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DESIGN AND THE CITY

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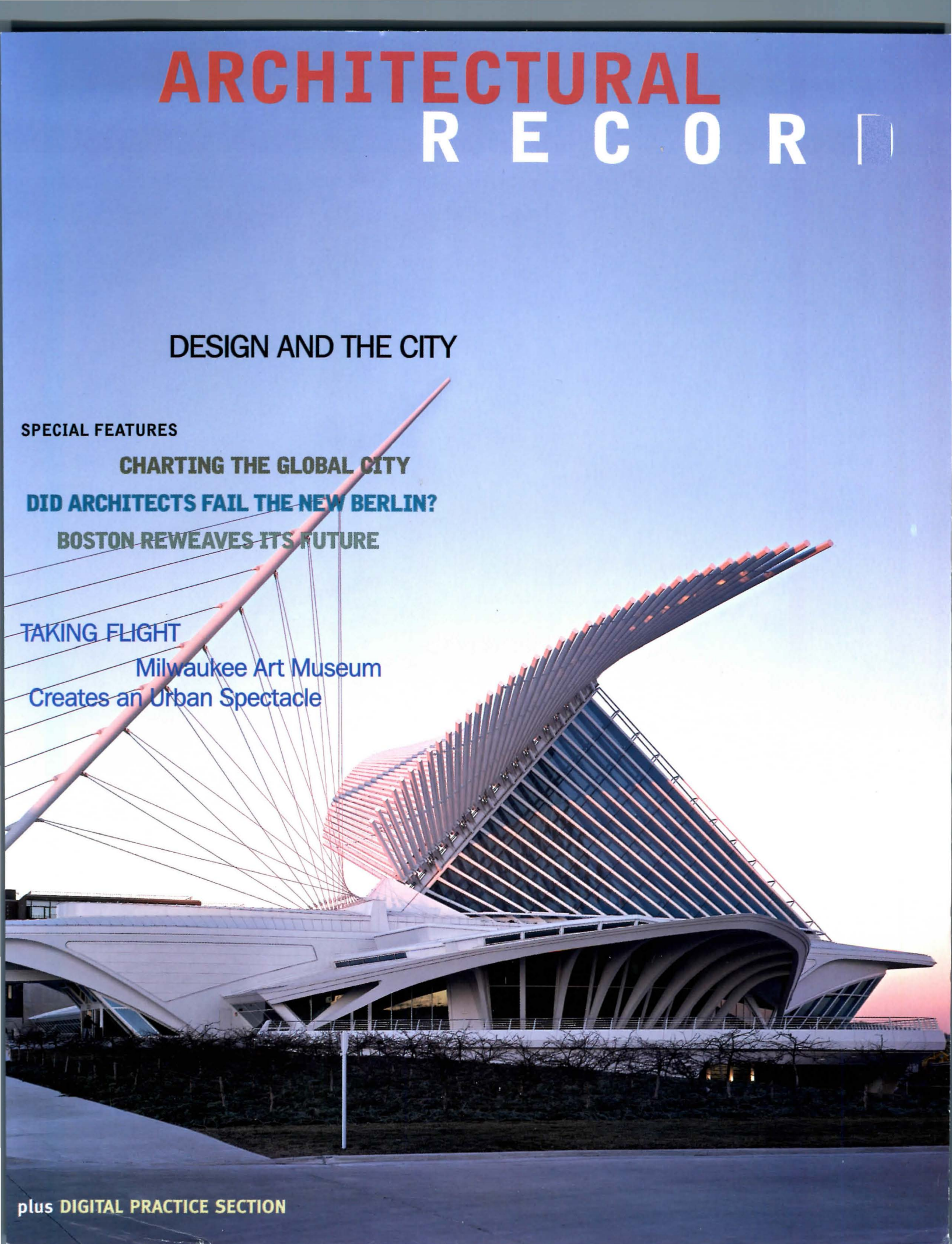
TAKING FLIGHT
Milwaukee Art Museum
Creates an Urban Spectacle



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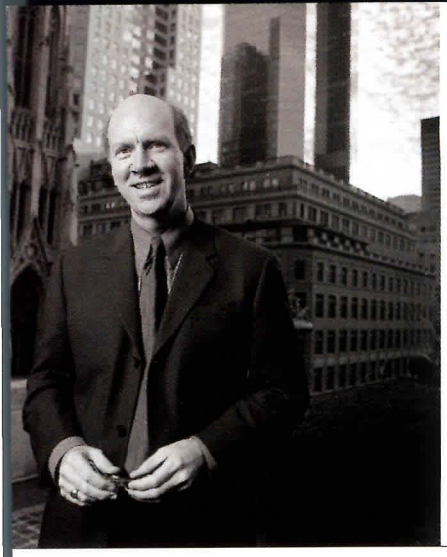


Editorial

By Robert Ivy, FAIA

In the 20th century, urban observers like Jane Jacobs praised the interactive sensory and social experiences that lie on any good block in Greenwich Village or Back Bay Boston. They cited 19th-century precedent, admiring humanely scaled buildings with their wealth of detail and texture, overlaid with the modern era's democratically raucous street life. Discovering worthwhile contemporary examples of urban vitality, however, has often meant traveling outside the U.S. After a 13-hour flight to Japan, one can find age-old civic traditions mingling with tomorrow's, out on the open street.

The first, most obvious lesson—one already familiar to Western audiences—is apparent on any Japanese byway: Low-rise, high-density cities can make humane places to live. The civilized residential heart of Tokyo beats outside the governmental core, a hop away by commuter rail. There, unnamed roads conform with the topography, combining four stories of housing above the odors and colors of streetside shops: fishmonger, pharmacy, sweets, antiques, cheap clothing, hardware repair, flower vendor. From wall to wall, a constantly rolling tangle of baby strollers, conversation, and the errant auto converge in a quotidian version of street-heaven.

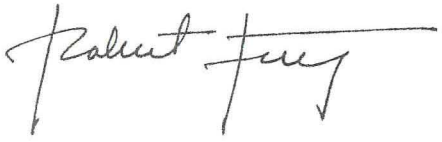
Conversely, in a city of 8 million people where not everyone can live downtown, transportation counts. Subways link the metropolitan area, interconnected to larger rail lines, buses, and planes, yet a daily commute may take 2½ tedious hours from the eastern suburbs. Despite a plethora of rail, including accurate-to-the-moment bullet trains and private lines, freeways can be jammed with Toyotas and Hondas, and at certain hours, the sidewalks seem impassable. Everyone wants to be near the gravitational core.

Unlike Western cities, which owe their rationally gridded roads to the Roman military camp, Japan's urban origins are more complex. In this multilayered country, mountain wilderness rolls down to space-age cities like Osaka or Tokyo, which, in their historic antecedents such as Kyoto, constantly unfolded inwardly, as wrapping became artful for objects and people (think of the kimono, with its under and outer garments). The late-20th-century reconstruction boom brought astonishing modernity and a stylistic polyglot to the entire country, with a certain grimy urban aspect. Much as John Portman envisioned in this country, layers translate into levels where land is scarce: In Osaka, skybridges connect tall structures; in Tokyo, shopping and dining regularly occur below grade. Despite the presence of a few well-visited parks and the Imperial Palace grounds, only a few large open spaces allow breathing room. The street represents Japan's contemporary face, the visible, animated component of the whole organism.

Jump downtown to the contemporary drag, where Sunday evening activity reaches fever pitch on the Ginza—blue and red and white signs vertically ablaze and all doors open. Despite Japan's current, larger economic doldrums, no slowdown in retail activity seems apparent. Stylish shoppers four abreast buzz through the Matsuya department store or the new Hermes emporium, its oversize glass-block facade designed by Renzo Piano. The brand matters, whether the brand is a famous architect or a silk scarf.

And what do you do on a street? Move. You walk, ride, pause, and then walk again, taking the measure of time and place in one meter increments, the width of the human stride. Outdoors in Tokyo or Milan or New York, we fully engage life, not passively but by moving and seeing, watching, gabbing on cell phones, eating, and occasionally buying. But to see this urban vitality as simply the visible heat and light of commerce misses part of the point.

What I saw in Tokyo has more to do with a kind of human unfolding for people whose lives are circumscribed by other physical and social layers. On the street, we put on a new set of garments, what the 17th century would have termed raiment—comprising an environment for mind and body that is broader, open to the sky, electrified with color and the hum of the present. In 21st-century Japan, as in 19th-century New York, we are drawn inevitably to the light, and it shines most clearly on the street. The old lessons about urban life still apply, translated and plugged into a new age.



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Letters

Palatable Postmodernism
Bob Campbell's February Critique on the virtues of Postmodernism [page 53] is brilliantly sane. Those who gloat over the supposed death of Postmodernism (or deny their involvement with it) are as misguided as those who danced on the grave of Modernism in the 1970s. Inclusiveness, yes!
—John Morris Dixon, FAIA
Old Greenwich, Conn.

Wake up
I would like to express my opinion regarding your December 2001 issue, which was in part dedicated to "decidedly edgy" young architects. With the exception of a couple of teams, all the projects were at the university level, and in my opinion, have little to do with harsh architectural reality.

Your selection of the published projects could mislead young architects who dream of starting their own firms. Architecture is not about drawing pretty pictures, unless you are still in school. All those nice buildings that Richard Meier designed are not there because he is a genius architect, but mostly because he is a genius politician and has found a way to make his peers and the general public happy.

Please be a little more real and give credit to the young architects who are out here trying to become involved in public life, attending City Council meetings, and trying to keep change orders under .3 percent. We are the ones who are pushing the real envelope, and taking the risk of losing real customers, even as we present them with projects that are beyond their conventional suburban thinking.
—Alex Protasevich, Assoc. AIA
Salt Lake City

Each month in archrecord2, both on the Web at architecturalrecord.com and in the magazine, we present the work of young architects such as yourself, including a forum for discussion, career, and lifestyle issues.
The Editors

Family values
In the January issue of RECORD [News, page 24], you quoted an officer of *The New York Times* as saying, "This building is designed from the ground up to reinforce the values of The New York Times Company."

Does this mean it will lean to the left?
—David Ganly
New York City

Looking back at a hero
I just read the January 2002 editorial about Sambo Mockbee [page 15], and I was very much encouraged and challenged by what you had to say. It seems that Sam looked at the world—at those around him—with a kind of humility that recognized no class, race, or creed. He truly sought to serve others through his talents. He could provide shelter and make it beautiful. He made strides toward redeeming our culture through the work of his hands. The editorial put it so well, contrasting the way most of us deal with poverty to the way Mockbee did: "Consistently, unapologetically, Sambo raised the curtain and went inside." We all should—not forcefully, as if we have "the answers," but lovingly. Interesting to think about the work he left behind; not buildings that point back to him as a great architect, but very lives that were changed by what was given to them!

Thanks for presenting his life and passion to us through this forum; this may have been the most important editorial you will ever have the opportunity to write. I hope we all take heed—first of all myself.
—Brian Barrett
The Garrison Barrett Group
Birmingham, Ala.

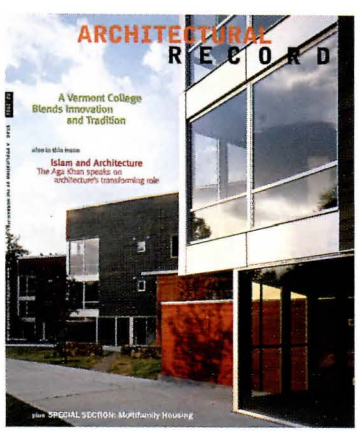
Reuse, renew, recycle
We were coarchitects with Hans Hollein for the proposed Harvard Square building that was defeated last spring [November 2001, "Preservation's Shackles," page 91]. Although historic preservation and adaptive reuse are an important part our firm's work, we believe that new design should be encouraged to go in new directions. This means there may often be some ruffled feathers, even some mistakes, but a review process that merely prevents what it considers to be bad design rather than encouraging imagination is a mistake in itself. It leads to just the sort of corporate blandness that has taken over much of Cambridge.

Two blocks from our site is Benjamin Thompson's superb 1970 glass-and-concrete Design Research (now Crate & Barrel) building, similar in size and materials to ours. We wonder if it could have been built today. However, we are not entirely pessimistic about public acceptance of imaginative design in our city, for it should be pointed out that three out of four Cambridge public reviews approved the design we submitted.
—Leland D. Cott, FAIA, principal
—Jonathan Hale, AIA, director of business development
Bruner/Cott & Associates
Cambridge, Mass.

Plastic passion
So, "Plastics Finally Get Respect" [December 2001, Building Science, page 107]. It's about time!

Architects like Peter Pfau offer outstanding examples of their use. However, despite the fact that performance, aesthetics, and versatility make translucent polycarbonates an exceptional choice for economical, energy-efficient daylighting, many architects have yet to invest the time and effort to learn about such alternatives. Hopefully, articles like this will spur investigation and evaluation by the AEC community.
—David M. Miller, AIA, president,
Duo-Gard Technologies
Canton, Mich.

Corrections
The photograph of the Bennington college dorms by Kyu Sung Woo (below) that appeared on the cover of the February 2002 issue should have been credited to Timothy Hursley. In that issue's story about the Gateway School [page 116], Andrew Bartle was the principal in charge. Also, the bottom picture on page 116 was reversed. In the January issue's story on the Allston Library [page 86], Richard Burck Associates was the landscape architect. In January's story on the Portland Airport [page 124], Kelly Davis, AIA, was project manager; John Thompson, AIA, was senior designer; and Bob Zimmerman, AIA, was project architect for Zimmer Gunsul Frasca. Also in that issue, in the Guggenheim Las Vegas story [page 100], the winding stainless-steel ramps were by Raymond Company and the cabinet work was by Commercial Cabinet Company.



Bennington College Dorms by Kyu Sung Woo. Photograph by Tim Hursley.

Please e-mail your letters to rivy@mcgraw-hill.com.

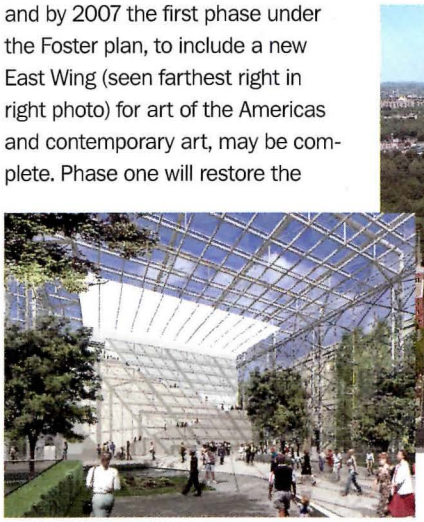
Record News

Lord Foster unveils Boston's Museum of Fine Arts expansion plan

The list of ambitious art museum construction projects in the United States continues to grow. In mid-February, the Museum of Fine Arts, Boston (MFA) unveiled plans by London's Lord Norman Foster for a multiphase expansion and renovation by his firm, Foster and Partners. The project will be part of the MFA's $425 million fund-raising campaign—the largest arts campaign in the U.S. outside of New York.

At least $180 million of the funds raised will go to construction. Plans call for a new glass-covered structure to be inserted within the length of the existing museum, which has a number of components, including the original 1907 building designed by Guy Lowell and a West Wing by I.M. Pei, completed in 1981.

Construction will begin in 2003, and by 2007 the first phase under the Foster plan, to include a new East Wing (seen farthest right in right photo) for art of the Americas and contemporary art, may be complete. Phase one will restore the symmetry of the original building design, with the south entrance connected to the reopened north entrance facing the Fens. A glass-covered, "jewel box" public space (left photo) will be inserted in the Fraser Garden Court.



The MFA expansion (above) will include a glass-covered structure inserted within the length of the existing museum and a "jewel box" (left).

Implementation of future phases, which would more than double the museum's square footage and include underground parking, will take about 15 years to complete and will depend on the success of fund-raising efforts.

John E. Czarnecki, Assoc. AIA

Drastic alteration underway for Meier's Bronx Developmental Center

Alterations have begun that will leave almost unrecognizable the Bronx Developmental Center, one of the key works in the career of Richard Meier, FAIA. Completed in 1977 as a treatment center for the mentally retarded, the center was sold last year by New York State for $3.7 million to the Simone Development Companies, which is converting the structure to offices.

The *AIA Guide to New York City*, called it "a consummate work of architecture … sure to be ranked among the great buildings of its time." On a recent visit, the power of Meier's crisp geometries appeared undiminished. But builders have already started removing the airplane-fuselage-colored aluminum panels with their signature porthole-like windows to make way for white metal panels with rectangular windows. Meier's windows could not economically be saved, explained Mitchell D. Newman, AIA, president of Newman Design Group, the firm that has designed the renovation.

Interiors have already been gutted, but plans include the retention and restoration of a large landscaped courtyard and the glassy bridges that cross it. Simone will add 120,000 square feet to the building's existing 330,000 square feet, and three planned structures could enlarge the complex to a total of 1.2 million square feet.

Meier's aluminum facade included rounded windows.

The state did not attempt to put any conservation strings on the sale, and the building is too young to be eligible for local or national landmark status. "It slipped by everyone's radar screen," said Theo Prudon, who is president of DOCOMOMO U.S., a national organization dedicated to preserving modern buildings. Simone did not consider hiring Meier, nor did Newman consult his office. Meier said he was "shocked," having heard nothing about the alteration prior to a February 1 *New York Times* report.

The renovated building will have white metal panels.

The Bronx Developmental Center has posed special problems, however, because both its imagery and functionality were questioned from the day it opened, especially by mental heath advocates.

James S. Russell, AIA

OFF THE RECORD

After a 16-month work stoppage, construction is set to resume on the San Diego Padres ballpark designed by Antoine Predock, FAIA. Struggles over financing came to an end when Merrill Lynch bought $169 million in bonds to finance the ballpark, which will likely open in 2004.

Toshiko Mori has been appointed chair of the department of architecture at the Harvard University Graduate School of Design. She succeeds Jorge Silvetti in that position.

Steven Ehrlich Architects has been selected to renovate the historic Culver Theater in Culver City, California, now called the Kirk Douglas Theatre.

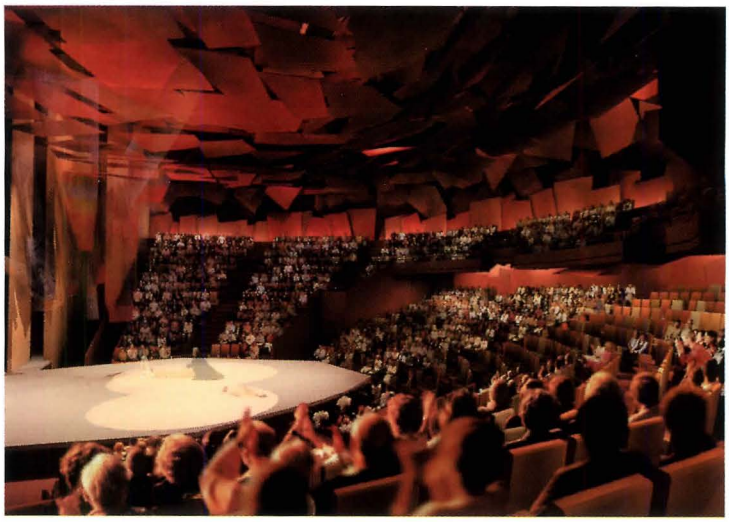
Field Operations has developed a competition-winning plan to transform Fresh Kills, a 2,200-acre landfill on Staten Island, New York. Others competing were Hargreaves Associates, Tom Leader Studio, John McAslan + Partners, Rios Associates, and Sasaki Associates.

Ann Casso has been appointed executive director of the AIA Trust, which develops insurance and financial benefit programs for AIA members. Casso succeeds Ann Marie Boyden, Hon. AIA, CAE, who is retiring after 13 years as the AIA Trust's first executive director.

Construction will begin this year on a $20 million expansion of the 26-year-old Maryland Science Center in Baltimore's Inner Harbor. Design Collective of Baltimore will design the 42,000-square-foot addition.

The AIA/UK chapter has given its 2002 Excellence in Design Awards to Patel Taylor Architects for Thames Barrier Park, Richard Rogers Partnership for 88 Wood Street in London, Wilkinson Eyre Architects for Gateshead Millennium Bridge, and Zaha Hadid Architects for Terminus and Car Park in Hoenheim North, Strasbourg, France.

Nouvel inspired by site for Guthrie



"I was strongly influenced by this site," French architect Jean Nouvel said as he unveiled his design in February for the $125 million Guthrie Theater in downtown Minneapolis near the Mississippi River. "I like to work with identity ... the specificity of a site. And I knew that I had found that here."

For what will be his first building in the United States, Nouvel, who is clearly captivated by the river, designed a three-stage, 225,000-square-foot building with a stylized industrial aesthetic that references neighboring historic buildings. The most notable feature of the design is a 140-foot-long cantilevered "endless bridge" that slices through the main theater lobby at the second level and extends to the river's edge. On the third level, a smaller lobby with walls of floor-to-ceiling orange glass will also cantilever off the building for unobstructed, albeit tinted, views up and down the river. Exterior building materials include transparent silver metallic banding and a combination of clear glass and metal panel louvers in a pale yellow color intended to mimic the weathered limestone of neighboring buildings.

Nouvel has designed a 1,100-seat theater with a thrust stage (above) that has an asymmetrical seating arrangement similar to the one in the existing Guthrie Theater. The complex will also include a 700-seat theater and a flexible 250-seat black-box theater for experimental works.

Scenery and costume shops will be on top of a 600-car parking ramp across the street. Two fully enclosed skywalks will link the theaters to the shops.

If funding is procured, groundbreaking is scheduled for fall, with a 2005 opening. Currently in the midst of a $75 million capital campaign, the Guthrie has asked the state for $35 million. Minnesota governor Jesse Ventura opposes the expenditure. *Bob Dillon*

With building forms and metal cladding, Jean Nouvel invokes imagery of the industrial past in his design for the Guthrie Theater on the Mississippi River in Minneapolis.

AIA scholarship support rescinded, then abruptly reinstated

As the e-mail newsletter *ArchVoices* reported, the American Institute of Architects (AIA) announced in mid-January the suspension of AIA/AAF scholarships for first professional degree candidates for 2002–2003. Citing diminished returns on the AIA scholarship endowment funds in the slowed economy, Norman Koonce, FAIA, EVP/CEO of the AIA, wrote in a January 16 letter to all architecture schools in the United States: "I know many of your students may have already begun working on the scholarship application, but I must ask your help in immediately suspending the process. The American Institute of Architects is not in a position to make scholarship awards ... for 2002."

Following concern from educators, practitioners, and AIA components, Koonce subsequently sent a letter on February 4 to the schools that stated: "Please encourage those architecture students from your school who had planned to apply for an AIA/AAF scholarship as a First Professional Degree Candidate to resume their application process ... We will diligently pursue creative approaches for continued funding of these 2002 scholarships." The application deadline was extended two weeks, to February 22.

In 2001–2002, $330,000 in financial support was administered to 243 students through the Scholarship for First Professional Degree Candidates. The total to be granted for 2002–2003 was not known to us at press time. *JEC*

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SPECIAL REPORT

Heavily damaged buildings surrounding Ground Zero require extensive renovations

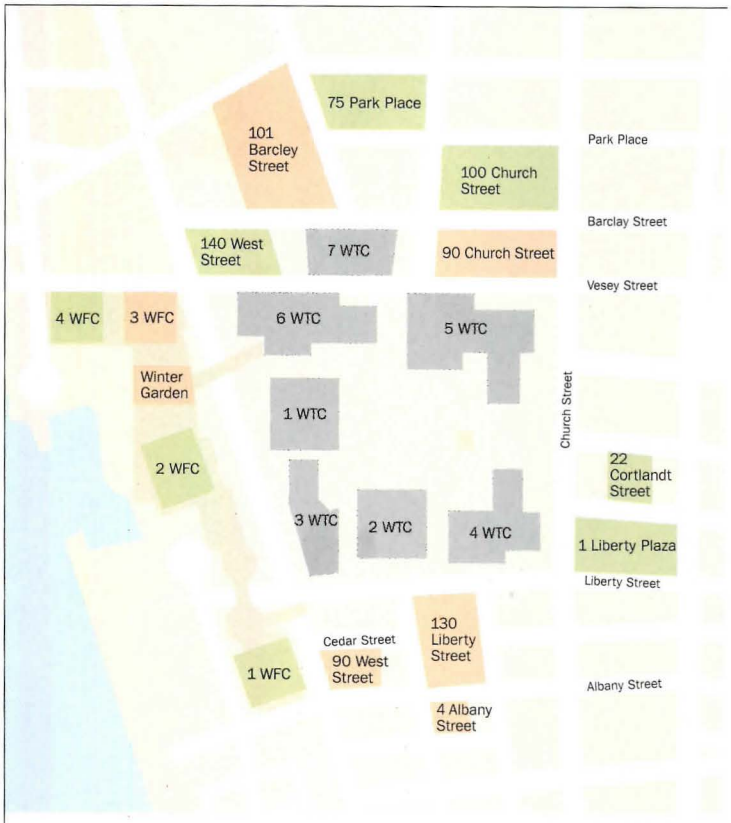
Repairs to 130 Liberty Street (left, pictured soon after the attack) will take at least a year, but the fate of 90 West Street (below) is uncertain. The Winter Garden (bottom) reopens in September.

Efforts continue to renovate and reopen buildings surrounding the World Trade Center that suffered considerable damage in the September 11 attack.

The World Financial Center's Winter Garden (below), designed by Cesar Pelli, FAIA, and completed in 1988, is in the midst of a $50 million restoration that should be complete in time for the one-year anniversary of the September 11 disaster. In the attack, debris from the towers smashed through the Winter Garden's east facade and glass-covered roof. Replacing the Winter Garden's damaged marble alone will cost $3 million.

As of mid-January, the World Financial Center was about 25 percent occupied. The World Financial Center's towers 1, 2, and 4 have reopened. Just north of the Winter Garden, 3 World Financial Center sustained structural column damage on its southeast corner from falling debris. Portions of that building will reopen this spring, with American Express moving employees back into the building in April. The Marriott Financial Center at 85 West Street, used by the Red Cross for many weeks after September 11, reopened to the public in January.

Repairs to 130 Liberty Street (top), which had a debris-riddled gash from the ground to the 24th floor in its north facade, will likely take at least a year. The limestone and terra-cotta clad 90 West Street (above), a 23-story, 1907 Cass Gilbert building, sustained considerable fire and debris damage from the attack. The building's fate is uncertain—it may be demolished if renovation, estimated to cost $50–$100 million, is unfeasible or not fully covered by insurance. An Embassy Suites Hotel north of the World Financial Center reopens in April, and the Millennium Hilton on Church Street will likely open in September after cleanup and repairs. *JEC*

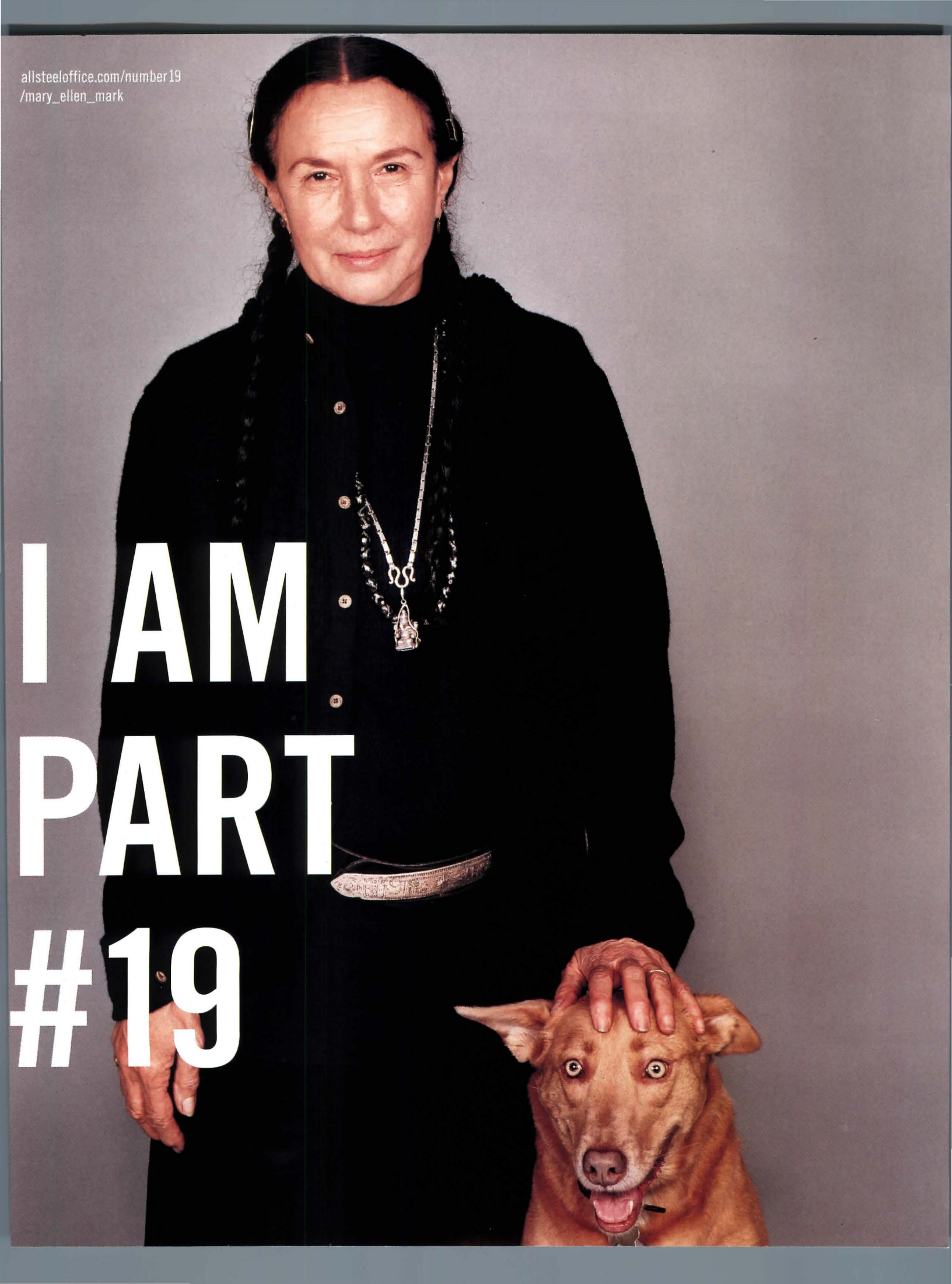


Assessing the damage done

The September 11 attack destroyed the World Trade Center, but about 45 buildings were also battered in the immediate area. Here is the status, as of late February, of the surrounding buildings that sustained the most damage. Buildings in green have reopened, and those in gray are gone.

BUILDING	SQ. FEET	STATUS
1 World Trade Center	4.76 million	Destroyed
2 World Trade Center	4.76 million	Destroyed
3 World Trade Center	n/a	Destroyed
4 World Trade Center	584,000	Destroyed
5 World Trade Center	784,000	Destroyed
6 World Trade Center	538,000	Destroyed
7 World Trade Center	2 million	Destroyed
1 World Financial Center	1.46 million	Reopened
2 World Financial Center	2.59 million	Reopened
3 World Financial Center	2.30 million	Reopening starting in April
4 World Financial Center	2.08 million	Reopened
90 West Street	335,000	Building survival uncertain
140 West Street	1.17 million	Partially open, rest by 2004
130 Liberty Street	1.42 million	Reopening at least 1 year away
4 Albany Street	131,000	Reopening 6–12 months
1 Liberty Plaza	2.12 million	Reopened in October
101 Barclay Street	1.23 million	Reopening this summer
90 Church Street	950,000	Reopening starting in June
100 Church Street	1.03 million	Reopened in January
22 Cortlandt Street	668,000	Reopened in February
75 Park Place	567,000	Reopened

Sources: Crain's New York Business, The New York Times, *building owners, LZA/Thornton-Tomasetti*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SPECIAL REPORT

Architects assemble and catalog WTC artifacts for history

Among the items saved are a mangled stabile by Alexander Calder (left, before; right, after).

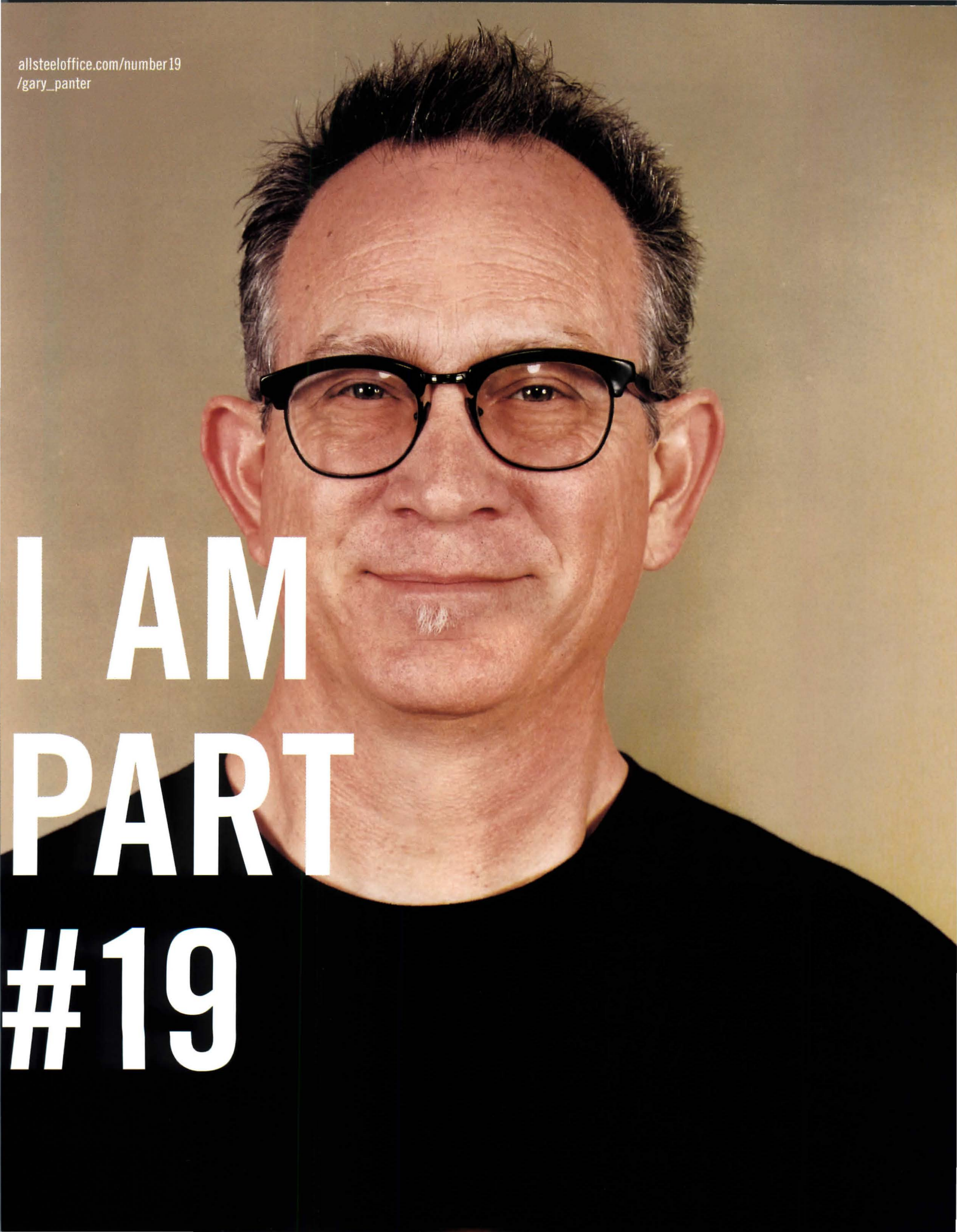
During the months since the collapse of the World Trade Center, a small group of architects has been working to determine what to save. The process began two weeks after the disaster, when Robert Davidson, chief architect for the Port Authority, appointed Bart Voorsanger, FAIA, principal of Voorsanger & Associates Architects; Marilyn Jordan Taylor, FAIA, chair of Skidmore, Owings & Merrill; and Saul Wenegrat, former curator for the Port Authority, to the task of recommending which objects to salvage.

In the weeks following the destruction, Mark Wagner and Andrea Wiedemann, a Voorsanger architect and intern, respectively, began scouring the debris. They have assembled, photographed, and cataloged a collection of significant artifacts, from shards of a high-altitude television antenna that once graced the north tower to 40-ton remnants of steel curtain wall to signs that marked exits to buildings. The team also rescued two of seven major public art works that remain partly intact—a dented Calder stabile and the remnants of a Fritz Koenig spherical bronze sculpture.

By mid-October, the team was approached by a consortium of 40 cultural institutions—among them the New-York Historical Society and the Smithsonian Institution—that are beginning to think about how to commemorate the tragedy. The Museum of the City of New York, for example, expressed interest in preserving objects of social as well as architectural significance. In response, the team began collecting fragments that reflected daily life at the site, such as office furniture and coffee cups. Objects—some mangled, others chillingly undamaged—are being stored in scrapyards in New Jersey, at the Fresh Kills landfill, and in an unused airline hangar at Kennedy airport. Voorsanger, who has been working pro bono on this project, says, "We are intentionally not taking a position about what a memorial should be in order to preserve the widest possible array" of artifacts. *Tess Taylor*

A portion of the north tower antenna (below) and the Fritz Koenig spherical sculpture (bottom).

www For continuous updates on the aftermath of the September 11 attack, visit our special section at: ***architecturalrecord.com***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Exhibited projects include the Utah Olympic Oval (top), by Gillies Stransky Brems Smith, and the Nike Headquarters in the Netherlands, by William McDonough.

Fit cities celebrated during Winter Olympics

"The Physical Fitness of Cities," a 2002 Cultural Olympiad exhibition in Salt Lake City emphasizes the interdependence of the built and natural environments. The exhibition celebrates innovative urban design and "excellence in human settlements, at a time when the Olympics turn our attention to excellence in athletics," said Salt Lake planning director Stephen Goldsmith, who served as project director for the exhibition and a related symposium held in the city.

Continuing through March 30 in the restored 107-year-old Salt Lake City and County Building, the exhibition highlights projects that, according to the program, "establish new standards of resourceful design, ethical practice, and far-reaching vision." San Francisco's Yerba Buena Gardens, the Nike European Headquarters in Hilversum, the Netherlands, and Staten Island's Eibs Pond Park Outdoor Classroom are among the projects chosen for the show because they are examples, says Goldsmith, of city builders working with nature.

Keynote speaker William McDonough, FAIA, began the three-day symposium, held February 1 to 3, in a tone that was both ominous and hopeful. Rather than reusing conventional designs, architects must take guidance from nature, he said. Quoting Einstein's statement that "no problem can be solved by the consciousness that created it," McDonough urged his audience to reinvent building and community designs, and spoke of his own firm's successes in persuading corporations to adopt healthful building practices.

Trust for Public Land director Will Rogers added to that message. "The chronic diseases of the 21st century—asthma, obesity, depression—can be moderated by how we design our human environment," Rogers said.

Author Terry Tempest Williams gave the symposium's final lecture. Williams spoke of an event—the 1983 flood of downtown Salt Lake City—that asserted nature's power to both threaten the community and knit its people together. Williams's new book, *Red: Passion and Patience in the Desert*, examines how the author's home state of Utah has been transformed by population growth, and expresses hope for further change, guided by a new consciousness of "nature as mentor," as Williams put it.

Other symposium speakers included Moshe Safdie, FAIA, Michael Sorkin, Michael Pyatok, FAIA, and Peter Calthorpe, FAIA. *Diane de la Paz*

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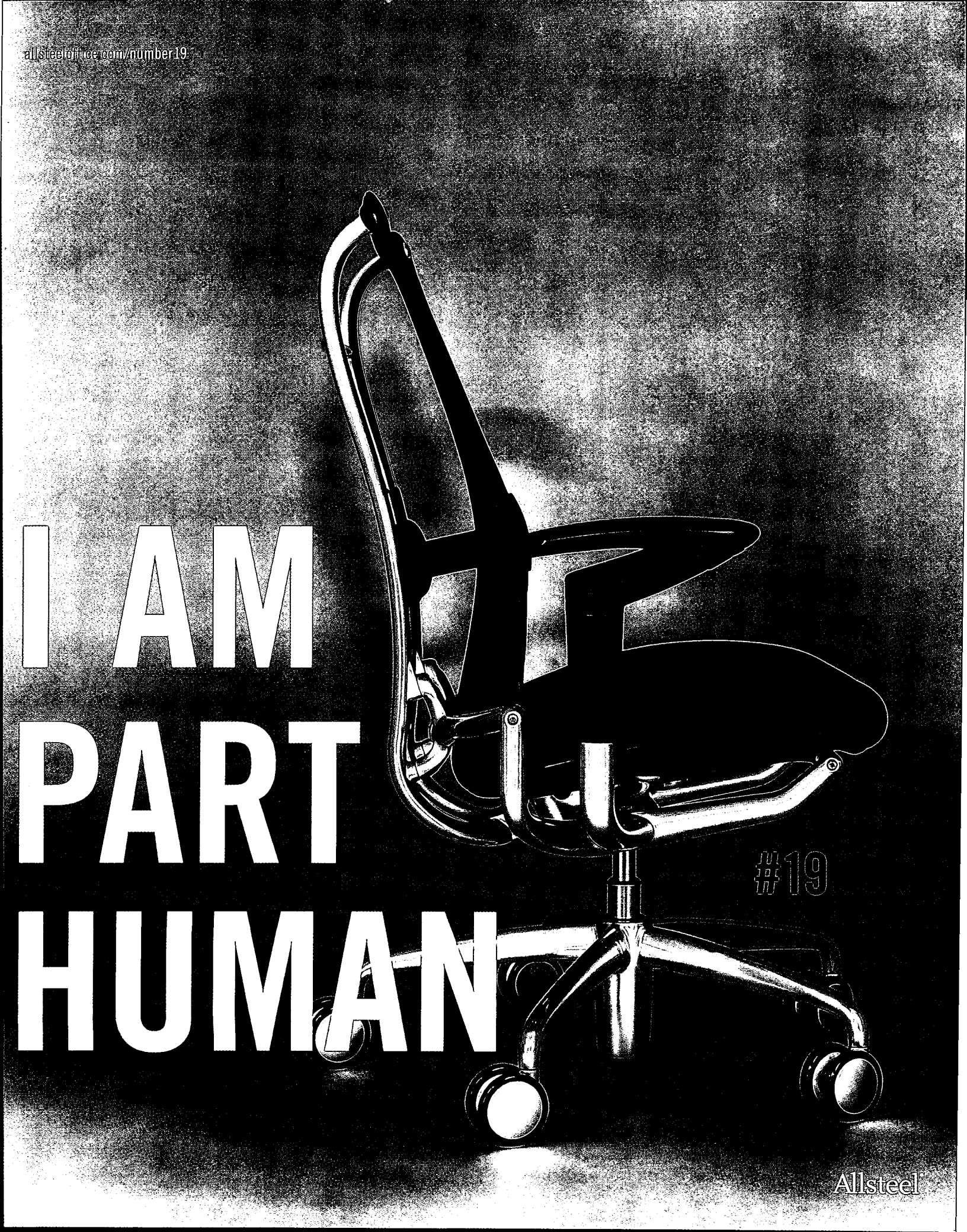


Millennium Dome and surrounding site to be redeveloped

Nearly two years since the competition to find a use for London's Millennium Dome was launched in March 2000, a solution is on the horizon. Instead of selling the notorious visitor attraction, which closed on December 31, 2000, the British government plans to lease it to multinational development consortium Meridian Delta. The government hopes to conclude a legally binding contract with Meridian Delta by the end of May, thereby bringing to an end an extremely embarrassing and protracted episode. If the deal goes through, the government will work in joint venture with Meridian Delta for 20 years, during which time the government will also take a portion of the profits, estimated at $800 million.

Meridian Delta plans to turn the Millennium Dome and the surrounding 190-acre site into a mixed-use commercial, residential, and leisure district, known as Dome Waterfront.

The Millennium Dome will be transformed into a 20,000-seat arena for sports and concerts.

The Millennium Dome itself will be fitted-out as a 20,000-seat public arena, to a design by HOK Sport, opening in 2004. The cost of converting Richard Rogers Partnerships' iconic dome tent would be approximately $300 million. The area surrounding the dome will be developed with 5,000 homes, open space, and enough corporate and commercial space to support 20,000 jobs. Terry Farrell and Partners, which has been planning for the site for more than six months, has developed the master plan.

In total, Meridian Delta's plan will attract over $6.5 billion of investment to the former gasworks on the northern tip of the Greenwich Peninsula. The Meridian Delta consortium comprises U.S. giant Anschutz Entertainment Group, Lend Lease Europe, and Quintain Estates and Development. *Adam Mornement*

The master plan by Terry Farrell includes 5,000 homes, and office and commercial space to support 20,000 jobs.

Whitney Young, Topaz, and Young Architects winners named

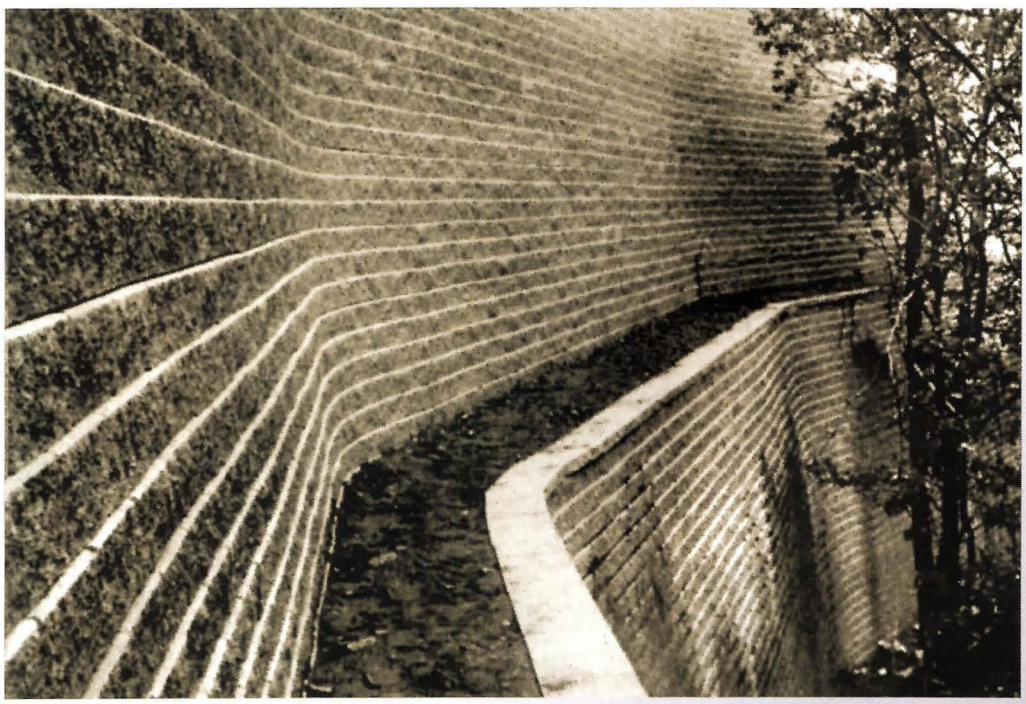
The American Institute of Architects (AIA) has announced winners in three award categories for 2002: AIA/ACSA Topaz Medallion, AIA Whitney M. Young, Jr., Award, and Young Architects Award.

Architect and educator Jerzy Soltan, a student of Le Corbusier through correspondence, was named recipient of the 2002 AIA/ACSA Topaz Medallion, which honors a person who has made an outstanding contribution to architectural education for at least 10 years and whose teaching has reached a broad range of students. Soltan retired in 1979 after 20 years at Harvard Graduate School of Design.

Robert P. Madison, FAIA, who has been a counselor, mentor, and advisor to minority students, was named winner of the 2002 AIA Whitney M. Young, Jr., Award. The award is named for the late civil rights and urban leader who, at the 1968 AIA convention, challenged architects to assume professional responsibility for social issues. Madison, the first African-American to graduate from an architecture school in Ohio, has been a leading architect in Cleveland since starting his firm in 1954.

Winners of the 2002 Young Architects Award are Randy G. Brown, AIA, of Omaha; Barbara Campagna, AIA, of New York City; Mohammed Lawal, AIA, of Minneapolis; and Joe Scott Sandlin, AIA, of Anchorage. The Young Architects Awards are conferred to those in an "early stage of their architectural careers who show exceptional leadership in design, education, and/or service to the profession." *JEC*

Form doesn't always follow function. Sometimes they walk side by side holding hands.



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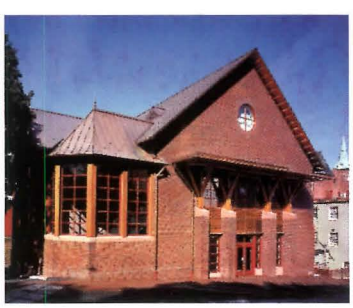
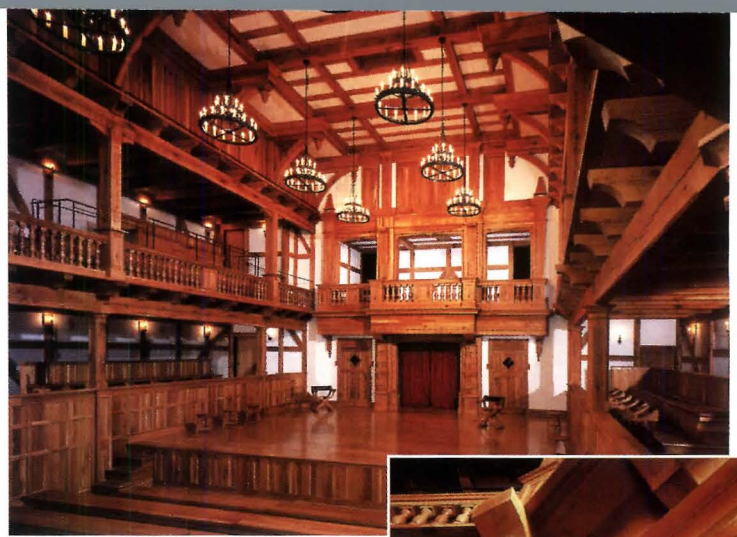
Blackfriars Playhouse re-created in Virginia

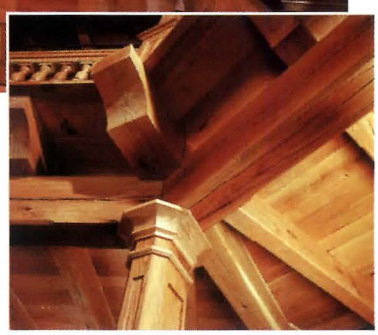
"We are not interested in creating 'ye olde Shakespeare,' but in recovering things that are primary to theater," says Ralph Cohen, director of the newly opened re-creation of London's Blackfriars Playhouse in Staunton, Virginia.

The original 1596 theater, the bard's favorite venue for staging his plays, stood on a bank of the Thames in London until it burned down in the city's Great Fire of 1666. Then, it was a new theater within an old refectory building; its facsimile in Staunton, a former industrial town in the Blue Ridge, recreates the 16th-century playhouse within a contemporary shell. The Virginia version is marked by a large gable, overhanging eaves, a glazed corner stair tower, and white oak detailing.



Because no pictorial evidence of the original Blackfriars interior survives, Richmond architect Tom McLaughlin, AIA, relied mainly on research by Elizabethan scholars. His 4,500-square-foot, $3.7 million structure seats 320. The framing is 12-by-14-foot white oak beams, the heaviest weighing 900 pounds, and 8-by-10-foot columns. Where possible, McLaughlin's team used traditional materials and methods: balusters and decorative elements hand-carved, and metal chandeliers and sconces handcrafted.





The re-created theater (left) has an interior featuring handcrafted white oak detailing (above and right).

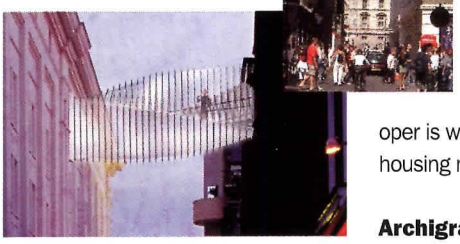
Bench seating on three sides of the thrust stage creates a closer relationship between actors and audience and among audience members than a proscenium arrangement would. The stage set is simple and fixed. Contemporary and period costumes provide color and indicate changes in venue and mood, and each actor plays several roles in a performance.

The Blackfriars' opening is the first step in establishing a national center for Renaissance drama performance in Staunton. Ground-breaking for a re-created Globe Theatre is slated for 2005.
Andrea Oppenheimer Dean

News Briefs

Footbridge to dance over London Wilkinson Eyre Architects' footbridge for the Royal Ballet School in London recently won planning approval. The 26-foot link, 164 feet above Floral Street in Covent Garden, connects the ballet's new Upper School with the Royal Opera House. Glazed on all sides and sloping from 1 to 12 inches, the fourth-floor passage is supported by 23 square, parallel portal frames. Each frame is rotated roughly 4 degrees, to achieve a full 90-degree twist from end to end, giving it a "dancelike sense of movement," says James Eyre, RIBA, the firm's principal. Transparent and opaque glazing is attached to each 10-foot-tall aluminum frame to create the snaking effect. The $716,100 bridge, to be completed this summer, is the result of a design competition that Wilkinson Eyre won against Jeremy Dixon.Edward Jones. *Tony Illia*

$100 million for L.A. housing Los Angeles Mayor James K. Hahn has proposed a $100 million trust fund to build affordable housing in that city. The plan, if approved by the Los Angeles City Council, would increase the city's investment in housing to become the largest of any U.S. city by fiscal year 2003–2004. Los Angeles currently has a $10 million housing trust fund. By 2002–2003, it is expected to increase to $52.9 million. Funding would come from Community Redevelopment Agency funds, hotel taxes, federal community development block grants, and an increase in city business taxes.

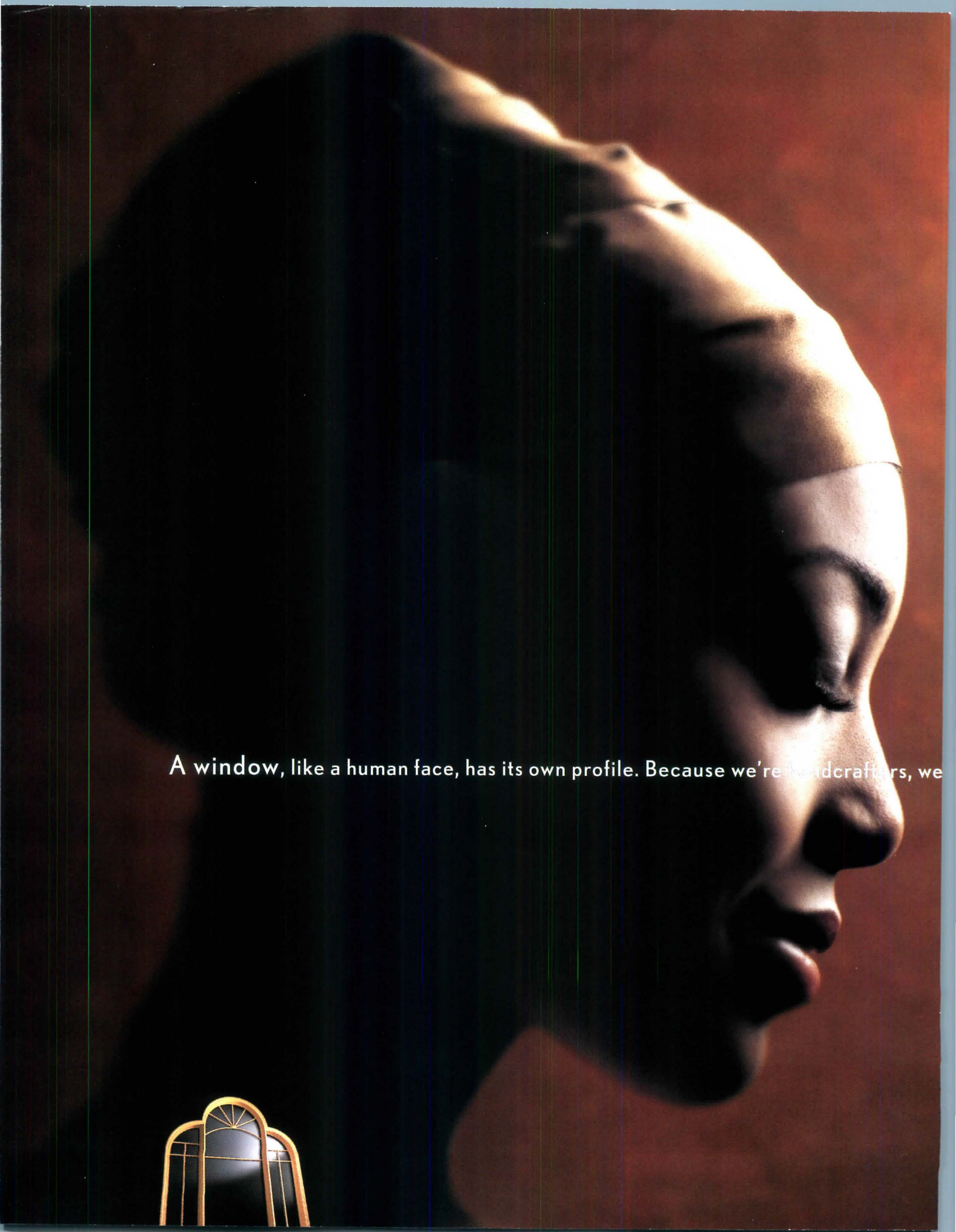


Wilkinson Eyre's London footbridge.

SHoP's DUMBO building moves forward Light Bridges, a mixed-use condominium complex by SHoP/Sharples Holden Pasquarelli planned for Brooklyn's DUMBO neighborhood, has been approved by the City of New York. The building, SHoP's largest project to date, will include four floors of commercial space with 20 floors of residential condominiums. The building's exterior curves respond to zoning restrictions and available light and views. A construction date is uncertain, as the developer is waiting for the New York housing market to strengthen.

SHoP's condo development in Brooklyn.

Archigram wins RIBA Gold The British experimental architectural collective known as Archigram, rooted in 1960s counterculture, has won the 2002 Royal Gold Medal by the Royal Institute of British Architects (RIBA). The Royal Gold Medal is the RIBA's most prestigious architectural prize. Although Archigram disbanded in the 1970s, the group's influence over a generation of British architects is still apparent today. Archigram, led by Peter Cook, Warren Chalk, Dennis Crompton, David Greene, Ron Herron, and Mike Webb, was formed in the early 1960s by a group of British architecture school graduates who endeavored to push the boundaries of design and question the prevailing pedagogies of London architectural practice.


A window, like a human face, has its own profile. Because we're

Dates & Events

New & Upcoming Exhibitions

The Way of the Tea
New York City
March 6–May 9, 2002
In this exhibition, architects, designers, and artists explore the enduring influence of the tea ceremony upon contemporary art, architecture, and industrial design throughout Asia. Featured designers include architect Masayuki Kurokawa, graphic designer Kan Akita, and interior designer Takashi Sugimoto. At the Japan Society. For more information, contact 212/832-1155.

Ten Shades Of Green
Houston
March 22–April 21, 2002
Ten Shades of Green seeks to illuminate the different environmental issues involved in architecture and design. The ten shades refers to ten projects that have been selected as remarkable examples of sustainability. Among them are Foster & Partners' Commerzbank and Renzo Piano's Beyeler Foundation Museum. Sponsored by the Architectural League. At the University of Houston. Contact 212/753-1722.

The Alliance of Art and Industry: Toledo Designs for a Modern America
Toledo
March 24–June 16, 2002
In the 1930s, Toledo was a hotbed for cutting-edge industrial design. Now, almost a century later, it is celebrating its past with this exhibition at the Toledo Museum of Art. Among the 180 products included are cars, scooters, appliances, furniture, gadgets, and even a life-size model of the wildly modern "Kitchen of Tomorrow," presented in 1942. For more information, call 800/644-6862.

Alsop at the Soane
London
March 28–October 8, 2002
Celebrating the process behind the practice, this exhibition is the third in a series linking the work of celebrated contemporary world architects with the tenets and themes of the Sir John Soane's Museum and its unique collection of architectural ephemera, sculpture, and painting. The show includes models, film projections, and a selection from concept sketchbooks. At the Sir John Soane's Museum. Contact William Palin at will.palin.soane3@ukgateway.net.

Ongoing Exhibitions

Aluminum by Design: Jewelry to Jets
New York City
Through April 7, 2002
Exploring how aluminum has inspired innovation in design, this exhibition includes works by René Lalique, Jean Prouve, Mies van der Rohe, Russell Wright, Charles and Ray Eames, and Gio Ponti. At the Cooper-Hewitt National Design Museum. Contact 212/849-8400 or visit www.si.edu/ndm.

Renewing, Rebuilding, Remembering
New York City
Through April 12, 2002
A photographic exhibition investigating cities that have been rebuilt in the wake of man-made and natural disasters. Photographs, renderings. and models will illustrate a diverse response to traumatic events and their dynamic impact on urban life. Among the cities on display are Berlin, Lebanon, Oklahoma City, and Manchester, England. At the Van Alen Institute. Contact 212/924-7000.

Museums for a New Millennium
Fort Worth
Through April 14, 2002
Finally making its United States debut, this international traveling exhibition presents the architectural designs of 25 world-renowned museums through drawings, photographs, and original models. Featured projects include works by Norman Foster, Zaha Hadid, Daniel Libeskind, and Santiago Calatrava. At the Modern Art Museum of Fort Worth. Contact 817/335-9215.

Isamu Noguchi: Sculptural Design
Weil am Rhein, Germany
Through April 21, 2002
Bridging the gap between fine and applied arts, this exhibition features the astounding artistic versatility of sculptor Isamu Noguchi, whose work extends well into the fields of architecture and design. On view are more than 80 projects—sculptural works, furniture, stage sets, and public design. At the Vitra Design Museum. Contact 011 49 7621 702 3351.

Dates & Events

Cesar Pelli: Connections
Washington, D.C.
Through April 28, 2002
One of the most comprehensive retrospectives on the life and work of distinguished architect and AIA Gold Medalist Cesar Pelli. Through photographs, photo murals, more than 100 drawings, and 30 originals models, the show will explore over a half century of his career, culminating with his most recent work. At the National Building Museum. Contact 202/272-2448 for more information.

Architecture Flirts With Art: UN Studio/Matrix 146
Through April 28, 2002
One of the first museum exhibitions devoted to the innovative architectural designs of the Amsterdam-based UN Studio. The show's blend of digital and physical representation will feature some of the firm's most notable work, including the Erasmus Bridge and Mobius House, in a fashion that mirrors the firm's imaginative approach to digital technology and architectural design. At the Wadsworth Atheneum Museum of Art. Contact 860/278-2670 for more information.

Mathematica
San Francisco
Through May 5, 2002
This Eames-designed exhibition from 1961 showcases mathematics as both a science and a tool for art. Forty years later, it remains the only Eames exhibition still in existence. Other Eames designs on display include toys, home electronics, and lesser-known furniture. At the Exploratorium. Contact 415/563-7337 or visit www.exploratorium.edu.

WTC: Monument
New York City
Through May 5, 2002
As a tribute to the Twin Towers, this exhibition provides an in-depth exploration of the buildings' conception, design, and construction, beginning in the 1960s. It includes a 7-foot-tall architectural model of the towers by WTC architect Minoru Yamasaki, and a film commissioned by the Port Authority. At The Skyscraper Museum. Contact 212/968-1916 for more information.

Mood River
Columbus, Ohio
Through May 26, 2002
Explore the forms, materials, and textures of contemporary design through a close look at the objects and icons that define our everyday reality. This exhibition features more than a thousand products and designs from the worlds of fashion, sports, and technology, representing such designers as Philippe Starck, Frank Gehry, and Issey Miyake. The show is accompanied by a series of lectures, discussions, and walking tours. At the Wexner Center. Contact 614/292-3535.

Mies in America
Chicago
Through May 26, 2002
Exhibits work from the late career of the German architect Ludwig Mies van der Rohe, after he arrived in America in 1938. The Seagram Building in New York and the Farnsworth House in Illinois are among the show's highlights. At the Chicago Museum of Contemporary Art. Contact 312/280-2660.

US Design, 1975–2000
Denver
Through May 26, 2002
Through a choice selection of drawings and designs, this exhibition celebrates the work of American designers in the last quarter of the 20th century. Included in the showcase are such designers as Robert Venturi, Maya Lin, and Steven Holl, extending to architecture, industrial design, and beyond. At the Denver Art Museum. Contact 720/865-5000 for more information.

Lectures, Symposia & Conferences

Bricks and Clicks: Challenges in the Digital Age—Annual NASCUP Conference
New York City
March 13–15, 2002
Sponsored by the Society of College and University Planning, more than 250 campus administrators, planners, and architects are invited to discuss the relationship between teaching, education facilities, and technology. At Columbia University Lerner Student Center. For more information visit www.ccsu.edu/planning/nascup.

Havana: 500 Years of Architecture
Washington, D.C.
March 19, 2002
Architects Julio Cesar and Loeb Fellow at the Harvard Graduate School of Design survey more than five centuries of Cuban architectural heritage and history in a lecture that addresses the social and political impact of architecture. At the National Building Museum. Contact 202/272-2448 for more information.

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Dates & Events

"Velocity" Design Conference
Richmond
March 22–23, 2002
The Virginia Society of the AIA presents its fifth biennial Virginia Design Forum. Speakers include Neil Denari, former director of SCI-Arc, Tod Williams, Ben van Berkel, William Morrish, and Adam Yarinsky. Register online at the Virginia AIA Web site, www.aiava.org, or contact 804/644-3041.

National Green Building Conference
Seattle
March 24–26, 2002
Targeting the mainstream residential building industry, this national conference focuses on cutting-edge green building technologies within the area of sustainable design. The opening session will be led by Ray Anderson, C.E.O of Interface—one of the worlds largest carpet manufacturers. At the Westin Seattle. Visit www.nahbrc.org for more information.

Computing and the Craft of Architecture
New York City
April 4, 2002
Jame Glymph, a principal at Gehry Partners, will discuss how industrial technology influences design. He will also discuss the unique applications of computer technologies, together with the value of collaboration between architect, engineer, and craftsman. At the Architectural League of New York. Contact 212/753-1722.

Ethics in Architecture Conference
New York City
April 6, 2002
The Congregation of St. Saviour at the Cathedral of St. John the Divine and the New York Chapter of the AIA host their third annual conference regarding issues in ethics and practice. This year's conference includes topics such as "Rebuilding after 9/11" and "Sustainability." Organized and moderated by architectural writers Mary Zaboglio Donovan and Elizabeth Kubany. Speakers include Jean Gardner, Frank Harmon, and Stanley Tigerman. Contact 212/740-4867 for more information.

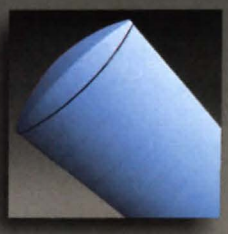
International Quingue Symposium
Newport, R.I.
June 27–30, 2002
This four-day symposium brings together architects, artisans, and scholars to examine key issues in historic preservation practices and will feature the ongoing work of local preservationists and institutions. At the Salve Regina University. Contact 401/341-2156 for more information.

Conventions

Building Energy 2002
Medford, Mass.
March 20–23, 2002
A timely conference and trade show offering insight into the latest solutions for renewable and high-performance energy-efficient buildings. Over 100 experts will attend, to lead seminars, lectures, and workshops. Sponsored by Tufts University. Contact Northeast Sustainable Energy Association (NESEA) at 413/774-6051.

Restoration & Renovation 2002
Boston
March 21–23, 2002
Now in its ninth year, this conference and trade show gathers exhibitors, speakers, and experts from around the world to address contemporary issues in restoration and renovation of period buildings, interiors, and streetscapes. To be held at the Hynes Convention Center. Contact 800/982-6247 for information or visit www.restorationandrenovation.com.

XXI World Congress of Architecture
Berlin
July 22–26, 2002



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Dates & Events

The Union Internationale des Architectes invites architects and students from around the world to discuss responsibilities and strategies for environmental and sustainable design within an urban context. At The International Congress Centre Berlin. Contact 49 30 90 12 13 14.

Competitions

Travel/Study Grants Available from the Architectural League
Deadline: March 15, 2002
In memory of architect and administrator Deborah Norden, the Architectural League is awarding a total of $5,000 annually in travel or study for students and recent graduates. Visit www.archleague.org for more information.

Gold Nugget Awards
Deadline: April 5, 2002
The Gold Nugget Awards are accepting submissions for the 39th annual "Best in the West" design and planning competition. Projects from the 14 western states and from countries around the Pacific Rim are eligible. Contact 909/987-2758 for more information.

Orphaned Spaces in the Public Realm: Young Designers' Ideas Presentation
Deadline: April 6, 2002
Young architects, designers, and artists are invited to revive Pittsburgh's forgotten neighborhoods and artifacts in a competition sponsored by the Pittsburgh History & Landmarks Foundation. An award fund of $10,000 has been designated and will be distributed among the winners. For more information, visit www.phlf.org.

Bus Shelter Competition Bloomington, Ind., 2002
Deadline: April 19, 2002
The Bloomington Community Arts Commission, in conjunction with Bloomington Transit, invites proposals for three new public bus shelters to be installed along a major thoroughfare that will be improved as part of a citywide transportation project in 2002. For information, contact BloomingtonArt@aol.com or call 812/336-0564.

2002 Business Week/ Architectural Record Awards
Deadline: April 19, 2002
This annual award program recognizes distinguished collaboration between client/architect teams who use design to achieve progressive goals. Entrants may submit projects completed anywhere in the world since January 1, 1999. Sponsored by the American Institute of Architects. Contact 888/242-4240.

The Great Egyptian Museum Competition
Deadline: August 10, 2002
An open invitation to architects from around the world to participate in the creative design of this new museum. Located near the Giza pyramids, the museum will house some of Egypt's most ancient monuments and treasures. For more information, visit www.gem.gov.eg.

Events & Programs

Summer Program in Classicism
New York City
June 15–July 29, 2002
Spend six weeks in New York City discovering the elegance of Classical architecture and principles of traditional urbanism. Students will have the opportunity to study with leading practitioners and work directly with a design studio community on real New York City projects. Deadline for application is April 15. Contact The Institute of Classical Architecture at 917/237-1208 for more information.

E-mail events and competitions to ingrid_whitehead@mcgraw-hill.com.

For and about the next generation of architects

archrecord2

FOR THE EMERGING ARCHITECT

Put some candles in the cake and get ready to sing. With this, the March issue, archrecord2 turns one year old. To celebrate, we're getting our hair done and going out for drinks, courtesy of the digital designs of Jordan Parnass. Care to join us? No need to bring gifts.

DESIGN

Jordan Parnass: Virtual and actual spaces

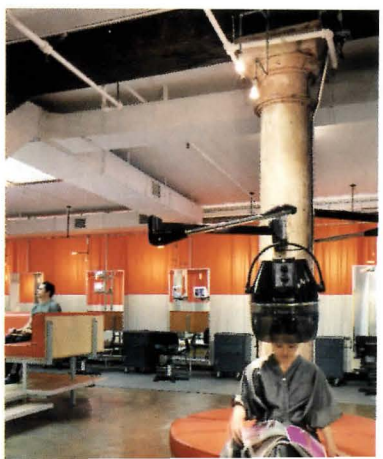
Architects, says Jordan Parnass, are trained to handle design projects of all stripes, whether they involve buildings, information, computers, or media devices. He would know—his work touches on all four. In nearly a decade of practice, Parnass has parlayed a passion for architectural and information design into a solo practice with an eclectic portfolio of interiors work, Web sites, and new media installations.

After working for Bernard Tschumi and founding a + i design corporation with two former architecture classmates from Columbia, Parnass struck out on his own in 1997, working from his Brooklyn loft and recruiting collaborators as needed for his various clients.

Many of Parnass's interiors explore how technology affects circulation, communication, and interaction. His latest New York project, the Remote Lounge, is a study in voyeurism. On a recent Friday evening, its retro-techno banquettes were packed with eager barflies who checked each other out by controlling video cameras that train their lenses on every corner of the space. Parnass admits that being spied on by strangers just an arm's length away could be "disturbing" to some, but he thinks "there's a little bit of energy that happens in that connection that you wouldn't get at other places." He notes that the Remote Lounge also attracts groups of friends who use the tools to interact in new ways. Packed with gadgetry that could let people substitute abstracted "e-lationships" for true interpersonal experiences, the Remote Lounge forces its patrons to confront their feelings about privacy, intimacy, and exploration.

Whether he's designing office spaces or Web sites, Parnass wants to make technology fun rather than ominous. "There's a nostalgia for a time when there was technological optimism, when people felt like the world would be a better place with technology," he says. "That's almost completely gone from our culture. And I think that's really sad." *Deborah Snoonian, P.E.*

Remote Lounge, New York, 2001
Jordan Parnass Digital Architecture. Lounge lizards at this Greenwich Village bar can train video cameras on each other, send text messages, or chat on the phone before meeting in person.



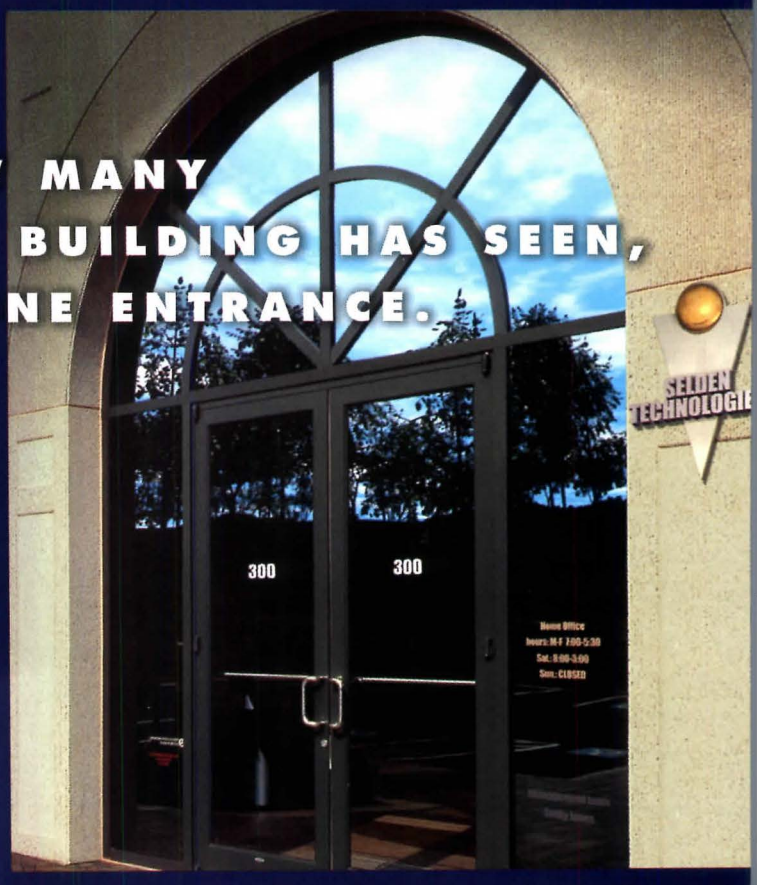
Oscar Bond Salon, New York, 1999
Jordan Parnass Digital Architecture and Eric Liftin. At this renovated salon, strategically placed cameras let patrons watch each other get coiffed even as their own hairdos dry.

LIVE

ArchitecTourist: Malta and Tunisia

John Cary, Jr., took a detour from his studies in Venice to see other sites around the Mediterranean. Travel with him by visiting architecturalrecord.com/archrecord2.

REGARDLESS OF HOW MANY EXITS YOUR BUILDING HAS SEEN, YOU ONLY NEED ONE ENTRANCE.



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Splitsville, U.S.A.: Why the practice and teaching of urban design is coming apart

Critique

By Michael Sorkin

I've just come back from an excellent conference—"The Physical Fitness of Cities"—which took place in Salt Lake City, then in the throes of its final Olympics preparations. Salt Lake was a heightened version of its usual dull, beautiful, weird, fascinating, and scary self. Security, needless to say, was draconian: explosives sniffers in the airport, troops with M-16s over their shoulders, elaborate credentials around everyone's neck, Jersey barriers guiding traffic, the whole nine post–September 11 yards.

Salt Lake has always been a well-disciplined city, with its rigid Mormon theocracy, its grid of wide streets numbered to reflect their distance from Temple Square, its rigorous proscriptions of daily life (no caffeine, tobacco, alcohol), and its cultural uniformity. And it has been a physically fit city, too. Mark Twain wrote in *Roughing It* that "Salt Lake City was healthy—an extremely healthy city. They declared that there was only one physician in the place and he was arrested every week regularly and held to answer under the vagrant act for 'having no visible means of support.' "

Although the event sites were dispersed over a wide area, the Olympic Village—housing the athletes, presumably the fittest people on the planet—was designed as an autonomous town, located in a set of tacky new buildings on the grounds of Fort Douglas in the foothills of the Wasatch, overlooking the city below. The military camp was itself established in 1862, ostensibly to fight the Indians but also to keep an eye on the Mormons, cannons ready to quell any excessive behavior. The village remains highly defensible, ringed by three layers of security fencing, patrolled by armed guards, and completely self-sufficient, providing housing, meals, shopping, entertainment, and health care (including the hugely controversial free condoms offered to the athletes)—the ultimate gated community.

However dull the new architecture or sinister the security, the village has much to say about the state of our urbanism—the good, the bad, and the ugly. To begin with the good: It's well-scaled and the old military quarters nicely preserved; it's walkable and wonderfully sited, right next to the university campus, another fine pedestrian ensemble. Moreover, the campus and the village are now served by a new light-rail line that runs down the hill to the center of town. For the athletes, the village represents an ethnic and national pluralism (if with a radically skewed median age) and a great place to party that's the diametric opposite of the city below.

On the other hand, in its combination of Radburn, *Blade Runner*, and *The Truman Show*, the Olympic Village is a nice reflection of the troubled picture of urban design as a discipline. It's a recombinant place that embodies many of the contending tendencies in contemporary American urbanism and the sometimes freakish results of their splicings. It's also a most cautionary place, a clear marker of the ethical depths that are associated with particular formal preferences and an object lesson in understanding that the place where strategies of

The Olympic Village in Salt Lake City reflects the contradictions in urbanism today: pedestrian-friendly but dull.

Contributing editor Michael Sorkin is the director of the graduate program in urban design at City College in N.Y.

organization meet form are where the urban rubber hits the road.

The field of urbanism has never been richer analytically nor able to draw on more diverse intellectual positions. From Camillo Sitte and Otto Wagner to Max Weber, the Chicago School, Ebenezer Howard, Patrick Geddes, Lewis Mumford, Jane Jacobs, Henri Lefebvre, Manuel Castells, Christine Boyer, Mike Davis, Peter Calthorpe, and Rem Koolhaas, the discipline teems with analysis. At this point, there is virtually no position without an extensive pedigree. Formal paradigms, however, are far fewer.

This split leaves urban design education in a parlous state. With no ideology enjoying the hegemonic sway of Modernism, the field is contested and, in many ways, adrift.

ONE THING WE DO NOT NEED RIGHT NOW IS A SINGLE THEORY OF URBAN FORM AND A SINGLE STYLE OF URBAN PRACTICE.

This reflects its own ambivalent origins. Arguments for the starting point of the discipline are both thick—José Luis Sert and Kevin Lynch, among others, are often cited as progenitors—and largely irrelevant. While the origin of urban design as an academic field cannot be clearly attributed, it is certainly the product of a particular moment in postwar American culture and reflects, in its emergence, other schisms that have characterized the practice of architecture.

The great originating rift in architectural education was the parting of the ways of architects and engineers in 19th-century France and the establishment of separate academies. This division of the artistic and the technical is one of the key operations of modernity, reflected both in the continuing clash between the two cultures and in various efforts to recuperate one side of the argument or the other.

One cause of the split lies in the origins of the discipline of planning. The central ambivalence here has long lain between the idea of physical planning and the set of anterior technical, social, and economic analyses that form the basis and shape the perspective of action. The conflict is not simply internal to planning but is reflected in its fraught relationship to architecture, a product of planning's dual origins in the social sciences and social work on the one hand and the formal disciplines of architecture and landscape design on the other.

This nexus of confusion is reflected in the academy by the migrations of the field of planning within the larger structures of university organization. The planning department at UCLA (in recent years the most progressive in the country) is now split off from the school of architecture with which it had long uneasily coexisted. At Harvard, a somewhat lackluster planning department was moved out of the design school into the school of government and, in effect, replaced by the urban design program, only to be moved back and joined to urban design under a single, if bifurcated, umbrella. At City University of New York, planning is at Hunter College, urban design is in the City College School of Architecture, and many of the powerhouse intellectuals—David Harvey, Neil Smith, Setha Low, and others—are rigged into the graduate anthropology department.

This bureaucratic discomfort reflects the historical circumstances for the emergence of the discipline of urban design in the attempt by architects to recover some influence over the physical design of cities from the planners who so dominated professional urbanism in the 1940s, '50s, and '60s—the brains behind urban renewal, the interstates, suburbanization, and the paternalism of one-dimensional structures of social control. In this sense, urban design was itself oppositional; although, in another, its own position was nebulous, concerned both with questions of the rights of city dwellers (if in a crudely theorized way) and with traditional urban forms that comprised the vessel putatively necessary for the exercise of such rights.

These issues continue to run through the heart of the discipline. In many ways, this is salubrious: One thing we do not need right now is a single theory of urban form and a single style of urban practice. The best-organized candidate for such dominance—the practices clustered under the rubric of "new urbanism"—is far less influential in the schools than in the profession in general. And, happily, the internal contradictions within the group seem likely to produce more and more open schisms as the green faction seeks to free itself from the lugubrious Disneyfication-by-prescription of the historicist wing.

More influential as an academic model is the school of neoquantification, an abstract version of functionalism that seeks to translate statistics directly to form. This group has far deeper affinities with intellectual postmodernity (as opposed to the architectural revivalism sometimes encompassed by the term), and its analysis has a good deal more bite. Unfortunately, any diagram is always at risk from the next diagram and from the pushy relativism of postmodernism, with its focus on constant shifts in perspective and the incessant interrogation of the origins of value.

Another strand in the braided taxonomy of urban design has its origins in the reformism of Jane Addams, Jacob Riis, tenement legislation, the activism of the New Deal, the oppositional practice of advocacy planning, early preservationism, and the larger movement for citizen involvement in the process of urban decision making and design. Although I personally feel a deep affinity with this history, the problem with its current translation lies in a certain reticence about design. The emergent school of "everyday" urbanism, while distinct from the grim generic of the neoquants and crucial for empowering citizenship, nevertheless is too suspicious of formal experiment and overly sanguine about the dispensability of architecture as an artistic practice.

Ironically, the area of urban investigation that seems to have the least influence in the architecture schools is environmentalism, the panoply of practices and investigations subsumed by questions of "green." Part of the reason is political. Unlike the European greens, our domestic variety has tended to be more delimited in its analysis, more focused on the aesthetic, spiritual, and medical consequences of deleterious environmental policies than on issues of maldistributed resources and the political effects of globalization. And part of the reason is that green architecture is only beginning to make a sufficiently compelling and comprehensible formal case for itself in this country. The upshot is that sound environmental design practice is the most undertaught subject in American architectural schools.

Every second, three people are born on the planet, two of them in cities. Urbanism is in crisis: The condition for billions of people in our cities is wretched, and we need to rapidly refit our dysfunctional metropolises for justice and sustainability and build new cities around the globe. Urban design is a discipline—however it sorts out its relations with its professional siblings—that must be the site of a merger between social, environmental, and formal practices. If we designers are to have a relevance beyond that of stylists or critics, we must produce convincing forms—as many as possible—for this coming together. While many schools of this urban joinery might and should emerge, there is no way a satisfactory urbanism can be taught that slights any of these aspects. Let a thousand urbanisms bloom! ■

Fear must not become a form-giver for architecture

Practice Matters

By Charles Linn, FAIA

The terrorists were remarkably effective in what they did—it goes without saying that the events of September 11 have changed all of our lives forever. In recent months, most of us have been living with more anxiety than we are accustomed to. Our hyperactive news media keeps us on the alert for a new race of super villains capable of harming us with everything from home-brew bacteria to tennis-shoe bombs. The greatest power of these foes is their ability to defy description. No one knows who they are, where they will strike, what weapons they will use, when they will do it, or why.

As a consequence, the work architects and engineers are asked to do to protect the health, safety, and welfare of the public has taken on new dimensions. Security and threat assessments are a growth industry for us. Those who take on this work are expected to determine if buildings are safe, and if not, to show how they can be made so. But isn't the subtext really, "How can the people who use this building be made to feel safe? Can you help us feel we are in control of what cannot be controlled?"

On the face of it, this seems out of the architect's purview. The psychological fortification of people against the unknown and unseen has always been the province of others: theologians, who traditionally counsel believers to have more faith; and mental health professionals, who may prescribe therapy, drugs, or both. We never thought this task would fall to us, but now it has. Now we must learn to show our clients how to deal with the unknown, and to do it as responsibly as anything else we do. And we will.

Our own trauma

The process of learning to assuage the fears of our constituency will require that we come to grips with the profession-specific trauma many of us have experienced as a result of that horrifying day. The collapse of the World Trade Center violated every principle of physics and engineering that we have placed our faith in for our entire professional lives, and it happened right in front of us.

We may have disliked the design of the buildings, thought they were an insult to the skyline, or hated them because they seemed to embody the arrogant soul of capitalistic greed. But, no matter what we thought of them, they were, unquestionably, a technical triumph. They were a symbol of what we are capable of doing when we are at our most determined and inventive. They were resistant to all of the forces we could conceive. While it seems uncertain exactly which American ideals the terrorists were trying to obliterate when they attacked, they certainly could not have done anything to wound the confidence of architects and engineers more completely than to bring about the destruction of the twin towers. This kind of failure is unknown to us—the training architects and engineers receive and the codes that guide us are so thorough and so good that only a handful of us will ever have a building we designed destroyed by a fire or structural failure. Nothing in our training prepares us for the feelings of grief and helplessness that doctors experience when, despite their most intelligent and heroic efforts, a patient is lost.

Now, when people ask, "Can it be made safe?" we can no longer punch numbers into a calculator or pick up a copy of the life-safety code, and say, "Yes, it is safe because it says so here." Instead, we have all been reminded in the most devastating way possible what we have always known: The qualities that make people feel safe when they occupy the environments we design are not to be found within equations or codes.

The greatest danger

We already have much experience designing some of the safest, most secure buildings possible. They aren't embassies or airports, but gated communities that combine studio apartments with on-site dining, recreation, and health-care facilities. Most people don't live in them willingly, however—to get into prison you have to be convicted of a crime.

Obviously, people do not envision that, when they ask us to create a place that is safe, we will give them a jail. Still, the greatest danger our profession faces now is that in solving the security problems set before us, we will overcompensate, either because we are still being affected by what we saw on September 11 or because our clients believe they are in much more danger than they really are.

Yes, it is absolutely necessary that we create infrastructure that protects people and property where threat is high; for example, at airports, schools, courthouses, and embassies. But those places are the exception, not the rule. It will be a mistake our profession will long regret if we incarcerate those who have given us their trust inside oppressive architecture.

The greatest service we can offer our clients is to remind them that living rich and rewarding lives means accepting reasonable amounts of risk—architecture cannot be kept open and alive without it. What our profession must do now is to calm people and to help them understand which risks can realistically be dealt with through architecture and which cannot.

In the late 1920s many delightful Modernist buildings were built in the Soviet Union. As Stalin ascended to power—and became more and more paranoid—this open style was repressed and replaced by plain, gray, fortified architecture. It reflected the dictator's unbridled terror—of his own people and the outside world.

We can't let fear do this to our architecture. ■

CONTINUING EDUCATION

This article is a companion piece to this month's Building Science story, starting on page 135. You must read both articles to answer the Continuing Education Questions on page 226.

THE STEEL WINDOW RE

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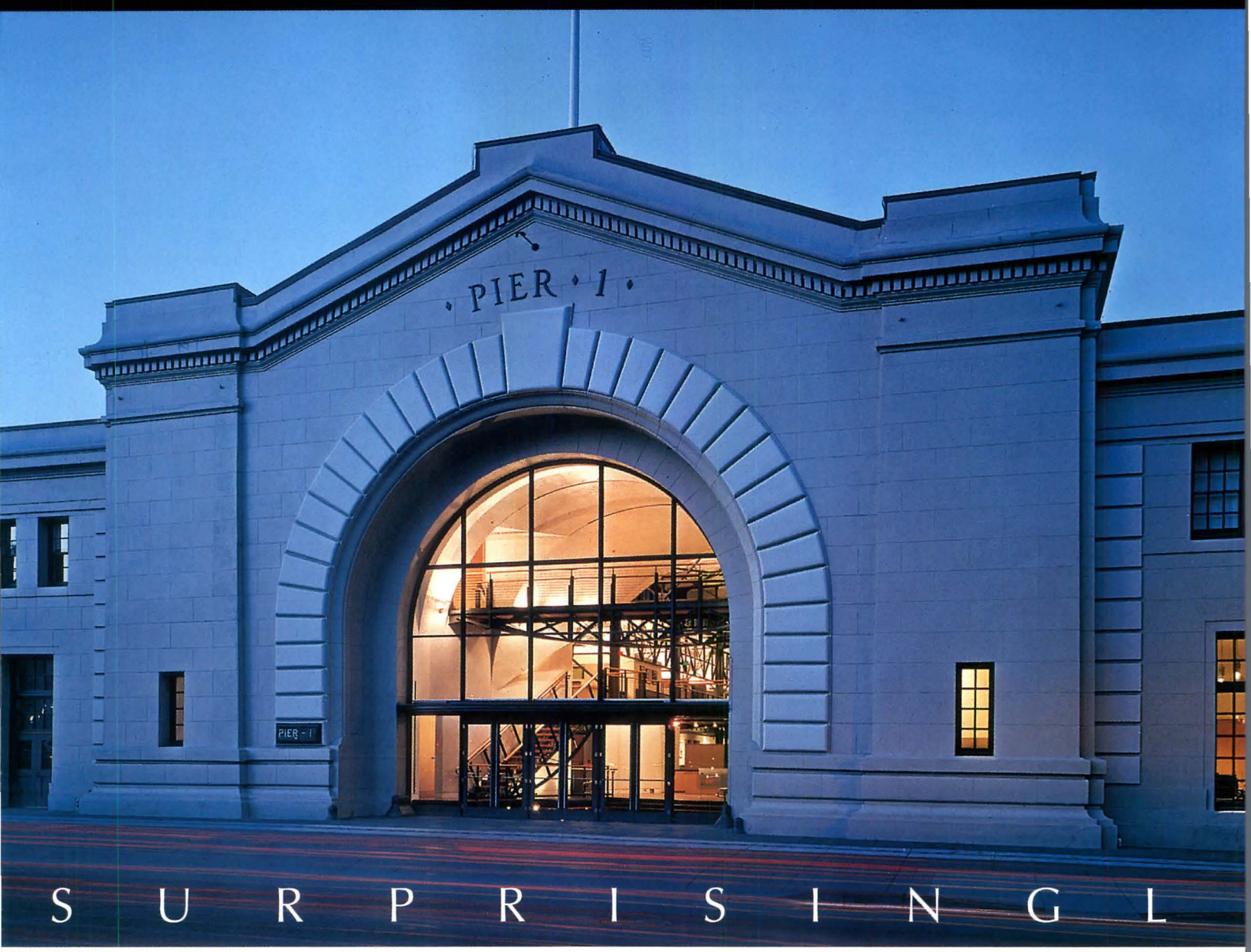

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Pier 1, San Francisco, California *Photographer: Timothy Hursley* *Architects: SMW*

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A New York exhibition looks toward the future of the World Trade Center site

Exhibitions

By Sarah Amelar

A New World Trade Center,
Max Protetch Gallery, New York City (January 17–February 16, 2002).

Two weeks after the terror of September 11—when the ruins were still burning and acrid clouds enshrouded lower Manhattan—New York City gallery owner Max Protetch conceived of an exhibition that would present architects' proposals for "a new World Trade Center [WTC]" on the existing site. "Architects, as you know, must always be optimists," he wrote to a small group of architects. "As saddened and troubled as we all are about the events of September 11," he continued, "we look to you to create a better future.... Now, more than at any other time ... there is an opportunity to show an expanded public the ways in which architects can transform the world."

Protetch soon engaged advisors, including the editors of RECORD, to extend the roster of invited participants to 115 architects, plus a few artists represented by his gallery. The final list was international, featuring world-famous practitioners, alongside risk-taking upstarts. But was it presumptuous to think that architects could transform the world? And was it too soon to consider the future of New York's festering, gaping wound?

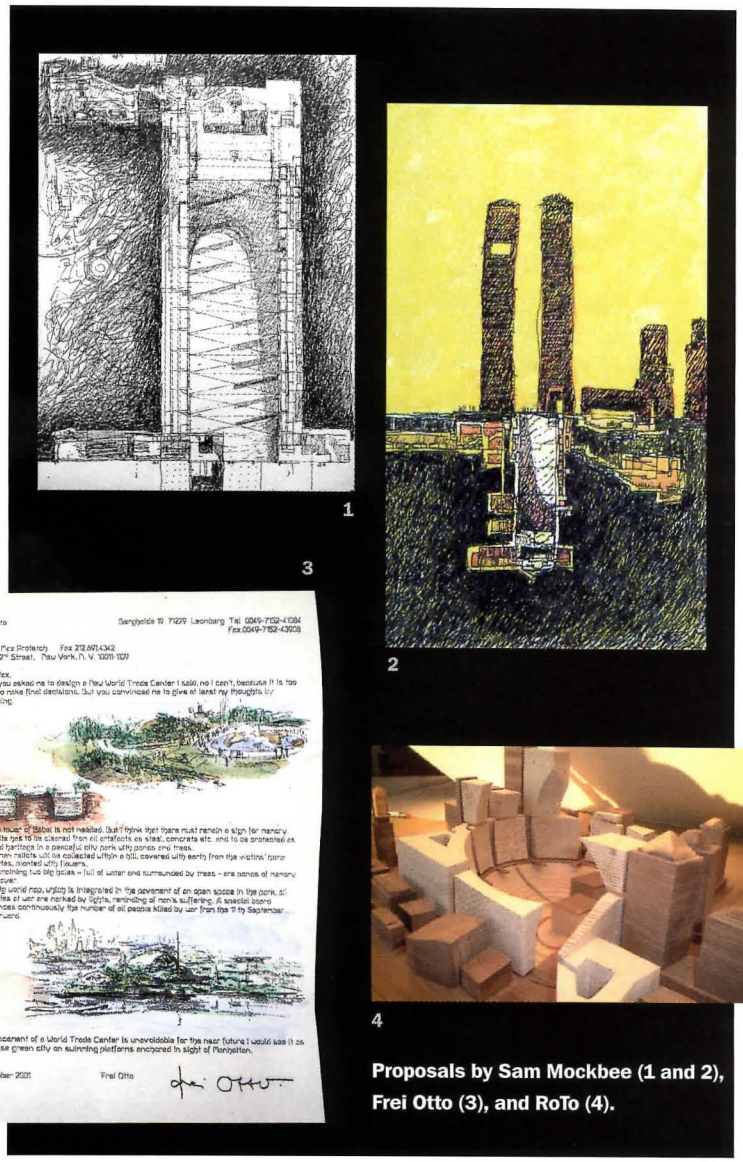
Some thought so, but others were grateful, as architect Craig Hodgetts put it, "for this mechanism of personal and collective healing, this means of opening up the conversation." They hoped the show would productively slow the response process, curbing bureaucratic impulses to rebuild too hastily.

Yet some architects were wary of seeming opportunistic, as if rushing to promote themselves or to profit in the wake of disaster. One passage in Protetch's letter raised concerns: "The gallery will split the sales price [of the exhibited work] with the architects, and we are open to any suggestions of charities to which we could contribute a portion of the proceeds." Several architects resolved the dilemma by determining to donate their entire share, if the work sold, to a September 11 victims' fund.

Among those accepting Protetch's invitation were Zaha Hadid, Steven Holl, Daniel Libeskind, Thom Mayne, Eric Owen Moss, RoTo, and more than 50 others. The response grew as unsolicited work made its way into the show, which later opened to massive crowds, lines around the block, and a media frenzy.

With drawings and models generated in a few weeks, the proposals were clearly the sparks of ideas, rather than builder-ready schemes.

Certain themes, concepts, and formal approaches threaded through the show. It begged the question of how much of the site should become a memorial and how much should go to the rebirth (at least programmatically) of the obliterated structures. A surprising number of schemes recreated gargantuan towers. A large group also retained the Twin Towers' footprints as a memorial. Many of the proposed volumes, including those by Ocean, NOX, Office d'A, Asymptote, and artist Vito Acconci, were melded, contorted, deformed, or punctured—as if subliminally, if not explicitly, evoking the catastrophe of 9/11.



Proposals by Sam Mockbee (1 and 2), Frei Otto (3), and RoTo (4).

A few architects stepped back from Ground Zero altogether, such as Field Operations, which proposed a memorial earthwork for Fresh Kills landfill, a major WTC recovery site.

Changeable, often electronic, building skins—an already familiar notion—cropped up in various guises, some with victims' names or faces.

But many schemes seemed

IMAGES COURTESY THE ARCHITECTS AND MAX PROTETCH GALLERY

Exhibitions

less emotional or visceral than one might have expected. Several were glib, and others appeared as formal exercises, drawing on the bag of tricks du jour.

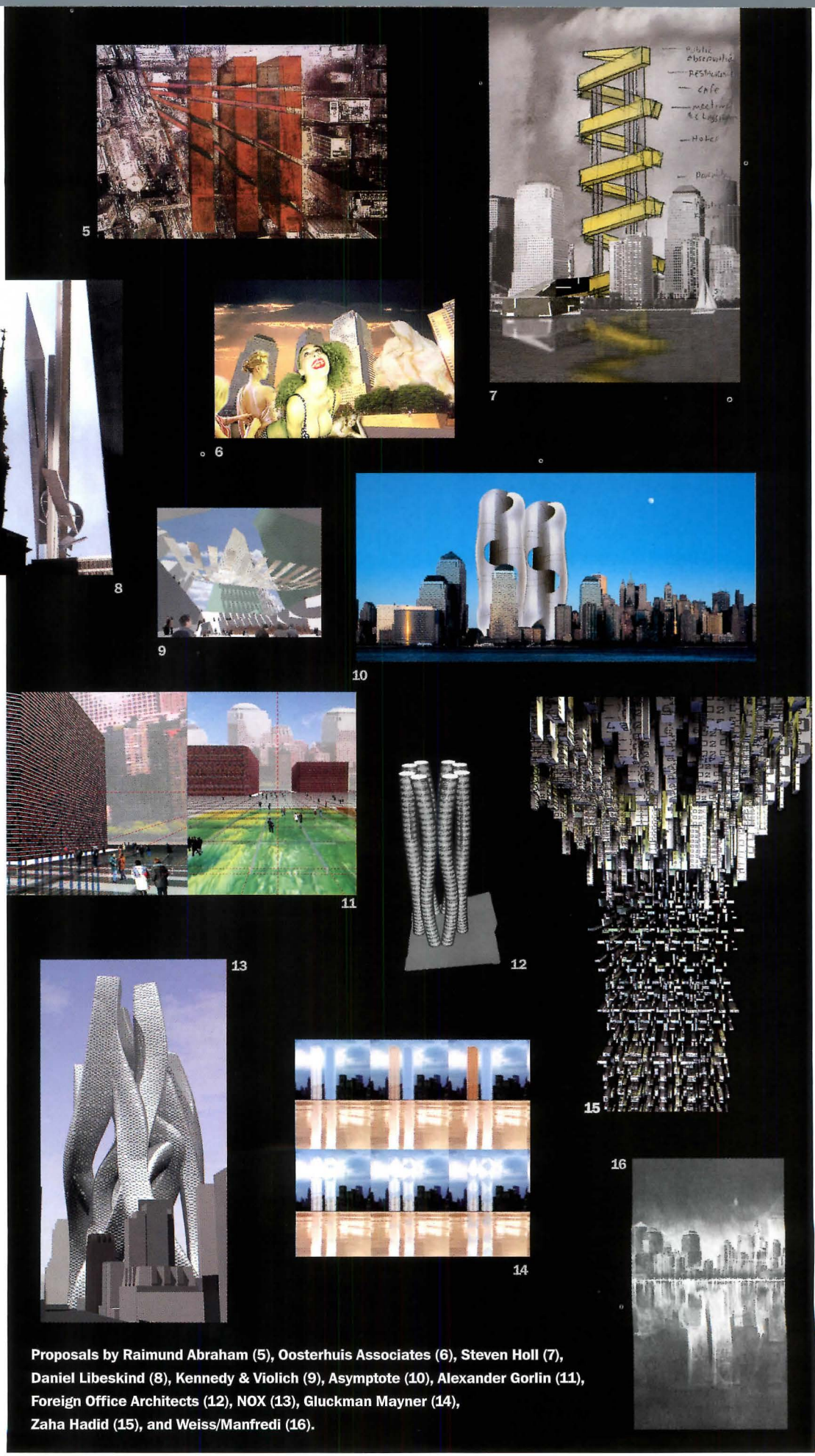
Cleverly, proposals such as Winka Dubbeldam's interactive cyberpiece and Della Valle & Bernheimer's blocks were presented as games, analyzing, with self-aware superficiality, the economic and social forces that might shape new construction at the WTC site.

A few of the foreign architects, far from New York's shore, approached the tragedy with a light, goading, or even appallingly flip, attitude. As Kas Oosterhuis of Rotterdam wrote: "Come on, America, wake up.... Let's face it. Everybody was fascinated by the 9/11 event. Everyone was thrilled to watch the movie, over and over again. Only extremely disciplined individuals could resist."

At the spectrum's other end were stirringly poetic works by Frei Otto and the late Sam Mockbee, as well as the widely publicized *Towers of Light*, luminous and ghostly shafts by John Bennett, Gustavo Bonavardi, Julian Le Verdiere, Paul Marantz, Paul Myoda, and Richard Nash-Gould. Mockbee's vision, sketched on his deathbed, recreates towers, but focuses on the experience of spiraling down to a subterranean chapel. Like proposals by Steven Holl and others, Mockbee's is about bearing witness to the site. But it is also about the power of descent into darkness to confront loss.

A desire to see the collection extended far beyond the gallery. Filmmaker Michael Blackwood is creating a documentary on it. A catalog is also in progress. World-transforming ideas or not, the ensuing dialogue clearly sounded a resonant chord. ■

www To see all the schemes and accompanying texts, visit **architecturalrecord.com**.



Proposals by Raimund Abraham (5), Oosterhuis Associates (6), Steven Holl (7), Daniel Libeskind (8), Kennedy & Violich (9), Asymptote (10), Alexander Gorlin (11), Foreign Office Architects (12), NOX (13), Gluckman Mayner (14), Zaha Hadid (15), and Weiss/Manfredi (16).

Snapshot

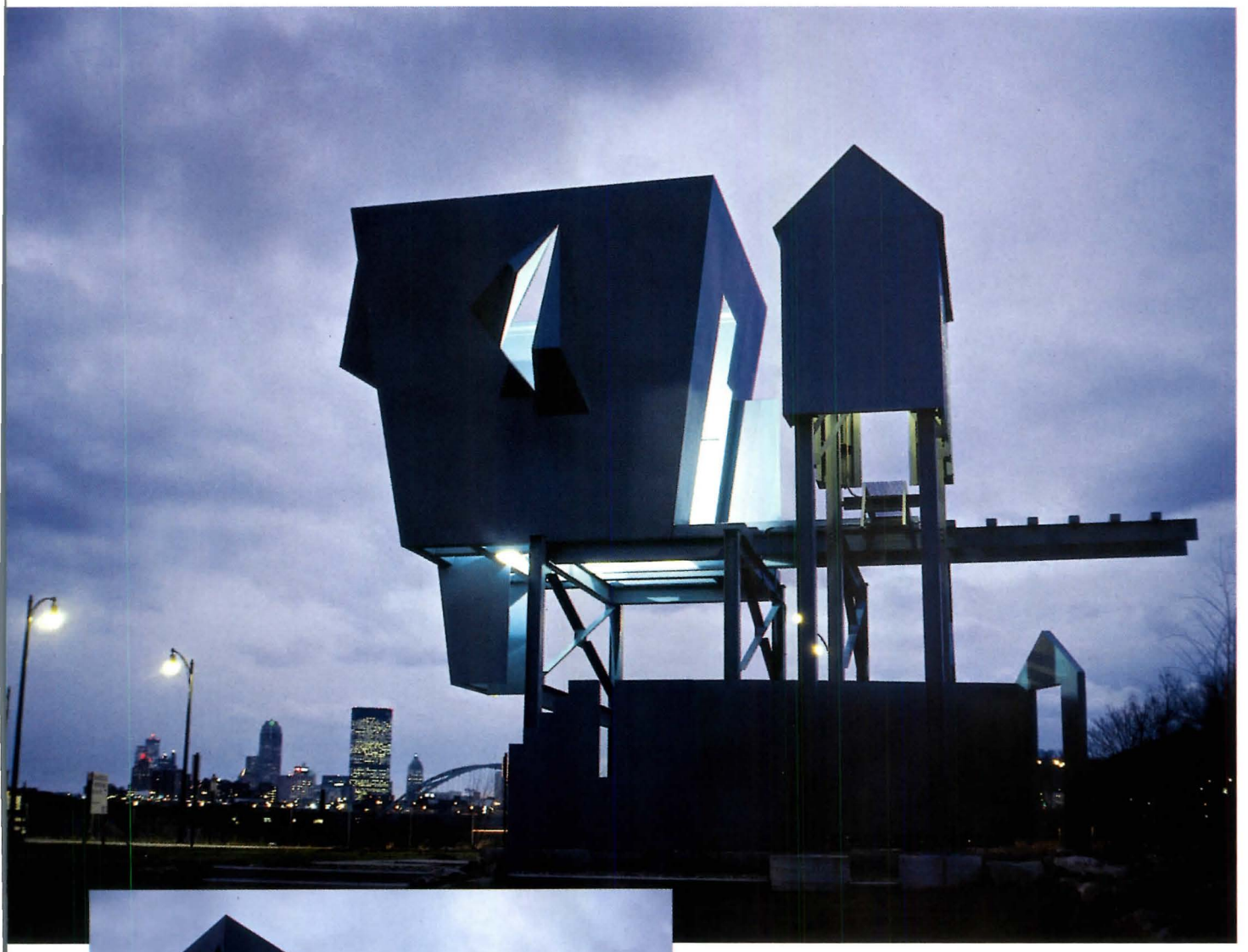
By Ingrid Whitehead

Remembering those who forged an age of steel

The South Side of Pittsburgh was once a place where huge trucks shook the earth, whistles screamed, iron clanked, and a person could read a newspaper at night by the light of the glowing sky near the steel mills. The mills may be gone, replaced years ago with residential and commercial development, but the legacy of the workers carries on through songs and poems, and, now, a monument honoring the men who endured the searing heat and backbreaking work.

James O'Toole, a graduate architect working in the design department of L.D. Astorino Architects in Pittsburgh, heard of the City of Pittsburgh's competition for a sculpture to be built on the site of a former steel mill, next to the city's just-completed, largest park. Inspired by a visit to a working steel mill and by the stories of former steelworkers, O'Toole's winning vision took more than muscle to see through, and cost much more than the city's award of $25,000. A self-described "architectural bandit," O'Toole had to personally raise $350,000 for the project itself, and $40,000 for the necessary landscaping. He credits his

Snapshot



employers Lou and Dennis Astorino for giving him the means and the encouragement to finish the job. The Astorinos opened doors to contractors, politicians, and other resources for O'Toole, and mentored him through the three-year project even when the obstacles to completion seemed impossible to overcome.

But in April of 2001 the completed memorial became a memorable part of the city's landscape. The project stands 50 feet tall and appears as a progression of interconnected structures. A bottomless, skeletal shed hovers above a 70-ton ladle, into which rainwater—reminiscent of the molten steel that once flowed at this site—is collected and flows into a network of gutters terminating at a pool below. From the shedlike unit a grate creates a path over cantilevered train tracks that leads to a sloping component supporting the ladle and its descending funnel. The sloping structure is pierced with crystalline-shaped holes, letting light bounce and refract off its reflective steel walls. Made entirely of concrete and steel, and lit from within, the structure gives off an eerie glow at night, much like the mills did 100 years ago, when graphite particles glowed in the air like fireworks.

"The intention of the project is to incite reveries," says O'Toole. "How can intense heat and weight be replaced? Water now invites you to stick your arm in, reminding visitors of a wetness that would once have melted flesh." ■

The City remade, from Boston to Berlin

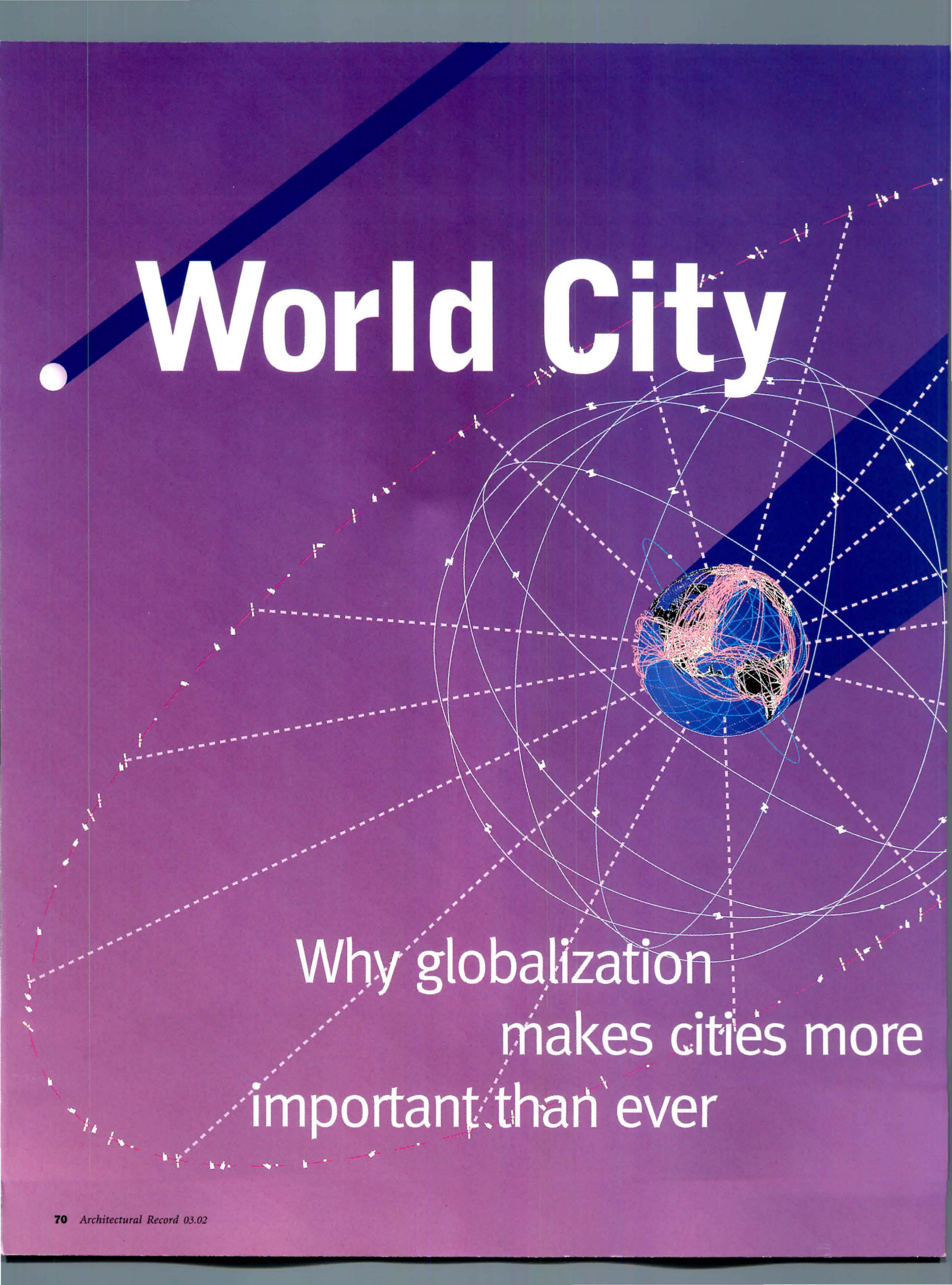
Engaging design and the city at meta- and micro-scales

Whether the point of view is cosmic or granular, we are witnessing the broadly based engagement of design and the city. From the stellar perspective, new methods of envisioning the world, based in part on the mating of comprehensive satellite photography and digital technology, allow architects and planners like Michael Gallis to make connections where we hadn't realized they existed. What is the shape of the meta-city? How far has sprawl taken us from our urban centers? And how is the succession of urban places linked? Today, rather than postulating or imagining, we can actually see, through Gallis's comprehensive graphic lens. His drawings, moreover, have an unearthly beauty of their own. Looking in more closely, Berlin and Boston have taken entire swaths of land and made them new. In Berlin's case, Potsdamer Platz has constituted the largest construction site in the world, garnering our attention for a decade. How has it fared? What sorts of precincts, neighborhoods, and buildings have resulted from this concentration of capital and energy? James Russell has been following the German capital's progress, with both admiration and reservations. And what has resulted from clearing the debris away from Boston's massive Big Dig—this continent's largest urban redevelopment? Robert Campbell, *Boston Globe* critic, provides answers. From the ground, our cities are employing world-class talent to bring otherworldly qualities to real-world projects. Witness Milwaukee and Philadelphia, two cities that invested in design to propel their fame far beyond the city limits. All lie within the following pages, from the heavens to urbane earth.

Robert Ivy, FAIA

MAP COURTESY BERLIN OFFICE OF URBAN DEVELOPMENT

World City



Why globalization makes cities more important than ever

Global-economy connectivity includes layers of satellites as well as air and shipping trunk lines, all distributed through urban hubs like the New York metropolitan region (above).

IMAGES © MICHAEL GALLIS & ASSOCIATES

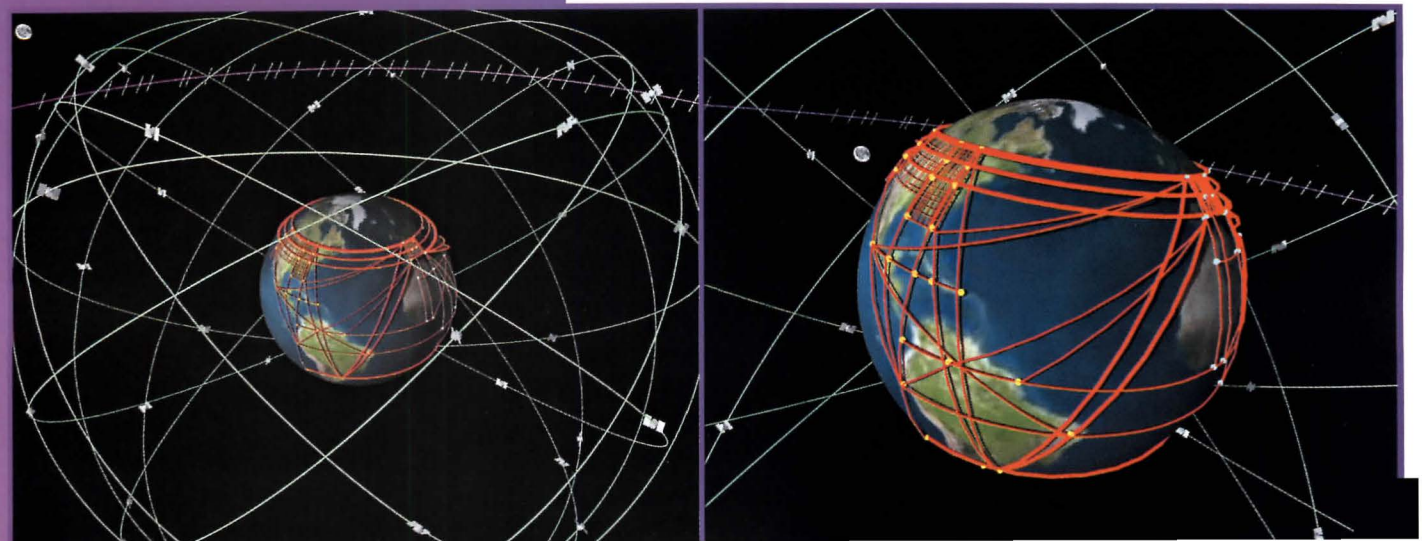
By Michael Gallis with James S. Russell, AIA

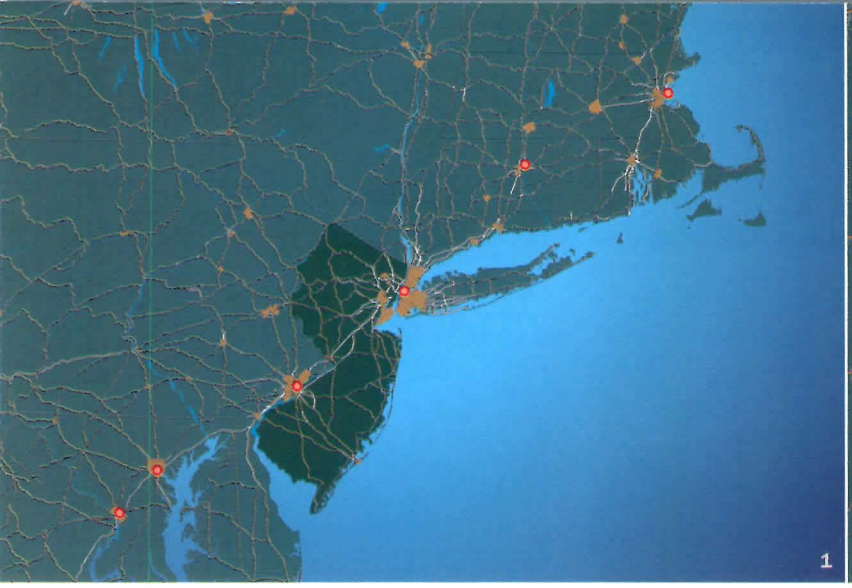
We're all post-industrial now. Or at least that's the fashionable line. Cities that united people and ideas are becoming anachronistic, the reasoning goes, so we should expect to work from anywhere and watch old cities shrivel. Let's just move on to virtual communities: a self-revitalizing electronic universe of total connectedness. Anyone stuck in a "post-industrial" traffic jam, however, will attest to how naive it is to expect that electronic communities will soon replace the real thing.

We're here to argue that in a globalizing age real cities have become more important than ever, but they are taking on new form. The factors that have historically determined the fate of cities—the depth and diversity of their human infrastructure along with the quality and quantity of their connection to movement networks (not just electronic ones)—apply today more than ever. Globalization of the marketplace, technological advancement, and the organization of knowledge do form the basis of the 21st-century economy, just as the techno-gurus argue, but this economy is also moving more people, information, and goods over more physical infrastructure than ever before.

The "virtualness" that technology has made possible is not nearly as important as the *connectivity*—and it is the increasing ways in which we are linked that is causing a new kind of urbanity to emerge that we call the "world city." If you don't have connectivity, you can't design athletic shoes in Oregon and make them in Latin America from fabrics

Michael Gallis's Charlotte, N.C., consulting firm positions cities within the emerging global economy. Editor at Large James S. Russell, AIA, has consulted to Gallis.





The discrete cities that dotted the 450 miles from Boston to Washington, D.C., in 1945 (1) sprawled into suburbs by 1990 (2), later exploding over a gigantic landscape (opposite, 3) partly due to globalization.

woven in Asia out of petrochemicals processed in Texas—and then sell them worldwide.

World city is not a single bloblike urban conurbation seeping over every acre of the globe. But the vast networks of all kinds that girdle the world are so intertwined that they unite existing cities in a single global urban entity (as diagrammed on previous pages). In these networks, cities are the hubs for making, for distributing, and for consuming. They will succeed in the coming century in much the same way they've always succeeded—by adapting to evolving networks of connectivity (bottom, this page and opposite).

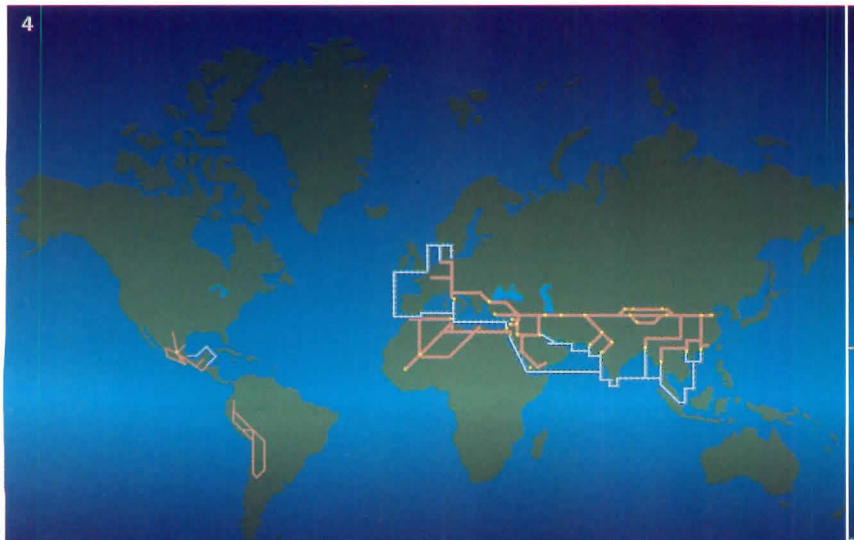
Census data shows that Americans are gathering in the largest metro areas (if not precisely in the big cities within those metro areas). That's because economic growth is occurring in those places that have the depth and diversity of expertise to serve vast and diverse global markets (in terms of education, R&D, health care, culture, arts, sports, and recreation) and the best global connections (air, rail, road, water, telecom). The importance of cities in these networks corresponds to the quality, quantity, and diversity of their connectivity. One reason BMW distributes parts in Senatobia, Mississippi, is its proximity to airports in Memphis, which Federal Express has turned into one of the busiest freight hubs in the world.

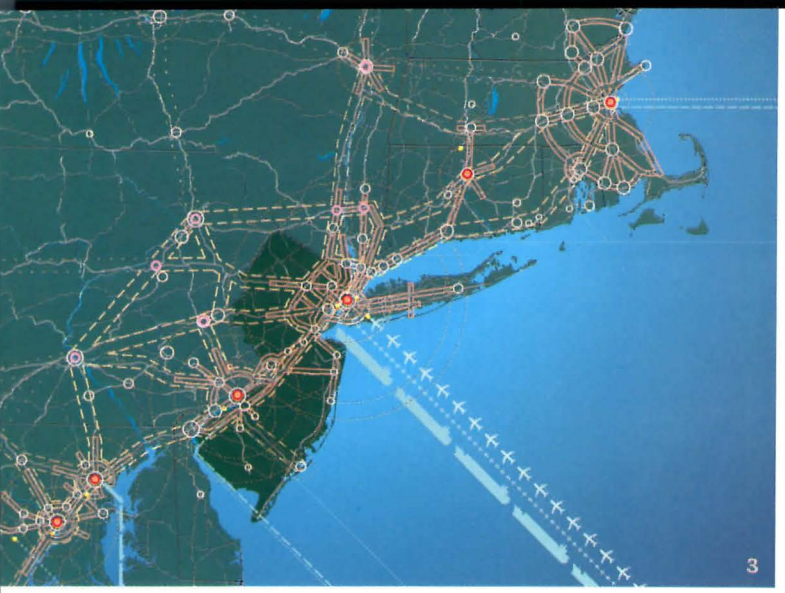
The notion that cities need physical infrastructure more than ever is heartening to architects, because designing what cities are made of is what architects have traditionally done. But the complexities of the world city also calls on people who can make abstract notions understandable through visual means and who can pick patterns out of the global information tidal wave.

The patterns our research picks out show that the fast-evolving global network is shaping cities in ways we have largely failed to anticipate, causing urban places to mutate into new forms that we don't wholly understand and that we certainly have not yet attempted to plan, manage, or design. The collapse of Communism, the gradual integration of China, Russia, and its satellites, along with the growing scale of world enterprise, has begun to make obsolete the idea of trading nations, replacing it with continent-scaled trading blocs. The introduction of a single currency in Europe this year is only the latest evidence of that continent's integration. Trucks line up for miles at the Texas/Mexico border thanks to the North American Free Trade Agreement—which has created a three-country North American trading bloc.

Within these blocs we find a hierarchy of urban hubs. In America, these are not just big cities, or even big cities and their suburbs. They have morphed into metropolitan regions: multicentered, multijurisdictional urban networks, encompassing older cities and suburbs and the suburbanizing hinterlands—the host of smaller towns functionally linked to the metro core (as in Memphis, opposite, above right, though each takes a distinctive form). It takes a metropolitan region in today's economy, since it can offer the scale, diversity, and complexity called for by the global economy: depth in key knowledge-based fields like technology, finance,

Cities throughout the ages have succeeded by linking themselves together: the Silk Road (4); the Age of Sail (5); the Age of Steam (opposite, 6); and our age of oil, autos, air, and telecommunications (opposite, 7).

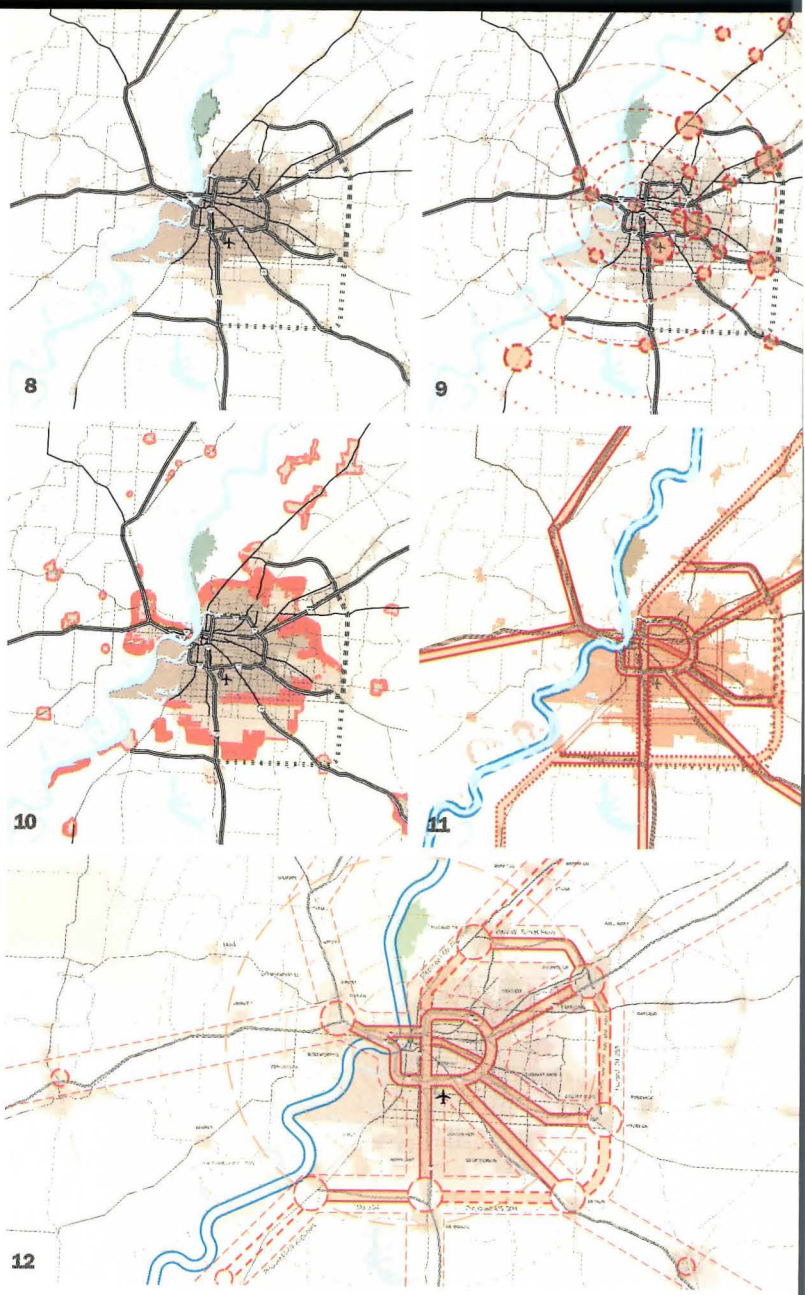




media, and law; and a substantial infrastructure of educational, medical, research, cultural, and arts institutions. Cincinnati is not just the few dozen square miles within its city limits; it's really a 60-mile-diameter "market space." Larger metro areas stretch across hundreds of miles.

No one planned this scale of urban transformation. Indeed, few people yet understand the developing patterns. But these new urban forms create a variety of unintended consequences. In a study of New Jersey, for example, we learned that distribution activities that once took place within a few blocks or a few miles of the vast Elizabeth container-ship docks now occur as far away as Harrisburg, Pennsylvania—160 miles west. These growth eccentricities (and accompanying land-use conflicts and enormous increase in traffic) are encouraged by the failure of dozens of cities and three states to understand the consequences of changes in port activities and retail-distribution concepts and the way these affect the region. Thanks to congestion and high land costs in more developed locations, what was once a linear Northeast Corridor between Boston and Washington, D.C., has metastasized into a lattice of big and small centers sprawling over 10 states and thousands of highway miles (top, opposite and this page), with profound consequences for affected communities.

It has been convenient to regard urban growth and change as unmanageable or best left to market forces alone. The patterns we are detecting show more dramatic, and potentially damaging, effects globalization can have on the places we live in, and how important it is to understand and plan for them. Economic integration with the world is inevitable for the U.S.—indeed, the nation has benefited enormously from it. The world city is the largest form of architecture we make. Are we prepared to design it? ■



Memphis thinks of itself in terms of separate political units (8), but economic activity draws small towns into the urban orbit (9).

Growth (in red, 10) crosses boundaries and aligns to road corridors (11), driving the form of a giant metro region (12).

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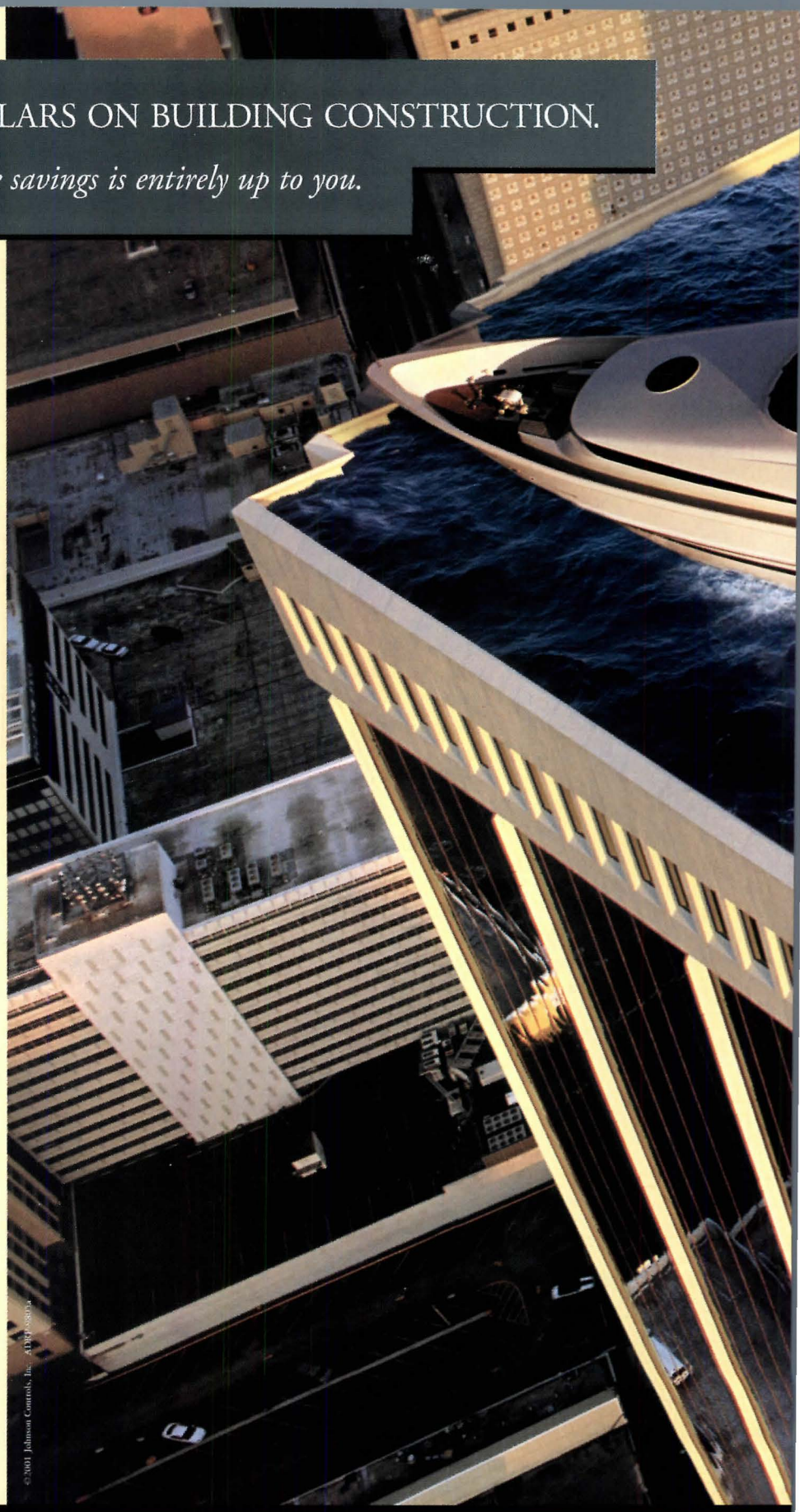


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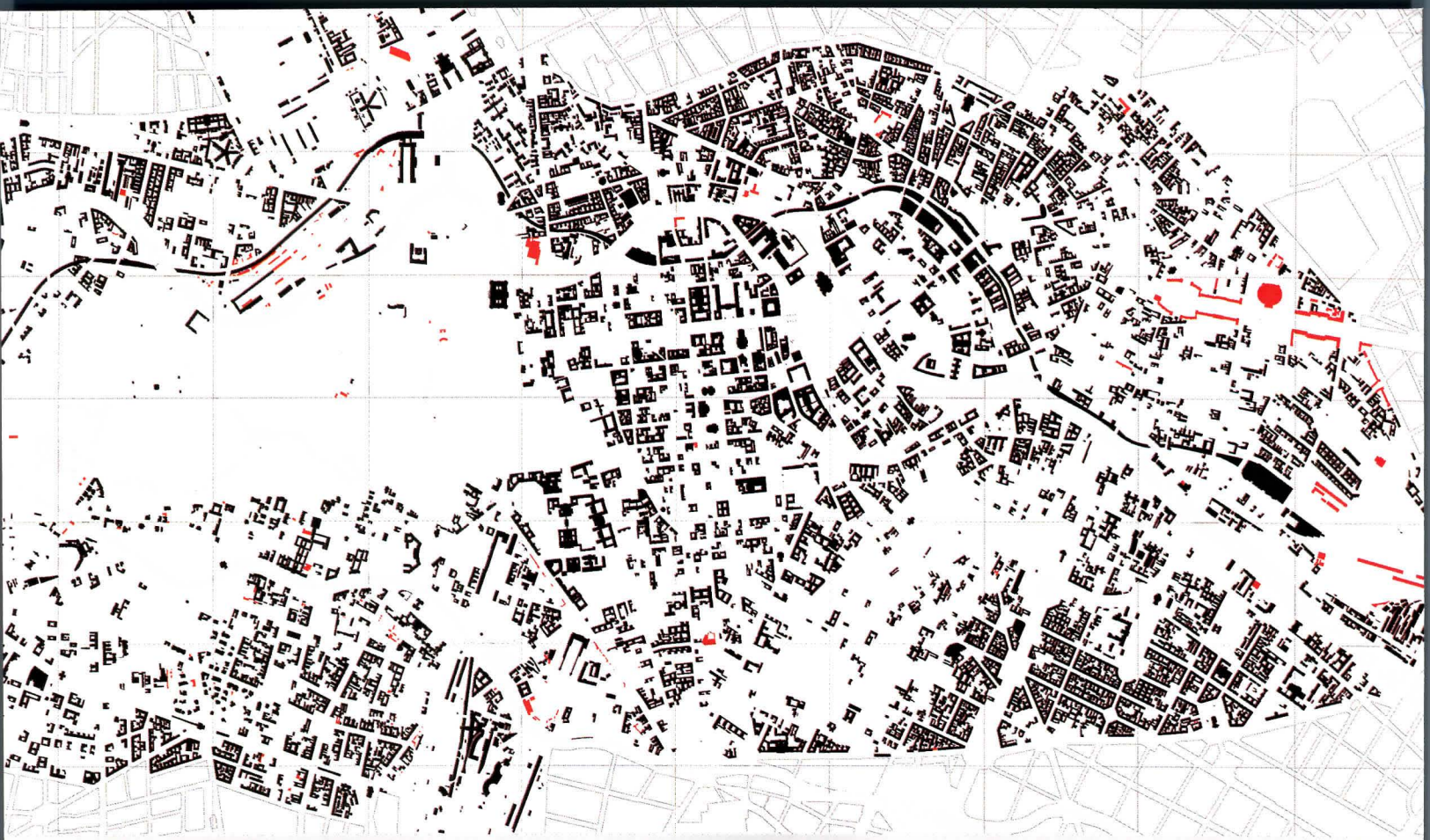
All of Berlin was once like the densest blocks on this map. Only tentative reconstruction (in red) occurred in the first postwar years.

The New Berlin

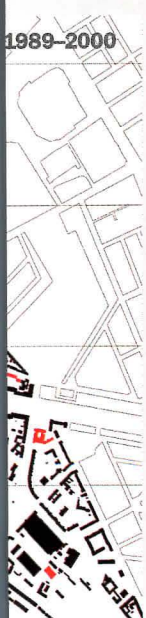
1945–1953

What happens when a city



ransforms itself through architecture?

1989–2000



PHOTOGRAPHY © JOHN EDWARD LINDEN/ARCAID (OPPOSITE, TOP); WERNER HUTHMACHER (BELOW); MAPS: © BERLIN OFFICE OF URBAN DEVELOPMENT

By James S. Russell, AIA

Berlin has tantalized the world for the past 12 years. Millions cheered as the Wall was dismantled. The city was going to become the gateway to the entire former Soviet Socialist empire as it was transformed into an economic dynamo by new investment from the West. We watched a skyline of construction cranes rise over the metropolis and marveled at the awesome commitment to knitting together a city divided for 50 years. Berlin audaciously tried to reconcile its tragic past with a new vision of the urban future.

The city placed the realization of this grand ambition in the hands of architects—an opportunity unequaled since the great rebuilding projects after World War II. Important museums and public buildings were erected or rebuilt. Hundreds of miles of the rapid-transit system have been renovated and hooked back together as work proceeds on a vast new rail gateway. Countless less-glamorous projects have been undertaken, from refitting power plants to repaving sidewalks.

Lately, things have quieted down. The government is moving east from Bonn, but the economic integration of the old Communist bloc has been slow. Berlin is awash in empty commercial space, and apartments are cheap. Indeed, the city spent so freely over the past decade that it is all but bankrupt. Most of the cranes that so thrillingly carved up the sky have now been dismantled. Raphael Roth, a local real-estate developer, counsels patience. "It's taking longer than we hoped, but Berlin will be the hub for the East. The East is the future, because the West's closets are full."

Whether or not Roth is correct, a number of critics have found the architect-designed new Berlin wanting—no matter the money spent and the world-class talent involved. Berlin is just "a museum of itself," sniffed Herbert Muschamp,

Even with post-1989 construction (like the Chancellery, right, and buildings flanking the Brandenburg Gate, opposite, top), Berlin has not reached prewar densities.

The New York Times critic, in 1999. "The great undertakings of the past decade have been overwhelmingly disappointing," wrote Martin Filler last November in *The New York Review of Books*. Did architects fail Berlin? "People come to Berlin with expectations they would never apply to any other city," comments Frank Barkow, an American architect who works in Berlin with his German partner Regina Leibinger.

Berliners are vexed by this American disappointment. They have always seen architecture as an expression of the city's identity. Americans use architecture to aggrandize the individual, they say, pointing to the nation's neglected public realm. After the terror attacks of last September, however, Americans are looking at Berlin—and at architecture—in a new light, asking whether designers can express their grief and commemorate their losses.

Perpetrators commemorating victims

Berlin has already been there. And Berliners will tell you that experience does not make it any easier. Peter Eisenman's Holocaust Memorial has been held up by years of debate, money problems, and design alterations. Work stopped some time ago on the Topography of Terrors, the ruined site of what had been Gestapo headquarters, where cost estimates for completing Peter Zumthor's design for a museum had risen astronomically. In spite of the local debt crisis, both projects are expected to proceed soon. Debate raged so long over what and how Jewish history should be interpreted in the museum designed for it by local architect Daniel Libeskind, that it opened without displays two years ago—to instant acclaim. Its permanent exhibition opened last September [RECORD, October 2001, page 46].

Such commemorative efforts form what Michael Blumenthal calls "a conscious effort on the part of this generation of Germans to confront their nation's past and to deal with it in a constructive and open way." The Nazis drove out his family, one of the city's oldest and most prominent, when he was 12. Starting over in America, Blumenthal eventually became treasury secretary under President Carter. He returned to Berlin to oversee the Jewish Museum's installations. "It is unique and courageous for a nation to put up a monument to the victims of its own atrocities," he adds. Numerous experts told him Libeskind's design was inappropriate for exhi-

(Below from left, this page and opposite): The Chancellery from the Reichstag; Neues Museum, the only restored of the five-building Museum Island complex; '50s Socialist Modernism at Alexanderplatz; the restored Karl Marx Allee.

(Above, from left): Renzo Piano's Marlene Dietrich Platz in the Potsdamerplatz redevelopment, which features set-piece skyscrapers; elevator cores for the planned Topography of Terrors museum.

bitions. While some critics haven't changed their minds, Blumenthal says, he's become a convert to the power of architecture. "We had 350,000 paying visitors when it was empty, and with the exhibitions, it is now the most visited museum in Germany," he says. "It has surpassed my expectations."

Even the sternest critics usually point to the Jewish Museum, Norman Foster's Reichstag, Frank Gehry's DG Bank, Sauerbruch Hutton's GSW Headquarters [RECORD, January 1999, page 76; July 1999, page 102; October 2001, page 120; June 2000, page 156] and a few other structures as high points in the new city's architecture—a list any city might envy.

At the same time, there is also a broad consensus that architecture has failed Berlin in a way that extends beyond the quality of individual projects. Berlin architect Axel Schultes has been an outspoken critic, even though it is his ambitious, competition-winning master plan that is being built to house the national government. "Berlin could have launched an international discourse about the city," he says. When you look for specifics, however, the compelling paradigm for the city of the next century remains undefined, inchoate—certainly not ready to be tested at the scale of a major world capital. The enticingly panoramic clean-sweep urban schemes that so preoccupied the architects of the 20th century—Chandigarh, Brasilia, Dhaka, even cold war Berlin itself (when each half of the city saw urban regeneration as a vindication of political ideology)—don't comfortably fit today's pluralistic view of the "good city."

The uses of history

Several critics have seen the "good guys"—the aesthetically innovative avant-garde formalists—as losing the architectural battle for Berlin to the "bad guys"—the contextualist conservatives [RECORD, October 1995, page 29]. But Matthias Sauerbruch, partner in the Berlin and London firm of Sauerbruch Hutton (lionized as a neglected innovator), offers a more nuanced view. "The generation of the '50s and '60s was trying to get as far away from history as possible," he says. "Now it's more about discovering history and trying to make it usable to go forward."

Berlin's urban debate is, as much as anything, a debate about the way history is used, and it is conducted largely within a paradigm framed by the late Aldo Rossi. In his *The Architecture of the City*, of 1966, he argued against Modernist idealization and its striving to perfectly fit the form to the use. He demonstrated that ancient buildings adapted to changing uses over the centuries, even becoming richer as they accumulated physical alterations and layers of meaning over time. Berlin's International Building Exhibition (IBA) of the 1980s was imbued with the Rossi ethos. It plugged holes in West Berlin's urban fabric through

historically aware small-scale insertions of new work by a roster of name-brand international architects.

The IBA approach, now dubbed "critical reconstruction," underpinned the hastily assembled citywide strategy for rebuilding. It is at the scale of execution, rather than of philosophy, that the formalists battle the contextualists. The esthetic innovators claim that officials, led by Hans Stimman, the Berlin senator in charge of urban development, have simply not been critical enough in terms of the reconstruction. Stimman's guidelines tried to restore a scale of architectural expression and a diversity of uses typical of prewar Berlin through highly prescriptive urban-design guidelines. In rebuilding the Baroque-inspired streets and squares of the once-posh Friedrichstrasse, which largely lay fallow during the divided-city era, guidelines mandated a vertical layering of retail, office, and residential uses and a horizontal diversity of facade treatments (above). "This change in paradigm," said Stimman in a speech given in New York last year, "away from the American city to the Old Urbanism of Europe, provoked a segment of the planners and builders in Berlin, the architects wedded to the freestanding object." According to Sauerbruch, the Stimman approach subsumed the architecture of the individual to the harmony of the whole. "They claimed," he says, "that architecture that doesn't follow the rules or that aspires to be exceptional only rarely achieves it. But this approach has proved a self-fulfilling prophecy in which individual buildings have come out very average and the whole now exudes mediocrity."

The new nostalgia

Berlin was not only supposed to show the way to a new vision of city-making, it was supposed to remain unique and special at the same time. Like many longtime visitors to Berlin, Columbia University architectural historian Barry Bergdoll finds the city "at once disappointing and fascinating." What bothers him is that Berlin "seems more and more just another major city." Such normalcy is essential for the city to function as an economic entity that creates wealth for its inhabitants. But Bergdoll recognizes that it's not as much fun to visit: "So much seemed exciting in '92. We enjoyed the frisson of that moment of possibility—seeing the Wall and walking through Checkpoint Charlie." You don't get that "cold war tourism" charge anymore, he says, "and we're nostalgic for that moment. That's why visitors are so obsessed with where the Wall went." (Its path today is all but undetectable.)

The most glaringly untidied place in Berlin is the asphalt-covered plain at the very center of town, presided over by the marble and copper-tinted reflective glass bulk of the partially demolished Palast der Republik. In front of it once stood the dour Stadtschloss—the Prussian imperial palace. Severely damaged in World War II, eastern-sector officials demolished the mammoth structure in 1950. For years, a well-organized coterie of citizens has campaigned for the vastly expensive reconstruction of the palace, even though no one quite knows what it would be used for.

The Schloss controversy is one of Berlin's "permanent debates," according to Daniel Libeskind, concerning, inevitably, history and memory. "There is a tradition of restoring palaces and old fabric as tourist destinations," says Mary Pepchinski, an architect and professor at the University of Dresden, citing the Romerburg in Frankfurt, a historic quarter recreated out of the ashes of wartime bombing. A government commission recently recommended rebuilding the palace exterior around a modern interior. "It's seen as safe, boring, and maybe a quick solution—a classic political compromise," says Jan Fischer, an American architect and writer who lives in Berlin. "But no one seems beholden to it." It's easy to dismiss the palace-restoration movement as kitschy Disneyfication. Don't be too dismissive, says Pepchinski. "It's about how people apply meaning to the city, what they want to live with." Blumenthal finds the Schloss debate troubling. "In trying to connect to history, how much does reconstruction remind us of the bad old days?"

Well he might ask. In the 1950s, officials carved the gigantic Stalinallee through the postwar rubble of East Berlin. The limitations on political discourse in the East presumably muted the obvious perception that this 2.5-mile stretch of palatial facades, triumphal gateways, and heroic towers evoked Albert Speer's imperial schemes for the Nazis. Later renamed Karl Marx *(continued on page 222)*

In Berlin's oldest precincts, new building facades emulate old variety (above). For some observers, the glassy emblems of modern Berlin evoke a far more experimental era—the 1920s (below).

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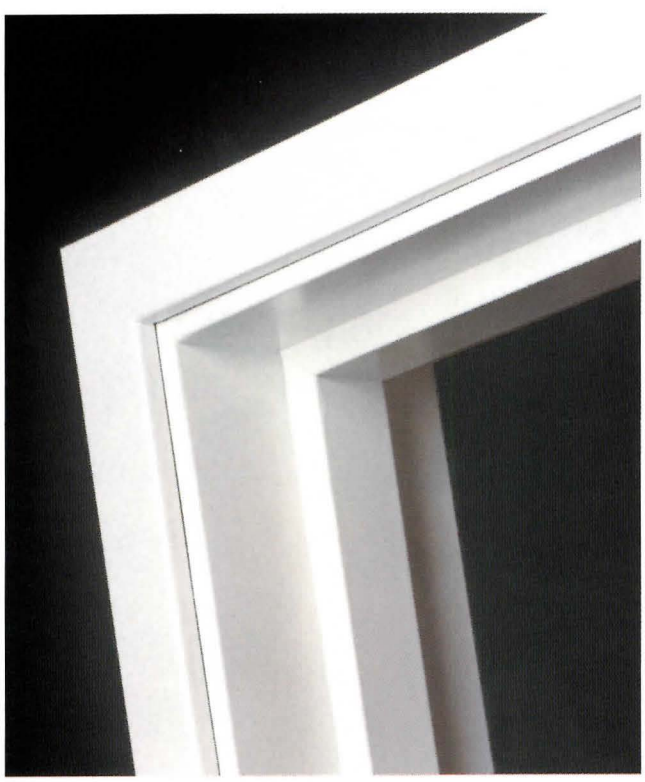

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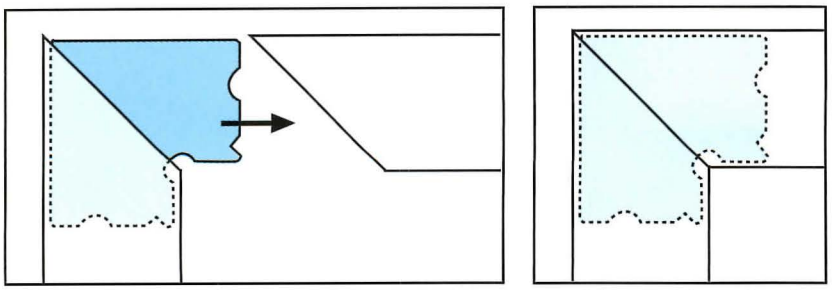

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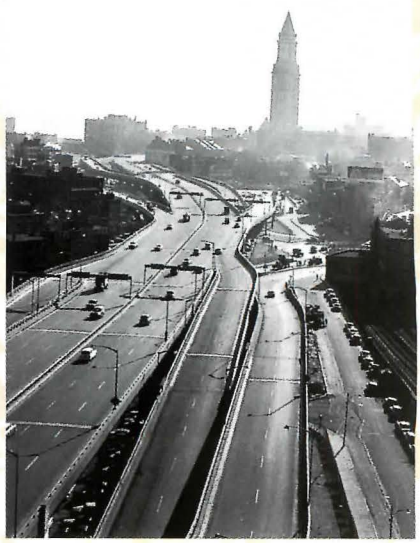
The rendering indicates the huge amount of urban space that will be recovered as Boston's Central Artery is replaced by tunnels. Photographs (right) show the Artery under construction in 1953; as it appeared when completed in 1956; and bumper to bumper, prior to demolition.



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THE Big Dig

What's Up Under Boston?

By Robert Campbell, FAIA

It was back in the early 1970s that the idea first surfaced. What if we demolish the Central Artery, Boston's other Green Monster, the overhead expressway that slithers like a fat invading dragon through downtown Boston, cutting most of the city off from its waterfront? What if we put it in a tunnel underground? With the barrier of the expressway gone, we said, we'll be able to reconnect the city with its harbor in an era when waterfronts are becoming sites for recreation, rather than for shipping and industry. We'll improve traffic flow by correcting the Artery's notoriously dangerous crossing movements. We'll even be able to run a branch of the new tunnel out to the airport. We'll increase the value of the downtown real estate that now suffers from the blight of the Artery. And, anyway, we noted, the Artery is aging and rusting. From time to time a chunk of concrete falls out, landing like a meteorite from the sky.

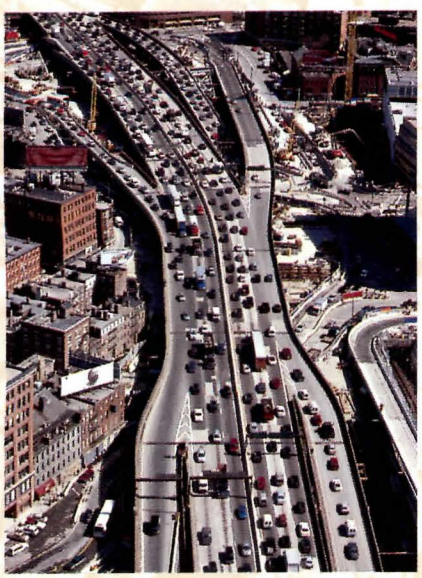
It all sounded like Utopia. But some were skeptical. The city's wisest and wittiest voice, Congressman Barney Frank (then a state legislator), suggested gloomily: "Depress the Artery? It might be cheaper to raise the city." His words sound prescient today, as cost projections climb toward the $15 billion mark. Press and politicians are quick to speak of "cost overruns."

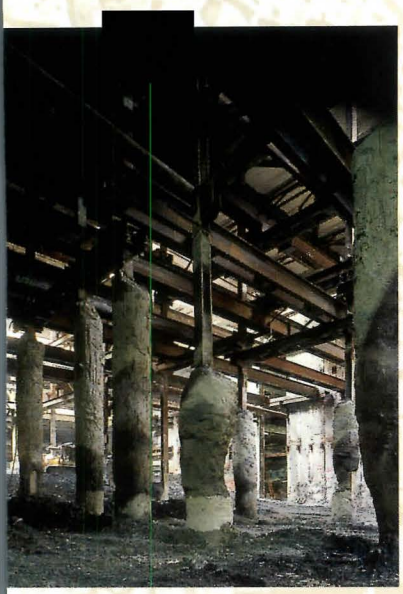
But, in fact, the Artery Project—the Big Dig, as Bostonians call it—is a bargain. In any East Asian or European city, it would attract little attention. Osaka and Hong Kong create new international airports on artificial islands in the ocean. Europe tunnels more then 20 miles beneath the English Channel. Only in the United States is it considered odd to make large public investments in the quality of urban life. Fifteen billion dollars works out to about one movie ticket per American per year over the life of the Big Dig. It's worth it. And as any architect can probably intuit, the "overruns" are fictions, because the initial estimates were fictions. It is not possible to know in advance what a project like this will cost. A feasibility study for the Big Dig would be like a feasibility study for a war. You can begin a war, but you can't know where it will end. Nobody foresaw—nobody could have foreseen—the problems that the Dig would encounter.

The Dig exists because of the political legerdemain of the late Thomas P. "Tip" O'Neill, Speaker of the House. But the concept is that of Fred Salvucci, the acknowledged godfather of the Big Dig, who was secretary of transportation under former governor and presidential candidate Michael Dukakis. (A local joke: "If you want to depress the Artery, just ask Dukakis to talk to it.") Salvucci came up with the brainstorm that the Dig would be part of the Interstate Highway System. Thus it could be largely funded by the federal government. By means of who knows what horse trades, Tip O'Neill sold that concept to Congress, which overrode a veto by President Reagan. The initial estimates were, as much as anything, Tip's canny assessment of what his colleagues would swallow. As the cost predictably ballooned, the feds grew reluctant to keep paying, and the state today picks up most of the tab. The real downside of the Big Dig is the way it's draining funds from every other state public works project.

Whatever else it is, the Dig is a thrilling adventure in engineering. You have to think of the tunnel as a kind of serpent, swimming just beneath the surface of the city. Like sea serpents, it isn't straight. There are places where it humps up to within a few inches of the surface, and there are places where it sinks more than 100 feet down. It does this because it has to slither its way among an incredible welter of subway

Robert Campbell, FAIA, is the architecture critic of The Boston Globe, *a Pulitzer Prize winner, and the bimonthly author of our Critique column.*






lines and underground utilities.

At one point a corner of South Station, Boston's massive old masonry train station, was temporarily propped up, so the tunnel could be shoehorned between the station above and a subway line below—while keeping all roads and rail lines fully operational and uninterrupted. Engineers couldn't make a cut here, because a cut would disrupt the rail lines. They had to bore the tunnel. But the soil, which like most of Boston is mostly fill, was found to be too soft to tunnel through. It would have collapsed into the hole, along with the railroad tracks. So the soil, acres of it, was temporarily frozen to a depth of many feet to permit the boring machines to function.

A whole series of works of architecture had to be designed simply to house the fans that would ventilate the tunnel. One of them received a National Honor Award from the AIA, and when it was found that conventional tunnel sections for the extension to the airport could not be floated beneath Boston's low bridges, the engineers created an entire 7-acre factory at the harbor's edge to manufacture steel box sections. Each weighed about the same as the Titanic, and each was floated across the water and (like the Titanic) sunk, using global positioning technology to place it with a margin of error of less than half an inch.

Through it all, the old overhead Central Artery, with all its ramps, continued to function. It will not be torn down until the eight-lane tunnel beneath it is complete. Traffic of all kinds—Amtrak, commuter trains, subways, cars, and trucks—continues to flow with remarkably little inconvenience. The coordinating engineers, Bechtel/Parsons Brinkerhoff, solved problem after problem—employing technology that had been developed and proved, more often than not, in Europe. They also, predictably, made some blunders. Water leaked into one of the tunnels. Less forgivably, part of a bridge had to be rebuilt when it was discovered that reinforcing rods were spaced too close together, so the concrete couldn't be forced in to bond with them.

The bridge in question—the Leonard P. Zakim Bunker Hill Bridge, a name that sounds like the political compromise it is—occurs where the Big Dig tunnel emerges from the ground and crosses the Charles River into Cambridge. Already, the bridge—not yet open to traffic—is a Boston landmark, dramatically lit in blue at night. It is a cable-stayed construction designed by Swiss engineer Christian Menn. It is unique among such bridges, so far as I know, in that it is asymmetrical. To solve the intricate traffic movements, two of its lanes are cantilevered out to one side. This oddity gives the bridge an engagingly lopsided informality. Not so engaging is the dumb detail at the top of each of the supporting concrete towers. They are arbitrarily sculpted into pyramids so as to rhyme, visually, with the Bunker Hill Monument nearby. It's a needless gesture that spoils the rigorous beauty of the engineering.

Visiting the Big Dig at its most spectacular, about two years ago, was very much like walking into the interior of a Piranesi engraving of a madhouse or prison. Many people commented on the resemblance. In the deeper places, where the tunnel was cut rather than bored, you'd stand at the bottom between two slurry walls and look upward as much as 120 feet, through tier upon tier of steel and concrete, with the light trickling down as if from another planet.

OK, flash forward to the present. The end of the Big Dig is at last in sight. Now everyone's attention is on another issue: What to do with the new long, winding corridor of space that currently lies in the shadow of the overhead Artery, but which will emerge when the Artery comes down? This is today the most hotly argued design question in Boston. In a small way, it's like what happened when the fortifications of Vienna and similar cities were torn down. What do you do with the new space?

Predictable forces are aligned. The Greenspace Alliance, a powerful group in Boston, believes that as much of the surface as possible should be green parkland, air and grass and shrubs and trees, a "lung for the city," in Olmsted's term. The Artery Business Committee, representing owners and other business interests in the area, would like to see cultural uses introduced to activate the space, perhaps with outdoor cafés and the like. Architects, in general, tend to think metaphorically of sewing the city back together over this gash, rather than memorializing it by means of an uninterrupted linear park. (However, nothing exceeding a few stories can be economically built, since the tunnel isn't structured to bear anything higher.) The Horticultural Society

From the surgically precise excavation of the old structure and utility lines to the braced slurry walls built as far as 120 feet underground and the 13-foot-thick coffer dam, almost all of the work involved to complete the Big Dig has had to be accomplished at a huge scale.

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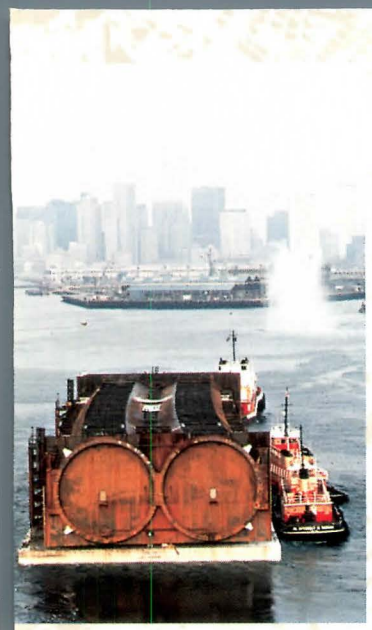
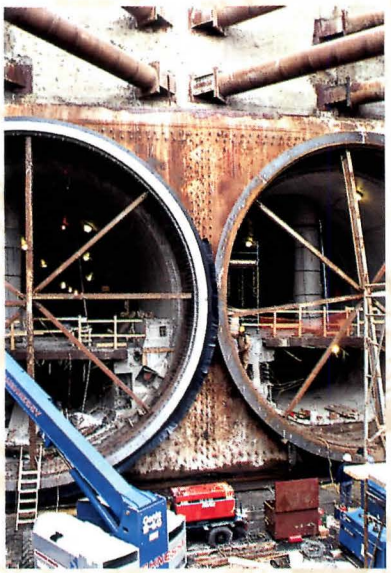
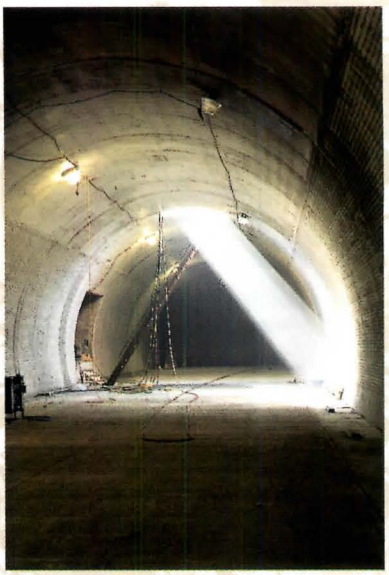





Steel tunnels that were submerged under the bay had to be built in Baltimore and moved to Boston on barges. Each tube is wide enough to carry two lanes of traffic. The cable-stayed bridge spans the Charles River, connecting Cambridge with the tunnel.

would like to build a glazed winter garden, but it may not have the money to do so. The North End neighborhood at one end and the Chinese community at the other have their own agendas. The state legislature, in a virtually secret move, determined that the land will be called "The Rose Kennedy Greenway," honoring the matriarch of the Kennedy clan while undermining those who object to an all-green surface. These are only a few of the many groups and voices that have entered the debate. Some of the abutting owners have hired their own urban design consultants.

The Massachusetts Turnpike Authority controls the land, and last year it commissioned a $1 million study, led by Karen Alshuler of SMWM in San Francisco. The goal was to create a master plan—really a set of visual guidelines—under which landscape architects, yet to be selected, would develop designs for the various parcels. The Alshuler study operated within—and chose not to challenge—a set of rigid parcel-by-parcel constraints laid down more than a decade ago by the environmental permit (subsequently embodied in a special zoning law) that allowed the Big Dig to occur. These require that 75 percent of the land be "public open space," and in many cases they virtually dictate what can happen on each parcel. The authors of the study talked to everyone, in the vain hope of discovering consensus. As a result, they created a shallow, least-common-denominator document that lacks vision and invention and failed to ignite any enthusiasm. Many of the parcels are proposed to be simply grass plots with artfully angled paths.

Meanwhile, the state government, despite lengthy meetings and discussions, has failed to decide who will be responsible for managing and maintaining the land in the future. Presumably the city government will play some role in that, but nobody knows what.

It's a typical Boston brouhaha. Whatever happens, we can now be sure that the Big Dig will indeed get finished, at whatever financial cost. We can be sure, too, that Boston will be a better place for it. What is less certain is whether we will ever get beyond that, to seize the opportunity of a century to create a great and memorable example of city-making. ■

What happens when freeways come down

Besides Boston, eight other U.S. cities have started or completed freeway redevelopment projects: Cincinnati; Duluth; Fort Worth; Hartford; Pittsburgh; Portland, Oregon; San Francisco; and Seattle. Several more projects should start shortly: Milwaukee, Portland (again), and San Francisco (again). Such projects mean considerable professional opportunities—and large fees—for architects and planners.

Three forces are driving this emerging trend. First, many downtown freeways are obsolete due to overcrowding, lack of maintenance, and decades of heavy use. Second, money is available from federal, state, and local sources. Third, although freeway redevelopment projects are never cheap, they can reap tremendous financial returns and quality-of-life improvements.

Freeway redevelopment projects take three forms.

Removal: The best-known example is San Francisco's late but not lamented elevated Embarcadero Freeway. San Francisco will also remove its equivalent of Boston's Central Artery near the Civic Center.

When outright removal is not a realistic option, cities can turn to two other strategies.

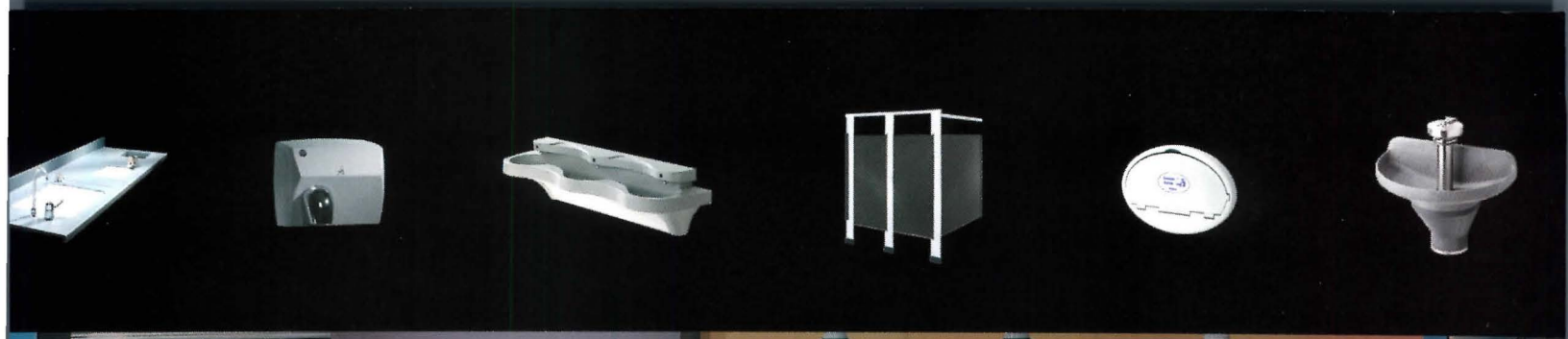
Relocation: Fort Worth is demolishing the downtown stretch of I-30. A replacement section I-30 was built a quarter of a mile to the south, well outside the downtown core.

Retrofit: Freeways that cannot be removed or relocated can still be retrofitted with new features such as Pittsburgh's 100-foot-wide, 4,000-foot-long Allegheny Riverfront Park, built beside and atop the Fort Duquesne Boulevard highway.

Of course, freeway redevelopments face potential roadblocks. They are incredibly expensive and prone to cost overruns and mismanagement. In addition, most government officials—and many architects—have not recognized this trend, or the opportunities it offers our cities, so design issues are not being debated, plans are not being made, and specific freeway redevelopment programs are not being formulated.

The obsolescence of scores of ill-located 1950s and 1960s downtown freeways is an extraordinary opportunity to repair the damage they have wreaked upon American cities. But, if freeways are rebuilt where they stand, this nascent trend could become the opportunity that got away. *Charles Lockwood*

Charles Lockwood has written many books on U.S. architecture and cities.



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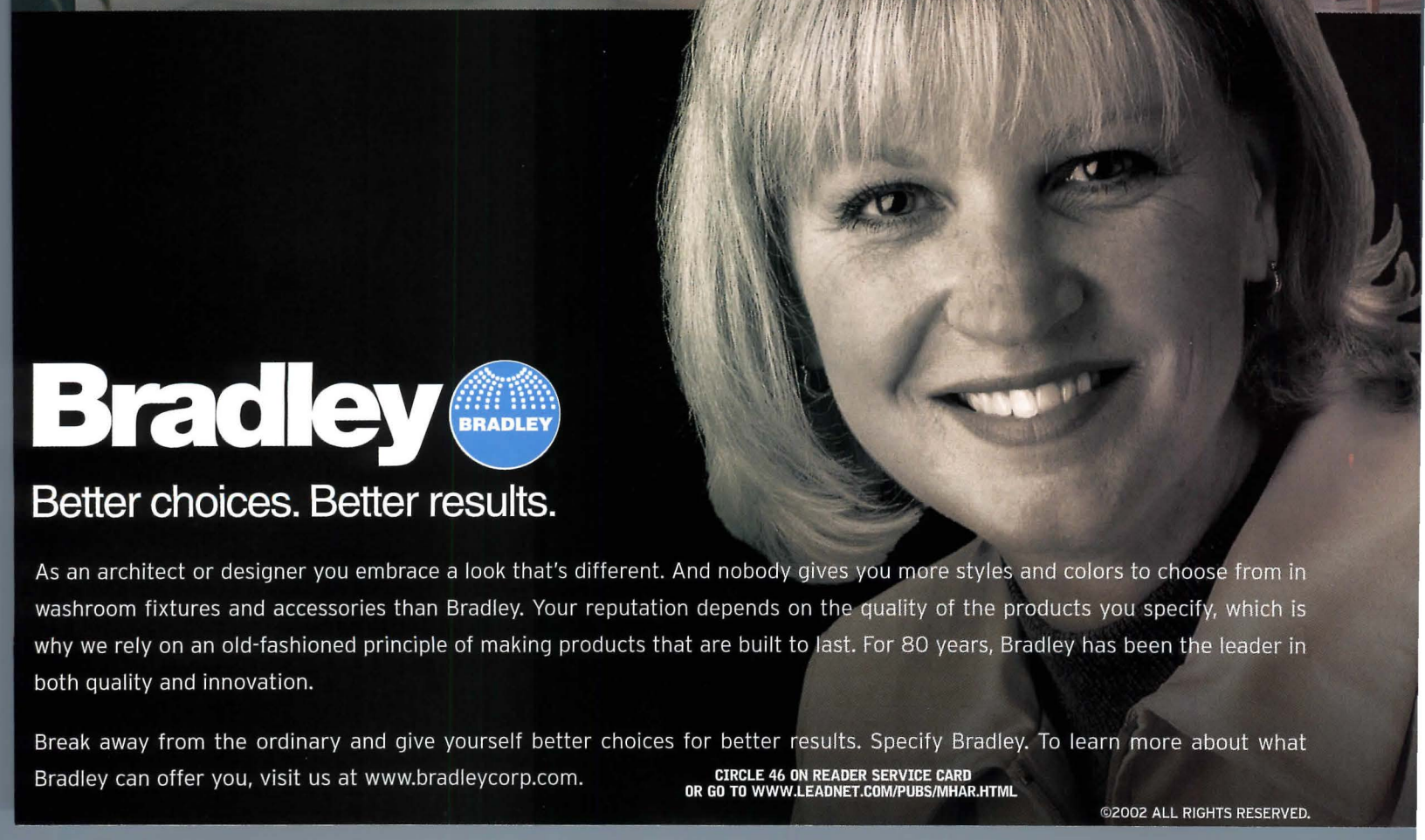

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Cables, strung from a mast that acts as a counterbalance to the pedestrian bridge, are a lyrical contrast to the closed brise-soleil.

Santiago **Calatrava** marries sculpture and structure, and molds a new identity for the **MILWAUKEE ART MUSEUM**, his first building in the United States

By Blair Kamin

Unlike Las Vegas high rollers, art museum directors don't walk around with suitcases full of cash and dice spilling on green felt crap tables. But maybe they should, considering the gambler's mentality it takes to build a great museum today. Anyone wanting to repeat the much-hyped "Bilbao effect" must forge a partnership with an architectural superstar, raise millions of dollars, then hope that the finished product turns out to be a media megastory that draws critical raves as well as hordes of visitors.

For better or for worse, this is the way the global museum game is played at the beginning of the 21st century, and it certainly describes the high-wire act that the Milwaukee Art Museum has performed with its $75 million Quadracci Pavilion addition designed by Zurich-based, Spanish-born architect and engineer Santiago Calatrava, with Milwaukee firm Kahler Slater as architect of record. Not only is this Calatrava's first building in the United States and his first museum, but it also represents his most extensive essay in kinetic architecture, sporting a 217-foot-wide brise-soleil, set atop the museum's glass-sheathed reception area, that opens like the wings of a giant bird.

Before the museum opened last October, questions abounded about the feasibility and appropriateness of the daring contraption. A tropical sunshade in frigid Milwaukee? There were concerns, too, about Calatrava: How could he relate his stark white, gravity-defying, steel-and-concrete Modernism to the Midwestern Rust Belt city of Milwaukee?

Today, though, it is clear that Milwaukee's gamble has paid off in the form of a striking monument that is at once a strong personal statement and a sensitive essay in the making of place. While visitors may flock to the addition to glimpse the birdlike brise-soleil, they are likely to come away realizing that the device is not an isolated gimmick, but simply the most visible part of an inspired, carefully conceived whole. What makes the building fly is Calatrava's singular fusion of sculpture and structure.

Structure has been off the architectural radar screen for nearly a quarter of a century, ever since the Postmodern assault on the formulaic

Pulitzer Prize winner Blair Kamin, a contributing editor to ARCHITECTURAL RECORD, *is the architecture critic for the* Chicago Tribune. *A collection of his essays,* Why Architecture Matters: Lessons from Chicago, *was published in 2001.*

Project: *Milwaukee Art Museum expansion*
Architect: *Calatrava Valls—Santiago Calatrava, principal*
Architect of record: *Kahler Slater—David Kahler, FAIA, principal in charge; Lou Stippich, AIA, project manager; Erv Schloemer, AIA, senior project architect; Roger Retzlaff, AIA, project architect*
Structural and civil engineers: *Graef Anhalt Schloemer & Associates*
Mechanical and electrical engineers: *Ring & DuChateau*
General contractor: *C.G. Schmidt*
Brise-soleil mechanical equipment designer: *Neenah Engineering*
Landscape: *Office of Dan Kiley*

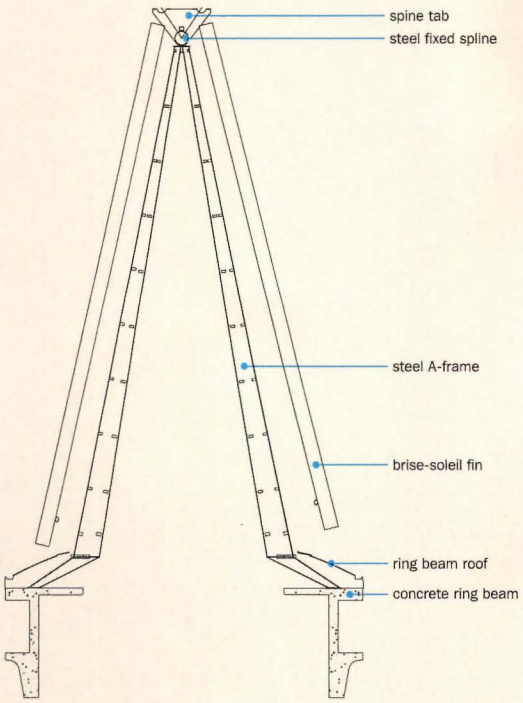
Looking south, the long, low building volume with gallery and gallerias leads to the reception hall topped with the dynamic brise-soleil. A pedestrian bridge, spanning over geometric gardens designed by Dan Kiley and an entrance drive, connects the museum entrance to downtown Milwaukee to the west.

A sunshade unlike any other

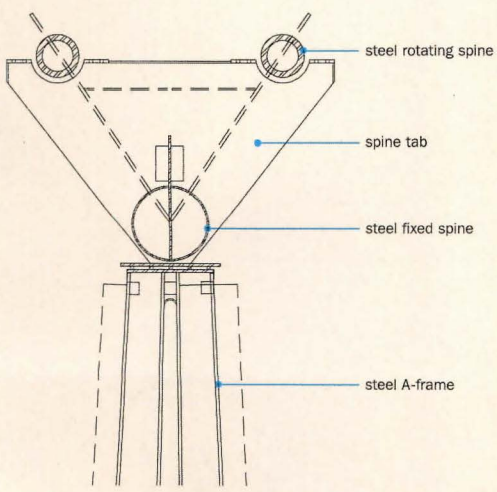
The primary elements of the Burke Brise-Soleil (named after donors John and Murph Burke, who gave $1.5 million for the project) are the 72 fins, which range in length from 26 to 105 feet. Ingemetal, a metal manufacturer in Zaragoza, Spain, coordinated the fabrication of the fins, which were shipped to Milwaukee in Russian cargo planes.

Constructed of steel plate ranging in thickness from 3/16 inch to 3/8 inch, each fin has a twin-plate fin tab welded to its end. Sets of twin plates on the spines accept the fin tab plates and enable the fins to be bolted to rotating spines.

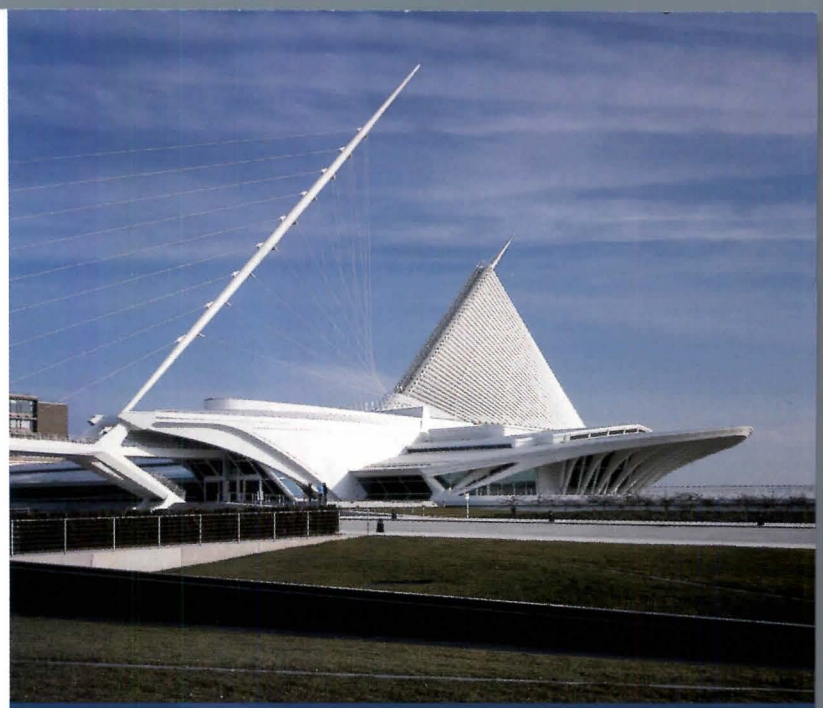
The rotating spines are supported on spine tabs and at their base. At the spine tabs, the rotating spines are cradled in bearings that transfer weight load and facilitate spine rotation. The spines are supported at their bases through flat bearings on the concrete structure. *John E. Czarnecki, Assoc. AIA*



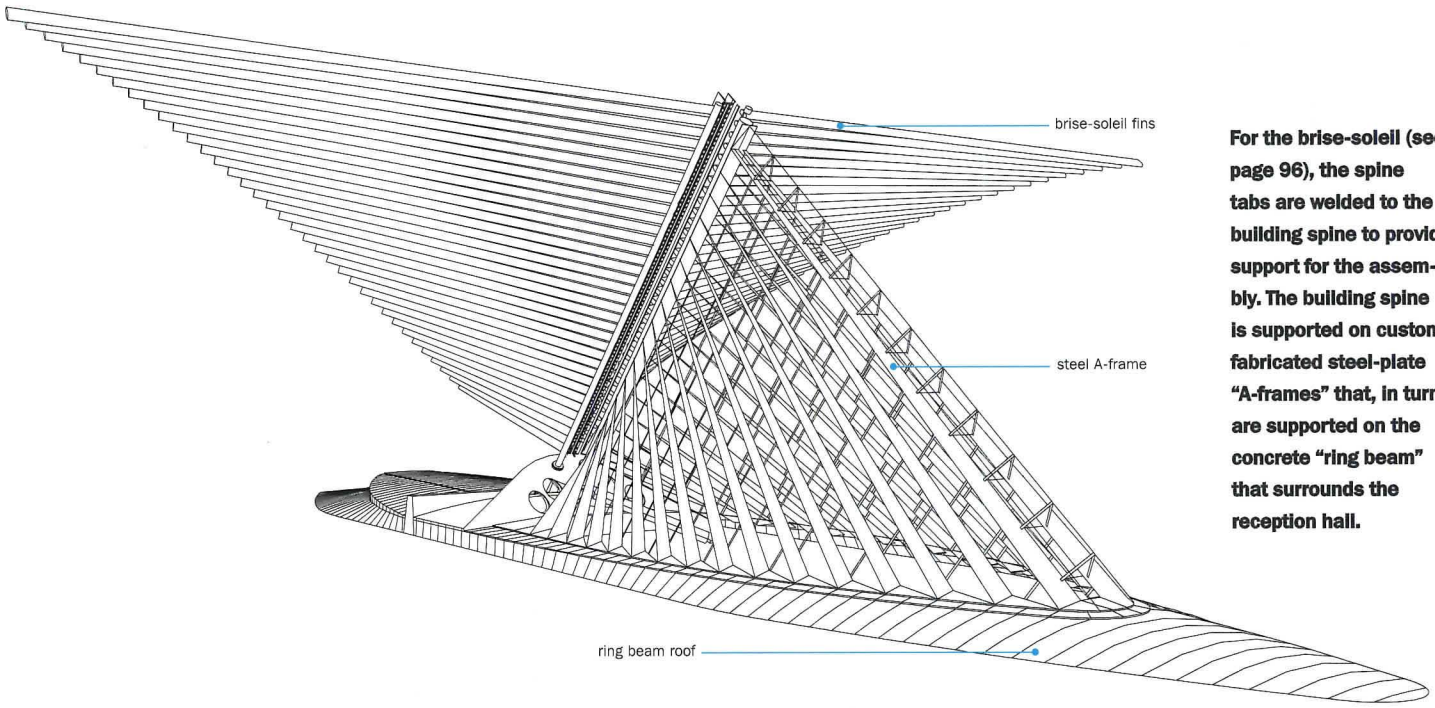
SKYLIGHT/BRISE-SOLEIL SECTION



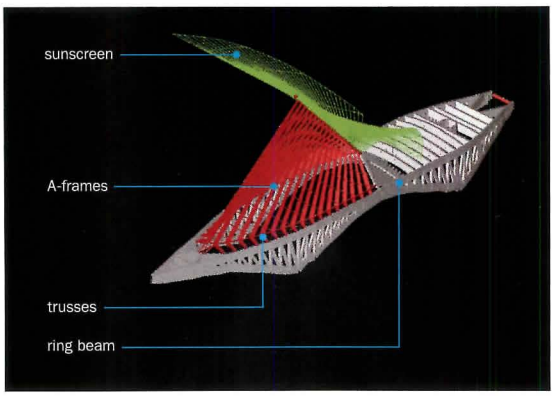
BRISE-SOLEIL SPINE *DETAIL*



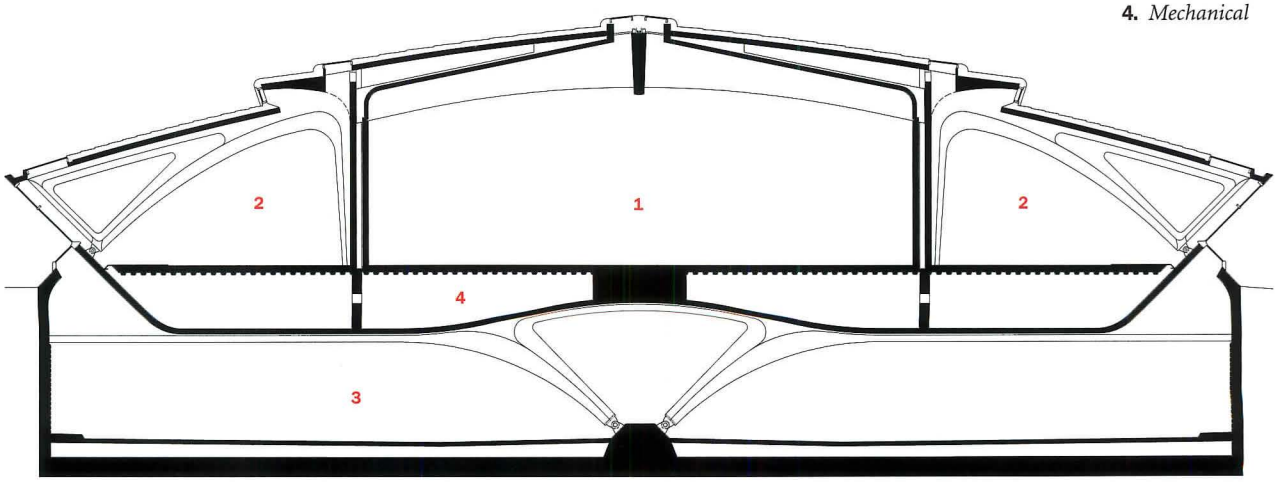
The brise-soleil takes about four minutes to open and close, and it will close automatically if sensors detect wind speeds exceeding 23.6 miles an hour. A system of 22 hydraulic cylinders, 11 for each side, raise and lower the 72 steel fins, which weigh 110 tons in total. The brise-soleil was initially designed for carbon fiber fins that would have been too costly and taken much more time to construct.



For the brise-soleil (see page 96), the spine tabs are welded to the building spine to provide support for the assembly. The building spine is supported on custom-fabricated steel-plate "A-frames" that, in turn, are supported on the concrete "ring beam" that surrounds the reception hall.



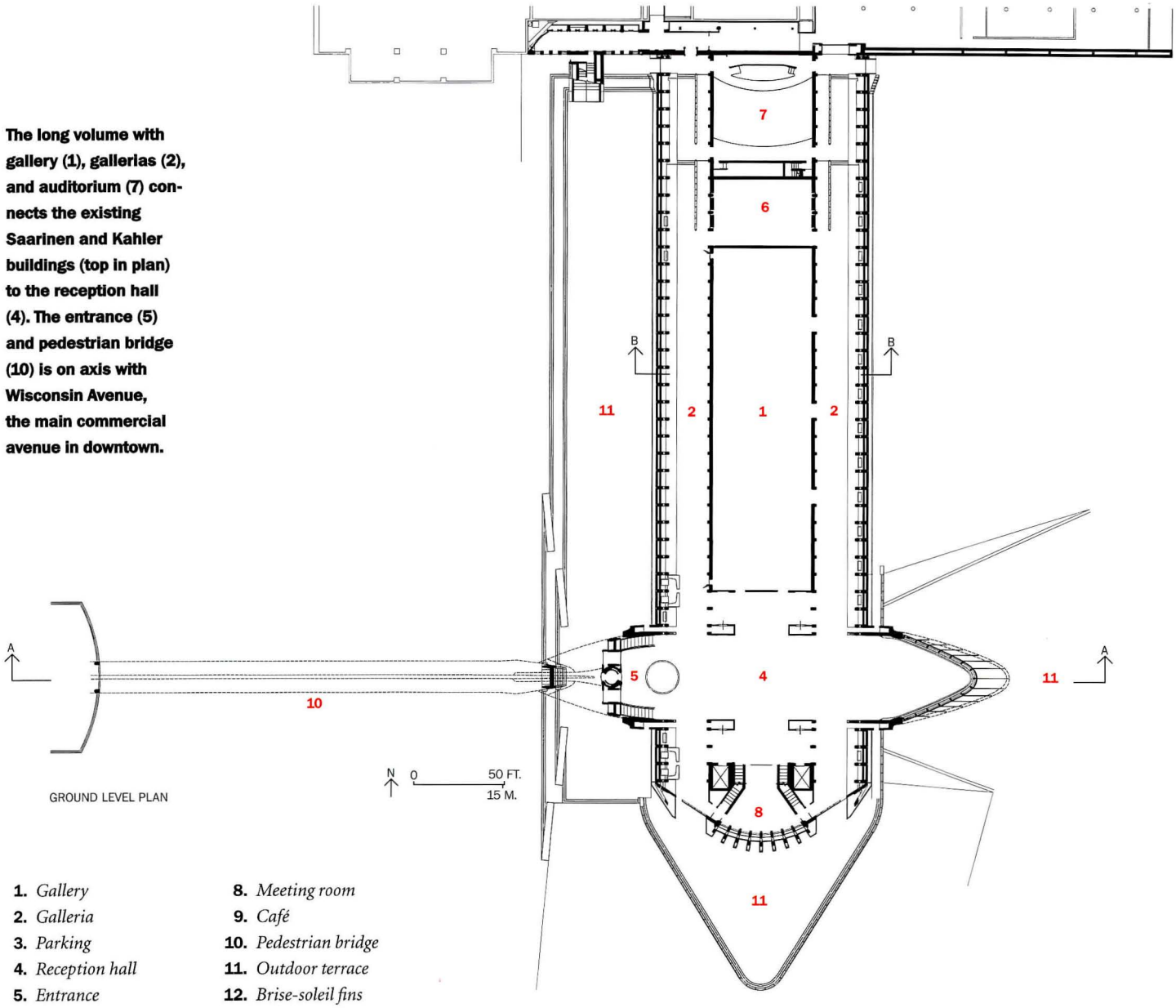
1. *Gallery*
2. *Galleria*
3. *Parking*
4. *Mechanical*



SECTION B-B THROUGH GALLERY

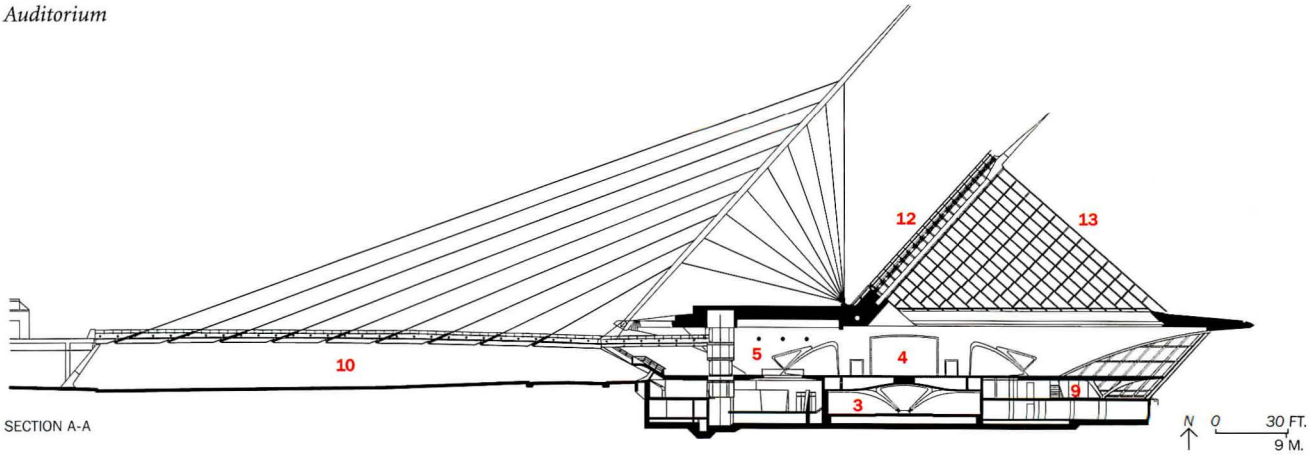
0 10 FT.
3 M.

The long volume with gallery (1), gallerias (2), and auditorium (7) connects the existing Saarinen and Kahler buildings (top in plan) to the reception hall (4). The entrance (5) and pedestrian bridge (10) is on axis with Wisconsin Avenue, the main commercial avenue in downtown.



GROUND LEVEL PLAN

1. *Gallery*
2. *Galleria*
3. *Parking*
4. *Reception hall*
5. *Entrance*
6. *Gift shop*
7. *Auditorium*
8. *Meeting room*
9. *Café*
10. *Pedestrian bridge*
11. *Outdoor terrace*
12. *Brise-soleil fins*
13. *Skylight*



SECTION A-A

Modernist buildings of the 1970s. But Calatrava is at pains to reveal a building's bones, making them the centerpiece of his baroque visual drama. Although his Milwaukee addition is not without faults, it nevertheless has real significance because it reasserts and refreshes the age-old premise that architecture is a building art.

To fully grasp the importance of Calatrava's design, one must understand its spectacular site, just to the east of downtown Milwaukee on the shores of Lake Michigan. In 1957, Milwaukee's civic leaders imported to this setting an earlier star, Eero Saarinen, to design a multipurpose Modernist structure that would house a war memorial above and an art museum below. Saarinen's solution, a cruciform concrete mass soaring above a heavy, stone-clad base, nobly commanded its environs, but it had limited room for galleries and made the museum visually subservient to the war memorial. The space crunch was temporarily alleviated in 1975, with the museum's first addition, a low-slung Brutalist structure by Milwaukee architect David Kahler that was wedged between the war memorial and the lake. But this appropriately modest, if unremarkable, building left the museum without a strong formal identity.

Calatrava, who won the Milwaukee commission in 1994, besting finalists Arata Isozaki and Fumihiko Maki, set out to correct that problem in a composition that grew substantially in cost and scope after it was unveiled in 1996. That shift occurred because Calatrava's design (and his charm on the fund-raising circuit) opened wallets. The budget shot from $35 million to $75 million to include higher-than-expected construction costs and major additions, such as the brise-soleil, a 100-space underground parking garage, and gardens by landscape architect Dan Kiley.

Three distinct elements in a powerful whole

In its finished state, the addition conveys the impression of a powerful whole even though it is made up of three distinct elements: a low-slung gallery building that extends southward from the Saarinen and Kahler wings; a 250-foot-long, cable-stayed pedestrian bridge that links the museum to downtown Milwaukee; and the brise-soleil, which sits atop a steel-framed reception hall and consists of 72 paired steel fins. Driven by hydraulic motors, the fins ostensibly are there to control the temperature and light in the reception hall, but they also give the museum a landmark presence it never had underneath the war memorial.

While reaction has been favorable, some critics have observed that, by separating the grand reception hall from the more modest gallery building, Calatrava has dodged the conflict between the container and the contained that must be resolved if a building is to rank as a great art museum. Indeed, Calatrava's addition has very little art in it. Just 12,000 of its 142,000 square feet are devoted to gallery space, with the rest going to public spaces like the reception hall. But Calatrava's task was less to resolve the ongoing battle between art and architecture than to recast the entire museum's inner workings and identity. He did the former by shifting the public spaces out of Kahler's wing and allowing the space they occupied to become galleries, thus giving the museum 30 percent more art-display space. He did the latter by creating a grand civic space and a new image for both the museum and its city.

Take, for example, his deft handling of the spectacular shoreline site. He keeps the gallery building low to preserve views of Lake Michigan from the city. Throughout, he abstracts nautical imagery (sails, planks, prows, masts, soaring birds) to link the museum to the lake. While the blazing whiteness of the building appears to set it apart from Milwaukee's somber vernacular, the color actually makes the block-long structure seem smaller than it would have otherwise and further links the building to its lakefront site by echoing the colors of sails.

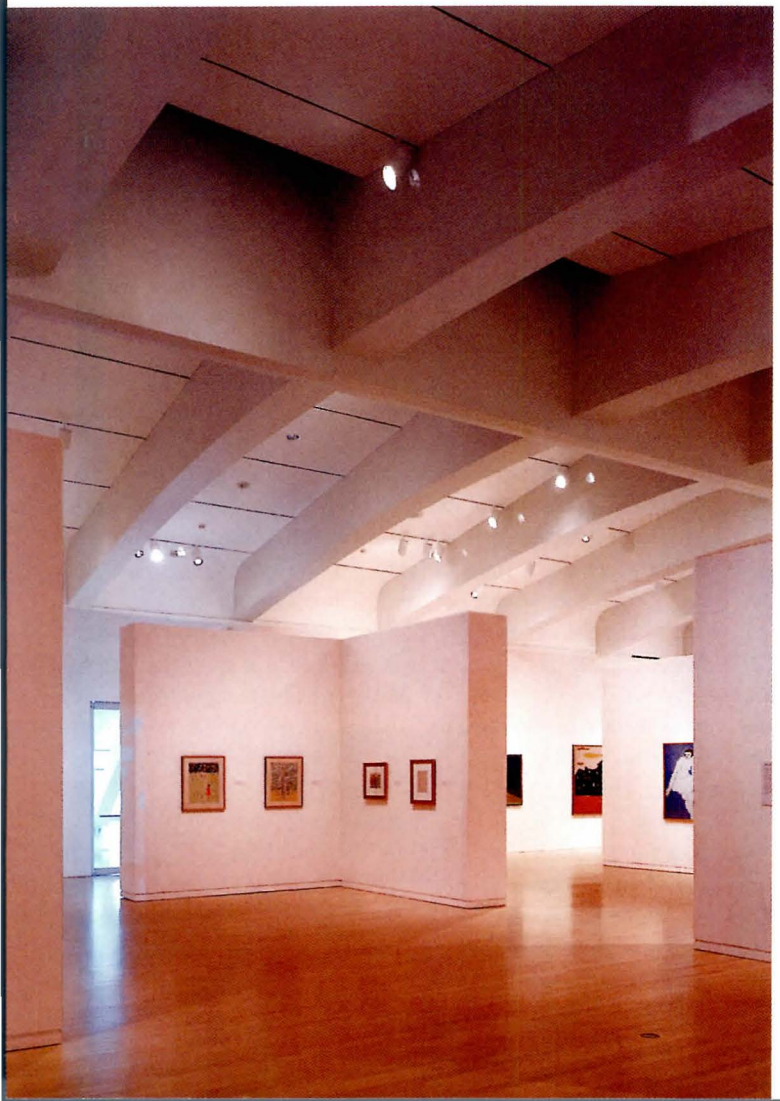
CALATRAVA'S TASK WAS TO RECAST THE MUSEUM'S INNER WORKINGS AND IDENTITY.

Calatrava is equally good at relating his addition to both the city and to Saarinen's war memorial. The sculptural presence of the brise-soleil culminates the axis of Wisconsin Avenue. Meanwhile, the addition echoes Saarinen's cross-shaped plan, while Calatrava's building opens up a genuine dialogue with Saarinen's: the earlier structure, heavy and gray; the newer one, light and white—one trying to float but still earthbound; the other truly soaring—one static, the other dynamic.

When the brise-soleil unfolds, it is an event, one that beckons museumgoers outside with their video cameras. As the fins move upward, the sunshade resembles the bottom of an hourglass. Then, as the fins reach their apex and transform themselves into softly curving arcs, the resemblance to a bird becomes unmistakable. This is not spectacle, but art, a stunning and skillful transformation of heavyweight steel into a kinetic sculpture that seems as light as a bird's wings.

Calatrava has designed moving buildings before, like his

Curving concrete arches near the entrance (opposite, left), when repeated create a beautiful rhythm in the gallerias (opposite, right), which have skylights between the arches (above). For the gift shop, Calatrava designed the showcase tables (right). Ascending the stairs (below, right) from the parking garage allows a glimpse of the reception hall. The main gallery (below, left) is flexible.



From the front entrance, visitors see the reception hall ahead (above). The underground parking garage (right), with painted white walls, ceiling, and curving concrete arches springing from the floor, is as poetic as the public spaces above.

sphere-shaped City of Science in Valencia, Spain, which has a cantilevered glass and concrete canopy that drops down over the facade like an eyelid over an eye. Yet the Milwaukee addition represents his most extensive effort in an aesthetic where buildings move or seem to move. Why do it here? Simple: The Milwaukee museum desperately needed to make a powerful visual statement, and Calatrava gave it one with modern machinery that can instantly transform the building's appearance.

As the rest of the exterior demonstrates, Calatrava is a master of this kinetic genre. His cable-stayed bridge in Milwaukee is a structural tour de force; its wafer-thin steel deck makes it seem to float. There are other memorable flourishes, like the gallery building, which culminates, on the addition's south side, in a beautifully sculpted prow that recalls the extended fingers of a human hand.

Calatrava speaks of his design as a series of gestures, which seems appropriate because the building, like a sculpture, resembles a body moving through space. Yet befitting its role as architecture, the addition shapes space, as when the gallery building frames the stone forecourt to the west of the addition and, to its west, Kiley's gardens. Their low-slung hedges aptly echo the horizontality of Calatrava's *(continued on page 224)*

Sources

Metal/glass curtain wall/skylights: *Super Sky Products*
Metal roofing: *Overly Manufacturing*
Glass: *Viracon; Cricursa*
Entrance and interior glass doors: *Ellison Bronze; Blumcraft; ACI*
Boardroom furniture: *Keilhauer; Davis*
Interior ambient lighting: *Bega; BK; Edison Price; Elliptipar; Evenlite; Hydrell; Kirlin; Kurt Versen; LSI; Prescolite*
Controls: *Lutron*

www For more information on the people and products involved in this project, go to Projects at **architecturalrecord.com**.

In the reception hall under the brise-soleil, the nature of the glass-and-steel skylight is less transparent when looking east, toward the lake (opposite, top), than when looking west, toward the entrance (this page).

A symbol for the city, the Milwaukee Art Museum addition demonstrates the power of architecture

What can one building do for a city? Can it uplift a city or alter perceptions of it? Milwaukeeans think so. Now that the Santiago Calatrava addition to the Milwaukee Art Museum (MAM) has opened, the building is being critiqued and analyzed not only as a museum and as a sculptural edifice, but also for its lasting impact on this midsize Midwestern town.

Calatrava's first building completed in the United States is in, of all places, the 19th largest city in the country, with a population of about 597,000 people. For Milwaukee, known as the home of Miller Brewing and Harley-Davidson, the Calatrava building is a new visible symbol. Whether Milwaukeeans want to admit it or not, in our media-driven society the Calatrava addition to MAM now *is* Milwaukee to the rest of the country and the world.

"We've had this beer, brats, and *Laverne and Shirley* image for a long time, and we've had a hell of a time shaking it, frankly," says Donald Baumgartner, president of the MAM board. "I think this art museum has put us in a new league."

"It challenges those preconceptions," added Robert Greenstreet, dean of the University of Wisconsin-Milwaukee School of Architecture and Urban Planning, chair of the city planning commission, and a member of the 21-person architect-selection committee that chose Calatrava over Arata Isozaki and Fumihiko Maki for the MAM job in 1994. "I'm very positive about the impact that this can have on the city, in the way in which it stimulates a level of architectural awareness among the citizenry."

Milwaukeeans, most of whom had rarely talked about architecture and design, now use "Calatrava" as a household name, thanks to a saturation of local media coverage. The museum itself is getting exactly what it wanted—more visibility in the art world and in Milwaukee, with far more regional visitors. What seemed implausible before is now true—Chicagoans are making the 90-mile trek north to go to the Milwaukee museum. MAM's average annual attendance was 165,000 in 1999 and 2000, but attendance from the May 4, 2001, partial opening of the Calatrava addition to the end of 2001 was 375,000. When the addition was fully complete, 32,000 people filled the museum for the October 14 opening, far surpassing the previous typical big day for the museum—5,000 visitors—and the prior daily average of 1,000 visitors.

Will the Calatrava building be to Milwaukee what Frank Gehry's Guggenheim is to Bilbao? Milwaukee mayor John O. Norquist is wary of the comparison. "I don't think it's healthy for Milwaukee to look at this as a savior project," says Norquist, mayor since 1988 and a former public member of the American Institute of Architects national board of directors. "This analogy to Bilbao troubles me a bit because American cities have a tendency to feel that they have to suddenly transform themselves with new convention centers or stadia. Cities are successful because of their urbanity, a collection of parts, not one trophy."

Greenstreet, however, believes a comparison to Bilbao is valid. "Few buildings can transcend their basic function to become a powerful symbol of revitalization and forward-thinking. We've seen it in Bilbao, and most effectively in Sydney," he says. "Milwaukee's reputation is somewhat conservative—this project represents the readiness to embrace the unknown in a radically new building."

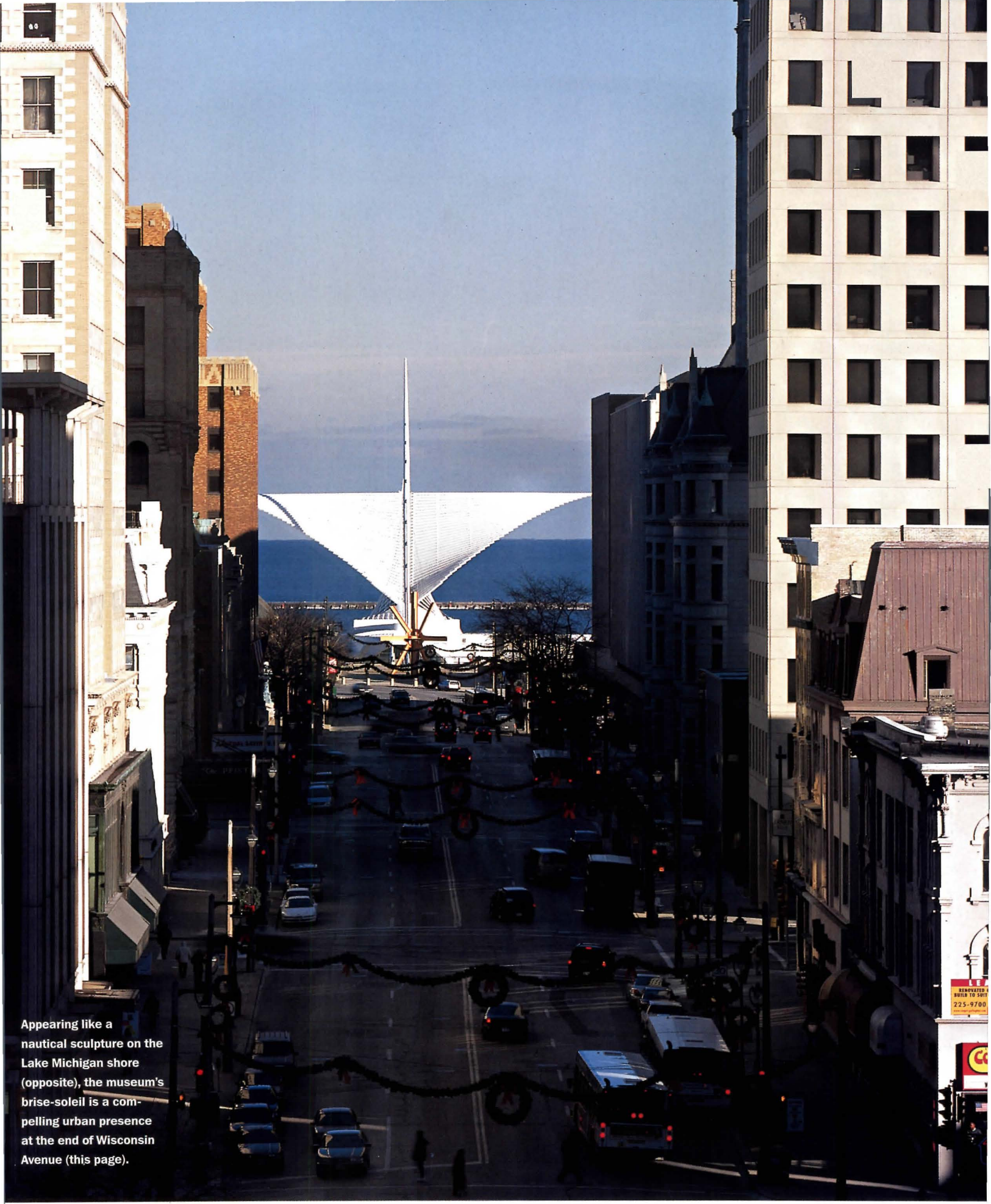
David Kahler, FAIA, agrees. Kahler is president of the Milwaukee firm Kahler Slater that collaborated with Calatrava as architect of record for MAM. "Symbolically, this has become a catalyst for a renewed vigor in the community," he says. "It has provided a degree of energy that has not been here for a long time, and the community now believes in itself."

Milwaukeeans buy into the dream, raise millions

The museum required the largest fund-raising effort in Milwaukee history, and, in another first for the city, architecture was used to promote fund-raising. What started in 1993 as a modest proposal for a 40,000-square-foot addition costing $8 to $10 million grew by 1996 into a campaign for a $35 million project of 58,000 square feet. Money flowed in faster and in larger amounts than anyone associated with the museum had anticipated, allowing MAM to add elements to the program for a 142,000-square-foot, $75 million building project as part of a $100 million capital campaign. The campaign, a civic wonder, was completed earlier this year, raising $30 million in less than nine months and garnering 23 gifts of at least $1 million each. "What this building did and what Calatrava did was to sell a dream very effectively to an audience not known for dreaming," Greenstreet says. "And he sold the community an idea of a building that consumed that dream."

Calatrava's addition has also pushed the city's architects to reach for a higher level of design quality, according to Peter Park, director of city planning in Milwaukee. "The Calatrava building has clearly raised the bar for what clients and developers are striving for," he says. "It helps reflect a desire to explore more architecturally rich concepts and endeavors."

Greenstreet concurred: "It helps architects expand their clients' sensibilities by raising expectations of what constitutes great architecture in the city. That is a profound change." *John E. Czarnecki, Assoc. AIA*



Appearing like a nautical sculpture on the Lake Michigan shore (opposite), the museum's brise-soleil is a compelling urban presence at the end of Wisconsin Avenue (this page).

When twilight falls, the Kimmel Center comes to life on Philadelphia's Broad Street, now Avenue of the Arts (right and below). The center occupies a city block south of City Hall and north of the University of the Arts, which is in a 202-year-old Neoclassical building designed by John Haviland, with additions by William Strickland and a rear building by Frank Furness.

Rafael **Viñoly's** arresting and controversial design for the new **KIMMEL CENTER** offers the Philadelphia Orchestra a concert hall under glass

By Suzanne Stephens

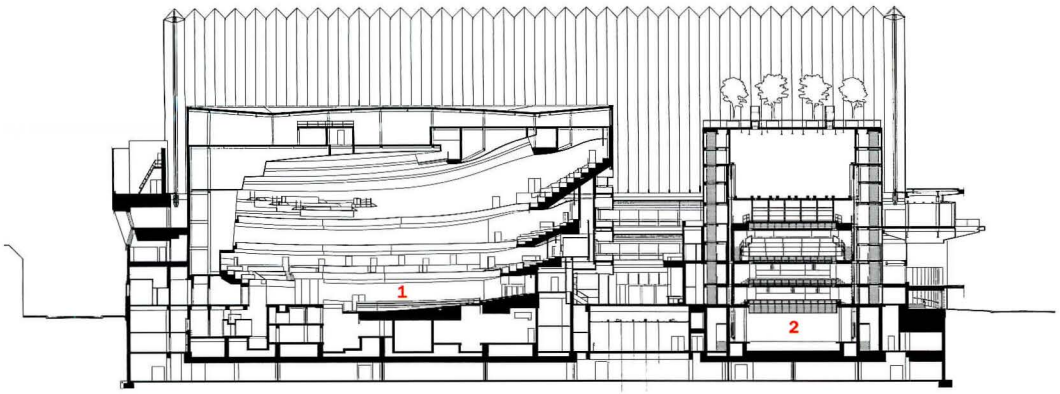
The deep irony of the Kimmel Center's first-night opening in Philadelphia last December 14 was stunningly palpable. Sir Elton John was hunkered over a piano singing his heavily amplified heart out on the stage of Verizon Hall, the main auditorium for the new $265 million center. The whole reason everyone was there was because the Philadelphia Orchestra had carried on so long about the need for an acoustically reverberant space. The orchestra's old home, the much-revered Academy of Music, built in 1857 in an Italianate mode by Napolean LeBrun and Gustave Runge, was deemed too "dry"—its reverberation time too short. Out of this discontent eventually sprang the monumental, 429,085-gross-square-foot Kimmel Center, a 150-foot-high, glass-barrel-vaulted structure encompassing two auditoriums. Designed by the New York–based architect Rafael Viñoly, FAIA, the structure houses six performing arts companies, including the Philadelphia Orchestra, and straddles a full city block, just down Broad Street (now called Avenue of the Arts) from the old Academy.

As striking as Elton John's array of audio equipment, replete with a ganglia of electrical cords and dangling video screens, were the nickelodeon-style light stanchions and trusslike appendages. True, the razzle-dazzle was gone by the second opening night, when the Philadelphia Orchestra was back in charge of the sinuous, mahogany-clad hall. But the memory lingers.

Clearly, those planning the big first nighter did not want the center to seem stuffy. The mise-en-scène provides a telling clue about Philadelphia's own quest for a certain image, which has in turn shaped the architecture of this civic center. The city's legacy of Quakerism, Sunday blue laws, and suburban Main Line helped mold its stodgy reputation. In 1958, when sociologist Digby Baltzell wrote *Philadelphia Gentlemen: The Making of a National Upper Class*, Eugene Ormandy was reigning conductor of the Philadelphia Orchestra. Of an afternoon, tweed-suited and mink-stoled matrons could stroll from the Nan Duskin store off Rittenhouse Square to the Academy to hear him create that "Philadelphia Sound." Ormandy had overcome the dry acoustics of the sumptuous La Scala-esque auditorium by bringing out a plushness in his string section once described as "the sound of pearls dropping on brown velvet."

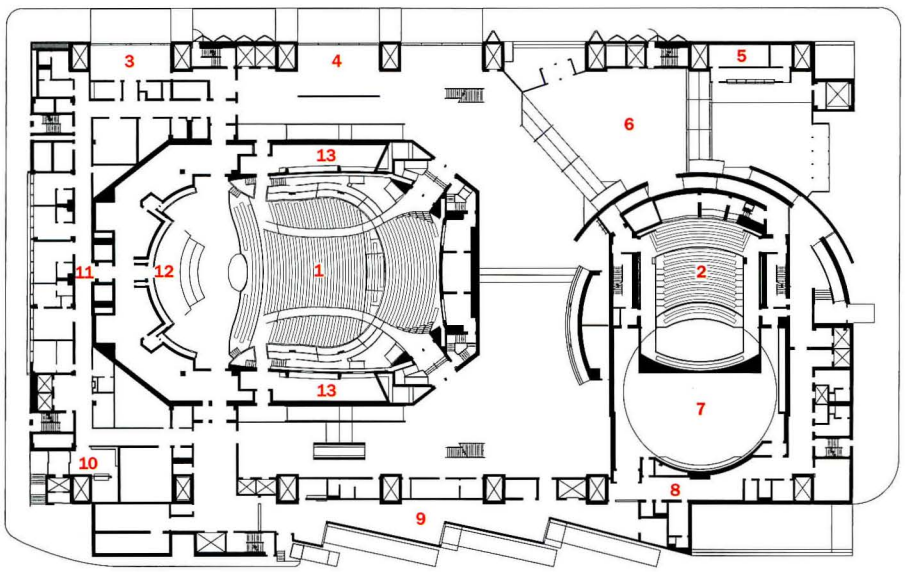
Already in 1958 modernity was changing the city's image. For one thing, another "Philadelphia Sound" was being generated out of "Sou'Philly," heralded by Dick Clark's *American Bandstand* TV show, where duck-tailed teenagers rocked and rolled to pop culture stars Bobby Rydell (né Ridarelli), Frankie Avalon, and Fabian. Architecturally, a new modern identity was being forged, as well. A few blocks away from the Academy, near City Hall, urban planner Edmund Bacon was creating Penn Center, which, along with the renewal of Society Hill, would lure suburbanites back

Project: *Kimmel Center for the Performing Arts, Philadelphia*
Owner: *Regional Performing Arts Center*
Architect: *Rafael Viñoly Architects—Rafael Viñoly, FAIA, principal and lead designer; Jay Bargmann, AIA, project director; Sandy McKee, AIA, project manager*
Acoustic designer: *Russell Johnson of Artec Consultants*
Theater consultants: *Theater Projects Consultants—Richard Pilbrow and David I. Taylor*
Structural engineers: *Dewhurst Macfarlane with Goldreich Engineering*
M/E/P consultants: *Arup*



LONGITUDINAL SECTION

1. *Concert hall*
2. *Recital theater*
3. *Greenroom*
4. *Gift shop*
5. *Box office*
6. *Lobby*
7. *Revolving stage*
8. *Recital theater support*
9. *Loading dock*
10. *Stage door*
11. *Concert hall support*
12. *Stage*
13. *Reverb chamber*



FLOOR PLAN

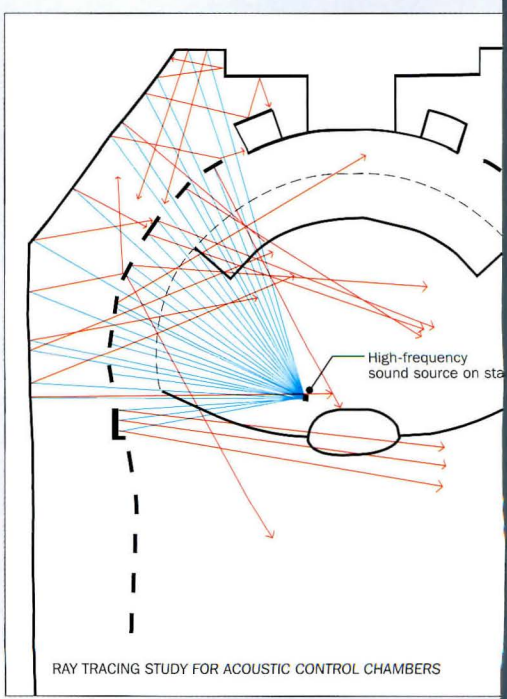
The Kimmel Center has a reinforced concrete foundation, rubber pads to insulate against vibration, then a concrete basement, and a steel-frame structure above. Vertical cantilevered box columns support the general building and provide space for HVAC.

Now showing: Forty years' worth of acoustical innovations

The acoustical innovations that have debuted over the past four decades in the most sophisticated concert halls and auditoriums were inspired by economics. "In the 1950s, it became evident to auditorium owners that they had to have all kinds of entertainment in order to make money," says Russell Johnson, whose firm, Artec Consultants, designed the acoustics for both the concert hall and the recital theater at the Kimmel Center. "Around 1960, I pioneered the concept that in order to do the very best for each kind of performance that goes on a stage, you have to be able to adjust the acoustics of the room to match the event's acoustical requirements. That's the way we now approach concert hall design."

Most of the ideas Johnson began developing back then are built into Verizon Hall. The most prominent is the use of hinged panels to allow the movement of sound between the audience chamber, where the stage and seating are located, and acoustics control chambers located around the audience chamber's perimeter. These allow the volume of the hall, and therefore its reverberance, to be adjusted. To make the room more reverberant, the doors are opened to allow the sound energy to bounce around the control chamber and mix with the sound from the stage. When the doors are opened more fully, more reverberance results. A second system in use is an acoustical canopy, which hangs over the stage. It has three sections that can be raised or lowered independent of each other to further adjust the hall's acoustical environment. The third element is a series of acoustic-control curtains—lengths of fabric that can be lowered in front of the walls in order to change reverberation time. After Verizon has been in use for some time, Artec will recommend acoustical settings for each type of event typically held in the hall.

Charles Linn, AIA



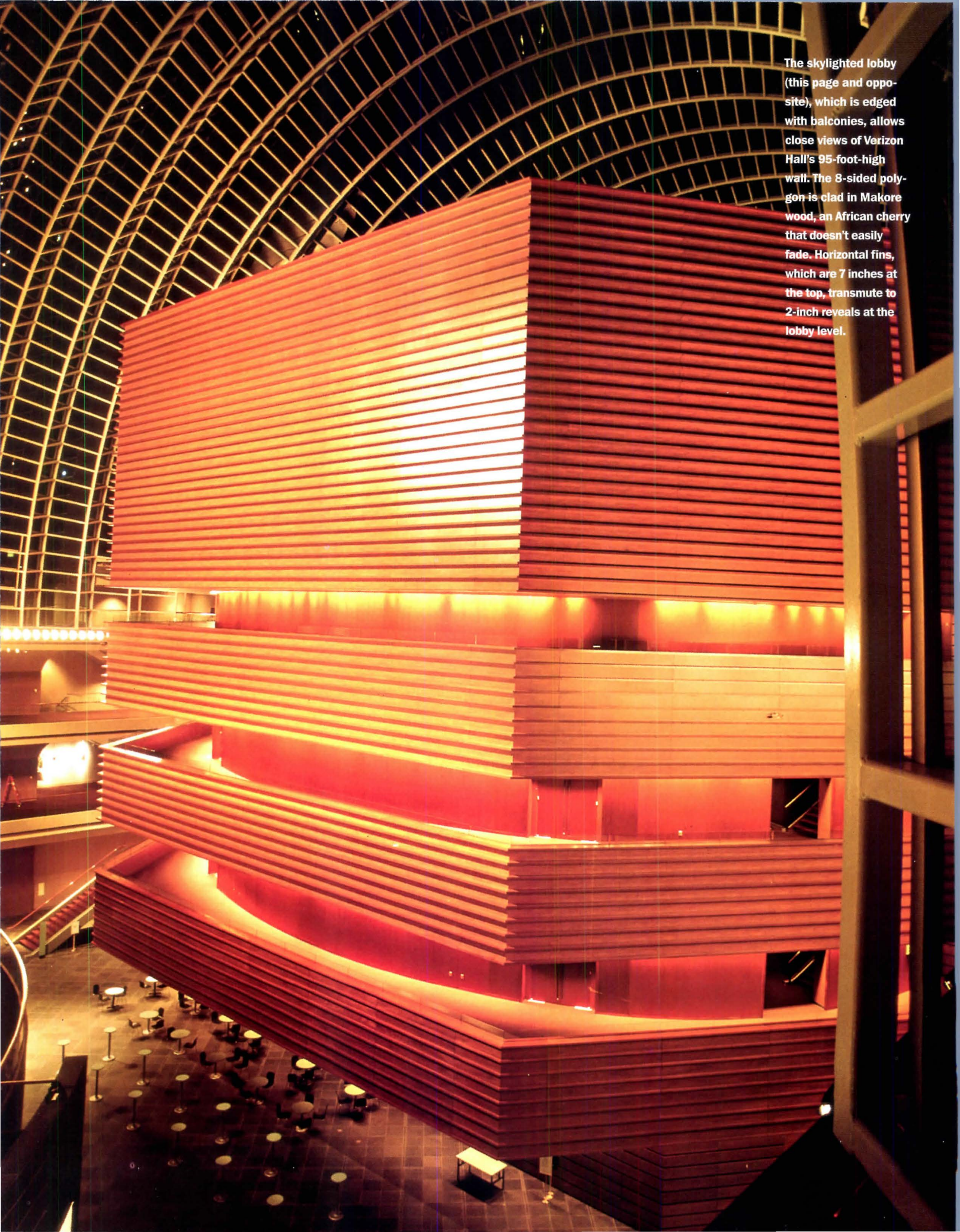
RAY TRACING STUDY FOR ACOUSTIC CONTROL CHAMBERS

downtown. The results were urbanistically successful but bland. In 1958, Louis Kahn was not involved: He was designing his only big hometown job, the Richards Medical Research Laboratory for the University of Pennsylvania. That's where Robert Venturi was teaching, and his future partner, Denise Scott Brown, had just begun to study planning.

Perhaps one of the ironies of our times is watching taste subcultures blend over the years. Today, if you want a symphony hall, you design one that can also accommodate ice-skating performances. And if you plan an opening night, you have Sir Elton John and the Philadelphia Orchestra. (Not to mention that on the first night, Paul Anka and the $30 million donor, dress manufacturer Stanley Kimmel, crooned a duet, Sinatra-style.) A concert hall that can handle this combination has to be sufficiently stuffy (meaning grand), but still pop (lively). This is something that Rafael Viñoly accomplished to a large degree with a spectacular sense of show biz. And, ironically, this could be the reason why Venturi Scott Brown (VSBA) ultimately lost its first major downtown project, the commission it had won in 1987 to design the new home for the Philadelphia Orchestra.

Although Venturi had coined the term "both/and" architecture, his and Scott Brown's scheme was perceived by the orchestra clients as "either/or." The firm's first design was too discreet. A redesign featuring a polychromed, metal and glass pedimented facade, festooned with musical notes, seemed too commercial (or too *American Bandstand*?)

A roof garden with 16 planters sits atop the Perelman Theater, sheltered by the arched vault of folded-plate Vierendeel trusses, (above). The 150-foot-high vault, spanning 174 feet, is made of two types of rectangular steel tubes: one, 5 by 5 by ½ inches; the other, 5 by 4 by ½ inches. The glass panels are 7 by 3 feet by 3 inches.



The skylighted lobby (this page and opposite), which is edged with balconies, allows close views of Verizon Hall's 95-foot-high wall. The 8-sided polygon is clad in Makore wood, an African cherry that doesn't easily fade. Horizontal fins, which are 7 inches at the top, transmute to 2-inch reveals at the lobby level.

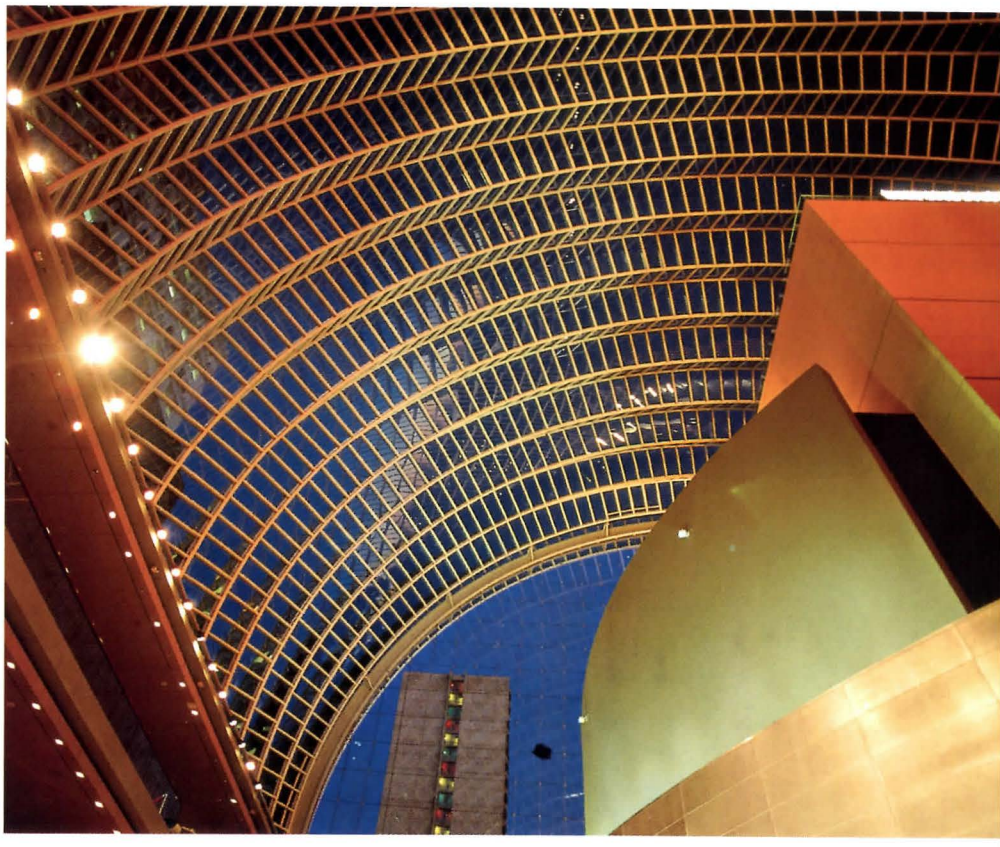
To be sure, Venturi Scott Brown's commission was modest, a privately funded hall just for the Philadelphia Orchestra, with a budget of $74 million ($76 million for the second version). But the clients weren't enchanted, and fund-raising stalled. Around 1995, then-mayor Edward Rendell conceived of a large performing arts complex of which the orchestra would be a part, all under the aegis of a public-private entity named the Regional Performing Arts Center (RPAC). The Philadelphia Industrial Development Corporation (PIDC), a quasi-public entity headed by former city-planning director Craig Schelter, acquired the land on behalf of the city and served as a conduit for $65 million in state money. The Philadelphia Authority for Industrial Development leased the land to RPAC, which in turn rented space to the various participants.

The linchpin in the new mechanism was developer Willard Rouse III, who had been tapped by Rendell as RPAC's voluntary head. The nephew of developer James Rouse, Willard III had put his indelible stamp on Philadelphia in the 1980s by building Liberty Place, two garish Decoid Postmodern towers, one by Murphy/Jahn, the other by Zeidler Roberts. In so doing he broke the Philadelphia gentleman's agreement never to erect a tower higher than William Penn's statue on City Hall. Clearly, Philadelphia had changed.

With its mission, PIDC, on behalf of RPAC, invited only architects who had experience designing an auditorium to compete. (VSBA declined). The shortlist came down to Cesar Pelli, Barton Myers, Pei Cobb Freed, Viñoly, and Zeidler Roberts. Evidently, Viñoly, known for his ebullient charm, made a spellbinding presentation. It didn't hurt that he knew a lot about music: His father was artistic director of the Sodre Opera Theater in Buenos Aires, and Viñoly keeps a grand piano in his office.

Strengths of the Kimmel Center

Viñoly also knows how to create a big architectural whammy. His design calling card is the roof, as seen in his Lehman College Gym (1994), or the awe-inspiring atrium, seen in the Tokyo International Forum (1996). In Philadelphia, you get the shimmering, barrel-vaulted roof balanced on steel columns, and a sun-splashed atrium where the two large, sculptural, steel-framed containers for the auditoriums are moored.



The pièce de résistance is Verizon Hall (the Perelman Theater is being finished at press time). Sheathed on the outside in a reddish Makore wood, the cleanly crafted polygonal form has horizontal fins that project 7 inches at the top, then become 2-inch-deep reveals at the lobby level—a somewhat megascale homage to Frank Lloyd Wright's Sturges House (1939) in Los Angeles. Inside, the hall is clad in sumptuously curved mahogany panels, to which are added solid mahogany wood diffusion strips. The effect is ornate, warm, and stately without being a kitsch imitation of 19th-century opulence. The hall's cello shape and use of hardwood were only two of the strategies that Viñoly, acoustical consultant Russell Johnson, and theatrical consultant Richard Pilbrow labored over to keep the "Philadelphia Sound," while still solving all the acoustical problems that had prompted the new structure (see sidebar, p. 108).

As for the Perelman Theater, the geometrical amalgamation of a cube with rounded extensions, clad at the base in black granite (honed and polished), and a goldish corrugated steel top, is designed for instant convertibility. With a push of a button, this 650-seat recital hall easily changes into a theatrical playhouse. Viñoly and

The sides of Verizon Hall are formed of 102 hinged panels that open to reverberation chambers. They and the balcony soffits are covered with solid South American mahogany blocks in six different shapes and six patterns to distribute and disperse sound.

The quartered-figured mahogany (from sustained growth forests) was chosen, according to Architectural Woodworking Industries, to obtain a grain that would have a glossiness under low light. The walls of the 2,543-seat auditorium are faced with ½-inch-thick African mahogany veneer with a fire-rated core. The topmost ceiling is solid plaster, 3 inches thick. Applied to that are ⅜-inch-thick, fire-rated mahogany panels.

Pilbrow came up with a scheme where a revolving circular stage, surrounded by audience seats, rotates to the back, allowing a proscenium stage with a fly tower to take its place. The seating in front of the stage can be dropped to the basement via an elevator, with a floor sliding out for dance and theater performances, or parties.

Now the hard part

As a performing arts center, the Kimmel has strong selling points. Its striking use of technology with arches of folded-plate Vierendeel trusses and glass panels is captivating; the insertion of delicate, cable-supported glass curtain walls at both ends is impressive. The roof garden on top of the Perelman Theater, where trees in planters are shielded by the garantuan glass vault, creates a play in scale that is awe-inspiring. But the Kimmel Center's exterior is another story. Looking at the building from the pedestrian's standpoint is oppressive. Even if the scale of buildings at this end of the avenue is variegated, Broad still has a pedestrian feel to it. Yet where the barrel vault meets the base, the klunkiness shocks. We are back to the Modernist dilemma: The massing and materials of the steel-framed lower section, especially the cheap-looking brick cladding, are drab and perfunctory; a sense of detail nonexistent. You go from a transparent version of Boullée's Bibliothèque Nationale on the top to Wal-Mart on the bottom.

Inside the Kimmel Center, the heavy-handedness continues. At the edges of the atrium are cantilevered balconies, accessible by grand stairs. The materials and detailing of the balconies themselves received the short end of the design stick. The gypsum-reinforced glass surface is bland, and the balustrades commonplace. Meanwhile, the acoustic solution has been cautiously embraced. Verizon Hall has "clarity," says Barbara Jepson of *The Wall Street Journal*, but "the loud orchestra passages were brittle." Other reviews were mixed. These things take time.

So in the end, was it worth all the angst? The good news is that six performing arts organizations have a home, and the Academy of Music is still in use for opera and ballet. The disconcerting news is that the orchestra is in debt $4 million with a $37 million budget and has 400 fewer seats than it had with the Academy. That means higher prices.

Architectural oomph costs money. And the cruelest irony offered by much of the design is that to make the big splash (Verizon Hall, the glass vault), you need to take shortcuts. This paring down of design creativity, use of materials, and detailing evidently was relegated to the outer, lower ramparts, unfortunately where it shows. The building isn't Bilbao. Yes, it's unfair to measure every major arts building on that scale. But, after all, that's how cities are trying to get into big time now—with "szhooshed-up" museums and performing arts centers. Instead of giving Philadelphia a breathtakingly new civic image, Kimmel Center presents a strange combination of both grand and pop. The pop is not lively, just conventional, rather like a sports stadium. So its "both/and" mix doesn't entirely come off. Like hearing Elton John in Verizon Hall. ■

Sources

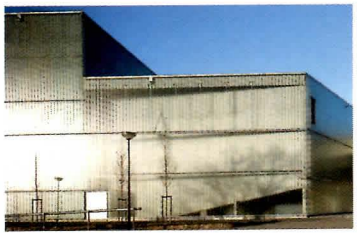
Steel frame: *Helmark Steel*
Masonry cladding: *Beldon Brick*
Wood: *Architectural Woodwork Industries with Imperial Woodworking (Verizon Hall); Haggerty Woodworking (Perelman Theater)*
Glass, end walls: *National Glass (contractor); PPG (lights); Dlubak (lamination)*
Glass, barrel vault: *Architectural Skylight (manufacturer); Viracon (lights)*
Elastomeric roofing: *EDPM; Johns Manville*

www For more information on the people and products involved in this project, go to Projects at **architecturalrecord.com**.

Unprivate Identities

WHETHER BURIED UNDER A PARK OR WRAPPED IN TRANSLUCENT GLASS, THESE BUILDINGS EXPRESS THEIR COMMUNITIES' NEEDS AND SERVE AS THEIR PUBLIC FACE.

By Clifford A. Pearson



1.

IJsselstein, the Netherlands

Ben van Berkel and Caroline Bos's UN Studio designs a city hall that floats above a new urban plaza and helps link the old town with the new.

2.

The Bronx, New York

A recreation and arts center by Hanrahan + Meyers offers kids in the Hunts Point area an alternative to the prison next door.

3.

Vancouver, British Columbia

Its roof a park and its front a marina promenade, this concrete-and-glass building by Henriquez Partners serves an upscale community.

4.

Chula Vista, California

Inspired by the agricultural buildings that have been replaced by suburbia, Rob Wellington Quigley creates a community center in a park.

Whose community is it? That's the key question behind each of the buildings shown here. Before the architects start designing, before the administrators begin programming, even before the client selects a site, the major players must agree on whom the building will serve. In a society with changing demographics and fuzzy lines between public and private realms, defining community is a tough—potentially explosive—task.

The four projects in this month's Building Types Study come from three different countries and represent a range of social contexts. One project is a city hall in a historic European city, another is a recreation and crafts center in a new stretch of southern California suburbia. One serves a low-income neighborhood in the south Bronx, while another is surrounded by luxury apartment towers. All of the projects, though, share a similar scale and address a common set of design issues. Who are the people who will use the building? What are their needs? How can the architecture relate to what is already built in the area yet also point to new possibilities? How can the building be welcoming and at the same time secure?

Once upon a time, municipal governments built public facilities, and private groups such as developers or homeowners associations would build clubhouses open just to a particular group of people. Today, such easy divisions of responsibilities are less common. For example, a private company built the Coal Harbour Community Center in Vancouver as part of its deal to develop luxury housing, then handed it over to the city to own and run. A similar public-private partnership created the Heritage Park Community Center in Chula Vista, California. Even in Holland, where the public sector traditionally carries a greater burden of community services than government does in North America, the city of IJsselstein brought in a private company to operate the theater in its new city hall.

While planners had envisioned community facilities for Coal Harbour and Heritage Park from the beginning, the Hunts Point and IJsselstein projects had to elbow their way into existing urban settings. Either way, the best community buildings reach out and make connections to their surroundings—by creating new outdoor spaces, reshaping existing spaces, recalling materials found in the area, or acting as hinges between old and new.

No matter what approach its architects take, a community building can help define a neighborhood, putting an architectural face on a diverse mix of people. That's why these projects matter so much. ■

www For additional community buildings, and more information on the people and products involved in the following projects, go to Building Types Study at **architecturalrecord.com**.

IJsselstein City Hall
IJsselstein, the Netherlands

1

A COMBINATION CITY HALL AND THEATER BY UN STUDIO MAKES CONNECTIONS BETWEEN DIFFERENT PARTS OF TOWN AND DIFFERENT ERAS.

By Tracy Metz

Architect: *UN Studio—Ben van Berkel, architect; Harm Wassink, project leader; Henri Borduin, Jeroen Steur, Oliver Heckmann, Luc Veeger, Casper Le Fèvre, Marion Regitko, Kiri Heiner, Jacco van Wengerden, Aad Krom, Niek Jan van Dam, Karst Duêrmeyer, collaborators*
Owners: *City of IJsselstein (city hall); Het Fulco (theater)*
Consultants: *Lodewijk Baljon (landscape); Peutz & Associes (acoustical)*
General contractor: *Aan de Stegge*

Size: *97,200 square feet (city hall and theater); 75,600 square feet (parking)*
Cost: *$7.3 million (excluding parking)*

Sources
Glazing system: *Pilkington*
Recycled green glass: *Profilit*
Acoustical panels: *Isotoon*

www For more information about the people and products involved in this project, go to Building Types Study at **architecturalrecord.com**.

Program

With a new city hall designed by UN Studio, the Dutch town of IJsselstein, a few miles southwest of Utrecht, marks its coming of age. Not literally—the town is centuries old—but emotionally. By providing an urban focal point, public space, and unusually thoughtful architecture, the town hall fills some critical gaps in IJsselstein's civic fabric.

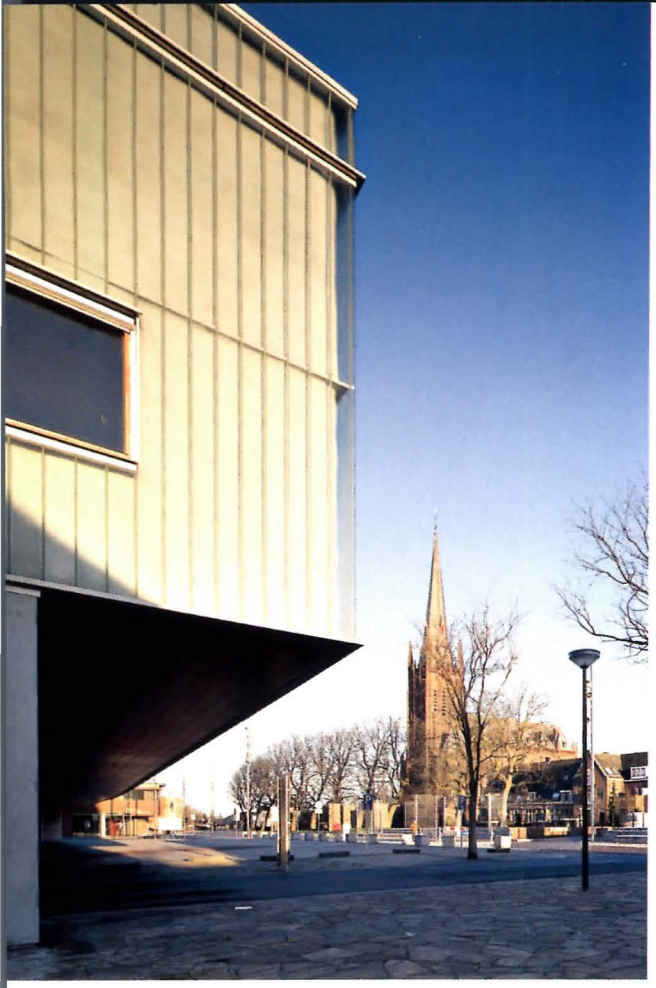
The client's requests were straightforward: build a combination of a city hall, theater, and café with space for social activities and underground parking for 250 cars. Not too expensive, please, and not too tall (no more than three stories). And somehow it must negotiate a tricky site on the border between the town's small historic center—where a windmill still grinds flour every day—and a large expanse of new housing.

Solution

IJsselstein's goals in building the city hall were to create some formal cohesion between old and new and provide residents with a new social and cultural venue. The area around the hall is emerging as an extension of the old town center, with a supermarket, apartments, and a stop for a light-rail line.

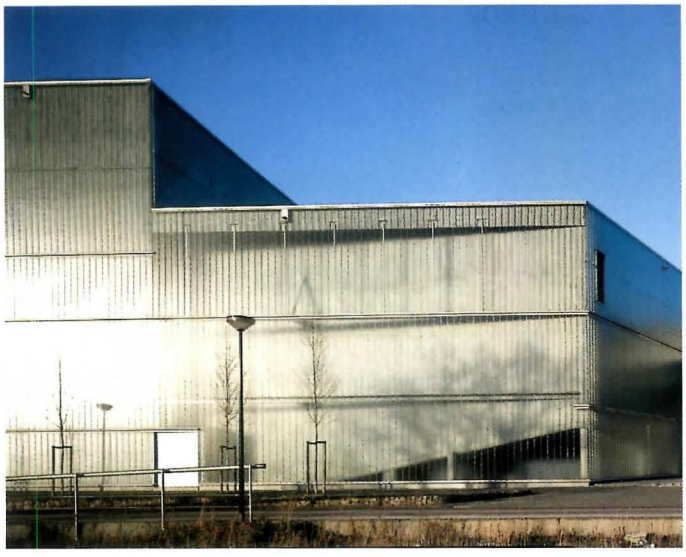
Before the town hired Ben van Berkel and Caroline Bos's Amsterdam-based UN Studio, it hired a large urban design firm from Rotterdam to develop a general configuration plan. "The first thing we did was switch the cultural and civic functions around," says Harm Wassink, a project leader for UN Studio. "It seemed logical to place the entrance to the café on the side where pedestrians and bicycles come by and to put the entrance to the city hall on the new public square across from the historic center," adds Tobias Walliser, the other project architect. The slow traffic on the east side is "guided" into the urban domain by extending the red asphalt of the bike path under the building and

RECORD's Amsterdam correspondent, Tracy Metz writes about architecture and landscape for NRC Handelsblad.



The building floats above a new public plaza and helps connect the historic city center with new housing developments beyond. On the main facade (below), the architects used vertical windows for offices and translucent glass for cultural spaces.

The architects wrapped the building in a range of different kinds of glazing, including a translucent green material made from recycled glass that is used on the theater (below). The building provides a variety of spaces for culture, as well as city offices and chambers for the city council (opposite, top).



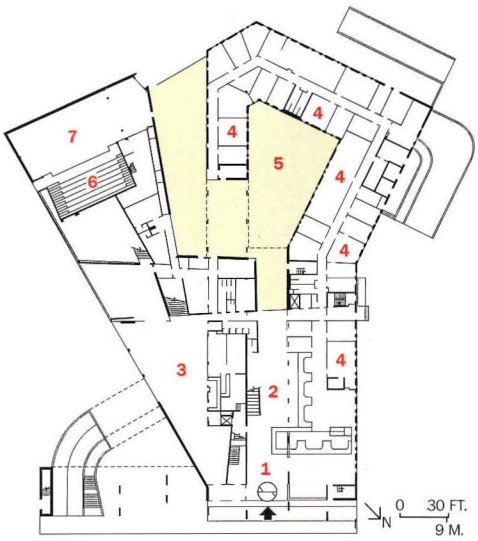
into the new plaza.

To root the building in its context, the architects oriented it along sight lines set by its two big public neighbors, a Dutch Reformed church and a Catholic basilica. The architects consistently maintained these lines throughout the building. They staggered the concrete piers supporting the long cantilevered wing of the north facade so the lines of vision are uninterrupted as you look out the building. They even arranged the theater's 370 seats along these lines, setting them at an angle to the enclosing box and squeezing the bright red aisles into long thin triangles that create a momentary sense of disorientation.

While most buildings in town are brick, UN Studio decided to wrap the city hall in something quite different: a translucent material made of recycled glass that comes in U-beams and gives the facade a sense of depth. Using the material in single or double layers to make it less or more opaque, and contrasting it with clear glass, the architects were able to create separate zones in the facade without interrupting the building's mass. And by applying it to the building's corners and silhouetting it against the sky, they created delicate, diaphanous edges.

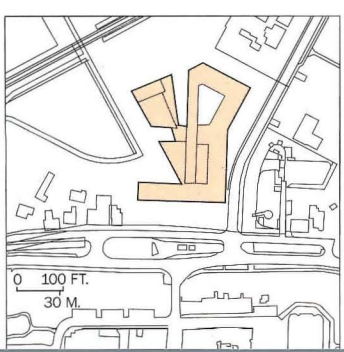
Commentary

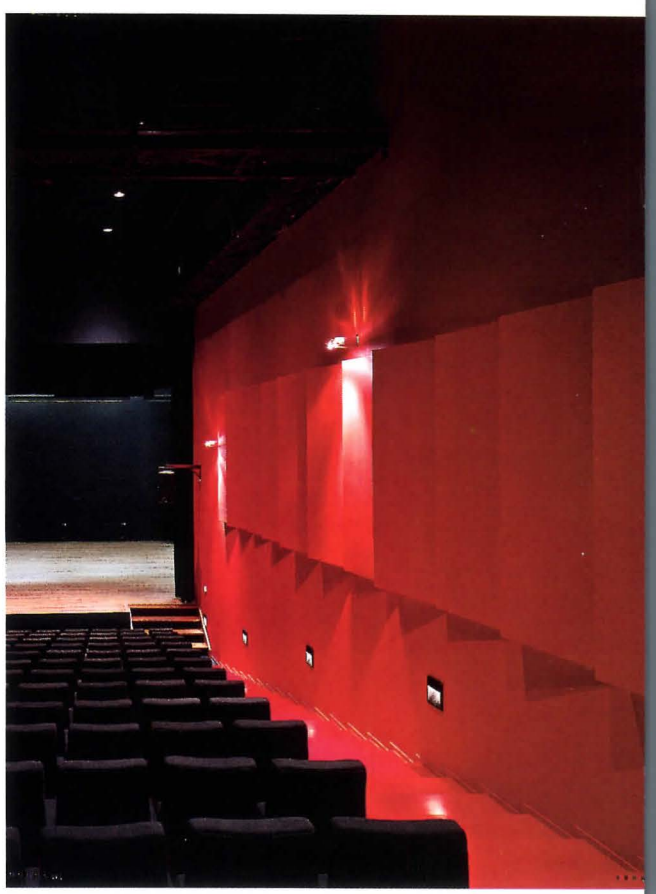
At first, UN Studio wanted to integrate the building's civic functions with its cultural ones. But the client kept pushing for greater separation. In the end, the only overlapping of the building's two largely autonomous halves is in the movie hall, which literally breaches the divide on the first floor, next to (but not visible from) a rather depressing, windowless wedding chamber. The courtyard, beautifully landscaped with rocks and narrow water channels by Lodewijk Baljon, symbolizes the uneasy cohabitation of these two functions in their glass cage: no touching, only looking. Given these constraints, it is to the architects' credit that this building manages to put on a dignified, convincing, and coherent public face. ■



GROUND FLOOR

1. *Lobby*
2. *City council services*
3. *Café*
4. *Office*
5. *Courtyard*
6. *Theater*
7. *Stage*





Hunts Point Community Center
The Bronx, New York

2 **HANRAHAN + MEYERS ARCHITECTS DESIGNS A "SOFT, SCULPTURAL" PLACE FOR RECREATION AND THE ARTS IN A TOUGH NEIGHBORHOOD.**

By Clifford A. Pearson

Architect: *Hanrahan + Meyers Architects—Tom Hanrahan, AIA, Victoria Meyers, AIA, partners; Rhett Russo, project architect; Sam Leung, Jason Holmes, Phillip Binkert, project assistants*
Client: *New York City Department of Design and Construction*
Engineers: *LERA (structural); Lakhani & Jordan (mechanical/electrical/plumbing)*
Landscape: *Signe Nielsen*
Construction manager: *STV Construction*
General construction: *TJM Construction*

Size: *18,625 square feet*
Completion date: *October 2001*

Sources
Weathered concrete block: *Anchor Products*
Aluminum and glass curtain wall: *YKK Industries*
Standing-seam metal roof: *Englert*
Bi-folding security doors: *Wilson Doors*
Metal halide lights: *Holophane*

www For more information about the people and products involved in this project, go to Building Types Study at **architecturalrecord.com**.

Program

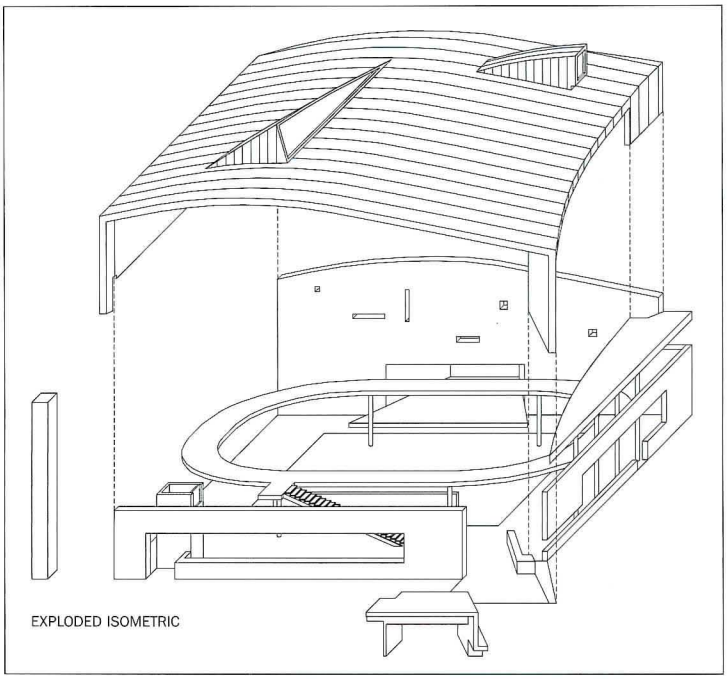
A spit of land pushing into the East River, Hunts Point is where New York City's food chain begins: literally, with the sprawling wholesale food market named for the area, and figuratively, as where many Dominican and Puerto Rican immigrants begin their struggle up the American economic ladder. It's a tough place, with as many people sliding down as moving up. Any facility that offers a sense of stability is welcome there. The Hunts Point Community Center is such a haven, providing a refuge for kids to play basketball, do their homework, or act in a play.

The community center's immediate neighbors underscore some of the promises and failures of the South Bronx: a nondescript day-care center, the Julio Carballo playing fields, the St. Ignatius monastery, and Spofford Prison.

Thanks to the participation of Ninfa Segarra, who was deputy mayor during the project and comes from the area, the community center moved forward on a fast track, taking just seven months to build and two years from design to completion. Segarra was also the person who pushed to include arts spaces in the program, along with ones for sports and recreation.

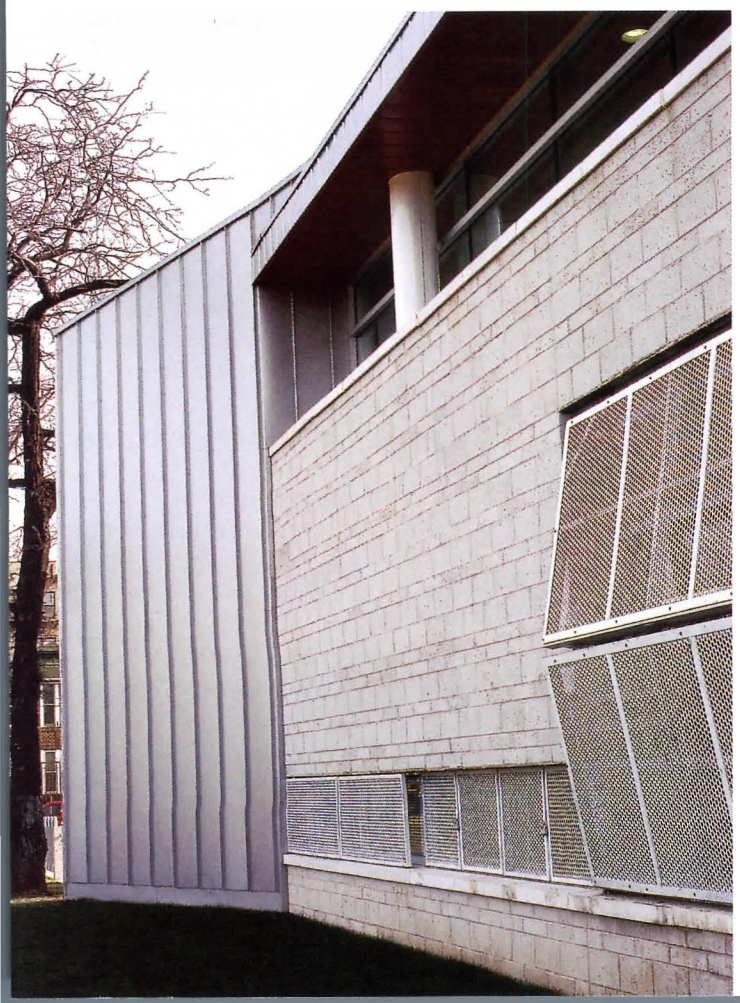
Solution:

The speed of the project, combined with the limited capabilities of public contractors, set parameters for the architects. "You need to make your moves big and keep things fairly loose," says Tom Hanrahan, AIA, one of the partners at Hanrahan + Meyers Architects. He and his partner, Victoria Meyers, AIA, designed a great curving roof to grab attention and recessed the east-facing entry facade 5 feet under the roof to give the building depth and protect it from the morning sun. At the same time, the architects kept the detailing simple and approached the building as a series of separate systems (structural, cladding, interiors) that work together without necessarily aligning perfectly. "You have to paint with broad brush strokes on a city project like this," says Hanrahan.


EXPLODED ISOMETRIC

Set on a 100-foot-square piece of land carved from the featureless city park that includes the Julio Carballo fields, the community center needed to establish a secure and inviting presence. "We wanted to give the building a soft, sculptural character," says Meyers. "We even looked at Ronchamp," she notes, recognizing in her voice the gap some observers might see between a recreation center and Le Corbusier's great pilgrimage church.

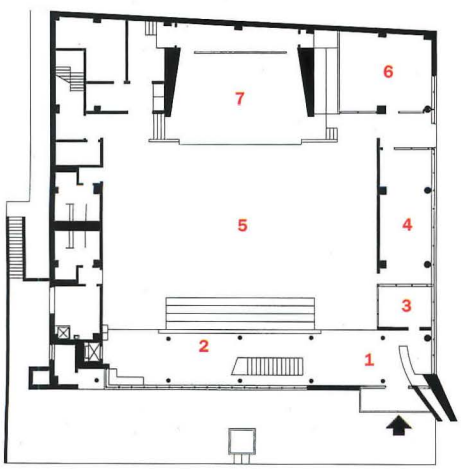
While the client wanted to limit glazing on the ground floor for security reasons, Hanrahan and Meyers showed they could incorporate *long*



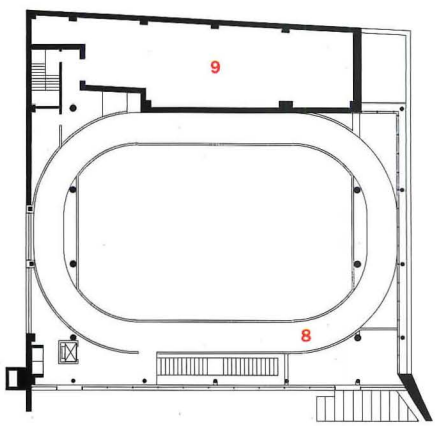
Bi-fold hangar doors on the main facade (above) and the side facing the playing fields (below and left) protect windows. When open, the perforated-metal doors act as a window canopy. Sand-blasted concrete block echoes the gray stone of a nearby monastery.

The architects kept fencing around the site to a minimum (above). "We wanted a building in a park, not a building in a cage," says Hanrahan. Though the roof and skylights were the most complex part of the structure, standardized roof trusses helped simplify it.

1. *Reception*
2. *Lockers*
3. *Office*
4. *Classroom*
5. *Gym/auditorium*
6. *Fitness*
7. *Stage*
8. *Track*
9. *Mechanical*



FIRST FLOOR



SECOND FLOOR

0 20 FT.
3 M.

windows on the east and north facades (facing the street and playing fields) by using airplane-hangar doors that protect the fenestration at night but slide up and open during the day. The hangar doors are made of perforated metal so the interior can glow in the evening, and they fold in two sections to form a window canopy when the sun is out. To reduce solar loads and block views of the prison next-door, the architects wrapped the south and west sides of the building with mostly windowless mechanical and service areas.

The main floor of the building accommodates most of the center's activities, including a classroom with computers, a small fitness room, rest rooms, and a gym with a stage on one side. The second floor, which is surrounded by large areas of glass on three sides, is mostly a running track around the gym below. Two north-facing skylights bring daylight deep into the building and serve as sculptural elements inserted in the roof. "The idea was to make the running track float in the space," explains Meyers. The architects had hoped to include a soft "pillowlike" ceiling above the gym, but the city rebid the project against their advice and it came in higher the second time, forcing them to eliminate the ceiling and expose the roof from inside.

Structurally, the building combines a steel frame with concrete-block walls. Finishes such as terrazzo flooring in the lobby and ground-faced concrete block were selected for durability and ease of maintenance.

Commentary

The Hunts Point Community Center is a building with attitude—tough on the outside, soft on the inside. "This community really needed a place like this, needed it years ago," states Fernando Rosa, the manager of the center. "This place is a *home away* from home for a lot of kids from broken families," he adds. And it's clear from the lack of graffiti that the neighborhood as a whole has welcomed the facility. ■

The architects had hoped to use a vibrant color scheme on certain planes inside the building to animate the interiors and add depth to the spaces. Some of this was executed, but in a toned-down manner (this page).

Coal Harbour Community Center
Vancouver, British Columbia

3 **HENRIQUEZ PARTNERS TUCKS A RECREATION AND SOCIAL CENTER UNDER A PARK TO PRESERVE EXPENSIVE VIEWS OF WATER AND MOUNTAINS.**

By Sheri Olson, AIA

Architect: *Henriquez Partners Architects—Gregory Henriquez, AIA, design partner; Shawn Strasman, Fred Markowsky, Yijin Wen, Jaime Dejo, Frank Stebner, project team*
Client: *Marathon Developments*
Owner: *City of Vancouver, Board of Parks and Recreation*
Engineers: *CY Loh & Associates (structural); Stantec (mechanical); Arnold Nemetz & Associates (electrical)*
Landscape architect: *Philips Wuori Long*
General contractor: *Darwin Construction*

Size: *85,000 square feet*
Cost: *$10 million*

Sources
Liquid applied roofing membrane: *Monsey Bakor*
Anodized aluminum windows, skylights, exterior doors: *Kawneer*
Exterior feature lighting: *Rebelle Architectural Lighting, "Orchestra"*

www For more information about the people and products involved in this project, go to Building Types Study at **architecturalrecord.com**.

Program

Like a half-hidden submarine, the Coal Harbour Community Center on Vancouver's Burrard Inlet breaks the grassy surface of a waterfront park, emerging in a sleek skylight that resembles a glass conning tower. Its posh address (on some of the most expensive property in North America) forced the project underground to preserve the spectacular water and mountain views enjoyed by residents in nearby luxury towers.

The Coal Harbour development is transforming what had until recently been train yards at the end of the Trans-Canadian railroad into a community that will eventually comprise 5,000 people in 15 towers on 57 acres. Several apartment towers have already been built, and plans call for a school, a day-care center, and more housing.

Aggressive planning efforts to entice people back downtown require developers in Vancouver to pay for a portion of public amenities, such as community centers. "It's the third places—outside home and workplace—that create a neighborhood," says Larry Beasley, codirector of planning for the city of Vancouver.

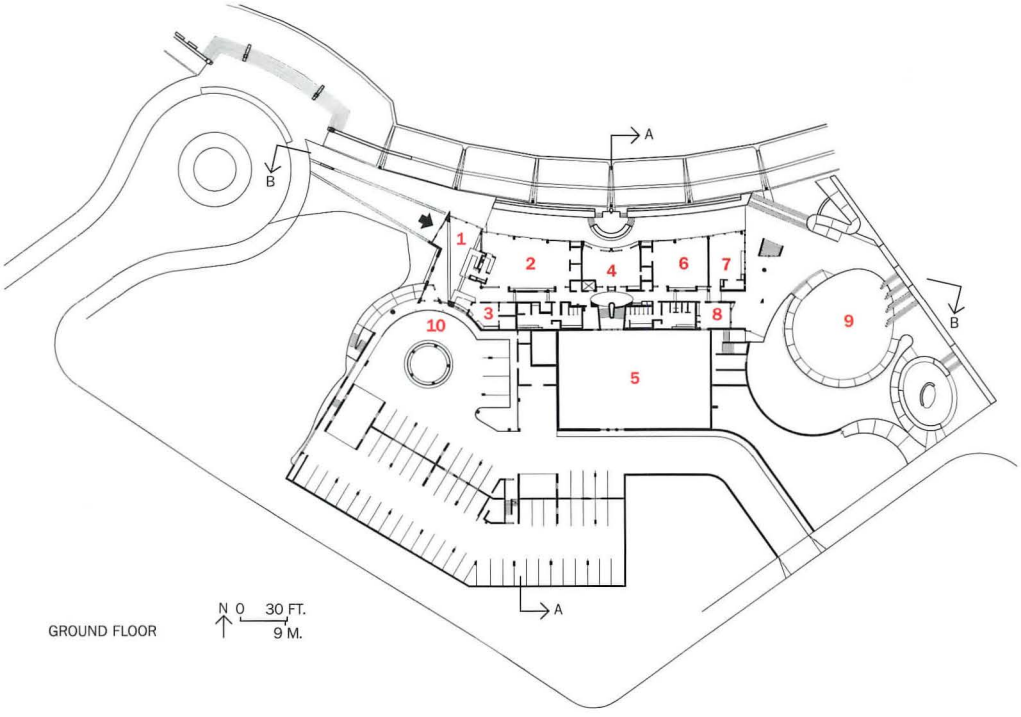
The result is a recent crop of boutique community centers tailored to specific neighborhood needs. Coal Harbour's cappuccino bar and mirror-lined dance studio serve its leisure-oriented users. It also fills needs not addressed by other community facilities in the area, providing, for example, one of the largest gyms downtown and a spacious, multipurpose room overlooking the marina that is already booked three years in advance for weddings.

Solutions

The architects exploited the shoreline topography by slipping the project into a 16-foot grade change between the park and sea level. Pristine poured-in-place concrete (the happy result of a strong tradition in British Columbia) serves both as infrastructure and enclosure, tying the project together. For example, what starts as a bench-height wall in the park winds its way down the site to become a concrete frame around a glass facade along the seawall promenade. "Our goal was to blur the line between building and landscape," says Gregory Henriquez, AIA, the design partner in charge of the project.

Contributing editor Sheri Olson, AIA, is the author of Miller/Hull, *published by Princeton Architectural Press.*

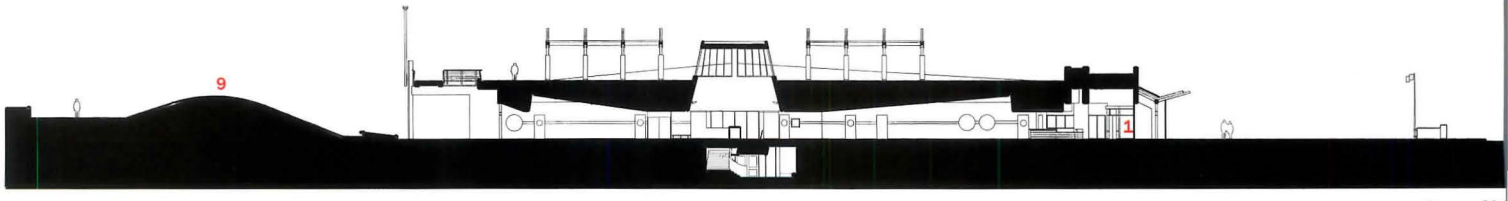
Although mostly hidden from above (opposite), the 85,000-square-foot community center asserts a strong waterside presence with sculptural concrete walls, outdoor stairs, and a towerlike skylight (this page).



GROUND FLOOR

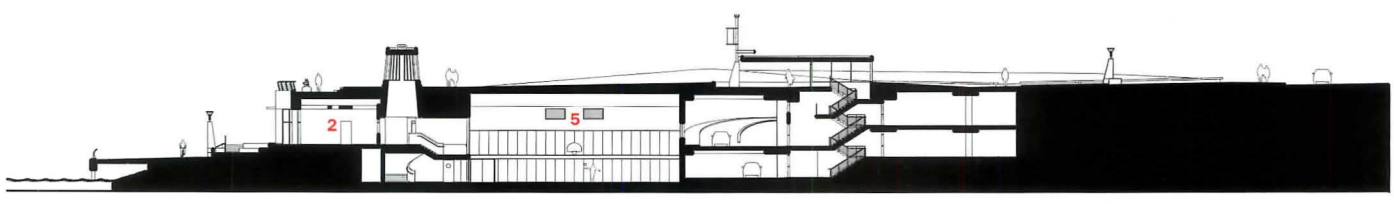
Light-topped masts and brightly painted steel posts call attention to access points and key elements of the project (above left and right). The distinctive form of the conning tower/skylight reads both above and below ground (above right and opposite, top), so it can serve as a navigational landmark for visitors. The facility provides the community with resources such as a large gym (opposite, bottom left) and a café (opposite, bottom right).

1. *Lobby*
2. *Multipurpose*
3. *Office*
4. *Youth lounge*
5. *Gymnasium*
6. *Dance*
7. *Crafts*
8. *Meeting*
9. *Amphitheater*
10. *Drop-off*



WEST-EAST SECTION (B-B)

0 20
6 M



NORTH-SOUTH SECTION *(A-A)*

Topside, a concrete path circles a grassy hill, unifying the irregularly shaped, five-acre park and adding visual interest to the birds-eye view from the tower. Built on 12,000 piles on dredge-and-fill land, the project uses the covering weight of the earth to help keep the structure in place in the event of an earthquake.

While the facility is tucked under grass, three mastlike beacons identify the building entrances and light the entire site. The nautical reference represents the architects' abstract interpretation of the surrounding ships, seaplanes, and docks.

Visitors arriving by car can be dropped off at a large circular area punctuated by a light well with a stand of bamboo growing up through its center from the garage below. From the garage or the waterfront, visitors enter a main lobby activated by a coffee bar with large windows facing the marina.

Although a double-loaded corridor runs the length of the project, the architects enlivened it with oversize portholes that borrow daylight from waterside spaces, transom windows, and sidelights around doors. The long, lineal space recalls a submarine hull, and a large oval skylight painted a sunny Peter Max yellow floods the interior with light while bringing a certain Beatles song to mind.

Commentary

Though complex in plan and section, the project is easy to navigate due to a series of architectural events. The conning tower, for example, is legible above and below ground, so it can serve as an orientation device while also demonstrating a sophisticated wit. The architects' abstract and episodic approach to the nautical theme is cohesive, not cloying.

The matter-of-fact handling of the constructed character of the site—no romanticized views of nature here, thank you—creates a particularly urban park and an unusually fluid building that incorporates both architecture and landscape. ■

Heritage Park Community Center
Chula Vista, California

4 **IN A BUILDING FOR A NEW SUBURBAN COMMUNITY, ROB WELLINGTON QUIGLEY RECALLS CALIFORNIA'S HERITAGE OF SIMPLE AGRICULTURAL SHEDS.**

By Alice Kimm

Architect: *Rob Wellington Quigley, FAIA—Rob Wellington Quigley, FAIA, partner; Bob Dickens, project architect; Katy Hamilton, project manager*
Owners: *The Otay Ranch Company and the City of Chula Vista*
Consultants: *Flores Lund Consultants (structural engineer); Burton Associates (landscape); Randall Lamb Associates (lighting)*
General contractor: *Erickson Hall Construction Company*

Size: *6,000 square feet*
Cost: *$1.3 million*

Sources
Metalwork: *Aztec Sheet Metal*
Glazing: *Moonlight Glass*

www For more information about the people and products involved in this project, go to Building Types Study at **architecturalrecord.com**.

Program

In some respects, the new residential development of Heritage Park typifies suburban sprawl: 1,314 merchant-built, single-family houses and 1,566 multifamily units that continue San Diego's relentless push south to the Mexican border. However, its master plan, designed by landscape architects Burton Associates, breaks with some of sprawl's conventions—devoting a large percentage of its 620 acres to landscaping, including a 120-acre park, or "village core." It even envisions a future light-rail transit system that will reach into every corner of the development.

"Tentacles of a green infrastructure reach into each of the residential clusters," says Rob Wellington Quigley, FAIA, who designed the 6,000-square-foot community center that anchors the village core. Conceived as a place for arts and recreation, the village park also includes playing fields, an elementary school, and a Quigley-designed aquatic center. The community center, though, is the heart of this new landscape.

The program for the $1.3 million facility is relatively generic: a large meeting room divisible into two, a crafts room connected to a secure courtyard, a kitchen, and an outdoor amphitheater.

Alice Kimm is an architect in Los Angeles and an occasional contributor to ARCHITECTURAL RECORD.

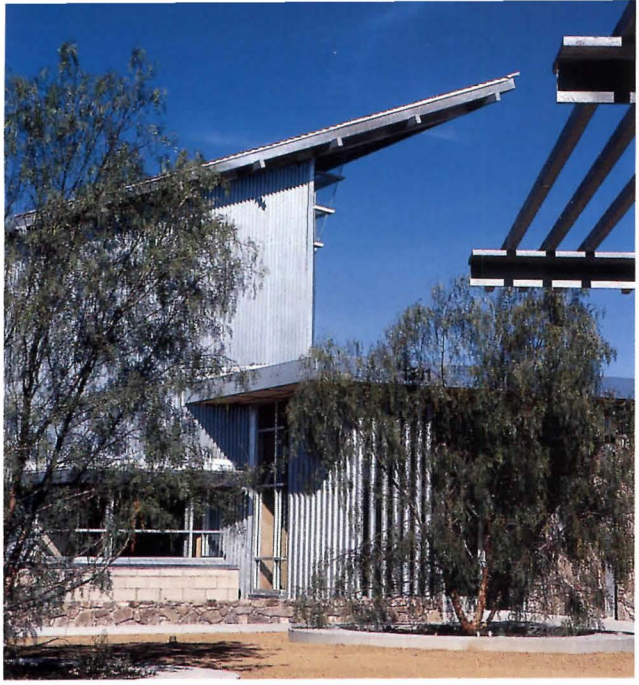
Solution

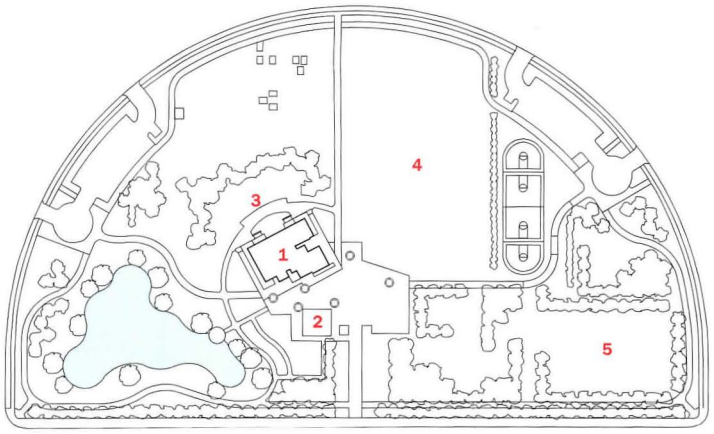
In form, the community center breaks significantly from the designs found in the rest of the development. The building's large pitched roofs and low-slung profile make reference to the barnlike "agricultural sheds" that formerly dotted this site. "Burton Associates generated a rural theme for the building," Quigley explains. "While we didn't actually save any of the existing rural shed buildings, we were inspired by them."

Quigley says the community center is "meant to be a simple and straightforward building." Simple it is. The main spaces—a large meeting room and a crafts room—flank a hallway, or "gallery," which leads to the outdoor amphitheater and park. A courtyard for ceramics provides a gated outdoor space adjacent to the crafts room. Storage spaces and rest rooms form a thick poché along the perimeter of the building.

The building is most interesting in section. Its form, according to Quigley, can be likened to "a barn with the corner over the entry and gallery lifted up to let in clerestory light." Daylight floods the gallery and penetrates the meeting and craft rooms through large, angled clerestory windows. So the interiors are enlivened by the play of light spilling from above. However, there are, curiously, few other openings connecting interior spaces with the exterior.

Quigley kept his palette, like his forms, simple and straightforward. He exposed the building's steel trusses and posts and clad much of the structure in corrugated

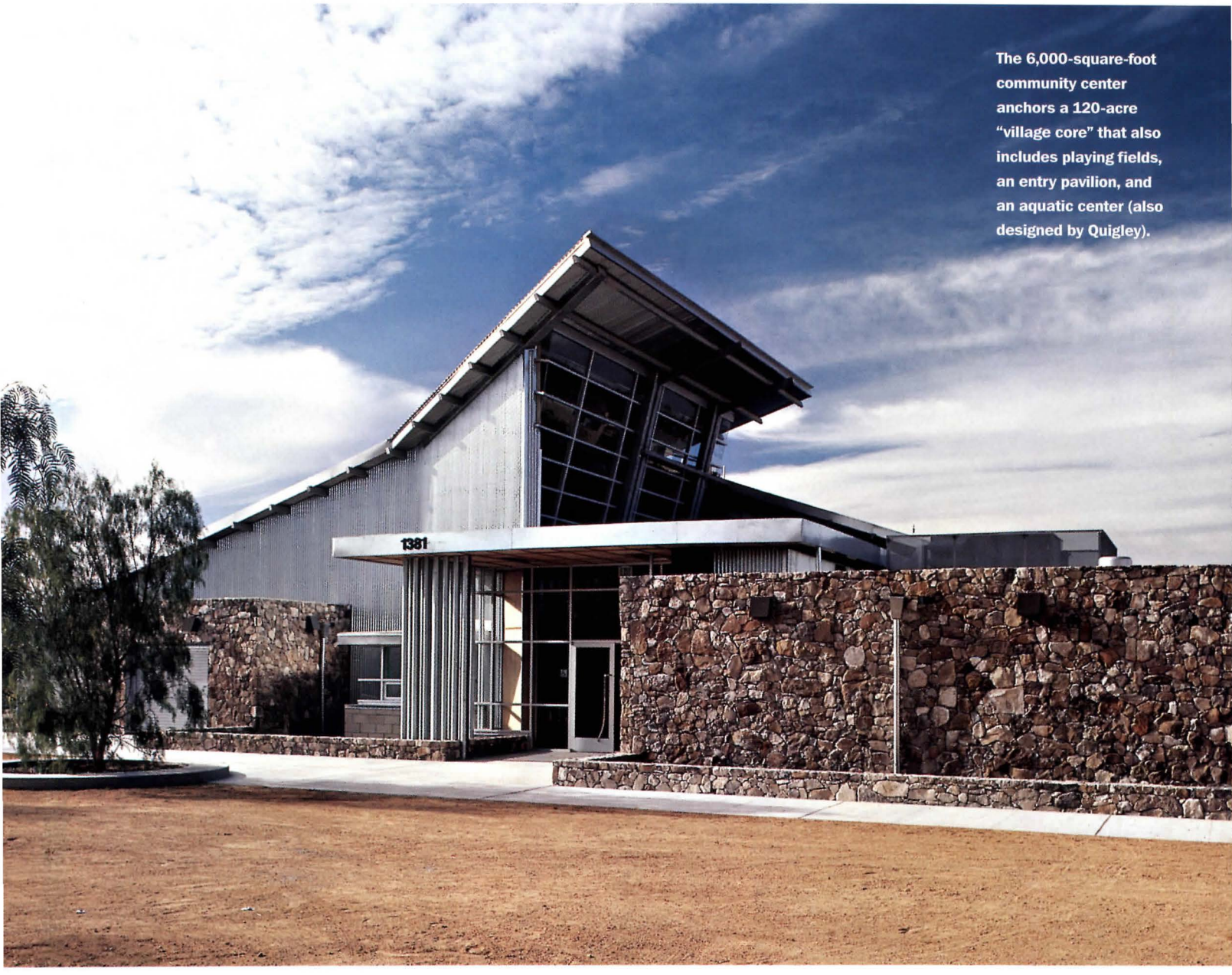




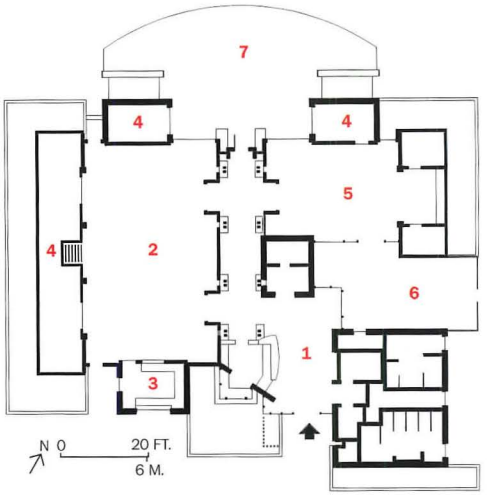
SITE PLAN

N 0 50 FT.
15 M.

1. *Community center*
2. *Pavilion*
3. *Amphitheater*
4. *Playing fields*
5. *Aquatic center*



The 6,000-square-foot community center anchors a 120-acre "village core" that also includes playing fields, an entry pavilion, and an aquatic center (also designed by Quigley).



1. *Lobby*
2. *Meeting*
3. *Kitchen*
4. *Storage*
5. *Crafts*
6. *Courtyard*
7. *Stage*

Quigley used a combination of materials, such as rough stone, plywood, and concrete, to give the building the feeling of a modern agricultural shed. In the main corridor, or "gallery" (left), most daylight comes from clerestory windows.

galvanized sheet metal reminiscent of agricultural sheds. He also used concrete block and the same rough, brownish stone found throughout the Heritage Park development. Inside the community center, the architect surfaced walls, the entry ceiling, and the reception desk with Douglas fir plywood, while specifying vinyl-tile flooring for the large meeting room and colored concrete for floors elsewhere.

The building boasts some clever details: stone bases for the gallery's structural steel posts that double as seating elements; an L-shaped screen of steel tubes on one side of the front entry that hides a security fence; and rough stone planters in front of the building that discourage skateboarders.

Commentary

In a context of suburban sprawl where wood-frame, stucco houses predominate, Quigley's community center provides a positive formal counterpoint. But given its public program and green setting, the building has a puzzling relationship with the outdoors—offering less contact between inside and out than one would expect.

While it brings plenty of daylight inside, the building provides few visual or spatial connections back to the park. Roll-up doors open the meeting and craft rooms to the outdoor amphitheater but account for only part of each room's short side. Thus the carefully coiffed and abundant landscape, which arguably sets this suburban development apart from most others, has little impact on people inside the community center. Quigley cites security concerns and the internalized nature of many activities taking place at the center as *justifications for limiting connections between indoors and out.*

Though attractive by itself, the building raises questions about the give-and-take between the need for security and privacy and the desire for transparency and openness. These issues are worth pondering, even in the context of a generic suburban development—indeed, *especially in such a place.* ■

In the aftermath of September 11, the urban landscape appears vulnerable and random

ARCHITECTS AND CONSULTANTS FOCUS ON RISK ASSESSMENT AND SECURITY THROUGH DESIGN

By Sara Hart

It is now a symbol of vulnerability as well as a safeguard. Commonly known as the Jersey barrier, because it was first used on the New Jersey turnpike in the 1950s to prevent out of control vehicles from careening into oncoming traffic, it is a continuous, partially tapered reinforced concrete wall that blends innocuously into the gray, multilane freeways that it divides. Weighing in at approximately 600 pounds per linear foot, it performs well.

Taken out of context, however, and deposited onto sidewalks and into public plazas, the portable version of the Jersey barrier is an eyesore, its design the basest application of form following function. Since the devastation of the World Trade Center, an attack mainly against civilians rather than federal or military personnel, portable barriers have been increasingly scattered coast to coast, decorating the entrances and perimeters of many office buildings and nongovernmental institutions and facilities. Their presence is obviously an improvised security solution, visual corroboration that we are unprepared for violent assaults on our buildings and open public spaces.

In no place are the barriers more ubiquitous than in Washington, D.C., where they started appearing in the 1970s and have steadily multiplied. With terrorist attacks on U.S. interests abroad, the 1993 bombing of the World Trade Center, and the destruction of the Alfred P. Murrah Federal Building in Oklahoma City in 1995, more layers of barriers have been added, until now they are so pervasive that they make the nation's capital appear to be permanently under siege.

The mantra: Openness

In the aftermath of September 11, the design community sought to stave off a panic that many feared would not only make the Jersey barrier an architectural icon but trigger an avalanche of draconian regulations that would turn buildings into bunkers and stifle creativity in the arena of civic architecture. Anxiety began before the destruction of the World Trade Center and a large portion of the Pentagon, and several sectors of the design professions teamed with bureaucrats to conduct studies, which yielded volumes of enlightened recommendations.

On November 30, 1999, the General Services Administration (GSA) and the U.S. Department of State, in cooperation with the American Institute of Architects (AIA), convened in Washington to debate the effects of terrorism on the country's public buildings at a symposium called "Balancing Security and Openness." An impassioned speech by then New York senator Daniel Patrick Moynihan eloquently summarized what most architects and many officials believe is the only appropriate guiding principle: "Architecture is inescapably a political art, and it reports faithfully for ages to come what the political values of a particular age were. Surely ours must be openness and fearlessness in the face of those who hide in darkness. Precaution, Yes. Sequester, No."

Jersey barriers have been an eyesore around the Washington Monument since 1998. New landscaping and a visitor center promise to restore its intended dignity.

Differentiating between risk and fear

Open yet secure. Accessible yet defensible. These are seemingly mutually exclusive demands. The GSA subsequently published a summary of the event in which a consensus is clearly and adamantly outlined. "Security should be designed to meet reasonable rather than rare catastrophic threats." Inspired by this apparent consensus, the event produced

CONTINUING EDUCATION

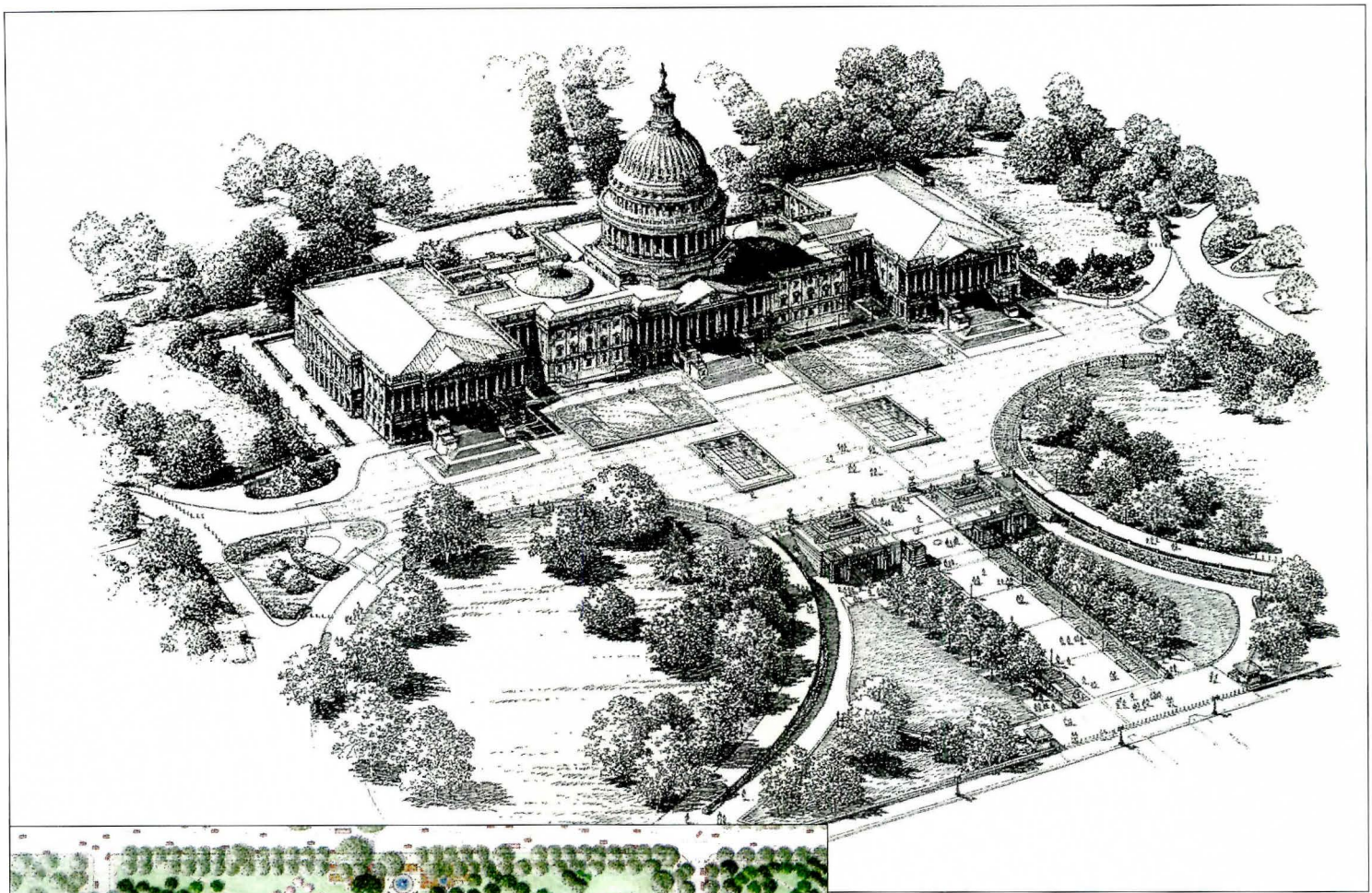
Use the following learning objectives to focus your study while reading this month's ARCHITECTURAL RECORD/AIA Continuing Education *article. To receive credit, turn to page 226 and follow the instructions.*

LEARNING OBJECTIVES

After reading "Fear Should Not Become a Form-Giver for Architecture," on page 55 of this issue, together with the article starting on this page, you should be able to:

1. *Discuss how public buildings can be open yet secure, and why.*
2. *Describe alternative ways to protect approaches to buildings rather than concrete barriers.*
3. *Explain how the Capitol Visitor Center will improve security of the Capitol.*

www For this story and more continuing education, as well as links to sources, white papers, and products, go to **architecturalrecord.com**.



Balancing security and design
The Olin Partnership has designed a series of sunken paths around the Washington Monument (above) that will guard against vehicles but maintain critical sight lines. RTKL's design for an underground Capitol Visitor Center (top) will increase security and make it possible for the east plaza to be landscaped according to Frederick Law Olmsted's original plan.

several solid, commonsense considerations: siting and setbacks, materials selection, structural systems that resist progressive collapse, the ability to isolate high-security spaces, landscaped buffer zones, and stand-alone checkpoints.

Yet there still is no consensus on how to assess reasonable risk or credible threat. An architect can design for security to the absolute outer limits of building science and never achieve an impenetrable building (at least not one that anyone would want to inhabit). This is the reality check that Gavin de Becker, best-selling author and security consultant, chants relentlessly in his books and presentations. In that 1999 symposium in Washington, he appealed to his audience to create a workable definition of *safe*, one that means "free of unacceptable risk." He explains this at great length in his latest book, *Fear Less: Real Truth About Risk, Safety, and Security in a Time of Terrorism* (Little, Brown and Company).

In a recent issue of the Georgia Institute of Technology publication *Research Horizons,* Russell Gentry and Craig Zimring, who are architecture professors at the university, site three reasons why there's so much confusion about what constitutes reasonable risk. First, there is no national building policy regarding security, no building science equivalent to the Federal Aviation Administration, for instance. Instead, there are building codes and standards, which generally adapt to trends in the

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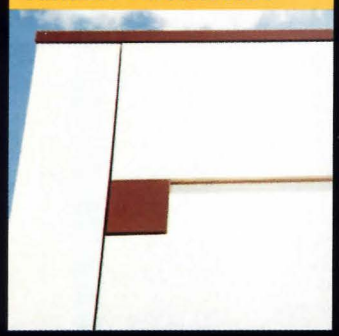

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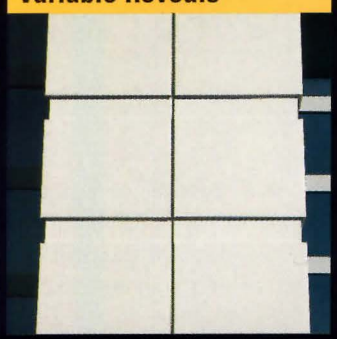

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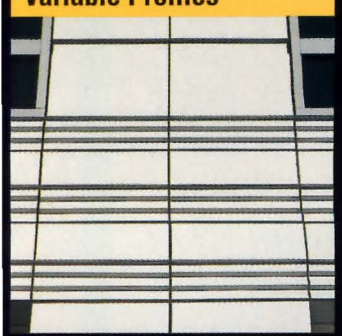

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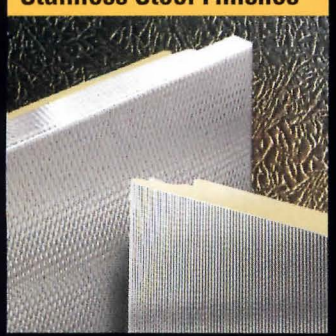

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Alternatives to the Jersey barrier
EDAW is one of several design firms commissioned by the National Capital Planning Commission to develop a series of bollards, planters, street furnishings, and gatehouses around the Capitol Perimeter. The firm is also working on prototypes for designers to select from in future projects.

building industry rather than dictate policy.

Secondly, there are few sources of research funding at the federal level for building science. The National Science Foundation funds research about building systems but not architecture. This, they say, leads to the third problem. Whereas building codes focus on issues such as life safety, structural integrity, and egress, they do not address security, largely because there is no definition of a "credible threat."

Gentry and Zimring call for more federally sponsored research carried out as a cross-disciplinary endeavor called the "science of building vulnerability." In essence, research, regulation, and building systems and their operation would be examined in relation to each other in an effort to achieve consensus in the area of risk assessment.

"What might be needed is some oversight body, without regulatory authority, much like the National Transportation Safety Board (NTSB)," suggests Gentry. "The NTSB looks at transportation safety and identifies problems and suggests solutions, but does not usurp the authority of existing regulatory bodies."

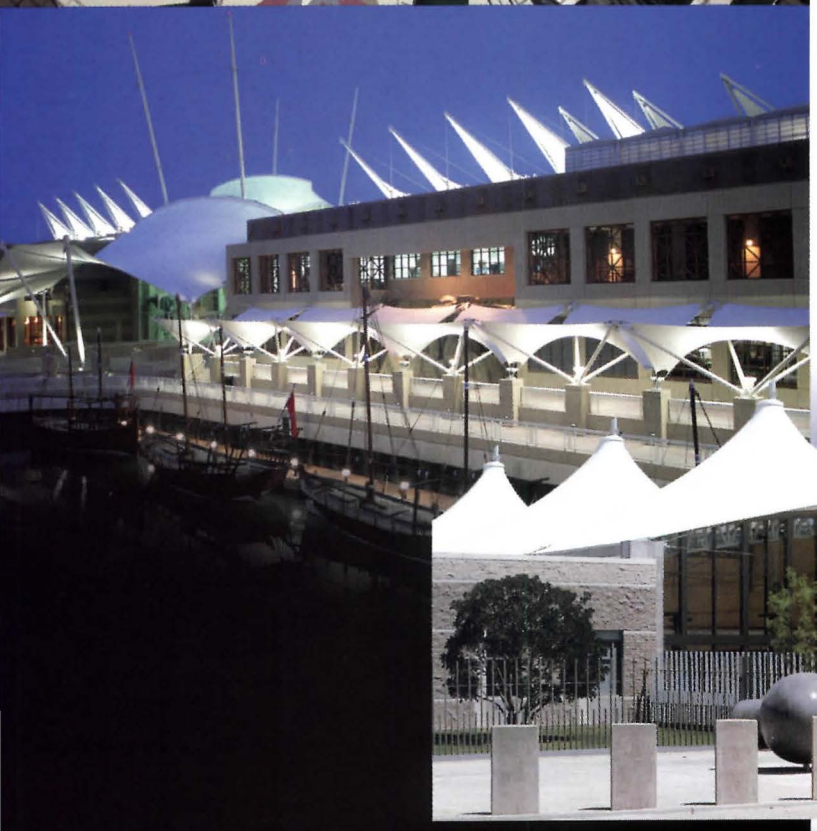
Their proposal is a long way from becoming reality; however, similarly motivated efforts in this direction are beginning to emerge. Gensler Architecture, Design & Planning periodically hosts members of the Washington, D.C., real estate community to discuss the future of building security. Recommendations from these meetings echoed de Becker's observations and added an emphasis on cost-effectiveness and the knowledge that threats change over time, an acknowledgment that further complicates risk assessment and, at the same time, creates an ecumenical and more productive exchange.

Security through design

Visual links between important federal buildings and open public spaces were important components of L'Enfant's 1791 master plan for the nation's capital and remain so today, even amidst the clutter of makeshift security devices. Two projects demonstrate how security-minded design

OPEN YET SECURE. ACCESSIBLE YET DEFENSIBLE. THESE ARE SEEMINGLY MUTUALLY EXCLUSIVE DEMANDS.

can actually improve the aesthetics of important spaces. The Washington Monument has been surrounded by Jersey barriers since 1998, when the U.S. embassies in Kenya and Tanzania were severely damaged by truck bombs. With the monument's renovation complete and its vulnerability to attack obvious, a plan to maintain its openness and security was approved by the Fine Arts Commission in December after the Philadelphia-based landscape-architecture firm Olin Partnership won the National Park Service's competition for a perimeter security plan. Instead



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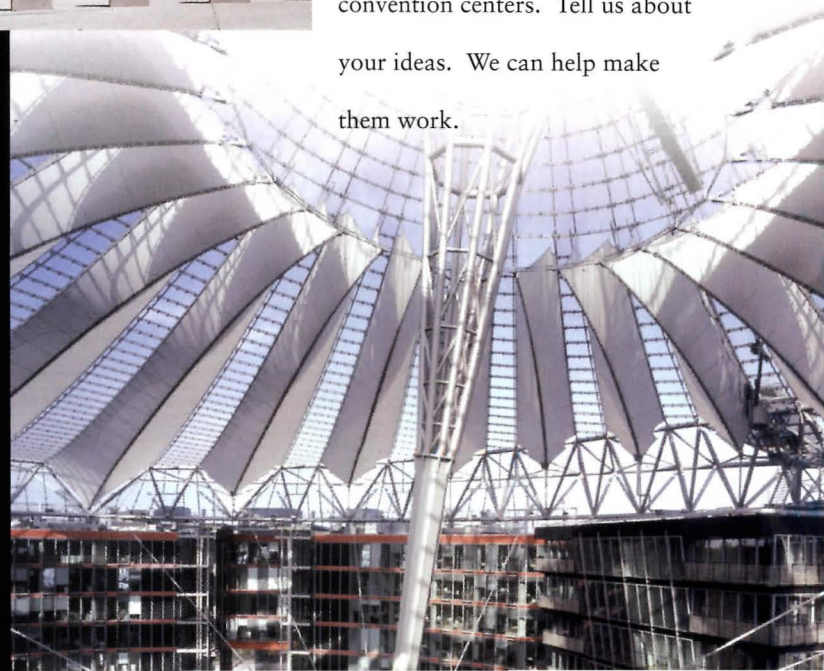

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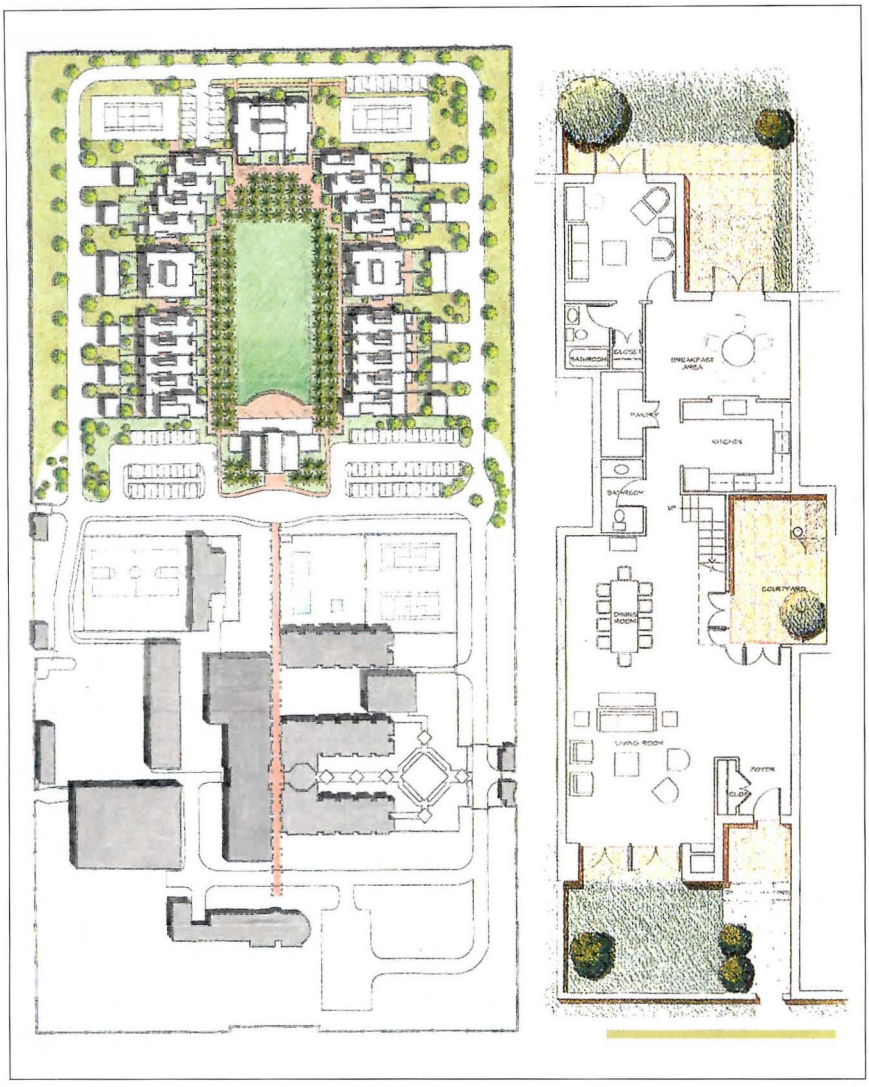

Protecting Americans abroad
Sorg and Associates' staff housing for the U.S. State Department in Bayan, Kuwait, incorporates security needs into the architecture. Town houses are sited around a courtyard with vehicular and pedestrian access controlled by gatehouses. Rear yards have high walls, and a day-care center is located deep within the compound.

of concrete bollards, fences, or outbuildings, the firm proposed a series of sunken paths of varying widths carved into the sloping hillside with 3-foot-deep, stoned-clad retaining walls, which will prevent vehicles from approaching the monument but won't disrupt critical sight lines.

Principal Laurie Olin rejected the idea of decorative bollards: "They would look like confetti on a large landscape." Instead of cluttering the hillside, he chose a centuries-old device used in French and English country gardens—the *ha-ha*, a channel with a retaining wall that serves as a substitute for a fence (it kept the cows away and yet was invisible from the manor house). "It's a natural solution and one that recalls some of the low walls and grading that [Frederick Law] Olmsted designed to direct pedestrians to the Capitol." In addition, tourists wishing to ascend the monument will be screened in a 20,000-square-foot, underground visitor center (to be designed by Washington-based Hartman Cox Architects) at a distance of 400 feet from the monument, and then approach it through a tunnel.

AFTER SEPTEMBER 11, ARCHITECTS WERE CONFRONTED WITH NEW QUESTIONS ABOUT SECURITY AND MARKET REALITIES.

The importance of a standoff distance is again confirmed in a similar scheme for the Capitol Visitor Center (CVC) under the Capitol's east plaza. According to Alan M. Hantman, FAIA, Architect of the Capitol—whose office is responsible for the 100-acre area within the Capitol Perimeter, which includes the Capitol itself, all the Congressional office buildings, the Capitol police headquarters, Library of Congress, Supreme Court, and other facilities—"Until two Capitol police officers were murdered in 1998, visitors [as many as 18,000 a day] were screened only after they were inside the Capitol building. After the tragedy, a makeshift shed was erected outside the east portico." To meet changes in security needs, Hantman reviewed and revalidated the plans, which needed few revisions to address new concerns.

Designed by Baltimore-based RTKL, the CVC is no mere security checkpoint. Scheduled for completion in 2005, it will contain an astonishing 588,000 square feet on three levels (compared with the Capitol, which covers 775,000 square feet) and will include exhibition spaces, two orientation theaters, an auditorium, gift shops, food services, vehicle access, loading docks, shell space for future use, and storage. By being underground, it is more secure, of course, but the greatest advantage is that it allows the plaza, which is currently a parking lot, to be

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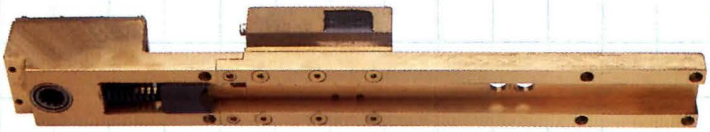
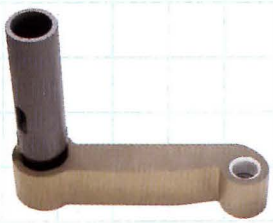


Cast bronze check and door guide assembly

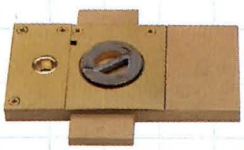
Cast bronze top pivot with bearing

Torsion bar closer spring



Cast bronze bottom arm

Cast bronze semi-automatic hold open device



Cast bronze floor box

Cast bronze door roller guide

Cast bronze door bottom pivot

Cast bronze top arm

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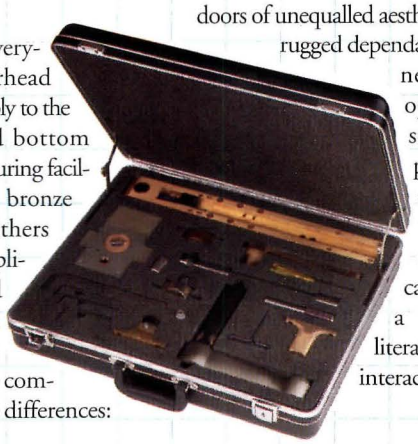

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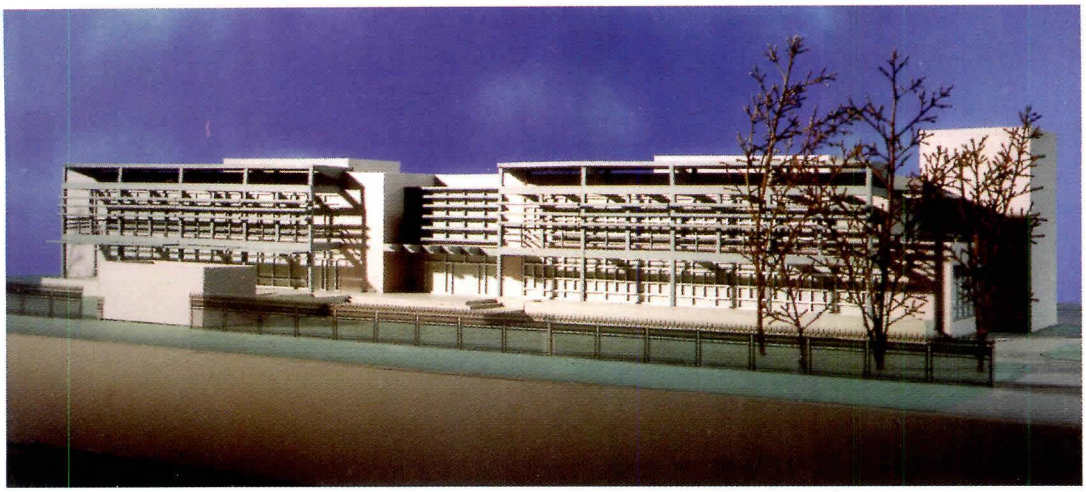

New embassy reflects democratic values
The U.S. Embassy in Tashkent, Uzbekistan, will have an anti-climb *brise-soleil* in front of a fake curtain wall that camouflages the stuccoed concrete envelope. A variety of window systems provides different levels of protection. Utility outbuildings make it unnecessary for service trucks to enter the compound. The site is protected with bollards on three sides and an intermittent irrigation canal at the rear.

returned to Olmsted's landscaping scheme of the 1870s.

The balancing of security strategies with the increasing demand for openness and accessibility, whether in private office buildings or federal buildings, is illustrated in two projects abroad. Suman Sorg, principal of the Washington, D.C., firm Sorg and Associates, has designed and renovated several buildings for the State Department and is experienced with security issues in other countries. Sorg recently designed new staff housing in Bayan, Kuwait. "The security criteria are different for diplomatic housing than for offices. There is always a debate about whether the housing should be near the offices or far away," she explains. The traffic is different. Children go to and from school; housekeepers, babysitters, and friends come and go, too, creating the need for the residences to be accessible around the clock.

Sorg's solution illustrates Barber's point that security should be incorporated into the architecture. Thirty-two town houses with community and day-care centers encircle an interior courtyard removed from the office compound. Separate vehicular and pedestrian entrances lead into the courtyard, each with its own guardhouse equipped with cameras and metal detectors, and yet this configuration seems no different from any gated community in the U.S. Openness, as an architectural representation of democratic ideals, was mandated by the State Department when it commissioned Sorg to design a new embassy in Tashkent, Uzbekistan, a former Soviet republic. Using local materials, Sorg designed an anti-climb (no footholds below 9 feet) brise-soleil. Stuccoed concrete walls with small security windows are hidden behind a fake curtain wall. Stand-off distances

"THE SECURITY CRITERIA ARE DIFFERENT FOR DIPLOMATIC HOUSING THAN FOR OFFICES."

for utility buildings, screening areas, parking, and controlled access are incorporated here as in all federal projects, but here the subtle integration of all needs into the design of the building makes the most stringent precautions seem uncontrived and appropriate.

Making smart choices

However a project is funded, a vulnerability assessment and cost-benefit analysis will determine whether the architect and client should pursue an active or passive plan. Active systems include expensive devices such as electronic entry control, closed-circuit TV, alarms, scanners, turnstiles, and guards, who can cost $220,000 a year for 24/7 service. In many cases, though, passive systems, such as evacuation plans, lighting, landscaping, and well-designed planters and bollards might be more effective.

Passive systems on a large scale can unify architectural elements as well as provide security. The Alexandria, Virginia, office of EDAW, a consulting firm and service provider in a variety of fields including urban design, environmental science, and landscape architecture, is one of several firms that is designing alternatives to the Jersey barrier. Their work is part of an approach recommended by the National Capital Planning Commission's Interagency Task Force to correct the damage done to the capital's character due to independent attempts at security at the expense

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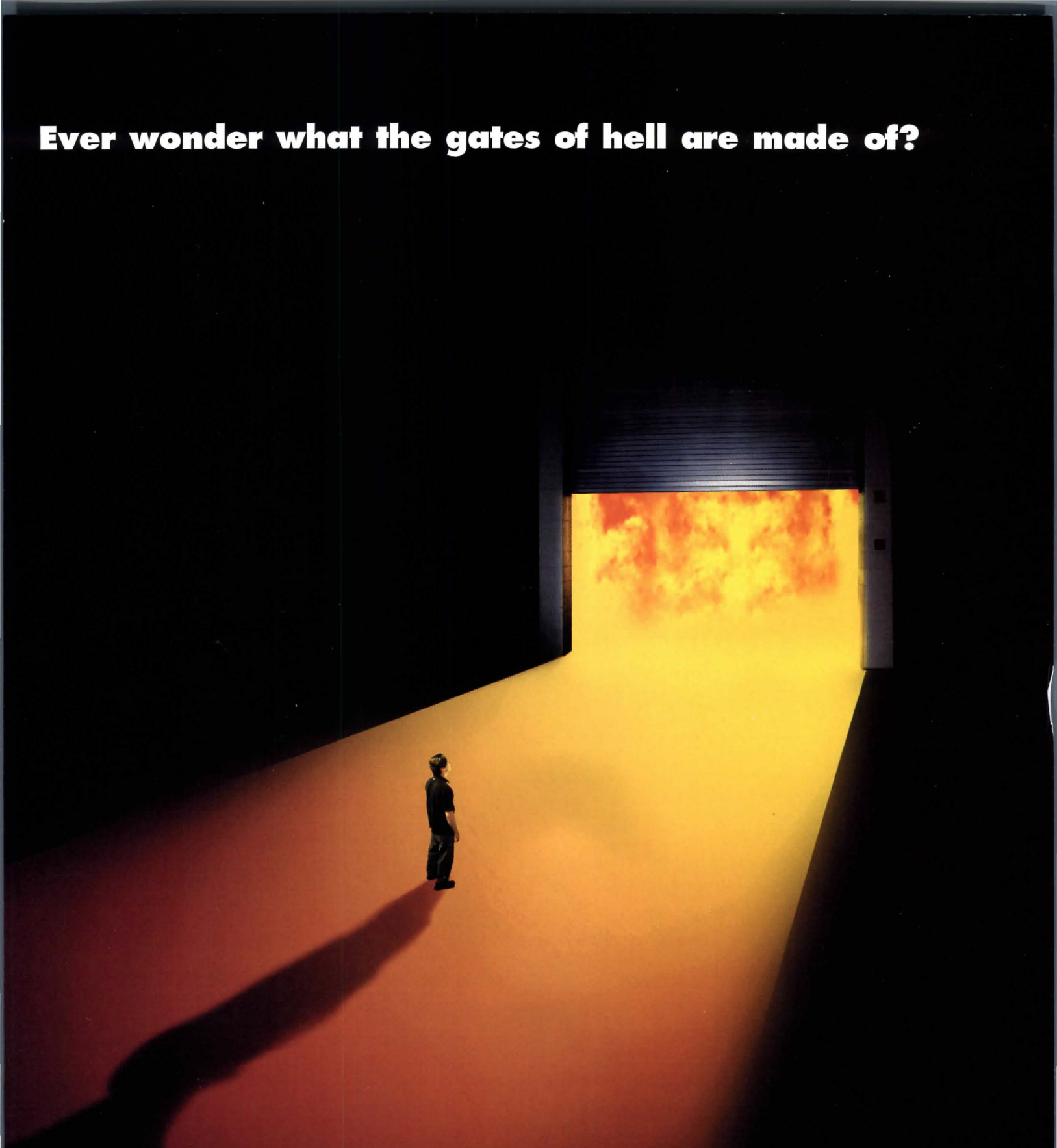

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of a comprehensive urban design strategy. Two years ago, EDAW designed a series of bollards, planters, street furnishings, and gatehouses around the Capitol Perimeter zone, especially around the Hart Senate office building on Constitution Avenue.

"I can't give you specific information on the bollards and planters, as it's information we may not to share," said Marsha Lea, senior associate, reflecting the sensitive nature of working for the government. "Each element is engineered to withstand a fully loaded truck traveling at low speed. This means that reinforcing in the aboveground portions, reinforced concrete footing and depth of footing, height above ground, and materials were all designed to do what a Jersey barrier does."

PEOPLE TOLERATED THE UGLY MAKESHIFT BARRIERS AROUND GOVERNMENT BUILDINGS BECAUSE THEY SEEMED TEMPORARY.

Could this be a sign that the Jersey barrier is about to return to its natural habitat, the freeway? As long as terrorist attacks occurred in foreign lands, no one paid much attention to the inadequacies of our own built environments. People tolerated the ugly makeshift barriers around government buildings because they *seemed* temporary. But since September 11, it is obvious that the threats are permanent, so the solutions also have to be permanent. ■

Resources for security through design

The American Institute of Architects (AIA)
"Building Security Through Design"
www.aia.org/security/

Gensler Architecture, Design & Planning Worldwide
"Security & Openness: Integrating Security into Office Buildings"
www.gensler.com/events/index.htm

Architectural Record, AIA, RTKL, National Building Museum, and Urban Land Institute
"Freedom without Fortresses? Shaping the New Secure Environment" (symposium)
www.archrecord.com/NEWS/ARTICLES/nbm112101.asp
www.rtkl.com/id4/symposium.asp#talk

General Services Administration (GSA)
hydra.gsa.gov/pbs/firstimpressions/

National Capital Planning Commission (NCPC)
www.ncpc.gov/planning.html

American Society of Landscape Architects
Security Design Coalition
www.asla.org/Members/publicaffairs/factsheets/securedesignfs.htm

National Science Foundation
Funding opportunities
www.nsf.gov/home/programs/eng.htm

AIA/ARCHITECTURAL RECORD CONTINUING EDUCATION

INSTRUCTIONS

- **Read the articles "Fear Must Not Become a Form-Giver for Architecture," page 55, and "In the Aftermath of September 11, the Urban Landscape Appears Vulnerable and Random," starting on page 135, using the learning objectives provided.**
- **Complete the questions below, then fill in your answers (page 226).**
- **Fill out and submit the AIA/CES education reporting form (page 226) or download the form at www.architecturalrecord.com to receive one AIA learning unit.**

QUESTIONS

1. What was the Jersey barrier originally designed to do?
a. divide sidewalks
b. reinforce concrete walls
c. keep vehicles from careening into oncoming traffic
d. provide exterior security

2. What does architecture convey about the people of a society?
a. their political values at that time
b. their idealist views for the future
c. their technological savvy
d. their artistic values

3. The GSA published summary calls for security to be designed to meet what criteria?
a. all possible threats
b. rare catastrophic threats
c. reasonable threats
d. routine threats

4. The science of building vulnerability proposes all of the following except?
a. formation of a new regulatory agency
b. a cross-disciplinary effort
c. a consensus regarding "credible threats"
d. more federally funded research

5. The proposed plan for the Washington Monument used which type of perimeter security?
a. fences
b. concrete bollards
c. sunken paths
d. Jersey barriers

6. By being underground, the Capitol Visitor Center allows which advantage?
a. a parking structure above it
b. a return to Omsted's landscaping scheme
c. room for future expansion
d. it cannot be seen by satellite

7. The outcome of meetings held by Gensler in Washington, D.C., was which?
a. buildings cannot be protected totally against terrorism
b. all buildings should have a defense against truck bombs
c. threats change over time
d. an open image is more important than terrorist threats

8. Whether a building will have an active or passive security plan is determined by which?
a. if any tenants in the building are federal agencies
b. if the client can afford the expensive active devices
c. if it is single or multi-tenant occupied
d. if a vulnerability assessment and cost-benefit analysis recommend it

9. An example of a passive security plan is which?
a. closed-circuit TV
b. lighting
c. electronic entry control
d. turnstiles

10. The mandate for new buildings is which?
a. security is of utmost importance
b. less demand for openness
c. balance security with increased demand for openness
d. more emphasis on accessibility first, security second

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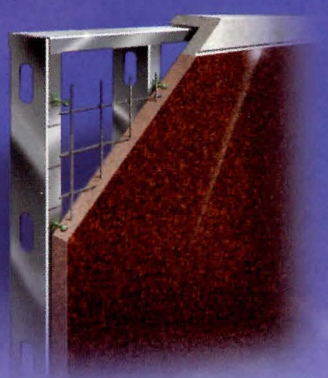

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Architectural Record Building Science feature, February 2002

"Life Safety Design: Specifying Fire-Rated Assemblies"
Provided By USG, February 2002

"Benefits of Staggered Truss Systems in Multi-Story Residential and Other Applications."
Provided By The American Institute of Steel Construction, Inc., February 2002

"New Ways to Build Better, Faster, Cheaper"
Architectural Record Building Science feature, January 2002

USG *Presents*

LIFE SAFETY IN BUILDING DESIGN: Specifying Fire-Rated Assemblies

by: *Rich Kaczkowski*
Program Manager, Construction Systems Laboratory
USG Research & Technology Center
Nestor Sanchez
Architectural Systems Manager, United States Gypsum Company

It goes without saying that life safety in building design is of paramount importance. However, because the standards and codes that regulate life safety design are continually evolving and improving, it is often difficult for architects to stay abreast of the latest requirements, systems and design specifications.

While life safety encompasses everything from personnel security to blast resistance to redundant protection against structural collapse, the core life safety issues still revolve largely around fire containment and control. Proper design of interior wall and floor/ceiling assemblies is an essential component of fire-resistant construction and, as such, a review of the fundamental specification principals behind fire-rated assembly design is timely and important.

AIA/ARCHITECTURAL RECORD
CONTINUING EDUCATION Series

Use the learning objectives below to focus your study as you read **LIFE SAFETY IN BUILDING DESIGN: SPECIFYING FIRE-RATED ASSEMBLIES**. To earn one AIA/CES Learning Unit including one hour of health safety welfare credit, answer the questions on page 145, then follow the reporting instructions on page 231 or go to the Continuing Education section on *www.architecturalrecord.com* and follow the reporting instructions.

Learning Objectives:

- Understand why fire-rated wall and floor/ceiling assemblies must be specified as systems;
- Realize the role that gypsum panels play in fire-rated systems and know how the panels perform under fire conditions;
- Understand the basic criteria for specifying firestopping systems, gypsum cavity walls and area separation walls.

The Systems Approach

A systems approach is a key principle behind successful fire-resistant wall and floor/ceiling design. These assemblies must be viewed and specified as complete systems. Why? It has long been recognized that the fire resistance of an assembly is strongly influenced by the interaction and compatibility of the individual components comprising it. Building codes require that wall and floor/ceiling assemblies be tested by independent bodies, such as Underwriters Laboratories Inc. (UL), and that the resulting rating be assigned to the complete system. This systems approach best reflects the reality of how an assembly performs when exposed to fire.

A wall system, for instance, may consist of products such as gypsum panels, framing members, fasteners, joint compound and finish treatment. The system may also include penetrants (e.g., pipe or conduit) breaching the wall that must be compensated for through the proper application of firestopping materials. The performance of the wall is dependent on how well these various products and materials function as an integrated wall assembly, or system. Performance will vary depending on:

- *the type of gypsum panel used;*
- *how the panels are applied (horizontally or vertically);*
- *the type and spacing of framing;*
- *the type and spacing of fasteners;*
- *the size, type and number of penetrations;*
- *where and how the partition intersects with a floor/ceiling assembly;*
- *and a variety of other issues.*

Individual products that are included as part of a system cannot compensate for any deficiencies in the overall system design. For instance, specifying an enhanced fire-resistant gypsum panel will not compensate for using an undersized stud or an inadequate number of fasteners.

Proper installation of a fire-rated assembly is also important. Good construction practices, executed in accordance with manufacturers' recommendations, are needed to ensure that the assembly built in the field is representative of the one tested.

The type of fire rating required for a specific partition or assembly is further impacted by a number of additional building design issues. Are the walls load-bearing or non-load-bearing? Are automatic sprinklers installed in the building? What is the anticipated building occupancy? How tall is the building? What is the proximity of the building to neighboring lot lines? All of these factors and others affect the fire-resistant rating that a partition or assembly must achieve.

In view of all these issues, it's no wonder that fire-resistant assembly design and construction is one of the more complex issues that architects and specifiers face on a day-to-day basis.

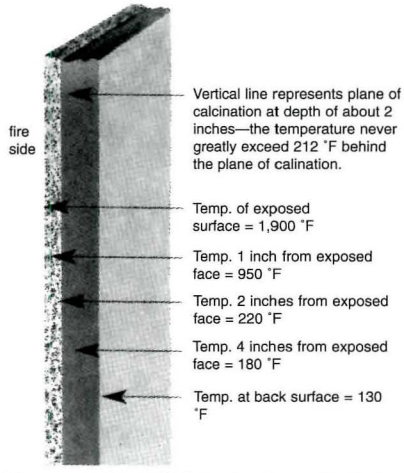


Diagram of a 6-inch-thick structural mass illustrates the fire resistance of gypsum materials at the end of a test conducted by UL.

Gypsum Panels in Fire-Rated Assemblies

A basic starting point for clarifying fire-rated assembly specifications is to understand the performance attributes of the gypsum panels used in fire-resistant systems.

Gypsum ($CaSO_4 2H_2O$), the principal raw material present in gypsum panels, is a naturally fire-resistant mineral. It contains chemically combined water (approximately 20 percent by weight). When the face of a gypsum panel is exposed to fire, the heat converts a portion of the combined water to steam. This process dissipates the heat energy, keeping the opposite face of the panel relatively cool. The panel will effectively limit the transmission of heat as long as there is water left in the gypsum, or until the panel is breached.

Type X, or fire-resistant gypsum panels, contain additives such as chopped glass fiber that are incorporated into the gypsum core. When exposed to fire, these additives serve to bridge the gypsum crystals and reduce the size of cracks that form as the panel's water is converted to steam. This further prolongs the integrity of the panels, enabling them to continue to act as fire barriers and thus retard the passage of heat through the assembly.

A wall or floor/ceiling assembly fire test simply measures the time it takes for the system to reach the limiting criteria specified in Standard ASTM (the American Society for Testing and Materials) E119. For a wall assembly, the limiting criteria is defined as passage of flame through the wall, exceedance of a prescribed temperature rise on the unexposed face of the wall, the ability of the wall to carry a superimposed design load during the fire (for load-bearing walls), or projection of water through the assembly. Per ASTM C36, a 5/8-inch-thick Type X panel must provide no less than a one-hour fire resistance rating when applied in a single layer on each face of a load-bearing wood-stud wall when tested in accordance with ASTM E119. A 1/2-inch Type X panel must provide a 45-minute fire resistance rating on the same assembly.

A second type of fire-resistant gypsum panel, known as Type C (enhanced Type X), provides even better performance. In addition to glass fiber additives, Type C panels contain additives that expand in the presence of heat, somewhat compensating for the panel shrinkage resulting from the dehydration of the gypsum. This helps add stability to the core, significantly enhancing the panel's fire-resistant performance.

The distinction between Type X and Type C panels is important. Unless clearly stated by a recognized independent testing body such as UL, Type X and Type C panels are not interchangeable. A Type C panel may generally be substituted for a Type X panel of the same thickness, but the reverse is not true; nor can a 5/8-inch Type X panel be substituted for a 1/2-inch Type C panel without a case-specific evaluation. This is particularly important on floor/ceiling assemblies, where the enhanced Type C performance is deemed essential.

Another important factor to consider is that in fire-rated steel-stud wall assemblies gypsum panels must typically be installed with all board joints (i.e., the edges and ends of the panel) backed by framing. Horizontal joints must also be staggered, so they do not align on each side of the wall. The reason for this is that joints normally open as the wall is exposed to fire, allowing heat and flame to enter the cavity and pass through the wall. The backing and staggering of joints helps compensate for this condition.

However, there are exceptions to this. Some manufacturers' Type X panels have been extensively tested to demonstrate that they may be installed without the need for backing the horizontal board joints. Furthermore, the horizontal joints of these panels do not need to be staggered on opposite sides of the studs. Details on this specification are explained in UL Design Nos. U419 (for non-load-bearing walls) and U423 and U424 (load-bearing walls). These designs offer architects a one-stop source for meeting a wide range of fire-rated performance requirements for wall scheduling. Within single designs, they provide all the details required for specifying non-load-bearing walls up to four hours duration and load-bearing walls up to two hours duration.

Listings of many other fire-rated designs are available from UL's *Fire Resistance Directory*, from the Gypsum Association's *Fire Resistance Design Manual* and from individual gypsum board manufacturers.

However, the fact that tested results are available for thousands of different wall and floor/ceiling assemblies does not eliminate the "gray areas" that architects may encounter when specifying fire-resistant systems. When the issues are

Gypsum Area Separation Wall Installation

Steel H-stud slides in place over gypsum liner panels.

An aluminum breakaway clip is screw-attached to studs and framing. Under fire exposure, the clips break away, permitting the fire-damaged wall to fail while leaving the separation wall intact.

Steel C-runner fits over the studs and panels. A second C-runner is then screw-attached back to back to lower the runner to hold the next level of studs and liner panels.

unclear, it is advisable to contact either the gypsum board manufacturer or the independent testing agency for clarification. For complex projects, independent fire code consultants may be brought in to recommend specific approaches for meeting code requirements. Ultimately, however, it is the local building code officials who function as the final decision-makers. As such, it is best to involve code officials as early as possible in the design process. This often helps to keep small problems from developing into costly, complex issues.

Cavity Shaft Walls

From a life safety standpoint, cavity shaft walls are among the most important assemblies in any building. These engineered wall systems deliver critical fire resistance and structural integrity around stairwells, elevators and other building enclosures. During a fire, they provide a means for occupants to exit, while allowing access for rescue and fire-fighting personnel. They also offer a channel for communications, and enable the movement of power, water, fresh air and exhaust.

When creating cavity shaft wall specifications, tested system performance should be given top priority. While this premise holds true for virtually any fire-resistant design, it is especially critical for cavity shaft walls. When it comes to tested performance, no other type of cavity shaft wall system has undergone more extensive research, testing and refinement than gypsum panel wall systems.

Gypsum shaft wall systems provide fire ratings up to four hours. The assemblies are lightweight—a two-hour system weighs only approximately 9 pounds per square foot and is only 3 1/2 inches thick. They install more quickly and cost effectively than "wet" cavity shaft walls, such as concrete block, and are erected from outside the shaft at each floor, eliminating the need for scaffolding. The shafts are enclosed early in the construction process and finished later, along with other interior partitions.

Although various types of gypsum shaft wall systems are available, the most extensively tested and most widely used system is built using C-H studs. This stud profile combines a conventional "C" shape with an "H" pocket. A two-foot-wide gypsum liner panel is slid into the H pocket, requiring access from only one side of the wall. Conventional four-foot-wide Type X or Type C gypsum panels are screwed into place on the C side of the stud. The C-H studs, which are engaged to steel J-runners fastened to the floor and ceiling, produce a stronger wall and enable greater limiting heights compared to competing systems.

Gypsum liner panels have a fire-resistant core and are treated to resist moisture penetration. Multiple layers of gypsum panels can be applied to obtain fire ratings of up to four hours duration. If required per the specification, Type X or Type C gypsum plaster base panels may be used to accommodate a veneer plaster finish.

When specifying cavity shaft walls, look for tested performance that accurately represents actual job conditions. For instance, determine whether the cavity shaft system has been tested (per ASTM E152) with the type of elevator door that will be used. Review the system's tested performance for call-button and floor-indicator penetrations (per ASTM E119), and seek a system with UL-listed smoke and fire dampers.

To ensure system longevity, make sure that the manufacturer has not only conducted structural testing to develop limiting heights (the maximum wall span that may be built for a given design load without exceeding stress or deflection limits), but has tested the wall to a high number of repeated cycles or oscillations. Cavity shaft walls are subjected to both positive and negative pressures as elevator cabs rise and descend. Oscillation testing provides assurance that the walls will withstand this continual flexing throughout the life of the building.

FIRESTOPPING – AT A GLANCE

To achieve a desired fire rating for a partition or floor/ceiling assembly, all penetrations through that assembly must be treated with a firestopping material.

In order to achieve a desired fire-rating for a partition or floor/ceiling assembly, all penetrations through that assembly must be treated with a firestopping material that meets nationally recognized test standards (ASTM E814 or UL 1479). A *penetration* (also called a *through-penetration*) is a hole cut or formed through the entire assembly to permit passage of a penetrant, such as a pipe, conduit, duct or cable bundle. The *annular space*, or the gap between the opening in the assembly and the size of the penetrant, must be filled with a firestop sealant and, if needed, a forming material. The *forming material* (usually mineral wool insulation) serves as a backing or dam for the firestop sealant.

In addition to penetrations, firestopping materials are also used on joint systems between adjacent walls and/or floor/ceiling assemblies. UL identifies four types of joint systems: floor-to-floor, wall-to-wall, floor-to-wall and head-of-wall. The test criteria for all these building joints can be found in the Standard UL 2079, *Tests for Fire Resistance of Building Joint Systems*.

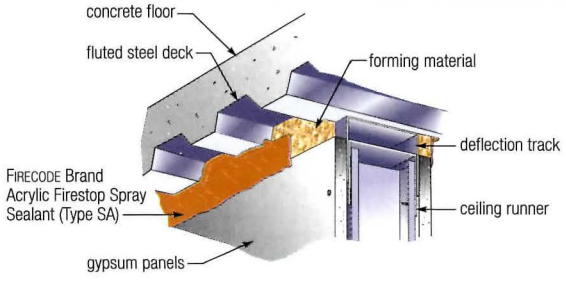
Generally speaking, there are three primary types of firestop sealant materials: mortar, caulk and intumescent.

Mortar-type firestops are applied wet over the forming material (when needed). They are available in either powder or ready-mixed formulations, and are usually the most economical option. They set or harden to form a strong, durable firestop, and are typically used in walls, floors and curtain wall slab edge conditions where strength and economy are required.

Caulk-type firestops are applied from a caulking tube or pail, or are spray-applied. They are easy to install, economical and flexible. They are typically used in dynamic joints in head-of-wall systems, as well as in certain floor and wall penetrations where movement is anticipated and flexibility is required.

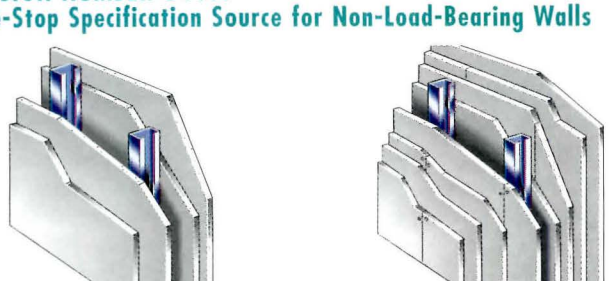
Intumescent-type firestops are specifically designed for use with plastic and insulated pipes, and other penetrants that will be burned or melted when exposed to fire.

Intumescent materials expand when exposed to heat to fill the cavity left by the damaged penetrant and thus prevent the passage of flame and smoke.



Head-of-wall intersections, where drywall partitions meet fluted steel decks, represent one of the more difficult firestopping applications for both specifiers and contractors. UL-classified head-of-wall systems are available that utilize sprayable firestopping products. These products provide a cost-efficient solution for head-of-wall applications with long construction joint runs.

UL DESIGN NUMBER U419: A One-Stop Specification Source for Non-Load-Bearing Walls



UL Design Number U419 provides all the details required for specifying non-load-bearing walls with fire ratings from one to four hours. Shown here are a two-hour wall assembly (left) and a four-hour wall assembly.

Area Separation Walls

For multifamily construction, area separation walls (also known as "fire walls," "party walls" and "townhouse separation walls") serve to protect residents of adjacent units in townhouses and apartments in the event of a fire. They must provide both fire protection (usually two hours) and the needed structural stability to withstand the collapse of an adjacent structure without losing their integrity. Both concrete block and gypsum-based systems are commonly used as area separation walls.

A basic masonry area separation wall configuration consists of a non-load-bearing concrete block wall serving as a divider between wood frame construction on either side. Lateral support from the adjacent construction can be provided to stabilize the area separation wall at intermediate floors and roofs, but the lateral attachment must be designed so that the collapse of the adjacent construction in the event of fire will not cause the area separation wall to fall.

Gypsum-based area separation walls consist of 1-inch-thick gypsum liner panels used in conjunction with H-shaped steel studs and C-shaped runners to form thin, space-saving alternatives to concrete block. While meeting the same design requirements for fire and lateral load resistance, the drywall assemblies weight at least 50 percent less than masonry walls, install more quickly and require less floor space. The structural stability of gypsum-based area separation walls is achieved through the use of special aluminum clips that provide lateral support from the structure to the fire wall at intermediate floors and the roof. The clips also function as break-away fuses by melting or yielding from the rise in temperature on the fire side of the wall. The clips, which melt at 1,200 degrees F (a temperature reached relatively quickly in a severe fire), permit the fire-engulfed structure to collapse independently of the area separation wall.

Conclusion

The objectives of this learning activity were to enable you to understand why fire-rated wall and floor/ceiling assemblies must be specified as systems; realize the role that gypsum panels play in fire-rated systems and know how the panels perform under fire conditions; and understand the basic criteria for specifying firestopping systems, gypsum cavity shaft walls and area separation walls.

The overriding goal of all fire-resistant assembly design is to manage risk and thereby save lives and property in the event of a fire or other catastrophe. For decades, manufacturers, code officials, testing bodies, trade organizations and associations have worked together to help establish the best possible building design and testing protocols. The resulting fire-resistant systems, testing procedures and codes represent the state-of-the-art in life safety design and construction… and they ensure the safest possible living and working environments.

This collective expertise is available to any specifier for any building design. Use it by insisting on a systems approach when specifying materials and by relying on established testing criteria for all fire-resistant design.

Additional Articles and Information: CLICK FOR THIS

As part of this CES learning activity, you are required to read three additional articles relating to fire-resistant assembly design and specifications. Test questions will be included from this information. The articles are:

- **ASTM E119 Fire Endurance of Building Systems:** This article discusses the criteria and testing standards established by ASTM for use in testing assemblies for fire resistance. **To read the article on-line, go to the USG Corporation Web site (www.usg.com), link to "Design Solutions" (located on the top navigation bar), then link to "Fire Construction" (on the side navigation bar) and click on the "ASTM E119 Fire Endurance of Building Systems" link; or go directly to www.usg.com/Design_Solutions/2_2_fire_construct.asp and click on the same story link.** To obtain a fax copy of the article, call USG at 888-874-2450 and ask for the ASTM E119 Fire Endurance of Building Systems Web article.
- **ASTM E84 Surface Burning Characteristics of Building Materials:** This article provides a basic overview of the ASTM criteria used to determine the flame spread and smoke density ratings for an assembly design. **To read the article on-line, go to the USG Corporation Web site (www.usg.com), link to "Design Solutions" (located on the top navigation bar), then link to "Fire Construction" (on the side navigation bar) and click on the "ASTM E84 Surface Burning Characteristics of Building Materials" link; or go directly to www.usg.com/Design_Solutions/2_2_fire_construct.asp and click on the same story link.** To obtain a fax copy of the article, call USG at 888-874-2450 and ask for the ASTM E84 Surface Burning Characteristics of Building Materials Web article.
- **Building and Inspecting Smoke Barriers:** The article provides insights into how gypsum partition walls serve as effective smoke barriers and provides design criteria for creating smoke barriers. **To access the article on-line, go to the Gypsum Association Web site (www.gypsum.org) and click on the "Download Free Gypsum Association Publications" link at the top of the page.** After filling out the required form, download the "Building and Inspecting Smoke Barriers (GA-618-96)" PDF file. To obtain a fax copy of the article, call USG at 888-874-2450 and ask for Gypsum Association publication GA-618-96.

TECHNICAL INFORMATION SOURCES

Following are several leading reference and information sources about fire-rated design issues:

United States Gypsum Company (www.usg.com)

Because the company originally established most of the fire testing procedures currently used by UL, it can offer unique insights into testing standards and applications. U.S. Gypsum's technical support department, which includes eight architects, five engineers and 12 technical representatives, is the largest of all gypsum industry manufacturers. For technical assistance, call 800-USG-4YOU or write United States Gypsum Company, P.O. Box 806278, Chicago, IL 60680.

Underwriters Laboratories Inc. (www.ul.com)

To obtain a copy of the *UL Fire Resistance Directory*, call (847) 664-2899, or write to Underwriters Laboratories Inc., Publications Stock, 333 Pfingsten Road, Northbrook, IL 60062.

The National Fire Protection Association (www.nfpa.org)

The association provides a wide range of code and standard reports and research data. Contact the association by calling 617-770-3000 or write to the National Fire Protection Agency, P.O. Box 9101, Quincy, MA 02269.

The Gypsum Association (www.gypsum.org)

The trade association for the gypsum industry publishes a *Fire Resistance Design Manual* (GA-600) that provides a one-stop reference source for tested fire-resistant wall and floor/ceiling assembly designs. Contact the association by calling 202-289-5400, or write to the Gypsum Association, 810 First St., N.E., Suite 510, Washington DC 20002, or e-mail info@gypsum.org.

Learning Objectives

- Understand why fire-rated wall and floor/ceiling assemblies must be specified as systems;
- Realize the role that gypsum panels play in fire-rated systems and know how the panels perform under fire conditions;
- Understand the basic criteria for specifying firestopping systems, gypsum cavity walls and area separation walls.

Instructions

Refer to the learning objectives above. Complete the questions below. Fill out the self report form on page 231 and submit it or use the Continuing Education self report form on *Record's* website—*www.architecturalrecord.com*—to receive one AIA/CES Learning Unit including one hour of health safety welfare credit.

Questions

Q: 1. Gypsum works as a natural fire-resistant material because:
A:
a: It uses dry construction techniques
b: It can be used with light weight steel or wood framing
c: Heat energy is dissipated as the water turns to steam
d: The gypsum crystals form cracks when the panel's water is converted to steam.

Q: 2. A Type X, or fire-resistant gypsum panel, contains additives such as chopped glass fiber that serve to:
A:
a: Reduce the number of fasteners required to attach the panel
b: Reduce the size of cracks that form as the panel's water is converted to steam
c: Eliminate the need for firestopping
d: Increase panel thickness.

Q: 3. Type C gypsum panels provide even better fire-resistant performance by:
A:
a: Increasing the amount of gypsum present in the panel
b: Reducing the heat generated from fire as it comes into contact with the gypsum panel
c: Providing a fire-resistant surface that protects the gypsum core
d: Expanding in the presence of heat, compensating somewhat for the panel shrinkage resulting from the dehydration of the gypsum.

Q: 4. Which substitutions are generally acceptable?:
A:
a: A Type X panel may be substituted for a Type C panel of the same thickness
b: A 5/8 inch Type X panel may always be substituted for a 1/2 inch Type C panel
c: A Type C panel may be substituted for a Type X panel of the same thickness
d: No substitutions are ever allowed.

Q: 5. A benefit of gypsum-based area separation walls over basic masonry construction is:
A:
a: They weigh at least 50 percent less
b: They provide lateral load resistance
c: The collapse of the adjacent construction due to fire will not cause the area separation wall to fail
d: They protect residents of adjacent units in the event of fire.

Q: 6. The structural stability of gypsum-based area separation walls is achieved through use of:
A:
a: Large-sized gypsum panels
b: Break-away aluminum clips that provide lateral support from the structure to the firewall
c: Steel studs and runners
d: A non-load-bearing concrete block wall.

Q: 7. A benefit of intumescent-type firestop sealant material over other primary types is:
A:
a: It provides flexibility of movement through the penetrations
b: It expands when exposed to heat to fill the cavity left by damaged penetrant
c: It is the most economical option available
d: It fills in the annular space of a penetration through assemblies.

Q: 8. What properties help gypsum board walls function as effective smoke barriers?:
A:
a: They can be used on load-bearing and non-load-bearing wall assemblies
b: They can be applied in multiple layers
c: They install quickly and cost effectively
d: They are constructed to achieve a significant degree of fire resistance, sound isolation and reduction of air leakage.

Q: 9. Under ASTM E119, a hose stream test:
A:
a: Measures an assembly's ability to withstand lateral impact from falling debris during the fire endurance period and before active fire suppression efforts begin
b: Is an indication of how long a room or zone can contain a fully developed blaze before it spreads to adjacent areas of the building
c: Determines fire-fighting practices or strategies at the fire site
d: Measures how quickly fire develops on an assembly's surface material once that material is exposed to flame.

Q: 10. Flame-spread ratings determined through ASTM E84:
A:
a: Measure the transmission of heat through an assembly to the unexposed surface
b: Are measured by a hose stream test
c: Indicate how likely a fire is to move from its point of origin, and how fast.
d: Determine the firestopping material needed in through penetrations in fire-rated systems.

About USG

USG Corporation is a Fortune 500 company with subsidiaries that are market leaders in their key product groups: gypsum wallboard, joint compound and related gypsum products; cement board; gypsum fiber panels; ceiling tile and grid; and building products distribution.

United States Gypsum Company, a subsidiary of USG Corporation, manufactures two types of gypsum panels for use in fire-rated assemblies: SHEETROCK® Brand Gypsum Panels, FIRECODE® Core and SHEETROCK Brand Gypsum Panels, FIRECODE C Core. The company also offers USG Cavity Shaft Wall Systems, USG Area Separation Wall Systems and a range of SHEETROCK Brand firestopping products.

For more information about United States Gypsum Company's products and systems, write USG Corporation, P.O. Box 806278, Chicago, IL 60680-4124, call USG's Customer Service Department at 800-USG-4YOU or visit the company's Web site at www.usg.com.

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BI ☐ Landscape Architect
BJ ☐ Planner
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BL ☐ Consultant
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CK ☐ Other

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DB ☐ 2 - 9
DC ☐ 10 - 24
DD ☐ 25 - 49
DE ☐ 50 - 100
DF ☐ More than 100

Buying Influence
EA ☐ Final Decision
EB ☐ Specify
EC ☐ Recommend
ED ☐ No Role

Location of Firm's Work
FA ☐ Local
FB ☐ Regional
FC ☐ National
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The American Institute of Steel Construction, Inc. presents:

Fire Protection for Steel: Myths Debunked

To ensure that fire protection is properly specified, the project's fireproofing schedule should include as the first note that: "All steel framed floors and roofs shall be considered thermally restrained."

Many designers are over-specifying fire protection for structural steel-framed buildings, according to a report by Richard Gewain of Hughes Associates, Inc., and Emile W.J. Troup, P.E., a consultant and structural engineer based in New England. In many cases, the over-specification results in a 25-50% addition in fire protection, which adds approximately $0.25/sq. ft. to the cost of construction. These numbers become especially troubling in light of actual fire performance. A review of fire data shows no evidence of any loss of life due to structural failure during a fire in a modern structural steel-framed high-rise building in the U.S. (with the exception of terrorist events that also destroyed large portions of the structural system).

Much of the confusion rests with the concept of "restrained" and "unrestrained" fire resistance ratings. Introduced in the late 1960s (and unique to North America), the concept of restraint as it relates to fire protection is poorly understood. Although similar terminology is frequently used in structural design, in the context of fire engineering it should be emphasized that restrained ratings relate solely to resistance to thermal expansion and do not relate to connection design. And, according to Gewain and Troup's review of actual fire data, analytical modeling, and full-scale fire tests, structural steel-framed buildings should be classified as restrained for purposes of specifying fire protection. The new report, which was prepared in conjunction with the American Institute of Steel Construction-American Iron and Steel Institute (AISC-AISI) Task Force for Fire Engineering of Structural Steel Buildings, provides information that will enable architects and engineers to satisfy code provisions requiring justification where fire resistance for steel beam floor and roof systems are based on "restrained assembly" ratings. The Task Force included a wide range of interdisciplinary experts from both the national and international fire safety and structural community. (Copies of the paper, "Restrained Fire Resistive Ratings in Structural Steel Buildings," can be downloaded at no charge from www.aisc.org/fire.html.) To ensure that fire protection is properly specified, the project's fireproofing schedule should include as the first note the following language: "All steel framed floors and roofs shall be considered thermally restrained."

When the dual classification was first introduced, the ASTM E-5 Fire Test Committee clearly recognized that architects, structural engineers, and building officials would have difficulty properly applying restrained and unrestrained ratings to the design of actual buildings. As a result, an appendix was added to ASTM E119 (Appendix X3) to provide guidance to designers and code officials. Table X3.1 (Construction Classification, restrained and unrestrained) contains the following information: "Steel beams welded, riveted, or bolted to the framing members – Restrained."

Prior to 1992, the Underwriters Laboratories, Inc. (UL) Fire Resistance Directory included a similar appendix. Unfortunately, in 1993 the appendix was deleted from the UL Directory in favor of an abbreviated discussion of the details of the UL fire test apparatus (interestingly, even today the *Design Information* Section of the UL Directory continues to directly reference the now deleted appendix). A careful review of the Fire Resistance Directory indicates that UL has decided to concentrate on describing its own unique test conditions and to defer to nationally recognized standards for guidance on the application of restrained and unrestrained ratings, Gewain

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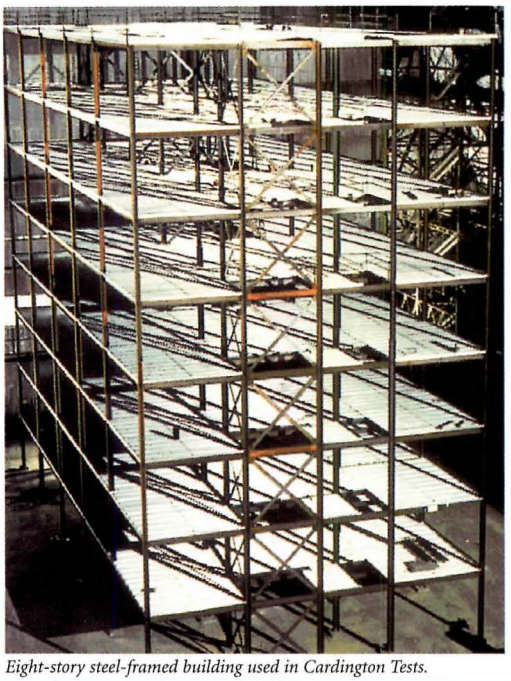
Use the learning objectives below to focus your study as you read **Fire Protection for Steel: Myths Debunked**. To earn one AIA/CES Learning Unit including one hour of health safety welfare credit, answer the questions on page 151, then follow the reporting instructions on page 228 or go to the Continuing Education section on *www.architecturalrecord.com* and follow the reporting instructions.

Learning Objectives

- Understand that all steel construction is classified as "restrained" as it relates to fire protection.
- Know what documents, tests and studies supports the classification of steel construction as thermally restrained.
- Understand that the future of fire engineering lies with performance-based designation in a hotel and a university case study.

and Troup point out. The newly written International Building Code (IBC) states that for an assembly to be considered restrained, evidence satisfactory to the building official must be furnished. Fortunately, a long history of fire testing and actual fire performance provides substantial evidence that steel-framed buildings should be considered as restrained construction.

For example, test assemblies fire tested at Ohio State University in 1965 were instrumented with strain gages placed on the steel beams loaded and fire tested according to ASTM E119. The vertical loads calculated by accepted engineering procedures to impose design stresses in the steel beams actually imposed measured initial working stress in the range of 18 to 36 percent below the design stresses for the beam assemblies involved in this study. These measured stresses are consistent with measured working stresses observed in ASTM E119 fire tests of floor or roof and beam assemblies. Thus it was shown that extended fire endurance experienced with some E119 tested floor assemblies must have resulted from load or moment redistribution. The boundary conditions in a building at the time a fire occurs are different than those in the ASTM E119 fire test. In actual buildings, it can be expected that these stress levels will be even lower since the tested beams in the OSU fire tests only had a steel deck/concrete slab not more than 3-ft wide. Again, for all practical purposes, steel-framed buildings can be considered restrained, according to Gewain and Troup.



Eight-story steel-framed building used in Cardington Tests.

Another relevant fire test involved three simply supported beams with pinned connections (simple double-angle bolted connections). These were found to perform equivalently to beams shimmed tightly against the UL restraining frame. The UL Test Report concluded:

"Summarizing, there does not appear to be significant differences in the fire resistance performance of restrained beams that are shimmed against the test frame as compared to restrained beams that are bolted to clip angles in the manner described in this Report. Thus, this test confirmed that beams with bolted connections should be considered as restrained beams."

During the 1980s, AISI funded an analytical study by Wiss Janney Elstner and Associates (WJE) to review the OSU fire data. WJE, utilizing FASBUS II software, validated the practical classification of restrained construction for structural steel in ASTM E119, Table X3.1.

Recent Fire Studies and Tests

Cardington Fire Tests: 1995-1996

During 1995 and 1996, large-scale fire tests were conducted on an eight-story, steel-framed office building at the Cardington Laboratory of the Building Research Establishment in the United Kingdom. The purpose of these tests was to investigate the behavior of a real structure under real fire conditions and to collect data that would allow computer programs capable of analyzing structures in fire to be verified. The structure was five bays long (148 ft) by 3 bays wide (69 ft) by 108 ft high, and beams in most of the tests were designed as simply-supported acting compositely with a concrete slab cast on metal deck. Columns were protected up to the underside of the floor slab and the beams; deck and floor slab in this unsprinklered building were unprotected.

Although the test program included one test on a restrained beam assembly on the seventh floor, it was noted that restraint as a variable in fire tests is largely unheard of in Europe. During this restrained assembly test, the maximum beam temperature reached was about 1,650°F and the maximum deflection was about 10 in. Although distress was noted in the bottom flange of the beam and at the connections (during cooling), the floor assembly continued to support its applied load at the conclusion of the test.

Ioannides and Mehta: 1997

This analytical study on restrained/unrestrained fire ratings used the measured temperatures at various locations along the depth of the beam and slab to determine nominal flexural strength and capacity of a beam during the ASTM fire test. The authors offered an analytical procedure, using an assumed time-temperature history for the particular assembly and beam rating coupled with the known properties of the steel at various elevated temperatures, to calculate the nominal flexural strength of the beam. They also provided methods to increase the nominal flexural strength (if needed) by accounting for the effects of rotational restraint (due to connections and slab reinforcement) and thrust restraint. Their study showed that, considering the combination of factors that occur in real buildings during real fires, steel beams, protected with spray-applied fire protection material thicknesses for restrained beams, can have sufficient load-carrying capacity without even counting on any restraint. Ioannides and Mehta's work went so far as to conclude that, considering the combination of factors that occur in real buildings during real fires, steel beams, protected with spray-applied fire protection material thicknesses for "restrained" beams, can have sufficient load-carrying capacity without even considering the beneficial effects of restraint.

An Extreme Fire Event

Experience from intense, uncontrolled fires in unsprinklered structural steel high-rise buildings with spray-applied fire protection during the past few decades is limited. However, these few events have borne out the ability of steel and composite floor systems to mobilize the surrounding structural elements and prevent collapse under the most intense of fire exposures. Perhaps the most dramatic example of steel's fire endurance occurred in a high-rise fire in an East Coast city in 1991—probably the most intense high-rise fire ever experienced in the United States. Robert Dexter, now with the University of Minnesota, and Le-Wu Lu of Lehigh University, prepared one of the most comprehensive reports on this dramatic event. The fire was reported to have caused a complete burnout of eight upper stories over an 18-hour period, being halted at the 30th floor by sprinklers that were being retrofitted into the building from the top floor downward. According to Dexter and Lu, although there was considerable distress to steel floor assemblies (originally fire protected based upon a restrained rating classification), there were no floor collapses.

Based on analysis of more than a quarter century of research and development, Gewain and Troup's report presents the following conclusions:

- The "unrestrained assembly" fire resistance rating for structural steel beam floor and roof systems, based on ASTM E119 temperature criteria only, has no relevance to the behavior of these systems exposed to uncontrolled fires in real buildings.
- The fire endurance of structural steel beam floor and roof construction under uncontrolled fire is enhanced by the interaction of the beams with the other structural elements and constructions that are integral with or surround the exposed assembly.
- All steel beam connections to other structural steel members exhibit both axial and rotational restraint. Even the least stiff connection is adequate to develop restrained assembly performance under uncontrolled fire exposure.
- Conclusions drawn from the fire research and computer modeling that have been performed by various agencies, including Underwriters Laboratories, Inc., support the conclusion that a restrained assembly classification and fire protection design is most appropriate for steel beam floor and roof assemblies, and verify the guidance contained in ASTM E119-00, Appendix X3.
- The performance of structural steel beam and concrete floor systems exposed to uncontrolled fires observed during the research and analysis studies conducted during the past 25 years largely explains the excellence performance of these systems during severe fire exposures in unsprinklered, modern mid- and high-rise buildings.

Gewain and Troup's full paper was published in the AISC's Engineering Journal, 2nd Quarter 2001 and is also available, along with a variety of other resources on fire design, on the American Institute of Steel Construction's website (www.aisc.org/fire.html).

Richard G. Gewain is consulting engineer, Hughes Associates, Inc., Baltimore, MD, and former Chief Fire Protection Engineer with the American Iron and Steel Institute. Emile W. J. Troup, P.E., is consulting engineer and consultant based in Canton, MA, and former president of the National Council of Structural Engineer Associations.

Current Building Code Requirements

Because various building codes treat the concept of restraint differently, it is critical for the specifier to clearly state that the design is restrained. The best place for this to occur is on the fireproofing schedule. The first note on the fireproofing schedule should read: "All steel framed floors and roofs shall be considered thermally restrained."

The latest editions of the three model codes have defined restrained assemblies as discussed below.

BOCA National Building Code: 1999 On December 2, 1993, the Building Officials and Code Administrators International, Inc. (BOCA) issued a code interpretation advisory addressing the application of restrained and unrestrained fire resistance ratings. This interpretation indicates that: (1) the support conditions in actual buildings must be considered when applying restrained and unrestrained ratings; (2) in-place construction must be representative of test assemblies; and (3) supporting construction for restrained assemblies must be capable of resisting thermal expansion throughout the range of anticipated temperatures encountered in a fire scenario. In effect, this BOCA Code Interpretation is consistent with ASTM E119, Appendix X3.

SBCCI Standard Building Code: 1997 Prior to 1995 the Southern Building Code Congress, Inc. (SBCCI) issued several nonmandatory interpretations on restraint that relied on the changing guidance in the UL Fire Resistance Directory, since the restraint section in the Standard Building Code (SBC) was largely undefined. In 1995 a significant code change restated portions of ASTM E119 Table X3.1 relative to steel framing in the body of the code.

Section 701.3.2 in the SBC now defines restrained floors, roofs and beams in buildings as those which are surrounded or are supported by construction capable of resisting substantial thermal expansion throughout the range of anticipated elevated temperatures. Construction not complying with this definition is assumed to be entirely free to rotate and expand and must be considered unrestrained. Table 701.3 states that restraint may be provided for steel framing by bolting, welding or riveting steel beams to steel framing members. These connections provide rotational and axial restraint, both (and each) of which is shown in the Gewain/Troup paper to be sufficient to justify a restrained rating. Copies of the paper, "Restrained Fire Resistive Ratings in Structural Steel Buildings," can be downloaded at no charge from www.aisc.org/fire.html.

ICBO Uniform Building Code: 1997 The Uniform Building Code (UBC) of the International Conference of Building Officials (ICBO) references UBC Standard 7-1 (ASTM E119). However, the UBC has adopted a different approach and requires that, before restrained ratings are used in building design, evidence satisfactory to the building official must be furnished by the person responsible for the structural design. Since the satisfactory evidence may vary from jurisdiction to jurisdiction, architects and engineers are encouraged to consult with the appropriate building official before proceeding with fire protection designs (e.g., thickness of spray-applied fire protection) based upon restrained ratings. It should be noted, however, that the use of restrained ratings under the UBC has been validated for specific, major projects based upon advanced computer modeling and analysis of the results from fire tests and research discussed below.

ICC International Building Code: 2000 The 2000 Edition of the International Building Code, (IBC), developed by the International Code Council (ICC), marks the availability of the first unified national building code supported by the three model code organizations mentioned above. This new building code represents a compilation (and compromise) of the latest editions of the BOCA, SBCCI and UBC codes. The IBC references the ASTM E119 Standard Fire Test, which includes the nonmandatory Appendix X3 guidelines. The IBC includes wording similar to the Uniform Building Code in that evidence of a restrained condition satisfactory to the building official must be furnished by a registered design professional. (By including this language, the ICC was addressing concerns related to design responsibility and code enforcement procedures. Building officials noted that the condition of restraint is often omitted from design drawings, leaving the spray-applied material applicators with little or no guidance from the responsible design professional.) The IBC essentially requires the design professional to designate whether fire resistive floors, roofs and beams are restrained or unrestrained. However, the IBC, like the UBC, does not specify what documentation is required to qualify as sufficient evidence of a restrained condition. Essentially, the Gewain/Troup paper, "Restrained Fire Resistive Ratings in Structural Steel Buildings," provides this documentation and can be downloaded at no charge from www.aisc.org/fire.html.

Proposed NFPA 5000 Building Code The National Fire Protection Association (NFPA) has recently embarked on development of an alternate building code to the IBC. At this time language is being drafted to provide guidance for design professionals and code administrators on the application of restrained fire resistance ratings. Publication of the NFPA 5000 Building Code is targeted for late 2002. ■

Fire Protection Q&A

Last year, Socrates Ioannides and John Ruddy, respectively president and chief operating officer of Structural Affiliates International in Nashville, TN, and nationally recognized experts on fire design, held an on-line chat about fire design.

Q: What is the difference between "restrained" and "unrestrained?"

A: Thermal restraint relative to the classification of the fire resistance of a structural assembly is different than the support restraint that will influence the force flow mechanism of the members. Thermal restraint is the resistance to expansion caused by elevating temperatures. The classification of fire resistance in the USA is dependent on the thermal restraint. If the system is classified thermally restrained, the fire protection can be as much as 1/2 that required if unrestrained.

Q: What is "restrained"?

A: Thermal restraint is the degree of resistance to thermal expansion. Restrained is the condition where the members under fire are restrained from thermal expansion by other members (systems) external to the element under consideration. An explicit definition of thermal restraint is difficult however guidance is provided in Table X3.1 of the appendix of standard fire test description. Thermal restraint is defined as the condition when the surrounding or supporting structure is capable of resisting substantial thermal expansion. It may be easier to understand thermal restraint by noting the definition of a thermally unrestrained condition as support conditions free to rotate and expand. Except in unusual conditions, steel framed structures are thermally restrained.

Q: Do you know what other countries are doing (that's different) in this field other than the US?

A: The classification as thermally restrained or thermally unrestrained in unique to the U.S. Other countries do not have this distinction.

Q: As a specific example, I had a column restrained at the top, with platforms bracing the weak axis. In a gas fire the column permanently deformed on the weak axis. Would this be restrained?

A: This does not exactly relate to the R/UR issue. Columns do not have the same distinction. Restrained/Unrestrained (R/UR) only applies to beams. The fire classification of columns is based on the ability of the insulating material to restrict the elevation of temperature of the column for the specified amount of time. Columns are not tested loaded therefore the end result would not be affected by the restraint condition.

Q: What are some of the limitations of the ASTM E119 fire standard?

A: ASTM E119 is a prescriptive test pertaining to the performance of structures to a predefined time/temperature fire curve. The E119 curve actually keeps getting hotter ad infinitum. Real fires die out once the fire load is consumed. The way the test is performed also has limitations-all tests are constructed restrained! The time at which the average temperature of the steel reaches 1100 degrees F becomes the unrestrained rated time. The restrained rating is then double the unrestrained time as long as the system can continue to carry the load, cotton balls are not ignited on the non-fire side and the temperature on the non-fire side does not raise by more than 250 degrees F.

Q: Are there any situations where steel beams would be considered unrestrained?

A: Steel beams sitting on masonry walls should be considered thermally unrestrained. This is a condition where the supports are free to rotate and expand which is the definition of thermally unrestrained.

Q: Does this apply to bar joists? And why?

A: Guidelines for the determination of the condition of thermal restraint are included in the appendix of ASTM E119, "Standard Test Methods for Fire Tests of Building Construction and Materials". Wall bearing steel joists of single span or the end span of multiple bays should be considered unrestrained. Interior spans of multiple bays with joists supporting continuous concrete slabs should be considered restrained.

Beam in Cardington Tests after reaching temperature in excess of 1600° F.

Q: Why is there confusion in the codes currently about restrained vs. unrestrained?

A: AISI spearheaded the fire proofing effort until the mid 80s. Many tests were sponsored including ones at UL that proved that beams connected with minimal shear connections ARE thermally restrained. Between the mid 80's and a couple of years ago the issue was not spearheaded by anybody. During the past few years, AISC has picked up the banner. During the intervening years, however, various interests have intervened and caused changes to certain codes. In the Eastern U.S., though, steel structures have always been considered restrained--SBCCI and BOCA areas generally accepted restrained ratings for steel.

Q: What's going to happen with the IBC?

A: UBC was the first (and only code until IBC) that put the onus of proof of restraint on the design professional. The International Building Code borrows provisions from the three major codes and is an accepted consolidation of the three. The provisions related to fire have been taken from the UBC. And like the UBC, the IBC directs the user to assume the structure to be thermally unrestrained unless evidence satisfactory to the building official showing the construction qualifies as thermally restrained is provided. There is sufficient information available to confirm a thermally restrained condition for framed steel structures. AISC has this information available (call the Steel Solutions Center at 312.670.5440). The recent article in the AISC Engineering Journal by Gewain and Troup is also a resource. Another building code by NFPA is in draft form. The provisions relating to the classification of restrained or unrestrained construction are very similar to the provisions of the IBC.

Q: Hasn't fire research in other countries been much more aggressively performed??

A: Fire engineering is receiving a lot of interest around the world. Rational approaches have been developed in the United Kingdom as well as in Australia. We are catching up and a more rational approach to fire engineering in the US is imminent. As I said earlier, most structures in the Eastern U.S. are being designed as restrained. As for other countries this is mute point, since they do not have this distinction of classifying construction as restrained or unrestrained. A full-scale fire test on an eight-story building was conducted at Cardington, United Kingdom in 1996. The results from that testing have stirred a lot of research interest. The US approach to fire engineering will benefit by the increase in international activity.

Q: How soon do you think we will see a change in the building codes regarding fire protection?

A: Predicting the timing of changes to the building code is difficult. The current codes allow alternative approaches and, as long as the building official is convinced that a reduced level of fire safety doesn't result, the alternative can be used in lieu of prescriptive approaches. In fact, analytical approaches have been used in a number of instances in the U.S. AISC has embarked on a five-year research effort at the end of which it is hoped that Performance Based Fire Engineering will be the accepted approach. Now, how long it will take to codify that, who knows, a few more years.

Q: To what extent are fire-resistant (fireproofing) coatings being employed in the US and elsewhere?

A: Building codes require a fire resistance rating for structural elements when the area and/or height of the building exceeds specified limit for each occupancy type. For instance, under the IBC, an office building with sprinklers over 5 stories would require protection of the structure. Also, under the IBC a one-story school building with sprinklers having an area over 58,000 SF would require protection of the structure. The most common method of protecting the structural elements is with spray-applied materials and the use of these insulating materials is extensive.

Q: How do you demonstrate a restrained condition in the context of the UL Fire Resistance directory? In other words, how do you prove it to the Fire Marshal?

A: There is supporting data obtained from tests and determined analytically proving that steel framed structures are restrained. Fire tests were performed at Ohio State University in 1966, UL Laboratories performed test to determine the condition of thermal restraint in 1984 and Wiss Janney Elstner performed analysis in 1988. For example, the UL test NC 505 -11 performed in 1984 states the following: "Steel structures with standard shear (clip angle connections) did not perform any different than test that were restrained in the normal manner." As mentioned earlier, these reports are available from AISC.

Q: Is there a good source for this information?

A: See 2nd Quarter 2001 issue of Engineering Journal for a summary of these tests. There will be a paper by R. Gewain and E. Troup on the subject, entitled "Restrained Fire Resistance Ratings in Structural Steel Buildings". The paper will also be posted on AISC's website after publication.

Q: Are there other tools to convince a fire marshal? In Virginia, the code official seems to want a direct correlation between restraint and the UL.

A: AISC has prepared a presentation that is given around the country trying to do just that. I think the Gewain/Troup paper in AISC Engineering Journal will provide a lot of the answers. Further, AISC could reproduce the three basic reference (Ohio State, UL, and WJE) and supply them if necessary. If an architect or engineer needs specific help, they can contact AISC at 312/670-2400 or email solutions@aisc.org.

Q: I have doubt regarding the relationship between UL restrained model, based on deflection limit and real structure. For example: limit state of compartmentalization, i.e., possibility of fissures in slab due to deflection of the real structure.

A: You are correct to question the application of test data to real conditions. UL tests are only prescriptive tests for comparison purposes. The rationale approach is to determine from calculations that a structure can sustain load for a specified duration.

Q: How does performance-based fire design work?

A: The ability to sustain load is at the base of the performance-based approach. In addition to the load carrying capacity, other life safety issues can be considered. For instance, sprinklers, fire compartments and travel distances may all provide a level of fire safety that can overshadow the fire proofing material.

Continued at: www.architecturalrecord.com/CONTEDUC/ConteducC.asp

Click for Additional Information

Go to *www.architecturalrecord.com/CONTEDUC/ConteducC.asp* to learn more about fire protection for steel. Test questions related to the online material are included on page 151.

Additional Required Reading

As part of this CES Learning Activity, you are required to read an additional article, "Performance-Based Design for Fire Resistance" by Barbara Lane. It provides some information and examples of performance-based design and fire engineering. To access the article online, visit www.aisc.org/fire.html. Or, to obtain a faxed copy of the article, call AISC at 312.670.5411 or email a request to tuegel@aisc.org.

Learning Objectives

- Understand that all steel construction is classified as "restrained" as it relates to fire protection.
- Know what documents, tests and studies supports the classification of steel construction as thermally restrained.
- Understand that the future of fire engineering lies with performance-based designation in a hotel and a university case study.

Instructions:

Refer to the learning objectives above. Complete the multiple choice questions below. Then go to the continuing education reporting form on page 228. Include the answers to these questions on the reporting form. Follow the instructions on the reporting form carefully. Fill out the form and mail or fax it to the address provided to receive one AIA/CES Learning Unit including one hour of health safety welfare credit. You may also go to the continuing section on *www.architecturalrecord.com* to read the course, answer the questions, print out the reporting form at the end of the course, fill it out and mail/fax the form to the address provided.

Questions

Q: 1. The report by Richard Gewain and Emile W.J. Troup found that the over-specification of fire protection for structural steel-frame buildings adds approximately how much to the cost of construction:
A: a. $0.25/sq. ft.
b. no significant cost increase
c. $.50/sq. ft.
d. $1/sq. ft.

Q: 2. To ensure that fire protection is properly specified, the project's fireproofing schedule should include as the first note the following language:
A: a. all concrete columns shall be considered restrained.
b. all steel framed floors and roofs shall be considered thermally unrestrained.
c. all steel columns shall be considered restrained.
d. all steel framed floors and roofs shall be considered thermally restrained.

Q: 3. Gewain and Troup's report concludes that the fire endurance of structural steel beam floor and roof construction under uncontrolled fire
A: a. is less than 1 hour.
b. is enhanced by the interaction of beams with other structural elements and construction that are integral with or surround the exposed assembly.
c. deteriorates due to the interaction of beams with other structural elements and construction that are integral with or surround the exposed assembly.
d. is more than 1 hour.

Q: 4. "Restrained" is:
A: a. the condition where members under fire are restrained from thermal expansion by other members (systems) external to the element under fire.
b. the ability of a building element to continue its function for a period of time without collapse
c. the resistance to the passage of flames or gases hot enough to ignite other materials
d. assuring that the temperature on the unheated side of an element does not exceed a set temperature.

Q: 5. Except in unusual conditions, steel-framed floors are:
A: a. thermally unrestrained
b. thermally restrained
c. require significant additional fire protection
d. welded to the columns.

Q: 6. Restrained/Unrestrained applies to:
A: a. beams
b. floors
c. roofs
d. all of the above

Q: 7. What situation would be considered unrestrained?:
A: a. cast-in-place concrete slab systems
b. steel beams with bolted connections
c. steel beams sitting on masonry walls
d. interior spans of multiple bays with joists supporting continuous concrete slabs

Q: 8. A benefit of a performance-based design solutions include:
A: a. uniformity among model building codes
b. elimination of additional fire resistance materials or systems
c. increased design freedom
d. all of the above.

Q: 9. Which of these issues is/are driving the move from prescriptive-based design to performance-based design solutions?:
A: a. recommendations based on standard fire resistance test methods are too conservative
b. standard fire resistance testing methods are too cost prohibitive
c. recommendations based on standard fire resistance test methods have led to recent major structural frame failures.
d. b and c

Q: 10. In the Cardington Large Scale Fire Test, the maximum beam temperature reached 1,650 degrees F and:
A: a. the maximum deflection was 10 inches
b. the floor assembly continued to support its applied load
c. the floor assembly collapsed.
d. a and b

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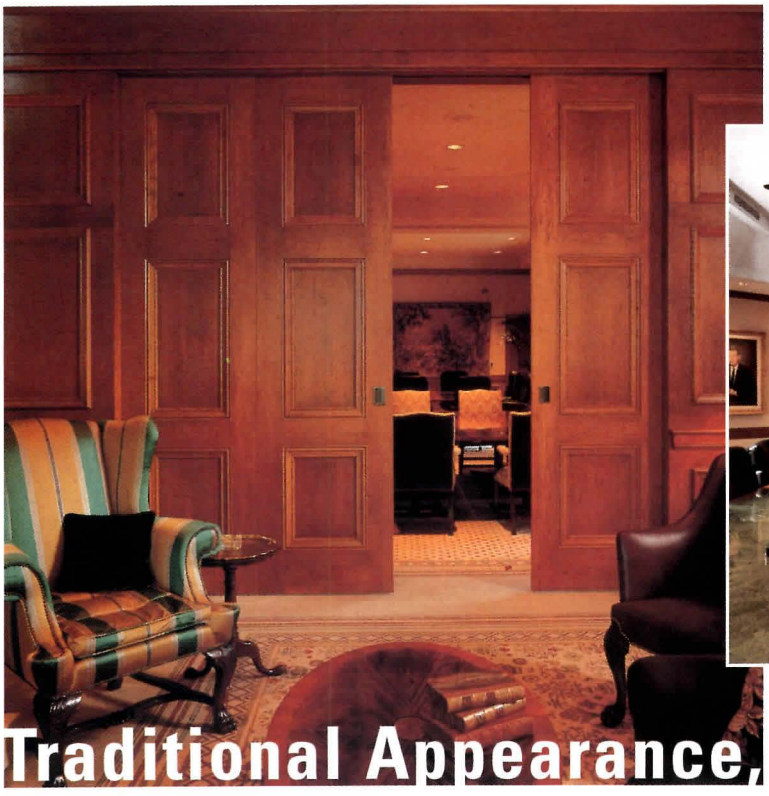
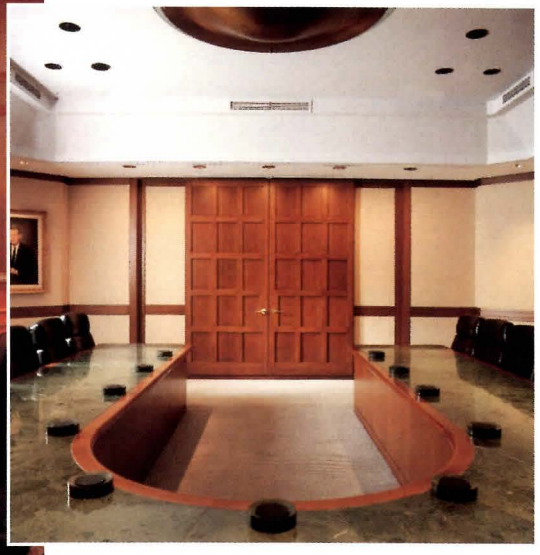




Traditional Appearance, Technological Savvy:
The New Architectural Stile and Rail Doors

"Architectural" stile and rail doors are not new, but their manufacture is undergoing continual change and the end products available from nearly all manufacturers are decidedly different from stile and rail doors designers may have specified in the past. The following section is designed to broaden architects understanding of the processes by which a majority of today's stile and rail doors are made and the new applications in which those doors may be used.

Architectural stile and rail doors now carry American National Standards Institute (ANSI) certification, and the Window and Door Manufacturers Association (WDMA) has re-written its architectural standards document to incorporate details arising from the certification process.

ANSI certification will give specifiers and end users of WDMA members' products additional confidence that architectural stile and rail doors are manufactured to comply with standards that ensure their uniformity and consistency throughout a project.

The WMDA's new standards, now referred to as ANSI/WDMA I.S. 6-A-01, are intended to serve as a guide to architects in specifying stile and rail doors, which have undergone something of a revolution over the past decade.

The term "architectural" refers to engineered stile and rail doors, which incorporate veneers and various core materials in place of solid lumber. "Engineered" stile and rail doors now account for 90 percent, or more, of the production of some stile and rail door manufacturers. True stile and rail doors are assembled of individual stiles, rails, mullions, panels or glazing joined by prescribed methods outlined in WDMA and ANSI documents.

WDMA adopted its first standards for architectural stile and rail doors in 1999 to reflect new door manufacturing technology and production processes that took into account new materials and new assembly techniques. Those standards were modified in October as a result of the ANSI certification process.

AIA/ARCHITECTURAL RECORD
CONTINUING EDUCATION Series

Use the learning objectives below to focus your study as you read **TRADITIONAL APPEARANCE, TECHNOLOGICAL SAVVY: THE NEW ARCHITECTURAL STILE AND RAIL DOORS**. To earn one AIA/CES Learning Unit including one hour of health safety welfare credit, answer the questions on page 157, then follow the reporting instructions on page 229 or go to the Continuing Education section on *www.architecturalrecord.com* and follow the reporting instructions.

Learning Objectives

- *Recognize the benefits of architectural stile and rail doors and their relationship to traditional solid lumber stile and rail doors.*
- *Understand how to meet code requirements for fire safety with contemporary stile and rail doors.*
- *Know the architect's responsibilities when ANSI/WDMA I.S. 6-A-01 door standards are referenced in a contract.*

Prior to 1999, the WDMA published a stile and rail standard—I.S. 6—that encompassed all styles of stile and rail doors from patio and screen doors to interior commercial products. But in 1995, says David San Paolo, operations manager for the Springfield, Mo.-based Maiman Co. and chairman of the WDMA's I.S. 6A quality standards committee, the industry began to see a need for a standard that more closely paralleled WDMA I.S.1A, a standard that applied to architectural flush doors, products made specifically for commercial applications. The change occurred as more stile and rail doors found their way into the commercial marketplace.

"As more and more stile and rail doors were required in the architectural venue, it was discovered there was a need for a new standard for architectural-quality stile and rail doors," says San Paolo.

One impetus for the change was the creation, in the mid-90s, of a 90-minute fire rated classic stile and rail wood door with a high-density, non-combustible wood core, utilizing new, fire-resistant adhesives. The discovery made the manufacturer a leader in the restoration of historic buildings requiring classically designed doors which could also meet contemporary fire safety standards.

Stile and rail doors, thereafter, began to be specified in commercial applications, where, previously, only flush doors with applied mouldings could satisfy fire ratings. Stile and rail doors quickly found their way into building areas that code requirements had made off-limits.

One goal of designers—that of maintaining an identical look throughout a project—has been elusive because of the upper fire ratings. But new core materials, specialty adhesives and new construction techniques, now allow door manufacturers, for the first time, to keep an architectural look and still meet building code fire ratings.

"Historically," says San Paolo, "if you wanted a six-panel door on all your room entries on rooms off a corridor, but you also wanted a six panel door on your stairwell, where a 90-minute fire-door was required by most codes, you were out of luck. Until the mid-90s, you could not have a true stile and rail stairwell door, only a facsimile based on a flush door design with attached mouldings. Same thing with, say, hotel ballrooms, or any number of different applications where code required a two-hour fire separation. You could not have had a stile and rail door prior to development of the new technology."

As a result of development over the past five years, that is no longer true. Architects can now have true stile and rail doors of any species of wood, even glass—not 1/4-inch wire glass, but clear glass—that meet current codes.

The pace of that development is quickening as a result of a heightened emphasis on security in the wake of the September bombing of the World Trade Center. A variety of new security glass, based on feverish testing, will soon make its way into the commercial marketplace, say glass industry sources.

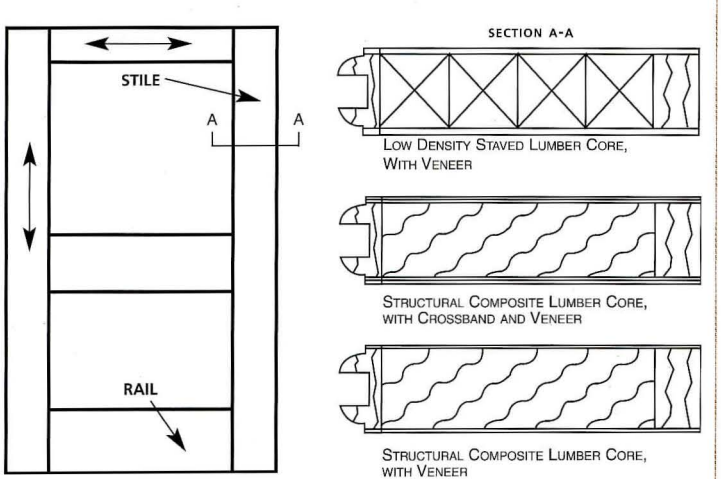
Cherry doors in Bank One Centre, Momentum Place (Dallas, Texas)

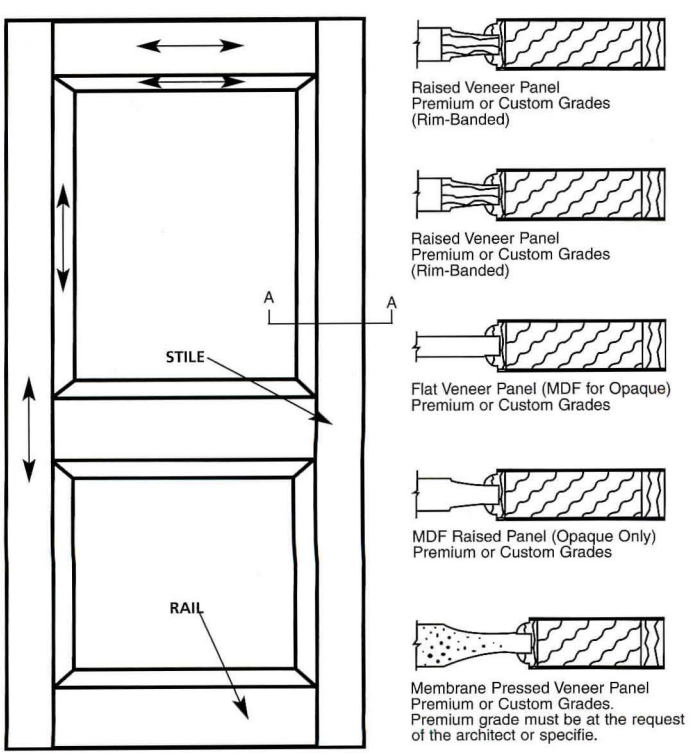
"We still talk to architects all the time who are unaware that there are stile and rail doors available in the marketplace for any applications with a greater-than-20-minute fire rating," says San Paolo. "They are still specifying a flush door with a veneer sketched on it to resemble stile and rail doors."

Few stile and rail doors today are made of solid hardwood. For most manufacturers, up to 90 percent of production today is "engineered." There are several advantages in using engineered constructs in place of solid hardwoods, say manufacturers: one is environmental—using veneers in place of hardwood conserves lumber. A second advantage, they say unequivocally, is that engineered products have dramatically improved the quality of stile and rail doors: today's characteristic stile and rail door is largely non-combustible, has excellent screw-holding capacity, good gluing properties (which result in a stronger final product), and increased dimensional stability, meaning that the tendency of assembled door pieces to act independently of one another in

ANSI/WMDA I.S. 6-A-01 Approved Methods of Stile and Rail Construction

The top illustration below is a section of a low density staved lumber core, once commonplace, but which is diminishing among manufacturers who increasingly favor structural composite lumber (SCL) cores, typically made of quick-growth trees, most often aspen. Compressed composite materials, say manufacturers have excellent "mechanical" properties, for instance their ability to hold hardware. Medium-density fiberboard (MDF) and particleboard are commonly used as core material, but do not have the screw-holding capacity of composites.





response to changes in temperature and humidity is significantly reduced. The result is longer life, less maintenance.

"Wood is a living, breathing object, even long after it is cut and sawn," says a manufacturer, "and that continues to take place long after it is installed. Engineered products help minimize those effects, especially movement that can damage doors."

Because only the "profiles" are of the desired lumber species, and the flats are veneered, engineered stile and rail cores can be interchanged in production to introduce non-combustibles to achieve fire ratings without sacrificing appearance.

Engineered stile and rail products once were a tough sell. "I still have some architects who say, "I want solid wood," says a manufacturer. "We still manufacture that door, but less than five percent of all stile and rail doors we manufacture are of solid wood, and those are mainly for exterior applications."

"Because we most commonly use veneers from the same tree in the manufacture of a single door, the compatibility of the grain is much higher in a veneered product than in a traditionally manufactured stile and rail door," he says. "In a typical door, there are eight stile and rail pieces, which in a traditional door are likely to have different grain patterns and potentially widely differing colors. In a contemporary architectural door there is a much greater likelihood of precision matching of wood color and grains."

Veneers: Look, Price, Flexibility

Use of veneers in place of solid hardwood lumber permits diversity of design impossible with traditional construction techniques, say in the ability to mix and match wood species in the same door or face a door with red oak on one side, black walnut on the other.

"One of the 'no-nos' from a solid wood viewpoint is gluing different wood species together, because when you do so, you have all kinds of inherent problems due to the varying degrees of movement of differing wood types," says a manufacturer. "In engineered construction, you can accomplish that kind of thing without a lot of trouble."

Architectural stile and rail doors afford the interior designer incredible variety, including more than 150 varieties of veneer. Not all the wood species available in veneer form are available as solid lumber. The cost of engineered construction architectural stile & rail doors (built to I.S. 6A-01 standards) is about the same as the cost of solid lumber doors, depending on the selected wood species. The cost of a red oak door, for instance, would be similar, whether built of solid lumber or of engineered materials. A door built of more exotic wood species, like cherry, or mahogany, can be manufactured less expensively as an engineered product.

WDMA quality standards, which govern manufacturing procedures by the association's members, along with other manufacturers, provide for two grades of architectural stile and rail door. Custom grade is most commonly specified when a normal degree of quality control is desired, or when a mill option paint grade is necessary. Premium grade doors may be specified for projects with a high degree of visibility. "AA" grade panel faces are required for premium grade panel doors. "A" grade panel faces are required for custom grade panel doors.

What the Architect Must Ask

When the ANSI/WDMA I.S. 6-A-01 door standards are referenced as part of contract documents, and no grade is specified, custom grade will be delivered. It is expected that architects shall:

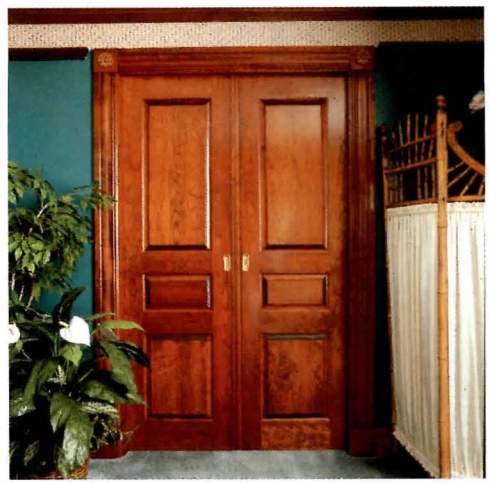
- Specify species and type of cut (if other than plain sliced).
- Specify whether panels are to be raised or flat, rim-banded or membrane pressed.
- Specify the fire-resistance rating, if required, as 20,45,60 or 90 minutes.
- Specify construction details and/or door types as appropriate.
- Specify non-standard stains, colors and finishes.

It is critical for designers to understand, or to consult manufacturers for advice, on how various veneer patterns can change the appearance of architectural wood doors. Final appearance is dependent both upon how the veneers are machined and how they are matched across the panel face.

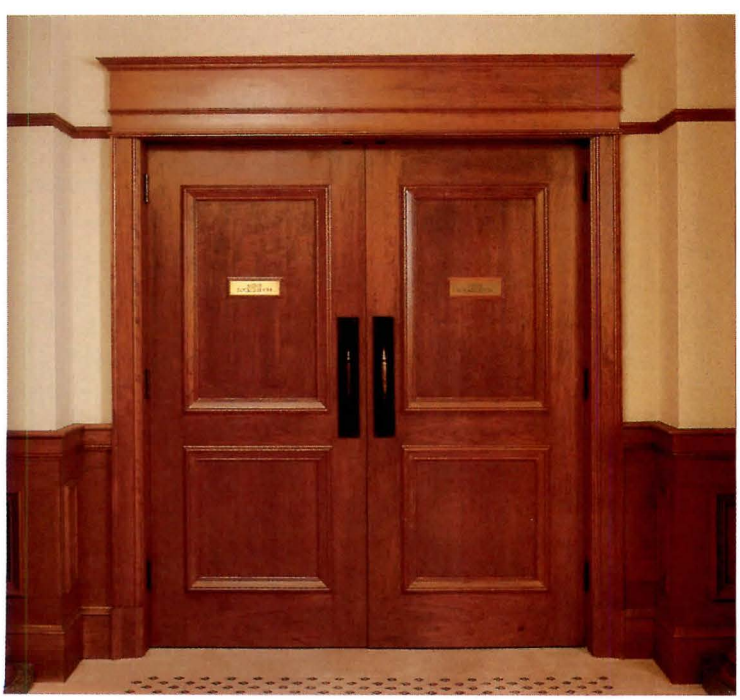
A rotary cut follows a tree's annual growth rings and results, generally, in a random appearance. A plain-sliced, or flat cut is sliced parallel to a line through the center of the log. Quarter-cutting produces a series of stripes that vary in width in differing species.

Architects can be confident that the engineered architectural stile and rail door is not easily discernable from a solid lumber door, even as to weight. A "typical" 3-0, 7-0, 1-3/4-in, six-panel door weighs about 85 pounds, roughly four pounds per sq ft. A solid pine door will be slightly lighter; hard rock maple slightly heavier. A typical door of engineered construction will be somewhere in the middle.

Quality, high-end architectural stile and rail doors are seen today in hospitals, country clubs, law offices, and high-end homes worldwide. They are used increasingly in historical renovation projects because they offer the design professional greater flexibility in the end product. Many WDMA manufacturers produce made-to-order stile and rail doors in a wide variety of panel types. Today's manufacturers can match a specific historical style with regard to mouldings, door layout, panel configuration, wood species, or any combination, in doors engineered to last a lifetime.



Cherry rim banded pocket doors adorn this residence.



Cherry doors grade the entrance to the men's lockers at the Golf Club of Oklahoma.

Better Ways to Make a Door

The "revolution" that has seen growing numbers of installations of architectural stile and rail doors in commercial buildings is due in part to a search by manufacturers for "better" ways to make a door. "We are always in relentless pursuit of better and less expensive materials," says one manufacturer. "We test adhesives. We conduct pull and shear tests. Cycle-slam testing simulates thousands of opening and closings of a door to test its durability, and it's effectiveness in the real world. We test the screw-holding ability of different cores."

Manufacturers, driven not by code, but by owners' expectations, are developing "quiet" stile and rail doors that can, for instance, assure private conversation in office settings or lower the transmission of heating and cooling system sound in condominiums. Doors are sold with a "sound transmission classification" that expresses their ability to contain sound. Sound attenuation has been accomplished in the past largely through gaskets between the door and frame, but engineered stile and rail doors give manufacturers new ways to combat sound through construction methods that maximize both acoustical dampening and air space within the door and reduce vibration. In some cases, sound dampening is achieved through specialty door bottoms, which can be surface applied, half-mortised or fully mortised (concealed) in the bottom of the door. The sound transmission test method is ASTM E90-90.

Research has also led architectural stile and rail door manufacturers to development of bullet-resistant doors, manufactured through a combination of specialty core materials and adhesives.

"Engineered construction has opened the door to a variety of solutions to long-standing problems," says one manufacturer. "Different construction methods, differing core materials and new adhesives can be combined for a number of specific purposes in ways we have never been able to before. And we can now do so without sacrificing appearance."

Development of new construction techniques means the new architectural stile and rail doors can now be used in places traditional stile and rail doors could not—dormitories and high-rises, for instance.

Click for Additional Information

Go to *www.architecturalrecord.com/CONTEDUC/ConteducC.asp* to learn more about architectural stile and rail doors including general requirements and finishing options. Test questions related to the online material are included below.

Learning Objectives

- *Recognize the benefits of architectural stile and rail doors and their relationship to traditional solid lumber stile and rail doors.*
- *Understand how to meet code requirements for fire safety with contemporary stile and rail doors.*
- *Know the architect's responsibilities when ANSI/WDMA I.S. 6-A-01 door standards are referenced in a contract.*

Instructions: Refer to the learning objectives above. Complete the multiple choice questions below. Then go to the continuing education reporting form on page 229. Include the answers to these questions on the reporting form. Follow the instructions on the reporting form carefully. Fill out the form and mail or fax it to the address provided to receive one AIA/CES Learning Unit including one hour of health safety welfare credit. You may also go to the continuing section on *www.architecturalrecord.com* to read the course, answer the questions, print out the reporting form at the end of the course, fill it out and mail/fax the form to the address provided.

Questions

Q: 1. How is it possible to achieve a 90-minute fire safety rating with a wood stile and rail door?
A: a. high-density, non-combustible wood core, utilizing fire-resistant adhesives
b. through the use of wire-glass inserts
c. use of structural composite lumber cores
d. using OSB in both stiles and rails

Q: 2. Staved lumber core, long the standard core, is being replaced by what?
A: a. structural composite lumber cores
b. solid wood
c. aluminum cores
d. extruded plastic panel liners

Q: 3. When specifying architectural stile and rail doors, it is the responsibility of the architect to:
A: a. specify the cut if other than plain-sliced.
b. specify whether doors are to be rim-banded or membrane-pressed
c. specify non-standard stains, colors and finishes.
c. all of the above.

Q: 4. The listed advantages of architectural stile and rail doors over solid wood include all but:
A: a. faster manufacturing schedule
b. able to be specified in places with fire rating code requirements
c. incredible variety of veneers
d. increased dimensional stability

Q: 5. How can the characteristics of a wood door be modified to increase sound attenuation?
A: a. specialty thresholds
b. increased use of hardwoods
c. specialty adhesives
d. use of structural composite lumber cores

Q: 6. Architectural stile and rail doors weigh only about half of a solid hardwood door because:
A: a. air pockets are typical to engineered construction.
b. structural composite lumber contains cellulose.
c. the doors will accommodate only lightweight glass.
d. None of the above. The weights are approximately the same.

Q: 7. The cost of engineered stile & rail doors relative to solid lumber doors is:
A: a. about half
b. three times as much
c. roughly the same except for exotics, which are less expensive.
d. two-thirds.

Q: 8. Polyester finishes may be specified that have as much as ___-percent the hardness of glass.
A: a. 10 percent
b. 40 percent
c. 60 percent
d. 80 percent

Q: 9. Most appropriate for laboratory or industrial applications is a finish of:
A: a. polyester
b. tung oil
c. catalyzed vinyl
d. acrylic lacquer

Q: 10. Solid hardwood doors account for what percentage of overall U.S. production today?
A: a. 10 percent
b. 30 percent
c. 25 percent
d. 19.4 percent

Where does "good design" meet the "bottom line"?

Right here.

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THE AMERICAN INSTITUTE OF ARCHITECTS

Digital Practice

 Deborah Snoonian, P.E.

BYTES

Graphisoft is holding an ideas competition for the design of a proposed conference center on the site of its headquarters in Budapest, Hungary. The center would host architecture-related exhibits and events and would be the first known structure situated over the Danube River. For more information, visit www.graphideas.com.

The Silicon Valley AutoCAD Power Users Group, the largest local user group in the U.S., awarded Revit Technology Corporation's 3D design software their 2001 "Best of the Best CAD Software" award over several Autodesk products.

Last fall, Texas A&M built a wireless design-build studio that lets students in architecture and construction science connect to the Internet via laptops. Instructors say collaboration among the disciplines was "significantly enhanced" by adding wireless technology.

LightWork Design, maker of the industry-leading LightWorks rendering engine, has released LightWorks Sketch for architects who want to provide stylized, nonphotorealistic images of their work. The new software supports the Epix file format from Piranesi's popular rendering program.

Three professors from Texas Tech's College of Architecture will produce the first-ever architectural drawings of the Statue of Liberty. They used a Cyrax 2500 laser scanner to collect more than 500 million measurements of the statue's surface for 3D digital modeling in Paraform and Innovmetrics. The 2D drawings, which will be done in AutoCAD, will conform to the documentation standards of the Historic American Buildings Survey.

Objects to See vies to become standard object technology for CAD

For the past few years, objects and object technology have been hot topics of conversation as ways to make CAD drawings more intelligent. Although several object file formats were developed throughout the 1990s, none has yet enjoyed widespread acceptance as an industry standard. This may change with the advent of Objects to See, or o2c, a highly compressed 3D file format developed by the German firm mb Software specifically for Internet-based communication. "More than ever, o2c is making 3D feedback more immediate and meaningful," says James Horecka, AIA, an architect practicing in Winchester, California.

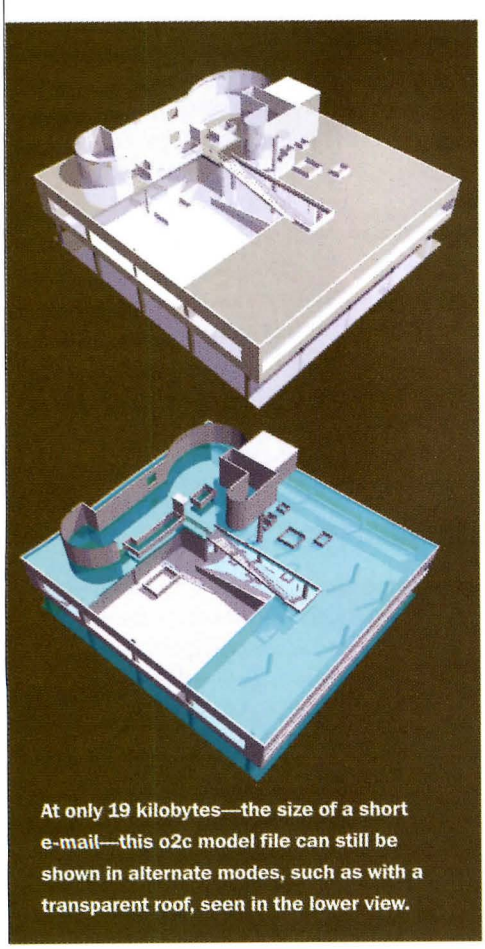
In the same way that the portable document format (PDF) files have become universal for online viewing of printed documents and forms—such as tax returns and reports with lots of charts and graphics—"o2c will become the 3D PDF," predicts Richard Morse, AEC product manager of the DataCAD product line.

DataCAD has hitched its wagon to this technology by allowing direct import and export of o2c-formatted files from its programs. While other major CAD vendors have yet to follow suit, free utilities are available to convert Autodesk's 3D Studio objects to o2c. Similar converters for the DWG format are soon to follow. In addition, a free o2c player for Microstation users was recently released.

But the real beauty of o2c is that it requires no specific CAD program to view, manipulate, or render 3D CAD objects or models. Just as the PDF file format grew in popularity due to the free and widely distributed viewing program Adobe Acrobat Reader, o2c files can be viewed with an o2c Player, a free plug-in utility (only 500 kilobytes in size) for Web browsers that can be downloaded from www.o2cworld.com.

Although o2c is only one of several object file formats in use—others include VRML, DXF, DWG, and 3D GIF—it has some persuasive advantages over these alternatives. First, it creates extremely compact files that make it very practical to attach to e-mails or post to Web pages for quick download. A full model of a house, for instance, might be less than 100 kilobytes in size (see illustration of Le Corbusier's Villa Savoy, left). Second, the user interface for the o2c viewer is easy to use, employing familiar click-and-drag movements. Third, the o2c file is a versatile format that can host a lot of annotated information, such as specification links or display options (e.g., alternate cabinet-finish displays or lighting options for a kitchen design). "Now we e-mail our clients a 3D model of their building so that they can have a real-time virtual walk-through of their new offices—no special software required," says Warren Payne of Ashton Mitchell Architects in Auckland, New Zealand. He adds, "What's more, the size of the o2c files is miniscule."

The file format also has heavy backing from industry leaders. Microsoft has integrated o2c into its Word and PowerPoint programs. Electronic models of Velux and Andersen windows are now widely available in o2c format. And IBM is banking on o2c for its e-commerce applications. These supporters will likely keep o2c in the forefront in



At only 19 kilobytes—the size of a short e-mail—this o2c model file can still be shown in alternate modes, such as with a transparent roof, seen in the lower view.

Digital Practice

the coming years.

The same features that make o2c appealing for e-commerce also make it appealing for architects and their clients. For example, o2c allows people shopping for a Ferrari to go online and view various models of the car in o2c-animated format while choosing an an exterior paint color and interior finishes; in the same way, architects may soon be sending their clients designs with instant-click options such as "View with screened porch option" or "View with brick exterior option." Architects and their consultants will also benefit by using conferencing software to review o2c models online, with ready tools such as redlining, multiple design overlays, and dynamic cross sections to facilitate their discussions.

The best news for architects is that o2c gives them another CAD tool for design assistance and client communication—even for smaller firms and solo practitioners whose resources for technology investment are limited. "I'm loving it for quick checks of parts of things as I develop them in 3D," says Horecka. "Work a little, check it out in o2c, see where improvements might be made, then work a bit more, check it out in o2c— it's really proving fast and handy." Fast, handy, and putting the power of object technology to work. *Evan H. Shu, FAIA*

Extranet use among architecture firms is hampered by skepticism

The use of extranets among architects doesn't appear to be increasing as quickly as predicted just a couple of years ago, and analysts and industry insiders say it's because firms are reluctant to adopt advanced Internet technologies—a symptom of a fragmented, conservative business culture that fiercely protects its turf and methods.

Yet this reality hasn't dampened the enthusiasm of companies like Constructware and Buzzsaw that outlived the dot-com collapse. [Note: RECORD publisher McGraw-Hill invests in e-Builder, another extranet company]. If anything, these outfits see themselves in better shape than ever.

The benefits of extranets seem obvious. Everyone on the project team can work from the latest set of CAD drawings, and there's a record of e-mails and other documents for all to see; in doing so, they smooth out communication and create a reliable paper trail. In a client study commissioned by Constructware, 65 percent of respondents said the vendor's products were significantly or critically important in reducing claims and litigation.

Although there exists no comprehensive study on extranet use in design and construction, anecdotal evidence suggests engineers and contractors have adopted the tools faster because they usually stand to gain more than architects from the streamlined communications that extranets provide. But the sales pitches have worked at least once for many architecture firms, as well. About 80 percent of firms with 50 people or more, and nearly half of all firms, have tried an extranet in the past two years, according to AIA's *Firm Survey 2000/2002*.

"[Architects] certainly need to know this is the future," says Scott Unger, founder and president of Constructware. "This is how they'll manage their information and communicate with team members."

ARCHITECTS ARE STILL UNCERTAIN IF USING EXTRANETS WILL PAY OFF.

Even so, skepticism remains among firms both large and small. Jill Rothenberg, Assoc. AIA, principal and chief technology officer at ADD in Cambridge, Massachusetts, says contractors often have their own systems to track change orders and submittal logs; using an extranet required them to enter the information twice. Haden Smith, AIA, CAD manager for Chiodini Associates in St. Louis, has been with his 30-member firm for nine months and has yet to use an extranet. And Geraldine Pontius, AIA, a sole practitioner in Baltimore, had trouble when her client, a Maryland state agency, couldn't handle the technological demands of the service. "The most important people on the team couldn't see the files," she says.

But Yangwei Yee, AIA, an associate partner at Skidmore Owings & Merrill, and Neil Katz, an associate with the firm's IT group, say extranets have been helpful. "We've had a lot of success with [ProjectPoint]," says Katz. "It's much more efficient than FTP or e-mail."

Part of the disparity in opinion is related to firm size. Smaller firms have difficulty absorbing the costs of the services—which can run up to $6,000 a year—and must pass them on to their clients.

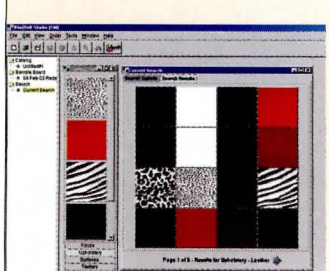
Another reason is turf battles. "I'm in charge of managing the material from the architect and the owner," says a project manager at Walsh Group in Chicago who requested anonymity. "I'm not sure I would trust that to anyone else."

Firms are also doubtful that the extra work and training required for using extranets will pay off in time saved on projects. "If [extranets] all failed tomorrow, architecture would still happen," notes Paul Doherty, AIA, managing director of The Digit Group, a technology consultancy for owners. "If you pulled the plug on CAD, that would be a whole different story."

The good news for vendors is that many owners are demanding extranets as part of any bid package. This will speed adoption faster than the industry would do on its own. "It's one thing to implement technology, it's another thing to change behavior," says Doherty. "Extranets may be a little ahead of the curve." *Chris Allbritton*

DOWNLOAD THIS: Sample boards go digital

Let BlueBolt Studio shrink your interiors library down to the size of your desktop computer. The software lets interior designers browse products and print specifications from more than 50 manufacturers (and counting). Images of products can be saved to digital sample boards and e-mailed to clients for review. You can search the library by product type, manufacturer, color, texture, or other attributes. For those who still want to see and touch the real thing, samples can be ordered directly from the software. Your computer monitor must be calibrated to display sample colors properly, an exercise that can be daunting for a novice user. Still, using BlueBolt Studio is faster than thumbing through enormous binders of sample books, and as a tool for quickly assembling options for your next award-winning interior, it has no peer. From BlueBolt Networks. 800/845-2511; www.bluebolt.com. *Deborah Snoonian, P.E.*



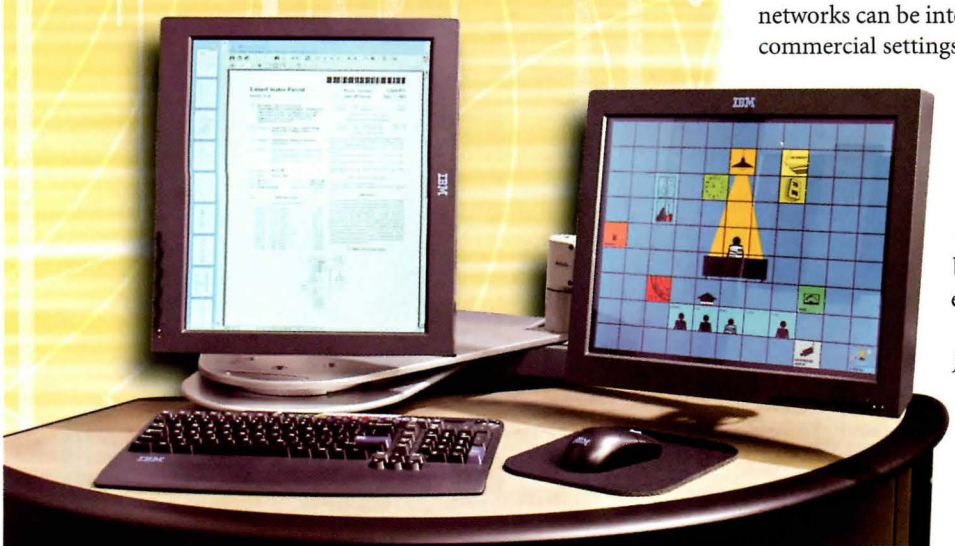
Space Invaders

PERVASIVE COMPUTING TECHNOLOGIES PROMISE TO REVOLUTIONIZE THE WAY PEOPLE USE BUILDINGS—AND HOW ARCHITECTS DESIGN THEM

By Jacqueline Emigh

Imagine, if you will, an office space dotted with collaboration-oriented cubicles, each one digitally controlled by its occupant. Glancing across the office, you see rows of color-coded status lights above the cubes, indicating whether its occupant is in or out—and if in, busy or available. Within each cube is a large touch-sensitive screen, which acts as the primary display for the occupant. Projected onto walls, tabletops, and floors are secondary touch displays that might include Web pages, user-selected screen savers, photos, and even videoconferences. Together, these displays and devices help workers create personalized environments for their daily tasks.

If this sounds like a futuristic fantasy or a dot-com utopia, it isn't. Together with office-furniture maker Steelcase, IBM has already shown the new BlueSpace office concept to more than 300 prospective customers at lab facilities in New York and Michigan. Beta testing is expected to start this summer. Meanwhile, organizations ranging from Cisco Systems to MIT and Georgia Tech are creating their own prototypes, presenting varied visions of how pervasive computing technologies such as sensors, handheld organizers like Palm Pilots, LEDs, and wireless networks can be integrated into the built environment in residential and commercial settings. The presence of these technologies is changing the way people use their offices and homes—and it will no doubt affect the way architects design them.



Making work feel like home

The ubiquitous, customizable nature of pervasive computing devices is blurring the distinction between residential and commercial spaces, giving employees more control over what their offices look

Jacqueline Emigh, a freelance journalist in New York, has written about technology for more than 12 years for leading trade, business, and consumer publications.

IBM and Steelcase's BlueSpace (previous page and above) will let workers customize their workspaces with digital content.

like and how they function. Through the use of embedded sensors, BlueSpace lets workers control temperature and lighting in their offices from their computers, or even remotely. "If you forget to turn off the heat in your office when you leave for the weekend, you can always take care of it when you get home," says Jennifer Lai, usability expert for BlueSpace.

Commercial spaces serve more people than individual homes, so more types of needs have to be addressed, says Lai. With BlueSpace, IBM and Steelcase are attempting to overcome problems with office cubicles that affect employees and employers alike. Companies want to make sure their employees can be productive in cubicles, something that has long concerned workers, as well. In focus groups that IBM put together for the BlueSpace project, workers' primary complaints were that "they can't customize their cubicles; they don't have any windows; they can't meet with others; and they can't get privacy from interruptions for doing 'heads-down' work," says Lai.

These concerns inspired IBM to develop BlueSpace's secondary display so that workers could enliven their cubes with still pictures, streamed video, or other digital content of their choice. Known as the Everywhere Display, the system uses LEDs to project images anywhere in the cubicle. Wireless sensing technologies allow for touch sensitivity, letting people use their fingers as cursors—even on walls and tabletops—to navigate the interfaces.

For creating flexible meeting spaces in the BlueSpace environment, Steelcase developed the Monitor Rail, a highly configurable tabletop that traverses the entire length of the cube, enabling workers to sit by themselves or with collaborators just about anywhere in the space.

Researchers at IBM expect to add speech recognition in office environments—but in limited doses, to keep noise levels down. "We don't want employees talking to everything in the office," quips Lai.

Blending work and home duties

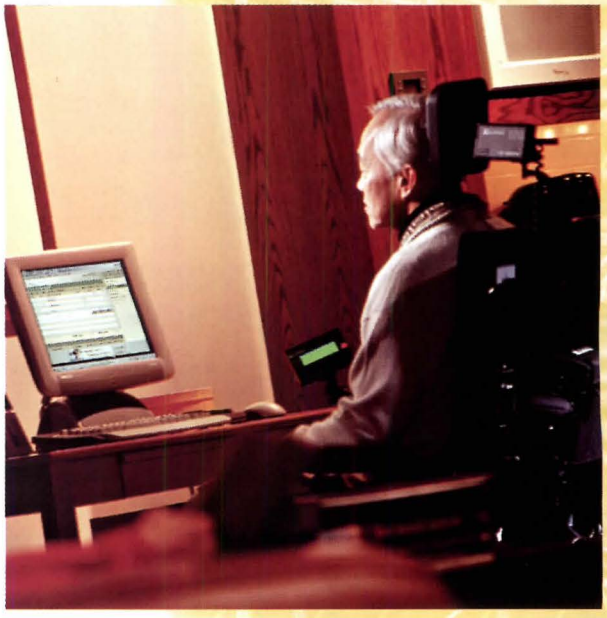
The deepening convergence between residential and commercial spaces can be seen, as well, at Cisco Systems' headquarters in San Jose, California. In a warehouse building on company grounds, Cisco has jointly located two prototype facilities, the Internet Home and the Mobility Center, which showcase various types of wireless technology and Internet connections for managing tasks at work and at home.

The 700-square-foot Mobility Center depicts pervasive computing options in three prototype venues: a hotel room, an airport lounge, and a coffee shop. The hotel room relies on a long-range, broadband Ethernet connection, while the airport lounge and coffee shop showcase Cisco's Aironet wireless technology. "When people walk out the door at home to go to work, they're not necessarily going to an office anymore—but you can still be just as connected and productive," says Rob Springer, Internet Home manager for Cisco. "We think merchants [like hotels] will find that high-speed Internet connections will attract clientele," he adds.

The Mobility Center is linked to a 1,700-square-foot Internet Home, which showcases Cisco's Internet technology working in concert with devices donated by Compaq, Honeywell, and other companies. In the home, they use Internet phones and Compaq's handheld organizer, the iPAQ, to manage home systems ranging from "nanny cameras" to heating to living room drapes, either from the home or from one of the prototype Mobility Center areas. In other words, no matter where you are, you can take care of your job and your house—or, preferably, both.

Staying healthy at home

Though much of the emphasis in pervasive computing is on worker productivity and convenience, other efforts focus on home-based health care and wellness. IBM's prototype home in Austin, Texas, the Networked



Research in telemedicine aims to help diagnose illnesses, remind people to take medications, and monitor health and wellness in the home—especially for the elderly.

Home, is investigating telemedicine for rapid on-site diagnosis so that people can avoid unnecessary sick days or trips to the doctor. "We're working on ways of taking pictures of the inner ear," says Bill Bodin, who heads up IBM's Pervasive Computing Lab in Austin. "One false earache can keep a parent at home needlessly."

Another research effort on home systems is MIT's House_n, a project overseen by the school's Department of Architecture. Researchers are eyeing two possible sites to build a prototype for their so-called electronically mediated house: a rooftop at MIT, or a single-family lot in Cambridge, Massachusetts. The technologies in the house will focus on health care, says Kent Larson, director of the project, "although there will also be some implications for energy usage," he adds. "We'd like to use early detection systems to encourage medication compliance, for example. We'll also look at 'just-in-time' information and delivering the right message to the right device." Innovations springing from this work might help aging baby boomers live at home longer instead of moving to nursing homes and assisted-care centers, predicts Gregory Beck, AIA, an architect who teaches at the school.

Sensing technology will be used to detect both objects and people in House_n for various monitoring purposes. Instead of cameras, however, MIT will use noninvasive sensors such as computervision and radio frequency (RF) tags, miniature wireless devices that can be detected through walls, clutter, and other objects. MIT is also working with IBM on a set of new display technologies, including the Sensetable, a digital table that recognizes what objects are placed on it.

LINKING SMART-BUILDING SYSTEMS WILL REMAIN A CHALLENGE FOR ARCHITECTS AND TECHNOLOGY COMPANIES.

MIT's pervasive computing efforts aren't limited to houses alone, though. Within its "Changing Places of Work" project, researchers will collect workplace activity data, with the aim of developing a "typology of work" that will be used to design a spectrum of workplace environments, which may also have implications for residential design.

Georgia Tech is sponsoring a major residential research project—the Broadband Institute Residential Laboratory, also known as the Aware Home, a retrofitted 5,040-square-foot house near the school's campus. An overriding goal, according to the project's Web site, is to create a home that is able to "know information about itself, as well as the whereabouts and activities of its inhabitants." In one research initiative, "Aging in Place," researchers are programming the Aware Home to track a senior adult's behavioral trends to augment their memory and senses and identify health emergencies, automatically contacting assistance services as needed.

Making it all work together

Despite the proliferation of research projects and the ever-increasing sophistication of pervasive computing techniques, both architects and technology developers still face a number of hurdles as they consider what kinds of systems to implement, and how. One of the first of these challenges is the integration and improvement of security systems in commercial structures in the post–September 11 era. Companies are scrambling to figure out how to extend the capabilities of wireless security through integration with other building systems and information. IBM is already testing a smart-card system that makes computer applications or documents containing sensitive information "disappear" from a monitor or other display device when unauthorized people approach the computer. Meanwhile, companies in the wireless access control area are working to add fingerprint-reading and facial-scanning functionality and to integrate smart-card systems with digital video cameras.

USING TECHNOLOGY AT HOME FOR SAVING ENERGY, NOT CHANGING CHANNELS

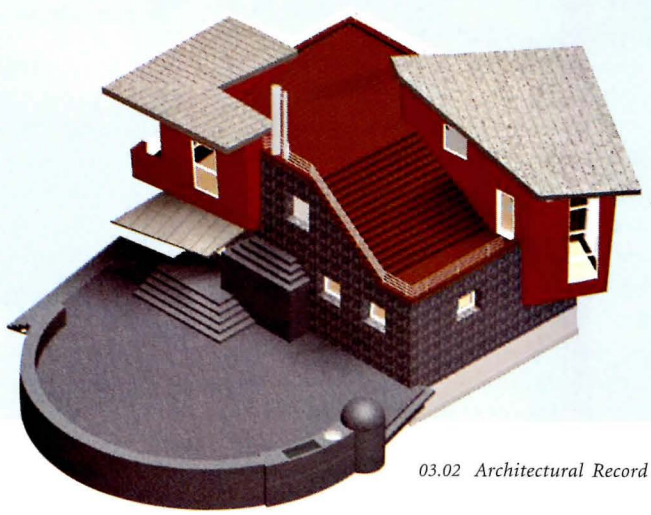
Michael McDonough, AIA, advocates using smart-building technology at home—but one of a different stripe. "Most smart-home systems emphasize entertainment and convenience," he explains. "And consumers will spend lots of money on entertainment systems and such, often to their later disappointment, because the systems are too complicated to use or maintain or upgrade. Why bother? If you invest in technology to gain efficiency rather than convenience, it'll earn its keep in the long run."

The architect is building E-House 2000 (shown below), a residential project he designed in rural Stone Ridge, New York, to demonstrate how wireless computing and monitoring technology enable energy-saving features and systems like radiant cooling and passive solar heating. Sensors will be used to track "the vanilla stuff" like temperature, says McDonough, along with humidity, heat gain, and even ground freezing near critical underground systems that could be damaged by frost.

The sensors will monitor the parts of the house most prone to failure or poor performance, like drains and flashings. "Some of the problems of past green buildings are well known," McDonough says. "With radiant cooling, you get condensation on the ceiling once you reach the dew point, so you have to make sure the indoor air is dry enough, or else you have to put in collection panels. And you can get cracking around windows due to thermal bridging, because the R-factor of glass is so much lower than the surrounding walls." Information from the sensors flows to supervisory control and data acquisition (SCADA) software that will alert him to potential problems, and either automatically adjust systems to work optimally in concert or let him manually turn on dehumidifiers, lower window shades, and make other adjustments from a home computer.

Cantilevered sections of the house with north-facing windows are built of steel rather than wood. McDonough says he will monitor the insulation around the steel to add heat as needed, to avoid the problems that often hamper steel's performance in cold climates. "I wanted to use steel to create a light, clean, modern look," he says. "Green building doesn't have to be all brown rice."

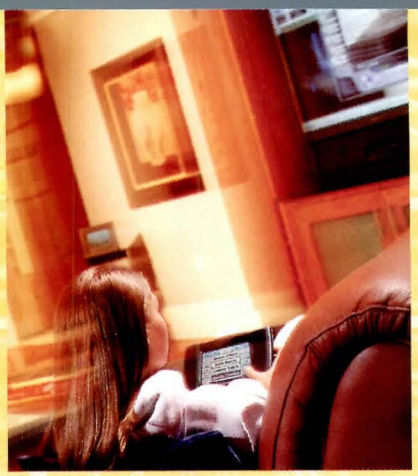
"There's no magic bullet here," McDonough says of the extensive monitoring and management system in the house, which he'll live in once it's complete later this year. "There's always the potential for failure or poor performance of building systems. But this stuff helps." *DS/JE*



Another challenge is integrating emerging technologies with existing building materials and methods—and with each other. "Systems in buildings are completely separate and proprietary [today]," says MIT's Larson. "The lighting system is separate from the security system, and both are generally overlaid onto a very low-tech and primitive enclosure." Adoption of design-build models and plug-and-play environments could hold the key to future progress in enabling buildings to become smart, comfortable, and user-friendly. "Design-build could free up architects to think more about design again," Larson says.

Architects and technology developers must also keep up with new materials that hold promise for changing how buildings and technologies function. Deborah Chung, an engineering professor at the University of Buffalo, is developing a new type of concrete that contains short, electronically conductive fibers. "The concrete is able to act as a sensor," says Chung. "It can sense its own stress or damage. It's also useful in suppressing vibration. If used in the floors of a multistory building, it might sense where all the people are." Such a material could potentially reduce or eliminate the conduits and wiring systems now so commonplace in all types of buildings. And W. Keith Edwards, a lab researcher at Xerox's Palo Alto Research Center, predicts that if wireless networks continue to become more popular, brick might even become an obsolete building material—it tends to block out wireless signals.

Designers also differ over how—or if—pervasive computing should affect the way their buildings look, although they generally agree that gadgetry should be as unobtrusive as possible. "People don't like to have a lot of technology hanging around," says one Georgia Tech spokesperson for Georgia Tech's Aware Home. "We've had TV crews [filming] in here, and they've asked, 'So where's the technology?'"



Cisco's Internet Home features Web pads that let people control entertainment and security systems as well as overall ambience such as lighting and temperature.

For his part, MIT's Larson hopes for a future of architectural "mass customization" in which people can easily swap out well-designed components of their houses or offices when newer, better ones become available. "By then, it will no longer be the case that architecture is largely fixed, and technology is ever-changing. Instead, architecture and technology will both be ever-changing," Larson says. ■

COMING UNWIRED: PERVASIVE COMPUTING AND THE ARCHITECTURE OF THE CITY

Pervasive computing technologies—always on, embedded in the physical world, miniature in scale, wireless, and networked—may represent the biggest technological transformation of everyday life since the invention of the computer itself. It will turn the virtual reality model inside out: If the former goal was to make computer environments lifelike, now our surroundings will function as a series of overlapping digital networks—reality as embodied virtuality. Our desktop computers, which comprise just two percent of all computers, will grow more obsolete as digital capabilities are scattered and linked throughout our entire environment.

Not surprisingly, funding for this technology's development has come primarily from military and commercial interests; the Oracle Corporation, for instance, offered to build a national security database for digital identification cards for U.S. residents. Likewise, increased security threats in the post–September 11 era have accelerated pervasive computing's evolution. Together, the sponsors and the urgency leave the public with less time for substantive debate about emerging technologies.

This is unfortunate, because pervasive computing will have profound consequences for cities, building systems, architectural practices, and everyday life. Some current applications are inarguably good: Pervasive building systems technologies can monitor seismic action, detect or correct structural failure, or regulate natural light and ventilation. These capabilities represent significant progress in energy conservation, building science, health, safety, and welfare.

But perhaps the most dubious trajectory of pervasive computing concerns surveillance. On a typical day in Los Angeles, it is estimated that individuals are filmed by 35 cameras, mostly for security purposes. Though few of these systems are integrated with useful data (e.g., photographs of known criminals), scanning for particular faces or racially dominant features is entirely possible. One can imagine the potential misuse. Since September 11, there have been proposals for 100 new surveillance cameras in Times Square, and parts of Salt Lake City could supply ample footage for each Olympic visitor's home movies. A chilling effect on public behavior is what law enforcers intend: The average Briton is filmed some 300 times a day, for instance, yet police admit no terrorists have been apprehended by this measure. They insist instead that crime prevention has been the principal result.

Do we condone the transformation of an ever-aspiring open civil society into a surveillance society? As public space becomes privatized through the apprehension of personal information for uncertain purposes, deviance and difference are dislocated to a further marginalized underbelly of the city. Though we might sometimes be relieved by this migration (potential muggers are discouraged by the presence of surveillance cameras), in other circumstances, public life is stifled. Would an AIA officer attend a gay rights march? Would a Microsoft employee join a protest at World Trade Organization meetings?

As architects, we can envision pervasive computing's ability to transform our task. There are aesthetic, programmatic, technological, communications, and safety implications that can become creative resources: Imagine a school that can automatically close its playground if security is at risk, animate classroom walls with digital resources triggered by children's questions, and keep the neighborhood informed of an energy conservation project through real-time displays. Architects have the opportunity to actively intervene so that the shape pervasive computing eventually takes is informed by our professional sensibilities. Only then can we guide rather than react to this emergent technology's impact on urbanism and architectural form. *Dana Cuff*

Digital Architect

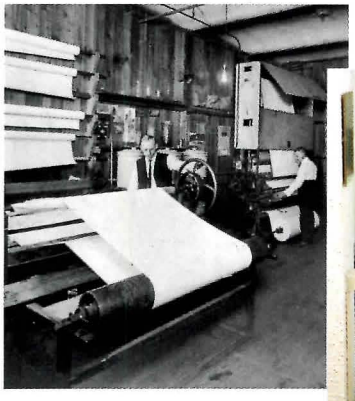
Tech primer: printers and plotters

By Jerry Laiserin, FAIA

Getting CAD documents, specifications text, or rendered images out of the digital realm and onto the physical media of bond, vellum, or Mylar is no trivial task. Successful printing and plotting require a coordinated assortment of software for preprocessing the digital material to be printed, hardware for the physical output, and optional add-on software and third-party services.

HOW IT WORKS: Dots and lines

Clicking the printer icon on a computer screen launches a complex sequence of internal software preparations. The process starts with a program called a printer (or plotter) driver, which harnesses the electronic bits whizzing around inside the computer and aligns them in a printer-specific way—different from the way that bits are displayed on screen. The vectors, or x-y lines, that make up a CAD file or a Postscript (PS) file for desktop publishing must be converted into a raster, the arrangement of horizontal rows of dots that most plotters and printers use to put pigment on paper. Along with this raster image processing (RIP), other software for anti-aliasing smoothes what would otherwise be stair-step "jaggies" where curved or angled lines and text characters span the printer's rows of raster dots. If a color file is being printed, the computer's internal red-green-blue (RGB) color representation gets translated into a grayscale for black-and-white printers, or into the cyan-magenta-yellow-black (CMYK) color representation that most color plotters and printers use.



Cumbersome old blueprint machines have given way to sleeker output devices like the HP Designjet 1050c Plus.

CAD output imposes additional demands. All the popular architectural CAD programs store design information in an internal database or model; each has its own means of extracting, exporting, or reporting scaled orthogonal views (plans, elevations, and sections) of the model onto paper-friendly arrangements called viewports, layouts, or paper space. Most CAD program output settings include pen tables, lists that correlate on-screen line weights to the thickness of printed lines (equivalent to the width of technical drafting pens).

Printing and plotting consumes lots of memory and processing power, which is handled by the hardware in a computer, a printer/plotter, or a network device called a print/plot server. Many printer/plotters have computer processors and memory built in; some even have their own internal hard drives to handle multiple print jobs.

The features

Now that modern raster technology has displaced the impact printers and huge pen plotters of yore, there is little clear-cut distinction between printing and plotting. Many people still associate plotting with large-size output, such as the popular D and E sizes, but the same hardware often serves as a wide-format printer, with the substitution of different driver software. By the same token, devices that print letter, legal, and 11-by-17-inch paper are usually sold as printers but serve well, with the right drivers, for half-size check plots.

The size of a printer/plotter's ink or toner imprint is measured in dots per inch (dpi); the more dpi, the higher the resolution and the better the resulting image quality. Maximal print resolution ranges from 600 dpi to 2,400 dpi; most devices offer a low dpi setting for faster, lower-resolution printing in draft mode.

The other important distinguishing features among printers and plotters are output speed (measured in pages per minute [ppm] for printing or square feet per hour [sq.ft./hr.] for plotting); the cost of expendables (e.g., ink refills, replacement print heads for inkjet printers, toner cartridges or refills for laser printers); and overall cost. Larger-format devices, and those that print faster and at higher resolutions, generally incur greater

Contributing editor Jerry Laiserin, FAIA, provides strategic consulting services to architects and their technology providers.

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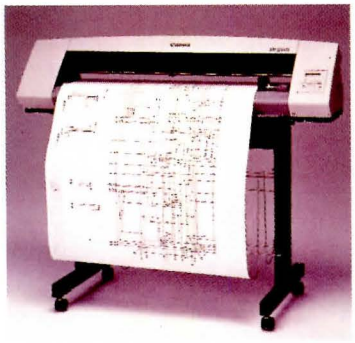
costs than do smaller, slower machines.

WHAT TO LOOK FOR: The basics

Hardware and software to print or plot letter-size sheets with acceptable resolution and color fidelity can cost as little as $200. High-speed, high-resolution, large-format Postscript and CAD-cable printing/plotting systems can cost as much as $20,000, while the heavy-duty, high-volume setups used in reprographics shops approach $200,000 in cost. Faced with such a vast spread in price and functionality, how can architects minimize the risk of overspending—or underestimating costs—when choosing the most appropriate devices for their practices?

According to Michael Horta, president of Computers in Design, a design technology consulting firm in New York City, the best way to narrow the field is to carefully assess the plotting tasks to be performed (see sidebar, above right, "Printing and Plotting: The Main Points"). Answering these questions helps firms zero in on key factors such as the required size and speed of output. For example, at 85 sq.ft./hr., an E size plotter (or 36-inch-wide printer), running in best-quality mode, can produce a 100-sheet, one-color set in about an hour and a half, or one sheet per minute. While this is more than fast enough for many architects, such a plotter would unacceptably throttle other firms down to just five sets of prints in an eight-hour day.

Kyocera Mita FS-1800.



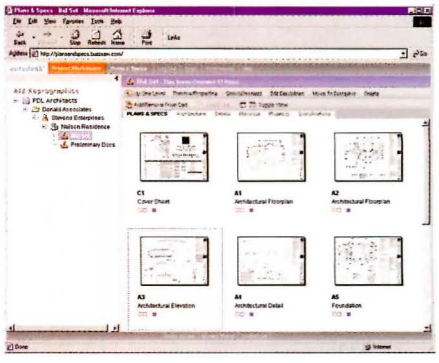
Canon SR-850E.

Firms that print fully rendered color images likely will want a high-resolution device (1,200 or 2,400 dpi), while those with little or no rendering requirements often can get by with a more affordable 600 dpi machine. Similarly, adding Postscript capability for full-blown desktop publishing can tack on 20 to 25 percent to the cost of a given printer—so adding that function to a $499 letter-size printer may be more sensible and cost-effective than adding it to a $4,999 wide-format machine.

More tips

Horta points out that the criteria that can be determined from manufacturer's spec sheets (resolution, print speed, and so forth) represent only part of the picture for smart shopping. For example, because CAD and rendered image files require substantial preprocessing and consume large amounts of memory, Horta believes that the most cost-effective add-on for any printer/plotter is expanded memory. "Buy as much as you can afford, because it allows the whole file or job to go directly to the printer, without tying up your computer or your network. If necessary," he adds, "cut back on frills like optional printer stands, output trays, or automatic sheet cutters."

Another feature Horta believes essential for large-format devices is the ability to handle roll media. "The amount of time and paper you waste trying to line up individual D- and E-size sheets in the machine isn't worth the savings from eliminating the roll feeder," he notes.



Plans and Specs organizes documents in an Internet repository for future print orders.

Horta also takes into account the way the device connects to a network. Virtually all these machines include the traditional "parallel" printer cable connection that works with almost any PC and operating system software. (Apple Macintosh computers and networks have their own special connection requirements, although DataViz MacOpener allows printing Mac files from PCs.) Newer small-to-medium format printers often include the faster universal serial bus (USB) connector that works with Windows 98, 2000, and XP, as well as most recent Macs. However, both parallel and USB inter-

Printing and Plotting: The Main Points

What you need

- Do you need color output, or are black-and-white plots and grayscale images sufficient?
- Does your firm produce 3D renderings as well as 2D working drawings?
- How often do you incorporate images like aerial photos or existing-condition snapshots in your CAD drawings?
- How often do you incorporate CAD drawings in other documents, such as proposals and brochures?
- Do you generate mostly check plots (smaller size, typically non-reimbursable) or lots of full-size bid sets, contracts sets, and permit sets (typically billable to your client)?
- Is your staff located in a single office space, on multiple floors, or in multiple offices?

What to buy

For printing fully rendered color images, a high-resolution printer (1,200 to 2,400 dpi) is optimal. Firms that print few or rendered images can get by with a 600 dpi device.

Buy as much memory as you can afford. Printer memory has a large impact on performance; cut back on frills like optional printer stands or output trays if necessary.

For wide-format printing, opt for a device with a roll feeder. Firms waste too much time and paper lining up individual sheets for printing.

Connect a shared printer to a computer dedicated as a print/plot server. Print speed and performance will drop if the computer is also used as a workstation.

HPGL (Hewlett-Packard Graphics Language) drivers show top performance for CAD output. Driver performance is critical for printing success; HPGL drivers, however, are only available for wide-format devices.

RECORD acknowledges Michael Horta, president of Computers in Design, for developing these recommendations.

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Digital Architect

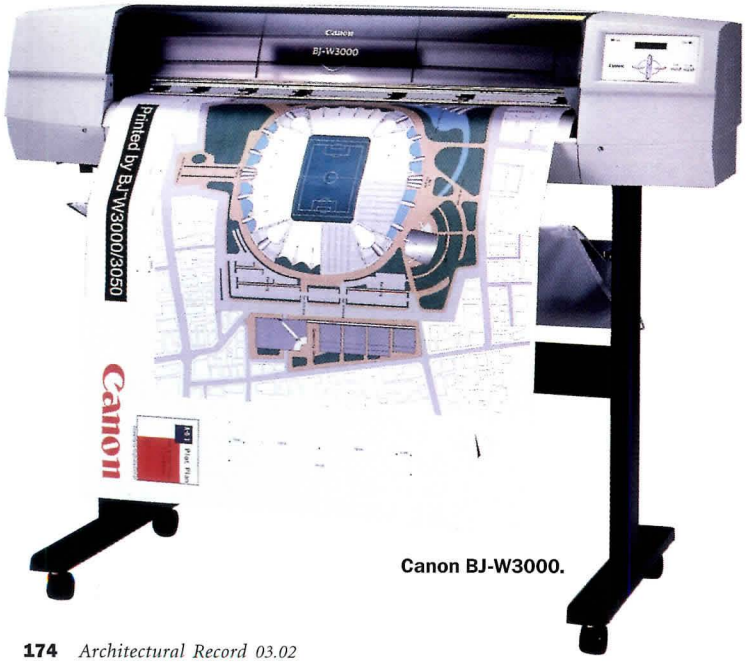
face printers still must connect to a PC that is connected to the firm's network. If the printer is shared, and the connected PC also serves as someone's workstation, performance will suffer. Instead, Horta recommends connecting output devices to a networked PC dedicated as a print/plot server. "The oldest, slowest PC in the office will do just fine—its electronics are still much faster than the mechanical action of the printer," he explains. "If the printer has a lot of on-board memory, the best way to connect to the network is with a direct network connection built into the printer, such as the Hewlett-Packard Jetdirect interface card."

The performance of a software driver is a critical factor in overall printing/plotting success, especially for CAD output. Horta says, "The best driver for CAD in terms of speed, quality of line weights, and ease of setup and so on is HPGL." This is Hewlett-Packard Graphics Language, a vector standard developed by HP for its own plotters. Most other plotter manufacturers, such as Xerox Engineering Systems (XES) and Encad (recently acquired by Kodak) offer HPGL emulation, although the de facto HPGL standard helps to explain HP's dominant market share for CAD plotting. Horta is critical of printer manufacturers, including HP, for not making HPGL available on smaller-size printers. Like many CAD gurus, he speaks wistfully of the HP Laserjet4MV, a discontinued 11-by-17-inch black-and-white laser printer with HPGL that still serves as a workhorse for razor-sharp half-size check plots in many studios and project teams. The printer/plotter in Horta's CAD training room is an inexpensive Epson Stylus C-size color inkjet device that is no longer marketed but treasured for its HPGL emulation, which is not offered in current Epson models of that size.

Most CAD programs include their own plotter drivers or can print to the standard Windows printer drivers, but Horta wishes for the same HPGL features on small devices that are available for large-format output.

The extras

Unlike other segments of the computer business, plotting has attracted relatively few add-on programs. Horta identifies the most popular add-on as Squiggle, a software tool that generates plotted line styles that look like freehand drawings done in pencil, marker, felt-tip pen on cocktail napkin, or other line styles. Squiggle works with AutoCAD and AutoCAD-compatible output files from other PC-based CAD programs. A similar program, called Doodle, works with the Windows and Mac versions of Nemetschek's Vectorworks, while the Windows and Mac versions of Graphisoft's ArchiCAD create a comparable freehand look via that program's built-in LiveStyles.



Canon BJ-W3000.

Hewlett-Packard's HP LaserJet 9000 series.

At least as important as line work is the bottom line. Many architects want to recover plotting costs by assigning project codes to each print job for later billing. Several add-on utility programs are available for this purpose. Argos, from Sepialine [reviewed in RECORD, June 2001, page 199], SmartPLOT from Technesis, and PrintSuite from Infinity Squared are among the CAD-oriented contenders, although many firms rely on the cost-recovery features of Equitrac's PrintLog Professional. Some of these programs work with fax and copy machines, as well, and all help to manage multiple plotting jobs and multiple plotters, in addition to capturing the cost factors (size, media, and so forth) for each plot. In the past, architects resisted using plot-management software because it imposes an additional data entry step in the plotting process, when time often is of the essence. But the latest versions of these tools, especially Argos, make the chore less onerous.

Many firms with substantial volumes of reimbursable plotting opt for an outsourced solution, in which their local reprographer provides equipment, media, expendables, and an on-site staff person to run the equipment in the architect's office. In this case, the firm receives a third-party invoice for reimbursement. This arrangement, called an in-plant, can be a cost-effective way to handle high plot volumes without incurring the up-front capital costs of a heavy-duty plotter, according to Lori Hason, vice president of National Reprographics, Inc. (NRI) in New York—one of the oldest and largest repro houses in the country.

AS FIRMS GLOBALIZE AND BECOME MORE COMPETITIVE, THEY WILL LIKELY OPT FOR IN-PLANT AND WEB-BASED SERVICES FOR LARGE PRINTING AND PLOTTING JOBS.

Hason also points to a larger trend toward Web-based document management, including remote plotting on demand, services NRI offers through its own WebEDM service and through ReproMax, a consortium cofounded by NRI that now includes over 50 regional reprographers.

Other third-party document, plot-management, and remote plotting solutions include regional independents such as Docunet from Design Media Connections in Indianapolis; the nationwide PlanWell network from American Reprographics; Web-based eQuorum; PlanLink from Charrette; the Digital Print Room from CAD vendor Bentley Systems; and Autodesk Plans and Specs, part of their Buzzsaw extranet *service.* ■

Digital Product Reviews

Autodesk puts "design" back into CAD

By Jerry Laiserin, FAIA

Architectural Studio
Autodesk

A common division of labor within architecture firms has project architects using CAD software to produce construction documents, while designers and senior principals cling to drawing by hand, especially during the early design phases of projects. This dichotomy is often cast as a technological generation gap—but the real divide is between precision drafting and expressive drawing as communications media for different messages and audiences.

In paper-based architectural studios of yore, it was easy to sketch over carefully drafted plans or even photos, or to draft using a freehand sketch as an underlay. The introduction of CAD disrupted this paper-based transfer of information between different media and methods. Autodesk's newest software, Architectural Studio (ArchStudio, for short) promises to reintegrate design with documentation, starting with the earliest schematic and conceptual design phases that until now have not been entirely computerized.

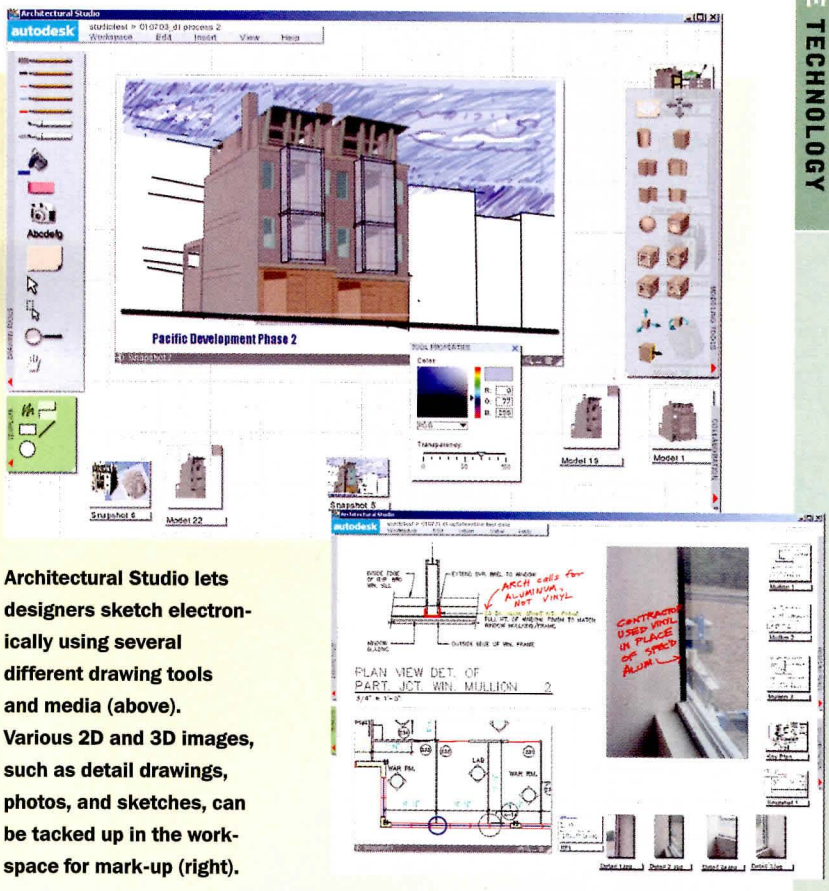
Software imitates life

The program embodies a digital metaphor representing the traditional tools and work methods of architects. On-screen, you see a tray of electronic 2D drawing tools: rolls of tracing paper; a clutch of pencils, pens, markers, and brushes; an eraser; and so forth. There's also a tray of 3D tools that can be stretched, squished, combined, carved, or dragged into place on a 2D background. It is possible to extrude 3D shapes from 2D drawings, and 2D drawing tools can be used to mark up the surfaces of 3D objects. Snapshots of 2D or 3D work produced in ArchStudio can be digitally pinned up in the workspace as thumbnails for future reference and handy access; or, they can be exported to other software for refinement as rendered images or production drawings.

Drafting work and models from other design software, such as Autodesk Architectural Desktop, can be brought into ArchStudio for editing or as backgrounds for additional sketches and studies. Photographs, scanned images, site plans, and other materials also can be brought into the workspace for reference or as backgrounds, just as designers have always done in noncomputerized architectural studios.

The bottom line

This flexibility and the careful mimicry of physical design media makes ArchStudio easy to learn and easy to use, especially for those with little or no CAD experience. Mario Guttman, AIA, corporate CAD director at Hellmuth, Obata + Kassabaum, says the firm's designers have been using ArchStudio successfully for "quick studies, fast visualization of unusual shapes, and multiple iterations of sketching over ideas in various stages of development."



Architectural Studio lets designers sketch electronically using several different drawing tools and media (above). Various 2D and 3D images, such as detail drawings, photos, and sketches, can be tacked up in the workspace for mark-up (right).

ArchStudio can operate as a stand-alone product, but an optional subscription-based collaboration service lets architects use the program's Workspace Navigator function to share their workspace online with others. At Kohn Pedersen Fox in New York, senior associate principal John Koga, AIA, sees ArchStudio's greatest value in enabling designers to share information, "which supports the firm's ability to practice internationally without setting up a lot of [overseas] offices."

Getting in touch

ArchStudio will run on any CAD-capable Windows PC, but the online collaboration feature works best with a high-speed Internet connection. The on-screen tools demand a pen-tablet input device for optimal performance; workable tablets, such as the Wacom Graphire, can be had for under $100 (the current "hot" setup for ArchStudio is the $1,500 Wacom Cintiq touch-sensitive LCD monitor/tablet).

At a suggested retail price under $1,000, plus $500 per year for the optional online service, ArchStudio represents great value. It enhances the early-stage design process in ways no other software has done until now, and if the reader will forgive the use of an "F" word, it makes CAD fun again. ■

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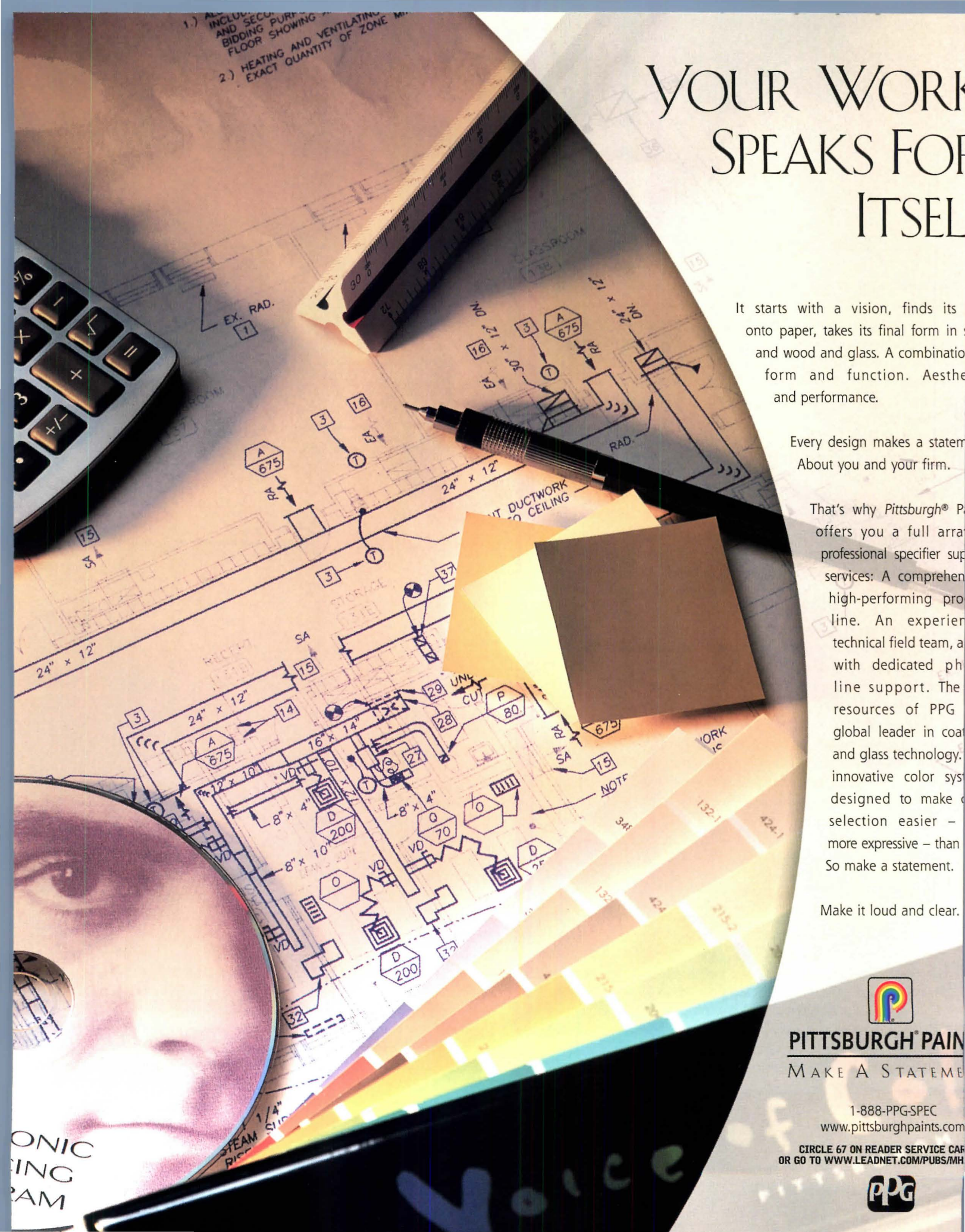

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INTERIORS

Of abstraction, faceted surfaces, and skewed perspectives: Welcome inside.

Architecture by nature is a process of enclosure, and examining the articulation of interior spaces is a mainstay of RECORD's coverage. Since 1970, the annual Record Interiors issue has presented projects in the vanguard of interior architecture and design. This month, we launch a new quarterly section that expands our exploration of this landscape. Mapping the territory where the work of architects, interior designers, and consultants frequently converges, we will survey essential elements—from architectural envelopes and space-planning to custom-designed furnishings and finish details.

Here we present four diverse hospitality projects: a nightclub, casino, hotel, and restaurant with adjoining bar. Though varied in program and budget, the venues resonate with grace notes echoing the zeitgeist.

At the Nouveau Casino in Paris (digital rendering, left), Périphériques wraps the ceiling and walls of a music club with fractured surfaces composed of opaque triangular panels. Like prisms refracting contemporary culture, the faceted planes come alive when blanketed with projected video images. At the Mohegan Sun casino, Rockwell Group's study of faceted form is a three-story tower clad with backlit alabaster panels. Veiling a bar with a ghostly glow, the structure seems like a photographic negative of the Nouveau, twisted and turned on end. Throughout the Connecticut casino, abstract forms express symbols of Native American culture. Meanwhile, at a historic San Francisco hotel, Philippe Starck juxtaposes signposts of Surrealism (a Dali-designed table, Magritte-inspired chair) with monumental scale. To recast the bar of a Victorian-vintage hotel in London, Adam Tihany alters perspective with canted perimeter walls edged with light. Designed to entice, these multilayered interiors all explore the boundaries of what Frank Lloyd Wright called "the architecture of the within." *William Weathersby, Jr.*

A departure from its sister space, a traditional Parisian café, the music hall has a contemporary edge, or many edges, courtesy of an envelope that presents "shards" of imagery. A mezzanine has the austere look of a 1970s lounge (inset, opposite).

Périphériques wraps the **Nouveau Casino** in Paris with a prismatic ceiling animated by video imagery

By Claire Downey

Café Charbon is one of the oldest and most popular cafés on the trendy Rue Oberkampf in western Paris. For years the owners had wanted to convert an abandoned factory behind the restaurant into a concert venue. Architects Louis Paillard and Anne-Françoise Jumeau of the firm Périphériques have their offices around the block from Café Charbon and are regular clients. After a few inspired conversations with the owners, Paillard and Jumeau were offered the design commission for the Nouveau Casino, and with it the difficulties of putting a nightclub literally under their neighbors' windows.

The program called for a 300-person-capacity concert hall, with direct access from both the street and the café; a bar; DJ booth; stage; dressing rooms; a ground-floor kitchen to be shared by the café and the concert hall; and a food and beverage prep area, storage, and cold rooms on the basement level. The 6,620-square-foot project was budgeted at $1.3 million (or $196 per square foot).

With apartments overlooking the site, the main challenge was to maximize the interior ceiling height and create a soundproof envelope, all without raising the roofline. The acoustical problem was solved by building an independent box within the existing shell, then separating the two with a continuous 9.45-inch air space. Each structure is insulated, bringing the overall wall thickness to 39 inches. Structural support and mechanical systems are completely contained within the inner box and rest on an independent floor slab. Below the warehouse, the soil is unstable; as in much of Paris's underground, it is a mix of ancient foundations and loose dirt. To reinforce the club's colored-concrete floor, where hundreds of patrons

Correspondent Claire Downey writes about architecture and the arts from Paris.

Project: *Nouveau Casino, Paris*
Client: *Paris Comptoirs*
Architect: *Périphériques—Louis Paillard, Anne-Françoise Jumeau, principals; Shirin Raïssi, Stéphane Razafindralambo, Philoméne Rowe, Rémi Schnebelin, project team*
Consultants: *Peutz & Associates (acoustics); SIE (electrical); Ravelli (ventilation); Faust; FVS; Di Profa*

PHOTOGRAPHY: © LUC BOEGLY/ARCHIPRESS

The bar (above) is fabricated of molded, translucent resin, which is internally lit by color-gelled fluorescents. Ornate chandeliers add a touch of familiarity. The mezzanine (left).

would be standing at a time, thin piles were sunk from 27 to 45 feet into the ground. Springs between the piles and the slab absorb vibrations from the musical performances.

What makes the club interior so striking is the enclosing shell, faceted by hundreds of black triangles. The triangular steel sections are supported on a metal frame, whose horizontal members zigzag up and down, in and out. Each section was designed on the computer to assure that every triangular piece lies flat to create a beveled surface. The effect is that of a cave cut from precious mineral formations. Jumeau calls it "a coal mine," inspired by the piles of coal, or *charbon*, left at the site from the days when many Paris cafés sold coal for heating.

The club's changing ambience comes from video images projected onto the shell to create what the architects call "moving wallpaper."

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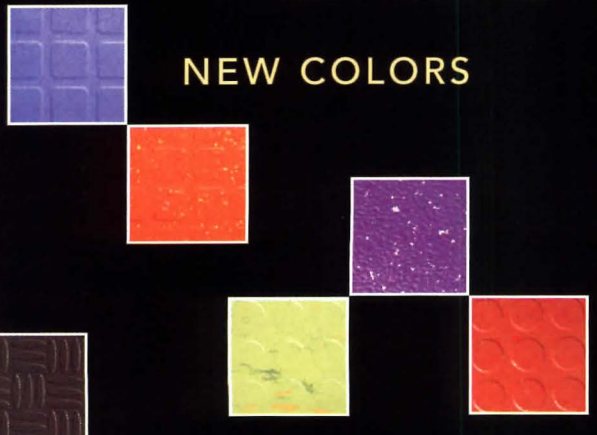

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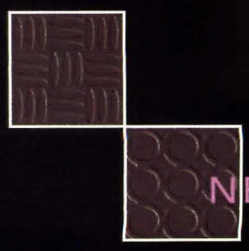

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About 80 percent of the ceiling and 20 percent of the wall panels are perforated and backed with acoustic material, a detail that goes unnoticed once changing video images envelop the room.

The black metal surfaces have a simple waxed finish, which is surprisingly reflective. Random triangles are mirrored to intensify the video effects. Ventilation gaps between triangles draw smoke out of the room, and fresh air is pumped through the side walls. Six video projectors, lighting, and other technical systems are attached to and sometimes hidden by the metal-framed shell. With ceiling height at a premium, air-conditioning units were squeezed into pockets above the irregular form.

On the mezzanine, Paillard wanted to create an "artificial landscape," with the curves of a banquette representing the grade lines on a map and tables the island centers. "As a private joke," he says, the banquette, seen in section, is the same as the front seat of a Citroën DS car.

The success of the rambunctious Nouveau Casino hasn't caused any neighborhood feuds. The insularity of the club has brought praise not only from neighbors but acousticians as well. Hiring architects that work and live nearby seems to have been a very smart move. ■

Sources

Upholstery: *Boyriven and Roby*
Banquettes: *Ets Lecorney*
Lighting: *I Guzzini*
Video projectors: *Fujitsu*
Acoustic wall panels: *Placoplâtre*
Custom metalwork: *Pyrrhus*

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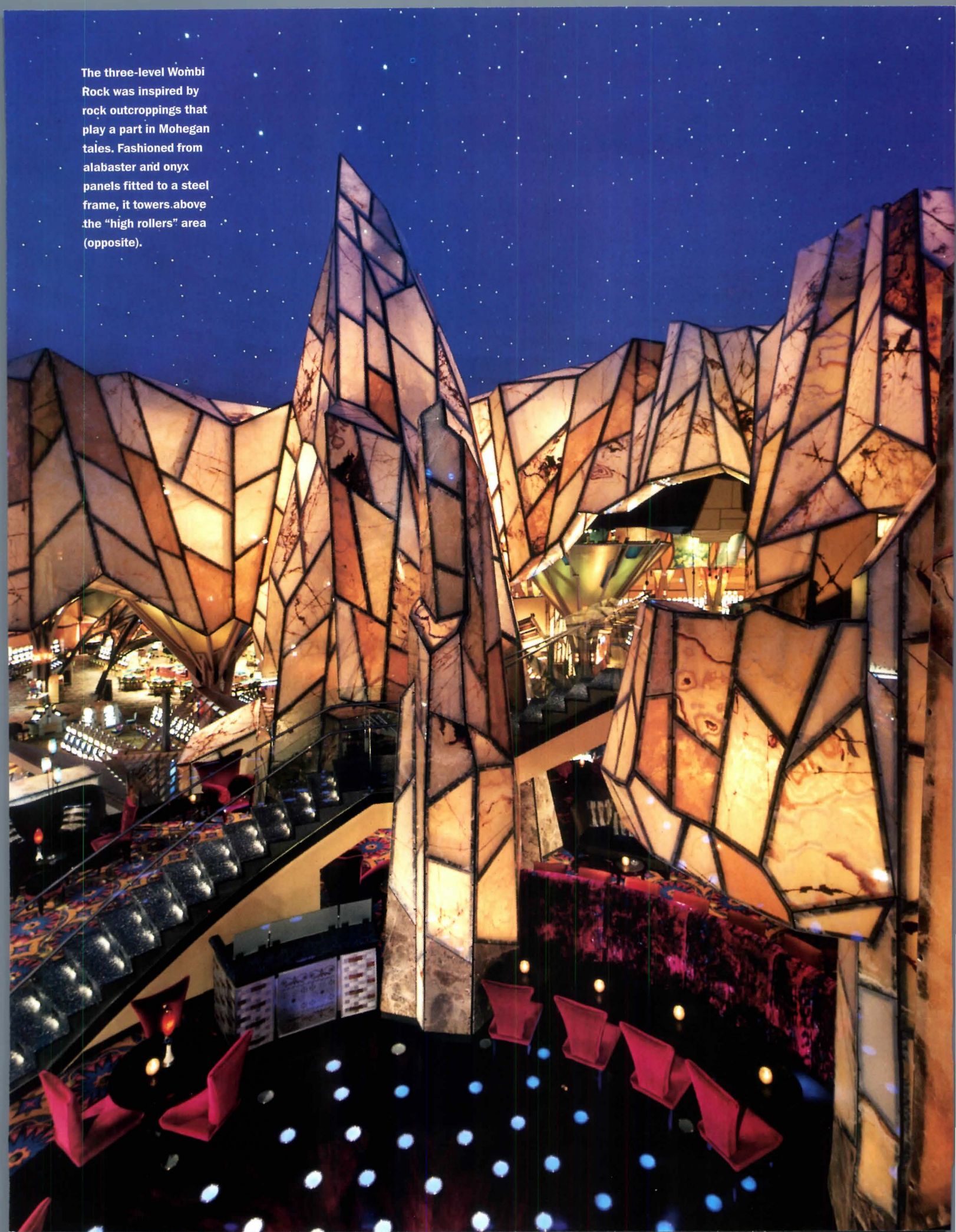


The three-level Wombi Rock was inspired by rock outcroppings that play a part in Mohegan tales. Fashioned from alabaster and onyx panels fitted to a steel frame, it towers above the "high rollers" area (opposite).

Rockwell Group guides Native American narratives into abstract territory at the **Mohegan Sun** casino

By William Weathersby, Jr.

It's a $1 billion bet. Building upon the success of the six-year-old Mohegan Sun casino, development partners Sol Kerzner and the Mohegan Tribe are wagering that amount with new attractions aimed to keep gamblers streaming to the 240-acre site in southeast Connecticut. Adding more than 4 million square feet to the existing 630,000-square-foot complex, the expansion recasts the casino as a full-scale destination resort along the Thames River. Unveiled last September, new features include 115,000 square feet of additional gaming space, nine new restaurants, a 10,000-seat arena, 300-seat cabaret, and two-story shopping promenade. Next month, a 34-story, 1,200-guest-room hotel and adjacent 100,000-square-foot convention center will debut to round out the resort.

Designed by architects Kohn Pedersen Fox Associates (KPF) with interior architecture and design by Rockwell Group, the property's new showplace is the Casino of the Sky, which expresses the symbolism and narrative history of the Mohegans' Native American culture through abstract architectural form and a collage of tactile materials. Breaking with many conventions of typical casino design, the architects have animated the interior landscape with high ceilings, ample skylights, and varied sight lines. A straightforward circular plan and wayfinding cues woven throughout the interior elements help patrons navigate around the gaming floor and other areas, while a planetarium-dome ceiling captivates the eye when players take a break from the slot machines.

Although the Mohegan Sun was conceived as an expansive resort, plans were scaled back to initially build only the first phase, the Casino of the Earth, which opened in the fall of 1996 [RECORD, March 1997, page 104]. Kerzner, the resort magnate whose Sun International has developed properties including the Lost City in South Africa and Atlantis in the Bahamas, had teamed with the descendants of the Mohegans, a largely defunct tribe of Native Americans who once thrived in the woodlands of Connecticut, to build the casino on reservation property.

In the late 1990s, KPF won a limited competition to refocus and manage the massive expansion. Rockwell Group, which designed the interiors of the original casino, returned as principal interior architect and designer, with Hirsch Bedner Associates designing hotel guest rooms and conference spaces. To complete the low-rise podium (casino, arena, and back-of-house facilities) within 35 months, KPF managed 39 architectural/engineering firms, who were divided into teams to tackle major zones of the complex as self-contained building projects. The existing casino remained open throughout construction.

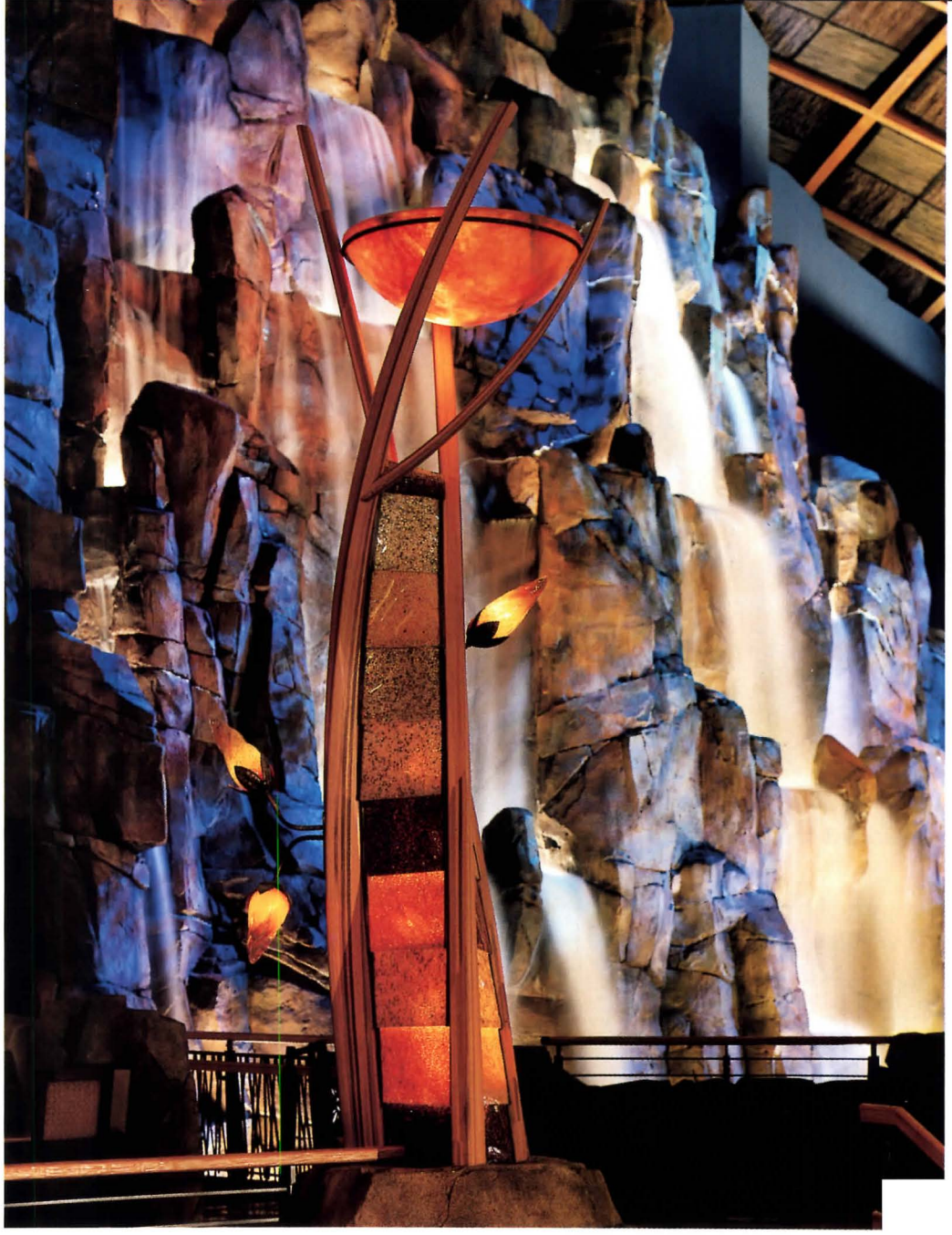
For the new gaming facilities, Rockwell Group's challenge was to create spaces that would relate to the existing casino without overshadowing it. "The client wanted to maintain a subtle sense of continuity within the entire complex, without duplicating design details," says Rockwell Group design principal David Mexico. "Our strategy was to carry through narrative themes and materials inspired by Mohegan motifs, but to express them in a more abstract architectural vocabulary."

The new casino is linked to the original venue by a retail arcade, which features elements of a "life trail," a linear abstraction depicting the Mohegan migration southward to the region centuries ago. A "Tree of Life," a waterfall, and sculptural representations of milestones along the journey delineate the path. The route ends at the 150-foot-diameter planetarium dome, which covers the Casino of the Sky. Special-effects lighting projects constellations, sun cycles, and clouds across the ceiling.

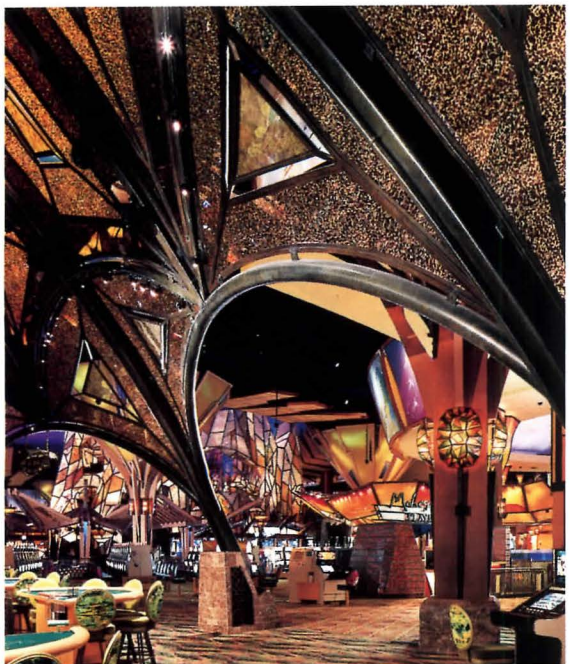
Departing from the existing casino's rustic details (lashed-log trellises, faux-hide canopies, stone partitions), the Casino of the Sky is a

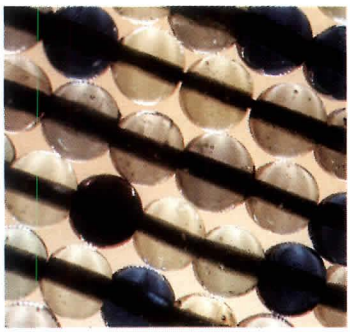
RECORD contributing editor William Weathersby, Jr., is based in Westport, Conn. He frequently writes about architectural interiors and lighting design.

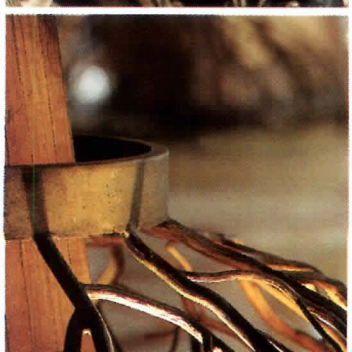
Project: *Mohegan Sun, Casino of the Sky, Uncasville, Conn.*
Architect: *Kohn Pedersen Fox Associates—A. Eugene Kohn, Paul Katz, James von Klemperer, principals; Lloyd Sigal, Joshua Chaiken, Russell Patterson, senior associate principals*
Interior architect: *Rockwell Group—David Rockwell, principal; David Mexico, design principal; Ed Bakos, managing principal; Robert Ashton, senior project manager; Lorraine Knapp, senior interior designer; Julie Yrasek, interior designer*
Consultants: *DeSimone Consulting Engineers; Flack & Kurtz Consulting Engineers; Thompson Engineering; Giovanetti-Shulman Associates; Fisher Marantz Stone (lighting)*



The Tree of Life (opposite) is detailed with copper, birch, and beads. A waterfall cascades down simulated stone behind a bar in the retail promenade (right). The smoke-free gaming area sits under a steel canopy detailed as an abstracted tortoise shell (below left). Glass-bead panels catch the light overhead near a glass sculpture by Dale Chihuly (below right).







A restaurant features moon-inspired imagery (left). The kaleidoscope of details includes (below, clockwise from top left): glass beads strung into panels; flowers preserved in acrylic to enhance a restaurant wall; the metalwork rope detail of a torchère; broken-tile mosaics; a gilt-branch cuff for a column; the curlicues of a Chihuly sculpture.

kaleidoscope of jewel-toned finishes. Every surface seems touched by the handwork of artisans: Glazed tiles, cast-metal balustrades, terrazzo floors inlaid with mother-of-pearl, tie-dyed velvet upholstery, and Murano-glass globes are among the wealth of materials. More than 30 million glass beads are strung into panels to catch the layered light. It's a riotous mix, but the dense patterning stands up to the scale of the 90-foot-high space.

A focal point of the casino landscape is Wombi Rock, a 60-foot tower clad with more than 12,000 plates of alabaster and onyx, like a massive geode outcropping. The backlit structure houses a three-level bar, lounge, and dance floor, and anchors one end of the gaming floor.

In the hotel lobby, guests will arrive amid a grove of stylized trees, constructed of cedar and copper and topped by beaded plumes. A reflecting pool is lined with mosaics representing Mohegan culture past, present, and future. Though many guests may not infer its many layers of symbolism, the Mohegan Sun expansion shines with a rich interior life. ■

Sources

Cabinetry, millwork: *Roger B. Phillips; Raymond; Swiss Services*
Metalwork: *Eurocraft Architectural Metal; Show Motion*
Paints, stains: *Sherwin Williams*
Wall coverings: *Elizabeth Dow; Bamboo Rattan Works; JM Lynne; Gilford*
Laminates: *Wilsonart; Pionite; Interlam; Chemetal; Formica; Nevamar; Abet Laminati; Laminart*
Carpet: *Couristan; Stark; Eurotex*
Resilient flooring: *Forbo Industries*
Tile: *Hunnell Street Tileworks; David Gordon Ceramics; Country Floors; Tiles/A Refined Selection; DAL Tile*
Furniture: *Lambert Furniture; Goodman Charlton; Roger B. Phillips; Westin-Nielsen; L&B Empire; Majestic Industries; AC Coin*
Lighting: *Unilight; Alger; Lumid; International Ironworks; Savoy Studio; Edison Price; ETC; Starfire; Fiberstars; Elliptipar; Lutron*

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Architectural Record Building Science feature, December 2001

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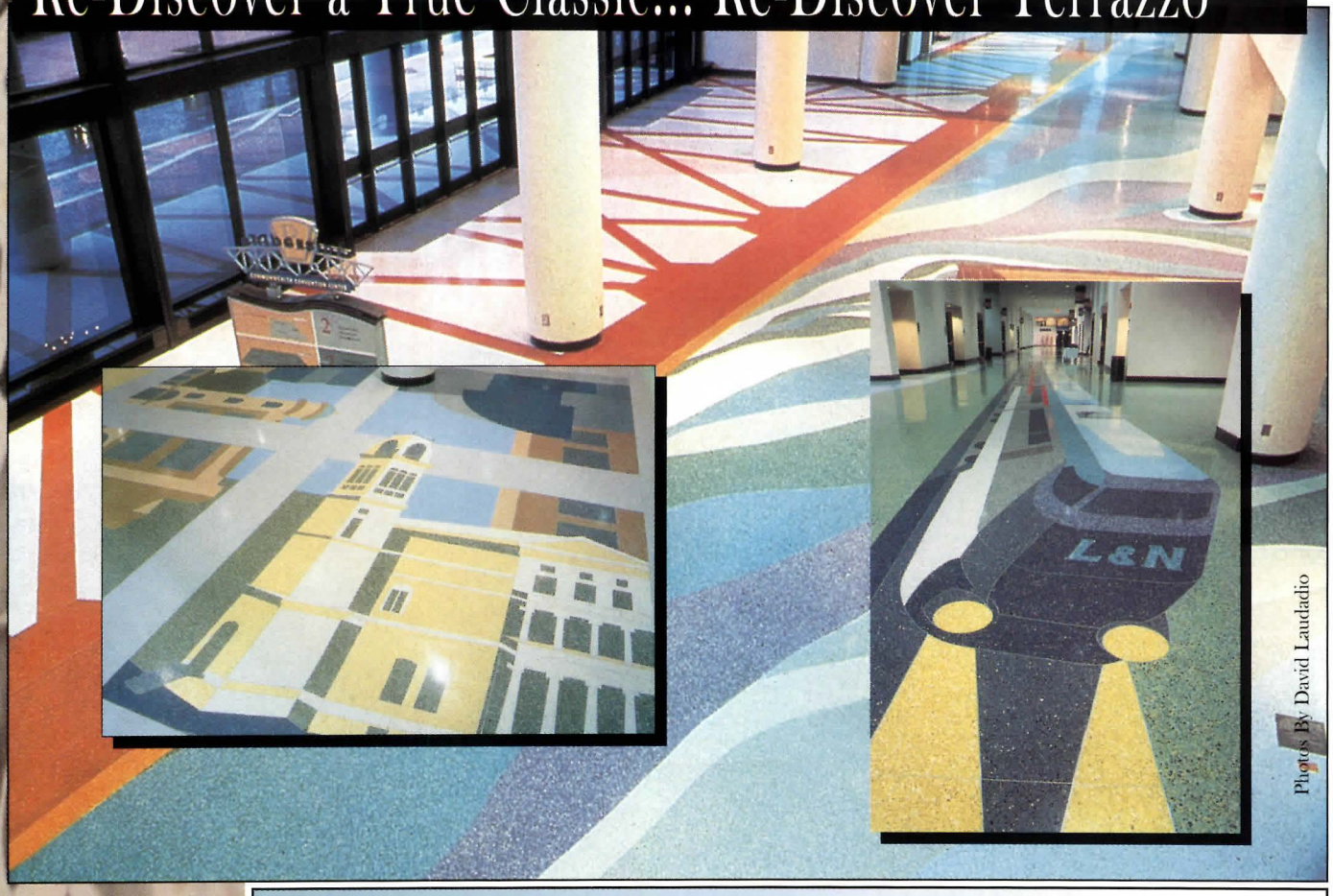

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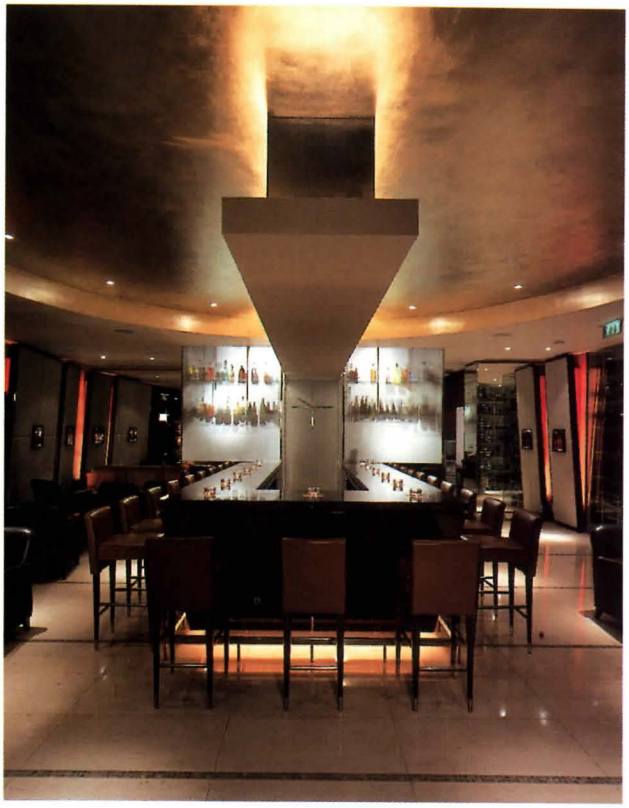
A frosted-glass scrim showcasing colorful bottles is a focal point in the Mandarin Bar. Canted wall panels, upholstered in leather and backlit with strip lights, play with perspective (opposite). A gold-leaf-covered dome ceiling forms a canopy above the bar. Fiber-optic insets cast a glow from the bartop.

Cloaked by a London hotel's Victorian facade, Adam Tihany's **Foliage** and the **Mandarin Bar** are tailored with modern angles and dashing custom details



By John Peter Radulski

Designed by architects Archer and Green as a gentlemen's residential club in 1889 and later converted to a hotel, the Hyde Park remains a stately presence in the heart of London's Knightsbridge district. The Mandarin Oriental Hotel Group acquired the 200-guest-room property at the turn of the millennium and launched a $70 million refurbishment led by Eric Parry Architects and Richmond International.

The hotel's redesigned restaurants and bar are destinations that now sizzle behind the restored Franco-Flemish facade. Tailoring 5,000 square feet of food and beverage space to the requirements of upscale travelers and the cuisine of star chef David Nicholls, Adam Tihany has designed rooms with the precision and dash of a bespoke suit. A well-dressed, split-level restaurant called Foliage; the more casual café, The Park; and the Mandarin Bar project cosmopolitan flair.

"The most important ingredients in designing a restaurant or bar are understanding the demographics of the clientele and acknowledging the geographical location," Tihany says. "At the Mandarin Oriental Hyde Park, we wanted to bring the park indoors, with spaces that are clean-lined and sexy, sophisticated but not trendy." To support the new public entertaining rooms, outmoded kitchen and storage spaces—which the hotel general manager called "Dickensian"—were brought up to contemporary standards.

Tihany, perhaps best known as the designer of the New York City restaurants Jean Georges and Le Cirque 2000, describes the previous Hyde Park restaurant and bar decor as "Francophile-Continental," with large rooms featuring cream-colored walls accented by boiserie. To establish a more intimate scale, he reconfigured the two spaces into a new trio—a bar/lounge, café, and main dining room.

Entered from the hotel lobby, the Mandarin Bar encompasses 2,500 square feet, with seating for 160, including a cigar lounge with custom humidor. Pale marble flooring sets the stage for lounge chairs covered in dark leather, mohair-upholstered sofas, and a central bar faced

John Peter Radulski is the former editor of Hospitality Design. *He is a writer and design consultant based in Westport, Conn.*

Project: *Foliage and Mandarin Bar, Mandarin Oriental Hyde Park Hotel, London*
Client: *Mandarin Oriental Hotel Group*
Interior designer: *Adam D. Tihany International—Adam D. Tihany, principal designer*

Fiber-optic fixtures backlight four sizes of silk leaves pressed between glass panels in Foliage, creating a play of light and shadow. The color of light is changed for each season, such as blue for winter (left) and green for spring (below). Tihany also designed the chairs and table accessories.

with Macassar ebony and topped with marble. At the room's perimeter, seven canted wall panels are clad in leather and backlit with low-voltage strip lights. A vitrine inset at the center of each panel showcases martini glasses designed by Tihany.

Tihany turns the task of bartending into a veiled performance. A hostess is stationed within the 3-foot-wide space between the U-shaped bar, which Tihany calls "the runway," while drinks are mixed behind a frosted-glass panel. Illuminated by miniature, ceiling-mounted halogen track fixtures, rows of colorful bottles behind the glass panel appear mosaic-like when viewed by patrons.

The bar opens to a rotunda, which is bracketed by two glass-enclosed rooms showcasing 5,000 backlit bottles of wine. The rotunda serves as a pivot point between The Park and Foliage. The dome ceiling is covered in silver leaf, and the floor is paved with limestone accented by inlays of metal and black marble.

One challenge in the 1,300-square-foot, 65-seat Foliage was to carry through a sense of place into evening dining hours. Although the dining room offers spectacular views of Hyde Park during the day, at night the park's lights are turned off and diners would peer into a darkened void. Tihany's solution was to shade the windows in the evening and rely on a series of light boxes set along the walls to visually "steal the park." The chrome-framed panels sandwich 24,000 white silk leaves between two layers of clear glass, which are mounted in front of a panel of mottled, reflective material. Top-mounted, fiber-optic lighting varies the intensity of light depending on the time of day and season. A color wheel can change the light from green to white to blue, while the remote illuminators facilitate maintenance. Rectangular chandeliers overhead faced in parchment and trimmed in stitched leather create another subtle plane of light. Wainscoting of hand-rubbed mahogany is a backdrop for Tihany-designed chairs upholstered in butterscotch leather. Dark basket-weave-patterned carpets underfoot allow the jewel-boxlike enclosure to captivate the eye, a modern spin on Victorian filigree. Tihany's attention to detail extends to custom-designed, botanical-themed tablecloths, serving pieces, and napkin holders. To complete the mise-en-scène, a leaf plucked from Hyde Park rests beneath every glass presentation plate. ■

Sources

Paneling: *Fidec International*
Chairs, tables, upholstery: *Colber*
Lighting: *Colber; Lucifer Lighting*
Carpet: *Thai Dynasty*

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Philippe Starck and Ian Schrager elevate the glamour quotient at the **Clift** hotel in San Francisco

Without signage at the entrance, a pale violet vestibule signals the new Clift (left). The refurbished wood paneling with marquetry in the Redwood Room (below) is a warm backdrop for Art Deco–influenced furnishings.

By Therese Bissell

They got off to a shaky start: the cosmopolitan city that cleaves to its romantic past versus the high-concept, too-cool-for-school brand that is Ian Schrager Hotels. When ISH bought the venerable Clift Hotel in 1999, San Francisco mobilized—focus groups, editorials, vigils, even a Web site warned the ISH triumvirate (Schrager, star designer Philippe Starck, and president of design Anda Andrei) to go easy. The Clift was home to the legendary Redwood Room, for decades the cherished haunt of thirsty sophisticates, rated by even the titanium scooter crowd the sexiest bar in town. ISH got the message. Their $40 million renovation notwithstanding, the Clift aura wasn't to be sacrificed on the altar of hipness.

ISH sparked the boutique hotel trend in 1984 with New York's Morgans. The drill is this: For a fixer building, Schrager devises a theme (cheap, young, luxurious, etc.). The staggeringly fecund Starck (he does everything from faucets to uniforms for the hotels) sketches out details, often from his home in France. "We create together," says Andrei, who, with an executive architect—here, Freebairn-Smith & Crane—prepares drawings from Starck's faxes and makes it all work. "The point is the integrity of the design as opposed to who stamps and signs."

"I love that San Francisco is old-fashioned and wood and cigars and elegant, and that it is also cyber kids with no history and no rules," Starck enthuses. His lobby for the historic, George Applegarth–designed, Italian Renaissance–style Clift addresses that duality. Ceilings are again their original 25-foot height; the shell—cool, gray, polished Venetian plaster walls and Pietra Serena limestone floors—is Old World and rich. (Schrager's signature: no exterior sign and the name shortened to "Clift.")

Amid the studiously placed lobby pieces is the requisite ISH big-buzz item, but Starck's bronze Louis Quinze–style Wonderland chair is more gimmicky space-waster than provocateur. The real theater lies in the 18-foot-high, cast-bronze fireplace mantel and Starck's space-manipulating use of contrasting materials in the door frames and reception alcoves.

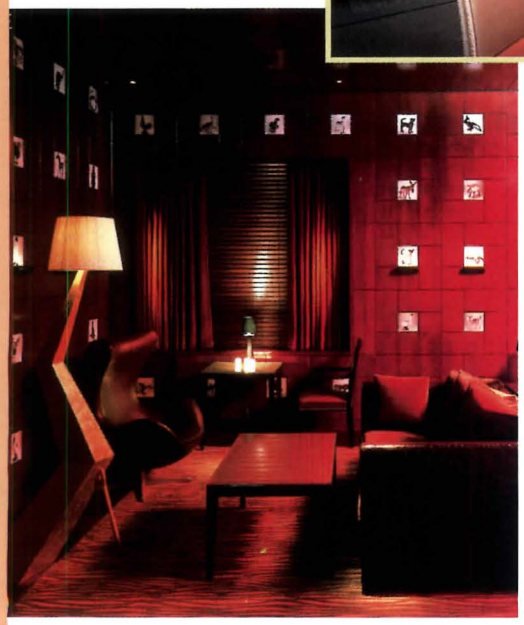
The fear was for naught: As renovated, the Redwood Room will surely be tryst central for the ages. Designed in 1933 and sheathed from a single, 2,000-year-old redwood tree, it is now largely monochromatic (red-

Therese Bissell, the former architecture editor of Architectural Digest, *writes frequently on architecture and interior design from San Francisco.*

Project: *Clift, San Francisco*
Client: *Ian Schrager Hotels*
Designer: *Philippe Starck, overall design; Bruno Borrione, designer*
In-house architect: *Anda Andrei, president of design, Ian Shrager Hotels; Cono DiZeo, Larry Trexler, Kirstin Bailey, Masako Fukuoka, Dan Stewart, Melissa Sison, Kelly Behun, Lara McKenna, Kim Walker, project design team*
Executive architect: *Freebairn-Smith & Crain/Levikow Associates*
Consultants: *Johnson Schwinghammer (lighting); Gerard Gerouste (art installations)*

Replacing the previous Versailles-themed restaurant, Asia de Cuba complements the vibe of the adjacent Redwood Room. The paneled columns, velvet draperies, and wood-grain-patterned carpet continue the "elegant forest" motif. Starck's etched-mirror cruciform table brings patrons together.

The lobby juxtaposes stylized vignettes, with iconic chairs joining art objects (above). Cool palettes and Starck furnishings reign in guest rooms (right).



Off the lobby, a "living room" lounge features curl-up seating and a photographic suite of plastic toy animals by French artist Jean Baptiste Mondino (left).

wood tones in 18 different textures of leather, fabric, carpet, wood, and bronze) with dashes of low-voltage color. The Art Deco marquetry and fixtures—as well as the gilded ceiling—have been gloriously preserved, and the 75-foot-long redwood-burl bar replaced (termites, apparently) with dramatically illuminated glass.

"Public spaces need experimentation, and they need to be strong," says Starck. "Guest rooms are absolutely the opposite." For the 374 rooms (49 are new), the designer used a soft pastel palette and sumptuous fabrics to broadcast tranquillity and luxe. While all the public areas have been reconfigured, the budget dictated that 90 percent of the guest rooms remain intact. The only perceivable flaw: tiny bathrooms in even some of the most expensive rooms, a condition of the building's footprint.

Grace notes include the sleek, all-white business center (velvet curtains, mesh Eames chairs); the rooftop Spanish Suite with wraparound terrace (once the owner's residence, now the locale for parties and chichi meetings); and the burnished, clubby "living room" lounge off the lobby.

"Less and less am I trying to prove something," Starck proclaims. The Clift, too, appears supremely comfortable in its new skin. ■

Sources

Furnishings: *Donghia; Poltrano Frau; Philippe Starck (custom)*
Carpet: *Option Tai Ping*
Wall coverings: *MDC Wallcoverings*
Paints and stains: *Benjamin Moore*
Lighting: *A+L Lighting; Artemus; Lightolier; CSL; Lucifer Lighting; Edison Price; Andromeda; Flos; Kovacs; Philippe Starck (custom)*
Lighting controls: *Lutron*

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New Products

To learn more about issues concerning fire doors, positive pressure, intumescent materials, or electronic access, architects can study up at **The Door & Hardware Institute's 27th annual convention**, held from July 13–15 at Chicago's Navy Pier. The door offerings below range from commercial security to residential patio styles to rolling counter fire doors. *Rita F. Catinella*

Renowned Italian car design firm creates three new racy security doors

Torterolo & Re, one of the biggest Italian manufacturers of steel-clad doors, has three new security steel-clad doors designed by Pininfarina, a firm that has been active in the style and production of cars for 70 years.

The steel-clad Dream door is equipped with an advanced electronically controlled closing system. Sections and indentations in the panel are reminiscent of the side of a sports car. The colors range from Ferrari red and yellow to metallic glossy Indian blue to metallic light gray. The distinctive features of the Pininfarina design can also be seen in the integrated aluminum handle and the "crankshaft" hinges, which are totally hidden in the frame. The inside of the panel is smooth and the same color as the outside. In the Wave door, the handle attracts attention: a metallic wave in a cobalt-blue, metallized-gray, yellow, or Ferrari-red color. The Shield model has notable technical features and is characterized by double-thickness galvanized sheet metal with high-security European-style cylinder locks. While the frames are of the same color outside and inside, the panels can be different. 39 019 516901. Torterolo & Re, Cosseria, Italy. CIRCLE 206

Armor-plated Wave (far left) and Dream (center) doors offer security and race-car appeal. Shield (right) features high-security cylinder locks.

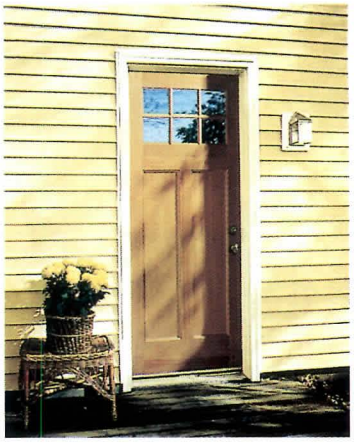
Embossed patterns include the Sunburst-Double Dome (left). Window styles include the porthole windows on this double door (right).

Stainless-steel door and frame options

Since 1993, the Next Door Company has specialized in stainless-steel entrances, storefronts, doors, and frames—the only U.S. manufacturer exclusively dedicated to this craft. Stainless steel naturally resists corrosion and oxidation and does not split or buckle. Next Door offers a variety of designs that include colored steel, embossing, custom etched and textured steel designs, and specialty glass.

Next Door's abraded door patterns, three-dimensional but smooth to the touch, are created through a special crafting technique. Textured and etched steel patterns include small squares, Deco, linen, Indiana leaves, and the customer's own patterns. Next Door's three embossing shapes—Cubic, Orbital, and Dome—are available in a multitude of patterns and colors. Designers glass is available leaded or molded, in colors such as gray, blue, clear, evergreen, and azurlite. The doors are available in five colors of stainless steel and nine finishes. Unique colors and finishes can also be mixed and matched. Finishes include satin, mirror, super mirror, beaded, vibration, bead-blasted (fine), bead-blasted (course), alpen-glow, and paint grade primed. Colors include silver, gold, bronze, rose (copper), and black. 800/791-4450. Next Door Company, Weston, Fla. CIRCLE 207

New Products



◄ On a mission

Nord introduces its newest line of interior and exterior doors, the Mission Series. Constructed from fir, hemlock, or knotty hemlock, Nord Mission doors are available in 10 designs: two constructed with decorative curved arches and eight featuring classic, straight tops for a more contemporary look. Exterior designs are available in 1-, 2-, 3-, and 4-panel, while interior designs include 2-, 3-, and 4-panel with an arch or square top. 800/877-9482, ext. PR-379. Jeld-Wen, Klamath Falls, Ore. **CIRCLE 208**

▲ Veneer flush doors

Newly patented, The Maiman Company's Neer Veneer Thermal Fused Flush Door comes in over 100 colors and wood grains at one standard price. The door features a nondelaminating surface that is formed with high-tech resins treated with heat and pressure to resist chemicals and scratches. Like the company's stile and rail doors, the Thermal Fused doors are built with up to 90-minute fire ratings. 417/862-0681. The Maiman Company, Springfield, Mo. **CIRCLE 210**

► Heavy-duty doors

EFCO heavy-duty D318 DuraStile doors provide durability and security for the rigors of schools and other heavy-use environments. These 2"-thick doors utilize 3/16" extrusion walls and deep-penetration welded corner-bracket construction. Available with medium or wide stiles, in a variety of finishes, they accommodate up to 1 1/16" glass or panels and any standard locking hardware. 800/221-4169. EFCO Corporation, Monett, Mo. **CIRCLE 209**

◄ Electric slide

The ESA sliding automatic door system melds a modern appearance with advanced microprocessor control. Ideal for retail storefronts, commercial entryways, and health-care settings, the 4½"-wide header is designed to blend with industry-standard storefront profiles and is strong enough for free-span openings up to 16' in width. 877/DORMA-11. Dorma Automatics, Upper Marlboro, Md. **CIRCLE 212**

► Rolling counter fire doors

Cornell's rolling counter fire doors with integral frame units are factory-welded and fully assembled for a seamless look. The new slip-in style allows the units to slide in and fasten onto existing wall openings. Built-in models are installed as the surrounding walls are constructed. Labeled integral frame units now offer sill options of an integral stainless-steel sill, a UL-labeled plastic laminate sill, or no sill at all. Units and sills are ½-hour UL labeled and are approved for mounting to rated drywall or masonry. Integral frame units include a curtain of either galvanized or stainless steel that stores in a compact coil at the head of the opening. 800/233-8366. Cornell Iron Works, Mountaintop, Pa. **CIRCLE 211**

▼ Narrower gliding patio door

Andersen's 200 Series offers a streamlined selection of the most popular sizes and styles of windows and patio doors, priced to fit a wide range of project budgets. Andersen's 200 Series Narroline gliding patio door was designed with narrower door panels for a larger glass area, clear pine interior, and Perma Shield exterior in white or sandtone color. Also in the series is the 200 Series tilt-wash, double-hung window. Low-E glazing is available in select markets. 800/426-4261, ext. 1232. Andersen, Bayport, Minn. **CIRCLE 213**

Product Briefs

▲ Nutty rug

G.T. Design was set up in 1977 to explore the potential of industrial materials. In recent years, their research has concentrated on raw materials such as coconut, silk, and hemp fibers. The result is Coconutrug, a carpet of pure coconut fiber handwoven on traditional looms and dyed with nontoxic colors. The rug is completely biodegradable, staticproof, and resistant to mold. It is intended for everyday residential or commercial use. 805/682-4661. G.T. Design, Santa Barbara, Calif. CIRCLE 214

◄ Modern, ancient covering

Armourcoat has created a line of polished and Venetian plasters in a combination of two and three dimensions. Armourcoat plaster has a stonelike finish that outperforms conventional high-volume interior wall finishes such as paint. Over 1,000 square meters of Armourcoat polished plaster was used in various finishes for the refurbishment of Tate Britain in London. 44 01732 460668. Armourcoat Surface Finishes, Kent, England. CIRCLE 216

▼ Don't mind the delay

Arconas launched Flyaway as a premier seating system for airports. Created by award-winning designer Douglas Ball, Flyaway is ergonomically contoured to provide a welcome resting spot for weary passengers. Flyaway's solid die-cast aluminum and steel frame construction was designed to ease the workload of airport maintenance personnel. 905/272-0727, ext. 312. Arconas, Mississauga, Ontario. CIRCLE 217

Product of the Month
Ultron Renew

Solutia has introduced Ultron Renew (right), a 100 percent recycled nylon 6,6 carpet fiber for the contract market. Ultron Renew utilizes post-industrial fiber and polymer products created during Solutia's nylon manufacturing process, before they enter the waste stream. Pigments, additives, and polymer concentrates are not recycled. Unlike lower recycled-content fibers, Ultron Renew is available in more than 30 solution-dyed colors.

In addition to developing new products, Solutia hosts the annual DOC Awards to recognize outstanding achievement in interior design in contract projects utilizing carpet made with Solutia Ultron VIP nylon fiber. In 2001, five firms won DOC Awards, including Michele Frigon and the project team at Partners by DESIGN, of Chicago. This firm won for their untraditional office design for Alternative Resources Corporation (above), a technology management and staffing service firm in Barrington, Ill. 866/UltronVIP. Solutia, St. Louis. CIRCLE 215

▲ The awning of a new age

Using a variety of metals, nontraditional fastening techniques, and blends of fabrics, Architectural Fabric Structures creates contemporary awnings, canopies, shade structures, and sculptures. Recent awning projects include a powder-coated steel frame with tensioned translucent fabric (above left), and a powder-coated steel frame with double layered mesh and opaque fabrics featuring an adjustable pitch to shed winter rains (above right). 415/289-0457. Architectural Fabric Structures, Sausalito, Calif. CIRCLE 218

Product Briefs

The latest in high-end designer furniture and traditional home interiors was on display in January for over 120,000 visitors at the Cologne International Furniture Fair. The dates for next year's show are January 13–19. *Josephine Minutillo*

► Gargantuan garden table

The multifunctional Gargantua was designed for informal get-togethers. Each of the four benches can be unhinged to make room for a high chair or wheelchair, or installed at different heights. With all the benches in the highest position, it becomes a giant table for up to 12 people. Teak with galvanized metal. 404/872-1050. Domus, Atlanta. **CIRCLE 219**

◄ Finnish fabrics

Woodnotes features carpets, fabrics, upholstery, and accessories all woven from spun paper yarn. The translucent vertical design of Open Sky by Ritva Puotila makes it ideal for use as roller or folding blinds, or as partitions and screens. Available in several colors. 314/454-0111. Centro Modern Furnishings, St. Louis. **CIRCLE 220**

▼ Colorful collection

Although most Italian lines wait until the Milan Fair in April to introduce their new products, Paola Lenti presented a variety of new fabric colors and patterns that can be coordinated with their already extensive collection of carpets, felts, tapestries, and seating. Completely handmade of New Zealand wool, the area carpet range is available in various designs and 160 shades. All the creations in the printed felt collection can be customized according to taste and requirements. 888/545-5073. Counterpoint Design Resource, El Paso, Tex. **CIRCLE 221**

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▲ A visible difference

The Visible display case, exhibited internationally for the first time, has applications for retail, residential, and gallery spaces. The showcase is made of 6 millimeter, clear or frosted tempered glass. The frame is silver lacquered steel, with adjustable feet in the standing model. A horizontal and vertical wall-hung version is also available. The interior shelves can be inclined for special presentations, and the showcases can be custom designed. Standard length and depth is 120 by 45 centimeters. Available with lock and key. 415/543-5466. Limn, San Francisco. **CIRCLE 222**

▼ Scroll down

Hard edges are replaced by soft curves in Scroll, a new range of seating by Design Studio Vertijet—one of several new sofas introduced this year by German furniture manufacturer Cor. Composed of a wide, flat body that seems to hover above the floor, Scroll can be used separately as a chair, or as a sofa when combined with additional elements. It converts to a sleeper sofa with the back setting in the horizontal position and can be continually redefined thanks to the many combination possibilities of its various elements and adjustable backrest. 212/228-3600. SEE, New York City. **CIRCLE 223**

► Just in case

Among the new introductions this year from Interlübke was Case, an affordable mobile furniture system by Werner Aisslinger. It is available in several variations as shelves, a container, sideboard, or entertainment and computer rack, and comes mounted on castors or with feet. The translucent sides are available in blue, red, orange, and white. 212/832-8222. The M2L Collection, New York City. **CIRCLE 224**

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▲ Forget furniture

New this year from Dutch rug makers Danskina is Salto, a handwoven rug composed of individual loops made from 100 percent wool. Also available is Corale, a rug whose name derives from the unique look of its tufted fibers, also 100 percent wool. Both rugs are available in 12 different colorways and can be ordered in any size. The collection also features pillows that coordinate with the plush rugs to create a comfortable sitting and lounging environment to replace traditional seating furniture. 505/266-5245. Ideas for Living, Albuquerque. **CIRCLE 225**

▲ Montis moment

Until now Montis's collection has been limited to chairs and sofas. In an effort to better coordinate their pieces within a complete interior, the Dutch furniture maker introduced a new line of rugs by Christiane Müller, cupboards by Niels Bendtsen, as well as five new dining tables by Gijs Papavoine. The Ypsilon table has a top that is folded over with a filling in a different color. It is available in three lengths. The Malou, also by Papavoine, is a new formula for large upholstered sofas that comes in four lengths: 5 seater, 4 seater, 3 seater, or 1½ seater. 888/8-MONTIS. Montis America, Carrboro, N.C. **CIRCLE 226**

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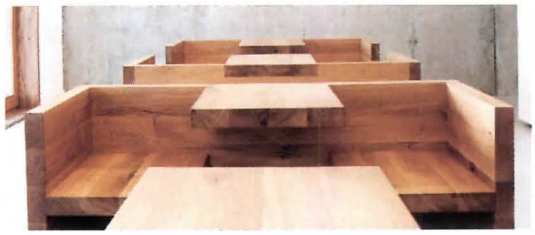
Product Briefs Cologne Fair

► Solid designs



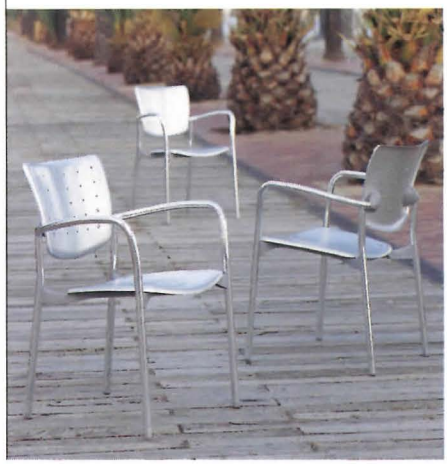
Originally known for its solid wood tables, the German-British furniture manufacturer e15 has expanded its collection to include chairs, benches, shelves, and beds, as well as a new line of outdoor furniture presented for the first time in Cologne. They have broadened their material range, combining aluminum, stainless steel, leather, and felt with a selection of woods including oak, maple, cherry, and walnut. The Tablebench by Hans De Pelsmacker uses simple geometries to create a table with built-in seating. 65" long by 22½" wide by 29½" high. Available in solid oak or brushed aluminum. 215/765-4806. Icons of Design, Philadelphia. **CIRCLE 227**

▲ Free spirit

The Spanish collection Sare features tables, chairs, desks, and shelving. This piece by Josep Lluscà is Barra Libre, a freestanding TV and stereo stand. The aluminum structure comes in several lengths with a choice of elements (including a CD holder, speaker stands, and drawers) either in glass, natural oak, white lacquer, or wengé wood. 34 94 315 1110. Sare, Azpeitia, Spain. **CIRCLE 229**

▼ Street smart

Brand-new from Catalan designer Josep Lluscà is Street, a chair whose durable construction and refined look make it equally suitable for use indoors and out. Discreet and light, the frame is made from a polished, anodized aluminum tube. The stamped aluminum surfaces of the seat and back lie on injected polymer supports, solidly clamped by extruded profiles. The result of extensive research of materials and manufacturing, Street is ergonomic, stackable, and recyclable. 34 93 775 5651. Amat-3 International, Barcelona, Spain. **CIRCLE 228**



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Product Literature

Ceiling system portfolio

Armstrong's new 2002 ceiling systems catalog showcases the entire Armstrong ceiling and suspension system portfolio in one customer-tailored reference tool. Totaling 254 pages, the catalog utilizes new tabs to call out individual product groupings, including mineral fiber/fiberglass ceilings, MetalWorks, WoodWorks, i-ceilings, and suspension systems. 877/ARMSTRONG. Armstrong World Industries, Lancaster, Pa. **CIRCLE 230**

Stylish chair brochure

Stylex's new 12-page brochure details the Rhythm stack seating collection. The brochure presents arrangements of the chair models, product specifications, and ordering information. 800/257-5742. Stylex, Delanco, N.J. **CIRCLE 231**

Choosing the best signage

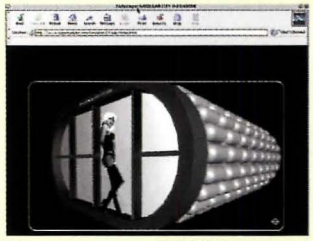
Best's Graphic Blast process carves copy and art into wood, Corian, Avonite, tile, stone, and practically all man-made materials. Best's new full-color catalog features ADA signage made from such materials, plus other interior and exterior architectural signage. The company also offers detailed specifications and dimensions to help in the selection of Best products. 800/235-BEST. Best Manufacturing Company, Montrose, Colo. **CIRCLE 232**

Door accessory catalog

ODL has introduced the company's new comprehensive 2002 Full Line Catalog. The 52-page, full-color catalog features detailed information on the company's line of decorative door-glass options, accessory products, and variety of products for the home. 800/253-3900. ODL, Zeeland, Mich. **CIRCLE 233**

NEW SITES FOR CYBERSURFING

Fun interactive site for Modular Lighting Instruments **www.supermodular.com**

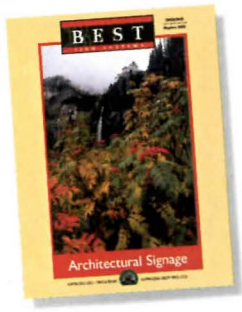


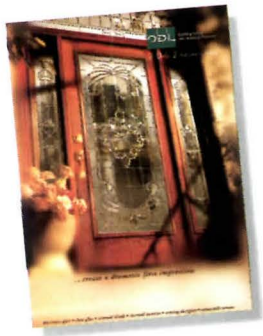
G.E. e-catalog **www.GELighting.com**

Site for Stockholm-based design store David Design **www.david.se**

Garden seats and tables **www.mckinnonharris.com**

Classic modern furniture **www.dennismiller.com**





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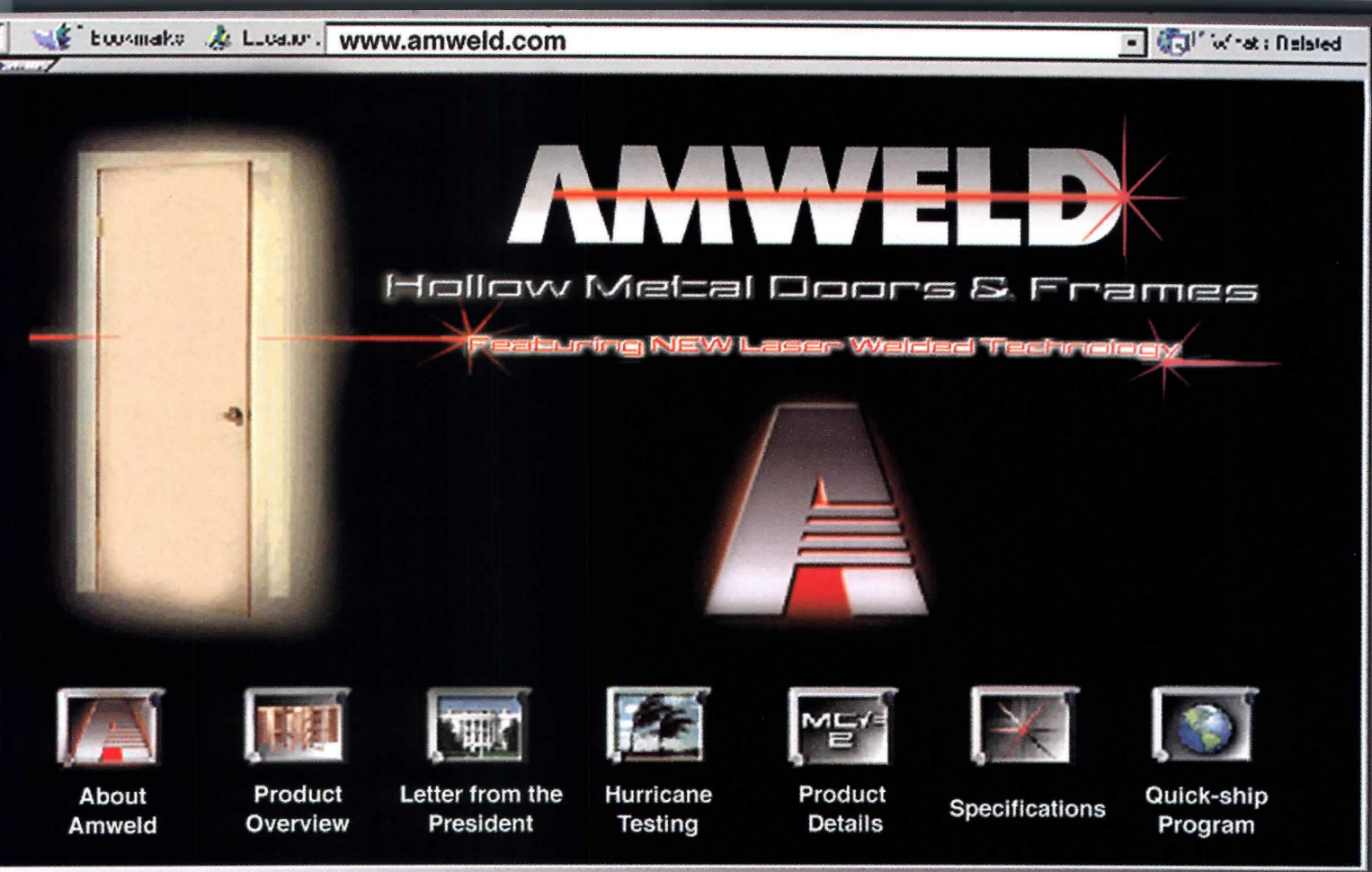

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Product Literature

Ceramic-tile buyer's guide

The Italian Trade Commission Ceramic Tile Department has published the eighth edition of the Buyer's Guide to Italian Ceramic Tile. This new, colorful edition covers 100 of the leading Italian producers of ceramic tile. It lists Italian, U.S., and e-mail addresses, Web sites, as well as primary U.S. and Canadian importers and agents. For a free copy, fax the Italian Trade Commission. 212/758-1050. Italian Trade Commission Ceramic Tile Department, New York City. **CIRCLE 234**

Stronger steel

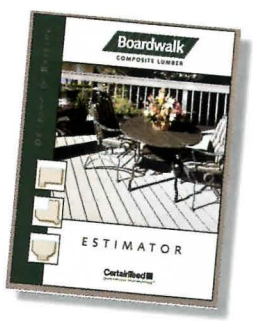
Major groups representing the struggling U.S. steel industry and its workers have released a report that lists uses of steel in America's energy and transportation security applications, health and public safety, and building and construction. The complete report, entitled *A Strong U.S. Steel Industry: Critical to National Defense and Economic Security,* is available in hard copy or electronic transmission. 202/452-7100. American Iron and Steel Institute, Washington, D.C. **CIRCLE 235**

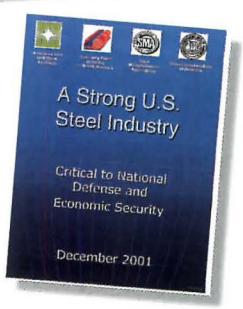
Wood finish guide

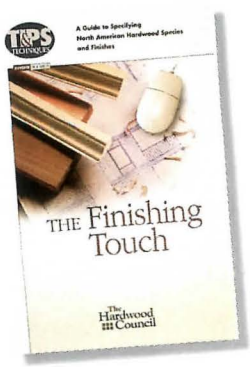
The Hardwood Council has published a new brochure called *The Finishing Touch* to help professional building and design professionals more effectively specify hardwoods. The 32-page booklet features a Stain Guide that depicts 21 North American hardwoods in clear, light, medium, and dark stains. The brochure also covers hardwood finishing basics, guidelines for specifying a factory finish, and an A–Z finishes glossary. 412/281-4980. Hardwood Council, Oakmont, Pa. **CIRCLE 236**

Decking estimator

Boardwalk Composite Decking and Railing, manufactured by CertainTeed, has introduced a time-saving estimating software system to accurately estimate standard and custom Boardwalk decking and railing projects for contractors. Using the CertainTeed-licensed software, professionals can estimate costs for decking and railing projects in a matter of minutes, instead of the hours the process requires when done manually. The software uses an on-screen worksheet and checklist and can incorporate both standard and custom deck shapes and designs into an estimate. 800/233-8990. CertainTeed, Valley Forge, Pa. **CIRCLE 237**







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THE NEW BERLIN *(continued from page 80)* Allee, the boulevard's Socialist Realist splendor has recently been carefully restored in all its urbanistic emptiness (page 78).

Learning from Berlin?

Some observers detect a character flaw in Germans' trust in the redemptive or corrective power of architecture. After all, if tragic history is reconciled through architecture, does that free people of personal responsibility—a dismissive "we've dealt with that, now let's move on" attitude? Many decent people thought that Germany's deep-seated love and commitment to culture would prevent Nazi barbarity. Many Jews who thought that way paid with their lives.

The focus on history, memory, and on urban identity can strike the outsider as an obsessive kind of navel-gazing, but it is part of a genuine transformation, say even hardened skeptics. Daniel Libeskind, who has fought many battles over how history should be presented in his own buildings and elsewhere in Berlin, admires the fact that "people see these buildings as expressions of the force of history rather than as about themselves." They hope to bequeath to the future a promising legacy in the city they're building. "Every building here, even an office building, has some visibility, and people ask what it will look like and why it is that way."

In the wake of autumn's terror attacks, Americans learned that they had few places that represented their united values, almost nowhere to grieve as a community or to sort out together what happened. Can American cities learn from Berlin's example? "There's a huge difference in how society is organized and does things there," says Michael Blumenthal. "Architectural structures are executed to have a connection to each other," he adds. "They are not done just to make money, they are done to relate to history and to have a certain collegiality to them that the public accepts. In Germany, societal needs are met with public funds and there is clearly a more coherent and comprehensive view.

"There are negatives in Europe," he adds. "It's heavily bureaucratized; things take a lot of time; it's not efficient. But it does have that positive effect." Libeskind, who practiced for several years in Los Angeles, agrees. "In America, the private world of power and money is seen as an inevitable force that dictates city form. And so architecture becomes little more than advertising. In Berlin, as in the rest of Europe, there is a notion that public space and civic space are important and of concern to everyone. Dealing with that can be difficult, but it's why I'm still here."

In spite of the monumental effort, Berlin is still visibly wounded from the depredations of war and political division. The planned cluster of skyscrapers has yet to rise from the asphalted expanses of the Alexanderplatz. Among the city's cultural gems, its Museum Island remains a romantic semi-ruin as lack of funds has drastically slowed renovation and reinstallation (page 78). The city's endless miles of precast-concrete housing blocks are dispiriting. But colorful, provisional forms of emergent capitalism poke out of its many disused corners. In short, the city remains alive and open to possibility.

"The attempt to create homogeneity was not successful," says Matthias Sauerbruch. "It denied what is Berlin's foremost characteristic, which is of collage or fragmentation or palimpsest. It's never been a complete city in the Parisian sense. I guess that makes it more American." The city is, in an old cliché, "forever to become and never to be." That may truly be the modern condition, not just in Berlin, but in cities everywhere; perhaps the best they can hope for and all that they can represent. ■

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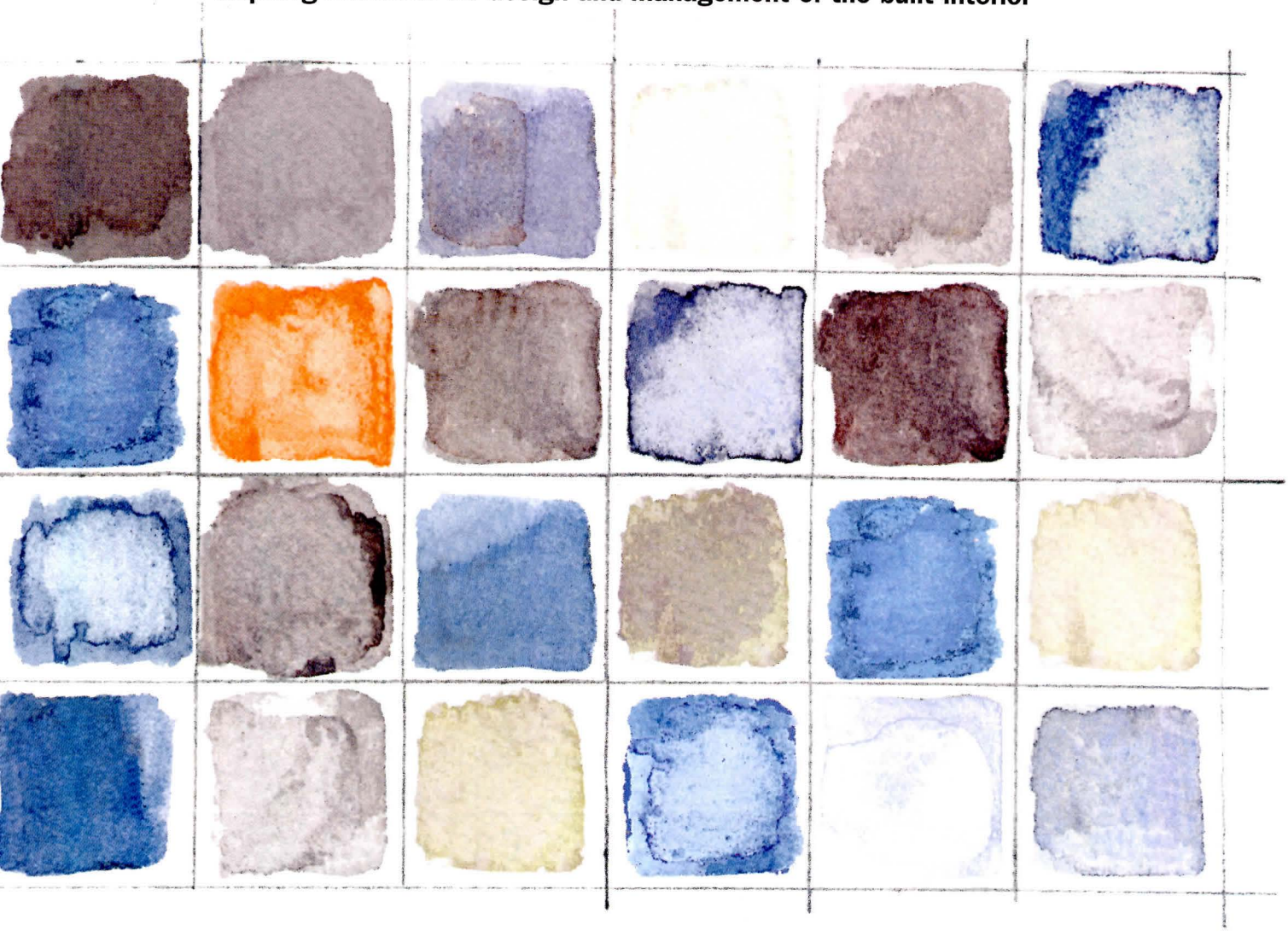

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MILWAUKEE ART MUSEUM *(continued from page 102)*

building and the lakefront, but they still have a presence of their own, with the hedges forming roomlike lawns.

To be sure, the addition has rough spots, especially in the unrefined connection between it and the existing buildings. When the brise-soleil is closed, for example, the tentlike reception hall appears too small to provide an effective counterpoint to the war memorial. Also, the base of the reception hall seems cartoonish—the window mullions are larger than Calatrava had wanted, and the hall's proportions are inelegant due to the bulky concrete structure that supports it.

But these problems are quickly forgiven once the visitor steps—or drives—inside, especially if the point of entry is the 100-space parking garage beneath the galleries. Here, in an inspired departure from the typical heavy-handed, post-and-beam garage, Calatrava uses inclined, steel-reinforced concrete columns that narrow toward a footlike steel base. Their lyrical, dancing effect recalls the famous "lily pad" concrete columns at Frank Lloyd Wright's S.C. Johnson & Son Administration Building in nearby Racine, Wisconsin.

Certainly there are echoes of Johnson Wax's streamlining in the parking garage's gracefully curving concrete walls. But it seems less important to compare Wright and Calatrava than to observe that, in Milwaukee, as in his earlier works, Calatrava's exposed structure imitates the figural complexity of nature rather than following a reductivist, Miesian mode. The addition thus has an inherent human scale. It seems as much a house as a culture palace, though there is no denying its cathedral-like identity, especially in its soaring, sun-washed reception hall and in the gallerias that extend outward from it like the side aisles of a church.

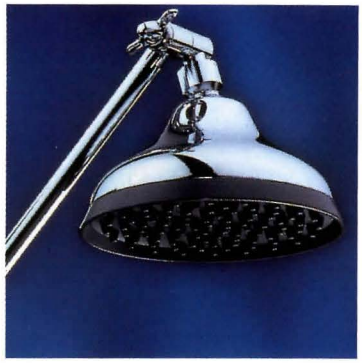
By siting the addition's temporary exhibition gallery just off the hall, Calatrava makes clear that one has entered an art museum rather than a generic room. Within the exhibition space, Calatrava's expressed concrete ceiling beams have a strong presence, yet they are not so strong that they overwhelm the art. Movable wall dividers are low enough to lend the gallery intimacy, but the visitor still feels like he is in an expansive space, one that bears Calatrava's mark.

The finest design strokes in the addition are the twin gallerias that flank the gallery and lead to the original buildings. Far from being mere passageways, the gallerias, which house changing displays of contemporary art, are destinations that are distinguished by the rhythmic, lyrical expression of their arching concrete ribs.

Structure in the service of sculpture

As in the garage, the ribs are grounded in steel joints that at once suggest the human foot and express the steel that reinforces them. Yet here, the concrete, painted white, seems otherworldly, dematerialized. Does this mean Calatrava isn't being "honest" with materials? No. Again, to great effect, he puts structure in the service of sculpture, drawing out, as he has said, "the inner potential for poetic expression that materials possess."

That potential has been handsomely realized. The addition takes us in dazzling new directions even as it reminds us of the traditional importance of materials and structure. True, this building does not match such masterpieces as Louis Kahn's Kimbell Art Museum in Fort Worth or another famous birdlike building, Saarinen's TWA Terminal outside New York City. Nevertheless, in contrast to the striking but largely nonfunctional Sydney Opera House, the Milwaukee Art Museum addition superbly serves its complex program while creating an instant landmark. For Calatrava, it represents an enormously successful American debut—a powerful hint of what he still may accomplish by embedding structure into sculpture. ■



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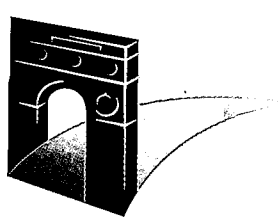

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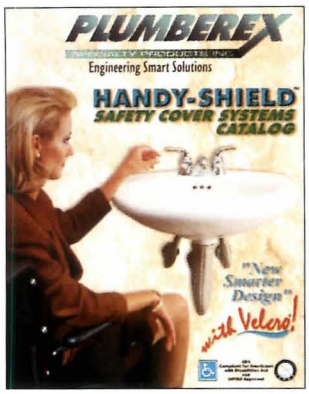

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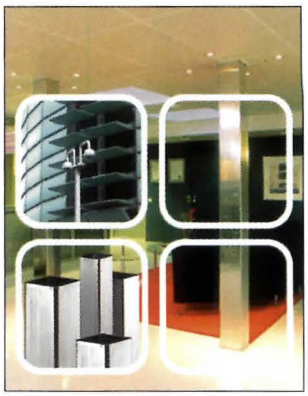

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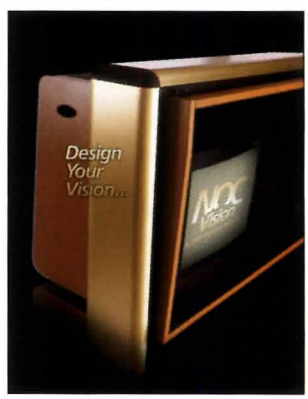

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mike_gilbert@mcgraw-hill.com

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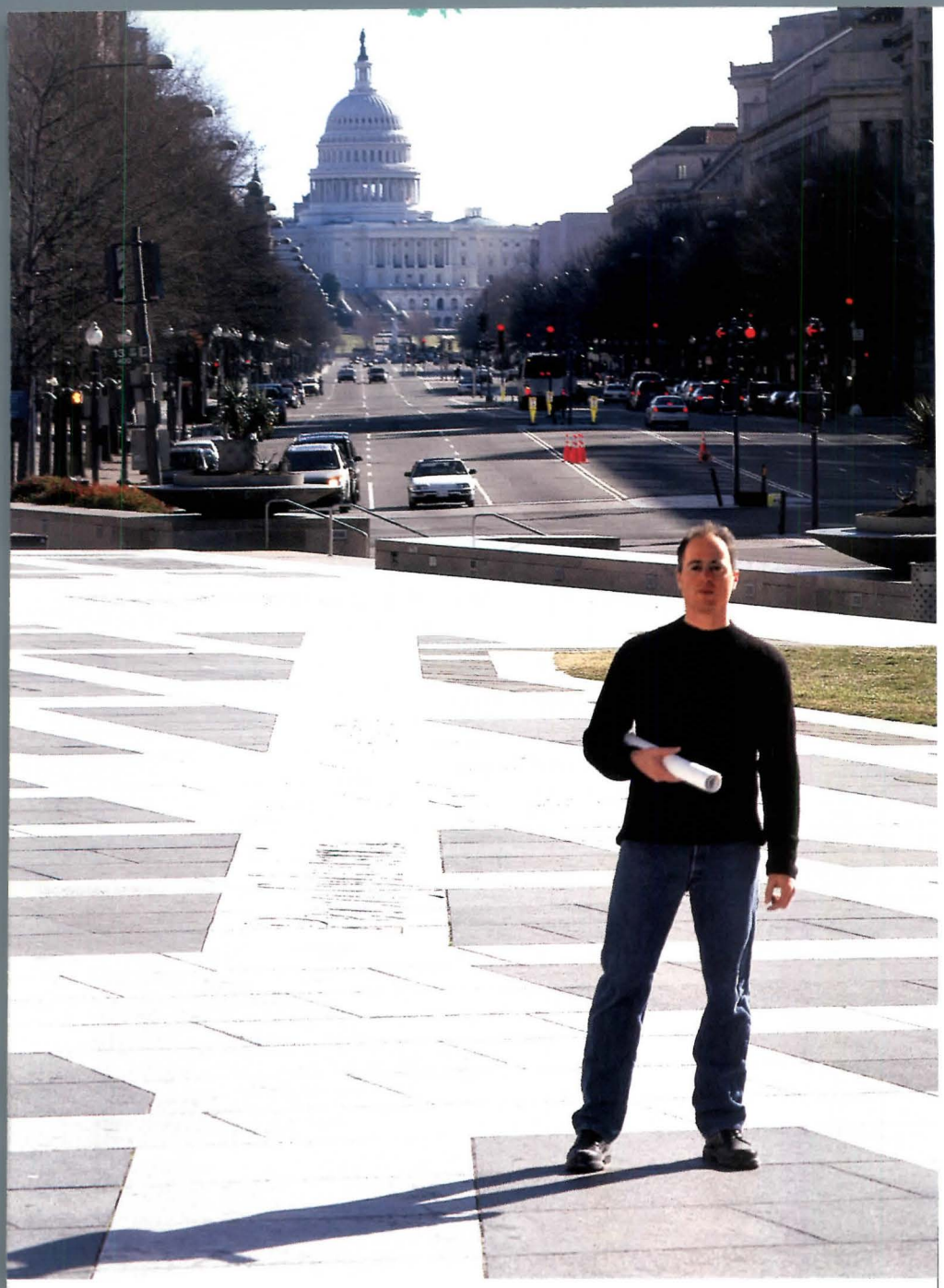

Andrew Altman: Planning for our nation's capital

Interviewed by John E. Czarnecki, Assoc. AIA

This year marks the 100th anniversary of the McMillan Plan, which reinforced the Washington, D.C., monumental core in the spirit of the 1791 L'Enfant Plan. While Washington is one of the most beautifully planned cities in the country, city planning had been an afterthought for recent mayors. That has changed under current mayor Anthony Williams, who appointed Andrew Altman as director of the D.C. Office of Planning in 1999 and quickly increased Altman's staff from 12 to 66 people. Altman, formerly a planner in Oakland and Los Angeles, is reasserting the role of city planning in our nation's capital, which has had to balance security with openness.

Q: *Washington, D.C., is a very different city, not only since Marion Barry was mayor, but in the months since September 11. What is Washington to you?* It's a living, vibrant city—not a fortress. That's the message we have to get out to people. And it has been my most fundamental challenge, among many, to bring back a vision for this city that really is from the ground up, from its neighborhoods. It's not just about monuments and federal buildings, but it's a living, breathing city. Planning is now given stature, legitimacy, and support in Washington. It's been important to rebuild confidence in planning again in this city—people had lost confidence because planning was absent for so long.

How do you work with the various federal planning agencies in Washington? What I've been trying to do is assert the city's role with respect to planning together, as opposed to planning separately. Our concern is much broader. Planning in Washington is no longer just a federal enterprise. The city is now asserting its own vision.

You're currently working on the Anacostia River waterfront. How will this impact the city? I'm passionate about remaking Washington into a waterfront city, which is one of my highest priorities. Seventy percent of our waterfront is owned by the federal government—whether it's federal property or city property, it's all about the city. So we're working very closely with all of the agencies along the waterfront—this includes the General Services Administration, the National Parks Service, the Navy—and doing a collaborative waterfront plan, with the city leading the charge. That's a fundamental tectonic change that has occurred since Mayor Williams was elected.

Tell me about your downtown plan. We introduced it last November, and we have seen that downtown is really starting to flourish. We have more than 6 million square feet of office construction and more than 2,000 units of housing being built there. We have such a strong office market that the challenge has been to introduce mixed uses, to introduce residential, and to create a downtown that doesn't close at five o'clock. The opportunity to re-image the area is really important.

How is the city commemorating the 100-year anniversary of the McMillan Plan? The mayor wants to produce the next 100-year plan for the city—to build it from the neighborhoods and to also look regionally. The region is burgeoning, so the next 100-year plan has to really look at that.

Photograph by Alan Karchmer/Esto.

For more of the Altman interview, visit www.architecturalrecord.com.

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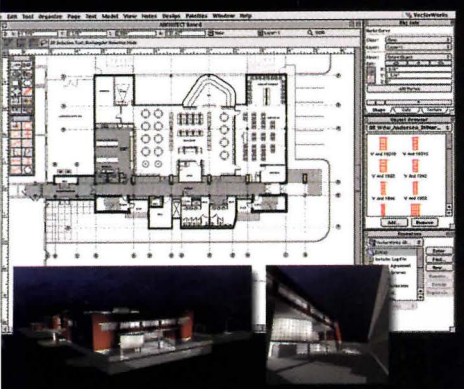

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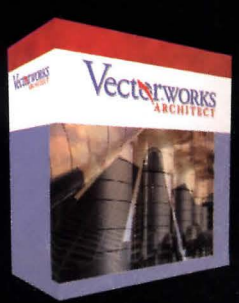

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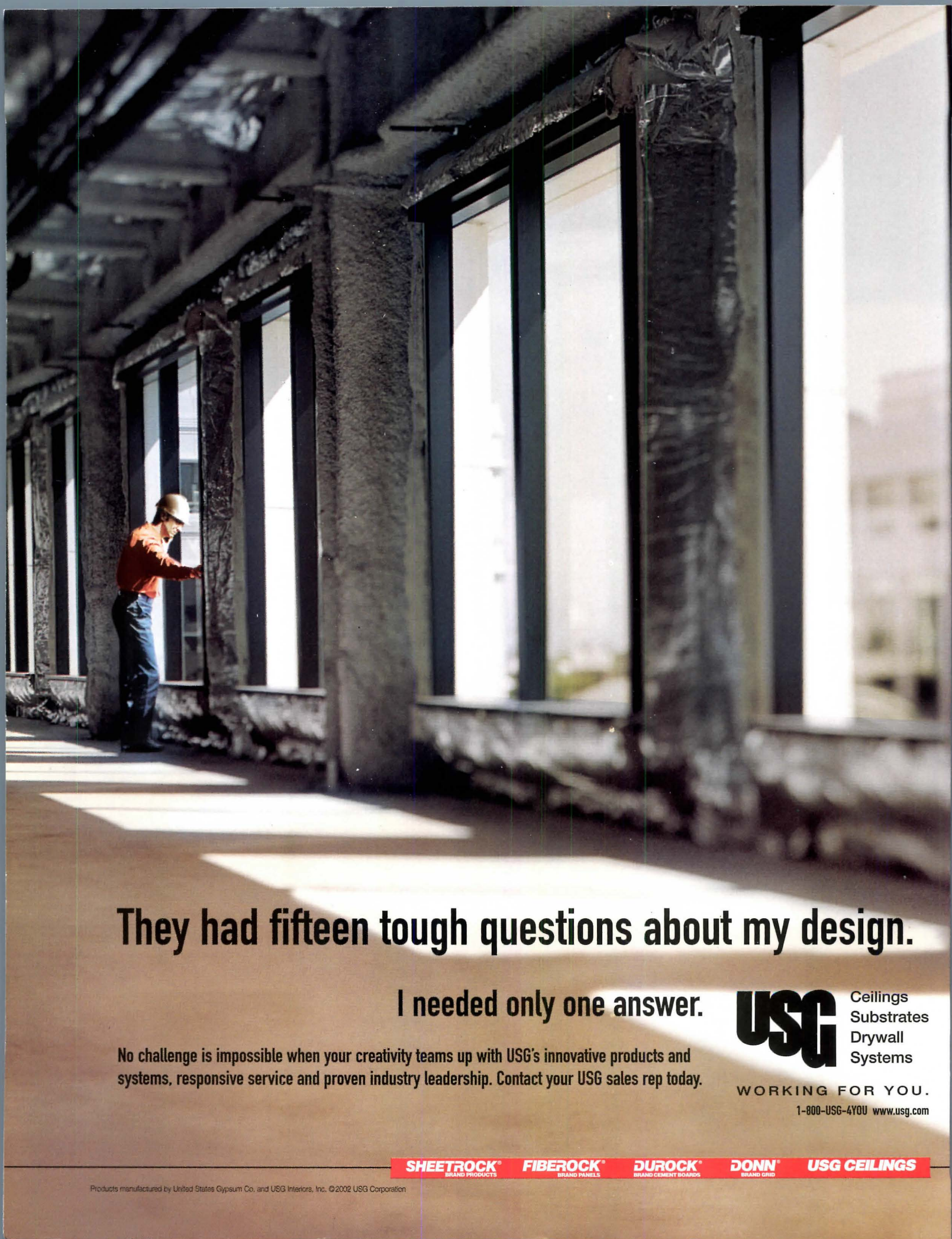
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