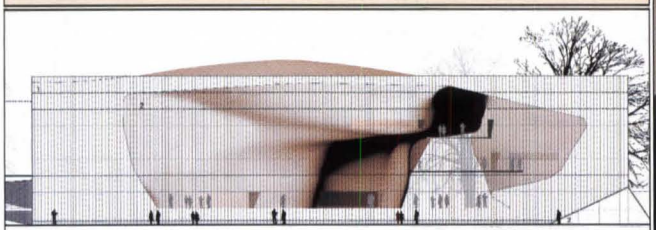
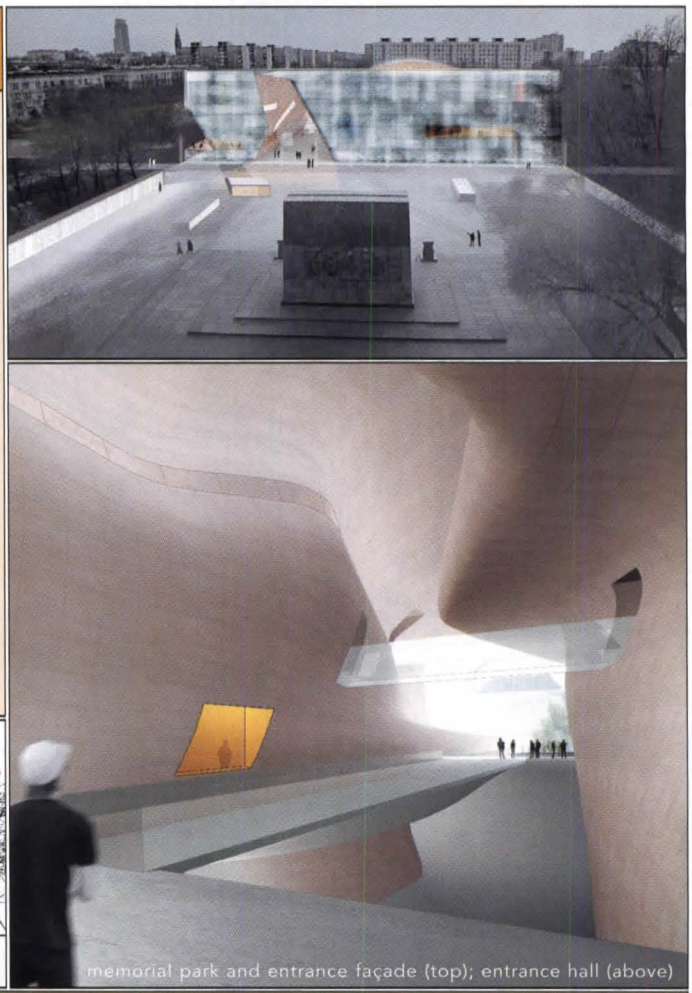
ARCHITECTS LAHDELMA & MAHLAMÄKI | MUSEUM OF THE HISTORY OF POLISH JEWS | WARSAW

A competition for a museum documenting eight centuries of Jewish life in Poland has been won by Architects Lahdelma & Mahlamäki. The 30-person firm, which is based in Helsinki, Finland, defeated better-known competitors including Peter Eisenman and Daniel Libeskind.

Sited in a downtown park that holds an existing memorial to the 1943 Warsaw Ghetto uprising against the Nazis, the scheme calls for an orthogonal building with a cavernous passage cut into it—a reference to the biblical parting of the Red Sea—that's naturally illuminated by clerestory. With curved, limestone-clad walls compressing and expanding space, this void serves as forecourt, central organizing device, and light court for the narrative museum on the lower level, while separating administrative functions from public spaces. Evocative of a rich if troubled history, the scooped-out interior is echoed in the façades of blue-green glass, which have carved-out openings, but with more angular lines. The completion of the 194,000-square-foot project is slated for 2008. **Abby Bussel**

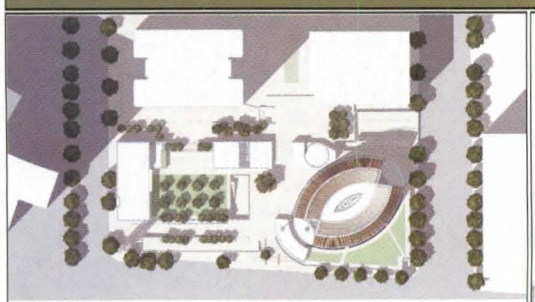


southwest elevation

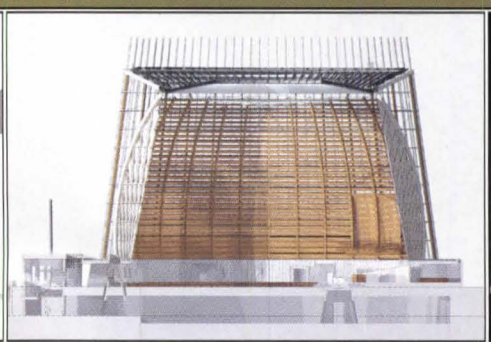


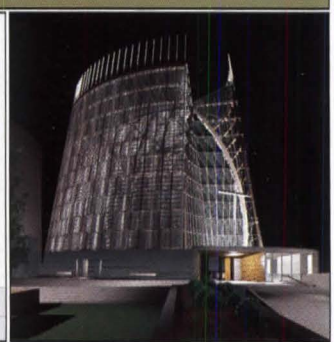
memorial park and entrance façade (top); entrance hall (above)

SKIDMORE, OWINGS & MERRILL WITH KENDALL/HEATON ASSOCIATES | CHRIST THE LIGHT CATHEDRAL | OAKLAND



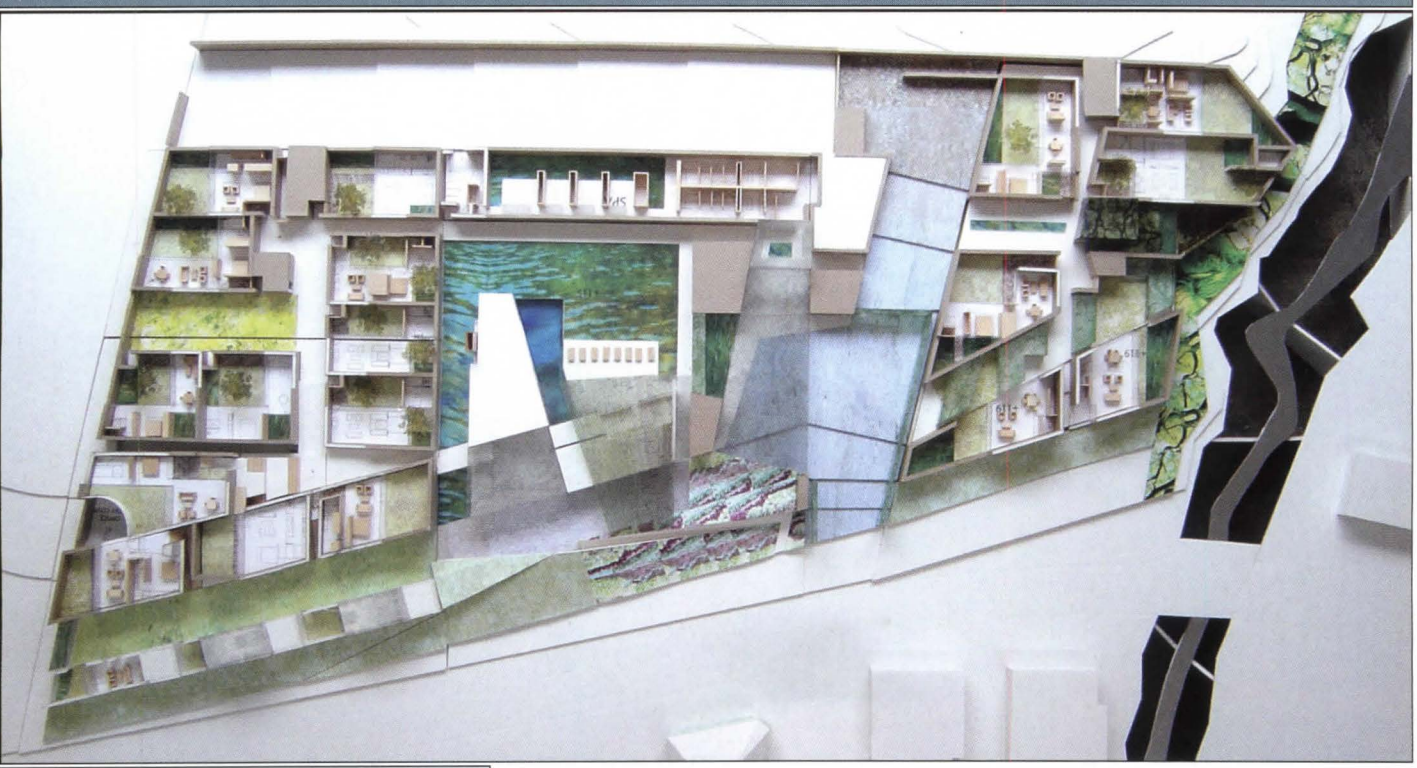
site plan (above); section (middle)



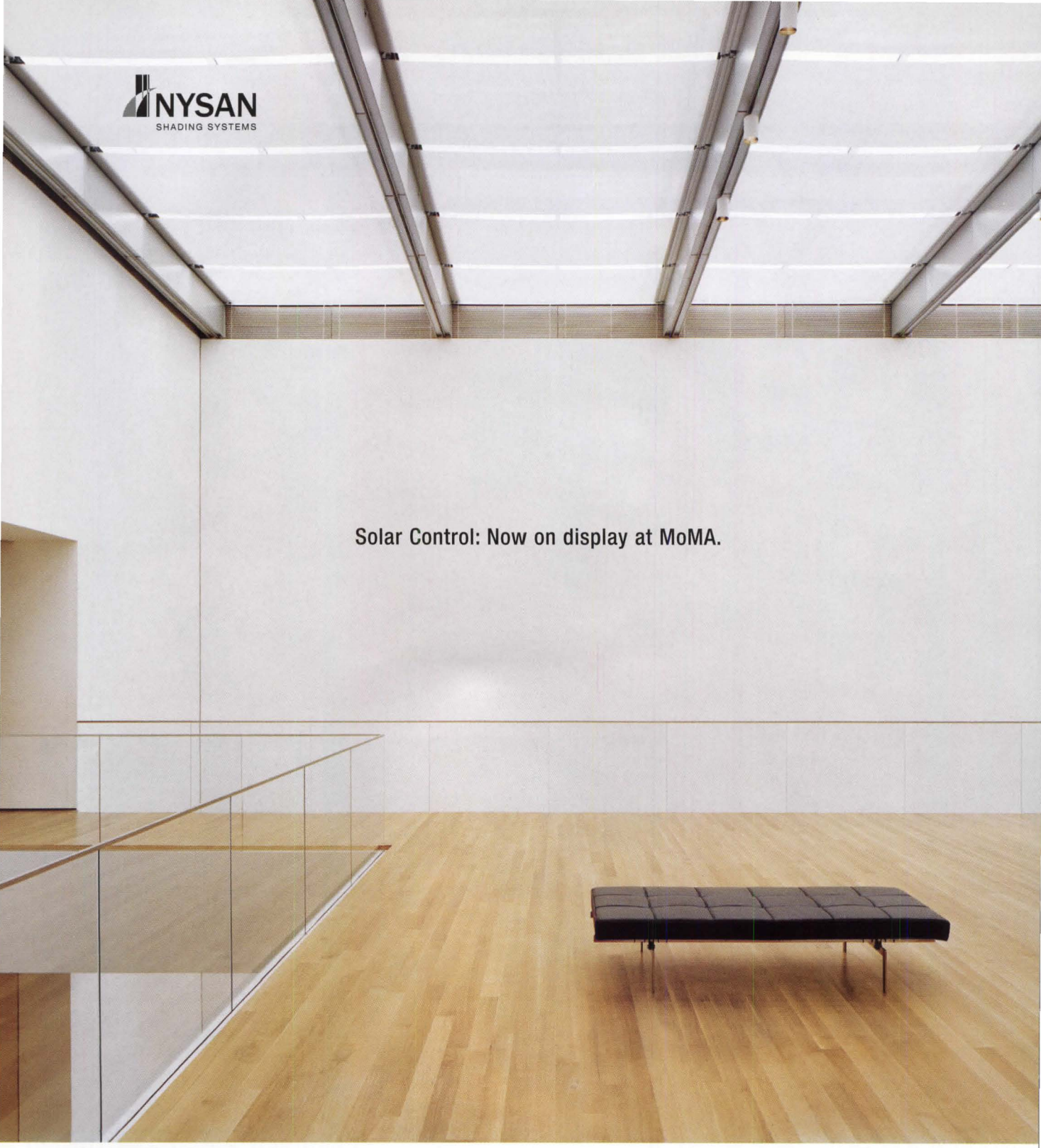


Craig Hartman, a partner in the San Francisco office of SOM, says that the design intent of Oakland's Christ the Light Cathedral is to "ennoble and inspire through the use of light, material, and openness." Slated for completion in 2008 and set on 2.5 downtown acres overlooking Lake Merritt, this translucent conical structure of 21,000 square feet, with its spiky crown, seems likely to achieve the high-gothic goal of dematerializing the enclosure of sacred space. The almond-shaped plan is formed by the intersection of two circles and expressed as two spherical wall segments. The 120-foot-high outer wall of laminated glass panels, set in an extruded aluminum frame, filters natural light through patterned ceramic fritting integrally fired onto its surface. The outer wall sits atop a 15-foot-high curved concrete reliquary wall and is supported on a structural frame of glue-laminated Douglas fir members with curved and tapered profiles. The vertical members are laterally stabilized by horizontal wood louvers with a surface layer of slotted and perforated panels. The angled louvers are more widely spaced at the bottom than at the top, increasing the amount of daylight to the interior. The trapezoidal end-walls and glazed roof also have diaphanous, patterned-glass panels. **Sally B. Woodbridge**

ANTOINE PREDOCK ARCHITECT AND PREDOCK_FRANE ARCHITECTS | INN AT THE FRENCH LAUNDRY | YOUNTVILLE, CALIFORNIA



Set to open in three years' time, this inn and spa for restaurateur Thomas Kelleher, whose famous French Laundry sits across the street, is sited on a flat parcel between Highway 29, which runs through Napa Valley, and the main street of Yountville, a town of 3,500 known as an epicurean epicenter in the wine country. With two roads to contend with, the architects chose to develop a sanctuary of protected spaces—sheltered from the flow of cars by perimeter walls and "defensive" white noise—that draw on parallels between the culinary arts and architecture. Beginning with the idea of "coursing and ritualizing," they catalogued experiences guests might have through the course of a day and across the seasons of the year. Local samples of earth, oak, moss, and glass inspire their materials palette, and Napa's natural and viticulture landscapes inform the organization of the 32,000-square-foot structure, which has a poured-earth base and glass walls. Spread across seven acres, the 20 guest rooms—each with its own large outdoor space—are arranged around common courtyards and gardens. **Abby Bussel**



Managing light and energy is the art of solar control. At MoMA, a Nysan® shading system transitions from a blackout shade to a 5% openness at the touch of a button while keeping the fabric stable and the reveal clean. For 80 years, architects and designers have turned to Hunter Douglas for innovative interior and exterior solar control.

Project: Museum of Modern Art, New York, NY
Architects: Yoshio Taniguchi and Associates and Kohn Pedersen Fox Associates
Product: Nysan Motorized Skylight Shades

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SOLAR CONTROL

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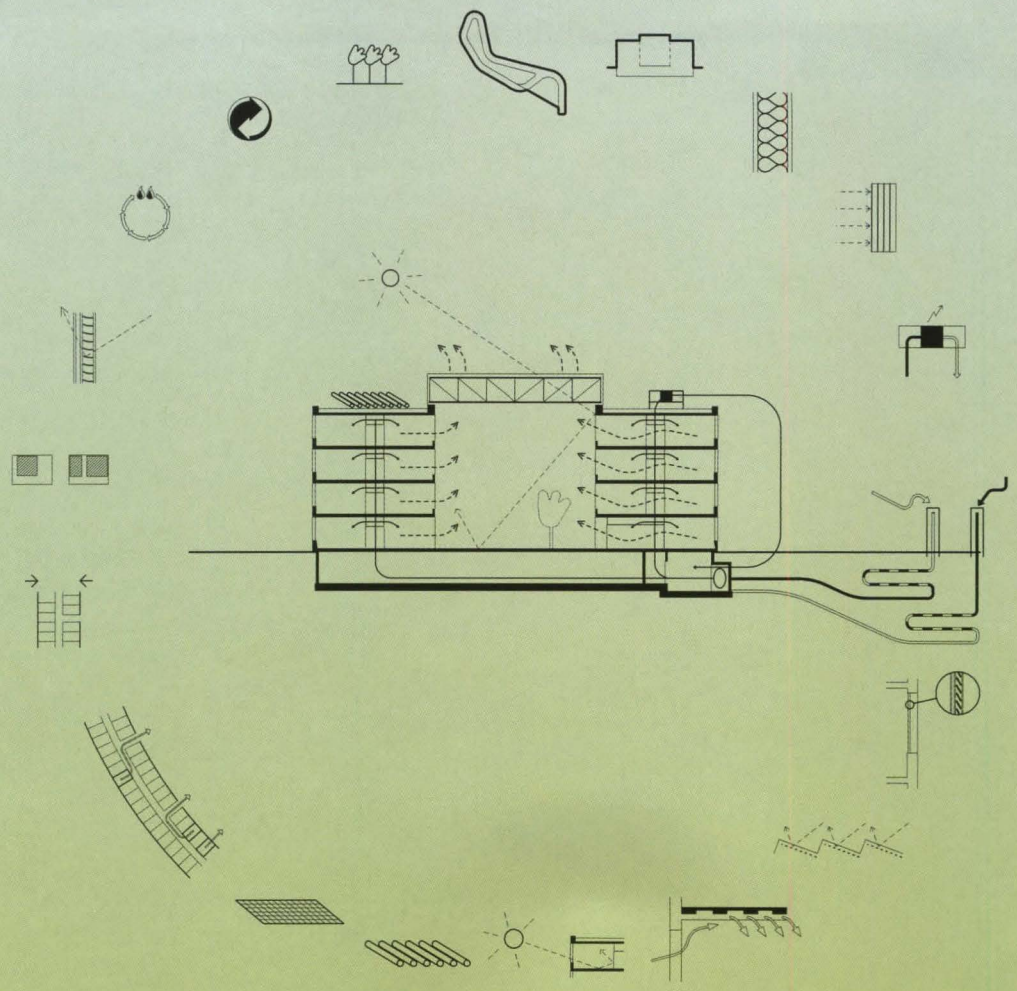


fresh air and sunshine

As the country slogs through another sticky-hot summer and electricity usage breaks records from coast to coast, we are reminded of our status as the largest consumer of energy on the planet. The United States is home to 5 percent of the global population, but consumes about one-quarter of the world's natural resources. While new GSA projects are required to meet stringent energy-use standards, only Nevada and Washington mandate LEED certification for state-funded projects. Meanwhile, many of our commercial buildings keep their lights on 24 hours a day and run air conditioning year round.

Of course, there's a different way. Take Germany's Federal Environmental Ministry in Dessau by sauerbruch hutton architects. Beyond the specification of materials with recycled or reusable content, this low-rise atrium building also minimizes heat-loss through its skin; precools fresh air in the subterranean passages of its geothermal heat exchanger; maximizes passive uses of the sun's energy through such strategies as flexible solar protection that allows low winter sun into the offices; and tempers interior climate through the atrium via operable windows and natural convection.

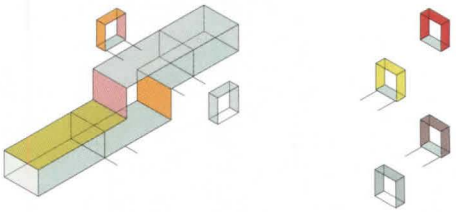
Lead by example. Interesting idea.

green acres

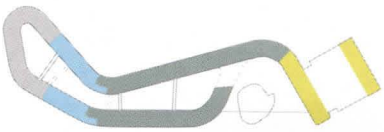
SAUERBRUCH HUTTON PAYS AN UNUSUAL HOMAGE TO THE BAUHAUS WITH A SINUOUS, HIGHLY EFFICIENT GOVERNMENT BUILDING. BY AARON BETSKY

ANNETTE KISLING

Germany is one of the few remaining places in the world where people still think the government should make things better, and that architecture should help in that effort. That sentiment pervades the 400,000-square-foot home of the German Federal Environmental Ministry in Dessau, which opened last May. Designed by the Berlin firm of sauerbruch hutton architects, it occupies what was once a heavily polluted site in this depressed part of the former East Germany in a building for 800 workers that doesn't tower over its neighbors. It actually shelters them from the noise of a new highway bypass, and it uses 50 percent less energy than comparable buildings. It looks pretty good, to boot.



The move of the environmental ministry from Berlin was a deliberate attempt by the federal government, in the wake of the fall of the Berlin Wall, to help revitalize what had once been a center for heavy industry. (Dessau is better known to architecture aficionados as the second site of the Bauhaus). The architect's solution to an awkwardly shaped site at the northern edge of the downtown area was to stack the individual offices—German law mandates that each official has his or her own office—into four levels, and then snake them around the site along a 1,200-foot-long double-loaded corridor enclosing an atrium to help modulate temperatures. The architects also rebuilt one of the existing factory buildings for the library stacks (adding a seductively curved reading room to lean against the original brick block), placed the cafeteria next to the new bypass to the west, and gave what remained of the site over to a public park. This accessible green area extends the open landscape to the north into the urban core, helping to integrate the bureaucratic behemoth into the city proper.



SHADES OF GREEN

The environmental ministry is a miracle of ecological gadgets that never strut their stuff but are built discreetly into every scale and aspect of the building. The architects started, literally, from the ground up, taking advantage of the stipulation that 30,000 cubic feet of polluted earth be removed, cleaned, and replaced; they took the occasion to install a heat-exchange system. Air is sucked underground in the park (through giant shafts that artist Hans-Joachim Haertel has turned into sculptural objects), circulated through the ground, and then led into the building, where it rises through wall plenums into the winter garden and out through the roof. At night during the summer, air can also be trapped in the building and then vented throughout the day. Occupants can partially open their windows, though only with small vents. So far the building is on target to meet the ministry's goal of a 50 percent savings in energy, with 20 percent of the total energy budget coming from renewable resources such as the geothermal heat exchange and roof-mounted solar panels.

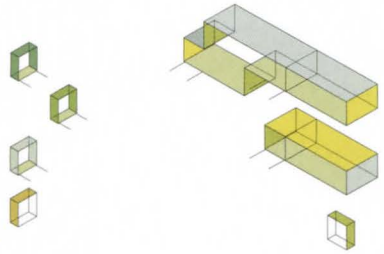
Beyond the train tracks that lead into Dessau's nearby Wörlitzer Bahnhof sits sauerbruch hutton architects' Federal Environmental Ministry. At the south edge of the site, an expanded existing factory building houses the complex's library, while newly constructed offices are sheathed in multicolored glass panels and wood.

The building's environmental consciousness continues with its use of materials, which are as nontoxic as possible. In fact, almost no venting of residual chemicals was needed once the building was completed. The most expensive material choice is on display in the façade, which the architects made of glass panels that are colored on the back in 53 different hues and that run between continuously curved timber bands. The architects claim the façade's $6 million extra cost—on a total budget of $82 million, which sauerbruch hutton contends is only 10 percent more than that for a building using

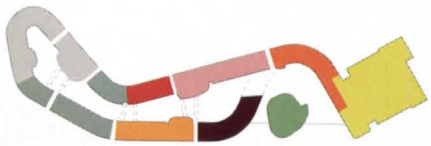
standard construction methods—is offset by the energy savings and the way in which the glass panels blend the ministry into its setting: The colors range from a reddish hue, where the building faces the brick structures of the surrounding residential neighborhood, to greener tints, where it looks out on the newly extended park.

FORM FOLLOWS ... THE CURVE

The ministry building is an "environmental structure displaying ecological themes," claims Mattias Sauerbruch, partner in the firm. It is also resolutely a piece of architecture that represents the character of the institution it houses through its structure and materials, while simultaneously becoming part of a larger cultural and physical context. At the environmental ministry, the firm's trademark play with multiple colors and amoeba-like shapes—which they have displayed in several laboratory facilities, factories, and office structures in Germany—serves to represent the ministry's function. Because of the continuously curving façade, the building manages to make clear that it is a bureaucracy without taking on the overwhelming look of one. The ministry's scale breaks down even further at the point where groups of people gather, as the architects housed the auditorium, meeting rooms, and a gallery in small pods that dot the atrium and the main public space. Every detail was considered, down to the change in texture on the building's floors that helps the partially sighted find their way.



Beyond such attention to detail and resolution of the whole, however, the architects also claim a larger purpose, one that refers to the older Dessau building against which any new construction has to measure itself. Says Sauerbruch, "The connection between rationality—in manufacturing technology and planning—and sensuality—in materials and production—as much as the integration of the whole spectrum of means of aesthetic expression, as can still be seen at the Bauhaus today, remains—for us, at least—exemplary. This dimension of real integration constitutes a quality that has more or less been lost in recent times and that our generation has to reacquire."

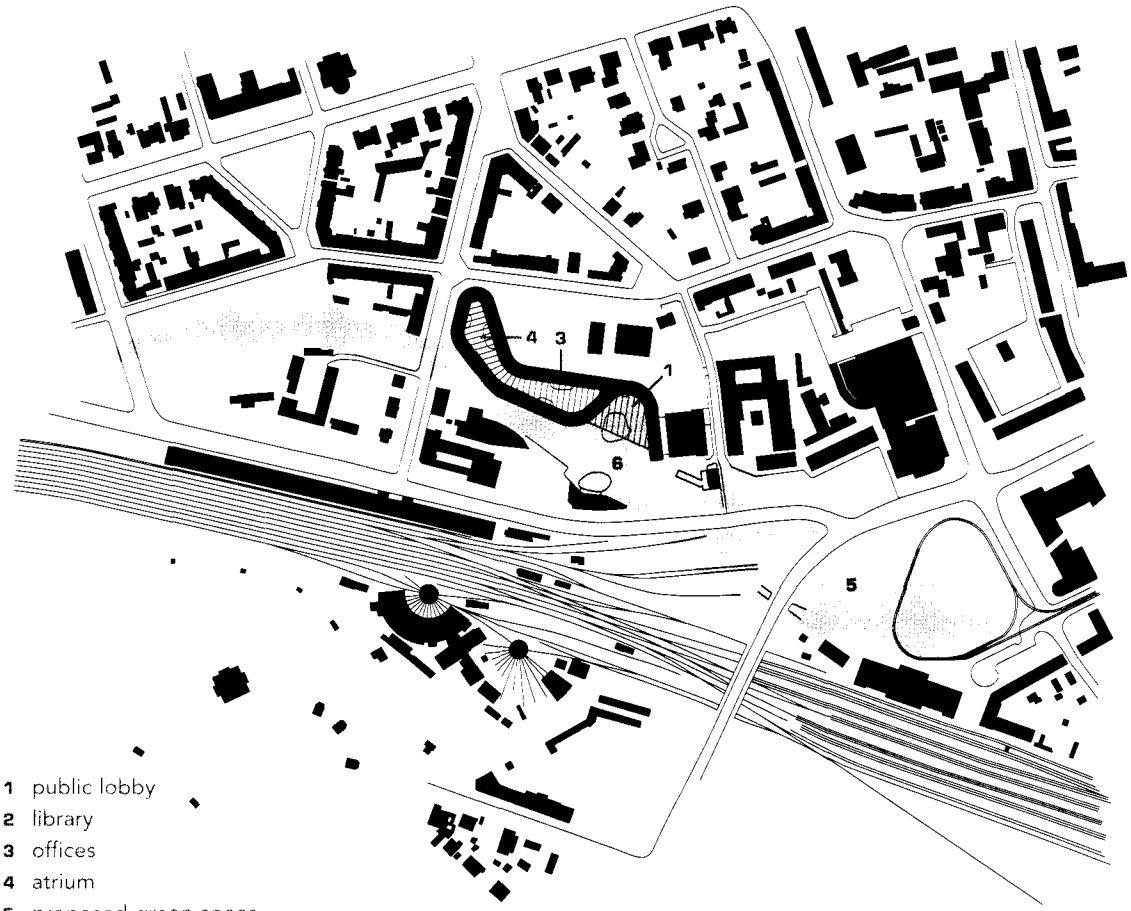


The environmental ministry expresses the integration of city and landscape, of technology and visual spectacle, of comfort and sensuality, of large-scale bureaucracy and a concern for small-scale and individual activities. What Sauerbruch is most proud of, however, is his firm's strategy of compaction: "By only covering 70 percent of the site, we managed to give a large new park back to the city. We not only fit the building into the site, we connected the pieces around it and made something that let people understand and use what was once an industrial wasteland."

Across a central atrium, offices are linked by bridges that serve each level of the serpentine building (facing page.) Illustrations show the configuration of the "bridge heads"—portals at the ends of the overhead walkways that are painted to match the façade (top)—as well as the distribution of ministry departments along the length of the complex (above).

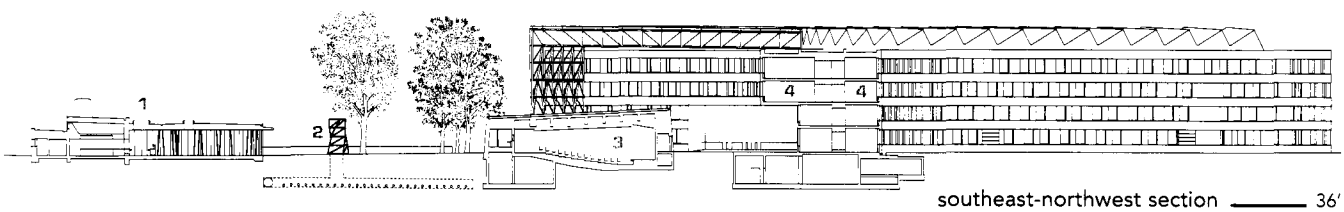
If one can offer any criticism of the ministry at all, it is that the building is so integrated, calibrated, and thus recessive as to leave no focal point or sense of modulation. This is an ecological snake that eats itself, leaving no angles, towers, hierarchies of form, or anything that might not be politically or aesthetically correct. Dessau is left with a smooth ecological operator that shows us the right way to make architecture. The firm sauerbruch hutton makes it look easy, leaving us to wonder what horrors, fissures, and possible beauty might lie hidden within the ministry's kaleidoscopic coils.

ANNETTE KISLING

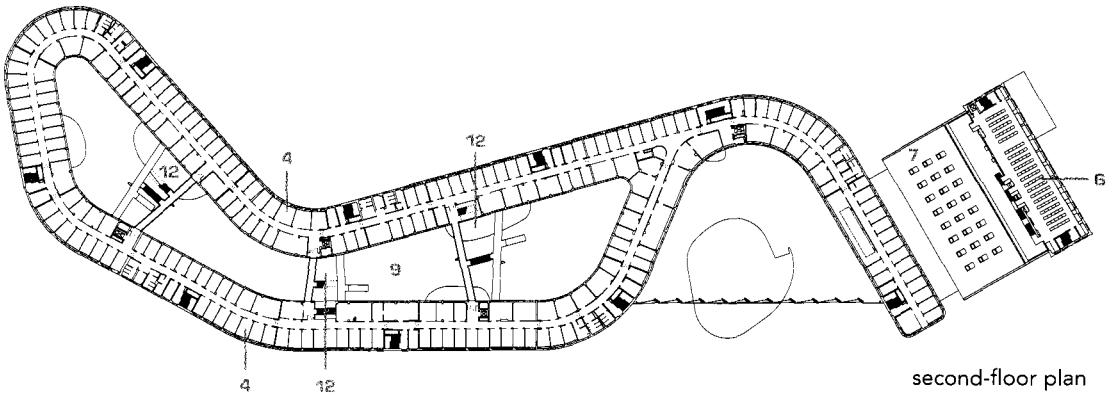


1 public lobby
2 library
3 offices
4 atrium
5 proposed green space
6 park

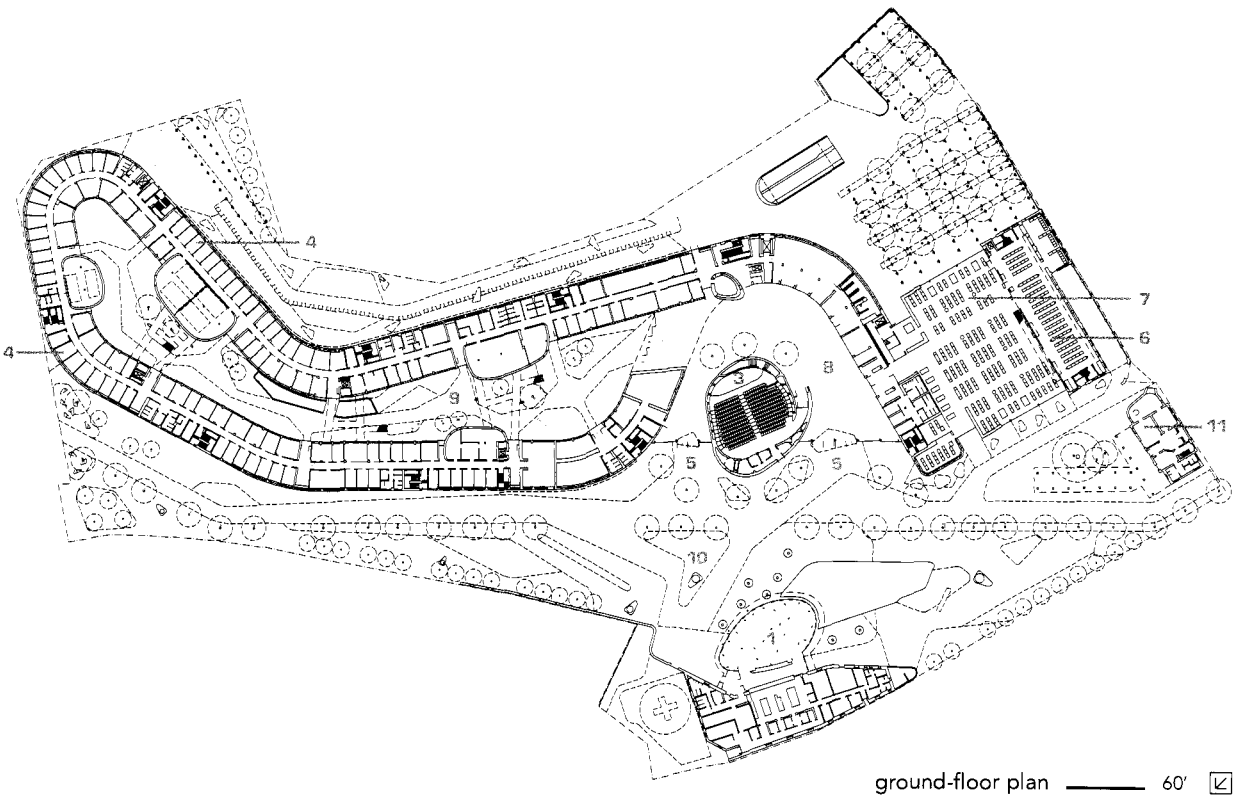
site plan 225′



southeast-northwest section 36′

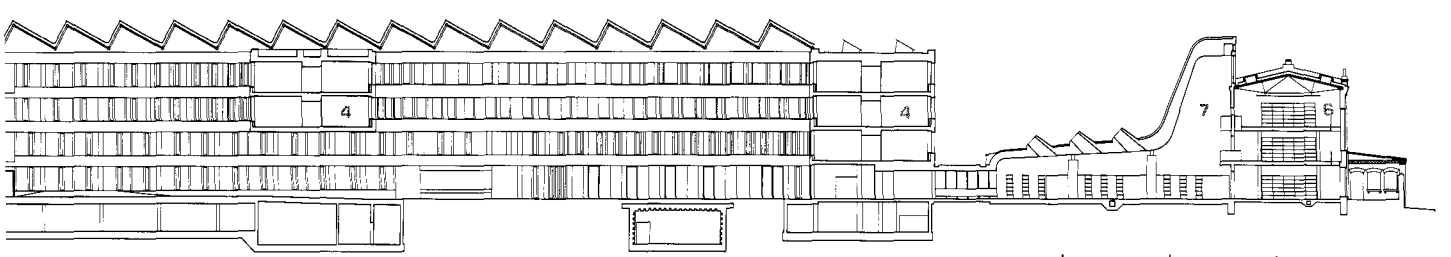


second-floor plan

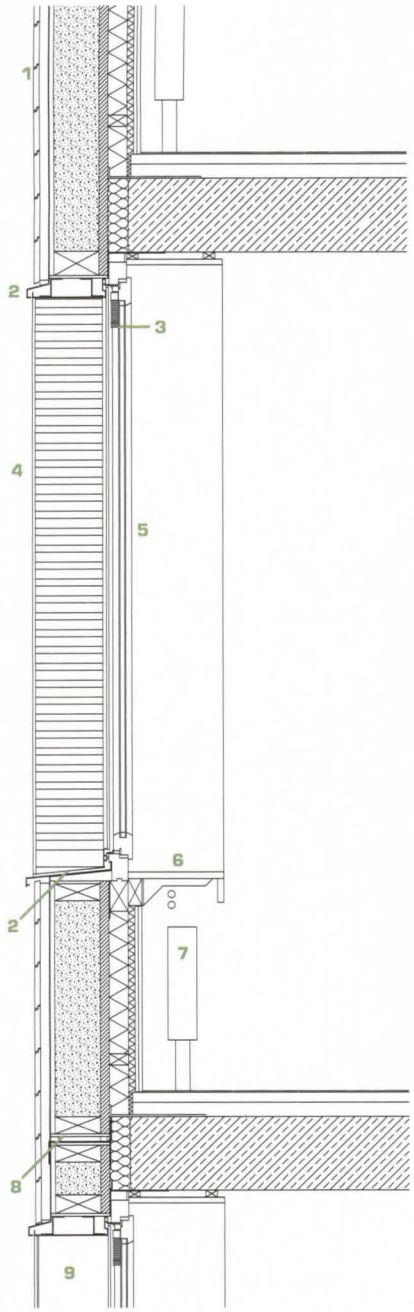


ground-floor plan ——— 60′

1 cafeteria
2 sculpture/ventilation shaft
3 auditorium
4 offices
5 entrance
6 library (existing building)
7 library (new building)
8 public lobby
9 atrium
10 park
11 train station
12 pedestrian bridges



northwest-southwest section ——— 25′



1 larch cladding
2 tin-coated copper header/sill
3 operable blind
4 ventilation grille
5 timber-framed window
6 timber sill
7 radiator
8 separation joint
9 window reveal

façade detail 1′

JAN BITTER

German Federal Environmental Ministry, Dessau, Germany

client: The Federal Republic of Germany **architect:** sauerbruch hutton architects, Berlin—Matthias Sauerbruch, Louisa Hutton, Juan Lucas Young, Jens Ludloff (principals); Andrew Kiel, Rene Lotz (project architects); Nicole Berganski, Denise Dih, Andrea Frensch, Matthias Fuchs, Frauke Gerstenberg, Andreas Herschel, Rasmus Joergensen, Agnieszka Kociemska, Mareike Lamm, Jan Laeufer, Jan Liesegang, Ian McMillan, Julia Neubauer, Konrad Opitz, Olaf Pfeifer, Jakob Schemel, David Wegener, Nicole Winge (project team) **landscape architect:** ST raum a. **engineers:** Zibell Willner & Partner, Cologne/Berlin (energy concept and environmental engineering); Krebs und Kiefer, Berlin (structural); ITAD, Dessau (plumbing); Ingenieurgesellschaft KEMPA Dessau (civil); G.U.T. (environmental remediation) **consultants:** GFÖB (ecological); IEMB (energy); Mueller-BBM (building physics); Schallschutzbuero Diete (acoustics); Florencia Young with Ruska Martin Partner (orientation system); Ingenieurbuero Lehr (electricity, lighting, and security) **construction management:** Harms & Partner **area:** 400,000 square feet **cost:** $82 million

FLUID

BMW CARS—AND THE PEOPLE WHO MAKE THEM—FLOW THROUGH ZAHA HADID'S NEW SWOOSH OF A BUILDING. **BY AARON BETSKY**

If BMW once prided itself on producing the "ultimate driving machine," Zaha Hadid and her London–based firm can now say they have produced the ultimate machine for the production of driving machines. They have done so by concentrating, like the modern automotive industry, not so much on the nitty-gritty of actual production, but on systems of design, control, and styling that transform the otherwise standardized machinery of car assembly into a high-performance and highly seductive object. What goes on under the hood or in the factory halls remains a mystery to most of us, but how the car appears and moves occasions an architecture that celebrates flow.

The car in question is the new BMW 3 Series, and the factory is located on the outskirts of the former East German city of Leipzig, some 100 miles southwest of Berlin. The three halls in which the cars are actually produced—"body-in-white," assembly, and paint—are anonymous boxes clad with corrugated metal and built according to the car company's in-house standards by AGP Arge Gesamtplanung, an engineering firm based in Stuttgart.

GOING WITH THE FLOW

It was the space between these closed volumes that was the subject of an invited competition Hadid won in 2002. Here, BMW wanted a 270,000-square-foot structure that would contain offices, a cafeteria, meeting rooms, and control functions. This was to be the heart of the factory, the "nerve center," where everybody entered, interacted, and was intimately connected to the production process. The manufacturer decreed open offices in which departments were not to be segregated from each other; a single entry point for all workers (white collar and blue); and a fabrication route that would send the cars on conveyor belts from one hall to another through the central building.

Hadid and her office's chief designer, Patrik Schumacher, responded with a version of the bundled, Z-shaped lines that they are now using in several concurrent projects, such as the Museum of Modern Art in Rome, currently under construction, and the aquatic center for the 2012 London Olympics. These organizational elements, expressed by parallel concrete planes, start by providing a bridge between the body-in-white and paint buildings underneath which the 5,500 employees enter and exit the plant. The tubes formed by the planes then zigzag between those two halls, before moving back to the assembly volume in the rear of the site.

These crisscrossing spaces shelter an ample reception lobby, which the architects call "the forum," and two north-south–oriented scissoring sets of terraces, one moving up from the entrance lobby, the other starting toward the rear of the forum and ascending to the bridge over the entry. Hadid and Schumacher tucked ancillary spaces such as kitchens, doctor's offices, and meeting rooms beneath the bridges and terraces, but tried to keep most spaces open and fluid. Even the quality-control station, where cars are checked for production faults, is visible through glazed walls. And over, through, and under all these planes, lines of half-finished cars inch forward noiselessly on tracks held up by pillars or slung from the ceiling, making the main purpose of the operation clear to all.

DRIVING THE MACHINE

"BMW wanted a clear organization of a very complex set of relations," explains Schumacher. "Our aim was to articulate it so as to reduce visual complexity." Though the organization devised by the architects sounds complex, it clearly defines the program. Hadid's office also simplified the building by reducing the

INJECTION

ROLAND HALBE

structure as much as possible, integrating it where appropriate into floors, ceilings, and walls. For the major structure, self-compacting concrete, an extremely fluid compound that allows the forming of very long spans with few visible joints, was used to precast structural elements and build cast-in-place walls (see "Extreme Concrete," right). The ceiling is a combination of steel trusses and a tubular space frame. Though the architects apparently pushed the budget a bit far, so that money ran out for a ceiling that would have organized services and structural elements into a more coherent plane—and though they could not control the sea of bland Dilbertania that washes over their pellucid office platforms—there is an astonishing clarity to the space. "It is a place where people, products, and information all circulate," notes Schumacher. "We gave depth and shape to that movement."

That is exactly what BMW plant manager Peter Claussen, who dreamed up the notion of the open office and the conveyor belts crossing through the main spaces, had in mind: "We wanted a really open landscape, where you could understand the technology and flows of people, cars, and information, where we could all see what we are doing." What he admires about Hadid's solution is that "she managed to produce the building with the materials that one expects in a factory; nothing fancy, but somehow they turn our very precise demands into very big sculpture. It makes me happy every day, but I think it will also please people 50 years from now."

Whether this architecture will indeed withstand the fast flows of capital and taste that continue to change the means of production at an ever-faster pace remains to be seen. For now, however, Zaha Hadid and her team have shaped those flows into a building that is the most heroic statement about how things are made that our consumer-oriented society has seen Henry Ford started up his assembly line.

EXTREME CONCRETE

While the organization and formmaking behind Zaha Hadid's competition-winning factory building for BMW are certainly novel, much of the architect's elegant structure derives from standard (and cost-effective) components. Off-the-shelf shapes of precast, prestressed concrete for slabs, beams, and columns are rendered in a self-compacting mix to achieve the highly articulated, void-free surfaces that Hadid favors. The first-floor slab, for example, comprises 18-inch-thick double-tee units spanning 33 feet between floor beams, which are typical inverted T sections. An elevated portion of the facility even borrows a standard bridge-building method: By the main entrance, where the first-floor slab cuts across at an angle to expose a clear span of about 150 feet, a number of 8-foot-long trapezoidal precast segments, varying from about 11 feet to 15 feet in depth, were connected by post-tensioning cables and grouted to appear as single, continuous beams. The clustered quartet of thin, raked columns that supports the span, however, is decidedly nonstandard.

The roof structure is primarily precast double-tee members on a 33-foot column grid, with areas of steel-tube space frame—elongated hexagonal cells of about 10 feet in depth—supported on columns extending from the first floor on a larger grid of about 65 feet by 100 feet. The *façades'* standing-seam metal cladding and windows wrap up and over the structure to become a roof with skylights. **C.C. Sullivan**

Located on the north side of the 540-acre site, the standing-seam metal–clad central building holds the main entrance—set beneath a dynamic bridge form—for blue- and white-collar workers alike, who also share use of outdoor spaces such as the courtyard (below).

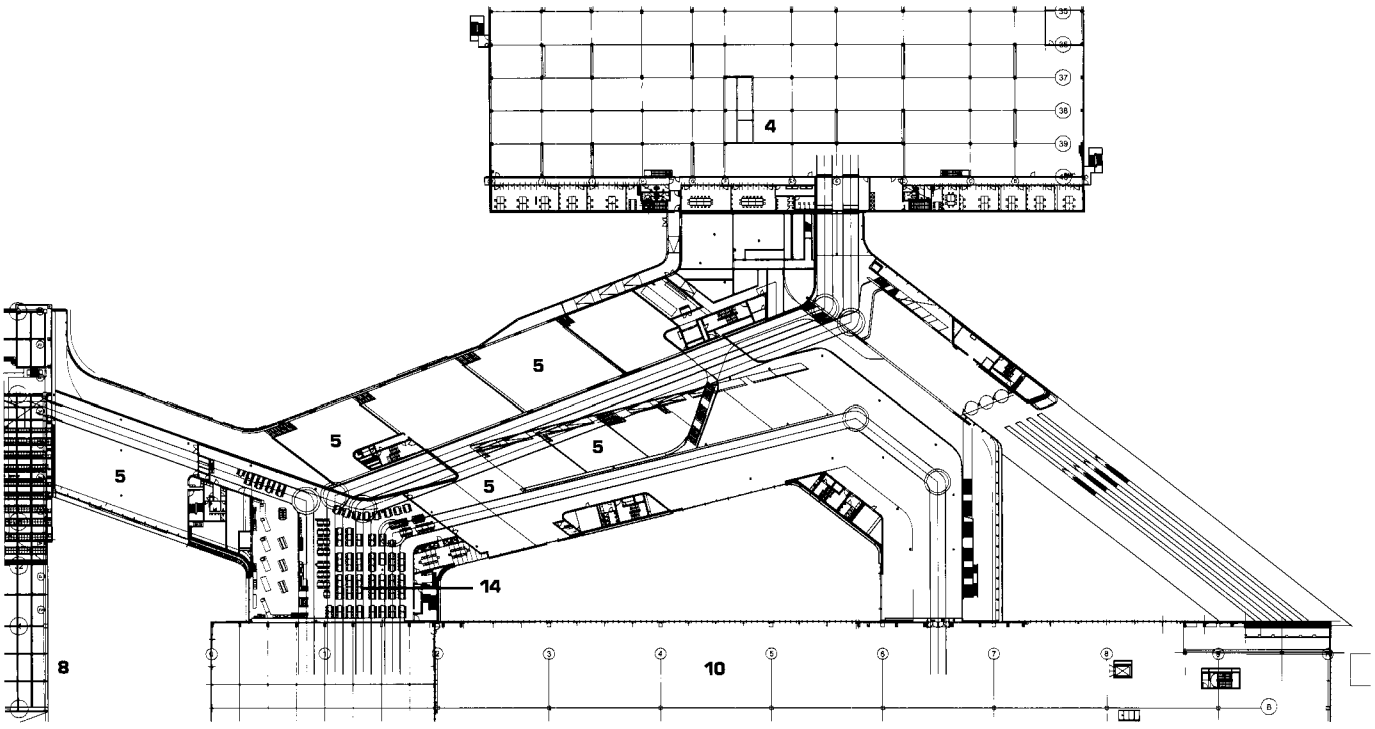
A staircase leads to the nonhierarchical office terraces requested by the client, and offers a view of the office bridge that hovers over the building's main entrance and landscaped carpark. Secondary elements such as painted metal tube railings reinforce the idea of fluid motion.

WERNER HUTHMACHER, EXCEPT FACING PAGE, BOTTOM: ROLAND HALBE

The superstructure is precast, prestressed concrete, as is evident in the "forum," (right), which doubles as a reception area and café, and flowing, multilevel workspaces (below).

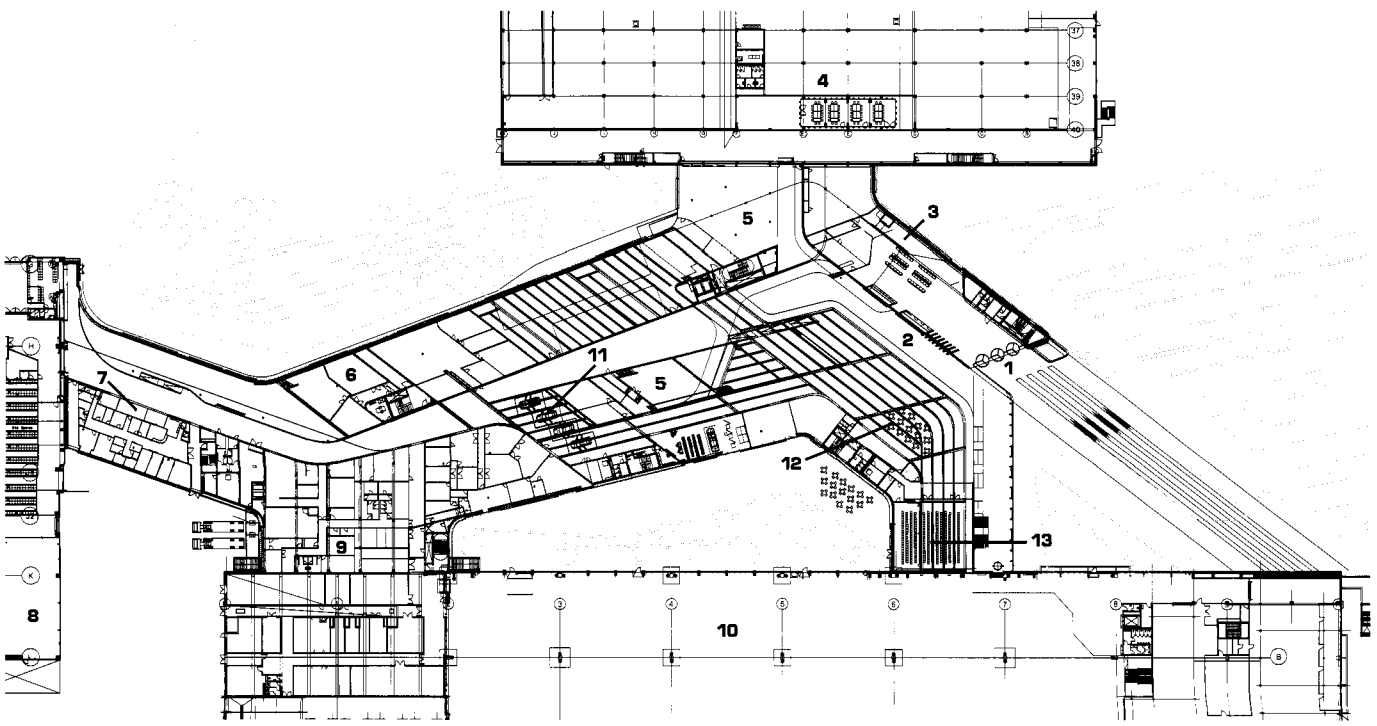
The building's scissor-section results in a cascade of open office tiers (left). Conveyor belts send car bodies through the workplace, emphasizing the flow of forms and spaces.

THESE PAGES, TOP: ROLAND HALBE; BOTTOM: WERNER HUTHMACHER

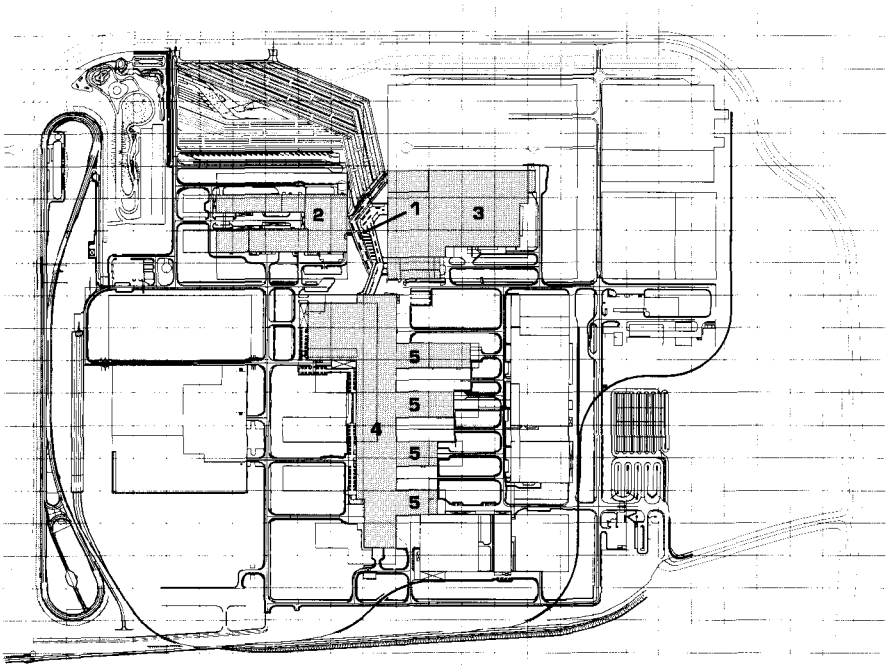


second-floor plan

1 entrance
2 lobby
3 shop
4 paint hall
5 offices
6 laboratory
7 infirmary
8 assembly hall
9 kitchen
10 "body-in-white" hall
11 quality control
12 café
13 auditorium
14 dining hall

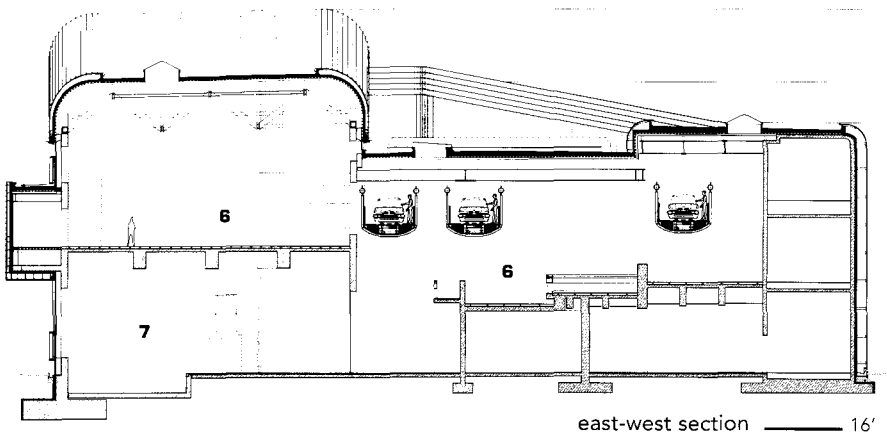


ground-floor plan 50'

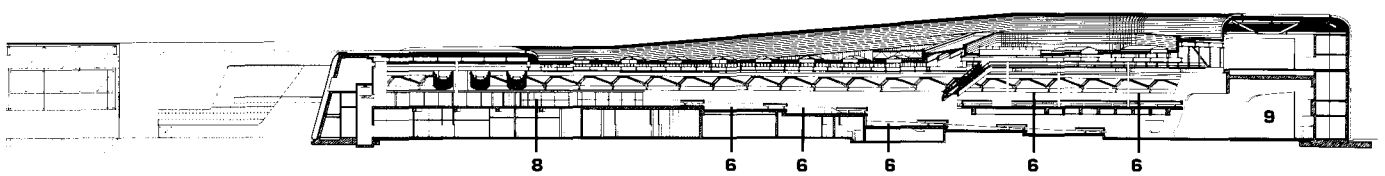


1 central building
2 paint hall
3 "body-in-white"
4 assembly hall
5 supply center
6 offices
7 laboratory
8 dining hall
9 lobby

site plan ——— 590′



east-west section ——— 16′

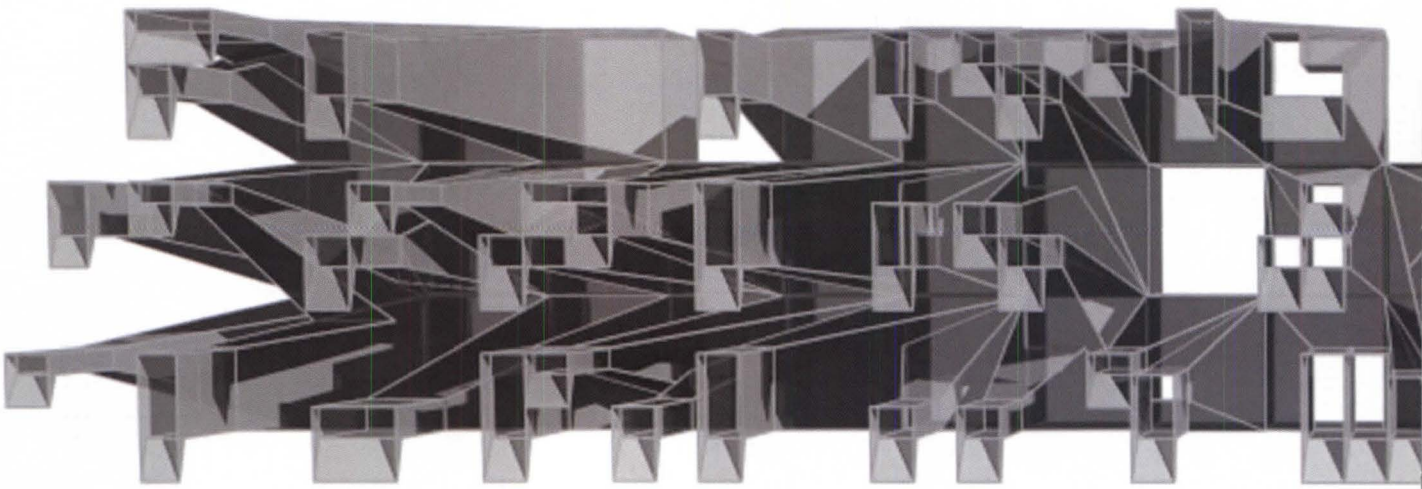


north-south section ——— 46′

Central Building, BMW Plant, Leipzig, Germany
architect: Zaha Hadid Architects, London—Zaha Hadid, Patrik Schumacher (design principals); Jim Heverin, Lars Teichmann (project architects); Eva Pfannes, Kenneth Bostock, Stephane Hof, Djordje Stojanovic, Leyre Villoria, Liam Young, Christiane Fashek, Manuela Gatto, Tina Gregoric, Cesare Griffa, Yasha Jacob Grobman, Filippo Innocenti, Zetta Kotsioni, Debora Laub, Sarah Manning, Maurizio Meossi, Robert Sedlak, Niki Neerpasch, Eric Tong (design team); Jan Huebener, Matthias Frei, Cornelius Schlotthauer, Fabian Hecker, Wolfgang Sunder, Manuela Gatto, Anette Bresinsky, Anneka Wegener, Achim Gergen, Robert Neumayr, Christina Beaumont, Caroline Anderson (project team) **engineers:** Anthony Hunt Associates (structural, M/E/P), AGP Arge Gesamtplanung (structural, M/E/P, civil, cost); PMI (acoustic) **consultants:** Gross. Max. (landscape architecture); Equation Lighting (lighting) **subcontractors:** Max Bögl Bauunternehmung (steel); Radeburger Fensterbau, Schneider Fertigbau (façade); Jaeger Akustik (interiors) **general contractor:** Arge Rohbau **area:** 270,000 square feet **cost:** $65 million

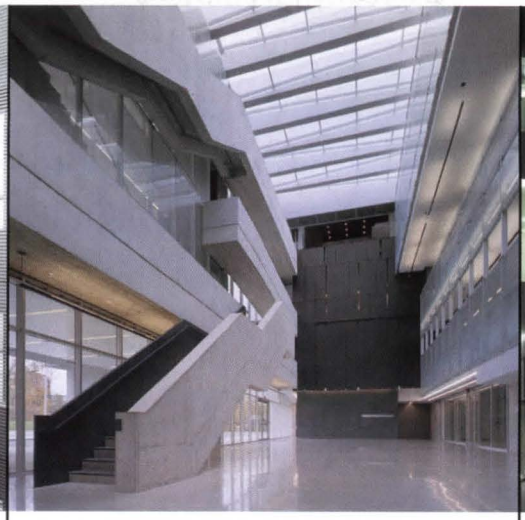
... physicists do not study just the 3-D space we live in. There are whole families of "abstract spaces" within which physical calculations take place, spaces which have totally different geometrical properties from the physical space within which we live. Who is to say, then, that "the true geometry" is defined by the space in which Uranus and Neptune orbit the sun? There is "Hilbert space," where quantum-mechanical wave functions undulate; there is "momentum space," where Fourier components dwell; there is "reciprocal space," where wave vectors cavort; there is "phase space," where many-particle configurations swish; and so on. There is absolutely no reason that the geometries of all these spaces should be the same; in fact, they couldn't possibly be the same! So it is essential and vital for physicists that different and "rival" geometries should exist.

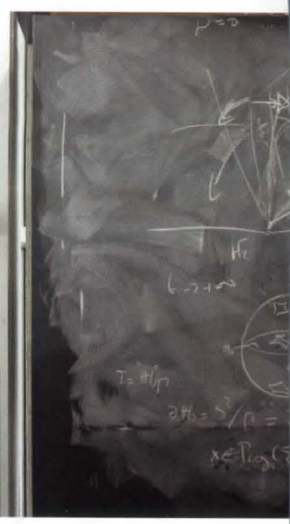
FROM *GÖDEL, ESCHER, BACH: AN ETERNAL GOLDEN BRAID* BY DOUGLAS R. HOFSTADTER (BASIC BOOKS, 1979)



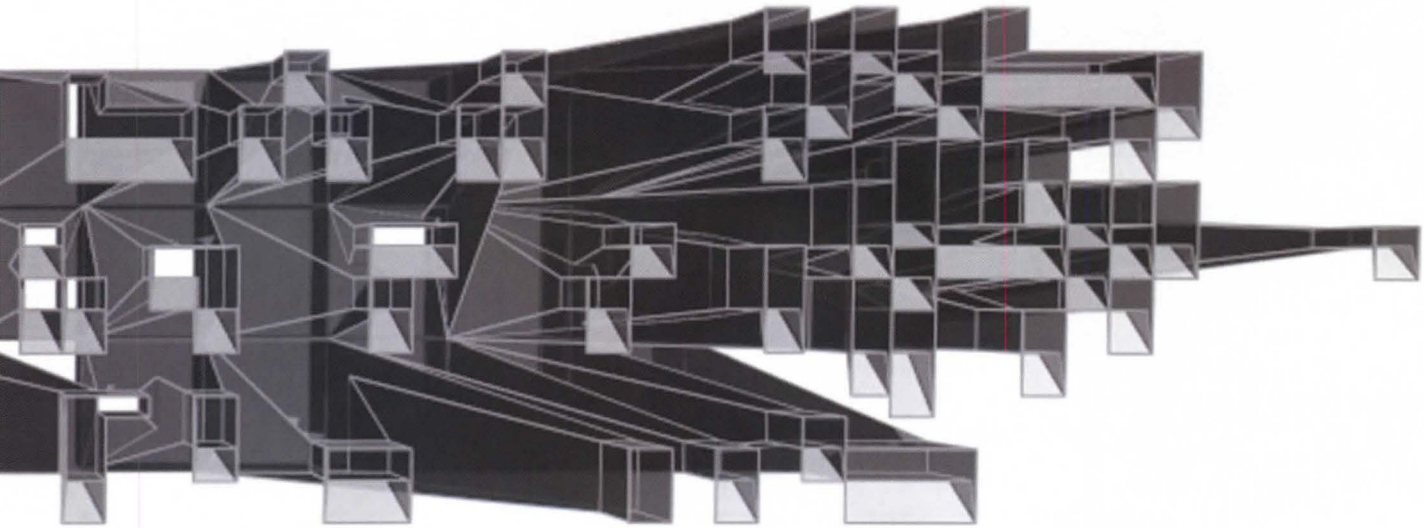
Quantum

SAUCIER + PERROTTE ARCHITECTS EXPLORES BOUNDARY SPACES



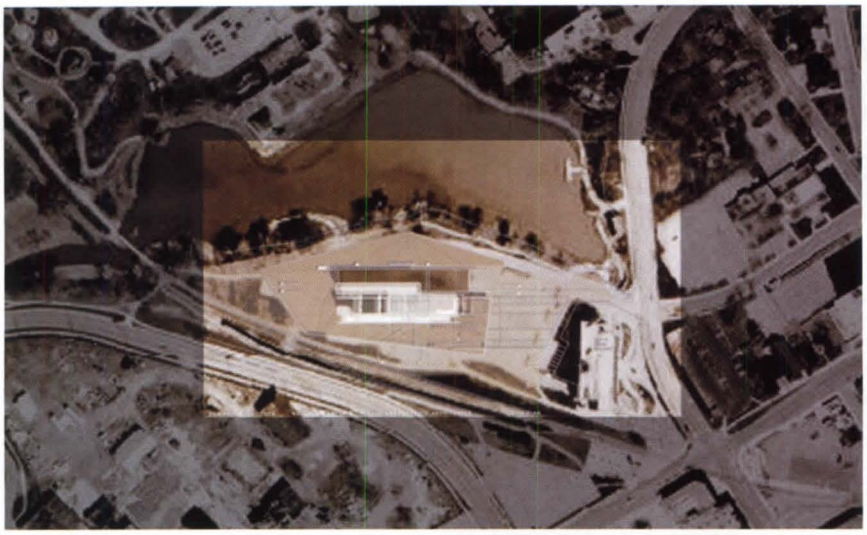


PROJECT BRIEF Founded in 1999 by Mike Lazaridis, creator of the wireless BlackBerry device, the Perimeter Institute is a private research center for theoretical physics. Its mandate is to attract world-class thinkers to Waterloo, Ontario, a Canadian city that enjoys a good reputation for insurance and classical music, but not for being a center of advanced studies in physics. Using a two-stage interview, the client sought an architect to create a new building "of the right scale and pleasing aesthetically, that would make a statement—but, most significantly, would be at the highest level of functionality," says Howard Burton, the institute's executive director. The facility was expected to offer inspiring, brightly daylighted spaces for individual and collaborative work among 10 permanent faculty members, 20 postdoctoral fellows on three-year stints, five associates, and 20 or so visiting theoreticians. It would also host an administrative staff of about 25 people, and large transient populations for workshops and summer programs.



Geometry

AT A PRIVATE CANADIAN INSTITUTE FOR THEORETICAL PHYSICS.

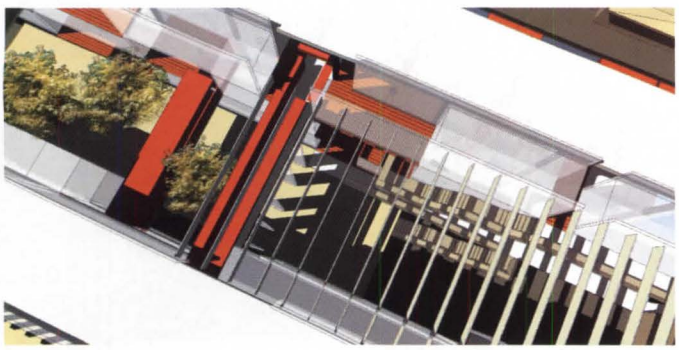


site plan ——— 150′

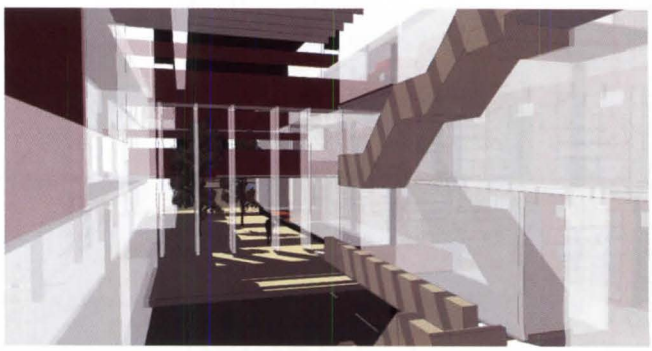
SITE The city of Waterloo donated a site on the shore of Silver Lake, which is located between the northern edge of its downtown and the southern boundary of the municipality's main green space, Waterloo Park. While it is adjacent to the primary pedestrian access between the university campus and the city center, the site is "a wilderness between clearly defined worlds," according to Saucier + Perrotte Architects: "Very austere, rough, with dense highways on one side and a serene lake on the other. So it's about the connection of two sides ... Riding the controversial line between public and private space, this private research institute attempts to subvert the usual hard thresholds established by private enterprise in the public realm."

DESIGN CONCEPT The P/A Award-winning concept (January 2002, page 90) for the building, which opened late last year, was "inspired by the nebulous spaces occupied by the subjects of theoretical physics, at once micro- and macro-cosmic, rich in information, and of indeterminate form and substance," say the architects—a notion extended to its siting in what they describe as an "improbable space" between the city and the park (top). A series of parallel walls—conceived as layers of glass with varied coefficients of shading—define the "secure zones" of the institute's facilities, "embedded in an erupting ground plane that reveals a large reflecting pool" (facing page). Bridges across central open spaces puncture those walls to act as "conduits" for quick access to information and resources, but they also metaphorically bind the public and private realms—and the individual and group pursuits—that take place in such a research institution (below).

The color palette is limited to shades of gray (including unfinished concrete) and clear glazing. From the exterior, two very different images are presented: The more open north façade, facing the pool and the park beyond (above), connotes the institute's function as "an organism, a microcosm of discrete elements," note the designers; the darker, punched south façade, facing the city across train tracks and a main arterial road, suggests a "unified entity," but one that is "of enigmatic scale and content."

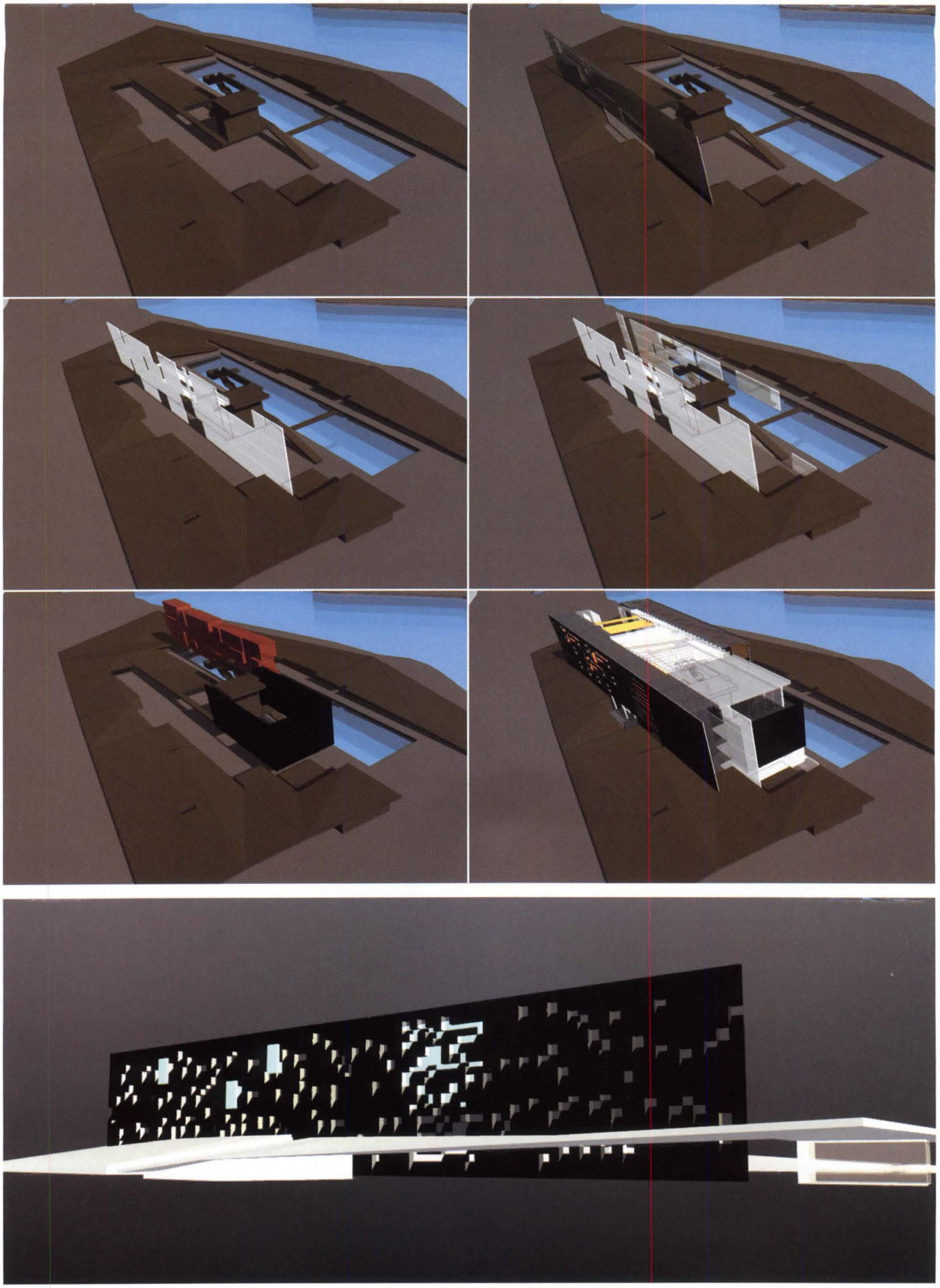


view from roof into atrium

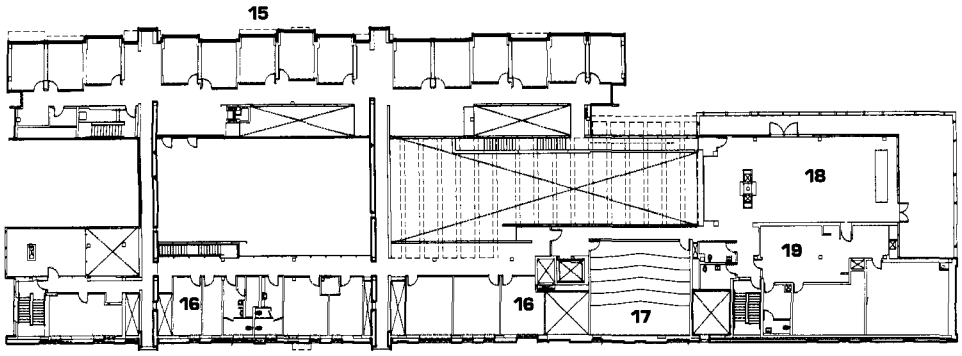


atrium view

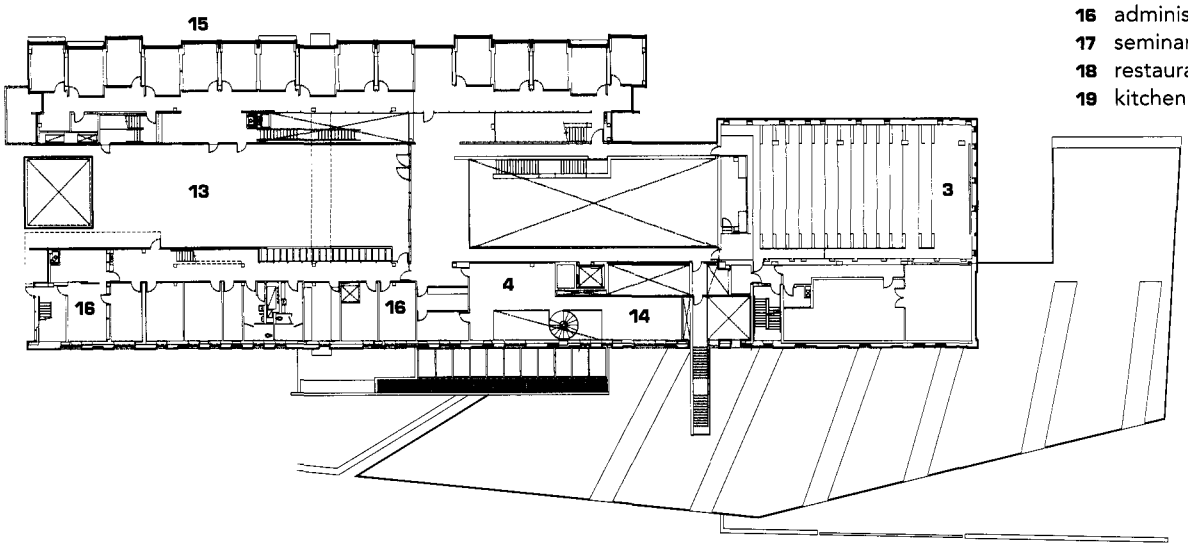
MIDDLE: COURTESY SAUCIER + PERROTTE; PRECEDING PAGES: MARC CRAMER, EXCEPT TOP RIGHT: COURTESY SAUCIER + PERROTTE



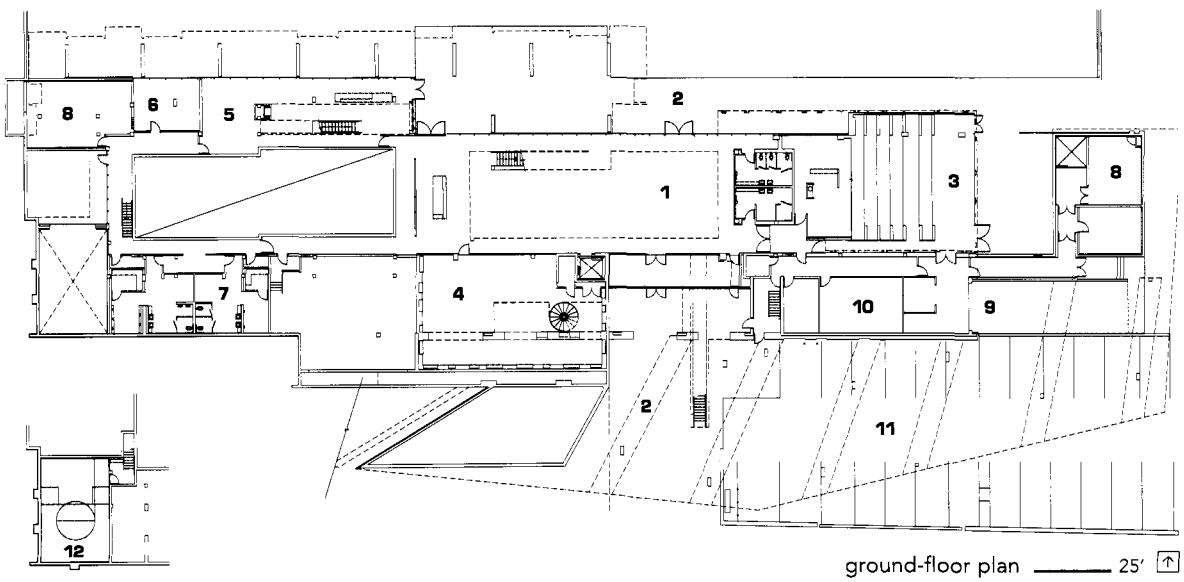
south façade perspective (above) and conceptual "layering" diagrams (top)



third-floor plan



mezzanine plan

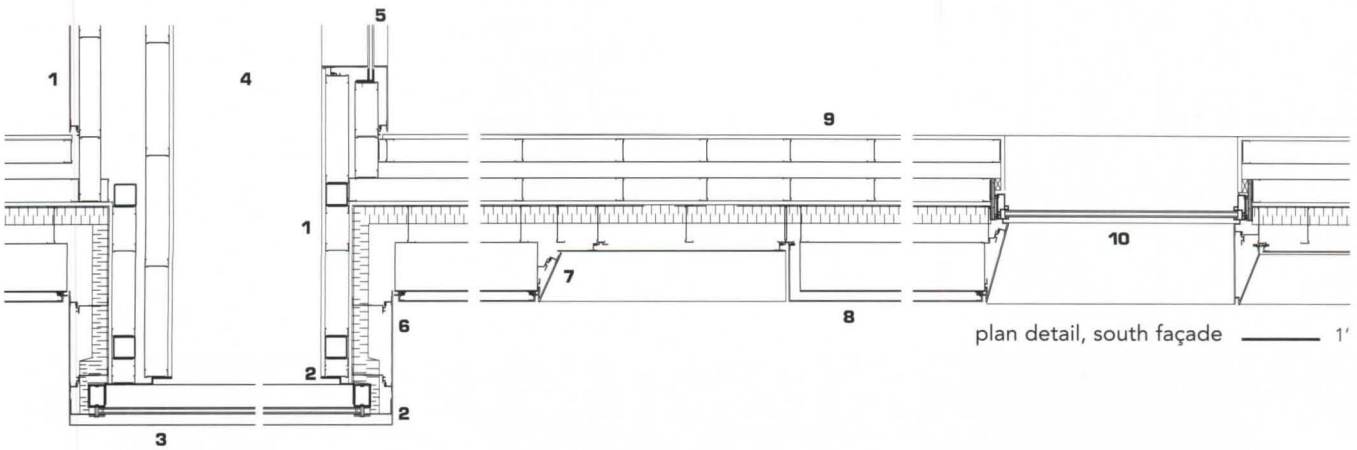


ground-floor plan 25′

1 main hall
2 entry
3 lecture theater
4 library
5 lounge
6 gym
7 changing rooms
8 mechanical
9 loading dock
10 storage
11 parking
12 squash court
13 garden
14 reading room
15 researchers' offices
16 administrative offices
17 seminar room
18 restaurant
19 kitchen

The research institute is a long bar organized around two central multistory spaces—the main hall on the ground floor and the interior garden accessed on the mezzanine—spanned by three bridges that extend across the entire volume. Access to the building is available from the north, along the reflecting pool, and under the new ground plane built up on the south side. The building houses a research center, individual and group research spaces, a library, and meeting and seminar spaces in addition to a 205-seat lecture theater. Administrative offices are located to the south; researcher offices to the north. The client requested that the facilities offer "an abundance of natural light and ample views for this contemplative work," balanced with a convivial and receptive atmosphere. Amenities include a restaurant, café, lounges, and a fitness area to help make the institute "a 24-hour facility that is as self-contained as possible," says Howard Burton, executive director. The plan also incorporates six working fireplaces and spaces outfitted for a busy schedule of invited musical performances.

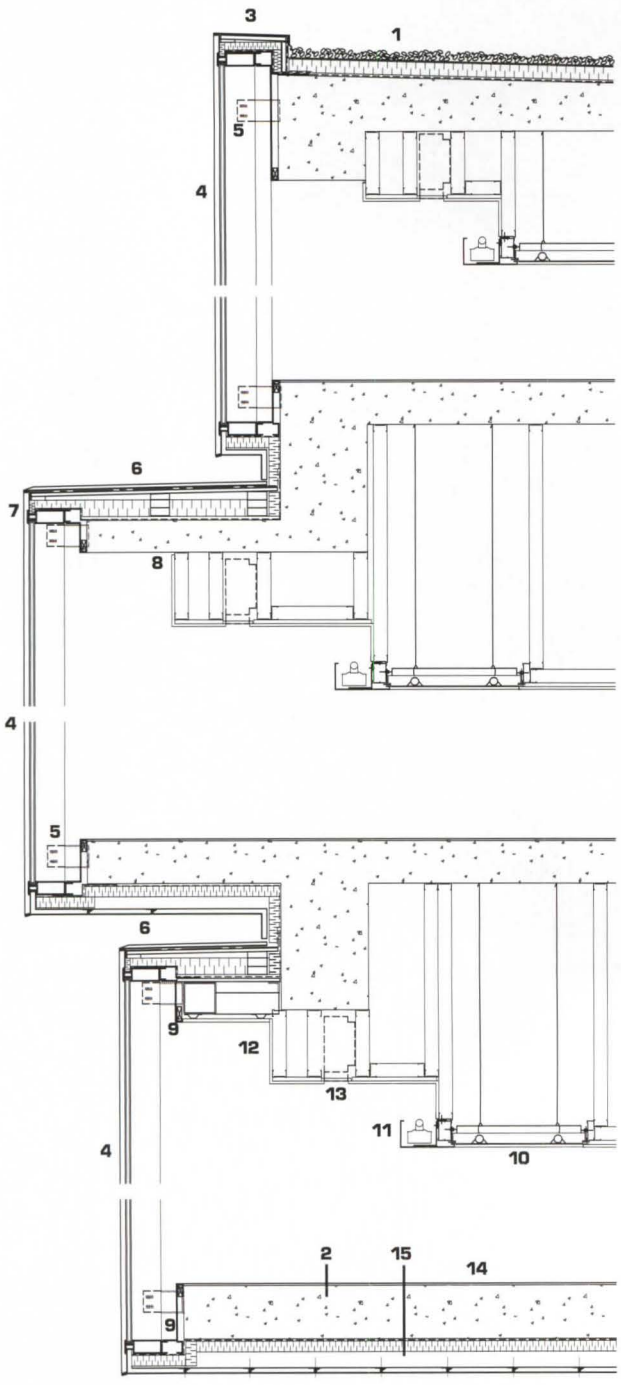
The south façade is a 2-foot-thick steel-stud assembly clad in black aluminum composite, reflective stainless steel, and painted-steel panels, dotted throughout with large and small windows to create a seemingly random pattern of glowing blips at night. Behind the staggered apertures are administrative offices, each penetrated by two windows. While the openings seem to connect to the individuality of the occupants behind them, this primary public exposure is meant to "present the institute as a unified entity, but of enigmatic scale and content," say the architects. The overall impression is also intended to conjure obscure mathematical imagery and "apparent disorder."



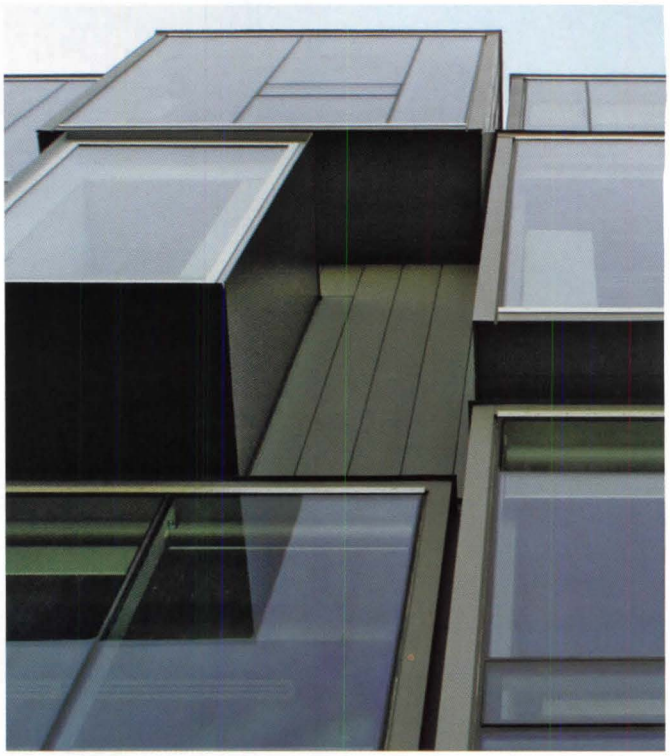
plan detail, south façade 1'

1 painted aluminum panels
2 anodized aluminum trim
3 anodized aluminum curtain wall
4 to interior bridge
5 glass wall with steel anchors
6 painted aluminum panel on polyurethane insulation over blueskin membrane and gypsum panels on steel studs
7 stainless-steel panel
8 aluminum composite panel on metal studs with polyurethane insulation
9 gypsum board with reveals
10 aluminum window

MARC CRAMER



section detail, north façade 9"

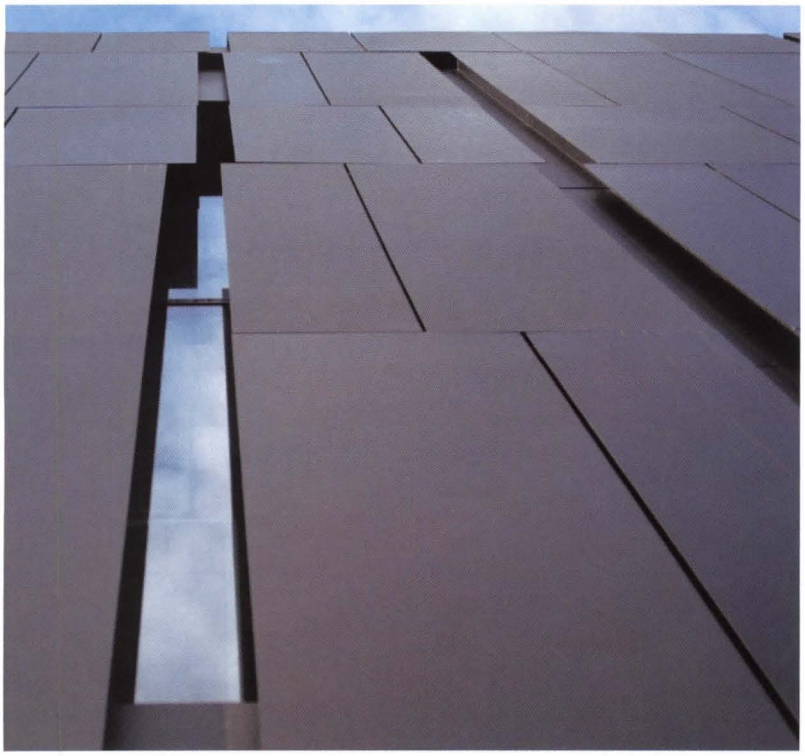


Enclosing the researchers' offices, the north facade is a gridded-glass curtain wall of black anodized aluminum and gray zinc. The cubes offer views onto a reflecting pool and the city's main park. This façade "reveals the institute as an organism, a microcosm of discrete elements" and individual thinkers, say the architects.

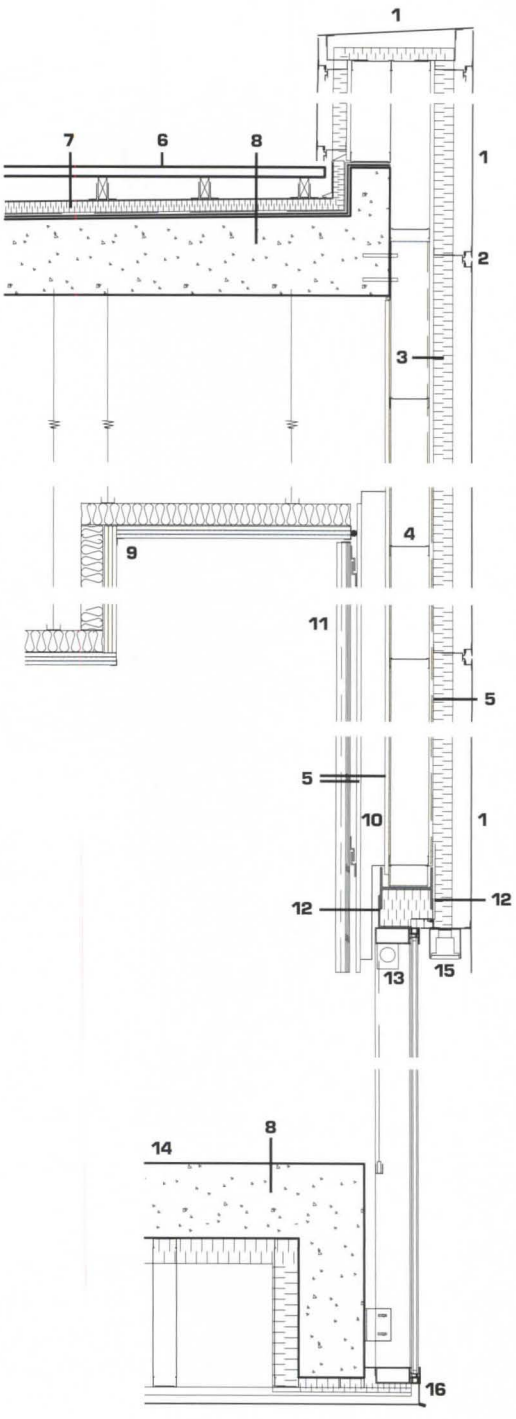
1 stone ballast on polyethylene membrane over rigid insulation and rubberized asphalt membrane
2 cast concrete slab
3 zinc coping over plywood with drainage layer on rigid insulation and rubberized asphalt membrane
4 anodized aluminum curtain wall with steel plate mullions
5 curtain-wall supports
6 zinc sheet
7 steel flashing
8 reveal bead
9 anodized aluminum trim
10 radiant panel
11 bent-steel light cove
12 gypsum board
13 supply air
14 linoleum floor
15 steel studs with neoprene spacers and steel Z-profiles supporting interlocking zinc panels attached with sliding clips

Perimeter Institute for Theoretical Physics, Waterloo, Ontario, Canada
client: Perimeter Institute for Theoretical Physics—Howard Burton (executive director) **architect and landscape architect:** Saucier + Perrotte Architects, Montreal—Gilles Saucier (design principal), André Perrotte (project architect), Trevor Davies, Andrew Butler, Dominique Dumais, Eric Majer, Pierre-Alexandre Rhéaume, Anna Bendix, Sudhir Suri, Christian Hébert, Laurence LeBeux, Quinlan Osborne, Jean-Louis Léger, Samantha Schneider, Nathalie Cloutier, Christine Levine, Jean-François Lagacé, Sergio Morales, Guillaume Sasseville, Maxime Gagné, Audrey Archambault (project team) **engineers:** Blackwell Engineering (structural); Crossey Engineering (M/E/P); Stantec (civil) **consultants:** Acoustics Engineering (acoustical design); Novita (audiovisual); YGQ (kitchens) **general contractor:** Eastern Construction **area:** 64,000 square feet **cost:** $20 million

COURTESY SAUCIER + PERROTTE



The 205-seat lecture theater is clad in black aluminum panels with varied slot openings on a steel structure hung from the roof slab. The space was designed to acoustical standards that would be suitable for chamber-music performances. Above the space, an ipe roof deck offers an al fresco dining area adjacent to the restaurant.

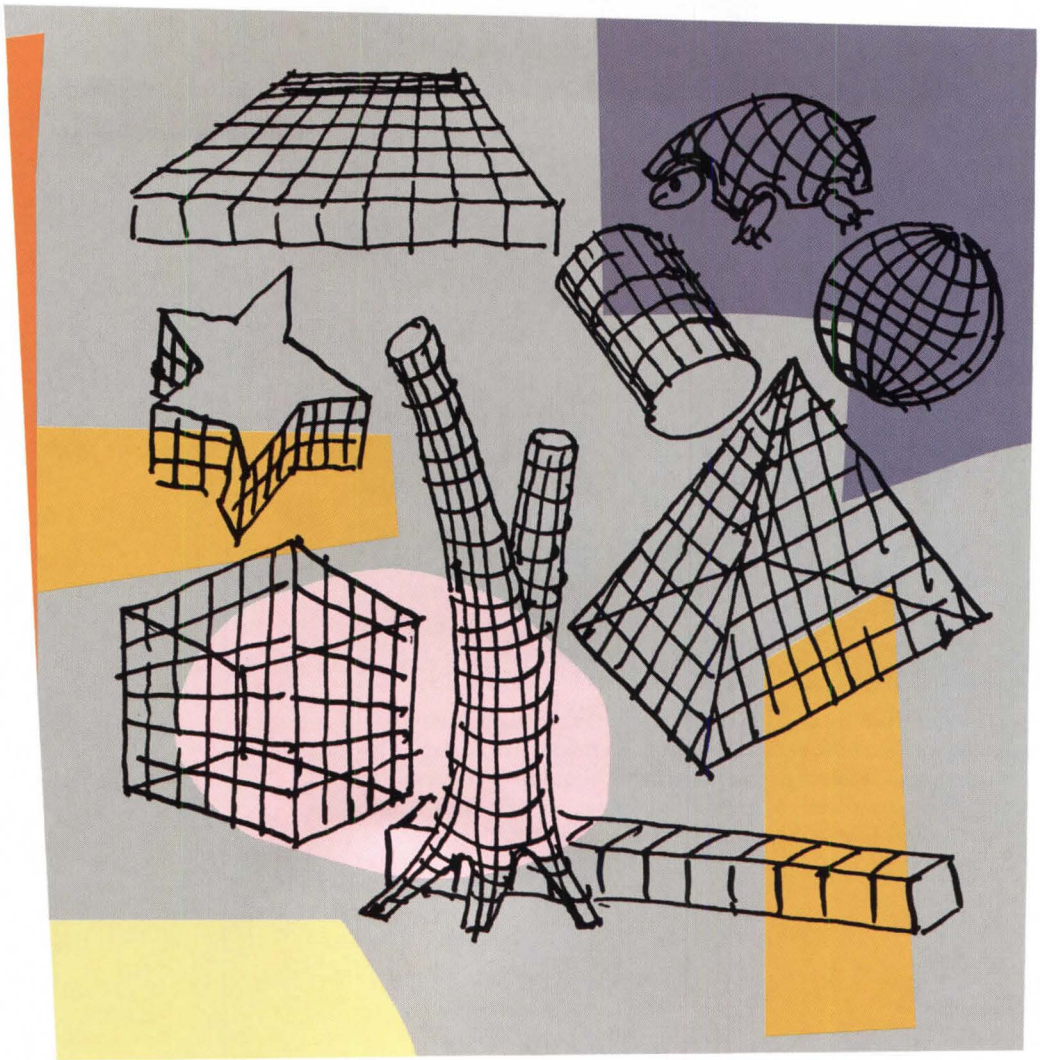


section detail at lecture theater ——— 1'

1 black anodized-aluminum panel
2 adjustable attachment
3 polyurethane insulation
4 horizontal steel studs
5 gypsum board
6 ipe deck on adjustable pedestals
7 polyethylene membrane over rigid insulation and rubberized asphalt membrane
8 cast concrete slab
9 insulated gypsum-board ceiling on steel spring and neoprene hangers
10 return-air plenum
11 tongue-and-groove white oak diffuser panels on plywood backing
12 steel angle
13 retractable window shade
14 linoleum floor
15 light fixture
16 zinc flashing

Specifications and Suppliers

exterior systems: Ontario Panelization **curtainwall, windows:** Fulton Windows **cladding:** VM Zinc **glazing:** Trulite; Viracon; Prelco; Merit Glass **skylights:** IBG Canada **roofing:** Roof Tile Management; Hydrotech; Thaler **air/vapor barrier:** Bakor **entrance doors:** Kawneer **metal doors:** Commercial Door and Hardware **wood doors:** Cambridge Door **door hardware:** Schlage; Stanley; LCN; Gallery Specialty Hardware **exit devices:** Von Duprin **security system:** *HID* **acoustical ceilings:** Armstrong; Decoustics **cabinetry:** Art Magic **paints/stains:** Sico **laminate:** Nevamar **tile:** Cica; Olympia Tile **linoleum floor:** Forbo **shades:** Solarfective **auditorium seating:** Irwin **fireplaces:** Superior **sauna:** Finlandia **squash court:** Playcon **interior lighting:** Artemide, Thomas Lighting (ambient); Lightolier, Ledalite (downlights) **exterior lighting:** Zaneen, Thomas Lighting



David Palterer for Cersaie 2005

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GOING WITH THE FAUX

Old world artisanship plus a splash of new technology ferry a San Francisco building back to the nineteenth century.

by Robert Klara

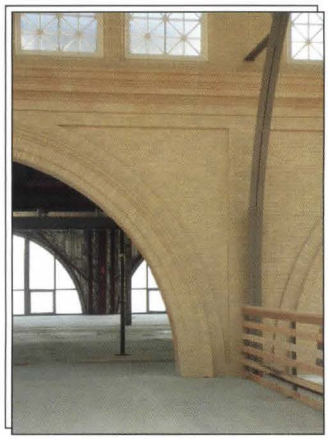
In the ferry building's renovated nave (above) the faux bricks are nearly impossible to tell from the originals, though visitors are invited by tour guides to try. A 1950s reuse left the hall interrupted by a new floor that also obliterated many of the arches (below).

In 1898, 33-year-old local architect A. Page Brown completed San Francisco's Union Depot and Ferry House at the foot of Market Street, a structure intended to befit the city's rising prominence. Crowned by a 240-foot clock tower, the steel-framed terminal stretched its neck out along the bay, extending the continent with 660 feet of beaux-arts confectionery. Inside, passengers awaiting their passage strolled beneath 44 yellow brick arches studded by scrolled terra-cotta brackets. The nave didn't just look solid, it was: It **survived the 1906 earthquake** that leveled most of the city. It survived the subsequent firestorms that leveled what remained.

It did not, however, survive the 1950s.

The construction of two bridges over the bay and the rise of the automobile had rendered ferry service obsolete, so the city converted the terminal to office space in 1955, shoving a floor across the formerly open clerestory and hammering 11 of the 44 arches to pieces. Though most of the arches remained, over a quarter of the original brickwork had been discarded.

Skip now to 2001: The Ferry Building (as it's now known) is to be reborn as an open retail market, the nave is to be restored, and San Francisco-based SMWM, chief architect for the project, has got a problem. "About 330 feet worth of the arches had been removed," recalls senior associate Andrew Wolfram. "**Large sections of brick were missing** in other places along with the terra cotta. In some areas, it was all completely gone."



What to do? Hard lessons learned from life in the seismic zone did not make real masonry look like a very good option, never mind the cost of finding a matching buff brick and reproducing intricate, century-old work. So the architects settled on the next best thing—something they now say is the first best thing: faux brick, *avec* **faux finish**.

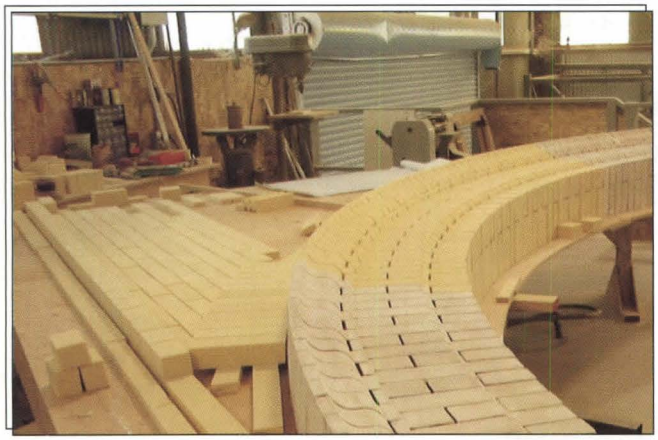
THEY WERE DUPED

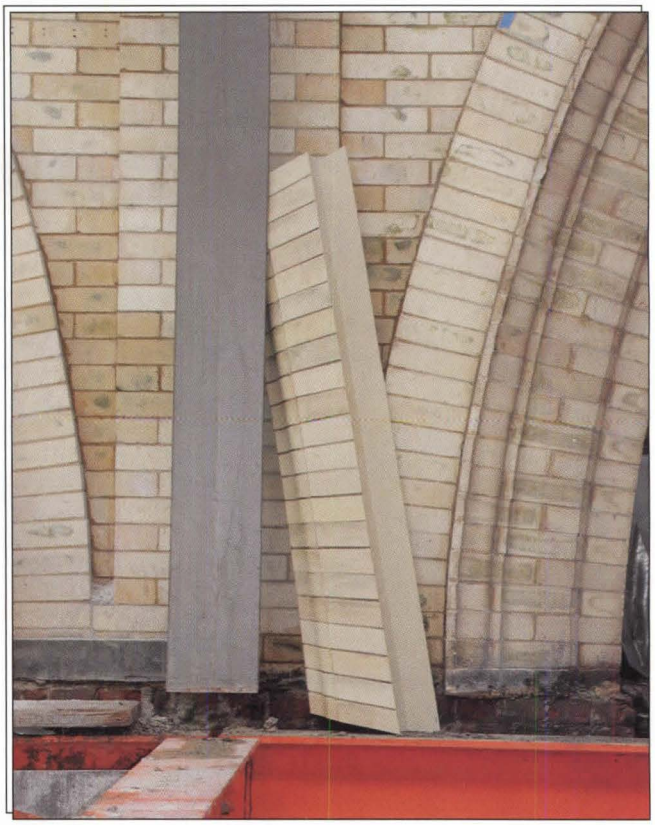
Serving as the restoration architects for the building, San Francisco firm Page & Turnbull chose the custom fabrication company of Kreysler & Associates, located up in American Canyon near Napa, to produce the fiberglass replacement arches and create the weathered appearance necessary to make it all look authentic. Ordinarily, a fabricator would choose an intact arch from which to make a mold and then cast replacement panels, but curve variations among the surviving masonry arches—and the problems these would have created when installing the new, half-moon windows beneath them—prompted Kreysler to create a **master model from scratch**.

To make the positive model for molding, Kreysler's team cut out a plywood spandrel panel 15 feet high and 12 feet across. Onto this they glued "bricks" cut from surfboard foam, and then grouted the seams by hand with joint compound mixed with sand. Because they were emulating a nineteenth-century masonry job, Kreysler's workers "created a randomness" to the brick positioning. "We didn't worry about the condition of the foam, too much either, like if the edges were ragged," company president Bill Kreysler says. "We were trying to make this look authentically irregular."

After making a fiberglass mold off the brick-panel template, the team poured into the mold a proprietary blend of synthetic resins and aggregates that achieves a stone-like finish and, in this case, a uniform yellow color similar to that of the bricks at the site. To add strength, Kreysler applied a second **layer of fiberglass** backing, which would support three load-bearing connections once the panel was installed inside the terminal building. (The process is nearly identical to modern boatbuilding, which Kreysler did prior to taking on architectural work: A plastic "gel coat" holds the color and maintains a smooth profile, while a backing layer of fiberglass gives strength and durability.) Once the mold had set, a little bit of sandblasting finished the surface effect: "When we erode the resin surface," Kreysler explains, "it **exposes the aggregate particles** and takes on the appearance of stone."

TOP: COURTESY KREYSLER & ASSOCIATES; BOTTOM: COURTESY PAGE & TURNBULL





To make the master mold for the arches, the fabricator cut out "bricks" of surfboard foam (above left), while the keystones (top left) were molded directly from an on-site casting. In addition to reproducing the arches, the subcontractor created faux brick headers, mullions, and sills, like the one shown leaning against a column (above).

COLOR MY WORLD

Indeed, it does look like stone—but not *enough* like it, which is where local faux-finishing artist Jacquelyn Giuffre hit the bricks. Giuffre's job was to apply a paint finish that would give the masonry a patina of age, but she faced a number of unique obstacles. For one thing, while the ferry building was under renovation, it had spent several months open to the harbor air, which caused some of the salts in the brick to come to the surface and turn green. "This presented real challenges because they had to faux-finish the panels to try to match brick on which the staining was in process," explains Tom Duferrena, an architect with Page & Turnbull. What's more, while much faux-finish work is seen by occupants at comparatively close range, the tops of the arches would be **28 feet away from pedestrians** on the upper promenade of the nave, and even further from those on the level below.

Using Cal-Tints pigments by Degussa (www.degussa.com), Giuffre developed six shades of yellows and browns, then "*aged down*" each brick with brushes and organic sponges—a process that took six months, even with help. The nature of faux finishing eschews the idea of following any set pattern, and the painting is purposely as random as the aging it's meant to emulate. "I don't even think about it—I just paint," is how Giuffre describes her process, which in this case also included **randomly stippling** shades of green around the bricks to match the algae growth on the bricks at the site. To judge the appearance of the finish from a distance, the architects crawled on top of storage cabinets in Giuffre's studio and stared at the panels on the floor, "to get the right perspective," she says.

To create the 11 replacement arches, workers clipped each of the 22 panels to the building's steel studs, one anchor point at each of a panel's three corners. Where there was a vertical seam—"the zipper"—between new panel and original brick, Giuffre did the finishing on site: "I had to be careful to **blend old and new**." Finally, an ultraviolet-protective coat sealed in the paint effects, which matched the old surface uniformly now that the building was again enclosed.

In the case of the ferry building (which reopened in 2003), a faux finish was in fact a union of prefabricated structure and an applied finish, a departure from the more traditional, artist-driven process. This does not, however, mean that the architects tried to hide the fakery. In fact, when visitors take tours of the marketplace in the building's nave, guides invite them to try to pick out which bricks are faux. "Nobody says they don't look real," Wolfram relates.

The Ferry Building, San Francisco

client: Port of San Francisco **developers:** Wilson Meany Sullivan, Equity Office Properties Trust, Primus Infrastructure **architects**: SMWM, San Francisco (base building), Baldauf Catton Von Eckartsberg, San Francisco (retail), Page & Turnbull, San Francisco (preservation) **engineers:** Rutherford & Chekene, Structural Design Engineers (structural); Olivia Chen Consultants (civil) **general contractor:** Plant Construction **area:** 280,000 square feet **cost:** $45 million

FOR INFORMATION ON FAUX FINISHES, CIRCLE 125 ON PAGE 81.

ABOVE, LEFT AND TOP LEFT: COURTESY KREYSLER & ASSOCIATES; ABOVE RIGHT: PAGE & TURNBULL

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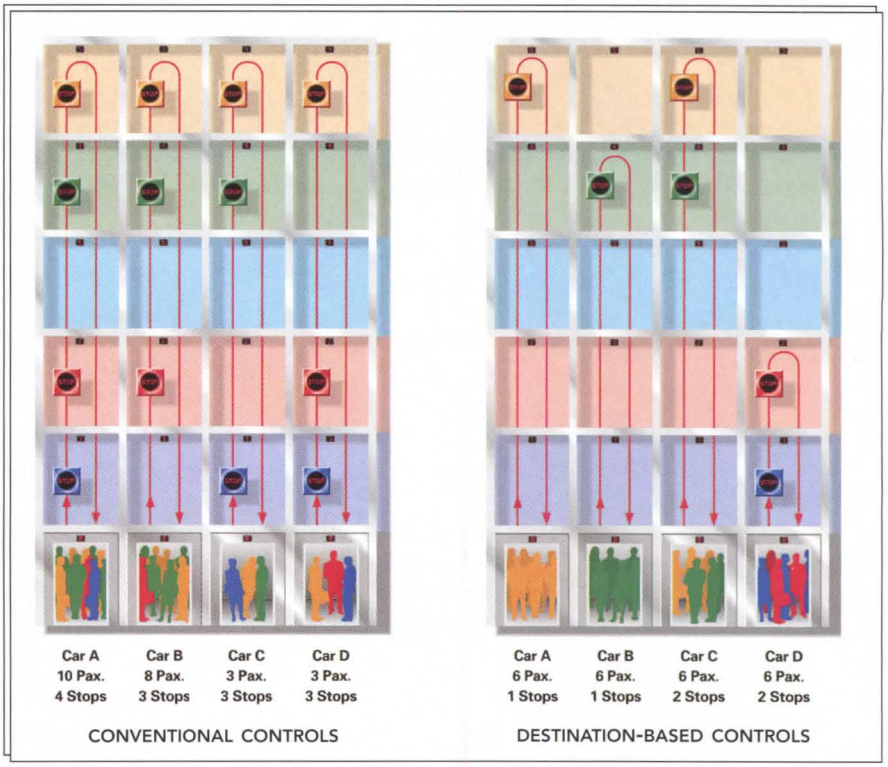
A FASTER RIDE

Destination-based elevators take off in the United States.

by Katie Gerfen



This schematic comparison of destination-based elevator systems and conventional systems demonstrates how the grouping of passengers going to the same floor (color coded here) can increase the efficiency of car routes, decreasing travel time for each passenger.

It happens to everyone. You're standing in the lobby of your office building. The clock is ticking toward the moment when you have to be in an important meeting. And every single one of your building's elevators seems interminably stuck on the fifteenth floor. Well, relax. Stress-reducing vertical transport, in the form of **destination-based elevators**, is on the way.

Though the idea for a destination-based system was patented by an Australian inventor in 1961, it was only recently pioneered for widespread use by Swiss manufacturer Schindler Elevators (www.schindler.com), with its Miconic 10 system and addressable car-dispatching software. Developed in the 1980s and first installed stateside in a retrofit of Indianapolis' Ameritech building in 1992, it is finally catching on in the United States, especially in urban centers. (There are over 2,100 installations worldwide with 500 in the United States, including 111 in the towers of New York City.) Other elevator companies, such as Mitsubishi (www.mitsubishi-elevator.com), ThyssenKrupp (www.thyssenkruppelevator.com), and Otis (www.otis.com) now offer competing systems.

EASY AS A, B, C

The concept is deceptively simple: Passengers press their desired destination floor into a **keypad** on a freestanding pedestal in the elevator lobby. The computer directs users to specific elevators based on shared floor destinations, for more efficient cycling of the cars and speedier trips.

"The key measurements for efficiency are wait time, **destination time**, and handling capacity," says Sula Moudakis, director of high-rise installation for Schindler. "This system decreases user travel time and improves the handling capacity of each car by up to 30 percent, so modernization projects can increase capacity without adding cars."

Behind the concept is a powerful **software program** run off a standard PC. It calculates the optimal floor-to-floor trip based on number of requests, effect on passengers already on board, and location of cars in the system.

High-profile towers seem an ideal application for destination-based elevators. They have been specified for the Freedom Tower (page 15) at the World Trade Center site, and 15 units are being installed in Foster and Partners' Hearst Tower in midtown Manhattan, which will open in 2006.

THINK OUTSIDE THE BOX

The use of the Miconic 10 has been relatively slow to catch on here, says Moudakis—at least in comparison with its adoption in Europe and Asia. "I think that is because American architects are just beginning to realize the design versatility this type of system offers," she elaborates. "A conventional system limits its elevator layout, but that isn't so with destination-based." Since each passenger is assigned a specific elevator, the computer calculates the users' walking time to the open car and waits for them to arrive. This allows greater latitude in the **design of elevator banks**: Cars can be placed away from the keypad—even around corners—and still be identified and reached before the doors close.

In an era of tightened security, destination-based systems easily integrate **key-card access** data and typical destination floors for specific users. This can help regulate the movement of visitors between floors and reduce pileups around in-car swipe pads.

If this trend continues, you might just have time to grab that blueberry muffin in the morning.

FOR INFORMATION ON VERTICAL TRANSPORT, CIRCLE 126 ON PAGE 81.

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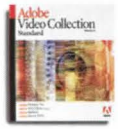

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RENDER ME 3-D

A novel lighting study run on real-time computer-game technology yields real time and cost savings.

by Anna Holtzman

To create this walk-through with accurate lighting and texture scenarios, Arup built a 3-D model in 3ds Max and ran it on a real-time engine using software called RTRE.

When the U.S. General Services Administration (GSA) Office of Applied Science asked engineering megafirm Arup to do a simple lighting study for a new federal courthouse in Jackson, Mississippi, the client did not anticipate that an overhaul of its design methods would ensue. Traditionally, when planning a new courtroom, the GSA has used plywood mock-ups of key components to test parameters such as sight lines. This method has certain benefits—primarily, the fact that one can walk around and sit in the model. However, the mockups are costly and represent only fragments of the courtroom. Critically, they also exclude information about lighting and materials. So for the Jackson job, the GSA decided to test the lighting scenarios on a **3-D computer model**.

Robert Stava, the creative director of Arup's 3-D Media Group, opted for a model created in **Autodesk's 3ds Max** (www.discreet.com) and run on a **real-time engine**, similar to those used for computer games. This allows the client to "walk through" the model (on the display screen), viewing fairly accurate lighting and texture scenarios. The drawback to this choice is that image quality is slightly lower than that of still renderings. But in the future, Stava predicts, "The technology will improve. Eventually, real-time models will take over."

ACCURACY CHECK

The project was an enticing one for Stava, because, he says, "To the best of my knowledge, this is the first time anyone has tried to do an accurate, real-world lighting solution in real time." Estimating that Arup's lighting study is 80 percent accurate, Stava attributes the error margin to limitations in hardware and software—for example, a standard red-green-blue monitor has a relatively low contrast ratio and resolution compared to those of the human eye. In addition, a real-time engine can handle only a limited number of polygons—in other words, geometric complexity—so Stava had to "dumb down" the textures and geometry slightly for the engine to run smoothly.

Working on a PC setup, Stava used an off-the-shelf software package now gaining popularity called **RTRE, from Cubicspace** (www.cubicspace.com), a real-time application that interfaces with 3ds Max. First, his two-person team built a 3-D model with textures that were scanned from actual material samples and then scaled by eye. Next, the model was given to Arup Lighting to input Illuminating Engineering Society of North America (www.iesna.org) photometric data describing the shape and lux levels of the fixtures. Then the lighting team ran illumination studies with software called **Radiance** (http://radsite.lbl.gov/radiance/HOME.html). Since there is no way to directly import a Radiance solution into 3ds Max, Stava's group used a proprietary engine to map the Radiance output onto the 3-D model, and then tweaked it by eye. For the final step, the Arup media team performed a "texture bake." This technique incorporates the lighting data and surface textures into the 3-D geometry, explains Stava. This way, the computer does not have to recalculate lighting effects each time the user "moves" through the model.

THE REAL TEST

The real-time model took roughly six weeks to complete, and then it was show time: Since the GSA has a working relationship with Disney, it took advantage of the entertainment company's Los Angeles "Imagineering Lab," a virtual-reality cave in which Arup's courtroom model was presented on a stereoscopic projection system to the project's lighting designers, architects, construction professionals, clients, and courtroom judges.

Aside from the fact that the computer model cost significantly less to build than a plywood mock-up, its accuracy allowed the project team to preemptively correct problems with the design—for example, insufficient illumination along one wall—before construction even began. While the Jackson courthouse, designed by Hardy Holzman Pfeiffer Associates, has since been put on hold, Stava reports that, "Across the board, everyone said that this is the way to go in the future."

FOR INFORMATION ON RENDERING SOFTWARE, CIRCLE 127 ON PAGE 81.

product: **Cut & Bond**
manufacturer: **Hanson Brick**
web: **hansonbrick.com**

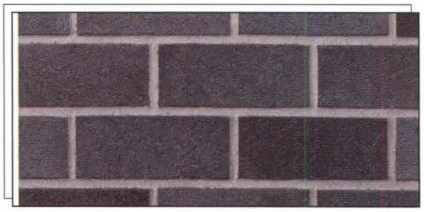
Traditionally, brick corners or arches over doors or windows are cut on site and bonded together, leaving a seam. This collection of precut and prebonded shapes allows the mason to easily assemble a corner or arch without visible joints, while also saving time and cost. Hanson's "New Concept Jack Arch" for windows and doors comes with angled bricks on either side of a keystone, with voussoirs that are already mortared together.

product: **Arcadian**
manufacturer: **Haddonstone**
web: **haddonstone.com**

Suitable for applications that require simple stone shapes—such as windowsills or cladding panels—Arcadian is produced by means of a multicasting system and accelerated vapor curing, which allows the product to attain overnight the equivalent of seven days of strengthening, while also minimizing primary efflorescence and helping to ensure color uniformity. The stone comes in two standard hues, Portland and Bath (below), and custom colors.

product: **Spectrum**
manufacturer: **Belden Brick**
web: **beldenbrick.com**

The Spectrum Series introduces a new, additional array of colors—starting with Ashberry (below) and Brandywine—that are a shade darker than the rest of Belden Brick's lines. Available in sizes ranging from "Modular" (3-5/8 inches by 2-1/4 inches by 7-5/8 inches) to a new dimension the company calls "Double Monarch" (3-5/8 inches by 7-5/8 inches by 15-5/8 inches), the series meets the ASTM standard for Facing Brick, Grade SW, Type FBX.



FOR MORE INFORMATION ON BRICK AND STONE PRODUCTS, CIRCLE 128 ON PAGE 81.

- product: **Duo**
- manufacturer: **Steelcase**
- web: **steelcase.com**

Duo is designed for pairs of people that spend much of their day working together but also need space to work independently. Through movable components, the workstations support dyadic work by providing quick access to materials while also affording privacy and interaction. The portfolio includes: tall storage, which doubles as a transaction surface between two workstations; an overhead unit that provides shared storage but doesn't hinder sight lines; and a slim unit that allows another shared surface for paper piling.

- product: **Ad One**
- manufacturer: **Vitra**
- web: **vitra.com**

Ad One is a modular system of tables, storage components, and accessories designed by Italian architect Antonio Citterio. The basic table measures 71 inches by 35-1/2 inches and is supported by a perimetric steel frame that allows the same four legs to support up to six connected tables. Storage units can sit below or on top of the tables, while elevated storage units can face toward or away from the desk. Fabric-covered screens can slide between tables, while central screens can also hold office accessories.

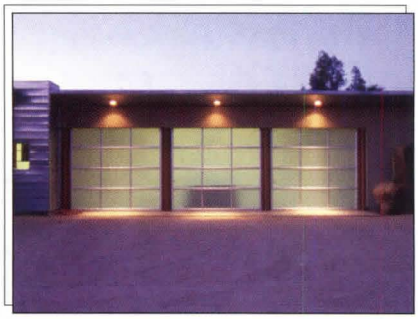
FOR MORE INFORMATION ON FURNITURE, CIRCLE 129 ON PAGE 81.

- product: **North Hatley**
- manufacturer: **Garaga**
- web: **garaga.com**

North Hatley is a carriage-house–style door of galvanized steel with baked-on polyester paint and traditional black stamped-steel hardware in a forged-iron look. It's available in widths of up to 18 feet and heights of up to 10 feet; five colors; and several window options.

- product: **Avante Collection**
- manufacturer: **Clopay**
- web: **clopaydoor.com**

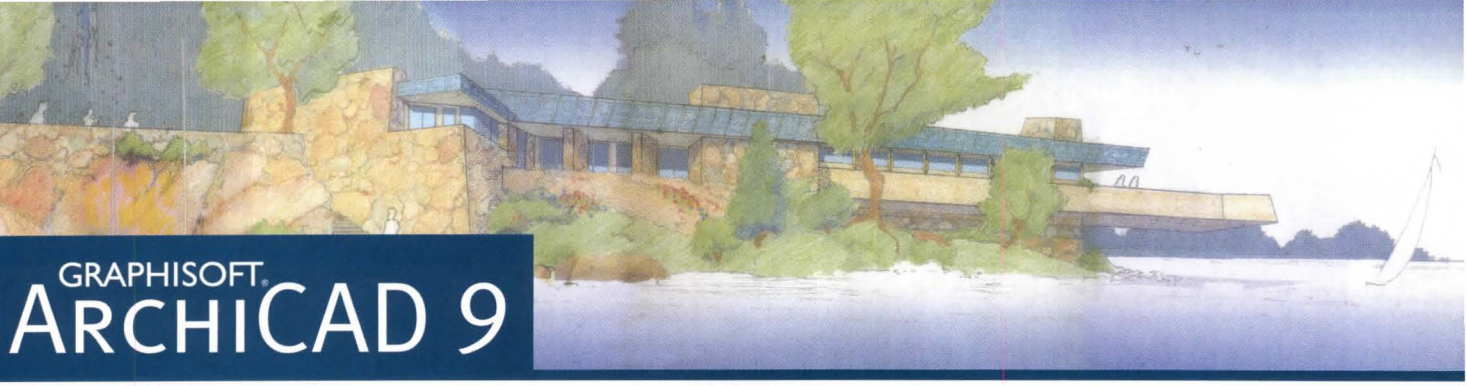
Formerly available only for commercial use, the Avante Collection has been recast as a domestic product. Glazing options include clear, frosted, tinted, and mirrored glass and acrylic panels. The 2-1/8-inch-thick aluminum frame can be painted or sealed with a clear, white, or brown finish.



- product: **Knock & Lock**
- manufacturer: **Overhead Door**
- web: **overheaddoor.com**

This breakaway door system has a steel exterior, a puncture-proof interior skin, and polystyrene insulation of up to 2 inches thick, providing an R-value of 8.56. Features include: automatic reset; single- and dual-panel breaks; and panel widths of 8 to 10 feet in 21- and 24-inch heights.

FOR MORE INFORMATION ON DOORS, CIRCLE 130 ON PAGE 81.



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"Other programs don't understand how a building will actually stand up in its environment. With designs developed in the ArchiCAD Virtual Building model, you can really get the full feel and dimensions of the space. This became very important in the review and approval processes. We sped through approvals because everyone could immediately see what the building would look like, inside and out."

– Thomas A. Heinz, AIA

In testament to the versatility and power of ArchiCAD®, a home based on an original Frank Lloyd Wright design, 50 years after its initial inception, is now under construction after being fully modeled and documented in ArchiCAD (on the Macintosh® platform) by Thomas A. Heinz, AIA.

Where most of Wright's later, Usonian residences are structured to follow a rectangular/square grid, this home was based on an equilateral triangle, with walls at either 60 or 120-degree angles. The building's site also played a strong role in the layout of the plans. A 60-foot rock, known in the project as the Whale Rock, forms a wall in the entrance of the building and also supports part of the roof. ArchiCAD allowed Heinz the flexibility to work with these challenges, following through on the design as Wright originally intended.

Thousands of architects around the world have designed over one million projects using ArchiCAD over the past two decades – including 5,000 square-foot projects like this home, to buildings that are hundreds of thousands of square feet, to entire cities!

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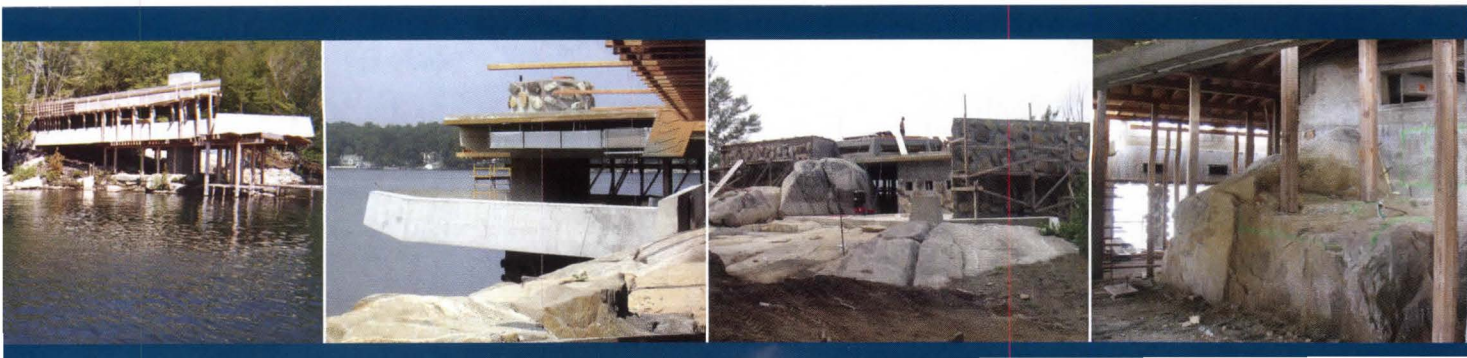
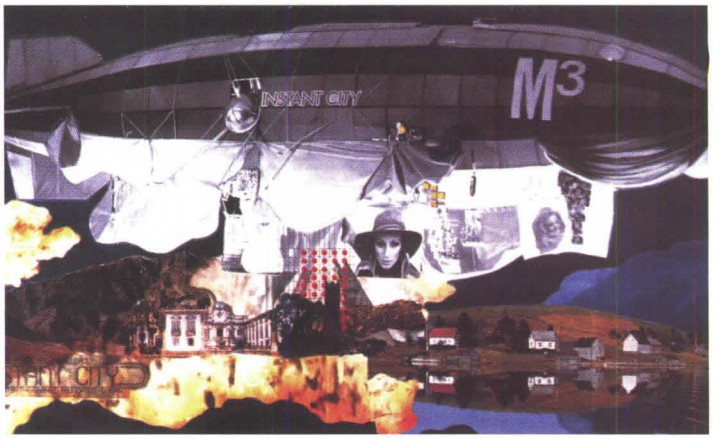


BOOK

***Exit Utopia: Architectural Provocations 1956-76* | edited by Martin van Schaik and Otakar Máčel | Prestel** Anyone distressed by the dystopian state of current events around the globe might find a mental escape hatch in *Exit Utopia*. It will remind readers that a handful of rebellious architects and artists, fueled by the social complacency and conservatism of the 1960s, upended professional stasis with their alternative schemes for human habitation. Famous, little-known, and never published works by the likes of architects Peter Cook (right), Superstudio, Yona Friedman, and painter Constant Nieuwenhuys are reproduced between the book's inescapable mirrored-metallic covers. **Abby Bussel**

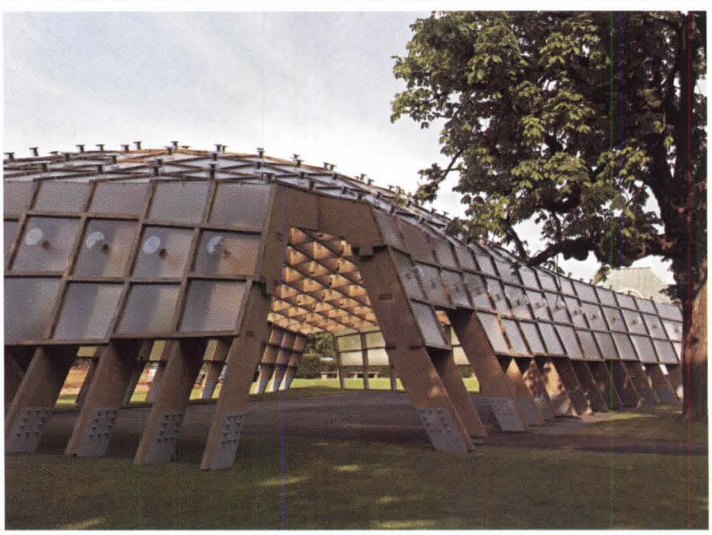


EXHIBITION

***Extreme Textiles: Designing for High Performance* | Cooper-Hewitt, National Design Museum | New York City | Through October 30** With high-tech woven samples organized according to such capabilities as strength, lightness, speed, and safety, *Extreme Textiles* includes several show-stoppers: An implantable polyester device for reconstructive shoulder procedures that resembles a lace doily; the Mars Pathfinder lander airbag (right), made of woven Vectran (a liquid crystal polymer), that may look like an enormous bunch of space-age grapes but in fact cushion the spacecraft's touchdown; and Testa Architecture and Design's carbon tower prototype (April 2003, page 51). The structural basis for this airy cylinder-shaped skyscraper is a woven carbon-fiber double-helix. These textiles are a far cry from grandmother's Afghan blankets. **Anna Holtzman**

INSTALLATION

***Serpentine Gallery Pavilion 2005* | Álvaro Siza and Eduardo Souto de Moura with Cecil Balmond (Arup) | Serpentine Gallery | London | Through October 2** Compared to the Serpentine's technically sophisticated, visually bombastic pavilions from years past, the 2005 entry by Portuguese architects Álvaro Siza and Eduardo Souto de Moura—with Cecil Balmond of Arup—known for the Serralves Museum and Braga Stadium (July 2004, page 48), respectively, seems positively primitive. But it isn't. Rendered in a contortive grid made of timber, the mixed-use structure is fashioned with panes of translucent polycarbonate, punctured with holes fitted with solar-powered electrical lamps. At night, it provides a mirror-ball effect of light when the café—paved with stones—becomes a venue for education and entertainment. The building faces the gallery, sited in striking opposition to its sensible neoclassical façade, and is poised on unclad "feet" extending from the folded-down roof, like an animal or a Roman war machine ready for the attack. From inside, however, it not only frames spectacular views of the surrounding Kensington Gardens through its various apertures but also affords protection from the elements and a sense of comfort like a marquee or an enormous hat. The pavilion is an open-air construction bolted together with mortise-and-tenon joints, yet for all its low-tech use of materials and ostensible design simplicity, it, more then its predecessors, appears truly site-specific: a complex structure that engages its public context through its conception, materiality, and sheer generosity. **David Bussel**



TOP: COURTESY PRESTEL; MIDDLE: COURTESY COOPER-HEWITT, NATIONAL DESIGN MUSEUM; BOTTOM: COURTESY SERPENTINE GALLERY

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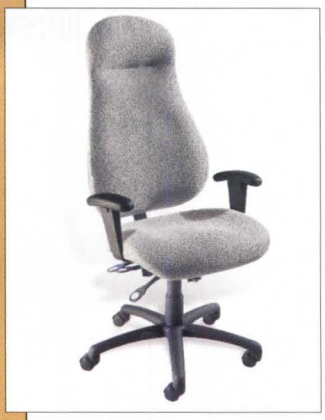

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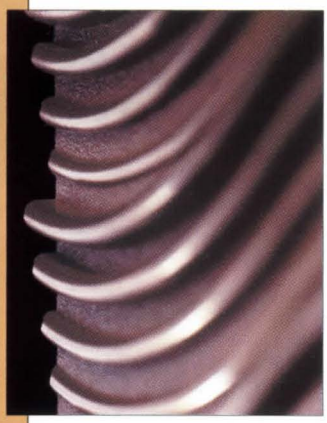

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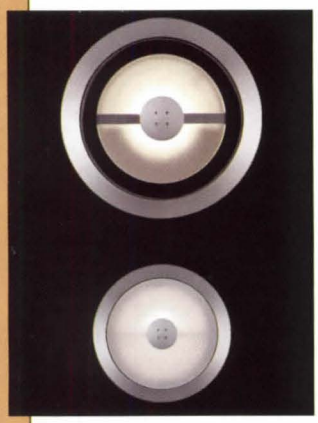

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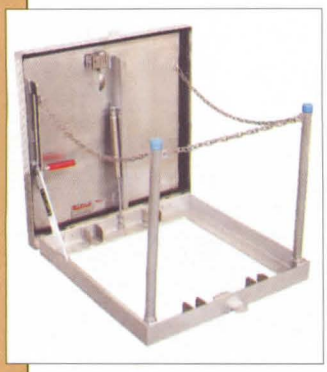

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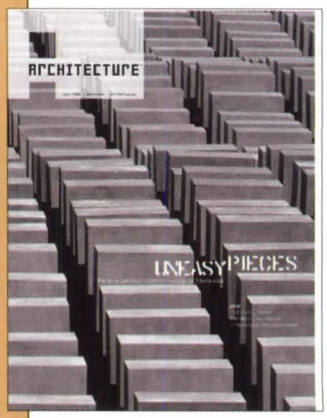

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PLEASE TURN OFF THE LIGHTS BEFORE YOU LEAVE THE BUILDING.

by Jane Holtz Kay

What would urban life be without a skyline emblazoned against the midnight stars? The image of *Bright Lights, Big City*, depicted on that novel's cover almost a quarter century ago, displayed the glowing façades of the Twin Towers. And, for all that loss, the image of the high-rise with its grid of glass panes continues to hold sway as the symbol of urbanity for corporations and architects alike. They ought to think again.

With interior lights on 24-hour duty, the high-rise skyline is a tribute to the romance of urban life, the power to soar, and the cliché that cities never sleep. But, for all the architectural panache, to a growing constituency this brilliant display of wattage—the sparkling cloak of eventide—is a death trap: a bird-slaying apparatus too seldom contemplated and a waste of energy in a world ever-more short of it and harmed by its creation of greenhouse gases. Advocates for our feathered friends reckon that birds' collisions into brightly lighted glass windows slaughter 100 million to 1 billion birds a year in this country.

Thus the effort to reduce the skyscrapers' nocturnal glow is two-fold. While environmentalists and ornithologists deplore the massacre of the birds, energy-conscious Americans criticize the associated fuel consumption of that illumination. And, yet, a constituency of Nantucket NIMBYs who should, one would assume, care for both the planet and the birds, has grabbed attention by fighting against the energy-saving wind turbines slated for Nantucket Sound, even as these vacationers' hometown office buildings slay more birds than any wind farm would.

As for the battered birds, the skyscrapers' shiny glass weakens the migrating flocks' navigation powers by fatally reflecting the images of trees and sky that draw them to smash into façades. But the Birds & Building Forum, a not-for-profit dedicated to bird safety, aims to have it otherwise. Last March, just one year after the ivory-billed woodpecker—thought to be extinct—made its stunning, and now suspect, reappearance, the forum (and cosponsors such as Chicago's Department of the Environment and Department of Planning and Development) gathered architects, designers, and bird partisans to study and mitigate avian deaths and crashes.

THE LANGUAGE OF BIRDS

On the pro-bird side of this battle are groups such as the Bird Conservation Network—a coalition of bird clubs, Audubon chapters, and ornithological societies located primarily in the Chicago metropolitan area—and the Fatal Light Awareness Program (FLAP), a 12-year-old nonprofit in Toronto dedicated to making the built environment safer for birds. Both organizations advocate "lights out" programs in their respective cities by asking businesses to dim building lights in towers from 11:00 p.m. until daylight during spring migration. Lately, the mission has expanded by seeking to reduce bird deaths in lakeside residential communities and lower-scale buildings beyond the urban core.

Mostly, though, bird health is much too low on the designer's list. "I've held hundreds of injured birds in my hands," says Randi Doeker, president of the Chicago Ornithological Society, which works with public agencies to broadcast the message to the largely indifferent designers and developers that the birds "can't tell the difference between the reflections and the sky." The society works with architects and designers to explore new building skins that discourage, rather than attract, birds, as well as to pull plants away from windows and station shades or flags to divert birds away from façades.

Adding to this repertoire of bird-saving strategies, avian advocates offer an ornithological manual for creating bird-conscious architecture: Shut down the lights, reprogram automated lighting systems, and use solar-reflective blinds or curtains. Scientists, too, have honed in on the negative effects of lighting and its needless fossil-fuel emissions in the empty hours of high-rise buildings. And a new vocabulary has emerged to categorize "crimes" of light: "light trespass" (when the back-porch antiburglar light shines next door); "sky glow" (when it chars the atmosphere, hiding the stars); and the familiar "glare" that affects all of us and contributes to CO_2 emissions.

Whether stopping birds from slamming into skyscrapers or curtailing global warming and wasteful use of natural resources, it's time for architects to turn the light on the glass building's environmental and avian assault ... off.

Jane Holtz Kay, architecture critic of *The Nation* and author of *Asphalt Nation*, is currently writing *Last Chance Landscape*, a book on climate change.

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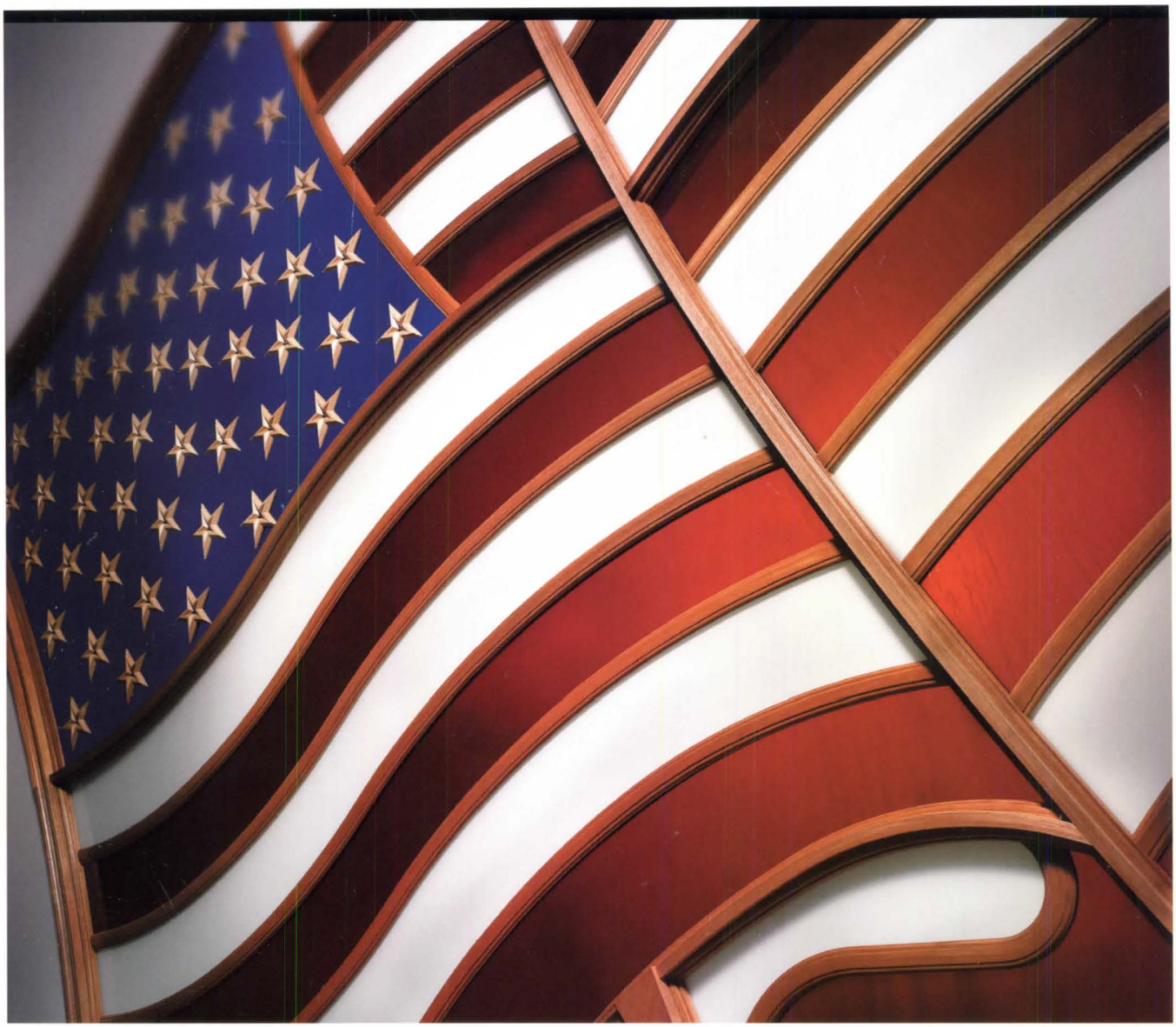

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