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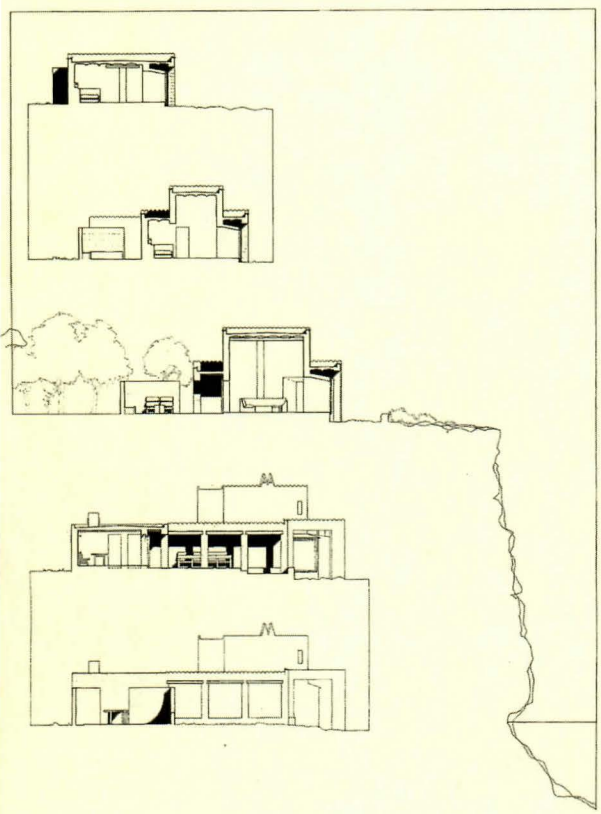

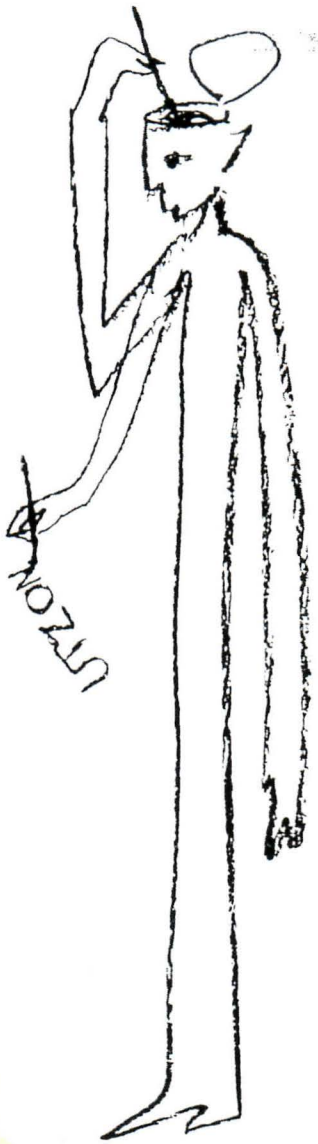

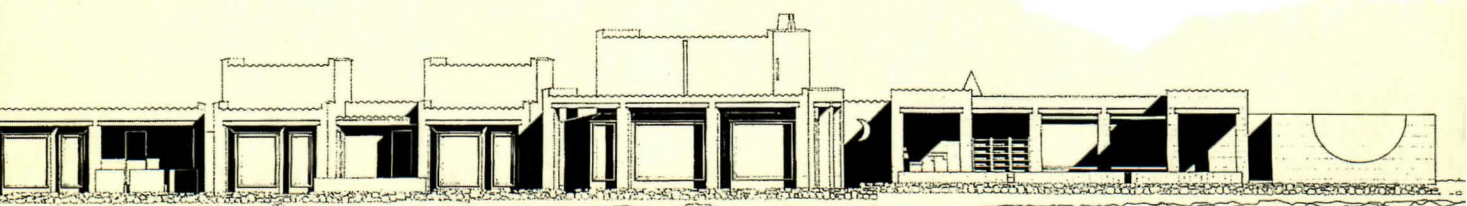

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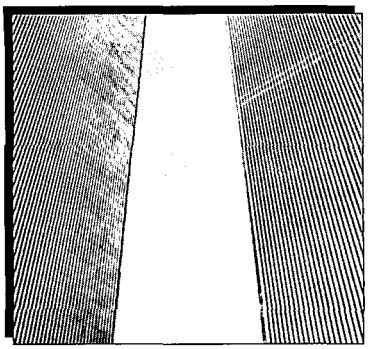

AS THE WORLD (TRADE CENTER) TURNS

BY ABBY BUSSEL

There are a staggering number of should-haves, could-haves, and what-ifs regarding the rebuilding of the World Trade Center site in Lower Manhattan. As the second anniversary of that bright-blue Tuesday morning is commemorated this month, decision-makers in both the public and private sectors must move past the small-minded political bickering and unconscionable power plays that have delayed the rebuilding of a site of historic consequence. Indeed, some progress has been made, and if all goes as planned, this fall a design will be selected from the 5,200 proposals entered in the memorial competition. But much still needs to be done to ensure that the public interest, not private profit or political currency, is top priority on those 16 acres of publicly owned land.

One major decision to applaud is the selection in July by the Port Authority of New York and New Jersey, the public agency that owns the site, of Santiago Calatrava as architect of a much-needed new mass transit station for downtown Manhattan. After the memorial, the station is the most critical component in the rebuilding process; it must provide easy and efficient access for commuters and the untold number of local visitors and tourists who will arrive in droves as the memorial begins to take shape. Given the Spanish-born architect-engineer's record of expressive monuments to travel, his approach to structure by way of forms found in nature will undoubtedly surprise and seduce the city.

The Port Authority—and retail leaseholder, Westfield Properties—must not only be open-minded as Calatrava presents his ideas, but thorough as well: his design should be more than a shell for a standard-issue program of mall stores and fast-food outlets with mediocre furnishings and uninspired signage. They must make the most of this architect's talents: let Calatrava design the interior, too, or hire someone of equal imagination to do so. The same goes for graphic design. Even the waste bins and water fountains must be beautiful. The city has few majestic gateways. With the Downtown Design Partnership, a joint venture between Calatrava and engineering-and-design firms DMJM+Harris and STV Group, it may finally get a truly modern one.

Far more problematic is the Freedom Tower, the culminating element in WTC master planner Daniel Libeskind's ascending spiral of skyscrapers. To be designed by David Childs, a partner at Skidmore, Owings & Merrill, the skyscraper is billed as the tallest in the world by both the Lower Manhattan Development Corporation and Larry Silverstein, the developer who holds the lease on 10 million square feet of office space at ground zero. (Libeskind will participate in the tower's conceptual and schematic development.)

If Libeskind's original vision for the symbolic, sky-high centerpiece of the World Trade Center site is followed, a 1,776-foot-tall tower will rise from its northwest corner in a few years' time, an extraordinary feat of structural engineering. But why build the tallest? Why not build the safest tower in the world? The strongest tower? The most sustainable?

Promoting the tower as the tallest is shortsighted. With other "world's tallest" contenders going up in or proposed for cities from Shanghai to Dubai, it is only a matter of time before the Freedom Tower is eclipsed by a developer with deeper pockets and a city with ambitions grander than our own. The current record is held by the 1,483-foot-tall Petronas Towers (1998) in Kuala Lumpur, Malaysia, Cesar-Pelli's bridged twin-set. By 2007, Petronas will be eclipsed by the Shanghai World Financial Center, a 1,614-foot-tall tower designed by Kohn Pedersen Fox, now under construction in China. During the last decade, developers in Chicago have scrapped two plans for towers reaching the 2,000-foot mark; surely, they will be back in the race sometime soon.

Marking the skyline of any city is a long-term proposition. Form and materiality must resonate with generations to come; in New York, building to a height associated with the country's year of independence as a measure of our freedom may not. Bigger is not always better. Let's not add another "should-have" to the list of missed opportunities in Lower Manhattan.

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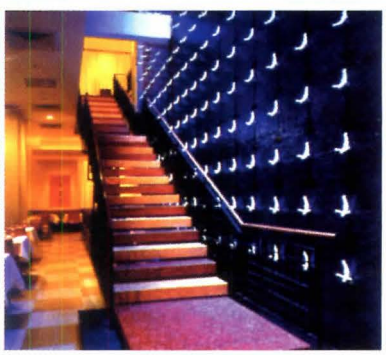


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Railroaded

Congratulations to Smarch and its Worb railroad station (July 2003, page 56). The process was superb and the design role was exceptional. The end product so evidently speaks, through its easy curves in form and detail, to the notion of train.

C. Crawford Murphy

Asheville, North Carolina

As the station in Worb shows, there seems to be a fixation on whimsical fabrics of structure and material without regard to the fabric of built space and qualitative experience. I agree with Gae Aulenti's assessment that architecture has become a game (July 2003, page 66). The purpose of the architectonic palette is the qualitative coherence of materiality, space, and use within the context of an existing environment, not an architect's isolated stylistic gimmick.

Gordon S. Loud

Holderness, New Hampshire

Ornament Found

I commend your willingness to discuss the long taboo, if not blasphemous, subject of ornament (July 2003, page 9); however, by focusing on texts that emphasize applied ornament you forget that many of architecture's earliest ornamental expressions were closely bound to structural function, especially at points of force and connection. Viollet-le-Duc believed that to create truly modern forms, the architect must use the newest materials and methods of construction (at that time iron, steel, and prefabrication), and that the honest expression of those bold new structures would be beautiful. Adolf Loos railed against "meaningless and applied ornament." But he also advocated the choice, when appropriate, of quality materials and solid craft. These principles, stated by Loos and Viollet-le-Duc, and expanded and enriched by Kenneth Frampton, have not been ignored by our generation of modern architects. Consider the thin-set Roman brick walls in Rafael Moneo's Archaeological Museum in Mérida, Spain, the oak cabinet that is Herzog & de Meuron's apartment building in Basel, Switzerland, or the sedimentary layers and form joints of Rick Joy's rammed-earth walls.

Anne M. Nequette

University of Arizona, Tucson, Arizona

Ornament in public architecture faces at least two obstacles today. One is our multicultural society: Whose beliefs, icons, and meaningful ornament does one adopt in the face of cultural diversity? A second issue is the interplay between science and faith. Meaningful ornamentation often denotes religious faith as opposed to "faith" in science and discovery. Today, we worship the sun with the use of photovoltaics instead of statues and icons.

Abie Khatchadourian

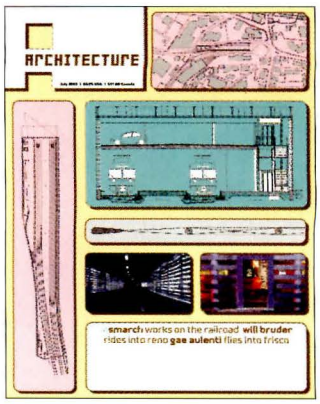
Brookfield, Wisconsin

There is a whiff of condescension in your hope that it is "not the case" that "only better awareness of ornament and its craft traditions will lead to new ornamental vocabularies and art forms." You seem to suggest that it is only hip to be "new" and "completely original." I'm optimistic that's not the case.

Wayne L. Good

Annapolis, Maryland

Not-so-poetic license



07 | 2003

Both the thesis and conclusion of Victoria Beach's comment on registration (July 2003, page 104) are incorrect and potentially destructive. Design isn't driven merely by aesthetic standards, but the integration of an overall process that architects are best qualified to lead. Registration, even in its current form, adds necessary legitimacy to that leadership where the environment, public safety, money, and risk are in play. Also, the building process is becoming increasingly complex, and strong leadership is necessary; if it doesn't come from qualified architects, there are manifold others willing to step in and orchestrate the "building engineers." Architects would then join the ranks of important but second-tier aestheticians like landscape, graphic, lighting, and signage designers.

Phillip G. Bernstein

Autodesk, Manchester, New Hampshire

My gratitude goes to Beach for articulating an unpopular position regarding architectural licensure. The overcredentialed underachiever subservient to market forces has become the norm.

Brook Finch

Albuquerque, New Mexico

Beach's proposal for broadening licensing is quite sound. It would involve researchers, engineers, code officials, firefighters, and builders, as well as concerned architects, in the construction of a safer environment, and, so, fulfill the legitimate goals of professional registration. It would also provide a logical reason for removing the accredited architectural degree from the series of hurdles we have placed in the paths of the young and gifted. In 1975, the AIA board of directors voted unanimously against requiring a degree. NCARB, however, having "dumbed down" the licensing exam so that it could be machine graded, made the university degree compulsory. It was a cheap way of pretending to assure the public—except for the students who had to finance it. Very few people are fooled by the licensing process. We know that the profession is regulated by the threat of litigation.

Jack Hartray

Nagle Hartray Danker Kagan McKay Architects Planners, Chicago

Corrections

The article "Vision Panels" (June 2003, page 67) should have credited James Carpenter Design Associates and Ove Arup & Partners for the concept design of the glazing and structural system for the atrium hall and the photovoltaic screen wall in the Austin Convention Center expansion. In addition, Carpenter/Norris Consulting served as daylighting consultant for this project *and designed the interior "skywedge" light* walls, and Ann Kale Associates was the architectural lighting designer. Also, in the July issue, the firm Duany Plater-Zyberk was misspelled.

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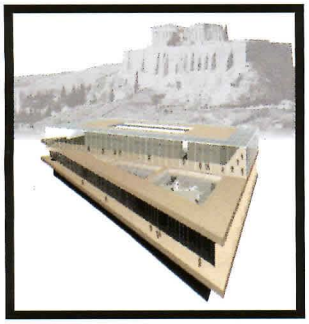


Despite reports to the contrary from myriad international news sources, including the *New York Times*, the BBC, the *Associated Press*—and *Architecture* (July 2003, page 16)—work has continued without interruption on Athens' New Acropolis Museum, designed by New York architect Bernard Tschumi.

It was widely reported that construction of the museum, which will feature skylighting and large windows to take in the city's strong sunlight, was suspended in May by Greece's highest administrative court, the Council of State. Even though the building is a major part of the Greek government's effort to secure the temporary return of the historic Elgin marbles to Athens in time for the 2004 Olympics next August, the council deemed the plans to be dangerous to unearthed antiquities still in the area. The museum will sit on columns above an ongoing archaeological excavation, which visitors will be able to view through the bottom floor. The judicial body reversed its decision in July after reviewing revised plans calling for 46 supporting columns instead of the original 63. But Tschumi claims work was never suspended.

"There has never been any stoppage on site," he reiterates. Tschumi blames conflicting maps of the museum's proposed footprint for the confusion. "There have been a whole series of internal problems," he says.

Added controversy surrounds much of the plans for Athens's Olympics. The $68 million museum's would-be centerpiece is the 2,500-year-old Elgin marbles. Also referred to as the Parthenon *marbles, the 160*-yard-long frieze depicting religious and mythological scenes was removed from the Acropolis in the early 1800s by Lord Elgin, then British ambassador to the Ottoman Empire. The marbles currently reside in London's British Museum, which adamantly refuses to loan out the work.

Other construction efforts associated more directly with the games are perilously behind schedule. **Jamie Reynolds**

CALIFORNIA BUCKS CODE

Although all eyes are on California's recall election, architects have yet another reason to keep the Golden State on their radar screen: new building codes. On July 29, in an 8-2 decision, the California Building Standards Commission (CBSC) voted in favor of utilizing the National Fire Protection Association (NFPA) 5000 Building Code and the NFPA 1 Fire Code in conjunction with the Uniform Plumbing Code and the Uniform Mechanical Code. In addition, the CBSC recommended use of the International Residential Code (IRC) for one- and two-family dwellings, but without the mechanical, electrical, and plumbing sections.

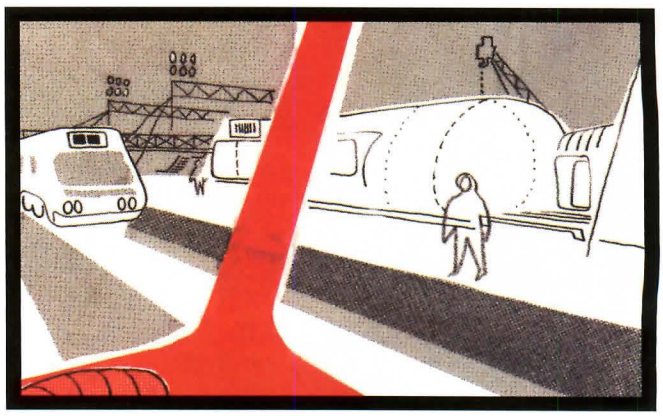
The decision by the CBSC to use parts of both the International Code Council's IRC and the NFPA family of codes is surprising, given the extensive support by California's state agencies, including the state architect's office, to support the adoption of the International Building Code (IBC) over those of the NFPA.

The DSA recommended use of the IBC because it believes NFPA 5000 requires a more substantial review process and prescriptive design and construction provisions for such areas as veneer, foundations, concrete, and masonry. The state architect is in the process of determining the amount of time needed to investigate the proper amendments to NFPA 5000 necessary to allow its adoption as the California Building Code by 2004. California still has another year of review before final hearings are held and specific codes are adopted as legislation.

California is not alone in the codes debate: Currently, 45 states use some portion of the IBC or IRC codes. New Mexico and the city of Phoenix are also conducting their own review process as to which codes to adopt.

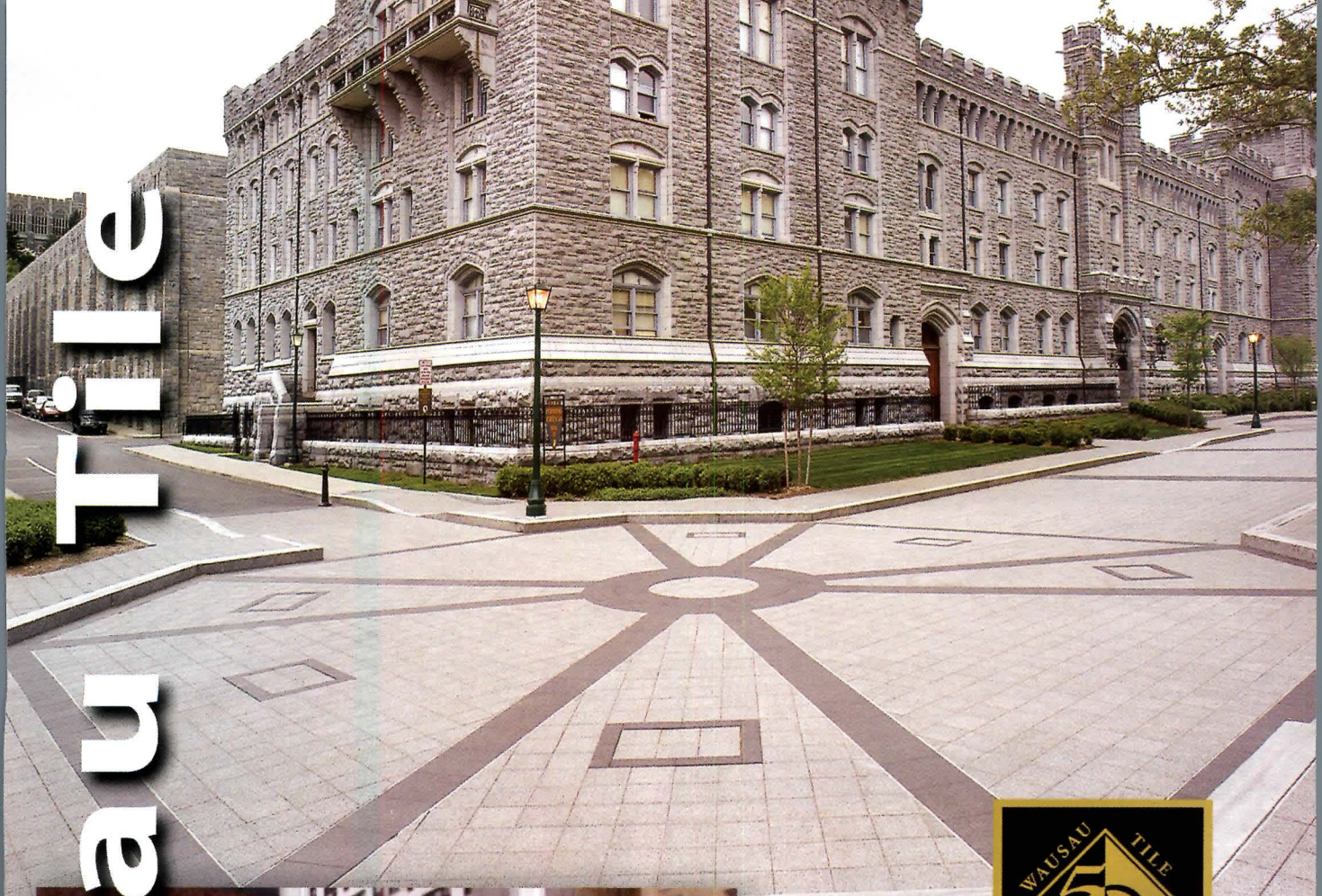
Since 1978, the AIA has advocated a single set of national building codes. **Elizabeth Donoff**

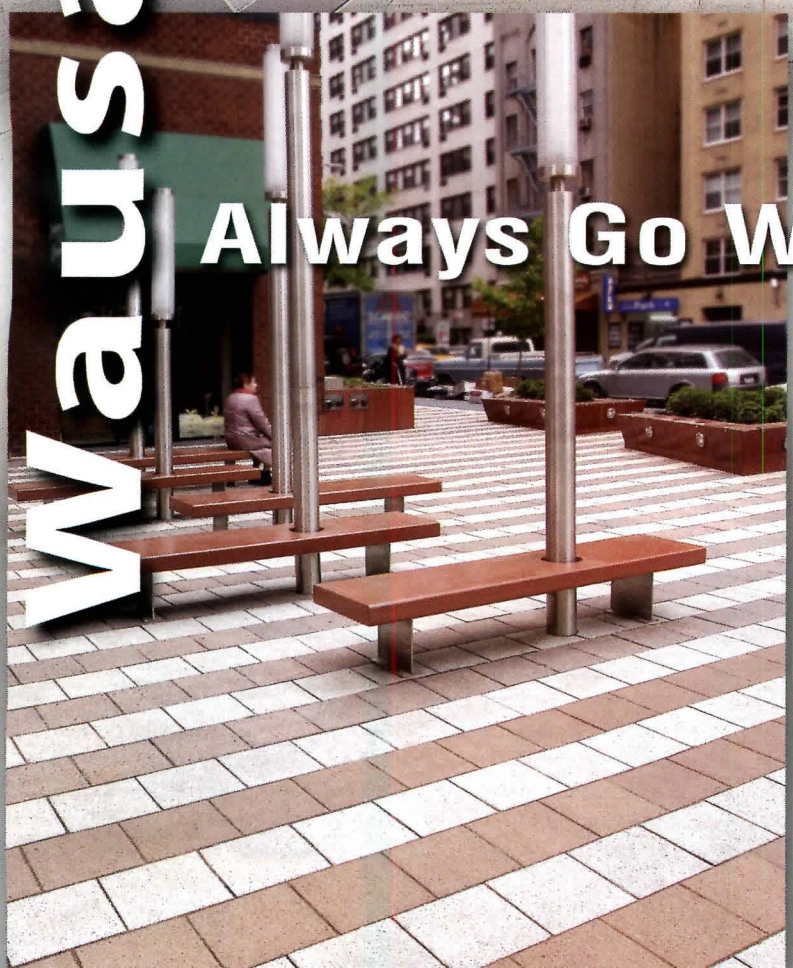
CEDRIC PRICE, 1934–2003



British architect and provocateur Cedric Price died last month at the age of 68. Though he built very little beyond an aviary at the London Zoo (1961), Price's influence was widespread, coming through a series of widely published propositions championing a temporary, adaptable architecture, which found expression in works by Archigram, Richard Rogers, Norman Foster, and Will Alsop, among others. A graduate of the Architectural Association and principal of his own London-based firm for four decades, he focused his efforts on schemes that liberated architecture from ideas of permanence and prescriptive programming, and he sometimes collaborated with other disciplines, as with avant-garde theater director Joan Littlewood on Fun Palace (1961–1964). Another project anticipated brownfield rejuvenation by decades: Potteries Thinkbelt (1964–1966) proposed to remake an abandoned railroad line into an expandable and mobile public university (above). Mounted on train tracks, classroom and laboratory modules would hold inflatable lecture halls and foldout desks, transporting students between housing and learning areas. For Price, architecture was a social art. **Abby Bussel**

RIGHT: COURTESY MUSEUM OF MODERN ART, NEW YORK; TOP: COURTESY BERNARD TSCHUMI ARCHITECTS





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UC BERKELEY GETS HAVENS HOUSE

As several West Coast universities have learned, gifts of architectural masterpieces can present their stewards with opportunities as well as challenges. The University of Southern California has struggled with expensive structural repairs to Frank Lloyd Wright's Freeman House, while Stanford University has had to contend with expensive seismic work on Wright's Hanna House.

Last month, the University of California, Berkeley was gifted an important local work of California mid-century modern architecture, the Weston Havens House (1941), located in the hills above the campus. The house was gifted without an endowment for maintenance.

The residence was designed by architect Harwell Hamilton Harris (1903–1990), who would later become dean of architecture at the University of Texas, Austin, in the 1950s. The house was bequeathed by the estate of Weston Havens, a descendent of early Bay Area pioneers, who lived in the residence until his death in 2001.

"This is one of the best, yet least known, works of West Coast modern architecture," says Harrison Fraker, dean of Berkeley's College of Environmental Design." The sectional relationship of its triangular trays held away from the slope both soar into the view toward the Golden Gate Bridge, and create a beautiful garden room—true brilliance." Fraker is in the process of assembling a board of advisors to support the school's stewardship of the house.

At one time Harris's masterpiece of Bay Area regionalism was widely recognized; it was equated with Neutra's Lovell Health House by the AIA's 1956 *100 Best Works of Modern Architecture*. Because of its unique relationship with its hillside site, critics compared it to Frank Lloyd Wright's Fallingwater. It has receded into history much in the way it has receded into the verdant landscape of Berkeley's hills. Now under the guardianship of the university, the Weston Havens House likely will once again enter its proper place in the canon of mid-century modern architecture. **John A. Loomis**

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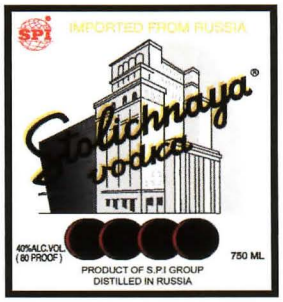
- According to the AIA, billings at architecture firms unexpectedly took a dip in July. Firms in the Northeast and West bore all of the downturn in activity; firms in the other two regions continued to show gains. Nonetheless, says the AIA, the outlook is optimistic for the balance of 2003.

- Just as the U.N. assembled an international roster of the hottest postwar architects for its iconic building on Manhattan's East River in the 1950s, last month the peacekeepers repeated history when they shortlisted several Pritzker Prize winners for a new U.N. office building just south of the existing complex: Richard Meier, Fumihiko Maki, Norman Foster, and Kevin Roche.

- Famed Arup structural engineer Tony Fitzpatrick, 52, died in a cycling accident in August. While renowned for his work on several high-rise structures, Fitzpatrick's best known project was his "taming" of London's Millennium Bridge when it began to wobble in 2000.

COURTESY ALLIED DOMECQ SPIRITS, USA

STALIN REDUX



In August, the last guests of the Hotel Moskva left the Stalinist-era hotel that overlooks Red Square, a building that has its likeness emblazoned on every Stolichnaya vodka label. When demolition of the 1935 landmark is complete, a modern hotel will rise in its stead. But there is a twist—the original façade will be replicated on the new structure.

With a bastardized neoclassicism emblematic of Stalin's preferred architectural style, Socialist Realism, the Moskva represents an era when architecture, like the other arts, was charged with shaping communist ideals. But the smog-gray Moskva, once a resting spot and watering hole for the Communist Party's elite, represented much more. As lore has it, in the early 1930s when architect Alexei Schusev showed Stalin two designs for the elevation, the dictator signed off on both, leaving a fearful Schusev in a quandary. With Stalin's purges at their height, the architect, rather than finding himself ushered into the bowels of the KGB building in the dark of the night, elected to use both *designs*. Thus the Moskva received its trademark lopsided façade: one wing has large windows framed by prominent cornices, the other, smaller simpler windows.

Developed by a U.S. company, Decorum, in conjunction with the city of Moscow, the $350 million replacement hotel, when completed in 2006, will be at once modern and commemorative of a remarkable moment of revisionist history, as the same bizarre elevation created under a brutal dictator is remade in a spanking-new nod to the past. **Bay Brown**

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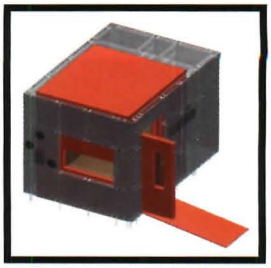
- Ward Bennett, a prolific New York icon who designed everything from jewelry to houses, died at age 85 last month.

- Another designer has been added to the World Trade Center rebuilding team: architect and engineer Santiago Calatrava will be the lead architect for the site's new $2 billion intermodal transportation terminal. As part of a team called the Downtown Design Partnership, he will work with engineers from firms DMJM+Harris and STV Group.

- The Anchorage Museum in Alaska, with diverse collections spanning from ethnography to art, has chosen London-based David Chipperfield Architects as design architect for their new museum. The short list had included Steven Holl, Vincent James, Michael Maltzan, Saucier + Perrotte, and Snøhetta.

- Rafael Viñoly will design Washington, D.C.'s $400 million Marriott convention center hotel.

A HOUSE FOR HISTORY



COURTESY MICHAEL SHUMAN, MASHDESIGN

An ambitious new documentary project led by Dave Isay (of National Public Radio's *All Things Considered* fame) and funded by the Rockefeller Foundation has a strong architectural element: public interviewing booths designed by Manhattan-based Eric Liftin of Mesh Architectures, in collaboration with architect Michael Shuman, interactive designer Jake Barton, and graphic designer David Reinfurt.

Beginning in October with a location in New York City's Grand Central Terminal, the project, called StoryCorps, will invite ordinary people to interview relatives and friends within a purpose-built enclosure. By encouraging subjects to speak candidly about their everyday experiences, the project will amass an archive of popular American oral history, to be stored at www.storycorps.net.

"These kiosks are going to be essentially mobile recording booths targeted for high-tech but low-cost recording techniques," explains Liftin. Each "StoryBooth," essentially a prefab shed, features a bright exterior of translucent honeycombed plastic with speakers that play recorded interviews. Inside the soundproof structure, however, is what the architect describes as "an almost domestic space," with residential-style furniture. The intimate 6-foot-by-8-foot interior space of the booth will accommodate two participants—one interviewer and one subject—and a facilitator to advise on interviewing techniques and operate recording equipment.

Although still tentative, plans are in the works for up to eight additional booths across the country. The Grand Central booth will be set up initially in the terminal's cavernous Vanderbilt Hall; its arrival is timed to coincide with the 90th anniversary of the building, which was designed by Warren & Wetmore and Root & Stem. **Jamie Reynolds**

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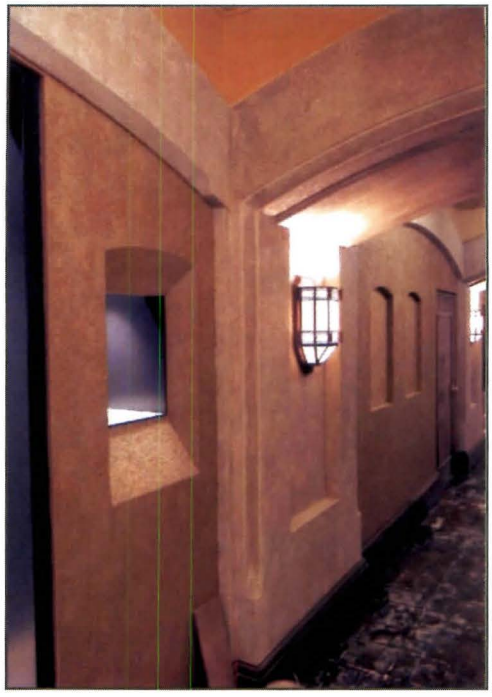

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INTEGRATING A AND E, UP FRONT

firm

Why do European and Asian architects work so much more closely with engineers than do their American and Australian counterparts? Whether due to contract law or doting clients, stronger early-phase design interaction in places like Germany and Japan yield a steady stream of breakthroughs in building design, technology, and sustainability.

Helmut Jahn has long excoriated U.S. architects for treating engineers as subordinates and last-minute help. That observation—and his candor—might explain why almost all of Jahn's practice and *haute*-tech creations have migrated to Europe. There, star designers advertise their alliances with star engineers—notably with Cecil Balmond, the structural swami at engineering firm Arup. Last year, Rem Koolhaas stated that Balmond "enabled me to rethink architecture."

Arup may be a special case: a firm with a reputation for collaborative work, which tends to beget itself. "You can do so much more with an outside engineering firm that likes creative problem-solving," says Jeff Logan, director of design at Anshen + Allen, San Francisco, which boasts a tight relationship with Arup's local office. The firms joined forces for a recent competition and to propose a design studio for the California College of Arts and Crafts that would "examine the engineer's mindset, to reduce barriers to collaboration."

"Architecture and engineering schools historically have each been very eccentrically and inwardly focused, so the students don't learn much about the other field," notes David Odegard, managing principal of Affiliated Engineers, a large M/E/P firm in Madison, Wisconsin. "And we go to professional school when we're the most impressionable, so it sticks."

THE E/A SOLUTION?

If an interdisciplinary curriculum is part of the answer, what about the interdisciplinary firm? "We are teamed from the beginning," says Ray Evans, CEO of Nashville-based Barge Waggoner Sumner & Cannon, a 440-person engineering and architecture firm with about 40 architects. "It takes a unique architect to work in a firm like this; you have to be talented, but you have to leave your ego at the door."

Most architects would rather go solo. "There's a downside to A/E firms," contends Logan. "Your work becomes limited as you specialize in certain building types. And one way or another, one of the disciplines is marginalized."

As for engineers, John Magnusson, chairman of Seattle-based structural design firm Magnusson Klemencic, encourages more empathy. "Architects are very comfortable dealing with ambiguities in their process, but when engineers see a solution, they jump on it," he explains. "Engineers must never say 'no' unless physics demands it." **C.C. Sullivan**

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Inaugural Driehaus winner Léon Krier's master plan for the first phase of the neotraditional town of Poundbury, Dorset, England (above).

In contrast, Pritzker recipient Jørn Utzon's best known work is a modernist icon, the Sydney Opera House, completed in 1973 (above).

CLASSICISM VS. MODERNISM

Will the debut of the Driehaus Prize for Classical Architecture heal the schism between the two camps? by Roger Yee

Was it coincidence or mimicry? On March 22, 2003, the inaugural Richard H. Driehaus Prize for Classical Architecture, bestowing a $100,000 grant and a scale model of the Choregic Monument of Lysikrates in Athens, was presented to the architect and theorist Léon Krier, longtime advisor to the Prince of Wales, in a ceremony held at the Art Institute of Chicago. Then on May 20, 2003, the 27th Pritzker Architecture Prize, furnishing a $100,000 grant and a bronze medallion, was awarded to architect Jørn Utzon and accepted on his behalf by his son Jan, at the Royal Academy of Fine Arts in Madrid. The similarity of the events underscores the continuing presence of two parallel worlds in architecture: one devoted to classical architecture, the other to mainstream modernism.

Or does it? The implications are more complicated for Michael Lykoudis, chair of the University of Notre Dame School of Architecture and administrator of the prize established by Richard H. Driehaus, chairman of the $2 billion investment fund that bears his name. Driehaus established the prize through Notre Dame because the school is respected for its teaching of classical architecture. Lykoudis and Driehaus hope the prize will make traditional architecture more respected by architects and the public, and in so doing refocus intellectual energy on significant issues such as urban sprawl. "The architectural profession needs to discuss common values rather than differences," Lykoudis maintains. "Hopefully, the Driehaus Prize will facilitate a dialogue. The environmental issues facing us are so immense; they will force our hand. The prize will provide a forum for discussion."

In effect, the program established by Driehaus, a civic-minded Chicago businessman and philanthropist (as was the late Jay A. Pritzker, founder of the Pritzker Prize and chairman of The Hyatt Corporation), addresses what classicists perceive as an establishment bias toward modernism. "Traditional architects face a refusal by the high priests of modernism to engage in dialogue," observes C. William Westfall, a professor at Notre Dame's Architecture School. "We just want a place at the table."

WHOSE SIDE IS TIME ON?

Why do classicists, employing the traditional orders of architecture in "antiquarian" replications or "traditional" adaptations feel public opinion is on their side? Despite widespread enthusiasm for unfettered originality fueled by the recent projects of such modernists as Frank Gehry, Daniel Libeskind, Zaha Hadid, and Santiago Calatrava, the public remains largely devoted to traditional archi-

LEFT: PROPHOTO; RIGHT: DAVID MESSENT

tecture. At least that's how the urban landscape looks to architect and urban planner Andres Duany, a principal of Duany Plater-Zyberk & Company, and partner to Elizabeth Plater-Zyberk, dean of the University of Miami School of Architecture and a Driehaus juror. "Much of what is built in the United States is traditional architecture," Duany insists. "I work in the builders' world, and the Driehaus Prize actually engages this world."

If anything, public interest in classical architecture and urban planning is expanding. This could represent a quest for history, continuity, and stability in an uncertain age, as well as a reaction to the impersonal, shoddy, and often disorienting nature of many contemporary buildings. Architect Robert A.M. Stern, dean of the Yale University School of Architecture, notes that architects honored classicism as recently as the 1980s. "The Pritzker Prize was new then," he recalls, "and architects actively debated modern architecture's direction and the meaning of postmodernism. Aldo Rossi and Jim Stirling explored these issues with direct quotations from the classical language that inspired many architects in their thirties and forties."

Hope for a détente may be found in a growing awareness of the dangers of sprawl and the joys of urban living. "A healing of the schism might come through the city, a shared interest of both sides," offers Blair Kamin, architecture critic of the *Chicago Tribune*. Indeed, modernism's failure in urban planning offers architects ample common ground. "Early modernists knew the city well," Kamin says. "Mies took great care in establishing his buildings as 'clearings in the forest.' However, Le Corbusier felt everything had to go, and he prevailed."

ENCOURAGING DISCOURSE

Whatever else it accomplishes, the Driehaus Prize demonstrates that both revolutionary and evolutionary changes are occurring, which may shape architecture's future. Accordingly, architect and theorist Robert Venturi, Pritzker Prize laureate in 1991, advocates an inclusive view of architecture. "I'm against the extreme modernist approach that prevails today," he declares. "The irony is that modernists are now copying early twentieth-century modernism and don't recognize that they're reviving a historic style. We're in an evolutionary period in which ideologies are all mixed up, and it is better to be good than original. After all, no one criticized Michelangelo for not inventing the basic form of his art."

Encouraging public discourse on architecture in all its forms is what prompts Bill Lacy, executive director of the Pritzker Prize, to hail the establishment of the Driehaus honor. "When the Pritzker started, there was so little public recognition of architecture," he remembers. "Now architecture has become much more visible, and merits much greater support. I welcome the Driehaus Prize. The more prizes for architecture, the better."

Author of several books, Roger Yee writes frequently on design and business topics and consults to design organizations.

SECURITY STATE

Israel offers lessons in security as America fortifies its buildings. by Barbara Horwitz-Bennett

Made of onyx, by day the reception hall at Israel's new Foreign Ministry appears to be made of Jerusalem stone, the cream-colored limestone found elsewhere in the complex (left). At night, the onyx, blast-tested to ensure that it would remain in large pieces if exploded, takes on a luminous quality. Overall, the architects deftly created a building that is at once secure and aesthetically pleasing.

While terms such as *secure rooms*, *blast mitigation*, and *energy-absorbing building materials* have been part of Israeli architects' vernacular for many years, such concepts have only recently begun making their way into project meetings in the West. As the Oklahoma City bombing and the events of September 11, 2001, increased the perceived terrorist threat in the United States, American architects have much to learn from their Israeli counterparts.

"I believe it's a well-accepted fact that the world leaders in protective-design technology, hands down, are the Israelis," states David Mead, vice president of security design services for A. Epstein and Sons International, a Chicago-based A/E/C firm that partners with the Tel Aviv–based architecture and engineering firm Eytan Building Design on security projects.

"The major difference between Israel and the rest of the world is that we, here in Israel, have extensive practical experience with terrorist attacks on buildings," claims firm principal Reuben R. Eytan, who notes that Israel has recorded an astounding 40,000 perpetrated acts of terror on its soil since 1968.

BLAST PROOFING

One standard programmatic requirement faced by Israeli architects is a blast-proof safe room, which by law must be in every residential and nonresidential building. In commercial buildings, for example, 3 percent of the net floor space in office structures must be designed as shelter. Architects are trained to design these rooms following technical specifications established and enforced by the Home Front Command, a division of the Israeli military which issues building regulations.

In addition to safe rooms, "We design our buildings so that they will not collapse as a result of local damage from an explosion, rocket, or plane crash," says Eytan, who specializes in structural protective hardening. While not required by law, Israeli building owners commonly request that architectural features such as reinforced concrete, shatter-proof windows, and extra-strength floors and columns are included in blueprints.

Toward this end, architects and structural engineers use energy-absorbing materials that distribute the shock of an impact with the goal of preserving the overall integrity of the building and preventing its collapse, much as practiced in seismic design. Examples, says Eytan, include concrete masonry block filled with concrete or rebar and concrete poured between steel plates. Security checkpoints are another requirement for nonresidential buildings, so architects are expected to design extra space in front of buildings for occupants waiting in line, explains Dorit Dar, an architect with Uzi Gordon Architects in Haifa, Israel. Yet, as all entrances require security guards, buildings are designed with fewer access points to minimize the cost of personnel.

Dar, who is currently designing a 1,000-car garage for a Haifa hospital, is dealing with another security requirement. Each of the three car lanes leading up to the security checkpoint for the hospital must be six vehicles deep in order to avoid blocking the main road. In addition, the checkpoint must be stationed away from the building itself to prevent potential car bombs from coming too close to the building.

REMEMBERING AESTHETICS

Israeli architects have the additional challenge of incorporating these safety measures in an aesthetically pleasing manner. Security checkpoints, for example, are often visually jarring. "The space and systems required should be packaged in such a way that they blend into the surroundings," says Guy Igra, a partner with Jerusalem-based architecture firm Meltzer-Igra. At the same time, he admits, "Sometimes it works and sometimes it doesn't." Eytan, however, prefers to give Israeli designers a little more credit. "Buildings here look like normal buildings, *not fortresses or bunkers*," he says. "There is always room for improvement, but we use ingenuity and

TIM GRIFFITH

experience. I think that architects have risen to the challenge."

A case in point is Toronto-based Diamond and Schmitt Architects' new Israeli Foreign Ministry building, designed in conjunction with Jerusalem-based architecture firm Kolker Kolker Epstein (KKE). The architects employed several clever tactics to mask security features behind impressive architecture. For instance the architects abide by the requirement for Israeli government buildings that cars can come no closer than 20 feet and passersby no less than 16 feet from the structure, while the edifice still appears open to the public. On the eastern end of the complex, the tall walls that surround the parking lot, keeping people and cars at bay, are obscured from view by both landscaping and a sidewalk set below grade. "Visually, the building doesn't appear as if it is sitting behind walls, although it really is," Randy Epstein, partner with KKE, explains.

> **"Buildings here look like normal buildings, not fortresses or bunkers."**

For the glazed wall in the entry plaza, the architects specified an expensive specialty glass that withstands large impact loads while simultaneously maintaining a sense of transparency and continuity, notes Epstein. Inside, the building's main reception hall has large surrounding walls made of onyx, which look like stone by day and glowing gems by night. The stone was blast-tested to ensure that it would remain in relatively large pieces in the event of an explosion. But to prevent the onyx or glass from imploding in the atrium, the architects designed horizontal bars and stainless-steel cables to serve as both a structural element and a means to catch the stone and glass if it breaks. And, overall, the building's structure was built in such a way as to absorb a blast in stages to prevent collapse. The flexible steel structure can absorb force and heavy beams will transfer horizontal forces to all elements around the building.

MENTOR STATE

From the Department of Homeland Security's color-coded national threat-level system to the myriad security hoops a person must go through at airports, the United States is on alert. The building design and construction industry is following suit: the U.S. Department of Defense now requires that all of its buildings use shatter-proof laminated glass, while New York City's building code is expected to add structural design requirements in the near future to ensure greater safety.

As Israeli firms have found, security measures should be incorporated during the planning phase of a facility, Epstein warns American designers, and not during or after its building and construction. In such an after-the-fact scenario, buildings in urban areas with newfound security concerns may have to resort to drastic measures such as closing down surrounding streets, he explains.

American designers would do well to study the lessons of architects and engineers in Israel, say those who know both markets. Concludes Boston-based architect Moshe Safdie, who has worked extensively in Israel, "Israeli architects have been at this for a long time."

Barbara Horwitz-Bennett is a freelance writer for the building and construction industry. She currently resides in Jerusalem, Israel.

OVERSEAS OPPORTUNITIES

By looking at local economies and needs for specific building types, architects are safely vying for a piece of foreign markets. by James McCown

"The speculator in real estate is enemy number one of the architect," Alvar Aalto once wrote, providing a cutting bit of Nordic candor on the love/hate relationship between developer and designer. But whether for love or money, when U.S. property markets collapsed in the early 1990s, many blue-chip American architecture firms were able to parlay their name recognition and experience into major commissions abroad. While the newness of working overseas has worn off, Asia remains a lucrative market, as does Latin America to a lesser extent.

After more than a decade of redefining the skylines of cities like Shanghai, Beijing, and Kuala Lumpur, the Asian architectural market shows no signs of drying up despite the recent threat of SARS. Indeed, many architects expect even more work as planning for the Beijing 2008 Olympics begins in earnest.

"I predict that the Chinese commercial development market will be strong for at least another 10 years," says Stan Laegreid, partner of Callison, a Seattle-based global architectural firm known for designing mixed-use complexes throughout Asia. "Continued development will be a huge commitment by the Communist Party."

SETTING A PACE

Despite the general optimism about Asian markets, Americans have fresh memories of the turmoil when the bottom fell out of Asian economies in 1997. The crisis affected Thailand, Indonesia, and Malaysia far more than it did mainland China, but across the continent, many U.S. firms were left in the lurch with unpaid bills and stranded employees they had relocated to foreign capitals. Market experts say that the gold-rush days of the past decade have given way to a slower, more rational market.

"In the 1990s, the attitude was definitely, 'Build it and they will come.' Now these developers actually have financial pro formas that make sense," says Rick Lincicome, CEO of Ellerbe Becket, which has built office buildings and healthcare facilities throughout the East Asian region. The markets are becoming more fragmented, insists Callison's Laegreid. Thailand, Malaysia, and the Philippines in particular are now on the upswing, he says.

Frietl Bohm, chairman of Columbus, Ohio-based NBBJ, estimates that his firm gets about a quarter of its total annual billings from non-U.S. work. More established markets like China are experiencing the natural progression of what he calls "the three waves of development": First, housing; then office buildings and other corporate facilities; and last, more sophisticated commissions like high-technology healthcare and transportation. "We knew that our expertise was in this third wave, so we stayed out of the [Asian] market until 1995," says Bohm, whose firm is currently designing the $92 million Koo Foundation Cancer Center in Taipei, Taiwan.

Leaders in Beijing want to continue to make their country hospitable to foreign companies, notes James Quille, CEO of Lend Lease Global Fund, a major real estate investor in the region. "The government will make sure that occupancy costs, especially in the office sector, will not become prohibitive," he concludes. "A government-controlled releasing of more and more land for development keeps the supply up and, thus, office rental rates down."

In U.S. real estate markets the rule of thumb is that an office vacancy rate of 10 percent or lower represents a strong market. At present, according to commercial real estate consultant Colliers

Leo A. Daly's 35-story Yinchen Cyber Tower, under construction in Shanghai, is intended to be a high-tech "intelligent building."

China	8.2	Russia	4.4
Mexico	5.8	Greece	4.0
Singapore	5.7	Canada	3.9
South Korea	5.6	Turkey	3.8
Vietnam	5.1	U.K.	2.3
Australia	4.8	U.S.	1.9

Percentage market growth anticipated for 2003

SOURCE: DESIGNINTELLIGENCE

International, Beijing and Shanghai are at about 15 percent and 20 percent, respectively, while in Kuala Lumpur and Jakarta the figures are at over 20 percent. However, pockets of strength still exist: Hong Kong is right at the magic 10 percent figure, with Taipei just a percentage point or two higher.

CHINESE REVOLUTION

After developing a signature style in U.S. skyscrapers in the 1980s, Kohn Pedersen Fox was able to go into overseas markets in a big way in the 1990s, and now counts about half of its total revenue from foreign sources. Firm president Lee Polisano says that while top American firms will continue to be in demand for their design flair and technical prowess, the time is ripe for the emergence of local talent, especially in China. "You'll see the emergence of some interesting Chinese architects over the next few years," he says. "There has been a tremendous amount of absorption of global technologies."

This 14-story office tower is at the center of Plaza Fundadores, a mixed-use complex under construction in northern Mexico designed by Spillis Candela DMJM.

Others predict rapid change in the many design institutes that form the basis of China's own architectural profession. By law, these design institutes, vestiges of the country's Maoist past, are involved in virtually every major architectural project in the country, either as collaborators, master planners, or managers of international competitions. Normally, after schematics and design development by U.S. firms, the projects are turned over to these institutes for construction documents and administration.

"Some of the large design institutes are forming for-profit affiliates," says Patrick MacLeamy, CEO of St. Louis–based Hellmuth, Obata + Kassabaum (HOK). With many of these new offshoots attracting young, highly educated Chinese design architects, he concludes, "We'll have a lot more competition."

James Cramer of the industry newsletter *DesignIntelligence* describes the sea change he has witnessed as moving from "Made in China" to "Designed in China," noting that there are now almost 700,000 architects in the country. By comparison, there are about 100,000 registered architects in the United States.

LATIN MARKETS

In Latin America, oil-rich countries like Venezuela were some of the first to import U.S. architectural talent as far back as the 1950s. Power centers like Caracas, Venezuela, and São Paulo, Brazil, boomed in the 1970s, but by the 1980s the entire continent fell into a cycle of recurring economic crises.

But Miami-based Spillis Candela DMJM, a firm with ties to Latin America that date back several decades, insists that selective opportunities exist, especially in Mexico. Principal Julio Grabiel is most bullish about mixed-use communities that target retiring North Americans who are lured by the sun and affordable Mexican real estate. "This is the beach for Phoenix," he says, referring to a mixed-use development the firm is designing in Puerto Peñasco along the Sea of Cortés. In the industrial city of Torreón in northern Mexico, the firm is also designing Plaza Fundadores, a 355,000-square-foot, mixed-use urban project on a 22-acre site. Looking at Mexico's local talent, *DesignIntelligence*'s Cramer notes that while Chinese architects may be coming into their own, Mexican architects and draftsmen are becoming part of the international phenomenon of outsourcing architectural and construction documents.

Elsewhere in Latin America, firms such as San Francisco–based Kaplan McLaughlin Diaz (KMD), Skidmore, Owings & Merrill, and KPF worked in Argentina and Brazil during the region's brief mid-1990s boom, but most major U.S. firms are taking a pass right now on aggressive pursuit of work on the South American continent.

In the late 1990s, KMD designed the new São Paulo headquarters of Rede Globo, the world's fourth-largest television network. "The infrastructure has been built at the bottom of the tower, but not the rest," says firm principal Jim Diaz, blaming the delay on the country's current uncertainty in the wake of election of a leftist president.

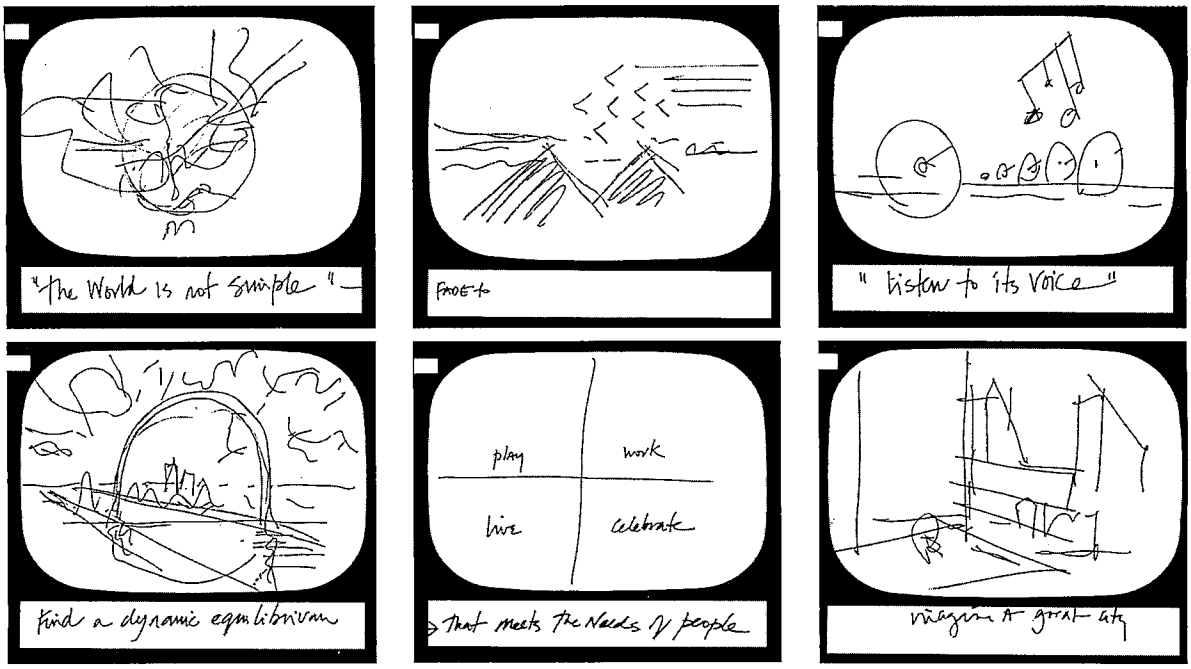
"It's just too risky," adds NBBJ's chairman Bohm, explaining his firm's decision not to make the region a priority.

AIA REACHING OUT

For its part, the AIA is trying to promote the idea that international work is not just for the big blue-chip firms. The organization's international committee regularly hosts video conferences to report on overseas work opportunities. The San Francisco AIA chapter took their outreach further, hosting a panel of architects and engineers that are video-linked in real time to a "mirror" group in a major Latin American or Asian market. In addition, standard AIA contract forms have been revised to reflect the need for prepayment in U.S. dollars and other financial issues, says William J. Higgins, incoming chairman of the AIA's international committee.

"There are some nightmare stories out there," Higgins relates, "like the Russian client who tried to pay his architects with vodka stock. We produce a checklist so U.S. architects know what is in store for them with overseas work."

James McCown is an architectural journalist whose work appears regularly in *Boston Magazine* and *Architecture Boston*.



To encourage participants at a "brand summit" to articulate the most essential aspects of "Newco"—the new firm they were creating—a group of architects and former clients was asked to script a 30-second commercial to promote the hypothetical company. A few frames of the storyboards are shown.

IT'S THE BRAND, MAN

"Branding" may be the most overused marketing term of our age, but for an architecture firm in transition, it's a crucial step. by C.C. Sullivan

What's your firm's competitive point of difference? And have you dimensionalized your manifesto recently for a new value proposition?

These terms may mean nothing to you, but for architect Peter H. Dominick, Jr., former principal of the wide-ranging Urban Design Group, these concepts were the driving force behind his latest project: finding an identity for his new firm, 42|40. (The new company comprises the Chicago and Denver offices of Urban Design Group, which broke away amicably from their Atlanta and Dallas units last May.) With cheery afterglow, Dominick recalls the two-day process that got him his new moniker and look: a "brand speed summit" in which he and 11 cohorts uncovered the essence of "Newco"—the generic name for the upstart company used during the session—and, along the way, the very meaning of architecture itself.

To facilitate the exercise, Dominick hired a corporate-identity agency, VSA Partners, that is best known for work with consumer businesses like Cingular and Harley-Davidson. VSA principal Dana Arnett saw no problem in extending his services to an architecture firm, however. "Branding is steeped in the experiences people have," Arnett explains. "Just as with Harley-Davidson, we need to recognize those emotional attributes related to brand, unlock them, and put them to work. Branding isn't just about logos, stationary systems, and websites; we're looking for the essence of a company."

So for Dominick, who had spent 15 years with Urban Design Group doing work for resorts and government agencies, what would that mean? While he wasn't sure, he invested his faith (and some $25,000 dollars) in his branding consultant—and in the expenses incurred by participants on the identity junket, including 12 associates, former clients, and friends. "The more diverse the group, the more you get out of it," explains Arnett.

BRANDED LINGO

On the basis of creativity and vocabulary alone, Dominick got his money's worth. As with other marketing consultants, the key to VSA's work seems to be in deploying a heavy arsenal of lingo and games. The summit team was asked to *dimensionalize* the hypothetical firm's brand using *rich language* exercises: *dialectics* and *visual language*. ("Pregnant" and "land shark" were two entries that came up in the latter category.) The group also listed Newco's *attributes* and *constituencies* to develop a nicely corporate-sounding *value proposition*. That notion morphed into a *positioning statement* that was tested through a game called "Beat Newco" to find the new firm's *competitive points of difference*.

While the jargon may seem overwrought, Dominick came out of the two-day session energized, a true believer in the magical science

of brand creation. Three exercises in particular, he recalls, helped him uncover the essence of 42|40: In the first, participants wrote definitions of architecture on index cards, which were secretly analyzed later by a graphologist to reveal hidden personality traits. Afterward, three breakout groups clipped pictures and phrases from magazines like *Vanity Fair* and *Popular Science* to visualize the history and character of the company. The paste-up boards—which prominently displayed a cowboy and a pregnant woman—were used to develop lists called "who we are" and "who we are not." (The latter included such entries as "Las Vegas" and "an army of one"; Ralph Lauren and Tony Blair made guest appearances on the former.) Then, three groups scripted and shot their own mock television commercials. Dominick's team conducted man-on-the-street interviews, asking, "What is your favorite building?" The responses ranged from the prosaic to the absurd, but one—"The Grand Canyon," said the confused interviewee—became a touchstone of the brand summit and the title of a book on 42|40's work.

In the architectural space, branding is a reputation-building philosophy.

WHAT'S IN A NAME?

By distilling the key ideas that emerge from the exercises, says Arnett, a company can develop a brand concept. "The process gives you more than just interviews" with employees and customers, he says. "It tells you how you speak, how you look, and what your place in the profession is."

While most architecture firms may forsake the formal branding summit, they all somehow settle on names and looks that reveal something about each firm's collective history or personality. Today, many new studios opt for cryptic or metaphorical names (Office dA, Loom), while others go after a generic and decidedly ironic appeal (Foreign Office Architects, Allied Works). More traditional appellations speak to star factor or office hierarchy (Polshek Partnership, Patkau Architects) or an abbreviated version of the same (MVRDV, SPF:a).

While the name 42|40 presents a fairly novel and mysterious entrant, its meaning—the approximate latitudes of Chicago and Denver—is well subsumed to its overall character: snappy, easy to recall, and redolent of some mathematical or scientific measure. It also incorporates the trendy (and hard to find on the computer keyboard) "|" symbol. (Their website URL leaves it out: www.4240architecture.com.)

So, was the process worth it? Dominick insists it was, and Arnett agrees, of course.

"In architecture, there are a handful of brands: Frank Gehry is in the social consciousness, as is Mies van der Rohe, and David Rockwell's environments are too," says Arnett. "But it has become identified with a signature style, and in the architectural space, branding is more of a reputation-building philosophy."

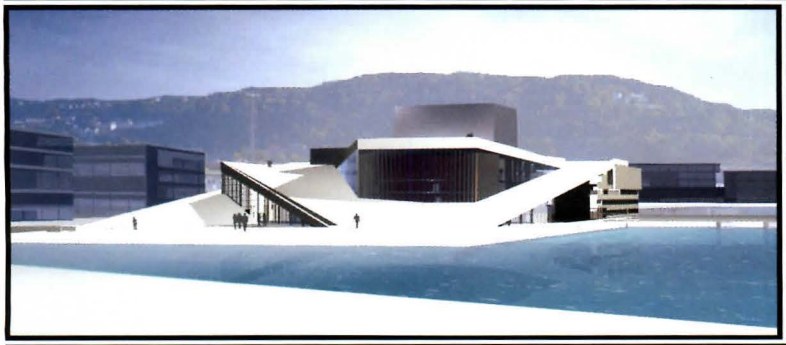
A brand can't improve an architect's work, but can it help a firm compete? Dominick, for one, is betting it can.

SNØHETTA | NATIONAL OPERA HOUSE | OSLO, NORWAY

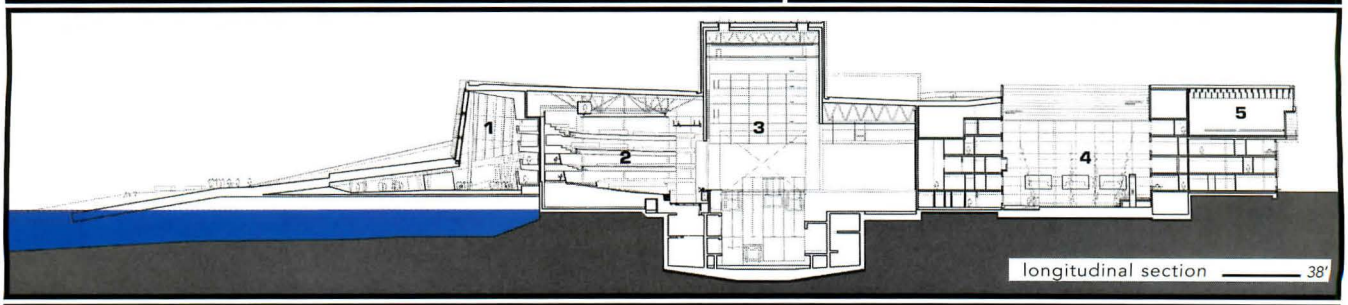
The development of a national opera has been the subject of political debate in Norway since 1889. More than a century later, an international design competition sponsored by Den Norske, the national opera company, resulted in 240 entries. The winning scheme, by Oslo-based Snøhetta, creatively interprets the competition's two main goals: that the design be monumental and that it act as a catalyst for development in the surrounding area.

The 387,500-square-foot project aims to create both a building and outdoor public spaces that will be enjoyed by people regardless of whether or not they attend performances. The building's form takes its cue from the nearby Ekeberg hill and the adjacent Oslo fjord. The dynamic roof form blurs the distinction between sky and ground plane, and as it slopes down at the perimeter of the building, acts as a platform for a variety of public spaces and activities. From the upper level there are breathtaking views of the city. The lower portion of the plaza creates a new waterfront edge, extending the program directly into the fjord.

The building is divided into three components: performance, rehearsal, and public areas. The primary materials—wood, stainless steel and granite—reinforce these spatial distinctions. But rather than create an urban space that is derived from the building's interior, Snøhetta has created a public realm that responds to its local urban condition, while simultaneously incorporating the historically proven form of an opera hall within. Oslo is left doubly richer, with both a new opera house and a new public environment. The project is slated for completion in 2008. **Elizabeth Donoff**



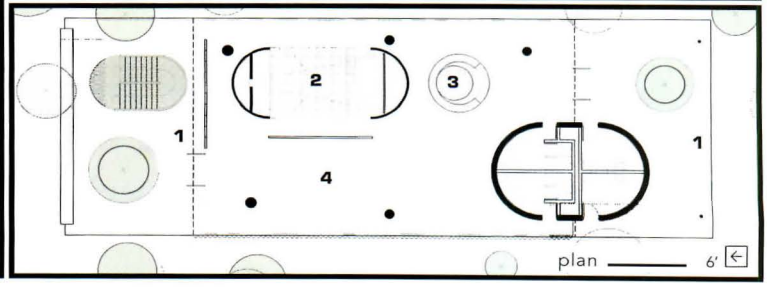
1 foyer
2 auditorium
3 main stage
4 light court
5 rehearsal room



TOURAINE & RICHMOND ARCHITECTS | SILVERWOOD LAKE VISITORS' CENTER | SAN BERNARDINO, CALIFORNIA

Located in California's San Bernardino Mountains, this 3,000-square-foot visitors' center sits in a forest of sycamore trees adjacent to a reservoir and camping and picnic areas. It was the Los Angeles–based architects' intent to create a pavilion in the trees, and they have literally done so. A concrete slab on piers is raised above the ground to create a minimal footprint, while native trees pass through the structure undisturbed. The architects also sought to create a self-sustaining building capable of operating independently of the power grid: a roof slab, staggered over the floorplate, creates a south-facing overhang to reduce heat gain, and solar roof panels heat water to be used for radiant floor heating. Construction on the center will begin in spring 2004. **Bay Brown**

1 deck
2 projection room
3 reception
4 display area



LEDDY MAYTUM STACY ARCHITECTS | ED ROBERTS CAMPUS | BERKELEY, CALIFORNIA

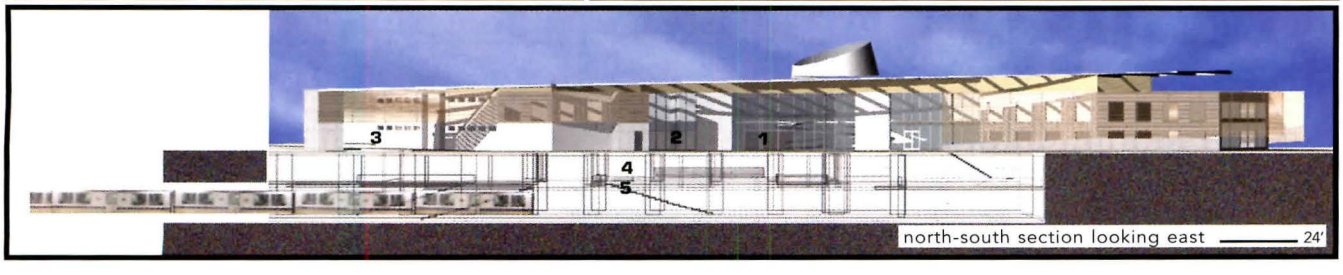
The first building of its kind, the 80,000-square-foot Ed Roberts Campus in Berkeley houses an international center for the independent-living and disability-rights movement. Comprising nine advocacy groups that have formed a single nonprofit organization to plan and develop an accessible, transit-oriented, and sustainable campus, the center is named in honor of Ed Roberts, a pioneer in the organized advocacy of independent living, who died in 1995.

San Francisco–based Leddy Maytum Stacy has designed a two-story building to include exhibition space, community meeting rooms, vocational training facilities, offices, a café, and a childcare and fitness center. A semicircular entry plaza serves as a transit hub and public gathering space. A transparent façade reveals an interior helical ramp that will be designed as functional public art by an artist, yet to be named, in collaboration with the architect.

The center serves as a model of progressive universal design—environments available to individuals of all abilities—including readily available products and technologies such as extra-wide corridors, motion-sensitive controls, and localized cooling. The architects are teaming with workplace consultant IDEO to explore new technologies, such as thermal controls, wayfinding devices, and voice-activated controls. The project also integrates sustainable principles throughout the design. An enclosed courtyard on the ground floor brings natural daylight and ventilation into adjacent spaces, and recycled redwood screens provide sun protection. **Elizabeth Donoff**

site plan

1 main entry
2 café entry
3 driveway
4 subway ticketing area
5 subway platform



north-south section looking east 24'

a life's work

For the architect to work in sovereign control of his means, he must experiment, practice in the manner of a musician playing his scales, practice with mass, with rhythms formed by masses grouped together by color combinations, light, and shade; he must sense with fervent intensity and generally rehearse his shape-creating expertise.

This requires close familiarity with materials: We have to be able to understand the structure of wood, the weight and hardness of stone, the character of glass; we must become one with our materials and be able to fashion and use them in accordance with their constitution.

If we understand the nature of the material, we have its potential close at hand and far more tangibly than if we base ourselves on mathematical formulae and art forms.

It demands a good, healthy common-sense understanding of life. An understanding of walking, standing, sitting, and lying comfortably, of enjoying the sun, the shade, the water on our bodies, the earth, and all the less easily defined sense impressions. A desire for well-being must be fundamental to all architecture if we are to achieve harmony between the spaces we create and the activities to be undertaken in them. —Jørn Utzon

Excerpted from Utzon's 1948 essay "The Innermost Being of Architecture" and republished in *Utzon: Inspiration, Vision, Architecture* by Richard Weston (Edition Bløndal, 2002).

ERIK INGER/PLANET FOTO

BENT RYBERG/PLANET FOTO

courts and complements

Jørn Utzon is no one-work wonder, but a modern master builder with an ouevre rich in materiality and light. BY MARTIN SCHWARTZ

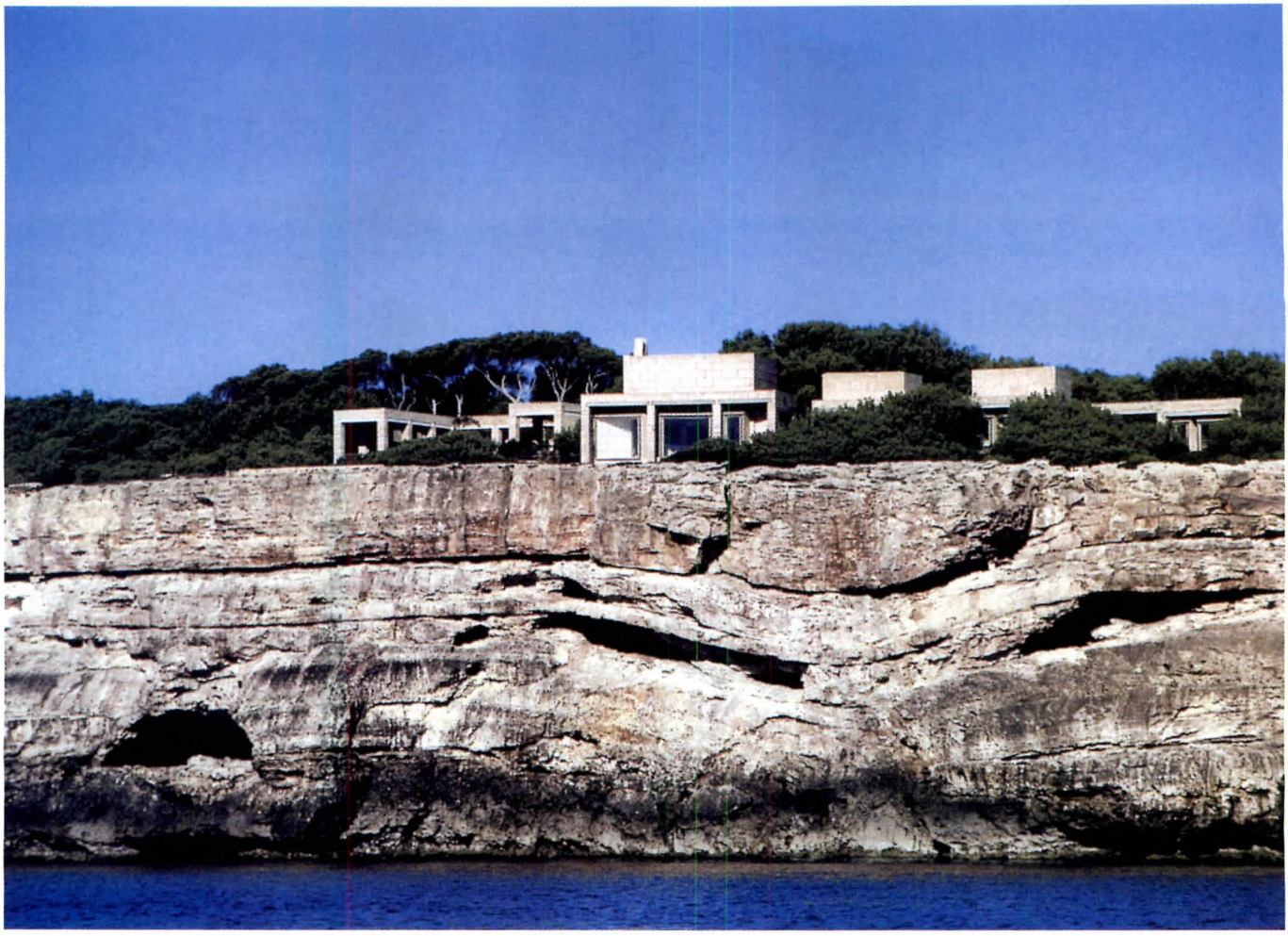
In April, Jørn Utzon celebrated his 85th birthday and won the 2003 Pritzker Prize. The Utzon Center, an institute devoted to the study of his work, opened in June at Aalborg University in his native Denmark, where the first Utzon Symposium was held last month. And Richard Weston's *Utzon: Inspiration, Vision, Architecture*, the first comprehensive look at the architect's career, was published last year. Yet he is known primarily for one building, the Sydney Opera House (1973). His otherwise relative obscurity can be explained, in part, by the circumstances surrounding the attenuated completion of that one building, the paucity of commissions following those events, and what some believe to be Utzon's desire to tell his own story. His 1957 competition-winning design for the opera house, now the symbol of a nation, indeed of an entire continent, made Utzon famous and gave us one of the few modern buildings admired by both the general public and the architectural community. But it also undermined his career. Local politics in Sydney, which led to the withholding of design fees and funds for mock-ups, convinced Utzon that he had no choice but to resign from the project. These events, along with the difficult technical task of building the opera house, unfairly tarnished his reputation, even in Denmark. Utzon left Sydney in 1966, the project only half completed.

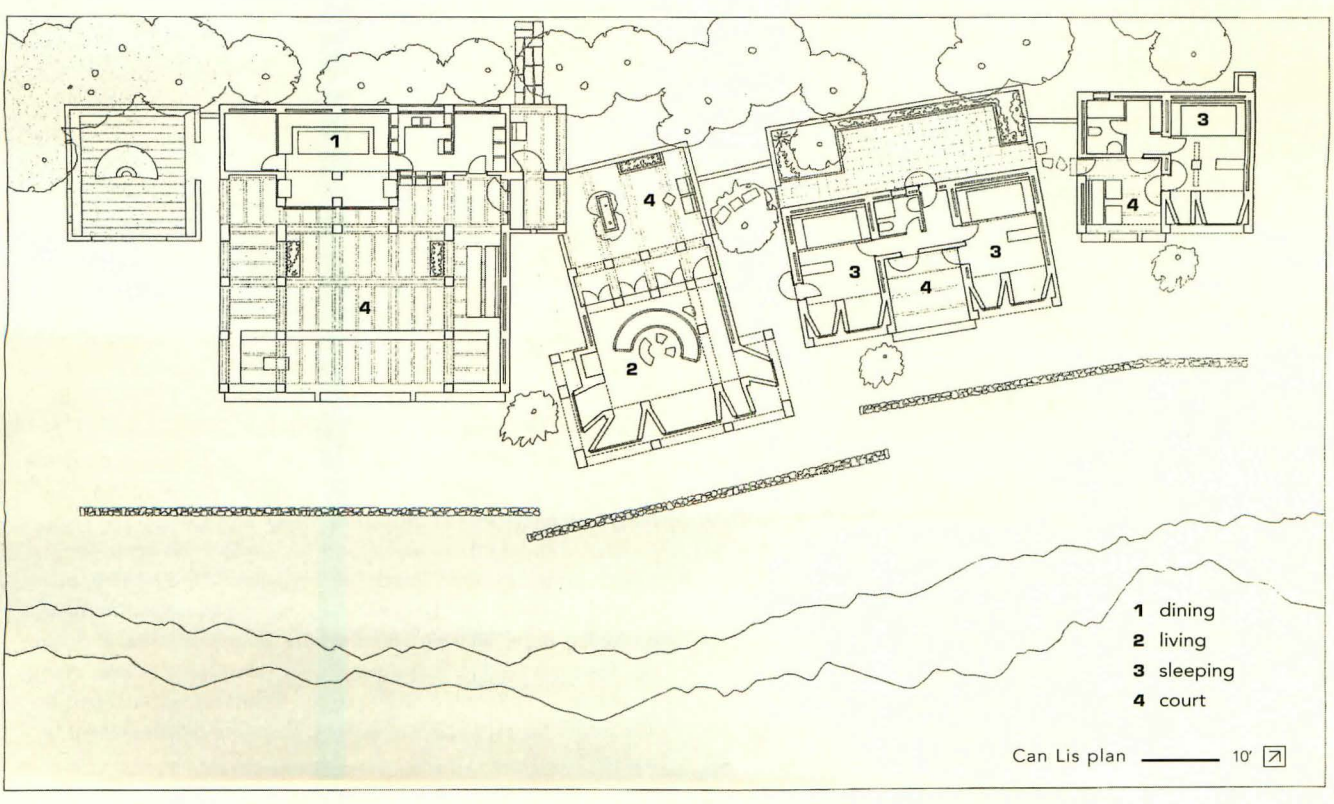
With the opera house, Utzon showed himself to be one of the great formgivers of modern architecture. It is significant that he never felt the need to rely on this aptitude again. The projects after Sydney are less concerned with the production of objects than with design and construction as thoughtful processes directly related to how people use and understand a building. Where there are unique shapes, they are devoted to the reception of light; Utzon uses his understanding of light to generate space and form. His approach to architecture could be called "complementary" in the sense that, in his hands, opposing tendencies become allies. He incorporates traditional materials (stone and wood) as well as vernacular forms (tiled roofs, simple shapes, mass in contrast to transparency) into the context of modern architecture, tying each building to its time and place. One source for this approach may be Steen Eiler Rasmussen, Utzon's teacher at the Royal Danish Academy, who wrote in his 1959 book, *Experiencing Architecture*, about perceptions of hard and soft, of heavy and light, and the deliberate design strategy of fusing such pairs to enrich meaning.

COURTYARD AS SPATIAL GENERATOR

Although his projects vary greatly in appearance, Utzon consistently explored the courtyard type, a device shared across cultures to capture a bit of the outside world and to receive light, to filter it before allowing it to enter a building, and to create shade and shadow. Courts can accommodate many uses, while defining distinct precincts. Perhaps no contemporary architect has explored the range of possibilities of the courtyard more effectively than Utzon. The typology, which appears in all of his completed buildings after Sydney, also distinguishes his public buildings from his residences. In his public buildings the courtyards are ordered orthogonally, while the residential courtyards are arranged informally with reference to topography, views, and light.

Utzon brought these ideas together vividly in his lesser-known works, including the Church at Bagsvaerd (1968–1976) near Copenhagen and Can Lis (1972), Utzon's first house for his family on Majorca, the Balearic island off the southeast coast of Spain where he has lived for many years. Unlike the Opera House, these two were completed according to the architect's wishes when he was at the height of his powers and therefore fully represent his architectural vision.





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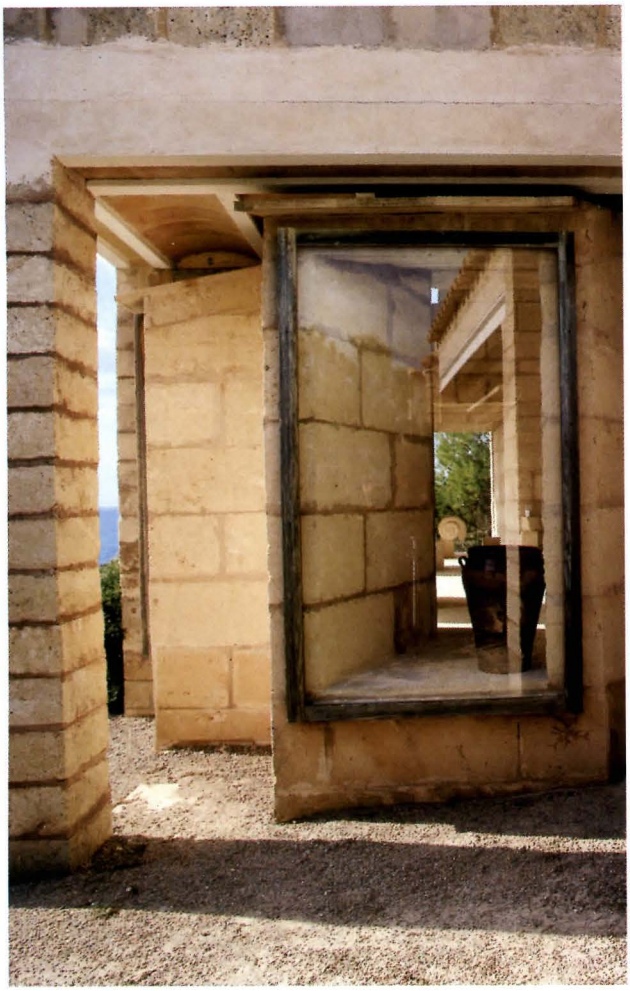
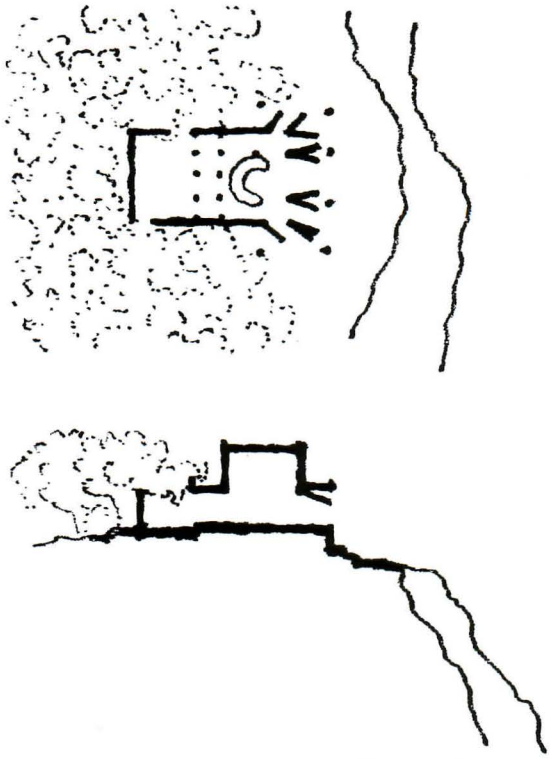




Can Lis, named for Utzon's wife, sits 65 feet above the Mediterranean on Majorca (above and facing page, top and bottom). The architect's organic modernism is steeped in time-honored construction techniques and shaped by site and local materials. Ashlar sandstone, quarried in a nearby town, is the main building block. Roof and wall openings are of reinforced concrete I-beams and lintels. Arched Catalan terra-cotta tiles span the gaps between parallel beams to make roofs (page 52). Wood frames fasten glazing to exterior walls for unobstructed views from the inside out, such as from a bay in the living room to the sea (left).

COURTING THE SPIRITUAL

The Church at Bagsvaerd is an austere, rectangular precinct. There are no windows, but this is common in a cloister. Religious buildings typically establish a place apart from the everyday world, and in this case, the views from the church are not compelling. The opaque exterior wall clothes an orthogonal matrix of completely skylighted circulation corridors and open courtyards, both types of spaces configured to receive and filter daylight from above. Toplighting is ideal at the latitude of Copenhagen, where the sun hovers low over the horizon, and it supports an interior strategy of indirect daylighting. The light in this building enters high, paints surfaces, reflects, and is softened by white matte walls. In the church, we see light remade by architecture.

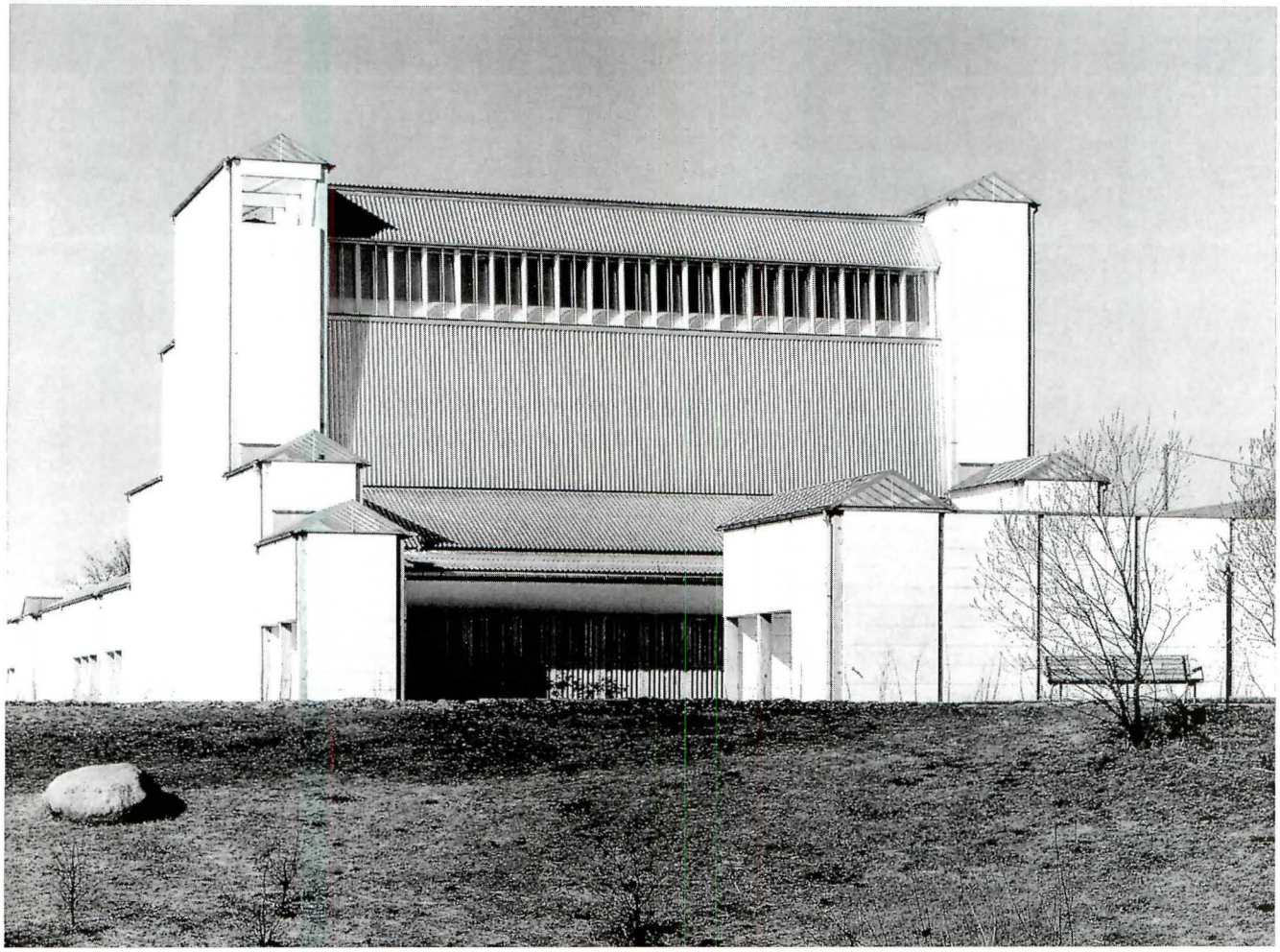
The most remarkable court in this composition is an interior space, the sanctuary. Utzon conceived the white, curved ceiling vault as a cloud canopy with breaks for entering light, as a representation of the sky or heavens, an ecclesiastical tradition reaching back to the painting of biblical scenes and even to the dome of the Pantheon in Rome. Encompassing the whole room, it may be seen as an expansion of Alvar Aalto's light-monitor strategy, but is most significantly an expression of Utzon's fascination with cloud forms and other shapes found in nature. Both architects' houses of worship recall northern European Baroque churches, in which the exterior form diverges from an undulating interior form and the resulting poche conceals the source of light.

At Bagsvaerd, light enters the sanctuary through high clerestory windows between vault segments on the west side of the room. Skylight and late afternoon sun break through the segments and are softened as they reflect downward. Here, light diffusing from the concrete vault surface translates the hard and massive material into one that is perceived as lightweight. Light also enters the sanctuary from around the vault, mostly from the skylighted corridors that flank the north and south sides of the room, emphasizing the independence of the cloud canopy, suggesting shelter, and intensifying the sensation of being inside and outside at the same time.

COURTING SEA AND SKY

Can Lis is arguably Utzon's most intricate composition of courts. The house is formed by a trail of five pavilions along a cliff overlooking the sea to the south. The disposition of each pavilion is adjusted to the cliff edge, light, and views. As in the church, there is a complementary play of light and materials. At Can Lis, local sandstone blocks are assembled into abstract cubes, and light and shadow patterns are articulated in sunlight on its surfaces, because the stone is unfinished and bears the marks of the circular saws that cut it.

Each pavilion is a court or includes one. As at Bagsvaerd,



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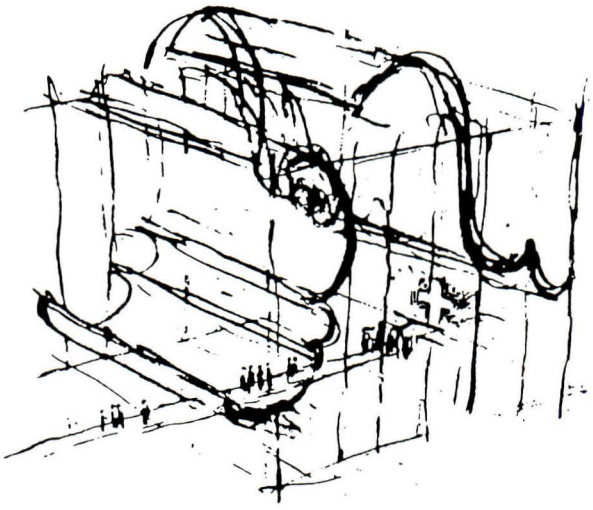
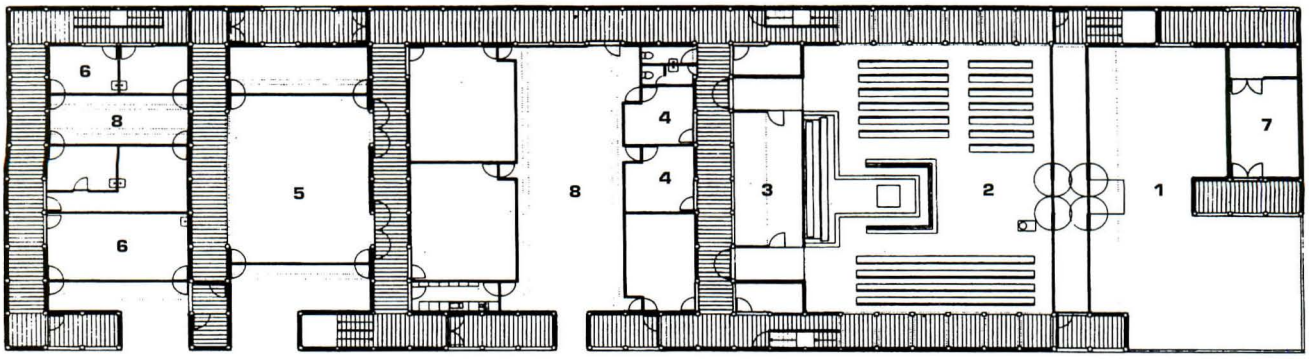


On an unremarkable site in a suburb north of Copenhagen, Bagsvaerd Church, built 440 years after the town's original house of worship was dismantled, employs many off-the-shelf components: it is framed in precast concrete units—square columns and rectangular beams; 1.5-inch-thick concrete planks form exterior walls (facing page). Perimeter and transverse corridors are toplit with V-shaped skylights, a building element typically specified for agricultural roofing (left).

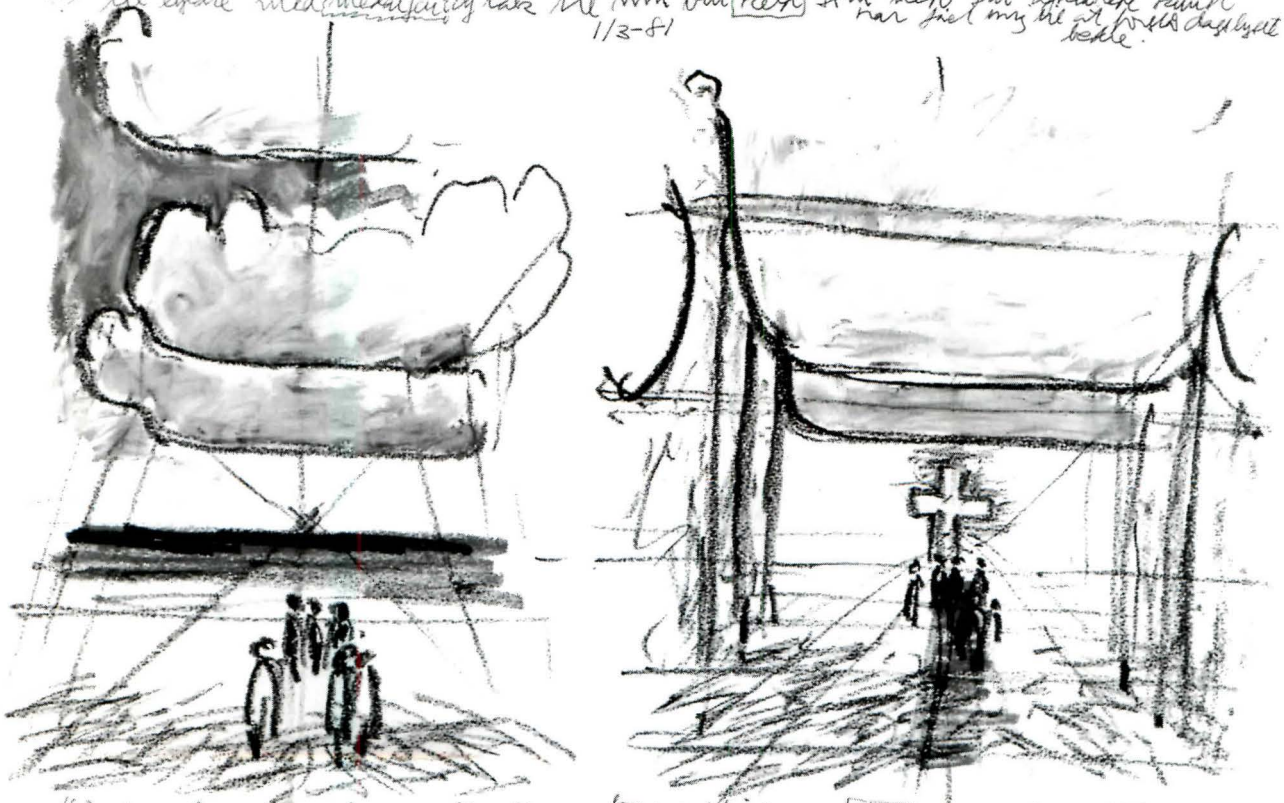


1 entry court
2 church
3 sacristy
4 office
5 parrish hall
6 meeting room
7 chapel
8 garden

Bagsvaerd Church plan 15'

there is one court at Can Lis that is fully part of the interior, a living room with a tall ceiling. But instead of reaching up for skylight, this pavilion reaches for the horizon with five window-bays, each large enough to hold a single person and fully glazed with the frames applied to the outside face of the house. The bays are configured and located to control direct sun while they collect skylight. With the window frames out of sight (in the manner of Swedish architect Sigurd Lewerentz), there is neither a shadow obstructing the inward rush of light nor an impediment to the equal and opposite pull of sea and sky. These unique spaces are person-sized courtyards off of the larger one, like side chapels in a church but with the walls blown out to reveal the sea and southern horizon. A small opening high on the southwest wall invites a spear of afternoon sunlight into the living room.

The lighting strategies at the church and Can Lis are the same: introduce skylight without glare, reflect it from building surfaces to articulate materials and construction processes, and domesticate the bright sun so that its movement animates space.



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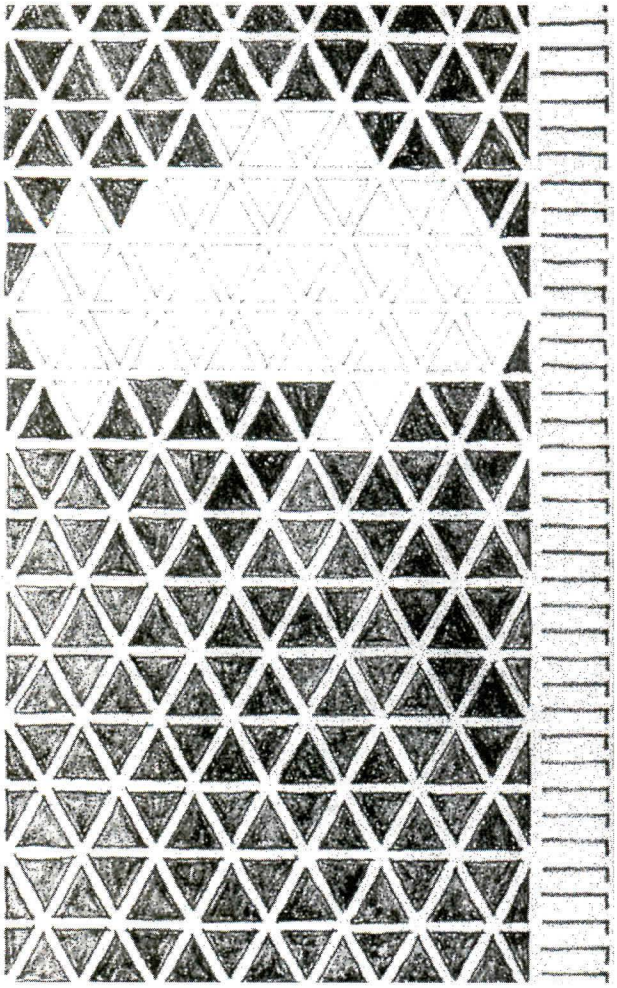
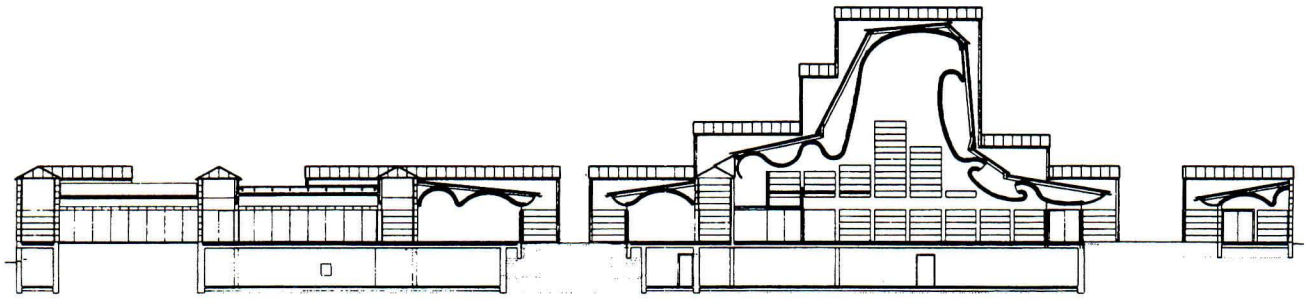


While lying on a beach in Hawaii where he was teaching, Utzon found in the sky an idea for Bagsvaerd Church. Inspired by this moment, he drew a sketch of a group of people walking across the sand toward the sea beneath billowing clouds; a second sketch transformed the first into parishioners moving toward a cross beneath a vaulted ceiling (facing page, bottom). The concrete vault of the nave is cast in place, the rough formwork having left its imprint (facing page, top). Behind the altar is a screen of thin white-painted brick, which was originally to include a religious motif (left). Bleached pine timber is present throughout the church (above).



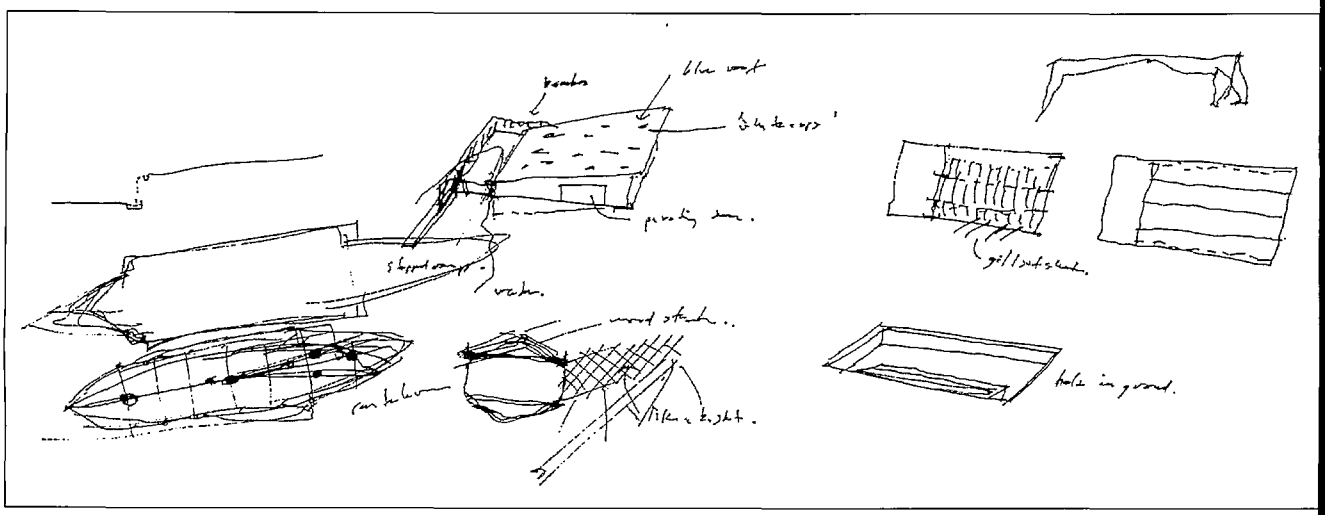
Bagsvaerd Church section ——— 15'

HOLDING COURT

As in most fine architecture, the architect finally reveals himself. Although the regional precedents for his courtyards—particularly Middle and Far Eastern—have been widely discussed elsewhere, there is good reason to believe that Utzon's consistent interest in courtyards is highly personal. A man described in Weston's monograph as "reclusive by nature" and "intensely private," the architect found himself in a most public profession. He had to have been conscious of the need to mediate the personal and social parts of life. The courtyard, as a threshold between inside and outside, helps to reconcile the ongoing conflict between the communal and the private.

For Utzon, the courtyard offers infinite spatial possibilities. And, in place of aggressive form-making, ever-changing daylight must satisfy his great sense of play (the other side of Utzon's shyness) as does the convergence of opposing tendencies: modern and vernacular, public and private, warm and cool, light and dark, abstract and figurative, complete and open-ended, hand-crafted and machined—all reflecting different sides of the same man.

Martin Schwartz, an architect in Ann Arbor, Michigan, is currently writing a book on Jørn Utzon's church at Bagsvaerd.



MENTAL GYMNASTICS

StudioWorks privileges the mind and body in a two-part addition to a secondary school in Los Angeles.

BY ANN JARMUSCH | PHOTOGRAPHS BY GRANT MUDFORD

The first of several startling aspects of StudioWorks Architects' additions to The Rose and Alex Pilibos Armenian School in Los Angeles lies in the parents' decision to build a gymnasium and a library simultaneously. Both resources have equal value at this private K–12 school of more than 750 students, so fundraising, design, and construction plans were undertaken jointly to enrich and upgrade a dreary campus awash in concrete surfaces and dated classroom buildings.

StudioWorks' principals Robert Mangurian and Mary-Ann Ray found harmony in these clashingly contradictory building types by turning to the etymologies of *gymnastike* ("exercise of the body") and *musike* ("education of the mind"). The relationship between mind and body—and the school's tight site in a densely built area of East Hollywood known as Little Armenia—prompted the architects to manifest this connection through what they refer to as a "floating library" above a "grounded gymnasium." But an early scheme that planted some of the hovering library's "legs" on top of a submerged gym required deep excavation and proved too expensive.

Still, Mangurian and Ray ultimately achieved a stunning surprise combination. A sky-blue, boat-shaped library held aloft by elliptical columns and skinny stilts and reached by nautical stairways and bridges contrasts with its neighbor, a low-slung, silvery gym embedded in the earth. Where the library entrances appear mysterious from ground level, the rigorously geometric gym's three huge (10-foot-by-13-foot) pivot doors swing open to reveal a regulation-size basketball court sunk nearly 10 feet below grade.

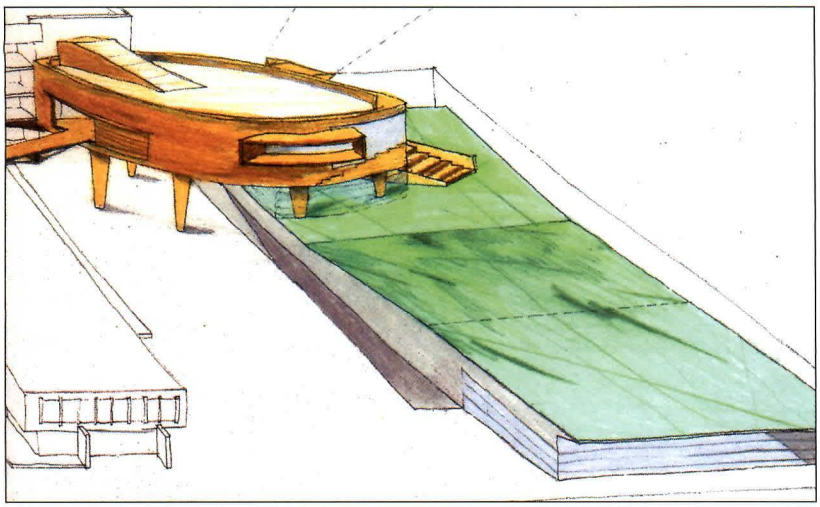
A cost-saving move that helped pay for the complex, bulbous library structure delivers another design surprise: The gym is a customized Butler building—the prefabricated product of what Mangurian called a "nearly interactive process" with engineers at Butler Manufacturing Company's Visalia, California, office. The typical Butler building is constructed of a standard roof assembly (required for structural integrity and guaranteed for 20 years) and vertical metal siding. StudioWorks changed the wall system, using the same siding horizontally and adding translucent fiberglass panels.

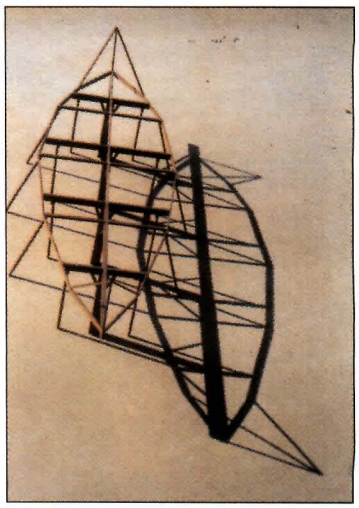
Knowing that Butler components are engineered to be efficient in cost, weight, and fabrication, Mangurian asked to explore the possibility of adding "less efficient" components. The architects wanted a different-shaped beam, for one thing. The engineer typed the altered specs into a computer, then announced the new price: $5,000 more, which Mangurian deemed acceptable. Even with changes, the cost of the gym remained a low $17 per square foot.

This Butler building, which appears compact and low from the street, has its foundation in an underground basin of exposed concrete that both insulates the gym, which is not air-conditioned, and forms its low, durable walls. Its bilevel roof is designed to resemble a rugged land form slick with rainwater, an image Mangurian and Ray rendered with a steel coated in a zinc-and-aluminum alloy for the roof. The result, seen from the library, is a craggy roof that captures mercurial reflections of the changing sky.

AN ARMENIAN RESONANCE

As much philosophers, poets, and artists as they are architects





and builders, Mangurian and Ray, with the aid of school leaders, collected symbols, colors, and narrative elements from Armenian culture and history, and then filtered them through their own cinematic lens. Religious faith (Armenia was the first nation to officially adopt Christianity) and long-elusive independence (in effect since the Soviet Union's breakup in 1991) are part of the story, but so is tragedy. Beginning in 1915, Turks waged genocidal attacks against Armenians, killing 1.5 million. Terrified survivors scattered around the globe; many stayed abroad to raise their families. Today, the Los Angeles area is home to the largest community of Armenians in the United States.

The most striking and memorable facet of StudioWorks' narrative interpretation of the students' heritage reaches deep into the Armenian soul. Noah's biblical ark is said to have lodged on Mount Ararat, a majestic symbol of Armenia that is now part of Turkey. This belief led the architects to model the library on a wooden, boat-shaped ark. Like the Old Testament ark, which held two of each animal species, the school's 108-foot-long library (114 feet counting the *faux* keel) is a repository of knowledge and culture, holding everything from books and folk art to traditional rugs and computer technology. "The boat shape also symbolizes the immigrants' voyage, yet it is anchored very firmly with these huge columns," said Viken Yacoubian, the school principal. "We have been displaced and found roots in America."

The pomegranate-red library can be entered through an existing four-story classroom building by elevator or via outdoor stairs with metal treads and jaunty nautical railings. Inside, the library is one big, long room—a volume with unfinished plywood walls and flooring. The design team constructed the computer tables and bookshelves that hug the ark's curved sides at StudioWorks' shop, which occupies half of the architects' studio near downtown Los Angeles.

The shelves hold books and Armenian artifacts contributed by families associated with the school or by St. Garabed Armenian Apostolic Church across the street. If funding becomes available, some artifacts may find their way into the ark's "hold," where they would be visible through windows cut in the library floor. (The architects had wanted students to be able to occupy the hold, but abandoned that idea because the cost of universal access was prohibitive.)

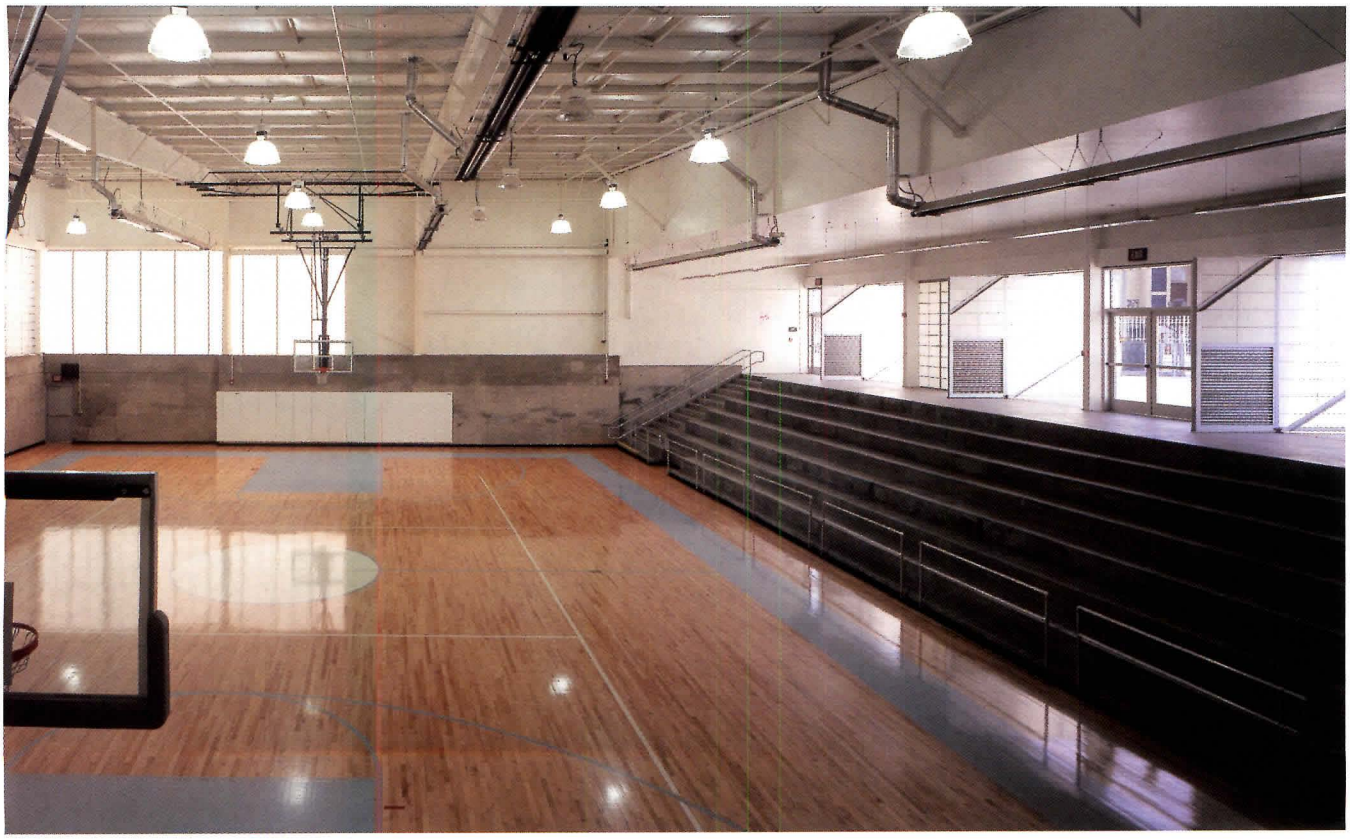
As the school encourages its students to be part of the greater world, the architects provided windows, or "viewports," as they call them, that frame neighborhood landmarks representing the sweep of past, present, and future. Among these are Griffith Observatory, Wright's Hollyhock House atop Barnsdall Park, St. Garabed, and the Hollywood sign. One small but special window looks east toward Yerevan, Armenia's capital. The library, in Ray's view, is both cultural collector and reflector.

This rich mosaic of Armenian and American icons supports the school's mission: to imbue Armenian-American students with a strong sense of their heritage while encouraging their full and equal participation in life in the United States. The layered symbolism also suits the architects, who want their buildings and public spaces to ring true to the people who use them.

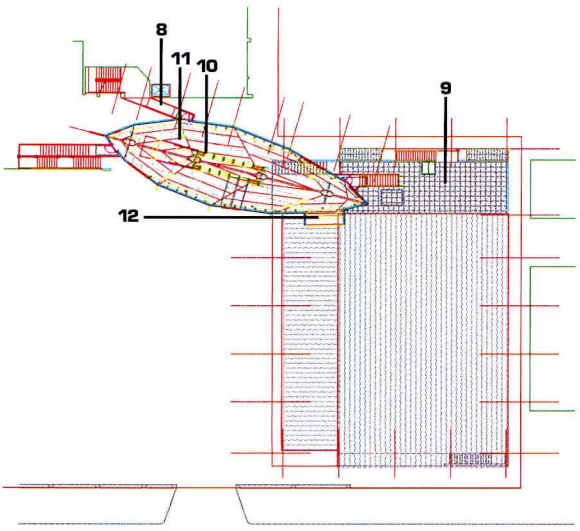
If imaginative cultural symbols aren't enough, StudioWorks also sited their buildings so the small campus now holds together in a U shape around a concrete courtyard that doubles as a playground. Like an equal partner, the machine-age gym stands opposite a spare, modernist classroom and administration building from the 1970s. The library is elevated just high enough off the ground to mask most of the unrefined classroom building, but the older building is also useful, as its elevator is the one that delivers students to the library. As a final gesture, the library noses its "bow" into a corner of the gym's roof deck, just like the biblical ark that floated wildly in the great flood until the water receded.

Ann Jarmusch is the architecture critic of the *San Diego Union-Tribune*.

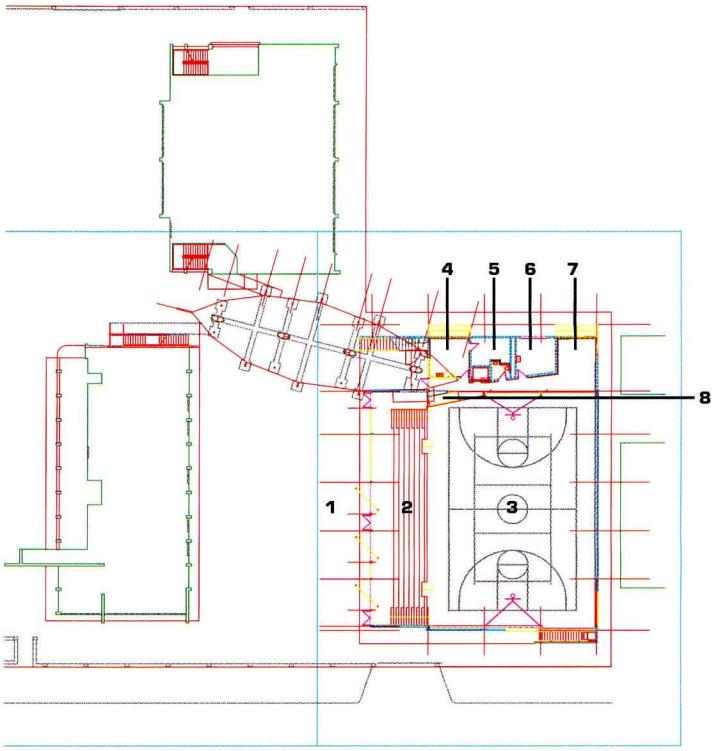
In an effort to animate and update the campus of the Pilibos Armenian School, the architects inserted a sunken gymnasium and a raised library for K–12 students of Armenian heritage (above). The 14,000-square-foot prefabricated gymnasium building, clad in translucent paneling, holds bleachers for 275. Conceived as an "earthwork," the seating steps down from the play yard through a series of oversized, pivoting doors (below).



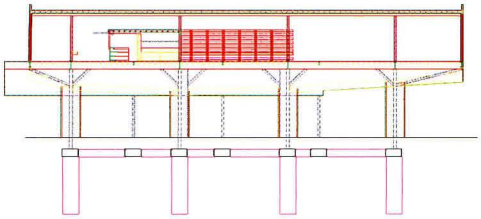
The 3,000-square-foot library (above) is clad in fiber-cement panel and holds 9,000 volumes within its plywood-lined interior. Its windows, or "viewports" as the architects call them, are set at various heights, connecting students and faculty to the East Hollywood neighborhood, the city beyond, and the sky above (below).



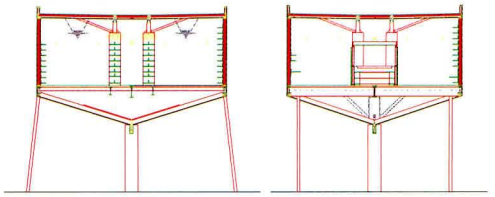
upper-level plan



ground-floor plan 40′



library section looking west



library sections through stacks (left) and checkout 12′

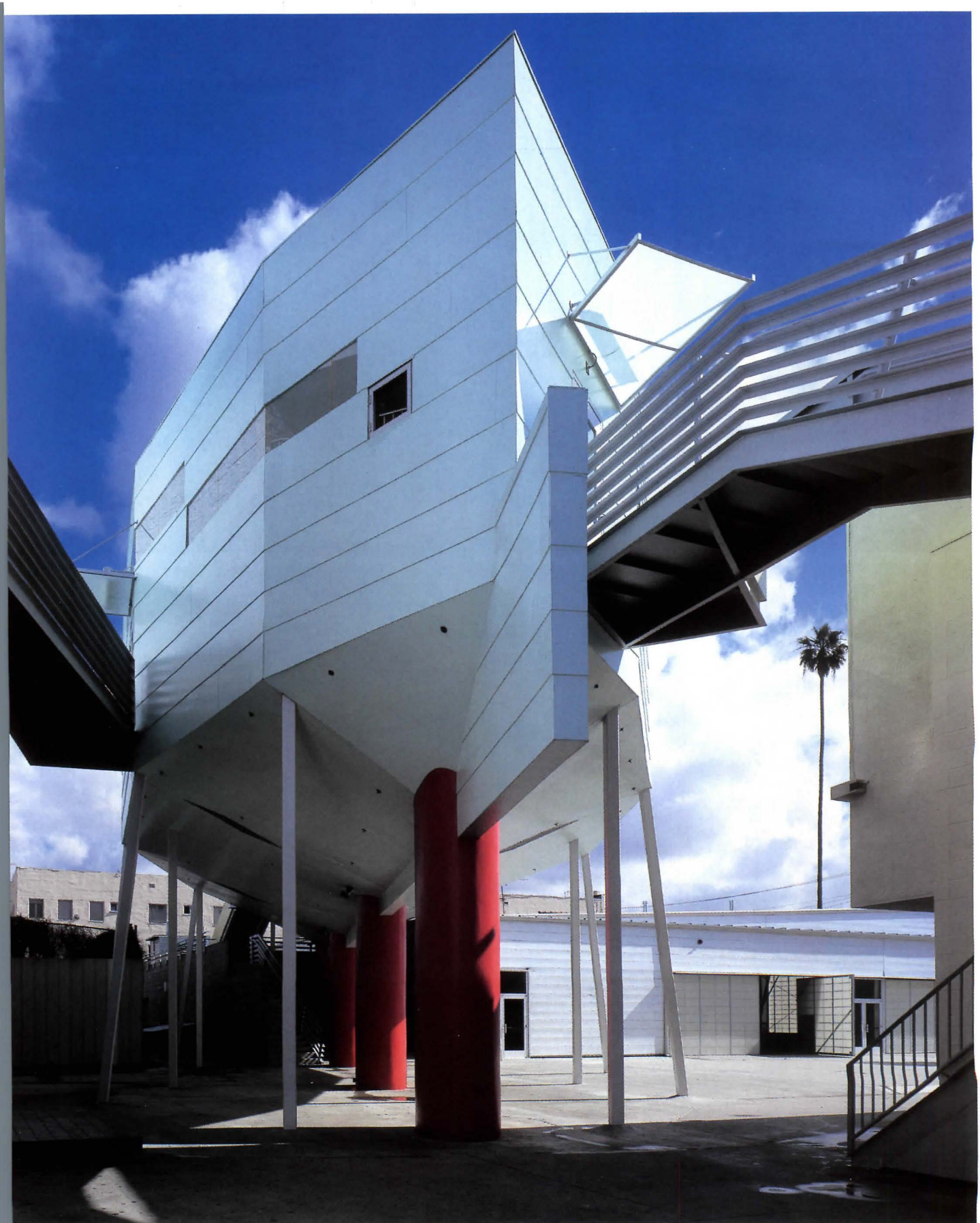
1 gymnasium entry
2 bleachers
3 gymnasium floor
4 student store
5 storage
6 maintenance
7 exercise room
8 bridge
9 library terrace
10 book stacks
11 checkout
12 reading nook

Rose and Alex Pilibos Armenian School, Los Angeles

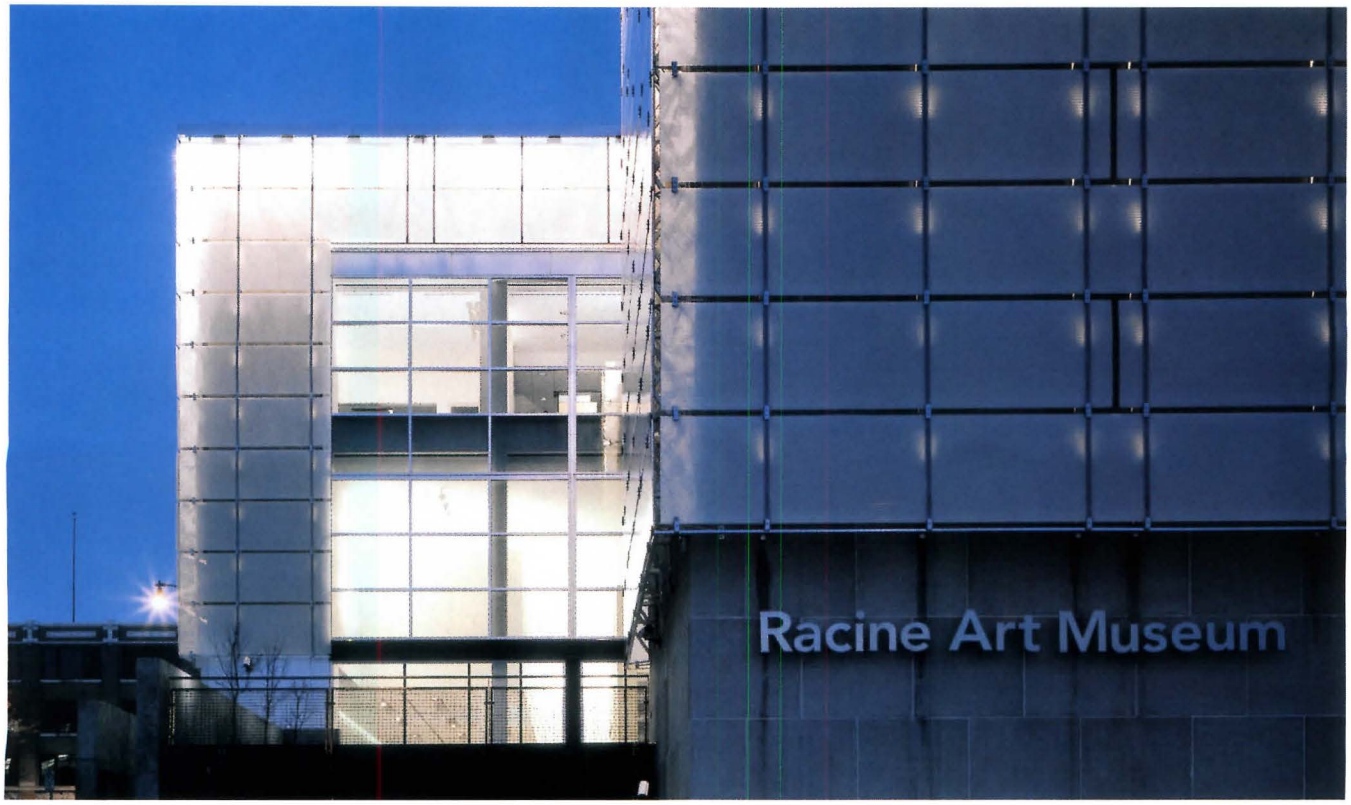
client | Western Prelacy of the Armenian Apostolic Church of America, The Rose and Alex Pilibos Armenian School **architect** | StudioWorks, Los Angeles—Robert Mangurian, Mary-Ann Ray (principals); Stefan Schiede (project architect); Sophie Smits, Josh Coggeshall, Onzieme Mouton, and Ellen Kuch (project team) **engineers** | Gordon Polon (structural); The Sullivan Partnership (mechanical, plumbing); Nikolakopulos & Associates (electrical); Grover Hollingsworth & Associates (soil) **general contractor** | Frederick Towers **construction manager** | Albert Danelian **pre-engineered-building supplier/subcontractor** | Bremco **area** | 15,000 square feet **cost** | $2.1 million

Specifications

masonry | Angelus Block Company **prefabricated concrete floor system** | Hanson Spancrete **structural metal** | Butler **metal cladding** | BHP **fiber-cement panels** | Hardie Panels **roofing** | Butler; Neogard **glazing, doors** | Arcadia **plastic glazing** | Kalwall **hardware** | Schlage **hinges** | Hager **closers** | Dorma **exit devices** | Von Duprin **cabinetwork and custom woodwork** | StudioWorks **Paints and stains** | Dunn-Edwards; Varathane **flooring** | Action Floor Systems **interior ambient lighting** | Metalux **downlights** | Lumark **exterior lighting** | Ruud **elevators** | Schindler **plumbing fixtures** | American Standard



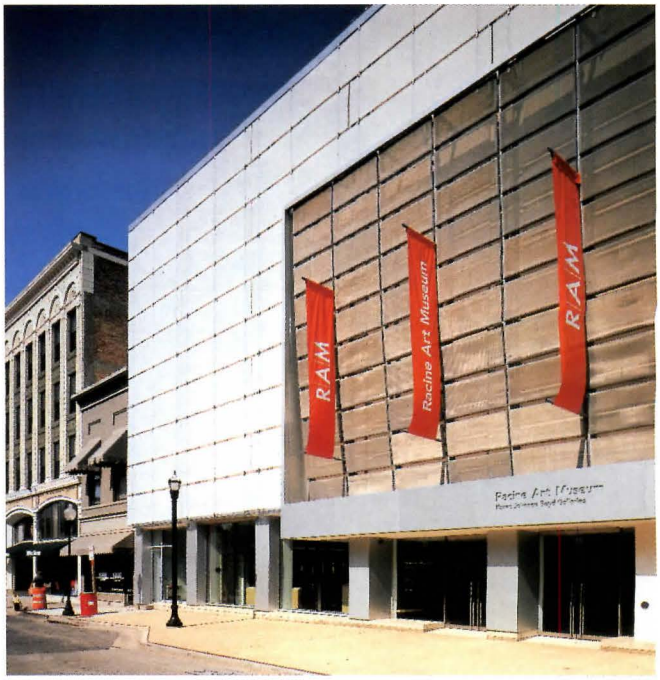
dges and stairs link the library to classroom buildings, while the horizontal orientation of cladding on the library and the gymnasium link the vest elements of the schoolyard to each other (above).


Racine Art Museum

Art in the Vault

Brininstool + Lynch create new galleries for the Racine Art Museum in a former downtown bank. **BY MICHAEL WEBB**

The new home of the Racine Art Museum—an institution that focuses on contemporary craftwork—offers an inspiring model to similar organizations across America that need more display space and a welcoming public presence but are unable to fund a grand edifice. Four years ago the museum's board selected Brininstool + Lynch, a small Chicago firm best known for its minimalist houses and art galleries, to create a new $50 million building alongside its old home, a nineteenth-century Italianate farmhouse in a park at the edge of this southern Wisconsin city. As the economy soured, the planning committee realized that it would be too extravagant a project for this depressed industrial city on Lake Michigan. They slashed the budget to $6.5 million and commissioned the architects to remodel a bank building that the municipality had donated on Main Street, leaving the farmhouse to be used as an educational facility. Frugality paid off: Infused with urban energy, the new museum has a visibility it lacked on its old site, and it may help regenerate downtown. It should become a stop on the architectural pilgrimage to Frank Lloyd Wright's Wingspread House and Johnson Wax complex, both in Racine, and Santiago Calatrava's addition to the Milwaukee Art Museum, 20 miles to the north.



Architects Brininstool + Lynch hid the façade of a former 1960s bank behind sheets of ribbed, cellular plastic (above). On windows that receive direct light, a silk-screened grid matrix helps reduce glare, and all of the building's glass is UV-treated (facing page, top and bottom).

WEAVING HISTORIES TOGETHER

Brad Lynch, the partner in charge, discovered that the 1960s limestone bank façade had been wrapped around two separate buildings and five small additions, dating back to the 1860s. Concrete columns and moment connections were added to bring the incoherent, 46,000-square-foot structure into compliance with code, and the dark and oppressive interior was opened up to house galleries, a spacious gift shop, research library, prep room, and administrative offices. A lofty, light-filled concourse zigzags through from front to back, tying these spaces together and opening onto a walled sculpture court with a view to the nearby lake. Below, exploiting the down slope toward the water, are loading and conservation areas that are accessed from the east, a story below the public entrance to the west. Expansive windows were added to provide a visual link to the street and frame a south-facing vitrine that is currently occupied by a Dale Chihuly glass installation.

There was no money to enhance or remove the ponderous exterior masonry, but Lynch called museum director Bruce Pepich and said, "I have one word for you: plastics." To provide a durable, maintenance-free wrapper, he selected a product developed in Germany for greenhouse construction. Sheets of this ribbed, cellular plastic—4 feet wide and up to 34 feet long—were attached to an 18-inch-deep aluminum space frame that is bolted to the stone. By day, the wrapper appears as a shimmering veil, catching every shift of light; at night, overhead lighting gives it a lanternlike glow. It's an appropriate image for a museum that boasts one of the nation's largest collections of contemporary crafts, and it unconsciously echoes the bands of glass tubes Wright used to similar effect on the Johnson Wax tower.

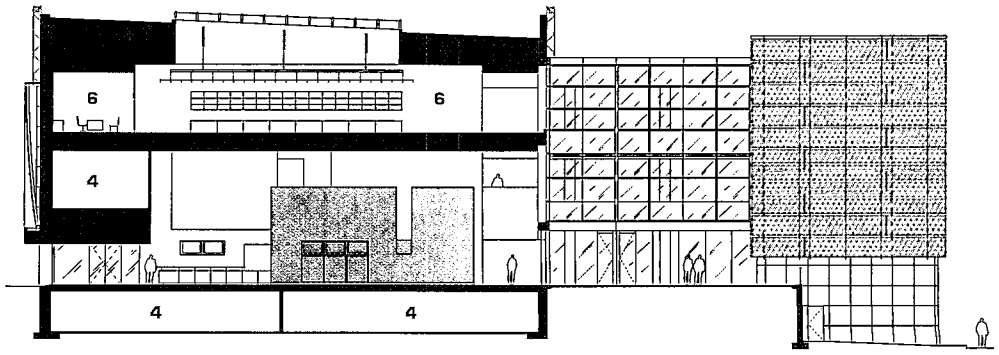
A COLLECTION BROUGHT TO LIGHT

All the glass is UV-treated, and to cut glare, a grid matrix is silk-screened onto windows that receive direct sunlight. The collection, 30 percent of which now can be exhibited every year (a threefold increase over the old building), includes light-sensitive fibers, baskets, and works on paper, as well as glass and ceramics. For Lynch, the challenge was to liberate visitors from museum claustrophobia while layering the spaces to provide different degrees of light and climate control. Fortunately, the architects had spent two years developing a detailed program for the original site, and choices made there about how to arrange the exhibits proved surprisingly relevant to the more confined plan of the Main Street building.

Each of the two ground-level galleries and the large, skylit gallery on the second floor are carefully proportioned to achieve a sense of intimacy, and the spaces feel as though they have been fitted together like cabinets. Ceiling services are largely concealed, and there is a 4-inch reveal at the base of the walls; light from clerestory windows subtly enhances the spatial qualities of these simple volumes. A limited palette of materials—including white painted plaster, black rubber floors, and millwork of reconstituted ash veneer—emphasizes the tactile qualities of the exhibits. A wall in one off the ground-floor galleries has cut-out windows to allow glimpses of people passing on the other side and to build anticipation for what lies beyond.

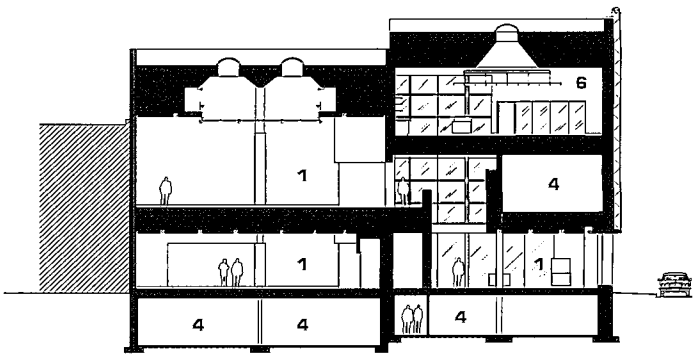
Though the Racine Art Museum will show some of its paintings and sculptures following the inaugural exhibition, which ran through August 31, the main task of the new galleries is to build public appreciation for crafts that for too long have been considered inferior to works of art. With this finely fitted renovation, Lynch both continues the tradition of materiality demonstrated by the museum's Wright-designed neighbors and provides an appropriate environment for the ongoing appreciation of its collection.

Michael Webb is the author of 21 books, most on architecture and design, and writes on those subjects for the *New York Times*, *Domus*, *Architectural Review*, and other publications.

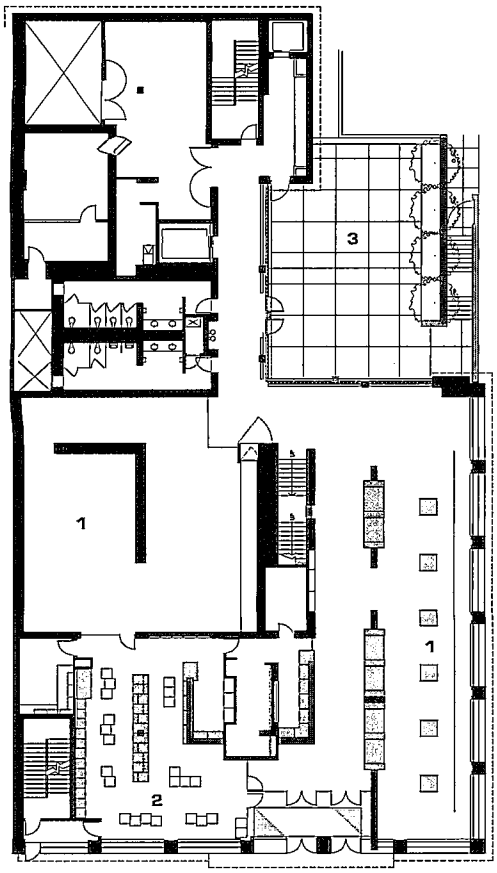


east-west section

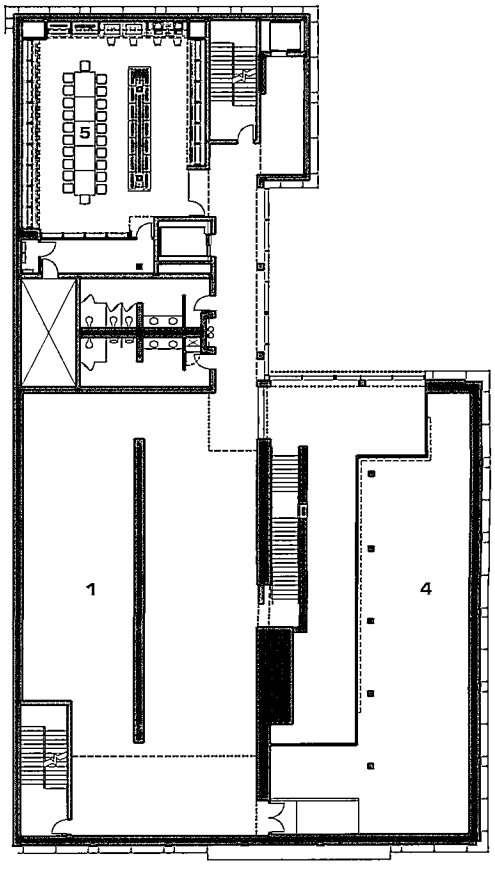
1 gallery
2 store
3 sculpture court
4 storage
5 conference room
6 office



north-south section



first-floor plan



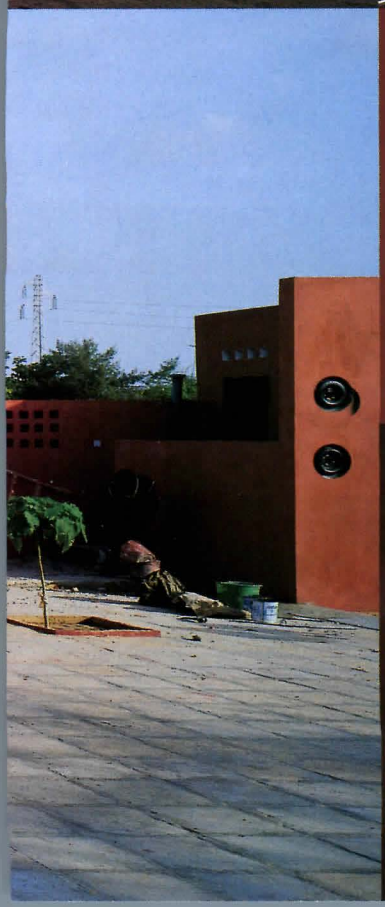
second-floor plan 15'

A muted palette and carefully considered proportions create a serene and intimate environment in the two ground-level galleries.

Racine Art Museum, Racine, Wisconsin
client | Racine Art Museum Association—Bruce Pepich (executive director) **architect** | Brininstool + Lynch, Chicago—Brad Lynch (design principal); David Brininstool (principal); Pablo Diaz (project architect); Daniel Martus (project manager); Christine Marsal Brandl, Jason Longo, Mollie Buhrt, Joanna Dabek, Kevin Southard, Matthew Reiskin, Kristen Rozycki (project team) **engineer** | Arnold & O'Sheridan (structural and M/E/P) **branding and signage consultant** | Liska + Associates **general contractor** | Bukacek Construction **area** | 46,300 square feet **cost** | $7.2 million

photographs by Chris Barrett, Hedrich-Blessing

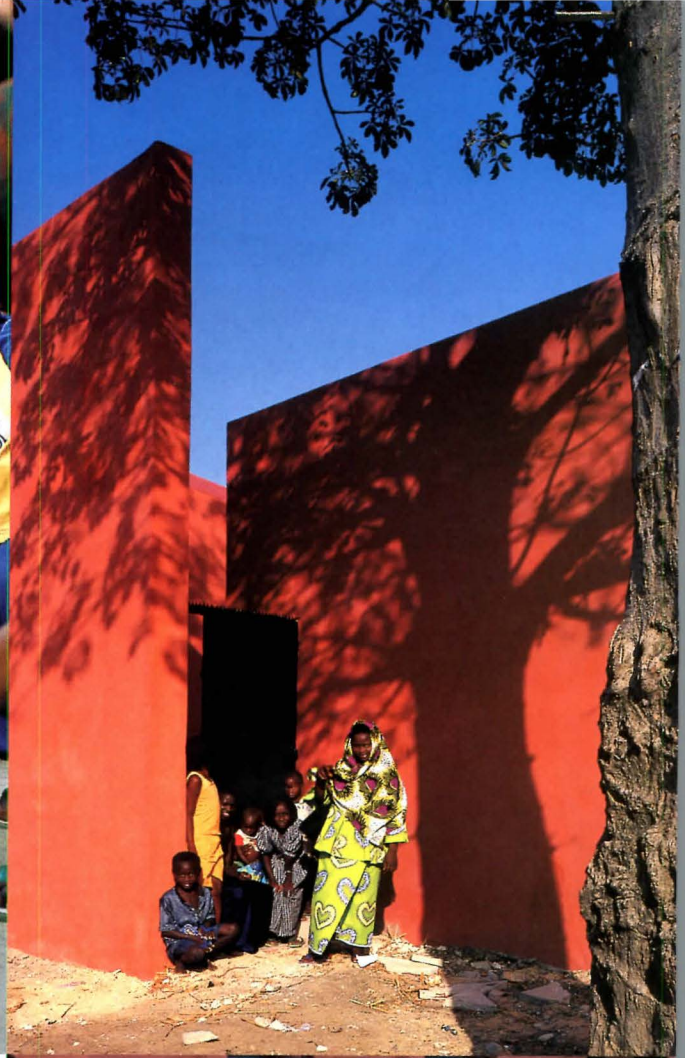
Specifications
glass curtain wall | Klein-Dickert **aluminum truss system for acrylic sheets** | Sign Effectz **acrylic sheets** | Cyro Canada **glass** | Viracon **blinds** | MechoShade Systems **hardware** | Blumcraft of Pittsburgh; Schlage **woodwork** | Woodmill Products **poured rubber flooring** | Gerbert **carpet** | Shaw Contract **special surfacing** | Knoll **furnishings** | Herman Miller (seating and conference tables); Spec (library tables) **lighting** | Bega (exterior); Sign Effectz (illuminated signage); Lighting Services (track) **plumbing fixtures** | American Standard; Grohe



collective construct

A trio of young Finnish architects design, fund-raise for, and build a women's center in Senegal.

BY CATHY LANG HO



Like many architecture students, Saija Hollmén, Jenni Reuter, and Helena Sandman were inquisitive, methodical, and conscientious. But they were clearly more ambitious than most. In 1996, as part of a seminar class at the Helsinki University of Technology, the trio traveled to Rufisque, Senegal, where a strong culture of social and economic women's collectives inspired them to design a center where these groups could congregate. They continued to collaborate after graduation, drumming up financial and political support in both Finland and Senegal to make their student project a reality. Five years, $76,000 (the bulk from the Finnish Ministry of Foreign Affairs), and thousands of frequent-flyer miles later, the budding architects have given the women of Rufisque what has become a vital resource.

FULFILLING A HISTORICAL NEED

As the three designers learned from Rufisque-based Finnish sociologist Anne Rosenlew, the phenomenon of women's groups is not new in Senegal; in fact, it has a long tradition throughout Africa. Rufisque—a city of 200,000 inhabitants on the Atlantic Coast, and a suburb to Senegal's capital, Dakar—has about 250 such groups, including social clubs, volunteer literacy programs, informal savings-and-loans collectives, groups that make and sell food and crafts, and others that help rural women adapt to city life. Hollmén, Reuter, and Sandman quickly understood the importance of creating a central hub for these gatherings, which typically met at different members' houses.

Built on a site donated by the city of Rufisque in the underdeveloped Gouye Aldiana district, the design responds in scale and massing to the low, dense buildings on surrounding city blocks. In form and plan, it draws from the typology of traditional Senegalese homes, with rooms arranged around a central courtyard. Though the center is the first public building in Gouye Aldiana, the architects did not want to emphasize its public nature, but rather to create a homey environment. The boundary between private and public is delineated by a solid outer wall tracing the site's perimeter, but one corner is left open, with an outdoor café and a small plaza where the women sell their cooking and crafts.

LOCAL COLOR

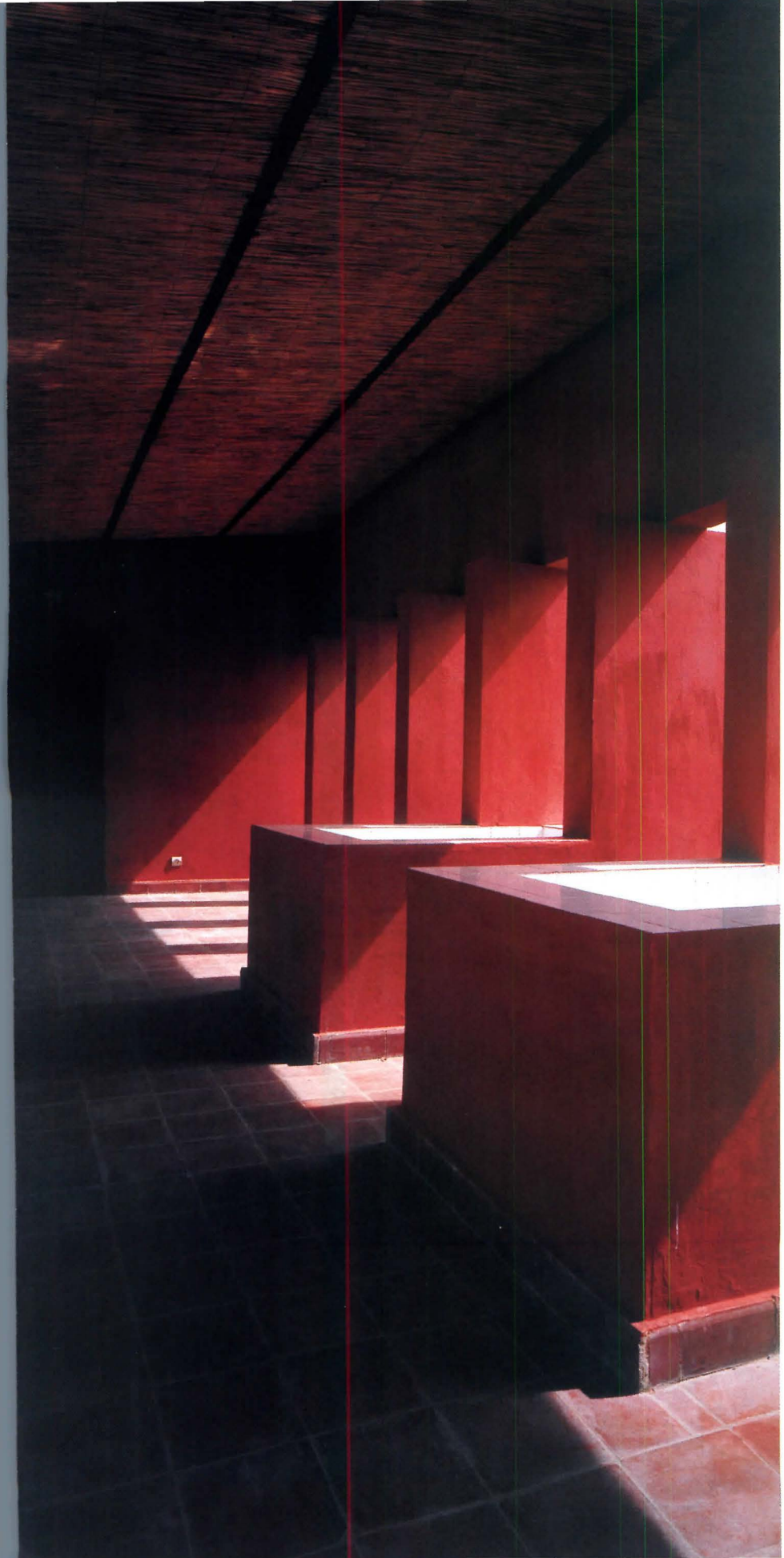
Working with Rufisque architect Mbacke Niang, engineer Galaye Niang, and contractor Abdourahmane Mbaye, the Finns attempted to employ as many local materials as possible. Sococim, a local cement factory and the largest in Western Africa, donated the concrete for the building structure and walls: cast-in-place columns and beams, and block walls, cast and dried on site. The recycled-metal rebars in the concrete were also donated, by Rufisque-based Sosetra. The architects' largest indulgence was color. The walls are painted a powerful red—a dramatic departure from the relentless grays of the surrounding buildings.

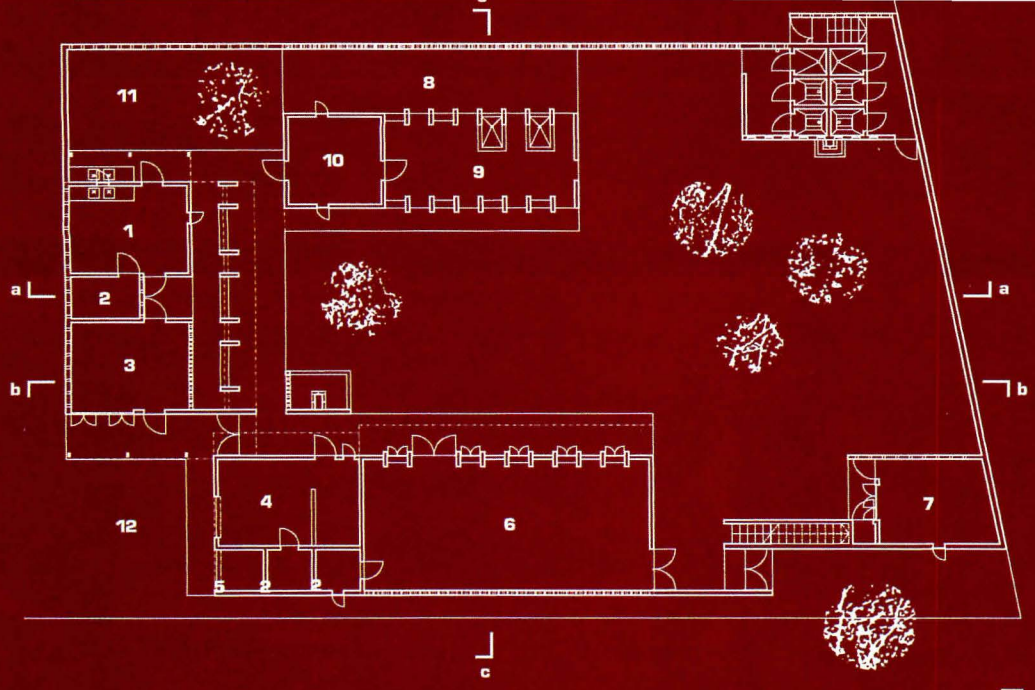
Traditional techniques, such as thick walls with few openings, and ample shade-producing features, like arcades, eaves, and shutters, keep the building cool. Vents were fashioned from discarded car wheel rims. "Glass brick" windows were made from green beer bottles (the contractor, Mbaye, who like most Senegalese is Muslim and therefore does not drink, objected to the beer bottles initially; he now laughs at the matter.) The roof is corrugated metal on steel beams. For ventilation, an open space is left between the roof and ceiling, which is made of thick straw matting to bring a warm, textured surface to the interiors. The architects chose the matting because of its insulating properties and also to resurrect a fast-disappearing local skill.

Though the connection between Finland and Senegal may not be apparent, one notable Finnish trait that propelled three of the country's most promising young architects more than 3,700 miles to build is a strong socialist ethic. Hollmén, Reuter, and Sandman sensed, rightly, that the provision of a center would facilitate the development of women's groups and help improve not only the lives of the women who use it, but, through the groups' economic and social initiatives, the life of the greater community as well.

PRECEDING SPREAD, LEFT: JAHA LÖNEN; FACING PAGE, TOP LEFT AND BOTTOM RIGHT: HOLLMÉN-REUTER-SANDMAN ARCHITECTS; TOP RIGHT AND BOTTOM LEFT: JAHA LÖNEN; THIS PAGE: JAHA LÖNEN

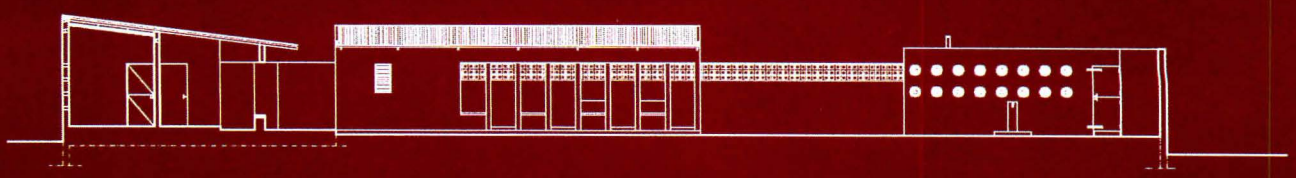
Creative use of inexpensive materials facilitated a high level of design on a low budget for Hollmén-Reuter-Sandman Architects' women's center in Rufisque, Senegal: a rich red pigment on the concrete walls sets the complex apart from the mostly gray surrounding buildings; car wheel rim vents and beer bottle "glass brick" windows provide aesthetic touches; and straw-matting ceilings lend the spaces insulation while reviving a disappearing local craft (preceding spread). The architects' process included extensive meetings with members of the community (facing page, top left). The resulting building is modeled on traditional local residences, with several rooms surrounding a central courtyard used for congregating (facing page, bottom left, and above).



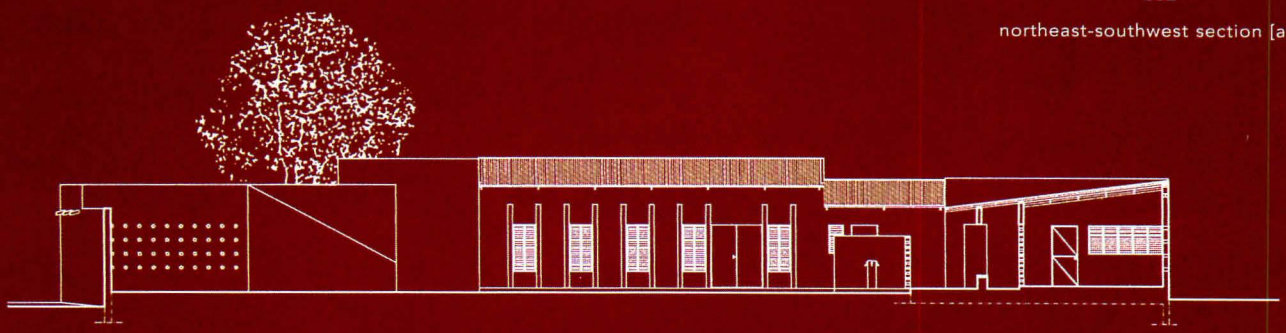


1 kitchen
2 store
3 restaurant
4 sales and display
5 peanut and millet mill
6 hall
7 guard's room
8 dyeing yard
9 dyeing atelier
10 handicraft room
11 outdoor kitchen
12 plaza for informal market

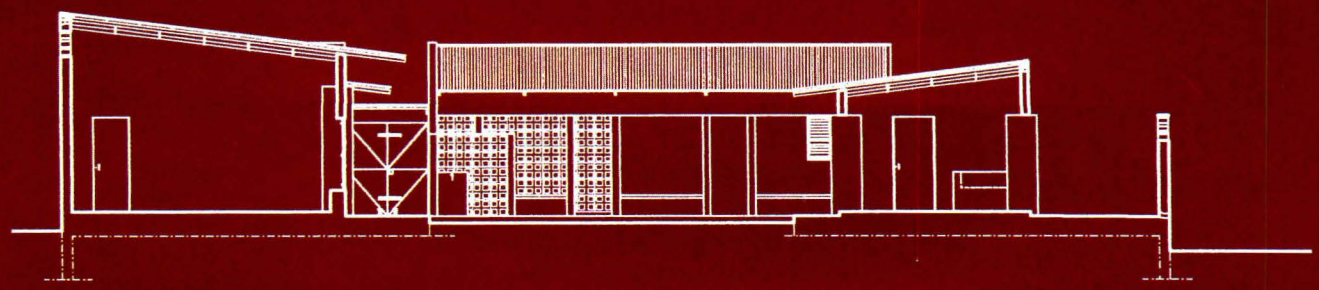
plan ——— 9'



northeast-southwest section [aa]



southwest-northeast section [bb]



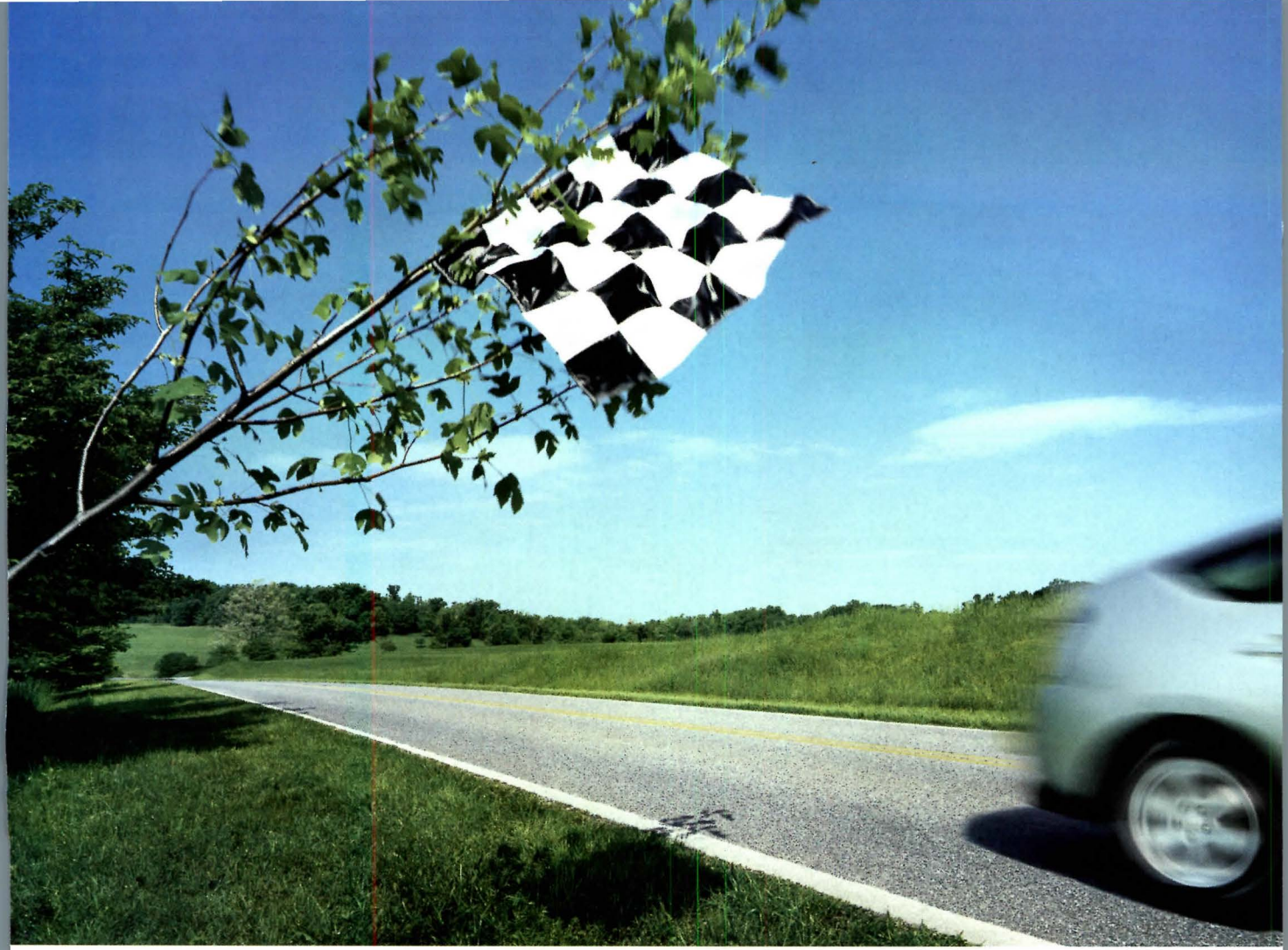
northwest-southeast section [cc] ——— 5'

Women's Center, Rufisque, Senegal

client | Comité de Gestion du Foyer de la Femme de Gouye Aldiana à Rufisque **architect** | Hollmén-Reuter-Sandman Architects, Helsinki, Finland—Saija Hollmén, Jenni Reuter, Helena Sandman **consulting architect** | Mbacke Niang **engineer** | Galaye Niang **general contractor** | Abdourahmane Mbaye **area** | 7,200 square feet **cost** | $76,000

photographs by Juha Ilonen and Hollmén-Reuter-Sandman Architects

FACING PAGE, LEFT: JUHA ILONEN; RIGHT, TOP AND BOTTOM: HOLLMÉN-REUTER-SANDMAN ARCHITECTS



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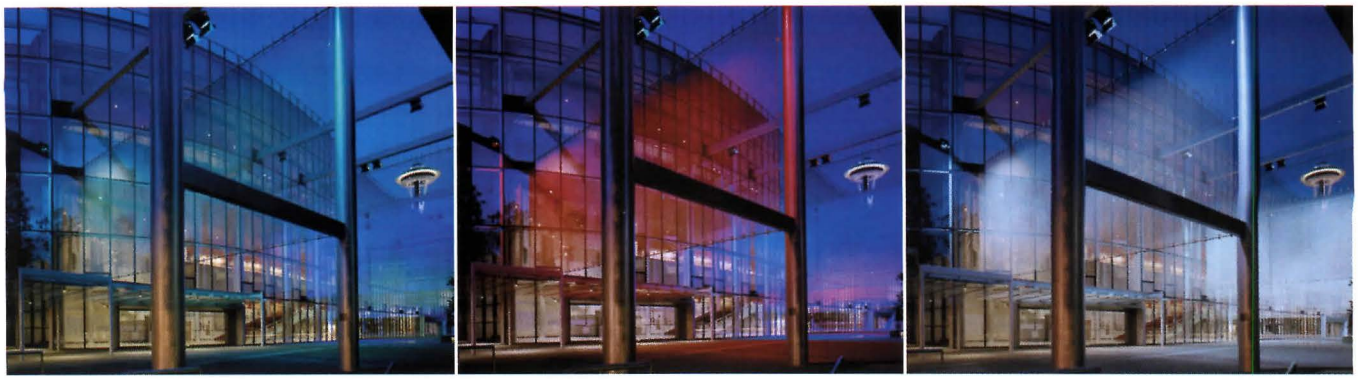


Nine billboard-sized stainless-steel scrims that appear to penetrate the curtain wall hang above the plaza and lobby of the new McCaw Hall, reflecting daylight and nocturnal displays of programmed colored light. The grandly curving glass wall contains heat-sensing mechanical shades and a "chimney" to exhaust warm air.

SYMPHONY OF COLOR, BALLET OF GRAY

LMN Architects | Marion Oliver McCaw Hall | Seattle

by Lawrence W. Cheek

Real Seattleites—mossbacks, we might call ourselves—are natural connoisseurs of the color gray. Gray skies, gray seas, a landscape often revealed through a gray scrim of fog or drizzle: none of it troubles us. We can find beauty in the tonal range of grays and silvers through the nine-month rainy season, and trust summer to burst through with a full complement of color, brief but glorious.

So mossbacks will instinctively dig the design of Marion Oliver McCaw Hall, the city's new home of Seattle Opera and Pacific Northwest Ballet, even if the architects had to shoehorn it into an unwelcoming site and reuse the footprint and entrails of a twice-remodeled auditorium dating back to 1928. Metaphorically, it explores the full Seattle spectrum of grays and silvers throughout an **outdoor-indoor entry procession**, then explodes with progressively deeper and more intense color in the performance hall. Despite the constrictions of site, the building engages the community and its geography more deeply and more theatrically than any other performance space in the city.

"Engaging the community" was a prime objective for Seattle-based LMN Architects, whose team is headed by design partner Mark Reddington. The concept of a concert hall as a temple of high culture, closed to all but the cognoscenti, was overturned. "We wanted to blur the barrier between inside and out, between people who are going to a performance and those who aren't," says Reddington.

McCaw resides at the northern edge of Seattle Center, home of the 1962 World's Fair and, more recently, Frank Gehry's Experience Music Project. But there's little nearby foot traffic, which is unfortunate because passing motorists can't read the building's elegant complexities. Daytime pedestrians who make it a destination are rewarded not only with an intriguing plaza but also with an invitation to wander freely through the grand lobby—unusual public access for any concert hall.

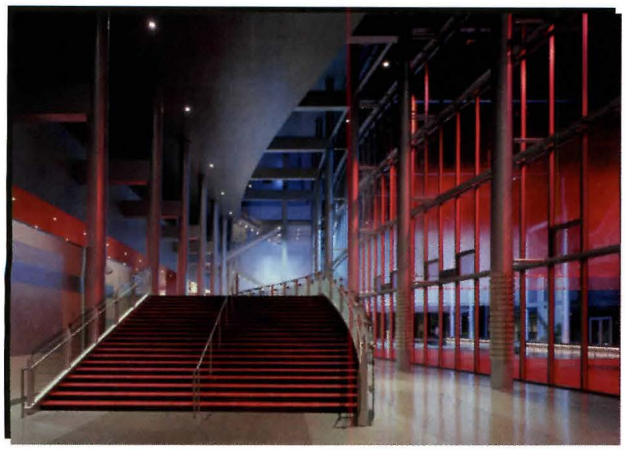
OPTICAL SCRIMS

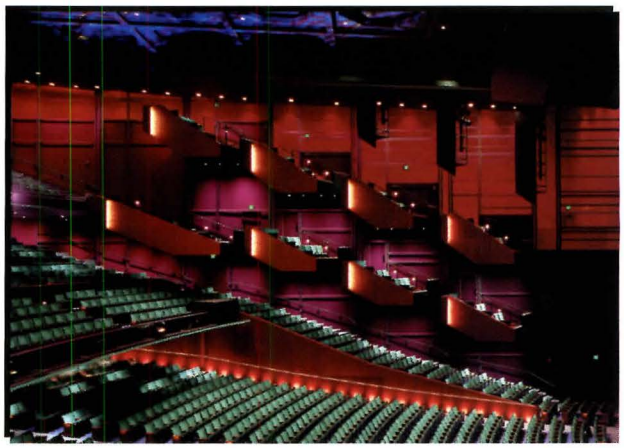
Nine **billboard-sized stainless-steel scrims** drape over the plaza, clipped to cables hanging from metal frames, which serve as filters for daylight and screens for nocturnal light shows designed by New York City lighting designer Leni Schwendinger. Their optical effects change with the weather, sun angle, and location of the observer, but frequently they make the main façade's serpentine window wall appear to dissolve into the sky, as if melting architecture into nature. At night, programmed compositions of lights spray the screens, their colors constantly shifting. A stroll under them can range from charming to eerie, depending on the moment's colors. (The orange is unearthly, the purple is spooky.) The **fountain**—sheets of moving water flowing over a slightly inclined plane of greenish stone—is less effective. Unless there's sun to bounce silvery sparkles off the ripples, it just looks like water on a sidewalk. Passersby, however, sometimes slip off their shoes and splash through it.

The scrims appear to pierce the **curtain wall**, continuing 6 feet into the lobby where they reflect fragments of the light show outside. The lobby itself is a theatrical experience even without colored light, a complex visual counterpoint of planes, grandly scaled curves, and space. Its musical analogy, though, would be foreign to the resident opera and ballet; it looks like the discipline of Bach, not the romantic sprawl of Verdi or Tchaikovsky. There are at least eight different tonalities of gray and silver in the room, a sleek and surprisingly elegant tumult of noncolor.

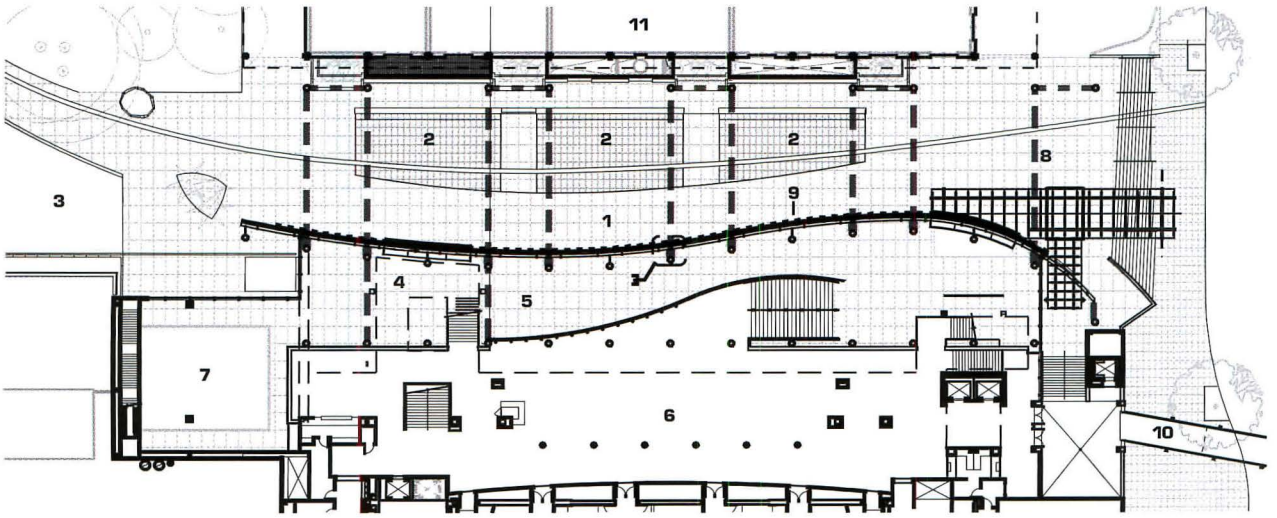
SOLAR CONTROL

The lobby faces a serious adversary through the 65-foot-high, west-facing curtain wall: the sun, which appears fairly reliably in Seattle from July through September. An **automated radiant-sensing system** unfurls **MechoShades** across the full height of the wall when unwanted solar heating begins, and the *space between screen and window* becomes a chimney that exhausts heated air through ceiling vents. The wall itself is a





From the first-floor foyer, a curved staircase directs traffic to the lobby area (left). Inside the renovated and colorful performance hall, the seating scheme was narrowed by about 30 feet, but metal screens were installed to maintain the original acoustic width (right).



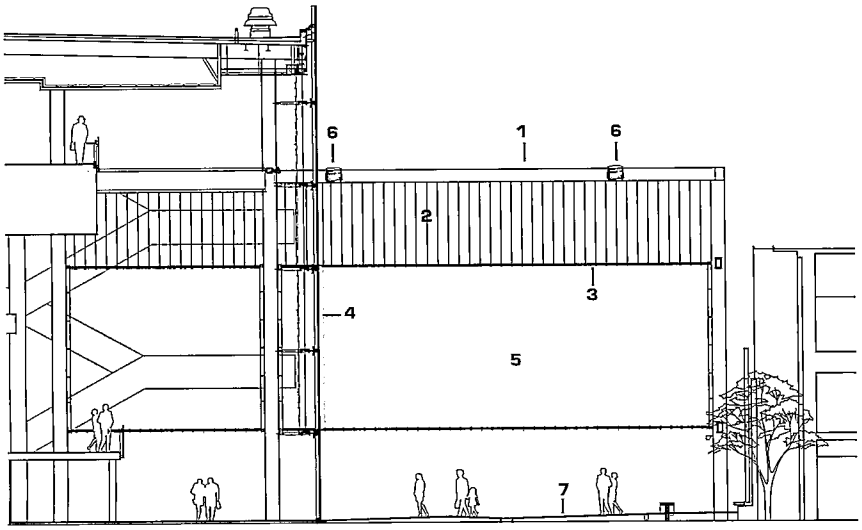
promenade/lobby plan 25'

1 promenade
2 water feature
3 lawn
4 entry
5 foyer
6 lobby
7 café
8 scrim above
9 curtain wall
10 bridge to parking
11 ballet school

unitized system designed to resist seismic and wind loads with **flexible gaskets**; each unit can move independently when it needs to.

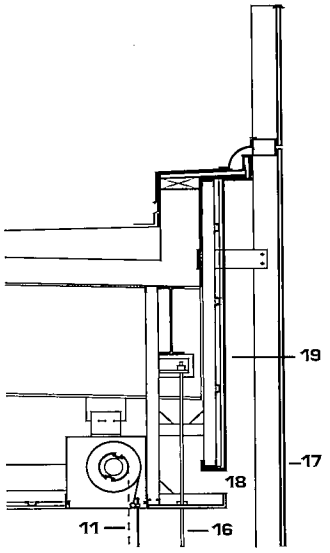
Inside, LMN thoroughly renovated the performance hall, trying to preserve its acoustics—singers said, essentially, don't mess with it—while repairing its inherited deficiencies. The old hall was too wide, leaving corner seats with lousy sight lines. LMN narrowed the seating scheme by 30 feet, visually closing in the sides with **metal screens** that left the acoustic width intact, and restored the lost seating capacity by extending both balconies forward. The 2,900-seat hall now feels surprisingly intimate, though acrophobes should not buy tickets for the highest balcony and box seats.

The steerage-class orchestra pit has been upgraded to first class. Air conditioning in the old pit consisted of fans blowing across buckets of ice. Now **64,000 1/4-inch holes** drilled in the operable pit floor provide a gentle draft of conditioned air from a plenum below fed by flexible ducts. LMN also raised the proscenium height to 35 feet and provided a newly cavernous backstage—

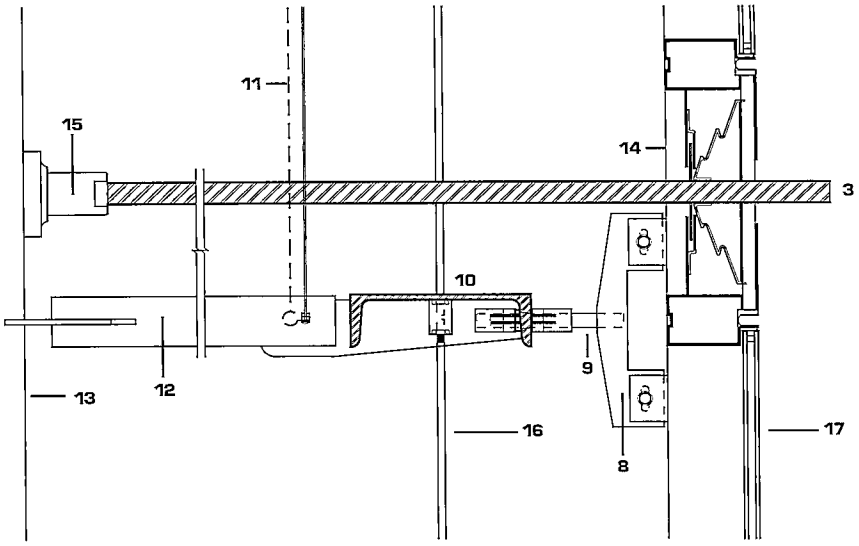


lobby/scrim section —— 10'

1 steel beam
2 stainless-steel support cables
3 stainless-steel scrim cables
4 curtain wall
5 stainless-steel support cables
6 scrim lights
7 water feature
8 cast-metal anchor bracket
9 threaded rod
10 wind girt
11 solar shade
12 strut
13 steel-encased concrete column
14 aluminum enclosure panel
15 cable terminator
16 sag rod
17 double-glazed low-iron glass with low-e coating
18 ventilation opening
19 aluminum panel



section at parapet —— 8"



detail at curtain wall and scrim cable —— 4"

essential for an opera company that made its reputation in the 1970s with a monumental Wagner *Ring Cycle*.

EXPRESSIONLESS FAÇADE

McCaw's one glaring failure is the expressionless **slate-gray steel-panel façade** facing Mercer Street, the one-way arterial that borders Seattle Center on the north. Its industrial mood contrasts starkly with the sleek elegance everywhere else, and its color darkens the pedestrian experience on the street. It would have been terrific to wrap the scrims and light show around this side, but the $127 million bill for the project has provoked controversy as it is, and there's a $15 million shortfall in private and public funding.

But the idea of highbrow art reaching out to engage the community is the right one, and Seattle is the perfect place to set the example. Back in the 1970s, Seattle Opera's flamboyant impresario Glynn Ross expanded the audience with gimmicks such as "Get mixed up with opera" banners on cement trucks. McCaw's aesthetic outreach is a world away from that, but its spirit is the same.

Struts and metal fittings—including a wind girt—connect scrim cables, sag rods, and a solar shade to the curtain wall and steel-clad concrete columns (left). At dusk, the scrims evolve from hues of gray to a lively ballet of color (right).

Marion Oliver McCaw Hall, Seattle, Washington

client | Seattle Center **architect** | LMN Architects, Seattle—Mark Reddington (design partner); Rob Widmeyer (partner-in-charge); Owen Richards, Jr. (project manager); Wendy Pautz (project designer); Peter Locke, Patreese Martin (project architects) **interior designer** | Sussman/Prejza **landscape architect** | Gustafson Guthrie Nichol **lighting designers** | Horton Lees Brogden Lighting Design; Leni Schwendinger Light Projects **engineers** | Magnusson Klemencic Associates (structural); CDi Engineers, with Arup and Keen Engineering (mechanical); Sparling (electrical); AKB Engineers (civil) **consultants** | Jaffe Holden Acoustics, with Michael R. Yantis Associates (acoustics/audio); Schuler & Shook (theater); Robert Israel (design); Syska & Hennessey (vertical transport); Rider Hunt Levett & Bailey (cost); WPA (environmental graphics); Betsy Eby (veneer plaster/metal leaf) **construction manager** | Skanska **general contractor** | Skanska USA Building **sustainable rating** | LEED silver (pending) **area** | 295,000 square feet **cost** | $90 million

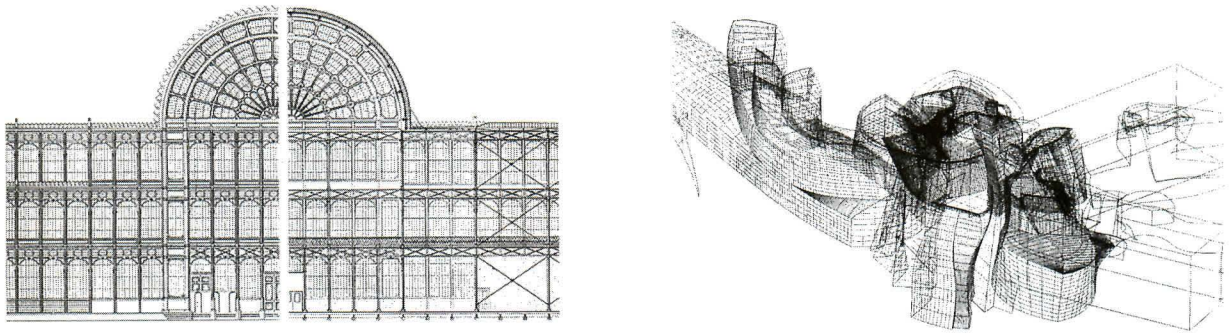
Photographs by Eduard Hueber

Specifications

structural steel | Canron **metal/glass curtain wall** | Walters & Wolf **metal cladding** | Morin **single-ply roofing** | Johns Manville **low-e glass** | Viracon **fire-rated doors** | Interstate Door Sales **acoustical doors** | IAC **aluminum entrance doors** | Kawneer **overhead acoustical and insulated coiling stage door** | Cookson **fabric and acoustical ceilings** | Audio Acoustics **metal coatings** | Tnemec **paint** | Scufmaster **terrazzo** | Bay Decking **wood flooring** | Commercial Floor Distributors **carpet** | Lees Carpet **theater seating** | Irwin Seating **scrim installation** | International Cordage **scrim hardware** | Frontier Technologies **scrim material** | Cascade Coil **operable shades** | MechoShade **signage** | DOTY **MR-16 downlights** | Lucifer Lighting **compact-fluorescent fixtures** | Cooper Lighting **LED PAR lamps** | Boca **LED fixtures** | Belfer Lighting **colored glass-rod fixtures** | Resolute **controls** | Electronic Theater Controls; Lighting Control & Design **audio/video installation** | SPL **theatrical systems** | J.R. Clancy **electrical systems** | D.W. Close **mechanical systems** | MacDonald Miller **carbon dioxide sensors** | Siemens **waterless urinals** | Falcon **elevators/escalators** | Thyssen

We Have Seen the Future, and It Is Pixellated

Branko Kolarevic connects the dots in the timeline of the digital revolution.



A comparison of the drawings of Joseph Paxton's 1851 Crystal Palace (left) and Frank O. Gehry's 1997 Guggenheim Bilbao (right) provides a striking example of the changes computer technologies have brought to the profession.

Joseph Paxton's 1851 Crystal Palace was a bold step forward for its time, embodying the technological spirit of the Industrial Age and heralding a future of steel-and-glass buildings. In 1889, Gustave Eiffel's eponymous tower in Paris manifested the soaring heights that new buildings could reach. It took nearly another century for glass and steel to become ubiquitous worldwide, with gleaming skyscrapers part of every metropolis' skyline.

The first Crystal Palaces and Eiffel Towers of the information age have been built over the past few years. Frank Gehry's Guggenheim Museum in Bilbao (1997) is probably the best-known example, capturing the zeitgeist of the digital-information revolution, whose consequences for the building industry are likely to be on par with those of the industrial revolution: the information age, just like the Industrial Age before it, is challenging how we design, manufacture, and construct buildings.

Admittedly, there is a considerable degree of novelty in the complex, curvilinear forms emerging from **digital design processes**. The strong visual and formal juxtapositions created by the new "blobs" when placed amid traditional "boxes" in urban contexts add to their iconic status, and to the perception of them as being exceptional and marvelous. For many architects trained in the certainties of Euclidean geometry, however, the emergence of curvilinear forms poses considerable difficulties. In the absence of an appropriate aesthetic theory, the blobby forms often seem to be utterly esoteric and spatially difficult to comprehend, and are many times simply dismissed as another architectural fad.

What is overlooked is that these new curvaceous shapes are intrinsically tied to a broader cultural discourse. Rounded contours have been omnipresent in our lives for a good part of the past decade, from toothbrushes and toasters to cars and planes; somehow, perhaps in the absence of a convincing conceptual framework, the curves were widely ignored by the architectural culture until a few years ago, despite numerous precedents ranging from the Baroque to organic modernism. This formal ignoring of wider industrial-design trends also stems from technological inertia: Historically, the building industry has been among the last to change and adopt new technologies, and things were no different in the discovery of the digital; for example, computer-aided three-dimensional interactive application, or **CATIA**, had been in use by the aeronautic industry for 20 years before it was "discovered" by Frank Gehry's office.

FINDING FORM, NOT FASHION

Digital media is increasingly being used not just for representation, but as a tool to generate and manipulate form. In a radical departure from centuries-old traditions and norms of architectural design, digitally generated forms are not "designed" or "drawn" according to the conventional understanding of these terms, but are calculated by a chosen **generative computational method**. Instead of modeling an external form, some designers articulate an internal generative logic, which then produces, in an automatic fashion, a range of formal possibilities that the designer can choose from for further development. The designer essentially becomes an "editor" of the results of the designed system, and the choice of forms is driven largely by the designer's aesthetic sensibilities.

Important to these generative systems is a focus on spatial relations, an idea that emerged from a branch of mathematics called **topology**. According to its mathematical definition, topology is a study of intrinsic properties of geometric forms that are not affected by changes in size or shape, and so remain invariant through continuous elastic deformations, such as stretching or twisting. A circle and an ellipse, for example, or a square and a rectangle, can be considered topologically equivalent, as both circle and square could be deformed by stretching them into an ellipsoid or rectangle, respectively. Topology is ultimately about relations, interconnections within a given

LEFT: COURTESY SPON PRESS

Real Life, Rendered

Lifestyle Virtual Reality
ALPHA VISION
www.alpha-vision.com

To improve your digital presentation techniques, look into Alpha Vision, a Quebec-based motion-graphics company that employs animation and film-production technology (and actors) to sell high-end real estate ventures to potential clients. While intended for developers, the attraction for architects is the ability to have film-effects-quality renderings on hand while a project is in design development.

spatial context, and not about specific forms. What should make topology particularly appealing are not the new forms produced, but the shift of emphasis from physical shape to the structures of relations—interconnections that exist internally and externally within an architectural project.

ROBOTIC CONSTRUCTION

The curvy forms discovered through generative digital systems are now even more appealing because they can be constructed. The new formal universe introduced by digital design has prompted a search for tectonics that, for example, make undulating, sinuous skins buildable. With the appearance of computer numerically controlled (**CNC**) fabrication processes (see May 2003, page 108), forms that until recently were very difficult to conceive, develop, and represent, let alone manufacture, are now attainable.

After components are digitally fabricated, their assembly on site can also be augmented with digital technology. **Digital 3-D models** can be used to precisely determine placement for components, move them into position, and fix them there. This data can even be used to control **construction robots**. In Japan, a number of robotic devices for the moving and fixing of components have been developed in the last few years, such as Shimizu's Mighty Jack for heavy steel-beam positioning, Takenaka's Self-Climbing Inspection Machine, and Shimizu's Insulation Spray Robot.

While at the moment these machines are mainly used for repetitive tasks with little variation, it is conceivable that in the not-so-distant future architects will directly transmit design information to a construction machine that will automatically assemble a complete building. The Shimizu Manufacturing system by Advanced Robotics Technology has actually been applied to a full-scale building project: the steel frame and concrete floor and wall panels for the 20-story Juroku Bank Building in Nagoya, Japan.

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The ability to digitally generate and analyze design information and then use it to directly manufacture and construct buildings fundamentally redefines the relationship between conception and production, providing an information continuum from design to construction. In this scenario—which is being hotly discussed in the architectural software industry under the moniker building-information modeling, or **BIM** (see July 2003, page 79)—a digital model is the single source of design and production information, generated and managed by the designer to encode all information needed to manufacture and construct the building.

A MODEL FUTURE

This model of a digitally facilitated collaborative continuum from design to construction, while opening up unprecedented opportunities for the building industry, faces a number of challenges. The principal obstacles stem from long-established **social and legal practices** in the industry, whose highly differentiated structure facilitates a clear definition of responsibilities, but prohibits the emergence of new synergies.

The sharing of digital data among various parties in the building process is, in fact, discouraged by the current legal codes of practice. Under the current definitions of professional liability, if an architect transmits a digital model or drawing to a contractor or fabricator, he or she becomes liable for any work resulting from the given data. The consequence is that each participating party in design and construction creates its digital work from scratch—that is, from paper documents reproduced from the previously digitally generated information. Needless to say, this process is not only highly redundant and utterly inefficient, but it also compounds any errors that could occur in interpreting the information exchanged on paper.

While uniting all the participants through a single modeling system does hold the promise of a remedy for present inefficiencies, it makes the responsibilities of different parties far less distinct than is presently the case. If the building industry were to adopt this new modus operandi of shared responsibilities, it would need to clearly assess the legal repercussions and embark on a fundamental redefinition of relationships among various parties in the building industry, with the help of legal and insurance experts.

As constructability becomes a direct function of computability, the question is no longer whether a particular form is buildable, but what new instruments of practice are needed to take advantage of the opportunities opened up by digital modes of production.

Branko Kolarevic is associate professor of architecture at the University of Pennsylvania. This article was adapted from his forthcoming book, *Architecture in the Digital Age: Design and Manufacturing* (Spon Press, 2003).

A MATERIAL FOR ALL AGES

Lederer + Ragnarsdóttir + Oei | Schoolhouse and Sports Hall | Ostfildern, Germany

by Julia Mandell

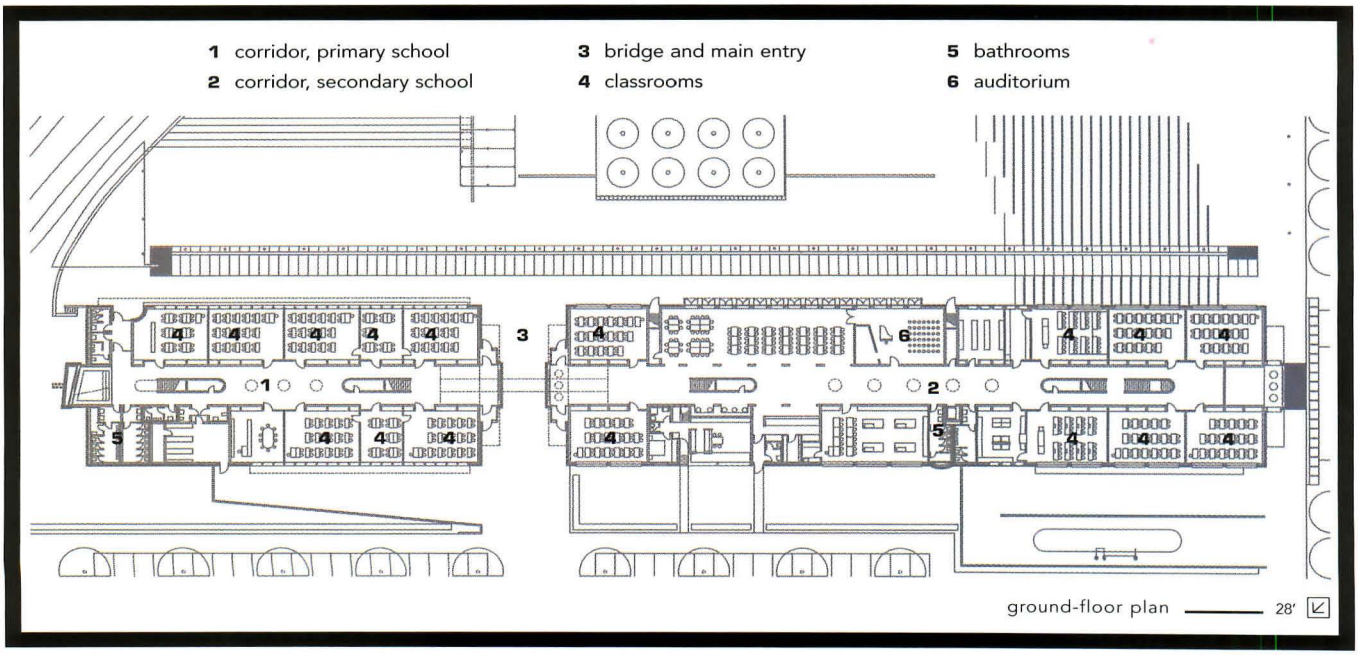
The brick courses on the face of the Scharnhauser Park Primary School (above) elegantly emphasize the horizontality of the façade design while adding texture and detail.

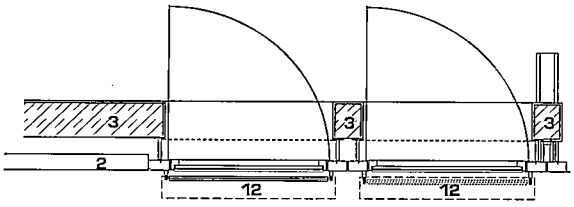
"We wanted a material that would age well, that would be robust," says Stuttgart-based architect Arno Lederer of Lederer + Ragnarsdóttir + Oei (LRO) in discussing his choice of brick for a schoolhouse and sports hall at Scharnhauser Park in Ostfildern, Germany. A three-part project for a new town of converted American army barracks on the outskirts of Stuttgart, the final portion—the primary school—was completed in 2002, three years after the gymnasium and the secondary school. All three buildings have extensive brickwork for durability and texture, including brick interior and exterior walls.

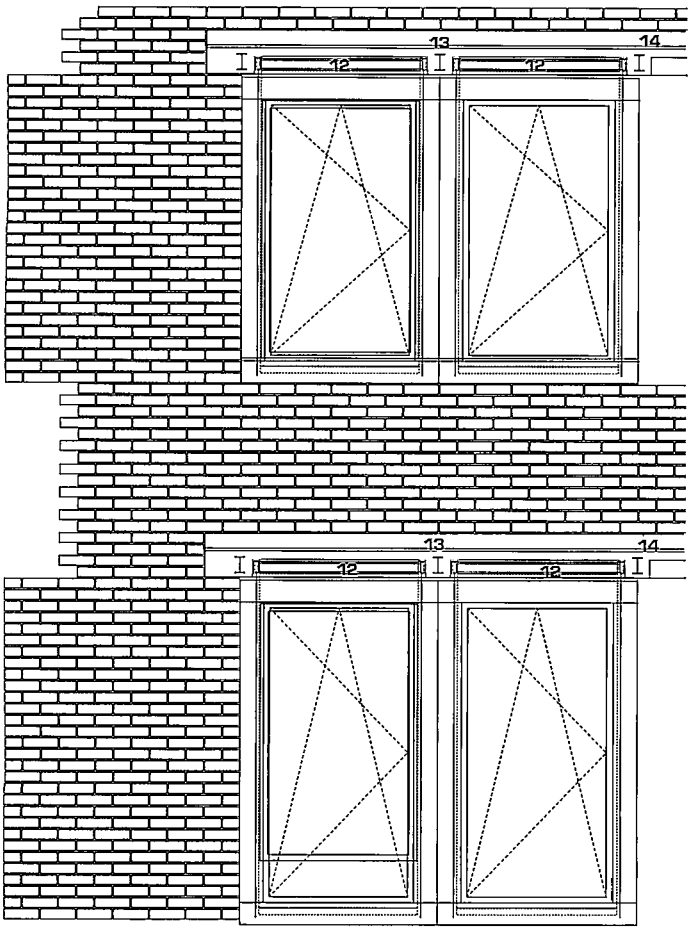
Using brick in modern wall construction has raised issues about authenticity since the advent of steel-beam construction at the turn of the last century, but Lederer sees no conflict in pairing a brick shell with insulation and utilities. "All modern cladding materials are only used to make sure the insulation is not damaged," he explains. "Brick in modern wall construction serves the same function but is stronger than steel or aluminum and ages well."

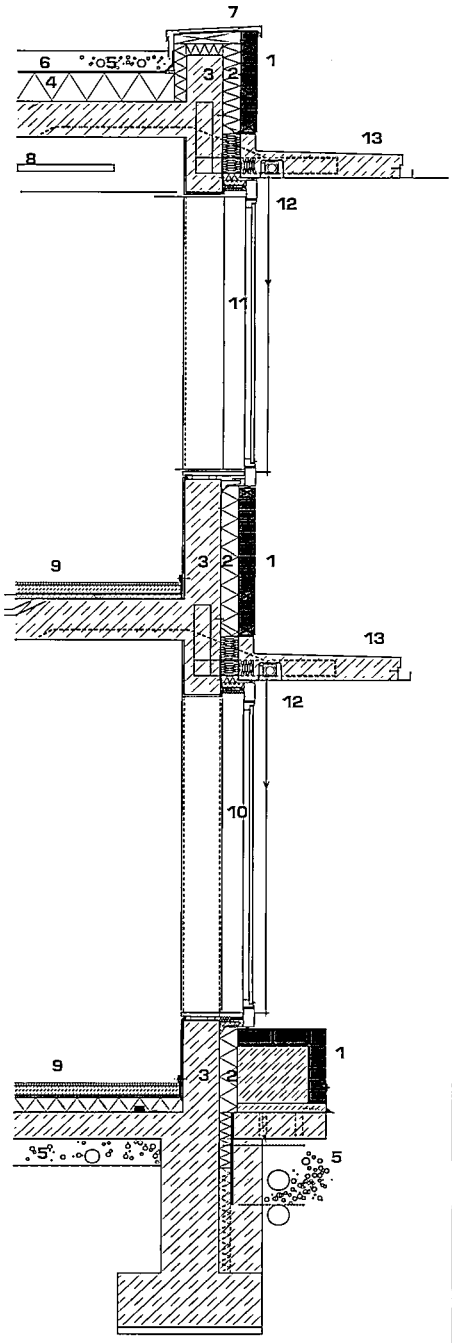
Because of budget concerns, an inexpensive, local brick baked in a rough-edged mold was chosen for the project. Interested in the material's rough texture, the architects emphasized its irregularity by employing a mortaring technique used in 1950s and 1960s churches designed by the influential Swedish architect Sigurd Lewerentz: Excess mortar is smoothed down rather than scraped off, covering the edges of the brick. The result is bold and simple, like a child's drawing.

By using brick inside and out, LRO wanted to create the effect of an internal street, as well as ensure a durable interior. "Since we are housing kids from grades one through nine in the schoolhouse," explains Lederer, "we wanted to ensure that the building would hold up under their use." LRO's exploration of long-lasting materials works well in Ostfildern, but it has farther-reaching implications than just protecting school buildings from energetic playground kicks. "We live in a culture that only thinks positively about youth, not about getting old," says Lederer. "More and more things are falling apart and we need to think about building structures that will last—it is a way in which modernism failed."



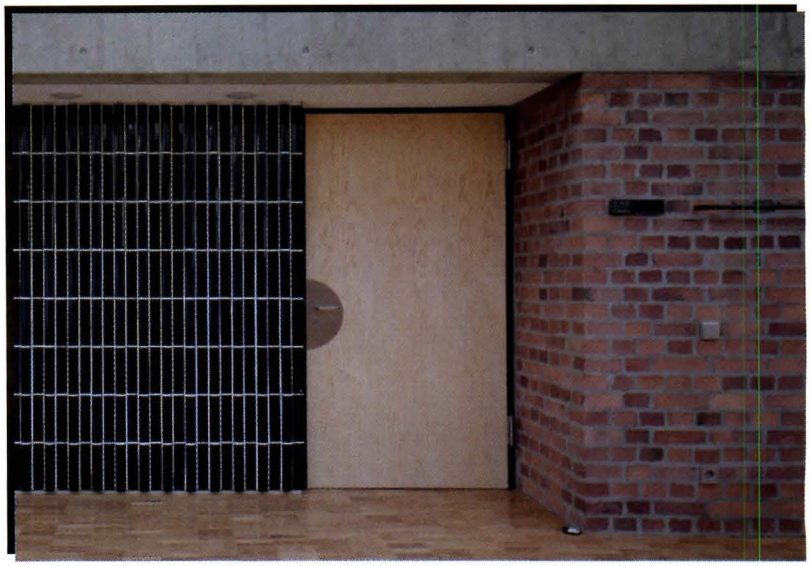






1 frost-resistant brick
2 waterproof insulation
3 reinforced concrete
4 ballasted modified-bitumen roof
5 gravel
6 herbal plantings, topsoil, roof protective layer, and root barrier.
7 titanium cap
8 acoustical ash ceiling slats
9 oak parquet on concrete
10 1.1 kilowatt glass
11 sound-proof glass
12 motorized sun-shade
13 poured-concrete window overhang
14 stainless steel I-beam

primary school façade plan, elevation and section detail ——— 6"

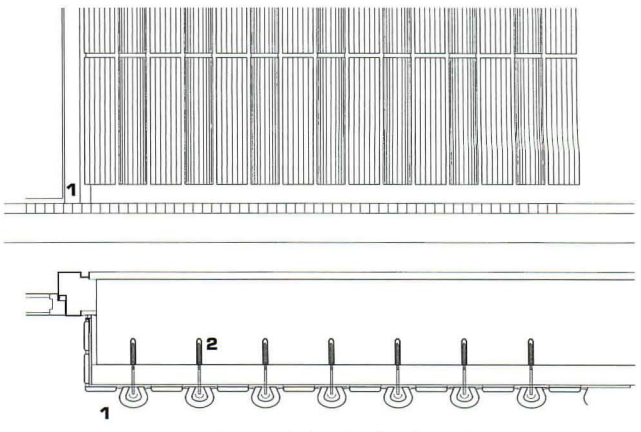


Schoolhouse and Sports Hall at Scharnhauser Park, Ostfildern, Germany
client | SEG Siedlungs **architect** | Lederer + Ragnarsdóttir + Oei, Stuttgart, Germany—Arno Lederer, Jórunn Ragnarsdóttir, Marc Oei (principals); Judith Haas, Alexander Mayer-Steudte, Eva Caspar (project managers); Conny Hund, Ulrike Hautau, Marco Garcia-Barth, Pia Elser, Volker Hahn, Markus Horn, Kim Betten, Tanja Pfahler, Annette Strauss, Daniel Trepte, Eva Wanner (project team) **engineers** | IB Müller & Müller (structural, civil); IG Wetzstein (M/E/P) **consultants** | IB Schäcke + Bayer (construction) **area** | 61,000 square feet **cost** | $25 million

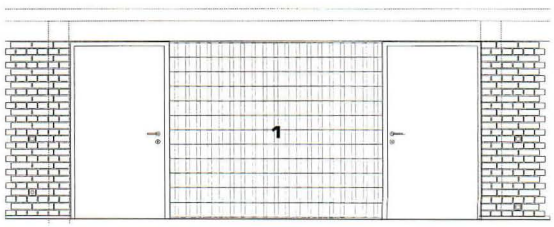
photographs by Roland Halbe

Specifications
concrete and masonry | Rommel **metal/glass curtain wall, glass and metal doors** | Guttendörfer **wood doors** | Eckstein **ceiling systems** | Single; Frickenhausen **cabinetwork and custom woodwork** | Hanselmann **flooring** | Beil; Albstadt-Ebingen **stone** | J. Kapsheck; Bourbon Tile & Marble **ceiling systems** | USG Interiors **furnishings** | VS Vereinigte Spezialmöbelfabriken **interior ambient lighting** | Louis Poulsen

Closer to the classrooms, the use of brick (left) recedes and material choices become progressively warmer, inviting touch. Next to maple classroom doors, for example, LRO introduced a smooth semicircular blue tile that shimmers, changing in tone with the light (above, below). The Finnish-made tile, which was originally manufactured not for decorative use but to protect wiring, was used by Alvar Aalto in the interiors of the Nordic House (1971) in Reykjavik, Iceland. LRO bought the last batch for the Ostfildern school, where they anchored the tiles to concrete walls with threaded rods.



section and detail of Aalto titles ——— 5 1/2″



1 Aalto titles **2** threaded anchors

elevation of Aalto titles ——— 35″

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windows: the pleasure and the pane

product: **Child Guard Lock**
manufacturer: **Thermo Roll Window Corporation**

Thermo Roll has introduced a patented child-guard lock that provides a "concealed-from-view" alternative to child-guard bars for dual-action tilt-and-turn windows. The special locking system disables the "swing-in" operation of such windows, and requires a key to disengage the lock and permit the tilt-and-turn action to resume for cleaning purposes. When combined with a 4-inch limiting stop, it meets requirements set by such agencies as the Window Guard Policy and Acceptance Board in New York City. The lock can be installed on new tilt-and-turn windows or as a retrofit upgrade for existing window units.

product: **Activ Self-Cleaning Glass**
manufacturer: **Pilkington Building Products North America**
website: **pilkington.com/northamerica**

This self-cleaning glass uses ultraviolet energy from the sun. A photocatalytic process breaks down and dissolves dirt and debris, and a hydrophilic action causes rain to sheet on the panes, washing away grime with minimal spotting and streaking. Natural precipitation or a quick wash-down with a hose keeps the windows clean.

product: **WinGuard Impact-Resistant Windows**
manufacturer: **PGT Industries**
website: **pgtindustries.com**

This impact-resistant window line now includes energy-efficient vinyl frames that address wasteful heating and air-conditioning loss. The frame depth is 3 inches, and it is made of heavy-duty, multichambered 100-percent vinyl. The window system includes impact-resistant laminated glass with an air space and a third piece of glass for insulation. The frames are available in white or almond.

product: **IQ Heating Glass**
manufacturer: **Glass Consult**
website: **iqglas.com**

Long a staple in Europe, this energy-efficient heating glass is finally available in the United States. The window system employs radiant heat and a double-pane structure to eliminate condensation. This glazing reduces dust circulation and can become opaque with the flip of a switch. Cables and wires are concealed within the frame.

product: **Casemaster**
manufacturer: **Marvin Windows**
website: **marvin.com**

Marvin's Casemaster line has a dozen new features, including a screen with a wood surround that blends into the window profile and can be painted or stained. The standard crank handle has been replaced with an ergonomically designed folding handle that comes in a satin taupe finish.

FOR INFORMATION ON WINDOWS AND GLAZING, CIRCLE 149 ON PAGE 113.

cover-up: sealants and coatings

product: IAQ 6100
manufacturer: Fiberlock Technologies
website: www.fiberlock.com
These days, it's all about mold—preventing it, that is. This antimicrobial sealant offers mold protection, but allows materials—stone, wood, concrete—to retain a natural look. Unlike similar products on the market, this sealant is transparent, though it goes on white for easy application inspection. The formula, which contains an EPA-registered fungicide, can be sprayed on, and is permeable enough to allow water and vapor to pass through, further decreasing the likelihood of mold growth.

product: UltraCrete
manufacturer: Sherwin-Williams
website: www.sherwin-williams.com
This "solvent-borne" texture coating prevents construction delays caused by poor weather or surface conditions on fresh concrete. The spray-on product—which provides resistance to UV damage and efflorescence for tilt-up, precast, and poured-in-place concrete—can be applied to concrete that is damp or has minor surface dirt, and at temperatures as low as 20 degrees Fahrenheit. It also offers a clean finish and can be tinted on site.

product: NeoCAR, UCAR
manufacturer: Dow Chemical
website: www.dow.com
A series of latex products from Dow can be formulated into an array of coatings for different needs. If moisture is a problem, NeoCAR acrylic latex 820 can be mixed to produce a variety of water-resistant coatings, from clear sealers to pigmented systems. For heavy wear and tear, UCAR acrylic latex 627 provides industrial-strength stain resistance and grain-crack resistance to primer systems. And for an alternative to all-acrylic, NeoCAR latex 2535 lends wet adhesion, grain-crack and alkali resistance, and good film build to general-purpose exterior coatings.

product: Pure Performance
manufacturer: PPG Architectural Finishes
website: www.pittsburghpaints.com
This line of paints goes a step beyond the ordinary: In addition to commonly expected characteristics such as washability, good adhesion, and low spatter, these finishes come in an array of over 1,890 colors and offer a range of environmentally friendly advantages. With minimal odor during painting and drying, zero volatile organic compounds (VOCs), and mildew resistance, Pure Performance holds the Class A certification for meeting environmental standards from Green Seal, an independent nonprofit organization that rates environmental attributes of building products.

FOR INFORMATION ON COATINGS, CIRCLE 150 ON PAGE 113.

Understanding the Environmental Impacts of Vinyl Building Materials

American Plastics Council

Delivering the best balance of aesthetics, function and low environmental impact requires the architect to step beyond the intuitive. True "green" success demands a disciplined, objective approach to materials evaluation and selection.

When specifying building materials intended to yield an environmentally friendly structure, the natural tendency is to select natural materials. Intuitive choices, though, often lead to selections that are not as beneficial as those based on scientific evaluations of environmental impact over the life of the building.

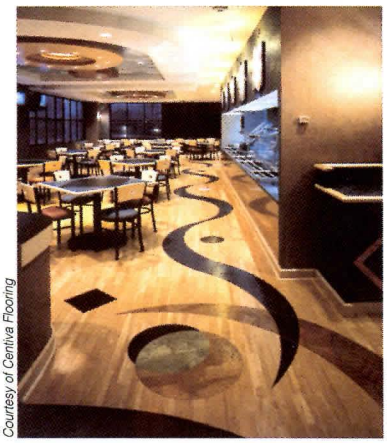
For instance, if you were asked to select the best floor covering material for a project where environmental performance was as important as economic performance (a 50/50 weighting), would you choose:

- ceramic tile made with recycled glass,
- terrazzo,
- natural cork floating plank,
- wool broadloom with low-VOC glue,
- linoleum, or
- vinyl composition tile?

The scientific choice, based on a detailed life-cycle analysis of these six floor coverings, computed with publicly available BEES 3.0c software developed by the National Institute of Standards and Technology (NIST), may surprise you.

The floor covering with the best overall performance is vinyl composition tile (VCT), yielding a composite BEES score of 5.6, compared to scores ranging from 8.6 for ceramic tile with glass to 35.5 for linoleum. (Lower scores are better.)

In setting up the comparison, environmental impacts were set to the U.S.



Courtesy of Centiva Flooring

Environmental Protection Agency's weighting scale, environmental and economic impact weighted equally, and all transportation distances the same.

While the attractive overall performance of vinyl composition tile may seem counter-intuitive, it becomes less so when all of the economic and performance characteristics inherent in vinyl building products are understood.

Creating Vinyl

Vinyl is derived from two primary ingredients: petroleum and salt. Petroleum (or natural gas) is put through a refining process called cracking, which produces ethylene. Ethylene, combined with chlorine from salt, produces ethylene dichloride. Another cracking process transforms ethylene dichloride into vinyl chloride monomer (VCM).

Finally, through polymerization, the vinyl chloride monomer is converted into a fine, white powder — vinyl resin. The resin, combined with various additives, yields polyvinyl chloride compound with specific aesthetic and performance characteristics.

Additives Make the Difference

Modifiers, pigments, plasticizers, and stabilizers determine the color, flexibility, UV resistance and numerous other attributes for each vinyl product.

Vinyl can be made rigid and impact resistant enough for pipe or siding, or thin and flexible enough for wallcovering and upholstery.

Learning Objectives

This article covers the key environmental impacts of vinyl building products, and the affect of life-cycle analysis on product selection.

Key points include:

> Identification of the types of vinyl building products available as well as their recycling potential

> Descriptions of how life-cycle assessment can affect vinyl product specification and selection

> Discussion of the impact of various vinyl products on building energy efficiency and resource utilization

> Listings of the energy efficiency characteristics of vinyl roofing membranes, glass-door profiles and vinyl windows.

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To take the quiz and earn 1 AIA/CES Learning Unit (LU) of health, safety, and welfare, go to www.architecturemag.com, click on "Continuing Ed," and proceed to "Understanding the Environmental Impacts of Vinyl Building Materials." or turn to page 100. You must answer 70% of the questions correctly to receive credit for this course. This course also requires online reading in addition to the following article. See page 100 for details.

It can also be made weather and heat resistant for outdoor uses such as fencing and decking, or made to match virtually any design color, for interior applications like flooring.

Recycling Vinyl

If local facilities are available, virtually all vinyl building materials have the potential to be recycled, because vinyl reclaim can be used in nearly all industrial and building product applications. Recycling facilities across the U.S. accept vinyl waste from both post-industrial sources (scrap generated during manufacture) and post-consumer sources (waste generated during installation or at the end of a product's useful life). For a list of vinyl recyclers, visit *www.vinylbydesign.com*.

Recyclers that handle vinyl convey the vinyl reclaim to manufacturers that use the scrap to make a host of different products. For example, some vinyl carpet-backing systems are made of 100% recycled materials, while vinyl roofing membranes find their way into such second-generation products as speed bumps, parking curbs, and asphalt patching material.

Several major vinyl window extruders not only recycle their own in-house mold overflow, but also accept — and in some cases, buy back — the cut-offs from window fabricators to recycle back into new vinyl windows and vinyl-profile glass doors. Vinyl window reclaim is also highly valued for use in other rigid vinyl applications like vinyl fencing.

The net result is that resource utilization in vinyl product manufacture is particularly efficient, with only about 1% of all vinyl compound ending up as manufacturing waste, and 99% as product.

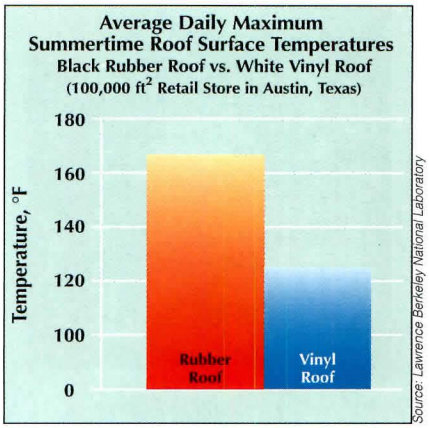
Finally, some vinyl products, like PVC pipe and fittings, have such long useful lives that very little of the material is currently available for recycling.

On occasions when recycling is not economical, the vinyl transported to landfill can be trusted to remain inert under normal landfill conditions. In fact, vinyl is often specified as the material of choice for landfill liners, based on its long-term stability.

Roofing and Heat-Island Effect

Recently, one environmental aspect of the built environment has received increasing attention: creation of the urban heat-island effect. While net heat-island effect is a product of many variables, a recent study has shown roof reflectiveness to be one of the most important.

The theory is simple: A light-colored, reflective roof absorbs much less radiant energy than a conventional dark-colored roof. Reducing the roof's solar-energy absorption lowers the roof's surface temperature, thereby decreasing heat island effect.



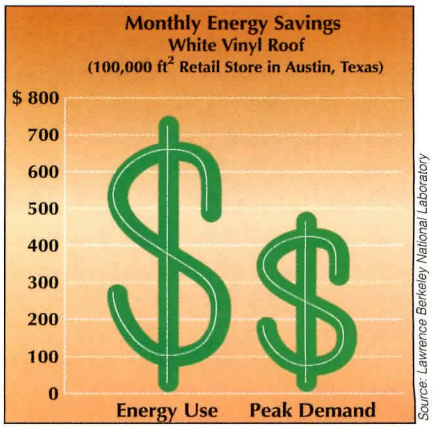
But there are other benefits: lower roof temperatures can lead to reduced greenhouse gas emissions, as well as decreased heat transfer rate through the roof. Lowering the heat transfer rate, in turn, cuts the building's thermal load, directly reducing air-conditioning energy consumption.

The magnitude of energy savings depends upon building type, level of roof insulation, ventilation rate between roof and ceiling, HVAC size and efficiency, and of course, roof solar reflectance.

One recent study, sponsored by the U.S. EPA and U.S. Department of Energy (DOE), and conducted by the Heat Island Group at the Lawrence Berkeley National Laboratory, analyzed summertime air-conditioning energy savings and power-demand reduction of a 100,000-ft² retail store in Austin, Texas, comparing a cost-competitive white reflective vinyl roof membrane with a typical black rubber roof.

The building was monitored with its original black roof from August 1999 to April 2000. In April and May 2000, this roof was replaced with a white vinyl membrane. The research staff continued to monitor the building with its new white roof from late May through September 2000.

HVAC energy use, total building energy use, temperatures at a variety of locations (including the roof surface, the bottom of the roof, the plenum between the roof and the ceiling, and the conditioned space), as well as climate parameters (ambient temperatures, wind speed and direction, and solar intensity) were measured at fifteen minute intervals.



The Bottom Line

The average daily maximum roof-surface temperature for the black roof was 168°F (76°C). For the white roof, it dropped to 126°F (52°C). Similarly, the maximum plenum temperature averaged 101°F (38°C) with the rubber roof, but only 95°F (35°C) with the vinyl roof.

The average daily HVAC energy consumption dropped 355 kilowatt-hours with the reflective vinyl roof (11% of total HVAC energy use — a savings of about $750/month). Summer peak power demand was reduced by 35 kilowatts, a 14% savings, which translates to cost savings of about $490/month.

Study scientists estimated that installation of the cool roof reduced building energy consumption by 60 megawatt-hours per year, yielding a total annual energy and peak-demand

savings of about $7,200. The total discounted savings over the expected life of the roof were estimated to range from $60,000 to $70,000.

For more details, see Konopacki, S. and H. Akbari. 2001. "Measured Energy Savings and Demand Reduction from a Reflective Roof Membrane on a Large Retail Store in Austin," Lawrence Berkeley National Laboratory Report LBNL-47149, Berkeley, CA.

The Case for Roof Aesthetics

While the Lawrence Berkeley National Laboratory study has established vinyl roofing membranes' ability to reduce heat island effect and building energy consumption, practical experience has also shown that vinyl roofing membranes can offer aesthetic and mechanical advantages.

The membranes are available in custom colors that can be specified to match other building materials, such as aluminum, without requiring the use of maintenance-inducing paint.

Vinyl also bonds well to metal flashing, which allows minimal downturn on the flashing at the exterior walls. The joint, when heat-welded and mechanically fastened, typically remains trouble-free throughout the life of the vinyl membrane roof — often 35 years or more.

Vinyl Windows More Versatile, Too

Major advances in aesthetics and application versatility have recently led to increasing application of vinyl windows in commercial buildings, as well as in high-end residential and multi-family construction. With the advent of vinyl windows with curved profiles and a variety of other shapes, the architect can now specify matching vinyl windows throughout a structure, with few design-limiting geometry constraints.

At the same time, vinyl windows can now be supplied in multiple colors, and at least one manufacturer offers a coating process that uses thermally reflective pigments that have solar reflectance nearly equal to that of white, even when furnished in dark shades. Windows can also be specified with exterior surfaces of one color, and interior surfaces of another.

Regardless of design geometry or color, vinyl windows require virtually no maintenance throughout their useful lives.

A Clear Path to Energy Savings

From the environmental standpoint, vinyl windows save energy both during their use and manufacture.

In the use phase, many factors impact overall energy efficiency, but the most common performance measurement is U-factor— the rate of heat flow through a given material. Vinyl's U-factor compares favorably with alternative window and door framing materials.

The typical U-factor of double-glazed vinyl windows with low-solar-gain, low-E, argon-gas-filled glass, is 0.32 BTU/hr-ft^2-°F. The U-factor of equivalent wood windows is also 0.32, while the U-factor for aluminum without thermal break is 0.60 BTU/hr-ft^2-°F.

Moreover, vinyl windows require only about one-third as much energy to manufacture as aluminum windows, saving nearly two trillion BTUs of energy per year, compared to alternate materials.

For the most energy-efficient windows and glass doors, the architect should specify products with National Fenestration Rating Council (NFRC) or the US EPA's and US DOE's ENERGY STAR® labels. Many vinyl window and glass door products have met the energy efficiency standards of these two organizations. The NFRC and ENERGY STAR labeling systems provide an accurate and practical way to measure and compare the energy efficiency of different windows, doors and skylights.

Courtesy of Certainteed

Vinyl Outdoor "Lumber"

Vinyl fence, decking and railings, along with vinyl-and-wood composites, save hours of annual maintenance labor, and require no paints, stains or harsh cleaning chemicals. Since they last longer than many other outdoor building products, and can generally be recycled at the end of their useful lives, they also reduce the amount of energy and other resources needed for replacements.

Summary

Architects who want to create structures that tread lightly on the environment — while meeting the owner's aesthetic, functional and fiscal expectations —can satisfy that desire best by applying life-cycle assessment principles.

Clearly, vinyl building materials, though synthetic, can offer much greater long-term environmental benefits than many of their apparently *"natural" counterparts, and so,* offer a prudent choice for many applications.

Courtesy of Certainteed

The quiz below includes questions derived from the online material not included in this printed article. You are required to read the additional online material in order to take the quiz and complete this continuing education unit. Please go to www.architecturemag.com, click on "Continuing Ed" and proceed to "Understanding the Environmental Impacts of Vinyl Building Materials."

TEST QUESTIONS

1. Vinyl is derived from two primary ingredients. They are:
a. Petroleum and vinylidine
b. Natural gas and coal tar
c. Petroleum and salt
d. Carbon tetrachloride and pre-vinyl monomer

2. In the BEES lifecycle analysis of six floor covering alternatives, the one with the best overall score was:
a. Linoleum
b. Natural cork plank
c. Terrazzo
d. Vinyl composition tile

3. When vinyl chloride monomer is polymerized, the result is:
a. Vinyl resin, a fine, white powder
b. Vinyl pre-polymer, a light tan emulsion
c. Ethylene dichloride, a clear liquid
d. Vitreous vinyl, a thick yellow paste

4. The Austin study, comparing a white vinyl roof with a traditional black rubber roof, found average daily maximum roof surface temperatures to be:
a. Vinyl—201°F; Rubber—105°F
b. Vinyl—126°F; Rubber—168°F
c. Vinyl—116°F; Rubber—142°F
d. Vinyl—195°F; Rubber—101°F

5. During manufacture of vinyl building materials, the percentage of vinyl compound that ends up as product is:
a. Almost 42%
b. Just over 78%
c. Nearly 87%
d. About 99%

6. Vinyl window scrap can be recycled back into:
a. Vinyl windows
b. Vinyl profile glass doors
c. Vinyl fencing
d. All of the above

7. In the Austin roofing study, average HVAC energy and cost savings for the white vinyl membrane roof were:
a. 5% of HVAC energy consumption ($425/month)
b. 17% of HVAC energy consumption ($975/month
c. 11% of HVAC energy consumption ($750/month)
d. 9% of HVAC energy consumption ($1215/month)

8. The urban heat-island effect can be ameliorated at least in part by:
a. Specifying a light colored, reflective roof material
b. Installing an extra layer of asphalt in a built-up roof
c. Both a. and b.
d. Neither a. nor b.

9. Comparing energy consumption during the manufacture of vinyl windows and aluminum windows, vinyl windows require:
a. Nearly twice as much
b. About one-third as much
c. Approximately 20% more
d. Just over one-half as much

10. Vinyl outdoor building materials, like deck, railing and fencing, require:
a. Annual resurfacing and painting
b. Only bi-annual power washing and paint touch-up
c. Re-staining and sealing every few years
d. Virtually no maintenance

Understanding the Environmental Impacts of Vinyl Building Materials

Successful completion of this test (a score of 70% or higher) will earn 1 AIA/CES health, safety and welfare LU hour.

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Go to *www.architecturemag.com* and click on "Continuing Ed" to download a PDF of this unit, or mark your answers to the test questions at right, then mail or fax this completed form to:

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test>									
1.	a	b	c	d	**6.**	a	b	c	d
2.	a	b	c	d	**7.**	a	b	c	d
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4.	a	b	c	d	**9.**	a	b	c	d
5.	a	b	c	d	**10.**	a	b	c	d

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PAVILION

***Solos: SmartWrap* | Cooper-Hewitt, National Design Museum | New York City | Through October 10** SmartWrap, an outdoor pavilion designed by Philadelphia firm KieranTimberlake Associates, is the first piece in the Cooper-Hewitt's Solos Series, a succession of projects to be displayed at the museum under the vaguely defined curatorial mission of presenting "emerging developments in architecture and design." The trade-show-booth like structure displays a new polymer film developed by Stephen Kieran and James Timberlake in collaboration with DuPont. Currently still in the conceptual phase, the film will be printed with molecular technologies that give it interactive insulating properties and solar-powered luminescence. The pavilion, however, is little more than a wood-frame box draped in colored plastic. While portions of the drapery contain the actual technologies, the rest is only decorated with representative patterns, making it difficult to get a sense of the material's possibilities. By focusing on surface, the designers seem to have forgotten about substance. **Julia Mandell**

PAVILION

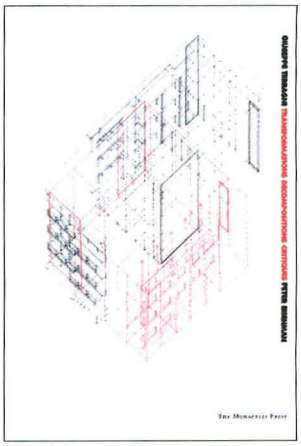
***Skyspace* | James Turrell | Henry Art Gallery | Seattle** James Turrell, an artist whose medium is light, has had a long connection with Seattle, a city known for its shortage of sun. This summer saw the inauguration of a major permanent Turrell installation there, a $1.4 million "skyspace" built in a small courtyard at the Henry Art Gallery, the art museum of the University of Washington. Designed in collaboration with Bruce Donnally of local firm Donnally Architects, the skyspace is a 20-foot by 28-foot oval pavilion set atop two concrete pillars, its roof pierced by a large elliptical oculus with a cast-fiberglass knife-edge profile. Viewers inside the space see the sky as a depthless surface brought down to the level of the ceiling, like a real-life backdrop to a Renaissance fresco. This being Seattle, the skyspace comes with a retractable roof, a neat feat of engineering that swings on two pairs of arms to close off the oculus. Lit from beneath, the ceiling becomes suffused with a deep blue field of light. The skyspace's exterior, a field of full-spectrum LEDs set underneath 17-foot-tall, 18-inch-wide strips of glazing, performs a meditatively paced light-show. The artwork is already popular with campus denizens: Henry director Richard Andrews, who spearheaded the project, reports eavesdropping on passersby while fine-tuning the light systems with Turrell. Recently, a mountain biker stopped, stared for a minute, then exclaimed to anyone within earshot, "Architecture rules, man!" **Eric Fredericksen**

LEFT: FEATURE PHOTO SERVICE; RIGHT: LARA SWIMMER

views

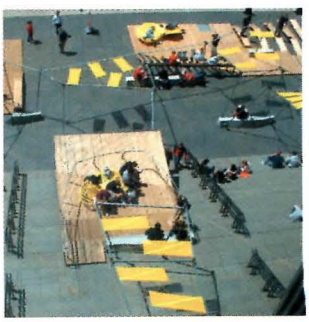
BOOK

***Giuseppe Terragni: Transformations, Decompositions, Critiques* | Peter Eisenman | Monacelli Press** Eisenman's "textual readings" of two works—Casa del Fascio (1933-1936) and Casa Giuliani-Frigerio (1939-1940), both by Italian rationalist Giuseppe Terragni—is an extraordinary document, if near-obsessive in detail. Four decades in the making, the book is no easy read; brave souls should set aside lots of time and mental energy. The payoff, however, is the book's collection of 350 two-color plans and elevations, all based on original drawings and blueprints found in Terragni's former office in Como by the author in the early 1960s, when he traveled to Italy on a fellowship. **Abby Bussel**



PAVILION

***Garofalo Architects: Between the Museum and the City* | Museum of Contemporary Art | Chicago | Through October 14** Exasperated, no doubt, by the notoriously morose countenance of its Josef Paul Kleihues-designed building, Chicago's Museum of Contemporary Art (MCA) has launched the first in a series of summertime architectural installations intended to cheer up its concrete-and-granite entrance plaza and lure in tourists from nearby Michigan Avenue. MCA chief curator Elizabeth Smith tapped hometown architecture wunderkind Doug Garofalo to produce the debut design, a trellis of steel struts that climbs, insectlike, up the plaza's monumental staircase toward the museum's second-floor main entrance. Yellow vinyl fabric stretches between the struts, which are anchored to concrete blocks cast in three different angled forms. Wooden platforms on the plaza and stairs fold upward in places to create seating; bundles of plastic tubing scattered across the wooden platforms provide additional seats. According to Garofalo, because the installation has no dedicated purpose, "Not everyone 'gets' what we tried to accomplish with this commission." Given the severity of the starting point, it's enough that he has provided an interesting place to sit. **Ned Cramer**



TOP: COURTESY MONACELLI PRESS; BOTTOM LEFT: COURTESY MUSEUM OF CONTEMPORARY ART, CHICAGO; BOTTOM RIGHT: COURTESY GAROFALO ARCHITECTS

EDUCATION

Design Camp | Design Institute, University of Minnesota | Minneapolis If you've spent this summer gearing or morphing, chances are you're either a Transformer action figure, a Pokémon character, or one of the 100 high-schoolers who attended the University of Minnesota's Design Camp this June, now in its second year. An undertaking of the school's Design Institute—a research institute devoted to improving design in the public realm—with funding from the Minnesota-based Target Corporation, the camp offers six parallel one-week workshops that introduce teens to design in everyday life. ("Morphing" is a workshop on multimedia communications, and "gearing" explores product design. An environmental design course is called "dwelling.") Fifteen-year-old Evan Rice from New Jersey, who attended "gearing," reports, "We learned the difference between redecorating and redesigning." As the Transformers slogan says, there's "more than meets the eye." **Anna Holtzman**

EVENT

Architecture Week | New York City | www.aiany.org | October 7-13 In early October, New York City Mayor Michael R. Bloomberg will officially open the AIA New York's new Center for Architecture, a gallery and cultural institution focusing on architecture and urban issues, and simultaneously commence Architecture Week, a city-wide, six-day series of events to celebrate the metropolis' built environment. Featured will be *openhousenewyork*, a two-day happening including free access to and tours of architectural sites around the city (October 11-12); a 16-hour *Design-in* with 80 speakers from the building professions; and showings of the play *Private Jokes, Public Places* by Oren Safdie (son of architect Moshe Safdie), about an architecture student's studio critique. **AH**

COURTESY DESIGN INSTITUTE, UNIVERSITY OF MINNESOTA; COURTESY ANDREW BERMAN ARCHITECTS

EXHIBITIONS

BELLEVUE, WASHINGTON
Lucy Orta
Works by the British-born artist that bridge the worlds of performance art, fashion, and architecture.
BELLEVUE ART MUSEUM
www.bellevueart.org
September 27–January 18

DESSAU, GERMANY
The Bauhaus Style
An examination of the Bauhaus school as a "lifestyle" rather than an aesthetic style.
BAUHAUS DESSAU FOUNDATION
www.bauhaus-dessau.de
Through November 16

LISBON
Experimenta
The Lisbon design biennial, looking this year at design culture from the consumer's perspective.
VARIOUS LOCATIONS
www.experimentadesign.pt
September 17–November 2

LONDON
Totally Somewhere Else
A biennial show of European design, in which visitors vote on the best and worst projects.
DESIGN MUSEUM
www.designmuseum.org
September 26–January 4

LOS ANGELES
Frank O. Gehry
An exploration of the architect's design process through documentation of his current projects.
MUSEUM OF CONTEMPORARY ART
www.moca-la.org
September 7–January 26

LYON, FRANCE
Lyon Biennial
The seventh biennial in Lyon, featuring visual arts, music, dance, and architecture from around the world.
VARIOUS LOCATIONS
www.biennale-de-lyon.org
September 17–January 4

NEW YORK CITY
Vito Acconci
A site-specific installation by the artist, whose work includes sculpture, furniture, industrial design, and architecture.
PRATT INSTITUTE
www.pratt.edu
September 12–November 8

NEW YORK CITY
Absence into Presence
Memorials by artists and designers from Aldo Rossi to Daniel Libeskind.
PARSONS SCHOOL OF DESIGN
www.parsons.edu
September 3–October 3

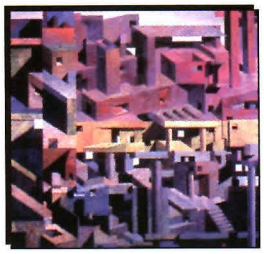
NEW YORK CITY
City without a Ghetto
The history of urban development, examined through photography, legislative diagrams, and video.
STOREFRONT FOR ART AND ARCHITECTURE
www.storefrontnews.org
September 4–October 15

SÃO PAULO
São Paulo Biennial
The Brazilian city's fifth international biennial of architecture and design, covering the built world and urban issues.
VARIOUS LOCATIONS
www.bienalsaopaulo.org.br
September 14–November 2

TORONTO
Art Deco 1910-1939
A comprehensive overview of the Art Deco style, organized by the Victoria and Albert Museum in London.
ROYAL ONTARIO MUSEUM
www.rom.on.ca
September 20–January 4

VANCOUVER, CANADA
Image Building
A juried exhibit of architectural photography.
ARCHITECTURAL INSTITUTE OF BRITISH COLUMBIA
www.aibc.bc.ca
September 19–October 31

WASHINGTON, D.C.
James Heron
Paintings of unpeopled, unadulterated architectural forms by the San Francisco-based architect.
THE OCTAGON
www.theoctagon.org
September 19–January 9



WASHINGTON, D.C.
Up, Down, Across
An exhibition on the history of elevators, escalators, and moving sidewalks.
NATIONAL BUILDING MUSEUM
www.nbm.org
September 12–April 18

WEIL AM RHEIN, GERMANY
Marcel Breuer
Architecture, furniture, and objects by the late Hungarian-born Bauhaus-school designer.
VITRA DESIGN MUSEUM
www.design-museum.de
September 13–April 25

EVENTS

BALTIMORE
NeoCon East 2003
Merchandise Mart's East Coast trade fair for interior design.
BALTIMORE CONVENTION CENTER
www.merchandisemart.com
November 6–7

BOSTON
Build Boston
Annual tradeshow for the building industry, with over 350 exhibitors of products and services.
WORLD TRADE CENTER BOSTON
www.buildboston.com
November 18–20

MIAMI
Healthcare Design
Annual conference, originally produced by the Center for Health Design, now cosponsored by Medquest.
INTERCONTINENTAL HOTEL
www.healthdesign.org
December 7–10

COMPETITIONS

Rome Prize
Applications due for residency fellowships at the American Academy in Rome, for work in architecture and related fields.
www.aarome.org
Deadline November 1

Arnold W. Brunner Grant
An annual grant for advanced study in any area of architectural investigation, sponsored by the AIA New York chapter.
www.aiany.org
Deadline November 3

AIA Housing PIA Awards
The AIA Housing Professional Interest Area awards for housing and community design.
www.aia.org
Registration deadline November 22

Sacred Space
International ideas competition for an interfaith worship space, sponsored by faith-based groups and the San Francisco AIA.
www.uri.org/designcomp
Registration deadline December 31

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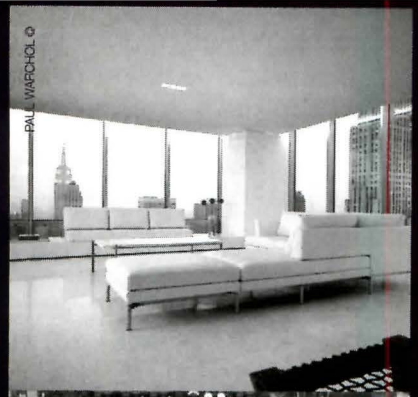

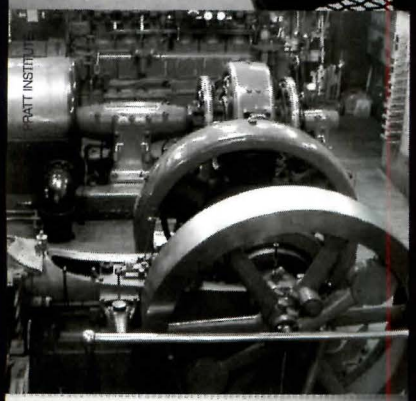

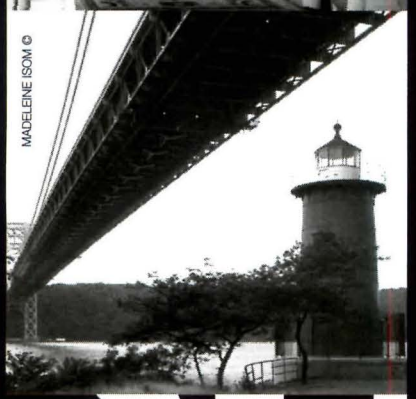

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on the fringes
beyond the gate
to the sky
off the path
across the tracks
past the doorman

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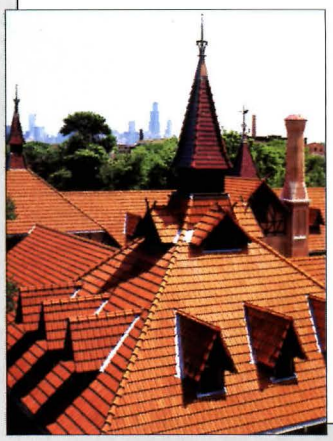
Circle 101

Ludowici Roof Tile



After more than 100 years, Ludowici clay roof tiles remain the preferred choice of architects and building professionals. No other clay tile manufacturer offers more color, styles, fittings, textures, or finishes. And every tile is backed with a 75-year limited warranty (see actual warranty for details). Call for full-color brochure or visit www.ludowici.com

Circle 104

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Circle 102

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e-mail: speceurotex@prodigy.net

Circle 105

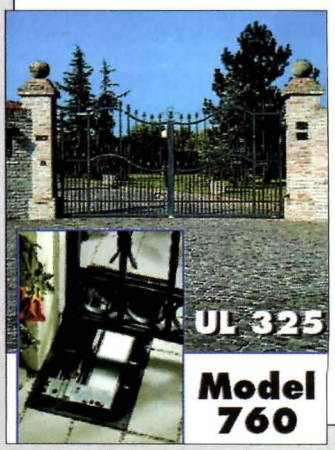
Ceramic Tiles of Italy Design Competition

CERAMIC TILES OF ITALY DESIGN COMPETITION 2004

North American architects and interior designers are invited to submit residential, commercial or institutional projects to the 2004 Ceramic Tiles of Italy Design Competition, which recognizes excellence in the design and installation of Italian ceramic tile. Winners will receive a cash prize of $5000 and a trip to Cersaie 2004. Deadline: January 31, 2004. www.italiatiles.com

Circle 103

FAAC International, Inc.



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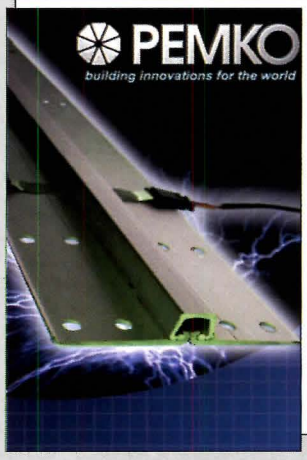

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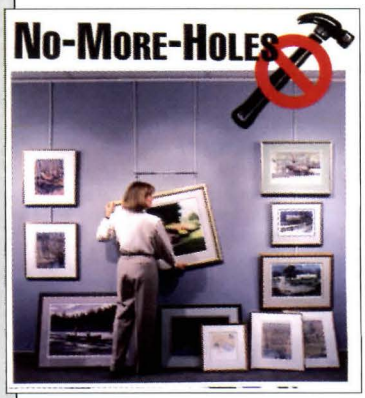

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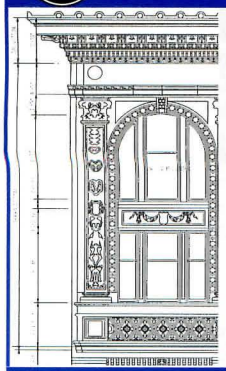

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Chair, Design Search Committee / Department of Architecture
Room 10-491M, MIT / 77 Massachusetts Avenue
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MIT is an equal opportunity / affirmative action institution. Women and minority candidates are strongly encouraged to apply.

MIT massachusetts institute of technology
department of architecture

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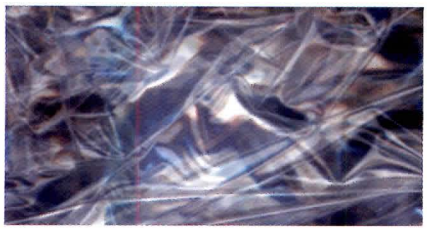

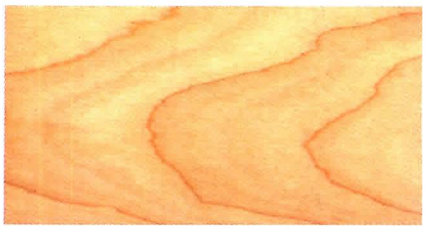

SUSTAINED BY SCIENCE

The LEED green-building ratings are based on political agenda, not sound science, argue timber and plastics advocates. by Patrick Moore, with Mason Knowles and Mike Levy

There is growing interest in "green buildings" among governments, corporations, and architects, and this is positive. Unfortunately, the standard being adopted by many reflects political bias and "agenda-based" policies rather than good science. The Washington, D.C.–based U.S. Green Building Council, which created the Leadership in Energy and Environmental Design (LEED) rating system, is influenced by a number of environmental groups, in particular the Natural Resources Defense Council (NRDC), as well as by many professionals in building and architecture.

The LEED standard is basically a system of points awarded in such categories as siting, materials, water and energy use, indoor-air quality, accommodating alternative transportation, and "innovation." Unfortunately, LEED does not incorporate a *life-cycle* analysis of the environmental impact of materials used in construction. For example, a material is considered "green" simply because it has recycled content, regardless of the energy required to recycle it or the pollution caused in the process. A material also gets points if it is manufactured within 500 miles of the construction site, regardless of the environmental impacts involved in the manufacturing process.

HYDRO A NO-GO

Many of the standard's specific weaknesses reflect political bias among the environmental groups that influence LEED. For example, large-scale hydroelectric power is not eligible for any points even though it is the most abundant form of renewable energy in North America. ("Low-impact hydro" is eligible, however.) With this logic, it would be just as plausible to be against wind power because of the environmental impact of mining and manufacturing the materials used to build thousands of wind machines. The truth is that the long-term dividends of both technologies far outweigh their negative environmental impacts.

Similar prejudices affect the use of wood. LEED considers construction lumber "green" only if it is certified by the Forest Stewardship Council, the only body recognized by NRDC for this task. This rules out over 98 percent of all wood produced in North America—much of which is certified as sustainably managed through other programs. This policy, which reflects the antiforestry bias of a vocal minority, encourages architects and designers to use nonrenewable alternatives like steel and concrete. Worse yet, lumber is actually excluded from LEED's list of "Rapidly Renewable Materials." A host of politically correct materials are eligible for points, however, such as bamboo flooring, wheatgrass cabinetry, and sunflower-seed board. While such plants grow more quickly than timber, forested areas of native trees are preferable by far to exotic monoculture crops.

PLASTIC CRITERIA

In other ways, the LEED rating system remarkably contradicts its own intent. The standard seems to ignore the environmental impact of a building's long-term energy consumption. For example, a spray-applied polyurethane-foam roof doesn't qualify for LEED "cool-roof" credits, even though it provides a light-reflecting coating and an R-value of up to 21 that meet similar standards in the California energy code and the EPA Energy Star program. To meet LEED's requirements for roofing emissivity and reflectivity, a metal roof with no insulation would be considered a better choice, even though it would increase energy use—and greenhouse-gas emissions.

Another green technology that cuts the use of fossil fuels, the ground-source heat pump, can deliver up to 50 percent of a building's energy needs with renewable earth energy. Yet, LEED only offers credits for up to 20-percent renewable energy, and the name of the technology is omitted from the standard.

Last, many proponents contend that LEED-certified buildings need not cost more to construct than typical buildings. However, a 2003 study by market cost-analysis firm Northbridge Environmental Management Consultants of Westford, Massachusetts, for the American Plastics Council, an Arlington, Virginia–based trade group, concludes that compliance with LEED increases building costs anywhere from 3 to 11 percent—a sizable premium—depending on the level of certification. And as the roofing example shows, the rating system also can result in the use of inefficient materials and potentially higher long-term maintenance costs.

To affirm performance ratings, the U.S. Green Building Council must incorporate into LEED such positive improvements as life-cycle analysis and the measurability and benchmarking of material performance. Timber, plastics, and hydroelectric power should be treated like any other applied technology and judged on the basis of scientific criteria, not subjective bias. At the end of the day, an architect who adheres to a green rating system has to answer the core question: "Did the decisions I made to obtain rating points really make an environmental difference over the life of the building?"

Green buildings will work only if they are based on science, not politics. Let's move in that direction before our society develops a new set of ingrained misperceptions about materials and energy resources.

Author of *Green Spirit: Trees Are the Answer*, Patrick Moore was a founding member of Greenpeace and is now chairman of the Vancouver, Washington–based environmental consultancy Greenspirit. Mason Knowles and Mike Levy are executives of the American Plastics Council, Arlington, Virginia.

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