

Shaking off the terror

Editorial

By Robert Ivy, FAIA

Tuesday, September 11, we walked through a door into a cold new world. Our passage was not by choice, but by wrenching, violent action. With tales of escape fresh on our lips and the pall of smoke still in the air, we are beginning again, sweeping the streets, burying the dead, clearing the debris, and returning to work while shaking off the terror. For many of us, Tuesday was the blackest day in our lives, unleashing nihilism and destruction on American soil.

Since then, our perspective has changed: What might have seemed important on September 10 now seems trivial or transformed. For architects, discussions have centered not only on building forensics, on the fiery collapse of the World Trade Center, but also on safety and security for tall buildings. Subsequently, many people are asking if skyscrapers should be built at all.

To clarify the argument, we need to separate the intent from the target. The terrorists who attacked the twin towers of the World Trade Center took aim, not at architecture in the abstract or at skyscrapers in general, but at an extreme expression of heroic materialism. The fanatics who drove the fuel-laden, airborne bombs into the World Trade Center chose buildings constructed at another dark time, the late 1960s and early 1970s. While critically disdained in 1973, they had acquired a surreal presence as universal icons of American commercial power and dominance, much like the low-scaled, equally symbolic Pentagon in Washington. At night, or in afternoon light, they glowed.

Few buildings matched the towers' scale, or the scale of loss when they fell. Yet high mortality at the WTC should not spell the death of future skyscrapers: They remain an expression of the American spirit, an urban equivalent of Manifest Destiny. When they were born in the cauldrons of 19th-century optimism in capital-intensive cities, skyscrapers reflected American expansionism and engineering hegemony, and they still help to define us.

By concentrating workers and housing, they have fostered an urban resurgence, replete with fragrant energies, encounters, and opportu-

nities for cultural dialogue at a time when world populations continue to expand. Energy intensive in their making, they nevertheless conserve land, the most precious commodity, and provide an antidote to sprawl.

Who can imagine an effective alternative? Haven't we moved beyond the suburban office park, a profligate development model that peaked in the 1970s and '80s? Must we rely on the automobile and fling apart from each other in a contemporary version of fortress building? By contrast, cities remain the finest expression of civil society, demanding cooperation in proximity and releasing positive energy as by-product.

Should skyscrapers change? For the near future, until the dust has cleared, we can temper our pride with an acute civic consciousness, continuing to build big but rethinking the pattern. Perhaps we will design high-rises in aggregate, remembering lower Manhattan prior to the twin towers, avoiding the overweening gesture, focusing on differentiation and detail rather than bravado or extreme height. Our goal can still be tall, if not supertall, buildings.

In professional circles, we should debate the safety of the megastructure, since buildings above 50 stories raise unique questions of egress and safety, such as "Do bunkered sky-lobbies make sense? Should all elevators exit at street level?" We should converse with developers and office workers, listening and probing while leading discussions on what types of high-rises seem comfortable, accessible, and appropriate.

Despite all our momentary fears, low-rise buildings and dispersal to the suburbs are not the best answers, but a form of capitulation. While others may offer political or military solutions to the challenges of terrorism, architects and other design professionals can hatch their own courageous plans, offering collaborative vision to lead us up, out of these ashes.



Architectural Record, February 1964

SPECIAL REPORT



WTC TOWERS COLLAPSE

(continued from page 26)

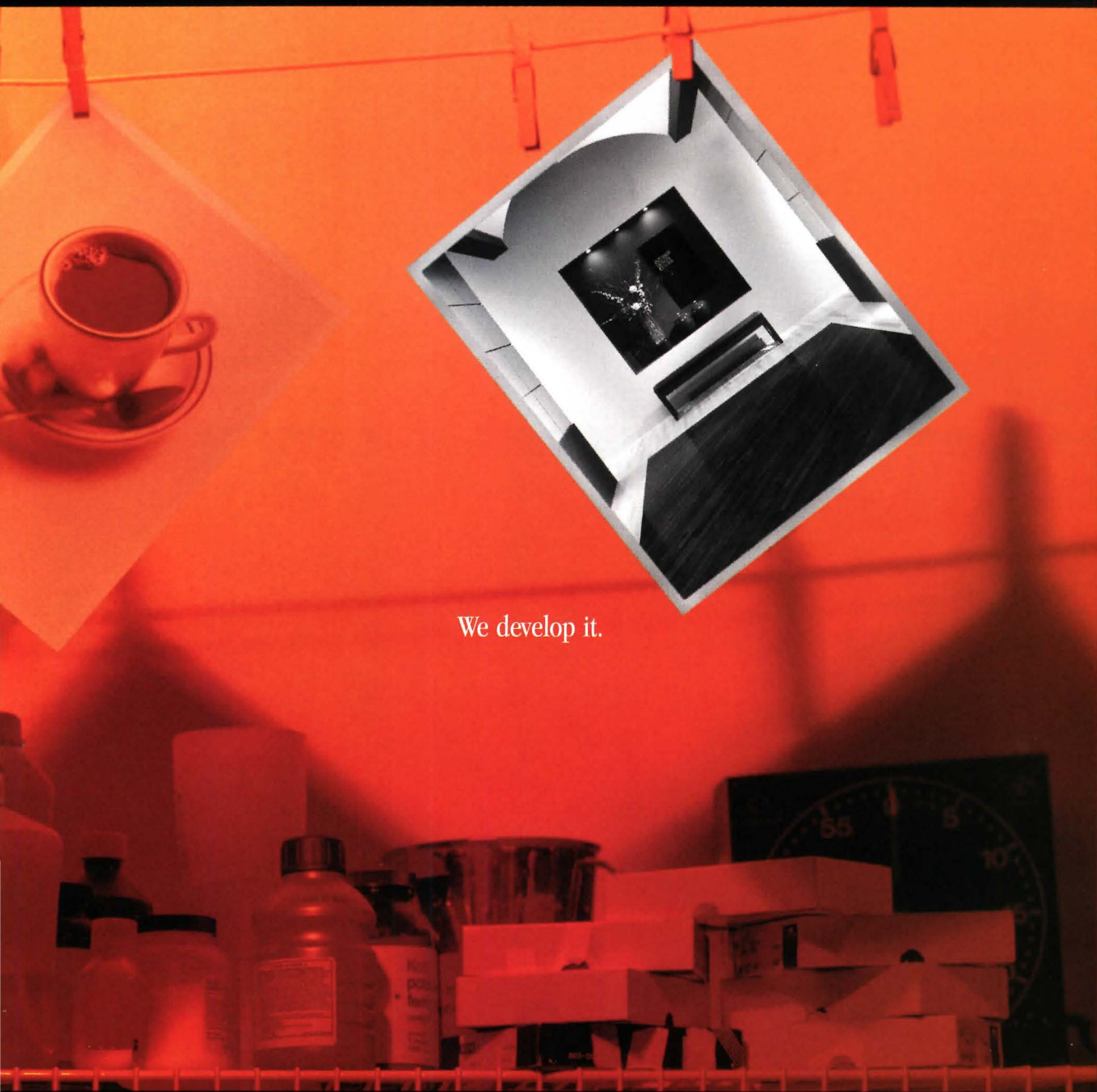
projects around the city that were slated to receive substantial public financing, including the \$1.5 billion renovation of Lincoln Center [RECORD, MARCH 2001, page 27], the Guggenheim Museum on the East River [RECORD, MAY 2000, page 41], and possible new baseball parks for the Yankees and Mets, will be delayed at the very least and could be scaled back or reconsidered altogether.

And in the design community, the destruction of the towers was especially saddening for those who conceived them. Henry Guthard, senior vice president of Minoru Yamasaki & Associates, was on the original design team for the World Trade Center. He had been in New York just three days before the attack and saw the towers from his airplane window. Like others, he watched helplessly as the crashes eventually took them down. "To see it suffer these blows, to see it wince but not cower, that's what we prayed for," he told RECORD. "We're devastated now. They were so much a part of our lives. Every building is like a child to us." ■

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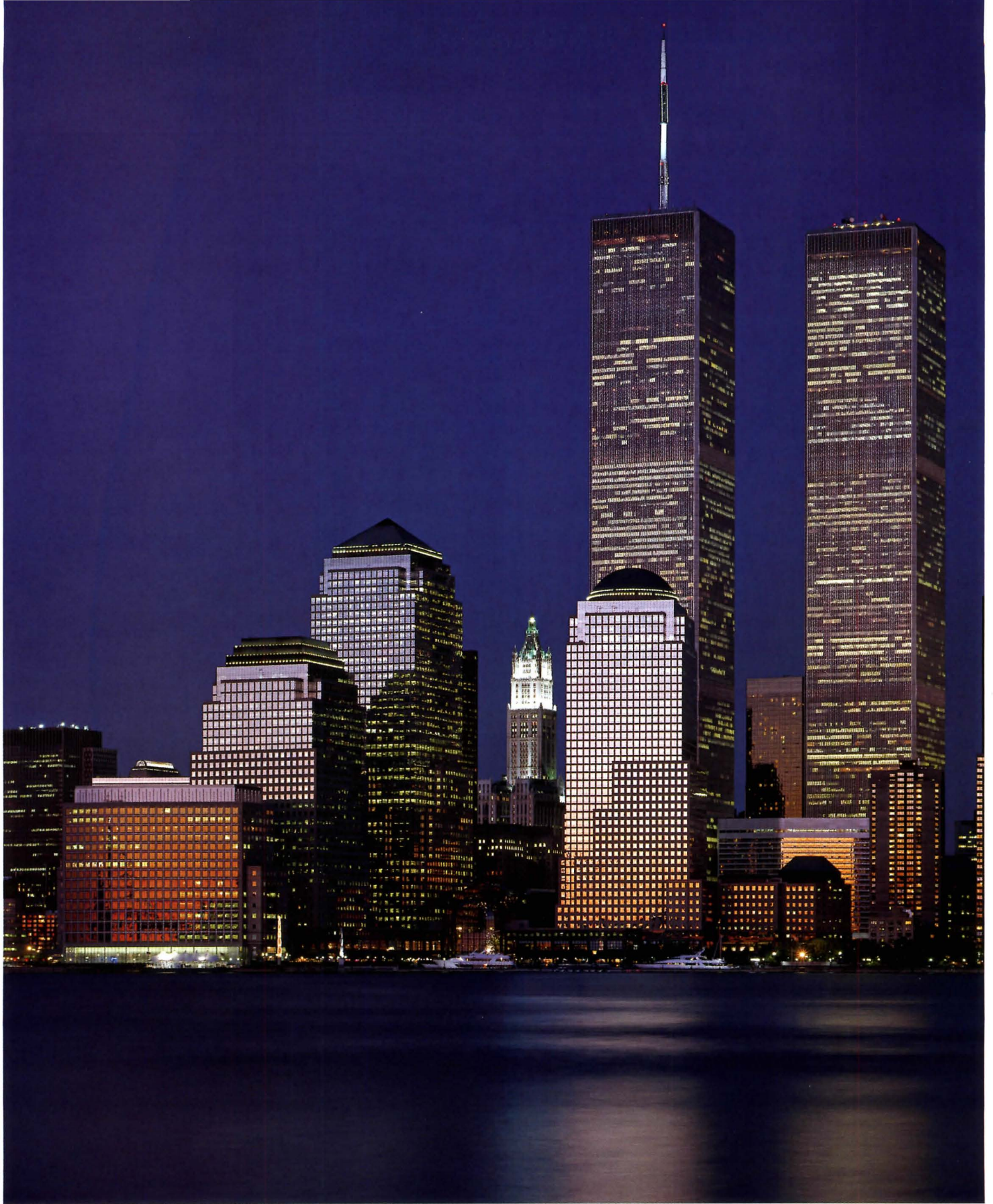
Lanterns and light catchers

Photography by Eduard Hueber

They looked like what a child might draw: dual, flat-topped rectangles, 110 stories each (an acre per floor!), a daytime city of 50,000 souls rising above the steeples and turrets of lower Manhattan, orienting us from the eddies of New Jersey and from 42nd Street. Derided for a simplistic urban plan by distinguished critics, scaleless, monolithic, touted as the tallest buildings in the world until superceded by Chicago's Sears Tower, the twin towers of the World Trade Center embodied New York's and America's 20th-century economic preeminence—unsubtly and powerfully. They could not be ignored.

As time passed, they became marked by human experience, from working conferences and courtyard festivals to lazy Sunday afternoons at Borders and celebratory dinners





The World Trade Center seen across the Hudson River at dusk—summer 2001. In the foreground, the World Financial Center. As framed by the Brooklyn Bridge (opposite).



at Windows on the World. Aesthetically, as our early perceptions evolved in our consciousness, the towers subtly changed from arrogant markers to anchors, glowing stakes in the schist of an island continent. Not beloved, perhaps—certainly not personality-filled—but lanterns and light catchers, their ribbed sides reflecting the sunlight and moonlight, their walls blooming in a vertical ribbon of evening twilight. Sundials, casting shadows.

Now they are gone, and the scale of the city has shifted. Somehow, in their absence, the sky looks bigger and the remaining buildings seem smaller in our view. We can see that the towers lent scale to the whole island, much as an arm does to the body. Gone in a flash, in the twinkling of an eye. *Robert Ivy*

Lower Manhattan as seen from Jersey City, anchored by massive 110-story twin towers, painted in afternoon summer light.



Environmental Design Solutions with Water, Wind and Light

By Barbara A. Nadel, FAIA

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Preserving Art Amid an Island Setting

Interior living spaces with natural light and panoramic waterfront views are ideal for entertaining and relaxing. When an art dealer wanted an 800 square foot, two story addition with 360 degree lake views for his weekend retreat on Candlewood Isle, Connecticut, he turned to New York City architect Jeffrey Berman, AIA, principal of Jeffrey Berman Architect - and to Marvin Windows and Doors for the big picture solution. The house, located in the middle of man-made Candlewood Lake, was originally built with Marvin products, and both the client and Berman chose Marvin for the addition.

The design goals were to create a large space for entertaining, protect an art collection and capture the magnificent views overlooking the garden and the lake. Marvin was the only manufacturer to provide the flexibility needed for different sizes and shapes, including larger assemblies. The wide expanses of glass maximized views, while retaining a smaller, residential scale for a grand window wall, and avoiding a curtain wall look. Window trim is painted on the outside, and provides the only opportunity to add color to the building's exterior palette of natural materials.

"The client wanted Marvin Windows and Doors, because they offer the best thermal performance and airtight seals to protect artwork from dust and dirt. Humidity and temperature control were also considerations in the windy lakefront environment. We used insulated double glazed, operable windows with integrated screens. On a cool summer night, the clients will open a window, enjoy the breeze, and feel like they're outside," said Berman.

Beachfront Conditions Provide Design Challenges

Hurricane-strength winds, extreme temperatures, ocean views and natural light were the environmental design criteria for a home facing the Atlantic Ocean in Locustville, on Virginia's Eastern Shore. This seaside summer residence - designed by Don A. Swofford, AIA, principal of DASA, in Charlottesville, Virginia - in classic Colonial Williamsburg style, had to withstand hurricane winds exceeding 135 miles per hour. The Marvin Magnum Window series was specifically chosen to provide the historic house appearance and withstand hurricane wind loads.

"The code calls for 105 mph wind resistance, but the owner wanted

to design to 135 mph for safety. The windows in the rooftop lantern could not have hurricane covers, so we designed the lantern with a steel frame running down to the foundation. Marvin's Magnum series provided 1-1/2" wide custom detailed muntins, solid thermal panes and Authentic Divided Lites. Year-round temperature swings at this Atlantic beachfront vary from 105 degrees in summer to 10 degrees below zero in winter. These windows provide good R-values to reduce interior cooling and heating loads," said Swofford.

"Marvin helped us meet our design goals by manufacturing high performance windows to reflect the Colonial Williamsburg style, while cutting project costs by 40 percent. As the first architect in Virginia to use Marvin Windows and Doors, I'm confident Marvin can meet criteria for any job and work with architects and owners to meet special design criteria. We know we can rely on the quality, performance and aesthetics of their products. The Magnum series has successfully met unusually high wind resistant requirements. Most importantly, our client is very pleased with the results," Swofford added.

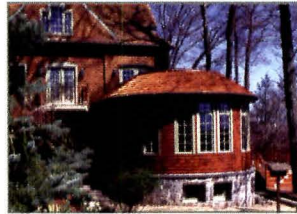
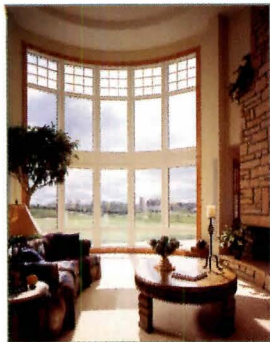
Light-filled Small Scaled Addition Saves Energy Costs

Starting the day in a cozy light-filled breakfast nook overlooking the woods is just what architect Michael Crosbie, an Associate with Steven Winter Associates, Inc, in Norwalk, Connecticut, had in mind when he designed an addition on the north facing side of his 1938 vintage home. He wanted the new windows to match the existing "six over one" windows on the rest of the house. Crosbie achieved these aesthetic goals and more, with Marvin Windows and Doors.

Crosbie chose Marvin because of the high quality they provide, the custom capabilities and selection available to meet project needs. Specifically, the Simulated Divided Lites - the muntin bars separating panes of glass in a window sash - attached to the window gave the appearance of a true divided lite, while providing the advantage of double paned glass and energy efficiency.

"I wanted the small scaled addition to appear like it had always been part of the house, and Marvin worked out all the details just perfectly. They ganged three windows together in one assembly for easier installation, but the windows look like three separate units. The contractor installed the windows in less than a day. The product versatility is endless; Marvin will do anything you want," said Crosbie.

Inside, the simple, tastefully detailed addition overlooks a naturally landscaped area, and includes built-in bench seating below the windows. "We rarely turn the lights on, because there is so much natural light entering the space, even with a northern exposure. As a result, we've saved on electricity and energy use. Marvin was the most economical choice available on the market that gave me exactly what I wanted: aesthetics, maximum natural light, energy efficiency, double glazed units and ease of installation," Crosbie added.



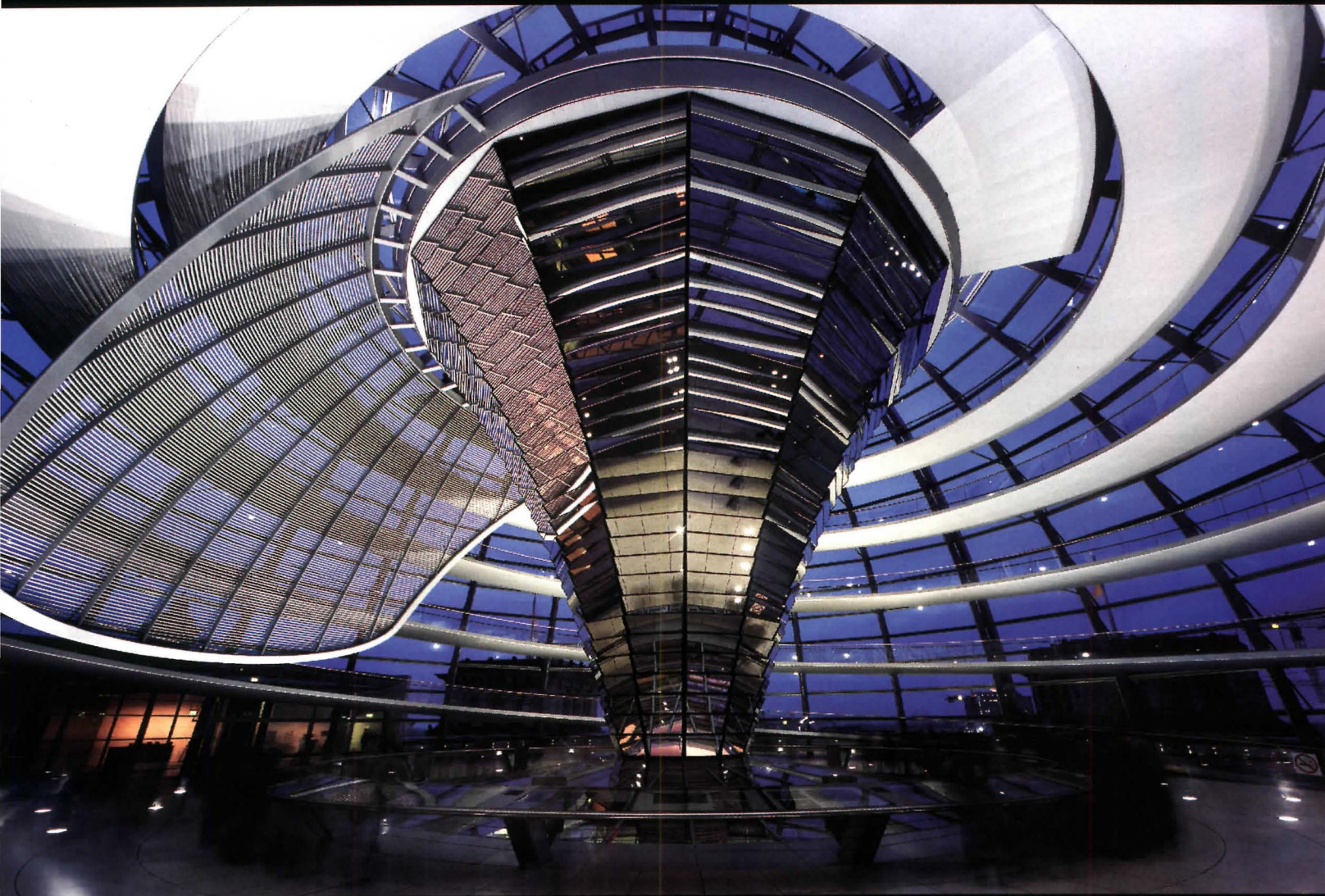
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Barbara A. Nadel, FAIA is principal of Barbara Nadel Architect, in New York City, specializing in programming, planning and design of institutional facilities. She is 2001 National Vice President of the American Institute of Architects and frequently writes about design and technology.

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CIRCLE 15 ON INQUIRY CARD

Record News

Broncos and Steelers open new football-only stadiums

While the building boom is winding down for professional baseball parks, a number of National Football League teams are building football-only stadiums. New NFL stadiums opened this season in Pittsburgh and Denver, and teams in Seattle, New England, Detroit, and Houston will have new homes in 2002.

In Pittsburgh, just west of where Three Rivers Stadium had stood, the 65,000-seat, \$281 million Heinz Field dominates the redeveloping North Shore of Pittsburgh's Allegheny River. The 1.5-million square-foot, football-only stadium, by HOK Sport with WTW Architects, is the new home of the Pittsburgh Steelers and the Pitt Panthers. Touted as the only open-ended stadium in professional football, with dramatic city views, the U-shaped facility features large spiral stairways and one of the NFL's largest scoreboards at its open end. From a base of precast stone, an exposed steel structure rises as a nod to the local industry. The stadium's upper decks, in three separate sections, are supported by distinctive yellow structural members in groups of four, dubbed "quad pods." Tapering steel columns support the lower decks, and glass curtain walls enclose two three-story club lounges. A significant revenue source, 130 luxury suites are leased with seating for more than 1,500 Steeler fans.

Denver's Mile High Stadium—built in 1948 but extensively modified over the years—was



Pittsburgh's new Heinz Field replaces Three Rivers Stadium.

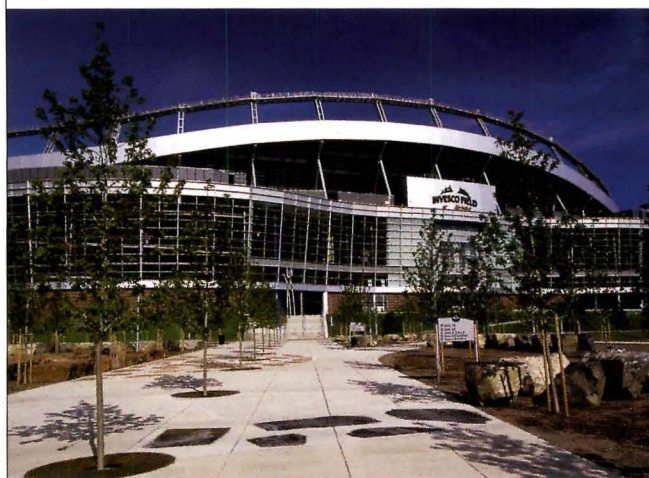
famous for its steep bowl and its horseshoe-shaped design. Set on the western edge of downtown, it was ugly, but rabid Denver Broncos fans loved the place. Several years ago, however, team owner Pat Bowlen declared the rusting hulk structurally and economically obsolete. He wanted a brand-new facility, and he offered to pay 25 percent of the cost if taxpayers paid the rest. Voters approved the deal in 1998.

Completed in August at a cost of \$400.8 million, the awkwardly named Invesco Field at Mile High sits adjacent to the old stadium, which awaits demolition. Invesco Field was designed by HNTB Sports Architecture, of Kansas City, Mo., in association with Denver's Fentress Bradburn Architects and Bertram A. Bruton and Associates. The stadium, which has natural grass, retains several of the old facility's design elements, including a steep rake, steel treads and risers (the better to stomp on), and a horseshoe shape. But it's also quite modern, with curvy lines and an

aluminum skin set atop an articulated brick base.

With 1.8 million square feet of built space, Invesco Field is more than double the size of old Mile High, though it contains roughly the same number of seats: 76,125. It also has 124 luxury suites, which cost up to \$125,000 a year.

For two cities that are increasingly embracing the merits of good design, the new football stadiums in Pittsburgh and Denver are signature urban landmarks. *Charles L. Rosenblum and David Hill*



Denver's Invesco Field at Mile High features a sweeping roof line.

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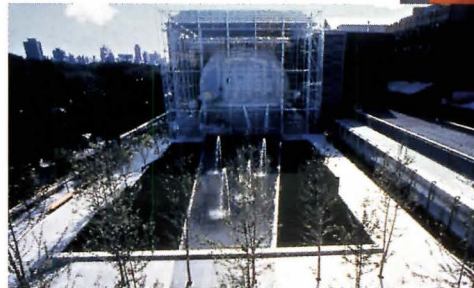
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CIRCLE 17 ON INQUIRY CARD

Record News



Hypo Alpe-Adria-Center in Austria by Morphosis (left), Gagosian Gallery by Studio Works (below), and landscape at New York's Rose Center by Kathryn Gustafson (bottom).



Morphosis and Studio Works win 2001 Chrysler Design Awards

Architecture firms Morphosis and Studio Works and landscape architect Kathryn Gustafson were among the recipients of the 2001 Chrysler Design Awards. Established in 1993, the awards program recognizes the contributions of six innovators in a variety of design fields. Other honorees this year included graphic designers Susan Kare and Stefan Sagmeister, and digital designer Daniel Rozin.

At press time, an awards banquet was planned for October 3 in New York. Each honoree received a \$10,000 prize and a trophy designed by previous winner David M. Kelly, chair and co-founder of IDEO, a product development firm.

Morphosis, a 25-year-old architecture firm based in Santa Monica, Calif., is headed by Thom Mayne, AIA. The firm has won numerous awards for both private and public commissions. Major projects include the headquarters for Austria's

Hypo Bank and the General Services Administration Headquarters in San Francisco. Mayne is a cofounder of the Los Angeles architecture school SCI-Arc.

While Studio Works has had a number of built projects, the firm has won numerous awards for projects that were never constructed. Firm leaders Robert Mangurian and Mary-Ann Ray have taught and practiced for more than 25 years.

Their projects include a combined gallery and residence for Larry Gagosian in Los Angeles and the low-cost InsideOutside House in Houston.

Kathryn Gustafson, who studied landscape architecture at the École Nationale du Paysage in Versailles, has won international recognition for her work in landscape design. Her projects include Paris's Parc de la Villette and the Rights of Man in the town of Evry, France. She is currently working on The Shoulder Garden for Millennium Park in Chicago.

The awards jury included Tim Brown, president of IDEO; Holly Brubach, former style editor of the *New York Times*; Stephen Doyle, founder of Doyle Partners, a graphic design firm; Omar Wasow, cocreator of blackplanet.com, an online community for African-Americans, and an analyst with MSNBC; and architect Tod Williams, who won the award in 1998. *Christina V. Rogers*

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CIRCLE 18 ON INQUIRY CARD

Record News



German Chancellor Gerhard Schröder kneels at the exhibit *Fallen Leaves* in the museum.

After entering the museum, a twisted metal underground "road" leads to the two-story permanent exhibit that unfolds along a winding path on which displays are grouped both thematically and chronologically. It comprises nearly 4,000 works in both traditional and new media, including touch screens, pivot panels, scrimms, question drawers, and other types of informational displays. Play nooks and comment boards allow visitors to interact with the building's interior and note their impressions as they move through the museum. One exhibit, *Fallen Leaves* (left), features disks of rusted iron on which faces that appear to be screaming are etched. Two other underground roads lead to an outdoor garden and a dead end—the "Holocaust Void"—a large, empty space that rises up to the full height of the building.

Libeskind's Jewish Museum in Berlin finally opens with installations

Even empty of exhibit material, the zinc-clad Jewish Museum (below) quickly became a cultural attraction in Berlin when it opened in 1998, drawing some 350,000 visitors yearly. Now, nearly three years after Daniel Libeskind's museum was completed [RECORD, January 1999, pages 76–89], the exhibit installation, designed and installed by German design firm Wüerth & Winderoll, has finally opened.

Critics wondered if Libeskind's powerfully metaphoric architecture—a deconstructed Star of David, featuring acute angles, tilted floors, and contorted underground tunnels symbolizing the difficult path of Jews in Germany history—would overshadow rather than accommodate the objects inside that are meant to tell the same story. To be a working museum, the building's air-conditioning, lighting, and wiring had to be revamped.

The designers were careful not to block the building's signature slit windows, placing free-standing elements away from them and cutting display panels to fit spaces between them. Occasionally, tilted cases or columns mimic or emphasize eccentric architectural features.

The public exhibition opening was delayed from September 11 to 13 due to the World Trade Center disaster. *Jan Otakar Fischer and DS*



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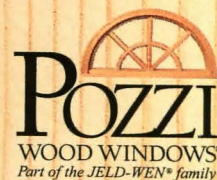


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CIRCLE 19 ON INQUIRY CARD

Record News

Will Alsop designs a light rail station for Canary Wharf in London's Docklands

Will Alsop has been commissioned to design a "distinctive and contemporary" Docklands light rail station at Canary Wharf in London. Funded by the Canary Wharf Group and the Docklands Light Railway, the transport facility is intended to accommodate the increased traffic expected as London's new business district nears completion.

Called Heron Quays station, it will replace an existing light rail facility located on the southern edge of the former docks. The site is a short walk from Cesar Pelli's 1 Canada Square tower, the tallest building in England.

When the original Docklands Light Railway station was constructed, at the end of the 1980s, Heron Quays was an abandoned wasteland on the periphery of the Canary Wharf site. Today the same

station is flanked by two fast-emerging towers and has become a key point of access between the Jubilee Line metro station (designed by Foster and Partners) and the commercial/residential district south of Canary Wharf.

The two new towers include Morgan Stanley's headquarters designed by Skidmore, Owings & Merrill and Lehman Brothers' building, which is Cesar Pelli's fifth building within the Canary Wharf masterplan. The Alsop station will be linked to both buildings and a ground-level retail precinct via an underground walkway. The towers and Alsop's station are due for completion in 2003. Built on stilts approximately 65 feet above



A Docklands rail station by Will Alsop will be built with a shell of concrete and steel.

ground, Heron Quays station will be wrapped in a stainless steel shell. The underside of the station will be enclosed by a concrete shell designed to act as a sound barrier.

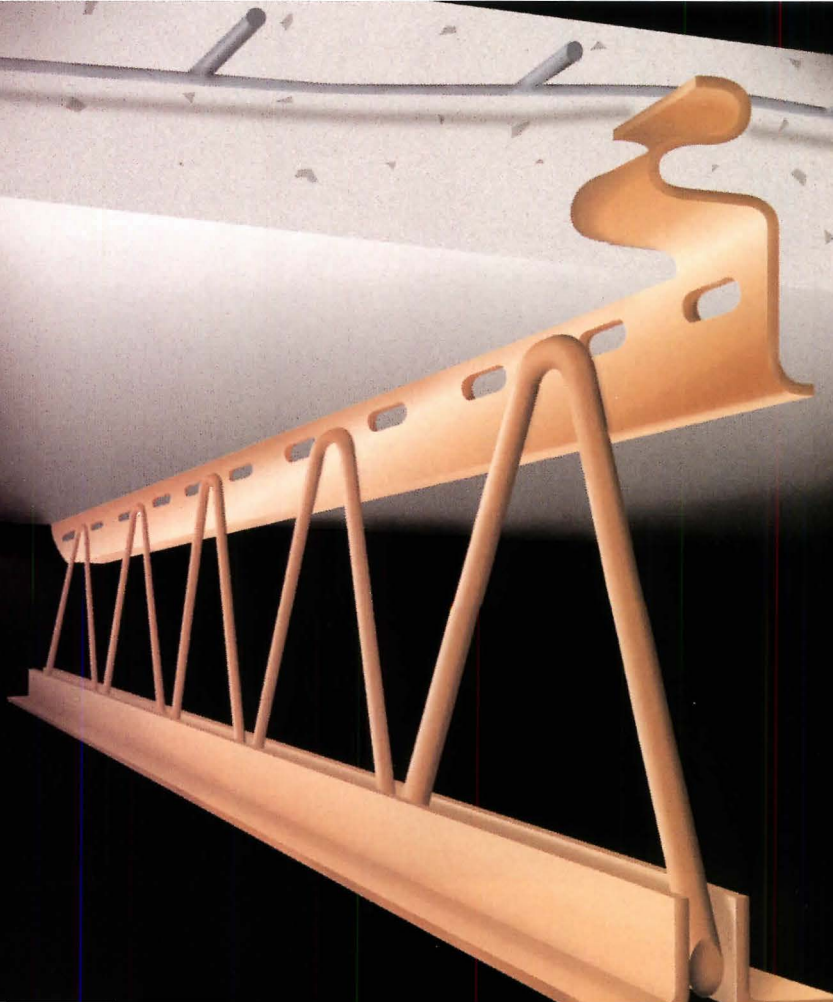
The Canary Wharf Group has more than 7 million square feet of office space under construction

across 12 sites in the area. Subject to market conditions, buildings in the Canary Wharf masterplan will be complete by 2006. Smooth-running, high capacity transport links are key to the long-term success of the Docklands development.
Adam Mornement

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Less than 50 years old, IIT's Crown Hall among 15 sites named National Historic Landmarks

Secretary of the Interior Gale Norton has named 15 sites as National Historic Landmarks, five of which were designated for their architectural significance. The most notable among this group is Mies van der Rohe's S.R. Crown Hall at the Illinois Institute of Technology in Chicago. The other four landmark designees in the architecture category were the Merchant's Exchange Building in Philadelphia; Dutch Reformed Church, Newburgh, N.Y.; Samuel Wadsworth Russell House, Middletown, Conn.; and Gibson House, Boston.

Crown Hall will also receive a \$250,000 Getty Institute Conservation Grant, which will be used toward the restoration of the exterior of the International Style masterpiece.

Mies was given the commission to design the entire IIT campus in 1939. Crown Hall serves as the home of the College of Architecture, which Mies led in the period of

Crown Hall's construction. The building, completed in 1956, expresses Mies' often repeated maxims "less is more" and "God is in the details." Crown Hall is a single-story building with a structure that is completely supported by four steel plate girders, allowing for a single interior space with no support columns. The

interior houses both studio space for students and a gallery. The July 1956 issue of RECORD contains Philip Johnson's assessment of the completed building: "Not since the Gothic," he wrote, "has there been such clarity of expression."

This year's National Historic Landmark announcements have

been marred by a controversy surrounding the nomination of the Fresno Sanitary Landfill as a Landmark in the "Individual Topics" category. The dump is also on the Environmental Protection Agency's Superfund cleanup list, and its nomination has been put on hold.

Kevin Lerner



S.R. Crown Hall, completed in 1956 at IIT, has been designated a National Historic Landmark.

49

*hurricanes**

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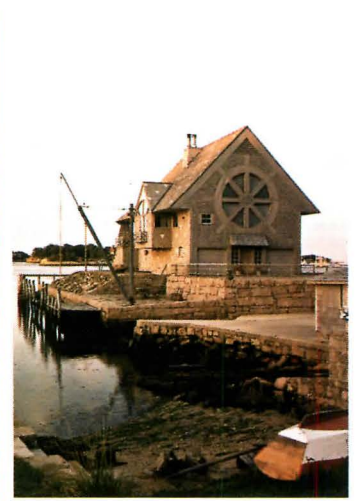
* NUMBER OF HURRICANES THAT HIT THE ATLANTIC BASIN FROM 1995 TO 2000.

Steven Izenour, architect and principal with Venturi Scott Brown Associates, dies at 61

Steven Izenour, AIA, who was inextricably a part of the architectural design and unique theoretical outlook of Venturi Scott Brown and Associates, died on August 21 of a heart attack during a rare vacation. A partner in the Philadelphia firm, he was 61. He joined VSBA in 1969 after assisting Denise Scott Brown and Robert Venturi in design studios at Yale that resulted in the seminal book *Learning From Las Vegas*, which he coauthored. He led programming and schematic design for most of the firm's major architectural projects, but he retained a special love for the simple, visceral appeal of the commercial signs and symbols that litter the American landscape. He transformed this imagery in several projects for the Walt Disney Company [RECORD,

FEBRUARY 1998, page 58]. He designed festive lighting for Philadelphia's Benjamin Franklin Bridge and invested his own energy trying to convince the struggling beach town of Wildwood, N.J., to use its dilapidated but exuberant 1950s diner and motel architecture as a means to urban revival. "The bright pinks and greens that have come out of our office are Steve's colors," commented Scott Brown. "He was at the brightest end of everything we've done."

Colleagues especially miss Izenour's humor and spirit. "He took everyone under his wing," said Fred Schwartz, a former firm associate. Izenour is survived by three children, his wife, Elizabeth, and his parents, George and Hildegard Izenour. *James S. Russell, AIA*



Work by Steven Izenour (above) include the A-Frame for Art (top), a house on Long Island Sound (top right), and the Camden Children's Garden (right).



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News Briefs

Major changes for L.A.'s Century City The ABC Entertainment Center, the focal point of Century City in Los Angeles, is about to undergo major changes. The site, with the twin 44-story Century Plaza Towers, will have a new 15-story



ABC Entertainment Center in L.A.

office building with an unusual 90-by-110-foot opening in the middle (photomontage above). The 29-year-old Shubert Theatre will be razed for the new office. Gensler has been hired to design the new office and adjacent open space, to be developed at a cost of \$280 million.

Nouvel wins Praemium Imperiale French architect Jean Nouvel has been named one of the winners of the 13th Praemium Imperiale award by the Japan Art Association. Other winners this year are Arthur Miller for theater/film, Ornette Coleman for music, Marta Pan for sculpture, and Lee Ufan for painting. The Praemium Imperiale is an annual award for global achievement in the arts given by the Japan Art Association. Nouvel, most famous for his l'Institut du Monde Arabe in Paris, is, according to the Art Association, an architect whose "buildings go beyond cultural constraints. He places great importance on harmonizing a building with its site and surroundings."

EHDD designs computer museum Esherick Homsey Dodge and Davis (EHDD) of San Francisco was selected from a field of three

finalists in an ideas competition to design a permanent home for the Computer Museum History Center in Mountain View, Calif. The 80,000-square-foot museum will be located at historic Moffett Field as part of the proposed NASA Research Park. Construction will begin in fall 2003, with an opening scheduled for 2005. The other finalists for the project were Michael Maltzan Architecture of Los Angeles and William McDonough + Partners of Charlottesville, Va. The museum program calls for a grand lobby space, an events space, and a gallery for exhibiting artifacts from, and the



EHDD's scheme for the computer museum.

history of, the computing era. Van Sickle and Roller of Medford, N.J., will design the exhibits.



John McRae

McRae moves from academia to RTKL John McRae, FAIA, has made an unusual move from academia to architectural practice. He has left Mississippi State University, where he was dean of the school of architecture for 14 years, to become a vice president at RTKL, where he will direct the firm's in-house education program, RTKL University, from its Baltimore office. RTKL University is being developed as an education and training curriculum and mentorship program for RTKL architects. "This level of commitment and focus by RTKL represents what I believe is an unusual, perhaps unique step among architectural firms and I look forward to the process," McRae says.

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Project: TBWA Chiat/Day, Los Angeles
Architect: Frank O. Gehry & Associates

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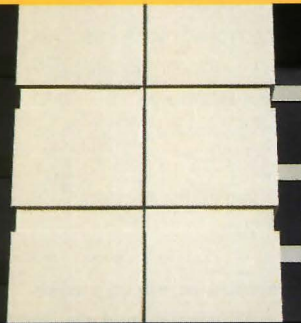
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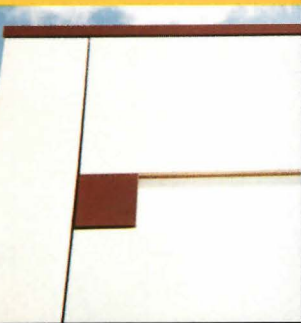
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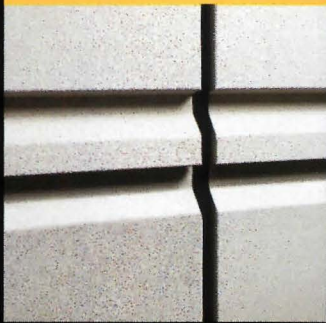
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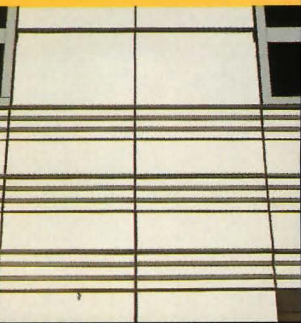
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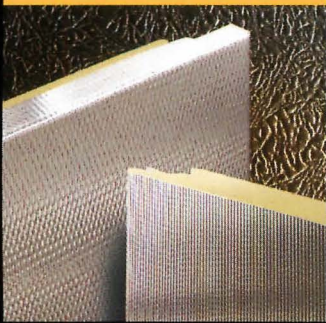
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Letters

DEPARTMENTS

WTC engineer speaks

Architects from all over the world, both friends and strangers, have sent messages of support and thanks to the structural engineering teams that worked on the World Trade Center design. The phone calls, e-mails, and messages on our Web site all had the same theme: "The towers performed better than anyone could have expected and, by avoiding immediate collapse, thousands of lives were saved." We want to thank all of you for your encouragement. Yes, the work of John Skilling and Les Robertson, and the engineers they led 35 years ago, did save lives.

However, both our anguish and anger still burden us like a heavy weight. Our hearts go out to all who have suffered losses to this evil

brought upon our country. Structural engineers dedicate their careers to trying to keep people in buildings safe from all forms of natural hazards. The feeling of helplessness is gut-wrenching when watching a very unnatural hazard like this cause so much pain, suffering, and loss of life.

Since the demise of the towers, every kind of print and broadcast media has contacted us asking for interviews. At last count, these requests numbered more than 60. A frequent question was, "Does this mean the end of high-rise buildings?" Or, "Do we need to change the way buildings are designed?" Both of these questions indicate a lack of understanding about what we have witnessed in the World Trade Center attack.

The fact that the towers survived the initial attack hid the reality that virtually all buildings would collapse immediately when hit by a 767. There is no technology that would allow our buildings to be subjected to this kind of hazard and survive. Pursuing the idea that "hardening" our buildings will solve this problem is a dead-end street. Even if some miraculous new technology were invented to harden our buildings, what would we do with all of our existing buildings? Tear them down and replace them with bunker buildings? What about the other places where large numbers of people gather, such as concert halls, sports facilities, or churches? Do we abandon these?

The problem we are dealing with in this case is not design short-

comings in buildings ... it is the security of airplanes. And that's the good news, because that problem has a much greater chance of being solved. It will be solved.

While improving airplane security will not eliminate the overall problem of terrorism, it can remove this one newly discovered weapon from the arsenal of evil.

—Jon Magnusson, P. E.
Chairman/CEO
Skilling Ward Magnusson Barkshire
Seattle, Wash.

Put the trivial in perspective

Architecturally and culturally, this is clearly the end of the era of hyper-inflation of image, surface, and the blurring of architecture with fashion, shopping, and other popular enthusiasms. This was the finale of Prada

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and Issey Miyake as matters of significance for architecture. In the context of this monumental tragedy, who cares about the superficial and fashionable? There will be a return to basic issues of architecture as structure, mass, and space. For a long time, Le Corbusier's reminder to architects about "mass" was superceded by "surface." The Muschampian obsession with architecture as an entirely personal, narcissistic, self-analytic pursuit now appears repulsive in the face of the obligations of public building.

This was a rude awakening: Reality is not an illusion on a computer screen. Despite the flirtation of architecture with cosmology, chaos, and string theory, kicking a building will really make it fall down and kill people. We need less esoteric philosophy and more thought about how human beings and architecture interact in the real world. This is the end of the virtual, an event of climactic finality that has literally hit architecture with such impact as to remind us with brutal

force of what it is all about.
—Alexander Gorlin, AIA
New York City

Of noses, faces, and spite

As an architect and a humanitarian, I'm very worried about the notion of rebuilding the massive towers. Can't we still see that tall buildings are easy targets for attacks? And, as we all saw, it only took an hour for a massive graveyard to be created.

Planning and building safe dwellings for human beings should be the first priority of architects, engineers, and cities.

What we've witnessed in the political discussion and the media coverage of this tragedy is that it's all about the ego of the creators of such landmarks, as such massive buildings are sculptures or symbols of power and superiority. If only we could overcome our inflated egos. I suggest we start a campaign to raise dialogue and awareness on this matter.

—Ozlem Paker
Via e-mail

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I'm sure the whole architectural community is waiting to see how many of the elite architects who have graced the covers of one of our few architectural magazines, and who may never have to work another day in their lives (thanks to "Bilbao"-like commissions) will band together and offer to design and produce construction documents for our new state-of-the-art World Trade Center replacements. The pride you'll feel in patriotically contributing your time and skills to design, and subsequently build, these new "memorial" buildings should be compensation enough. Shame on your American selves if you accept a dime in return!

—Anthony Wilkins, *Intern-Architect Virginia Beach, Va.*

Rooms with views no more?

The sight of the south World Trade Tower crumbling down brought this feeling to my gut: This is the death of the skyscraper.

The lingering aftereffects for

architecture may become evident as corporate clients no longer desire the physical manifestation of American might and prosperity. Forget ever-taller buildings. They'll want to stay closer to the ground!

These types of cataclysmic events alter cultures permanently. It's a sure bet that the era of the skyscraper will now have a solid end date in future history books.

—Toby Weiss
Via e-mail

Corrections

In the *Summerset at Frick Park* [JULY 2001, PAGE 37] development, LaQuatra Bonci Associates completed the master plan after an initial planning process that included Cooper, Robertson and Partners and Urban Design Associates. Looney Ricks Kiss (credited in the story with developing the master plan) was responsible for architectural design of the houses.

E-mail letters to editor-in-chief at rivy@mcgraw-hill.com

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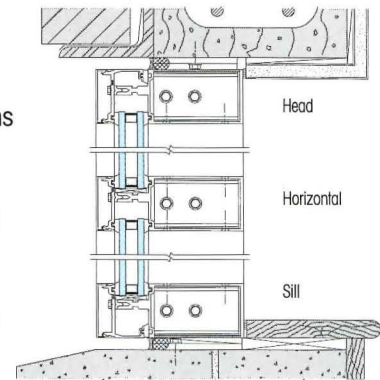
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Dates & Events

New & Upcoming Exhibitions

Monuments and Memory Washington, D.C.

September 29–January 13

A timely showcase regarding the memory of nationally significant events and the designs which help create and maintain these memories. Washington-based architects exhibit competition entries for various war memorials, in addition to hypothetical projects. At the National Building Museum. Contact 202/272-2448 or see www.nbm.org.

Mathematica San Francisco

October 6–May 5

This Eames-designed exhibit from 1961 showcases mathematics as both a science and a tool for art. Revisited forty years later, it remains the only Eames exhibit still in existence. Other Eames designs on display include toys, home electronics, and lesser-known furniture. At the Exploratorium. Contact 415/563-7337 or see www.exploratorium.edu.

Nova Scotia Architect: Brian MacKay-Lyons—An Exhibition Chicago

October 9–November 1

A traveling exhibition that explores the inventive work of this Canadian-born architect. The opening will commence in Chicago with a lecture from the architect entitled, "Stewardship." Graham Foundation. Contact 312/787-4071.

The Chicago Bungalow Chicago

October 18–January 15, 2002

This exhibit offers a kaleidoscopic look at 20th-century life in urban America as viewed through the architectural and social history of the Chicago Bungalow, via photos, memorabilia, and samples of decorative arts. At the Chicago Architecture Foundation. Contact 312/922.3432 or see www.architecture.org.

Ongoing Exhibitions

On Movers and Shapers New York City

Through October 13

Through photographs and video installations, artists Ines Schaber and Jorg Stollman track and document the affects of landscape design in desert Arizona. The subtle presence of cacti signify huge efforts of mobilization, carefully detailed in this show. At the Storefront for Art and Architecture. For more information contact 212/431-5795 or e-mail info@storefrontnews.org.

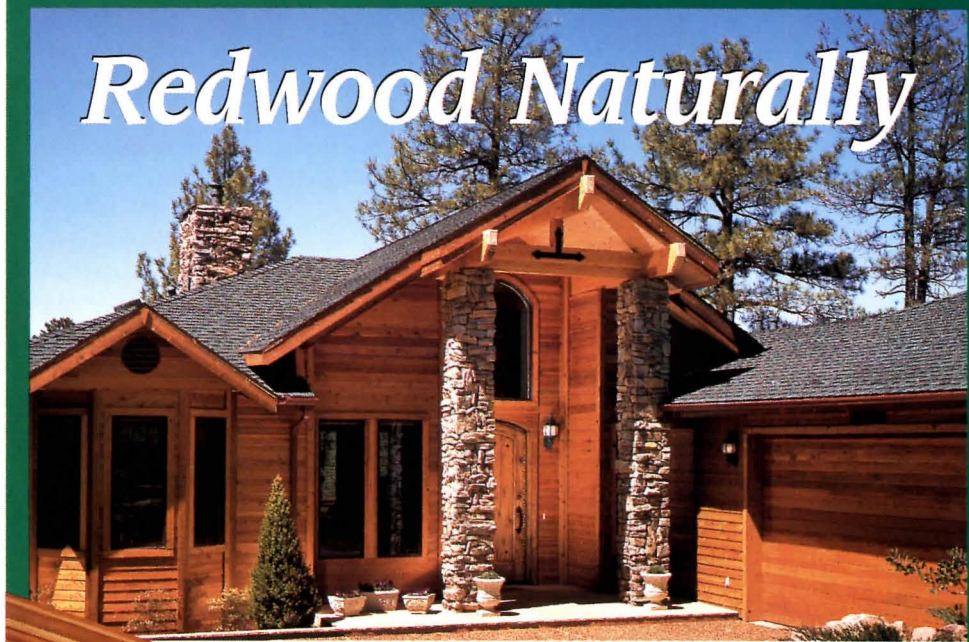
Alternative Architecture: The Work of Allan Wexler Buffalo

Through October 27

Exhibits the work of this unconventional artist/architect whose designs explore the relationship between the applied arts and fine arts through highly unusual, small-scale works of architecture. Other artists will be included in

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Dates & Events

the show, as well. At Hallwalls Contemporary Art Center. Accompanying lecture by Wexler to take place on September 15, at the Albright-Knox Gallery. Contact lamarche@buffalo.edu.

From Arts and Crafts to Modern Design: The Architecture of William L. Price **Washington, D.C.**

Through March 24
The first retrospective of the architect's thirty-year career features original drawings and furniture designs. Projects include luxury hotels in Atlantic City, midwest train stations, and private residences. At the National Building Museum. Contact 215/898-7798.

Cesar Pelli: Connections **Washington, D.C.**

Through April 28

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 original 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.

The Architecture of the American Craft Museum **New York City**

Through January 13
An installation of a model of the newly designed building by architects Tod Williams/Billie Tsien and a photo essay documenting the construction process, from ground breaking to near completion, of the museum's new site at 45 West 53 Street. Contact 212/977.7170 or see www.folkartmuseum.org.

Perfect Acts of Architecture **Pittsburgh**

Through January 6
Features more than 140 drawings and collages on the architectural meditations of architects from the 1970s and '80s, when design was highly theoretical. Includes the work of Rem Koolhaas, Bernard Tschumi, Peter Eisenman, Daniel Libeskind, and Morphosis. At the Heinz Architectural Center. Contact stitelert@carnegiemuseums.org.

Lectures, Symposia, & Conferences

Design + Architecture 2001 **Miami**

October 1-30
Beginning on the first of the month with D+A day, this event features a variety of exhibitions, tours, open houses, workshops, and lectures along the Florida Coast. The event is part of a community-wide effort to raise awareness of the impact of design and design-related fields in the

immediate community. Visit www.designandarchitectureday.com.

Design Matters: Best Practices in Affordable Housing **Chicago**

October 22-23
A symposium dedicated to promoting the idea that residential design can be both affordable and of high quality. Issues to be addressed include construction cost containment, energy and resource efficiency, and alternative materials and methods. At the University of Illinois College of Architecture and the Arts City Design Center. Contact 312/996.2076 or go to www.affordablehousing.aa.uic.edu.

Architecture Now! **New York City**

October 30
A discussion by Tod Williams and Billie Tsien with Philip Jodido regarding the enthusiastically titled publication. Featured work includes architects Jakob and MacFarlane, Diller and Scofidio, Asymptote,

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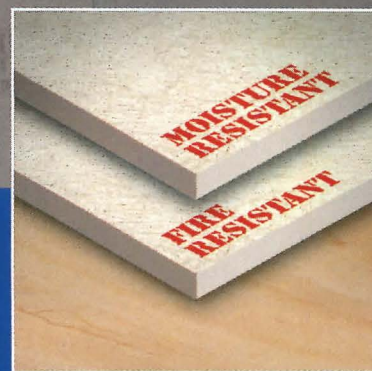
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CIRCLE 32 ON INQUIRY CARD

Dates & Events

Meier, and Williams and Tsien, and investigates current influences on current architecture. At the Cooper-Hewitt, National Design Museum. Contact 212/849-8380 or see www.si.edu/ndu.

Less is More: Tenth International Symposium of Architecture Monterey, Mexico

November 2

A symposium featuring Ken Yeang, Manuelle Gautrand, Rodolfo Machado, Francisco Serrano, and Alberto Kalach. Part of the University's 55th anniversary. At the Universidad Autonoma de Nuevo Leon, Facultad de Arquitectura. Contact 011 52 83 76 26 00 x111 or facarq@ccr.dsi.uanl.mx.

Abitare Italia New York City

November 4-7

A four-day symposium in decadent celebration of Italian furniture design. For quality assurance, it begins with scholarly discussions on the history and impact of Italian design before a 20% discount on the products ensue. Lectures at the Italian Trade Commission and the Italian Cultural Institute. Shopping at participating showrooms. Contact 212/353-1383 or see www.abitareitalia.com.

Architecture in the Form of Dialogue: Fourth International Architecture Symposium

Pontresina, Switzerland

November 12-14

A three-day symposium dedicated to the discussion of media, politics, mobility, and architecture in the coming century. Sponsored by the British Council, the forum features an interdisciplinary panel of internationally known architects, theorists, and city planners, including Will Alsop, Wolf D. Prix, Maxwell Hutchinson, and Hani Rashid. Contact 011 41 81 838 83-18 or visit www.archisymp.com.

Tours

Charleston's 25th Annual Fall Candlelight Tours of Homes and Gardens Charleston, S.C.

Through October 27

Hosted by the Preservation Society of Charleston. Each tour highlights a different neighborhood. Contact 800/968-8175 or preserve@preservationsociety.org.

The Art and Architecture of Bilbao and Barcelona

October 12-19 and

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Sicily: Archaeological and Architectural Splendors

November 10-20

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Conventions

Build Boston Boston

November 13-15

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Competitions

The City of Wildwood

Deadline: October 12

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The Bloomington Community Art Commission seeks proposals for three new bus shelters to be installed throughout the city. The award includes \$2,500 for each of the winning designs. Contact BloomingtonArt@aol.com for a brochure.

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For and about the new generation of architects

archrecord2

FOR THE EMERGING ARCHITECT

One hallmark of the younger generation of architects is that they are always looking toward the future: experimenting and theorizing and trying to make the world a better place. A noble calling even in the most normal of times, but especially important as architects think about remaking the world after a crisis. This month, *archrecord2* looks at two young architects in the vanguard of mobile design and of “green” architecture. And, as always: Design, Work, Live, and Talk.



DEPARTMENTS

DESIGN

Jennifer Siegal: The New Nomadism



The road, so to speak, from the Oscar Mayer Wienermobile to the iMobile—which, at its most basic level, is a computer lab on wheels—would seem to be a long and winding one. But a look at the career path of Jennifer Siegal, the founder and principal of Los Angeles’ Office of Mobile Design, leads squarely back to frankfurters.

“My grandfather was a hot-dog salesman in Coney Island,” Siegal says, “and I was also a hot-dog salesgirl when I was going to SCI-Arch.” Siegal bought a cart while she was earning her master’s degree from the Southern California Institute of Architecture, and her profits helped pay for her degree. More importantly, though, working as a peripatetic entrepreneur influenced Siegal’s design thinking. That experience, combined with several years of travel in the U.S. and abroad, gave Siegal an increased awareness of the nomadic nature of societies, especially in Southeast Asia.

“In my travels, I also became aware that I needed fewer and fewer things,” Siegal says. “Becoming light on my feet became a sort of way of life for me, and it seemed that the paring down of my lifestyle was reflective of what was happening for a lot of people in my generation.”

While traveling, Siegal taught at several universities, and she began developing her ideas in design/build studios with her students. Eventually, she returned to Los Angeles and began teaching at Woodbury University. She founded the Office of Mobile Design in 1998. Siegal had already begun to build and write in conjunction with her teaching, and the resulting recognition helped her firm win its earliest commissions. Work began to arrive.

“I guess it’s like any small firm,” Siegal says. “You get recognized for one thing and then you start to gain momentum. We actually launched our Web site, www.designmobile.com, and that



iMobile, unbuilt, 2000
Office of Mobile Design. The iMobile is designed to showcase new computer hardware and soft-

ware or to provide computer access to schools, rural areas, or other locations where it would not otherwise be available.



Portable House, mobile, 2001
Office of Mobile Design. An update on the mobile home, but actually based on the structure of portable classrooms. A prototype is currently under construction at a California factory.

helped us gain a lot of recognition, too.”

Siegal won the commission to design offices for the online “extreme sports” retailer PIE.com in large part because of her mobile emphasis. Siegal says that without being “overtly obvious, and using surfboards and sailboards and things,” she tried to emphasize “speed and movement and light.” The result is an office full of curving dividers and a central spine overhead that serves as a cable tray, bringing network connections to the scattered computer stations.

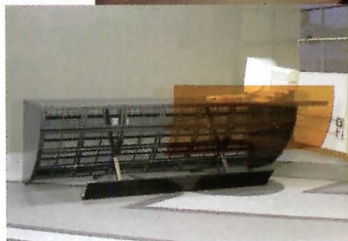
Aside from PIE.com, however, Siegal continues to focus on mobile architecture. Current and recent projects include a display and service kiosk for electric bicycles and a portable house, which is based on the structural system of a portable classroom, built with environmentally-friendly materials such as Plyboo bamboo flooring and recycled newspapers. The portable house is meant to appeal to people with transient, minimalist lifestyles who still have a good sense of design.

And while the iMobile may not be the Wiernmobile, Siegal has not completely abandoned hot dogs. She may even design a better hot-dog cart. “Actually,” she said, “that’s a really good idea.” **Kevin Lerner**
Go to architecturalrecord.com/archrecord2 for more on Jennifer Siegal, including other projects, and to submit your own work.



PIE.com offices, Hollywood, Calif., 2000

Office of Mobile Design. The interior design for the offices of this “extreme sports” retailer emphasize speed and movement.



WORK

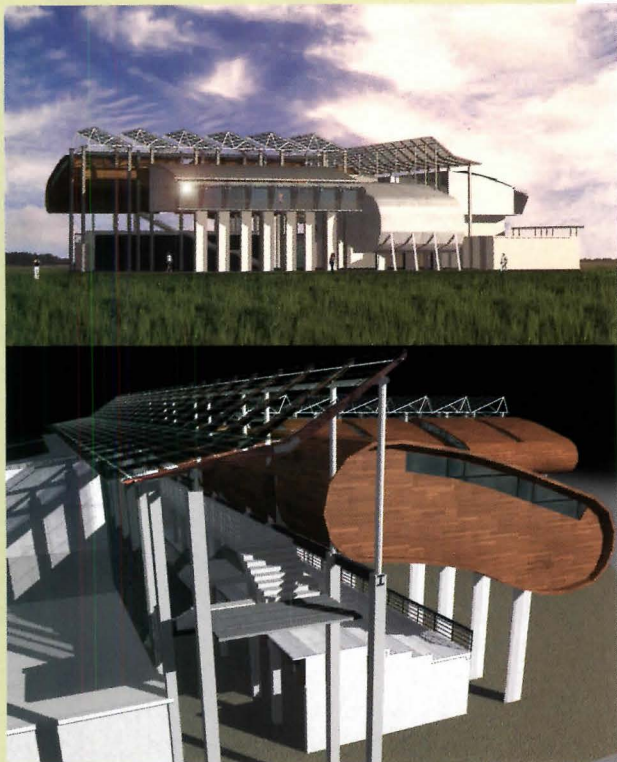
A competition for a green campus

Diligent programming and a sensitivity to detail and sustainability have won Apurva Parikh first prize for his design for an agricultural education building in this year’s Leading Edge Student Competition for Sustainable Design. Parikh is a master’s candidate in the University of Texas at Austin’s architecture program.

As the first building for Tulare County’s new agricultural campus center in California, the design invokes the region’s agricultural machinery, landscape, and climate by allowing the wind, sun, and rain to shape its forms. Hovering, kidney-shaped lecture halls allow wind to filter through the structure, while angled glass panels diffuse sunlight into the classrooms and exterior corridors.

“The building is essentially porous to the wind and sun,” says Parikh. “The elements penetrate deeply into the structure, reducing the building’s dependence on air-conditioning and artificial lighting.” The building’s membrane also facilitates the production of heat and cooling through active mechanical systems imbedded into the structure, demonstrating that sophisticated planning can produce lasting efficiency. *Christina V. Rogers*

Go to architecturalrecord.com/archrecord2 for more on this competition.



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Competition demonstrates how mixed incomes can coexist

Correspondent's File

By Rosemarie Buchanan

As many competitions do, Chicago's competition for a mixed-income housing redevelopment was filled with brazen optimism tempered by a shot of reality. Brian Healy Architects of Boston was named the winner in late August, but it is not certain if the Chicago Housing Authority (CHA) will build his design.

The City of Chicago and the CHA invited seven architects—four chosen outright and three selected from 118 contestants—to tackle a heady proposition. The competition program called for the design of housing on a vacant square block on Chicago's West Side to accommodate three income levels: market-rate, affordable, and low-income subsidized housing. The housing block, with density between 28 and 38 units per acre, was to be crafted so the three income levels would be indistinguishable from the outside. All three unit types had to be distributed evenly across the development, providing one third for each income group, and every unit had to have its own entrance to the outside—in other words, no common entrance. The "redevelopment requires that . . . public housing no longer is visually stigmatized as the poor man's house," the competition's original grant proposal stated.

The competition site was an eight-acre block in the ABLA neighborhood—a conglomerate of four separate public housing develop-

Rosemarie Buchanan is a Chicago-based journalist who writes about architecture. Her articles appear frequently in the Chicago Tribune.

ments built between 1937 and 1962. The district is subject to a master plan now being reviewed by the Department of Housing and Urban Development (HUD). The site borders Roosevelt Road, the University of Illinois at Chicago, and a rapidly gentrifying area of the city where lofts and condos sell for between \$300,000 and \$500,000. With two HOPE VI HUD grants totaling \$59 million awarded to ABLA in 1996 and 1998, the city appropriates \$140,000 to construct each affordable unit and \$106,000 for each CHA unit.

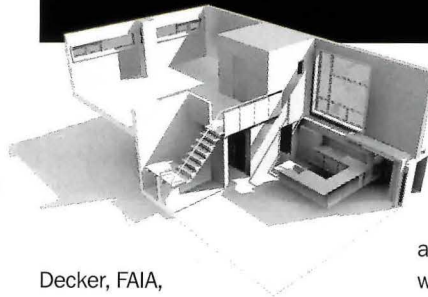
Seven entrants

Competition entrants included four preselected architecture firms: Shim-Sutcliffe Architects of Toronto; Garofalo Architects of Chicago; Coleman Coker of Memphis; and Stanley Saitowitz/Natoma Architects of San Francisco. The three selected from the open competition were Healy; 3D Design Studio of Chicago; and the Chicago-based team of Wheeler Kearns Architects with Roberta Feldman and Xavier Vendrell. Garofalo Architects won an honorable mention.

The jury, which judged proposals anonymously, included Howard



The winning design by Brian Healy Architects.



Decker, FAIA, chief curator of the National Building Museum; Stanley Tigerman, FAIA, principal of Tigerman McCurry Architects; Deverra Beverly, ABLA local advisory council president; Reed Kroloff, editor in chief of *Architecture*; developer Ken Rice; Lamarr Reid, AIA, principal with Perkins and Will; landscape architect Ted Wolff; Daniel Levin, president of the Habitat Company; Katarina Reudi, professor and director of the University of Illinois at Chicago School of Architecture; and Randy Jefferson, AIA, principal with Gehry Associates.

Each entrant received a \$20,000 honorarium, and Healy received an additional \$15,000 and the possibility of negotiating with a developer to have his design constructed. Healy's design was based on a "typical Chicago block"—he cited the 19th-century pattern of the streetscape and alley system as the infrastructure. Parking ran underneath blocky, 25-foot modular units. The design took Modernist principles, such as a gridded layout, and teamed them with a vernacular vocabulary. Stating that an "overreliance on symbolism is a bad thing," Healy decries the label "modern" to characterize his proposal, preferring to describe his project as "a warehouse, something that avoids pastiche." Juror Lamarr Reid said Healy's design was by far



Competition entries by (from left) Stanley Saitowitz/Natoma Architects, Shim-Sutcliffe Architects, and Doug Garofalo.

Correspondent's File

the most buildable and feasible. "We're confident this (design) can be followed through, and it engages the street," Reid said.

Doug Garofalo's design wove apartments into ribbed, undulating, and bargelike clusters of concrete, brick, and glass on pilotis, and incorporates the potential for home businesses. In his design statement, Garofalo wrote that he counterbalanced the "individual nature of domesticity" with the "standardized, repetitive building practices." The jury awarded

Garofalo an honorable mention, according to juror Howard Decker, as a nod to his ingenuity.

Shim-Sutcliffe divided the site into a linear two-third, one-third proportion with a path stretching down the middle. Arrangements of different size apartments and courtyards created a rhythm, and Jenga-like units interlocked around each other to mask where one ends and another begins—blurring the ability to discern one income level from another. Brick-clad clusters formed a line of defense

against Roosevelt Road, a common feature of many designs, topped with a ramplike roof.

Coleman Coker's creation had parking under linear housing clusters. The facade treatment vaguely resembled Karl Ehn's Karl Marx Hof in Vienna. Stanley Saitowitz's more insular urban village was designed to value "simplicity and regularity over complexity." Saitowitz implemented two corridors to divide the rectangular-shaped block into equal thirds, and he used glazing to diminish the distinction between the clean-lined domestic space and semiprivate courtyards.

Wheeler Kearns with Feldman and Vendrell encircled the block's

perimeter with apartment clusters and based their plan on the existing street and alley system. Balconies were designed to stretch and overlap units to encourage neighborly interaction. This team interpreted its design as respectful of "Chicago's urban pattern, yet resist(ing) the insularity of the private lot."

3D Design Studio's submission was the only one to bisect the square block laterally. Each of its housing clusters resembled an extenuated townhouse, tall and narrow. Its design intent: "to disintegrate the superblock."

According to Lee Bey, deputy chief of staff for Mayor Richard M. Daley and a former architecture critic for the *Chicago Sun-Times*, and Denise Arnold, AIA, competition director, it is uncertain if the housing will be built as Healy designed. Once HUD approves the neighborhood master plan, the city will publish an RFP for developers to develop the entire site. The developer will determine whether Healy's design, or that of another architect, will be built. ■



Entries by (from left) Wheeler Kearns Architects, 3D Design Studio, and Coleman Coker.

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Having trouble understanding what the architectural cognoscenti are saying? You're not alone.

Critique

By Robert Campbell, FAIA

I treasure them. They are collector's items. They are the gems of architectural prose. Of ArchiSpeak.

Here is one: *These distortions elicit decipherment in terms of several virtual constructs that allow the house to analogize discourse and call for further elucidation. These constructs are continually motivated and frustrated by conflicts in their underlying schemata and the concrete forms in which they are inscribed.*

Notice the 14th word. It's the only clue that the author is talking about a house. This author was, at the time of writing, a teacher of beginning students at a major school of architecture. One's heart goes out to the students, who came to school to become architects and instead were faced with a buzz-saw of incomprehensible babble.

Loved that one? You ain't heard nothin' yet. Try this: *The work of Diller + Scofidio is situated between 'inscription' and 'prescription' and architecture of 'description' concerned with the hyper-present. Though description is commonly understood to be recapitulation, passive and uncritical, here, it is employed actively, as intervention. By articulating the culturally loaded spaces of and between surfaces and foregrounding their relations,*

Contributing editor Robert Campbell, FAIA, is the Pulitzer Prize-winning architecture critic for the Boston Globe.

those relations necessarily become disrupted.

A Zen master would flip. Anyone can hear the sound of one hand clapping, but who can articulate a culturally loaded space?

I'm not the only one who collects these gems of pretentious illiteracy. Someone recently slipped me an anonymous list, entitled "Words Actually Used and Heard at the GSD"—the GSD being Harvard's Graduate School of Design. The list

intertwines formal and digital modalities . . . In two intertwined but separate processes, both modalities seek to develop a hyper-functional relationship with the 'primary code,' their internal design logic; they subsequently, undergo a process of (re)contextualization, through a series of systematic negotiations of local conditions. These processes generate/explore unique topologies.

Where do bright students learn

Unfortunately, many of us are intimidated by ArchiSpeak. Intimidation may, in fact, be the author's goal. In the dim recesses of my past, I was a Phi Beta Kappa English major at Harvard. It's a background that encourages me to believe that if I can't understand what a writer is saying, it's probably the writer's fault and not mine. No less an intellectual than Ludwig Wittgenstein wrote that anything that can be thought about can be

situated...inscription...culturally loaded...virtual constructs...
discourse...re-inventing typologies...otherwise obsolete phys
transgression...digital modality... (re)contextualization... syste
negotiations...internal topological intensities...Adornian, r
atlographic...Cartesian nostalgia...tectonics...formal palpita
Framptonian terminology...graphic transubstantiality...heuristic
synchronistic experientiality...hypernormative discourse...hyper

is comprehensive, as befits a work of Ivy League scholarship. It contains 105 items. A sample:

Adornian referent, fractured embodiment, graphic transubstantiality, semiotic traceable referents, synchronistic experientiality, hypernormative discourse, hyperspatial dislocations . . .

The GSD is my alma mater, and I'm grateful for its rich outpouring of ArchiSpeak. The following example was mailed to me by a team of GSD students who had just won a competition to design new mailboxes for the school. The document, entitled "Reinventing the Mailbox," runs to three pages. I quote:

The project deploys and

to write gibberish? Guess. Here's an excerpt from the brochure of another school of architecture: *A coherent and differentiated spatial paradigm overlays both the natural and historical determination of places and the homogeneous construction of modern space. Such changes in the nature of contemporary space give rise to the replacement of a long-lasting epistemology of conservative systems by non-isolated, complex models that approach reality as an unstable set of vaguely delimited locations crossed by flows of energy and matter.*

It is possible to work out what this author means, more or less. He just has no idea how to say it.

expressed clearly. Why do architects so often envelop themselves in fog? Maybe because:

- Turgid writing is the expression of turgid thinking. ArchiSpeak usually means the author simply hasn't thought things through. If you write clearly, you've probably also thought clearly. If you've thought clearly and you still write ArchiSpeak, you're most probably showing off.
- Architecture schools are usually lodged in universities. This leads the architecture faculty to trust the fantasy that architecture, like philosophy and other university subjects, is principally an intellectual activity. It isn't. Its excellence is of a different kind. (I didn't say architect-

Critique

ture isn't intellectual, I said it isn't principally intellectual.)

- Architects, especially academics, may feel they're so smart they don't need to master the technology of writing. But that technology must be learned like any other. In writing as in architecture, there is such a thing as clarity and rigor of design and detail. We architects demand those qualities in our designs. But we ignore them in our writing as we massacre syntax, chop-shop metaphor, and reach for exactly the wrong polysyllabic word.

Why should anyone care?

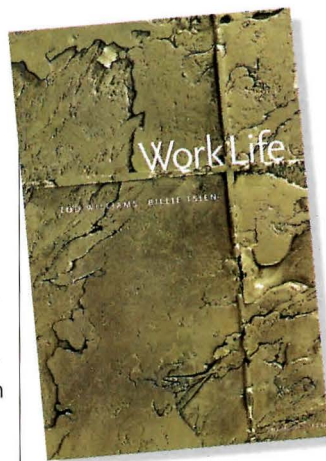
Maybe because:

- Many of the ArchiSpeakers have something to say, if we could only figure out what it is. And life would be more fun if we didn't have to swim in verbal glop.
- ArchiSpeak leads young architects to believe they must reinvent themselves as members of a cult, a cult

with a private lingo the public can't understand. (Not to mention those black uniforms.) They'd be wiser sticking to common English. Frank Gehry, who never emits ArchiSpeak, once told me students would be better off reading novels than architectural theory, because they'd learn something about men and women.

- ArchiSpeak makes people think they are smarter than they are (when they write it) or stupider than they are (when they can't understand it). Either way, ArchiSpeak is doing harm. Mastery of gobbledygook is not a sign of intelligence.

And finally. Sooner or later, architects (and planners and landscapers and urban designers) must convince someone to hire them or at least bless them with a grant. Such benefactors like to believe that architects live in the same world they do. Nobody is going to trust a dollar to a pompous twit. ■



Books

Work Life: Tod Williams Billie

Tsien, edited by Hadley Arnold.

New York: Monacelli Press, 2000, 264 pages, \$60.

The trend these days is for architects to stuff their monographs to the bursting point. Too much design ain't never enough. Gotta have 500 pages or more. Gotta weigh a ton. Not surprisingly, Tod Williams and Billie Tsien have taken a different approach to the first book on their

work. Even the proportions of the book are different. Square and blocky is in right now. Theirs is tall and thin.

Like their architecture, Williams and Tsien's monograph speaks powerfully by keeping its voice low and clear. Instead of showing everything the couple has ever designed, it presents 10 recent projects, ranging in scale from sets for a dance troupe and an installation of Noguchi lamps at a department store to the "scientific monastery" they created at the Neurosciences Institute in La Jolla, Calif., and the new residential college they designed for the University of Virginia. Michael Moran's duotone photographs capture the poetic spirit of the buildings and stand on their own as works of quiet beauty. More drawings, though, would have helped document the projects.

Short chapters show some of the couple's older projects and ones in progress. The book ends with each architect describing the other's contribution to the practice. *Reviewed by Clifford A. Pearson*



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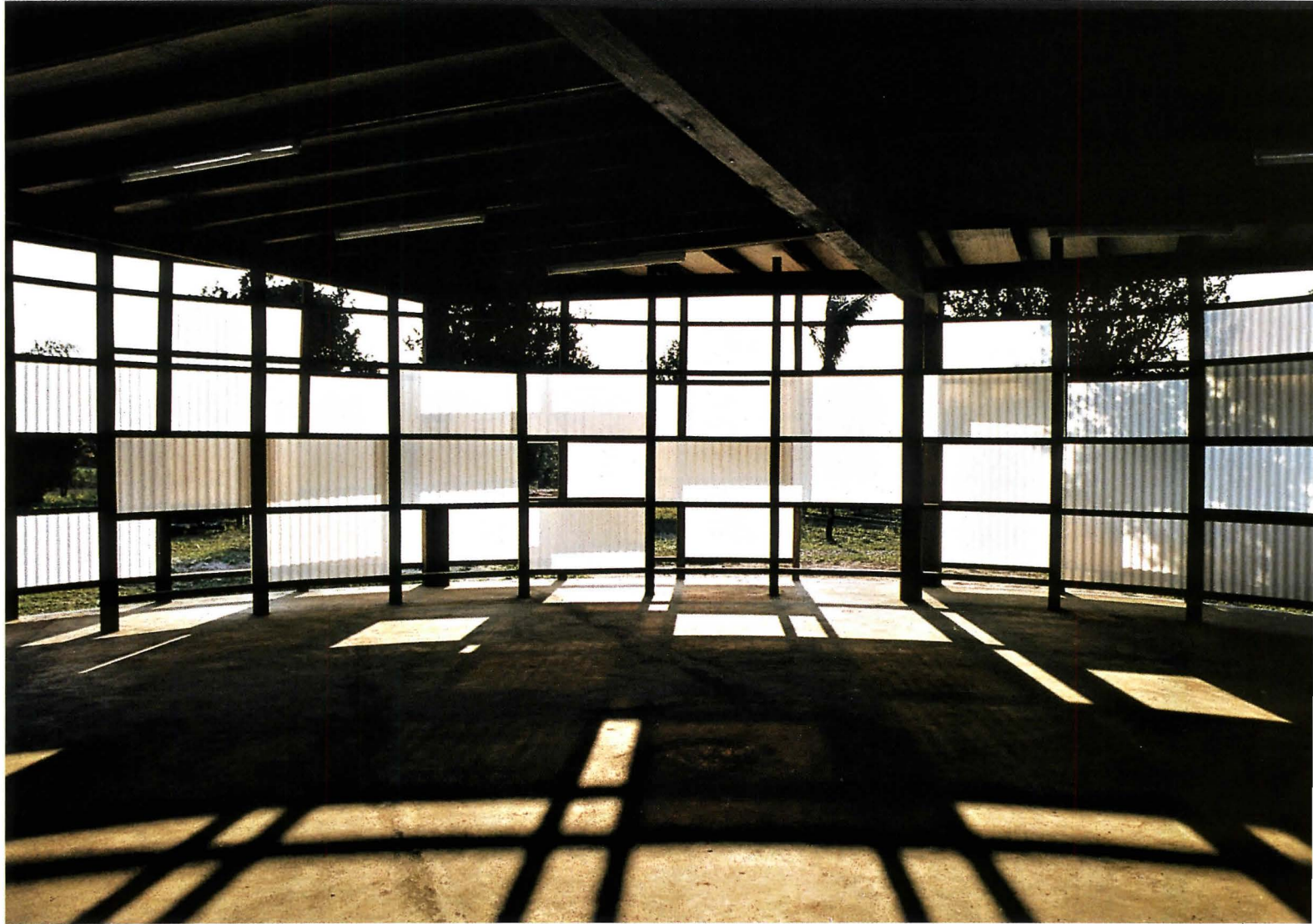
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Snapshot



By Jane F. Kolleeny

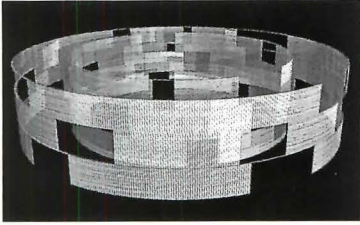
Extraordinary power can be experienced in the most modest of circumstances. Take for example this little church, which conjures up strength and purpose in its simple and flexible design. It also demonstrates an exemplary relationship between architect and community and shows that minimal resources can result in significant community benefit.



If there ever was a church built for and by the people, this is it. Conceived and constructed by the congregation, this 1,200-square-foot structure in the remote village of Urubo, 20 minutes by car outside Santa Cruz, Bolivia, was raised through their blood, sweat, and tears, and donations from Christians in the United States and Bolivia. Made with local, pressure-treated timber and translucent polycarbonate sheets, patterns of light and degrees of shade record the movements of the sun through-

And the meek shall
rule the earth

Snapshot



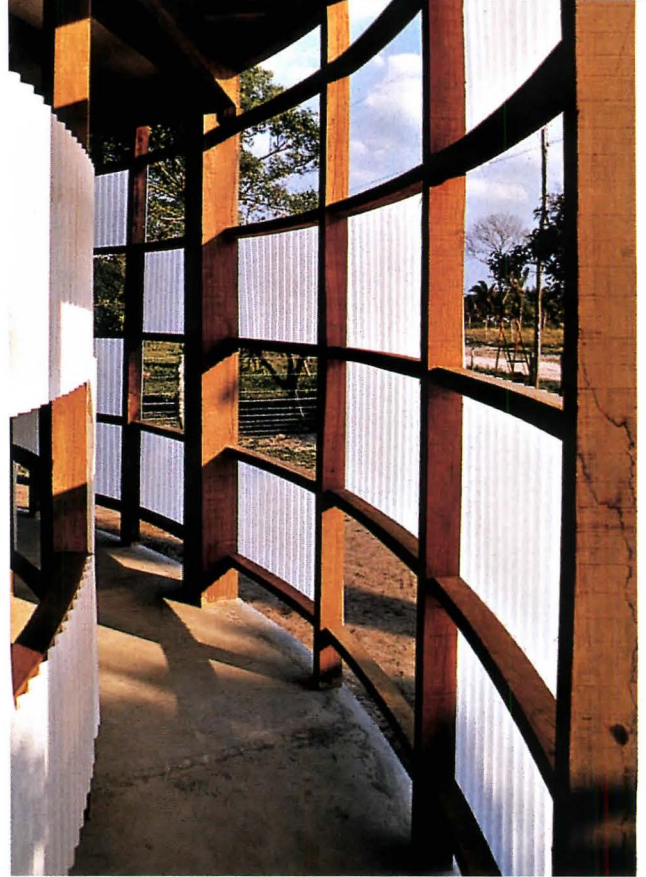
out the day and mark the times of the year. The building glows within like a luminous egg.

Architect Jae Cha developed a grass-roots vision that took eight months to plan but was implemented in a mere 10 days. Cha observed that “well-planned public spaces that meet the needs of a community

are often overlooked as a potential means to fight poverty. Charitable contributions may reduce need, but ending poverty requires developing sustainable methods and encouraging a web of community interaction.” Indeed, the modest church is multifunctional, serving not only as a gathering place for worship but as a daycare center, a vaccination center, and a public market.

Though Urubo is close to a city, this rural village is peopled by about 150 families who live in mud and straw shacks, traveling by foot or horseback. Since there is no economy in Urubo, most people walk to Santa Cruz for work. Many of the women in the village have no place to take their children when they work. Plans are underway to open a kindergarten at the church where children can be dropped off during work hours. This project, funded by Christian organizations both in the United States and in Bolivia, was organized by Light, Inc., a nonprofit, nongovernment architectural practice founded by the architect.

Jae Cha believes that flexible public spaces like this can provide the physical foundation for economically diverse, self-supported and self-guided communities. “We emphasize independence, rather than dependence, by seeking to create public spaces that offer direct paths to community empowerment and vitality.” ■



The patterns of light and dark speak both of transience and of the regularity of the simple rhythms of this archetypal structure.

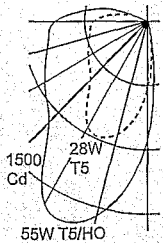


size matters...

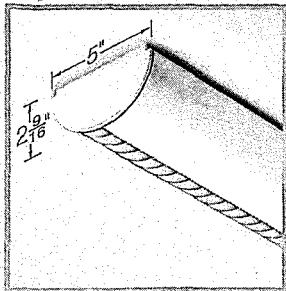
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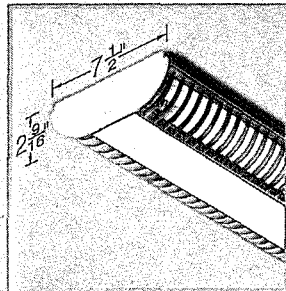
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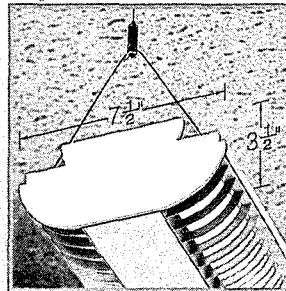
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BUSINESS** IN A NUMBER
OF SETTINGS

By John E. Czarnecki, Assoc. AIA

The sense of what constitutes good business has evolved in the first five years of the Business Week/Architectural Record Awards program. In that time, in the United States in particular, we've seen the arrival and abrupt rightsizing of the New Economy. The lasting result of the go-go economy with its irrational exuberance has been a transformed American workplace: The influx of new dot-com companies in the late 1990s ushered in a more democratic office environment designed to foster creativity. But good business is no longer relegated to the workplace. Today, the art of economic enterprise can be expressed in many forms, including a funky, transformable office, a pedestrian bridge, a chilled-water plant, or even a Buddhist temple ossuary. Those diverse building types were all winners in the fifth annual Business Week/Architectural Record Awards program, showcasing the best examples of how good design is good business.

A jury of architects and business leaders poured through 192 entries in selecting 19 projects that were honored as finalists. This was the

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first year to include finalist as well as winner categories, and, ultimately, 11 of the 19 finalists won awards. Only four of the 11 winners were primarily offices—the Chesapeake Bay Foundation headquarters by Smith Group, the Wieden + Kennedy headquarters by Allied Works Architecture, LVMH Tower by Christian de Portzamparc, and SAP Global Marketing headquarters by HLW.

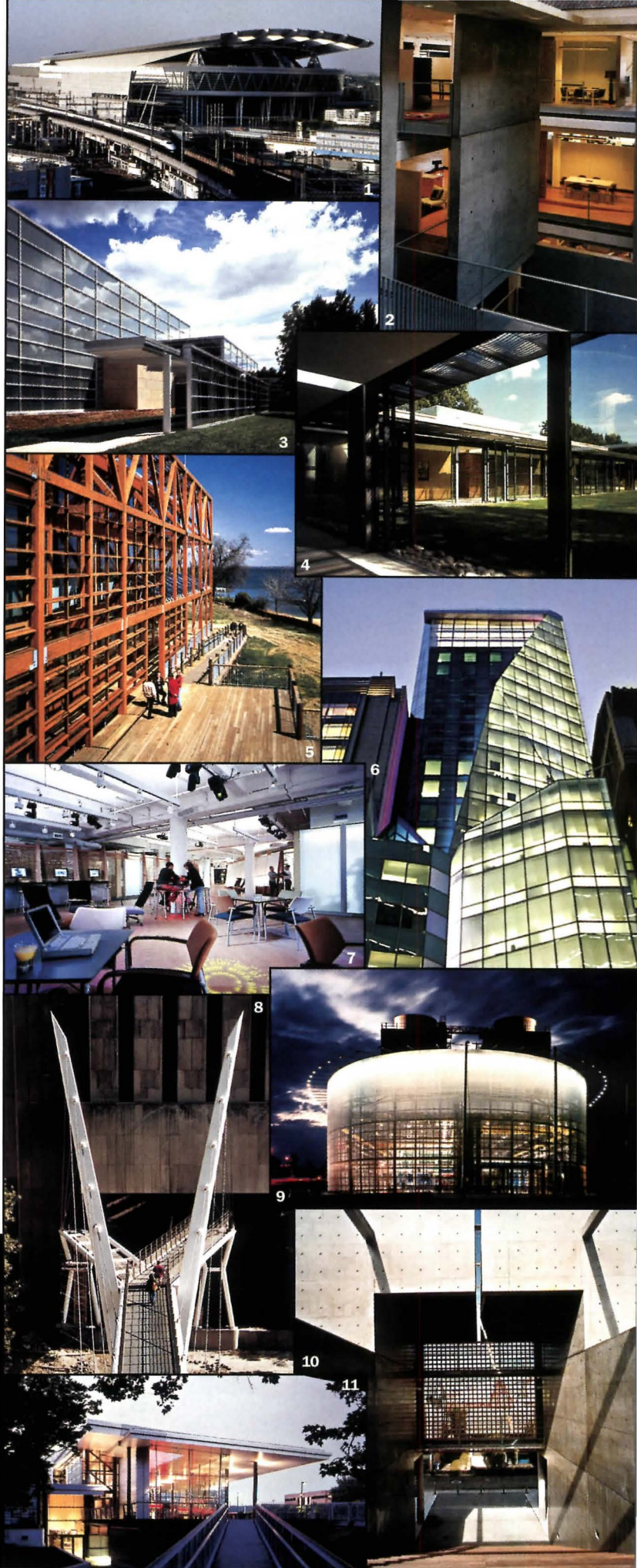
“People are beginning to see this award in a much broader way,” said jury chair Charles Rose, AIA, principal of Charles Rose Architects. “Many nonprofits, in particular, are seeing architecture as a critical piece of their economic plans.”

Conscious of an expanded concept of the value of a building for an organization, the jury awarded a wider variety of projects that had, according to Rose, “a lot more aesthetic staying power” than past years’ honorees. So, while a reformed, informal corporate America may be here to stay, this year’s awardees represent good business in a more universal context of place, building type, and design intent.

1. Saitama Super Arena
2. Weiden and Kennedy
3. Phillips Plastics
4. Dulwich Picture Gallery
5. Chesapeake Bay Foundation
6. LVMH Tower
7. SAP Global Marketing
8. Chilled-water plant
9. Pedestrian bridge
10. Kuhon-ji Buddhist temple
11. Corning Museum of Glass

5th Annual Business Week/Architectural Record Awards

This unique awards program judges entries on the basis of their architectural excellence and the degree to which they advance the owners’ goals. Entries include information on the results realized by each project. The jury is selected by Business Week, RECORD, and AIA (the sponsor) and includes architects, academics, critics, and business leaders. After the jury narrows the entries to about 20, at least one juror visits the sites. For more coverage, see the November 5 issue of Business Week or go to www.architecturalrecord.com.



SAITAMA SUPER ARENA FLEXES MEGA MUSCLES

On the tiny island of Japan, space is extremely precious, as the population pushes 126 million. Designed for multiple programming needs in one inclusive location, the 500,000-square-foot Saitama Super Arena was a welcome arrival in the prefecture of Saitama, Japan, just north of Tokyo. Hosting sports, music, industry, and cultural events, this gathering place is useful to people in the community of all ages and walks of life.

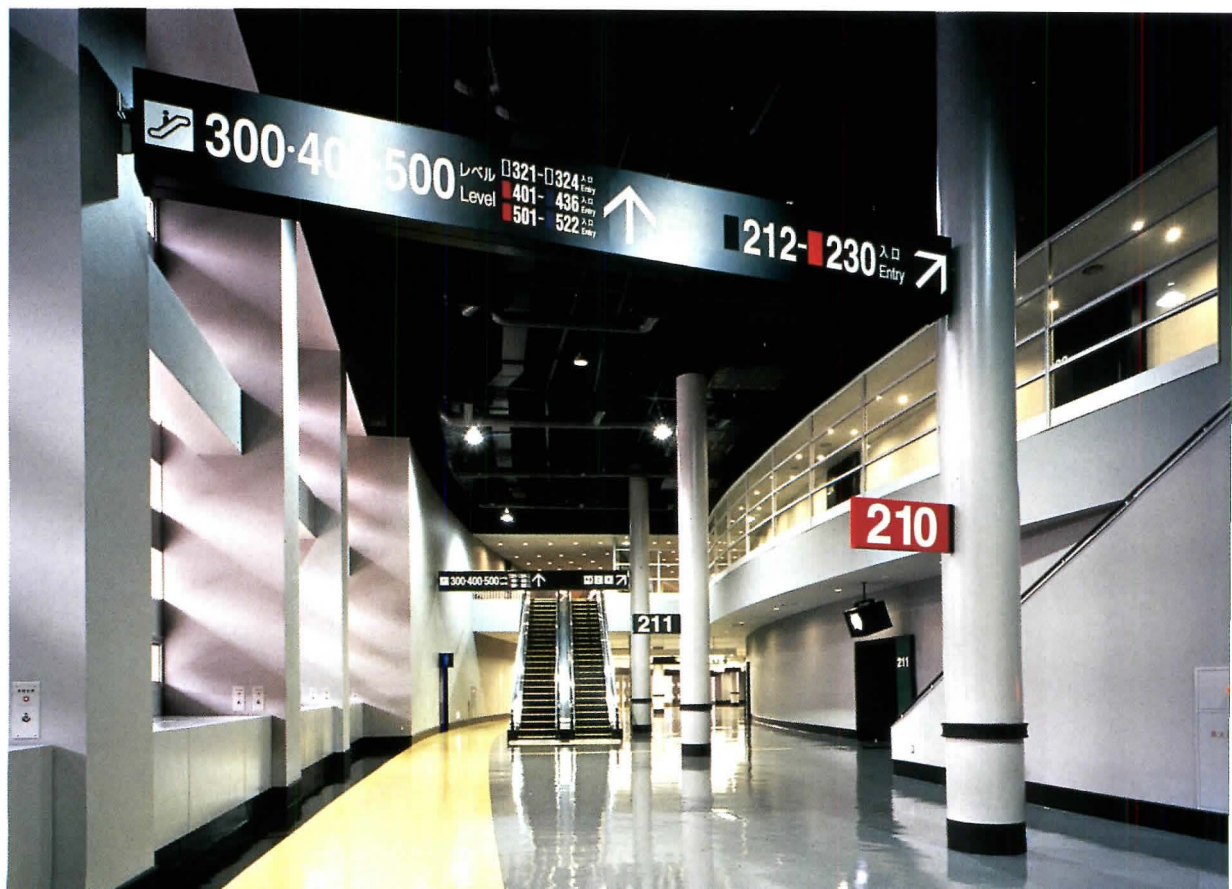
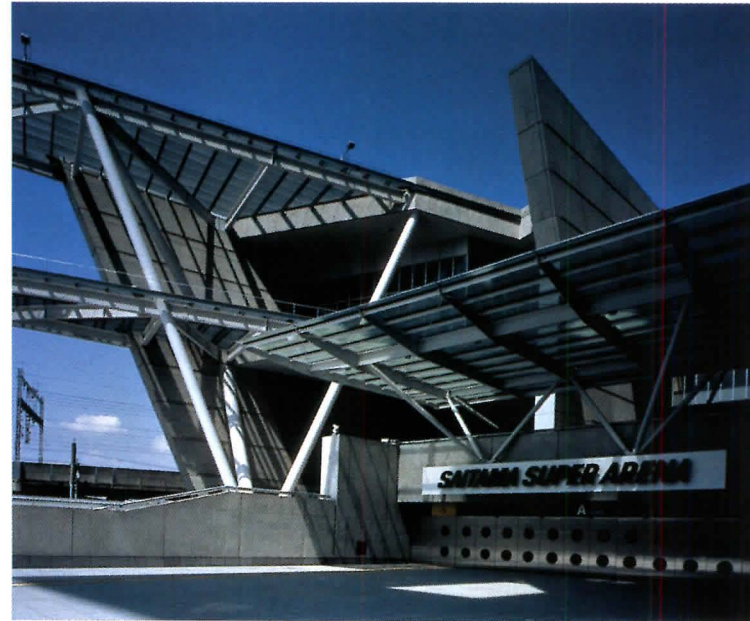
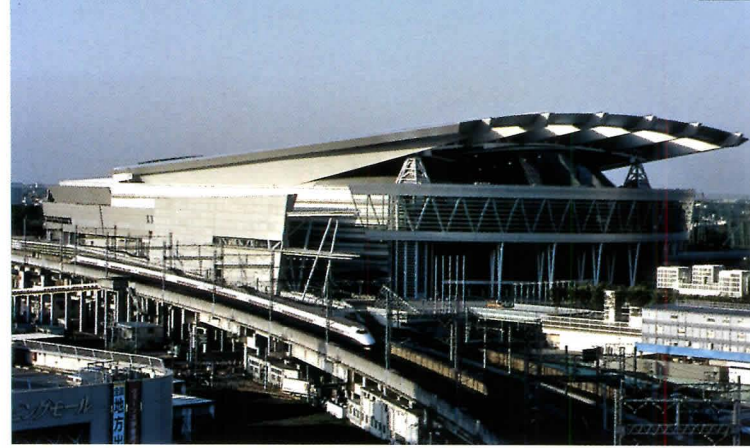
The design team was challenged to create a multifunctional facility that combine three buildings in one. It transforms from 30,000 seats for field games and exhibitions to 20,000 seats for music and sporting events, and provides daily cultural and retail activities simultaneously. The building's design and use of technology have caught the attention of visitors and professionals from around the world. Saitama stretches the limit on flexibility, with walls, ceilings, seats, and floors that move. A block of 9,200 seats along with toilets, concessions, and circulation can be reconfigured in about 20 minutes. The movable-block technology has performed flawlessly from its initial test in early 2000 through the building's first year of operation.

The arena profits from the area's robust industrial activity by utilizing a large exhibition space for trade shows and conventions. "This project was done as a spark plug to ignite interest in the development of this new town. What's sprouting up all around it are new office buildings, government centers, and commerce," says juror Neil Frankel, FAIA.

"We are pleased that this dynamic space has been enabled by the highly successful 'moving block' structure."—TAKAHIRO GUNJI, SAITAMA

PREFECTURAL GOVERNMENT

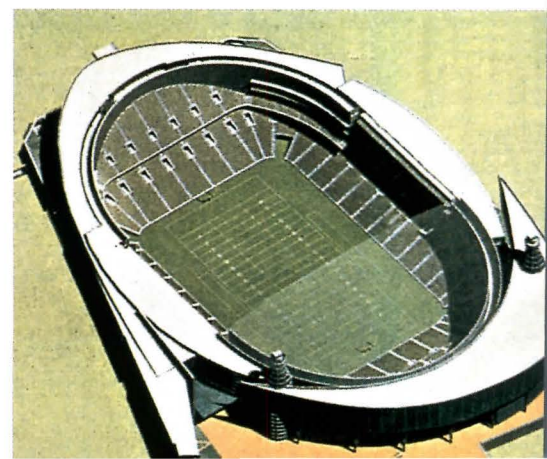
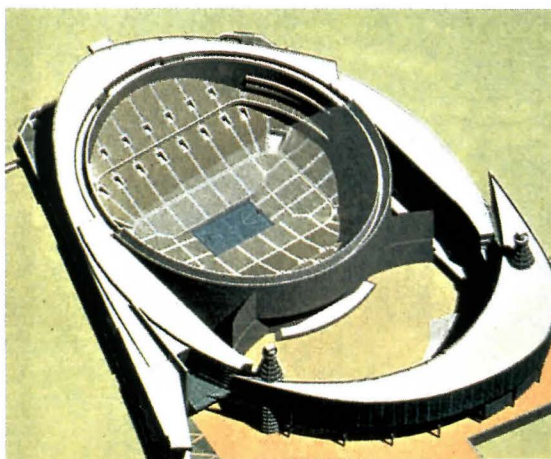
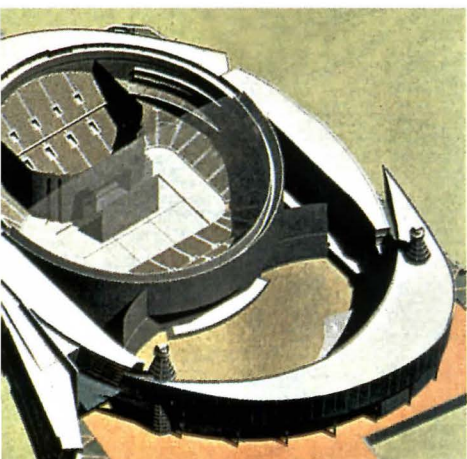
Project: Saitama Super Arena, Saitama, Japan
Architect: Nikken Sekkei (representative of MAS 2000 Design Team)—Mitsuo Nakamura, Takashi Hirai, Tadao Kamei, Yasuyuki Komatsu; in association with Ellerbe Becket—Gordon E. Wood, Dan Meis
Client: Saitama Prefectural Government
Key Players: Flack + Kurtz Consulting Engineers





"THEY HAD THE BUDGET TO MAKE SOMETHING THAT REALLY BREAKS THROUGH ALL THE RULES OF CONSTRUCTION. IT'S LIKE BUILDING A SPACE SHUTTLE."

—CHEE PEARLMAN



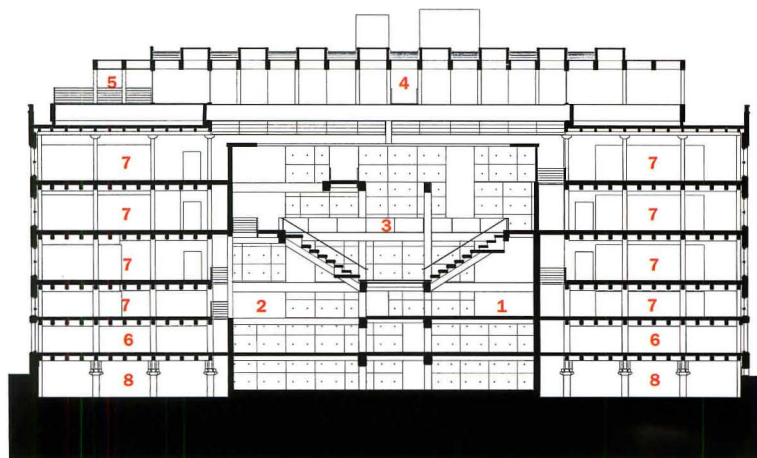
THE ENGINE OF CREATIVITY PERCOLATES AT WIEDEN + KENNEDY

The new global headquarters of this ad agency needed to effect a change—in the mind-set of both its employees and its customers. In its internal organization, it needed to emphasize teamwork and neighborliness, a goal that was accomplished by creating a transparent environment that minimizes staff hierarchy. Its position as a business that influences culture also needed to be strengthened. This was achieved by incorporating spaces for the creative arts. Designed with these aims in mind, the building speaks strongly of new values.

The restored 1914 warehouse in Portland's Pearl District had to accommodate open and creative workspace for 500 employees. The heavy timber building required substantial renovation, repair, and seismic upgrade. The architectural focus became a centralized gathering space, where the entire agency would come together as one with the community. Advanced lighting and audio-visual systems provide an infrastructure that allows artists, and the agency and its clients, to stage all manner of gatherings. Other goals included energy efficiency, resource conservation, and occupant-friendly systems that contribute to an environmental ethic.

The building is a remarkable success, measured by employee satisfaction and the agency's favorable positioning as a creatively led company. Says juror Susan Cantrell, "The building is infused with fresh visions by artists. It has an amphitheater, which it fills up with artists and writers and dancers and performance artists to help inspire the creative people who work there."

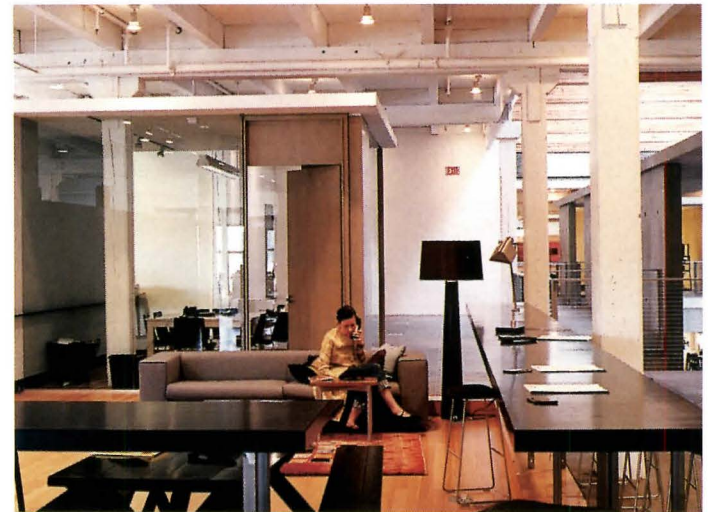
"A great building not only changes your environment, it changes your outlook, your fortunes, your sense of self and community. This is one great building." — DAN WIEDEN, PRESIDENT/CEO



NORTH-SOUTH SECTION

0 20 FT.
6 M.

- 1. Screening room
- 2. Gymnasium
- 3. Auditorium
- 4. Penthouse
- 5. Roof terrace
- 6. Retail
- 7. Office
- 8. Parking





**"TO SEE THE
IMAGERY AND
QUALITY AND
CHARACTER OF
ARCHITECTURE
ADOPTED BY AN AD
AGENCY IS
ACTUALLY REALLY
REFRESHING."
—CHARLES B. ROSE, AIA**

Project: Wieden +
Kennedy Building, Portland,
Oregon
Architect: Allied Works
Architecture, Inc.
Client: Wieden + Kennedy
Key Players: kpff
Consulting Engineers (struc-
tural); Glumac
International (mechanical);
James Graham and
Associates (electrical)



PEOPLE POWER SUCCEEDS AT PHILLIPS

Instead of just building a factory for its custom-molding division, Phillips Plastics created a manufacturing facility that “sustains and enhances” a corporate culture in which “all people are important,” states the company. The 60,000-square-foot building, set on a wooded site overlooking the confluence of the Elk River and Elk Lake in rural Wisconsin, treats blue-collar and white-collar employees as equals [JUNE 2001, page 112]. Although an acoustic-glass wall separates the factory floor from offices, visual contact between the two areas encourages a sense of working together. Views outdoors, plenty of daylight, and handsome materials are distributed throughout the facility. Even the massing of the building encourages a spirit of teamwork, with intersecting glass-and-stone blocks dissolving any distinction between production and administration.

The heart of the building—a 220-foot-long-by-130-foot-wide manufacturing shed—combines two overhead gantry cranes and three service trenches to create an uncluttered and flexible factory. While the design team brought as much daylight as possible to work areas, it controlled light quality with shading overhangs, fritted glass, and native plantings. Such strategies reduced glare in work areas and energy consumption throughout the building. Juror Neil Frankel, FAIA, observes, “One can imagine Phillips bringing customers to this facility, knowing that the precision and culture of the company are revealed in the building.”

“This project is the result of a 37-year effort to enhance the ability of people to work together effectively.” —ROBERT F. CERVENKA, PHILLIPS PLASTICS CHAIRMAN OF THE BOARD



Project: Phillips Plastics Custom Molding Facility, Phillips, WI

Architect: Krueck and Sexton Architects; Doug Haas, O.J. Boldt Construction (architect of record); Rick Fischer, AIA (associate architect)

Client: Phillips Plastics
Key Players: Larson Engineering of Wisconsin (structural)

“IN PHILLIPS’S BUSINESS, YOU WOULDN’T HAVE A SHOWROOM. THIS BUILDING IS THE SHOWROOM AND IT SPEAKS FOR THE COMPANY.”

—TERENCE RILEY

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Kiewit Construction Company
General Contractor

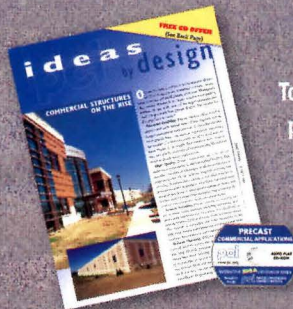
When Level 3 needs to grow, speed rules.

The global communications/information services company wanted a world headquarters near Denver and they needed it fast. Starting with 50 employees during their design phase, they exploded into 3,000 employees by the time the project was complete – a four-building campus of 850,000 square feet in 20 months.

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ARCHITECTURE SPEAKS QUIETLY AT DULWICH PICTURE GALLERY

It is a trick that few architects know—how to insert into existing buildings modern additions that do not overstate the purpose they serve. Founded in 1811, the Dulwich Picture Gallery, England's oldest built-for-art gallery and a masterpiece of architecture, needed such treatment. Rick Mathers Architect succeeds in getting out of the way to allow this historic gem, designed by one of England's most famous architects, Sir John Soane, to speak its mind. Damaged in World War II, the building needed a complete systems and technical overhaul. The new addition offers the necessary visitor amenities, including a 60-person café and a multipurpose room for education, while respecting the original setting of the gallery. The complex forms a cloister that defines a formal quadrangle facing a garden, which the café opens out to and which serves as a link to the main gallery.

Although there is little visual evidence of change, the existing gallery has been entirely refurbished with modern computer-controlled variable daylighting through the roof lights, new lighting to replace the fluorescent fixtures, and concealed black-out blinds. This has brought the lighting control for the displayed pictures within modern conservation standards.

"Doubling attendance and creating an income stream that supports the museum, as well as involving the local community in programs that occur at the museum, are noteworthy signs of success," says juror Robert Walston.

"The visitor amenities provided in the addition are housed in the most elegant and useful of modern buildings." — KATE KNOWLES, HEAD OF PRESS AND MARKETING



Project: Dulwich Picture Gallery, London, England

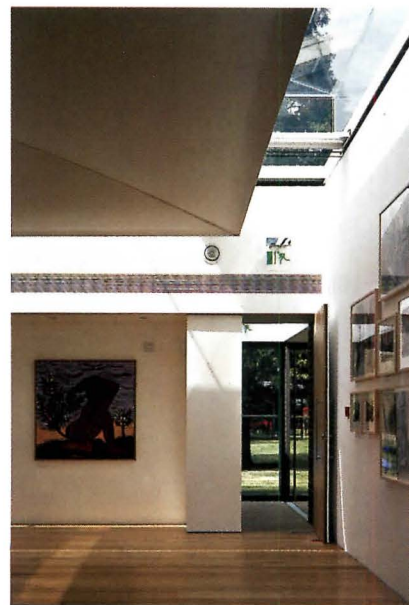
Architect: Rick Mather Architects—Rick Mather, Douglas McIntosh, Neil Bennett, Matthew McGrory, Chris Wood

Client: Dulwich Picture Gallery

Key Players: Dewhurst Macfarlane and Partners (engineers); Phoenix Large /Light Matters (lighting)

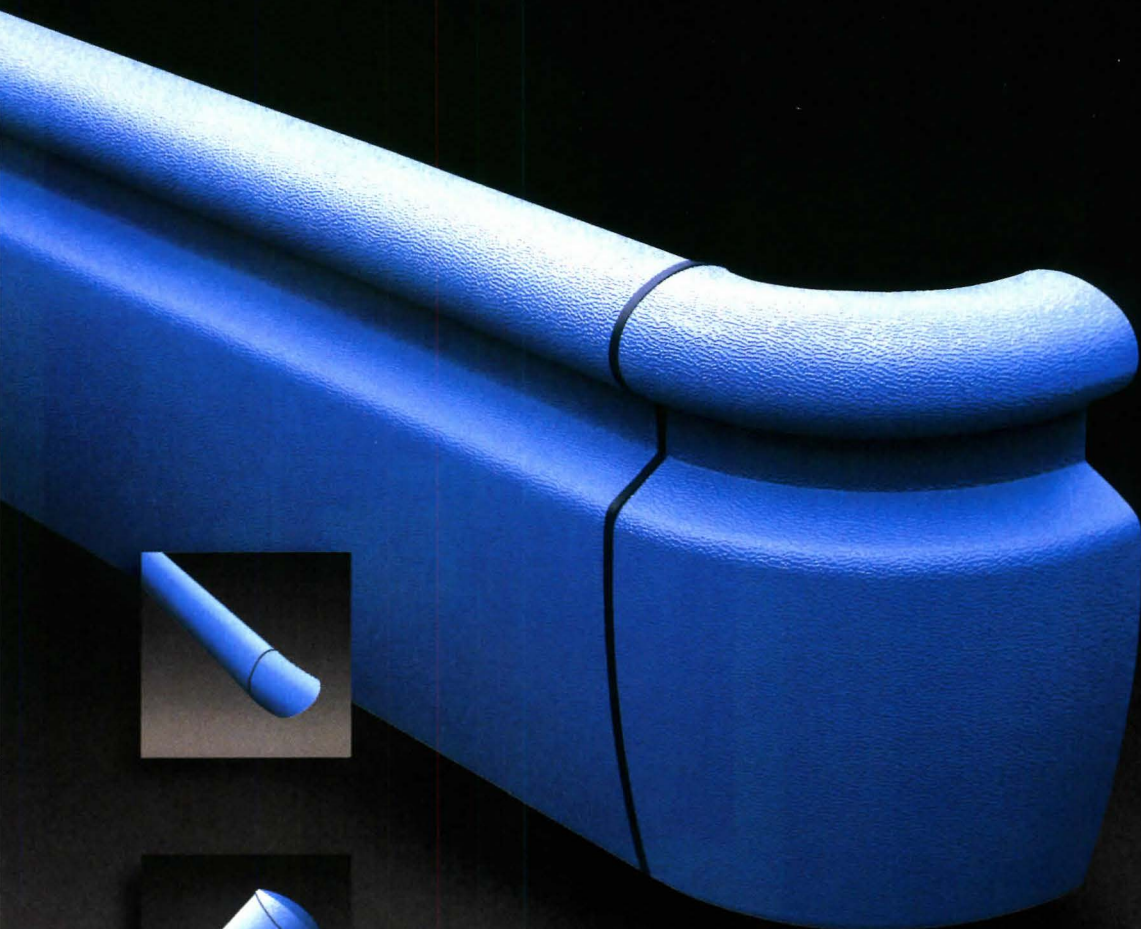
"THE ARCHITECT WAS IN TOUCH WITH THE CORE VALUES OF HIS CRAFT. HE KNEW THE SOANE BUILDING WAS A NEAR PERFECT GEM, AND THE SOLUTION WAS NOT MORE ARCHITECTURE."

—TERENCE RILEY





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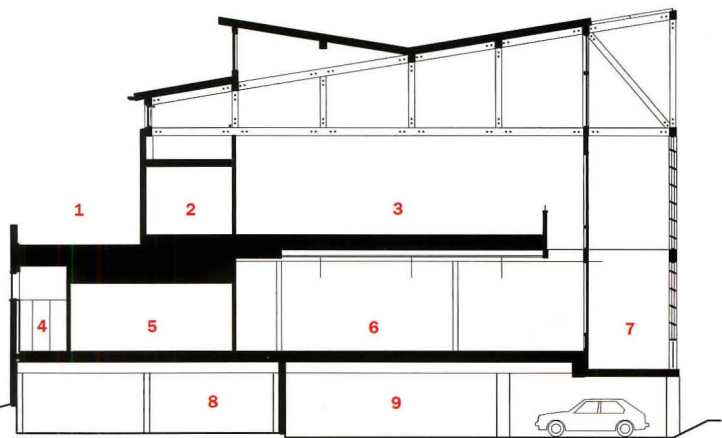
In designing a new headquarters for the largest nonprofit regional environmental organization in the U.S., Smith Group created an icon for sustainability. The Chesapeake Bay Foundation headquarters, the Merrill Environmental Center, a building with a number of environmentally “green” features, embodies the culture of the organization and is the only building to have received a platinum rating from the U.S. Green Building Council’s Leadership in Energy Efficient and Environmental Design program.

The 32,000-square-foot office building, located on 31 acres near the shore of the Chesapeake Bay in Maryland, includes solar panels, natural ventilation, a geothermal heat pump with a desiccant dehumidification system, and roof and wall enclosures of Structurally Insulated Panels. Clad in galvanized siding made from cans, cars, and other recycled metal objects, Smith Group designed the building to use 10 percent of the potable water and 70 percent less energy than a typical office building. All wood was from renewable sources. A number of technologies are brought together in one building—a demonstration building of sorts for green technology.

The Chesapeake Bay Foundation headquarters raised crucial questions for the jury beyond simple aesthetics and matching building program with business mission: Does green design necessarily mean good design? And is green design necessarily good for business?

“It has been a magnet for the audiences whose building projects we want to influence.”

— MARY TOD WINCHESTER, CHESAPEAKE BAY FOUNDATION VP



NORTH-SOUTH SECTION

0 10 FT.
3 M.

- | | | |
|----------------|----------------|--------------------|
| 1. Cistern | 4. Locker room | 7. Deck |
| 2. Restroom | 5. Restroom | 8. Mechanical room |
| 3. Open office | 6. Open office | 9. Parking |





Project: *The Philip Merrill Environmental Center, Annapolis, Maryland*

Architect: *Smith Group—Thomas Eichbaum, FAIA, Robert M. Anderson, AIA, Donna McIntire, Greg Mella, AIA*

Client: *Chesapeake Bay Foundation*

Key Players: *Smith Group (MEP); Shemro Engineering (structural); Greenman-Pederson, Inc.*

"THE CHESAPEAKE BAY FOUNDATION IS DOING EVERYTHING IT CAN TO HAVE A SELF-SUFFICIENT BUILDING THAT DOES NOT DETRACT FROM ECOLOGY."

— MARK WALSH

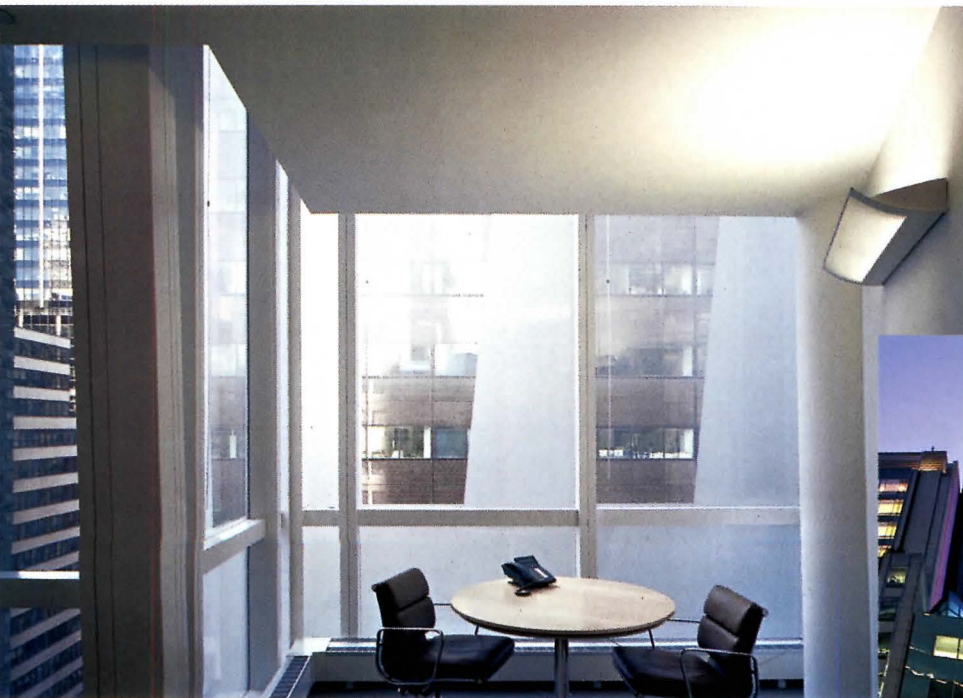
LVMH TOWER OFFERS A NEW SLANT ON NEW YORK CITY ZONING RULES

For its new American headquarters, the international luxury goods conglomerate LVMH Mœt Hennessey Louis Vuitton wanted a design that would stand out from the throng of tall corporate towers and glossy shops of midtown Manhattan. The company got its wishes by going to the French architect, Christian de Portzamparc. The Pritzker-Prize winner came up with a slim, 60-foot-wide, 24-story tower with a multifaceted glazed facade of folded and chiseled wedgelike planes that inventively responds to New York City's zoning regulations. De Portzamparc followed the rules calling for setbacks according to a sky-exposure plane, yet literally gave them a new slant.

Working with the Hillier Group and curtain wall consultant Robert Heintges, de Portzamparc devised an architectonic facade that features three types of glass—clear glass; green glass with ceramic frit; and a white, low-iron glass with a sandblasted geometric pattern. Most of the office floors of the 112,167 square-foot, steel-framed structure are a perfunctory 3,000 to 5,000 square feet in size, with 12-foot, floor-to-floor heights. Topping the building, however, is a spectacular glass cube, where a 30-foot-high penthouse has been fitted out for receptions.

LVMH believes the volumetric skin is a refined, dynamic image for the company. The response from the public and press has made the investment—estimated at about \$40 million—worth it. [see MARCH 2000, page 99].

“True, the building cost more than simple offices, but the creative gesture is also a major investment.” —LVMH MÔET HENNESSEY LOUIS VUITTON



Project: LVMH Tower,
New York City
Architect: Atelier
Christian de Portzamparc,
architect—Christian de
Portzamparc, Bruno Durbeq,
Wilfrid Bellecour; Hillier

Group (architect of record)
Client: LVMH
Key Players: Peter
Marino (interiors);
Weiskopf and Pickworth
(engineer); Ove Arup and
Partners (structural)



“THIS TOWER HAS DONE MORE THAN WAS INTENDED— THAT IS, TO IMPROVE THE CULTURE OF BUILDING IN NEW YORK. IT HAS RAISED THE EXPECTATIONS ABOUT WHAT ARCHITECTURE CAN DO.”—TERENCE RILEY

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CIRCLE 52 ON INQUIRY CARD

EVOLVING SPACES: SAP GLOBAL MARKETING HEADQUARTERS

Last summer, SAP, the world's third largest software company, decided to move its marketing headquarters from a corporate headquarters in Walldorf, Germany, to New York's Greenwich Village. Selecting a historic printing building at the edge of lower Manhattan's former dot-com haven known as Silicon Alley, the firm sought to establish an intimate yet dynamic work environment at the core of its operations.

Using movable walls, flexible partitions, and convertible furniture, the architects created a continually evolving space to cater to the office's broad spectrum of needs. A central plaza at the heart of the office can accommodate a variety of marketing and media events, while intermediate workspaces defined by frosted glass and slatted partitions radiate outward. Rotating cylindrical desks and plug-and-play devices similarly allow employees to reconfigure the space according to their individual preferences and needs.

The flexible working areas were an immediate success. Having the ability to easily move walls and lower screens means the employees can transform an ordinary office into a kinetic marketing environment, with the space itself an integral working tool. SAP has already decided to expand its operations to another floor, and HLW is now in the process of designing the expansion.

"If we are really going to have a marketing culture, you have to have the environment for it."—MARTIN HOMLISH, EXECUTIVE VICE PRESIDENT/
CHIEF MARKETING OFFICER



Project: SAP Global Marketing Headquarters
Architect: HLW International—Susan L. Boyle, AIA; Vivian Chavez, AIA; Nicholas Rumanes
Client: SAP Global Marketing, Inc.
Key Players: Basma Basilius; Isaac Vanunu, (electrical engineer); Frank Andrade (plumbing); Tim Schenck, Krystyna Walter (HVAC)

"THE FACILITIES ARE FASCINATING. A PERSON HAS THE ABILITY TO TRANSFORM THE LAYOUT OF THE WORKSTATION IN TERMS OF WHERE THEY ARE FACING, FROM INDIVIDUAL WORK TO TEAMWORK."

—GARY HANEY, AIA



A WARM WELCOME FROM THE UNIVERSITY'S CHILLED-WATER PLANT

A two-block-long chiller plant is not a self-evident way to say, "Welcome to the University of Pennsylvania!" But in the hands of architects Leers Weinzapfel, the plant has become an elegant urban gateway for an increasingly busy side of the campus. The university recognized that a new chiller facility could more reliably and economically serve its growing medical and research complex, but also saw that the best site for it was too prominent for such a large, utilitarian structure to be built undisguised. The architect won a competition for the structure, sponsored by Penn, with the deceptively simple strategy of wrapping the plant in an oblong scrim of perforated, corrugated metal panels. A running track encircling the enclosure and a baseball field to one side restored athletic fields displaced by the plant.

By day, depending on the angle of the sun, the plant appears in ghostlike profile behind the screen and its web of supporting steel—or it can disappear, except for its rooftop chillers, behind what looks like a shadow-dappled solid wall. At night, fixtures ringing the top of the enclosure project a halo of light, under which the structure's brightly colored pipes and tanks are visible.

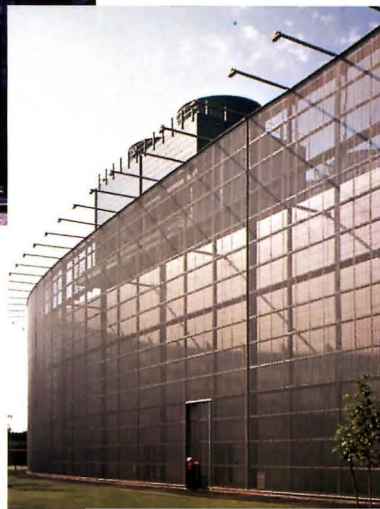
While the University appreciates this aesthetic chameleon of a gateway, it also enjoys the plant's 40 percent lower energy usage and the ease with which its current 20,000-ton cooling capacity can be more than doubled.

"For coming generations, the plant will introduce students and visitors to the institution."

— OMAR BLAIK, VICE PRESIDENT FOR FACILITIES SERVICES



Project: Modular VII
Chiller Plant, Philadelphia
Architect: Leers Weinzapfel
Architects—Jane Weinzapfel,
FAIA, Andrea P. Leers, FAIA,
Joe Raia, AIA
Client: University of
Pennsylvania, Philadelphia
Key Players: William J.
Trefz Consulting Engineers
(mechanical/electrical engi-
neering); Keast and Hood
(structural engineer)



"THE ARCHITECT AND CLIENT GAMBLER THAT THEY COULD MAKE SOMETHING YOU REMEMBER EACH TIME YOU ENTER PHILLY—AND THEY SUCCEEDED."

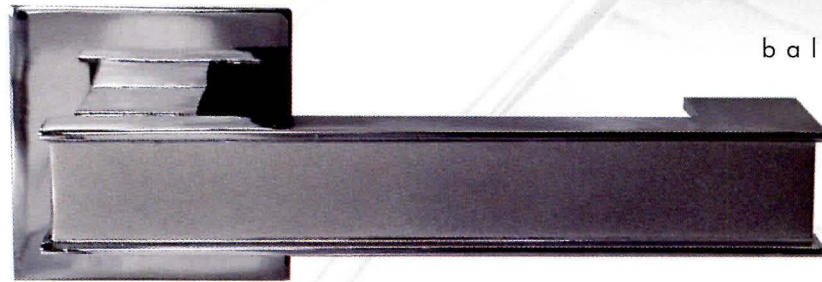
— MARK WALSH

Get a grip on our new levers.

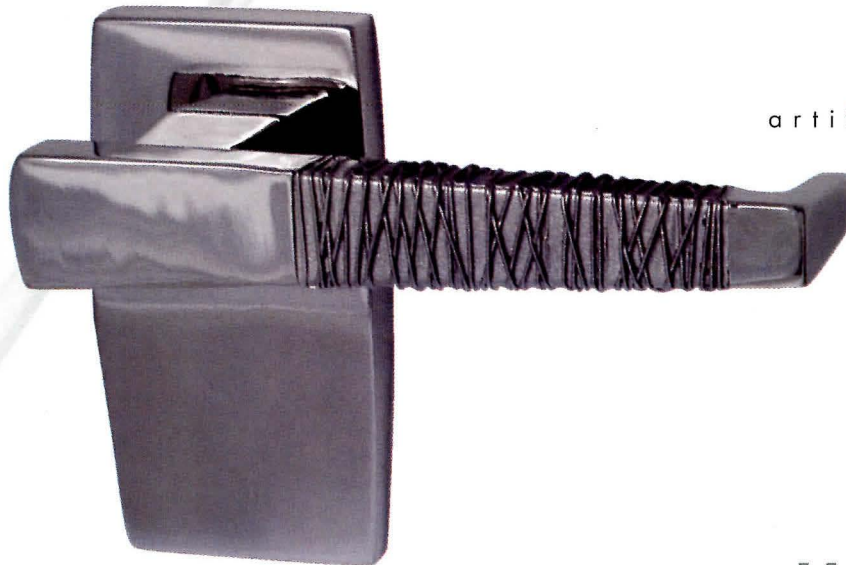
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WELCOMING BRIDGE BOOSTS SAFETY

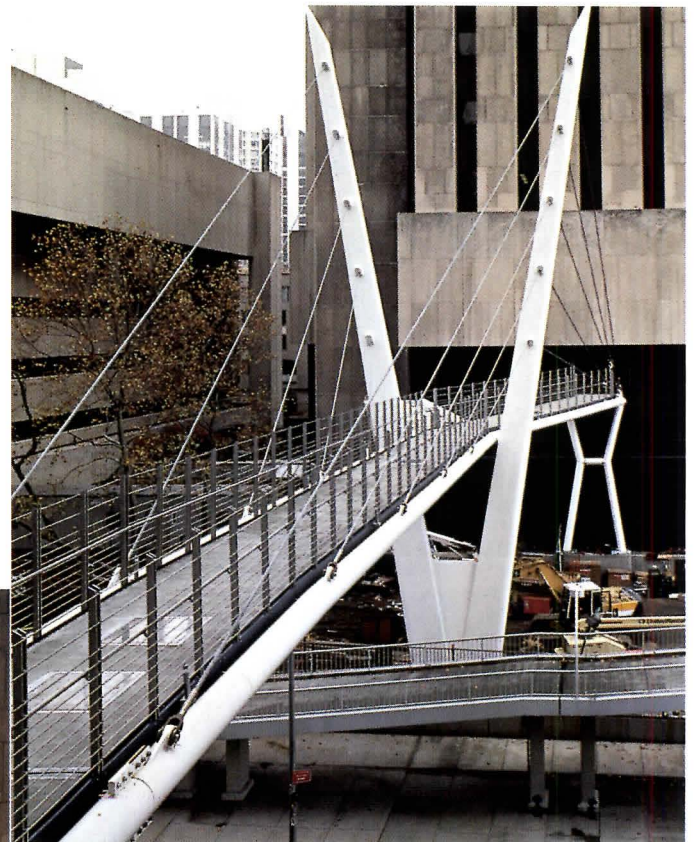
After a series of accidents injured residents of a high-rise apartment building serving Rockefeller University in New York City, officials recognized that they needed a bridge to get residents over the traffic swarming on and off a highway that separated the building from the campus.

Wendy Evans Josephs, in getting acquainted with the university president emeritus Torsten Wiesel, learned that he had rejected a bridge design that circled a neighboring building, making it too costly to build. She sketched a cable-stayed alternative, suspending the bridge deck from a single pier and mast, which avoided disrupting traffic during construction and relocating a maze of underground utilities. It didn't rely on the adjacent buildings for support—they didn't have the capacity. She submitted her idea unsolicited. Urged to develop it, she and joint venture partner Weidlinger Associates, structural engineers, eventually built it for one fourth the rejected design's estimate.

From the apartments, Josephs routed the new pedestrian path through a laboratory building, linking it to a reworked plaza and entrance to another long-neglected complex of lab buildings. The rails and bridge deck were slimmed to keep vistas to the East River unblocked, and campus steam lines and utilities were extended under the walking deck, freeing the apartment building of costly vendor-supplied heat. The utility savings alone will pay for the cost of the bridge in just a few years. No one has to dodge cars and trash bins to enter the campus anymore. The elegance of the bridge and campus entrance now aids recruitment.

“The pedestrian bridge forges a link between the campus and housing, providing a safe passage for all.” —TORSTEN WIESEL, PRESIDENT EMERITUS

Project: *The Campus Community Bridge in honor of Torsten Wiesel, New York City*
Architect: *Wendy Evans Joseph, AIA (principal-in-charge); Robert Furno, AIA (project architect); Peter Cody; Stas K. Zakrzewski*
Client: *The Rockefeller University*
Key Players: *Weidlinger Associates, Inc. (engineers)*



“THIS SOLUTION IS SO ELEGANT AND EFFECTIVE THAT IT'S HARD TO IMAGINE HOW THE UNIVERSITY FUNCTIONED BEFORE THIS BRIDGE WAS BUILT.”

—GARY HANEY, AIA

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Design by Alan Newell

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CIRCLE 53 ON INQUIRY CARD

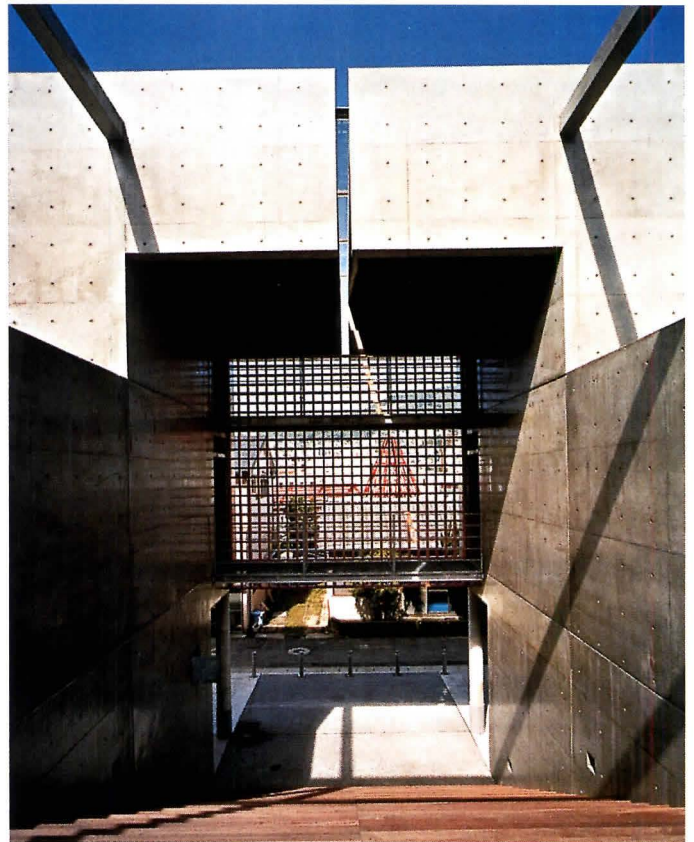
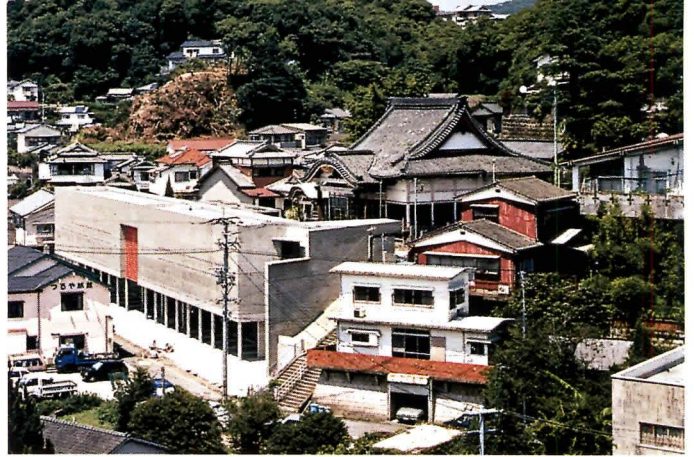
SERENE STABILITY: KUHONJI BUDDHIST TEMPLE GATE AND OSSUARY

The Kuhonji Temple in Nagasaki, Japan, had a problematic site. Its ossuary (a funerary vault central to Japanese ancestor worship) had been built on sloping, shored-up land that was deteriorating. The local authority called for its demolition. A special committee of the priests and members of the temple's Jodo sect decided on another scheme: to build a new and larger ossuary that would form a retaining wall for the site. By building a 3,000-square-foot structure, the group was able to expand the ossuary from 100 to 400 tombs, thus making a profit through the sale of additional tombs. Since the existing temple had no traditional gate, the new plan also includes one, with a central stair bisecting the new complex, and parking slots provided at the bottom. Sacred ponds behind the ossuary are traversed by a glass bridge that leads to the temple at the top of the site.

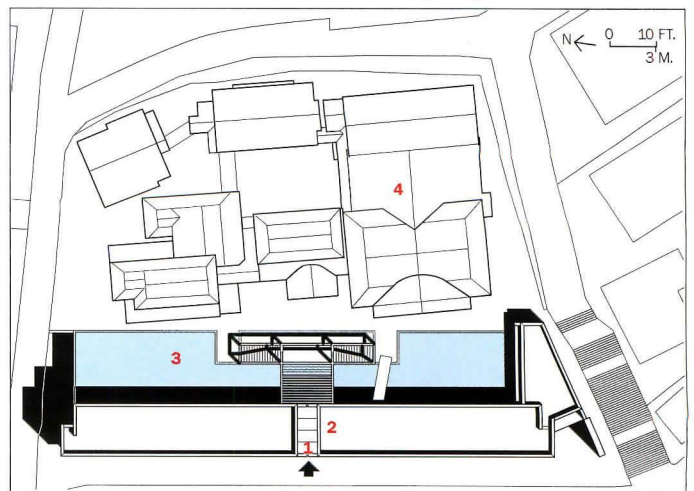
The crisply detailed, poured-in-place concrete structure, designed by Furuichi and Associates of Tokyo, not only solved the problem, but proved to be an economic success. It also generated new interest in the temple from the neighborhood. As juror Gary Haney, AIA, noted, "It is a wonderful story about how a simple architectural solution has stabilized a decaying building—and a religious group." Another juror, Chee Pearlman, commended the solution for being executed with such elegance: "We have seen an architect come in and really make this building an extension of a belief system."

"Buddhist temples were considered old-fashioned; now with this new ossuary the local people are showing more interest."

—YOJYU USHIDA, JODO PRIEST



1. Entrance to the temple gate
2. Ossuary
3. Shinsui-ike (sacred pond)
4. Existing temple



Project: *Kuhonji Buddhist Temple Gate and Ossuary, Sasebo, Nagasaki, Japan*

Architect: *Furuichi and Associates—Tetsuo Furuichi (principal); Tomo House, Inc. (associate architect)*

Client: *Kuhonji Buddhist Temple*

Key Players: *Umezawa (structural engineer); Kojima (electrical engineer); Kurosaki (mechanical engineer); Takenaka Corporation (general contractor)*

"THE PROJECT IS QUITE CLEVER IN ITS SECTIONAL DEVELOPMENT AND ITS PLANNING. WITH VERY FEW MINIMALIST MOVES, IT TELLS A GREAT STORY."

—CHARLES B. ROSE, AIA

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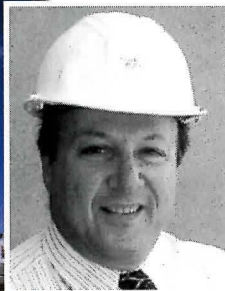


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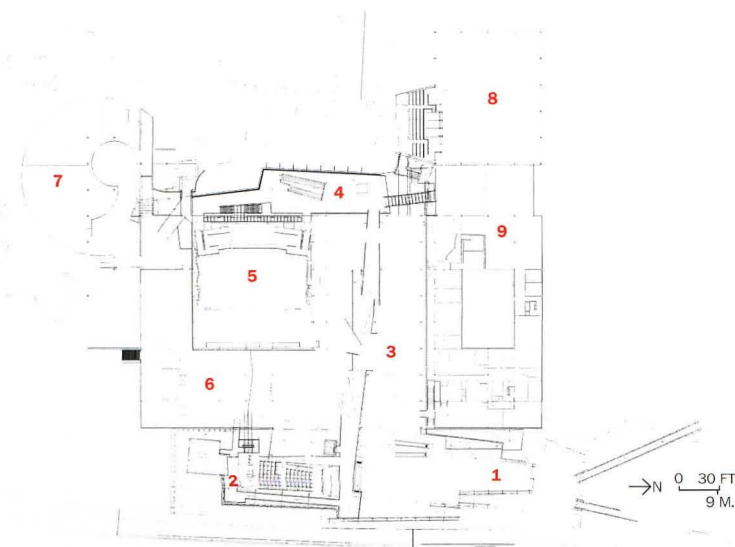
CIRCLE 54 ON INQUIRY CARD

CORNING GIVES THE GIFT OF TRANSPARENCY

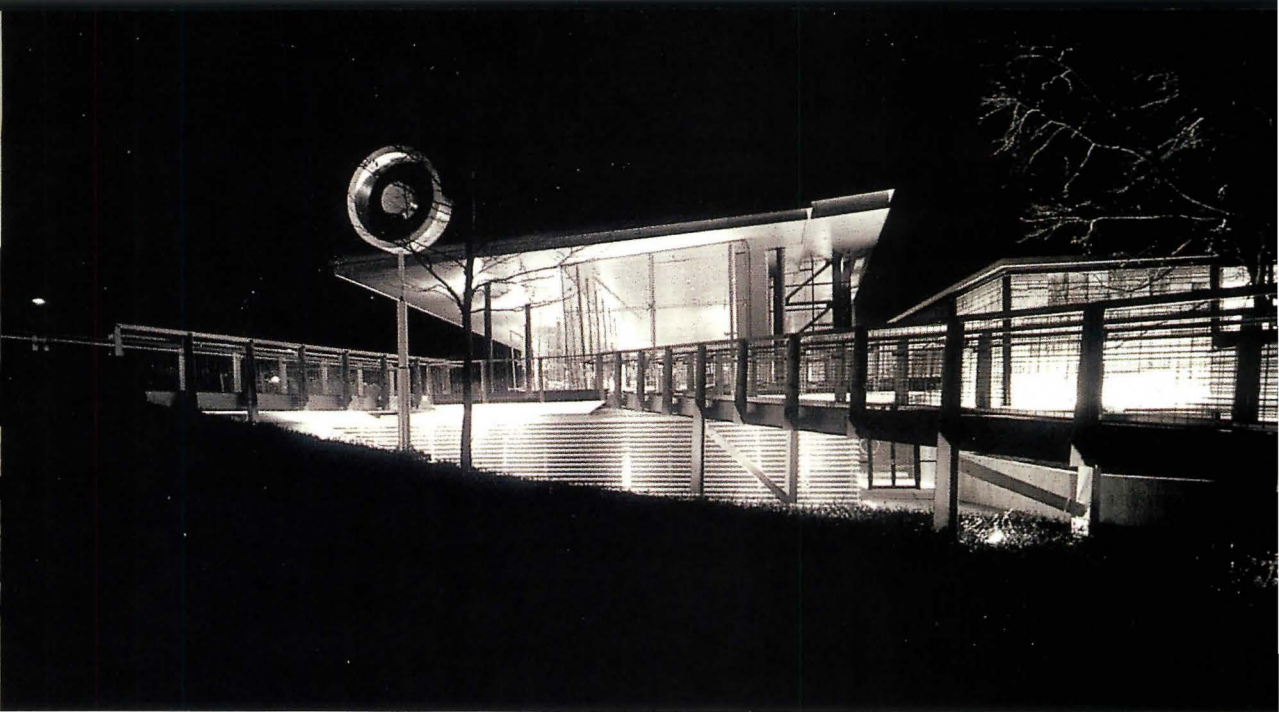
Much like the first glass center at the 1939 World's Fair, the original Corning glass museum, built by the architect Wallace Harrison in 1951, showcased the science and art of glass and served as a beacon for culture in the town of Corning, New York, and the region altogether. It was fitting that part of the scope of this five-year, multidimensional renovation and addition executed by Smith-Miller + Hawkinson was a performing arts space for the entire community. In addition, the firm renovated the Corning Glass Center, including the Stueben glass-blowing factory; refurbished the original glass museum; and added a new entrance pavilion called the Orientation Center, with its 80-person theater displaying the art and history of glass. This subtle recombination of disparate elements ties together the historical iconography of the original buildings with new insertions to create a full-service cultural and educational facility. Visitorship, which had been turning downward for a number of years, has been going back up at the significant rate of 8 percent annually.

Showcasing glass was tricky because the material is so much a part of the infrastructure. The architect orchestrated a dynamic sequence of glass exhibits for the visitor to pass through and engage in that is full of surprises. In the words of juror Chee Pearlman, "that's the thing that's so magical about this place—there's no small metaphor for the use of the shimmering, glowing, alive material of glass to make this a welcoming place."

"Like glass, the building reveals itself over time, retaining a sense of discovery. I feel this will be a new and surprising building for a long time to come." —ROB CASSETTI, MARKETING DIRECTOR



- | | |
|----------------------------|--------------------------|
| 1. Entrance/lobby | 5. Auditorium |
| 2. Theater | 6. Sculpture gallery |
| 3. Glass innovation center | 7. Collections gallery |
| 4. West bridge | 8. Stueben glass factory |
| | 9. Offices |



Project: *Corning Museum of Glass, Ithaca, New York*
Architect: *Smith-Miller + Hawkinson Architects—Henry Smith-Miller, Laurie Hawkinson, Ingalill Wahlroos*
Client: *Corning, Inc.*
Key Players: *Ove Arup and Partners (engineers); Ralph Appelbaum (exhibition design); Welliver McGuire (general contractor)*

“WEAVING TOGETHER THE HISTORICAL ICONOGRAPHY OF THE EXISTING BUILDINGS WITH THE NEW DESIGN IS SO SUCCESSFUL THAT IT’S TRANSPARENCY ITSELF.”

—GARY HANEY, AIA

Eight finalist's projects buzz with creativity

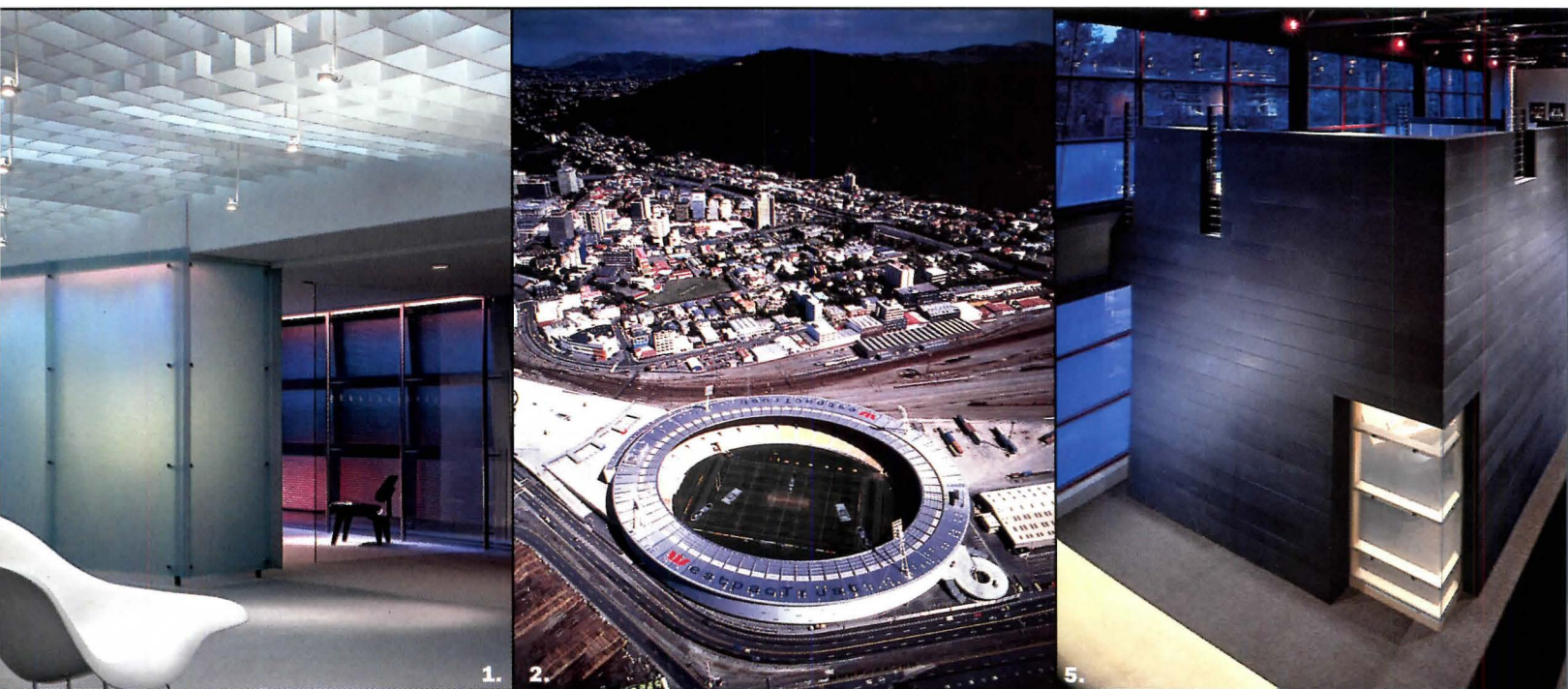
GOOD DESIGN CONTRIBUTES NOT ONLY TO THE BOTTOM LINE BUT TO THE POETRY THAT UNDERLIES SUCCESS

By Jane F. Kolley

The finalists for the Business Week/Architectural Record Awards program demonstrate the variety of goals that institutions and their buildings can reach together. Defining such goals is not so simple. It can involve determining how a company appears to the public, how contented its employees are with their work environment, and how a business demonstrates its commitment to values.

While these eight projects were not included among the final 11, they all demonstrate not only highly successful architecture but also exemplary values. The word "business" here connotes a broader, more generalized definition than is usual. It might mean the business of religion, education, or government. It's nice that such diverse aspects of society have joined the ranks of corporate America in appreciation of the importance of success.

Architecture can be celebrated as an expression of a principle, as in the case of the U.S. Courthouse and Federal Building in Islip, New York. The



building's open plaza suggests that judicial process is accessible to all; its formality expresses the stateliness of the justice system, and its tower rises like a noble beacon of authority.

The adaptive reuse of Pittsburgh's Allegheny County Jail, a historic landmark, seeks similar goals through humanizing a decaying building that begged to be saved, but lacked the resources. A design/build/lease arrangement unified seemingly disparate goals resulting in this sensitive preservation. The client, developer, and architect for the Lincoln Street Garage chose to stay downtown and reuse an existing commonplace building located along a vehicular artery through Boston.

The relationship between employer and employees has frequently been winnowed down to nothing more than a paycheck. Not so among the companies featured here, who show a remarkable commitment to attracting good workers by providing an environment that enhances well-being. At

TBWA/Chiat/Day in Los Angeles a warehouse is transformed into a creative advertising city, with themed areas of activity on either side of "main street." At Hansen Construction Office, Aspen, Colo., the gentle touch of Harry Teague transforms offices to showcase the firm's product—the execution of design itself. The Herman Miller showroom serves as the flagship selling space for its well-known furniture, finessing the firm's core values of innovation and beauty.

The minimalist aesthetic of the Helmut Lang Perfumerie in New York City drives home the message of haute couture through an old-world apothecary theme. Lastly, the Westpac Trust Stadium in Wellington City, New Zealand, represents the innovative trend of providing multiple uses in one flexible space, maximizing land use, satisfying a multiconstituency client, and providing revenue to finance the entertainment venue. These gifts of good architecture set a new standard of excellence from which good business can build. ■



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AND THE FINALISTS ARE...

1. **Herman Miller National Showroom**, Chicago
Krueck & Sexton Architects
2. **Westpac Trust Stadium**, Wellington, New Zealand
HOK Sport
3. **TBWA/Chiat/Day**, Los Angeles
Clive Wilkinson Architects
4. **Adaptive Reuse of Allegheny County Jail**, Pittsburgh
IKM, Inc.
5. **Hansen Construction Office**, Aspen, Colo.
Harry Teague Architects
6. **Helmut Lang Perfumerie**, New York City
Gluckman Mayner Architects
7. **Lincoln Street Garage**, Boston
Brian Healy Architects
8. **U.S. Courthouse & Federal Building**, Central Islip, N.Y.
Richard Meier and Partners/The Spector Group

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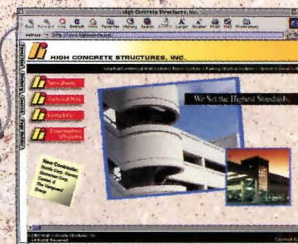
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CIRCLE 58 ON INQUIRY CARD

Behind the discreet facade of **DG BANK**, in the symbolic center of Berlin, **Frank Gehry** takes corporate architecture someplace it's never been



DG Bank's sculptured roof (right) and giant facade openings (about 10 feet wide and up to 15 feet high, below) reflect the scale of the Brandenburg Gate nearby.



PHOTOGRAPHY: © ROLAND HALBE (LEFT); WALTRAUD KRASE (TOP)

By James S. Russell, AIA

Only the aficionado would recognize the facade of Pariser Platz Number 3 as the work of today's master of architecture-as-sculpture, Frank O. Gehry, FAIA. The exterior only hints at the presence of an object within that is astonishing, menacing, and captivating all at once. Gehry calls the object a "horse's head." DG Bank, the Frankfurt-based financial-services company that built the building, prefers to call it a conference center.

The object (pages 126–127) is just a meeting room in the heart of the building, but its power cannot be denied. Is this a snarling snout that confronts us as we approach it? Is that a single, staring eye off to the left or a bit of fabric torn by a wind gust? As the visitor moves around the object, a glazed slit becomes visible, like the hinge between jaw and skull. Somehow, a few dozen metal panels has become feral, suggesting a mammalian form frozen as it struggles against the tight confines of its enclosure.

This is the Gehry aesthetic in its most psychologically naked form. And yet this object could not wield its emotive power over us without the neutral, arcaded, Douglas fir-paneled atrium that grasps it so tightly or the child's-block simplicity of the stone-clad exterior.

For this stunning contrast between object and container, Gehry must thank the rigid, highly prescriptive urban-design and zoning requirements that applied to the site. There were so many rules because Pariser Platz is, as Gehry calls it, "the Holy of Holies," the setting for the symbol of reunited Berlin: the 1788 Brandenburg Gate that encloses the Platz on the west. The square found itself in an East-West no-man's-land during the divided-city era, and most of its war-blasted ruins were bulldozed. The rules are intended to restore a polite dignity to the reconstructed buildings around the square and defer to the Gate. Even though prestigious buildings (including ones for the French and American embassies) are in various stages of planning, construction, or

Project: DG Bank, Berlin, Germany
Architect: Gehry Partners Architects—Frank O. Gehry, FAIA, design principal; Randy Jefferson, project principal; Craig Webb, project designer; Marc Salette, Tensho Takemori, Laurence Tighe, Eva Sobesky, George Metzger, Jim Dayton, John Goldsmith, Jorg Ruegamer, Scott

Uriu, Jeff Guga, Michael Jobs, Kirk Blaschke, Nida Chesonis, Tom Cody, Leigh Jerrard, Tadao Shimizu, Rick Smith, Bruce Shepard, project team
Engineers: Ingenieur Buro Muller Marl (structural); Schlaich, Bergermann und Partner (skylights and interior glass system)
Contractor: Muller Altvatter

Although rules intended to recreate a historical context applied to the south facade (below), Gehry was allowed a looser interpretation in the gentle curve of the wall and the projecting apartment windows.



completion on other sites around the square, the rules intentionally preclude the sculpturally individualistic object buildings that Gehry and other of today's prominent practitioners are famous (and notorious) for.

Regulations governed height, mandated a mix of housing and office uses, and demanded daylight access for every office. Gehry didn't fight the rules. ("I never would have done a Bilbao on such a site," he says—even if there had been no restrictions.) But he built an aesthetic strategy around

"I WOULD NEVER HAVE DONE A BILBAO ON SUCH A SITE." —FRANK O. GEHRY

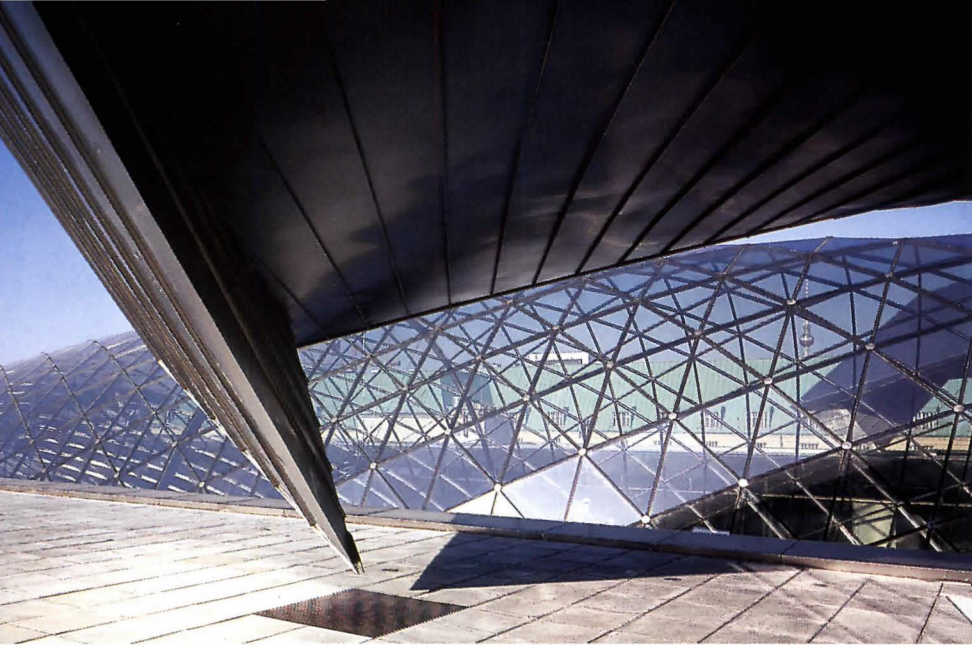
the regulatory regime. In the facades, he has observed the requirements for stringcourses, setbacks, and the proportion of stone wall to openings, but used them to engage the imperial scale of the square and the Gate. DG Bank's south elevation (less rule-constrained than the Platz-facing north facade) offers, by contrast, a jaunty row of plump, convex flutes (left).

On this site, where only two narrow ends offered unencumbered exposures, meeting the daylight requirement ruled out any but a courtyard-building arrangement, Gehry concluded. So he cut a skylit atrium into the center of the building, digging it one level below grade, which packed DG's required 190,000 square feet of office space within the mandated zoning envelope. Another narrow, skylit atrium opens a membrane of daylight between the offices and 33,000 square feet of apartments wedged into a south-facing slab (see section page 128).

The design team experimented with ways to create within the atrium an "interior landscape" for staff to gaze upon. In the competition-winning scheme, the atrium was garnished with a glass sphere, a five-story-high tree, and a strange white object, something like an animal head draped in cloth (page 124).

After Gehry was selected in the competition, the bank decided to turn the building from a speculative project into its most important branch, akin to an embassy, according to Detlef Marquardt, a DG Bank vice president who is the spokesman for the project. "We see it as an emblem of reunification, the new aspirations of Berlin embodied by art and architecture," he said.

At the bank's urging, Gehry's team had eliminated the tree and the other shapes intruding on the atrium space, leaving only the shrouded-head object, which made it, as Gehry says, "the object of desire." As in other highly articulated shapes by Gehry, the final form of what would become the main conference room was ruled by intuition, honed



The atrium roof (opposite top and left), billows up under a metal shieldlike form that locks the lower office area (below) into the higher apartment block. Schlaich Bergermann developed a diagonal atrium glazing grid running in the same plane as members that vault from side to side (left). The bi-directional curve of the roof shape could then be made with flat-glass panels.





Of shrouded skulls and torso-shaped skylights

1



A study made for the unbuilt Lewis House (1) was borrowed as the shrouded meeting room in the DG Bank competition model (2).

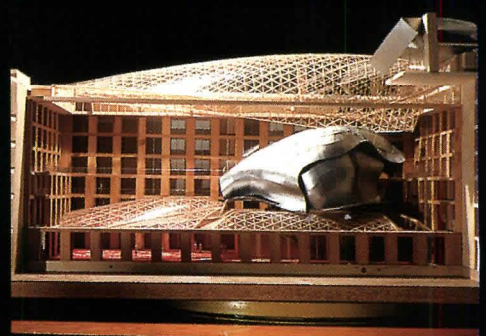
Although all the ingredients of the completed building are present in the competition submittal, they underwent an intense refinement

2



process. The team brought in Jörg Schlaich, of Schlaich Bergermann, a structural engineer legendary in Europe for skylight structures stretched in lithe, delicate arcs. The tentative look of the overlapping glass shells of the competition design's roof

3

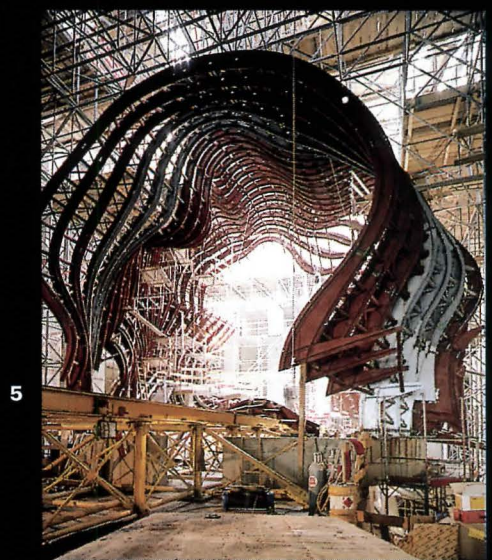


The Douglas Fir-paneled arcade in the lobby (opposite) echoes the stone-faced arcade of the Pariser Platz, while offering a first tantalizing glimpse of the atrium and its spectacular conference room. Office windows open onto the atrium at the upper floors, but on two levels, arcaded passages wrap the atrium (right).



became a single, sinuous double curve (3, 4). Cinched tight at the southern end by a fretwork of cables radiating from a hub suspended in air, the glass roof evokes a fish torso—familiar iconography in the Gehry canon. The atrium floor became glass, with

Schlaich flattening the shape used in the roof vault into a bubble that isolates the below-grade meeting and reception spaces. CATIA, the computer program long refined by Gehry Partners, calculated strut and glass dimensions (all different) and guided fabricating devices at Joseph Gartner & Sons, the curtain-wall maker. CATIA was also used in the determination of dimensions for the conference room supports (shown in construction, 5).



The evocative power of the conference room partly derives from the sense that it is tightly confined within the wood-clad atrium (opposite). Ramps (below and right) lead to the room around a bubble of glass that covers a below-grade reception area. Gehry calls Jörg Schlaich, the engineer who worked out the glazed structure, “the best alive.”



through modelmaking in a variety of media, and intended to evoke a range of metaphors and emotions without committing to any single one.

Gehry described the shape as the skull of a fossilized prehistoric horse’s head when it was first developed, for the unbuilt Lewis House. Gehry credits Peter Lewis for allowing him to take his aesthetic ambitions farther than any built project ever has. “People think I’m a wild man,” he explains, “but I do have a sense of propriety, and I may have edited this out if not for Lewis.” Initially he simply borrowed the shape from the Lewis design to convey to DG Bank something of the nature of what he hoped to do. As he refined it, it became a means to further explore the drapelike shapes that have appeared in recent projects, especially the Experience

“PEOPLE THINK I’M A WILD MAN,” SAYS FRANK GEHRY, “BUT I DO HAVE A SENSE OF PROPRIETY.”

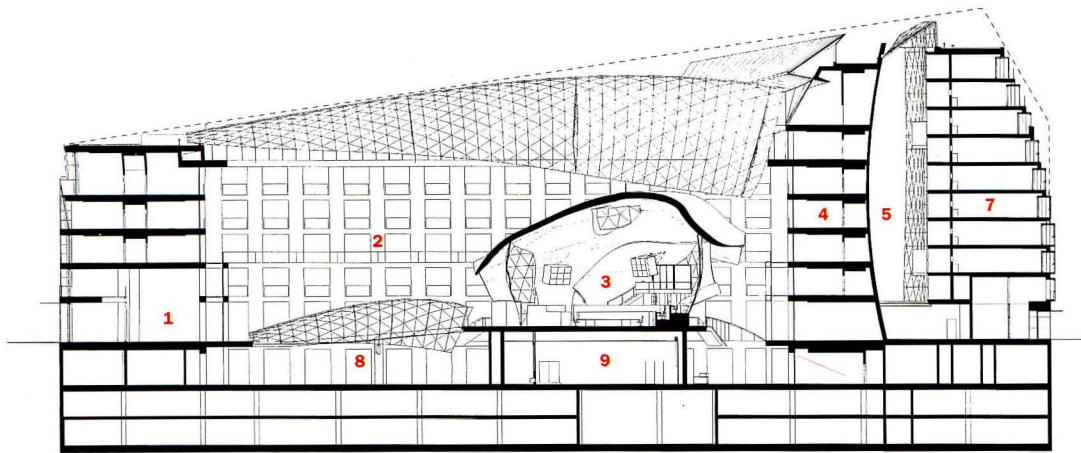
Music Project in Seattle (AUGUST 2000, page 106). Gehry is particularly taken by the work of Claus Sluter, a Dutch sculptor of the Renaissance, whose approach to drapery scholar Craig Harbison has described as “deeply undercut, as expressive as any human arms or legs could be.” In one study, the architects hung red velvet to achieve the desired shape, then poured beeswax over it. Bernini did the same thing with wet plaster, but he did not have a computer digitizer to capture the result.

Early studies of the conference-room cladding show strips of metal shingled over each other, but that was deemed by the bank to resemble armor too closely—an inappropriate image to evoke given the disastrous consequences of Berlin’s bellicose history. Gehry’s team made the panels smoother, more skinlike, but also far more difficult to fabricate. After two suppliers failed to produce acceptable panels, a third finally finished the cladding 23 months after the building was occupied.

Compelling as the conference room is, it does tie the interior

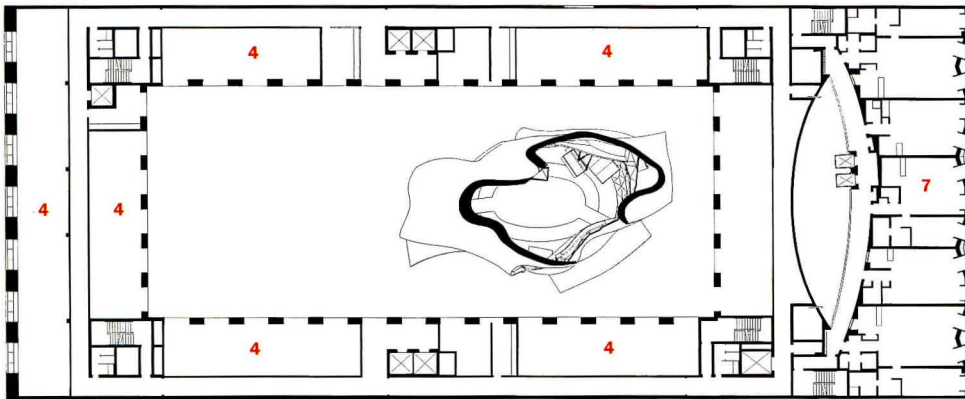


Gehry sees the conference room, the torsioned skylight roof, and the glass floor as a single sculptural piece within the atrium.



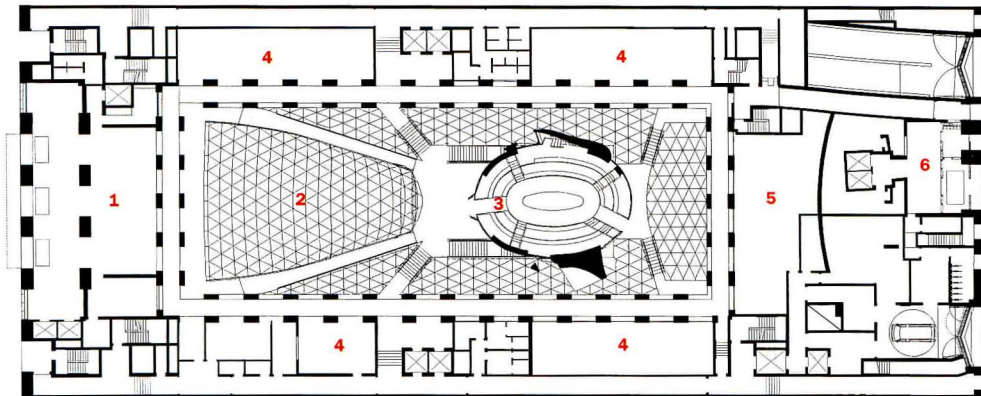
NORTH-SOUTH SECTION

1. Lobby
2. Atrium
3. Conference room
4. Office
5. Apartment atrium
6. Apartment lobby
7. Apartment
8. Reception
9. Meeting
10. Café

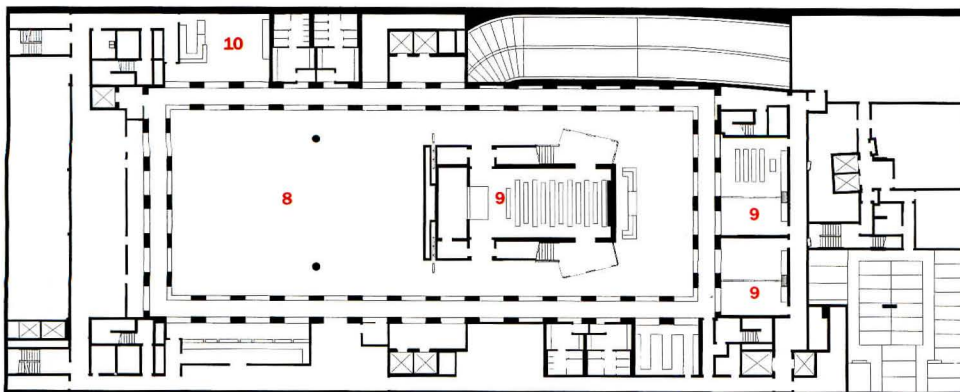


THIRD FLOOR

Gehry Partners devised a courtyard scheme because regulations required all offices to have access to daylight and only the short sides of the lot offered direct access to light. The conference room together with below-grade meeting, reception, and dining spaces creates a fully serviced conference center that DG Bank sometimes rents out.



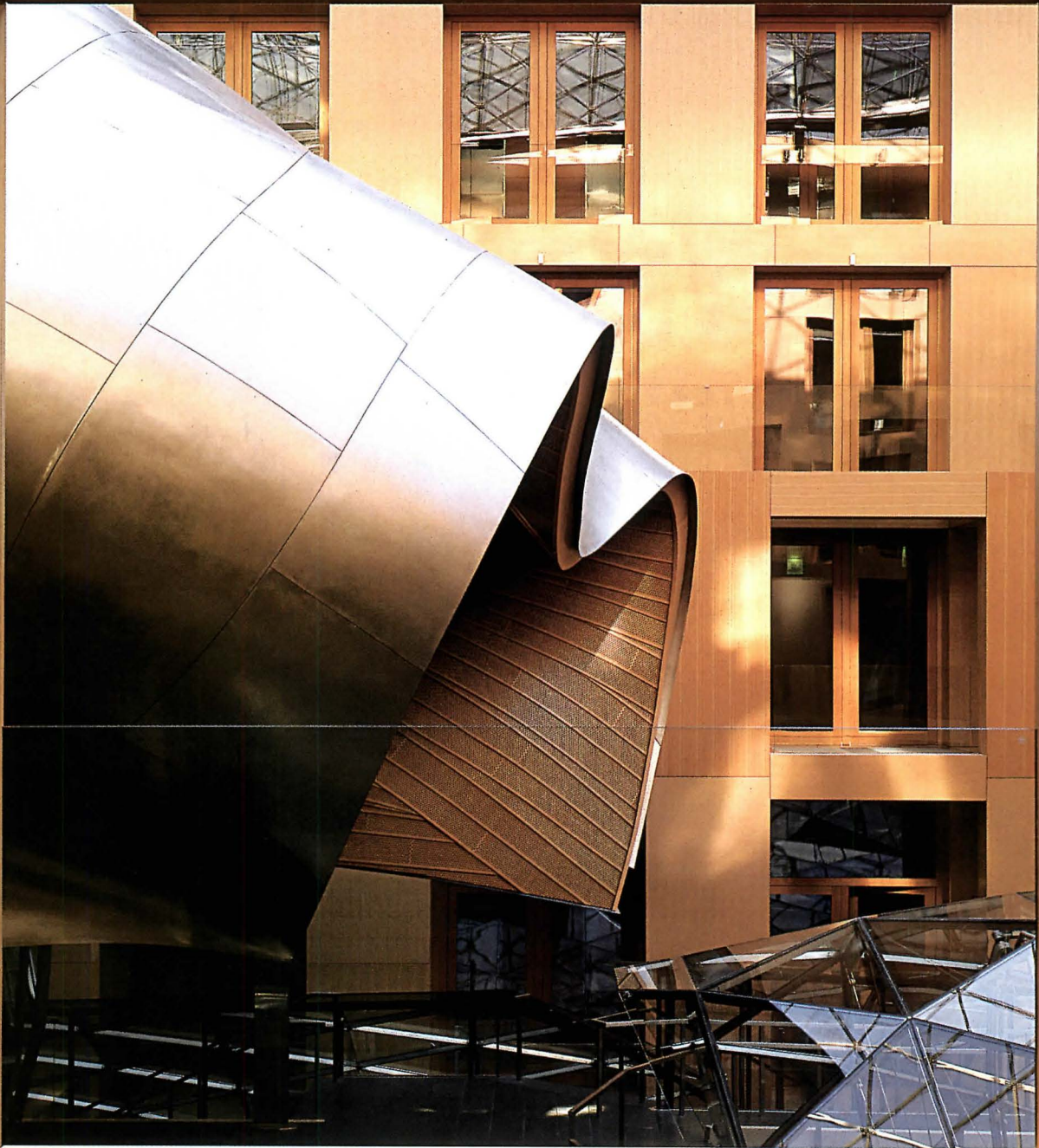
GROUND FLOOR



FIRST BASEMENT

N ← 0 20 FT.
0 6 M.

As the visitor moves to the side of the conference room, a glazed fissure becomes visible—like the rotation point of jaw and skull.





The evocative exterior of the conference room opens onto a womblike interior, lined with perforated strips of wood (this page and opposite bottom). The glass-roofed reception area is hung with glass sculptures by Nikolas Weinstein.



together. “My intent is that the conference room act as a fulcrum between the roof and the glass underneath,” says Gehry, “so that you could almost remove them as a single piece.” Standing in the lobby, you can see the glass above the reception floor swell up in a crystalline wave that seems to carry the conference room with it. The atrium roof appears to unfurl from behind the top of the conference room. Above the glass roof, a curve of metal projects like a prehensile fin above the glass vault, visually locking the lower volume of the offices into the higher slab of apartments behind.

Even conventional elements of this building are astonishing, like the enormous glass windows on Pariser Platz, which slide open automatically with the deliberateness of safe doors. The conference room, however, leaves behind an indelible impression—and raises questions. “It brings up a lot of subconscious stuff,” explained partner Craig Webb, which he says was intentional, but, “we were worried about the darker connotations.” An object that could be a sacred crypt housing the desiccated remains of some modern hero turns out to be, inside, a comfortably womblike meeting room, equipped with all the accoutrements of modern business (opposite). Why is such powerful symbolism deployed to such a prosaic end? Gehry’s designs trigger a wealth of images, which enrich the experience of his buildings. But doesn’t the lack of content in the symbolism here devalue the emotions such a pow-

DG’S VERY POWER RAISES A QUESTION: WHY IS SUCH SYMBOLISM DEPLOYED TO SUCH A PROSAIC END?

erfully made piece is capable of evoking? Is this just another architectural bauble to be checked off by the tourist hordes that swirl through Berlin?

To be sure, this is a business building, not a monument or a history museum. One can’t fault Gehry for responding to the bank’s pragmatic needs, while taking this structure into an aesthetic realm almost unimaginable for a commercial building. And DG Bank’s extraordinary commitment to the project has added immeasurably to the artistic wealth of Berlin.

But Gehry did not want it to mean more. “It doesn’t *represent* anything,” he says. Indeed, after a close colleague told Gehry that the imagery sent the wrong message in history-sensitive Berlin, Gehry got assurances from a number of sources that the conference room did not make “a politically inappropriate statement.” Gehry hopes people see the image as “friendly,” as “about making an exciting place.”

DG Bank shows that Gehry has that all-too-rare power to move us, but is he hiding his power under a bushel of deference? The ambiguity of expression is especially glaring in modern Berlin where architects of as wide-ranging sensibilities as Norman Foster, Peter Zumthor, Daniel Libeskind, and Peter Eisenman have taken real aesthetic risks in designs that attempt to grapple with the city’s tragic past and its hoped-for better future. Gehry shows us he can reach into our subconscious, but does he want to take the riskiest possible course—to grab our emotions, like the best artists, playwrights, and writers do, and take us someplace we need to go? Maybe DG is just a dry run for the great commemorative or memorial project the architect has yet to build. ■



Sources

Italian limestone: *Laboratorio Morseletto*

Skylight and atrium glazing systems: *Josef Gartner and Co.*

Metal windows and entrances:

Aepli

Wood Windows: *Schindler*

Lighting: *Erco, Zumtobel*

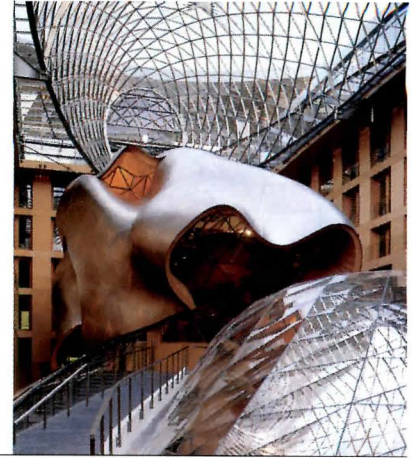
**Aurora Place stands
between Chifley Tower
(left in photo) by Kohn
Pedersen Fox and
Governor Phillip Tower by
Denton Corker Marshall
(right in photo).**



ARCHITECTURAL RECORD

10.2001

On the Cover: World Trade Center, Photograph by Andrea Sperling/FPG
Right: DG Bank, Photograph by Roland Halbe ▶



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- 34 WTC PHOTO ESSAY: Lanterns and Lightcatchers**

WWW For continuous updates on the developing story at the World Trade Center, go to www.architecturalrecord.com.

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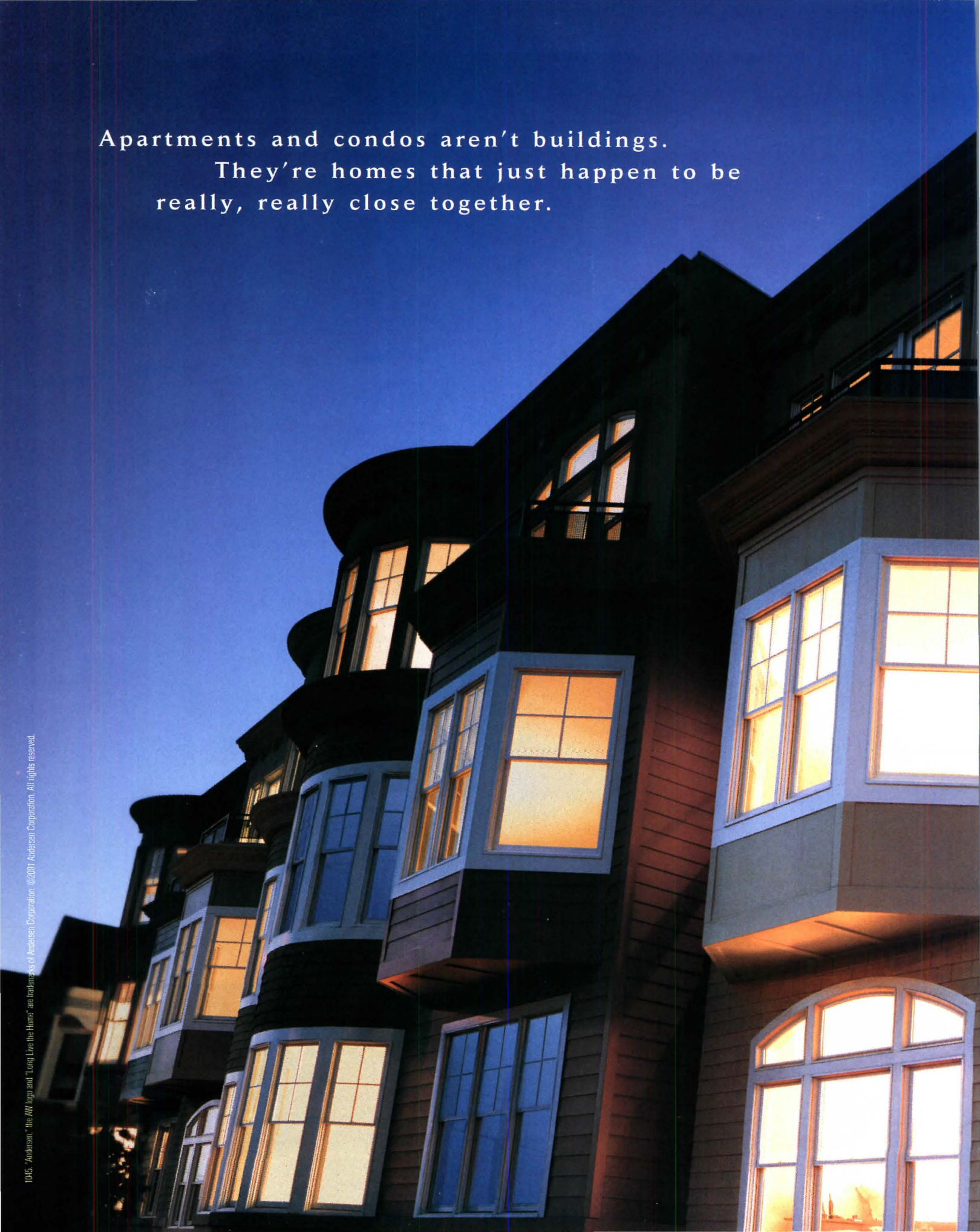


The AIA/ARCHITECTURAL RECORD

Continuing-Education Opportunities are "Dynamic Concrete in the 21st Century" [page 175], "Wood Windows: New Standards, New Looks." [page 191] sponsored by Jeld-Wen and "A Specification Guide for Exterior Wall Sheathings" [page 197] sponsored by USG

WWW *You can find these stories at www.architecturalrecord.com, including expanded coverage of projects. Explore the latest news about emerging architects at www.architecturalrecord.com/archrecord2.

Apartments and condos aren't buildings.
They're homes that just happen to be
really, really close together.



For **AURORA PLACE**, a mixed-use complex, Renzo **Piano** designed towers that sail above Sydney

By Lisa Findley

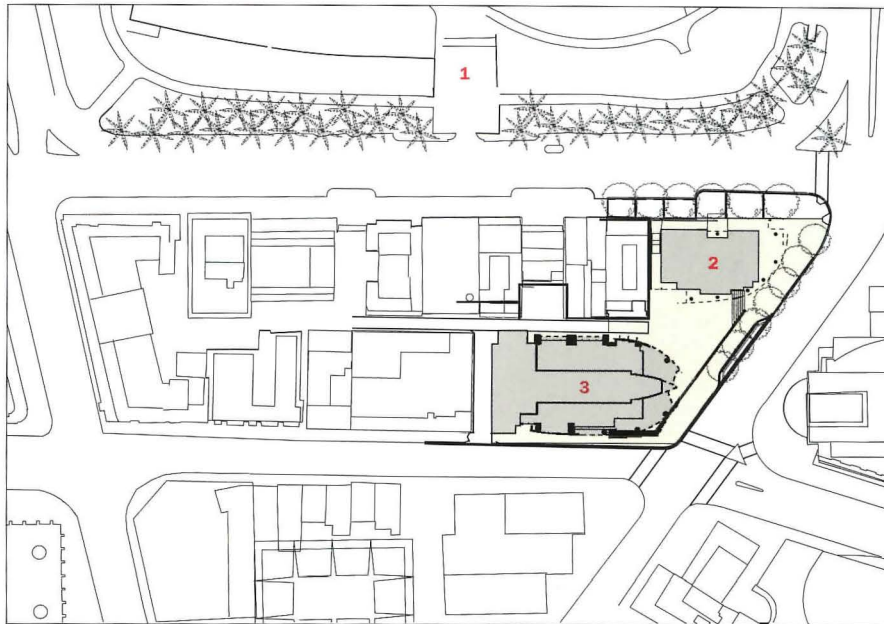
S ydney's downtown high-rise district meets the Royal Botanical Gardens at a dramatic edge that is one of the city's thrilling urban moments. The transition between wall-to-wall big buildings and the gardens' lush, cockatoo-inhabited trees consists of a single row of mid-rise, mostly residential buildings that line the street opposite the park. Looming immediately behind these modest structures are some of the Sydney's tallest buildings. The abrupt contrast between town and garden suits this bold but graceful city. Renzo Piano Building Workshop (RPBW) recently contributed to this dramatic edge with Aurora Place, a mixed-use project that occupies the end of a long, narrow urban block. On the city side, a 41-story office tower faces a public plaza, while a new 18-floor residential building rises over the gardens.

The design continues RPBW's strategy of approaching every project with a fresh perspective while drawing on the wisdom accumulated from past work. Aurora Place is classic Building Workshop: inventive, poetic, beautifully detailed, and responsible to the site's wide range of urban issues and scales.

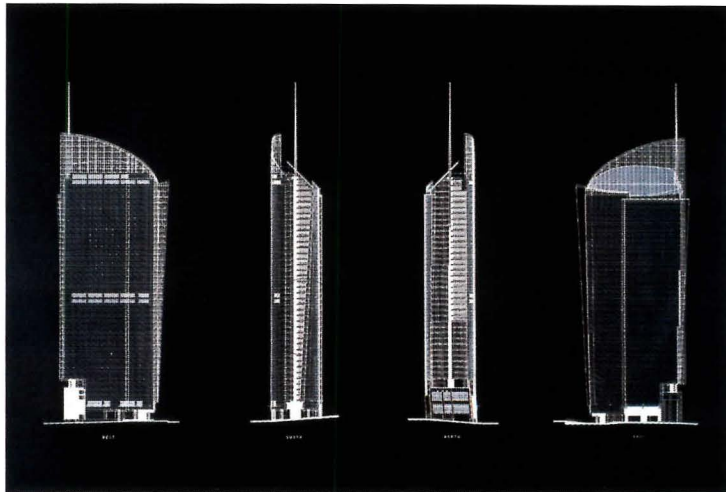
At the scale of the city, Aurora Place echoes the reference to Sydney's maritime history captured in the sail-like forms of Jørn Utzon's Opera House a short distance away. Aurora Place's sails are vertical, custom-designed glass curtain walls curving free of the building's frames. These sails are mostly white, like the Opera House's gleaming tiles, but they are much more ethereal, rendered in glass with an opaque white frit graded from 80 to 40 percent.

With its sail-like skins, Aurora Place enters the competition among Sydney high-rises for the best game with the sky. The neighboring Governor Phillip Tower (by Denton Corker Marshall, 1995), crowned with a giant grid of mirrored glass, reflects the strong Australian light so successfully that it is often unclear what is building and what is sky. Across the street, the curved reflective surface of Chifley Tower (Kohn Pedersen Fox and Travis Partners, 1993) softens the sun's hard edges in certain light. RPBW plays this game with a new strategy of visually dissolving the

Contributing editor Lisa Findley practices architecture in Oakland and teaches at the California College of Arts and Crafts. She is currently writing a book, Constructing Culture: Architecture, Memory, Politics, and Hope.



1. Botanical Gardens 2. Residential tower 3. Office tower



Project: Aurora Place, Sydney, Australia
Developers: Lend Lease Development, East Asia Property Group, and Mirvac
Architects: Renzo Piano Building Workshop (locally represented by Innovarchi) in association with LLDG and GSA—Renzo Piano,

Mark Carroll, Shunji Ishida, Olaf de Nooyer, Ken McBryde, Christopher Kelly, project team
Engineers: Arup in association with Lend Lease Technical Services Group and TTW (structural); Arup (facade and mechanical)
General contractor: Bovis Lend Lease



The 18-story apartment tower faces the Royal Botanical Gardens with stacked porches enclosed by louvers and low-iron-glass panels (left). The sail-like glass skin of the 41-story office tower seems to peel away from the structure (left and above). A glazed canopy protects a plaza between the two buildings (opposite) with a sculpture by Kan Yasuda.



top of the building into the sky by curving the swelling glass skin 100 feet beyond the the upper perimeter and reducing the density of the frit.

At the scale of the city block, RPBW treated the two buildings as cousins. They share elegantly detailed glass systems and glazed terra-cotta tile cladding and are crowned by extensions of the exuberant sails that curve in both plan and section. The office tower, however, has more glassy surfaces, while the residential building has more of the rust-orange tile that recalls the red earth of the central Australian desert. The architects treated the office tower as a freestanding object settled onto the plaza and contained by the street. The residential building, on the other hand, fits

AS WITH ALL OF PIANO'S PROJECTS, AURORA PLACE SINGS AT THE SCALE OF THE HUMAN BODY.

politely in with the fabric and scale of the smaller buildings facing the gardens, while not conforming with them in style. In an odd way, it is this smaller building that anchors the project to the block.

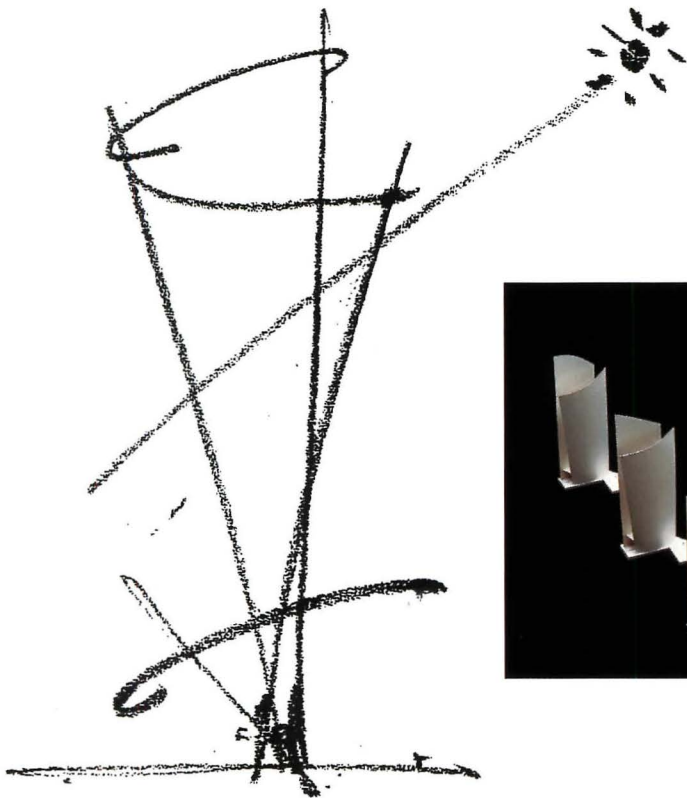
The plaza that provides entry into the office tower absorbs a small lane that used to separate the two sides of the site. The plaza now links the two buildings—a big job, since the street level climbs 11 feet from the city side of the narrow block to the garden side. Visitors enter the plaza at grade on the lower, office-tower edge of the site, and they can continue to the residential tower on a sloping sidewalk with stairs occasionally connecting sidewalk and plaza. This slightly awkward arrangement means that the plaza with its cafés and shops is not readily visible from the street nor



directly connected to the comings and goings of the residents. A huge suspended glass canopy hovering over the plaza deflects local wind conditions but creates an oddly scaled space between the two buildings.

As with all RPBW projects, Aurora Place sings at the scale of the human body. All of the materials are carefully considered, thoroughly researched, and beautifully deployed. The wood and warm colors of the office tower lobby invite lingering at the café near the elevator bank. The skin's fritted glass rejects heat while transmitting daylight into the interior of the offices. The places where the glass enclosures and curtain wall can be approached are intriguing and serve as reminders of the magnitude of the technology required for a high-rise building. *(continued on page 139)*

RENZO PIANO speaks with RECORD about skyscrapers and the city



The recent destruction of the World Trade Center in New York casts an ominous shadow on high-rises everywhere, especially those that aspire to landmark status. Earlier this year, well before the tragic events of September 11, RECORD's editor Robert Ivy spoke with Renzo Piano at his glazed-roofed offices overlooking the Ligurian Sea outside of Genoa. Although the topic of terrorism and its impact on skyscraper design did not arise, Piano discussed his views on building in New York, his approach to design, the problem of urban sprawl, and the role of memory in architecture. What follows are excerpts from that interview. Readers can find a more extensive version on the magazine's Web site (www.architecturalrecord.com).

ARCHITECTURAL RECORD: You have worked in many great cities in the world—Berlin, Paris, Turin, Osaka—and now you are designing projects for New York, San Francisco, and Chicago. Do you think it's going to be hard to achieve what you want in a city like Manhattan, which has the reputation of being a tough place to build?

RENZO PIANO: This is what architecture is about. Architecture is not an art independent from reality. Real architecture, real painting, real poetry, real music is never detached from physicality. In architecture, that's it. Architecture is at the edge, between art and anthropology, between society and science, technology and history. Sometimes memory, too, plays a

part. Architecture is about illusion and symbolism, semantics, and the art of telling stories. It's a funny mixture of these things. Sometimes it's humanistic and sometimes it's materialistic.

AR: So you're not worried about working with tough New York developers on a project like the New York Times Tower?

RP: No. Of course they are developers. But what is wrong with that? In some ways the best client is a tough client who knows what he wants. That doesn't mean you give the client exactly what he wants.

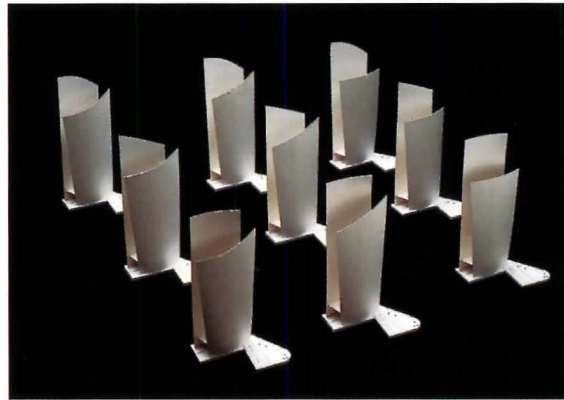
You are responsible for doing your job well. But a good building needs a good program. I don't think there is one single good building without a good plan. It's impossible. Certainly you need a good architect, but that's not enough.

AR: You have studied ceramics and tiles more than most contemporary architects. How will you use them in New York?

RP: Ceramics are metamorphic materials. They have a great ability to bleach and change, to echo the weather. For me, the most beautiful quality of Manhattan is its ability to change with atmospheric changes. One of the most poetic views of Manhattan is of its forest of buildings as they take the quality of the weather. New York is a peculiar place because it's very hard, very tough when you touch the ground. It's made of stone and steel. But as soon as you break from the ground and go up, you can see it's one of the softest cities in the world.

AR: What will the New York Times building do to advance your thoughts and work? Where is it going?

RP: This is exactly the question we ask each time. We are lucky to be able to decide what projects we want to do—not because we are snobs but because we are in a lucky position. Let's talk about expression in architecture. I like fighting gravity. Magic is essential in architecture. Working in Manhattan, I love the idea that we accept the clear and simple geometry of a building. We accept that logic. But complexity comes from

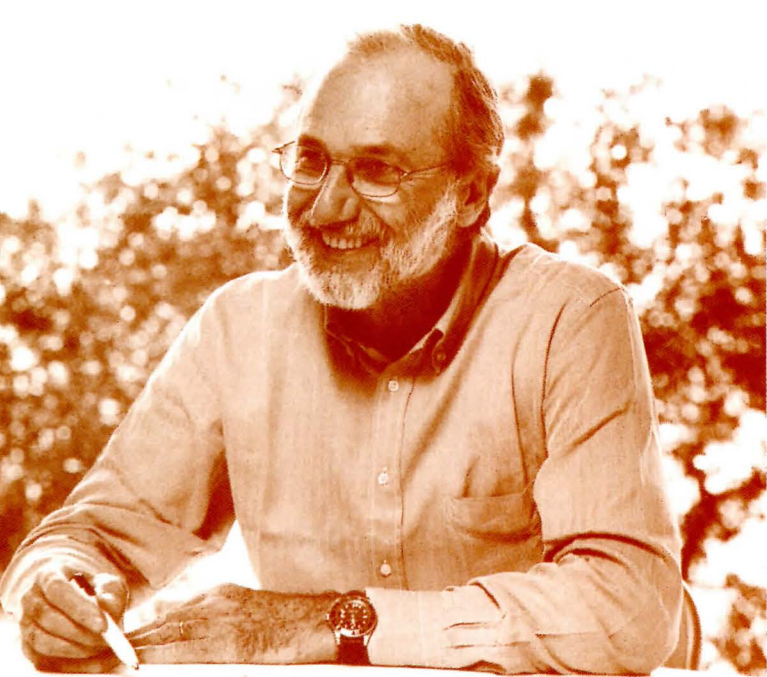


Piano comments on the WTC disaster

In an interview published in the Italian newspaper *La Repubblica* on September 21, Piano spoke about skyscraper design in the wake of the World Trade Center attacks.

When asked "Is it possible to build safer skyscrapers?" he replied, "We already know how to build skyscrapers that can resist earthquakes. Now we must devise ways to protect buildings from the kind of fires that occurred at the twin towers. The necessary technology exists and is employed at offshore oil-drilling platforms where protective coatings such as polypropylene fibers are used. There's a need to rethink security systems and make fire egress easier."

Asked what should be built on the WTC site, Piano said, "Whatever is built, there should first be a great deal of thought and reflection. It's not only an economic issue but a cultural one. What is at stake is saving the soul of a city, its spirit."



texture, from vibration, from the metamorphic capacity of the building to transform, to change, to breathe. Sometimes buildings even make sounds. You know, in New Caledonia we learned from the local culture that buildings sing. And we were actually able to do that, to make our building [the J.M. Tjibaou Cultural Centre in Nouvéa] make a sound when the wind blows. So the complexity doesn't necessarily come from geometrical complexity. The building is actually very simple. But the complexity comes from the skin, the surface of the building actually vibrating, working with the weather. In Manhattan, I think the Times building will be tough when it touches the ground and then become more light, more vibrant, more metamorphic as it disappears in the clouds. I'm working on the idea of putting a garden on the roof, so there's a garden in the sky. On the street level there will be a lot of activity: a small auditorium, a small museum for the Times collection of pictures and documents, shops—lots of street life.

AR: *Your work often centers on complex issues that are resolved simply. Can you explain your approach to design?*

RP: I came to architecture as the son of a builder, so when I was a young architect I was devoted to developing objects. I was attracted to the physicality. The piece-by-piece approach was essential to me. Then I began to understand that this is not enough. Architecture is more than just putting things together. It's about the organic, about illusions, a sense of memory, and a textural approach. I must admit, though, that I still love the idea of putting parts together. That is why my office is called the Building Workshop. I love the idea that you go from the general to the detail and then from the detail to the general. It's a double process. You cannot think about the presence of the building in the city without thinking about materiality. And when you think about materiality, you start to think about detail.

AR: *There is a lot of talk about architecture becoming virtual. What is the role of the computer in architecture today?*

RP: The computer is essential. When you make a building like, for example, Kansai Airport in Osaka [RECORD, JULY 1994, Pacific Rim section, page 26], you need a computer to optimize everything—the structure, the form. You know, computers are getting so clever that they seem a bit like those pianos where you push a button and it plays the cha-cha and then a rumba. You may play very badly, but you feel like a great pianist. The same is true now in architecture. You may find yourself in the position where

you feel like you're pushing buttons and able to build everything. But architecture is about thinking. It's about slowness in some way. You need time. The bad thing about computers is that they make everything run very fast, so fast that you can have a baby in nine weeks instead of nine months. But you still need nine months, not nine weeks, to make a baby.

AR: *Let's jump around a little here. What do you think of the role of the architect in today's world? Where do we stand as a group?*

RP: This touches on the ethics of the profession and how we go about our work. Can I confess one thing? I take pleasure in what I do. Pleasure is one of the most important things. You may say this is selfish. It is not selfish.

AR: *When you accepted the Pritzker Prize in 1998, you described architects and yourself as explorers. Do you take an idea or a line and rework it or are you always looking for the new?*

RP: I think it's important to note the difference between style and coherence. If you're talking about coherence, I love it. If you're talking about style, then I start to be more suspicious. Coherence is about the experience, about using what you've been learning and reapplying it. It's not about making yourself recognizable. But architecture is necessarily about exploring. Every place is different, every client is different, every society is different. Culturally, historically, psychologically, anthropologically, and topographically, every job is different. So the real risk is that as an architect you end up imposing your stamp before you understand what is the reality of a place. I never take a new job without visiting the place, without trying to understand, without trying to get a basic, fundamental emotion. Because that's what it's all about—building emotion. I try to understand what is the real nature of a place, what is the context. My goal is not necessarily to integrate with the context. Sometimes architecture should not integrate but should make a contribution to the context.

AR: *Do you ever worry that you won't find the genius of a project or make it work?*

RP: Oh, yes, you worry about that. And the next thing you worry about is staying on track, because architecture is a very long, complex process. There are two things I worry about. In the beginning, it's finding the emotion, the basic emotion. But then, you need to find the direction and stay with it for sometimes five or six or more years.

AR: *Tell us a little about how your firm operates. What is your role here?*

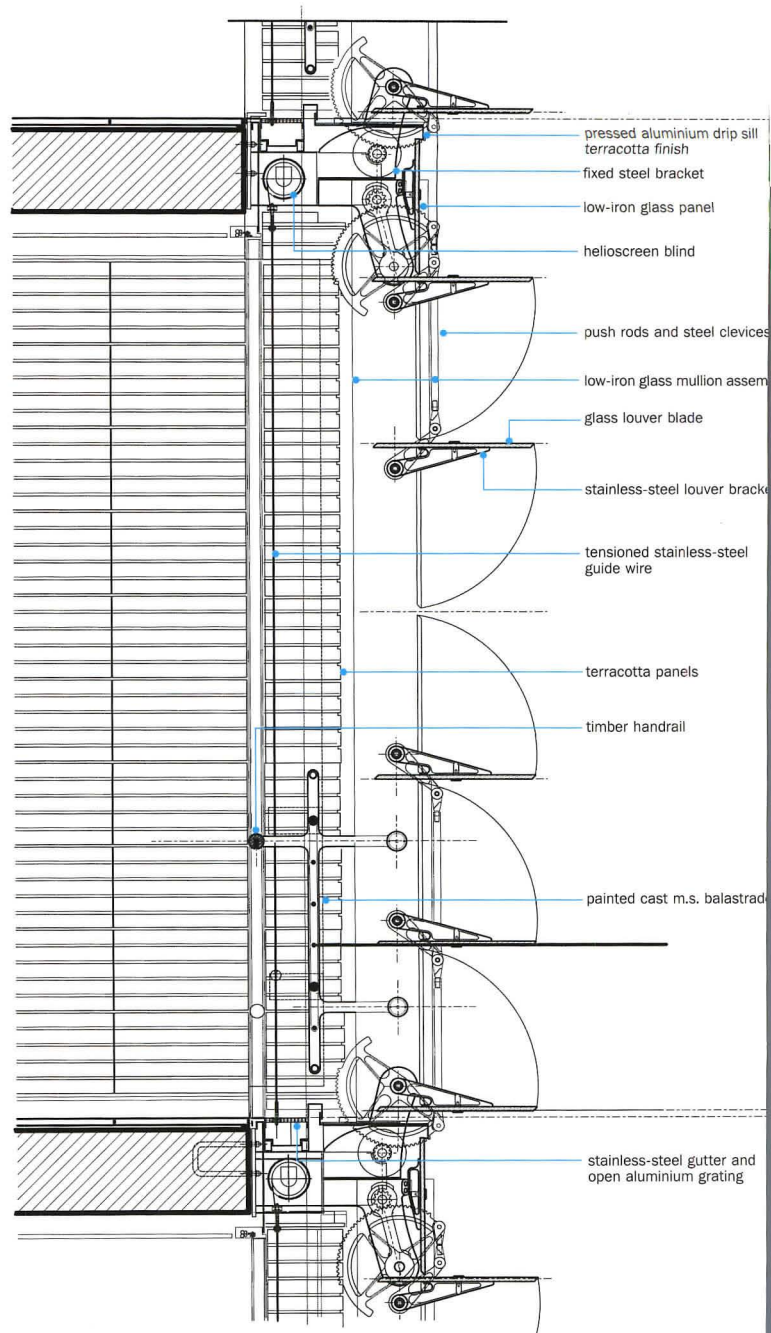
RP: One of my favorite roles, though not necessarily the main one, is spending time—my colleagues might say losing my time—in the model-maker's shop. I love watching things and touching. If you look around my workplace here, I have all my small working models on the wall. What I do is mentally I touch each one. They're like my children, and I go and touch each one to understand what is going on.

AR: *You've spent a lot of your career working on cities such as Genoa and Berlin. What is the state of the contemporary city today?*

RP: Right now I'm working with Milan, helping it plan its peripheries. This is going to be one of the biggest challenges in the next 50 years. How do we transform the periphery? It's not just about form, it's about content. The real trouble is that these urban peripheries are monofunctional, they're all about just one mode—production or business or housing. But after the city's big explosion, now we're seeing it start to implode. I like the idea that sustainable growth is about implosion not explosion.

AR: *There are some architects who have made careers of mostly talk.*

RP: Yes, there's nothing wrong about that. But for me, I prefer to build. ■

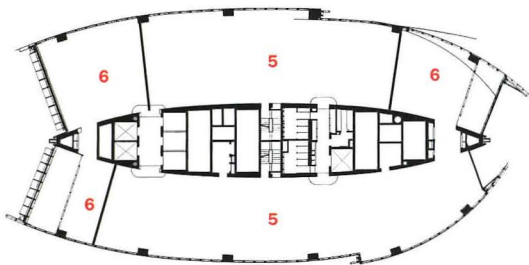


SECTION THROUGH EAST FACADE LEVELS 1-14

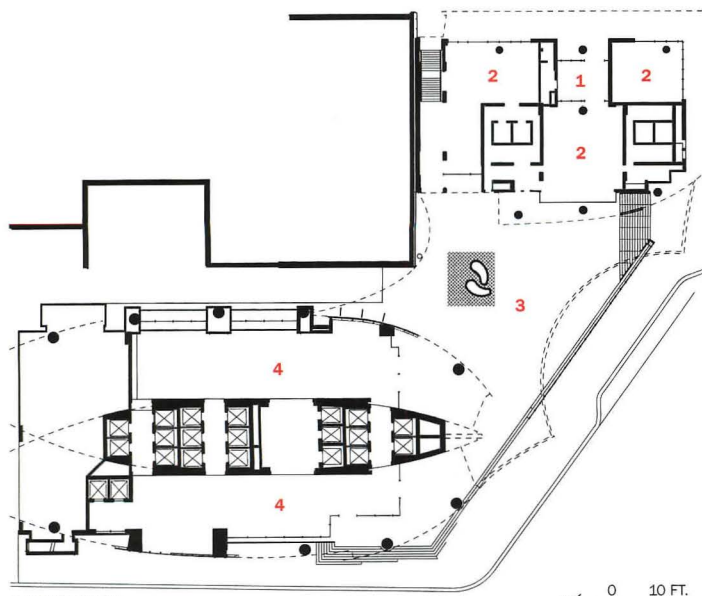
The office tower has a total of 535,000 square feet of leasable space with office space extending between 36 and 40 feet from the core to the building's perimeter. The most unusual aspect of the office floors are the

winter gardens or breakout areas (top left) that have operable glass louvers to allow fresh air in. The architects used exterior materials like terracotta panels in the office lobby (left).

The 62 apartments in the residential tower are all floor-through units (right) with glazed porches featuring operable louvers (drawing opposite).



UPPER FLOOR



GROUND FLOOR

1. Residential lobby
2. Retail
3. Plaza
4. Office lobby
5. Office
6. Winter garden

(continued from page 135) In the residential structure, every apartment runs from the front to the back so that bedrooms can overlook the plaza, which is quiet at off-peak hours, while living rooms face the Royal Botanic Gardens. Made entirely of large louvered, clear-glass panels that can be adjusted or slid entirely open, the exterior wall of each living room takes full advantage of the fantastic views of the garden and the harbor beyond. And the constantly changing configurations of louvers, openings, and shades in each unit bring the facade to life.

When Aurora Place was first proposed, it met with extreme controversy because it was to replace a well-loved icon of early Australian modernism, Ken Woolley's 35-story State Office Block, completed in 1967. Sydney's architectural community agreed that whatever replaced this building should be of equal or greater caliber. With few tall buildings in RPBW's portfolio, there was some question as to how well the firm could rise to this challenge. But clearly RPBW built on what it learned from the elegant Debis Tower in Berlin's Potsdammer Platz to make a significant contribution to the urban fabric. And, in typical Building Workshop fashion, the dissolving edges and double-skin glass technology of Aurora Place already anticipates the next level as the firm works on the design of the New York Times Tower in New York City. ■

Sources

Exterior terra-cotta cladding: NBK and Permasteelisa

Curtain wall: Permasteelisa

Curtain wall glass: Viracon

Elevators: Kone

Granite paving: Melocco; Saba Bros.

Custom lights: Eagle Lighting

Glass fins steel work: WGE

Signage: Central Signs

Mast and steel sails: Rigby Jones

Cast winter-garden components: Hycast Metals

Lobby furniture: Dedece, Schaumburge + Alvisse and Wilkhahn

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

Spherical stones in a straight line, echoing the trajectory of the building's great cantilever, mark a path to the stairs that ascend into the structure's main volume.



On Lake Constance in Austria, **Baumschlager & Eberle** has created the dramatically cantilevered **ROHNER OFFICES** overlooking a marina

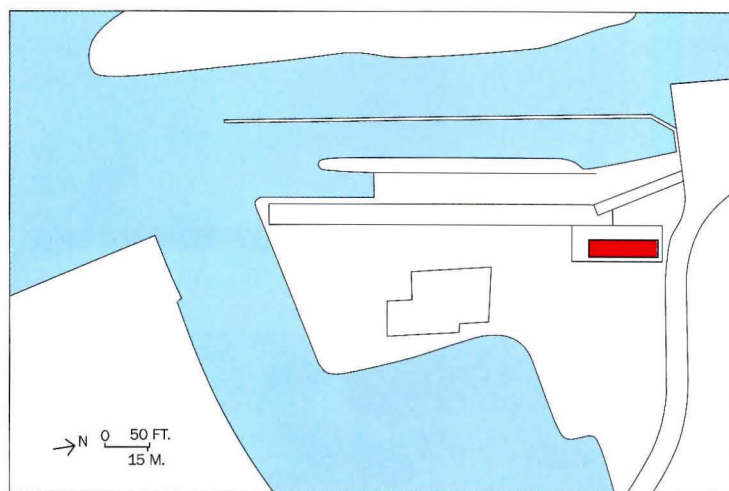
By S.A. Miller

It's like a waterbird standing on one foot," says architect Carlo Baumschlager of his Rohner building—and indeed, this small, almost entirely cantilevered structure conveys at once the absurdity and exquisite balance of a great wading bird aloft a single twig of a leg. The analogy is quite abstract: This 941-square-foot building, sited along Lake Constance in Austria, actually stands on dry ground with its boldly rectilinear, cast-concrete form hovering above a broad, though minimal, 148-square-foot footprint. Yet however stark the geometry, this structural *tour de force* evokes a range of metaphors, simultaneously recalling a waterbird, a telescope, and a dry-docked boat.

The telescope and boat are especially apt, as the Rohner building houses an office and surveillance station for the director of a marina. In 1999 Maria Rohner, who had commissioned a house by Carlo Baumschlager and his partner, Dietmar Eberle, in 1993, created a business to provide moorings as well as repair and winterizing services for recreational boaters. In Fussach, Austria, near the meeting place of the Rhine River and Lake Constance, where her family had run a gravel company, she began with only an outdoor dry-dock yard—but envisioned something far more ambitious architecturally. "I wanted a clear design with open Minimalist spaces—and no compromises," recalls Rohner, who'd known Eberle for many years. "I knew it'd be a building that people talk would about, and I didn't mind. But far more important was that the architect and I like it." She soon engaged Baumschlager & Eberle, outlining a simple brief: an office and meeting area with excellent sight lines toward incoming cars and boats, basic shower and toilet facilities for the customers, and a shelter for their bicycles and motorbikes.

In this picturesque Rhine Delta region, with distant views of the Alps, much of the architecture is traditional and influenced by the proximity of rural Switzerland. But Baumschlager and Eberle, based in nearby Bregenz, consistently transcended questions of style and local vernacular to explore, in a Modernist vein, the essence of simple materials and forms. Many of their early projects, typically boxlike with extensive use of unadorned wooden slats, are marked by an elegant lightness and an unusual attunement to proportion and detail [see MARCH 2000, page 61].

For the marina building, the architects were interested in creating, they say, a sculptural "viewing tube," focused on the lake and boatyard. They also envisioned a building that, from the approach, would



almost appear to float on water. Their solution—using cast-in-place concrete with steel to achieve a 33½-foot cantilever—offers a high and dry perch for times when the waves lap over the site. But when the lake is at its normal lower levels, this gravity-defying design, Baumschlager explains with deadpan pragmatism, "can provide shelter and storage under its cantilever for bicycles and motorbikes."

Approached from below, entry steps lead alongside the boaters' toilet-and-shower rooms to the main volume upstairs: largely a single, uninterrupted space, housing the office. Minimally efficient, its prime furnishing is long table down the center, one end of which serves as a desk, while the other provides a meeting area.

The building is essentially a box within a box: a larch shell inserted into a cast-concrete tube. "It's meant to function like a good coat," explains Baumschlager, "with an inner lining that warms you, and a tougher outer layer that shields you from the rain, wind, and snow." The larch planks, laid on the building's long axis, create a continuous interior fabric with floor merging into walls into ceiling. Horizontal slotlike windows run nearly the length of the office. The parallel courses of wood create long perspectival lines, channeling your gaze as they converge toward the tube's glazed end. Captured in a sort of tunnel vision, the views are, then, framed by the concrete shell, where it extends beyond the larch lining to form a balcony.

From the exterior, the glare-reducing setback of the glazing

Project: Rohner Office Building,
Fussach, Austria

Architect: Baumschlager & Eberle

Architects

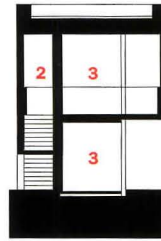
Architect of record: Rainer Huchler

Engineer: D.I. Ernst Mader

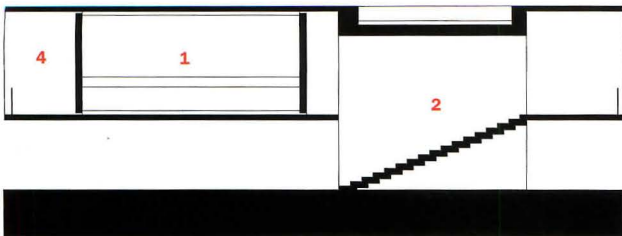
S.A. Miller is a journalist who frequently covers architecture and the visual arts.



SECTION A-A



SECTION C-C



SECTION B-B

0 10 FT.
3 M.

- 1. Office
- 2. Stairwell
- 3. Bathroom
- 4. Balcony
- 5. Storage

From one side, the cast-concrete building—with calm yet precariously asymmetrical cantilevers—appears like a Minimalist sculpture.



The building appears simple at first, but its balance changes subtly from shifting vantage points. Like a vessel afloat, the structure's cantilevered main volume hovers shoulder to shoulder with the dry-docked boats around it (below).





Lined with larch wood, the cast-concrete building is essentially a box within a box (this page and opposite bottom). Like a continuous fabric, the wood covers the floor, wall, and ceiling. The planks—oriented on the building's long axis—create perspectival lines that converge toward the views (above and opposite bottom).



enhances the perception of an “open-ended viewing tube.” With just a few precise moves, the application of glass throughout the project sets up a flickering dialogue between transparency and reflectivity. At one end, a single pane, serving as the balcony rail, plays against the large window several feet behind it, while on the building's matte concrete sides, the shallow-set slot windows become glowing horizontal strips, each mirroring a long slash of the surrounding trees.

As in good Minimalist sculpture, the building's apparent simplicity is deceptive, altering itself the more you look at or walk around it. The structure's few asymmetries—the pedestal's position on the long axis, the location of the strip apertures, and the lateral placement of the stair with its jagged cast-concrete silhouette—subtly shift the compositional balance as vantage points change. A building of many metaphors, it can appear alternately (or simultaneously) as a pure, calm yet precariously balanced sculpture, an exquisitely impenetrable form, a breathtaking feat of structural bravura, or a box floating on air within a sea of boats on wheels. ■

Sources

Concrete: *Oberhauser + Schedler*

Windows: *Böhler Fenster (wood)*

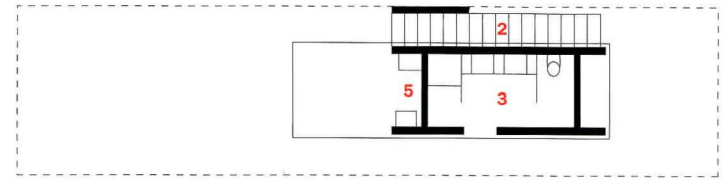
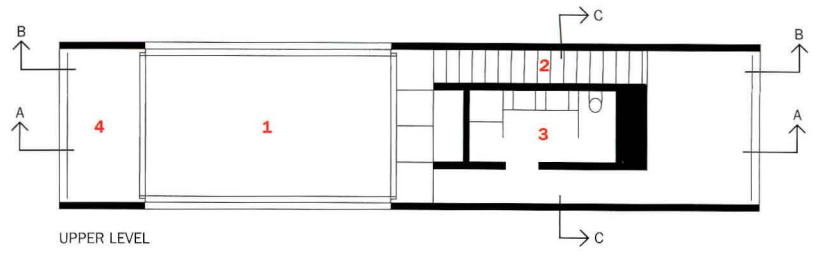
Doors: *Kieber Metallwerkstätte (metal); Böhler Fenster (wood)*

Cabinetry: *Hutle*

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



- 1. Office
- 2. Stairwell
- 3. Bathroom
- 4. Balcony
- 5. Storage



0 10 FT.
3 M.



The Wideck for the ceiling of the Padre Pio Centre was chosen for both its esthetic and acoustical properties. We felt the linear design of the Wideck panels helped to carry the eye forward towards the altar, and that the ceilings geometry ideally complimented the exposed wood and steel roof trusses.

*Paul D. Felder, AIA
The Architectural Studio, Allentown, PA*



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CIRCLE 59 ON INQUIRY CARD

Rays of Light

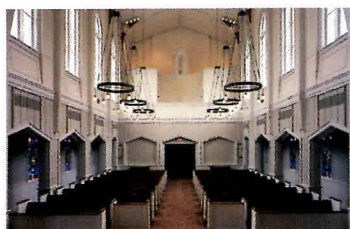
FOUR DISTINCTIVE INVITATIONS TO CROSS THE THRESHOLD OF THE ORDINARY AND EXPERIENCE A WORLD BEYOND THE EVERYDAY.



1.

Kings Point, New York

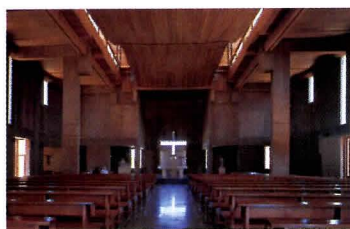
Revealed under the shallow-slope roofs of an Eisenhower-era building, Alexander Gorlin's mystical space surprises the viewer.



2.

Gulfport, Mississippi

Gothic-in-wood, with its country church associations, is the appropriate medium for this folksy seaside chapel designed by Errol Barron.



3.

Santo Domingo, Chile

In Domeyko's design, nothing is easily disclosed. The church carries on a dialogue between the abstract and the relative, with almost audible results.



4.

Kyoto, Japan

Stillness and muted light characterize Takashi Yamaguchi's austere statement on religion, nature, and history.

By Winifred Gallagher

Every religious building is a temple at heart. The Indo-European root *tem* means “to cut,” and refers to a detachment from the everyday world, elevating the place of worship to a place of contact between the human and the sacred. Many early temples were also observatories, which fostered “contemplation,” or turning one’s attention to a higher reality. Over several millennia the forms of sacred architecture have changed, but one element remains the same. A religious building that doesn’t invite us to cross the threshold from the quotidian into the transcendent—that doesn’t invite us to contemplate—might as well shut its doors. That would mean an awful waste of space. In 2001, 50 million square feet of religious facilities were built, reflecting a marked increase of about 42 percent from the early 1990s, according to Dodge Reports. Whether church, synagogue, temple, or mosque, the best Postmodern sacred architecture, like the remarkable buildings on the following pages, helps us set aside everyday reality and direct our awareness toward a greater, more mysterious universe.

Of all the architectural means of expressing the presence of the holy, perhaps the simplest, oldest, and most eloquent is light. The poetic management of this intangible form, which seems both of this world and not, has preoccupied architects since Stonehenge. Sophisticated ancient artists from many different religions built structures that captured the sun’s rays at certain times of the day or year, thus symbolizing in stone a desired harmony between the human and divine. As Christianity spread throughout the West, architects continued to preach with light. Anticipating Mies, they realized that, sometimes, less is more.

Ireland’s 8th-century Gallarus Oratory might be an overturned boat made of stone. The church’s only embellishment is a narrow window, barely more than a crack,



Ireland’s 8th-century Gallarus Oratory’s only embellishment is a narrow window opposite the door.

Winifred Gallagher’s books include The Power of Place, and Working on God. Gallagher’s next book, Spiritual Genius, will be published in 2002.

For 10 more places of worship, go to Building Types Study at www.architecturalrecord.com. The monthly expanded Web BTS features project descriptions, photographs, drawings, statistics, and links to people and products.

Salisbury Cathedral illustrates the basilica plan, the West's most ubiquitous form of sacred architecture. Its broad nave makes an ideal setting for large services, while the side aisles provide smaller gathering areas.



which produced an epiphany at every sunrise through much of the Dark Ages. Across the sea some four centuries later, Gothic architects would take a very different approach to light, using soaring stained-glass windows to turn vast stone cathedrals into membranes that barely screen heaven itself. Like their time-honored predecessors, the contemporary examples herein make inventive use of light to create sacred space.

Whether it's a temple or church, synagogue or mosque, a sacred building must be both a house of prayer or contemplation for the individual and a home for a community seeking to share its tradition. "Religion," which comes from the Latin *religare*, means to bind together. It seeks to connect us both with the sacred and each other. Accommodating religion's private and public dimensions under the same

The Live Oak Friends Meeting House in Houston, designed by Leslie Elkins Works, with a "skyspace" light installation by James Turrell, is a place where private contemplation is reinforced through the restraint and simplicity of design.



roof must have been one of the architect's earliest challenges. From the point of view of environmental psychology, the problem is one of furnishing the right level of sensory stimuli not only for two different functions, but also for two different sorts of people. Too much input from the environment impedes prayer and recollection, especially for intropective types, while too little feels cold and unsociable, especially to the extrovert. Culture, too, helps determine the right sensory balance, so that a religious building that might seem overly austere to American Christians can exemplify serenity to Japanese Buddhists. A case in point is the extreme simplicity of the White Temple by Takashi Yamaguchi and Associates of Osaka, Japan, which follows on these pages.

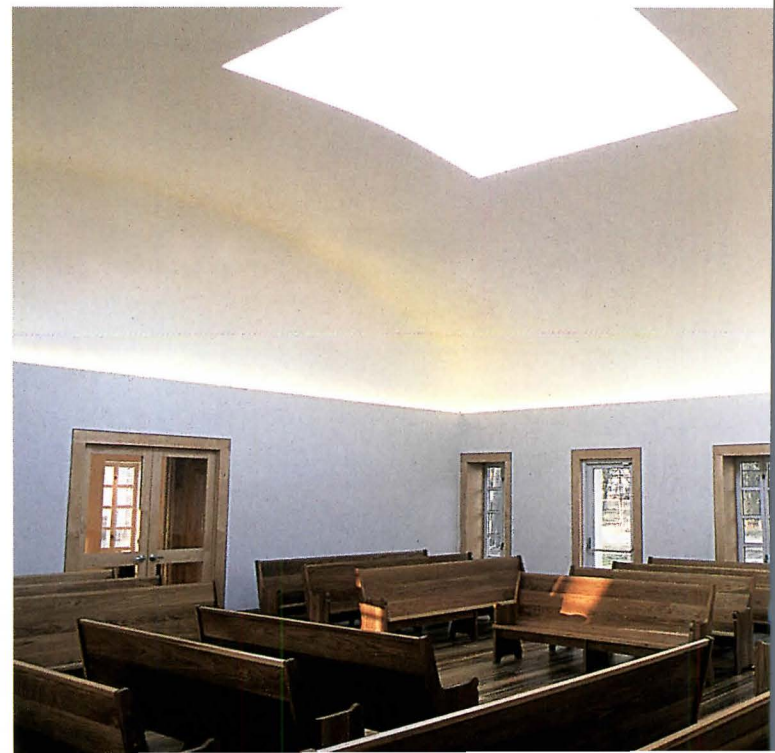
One enduring architectural approach that protects the private without alienating the public is the basilica, with a variety of improvisa-

OF ALL THE ARCHITECTURAL MEANS OF EXPRESSING THE HOLY, THE SIMPLEST, OLDEST, AND MOST ELOQUENT IS LIGHT.

tions. In Roman times, this large rectangular hall was commonly used for civic functions, such as courts of law. With an altar in its apse, the basilica's broad nave made an ideal setting for Christianity's mass and other large services. The building's two colonnaded side aisles also provided spaces for small shrines and chapels suited to private devotions. The flexible basilica plan was modified for use by other religions as well, and remains the West's most ubiquitous form of sacred architecture. St. Peter's by the Sea in Gulfport, Miss., seen on these pages, is a contemporary version of this style.

Modern-day representations of public and private places for worship can sometimes veer to the extreme. The modern megachurch, whose evangelical congregations number in the thousands, at first glance seems to have little in common with basilicas, much less temples. These huge religious complexes, which may include gyms and food courts, can look more like community colleges or arts and entertainment centers than churches. This new sacred vernacular is not for everyone, yet it presciently recognizes some important new elements in our changing religious landscape.

Americans increasingly define religion in terms of their personal spirituality, rather than as institutional authority. They're much less inter-





The Church of Latter-day Saints in Salt Lake City by Zimmer Gunsul Frasca Partnership is a modern megachurch, looking more like a community college or entertainment center than a church.

ested in denominational boundaries and abstract dogma than in religious experiences that illuminate and improve their lives right here, right now. Instead of a sanctuary featuring stained glass and sedate hymns on the organ, the core of the megachurch is a big auditorium equipped with state-of-the-art audiovisual systems. Professionals playing contemporary music, actors presenting sermons in dramatic form, and slides or films flashing overhead unite the huge congregation in a rousing public spiritual experience. Then, to provide religion's more private component, the megachurch offers numerous meeting spaces for as many as a hundred small groups that gather each week for diverse religious and social purposes.

The recently completed Live Oak Friends Meeting House in Houston, Tex., designed by Houston architect Leslie Elkins, with a "sky-space" light installation by Arizona artist James Turrell, reflects an opposite extreme, where private contemplation is reinforced through the restraint and simplicity of design. But like the Meeting House, the megachurch is an architectural attempt to lift up a religion's central message rather than its historical past, with its sometimes anachronistic associations. Previous generations of Americans evoked their spiritual traditions by reproducing the churches and synagogues of "the old country." As the nation becomes more socially and religiously pluralistic, this historicist architecture seems fusty and out of step. Stripped of the architectural symbols that proclaim "members only," the suburban megachurch—much like the urban storefront church—looks and often functions like a community center because it welcomes visitors with many different backgrounds, hopes, and needs.

The megachurch illustrates the fact that today, as clergy often put it, "there's more religion going on in the church basement than in the church." For many people, the core of spiritual life is no longer the big weekly worship service, but a prayer group, seniors' or youth program, AA meeting, or religious class conducted under a congregational umbrella. Even smaller churches and temples increasingly find that they are in effect a constellation of mini-congregations. Then, too, at a time of widespread financial, environmental, and social concern, many members are unwilling or unable to support religious real estate that is used only one day a

week for an hour or two. The growing trend of putting sacred spaces to multiple uses may seem modern, but it has at least one venerable precedent. Judaism makes no sharp distinction between studying the Torah and prayer. In Orthodox synagogues, or shuls, scholars may study scripture six days a week in the same space that, on the Sabbath, accommodates the whole congregation for worship.

Some of its forms and functions change over time, yet like the ancient temple, sacred architecture will always mean a special place cut off from the mundane that encourages the contemplation of the mysterious. As Ralph Waldo Emerson, the poet-philosopher, ordained minister, and father of America's independent spirituality, put it, "I like the silent church before the service begins, better than any preaching." ■



In Orthodox synagogues, or shuls, scholars may study scripture six days a week in the same space that accommodates the congregation for worship on the seventh. Shown is the Mesivta Yeshiva, New York City, by Fox and Fowle.

North Shore Synagogue

Kings Point, New York

1

ALEXANDER GORLIN ARCHITECTS HAS DESIGNED A HIDDEN SANCTUARY, REPLETE WITH BIBLICAL AND MYSTICAL SYMBOLS.

By Michael J. Crosbie

Project: North Shore Synagogue, Kings Point, New York

Architect: Alexander Gorlin Architects—Jason Federbush, project architect; Stephen Ray Fellman Architect, associate architect; Alexander Gorlin, Glenn Goble, David Gissen, Brendan Cotter, design team

Client: North Shore Hebrew Academy

Engineer: Ross Dalland, P.E.

Consultants: Kugler-Tillotson (lighting); Scarborough Acoustics, Inc. (acoustical); Sheldon Lazan (HVAC); The Sear-Brown Group (site engineer)

Stained glass: Alexander Gorlin Architects

General contractor:

P.J. Wyer Construction, Inc.

Size: 5,000 square feet

Cost: \$1.25 million

Sources

Exterior cladding: Belden Stark (brick masonry)

Roofing: Carlyle (elastomeric)

Windows: Kawneer (aluminum)

Glazing: Viracon

Skylights: Exarc Skylights

Doors: Kawneer

Metal doors: Aileron Design

WWW

For additional places of worship and more information on the people and products involved in this project, go to Building Types Study at www.architecturalrecord.com

Program

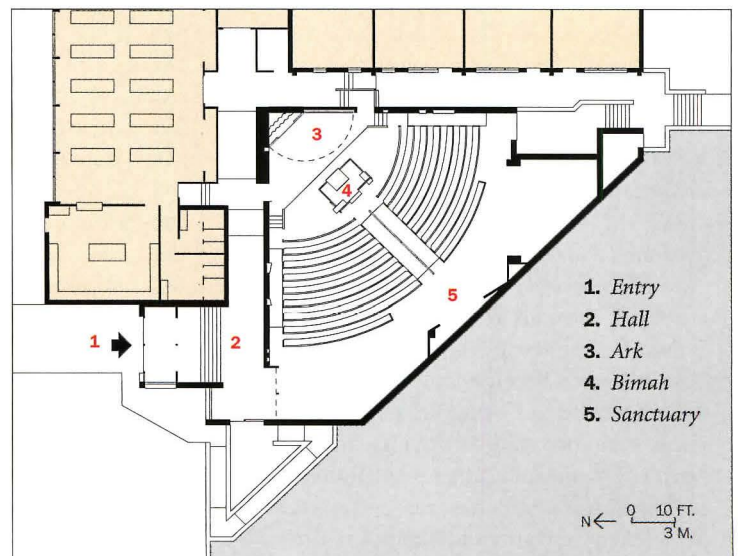
Orthodox Jews in Kings Point, Long Island, needed a place to worship. The closest synagogue was accessible only by car, the use of which is prohibited on the Sabbath. The North Shore Hebrew Academy was close by, but had no worship space. The academy was in need of an auditorium for its 1958 facility—a former public school. Could both needs be filled with a single, small addition?

Architect Alexander Gorlin's sensitive insertion needed to fill all the program requirements for worship, but had to do so within a height of 45 feet above sea level. The existing grade was already at 27 feet, which left a scant 18 feet in which to call forth some semblance of the sacred. The exterior design also had to honor the rather bland brick style of the original. The new addition, built into the side of a hill, seats 210 and is used every Sabbath and holiday for this congregation of families.

Solutions/Intentions

The design occupies the corner of two of the academy's classroom wings. A modest entrance pokes its way under the shallow-slope roofs of the Eisenhower-era building, doing little to prepare one for the mystical space within. Where he couldn't raise the bridge, the archi-

Michael J. Crosbie is the editor of the journal Faith and Form, and an architect with Steven Winter Associates.



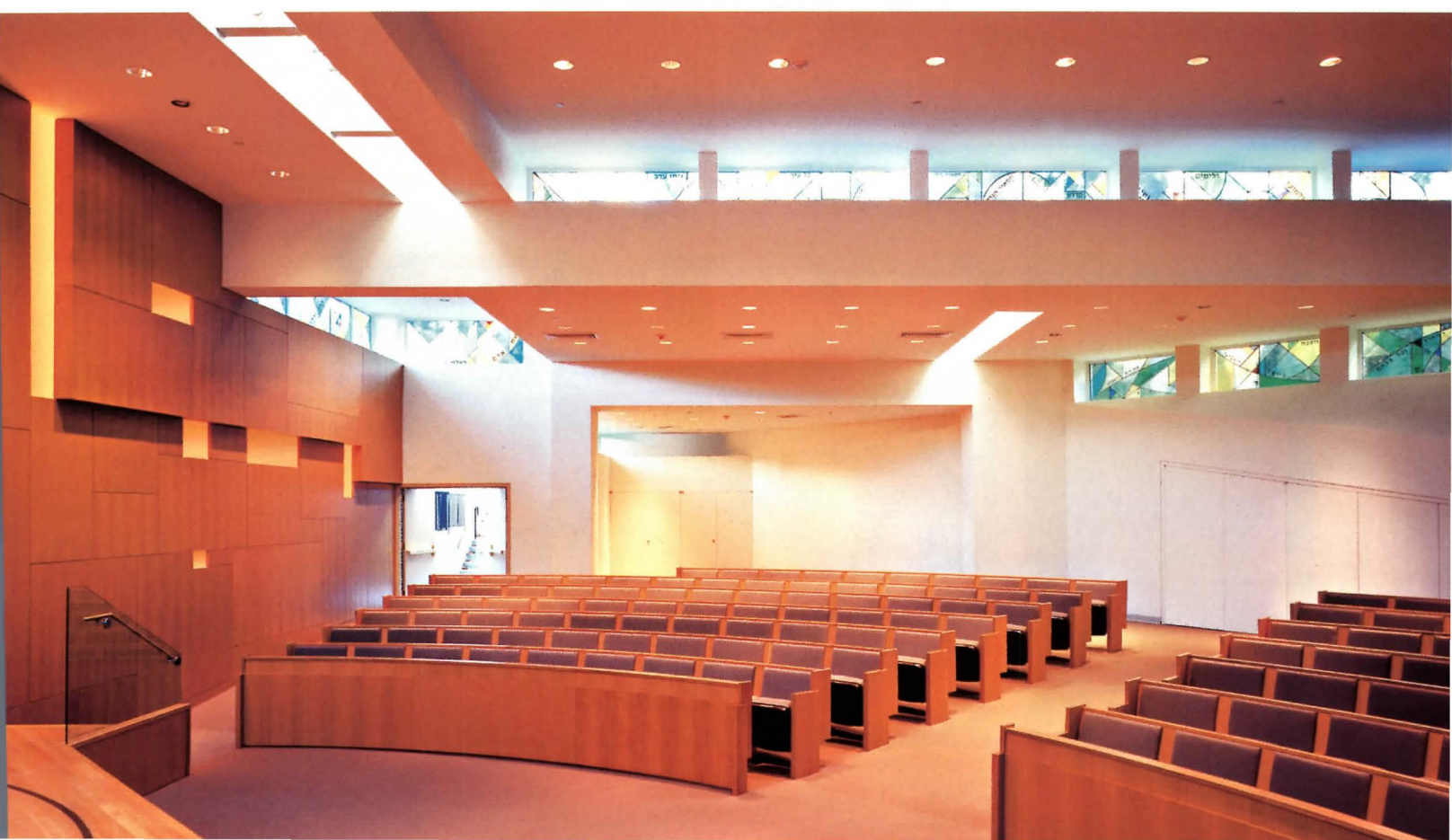
tect lowered the river. He sank the floor to gain height, and at the ceiling spun a thread of colored light with custom stained-glass clerestory windows of his design.

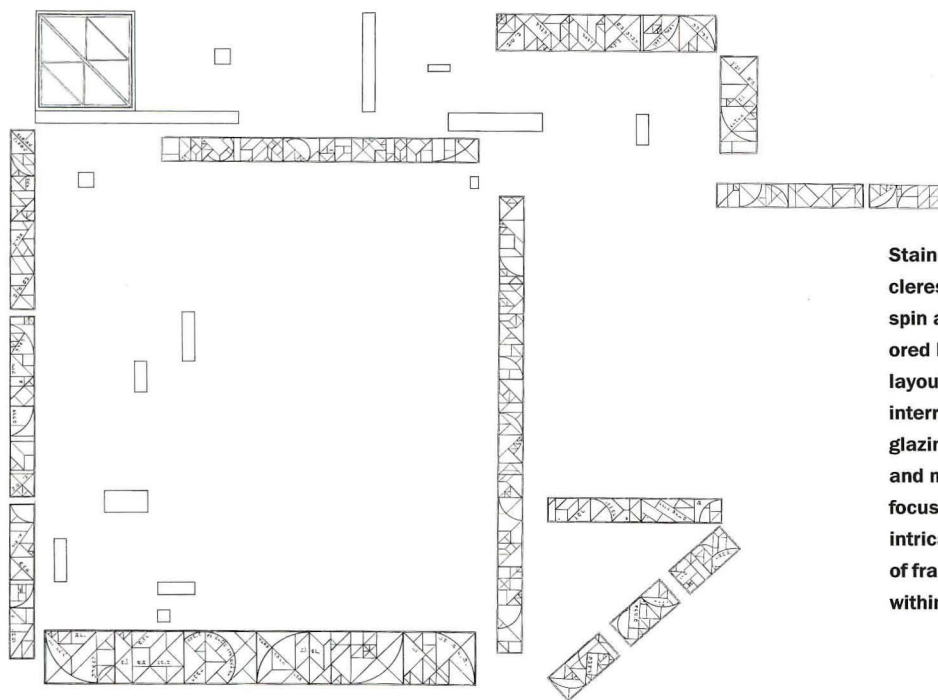
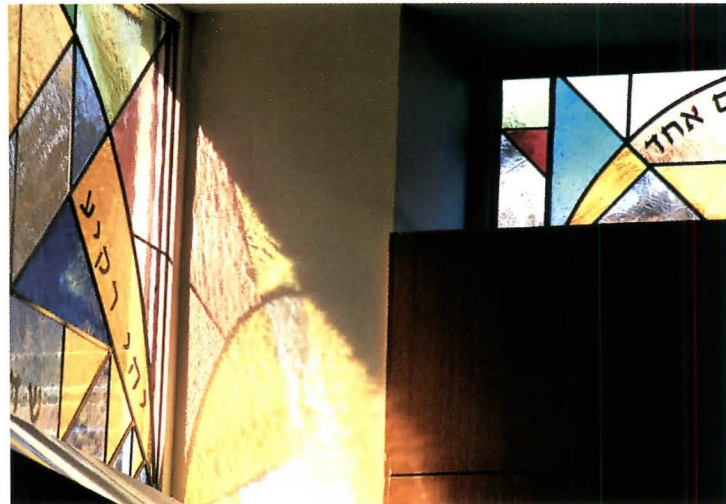
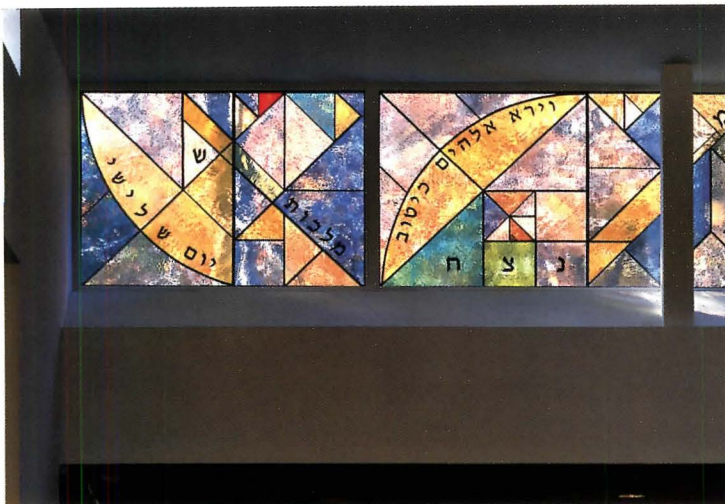
According to the synagogue's rabbi, Marvin Tokayer, the use of colored light through the windows lends

a sense of awe. The interior wall and roof surfaces appear in flux, sliding past each other. One brass-paneled wall actually pivots and rolls back to cover and protect the ark when the sanctuary is used as an auditorium.

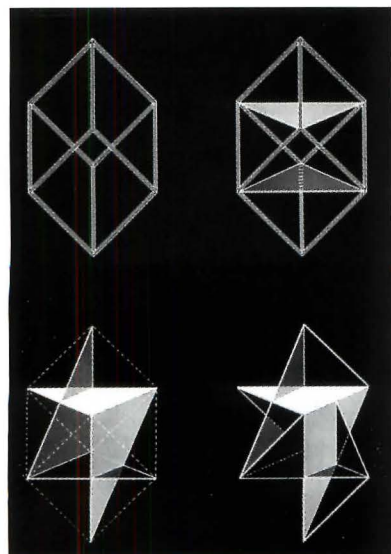
For the sanctuary's central focus, Gorlin evokes a passage from

The architect's sensitive insertion needed to fill all the program requirements for worship, but had to do so without exceeding 45 feet above sea level. The new addition, built into the side of a hill, seats 210 and is used every Sabbath and holiday for this congregation of families (right, below).





Stained glass clerestory windows spin a thread of colored light (top). The layout (left) shows the interrelationship of glazing, stained glass, and mirrors. A central focus is a cube with an intricate assemblage of fractured planes within (below).



the Old Testament's First Book of Kings, which provides an architectural description of the Holy of Holies in Solomon's temple: that it was "20 cubits long, 20 wide, and 20 high"—a cube of about 30 feet. While much smaller, North Shore's cube is designed to serve as a symbol of this sacred place in Judaism.

Over this symbol is laid a second: an intricate assemblage of fractured planes within the cube that recalls the Kabbalistic creation myth, in which the order of the original universe is shattered. Inside of this broken structure floats the Eternal Light contained within a geometric vessel that appears as a fusion of triangles. Directly below the shattered cube is the ark, the doors of which open to reveal a ritual curtain, or parochet, that covers the Torah within. The design of the parochet includes the Kabbalistic diagram of the *sefirot* and their Hebrew names.

A passage in First Kings notes that narrow clerestory windows were made in Solomon's Temple. At North Shore, the clerestory windows recall the tradition of assigning different colors to the light of the *sefirot*. The creation story is told through the windows, right to left, as each panel's geometric pattern and color suggest a day: the creation of light; of the sky; of vegetation; of the sun, moon, and stars; of the animals; and of woman and man. The last window, on the west wall, is the Sabbath—the day of rest. Says Rabbi Tokayer, "The space is very mystical, a meeting of the divine and the human." ■

Two inverted triangles
shift against each
other, suggesting a
Star of David at certain
angles or the "emana-
tions of the *sefirot*"
from the Kabbalah
(below, right).



St. Peter's by the Sea

Gulfport, Mississippi

2

ERROL BARRON AND MICHAEL TOUPS ARCHITECTS DOMESTICATES THE EPISCOPAL CHURCH WITH THE ARCHITECTURAL LANGUAGE OF CARPENTER GOTHIC.

By Christine Kreyling

Project: *St. Peter's by the Sea Episcopal Church, Gulfport, Mississippi*

Architect: *Errol Barron/Michael Touns Architects—Errol Barron, FAIA, partner-in-charge and project architect; Michael Touns, FAIA; Steve Olson, AIA; Byron Mouton, AIA; James Carney*

Client: *St. Peter's by the Sea—John Caridad, rector; Doug Singletary, chair of building committee*

Consultants: *Zehner and Bouchon (structural engineers); Canon Engineering (mechanical and electrical)*

General contractor: *George P. Hopkins, Inc.*

Size: *12,500 square feet*

Cost: *\$2 million*

Sources

Structural system: *Steel frame with metal stud infill*

Exterior cladding: *Lower section of church building—portland cement stucco with finish coat of synthetic stucco; upper section of church building—western red cedar board and batten; parish hall—western red cedar board and batten*

EIFS: *Final coat on stucco only*

Roofing: *16 oz. copper on steeple*

Tile/shingles: *GAF Slateline*

WWW

For additional places of worship and more information on the people and products involved in this project, go to Building Types Study at www.architecturalrecord.com

Program

St. Peter's by the Sea wanted to return to tradition after a lengthy sojourn in 1950s architecture. "The almost industrial style of the building had not worn well," says rector John Caridad. "We wanted something that looked more like a church." A new site was located, across Highway 90 from the beach, on one of the few stretches of casino-littered coastline still dominated by residential architecture.

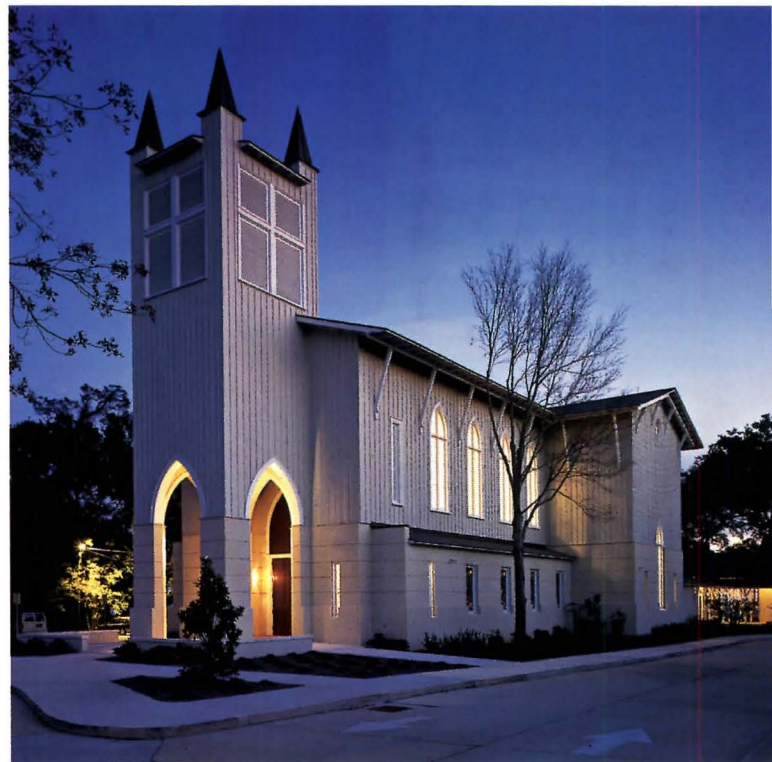
Rector and building committee asked architect Errol Barron for a 200-person-capacity church, a 24-seat chapel, and space for a large organ and choir. Other requirements included a parish hall, offices, classrooms, storage, and an outdoor area for informal gatherings.

Solutions/Intentions

Barron located the church facing the neighborhood street "because there was no good way to get traffic in and out" along the busy beach highway. The other building occupies the highway side, set behind a shady lawn. This multiuse, one-story structure with dormers reads like a house from the highway, reinforcing the residential context.

While Barron describes himself as "a modernist at heart," here he

Christine Kreyling is a freelance writer who serves as the architecture and urban planning critic for the Nashville Scene.



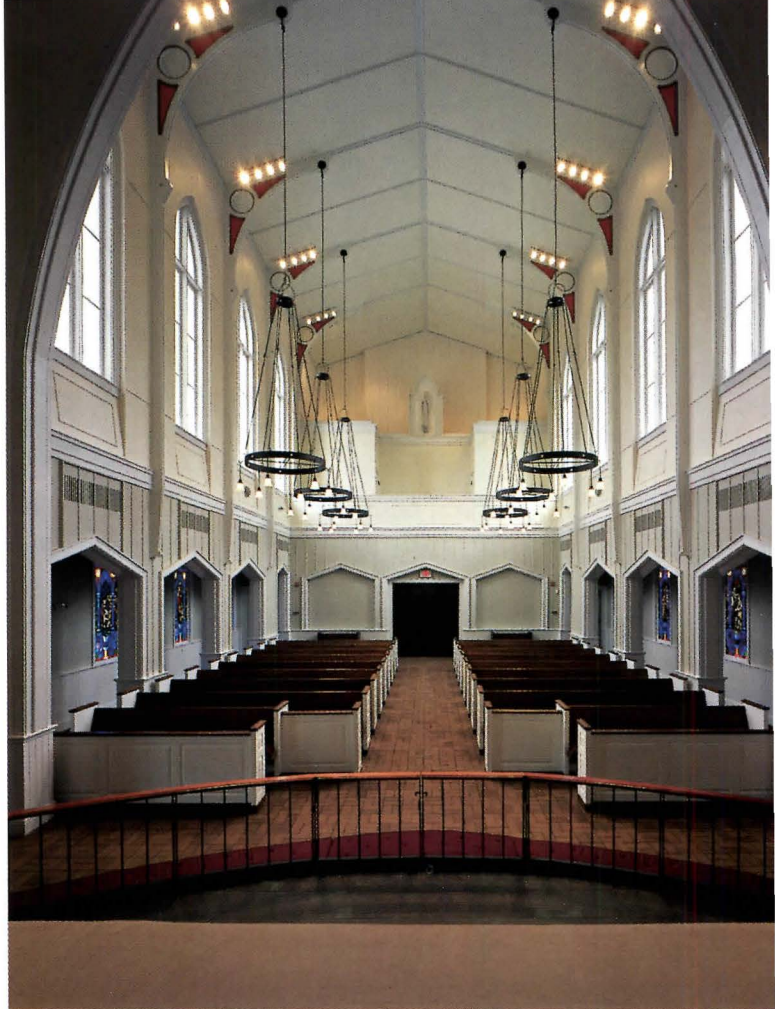
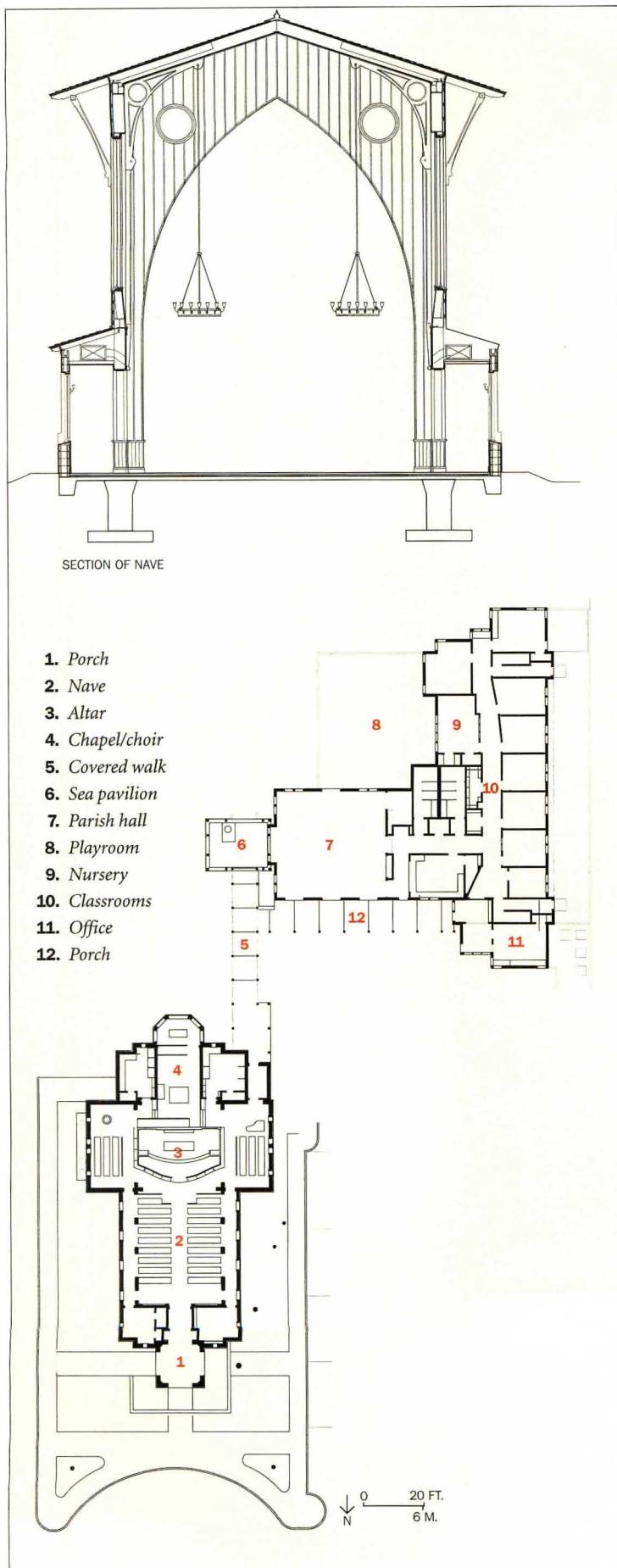
employed the architectural language of Carpenter Gothic. This style is rooted in the 19th-century pattern books that championed the Gothic for the country cottage. "The site lies at the end of a string of remarkable wooden buildings," Barron explains. "The Gothic-in-wood, with its country church associations, seemed appropriate. Keeping the building chapel-like when it's actually much larger was tricky."

Barron manipulated the perception of scale by dividing the exterior of the church horizontally,

into an upper facade of wood and, to the height of the low side aisles, a stucco base with an acrylic finish etched to look like masonry. He also placed four peaks on the bell tower rather than a single and more massive cap. The verticality of the board-and-batten siding is suitably Gothic, the cedar stained rather than painted for a rustic finish. The broad eaves, with their long rafter tails and brackets, cast shadows that further texture the surface. The brackets also help the building to resist winds in this hurricane-prone

St. Peter's is integrated by means of a breezeway connecting church with terrace and parish hall porch. A pavilion of lattice frames the path to the gulf (right, below).





area. "They literally hold the roof on," Barron says.

For the interior the architect rejected the currently fashionable central plan as "too secular. The congregation preferred the more formal traditional nave, but we pulled them closer to the altar by means of the transepts," Barron explains.

The most striking feature of the plan is the interlocking relationship between church and chapel. Screened by the reredos behind the altar, the chapel serves as choir space for Sunday services, with the organ recessed into its floor. Choir and organ are thus hidden from the congregation, suggesting a heavenly source for the sound. When the chapel is used for discrete services, chairs are turned to face the altar, and the clear glass apse that pushes south into the prayer garden provides views of live oaks, beach, and gulf.

Interior materials—brick-and-slate floors, board-and-batten and beaded wood, mahogany trim with a nautical spar varnish—reinforce the

country church character. Side aisle windows are stained glass, blocking unsightly views, and clear lancet windows in the nave offer vistas of sky and clouds.

Comments

St. Peter's is integrated by means of a breezeway connecting church with terrace and parish hall porch. A pavilion of lattice, wrapped around a live oak, frames the path to the gulf.

Rector Caridad is pleased with the church's adaptability to concerts, opera, and plays. "Music is an important part of our program," he says. "In the 2000–2001 season we hosted nine events. The acoustics are phenomenal."

For architect Barron, Carpenter Gothic proved compatible with the more contemporary forms he prefers. "The severity is not so different from Modernism. And there's an interesting tension between the almost hokey wooden Gothic and the great stone cathedrals to which it refers." ■



The architect rejected the currently fashionable central plan as too secular. The congregation preferred the more formal traditional nave, pulled closer to the altar by means of the transepts.

Santa Maria de las Brisas

Santo Domingo, Chile

3

FERNANDO DOMEYKO'S CHURCH SPEAKS SOFTLY OF THINGS ANCIENT AND MODERN, TRANSIENT AND PERMANENT, PHYSICAL AND SPIRITUAL.

By David Dillon

Project: Santa Maria de las Brisas, Santo Domingo, Chile

Architect: Fernando Domeyko Pérez

Production team members: Eric Mar, Benjamin Black, Jack de Volpine, Duncan Kinkaid, Jonathan Lavery, Mathew Noblet, Richard Olson, Sean Kwok, Steven Lee, Talia Braude, Alfred Gutierrez, Anthony Montaldo, Joel Turkel, Euhee Kim, Christopher Nutter, David Wiborg, Susanne Mae, Amy Lee

Client: Condominio las Brisas de Santo Domingo

Engineers: Eduardo Spoerer, Spoerer y Asociados Ingenieria, Ltda. (structural); Timothy Eliassen, TryPyramid Structures, Inc. (mechanical); Steven Varga, Waclaw Zalewski (structural consulting); Kurt Wagner, BOSE (acoustical)

General contractor: Ignacio Hurtado, Ltda.

Size: 3,600 square feet

Cost: \$2.5 million

Sources

Wood fabricator: Mario Wagner, R.G. Ingenieros, Ltda.

Stainless steel: Afredo Gredig, Nautivelas, Ltda.

WWW

For additional places of worship and more information on the people and products involved in this project, go to Building Types Study at www.architecturalrecord.com

Program

Imagine an egg sitting on a table, then reimagine the table as a grassy plateau with a forest at one end and the Pacific Ocean at the other, and you have the form and the context for Iglesia de Santa Maria de las Brisas.

Designed by Chilean architect Fernando Domeyko, the church is located in a fashionable suburb of Santiago, Chile, which, like its American counterparts, is a centerless sprawl of overstuffed houses and exclusive golf courses. In 1995, Domeyko won a design competition for a small meditation chapel, only to have his victory annulled when the community decided that what it really wanted was a church that would seat 350. Domeyko won that competition as well, getting the news the day before he returned to his teaching post at MIT.

In his mind, the church is both an island of urbanity in a suburban place and a means of enriching the spiritual and intellectual lives of the residents. "I wanted to design a building that was rooted in something larger than itself," he explains, "in nature or the environment. A place where you lose all sense of time in contemplating the arc of light and the forces of gravity."

Contributing editor David Dillon is the architecture critic for the Dallas Morning News and the author of six books.



Solutions/Intentions

Timelessness is implicit in the oval—a shape without beginning or end—as well as in the building's conspicuous evocations of ancient precedents, from Stonehenge to Inca fortresses to 11th-century Spanish churches. Yet the architect also chose the oval because it is strong, like an egg, and able to withstand the powerful earthquakes that are common in the region. And because it lacks corners and sharp edges, it doesn't generate winds that could damage the nearby stand of rare boldo trees, which are valued for their medicinal properties.

Visitors approach the church from the forest edge, passing beneath a spare modern bell tower

and colonnade to an entry plaza, which is partially bermed to hide the houses beyond. The circuitous route is an abbreviated pilgrimage, designed to empty the mind of worldly distractions before reaching the final destination.

Though barely three years old, Santa Maria de las Brisas already looks ancient. Oil from the concrete forms has mottled its exterior, to which an oxidizing copper roof has added flowing green stripes, as in a Morris Louis painting. The interior is spare and dark, with only indirect light on the first level and narrow slots of light above, as though the entire sanctuary were a celestial observatory. The altar faces the sunrise, as in ancient temples, with

Visitors approach the church from the forest edge, passing beneath a spare modern bell tower and colonnade to an entry plaza. The cir-

cuitous route is an abbreviated pilgrimage, designed to empty the mind of worldly distractions before reaching the final destination.



the morning light forming a stunning abstract cross behind it.

Yet within the fluid shell Domeyko has created a smaller rectangular space defined by four tall concrete columns. Structurally, the columns stabilize the egg and keep it from flying apart in earthquakes; ritually, they create a church within a church where intimacy and infinity meet.

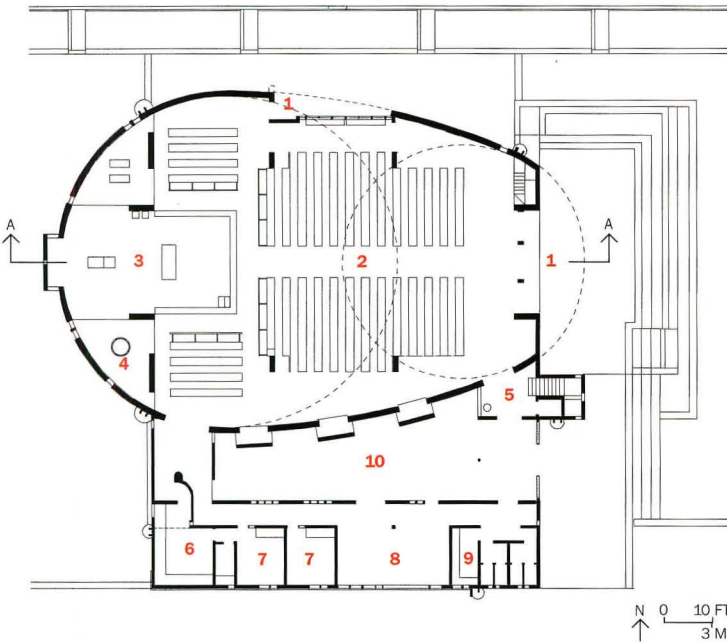
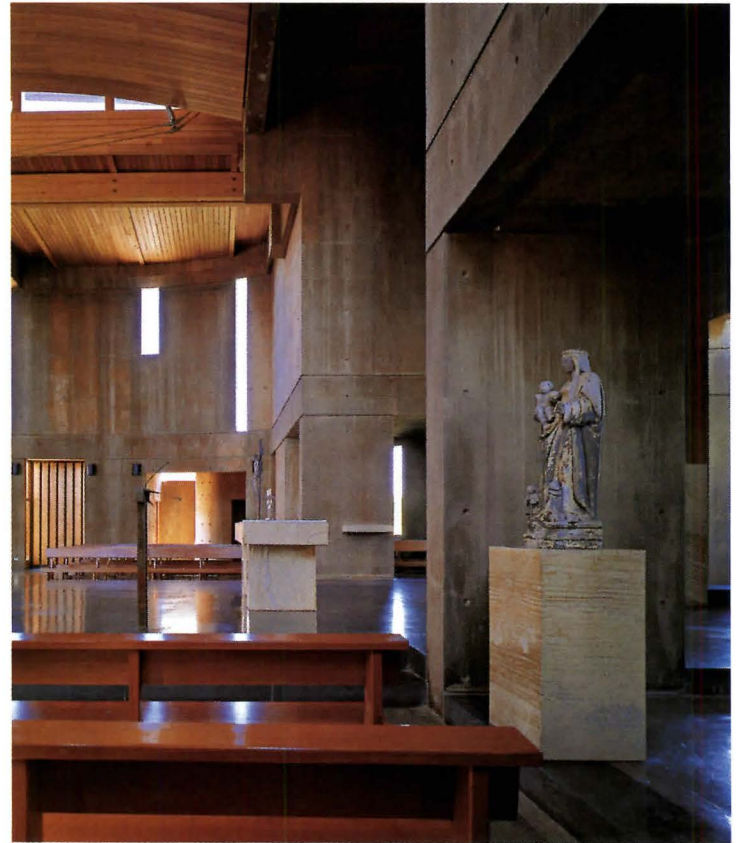
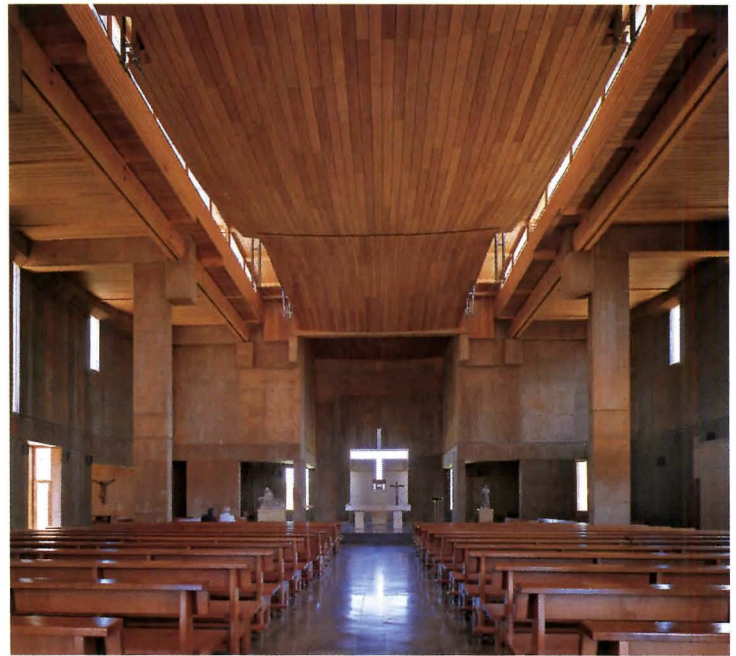
Overhead hangs a double-curved acoustical ceiling, shaped like a cello or the hull of a boat, and finished in a blond wood that brightens the dark interior. The ceiling slopes downward from the choir loft, compressing sound toward the congregation, then upward over the altar to give the celebrant's voice room to soar. The

pale wood provides a mellow counterpoint to the raw concrete, its supple forms playing against the rectangular columns and beams.

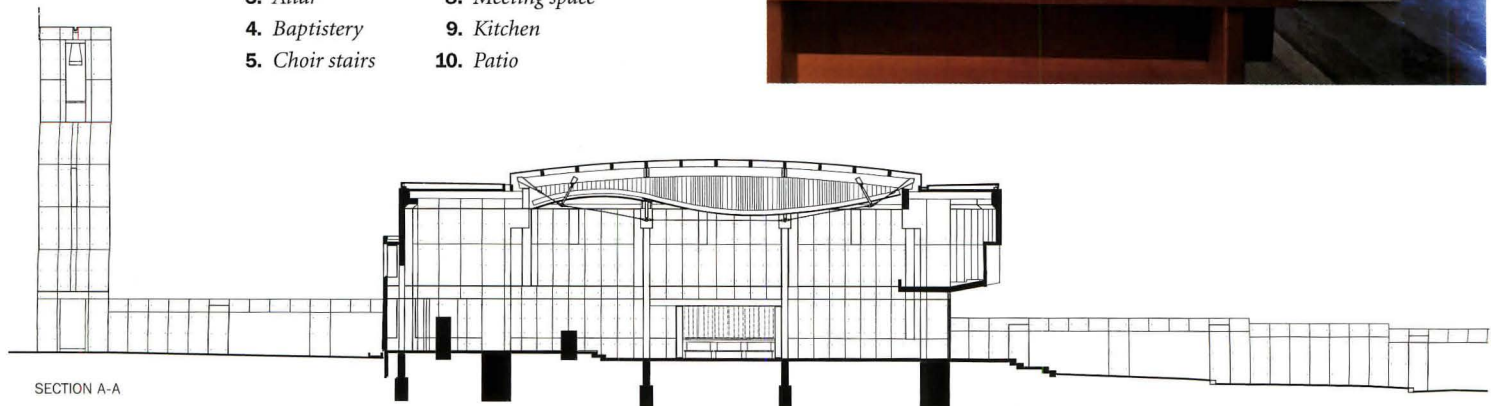
Commentary

The power of Santa Maria de las Brisas resides in its seamless integration of ancient and modern, transient and permanent, physical and spiritual. Without being overbearing, it brings all the senses into play to create a private and deeply internalized sense of space and time.

"The whole church is a dialogue," says Domeyko. "Buildings are too simple these days, with everything reduced to a single impression. In this church, nothing is revealed easily. You have to sit and wait for it to speak." ■



- 1. Entrance
- 2. Assembly
- 3. Altar
- 4. Baptistry
- 5. Choir stairs
- 6. Sacristy
- 7. Offices
- 8. Meeting space
- 9. Kitchen
- 10. Patio





The interior is spare and dark, with only indirect light on the first level and narrow slots of light above, as though the entire sanctuary were a celestial observatory.

White Temple

Kyoto, Japan

4

TAKASHI YAMAGUCHI AND ASSOCIATES USES CONTRAST TO DEFINE THIS TEMPLE OF SUBTLE VISION YET MODEST DIMENSIONS.

By Naomi R. Pollock, AIA

Project: White Temple, Kyoto, Japan

Architect: Takashi Yamaguchi and Associates

Client: Zuisen-ji Temple

Engineer: Taiki Maehara, SD Room (structural); Higuchi Denki Co., Ltd (electrical)

General contractor: Kyoritsu Komuten

Size: 800 square feet

Completion date: September 2000

Sources

Masonry: Yoshimura Stone Company

Painter: Sakai Toso

Furniture: SHUEI

Glazing: Asahi Glass Company

Lighting: Yamagiwa Corp. (downlights); NIPPO Electric Co. (concealed lighting)

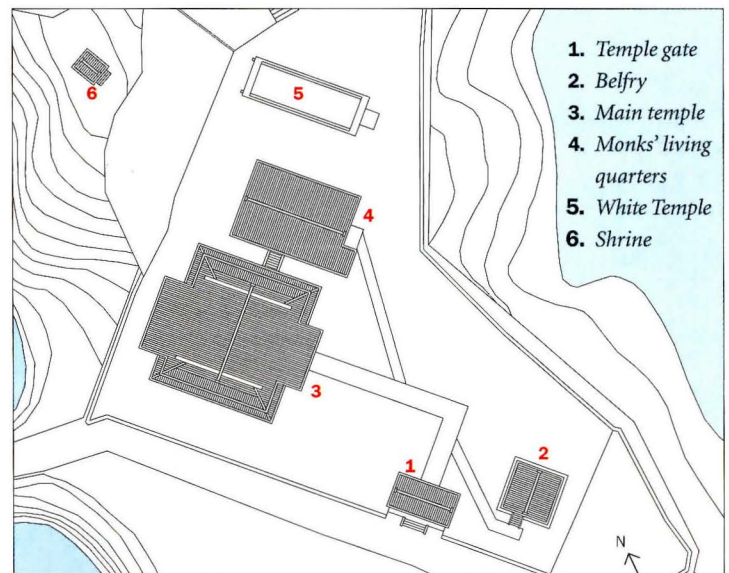
Program

White Temple, the recent addition to Zuisen-ji, a Buddhist temple compound on the outskirts of Kyoto, hardly blends in with the scenery. The rectangular, concrete box amid a sea of black gravel contrasts dramatically with the existing main hall, monks' quarters, and belfry—all timber post-and-beam structures capped by swooping tile roofs. Not to mention the mountains in the distance and Lake Tsutenko nearby. But that was exactly architect Takashi Yamaguchi's goal. Instead of trying to blend in by disguising his building's age or downplaying its contemporary materials, Yamaguchi uses contrast to define a place for worship yet also relate the building to its historical and environmental contexts. The white building extends an existing chain of contrasts, tying gray clouds to blue skies and blue skies to green hills. Though modern looking, White Temple has the hallmarks of its historic antecedents: a form that underscores the setting's natural beauty, a sequence of spaces tailored to a particular ritual, and a sanctuary that invites contemplation.

Solutions/Intentions

An austere, one-room chapel used exclusively for memorial services, the 32,000-square-foot White

Naomi R. Pollock is an architect living in Japan, where she writes about design.



Temple is divided into two halves: one for mourners and one for mortuary tablets inscribed with the names of the deceased. A smooth marble slab floating above the ground and jutting out from the building draws visitors in. It leads first to the seating area for family members, designated by straw tatami mats set into the floor, followed by another marble-floored area for monks conducting the service.

The second half of the room is dominated by a massive stepped platform where the memorial tablets are placed during the ritual. Intended to draw the gaze upward, the stepped platform hovers slightly above the floor and culminates in a modest altar where a Buddha figure stands, illuminated from behind in

the traditional manner of *gokou*, the painted, golden halo accompanying many Buddha statues. But instead of highlighting the figure with an artificial golden halo, Yamaguchi lit this one more abstractly with soft, natural light coming from the frosted-glass window comprising the entire rear elevation. The vast plane of glass filters the sun's brightness like a giant shoji screen, but replaces it with an otherworldly glow at the back of the sanctuary.

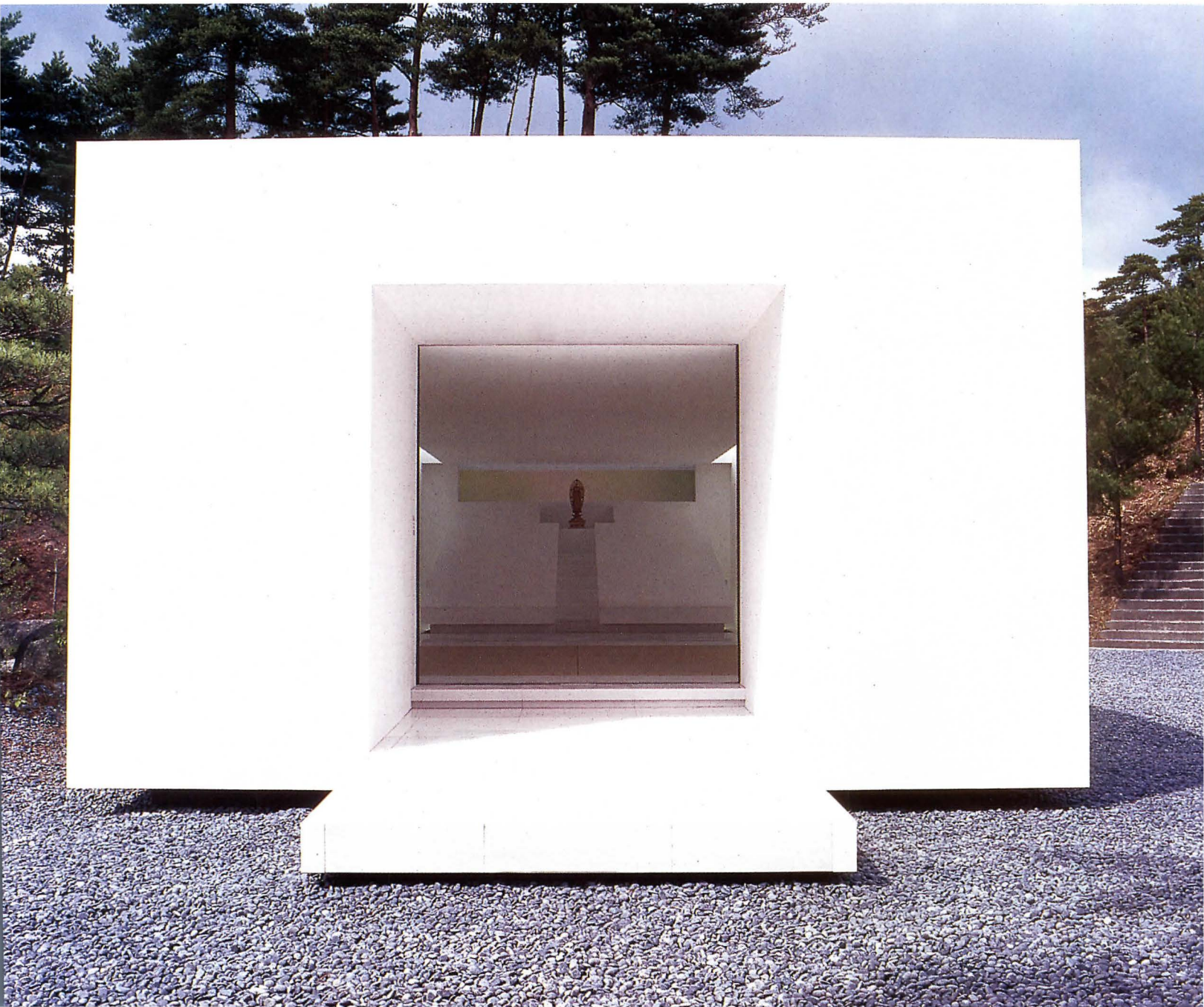
Though largely eclipsed by the stepped platform, the rear window echoes the generous front entrance. A pair of narrow frosted-glass skylights running down either side of the building spans the distance between these two openings. Small fixtures tucked

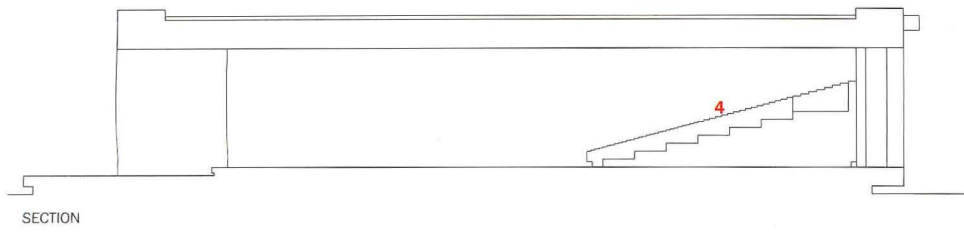
WWW

For additional places of worship and more information on the people and products involved in this project, go to Building Types Study at www.architecturalrecord.com

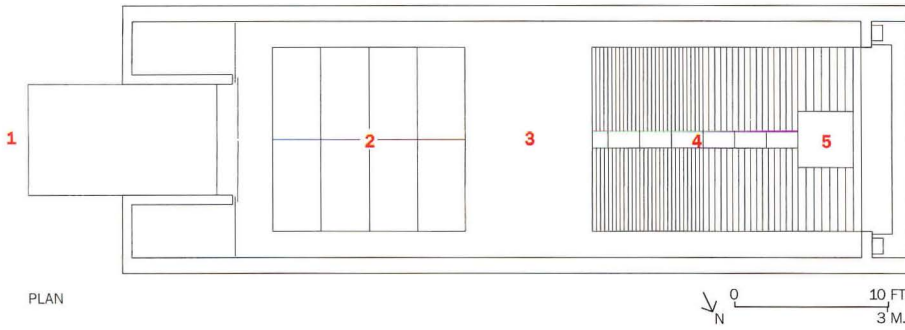


The rectangular concrete box amid a sea of black gravel contrasts dramatically with the existing timber post-and-beam structures capped by swooping tile roofs.



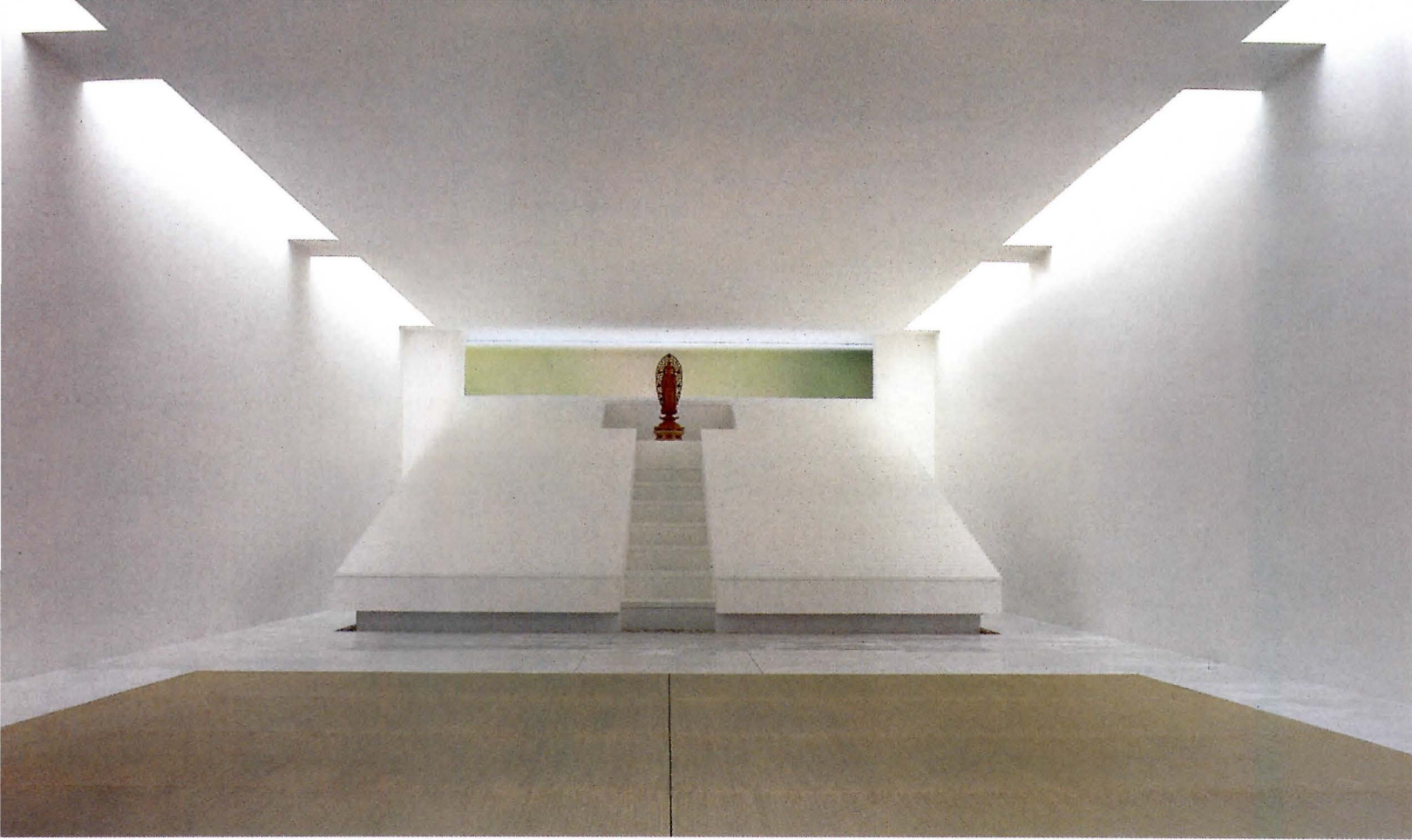


1. Entrance
2. Gaijin (tatami mats): a space for relatives of the deceased
3. Naijin: a space for monks who conduct the service
4. The altar where mortuary tablets go
5. A tier where the Buddha stands



The building's dominant axis and strong sequence of spaces symbolize the progression from this world to the next. Encased in walls almost a foot thick and filled with muted light, the womb-like interior is still and suspended from the world outside (below).





beneath the base of the stepped platform supply additional light for evening services. The building's dominant axis and strong sequence of spaces symbolize the progression from this world to the next. But these linear qualities are balanced by the womblike interior's stillness and suspension of outside concerns that come from encasing it with walls almost a foot thick and filling it with muted light. Yamaguchi's intention was to recreate the atmosphere of a Zen meditation garden within the sanctuary. Minimal compositions of

sand and stone, these gardens were designed to focus the viewer's attention inward by paring away everything unnecessary, says Yamaguchi.

Comments

A native of Kyoto, Yamaguchi has tremendous reverence for Japan's spiritual spaces and has devoted much of his career to understanding them. While his contemporaries in Tokyo were in hot pursuit of the latest trends, Yamaguchi was unraveling the mysteries of ancient temples and shrines, first as a student at Kyoto

University and then during a 10-year stint working for Tadao Ando. Yamaguchi made his own debut with Glass Temple, an addition to Reigenko-ji, an imperial temple compound in Kyoto dating from 1638.

Determining which aspects of tradition are expendable and which ones can be transcribed using today's materials and methods is tricky business. While many architects have tried their hand at it, few are able to pull it off. Yamaguchi succeeds because he uses technology to preserve and promote the essence of tradition. Not the other way around. ■

Small fixtures tucked beneath the base of the stepped platform supply additional light for evening services (below).



Dynamic Concrete in the 21st Century

THREE NEW PROJECTS BY RAFAEL MONEO, STEVEN HOLL, AND RICHARD MEIER ILLUSTRATE THE ONGOING VITALITY OF THE WORLD'S OLDEST BUILDING MATERIAL.

By Sara Hart

The primary ingredients for concrete—air, water, cement, aggregate, and sand—have been around since the earth cooled. The ancient Romans made pozzolan cement from burned lime and volcanic ash. The ash came from Pozzuoli, Italy, near Mt. Vesuvius, hence the name. (Today *pozzolan* refers to any inorganic compound, especially fly ash, used as either an admixture to or replacement of portland cement.) Of all their engineering accomplishments using this material—baths, aqueducts, roads, and the Colosseum—the Pantheon (A.D. 118–128) in Rome has to be the most astonishing. Unreinforced, in our sense of the term, yet still standing after 1,800 years, the structure has been much studied, but its endurance remains a marvel to engineers, architects, and lay people.

Concrete, as the most ubiquitous building material in the world, may be considered blandly sturdy in most applications, but in talented hands it can be strikingly beautiful, as in the case of the three projects featured here—two churches and a university dormitory. All currently under construction, they promise to usher in a new era of structural and architectural integration. Yet, all three are different in concept and execution.

Built to last

“One of the biggest issues in concrete now is durability,” says Nicholas Roberts, project architect for Leo A Daly, executive architect for the Cathedral of Our Lady of the Angels in Los Angeles. (1996 Pritzker



The concrete walls of the Cathedral of Our Lady of the Angels range from one to five feet thick.

Prize winner Rafael Moneo of Madrid, Spain, is the design architect.) If durability is a problem in general for the construction industry, the Archdiocese of Los Angeles made it the overriding issue by mandating that the new cathedral stand its ground like a medieval cathedral for 300 years.

“Of course, the Romans used a form of concrete,” explains Roberts, “but the reinforced kind we use now has only been around about 140 years.” It’s hard to anticipate the stamina of a material over the course of three centuries, in a region where there are no precedents to study or data to examine. Roberts and his colleagues located a couple of churches in the Los Angeles area that had been built in the 1920s. The concrete in these structures suffered from the number one enemy of most buildings: moisture penetration. Over time, concrete breathes, bringing in air and, in this case, salty and polluted water. The moisture works through the concrete and rusts the reinforcing steel bars. The rusted rebar expands, pushing the concrete away, resulting in cracking and spalling. Stainless-steel rebar is a good solution to the rusting problem but prohibitively expensive to use throughout most projects. Although it was used in a few critical areas in the cathedral, the architect and engineer specified that the standard rebar be placed no closer to the exterior than three inches rather than two inches, which is typical.

The architect wanted a smooth, refined finish to the concrete exteriors and designed the walls with a “shingled” surface in some areas.

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 258 and follow the instructions.

LEARNING OBJECTIVES

After reading this article, you should be able to:

1. Describe technological improvements to concrete.
2. Identify types of cements and why they are used.
3. Explain the most common problem of concrete structures.

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



**Cathedral of Our Lady of the Angels,
Los Angeles, California**

Architect: José Rafael Moneo
Architects, Madrid, Spain

Associate architect: Leo A Daly
Architects, Los Angeles, Calif.

Date of completion: September 2002

Consultants: Morley Construction
(contractor); Nabih Yousef (structural engineer); Catalina Pacific Concrete (supplier); Davis Color (custom color); Paulo Monteiro (computer simulation); Reginald Hough (concrete)



Morley Construction built many mock-up walls (above and left) off-site to test color and texture and to experiment with “shingled” surfaces. Chilled water, refrigeration, and mist cooling kept the materials cool on-site to ensure a 75 degree maximum temperature for the concrete at the time of placement. In warm weather, pours began at 5:00 A.M.

The challenge was to find a concrete recipe and curing method that would reduce shrinkage and thermal cracking. Furthermore, the structural engineer had been directed to deliver a building that would sustain quality of service after an earthquake. Besides the concrete investigation, structural engineer Nabih Youssef designed an isolated-base system of rubber isolator pads and sliders, which support the building and the adjacent campanile and isolate them from their foundations during lateral accelerations generated by earthquakes.

Roberts worked with Terry Dooley, senior vice president of Santa Monica-based Morley Builders, the general contractor for the cathedral, and David Selna, Morley’s project manager for concrete, among other consultants, to devise a multifold strategy to manage all structural and aesthetic concerns.

One critical decision involved the cement. The concrete mix for the walls includes Lehigh Aalborg cement, a type of Danish white cement, because it is uniform in color and generates a lower heat of

hydration than other white cements; and fly ash, the silicious by-product of coal burning. Heat of hydration is the heat generated when cement and water interact. A lower heat was needed because of the unusual mass of the walls, which range from one to five feet thick. Such

THE CHALLENGE WAS TO FIND A CONCRETE RECIPE AND CURING METHOD THAT WOULD REDUCE SHRINKAGE AND CRACKING.

mass traps heat, potentially raising the internal temperature levels above the 160 degree limit determined for curing, and increases the risk of thermal cracking.

The pozzolan fly ash replaced part of the cement content of the mix. “It also improved workability, ease of placement within the forms and around the reinforcing steel,” according to Dooley. “This tends to improve surface quality, where the concrete meets the form



Concrete forms (below and left) were made of double-thick plywood to improve the flatness of the surfaces. Extra strongbacks and supports increased rigidity and accommodated a four-foot spacing for wall ties. To reduce thermal shock, forms remained in place for at least 2 ½ days.



surface.” Not only is pozzolan economical and readily available in southern California, but the supplier, Boral Materials, guaranteed a narrow color range of light gray to off-white, as the architect specified.

The concrete choice responded to the changing dynamics of wall design, since the walls vary in thickness. Some diversity is due to different loads at different locations, requiring them to be thicker at the bottom. But this project is different. Moneo desired a wide variation in angles, with nonparallel surfaces in corridors and openings. Dooley, who was intimately involved with the process and the results, insists that “the play of light on these highly varied surfaces will be one of the great features of the cathedral.” Such an effect required over 800 different corner angles for the forms that were built to hold the concrete.

The exterior walls have an unusual shingle effect, which was achieved by building the pattern directly into the formwork. The resulting four-foot-tall “shingles,” each offset three inches from the adjacent one, have a smooth finish, which belies their material. “In real-

ity, it is a solid wall of reinforced concrete. Because of the quality of the finish, many observers have asked what veneer has been suspended from the walls or have asked for the source of our precast cladding,” explains Dooley. “We have neither of these. It’s a cast-in-place architectural concrete surface.”

Full of holes

Seismic concerns lessen on the East Coast, but there are still circumstances that call for invention. The site for a new undergraduate dormitory at the Massachusetts Institute of Technology (MIT) presented a tricky urban dilemma for New York architect Steven Holl. The site is a long and narrow parcel on the banks of the Charles River a few hundred yards from Alvar Aalto’s 1948 Baker Dormitory. The site’s prominence, however, was compromised by its awkward configuration. Holl had to figure out a way to build a 350-room dorm on a 90-by-2,100-foot lot without creating a massive wall that would obstruct the



**Simmons Residence Hall
at MIT, Cambridge, Mass.**

Architect: Steven Holl Architects,
New York

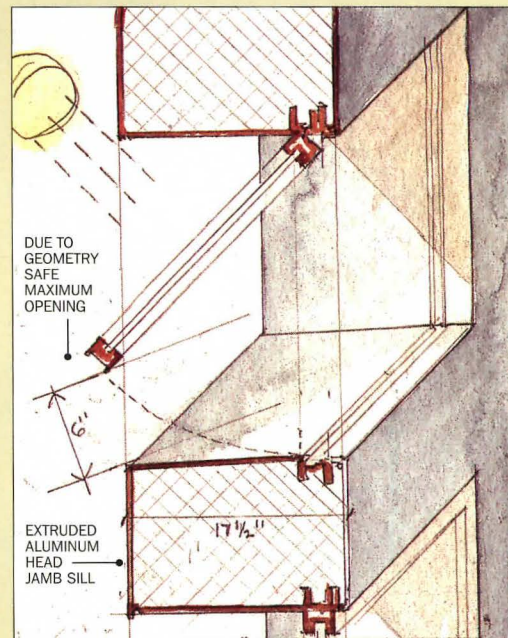
Associate architect: Perry Dean
Rogers, Boston, Mass.

Date of completion: Fall 2002

Consultants: Guy Nordenson
(structural); Simpson Gumpertz
& Heger (structural); Beton
Bolduc (concrete supplier)



Each single room has nine operable windows (right), two by two feet. Cast-in-place Percon panels create a gridded facade, which allows for long spans without deep beams. A stress diagram of the facade (bottom right) shows the concrete stresses in red and blue.



adjacent residential neighborhood's views of the river. Holl looked for a "porous building morphology" in which the geometry included five large-scale openings.

The solution for both structure and massing came from New York structural engineer Guy Nordenson, who developed a precast con-

"HIGH-STRENGTH CONCRETE IS DENSE AND PROVIDES A CLEAN AND RUGGED SURFACE ON THE INSIDE OF THE BUILDING."

crete system he calls Percon (short for perforated concrete). "It allows for a variable structure, which acts as a perforated bearing wall able to bridge the large openings, cuts, and cantilevers around the entire building," explains Nordenson. "The high-strength concrete is quite dense and provides a clean and rugged surface on the inside of the building. It is covered on the outside by insulation and aluminum panels that add as

well to the thermal mass of the building."

All the vertical and horizontal members are the same—either 10 by 12 inches (floors 1–5) or 10 by 10 inches (floors 5–10)—and are made of high-strength concrete with four reinforcing bars each. Iterative analysis showed that stresses in the members exceeded the capacity of the concrete where they cantilever around the building's corners or large openings. Nordenson solved this problem by increasing the diameters of the reinforcing bars as needed from numbers 5 (3/8 inch) through 9 (1 inch), and then repeating the analysis until no members were overstressed. This solution is cleverly illustrated on the facade. The heads and jambs of the windows are color-coded according to the stress they bear—red means high stress; blue, low stress. "The facade is a big stress diagram," jokes Nordenson. It is MIT, after all.

Concrete sails in Rome

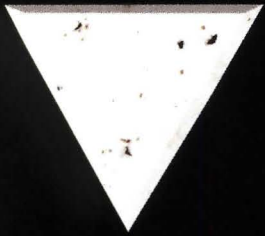
A few miles from the Pantheon, an American architect is stretching the



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CIRCLE 66 ON INQUIRY CARD

**Dio Padre
Misericordioso
(Jubilee Church),
Rome, Italy**

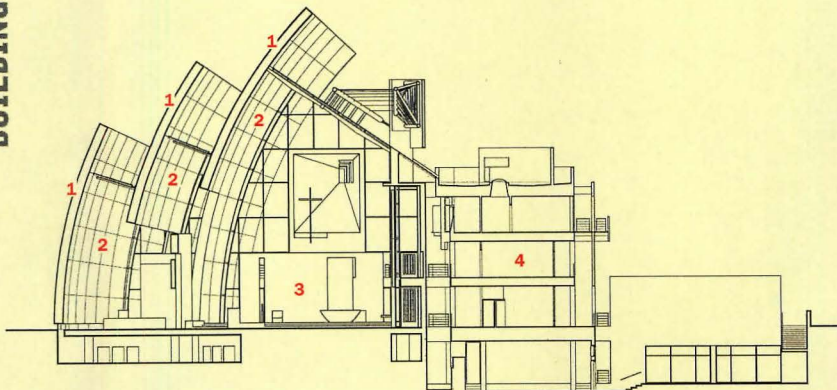
Architect: Richard Meier
and Partners, New York

Date of completion:
Early 2002

Consultants: Arup (structural);
Guy Nordenson (structural);
Italcementi (concrete and gantry crane)



Three precast concrete blocks, each weighing 10 tons, are hoisted into place by a rolling gantry crane (below). The final shells will range in height from 57 to 90 feet.



1. Concrete shells
2. Glass panels
3. Sanctuary
4. Community center



architectural limits of concrete. In his first ecclesiastical commission, New York architect Richard Meier has created a bold and modern precedent for civic and liturgical architecture with his design for the Jubilee Church in Rome. Commissioned by the Archdiocese of Rome, the church and adjacent community center are intended to revitalize an isolated residential

SEPARATED BY VERTICAL EXPANSES OF GLASS AND CONTINUOUS SKYLIGHTS, THE SHELLS APPEAR TO BE FREESTANDING.

district seven miles from the center of the city. Under construction since March 1, 1998, the 9,000-square-foot church's massing is defined by three concrete shells, ranging in height from 57 to 90 feet. The shells delimit three distinct spaces—the main sanctuary, the weekday chapel, and the baptistery, each with its own entrance. Separated by vertical expanses of glass and continuous skylights, the shells appear to be freestanding, and actually

could be, except that they're tied down to resist seismic and wind loads.

The shells are made of 346 white, reinforced, precast concrete blocks. They are spherical, curving horizontally and vertically. "The geometry is defined to maximize the repeatability of the formwork," explains John Eisler, project manager. "Think of a globe turned 90 degrees. The parallels run vertically [in this scenario], and the meridians run horizontally. As a result, a single stainless-steel form, adjustable on the ends only, can be used for every block."

Italcementi, one of the largest producers and distributors of cement in Europe and the technical sponsor of the project, developed the concrete for the project, including a new, brilliantly white cement, Bianco TX Millennium. Photocatalytic particles in the mixture oxidize organic and inorganic atmospheric pollutants, so that the brightness and color will not degrade over time. The aggregate is Carrara marble, which is a little softer than granite but also contributes to the mirror finish that the stainless-steel formwork produces.

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Gennaro Guala of Italcementi developed a curving gantry crane to lift the 10-ton precast concrete blocks into place, instead of the traditional scaffolding, which was considered too dangerous. A horizontal platform runs along the track, carrying each block to its specified section of the wall. Hydraulic pistons raise the platform, which then tilts the block into its location on a tier. All the rows are posttensioned vertically and horizontally with steel rods and cables so that the entire shell is in continuous compression.

Although complicated to design and build, once the shells are completed they will be efficient and low-maintenance. Facing south, they act as shading devices, allowing for large expanses of glass on the east and west. The thermal mass of the concrete walls will keep heat inside in the winter and outside in the summer, reducing the energy loads on the building systems.

Smart and environmentally friendly

Although it may appear that this workhorse of a material is as dependable as it's going to get save for incremental improvements, research and development are ongoing. The Portland Cement Association (PCA) is one of many national organizations that responds to industry concerns. Because sustainability has emerged as a primary issue in construction, the PCA spends about \$2 million a year sponsoring research to find ways to recycle the by-products of cement for use as fertilizer or to stabilize contaminated sites. It is currently developing a computer model for an environmental life-cycle assessment of portland cement concrete. All this data will help designers and specifiers

determine durability and environmental impact.

The next evolutionary step will be about brains, not brawn. Dr. Deborah Chung, chair of materials research at the State University of New York at Buffalo, has discovered a way to make concrete speak. "Smart concrete" senses its own situation with regard to deformation, damage, or temperature," reports Chung. "It's not about embedding instruments in the concrete. The concrete itself is actually modified by adding a small amount of short carbon fibers [to an ordinary concrete mix]." When a stress occurs, the contact between the fibers and mixture is altered, causing an increase in electrical resistance. This resistance can then be measured with meters and probes.

The commercial application of smart concrete is a few years away, but Chung has already secured a patent. The benefits are numerous. Carbon fibers make the concrete stronger and able to withstand greater stresses before fracturing. Chung has also done tests that show that highways paved with smart concrete will allow moving vehicles to be weighed and their speed measured. In buildings, minor structural flaws will be detected before they become major ones. Structural vibrations during earthquakes can be measured continuously in real time.

Architecture in the 21st century will be transformed by phenomenal advances in the area of high-performance, engineered materials. Structures will be built out of exotic composites, heretofore seemingly far-fetched, made up of combinations of ceramics, polymers, synthetic fibers, fabrics, and shape-memory alloys, to mention only a few. All of these developments will ensure the dominance of concrete, not replace it. After all, concrete is the original composite material. ■



**AIA/ARCHITECTURAL RECORD
CONTINUING EDUCATION**

INSTRUCTIONS

- ◆ Read the article "Dynamic Concrete in the 21st Century" using the learning objectives provided.
- ◆ Complete the questions below, then check your answers [page 258].
- ◆ Fill out and submit the AIA/CES education reporting form [page 258] or file the form on ARCHITECTURAL RECORD's Web site at www.architecturalrecord.com to receive one AIA learning unit.

QUESTIONS

1. Why are different types of cement used?

2. What is the most prevalent problem with concrete over time?

3. How can a concrete building be designed to be see-through?

4. How will the concrete in Rome's Jubilee Church stay white?

5. How are fibers being used in concrete?

Ergonomics in the Digital Office

By Jerry Laiserin, FAIA

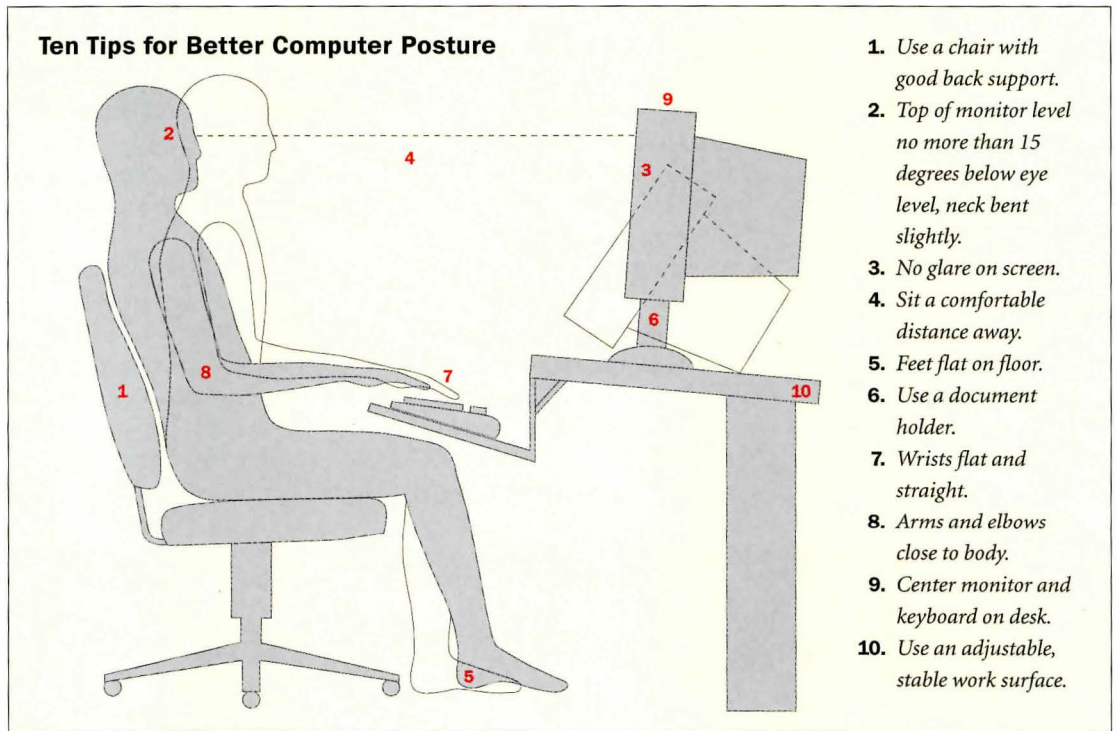
At the mention of occupational hazards in the building industry, most people think of ironworkers and steamfitters, miners and machinists. In comparison, designers, drafters, and spec writers seem to have it easy. While architects rarely risk life and limb during the workday, they are still vulnerable to workplace injuries. As computers have proliferated in design offices, architects spend more and more working hours seated in front of a keyboard and monitor. Without proper precautions, prolonged computer work can lead to a slew of nagging occupational disorders, even permanent disability. In a profession that values a "fine hand" and a "good eye," any threat to mobility or vision must be taken seriously.

The study of how people are affected by the tools they use is called *ergonomics*. Related terms like *engineering psychology*, *human engineering*, and *human factors* address people's interaction with their equipment and work environment. In office environments, this boils down to human-computer interaction (HCI) as viewed through human factors and ergonomics (HFE).

While recommended practices for ergonomic computer use have

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

www For more information on technology for architects, including product reviews and vendor lists, visit www.architecturalrecord.com/digital.



been well known for two decades and even enacted into law in some places, the prevalence of computing sparked interest in nationwide standards enforceable by the Occupational Safety and Health Administration (OSHA). Such standards were promulgated in the waning days of the Clinton administration but were withdrawn for further review under President Bush. Whatever form the final regulations take, the guidelines and criteria for HCI/HFE still hold.

Best seat in the house

Obtaining a comfortable, safe HCI/HFE setup involves balancing the placement of seating, keyboard, mouse, and video display terminal (VDT), or monitor. The goal is to place equipment and position the

body to avoid eyestrain and other possible injuries, including computer vision syndrome, musculo-skeletal disorders, repetitive stress injury, and carpal tunnel syndrome.

The principles of proper posture for computer work are not complex (see diagram above). Computer users should rest their feet flat on the floor, with knees bent at a 90-degree angle and upper body bent 90 degrees relative to thighs. Hands on the keyboard should form a straight horizontal line from wrists to elbows, which in turn should be bent 90 degrees relative to upper arms. From this sitting position, the top of the computer monitor should be at or within 15 degrees below eye level, at a distance approximately twice the width of

the screen. For example, a 15-inch cathode ray tube monitor is about 11 inches wide in viewable area, requiring a distance of 22 inches.

Chairs should have several adjustable features to help computer users maintain correct posture. Ideally, a chair will have an adjustable height, pan tilt, depth, back height, back tilt, lumbar support, headrest (height and tilt), armrest (height, spacing, and tilt) and overall swivel and recline. Users should also have an adjustable footrest, if needed, to have feet resting flat.

Numerous resources are available to check the adequacy of existing or proposed workstation configurations. The 3M Company, which manufactures a line of ergonomically correct computer

Digital Architect

accessories, provides a 19-item checklist on the Web, keyed to self-help tutorials. OSHA offers an online electronic compliance assessment tool, or eCAT, with a 33-item checklist. Open Ergonomics, Ltd., offers a free 78-item online interactive workstation assessment test. They also maintain a comprehensive database of human dimensions: a range of 280 dimensions for male and female adults within eight distinct national populations (China, France, Germany, Holland, Italy, Japan, the U.K., and the U.S.), along with U.K. and U.S. infants up to two years in age and children from two to 17 years old.

Standards for ergonomics are set forth by the American National Standards Institute and Human Factors and Ergonomics Society in their joint Standard 100 for VDTs, and also by the International

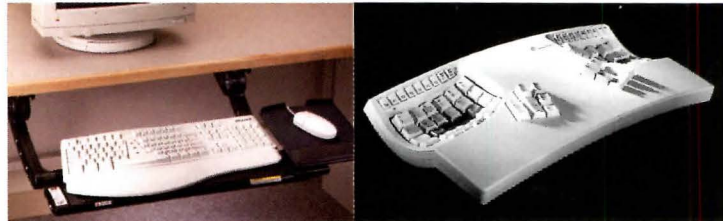
Organization for Standardization (ISO) Standard 9241, parts 3 ("visual display units") and 5 ("ergonomic requirements for office work with visual display units"). The ISO standards have been incorporated into draft design guidelines developed by the Business and Institutional Furniture Manufacturers Association, which cover furniture intended for computer use in the U.S. and Canada.

It's all in the wrist

Besides proper seated posture, the next most important components of a workstation are the keyboard and mouse platform and the keyboard itself. It's virtually impossible to achieve correct wrist alignment with a keyboard placed directly on a standard desk. The best solution is an articulating keyboard support that is both height- and depth-adjustable and also enables positive or negative

tilt of the keyboard (most experts recommend a negative tilt). Some keyboard supports enable proper wrist alignment for people of various heights, working either seated or standing. Many models are available from a variety of office supply houses, furniture manufacturers, and computer accessory catalogs.

wrists, and tilt the two halves to elevate the thumb side of each hand, in order to minimize pronation of the forearms. One model, the Microsoft Natural Keyboard, mimics some of these effects, although it's not adjustable. Specialty keyboards from companies like Kinesis cost little more



Articulating keyboards arms (left) with adjustable keyboard and mouse platforms enable users to achieve the recommended wrist angle. Ergonomic keyboards, such as the Kinesis model (right), further enhance wrist comfort.

Typing at a conventional keyboard requires turning over or pronation of the forearms in order to get fingers flat on the keys. Ergonomically ideal keyboards split the keys into adjustable left- and right-hand groups, rotate the split segments to minimize bending the

and are fully adjustable. Either the keyboard or the keyboard tray should include a padded wrist rest.

Mouse position is critical for computer-aided design (CAD) users because most CAD software requires constant input from

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Digital Architect

both devices. Conventional desktop setups place the mouse on a different vertical plane than the keyboard, and far off to one side. This imposes excessive and unnatural arm and wrist movements on the computer operator. Narrower keyboards, keyboard arms with integrated mouse trays, or pointing devices integrated directly into the keyboard all offer improvements, as do specialty devices like the 3M Renaissance mouse, with its joysticklike trigger handle.

Portable computers are especially troublesome from an ergonomic standpoint. Placed on a desk, the typical laptop or notebook PC combines a keyboard that's too high with a screen that's too low for long-term comfort. The best setup for extended office use of a laptop is to connect it to a docking station, a fully adjustable external monitor, and an external keyboard and

mouse on the same sort of adjustable platform as a fixed desktop machine. If this isn't possible, a lecternlike stand that elevates the screen and tilts the keyboard for a more natural wrist alignment is a second option.

The eyes have it

Accessory monitor arms or supports, typically available from the same sources as keyboard trays, extend the limited tilt-and-swivel capabilities built into most monitors. Monitor height and screen distance affect neck and shoulder comfort during prolonged computer work sessions, and adjustable screen tilt is important to minimize reflected glare, the principal cause of computer-related eyestrain. Flat-screen displays, such as liquid crystal displays (LCDs), are less prone to veiling reflections (glare that

obscures the on-screen work). LCDs also are smaller and lighter than standard monitors, thereby allowing more flexibility in placement.

Proper positioning of a monitor relative to room light sources helps minimize glare. Most guidelines recommend placement at right angles to windows and also perpendicular to linear light sources, such as fluorescent tubes (in many offices, such positions are mutually exclusive). Glare also can be controlled by using a polarizing filter attached to either the screen or the light source. 3M makes polarized filter sleeves that fit over most standard fluorescent tubes.

Architects who wear corrective lenses may find it difficult to achieve the ideal distance from their monitors. Many optometrists recommend transitional lenses or a separate prescription for lenses needed to accomplish computer work, combined with glare-reducing tints and coatings to further minimize eyestrain.

Getting better all the time

In the future, new computing technology and hardware may minimize or erase the ergonomic stresses placed on users today. Computer mice will be replaced by penlike styluses. Voice recognition capabilities, especially for general office applications, will reduce or eliminate keyboard input. Flexible liquid polymer displays will be as easily held and read as paper manuals and drawings, allowing users to enter work as if it were being done in hard copy, but capturing the work electronically.

Although a full ergonomic furniture and equipment setup may cost more than \$1,000, it's a small fraction of the average cost to settle a repetitive-stress-injury claim, according to figures compiled by the American Bar Association.

While computer technology has introduced new possibilities of workplace injuries, the risks are manageable through careful planning and moderate investment. ■

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WOOD WINDOWS: NEW STANDARDS, NEW LOOKS. IT'S AMAZING WHAT YOU CAN DO WITH GLASS TODAY!

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Use the learning objectives below to focus your study as you read **WOOD WINDOWS: NEW STANDARDS, NEW LOOKS. IT'S AMAZING WHAT YOU CAN DO WITH GLASS TODAY!** To earn one AIA/CES Learning Unit including one hour of health safety credit, answer the questions on page 195, check the answers on page 252, and follow the reporting instructions on page 258 or, use the Continuing Education self report form located at www.architecturalrecord.com.

EARNING OBJECTIVES

- Compare the new AAMA standard to the older AAMA standards.
- Explain what makes exterior aluminum coating more durable.
- Describe impact resistant glass and where it is used.
- Identify changes in window glazing.

Exterior cladding of wood window frames and sash, of either vinyl or aluminum, long ago became the accepted application for nearly all residential uses. Today, more than 80 percent of all windows produced by mainstream manufacturers have a clad exterior. Today's cladding not only provides nearly infinite design options, but greatly increases the ease of maintaining exterior window surfaces.

For years, the architectural community has recognized American Architectural Manufacturer's Association (AAMA) 2603 and AAMA 2604 as the standards for performance of inorganic coatings on architectural aluminum extrusions and panels. But recent technology advances have moved the AAMA to reassess the old standards, and in many cases raise the standards significantly.

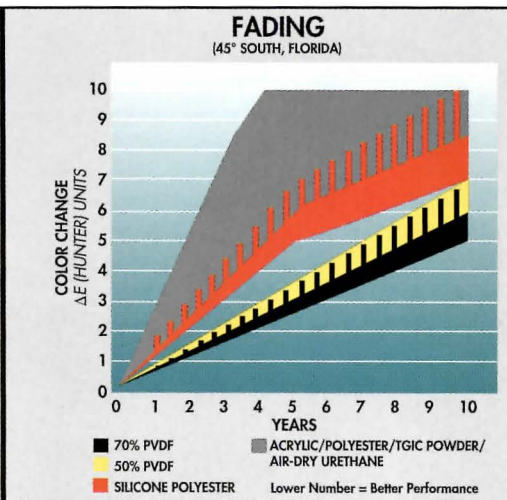
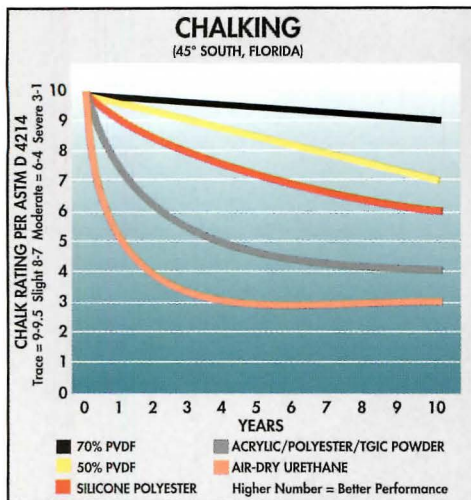
The new AAMA 2605 standard is a 10-year performing specification that more than doubles the old requirements in a number of areas, especially for weathering performance, abrasion resistance and resistance to salt spray and humidity.

The older 2603 standard allows, after 1,500 hours of accelerated testing, both slight chalking and fading. AAMA 2604 sets chalking and color performance standards for performance after five years and looks at lab results after 3,000 hours of accelerated

testing. New coatings technologies, from companies like Dow Corning and 3M, with vastly improved performance characteristics have pushed the AAMA to set standards for 10 year performance and to demand vastly heightened performance after 4,000-hours of accelerated tests, and 10 years of field exposure

Chalking occurs when finish surfaces degrade and begin to break down. Ultraviolet light is, typically, highly unfriendly to vinyls over time. "Chalk" will rub off on your fingers. Colors lose their brightness. "Even with synthetic, baked-on paints, if you, say, have a house in Jackson, Wyo., with bright red trim, in as little as two years that bright red coating will fade to pink, and eventually to white," says a U.S. window manufacturer. "There are products on the market today that will prevent that."

One of them is Kynar, one of several aluminum coatings using polyvinylidene fluoride (fluoropolymer, PVDF) resins. Polyvinylidene Fluoride is a high molecular weight thermoplastic polymer with excellent chemical inertness. It is highly resistant to oxidizing agents and halogens and is almost completely resistant to aliphatics, aromatics, alcohols and acids. It is unaffected by most chemicals and solvents, and will not burn in air. It is self-extinguishing.



These graphs are based on exposure and laboratory testing reports that are considered reliable. The data referred to is not offered as a guarantee or warranty, express or implied. Source: The Valspar Corporation, 1999.

Manufacturers using exterior window coatings of 70 percent Kynar 500® now offer 10-year warranties that finishes will remain clear and bright. With no fading, no chalkiness, no pitting, even if the windows are exposed to harsh sunlight, or constant fog. “Fifty percent Kynar (the percentage measure of the resin content) results in a good finish,” say technical consultants for one U.S. manufacturer. “A 70 percent resin content results in a longer-lasting finish.”

Kynar exterior finishes not only are extremely durable, but incredibly versatile. Relatively new computer-directed color-matching means designers now can choose windows clad in any color imaginable. “We can match the color of your client’s Jaguar,” says one manufacturer; “or the color of your wife’s eyes,” says another.

Turn-around time on custom-color clad windows—in any design, in any geometry—is guaranteed to be less than two weeks outside the normal ordering timeframe; a critical factor

in a marketplace where distributors are paring back standing inventory.

For custom-color, manufacturers typically ask architects or builders to provide a color chip, which is computer read. The results are “pretty much right on the money in terms of a color-match,” says a manufacturer.

Some manufacturers now offer extruded aluminum cladding on the exterior of both sash and frame, an option that ensures low maintenance and long-term performance. Extruded aluminum-clad frames are not subject to lifting joints and bent edges typical of roll-form clad products.

New generation extruded aluminum clad frames now come with what manufacturers call a “rigid integral nailing fin,” designed for ease of installation. With the nailing fin, the window unit does not move in and out of the wall during installation as is common with vinyl fins.

Manufacturers have recently developed the capability of cladding even complex arches, widening the already sometimes mind-boggling array of possibilities for designers. “Whatever we can do in wood, we can now do in a clad product,” says a manufacturer.



Pozzi® wood windows and patio doors with impact resistant glass.

IMPACT RESISTANT GLASS

A new generation of impact resistant glass is becoming a common code requirement in coastal communities across the South and the Atlantic Coast. In 1992, Hurricane Andrew was more than a disaster, it was a wake-up call for safety officials and local building inspectors.

The new impact resistant glass, developed specifically for the Southeast—that region of the U.S. most vulnerable to hurricanes—have recently become, or soon will become, a dictate of local codes in coastal regions from Texas to Virginia. Manufacturers are finding architects specifying it in Kansas and Iowa to help combat tornado disasters. It is also finding markets elsewhere because of its acoustical and UV resistant properties.

“This is the next big market,” says a manufacturer. “Code changes are under consideration in coastal cities in several states, and it is likely we will see this glass become a code standard within a prescribed distance of the shoreline everywhere.”

Impact resistant glass is, in most cases today, a laminated five-layer sandwich of glass, resin and mylar. Resin applied to the interior surface of two pressed sheets of float glass strengthens when cooled and hardens like safety glass. If the glass shatters it will stay in tact, adhered to the mylar/resin. It acts to ensure that nothing penetrates the fenestration of a building. Upon

impact, glass pieces adhere to the plastic inner layer, remain in the opening and preserve the building envelope.

Hurricane-force winds create tremendous pressures on a building. A 140-mph wind generating 80 pound per sq ft (psf) of wind load on a 4-X-8-ft window translates into a total load of 2,560 pounds of pressure on the window. When windows or doors fail, a tremendous pressure surge inside the building is almost immediate, creating forces that now want to break the structure apart.

To insure impact resistance, Dade County (Fla.) developed the now widely-used test in which a nine-pound two-by-four is fired from an air cannon at a speed of 34 miles per hour to simulate the force of a piece of flying debris in a hurricane.

The test has now been adopted by the Southern Building Code Congress International (SBCCI) and is likely to be incorporated into the International Building Code (IBC) when it is adopted.

The test requires three identical specimen window products—at least two must pass the exam. All parts of the test specimen, including glazing and structural framing, must be full-size, using the same materials, glass type, details and methods of construction and fastening as proposed for actual use. The test specimen must consist of the manufacturer’s entire assembled window unit.

Windows are tested for impact by both large and small objects. The Large Missile Impact Test uses the 9-lb. 2 x 4. Its actual prescribed impact speed: 50-52 feet-per-second (ft./s). Windows must survive two blows. In a Small Missile Impact Test, specimen windows are subjected to spherical steel balls weighing 2 grams each, propelled from a single device, impacting the window at 130-132 ft/s. A window is impacted 30 times.

Other tests administered in the U.S. are based upon Design Pressure (DP) ratings. These refer to the Air and Water structural ratings of a window based on positive and negative pressures, measured in pounds of pressure per sq ft. Minimum requirements vary from region to region. For some states, the required DP rating is as low as +15 to -15 DP. Parts of the Oregon coast require +30 to -30 DP. Dade County now demands a minimum DP rating of +55 to -55, but that will change in 2002 to +65 to -65.

Windows are actually tested at 1.5 times the required DP to allow for a safety factor. When they have passed, windows are labeled with the appropriate DP rating.

MAKE SURE YOU LOOK!

SBCCI Test Standard SSTD 12-97 (test standard to determine impact resistance from window debris) is now a mandatory requirement for manufacturers selling glass not only in Dade County, but also in coastal areas of Texas and North Carolina.

An additional benefit of the new impact glass, say manufacturers, is that it can also block up to 99 percent of harmful UV rays. Increasing demand for impact glass means that it is now available in virtually every window on the market—casements, awnings, double-hungs, bays, bows, sliding and, even, custom radius windows and patio doors.

GLAZING MODIFICATIONS

Manufacturers say changes are coming in glazing techniques, especially an industry-wide trend toward all-silicone glazing systems, replacing “boot-gasket” glazing.

“Wet-glazing will be a pretty big change from our perspective,” says a manufacturer.

In boot-gasket glazing, a piece of vinyl is wrapped around the glass. Its advantage is that the glass in damaged boot-glazed windows is relatively easily replaced. New glazing compounds, which will replace boot glazing, because they adhere rigidly to the glass, are not as amenable to glass replacement.

“Despite that, all manufacturers will soon be using the new sealants because suppliers (like Dow-Corning) have improved their performance so dramatically,” says an industry spokesperson. “The new sealants not only give the glass a better fit, but they will perform well over long periods of time, eliminating fear of either seal failure or weather-related problems with the windows.”

For a while, it is likely that window manufacturers will continue to produce boot-glazed windows in addition to the new wet-glazed lines. Eventually, however, boot-glazed windows will be discontinued, says the source.

“Aesthetically, wet-glazing will be an improvement,” says the source, “but there will be some resistance to it, because for years we have all sold boot-glazing as an advantage because it gives you the ability to replace the glass.”



Walls of windows and patio doors by Caradco®.



Norco® radius head patio door with panel and sidelites.



Caradco® wood windows with simulated divided lites.

HIGHLY ENERGY EFFICIENT DIVIDED LITES

It doesn't matter if your clients are building a traditional home or the most modern, or even remodeling a century-old classic. When choosing windows, clients all want the efficiency that modern glazing delivers.

New technology allows today's manufacturers to create highly efficient divided lites with a single insulating envelope — a single seal around the perimeter and interior thermal bars that never touch the glass — eliminating any heat transfer caused by conduction.

External muntins of next-generation divided lites are of highly weather-resistant solid aluminum, locked to the glass with very high-bond (VHB) adhesive developed by 3M.

Detailed wood interior muntins help capture the authentic appeal of true divided lite windows, and internal aluminum spacer bars, thicker and wider than

traditional shadow bars, are now designed to maintain a 1/8-in. thermal break between the grids and the glass, eliminating "edge effect" heat loss.

Low-emissivity (low E) insulating glass reduces heat loss and conductivity, and can reduce home energy consumption by up to 44 percent. low E is a coating of microscopically thin, optically transparent layers of silver sandwiched between layers of antireflective metal oxide.

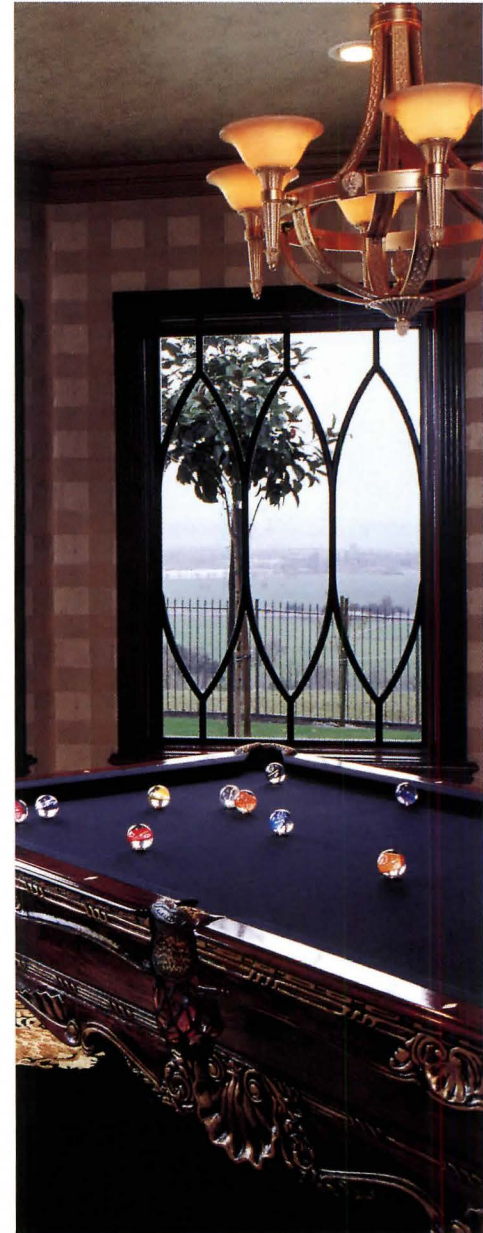
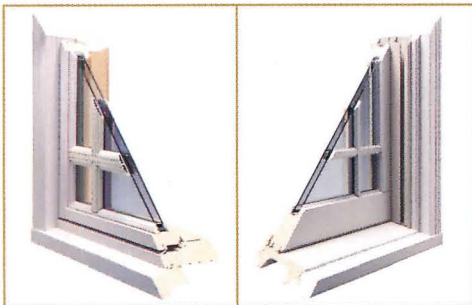
The coatings can be tuned to optimize reflection of unwanted solar heat gain in summer and maximize useable daytime solar gains in winter and, at the same time, reduce nighttime winter heat loss.

Because low E products are designed for optimal year-round performance energy savings and comfort, some manufacturers now incorporate low E glass as the standard glass throughout their product lines. "We think it is an important feature, and one that should be specified," says a spokesperson.

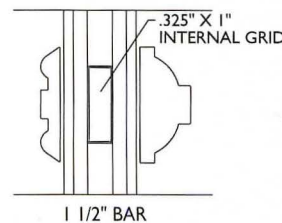
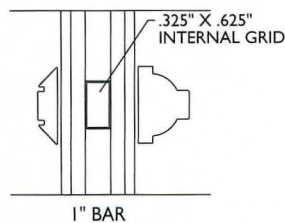
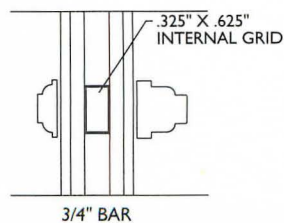
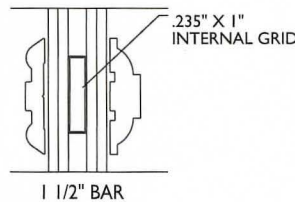
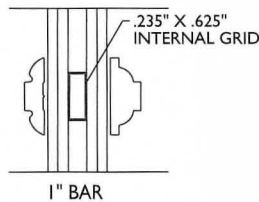
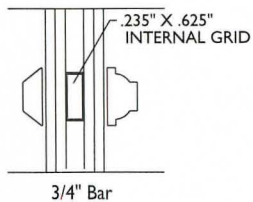
A growing list of historical sites undergoing renovation using contemporary divided lites speaks to the ability of window manufacturers today to address one of the most difficult architectural problems, that of matching classical design while at the same time incorporating today's higher standards for efficiency.

True divided lites, with authentic muntin bars are still available from nearly all manufacturers, but are available only as single-glazed units.

Simulated divided lites are a low maintenance, energy efficient alternative to insulating divided lites, and come in a wide selection of widths (up to 1.5 inches) and profiles and come in standard or custom patterns. They feature detailed wood interior or muntins, internal metal shadow bars and weather-resistant solid exterior muntins (attached to the window with very-high-bond (VHB) adhesive).



Norco® wood windows with creative divided lites



SUPERSIZE IT!

Architects who are building large footprint, high-ceilinged homes, or offices are demanding larger doors and windows, and manufacturers are expanding product lines to accommodate that demand. Some wood window manufacturers offer optional ADA-complaint sills that contribute to easy access for commercial width patio doors.

Entryway doors, once nearly universally sized at 3'0" X 6'8" now can be bought off the shelf at heights up to 10 feet. "Twelve-foot doors will likely soon be commonplace," says a manufacturer, and windows. "For instance seven-foot tall, operating casements are a possibility and will grow larger as well."

LEARNING OBJECTIVES

- Compare the new AAMA standard to the older AAMA standards.
- Explain what makes exterior aluminum coating more durable.
- Describe impact resistant glass and where it is used.
- Identify changes in window glazing.

INSTRUCTIONS:

Refer to the learning objectives above. Complete the questions below. Then turn to page 252 and check your answers. Fill out the self report form on page 258 and submit it or use the Continuing Education self report form on Record's web site - www.architecturalrecord.com - to receive one AIA/CES Learning Unit including one hour of health safety welfare credit.

QUESTIONS:

1. What is the difference between the older AAMA 2603 and 2604 standards and the new AAMA 2605 standard?

2. If impact resistant glass shatters, what keeps the glass shards in place?

3. What tests are conducted to measure impact resistance?

4. What is the difference between boot-gasket and wet glazing?

5. What other new technology is there for windows?

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Founded as a small millwork plant in Oregon in 1960, JELD-WEN today is one of the world's largest manufacturers of doors, windows, millwork, and specialty wood products. Three of its US divisions manufacture wood windows: Caradco®, Norco® and Pozzi®.

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CARADCO®

Since 1866, Caradco® has provided outstanding quality wood windows and patio doors at a great value. Today, Caradco® continues this tradition through a partnership with JELD-WEN, offering you innovations in first-class windows, service, and credibility. We still make our windows from solid Western pine and shape every piece with care and precision. But now, we also use high-technology glazing, cladding components, and finishes to make them perform even better.

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Norco® began operations in 1921 in Hawkins, Wisconsin, and has recently expanded to a second facility in Ringtown, Pennsylvania. Norco® manufactures a complete line of wood and aluminum clad wood windows and patio doors in a wide range of standard and custom products. The product line is versatile, flexible and full of options. In addition, Norco® has a reputation for solid delivery.

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POZZI®

Pozzi wood windows is an industry leader known for producing superior windows comprising artful, innovative window design. Pozzi®'s success over the years can be accredited to high-quality products, exceptional performance and one of the most reliable service records in the industry. Further, Pozzi® enables customers to design their own original creations. In fact, over 40 percent of our work is one-of-a-kind custom masterpieces. Whether your designs or ours, we take great pride in building the unique and unusual, while maintaining the highest engineering performance standards.

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A SPECIFICATION GUIDE FOR EXTERIOR WALL SHEATHINGS

by: Robert C. Grupe, CSI
Director, Architectural and Technical Solutions
USG Corporation

On the most basic level, exterior wall sheathings serve to enclose wood or metal-framed buildings and provide a surface for application of exterior claddings and finish materials. However, the role of sheathings extends well beyond these basics. Depending on the building design, exterior sheathings are often required to provide racking or shear resistance, fire resistance and resistance from water or moisture. They may also need to meet non-combustible construction requirements, as specified by building codes.

When architects create sheathing specifications, they need to take these performance criteria into consideration while simultaneously reviewing a number of other construction issues, including panel dimensional stability and “flatness,” fastener holding strength, installation ease, contractor acceptance and, of course, installed costs.

To create consistently successful exterior sheathing specifications, architects should select products that best meet building fire, structural and moisture design requirements while balancing construction cost and installation issues. The process begins by understanding the basic performance capabilities and limitations of the major sheathing product types.

SHEATHING MATERIALS

The age of modern sheathings dawned in the 1940s when architects began specifying 4- by 8-foot plywood panels in place of 1- by 8-foot boards to save on labor costs. Plywood was used extensively during the post World War II building boom and remained the only practical sheathing panel until paper-faced gypsum sheathings were introduced in the 1960s. In the 1970s, another sheathing panel – rigid foam – was introduced to meet demand for energy-efficient construction. OSB (oriented strand board) was developed as an alternative to plywood in 1981. Glass-mat-faced gypsum panels and cement board panels were also introduced during the 1980s. Finally, in 2000, high-performance gypsum/cellulose sheathing panels were brought to market.

Today, there are four primary categories of exterior sheathings: gypsum-based panels, cement-based materials, wood-based panels and plastic or foam products. Following is an overview of the specific sheathings available within each category.

Gypsum-Based Sheathings

Thanks to their excellent fire resistance and other performance attributes, gypsum-based sheathings are widely used in non-combustible construction. The products are available either surface-reinforced with paper or a glass-fiber

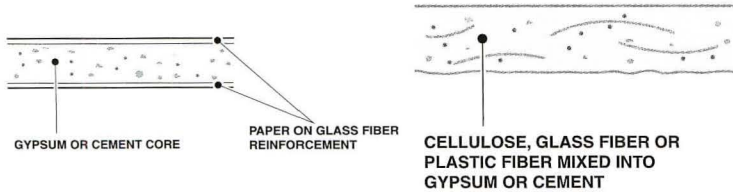
Use the learning objectives below to focus your study as you read **A SPECIFICATION GUIDE FOR EXTERIOR WALL SHEATHINGS**. To earn one AIA/CES Learning Unit including one hour of health safety credit, answer the questions on page 201, check the answers on page 252 and follow the reporting instructions on page 258 or, use the Continuing Education self report form located at www.architecturalrecord.com.

LEARNING OBJECTIVES:

- Explain the role exterior wall sheathings play in building design.
- Describe the relative merits of the major types of sheathing panels.
- Explain the key performance criteria that should be considered when specifying sheathings.

mat or core-reinforced with cellulose fiber. (See *Gypsum Panel Sheathing Types* illustrations.) Gypsum sheathings have the strength to effectively transfer lateral wind loads to structural framing. When properly fastened, they will stay secured to the wall for the service life of the building under both positive and negative wind loads, but they do not match the shear resistance of plywood or OSB. This usually necessitates the application of supplemental diagonal bracing to the framing. The overall performance and, especially the water-resistance, of gypsum sheathings varies depending upon the panel type.

Paper-faced gypsum sheathings consist of a fire-resistant treated gypsum core encased in water-repellant paper on both sides and the long edges. These surface-reinforced panels meet the requirements of ASTM C79 and install quickly and easily. Although paper faced sheathings can shed rainwater for several months if properly installed, they are typically warranted against weather exposure for only 30 days. When exposed to moisture for prolonged periods of time, the paper surface plies can separate or the paper can delaminate from the gypsum core. If water is trapped in the core, it can soften or dissolve it. The panels provide marginal fastener holding power, and long-term performance is reliant on proper design and installation.



Gypsum Panel Sheathing Types

Paper-faced and glass-mat-faced gypsum sheathings are surface-reinforced (left). Gypsum/cellulose panels, which are core-reinforced (right), offer superior performance including enhanced moisture resistance and fastener holding power.

Glass-mat-faced gypsum sheathings meet the requirements of ASTM C1177 and are a popular choice for non-combustible construction, due largely to their improved weather resistance, light weight and fast installation. Like paper-faced gypsum panels, glass-mat panels are surface reinforced and rely on the face layer for water resistance and strength. The panels are warranted against weather exposure for six months. However, under prolonged exposure to moisture, the core can soften and degrade. Glass-mat panels are also susceptible to pull-off by lateral wind loads, particularly when the panel fasteners are driven through the glass-mat face. Another drawback with glass-mat panels is the fact that the embedded glass fibers in the facing become airborne as the panels are handled and cut, which can cause skin irritation and itching for installers.

Sheathing – Typical Applications

Panel	Fire-Resistant Partition	Brick Veneer	Aluminum & Vinyl Siding Backup	Conventional Stucco Base	Adhesively Bonded EIFS	Direct-Applied Finishes (Tile & synthetic stucco)
Gypsum/Cellulose	1- and 2-hour fire-rated	Joint treatment recommended	Enhances wall straightness	Requires weather barrier	Excellent	Acceptable for limited applications
Glass-Mat-Faced Gypsum	1- and 2-hour fire-rated	Joint treatment recommended	Marginal	Requires weather barrier	Acceptable	Unacceptable
Paper-Faced Gypsum	1- and 2-hour fire-rated	Requires weather barrier	Marginal	Requires weather barrier	Acceptable	Unacceptable
Cement Board	1- and 2-hour fire-rated	Requires weather barrier	Unacceptable	Requires bond breaker behind stucco	Excellent	Excellent (requires weather barrier)
Fiber Cement	1-hour fire-rated	Joint treatment recommended	Unacceptable	Requires bond breaker behind stucco	Excellent	Marginal
OSB	Marginal	Joint treatment recommended	Provides additional nail base	Requires weather barrier	Unacceptable	Unacceptable

Sheathing Performance Attributes

Panel	Weather Exposure (Water Resistance)	Fire Resistance	Suitable for Bonded Veneers	Nail Base	Shear Resistance	Dimensional Stability
Gypsum/Cellulose	1-year exposure warranty ¹	Excellent	EIFS only	Fair	Moderate	Excellent
Glass-Mat-Faced Gypsum	6-month exposure warranty ²	Excellent	EIFS only	Unacceptable	Unacceptable	Excellent
Paper-Faced Gypsum	30-day exposure warranty ³	Excellent	None	Unacceptable	Unacceptable	Excellent
Cement Board	Excellent	Excellent	Excellent in wet climates	Marginal	Marginal	Excellent
Fiber Cement	Excellent	Moderate	Adequate	Unacceptable	Marginal	Adequate
OSB	Marginal	Combustible	None	Excellent	Excellent	Marginal

Notes: 1. Offered with USG's FIBEROCK® Brand Sheathing with AQUA-TOUGH™ 2. Offered with Georgia-Pacific's Dens-Glass® Gold Sheathing 3. Offered with USG's SHEETROCK® Brand Gypsum Sheathing

Gypsum/cellulose core-reinforced sheathing is the most recent introduction in the gypsum-based sheathing category. These panels are being specified with increasing frequency in applications ranging from schools to hotels to shopping centers.

Unlike paper-faced and glass-mat-faced gypsum sheathings, gypsum/cellulose panels are core-reinforced. They feature a homogenous cross-section made from cellulose (wood) fibers, gypsum and water-resistant additives. The core-reinforced technology offers significant performance advantages.

Gypsum/cellulose panels do not rely on a surface layer for strength, fastener holding power or moisture resistance. This contrasts with paper-faced and glass-mat-faced sheathings, which lose strength and water resistance if their face layers are torn or pierced or if water penetrates the cut end of the panel. Also, if fasteners are overdriven into surface-reinforced panels, the attachment to the framing is significantly weakened. Gypsum/cellulose panels have no face layer to separate from the core and will not lose strength when they are cut or when fasteners are overdriven.

The panels are also stiffer than other gypsum-based sheathings, providing a flatter, smoother surface – even under high wind load conditions. While the panels do not score and snap like paper-faced and glass-mat-faced panels, they install quickly. And unlike glass-mat panels, they do not itch or irritate installers' skin.

Gypsum/cellulose panels are available in 1/2- and 5/8-inch thicknesses. The 5/8-inch-thick panels are classified as Type X for fire resistance and meet the physical properties of ASTM C1278. The 5/8-inch-thick panels are acceptable for use in non-combustible construction, although they do not meet strict definitions for non-combustible materials.

The panels can offer significant installed cost savings. Due to their superior structural strength and fastener holding power, they are the only gypsum-based sheathing that can be installed over 24-inch o.c. framing (with fasteners spaced 8 inches o.c.) while withstanding a 30 psf wind load before surpassing an L/240 design criteria. This can translate into significant installed cost savings for a range of applications, including Exterior Insulation and Finish System (EIFS) construction, where a design wind load of 30 psf is required in most one- and two-story commercial construction.

Cement-Based Sheathings

Cement-based sheathings include cement board panels made from aggregated portland cement reinforced with glass-fiber mesh on both sides, fiber cement panels and concrete block.

Cement board panels are a top choice for both combustible and non-combustible construction wherever moisture resistance is a priority. The panels are “water-durable,” meaning they are highly resistant to moisture

NEW SHEATHING SCORES POINTS AT CMGI FIELD

Inside the framework of professional football's new CMGI Field, within the steel and concrete beneath 50-yard-line upper deck seating, two hangers and one apprentice — perched 55 feet off the ground on scaffolding — fasten a piece of FIBEROCK® Brand Sheathing with AQUA-TOUGH™ to metal ceiling studs.



USG's FIBEROCK Brand Sheathing was applied over the stadium's metal-framed exterior walls. The gypsum/cellulose panels provide excellent fire and moisture resistance while delivering a smooth, flat surface for application of EIFS finish

As the final screws are set, the crew members suddenly realize they've been working too fast. The scaffolding crew has fallen behind, and the hangers are out of room to complete their work. Who would have thought the sheathing, a new core-reinforced gypsum/cellulose panel from USG, would have gone up so quickly?

"My initial impression with this board was that it would take longer to install," admitted Joseph Duffy, vice president at Sweeney Drywall Finishes Corp., Burlington, Mass., and general manager for the stadium project. "Well, it doesn't take longer to cut. It doesn't take longer to hang. It's just great stuff."

That kind of reaction from the field is good news for architects who would like to take advantage of the panel's superior performance capabilities. The fire-resistant panel offers integral moisture resistance, excellent dimensional stability, superior



CMGI Field, the new home for the New England Patriots NFL team, is scheduled for completion in 2002.

damage. They will not rot or delaminate, bend or warp. The product is ideal for use under EIFS, ceramic tile and thin brick, and should be the sheathing of choice for climates where rainfall exceeds 20 inches per year. The panels also provide excellent fire resistance.

Fiber cement sheathings also provide excellent water durability and are typically denser than cement board panels. These panels are made from portland cement reinforced with cellulose, and should not be confused with gypsum/cellulose panels. Their greater mass makes them inelastic and brittle, and therefore more installation sensitive. They also do not provide the level of fire resistance that cement panels offer.

Although technically not a sheathing, concrete block is typically used as a replacement for sheathing and framing. It is offered by a variety of manufacturers and pro-

vides excellent performance and value when used on one-story commercial and institutional structures where durability is a priority. Installed costs for the product increase substantially for construction above one story. Concrete block is also the predominant choice for residential construction in southern Florida. When thicker-type blocks are used, the material can offer excellent fire resistance. However, it is thermally inefficient.

fastening power and better shear resistance than conventional surface-reinforced gypsum panels. CMGI Field, scheduled to open in 2002, will replace Foxboro Stadium in Foxboro, Mass., as the home for the New England Patriots NFL franchise.

"CMGI Field will be a world-class sports facility," said Dan Kraft, director of the Kraft Group, owner of the Patriots franchise. "As such, our design and construction teams were insistent on using only top-line construction materials, including the FIBEROCK sheathing. The product not only delivered the quality we needed, but it helped boost our construction productivity."

Sweeney Drywall has the contract for the stadium's exterior metal framing, sheathing and EIFS. The project was the first time that the company had used a gypsum/cellulose sheathing panel. The big question was whether the sheathing would go up quickly.

The answer turned out to be "yes," says Duffy, who keeps close tabs on costs and crew productivity at CMGI Field. The labor time required to install 210 MSF of sheathing could easily put the operation into the red, but Duffy and the hanging crew have found FIBEROCK Brand Sheathing to be as workable as glass-mat-faced panels.

"You can cut it and not get loose glass all over your arms and the back of your neck," said Jacques Laroche, foreman at Sweeney Drywall. "You don't have the problem of itching while you work with this product."

That's what Duffy likes to hear. The fewer the complaints, the better the production and work quality.

"FIBEROCK Brand Sheathing is a product we intend to keep using," said Duffy. "It's a product I expect architects will be specifying more often."

Concrete block is also inelastic, making it sensitive to building movement from seismic and other sources. During construction, it requires supplementary bracing and, since there is no cavity in the wall, additional labor is needed to run electrical and HVAC equipment.

Wood-Based Sheathings

Plywood and OSB are engineered wood products typically used as sheathings in residential construction.



Gypsum/cellulose panels do not cause skin irritation or itch during cutting and handling.

When properly attached, these panels offer excellent racking and shear strength. They also provide a nailing base for siding materials that require fastening between studs. Wood-based sheathings work with the framing to resist wind, seismic and other loads applied either perpendicular or parallel to the plane of the wall. While various grades of plywood offer differing levels of exposure performance and moisture resistance, wood-based sheathings may swell, warp or rot when exposed to damp environments. The panels also provide little or no fire resistance.

Plastic or Foam Sheathings

Plastic or foam sheathings are lightweight panels made of polystyrene or polyisocyanurate, used principally for insulation. They have no structural capacity unless heavily reinforced. Their principal use is for insulation. These high R-value panels require special detailing to meet any fire resistance rating. The products themselves will not support flame, but they can cause the premature failure of most fire endurance assemblies.

Polystyrene sheathings can withstand wet environments; polyisocyanurate products will degrade when exposed to moisture and therefore are covered with a foil skin for protection. However, these skins can act as a second vapor retarder, which may lead to vapor control problems unless special venting is included in the building design.

SPECIFICATION CRITERIA

While there is no single sheathing perfect for every project, there is a range of critical criteria that must be factored into any specification. In this section, we'll look at the three primary factors that affect any sheathing specification: performance, installation and cost.

Performance Factors

Fire resistance is a major consideration for any sheathing specification. Residential (combustible) construction allows architects to include wood-based plywood and OSB sheathings, as well as polystyrene and polyisocyanurate foam core sheathings as part of their specification choices. Non-combustible construction eliminates the use of these products. Gypsum-based sheathings and cement board panels provide excellent fire resistance, while fiber cement sheathings offer reduced fire resistance.

Water resistance is a critical consideration that impacts both project construction and long-term exterior performance. During construction, sheathings are used to enclose buildings, permitting interior work to continue regardless of weather conditions. Sheathings that can withstand direct exposure to weather for longer periods permit greater flexibility in construction scheduling.

Cement board panels offer the best performance in this area, as they are literally unaffected by moisture. Gypsum/cellulose sheathing, which is warranted against exposure problems for one year, is also an excellent choice, as are fiber cement panels.

Of course, water resistance also plays a key role in long-term exterior wall performance. The importance of water resistance is most vividly demonstrated by the high occurrence of EIFS failures in North Carolina, Georgia and other areas of the country beginning in the mid-1990s. “Barrier” EIFS design was based on the premise that moisture would be sealed out at the surface of the wall. As such, barrier EIF systems did not incorporate basic water management or “rainscreen” principles to direct intruding moisture out of the wall system as quickly as possible. As a result, when moisture did penetrate barrier EIF systems through window openings, imperfect flashing and deteriorated caulks and sealants, non-moisture-resistant sheathings such as OSB and plywood and gypsum-based panels all failed.

While the problems with barrier EIFS provide a dramatic example, similar situations can occur with other improperly designed or poorly maintained brick veneer, stucco, ceramic tile and aluminum, vinyl and wood sidings. While these latter cladding systems generally incorporate sound water management principles, moisture intrusion can never be completely eliminated.

As such, specifiers should match sheathing selection with the local climate conditions. For EIFS, brick veneer and ceramic tile finishes, specify cement board panels for wet climates such as coastal areas and regions with moderate to heavy rainfall, especially those areas with average rainfall exceeding 20 inches. For more moderate moisture conditions, high-performance gypsum/cellulose panels provide an ideal option, as these panels offer integral water resistance. Wood-based and paper-faced or glass-mat-faced panels make sense in drier, less windy climates.

Shear resistance and structural performance are also key considerations. Shear resistance refers to the ability of the sheathing to ensure that framing does not move out of square or collapse under wind load or seismic conditions. (See *Sheathing Wind Load and Shear Performance* illustrations.) Under positive wind load conditions, sheathing deflects between framing members. Under negative wind loads, the panels bend away from framing. Regardless of the direction of the wind force, the sheathing panels must not deform excessively or break away from the framing.

Sheathing Fastener Holding Strength and Allowable Wind Load Comparisons

Performance Value	Gypsum-Based and Cement Board Sheathing Panels			
	Gypsum/Cellulose Sheathing	Cement Board Panel ¹	Paper-Faced Gypsum Sheathing	Glass-Mat-Faced Gypsum Sheathing
Fastener Holding Strength (lbs) ¹	163	125	80	80
Typical Allowable Wind Load (psf) ²	61	46	30	30

Notes: 1. Based on published mechanical properties. 2. Panel-only data. Based on framing spaced 16 inches o.c. and fasteners spaced 8 inches o.c. 3. Based on panel in wet or dry condition.

Wood-based sheathing panels such as plywood and OSB generally provide the best shear resistance. However, these panels are combustible and are therefore acceptable only in residential (combustible) construction. For non-combustible construction, gypsum/cellulose sheathings deliver the best performance of any panel product. They provide wind load resistance of 61 psf (over 16-inch o.c. framing with fasteners spaced 8 inches o.c.) and a holding strength of 163 pounds per fastener. This is sig-

nificantly better than cement board panel performance and more than double the strength of paper-faced and glass-mat-faced gypsum sheathings. (See *Sheathing Fastener Holding Strength and Allowable Wind Load Comparison* chart.)

Sheathings that offer higher shear resistance performance generally provide greater structural stability and superior fastener holding power, as these qualities directly impact shear resistance. Shear-resistant panels also tend to lay flatter on the wall surface, ensuring a smoother, more visually appealing finished exterior.

Panel expansion or contraction due to heat and moisture is a final performance consideration. The more stable the material, the less potential there is for cracking and buckling to occur on the building exterior. Once again, specifiers should consider the local climate before choosing a substrate.

Cement board panels and gypsum panels, especially core-reinforced gypsum/cellulose panels, are inherently more stable than wood-based products when exposed to variations in temperature and moisture conditions. Wood-based sheathings are typically unaffected by temperature changes. However, they can shrink considerably under prolonged high temperatures and, as previously noted, the panels can warp and swell when wet.

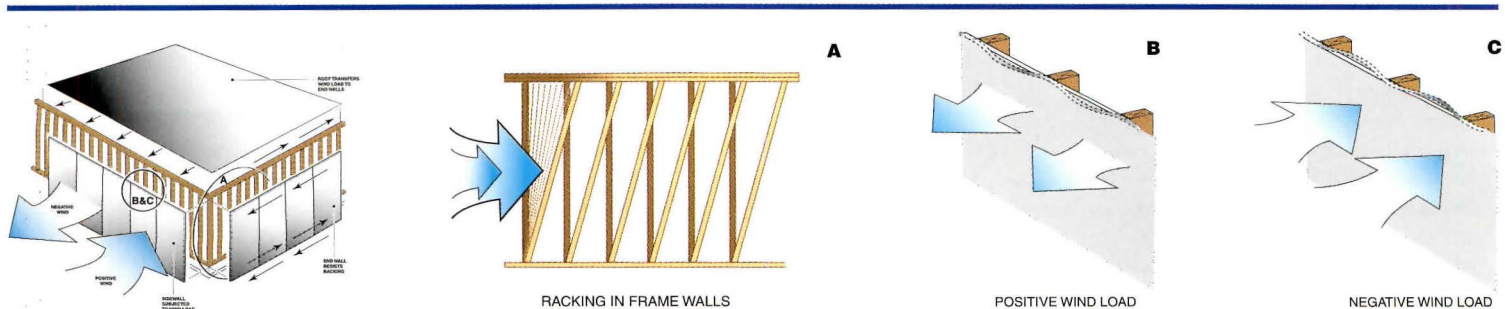
Installation Issues

Sheathing installation considerations should be focused on three factors: handling, cutting and fastening. The easier a substrate is to handle, the more likely it will be installed correctly and efficiently. Smaller, lighter and more rigid panels are easier to lift and put into place, while larger, heavier and more flexible panels are more difficult to erect.

How panels cut and fasten is just as important. Paper-faced and glass-mat-faced gypsum panels cut easily using a score and snap method. Cement board panels can also be scored and snapped. Plywood and OSB are cut with a power saw, while gypsum/cellulose panels can be cut with a power saw or shears. Because they are core-reinforced, gypsum/cellulose panels offer distinct fastening advantages compared to other gypsum-based panels. Most importantly, gypsum/cellulose panels eliminate problems resulting from overdriven fasteners, which can weaken surface-reinforced panels. Overall, gypsum/cellulose panels can usually be installed as quickly – or more quickly – than paper-faced and glass-mat-faced panels. This, coupled with the fact that cellulose/gypsum panels do not cause installer irritation or itch (an issue with glass-mat-faced gypsum panels), has led to quick contractor acceptance.

Cost

Ultimately, the choice of sheathing comes down to cost versus performance – getting the best sheathing value for the money. Cement board is the costliest panel product, but it also offers the best long-term performance. When viewed in terms of the building life cycle, cement board is often the most economical choice for EIFS, brick veneer and ceramic tile. Similarly, gypsum/cellulose panels offer excellent cost/performance value. The installed cost for gypsum/cellulose sheathings is often less than that of glass-mat-faced panels, yet gypsum/cellulose panels offer clearly superior performance.



Sheathing Wind Load and Shear Performance

Sheathing panels provide shear resistance (Detail A) to ensure that the building framing does not move out of square or collapse under wind loads or seismic conditions. Under positive wind load conditions (Detail B), the sheathing deflects between framing members. Under negative wind loads (Detail C), the panels bend away from the framing.

LEARNING OBJECTIVES

- Explain the role exterior wall sheathings play in building design.
- Describe the relative merits of the major types of sheathing panels.
- Explain the key performance criteria that should be considered when specifying sheathings.

INSTRUCTIONS:

Refer to the learning objectives above. Complete the questions below. Then turn to page 252 and check your answers. Fill out the self report form on page 258 and submit it or use the Continuing Education self report form on *Record's* web site - www.architecturalrecord.com - to receive one AIA/CES Learning Unit including one hour of health safety welfare credit.

QUESTIONS:

1. Explain the function that sheathings play in building design.

2. What are the key performance differences between surface-reinforced gypsum panel sheathings and core-reinforced gypsum panel sheathings?

3. What are the advantages – and disadvantages – of using wood-based sheathings?

4. Why is water resistance an important sheathing performance criteria?

5. What installation issues should be considered when specifying sheathings?

ABOUT USG

USG 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.

The company's FIBEROCK® Brand Sheathing with AQUA-TOUGH™ is a core-reinforced gypsum/cellulose panel that offers superior water resistance, strength and fastener holding power compared to other gypsum-based sheathings. The product installs quickly and provides up to one year of warranted weather exposure. FIBEROCK Brand Sheathing recently earned the “Green Cross” certificate from Scientific Certification Systems (SCS) in recognition of the fact that it is made from 95 percent recycled materials.

For more information about FIBEROCK Brand Sheathing, write USG Corporation, P.O. Box 806278, Chicago, IL 60680-4124, call USG's Customer Service Department at 1-800-USG-4YOU or visit the company's Web site at www.usg.com.



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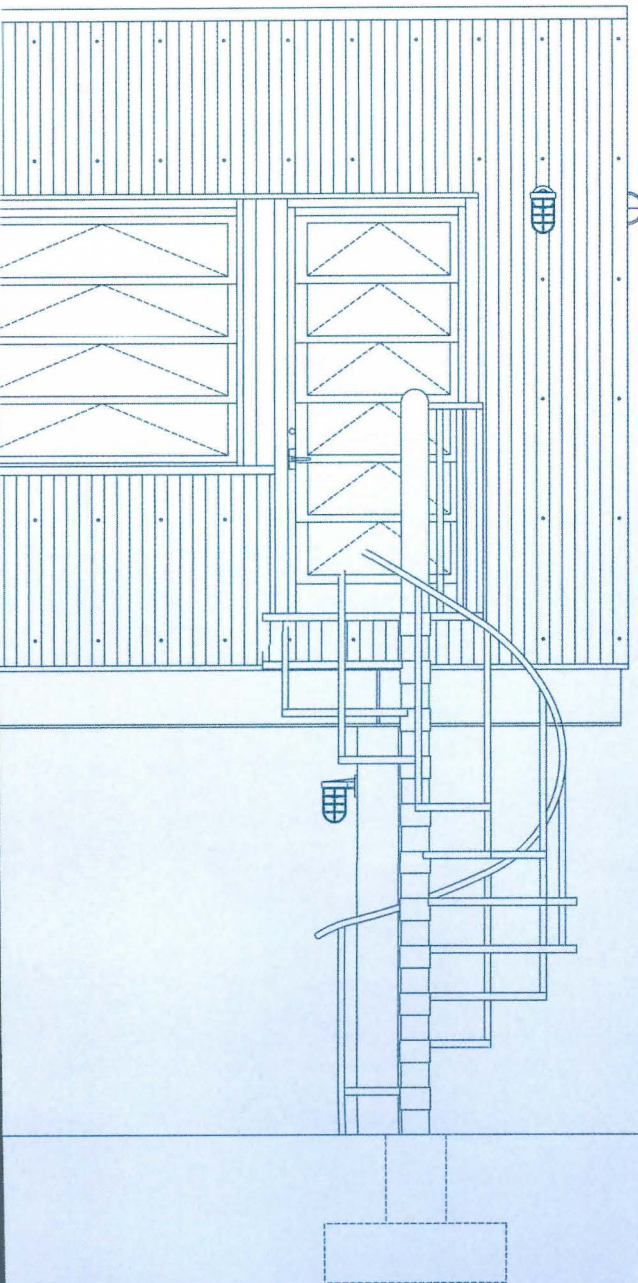
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RESIDENTIAL

Metal Funk— Warning: This is not your average house



This section comes with a caveat. The houses contained herein might not be for everyone. Traditionally, metal—inexpensive and often prefabricated—has been used for industrial and manufacturing purposes. As a residential cladding material, it has not gained popular acceptance.

But metal housing has been around for a while, usually hovering somewhere around the cutting edge. One of the first widespread residential uses of metal came with the introduction of the Lustron House in 1949. Originally built as a cheap, practical way to help fill the postwar housing gap, about 2,500 of these prefabricated houses were built. Today, Lustron Houses are hip collectibles. The Lustron, it seems, was way ahead of its time.

Unconstrained by our traditional notions of home as being brick, wood, or stone, the new houses made of metal seen on these pages also suggest a certain desire to be different. Danna Sigal and Ron Godfredsen describe their work as “exploration and adventure,” and their Butterfly House is no exception. Amid Spanish- and early-California-style residences in the Hollywood Hills, the structure is a standout of corrugated galvanized steel. It certainly doesn’t bear any resemblance to most speculative developer houses. Proving that architects often take risks when designing for themselves, the sheet-metal-clad tower Frederick Phillips created for his family is aesthetically more akin to a modern office building than to the typical American house. It asserts itself boldly in one of Chicago’s toughest neighborhoods.

Villa KBWW in Utrecht doesn’t look like a house at all. An almost square assemblage of metal and glass, it looks something like a Rubik’s Cube. Certainly, the use of transparency challenges the very idea of the private home. Finally, the Yardbird in Charlottesville, Neal Deputy’s answer to the home office, is the toolshed reinvented by an architect and placed atop pilotis. In a typical suburban neighborhood in the city that is home to Monticello, this building just seems to shout “notice me!” *Elizabeth Harrison Kubany*

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CIRCLE 80 ON INQUIRY CARD

Residential News

Department of Housing and Urban Development announces 2001 AIA/HUD award winners

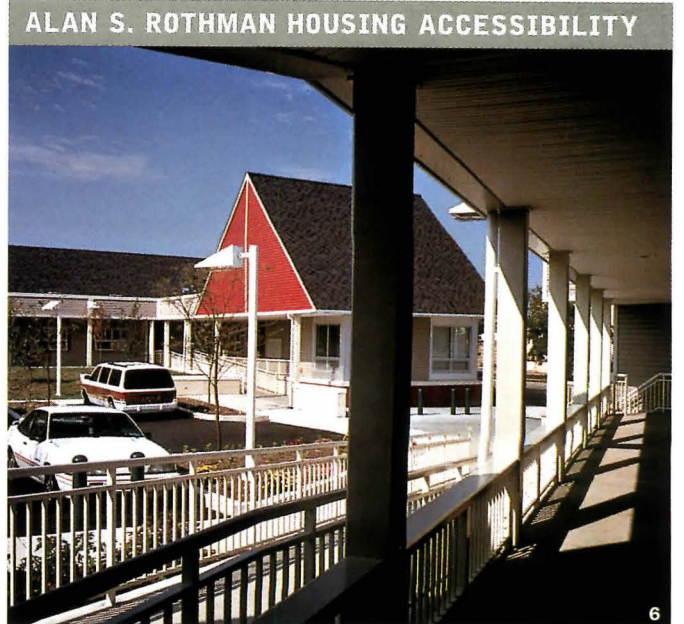
HUD and the AIA announced the six winners of the 2001 AIA/HUD Secretary's Housing and Community Design Awards for their innovative, affordable, and accessible building designs. **1.** East Lake Commons, Decatur, Georgia; Architect: Village Habitat Design, LLC; Associate Architect: Pimslers Hoss Associates; Owner: East Lake Commons Homeowners Association. **2.** Swan's Market Place, Oakland, California; Architect: Pyotak Associates; Associate Architect: Y.H. Lee; Owner: East Bay Asian Local Development Corp. **3.** TriBeCa Pointe, Battery Park

City, New York City; Architect: Gruzen Sampton, LLP; Owner: Rockrose Development Corporation. **4.** Center Commons, Portland, Oregon; Architect: Vallaster and Corl Architects and Otak Architects, PC; Developer: Lennar Affordable Housing. **5.** Arbolera de Vida, Albuquerque, New Mexico; Architect: Design Workshop and Studio E Architects; Owner: Sawmill Community Land Trust. **6.** Inglis Gardens at Eastwick, Philadelphia, Pennsylvania; Architect: Cecil Baker and Associates; Developer: Inglis Housing Corporation.

MIXED-USE, MIXED-INCOME DEVELOPMENT



COMMUNITY BUILDING BY DESIGN



Built into the hillside, the Butterfly House is clad entirely in corrugated galvanized sheet metal, differentiating it from the surrounding houses.



With metal cladding, Godfredsen Sigal Architects transforms a basic building into a stylish hillside house

By John Peter Radulski

The Butterfly House—a vibrant melding of galvanized corrugated steel, Douglas fir, and glass—stands in marked contrast to the Spanish- and early-California-style houses most common to the famed Hollywood Hills. Hired by a client to transform an existing nondescript bungalow into a showplace, architects Ron Godfredsen and Danna Sigal were presented straightforward mandates for how to build on the remnants of the original structure, which had been stripped down to its insulation, stucco, and studs: Use economically priced and easily worked materials; expand the square footage; maximize outdoor activity areas; and highlight views to Marina del Rey and downtown Los Angeles.

Since establishing their eponymous firm in Venice, Calif., in 1994, the husband-and-wife team has completed commissions ranging from a 400-square-foot residential addition to a casino and a retail store for *Hustler* publisher Larry Flynt. Such diversity, says Sigal, has allowed

Lighting in the craggy Hollywood Hills, the Butterfly House has a sculptural staircase that sweeps around the facade.

the firm to team with clients in the “exploration and adventure” of design and construction tethered to varied constraints.

Before considering forms and materials for the Los Angeles house, the architects and client Doug Dalton—Sigal’s first collaborator, a contractor who has since supported the couple on 10 projects—established the specific physical requirements. Sigal envisioned a house designed to meet the needs of residents with a very specific lifestyle, “a live/work environment for people who entertain a lot as part of their occupation in the film industry.” The next challenge was how to expand the nondescript shell. The original two-story house was 15 feet deep and 40 feet wide and abutted the base of a solid granite formation that receded 45 degrees from base to top. Godfredsen and Sigal had three 28-foot-long caissons hammered into the granite (at a rate of 7 inches per day) in order to construct a retaining wall and to build an extension onto the rear of the house. This effort made it possible to almost double the building’s previous footage, to 3,610 square feet.

John Peter Radulski is a writer and design consultant who lives in Westport, Conn. He is the former editor of Hospitality Design magazine.

Project: Butterfly House

Location: Los Angeles

Architect: Godfredsen Sigal Architects—Ron Godfredsen, Danna Sigal, partners; Maurice Harwell, Jason Pettinato, project team

Engineers: Parker-Resnick Structural Engineering (structural)

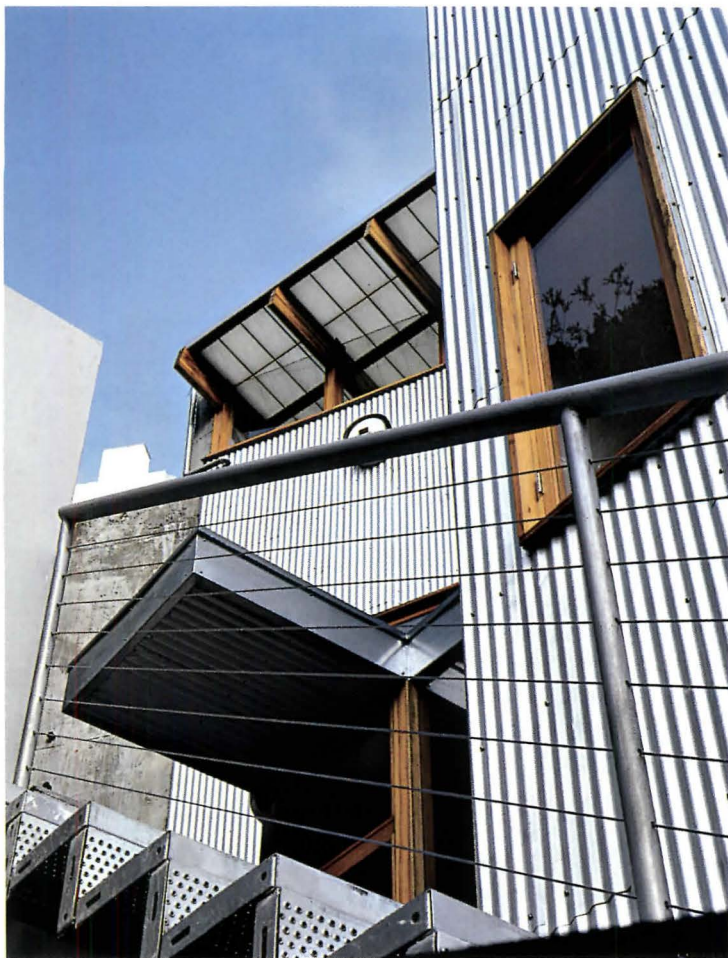
Consultants: Tim Thomas Associates (lighting)

General contractor: Dalton Construction



Douglas Fir window frames contrast with the metal cladding and give a preview to the house’s interior. Perforated galvanized

steel stairs lead to the front door; the overhang above the main entrance (opposite) is brushed sheet metal and corrugated steel.



Fiberglass roof panels, supported by glu-lam wood beams and steel rods, sit atop the house like the wings of a butterfly (below). The

exterior stairs, which begin at the entrance (left), progress almost continually to the roof deck (below), where views are showcased.



The design of the house was inspired in part by the architects' visit to Walter Gropius's home in Lincoln, Mass. Godfredsen says they admired its "simplicity of materials and form." They were also attracted to the shape of a 'butterfly' stool designed by Sori Yanagi that they saw there.

Physically and philosophically central to the Hollywood Hills project is an almost continual progression of stairways ascending nearly 45 feet from the street to the glass-walled roof deck, where a

A melding of galvanized corrugated steel, Douglas fir, and glass, the house contrasts vibrantly with its traditional neighbors.

pair of 16-by-32-foot translucent fiberglass panels appear like wings above the varied landscape.

Exterior stairs of perforated galvanized steel lead to the front door, while the overhang above the main entrance incorporates brushed sheet metal on the fascia, with corrugated galvanized steel cladding the top and bottom. Oriented vertically, the same material sheathes the exterior walls. Douglas fir-framed windows and doors break up the expanses of steel, allowing bright rays of daylight to infuse the interior.

Once inside, the architects trade metal for Douglas fir, glass, and drywall. Wood wraps the stairwells that rise from the entrance foyer up to the fiberglass-topped third floor. Noting the open space that extends between these two points, Godfredsen explains that the interiors were designed to flow almost seamlessly from floor to floor and

PINNACLE

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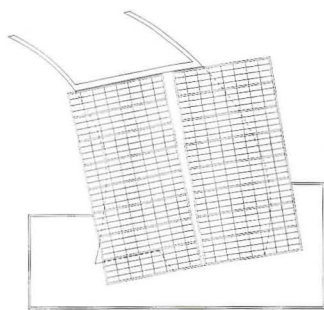
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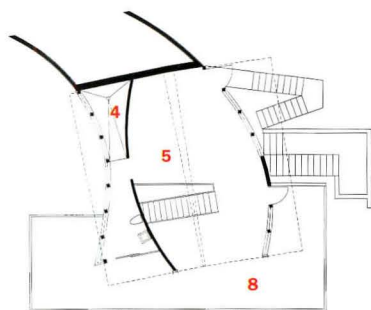
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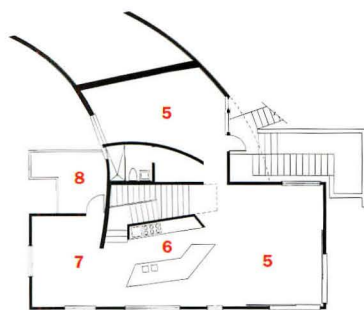
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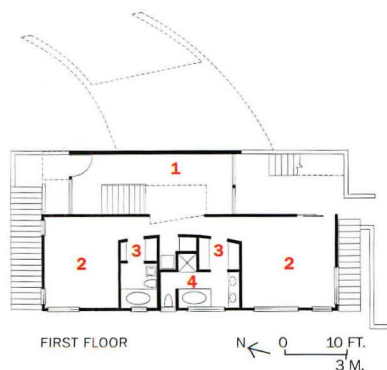
ROOF



THIRD FLOOR



SECOND FLOOR



FIRST FLOOR

1. Entry
2. Bedroom
3. Dressing/bathroom
4. Bathroom
5. Lounge/living
6. Kitchen
7. Dining area
8. Terrace



Inside, the architects traded metal surfaces for Douglas fir, glass, and drywall to create warm, light-filled living spaces.

within each level to achieve a high degree of transparency. Likewise, large expanses of glass—such as a pair of 8-by-12-foot windows in the living area that slide open to “remove” one corner of the room—accentuate the flow between indoors and out. On the top floor, curved glass walls with barely-there Douglas fir framing almost negate any sense of enclosure. Natural light also enters in through fiberglass roof panels supported by glued and laminated wood beams and steel rods.

Godfredsen and Sigal designated the rectangular streetside mass of the house as “urban,” a series of rooms from which city and ocean views can be scanned. Both vertically and horizontally oriented, windows either slide open or tilt outward; their asymmetrical placement further enriches the elevation. Meanwhile, the curvilinear addition to the rear faces the golden-hued granite and native grasses and other flora that surround the site. The polished arcs and planes of the house, like a butterfly alighting on the hillside, create a dynamic sense of animated beauty. ■

Sources

Roof deck coating: Pacific Polymer

Roofing system: Kalwall

Wood doors: Terry Lumber Sash and Door

Locksets: Omnia

Bathroom-finish hardware: Hastings

Cabinet hardware: Forms + Surfaces

Paints and stains: Frazee Paint, McClosky Marine Spar Varnish

Flooring: Saucedo Hardwood Floors

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Bjarne **Mastenbroek** and **MVRDV** play metal
against glass to create Villa KBWW



By Tracy Metz

One of Holland's tried-and-true housing types is called *twee-onder-een-kap*, two houses under one roof. For a two-family home in the city of Utrecht, two architects, Bjarne Mastenbroek of Architectengroep and Winy Maas of MVRDV, collaborated on an ingenious variation on this theme. Called Villa KBWW, the house is an assemblage of solids and voids constructed of glass and steel.

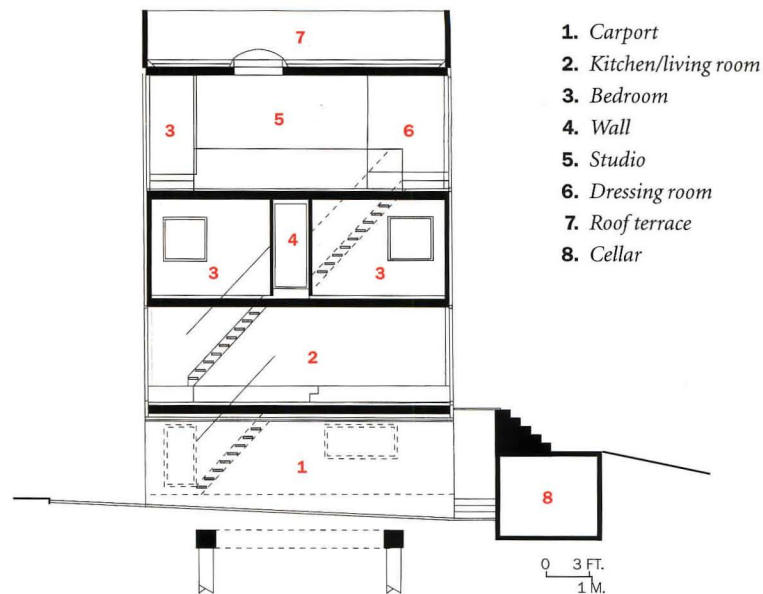
The choice of steel was dictated by the design, in which only one wall goes in a straight line to the ground. To avoid placing columns in the living spaces, steel beams are concealed in the floors, walls, and

sections of the facade to provide rigidity. Added advantages were lower costs, as it was possible to use prefab steel elements, and greater transparency where desired.

Located in a desirable residential neighborhood on the lovely 19th-century Wilhelmina Park, this urban villa is one of a number of new houses that contrast with their older ornamented brick neighbors. It is the only one with a facade consisting largely of glass.

The project started in 1994, when family WW (the clients' initials form the name of the house) bought the lot, only to discover that





their budget was insufficient. The KBs responded to their advertisement in the newspaper for a co-client. Thrown together purely by chance, the two families turned out to have divergent budgets and programs. The WWs had a traditional house in mind, whereas the KBs wanted an interesting space that interacted with the outdoors.

The KB family chose Bjarne Mastenbroek as the architect; it was Mastenbroek's idea to collaborate with Winy Maas of MVRDV. Says Mastenbroek, "Winy Maas and I had agreed long ago that someday we would design a house together. This house was a terrific first collaboration because it presented a very complex design challenge." Drawings of the floor plan show how the design began (with a simple perpendicular wall between the two halves), evolved, and where it ended (looking like something resembling a Rubik's Cube). Mastenbroek says, "We didn't so much design the elements themselves as the areas between the elements. That way you can create interesting spaces that escape from the predictable solutions you so often find in Dutch housing." The resulting assemblage of solid and void, metal and glass, provides each family with their ideal home.

The spatial complexity of the house was matched by the process of getting it built. The two families were at loggerheads more than once, the builder went bankrupt during construction, and the municipal fire regulations created almost insurmountable difficulties. It is a tribute to all that not only did the house indeed get built, but also that the clients are happy and that their children play together in the garden, designed by KB, which both families use jointly. ■

Tracy Metz lives in Amsterdam and is the features editor for NRC Handelsblad, a Dutch newspaper. She writes for RECORD about European architecture.

Project: Villa KBWW

Location: Utrecht, the Netherlands

Architect: De Architectengroep—Bjarne Mastenbroek with Floor Arons and Michiel Raaphorst, and MVRDV—Winy Maas, Jacov van Rijs, Nathalie de Vries, Mike Booth, and Joost Glisenaar

Engineers: ABT Velp (structural)

Contractor: Tiggelman bv

Sources

Concrete: VBI Beton

Glass: Rapid Pane

Electrical: SMEG

Kitchen: SMEG

Sanitary: Vegro

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In order to fulfill the divergent needs of two families, the architects used metal and glass to create a complex assemblage of solids and voids.



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On the edge of Chicago's notorious Cabrini Green, Frederick Phillips builds a graceful tower for himself

By William Weathersby, Jr.

While Mies's gleaming Lake Shore Drive apartment towers are the pinnacle of Chicago's residential architecture heritage, the Cabrini Green complex on the South Side represents a darker legacy: the city's abject failure in the realm of public housing. Completed in the 1960s to house up to 20,000 low-income residents, the cluster of high- and low-rise buildings now is being demolished and its tenants scattered, victims of the tract's crime and urban blight. While the city proceeds with public housing redevelopment plans (see www.thecha.org), one pioneering homesteader is bringing new vitality to this transitional neighborhood on his own time and dime.

In the shadow of Cabrini Green, architect Frederick Phillips has defied local skeptics to build a small, graceful tower as his own home. Set on a tiny triangular plot just northeast of a traffic artery that skirts the district and next to a 19th-century tenement, his low-maintenance, aesthetically high-impact building with loftlike spaces flouts the local masonry conventions of heavy brick and mortar. Instead, two sheet-

The site was said to be unbuildable, but the architect sandwiched two enclosed floors between a carport and roof terrace.

metal-clad stories seem to float in midair—boxes with a silvery sheen slipped between open spaces atop and below.

"Zoning setback requirements allowed only a constricted footprint," Phillips says. "This lot is really just a leftover scrap of the urban fabric that was once destined to be forgotten. I've always been drawn to finding the architectural possibilities buried within such remnants."

Phillips is no stranger to carving diamonds in a rough neighborhood. A home he built nearby for a physician was published as a Record House six years ago [RECORD, APRIL 1995]. His own previous house two blocks away appeared in RECORD in April 1990. With his new house, Phillips was inspired to build up rather than out for sweeping views of Chicago's skyscraper cityscape. The 1,200-square-foot house is vertically oriented, with a principal living space perched on the terrace. "The site ruled out a backyard," Phillips says, "and the elevated terrace creates a secure area for relaxing and entertaining." Living, dining, and

Contributing editor William Weathersby, Jr., lives in Westport, Conn. He grew up in a suburb on the North Shore of Chicago.

Project: Phillips House, Chicago
Architect: Frederick Phillips and Associates—Frederick Phillips, FAIA, principal; Vincent Rigg, Casimir Kujawa, project team

Structural engineer: Thornton-Tomasetti Engineers—Joe Burns
Landscape architect: Peter Lindsay Schaudt Landscape Architecture
Construction: Ladner Construction



Supporting the steel frame, the concrete stair tower allows the living spaces to appear suspended. The fire-engine-red skeleton of a spiral staircase is set off against the planes of polished concrete block and wavy steel.





kitchen areas occupy the third level. Two bedrooms are located on the second floor.

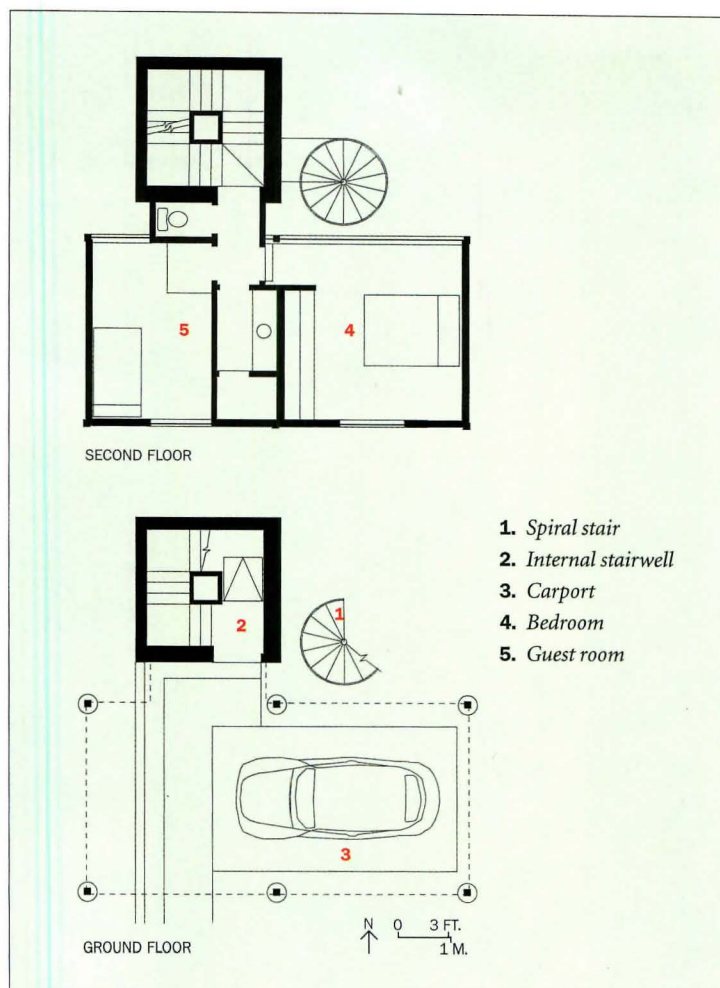
The Phillips House is an essay in structural engineering. Building codes mandated a steel frame because of the house's height and proportions. Columns are 4-by-4-foot structural tubes wrapped in 1-inch fireproofing beneath an outer steel shell. The inward-facing flanges of the beams sandwich the required fire-rated $\frac{3}{8}$ -inch drywall. Since the structural component of each column is only a 4-inch-diameter tube, an adjacent concrete-block tower, which houses an interior staircase accessing all floors, provides most of the racking support for lateral wind loads. "In effect, the core is pulled away from the building and placed to the side," Phillips says. "The concrete tower minimizes the steel frame, giving the floors a feeling of suspension." A spiral staircase rises along the north elevation where the metal and concrete towers meet, like treads ascending a treehouse. Painted fire-engine red, it is the vertical exclamation point to red metal-framed windows punctuating the corrugated steel siding.

Inside, Phillips indulged his passion for spare spaces flooded with light. The height of windows on the second and third floors keeps views unobstructed. Streamlined details embrace tactile materials. New England slate floors are laid in a running bond pattern "for a less clinical appearance," Phillips says. Retractable, translucent mesh terrace awnings provide sun protection while allowing a bird's-eye view of clouds rolling by. And there is no need to shovel snow off the terrace in winter: Here along Lake Michigan, the city's infamous winds make the lofty plane "self-cleaning." ■

Sources

Concrete block: *Trenwith Industries*
Windows: *Hopes*
Sheet metal: *Galvalume by Berridge*
Steel columns: *Firetrol*

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



1. Spiral stair
2. Internal stairwell
3. Carport
4. Bedroom
5. Guest room



The living, dining, and kitchen areas occupy the third level (top left, and above), while two bedrooms share the second floor (plan). The carport

(plan) alleviates the need for street parking or digging out of snowdrifts. Hydronic heating is set in concrete beneath slate.

With a dose of humor, Neil Deputy designs an inexpensive, prefabricated home office

By Elizabeth Harrison Kubany

Charlottesville, Virginia, is encumbered by the Jeffersonian tradition,” states Miami-based architect Neal R. Deputy. Certainly, this university town has become inextricably linked with Thomas Jefferson’s romantic neo-Classicism. With red brick, carved wood moldings, and seamed metal roofs, Monticello has influenced much of the architecture built in Charlottesville during the past 150 years. But Deputy sees a different city: “Charlottesville grew up around the railroads. Its rural and industrial past is often overlooked,” he says.

When Deputy’s client hired him to design a home office, it was the semi-industrial character of the site that inspired him. The stucco house is located on a corner lot in a 1920s and ’30s residential neighborhood. An auto dealership, metal shops, and a bottling plant surround the area’s houses.

Formally, “The Yardbird,” as Deputy titled his design, couldn’t be simpler. A 12-by-20-foot room elevated on pilotis, The Yardbird provides 240 square feet of custom workspace for this client. But Deputy envisions the unit in other places as well. The structure is almost entirely prefabricated and arrives on the site ready to be assembled. Deputy anticipates selling The Yardbird in a kit for use as a toolshed, outbuilding, or garden folly.

Deputy clearly brings a sense of humor to his work. He has done numerous prototypes for The Steel Zoo, using Quonset huts, grain silos, shipping containers, and tollbooths in various combinations to create customizable low-cost housing. And his buildings inspire wonder in others. Shortly after The Yardbird was finished, he heard a child ask his father, “How do they get the lawn mowers up there?” ■

Project: *The Yardbird, Charlottesville, Va.*

Owner: *Carl E. Owens III*

Architect: *Neal R. Deputy Architect, Inc.—Neal R. Deputy, principal; Gaither Pratt, associate*

Sources

Metal siding: *Fabral Co.*

Windows: *Traco*

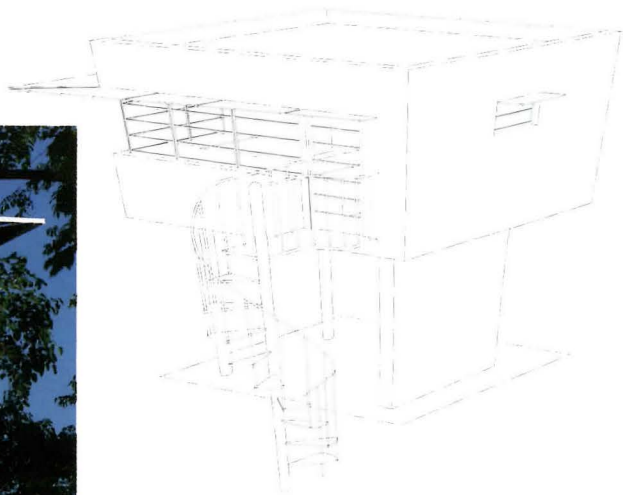
Spiral staircase: *The Iron Shop*

Lighting: *Stonco, Hubble, Leviton*

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Deputy calls the building, with its steel windows, corrugated metal siding, and exposed steel structure, “an alternate classicism for the city of Charlottesville.”





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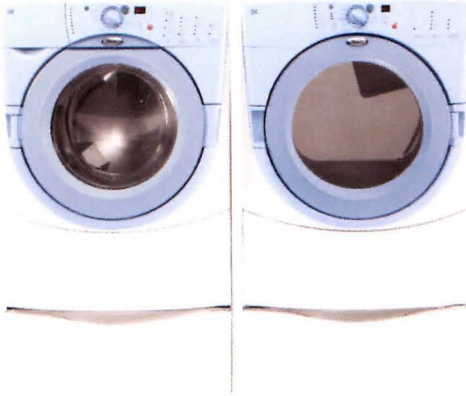
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Residential Products

► Smart laundry

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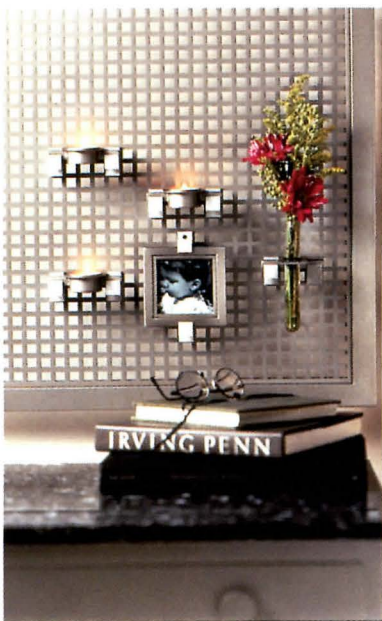
► Spinning shower

Moen's Revolution massaging showerhead takes ordinary water, spins each drop, and then twirls the entire stream. The increased speed in movement of the water drops results in a perception of warmer water, higher flow, and higher pressure. The control is located at the bottom of the showerhead, out of the main stream of water. 800/BUY-MOEN. Moen, North Olmstead, Ohio. **CIRCLE 203**



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▲ Basil and oregano

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▲ For the vertically impaired

Alaco Ladder Company recently added new finishes and options to its wood rolling ladder. The ladder is constructed in a straight or bent design with tapered side rails and beveled steps assembled with steel rods and plated steel braces. Ladders come in a variety of natural woods and a large selection of track and hardware options, and there is a model that is completely removable. The rolling ladder is ideal for a library or study or for reaching storage and display shelves that can be installed to cover a single wall or an entire room for any residential or commercial application. 888/310-7040. Alaco Ladder Company, Chino, Calif. **CIRCLE 205**

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Christo Lefroy Brooks has introduced a range of 20 sleek minimal fittings and fixtures called the XO Collection. All stainless-steel hardware is handcrafted in England through the lost wax technique employed in sculpture. The stainless-steel fittings and accessories are available in two main finishes—brushed and glassblast, a finish created by blasting the stainless-steel surface with tiny particles of glass. 212/226-2242. Lefroy Brooks USA, New York City. **CIRCLE 207**



▲ Getting toasty

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▲ Coffee table lawn

The Oasis Cocktail table from Ted Boerner took shape in 1997 when a client requested a space to display small treasures. A monumental slab on rounded, African-inspired legs offers a central copper trough with a removable glass insert top that stores underneath when not in use. In the new version, the table is surfaced in rotary-peeled bamboo veneer, and the bamboo's knuckles and other imperfections are retained, adding to the effect. The table is available square, rectangular, or round. Standard woods include hard white maple, cherry, rift white oak, mahogany, ash, and vertical grain fir. 415/487-0110. Ted Boerner Inc., San Francisco. **CIRCLE 206**



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**Copper ellipse soaking bath (far left).
Stainless-steel soaking bath (near left).**

Sculptural copper and stainless-steel soaking baths

Diamond Spas offers a line of plumbing fixtures fabricated from stainless steel and copper. A hand-made, full-skirted copper ellipse soaking bath is one of their newest offerings. The bathing well and top ledge have been left raw to patinate naturally over time. Whirlpool,

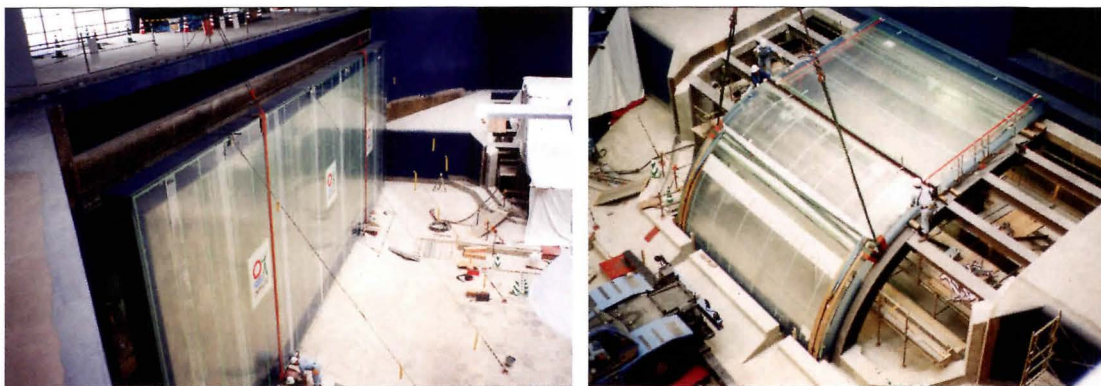
self-rimming, undermount, or custom designs are also available. The tub's dimensions are 40 by 72 by 24 inches. Diamond Spas also introduces a self-standing, stainless-steel Japanese soaking bath. The bath is constructed by hand, featuring clean weld seams, a

bench seat, and a bowed top ledge. Whirlpool, drop-in, self-rimming, and custom applications are also available. The stainless bath's dimensions are 42 by 42 by 34 inches. 800/951-7727. Diamond Spas, Inc., Broomfield, Colo. **CIRCLE 209**

Freestanding shade structures

Birdair has introduced a new line of preassembled, freestanding shade structures. Models are fully assembled and pretensioned, ready for on-site delivery and installation. Ideal applications for these closeable structures include: outdoor dining cafés, pool patios, pedestrian or valet shading, and many other landscape applications. The wind-rated structures come in a variety of shapes and sizes, can be linked together for continuous coverage, and can be permanently fixed or mounted for removal and storage.

Birdair also has a variety of pre-engineered modular products. These units are non-closeable and typically much greater in size than the pre-assembled units described earlier. The styles range from 13 to 40 feet wide and individual units can be linked together. 800/622-2246. Birdair, Amherst, N.Y. **CIRCLE 211**



Japanese aquarium to display world's largest acrylic panel

Nippura Co., Ltd., has just completed the waterproofing and acrylic work for the main tank of the new Okinawa Aquarium, which will open to the public in the fall of 2002. The main tank holds two million gallons of salt water and will showcase five full-size whale sharks along with other marine species.

Designers sought a view window big enough to allow visitors to see numerous whale sharks swim-

ming in tandem without any interruption. The result is the largest acrylic panel ever constructed, measuring 74 feet wide by 25 feet high by 2 feet thick, and weighing 133 metric tons. The window is made possible by Nippura's on-site vertical bonding and annealing technology, which allows architects to design view windows in sizes that would have been impossible to move with the crane-capacity

restrictions of the typical construction site. The main tank also features the largest acrylic dome room ever designed. The dome room is composed of seven separate acrylic panels that are 46 feet long by 28 feet wide by 10 feet high. The dome consists of over 50 tons of acrylic. The curved middle section of the dome has an arc length of 32 by 15 feet. 704/523-4384. U.S. Nippura, Inc., Charlotte, N.C. **CIRCLE 210**



New Products

► Sauna selections

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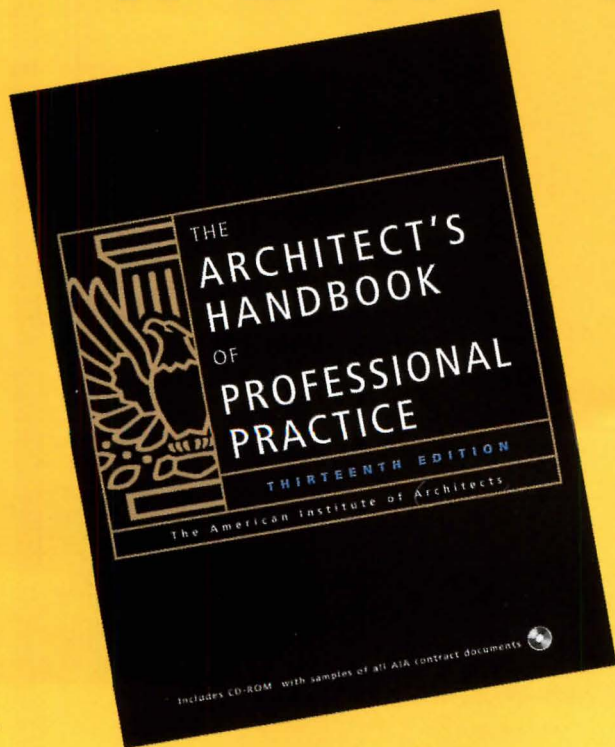


Castle, Del. The building was completed early in 2001 following an 18-month design and construction schedule, including site search. 816/968-3304. Butler Manufacturing Company, Kansas City, Mo. **CIRCLE 214**

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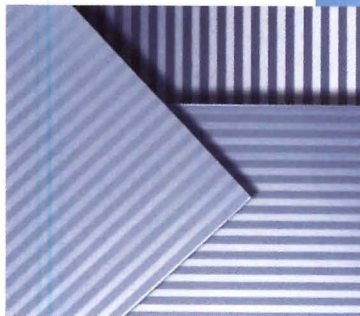
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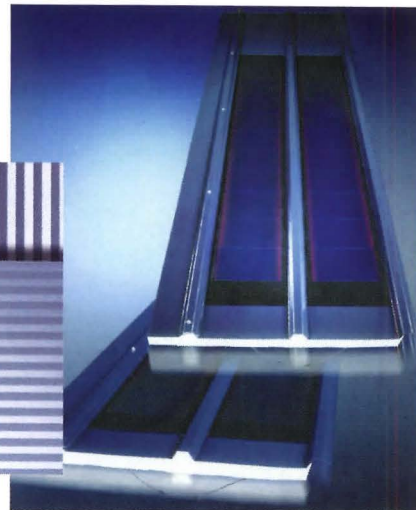
New Products

▼ Insulated wall/roof panels

Thyssen Thermowand Design 100 (below left) is Thyssen's newest, thickest model of streamlined, insulated metal wall panels with concealed fasteners. The factory-foamed panels are four inches thick, with skins of continuously processed, galvanized sheet steel and an insulating core of poured-in-place, polyurethane high-resistance foam, free of fluorocarbons and halogenated



fluorocarbons. Thyssen has also introduced an insulated version of its Thyssen Solartec metal roof panels with integrated photovoltaic components for solar energy applications (below right). 856/863-2666. New Century Building Systems, Glassboro, NJ. **CIRCLE 215**



▲ Keeping cool by the pool

OpenAire's retractable pool enclosures and skylights retract at the touch of a but-

ton, opening up to 50 percent of the roof area. Thermally broken aluminum framing systems provide an effective moisture barrier and can withstand the harsh environment of indoor pools. Enclosures and skylights can span large distances up to 100 feet and

are suited to new or existing construction. 262/675-6966. OpenAire America, Cedarburg, Wis. **CIRCLE 217**

► Towering structure

Towering 40 feet from the plant floor, the PortaFab structure shown has six platform levels with access provided by pre-engineered stair assemblies. The application-driven design was developed by PortaFab's in-house professional staff to meet the specific space requirements and characteristics of the building. The structure is designed to meet the 1997 UBC building code. 800/325-3781. PortaFab Corporation, Chesterfield, Mo. **CIRCLE 216**



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Product Briefs



▲ Solar shading solutions

With more than 160 years experience in the design, project management, installation, and maintenance of solar

shading systems, Levlux has completed major projects in Europe, Canada, Hong Kong, and the U.S. With the increasing significance of energy issues in the U.S., Levlux encourages American architects to look to its products as a way of controlling heat gain within buildings while moving away from the traditional route of air conditioning. Three key product groupings include the

Skyvane rack arm system, external shading systems, and specialty venetian blinds. 44/020-8863-9111. Levlux, Middlesex, England. **CIRCLE 218**

► An intelligent direction

Ariadne is a complete way-finding system for hotels, conference centers, corporate training centers, and other large meeting facilities. When tied in with an existing booking system, Ariadne automatically updates time, activity, and room assignments. A 40-inch plasma screen is designed as the main welcome board at the entrance of the building, with subsidiary 15-, 10-, and 6-inch screens networked throughout the facility as required. 214/352-9140. ASI Sign Systems, Inc., Dallas. **CIRCLE 219**



▼ Pan-Asian influence

Newari Gallery offers custom architectural elements, interiors, structures, adornments, and frescoes inspired by the ancient designs of countries such as Nepal, India, Thailand, and Bali. Newari provides design support in the creation of complete environments in the Pan-Asian vernacular for home, business, resort, and garden. Each wood, terra-cotta, and stone masterwork—from pergolas to window screens—is handcrafted in Nepal by artisans practicing the same techniques used for the past 1,000 years. 510/486-8778. Newari Gallery, Berkeley, Calif. **CIRCLE 221**



Product of the Month Riverstone

Riverstone is a new material developed in Italy of translucent resin and marble pebbles that is now available in the United States. Suitable for both residential and commercial applications, Riverstone comes in six colors: natural, blue, green, aquamarine, pink, and yellow (shown above).

The marble granules come in three sizes, small (10 millimeters), medium (14 millimeters), and large (22 millimeters). Riverstone can be cut and molded using normal marble machines. Ceiling border, frame, tile, flooring border, and wall-slab versions of Riverstone are available. It is not recommended that the product be directly exposed to the sun, since it may change the color of the resin. The surface is completely devoid of paints and is treated with a water-repellent wax protection. To maintain the surface protection and the original brightness, occasional treatment with marble wax is suggested. 212/727-9331. Artistic Tile, New York City. **CIRCLE 220**



▲ Endless color palette

Lamontage is a patented needle-punching method of rug construction created by Liora Manné. Hundreds of colors of felt can be blended to make hues for the planned rug design—whether it's traditional or modern. Next, the fabric is tacked down with a handheld tool that houses about a hundred barbed needles that move at a high speed to interlock the fibers. The work is then finished by a machine containing thousands of barbed needles that permanently laminate and strengthen the rug. 212/989-2732. Lamontage, New York City. **CIRCLE 222**

Product Briefs

▼ Versatile glass styles

Interstyle offers a complete line of glass tile in a full range of colors. The Aquarius line of rustic blocks of individually handcrafted glass measure about 4 by 4 by ½



inches. Aquarius is available in 20 combinations of colored gems suspended in clear glass. River Crystals are chunks of handcrafted and hand-colored glass, assembled into mesh-mounted mosaics. River Crystals are available in 10 colors and two sizes. Cobblestones is a glass mosaic series of 12 color groups, and Glassplash glass tiles feature a mottled texture. 604/421-7229. Interstyle Ceramic and Glass, Ltd., Burnaby, British Columbia. **CIRCLE 241**



▲ Fresh frescoes

Manufactured in Trieste, Italy, Rialto plaster finishes are historically accurate and have earned approval by the Italian Commission on Environmental and Cultural Sites Conservation and Restoration. The finishes include materials such as seasoned slaked lime, selected resins, marble, granite, quartz, colored earth, and natural pigments. Most can be custom blended to match specific requirements. 714/777-4401. Vero, Anaheim, Calif. **CIRCLE 242**

▼ Pesce carpets

This November, Milan's Galleria Nilufar will open an exhibit of three carpets in silicone, created exclusively by Gaetano Pesce for the gallery. Pesce has developed a new technique in which designs are created through the articulation of a multitude of variously colored drops of silicone. The result is an appearance reminiscent of the pixels of digital television or computer monitors. 39/02-780193. Nilufar, Milan. **CIRCLE 243**

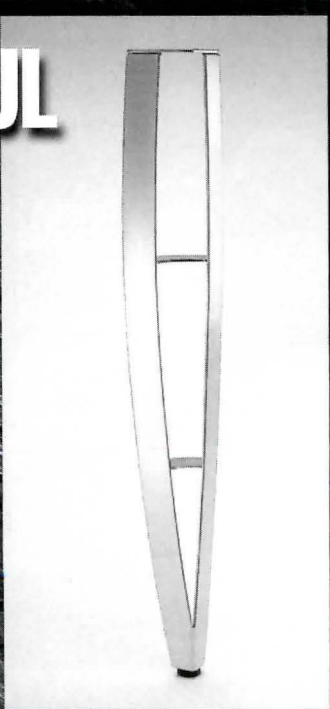


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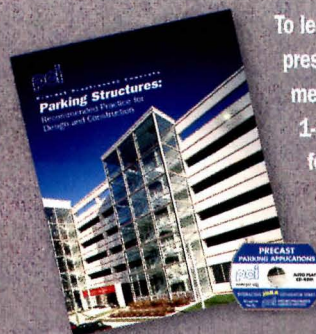
In the world of airports, traffic rules. Air, ground and pedestrian traffic compete for time and space. Construction cannot interfere.

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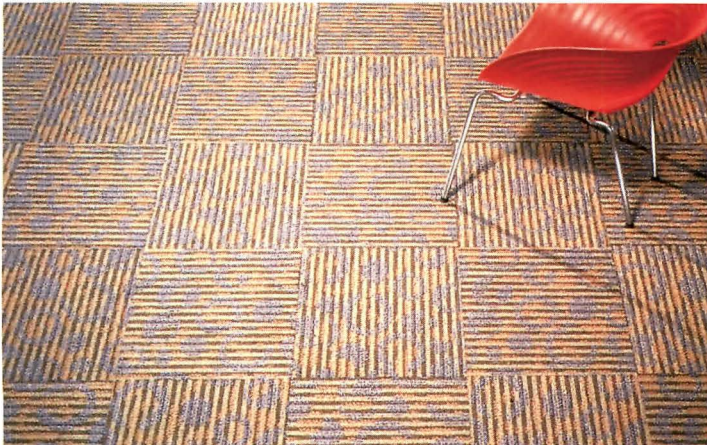
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Product Briefs



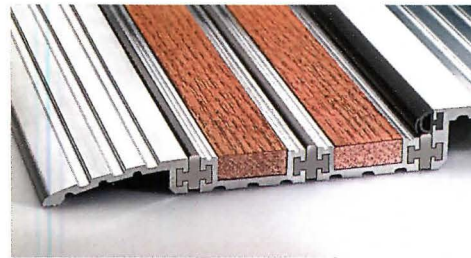
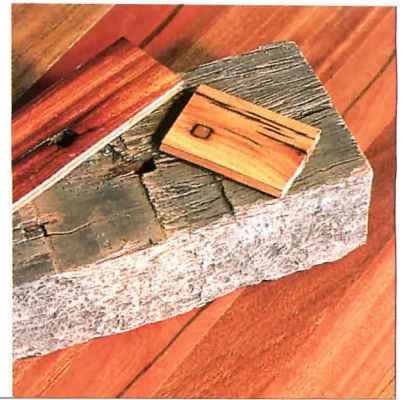
▲ Flooring fun and games

The Fun and Games collection includes four coordinating styles offered in eight colorways ranging from slightly retro combinations to ethnically inspired neutrals. Fun and Games includes Square Pegs, a style that overlays blocks of color over a contrasting zigzag stripe; Evasive Action, available in quarter-turn tiles; Round Holes, a product that uses circular elements of color over a wide striped field; and the coordinating Line-Up. 706/259-9711. C&A Floorcoverings, Dalton, Ga. **CIRCLE 223**

► Reclaiming the past

All AsiaRain jungle hardwood flooring is certifiably reclaimed, rediscovered, or recycled tropical hardwood. AsiaRain "Jungle Mix" floors are 100 percent rediscovered and reclaimed "used wood" from old railroad cross ties, telegraph poles, and bridge pilings out of Southeast Asia. 707/822-6200. AsiaRain Jungle Hardwoods, McCloud, Calif.

CIRCLE 224



▲ Thermal break door saddles

Zero offers a line of energy-efficient door saddles using unfinished oak inserts as thermal breaks. Used in combination

with PVC breaks, the wood inserts are suitable for both high-end commercial and residential use. The look can be customized by staining and coating to finish the exposed surfaces, and aluminum inserts are

available. Zero's thermal breaks are offered in a variety of wheelchair-accessible saddles. 800/635-5335. Zero International, Inc., Bronx, N.Y. **CIRCLE 225**

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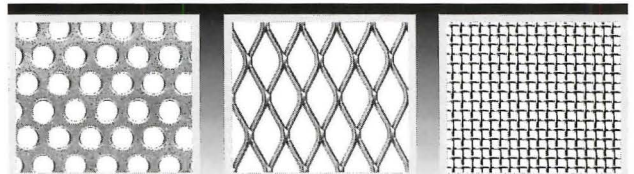
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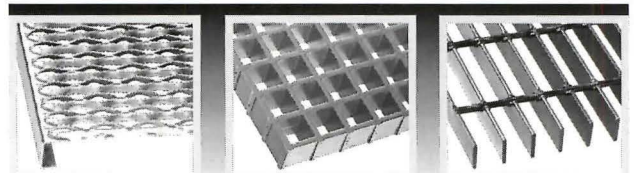
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Product Briefs



▲ Clear corporate vision

The employees of Cincinatti's Cinergy Corporation were no longer able to enjoy the atrium connecting their corporate headquarters. The atrium (top), which featured 2,300 square feet of sloped, glazed curtainwall, started to leak and the units began to fog up a year or so after the original construction. Harmon developed a plan using a 16-millimeter expandable polycarbonate material to allow for the movement between the buildings (bottom). It cost about 50 percent less than it would to actually reglaze the slope using one-inch insulated units. 763/287-4900. Harmon, Inc., Golden Valley, Minn. **CIRCLE 226**



▲ Green roof system

Weston's GreenGrid System is a new green roof technology that is geared

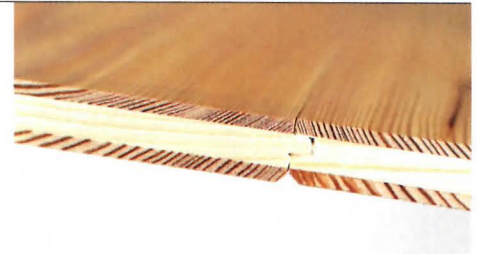
toward the needs and requirements of industrial, commercial, and government facilities. The interlocking GreenGrid modules are composed of recycled plastics and arrive at the work site planted and ready for installation. A recent study by Weston estimates that greening the rooftops of all city buildings in Chicago would result in nearly

\$100 million of annual energy savings. 312/424-3319. Roy F. Weston, Inc., Chicago. **CIRCLE 227**

► Austrian wide-plank flooring

Admonter Natural Flooring is a three-layered engineered product manufactured in Austria by Stia Holzindustrie GmbH, the industrial arm

of the Admont Benedictine monastery located in the small Austrian town of Admont. Stia is a proponent of conservation and plants four trees for each tree harvested. 970/728-0446. Edelweiss Wood Flooring L.L.C., Telluride, Colo. **CIRCLE 228**



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Record Houses 2002

ARCHITECTURAL RECORD CALL FOR ENTRIES

The editors of ARCHITECTURAL RECORD announce the 47th annual RECORD HOUSES awards program. This program is open to any registered architect; work previously published in other national design magazines is disqualified. Of particular interest are projects that incorporate innovations in program, building technology, and use of materials. The entry fee is \$50 per submission; please make checks payable to ARCHITECTURAL RECORD. Submissions must also include plan(s), photographs (transparencies, slides, or prints), this entry form, and a brief project description, all firmly bound in an 8 1/2-by-11-inch folder—postmarked no later than November 15, 2001. Winning entries will be featured in the 2002 RECORD HOUSES. Other submissions will be returned or scheduled for a future issue. Please include a self-addressed envelope with the appropriate postage, and allow 10 weeks for return.

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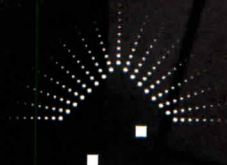


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Product Briefs

► Heavy traction

Noslip is a new commercial and industrial safety flooring system fabricated from the same anti-skid traction material that protects workers and equipment on steep inclines of loading ramps. Noslip consists of galvanized steel traction plates with closely spaced perforation grips that prevent slips and falls on wet, oily, dusty, and icy surfaces. The plates exceed



OSHA, ANSI, and U.L. standards. 800/922-6957. Universal Industrial Products Company, Inc., Pioneer, Ohio. **CIRCLE 229**

◀ Economical fabric ductwork

Low-cost fabric ductwork allowed for the creation of long duct runs, reducing the number of air-handling units at the GAN-COM plant in Highspire, Pa. Because the fabric duct requires 60 percent less labor to install than metal duct, Briner cut the number to six larger modular air-handling units. 502/493-2210. FabricAir, Inc., Louisville, Ky. **CIRCLE 230**



▼ Family addition

Ultima Vector, the new addition to the Vector family of ceilings, is a mineral fiber panel that features a smooth, fine-textured surface, excellent sound absorption, high light reflectance, and the patented Vector edge detail that creates an upscale, grid-hiding visual with downward access. The two-by-two-foot panels install in a 15/16-inch exposed tee suspension system, which makes them ideal for renovation applications as well as new construction. 877/ARMSTRONG. Armstrong World Industries, Inc., Lancaster, Pa. **CIRCLE 231**



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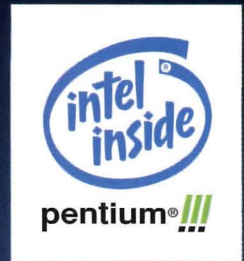
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Product Literature

Industrial coating colors

Tnemec now offers an advanced color-matching service for industrial coatings. Tnemec's Color Formula Guide includes more than 500 standard colors, and the color-matching service includes one-day turnaround in batch sizes from one gallon to 5,000 gallons. The service is available through Tnemec's 14 distribution centers across the country. 800/863-6321. Tnemec Company, Inc., Kansas City, Mo.

CIRCLE 232

ADA-compliant bath fixtures

Swan Corporation's new eight-page, full-color guide features a complete review of Swanstone reinforced solid surface, transfer and barrier free showers, and shower floors for assisted-living and/or ADA-accessibility requirement for residential, commercial, or institutional use. 314/231-8148. The Swan Corporation, St. Louis, Mo. CIRCLE 233

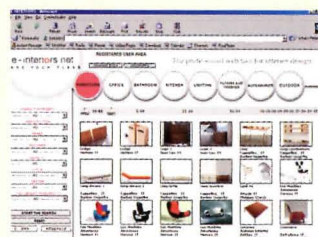
Lighting catalog CD-ROM

Architectural Landscape Lighting has announced availability of the *ALLscape Catalog 01* on CD-ROM. This interactive version of the catalog runs on Microsoft Internet Explorer and fea-



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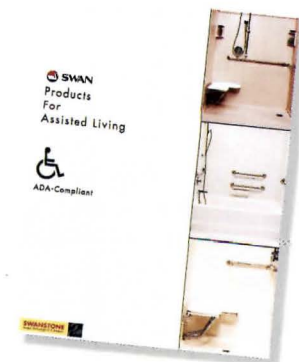
tures a highly visual homepage. 714/668-3660. Architectural Landscape Lighting, Santa Ana, Calif.

CIRCLE 234

Wall carpet brochure

Eurotex offers free new literature on its Lanai wall carpet. Product description, photographs, installation instructions, and construction and performance specifications are included. 800/523-0731. Eurotex, Philadelphia.

CIRCLE 235



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Product Literature

Trim and millwork catalogs

Style Solutions has introduced a set of new product literature available free to architects specializing in both residential and commercial projects. Over 100 new products are included in the catalogs, including expansions of the company's louver, window trim, moldings, balustrade systems, and decorative millwork product lines. 800/446-3040. Style Solutions, Archbold, Ohio. **CIRCLE 236**

Door/frame pricing guide

Chicago Metallic has released a new Door/Frame system price guide that depicts many of CMC's standard hinge preps. 800/323-7164. Chicago Metallic, Chicago. **CIRCLE 237**

Outdoor lighting series

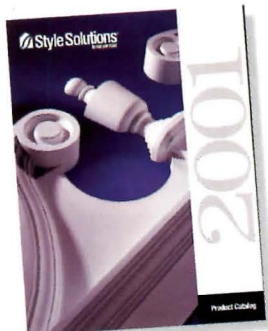
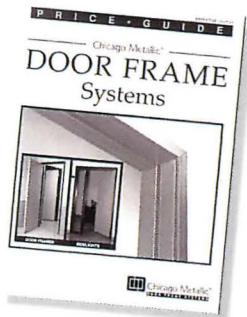
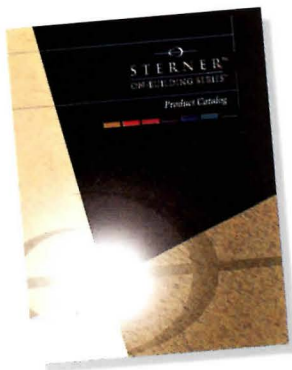
Sterner introduces the On-Building Series, which includes 94 products grouped in the following categories: step lighting, recessed lighting, wall lighting, parking/garage lighting, ceiling-mount lighting, cylinder lighting, and arm-mounted lighting fixtures. A new catalogue promotes the line in a user-friendly format and ordering matrix. 800/328-7480. Sterner Lighting Systems Inc., Eden Prairie, Minn. **CIRCLE 238**

Cabinet installations

A new eight-page brochure is available from Westmark Products showcasing commercial cabinet installations in educational, health care, and laboratory facilities. 800/755-3470. Westmark Products, Inc., Tacoma, Wash. **CIRCLE 239**

Roofing and waterproofing

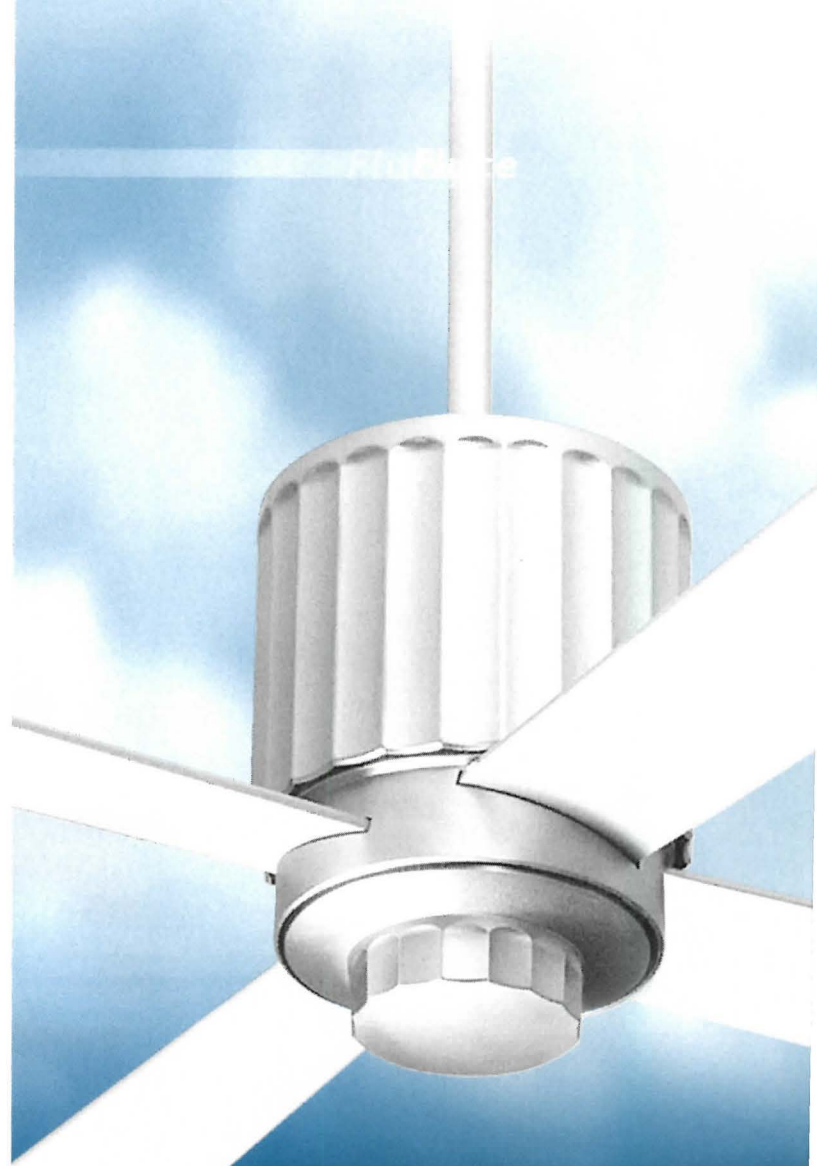
The National Roofing Contractors Association offers the fifth edition of *The NRCA Roofing and Waterproofing Manual*. The manual contains 1,450 pages of low- and steep-slope information about roof-system design and installation. The fifth edition includes new reroofing and architectural sheet-metal sections, revised steep-slope roofing, metal roof systems, and roof-system design guidelines for low-slope membrane roof-system sections. NRCA members receive one complimentary CD-ROM version. The initial hard copy of the manual can be purchased for \$125, including shipping and handling, with additional copies for \$250. The cost of the manual and CD-ROM is \$350 each for nonmembers. 800/323-9545. National Roofing Contractors Association, Rosemount, Ill. **CIRCLE 240**



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Answers to Continuing Education Questions from Page 195

1. AAMA sets the standards for exterior window aluminum coatings performance. The new AAMA 2605 standard more than doubles the old requirements in weathering performance, abrasion resistance and resistance to salt spray and humidity. The older 2603 standard allows slight chalking and fading after 1500 hours of testing. AAMA 2604 sets standards for five years and looked at chalking and color performance after 3000 hours of testing. AAMA 2605 sets standards for 10 years by demanding heightened performance after 4000 hours of lab testing and 10 years of field exposure testing.
2. Impact resistant glass is usually a laminated five-layer sandwich of glass, resin and mylar. Resin is applied to the interior surface of two pressed sheets of float glass. The resin strengthens when cooled and hardens like safety glass. Upon impact, glass pieces adhere to the resin and mylar inner layer and remain in the opening.
3. Large and small missile tests are used to measure impact resistance. For the large missile test, two out of three windows must survive two blows from a nine pound 2 x 4 shot from a cannon at 50 to 52 feet per second. For the small missile test, two out of three windows must survive 30 hits from steel spherical balls weighing 2 grams each propelled at 130 to 132 feet per second.
4. In boot-gasket glazing, a piece of vinyl is wrapped around the glass. This system allows for the glass to be replaced easily. Wet-glazing refers to silicone products used for glazing compounds and sealants. The new sealants give glass a better fit and perform well over long periods of time. Aesthetically, wet-glazing is preferable, however, the glass will be more difficult to replace since the silicone compounds adhere well to the glass.
5. Besides wet-glazing, impact resistance, and coatings on architectural aluminum extrusions, new standards are also seen in sizes of windows, the type of glass in windows, and the way divided lites are made. Windows have been available in standard sizes, normally three, four or five foot tall and standard configurations. Now we are seeing larger sizes used often enough that they have become standard. Windows are available now as operable in large sizes that were only fixed before. Many window manufacturers make windows standard with low E glass. This has come about because low E glass reduces energy consumption year-round. Divided lites are made either from aluminum on the exterior of the glass, or wood muntins on the interior of the window. These allow the window to be a single sealed unit rather than nine or twelve individual units, eliminating much heat transfer.

A SPECIFICATION GUIDE FOR EXTERIOR WALL SHEATHINGS

Sponsored by USG Corporation

Answers to Continuing Education Questions from Page 201

1. Sheathings serve to enclose wood or metal-framing buildings and provide a surface for the application of exterior claddings and finish materials. Sheathings may also be required to provide racking or shear resistance, fire resistance and moisture resistance. Additionally, sheathings serve to enclose buildings during construction.
2. Paper-faced and glass-mat-faced gypsum sheathings are surface-reinforced panels. Both rely on a surface layer for moisture resistance, strength and fastener holding power. If the face layer of these panels is torn or pierced or if water penetrates the cut end of the panel, these sheathings will lose both strength and water resistance. Gypsum/cellulose panels are core-reinforced panels featuring a homogenous cross-section made from cellulose fibers, gypsum and water-resistant additives. Gypsum/cellulose panels have no face layer to separate from the core and will not lose their strength when cut or when fasteners are overdriven. Due to their superior structural strength and fastener holding power, the panels can also be installed over 24 inch o.c. framing.
3. Plywood and OSB sheathings provide excellent racking and shear strength. They also provide a nailing base for siding materials that require fastening between studs. However, wood-based sheathings provide little or no fire resistance and therefore cannot be used in non-combustible construction. While various grades of plywood offer differing levels of exposure performance and moisture resistance, wood-based sheathings may swell, warp or rot when exposed to damp environments.
4. Sheathing water resistance impacts both project construction and long-term performance. During construction, sheathings are used to enclose buildings, permitting interior work to continue regardless of weather conditions. Sheathings that can withstand direct exposure to moisture for longer periods allow greater flexibility in construction scheduling. Moisture resistance also ensures that sheathings will be able to effectively withstand potential moisture intrusion.
5. Three key installation issues should be considered when specifying sheathings – handling, cutting and fastening. Smaller, lighter and more rigid sheathing panels are easier to lift and put in place, while larger, heavier and more flexible panels are more difficult to erect. The easier a panel is to handle, the more likely it will be installed correctly and efficiently. Panel cutting and fastening requirements also impact installation speed and quality. Solid-core gypsum/cellulose panels eliminate concerns about overdriven fasteners and can be installed as quickly – or more quickly – than paper-faced or glass-mat-faced gypsum panels.

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ANSWERS TO: "DYNAMIC CONCRETE IN THE 21ST CENTURY"

Questions appear on page 180. To receive CES credits, fill in the education reporting form below or on our Web site, www.architecturalrecord.com.

1. Portland cement is the industry standard, but different types of cement are used for their color and other properties. Lehigh Aalborg white cement was used for its uniform color and because it generates a lower heat of hydration, which was needed in the thick walls to ensure that their internal temperature did not rise above 160 degrees while curing. Pozzolan fly ash was used to improve workability and surface quality.

2. The biggest problem for concrete is moisture penetration. Concrete is porous, which allows air and moisture to permeate it. When the moisture works through to the reinforcing steel bars and mesh, it causes the steel to rust and expand. This pushes the concrete away, resulting in cracking and spalling. Ancient Roman concrete was not reinforced with steel, so it did not suffer from this problem.

3. The MIT dorm was designed with a concrete perforated bearing wall to allow large openings for a view. A precast concrete structural system was used to achieve this porous effect. High-strength concrete was used, creating a clean and rugged surface on the inside, covered by insulation and aluminum panels on the outside. The vertical and horizontal members were made of high-strength concrete with four reinforcing bars each, increased in diameter for strength.

4. Italcementi developed a concrete made of a brilliantly white cement, Bianco TX Millennium, and mixed in photocatalytic particles to oxidize atmospheric pollutants, keeping the brightness in the color. The aggregate used in the concrete is Carrara marble, which contributes to the mirror finish.

5. Fibers are being used in two different ways. First, synthetic fibers replace steel-rod reinforcing bars. The fibers have stronger tensile strength, are lighter weight, do not rust, and make irregular forms easier to pour. A second type of fiber, carbon, is added to the concrete mix. Carbon fibers make the concrete stronger and able to withstand greater stresses. When a stress occurs, an electrical resistance, which can be measured, is created between the fibers and the mixture. This allows minor structural flaws to be detected.



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F. Joseph Moravec: A man with a mission

Interviewed by Ingrid Whitehead

Appointed this June as commissioner of the GSA's Public Buildings Service, F. Joseph Moravec is a busy man—in charge of asset management and design, construction, leasing, operations, security, and disposal for more than 330 million square feet in more than 8,000 public and private buildings that accommodate over one million federal workers. Recently he has put aside his designated mission of providing government employees with the best workplaces possible to concentrate on relocating some 2,000 Pentagon workers and some 2,800 employees on the fed's payroll in New York City displaced by the September 11 terrorist attack. He spoke to RECORD before the tragedy, and in the darker days following, about his job and its new dimensions.

Q: *In the aftermath of the September 11 attacks, how quickly did you have your systems back up at the Pentagon and in New York? In D.C. we had 900 workstations up and running by Friday, and by Monday we had 2,000. In Lower Manhattan, we had 25,000 federal employees working. We evacuated 20,000 people from the World Trade Center buildings 6 and 7. We have been leasing space all over Manhattan to get them working again. One reason people come to work for the government is for love of country, and the way our security people responded, the way our systems came together after this tragedy really made that evident. I'm really proud. We should all be.*

What is your agenda for the Public Buildings Service? Our fundamental mission is to provide the federal worker with the most superior workplace possible. Also, because 450 of the 1,800 buildings owned by the federal government are historic, and 40 of those are national landmarks, I am very concerned with preserving these treasures. My priority is to get the resources and funds necessary to deal with a backlog of poorly maintained buildings. Also, to develop a national asset-management authority and to promote and sponsor a property reform act.

What is your knowledge or interest in architecture? Working in the private sector for 25 years, I was trained to think of what the user would want—efficient floor space, views, etc. I appreciate good architecture, and good architects. The GSA's Design Excellence Program has been around for about five years, and it's dedicated to finding the best architects to build federal buildings. Included in that program is a national peer review group, which gathers important architects from around the country to review the first phase of new designs. That program, along with our Construction Excellence Program and our Art in Architecture Program, have given us ways to improve federal buildings.

Have the terrorist attacks on the Pentagon and World Trade Center and the Oklahoma City bombing changed your building security agenda? Well, obviously these attacks have added new dimensions to my job. But the thing to

remember is that Timothy McVeigh was not a great architectural mind. We can't let people like him design our buildings. We won't be building bunkers. We'll build structures that are secure, but attractive and emblematic, accessible and open, light and airy. The most rigid security standards will be upheld, and, luckily, technology in this realm is moving rapidly, so we can accomplish this.

Do you think we should continue to build iconic buildings in America? I think public buildings should be iconic, yes. I think they should be expressive and symbolic of the spirit of the people. They should be timeless, high-value, and secure.

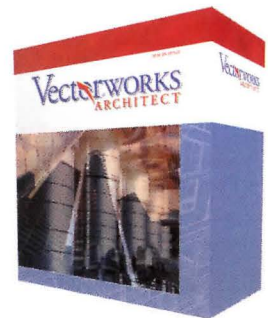
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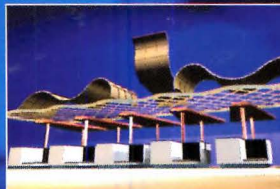
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