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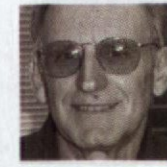
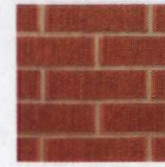
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APRIL 2003

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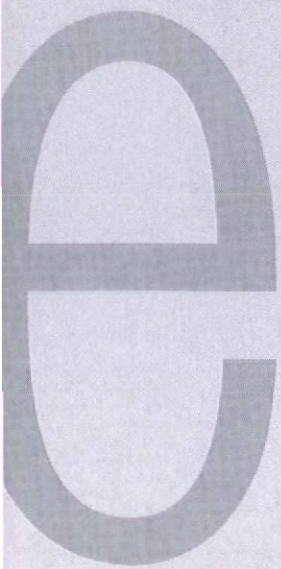
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The Spanish architecture firm Ábalos & Herreros fuses nature and structure in its ecologically thoughtful designs (page 60). Trees and grass grow atop the new administration and graduate building at Spain's University of Extremadura. The grass roof insulates the interior, while adjustable louvers on the façades and saplings help filter air through the building. At the public library in Usera, Madrid, a system of vertical apertures fitted with diffusers and sunshades formed by pivoting fascia panels modulate light. Photographs by Bleda y Rosa.

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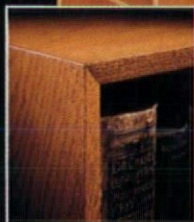
Ada Karmi-Melamede,
Public and Private

Steven Holl in Minnesota

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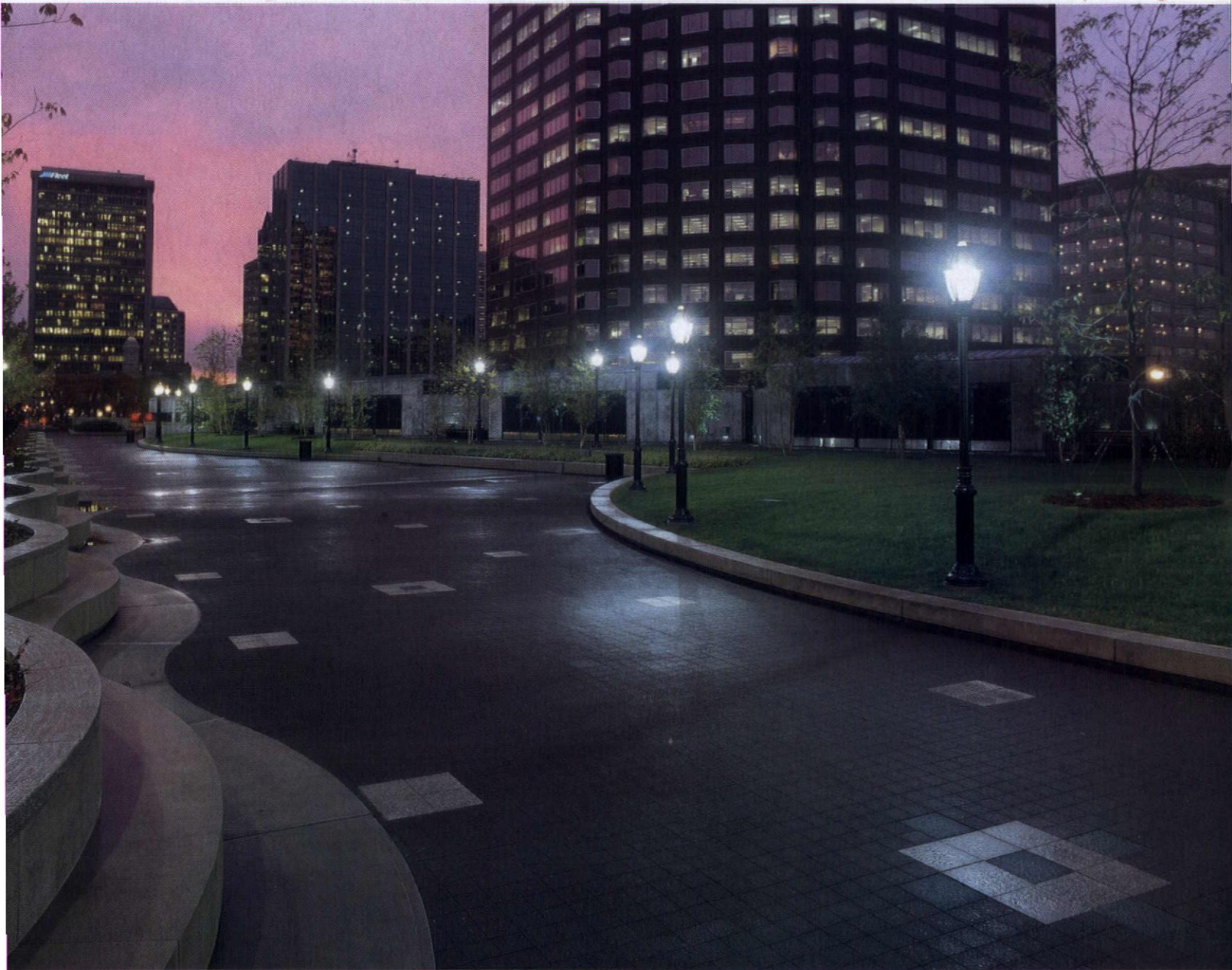
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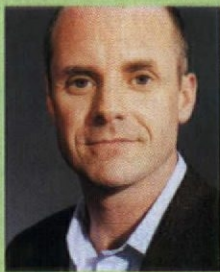


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SPRINKLERS SAVE LIVES

BY C.C. SULLIVAN

It hurts to recall the undiluted horror of that night in West Warwick, Rhode Island, when a club called the Station became, in an instant, a place of pain and grieving. As architects, however, we are compelled to face this tragedy and respond accordingly: We must advocate fire sprinklers in all buildings and all enclosed places of public assembly. And before such a law is passed—which, history shows, will take considerable effort—architects must individually promote the use of sprinklers—even when they're not in the budget, even when it's a residential client, even when we're not asked for our opinion.

The case for sprinklers is self-evident. In the United States, no more than two people have ever died in a fire in a sprinklered building, and in the last five years, the death toll for fires in fully sprinklered buildings is zero. In places like Fresno, California, where local codes mandate sprinkler systems in nearly all public buildings, property damage claims have been a mere \$40,000 for the last decade. Since Scottsdale, Arizona, began requiring sprinklers for single-family homes, there has not been a fatality, and fire-related property damage has dropped by 80 percent.

Despite this astounding track record, only 2 percent of the occupied structures in the United States have sprinklers. There must be good reasons for such limited access to safety, right? Not really. Invented in 1874, sprinklers were used in factories and warehouses through the mid-1940s, when three catastrophic fires in Boston, Chicago, and Atlanta prompted lawmakers to require automatic sprinklers to protect people, not just goods. Building owners, business leaders, and politicians immediately began to fight the new codes, and the opposition continues to this day.

The perennial objection, of course, is cost. For a new single-family house, the outlay usually hovers at just over a dollar per square foot—often less than 1 percent of the construction budget. At between \$1.50 to \$2.00 per square foot for a medium-sized building, installing sprinklers costs about as much as new carpeting. As a one-time investment to build a new structure, occupy a space, or open a business, this seems reasonable, especially given the savings in insurance premiums and fire-related damages. But opponents—including homebuilders, restaurant associations, developers, and pro-business groups—often hide behind existing laws and codes that exempt their buildings from mandatory sprinkler use—the very laws they loudly lobbied for in the first place. Some professionals offer creative egress calculations and fire-resistant assemblies as “performance-based” rationales for leaving sprinklers out of their designs.

Firefighters will have none of this. Like other groups around the country, the Rhode Island Association of Fire Chiefs has long lobbied for sprinklers in more buildings. In the early 1990s, their call for sprinklers in all hotels, apartments, and houses helped to pass a new law, but it only affected *new* hotels, motels, hospitals, and skilled-nursing facilities. In Rhode Island, as in most states, sprinklers are still not required in many public places, including schools and older buildings.

Those who open their doors to the public must buck up. Those with real financial hardship—small businesses, charities, and schools, for example—should get tax credits or grants. Governments should increase their budgets for inspections and code enforcement. Most important, the ingenious codes and design standards promoted by groups like

the National Fire Protection Association should be followed in every jurisdiction, and in every occupied space.

HATS OFF TO LIBESKIND

Berlin-based Studio Daniel Libeskind has pulled off the commission of a lifetime. “Memory Foundations,” the architectural concept for rebuilding the World Trade Center site, was selected by officials in New York in February over schemes by other high-powered teams. While acclaim for his design is by no means unanimous, Libeskind deserves praise for the way his ideas have connected viscerally with the people nearest the events of September 11, 2001. The architect's profound metaphors, conveyed through form, void, light, and material, remind us of his rare talent: transforming architecture into a commemorative gesture.

Yet, the political machinations of the last three months make one wonder whether anything remotely resembling his original gesture will be built. In securing the commission, Libeskind has made concessions that dilute the emotional impact of the tower forms, the public zones delineating a meaningful “wedge of light,” and the exposed slurry wall that serves as a memorial component. The revised plan even replaces a sky garden in the 1,776-foot-tall commemorative spire with a 110th-floor restaurant.

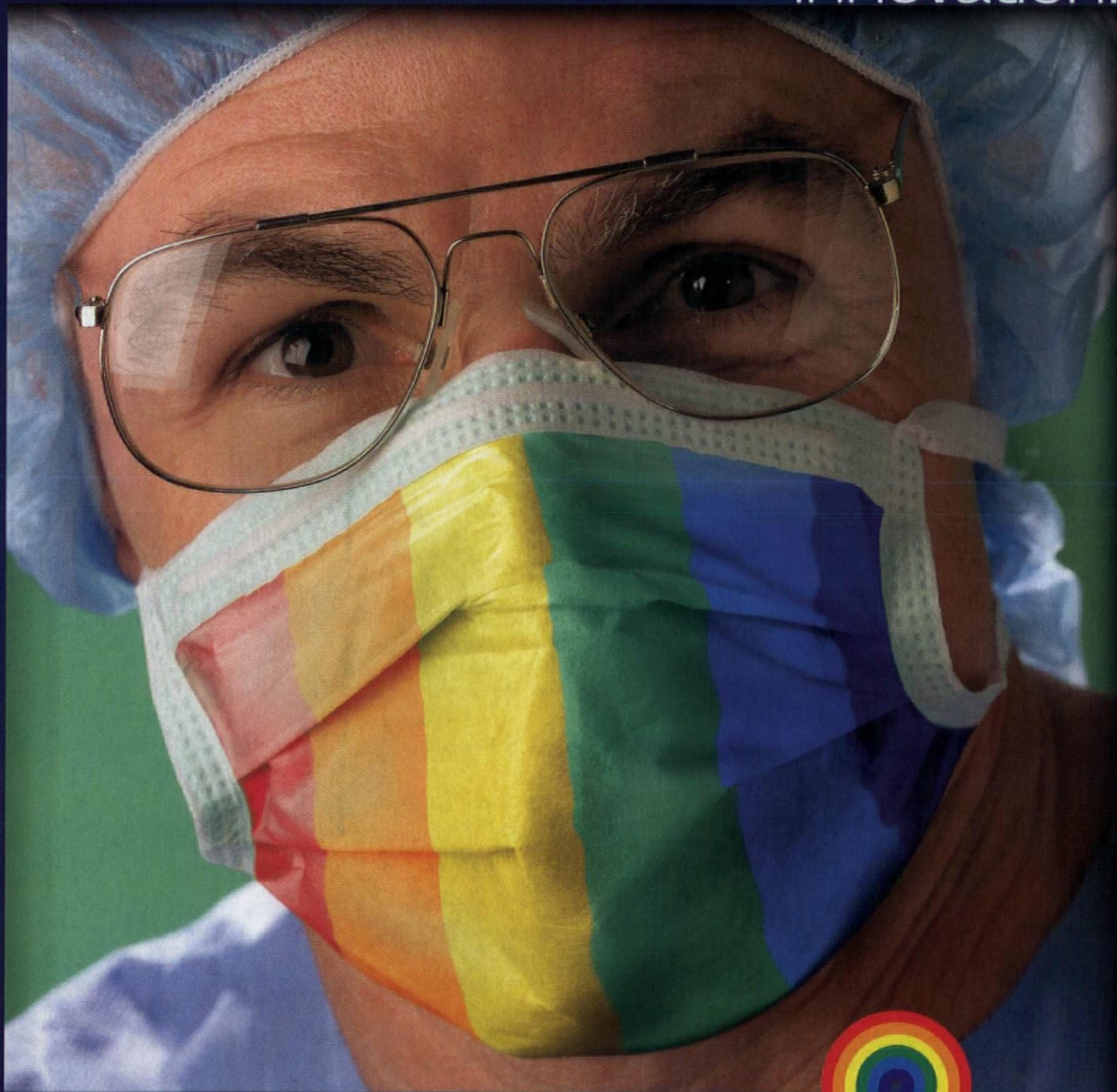
Such major changes over such a short time leave the public wondering what might happen during the years it will take to realize a significant portion of the plan. This new project could be a singular triumph for the free world—if our elected officials consistently and wisely defer to their chosen architect, and his commemorative vision. ■



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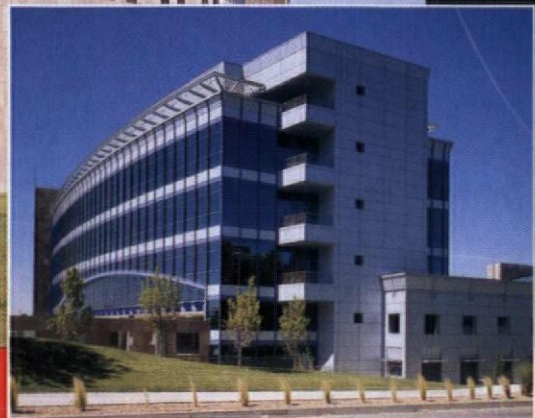
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> letters



STUDIO SCARS

I applaud the editorial regarding the "ritual scarring" of the traditional design studio (February 2003, page 9). Architectural curricula create poor self-esteem, competitiveness, and combative presentation skills. In law and medicine, arrogance is squashed in beginning students and later replaced with the self-confidence that comes from supportive mentors and colleagues. In architecture, the punishment continues and the survivors come out with big problems—among them, an inability to plan schedules. Most of all, they cannot support solutions that differ from their own.

Louise J. Miles
Milford, Delaware

I found the editorial "A Healthier Design Studio" disturbing. What is a "culture of sharing"? It sounds like something from Chairman Mao's little red book.

Robert M. Skaler
Philadelphia

BRIDGE THIS DIVIDE

After reading the commentary by Jane Holtz Kay (February 2003, page 33), I cannot help but wonder if she has ever been on the Leonard P. Zakim Bunker

Hill Bridge or near it. It is hard to understand how the bridge "columns and cluttered under-world mar the Charles" when the bridge spans the whole river. Its configuration also allows for the passage of pedestrians at ground level so they can use the parks adjoining the bridge.

Miguel Rosales
Rosales Gottemoeller, Boston

DIPLOMATIC IMMUNITY

The U.S. State Department's new standard designs for embassies (January 2003, page 45) not only lower the bar on architectural quality but represent the worst of U.S. urban planning and antidemocratic attitudes. By moving embassies away from city centers, the United States is exporting our "right" to urban sprawl. But more ominously, one justification of this planning is specifically to move the U.S. presence away from "Main Street." I guess the State Department is no longer interested in hearing from the citizens of other countries.

Raphael Sperry
San Francisco

NO CONTEST

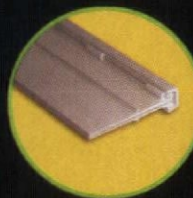
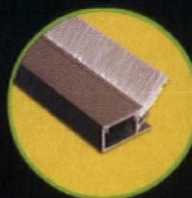
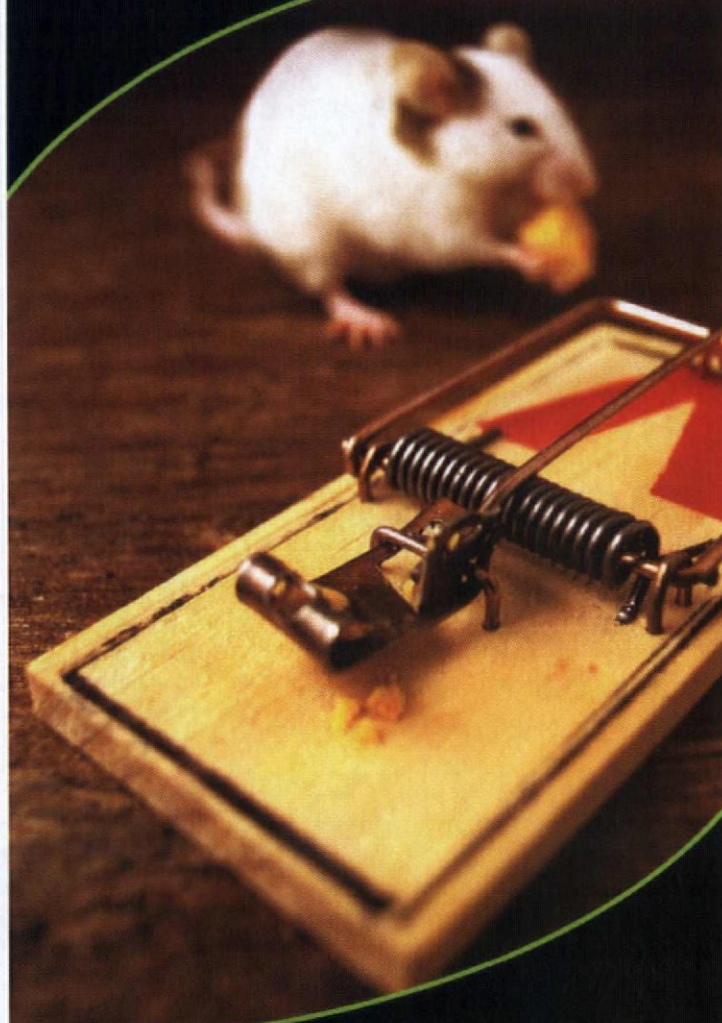
John Morris Dixon's statement that the New Jersey State Prison suffered a design change is untrue (January 2003, page 52). After successful occupancy, a state legislator called it "the marble prison," warping the truth by referring to marble aggregate in the precast concrete. The 1963 institution became a forerunner of the decades of humane facilities that were built before the pendulum swung back toward a more "punitive" architecture.

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Gruzen Samton, New York City

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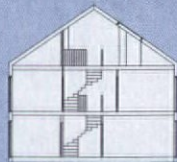


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Submission Requirements

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10. All entries must include clear, comprehensive images of both the interior and exterior of the residence and presentation-quality plans and sections (no more than 24 photographic images).
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12. All entry material must be firmly bound in binders no larger than 17 inches in one dimension only, to a maximum of 11 by 17 inches (9 by 12 inches preferred). Please avoid fragile bindings, sharp metal edges, etc. Slides should be submitted only as supplementary material. Videocassettes, CD-ROMs, models, and any unbound material in boxes, sleeves, etc., will not be considered.

13. Project Facts Page. To ensure clear communication to the jury, the first page of each entry binder must list project facts under the following headings: Location/Context, Site Characteristics, Zoning Constraints, Client/Program, Construction Systems, Sustainable Features (if any), Schedule and Cost per Square Foot. This information must include square footage, overall cost, and specific construction materials and systems. All project facts should fit on one page.

14. To maintain anonymity in judging, no names of entrants or collaborating parties may appear on any part of the submission except on entry forms. Do not, however, conceal the identity or location of the project.

15. Please do not send original drawings; *Architecture* accepts no liability for submittals.

16. Each submission must be accompanied by a signed entry form and a check covering the entry fee (\$150). Reproductions of the form are acceptable. Complete the entire form and put it in an unsealed envelope attached to the binder's back cover.

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18. Identify each submission on its entry form as one of the following:
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Entry Fees

19. An entry fee must accompany each submission. The fee is \$150; each entry after the initial entry is \$100.

20. Make check or money order payable to *Architecture*. (Canadian and Mexican entrants must send drafts in U.S. dollars.)

21. Fee must be put in an unsealed envelope with the entry form.

Return of Entries

22. *Architecture* will return entries ONLY if they are accompanied by a self-addressed, stamped envelope. *Architecture* assumes no liability for loss or damage.

Entry Deadline

23. All entries must be received by 5 p.m. EST July 14, 2003. To ensure timely receipt, *Architecture* recommends using a carrier that guarantees delivery time.

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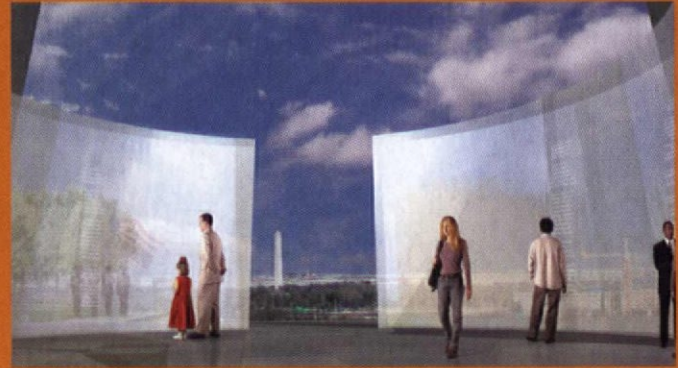
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Two New Memorials in the Capital: One Grand, the Other Minimal

> REMEMBRANCE In the same week in early March, the public got its first glimpse of two proposed new memorials skirting the perimeter of the Pentagon in Arlington, Virginia. After an elaborate six-month competition, an 11-member jury selected a pair of young, New York City-based architects to design the new memorial to the 184 victims of the September 11 attack on the Pentagon. Two days later, the Air Force Memorial Foundation unveiled its dramatic sequel to an earlier memorial design by architect James Ingo Freed, this one the work of ... James Ingo Freed.

Selected from 1,126 anonymous entries, the Pentagon memorial (top left, bottom left) is a design developed by Julie Beckman and Keith Kaseman of the firm KBAS. The 1.9-

acre memorial site sits about 200 feet from the rebuilt west façade of the Pentagon, where the hijacked American Airlines Flight 77 crashed.

The design comprises 184 cantilevered, illuminated benches of cast aluminum in parallel rows

"When we first entered the competition, we just wanted to contribute to the conversation," says Keith Kaseman about his and Julie Beckman's design for the Pentagon Memorial. "We are overwhelmingly honored to be part of the process."

arranged by the victims' ages and aligned along the axis at which the jet hit the building. Each bench, resembling a low-slung ramp, bears the name of a victim. A small pool of water will glow beneath each bench, and a canopy of red maples will stand overhead. "When

we first entered the competition, we just wanted to contribute to the conversation," said Kaseman a few days after the announcement. "We are overwhelmingly honored to be part of the process." Construction of the Pentagon memorial will cost

between \$5 million and \$7 million, with completion expected by September 2004.

About a quarter mile to the west, on a hill overlooking the Potomac and the capital, Freed's Air Force Memorial (top right, bottom right) will send three matte-finished stainless-

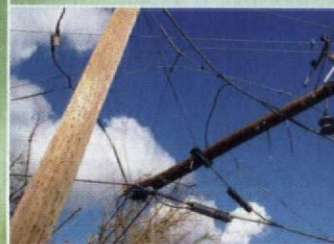
steel arcs into the sky—the tallest one will measure 270 feet high—representing contrails left by the "bomb burst" maneuver of the popular Thunderbird Demonstration Team.

This was the second, and vindicating, selection of Freed after his first design was scrapped in a dispute between the Air Force and the Marine Corps over the original site near the Corps' Iwo Jima memorial. Given a new site, the foundation elected to restage another blind competition, even though Freed had worked for several years on the first design—"an obnoxious affront," says someone close to Freed. However, out of 100 entries submitted in the second competition, Freed prevailed yet again. Groundbreaking is expected to take place in 2004, and construction will be completed in 2006. **BRADFORD MCKEE**



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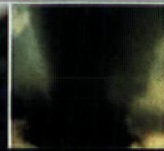
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Running the Numbers

> **ENVIRONMENT** As if there were any doubt that sustainable building is a critical part of our future, Building Green, the Burlington, Vermont-based publishers of *Environmental Building News*, have compiled some compelling statistics that strengthen the case. Here is a look at where we stand and what we are up against.

Number of U.S. commercial buildings constructed annually: **170,000**

Number of U.S. commercial buildings demolished annually: **44,000**

Number of new homes built annually: **1.6 million**

Number of housing units demolished annually: **245,000**

Increase in average house size from 1950 to 1999: **105%**

Portion of all U.S. energy consumption associated with buildings in 2000: **36.4%**

Portion of U.S. electricity consumption associated with buildings in 2000: **65.2%**

Portion of U.S. CO₂ emissions associated with buildings in 1999: **36%**

Portion of total U.S. greenhouse-gas emissions associated with all buildings in 1999: **30%**

Portion of U.S. annual landfill waste stream associated with construction and demolition (varying from state to state): **10-30%**

Total annual U.S. construction and demolition waste generation: **136 million tons**

Portion from demolition and renovation: **92%**

Portion recycled or reused: **20-30%**

Percentage of ozone-depleting substances used annually in the U.S. for building construction and systems: **60%**

New Prize Rivals Pritzker

> **LAURELS** The Richard H. Driehaus Prize for Classical Architecture has been established as a joint venture of the Driehaus Foundation and the University of Notre Dame "to honor a major contributor in the field of traditional and classical architecture or historic preservation," according to the university. The first recipient is Leon Krier, the philosophical father of the New Urbanism movement. At \$100,000, the award is equal to the Pritzker Prize. This and other similarities between the two awards led Blair Kamin, the architecture critic of the *Chicago Tribune*, to speculate that the Driehaus Prize was set up to counter the perceived modernist bias in the Pritzker's juries. Whether or not this was the intention, the monetary value of the nascent award certainly creates an influential new advocate for traditional architecture. **JULIA MANDELL**

BUZZ

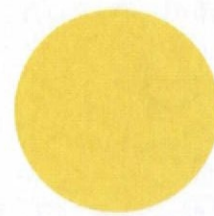
Diller + Scofidio will head the design team revamping the public spaces at New York City's Lincoln Center. The team also includes: **Fox & Fowle Architects; Cooper Robertson & Partners** as planners; **L'Observatoire** as lighting designers; **Olin Partnership** as landscape architects; and **2 x 4** as graphic designers. Pending funding, the plan will include a new concert hall by **Foster & Partners**.

Denise Scott Brown and **Robert Venturi** have donated \$25,000 to the new Charter High School for Architecture + Design in Philadelphia.

In Austin, Texas, a volunteer effort led by www.housethehomeless.org and **Leadership Austin** is rallying to build 275 houses for the homeless out of Austin phone books.

The **NEA's** 2002 National Medal of Art will be awarded by the president to **Florence Schust Knoll Bassett**, the architect and designer who pioneered interior space planning and designed furniture for **Knoll International**, and to **Lawrence Halprin**, the prolific landscape architect who designed the Franklin Delano Roosevelt Memorial in Washington, D.C.

Bruno B. Freschi, principal of **Cannon Design**, has been awarded the Queen's Golden Jubilee Medal, from the Canadian government, for significant contributions to architecture and education.



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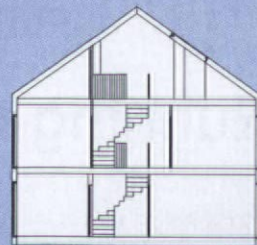
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For more information, see our
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on page 14 of this issue.

DRAWINGS COURTESY WARDY

Jerusalem Gates Downtown Mall

> **SECURITY** In a part of the world known for its open-air markets, the souk may be a thing of the past. Seeking to breathe new commercial life into Jerusalem's city center, the municipality is currently undertaking plans to enclose the outdoor Ben Yehuda pedestrian mall inside a security fence, highlighted by five architect-designed gates. As a prime target for terrorist attacks, particularly over the last three years, restaurants and shops in this once bustling area have suffered.



The signature gates are expected to give the project a fresh look, overcoming any feelings of being closed in, says Yoel Marinov, general director of the East Jerusalem Development Authority.

"It's not a natural thing to close a street with gates. However, the situation here is quite complicated," notes Guy Igra, a partner with Meltzer Igra Architects, the Jerusalem-based firm hired to design the gates. "The municipality is making a brave decision to try to revive this whole area."

In addition to the gates, the firm is designing small fabric tents to run along the top of the mall, creating a partial roof. Igra anticipates construction may begin as early as the spring of 2004. **BARBARA HORWITZ-BENNETT**

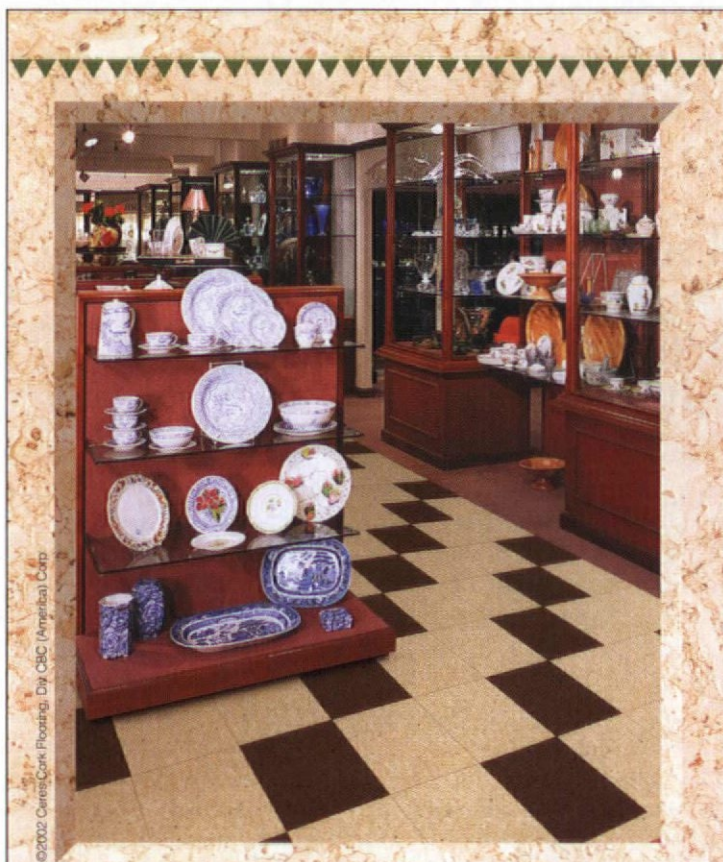
Peter Smithson, 1923 – 2003

> **SECURITY** British architect Peter Smithson died March 3. Smithson and his wife and life-long collaborator, architect Alison Smithson, who died in 1993, influenced generations of practitioners and academics worldwide with their tenacious advancement of modernism's social program.

Influenced by what they called the "social architecture" of Sweden and Denmark, the Smithsons established their own firm in 1950, after studying architecture at England's Durham University. They are best known for the seminal Economist offices, completed in London in 1964.

Beyond their built work, the Smithsons played a pivotal role in postwar theoretical circles, forging a new alternative to the towers-in-the-sky orthodoxy of the International Style. While the Smithsons railed against their forebearers, they experienced a backlash of their own when their Robin Hood Gardens, a 1972 concrete housing project in London, proved a bleak reality. Their efforts to build a contextual landscape where social exchange could prevail had mixed results, but their belief in the ameliorative power of architecture and urbanism still incites and inspires architects.

The architects' work and writings have been published widely and collected in *Changing the Art of Inhabitation* (Ellipsis, 1999) and *The Charged Void: Architecture* (Monacelli, 2001). **ABBY BUSSEL**



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Home Builders Shun Smart-Growth Initiative

> **PLANNING** Once you give an award, taking it away is a big step. But that's what *Professional Builder* did when its readers objected to the magazine's annual Professional Achievement Award going to the American Planning Association's "Growing Smart" initiative late last year.

Reportedly, the opposition against Growing Smart originated with the Michigan chapter of the National Association of Homebuilders (NAHB), and soon grew to reflect the position of the entire

national organization. According to *Professional Builder's* editor-in-chief Heather McCune, "[The NAHB] had nothing to do with the decision. It's just too soon to recognize at this point if Growing Smart will work or not."

Released last year, the Growing Smart project, a seven-and-a-half-year study sponsored by the American Planning Association, is a guidebook for legislative reform. A comprehensive collection of legislative models that reflects the diversity of planning issues faced by different states, the guide is meant to aid states in updating planning legislation—most of which was passed in the 1920s—to take into account current philosophies, particularly smart growth. Within a year of its release, 14 states had used parts of the

research to pass improved zoning and housing laws.

Concerning the rescindment of the award, Stuart Meck, the principal researcher of the Growing Smart initiative, says, "I am utterly puzzled." The NAHB was invited to participate during the researching of the initiative, he explains, and the final report even included some of the organization's suggestions. The NAHB declined to comment, but has issued a rebuttal statement concerning the initiative, disputing points such as who can bring lawsuits and the citizen-participation process. Meck says, "The NAHB is uncomfortable with democracy [in the planning process]. Our project represents a way of approaching the planning stage in which they do not control the agenda." **ANDREW YANG**

BUZZ

The Jury of Fellows of the **AIA** has elevated 62 new members to its College of Fellows, an honor awarded annually that recognizes those who have made a significant contribution to the profession and society. The jury also selected five international architects as honorary fellows. The new honorees, who are entitled to use the designation "FAIA" following their names, will be inducted into the college during the Institute's annual convention in San Diego next month.

Happy Earth Day, April 22.



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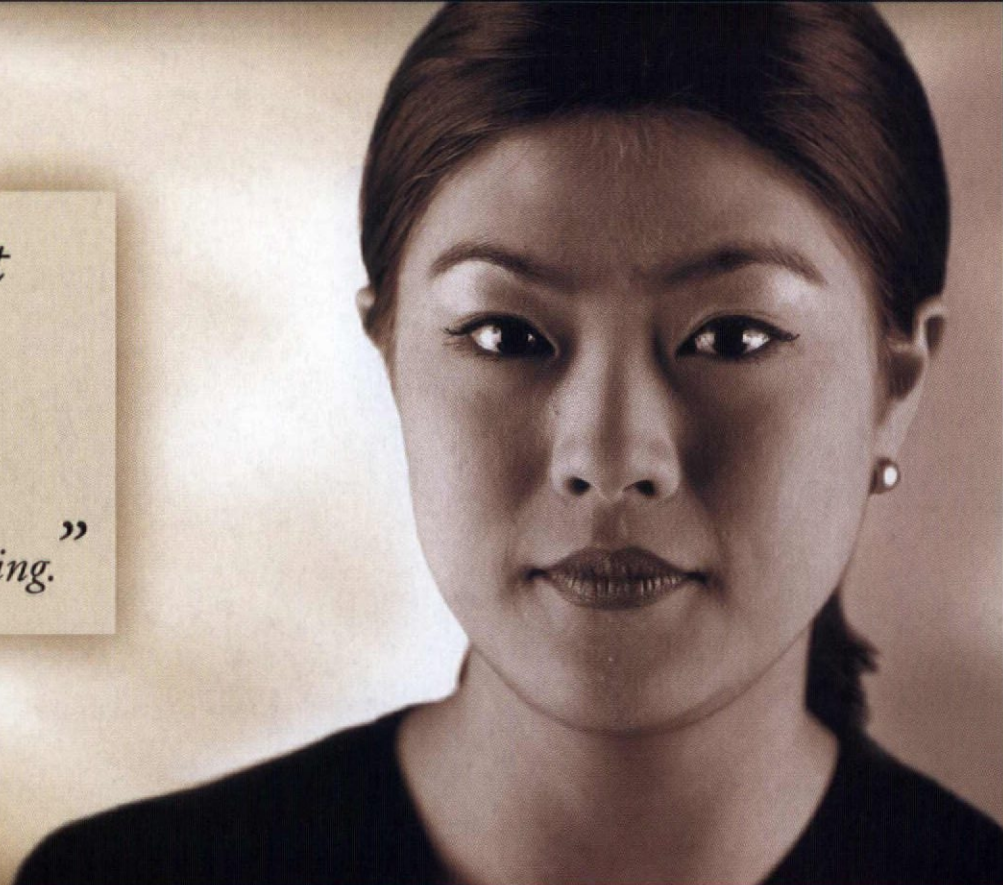
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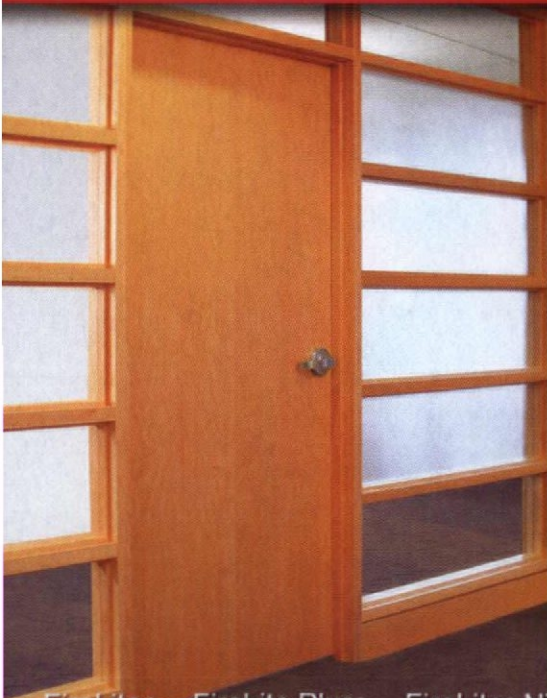
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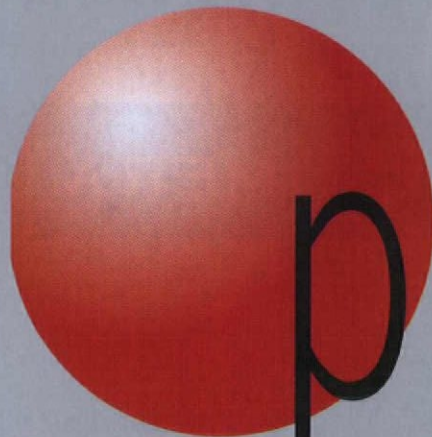
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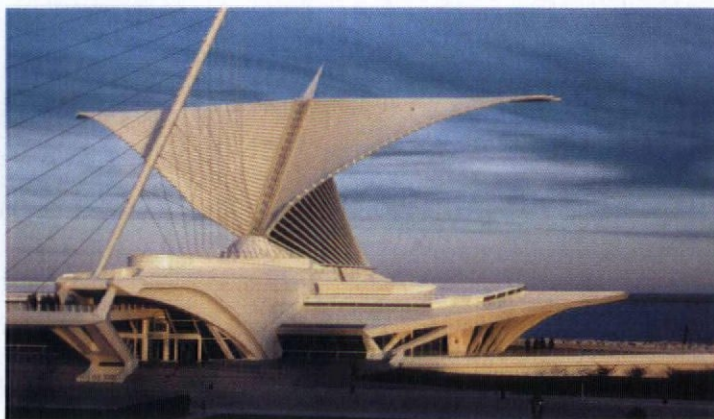


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The Green Building Advisor is a CD-ROM-based software from the publishers of *Environmental Building News* aimed at aiding architects and designers in brainstorming solutions for greener designs. Users plug in variables describing different aspects of their project, which are processed by the Green Building Advisor and answered with a variety of suggested sustainability strategies. The database provides information on costs, timetables, relationships between different approaches, and sources for further reference, including 22 case studies that demonstrate different strategies. The CD also includes a list of 1,500 green building products. **ANNA HOLTZMAN**



Soaring Structures

> EXHIBITION

"LIKE A BIRD: THE ARCHITECTURE
OF SANTIAGO CALATRAVA" /
MUSEUM OF ART HISTORY /
VIENNA / THROUGH MAY 18

The Museum of Art History in Vienna stands on a par with the Prado, the Louvre, and the Uffizi. Reflected across a plaza in an identical building is an equally esteemed institution, the Museum

of Natural History. For the first exhibition to bridge these two museums, architectural historian Liane Lefaivre muses on—quite fittingly—an architect who is also a master of bridge design.

In *Like a Bird: The Architecture of Santiago Calatrava*, Lefaivre illustrates her poetic proposition that Calatrava's structures reflect a desire to fly. She fleshes out her thesis with elements from the Natural History's bird collection,



and establishes an unlikely link between architecture and ornithology by displaying a selection of Calatrava's early sketchbooks—including doodles of flying men and birds—next to scientific drawings of birds. Most fascinating, however, is the juxtaposition of bird skeletons and the structural master's elegant models—some of which have movable parts and are available for children to touch. Perhaps this theoretical connection forged between building and bird will inspire a continuing bond between these two venerable museums and between the built and the natural.

LILLI HOLLIER

Studio Drama

> THEATER

"PRIVATE JOKES, PUBLIC
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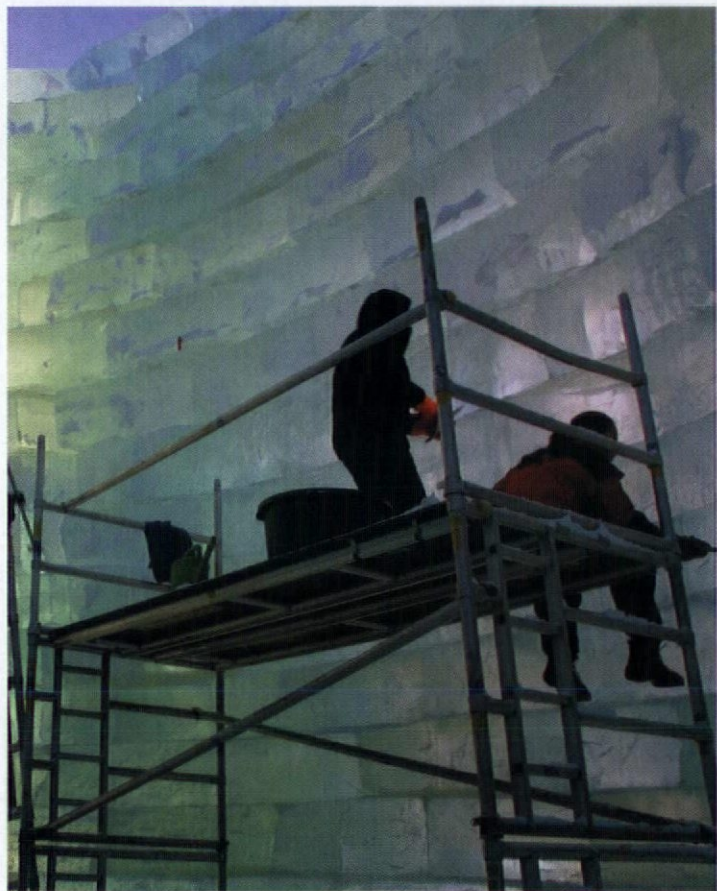
After premiering in Los Angeles in 2001, Oren Safdie's play *Private Jokes, Public Places* is coming to New York City. If the playwright's name seems familiar—and you're wondering what off-Broadway theater has to do with architecture—there's an explanation: Oren is the son of architect Moshe Safdie, and he has written a play about that hallowed ritual of architectural education, the studio critique. (The younger Safdie studied at Columbia's School of Architecture before turning to playwriting.)

In the play, the student protagonist and the jury butt heads over everything from CAD versus hand

drawing to the social and political obligations of architecture. The heroine challenges the status quo of architectural education: "You ask us to come up with these abstract ideas that aren't even meant to be built, but before you know it, someone publishes it in some shee-shee poo-poo New York magazine," and it ends up getting built. At the play's climax, her critics try to manipulate her into admitting that the lofty ideals she espouses are as baseless as the hollow theoretical exercises she claims to be challenging.

Will the in-jokes of our rarified subculture hold up in front of the general theater-going public? *Los Angeles Times* theater critic Kathleen Foley has already compared the play favorably to Yasmina Reza's acclaimed drama *Art*. **ANNA HOLTZMAN**





Ice House

> EXPO

"THE SNOW SHOW" / WWW.THESNOWSHOW.NET / KEMI AND ROVANIEMI, FINLAND / FEBRUARY 2004

In a union of art, architecture, and frost titled *The Snow Show*, New York City-based curator Lance Fung has invited 30 architects, paired with 30 artists, to create follies to be constructed in Finland's Lappish cities, Kemi and Rovaniemi, in February 2004. Apropos of season and place, ice and snow are the sole allowable building materials. As a test, two structures were built this past February: Steven Holl and American sculptor Jene Highstein designed an enormous ice cube with an elliptical vessel carved out of its center, while Asymptote's Hani Rashid and Lise-Anne Couture created two sensuous snow blobs, their interiors lit with projections by Finnish video artist Osmo Rauhala. The test run saw some minor mishaps: While Asymptote stuck to just snow for budgetary reasons, it ended up being more expensive than ice; then, some friction arose between Asymptote and the snow-building crew when their structure turned out more igloo-like than desired. But that was the purpose of the trial: to ensure that production hitches will melt away by next February, allowing the star lineup of architects and artists to thrill us with their chilly creations. **CATHY LANG HD**

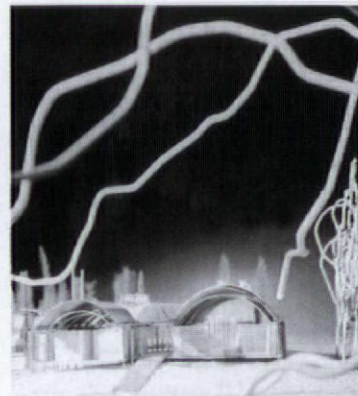


Murcutt: Australian for Architecture

> BOOK

"GLENN MURCUTT: A SINGULAR ARCHITECTURAL PRACTICE" / BY HAIG BECK AND JACKIE COOPER / IMAGES

In *Glenn Murcutt: A Singular Architectural Practice*, Haig Beck and Jackie Cooper delineate the evolution of the Australian architect's work—from the first house he designed for his mother to the Arthur and Yvonne Boyd Education Center in New South Wales, completed in 1999—with an elegance and economy of



means worthy of their subject.

Refuting perceptions of Murcutt's work as poetic or provincial, they place him in a broader context, extolling his combination of regionalism and modernism: Murcutt's "blend of the exotic and the universal makes his work both intriguing and accessible," they write. With thoughtfully chosen images and a minimum of text, Beck and Cooper emulate Murcutt's pursuit of "the most simple, least wasteful design." **ANNA HOLTZMAN**

Green Monsters


> BOOK

"BIG AND GREEN" / EDITED BY DAVID GISSEN / PRINCETON ARCHITECTURAL PRESS

Capturing the essence of the green movement is a new book, *Big & Green*, companion to the exhibition of the same name (at the National Building Museum, Washington, D.C., through June 22). With big-name essays and interviews, piquant references to historic precedent, and scores of amply illustrated projects by 30 active firms, the compilation pinpoints the state of sustainable design today—for large-scale commercial projects, that is. The result mixes serious arguments with



catchy factoids—ever hear of a ventifact, thermosiphon, or a *badgi*? The most salient article, by German environmentalist Michael Braungart (a collaborator with green guru William McDonough), links today's environmental challenges in part to prior aesthetic leanings. The shallow glazed boxes of early modernism, for example, might have fizzled out were it not for the coincidental rise of powerful air-conditioning systems. **C.C. SULLIVAN**



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EXHIBITIONS

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CHICAGO

Bernhard Hoesli: Collages a show of collages by the Swiss architect, at the Graham Foundation, through May 15. (312) 787-4071

Hiroshi Sugimoto: Architecture this photographer's black-and-white images of iconic modernist structures, at the Museum of Contemporary Art, Chicago, through June 1. (312) 280-2660



FORT WORTH, TEXAS

Markers' Marks in the Landscape over 60 prints in which artists explore marks left on the land by previous civilizations, at the Amon Carter Museum, through July 27. (817) 738-1933

FRANKFURT

Visions and Utopias: Architectural Drawings from the Museum of Modern Art, New York MoMA's traveling exhibition of sketches and drawings by architects from Frank Lloyd Wright to Daniel Libeskind, at the Schirn Kunsthalle Frankfurt, April 29-August 3. (49) 6929-98820

Oscar Niemeyer: A Legend of Modernism a retrospective on the Brazilian master architect responsible for the city plan of Brasilia, at

the Deutsches Architektur Museum, through May 11. (49) 69-212-38844

LITCHFIELD, CONNECTICUT

In Our Own Time: Modernism in Litchfield 1949-1970 the colonial town celebrates its buildings by Marcel Breuer, Richard Neutra, Eliot Noyes, and others, at the Litchfield Historical Society, April 12-November 30. (860) 567-4501

LONDON

Superstudio: Life without Objects a retrospective look at the radical Italian architects collective that challenged modernist doctrines during its brief existence from the mid-1960s to late 1970s, at the Design Museum, through June 8. (44) 20-7940-8790

Athens-Scape: The 2004 Olympics and the Metabolism of the City three linked exhibitions on the city of Athens and its transformations in preparation for the 2004 Olympics, at the Royal Institute of British Architects, April 22-May 24. (44) 20-7580-5533

LOS ANGELES

Roy McMakin: A Door Meant as Adornment a midcareer survey of the Seattle-based artist's work, which manipulates definitions of furniture and sculpture, at the Museum of Contemporary Art and the Geffen Contemporary, through June 29. (213) 621-2766

Raimund Abraham a look at work by the Austrian-born architect, at the Southern California Institute of Architecture, April-May. (213) 613-2200

NEW HAVEN, CONNECTICUT

Matter: The Work of Tod Williams and Billie Tsien featuring built projects, material studies, furniture, and more at the Yale School of Architecture, April 3-May 9. (203) 432-2292

NEW YORK CITY

Assignment: Green, a Survey on Eco-Design Education in New York work by students of architecture, planning, and other design disciplines, at the Urban Center Galleries, through April 29. (212) 935-3960

National Design Triennial: Inside Design Now the second multidisciplinary design survey (the first triennial was in 2000), at the Cooper-Hewitt, National Design Museum, April 22-August 3. (212) 849-8400

PHOENIX

Vital Forms: American Art and Design in the Atomic Age, 1940-1960 organized by the Brooklyn Museum of Art, at the Phoenix Art Museum, April 6-June 29. (602) 257-1222

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TransModernity: Contemporary Austrian Architects the current state of Austrian modernism is explored through contemporary work by three firms, at the Carnegie Museum of Art, through May 25. (412) 622-3131



SAN FRANCISCO

ROY/Design Series 1 architect Lindy Roy's first solo exhibition, and the first in a new series on emerging designers, at SFMOMA, April 19-September 7. (415) 357-4000

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VIENNA

The Buildings of the Rural Studio work by architects Samuel Mockbee and Dennis K. Ruth, at the Architekturzentrum Wien, through June 2. (43) 1-522-3115

WASHINGTON, D.C.

Of Our Time: 2002 GSA Design Awards artworks and architecture awarded by the U.S. General Services Administration, at the National Building Museum, through October 19. (202) 272-2448



CONFERENCES

Greening Rooftops for Sustainable Communities Conference, cosponsored by Green Roofs for Healthy Cities and the city of Chicago, at the Congress Plaza Hotel, Chicago, May 29-30. www.greenroofs.ca

Contribution and Confusion: Architecture and the Influence of Other Fields of Inquiry, sponsored by the Association of Collegiate Schools of Architecture, at the Marina Congress Center, Helsinki, July 27-30. www.acsa-arch.org/meetings

COMPETITIONS

The Nature Conservancy, Kapolei High School, and the National Endowment for the Arts seek design proposals for the new **Malama Learning Center** for nature conservation education, in Hawaii. Deadline July 1. <http://host36.ipow.erweb.com/~malamale>

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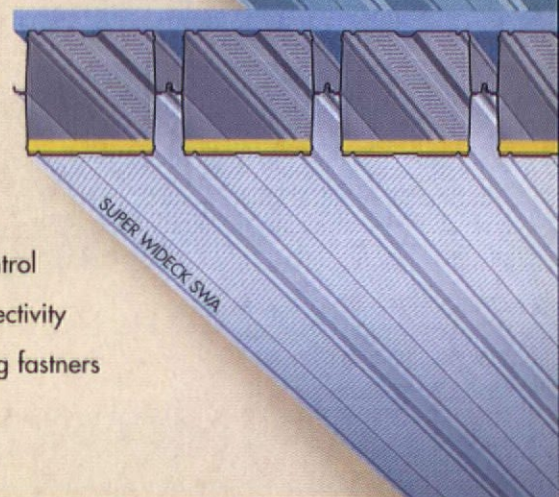
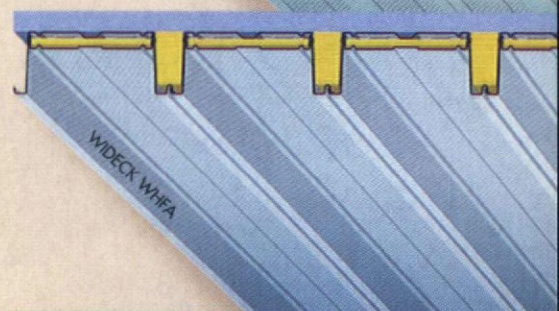
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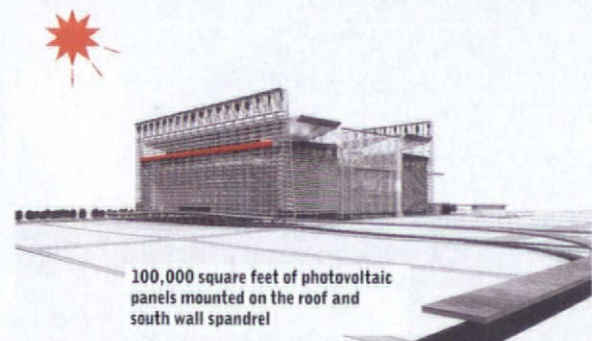
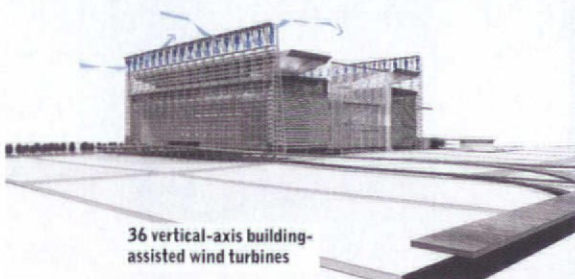
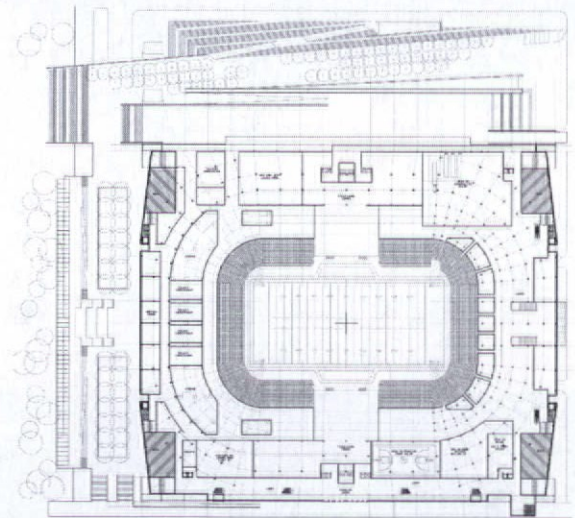
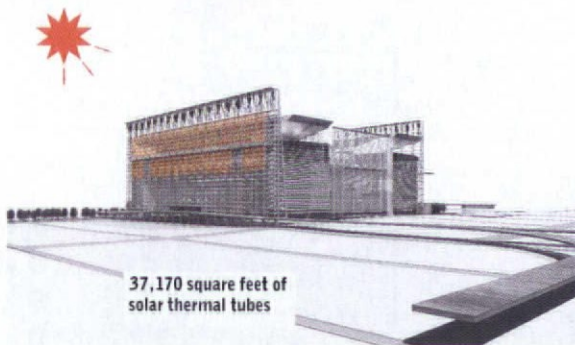
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KOHN PEDERSEN FOX ASSOCIATES / JETS STADIUM / NEW YORK CITY

The proposed—and controversial—new home of the New York Jets football team is a 75,000-seat, open-air stadium slated for a site between 30th and 34th Streets on Manhattan's far west side. The focus of a redeveloped Hudson River waterfront, the stadium will be built on a deck above an existing rail yard, with a large public plaza. Aside from holding the 10 Jets games played each season, the 2.6 million-square-foot stadium will also incorporate expanded convention facilities for the adjacent Jacob Javits Center. As New York City hopes to host the 2012 Olympiad, the stadium is designed to meet the requirements of the International Olympic Committee. Should the project make it through all the city and state approvals, the Jets hope to be playing football in the new stadium in 2009.

With a focus on sustainability, the design is a significant departure from conventional sports facilities. Through the use of more than 100,000 square feet of solar panels, 36 wind turbines, rainwater collection, and wastewater treatment, the stadium complex is conceived as entirely self-sustaining—able to generate energy for itself and even return electricity to the grid. Tapping into a different kind of sustainability, the design incorporates the High Line, an abandoned elevated railroad track running from 34th Street to downtown (see September 2002, page 120). Built in the 1930s, the now-derelict rail line—if its proponents succeed—will become a green space connected to the stadium's landscape program. **BAY BROWN**

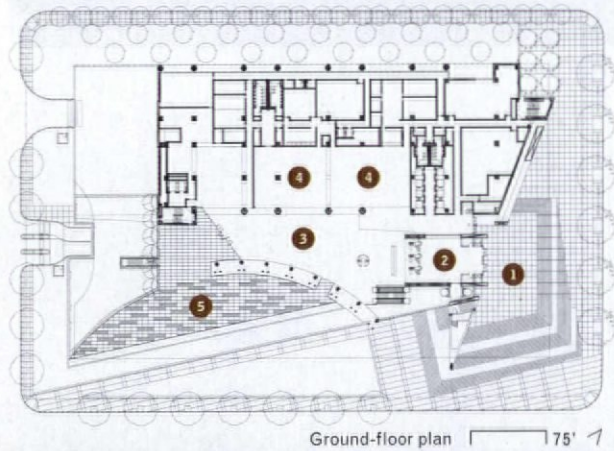


> on the boards

PERKINS & WILL / U.S. COURTHOUSE / LOS ANGELES

At 1.3 million square feet, this courthouse will have a considerable presence where the civic and commercial meet at Broadway and First Street in downtown Los Angeles. The architects attempted to effect the transparency that the American judicial system aspires to, while simultaneously making security and enclosure primary program objectives. The curved glass wall of the atrium is a unique tectonic assembly, which attempts to resolve these two goals, as well as being a focal point of the building's sustainability program.

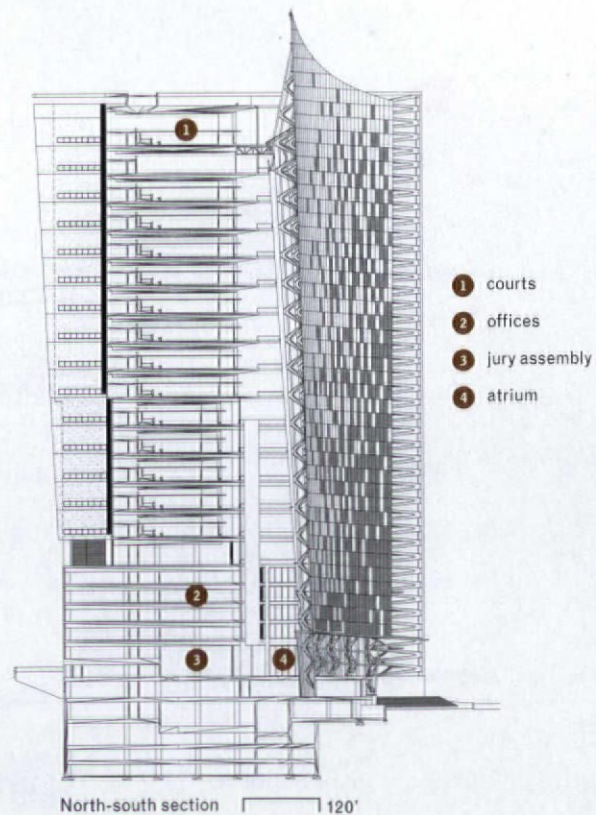
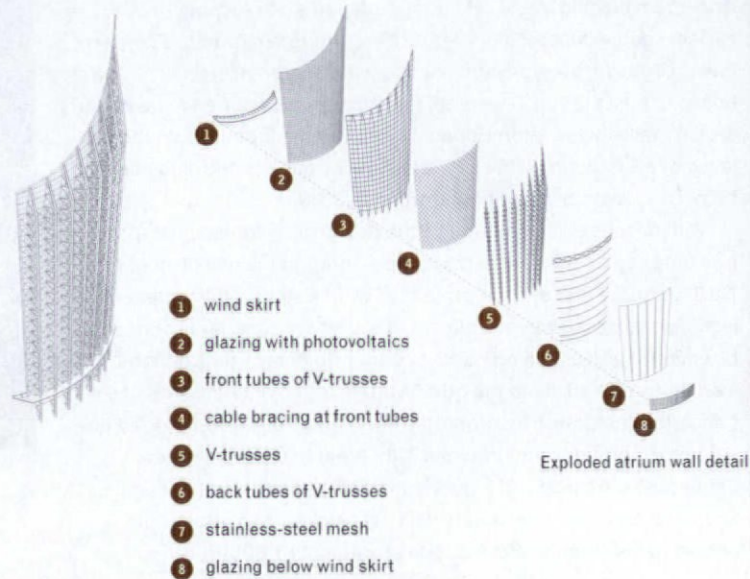
By collecting sun in winter for passive solar heating and filtering excess solar gain in summer, the climate-responsive atrium functions as a thermal buffer, reducing cooling loads by an estimated 228 tons. About 30,000 square feet of monocrystalline photovoltaic panels will be integrated into the atrium glazing, creating energy that will contribute 13 percent of the annual lighting load for the building. Daylight is admitted at opposite ends of the courtrooms with light shelves used to reflect the sun's rays deep into the building, potentially reducing electrical lighting loads in these spaces by 41 percent. Low-energy, underfloor air-displacement systems reduce cooling loads by 25 percent as compared to a typical overhead system.

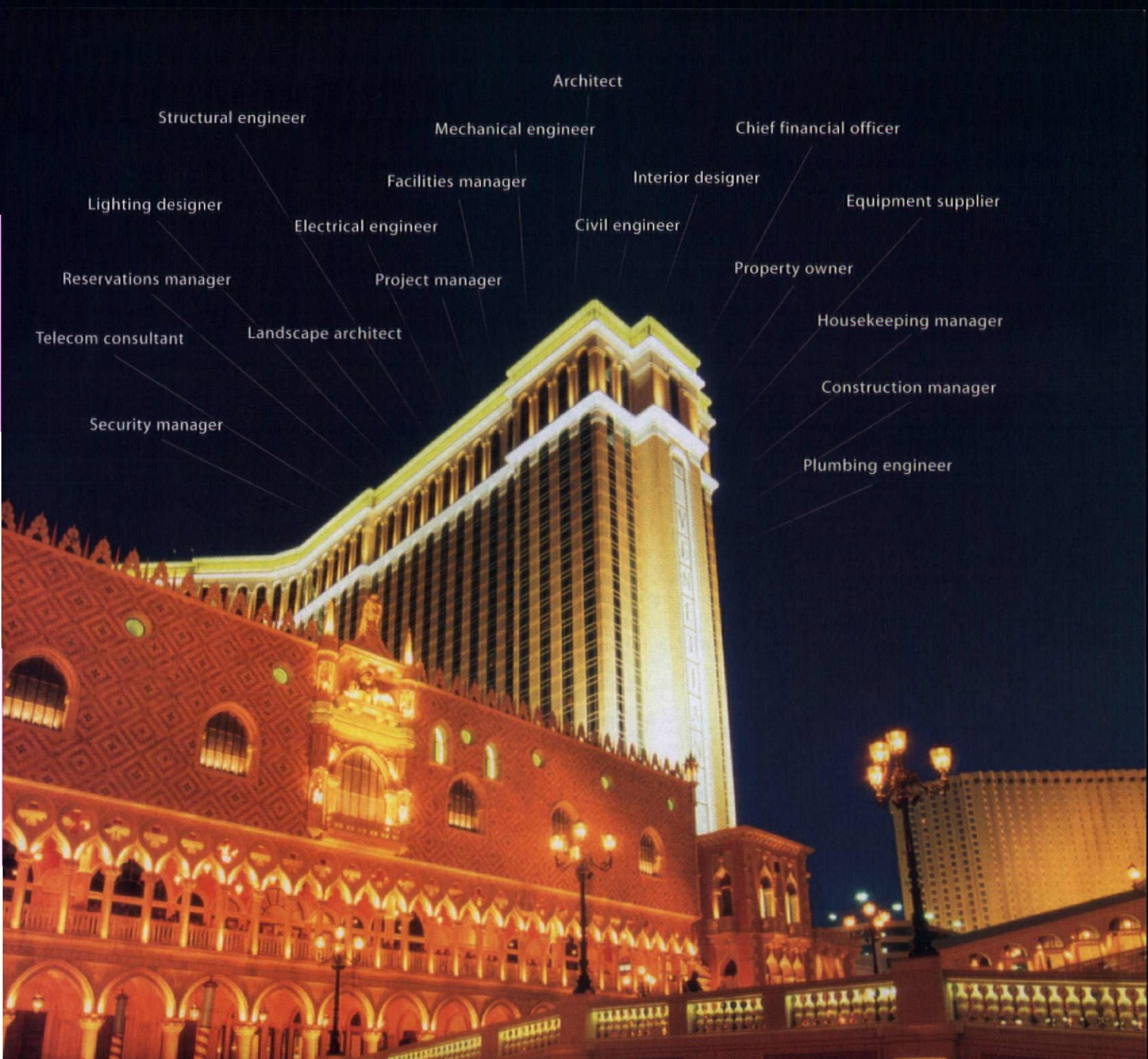


- 1 entrance
- 2 security check
- 3 atrium
- 4 jury assembly
- 5 public plaza



Commissioned as part of the General Service Administration's (GSA) Design Excellence Program, this courthouse was designed with sustainability as an imperative. While the GSA required Perkins & Will to shoot for a LEED silver certification, the architects are actually hoping for the gold when the building is completed in 2009, says design principal Ralph Johnson. **BAY BROWN**





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Construction manager

Plumbing engineer

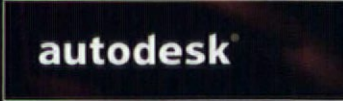
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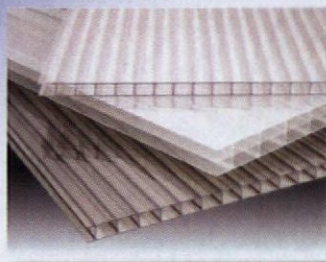
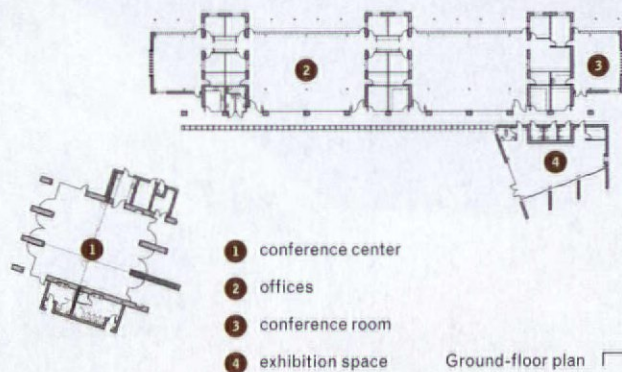
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> on the boards

MARMOL RADZINER + ASSOCIATES / TREEPEOPLE CENTER FOR COMMUNITY FORESTRY / LOS ANGELES

Located on 44 acres in Coldwater Canyon Park at the crest of the Santa Monica Mountains, the TreePeople Center for Community Forestry will become the environmental education organization's new home in late 2004. The 21,600-square-foot complex will include teaching and research facilities, a conference center, native gardens, and a community toolshed for the 30-year-old nonprofit, which teaches communities to manage their "urban forests," private trees and those that line neighborhoods.

The project consists of a 12,000-square-foot environmental learning and administrative center and a 3,800-square-foot conference center. The architects intend the complex to be one of the most resource-efficient buildings in the country, serving as a model of sustainable building and landscaping methods. The project is on target to achieve the U.S. Green Building Council's highest level of certification, the LEED platinum rating, by employing recycled materials from existing structures on the site, radiant floor heating using thermal mass, photovoltaic electrical generation, storm-water reclamation, and a gray-water irrigation system. **BAY BROWN**



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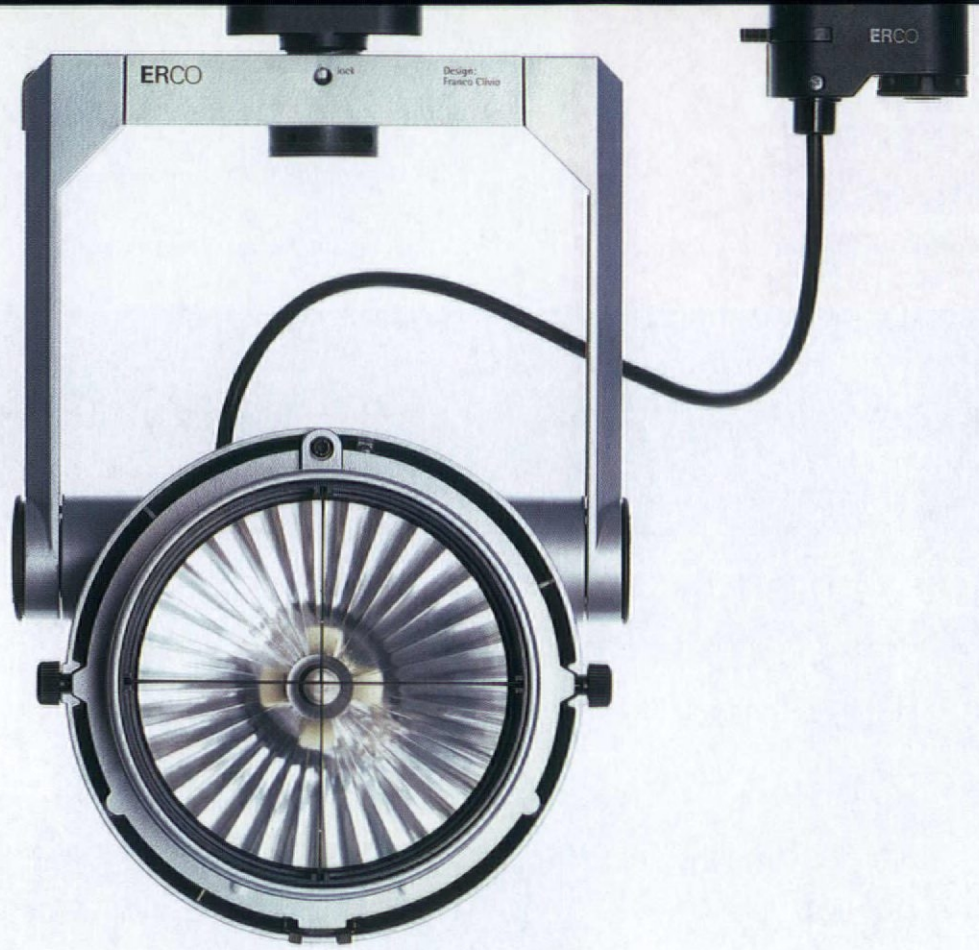
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Reviving Dead Malls

A competition seeks ways to regenerate shopping centers. BY MICHAEL WEBB

> ADAPTIVE REUSE When a mall has seen its best years go by, and ultimately goes into the retail netherworld, is there an afterlife? In a recent competition organized by the Los Angeles Forum for Architecture and Urban Design, contestants proposed to revive or replace troubled shopping malls with a sports center for high school students, facilities for seniors, a complex of art galleries, a strip of greenery extending into wetlands, a zoo, and a prison. These are the latest remedies being offered to the owners of America's failed shopping centers, victims of ferocious competition and stagnant demand.

Nearly a fifth of America's 2,000 large-scale regional malls are dying or declining, according to the study *Greyfields into Goldfields: From Failing Shopping Centers to Great Neighborhoods*, commissioned in 2001 by the Congress for the New Urbanism. With the nation mired in recession, the number of imperiled retail complexes is bound to grow. The National Endowment for the Arts, which has commissioned earlier studies on the adaptive reuse of movie palaces and railroad stations, recently published *Sprawl and Public Spaces: Redressing the Mall*, and it funded the Los Angeles Forum's ideas competition, Dead Malls.

As project coordinator Warren Techentin advised entrants, "The Dead Malls competition is based on the assumption that developers and redevelopment agencies cannot do experimental research themselves, and rely on the most predictable and standardized methods of mall conversion. However, malls are playing an increasingly significant role in public life, demanding that they become more inclusive of formerly excluded program types. The goal of this competition is not to reinvent



A winning entry by San Francisco landscape architects Stoner Meek proposed an ecological solution for Vallejo Plaza in California replete with recreational green space, wetlands, windmills, and electric cars.

retail, or the mall per se, but to deal with ideas that are rooted in a specificity of place and thereby become implicitly applicable to a number of real situations."

Dead Malls drew 75 entries from the United States, the United Kingdom, and Israel. Twenty-one of those entrants were invited to develop their proposals for a second round of judging that took place on March 1, yielding five equally premiated winners. The jury included architects Julie Eizenberg, Neil Denari, and Bob Somol; Jeffrey Inaba of AMO, the research and consultancy "mirror office" of the Office for Metropolitan Architecture; scholars Pat Morton and George Wagner; and artist-curator Matt Coolidge. Providing a reality check were developer Chuck Trevisan of the Irvine Company, which owns 120,000 acres of malls in California's Orange County, and Will Fleissig, cofounder of Continuum Partners, a mixed-use developer in Denver.

SHOPPED OUT

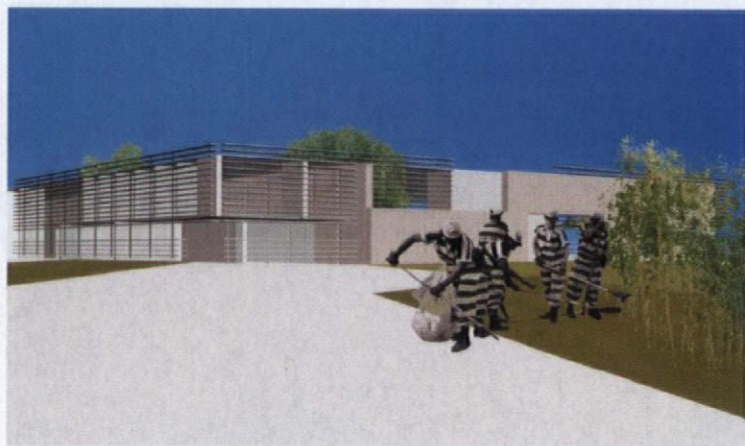
"We're over-retailed," declared Trevisan. "Too many developers take credits and rebates and run off, leaving cities stuck with a lot of non-performing malls." Growing up in Vallejo on the north edge of San Francisco Bay, he enjoyed a vibrant downtown. This was wiped out by the first big suburban mall, which succumbed to competition from the second. The trend toward

this kind of cannibalization continues. "Only one [Vallejo mall] is successful, and it's the biggest and the ugliest thing you've ever seen," he lamented. "The last time I went downtown, I cried, it was so badly boarded up."

One of these victimized malls, Vallejo Plaza, has found new life as a winning competition entry submitted by San Francisco landscape architects Stoner Meek. The firm proposed an ecological solution in which the dying mall and a defunct K-Mart would be piggy-backed onto a state-funded initiative to revive a neighboring wetland. The parking lot would be dug up and flooded, and a narrow 3,000-foot-long strip, presently occupied by buildings, would be transformed into recreational green space, with windmills for power generation and offshore islands where electric cars would be displayed. The project offers an idyllic prospect, though the designers' rendering provoked concern that the abundant bird life of the wetlands might be decimated by whirring blades.

Continuum's Fleissig emphasized the urgency of redeveloping malls that are no longer viable as retail spaces. "When the anchor goes, death comes quickly," he explained. "It becomes a cancer that spreads through the surrounding area, sucking out life and depressing tax revenues. Most pre-1990 buildings aren't worth adapting—it is cheaper to tear them down." He regretted that none of the contestants

>practice



While they didn't win, Jolie Kerns, Irene Cheng, and Brett Snyder caught the attention of the jury with their mall fashioned into a women's prison (left). One of the few entrants that approached the competition formally, Central Office of Architecture in Los Angeles sought to improve the design threshold of malls in their winning submission (right).

considered high-density housing, which is becoming a popular alternative.

Continuum has joined forces with the city of Lakewood, Colorado, west of Denver, to create Belmar, a 19-block residential-office-retail center that occupies the 103-acre site of the Villa Italia, once the largest shopping mall between Chicago and California. Belmar is one of several such developments in suburbs that have grown into cities. "Yearning for their own identity, they are converting the retail boxes and acres of asphalt that embodied suburban sameness into pedestrian-friendly Main Streets with unique character," wrote Christopher Swope in *Governing* last fall.

ANCHORS AWAY

Instead, the jury awarded two thoughtful makeovers: Pierre De Angelis and Carmen Suaro, architects in Culver City, California, won unanimous praise for the clarity and plausibility of their scheme to slim down the ailing Valley Plaza in North Hollywood. "Anchors away," was their battle cry and concept for eliminating unleaseable space and reconfiguring the anchor-store dumbbell plan into three linear strips: outdoor stands flanked by a public park and a covered concourse in which shoppers may roam at will. This agglomeration of small units, it seems, would take the mall back to its origin in the Middle Eastern souk.

Four New York City architects—Christine Williams, Tobias Armbrorst, Daniel D'Oca, and Georgeen Theodor—won with their proposal for a collection of small, cheap, and feasible (and potentially lucrative) moves that could be implemented over time to regenerate the Dutchess Mall in Fishkill, New York. They envisaged a mix of offices for small businesses grouped around service cores, a daycare facility, and traffic-generating drive-through car washes, banks, and fast-food outlets. The jury felt that this was more a marketing strategy than an architectural intervention—a criticism that was made of many entries—but they admired the way the design team had observed how the space was used, enhancing it with a modest investment. Trevisan noted that the architects had turned the storefronts to face out, a feature that retail tenants increasingly demand.

This proposal subverted two key elements of the traditional mall: a

wasteful monoculture and hermetically sealed boxes. In contrast, another proposal—notable, but not premiated—for the same site sought to preserve the "Frankenstein's monster" of its impassive walls and turn it into a minimum-security women's prison, exploiting the similarity of jails and malls in their physical structure and plan.

"Retail is conservative and doesn't attract adventurous architects," complained Julie Eizenberg, a partner in the Los Angeles firm of Koning Eizenberg. Despite this sentiment that the entries were short on design, the one pure statement among the winning entries was the transformation of the Hawthorne Mall in Southern California by the Central Office of Architecture, a Los Angeles firm. Here, the emphasis focused entirely on the shaping of space into curvaceous forms. The fifth winner was Field Eagle Rock, an imaginative but somewhat unconvincing attempt by Santa Monica architects Elizabeth Meyer and Anne Rosenberg to suburbanize an urban mall near Pasadena, California, by selectively demolishing and scattering its remaining elements among greenery.

While these proposals had merit, the realities of real estate and demographics carried the competition. "You can't apply a socially desirable program and hope that works, and you can't attack the problem with architectural forms," concluded Bob Somol. "In this competition, the viable schemes were more interested in designing scenarios and economies, describing constituencies, and making it look like a desirable place to go." While conceived as an "ideas" competition, the coordinators intend to publish the winning entries and other significant projects, as well as exhibit them in several venues across the country. The winners' boards will be displayed at the International Council of Shopping Centers Conference in Las Vegas this month. That's the jury that really counts.

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.

The winning entries and additional information on the competition can be found at www.laforum.org.

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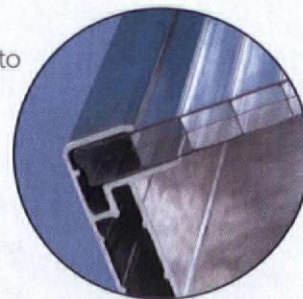


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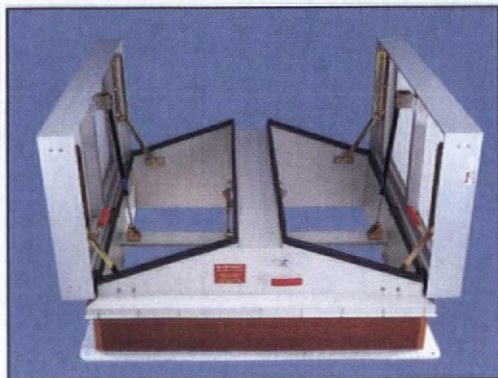
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The Going Rate

It's confusing, cumbersome, and in some cases oversimplified, but the LEED Rating System is the only game in town.

BY NADAV MALIN



> **STANDARDS** "Democracy is the worst form of government except for all those other forms that have been tried from time to time." Winston Churchill's 1947 comment to the House of Commons might just as well be a commentary on the U.S. Green Building Council's LEED Rating System. Applying for LEED certification is cumbersome, often confusing, and occasionally frustrating. The desire to keep the system accessible and easy to use for architects has, in some cases, compromised its very intent. Yet, even in countries that have in the past implemented other rating systems, organizations are now lining up to use LEED.

LEED stands for "Leadership in Energy and Environmental Design," a name and acronym coined in 1996 by Rob Watson, senior scientist at the Natural Resources Defense Council and the driving force behind LEED since its inception. Officially launched in 1998, LEED is a set of systems that provides a method for determining the degree to which a building meets commonly accepted standards for environmental sensitivity. At the heart of the program is a checklist of prerequisites and credits, each of which reflects a particular aspect of green performance. Each credit is worth one or more points (up to a total of 69 possible points). By fulfilling all the prerequisites and accumulating enough points, a building attains the status of "LEED Certified." Depending on their level of "greenness," buildings garner the label of Silver, Gold, or, for the truly ambitious, Platinum.

In four short years, this rating system has become synonymous with sustainable design in the United States. But LEED has done more than

merely define sustainable design; it has also generated enough excitement to drive the green building field from a niche market into the mainstream of commercial and institutional construction. The U.S. Green Building Council (USGBC) estimates that currently somewhere between 3 and 6 percent of all new commercial building square footage is being designed with the LEED checklist as a guide.

Going through the LEED process definitely adds to the soft costs associated with a building. There are registration and application fees, the design-team labor required for the application, and the time needed to optimize the design for energy efficiency and other green metrics. In terms of overall construction costs, however, a LEED building need not cost more than a standard building. In any case, investment that might be made in extra features should be recouped with savings in operating costs.

COMPLEXITY AND CONTRADICTION

LEED originators describe the rating system as "deceptively simple." Anyone with experience designing buildings and a passing familiarity with the principles of sustainable design can look over the checklist of credits and envision green strategies to implement. In practice, however, following the system can be quite tricky, since some of the strategies are more involved than they first appear. For example, reducing light pollution by using focused, full-cutoff, exterior lighting fixtures doesn't seem complicated, but where steep slopes are involved, it is often impossible to prevent light trespass to neighboring grounds. In other situations, documenting implementation is still a challenge, although the current version of the system—just released last November—has removed a number of hurdles.

Many of LEED's important technical issues are being resolved with time. Meanwhile, early users have had to decipher sometimes flawed interpretations and unclear objectives. For example, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1 is the basis for the LEED energy-efficiency credit, which is worth up to 10 points. While this standard was written with the intent of establishing a minimum performance level, LEED stretches this intent by using it to establish a baseline to reward superior performance. Moreover, Standard 90.1 does not allow designers to take credit for energy savings associated with smart architectural massing and orientation, among other strategies; yet, those approaches are at the core of what LEED aims to promote.

The system walks a fine line between ease of use and integrity: If it is too complex, no one will use it, but much of the challenge in quantifying LEED performance comes from the need to verify achievements that are inherently difficult to measure. Should daylight penetration and access to views, for example, be measured with or without workstations in place? Ignoring the workstations might mean that the achievement is not meaningful, but including them makes for very complicated calculations to determine how the workstations affect access to daylight and exterior views.

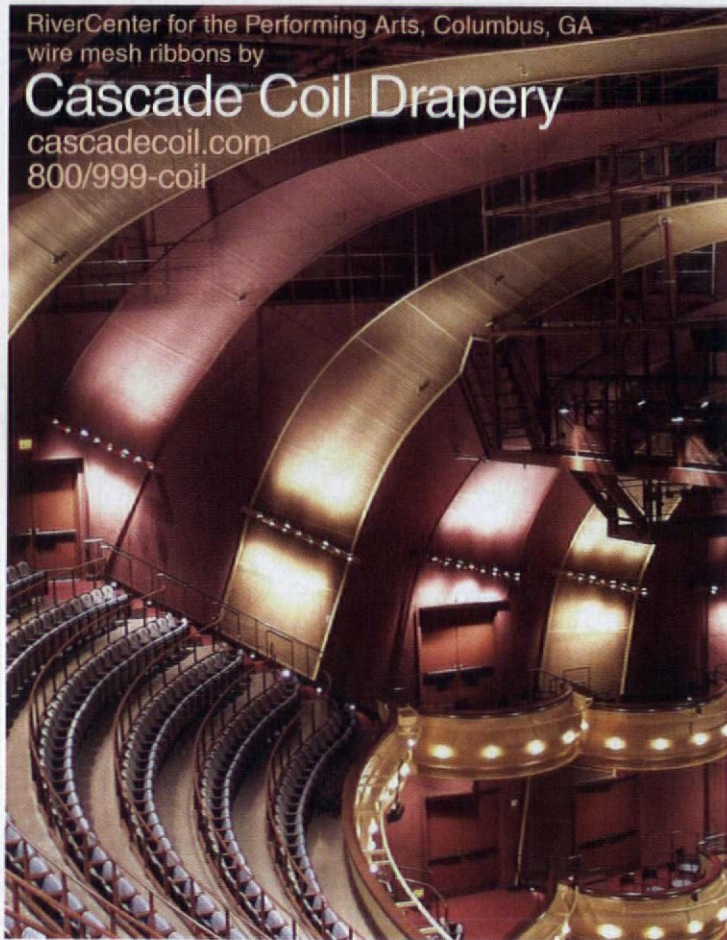
Similarly, the LEED system of credits rewards the use of materials with recycled content, or those made from rapidly renewable resources, even though it is widely acknowledged that those materials might not be the most ecologically sensitive choices. The means for determining the most ecological selection of materials are simply not yet widely available or

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feasible for designers to use. LEED credits represent a compromise between expediency and integrity, with sacrifices on both sides.

DESIGN BY CHECKLIST

Beyond the individual credits, some of LEED's drawbacks are inherent to the checklist format. In the hands of inexperienced designers, the checklist can result in a piecemeal approach to sustainability, with green features piled onto a conventional design. This approach inevitably adds cost and may not result in a truly high-performance building. The simplicity of the checklist is fundamental to the program's success, however. Experienced green designers can use it to organize a team around the task of designing a green building, while integrating selected strategies with little or no additional cost. The structure of the system, when backed by a client's commitment to achieving the rating, provides a critical insurance that key green aspects won't fall by the wayside as deadlines and budgets force compromises to a project. In addition, LEED transcends the limitations of the checklist with up to four "innovation points" for documented achievements that are not covered in the checklist.

The apparent simplicity of the relatively new program, its popularity, and the fact that becoming a "LEED-accredited professional" doesn't require a huge investment (just attend a one-day training session, study the *LEED Reference Guide*, and pass a test) have swelled the ranks of green designers (see chart, page 45). This growth in interest and influx of energy is commendable; unfortunately, getting the initials after one's name is easy compared with

creating a sustainable building. Doing that requires integrating a green agenda at the earliest stages of the design process, hiring consultants who have experience with green technologies, and working through design iterations as a team.

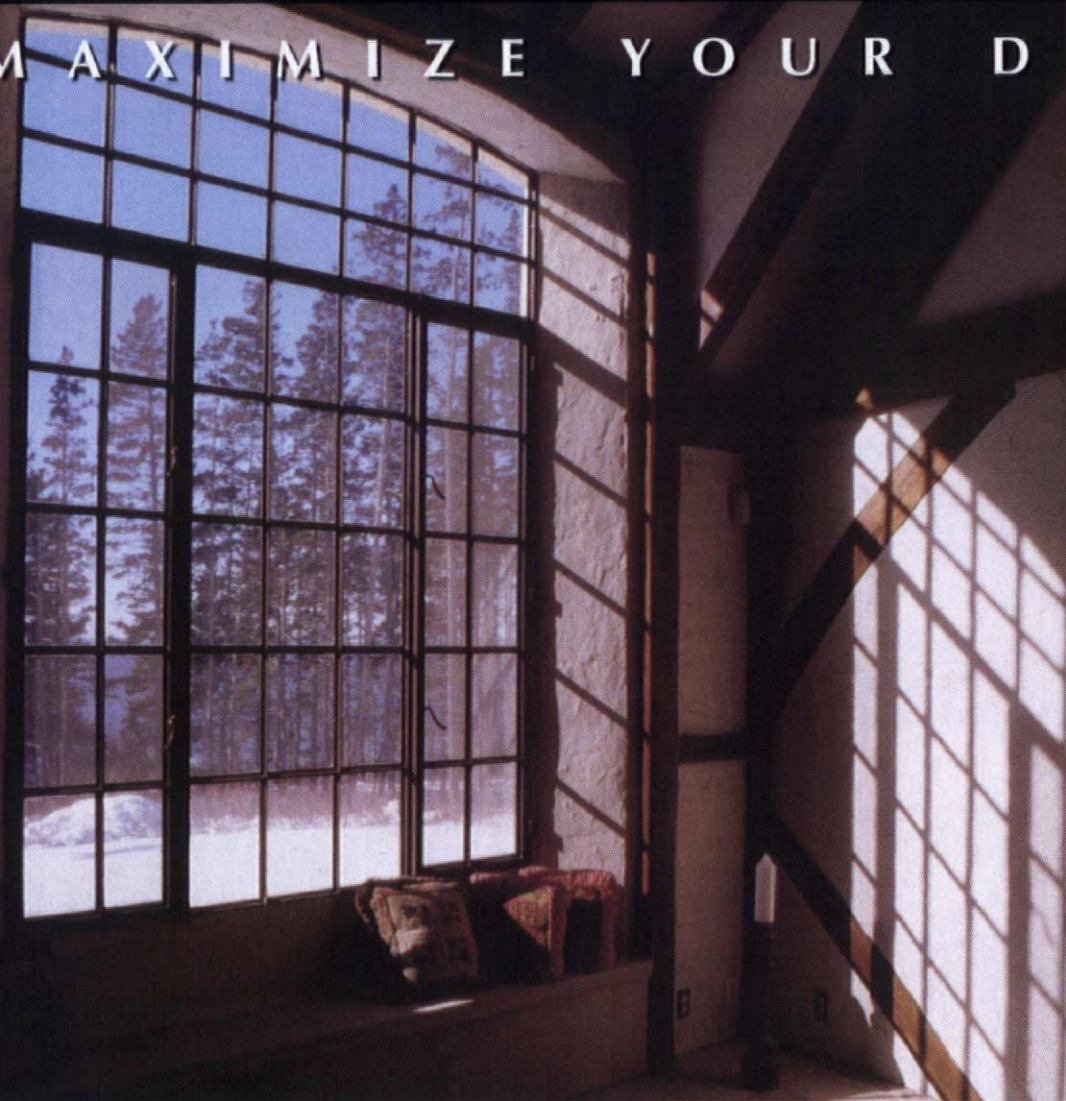
LEED certification, or the "greenness" of a building, is typically determined at the point of occupancy based on an application that includes information about a building's systems design and construction. To its credit, LEED both requires and encourages building commissioning, wherein a building's systems are tested to ensure that they actually operate as designed. Nevertheless, there are many examples of buildings that were touted as "sustainable" but that have not performed as well as advertised. Ultimately, it is not the building's state at the point of occupancy that matters, but how well it performs over time. That performance depends on successful design, construction, and operation.

USGBC is now testing a parallel rating system known as "LEED for Existing Buildings," or LEED-EB. This new system would serve both buildings that were certified initially and those that were not. In theory, each building with a LEED plaque will be recertified over time using LEED-EB to document its ongoing success. This will be the real test, of course: proving whether or not these buildings can go green for good. ■

NADAV MALIN IS EDITOR OF *ENVIRONMENTAL BUILDING NEWS* AND CONTENT DIRECTOR FOR BUILDINGGREEN.COM. HE COCHAIRS THE MATERIALS AND RESOURCES TECHNICAL ADVISORY GROUP FOR LEED.

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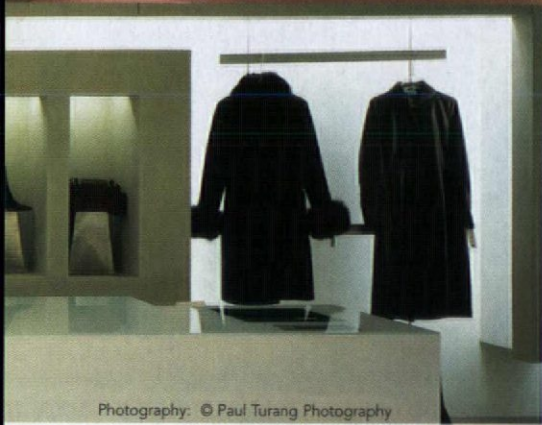
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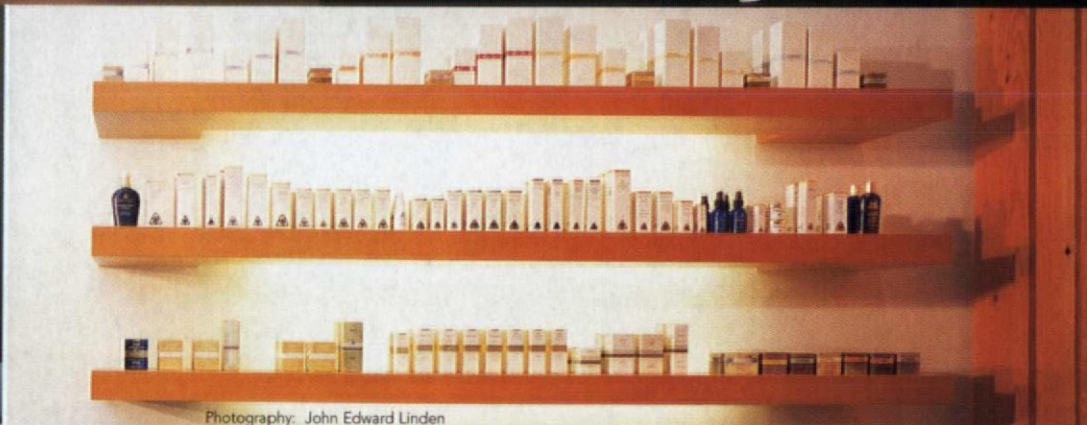
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"Slide by Side"



Little Green Schoolhouse

The sustainability movement is changing the way we educate a new generation of architects. BY JULIA MANDELL



> **EDUCATION** There is enough talk about sustainable design these days to keep architects acutely aware of its growing place in the practice, especially with new laws, tax credits, and voluntary standards like the U.S. Green Building Council's LEED Rating System; what is less visible to the professional community, however, is the impact sustainability is having on education. "Schools are changing," says Vivian Loftness, dean of the School of Architecture at Carnegie Mellon University in Pittsburgh. "Now when students apply for a job, the question isn't just, 'Do you know AutoCAD?'—that's a given. Now they are asking, 'Do you know LEED?'" While LEED has given practicing architects and their clients a concrete set of criteria for green projects, academics and policymakers have been working on ways to incorporate environmental thinking

and sustainable design into the curriculum of architecture schools. Driven by various aspects of sustainability, innovative programs are changing the way a number of schools approach architectural education, with promising results.

Ball State University in Muncie, Indiana, is just one of a number of schools approaching sustainable design as a cross-departmental area of inquiry. "It's just impossible to skip the interdisciplinary question," says Robert Koester, architecture professor and director of the Center for Energy Research/Education/Service at the school. "Sustainability is about economics, environment, and energy, and it's about ethics and social equity. If we follow traditional educational modeling and management, we can't get at that complexity."

At Ball State, this realization has resulted in

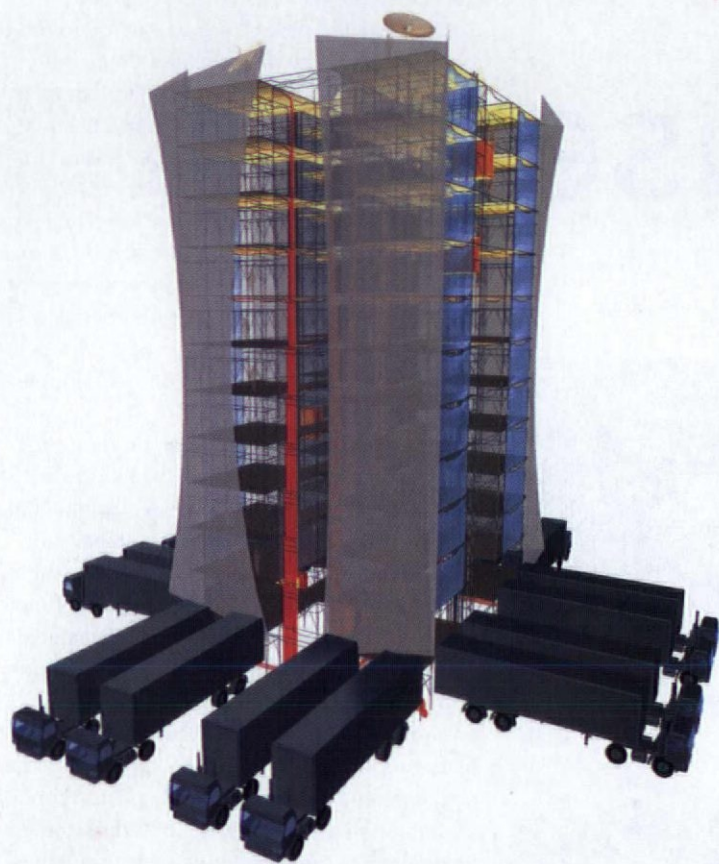
the "Clustered Minors in Environmentally Sustainable Practices," a group of interrelated minors from different disciplines: Environmental Context for Business, Environmental Contexts in Healthcare, Environmental Policy, Sustainable Land Systems, and Technology and the Environment. The program, which recently won a national award from the Green Building Council, allows architecture students to substitute one of these minors for the elective courses they would normally take. Coming from different majors, students offer a range of perspectives in the classroom, which allows for cross-pollination.

Many schools are also tailoring their program to focus on local issues. At Florida A & M University in Tallahassee, Florida, architecture professor Laverne Wells-Bowie and her colleagues are teaching a critical regionalism informed by environmentalism. In some courses, students work with clients and communities to better understand and engage the cultures and climates of tropical regions that inform and reflect life in Florida. "[Regionalism] can help people look beyond their own immediate environment," says Wells-Bowie. "They can understand correlations that different tropical environments have and then apply solutions and tools for new ways of building things. There is a need for a new tropical architecture, and sustainability is a big part of that."

One graduate studio at Florida A & M designed a sustainable master plan for the University of St. Maarten, on the Caribbean island of the same name. Working with the university as a client, students "looked at sustainability not only on that island, but in other tropical areas, and peeled back the rush to mechanize that was prevalent during and after the International Style. They are learning how to both make use of and mitigate climatic forces," says Wells-Bowie.

Educators are also making efforts to increase interaction between the building industry and academia, with programs like Carnegie Mellon University's "Intelligent Workplace." In operation since 1999, the Intelligent Workplace is a 7,000-square-foot "living laboratory" where professors and graduate students perform research, dwelling day after day with sustainable materials and building systems that are built into the facility.

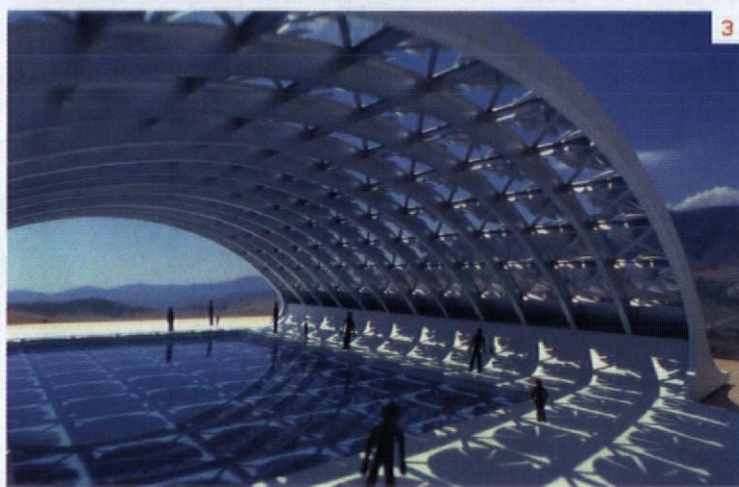
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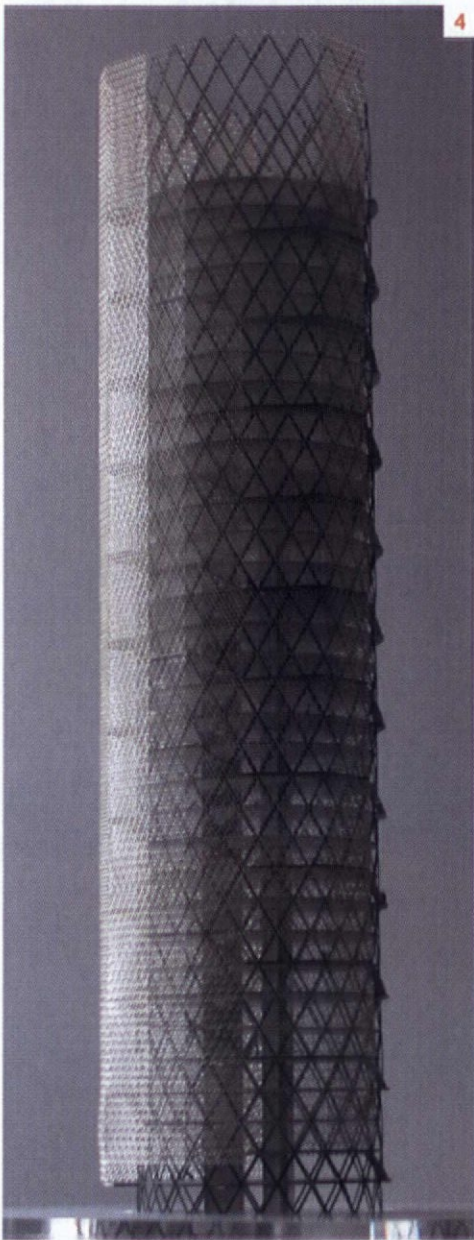
Freak-Show Green

Sustainability may be mainstream, but new experiments are far out. BY C.C. SULLIVAN

> RESEARCH It's hardly exaggerating to say that sustainability is the most important design input of our time. The big idea—balancing our habits and commercial practices with natural forces of renewal—is now pervasive enough to affect some portion of every craft and industry, from apparel design and food service to agriculture and mining. The same is true in architecture, in which environmentally based design has become its own subdiscipline, with a new-sprung hierarchy of experts, ratings, codes, and regulations. With a variety of motives, many architects have staked a piece of their design work on green building. What has emerged is a range of approaches to sustainable design, from the pragmatic to the cultish, with surprisingly varied solutions. Their aesthetic and functional diversity helps remind us that sustainable design is not an end but a means. Like the engineering disciplines, it is not a determinant of form, but rather an input, or overlay, that is an integral and undeniable part of today's design equation.



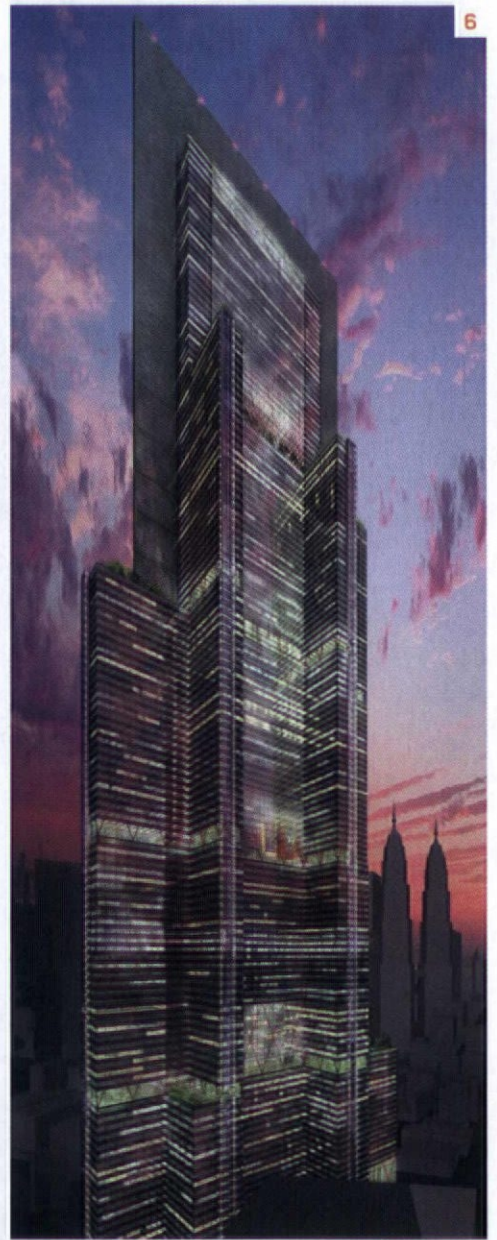
Unlike other expert vocations, however, this one is still nascent. We mainly agree on the goals, but the methods are in dispute, and there is plenty of mopping up to do. Fortunately, a core group of architects fixated on the problem of sustainability is wielding the mop. In their far-flung work, both theoretical and built, they are undertaking often-extreme experiments that help clarify the direction of a green future. (Many of these efforts are documented in *Big & Green*, an impressively sweeping exhibit at the National Building Museum in Washington, D.C., through June 22.) Their investigations invert the equation, making architecture a subdiscipline to the main effort: sustaining our ecology. Questions of cost, constructability, and even aesthetics are surrendered to the experiment. The approach is extreme, and the results are, too: muscular, breathing eulogies to mother earth. It's eco-hyperbole. It's freak-show green. And it's changing our life on earth. ■



4



5



6

1 FTL DESIGN ENGINEERING / RECYCLABLE, PORTABLE FABRIC SKYSCRAPER A concept for a 12-story, pack-and-go tower is built entirely of off-the-shelf construction equipment—scaffolding, construction elevators, and portable toilets—wrapped in tensile fabric. Trailer-mounted generators and HVAC units serve the reusable structure.

2 MVRDV / 3D GARDEN The high-density “stacked ecosystem” is the focus of works by the Rotterdam-based architects, from apartment towers with skyarks to agricultural towers for livestock and fish farms. Part of their mission is to bring natural relief to high-rise developments. At the 3D Garden, tree-planted balconies offer shade, visual variety, and an end-use for waste and water runoff.

3 MICHAEL JANTZEN / WIND SHADE ROOF This designer delights in wind-induced spinning, creating structures and form with the blades of wind-powered generators. The Wind Shade Roof is a long-span structure clad with wind turbines for both shading and electrical power. Another project, the Wind Turbine Observation Tower, is even more kinetic: Tower segments revolve around occupants in a steel and aluminum circulation core 25 feet in diameter.

4 PETER TESTA ARCHITECTS / CARBON SKYSCRAPER The lighter building materials are, the less they cost in hauling, hoisting, and scrapping. A group led by Peter Testa uses a superlight structural composite—resin-impregnated carbon fiber—to support a 40-story cylindrical skyscraper prototype. The inch-wide carbon strands are woven into a narrow helicoidal perimeter configuration, covered with a sheer curtain of ETFE resin membrane, that requires no interior columns.

5 RICHARD ROGERS PARTNERSHIP / INDUSTRIALIZED HOUSING SYSTEM Modular manufactured components could deliver 100,000 high-rise housing units for 20 percent of the cost of conventional construction. Designed for the forested hills of Korea, this project advances the art of low-impact construction.

6 KISS + CATHCART / EXPERIMENTAL SOLAR TOWER Solar and wind power meld in this 150-story tower concept. The thin, almost transparent skyscraper is clad with solar panels, and photovoltaic louvers wrap wind turbines to reduce the unsettling shadows caused by the spinning.

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- 231 Major Industries
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- 233 Naturalite Skylight Systems
- 234 Polygal U.S.A.
- 235 Schott

- 236 Solatube International
- 237 Structure Unlimited
- 238 Suntuf Inc.
- 239 Traco Skytech Systems
- 240 Velux-America
- 241 Vistawall Architectural Products
- 242 Wasco Products

Hardware

- 243 Accuride International
- 244 Adams Rite Mfg
- 245 Arakawa
- 246 Construction Specialties- C/S Group
- 247 Dorma Architectural Hardware
- 248 Dorma Glas
- 249 Dor-O-Matic Closers
- 250 DynaLock Corporation
- 251 Essex Industries
- 252 Forms & Surfaces
- 253 Fusital
- 254 Hafele America
- 255 Hewi
- 256 I-R Security and Safety
- 257 Jackson Corporation
- 258 LCN Closers
- 259 Marlite
- 260 Nanz Custom Hardware
- 261 Pemko
- 262 Rocky Mountain
- 263 Schlage Lock
- 264 Sugatsune America
- 265 Valli & Valli
- 266 Von Duprin
- 267 Yale Commercial Locks & Hardware
- 268 YKK AP America
- 269 Zero International

Access Door & Panels

- 270 Acudor Products
- 271 Sierra Products
- 272 Karp Associates
- 273 Milcor Inc
- 274 Nystrom Products
- 275 Precision Ladders
- 276 The Bilco Company

Glass

- 277 Cesar Color
- 278 CertainTeed Corporation

- 279 Joel Berman Glass
- 280 Leucos USA Inc
- 281 Madico
- 282 Meltdown Glass
- 283 O'Keefes
- 284 Pilkington
- 285 PPG Industries
- 286 Schott
- 287 Solutia
- 288 Technical Glass Products
- 289 Viracon
- 290 Visteon Corporation

Glazed Curtain Walls

- 291 Benchmark Architectural Systems
- 292 EFCO
- 293 Kalwall
- 294 Kawneer
- 295 Major Industries
- 296 PPG
- 297 Tubelite
- 298 Vistawall Architectural Products
- 299 Wausau Window & Wall Systems
- 300 Westcrowns

Translucent Wall & Roof Systems

- 301 Duo-Guard Industries
- 302 Kalwall
- 303 Major Industries
- 304 Suntuf Inc.

FINISHES

Gypsum Board

- 305 BPB Celotex
- 306 Collins-Truwood
- 307 Georgia-Pacific
- 308 Johns Manville
- 309 Lafarge Gypsum
- 310 National Gypsum
- 311 Temple Inland
- 312 United States Gypsum
- 313 W.R. Bonsal Company

Gypsum Fabrications

- 314 Custom Castings Northeast
- 315 Formglas
- 316 Hyde Park Fine Art of Mouldings
- 317 Monumental Construction & Moulding Co.
- 318 Pittcon Industries
- 319 Plastglas, Inc

Ceilings

- 320 Alpro
- 321 Altro
- 322 Armstrong
- 323 BPB Celotex
- 324 Ceilings Plus
- 325 Chicago Metallic
- 326 Eckel Industries
- 327 Ecophon Certainteed
- 328 Epic Metal
- 329 Fry Reglet
- 330 Gage Corp
- 331 Georgia-Pacific
- 332 Gordon
- 333 Hunter Douglas Architectural Products
- 334 Illbruck Architectural Product
- 335 Johns Manville
- 336 National Gypsum
- 337 Novawall Systems
- 338 Owens Corning
- 339 Sound Seal
- 340 USG

Ceramic Tile

- 341 American Marazzi Tile
- 342 American Clean/ Daltile
- 343 Ann Sacks

category continues on next p.

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- 45 Florim, USA
- 46 Graniti Fiandre
- 47 Imagine Tile
- 48 Laufen Int'l
- Resilient Flooring**
- 49 Amtico
- 50 Armstrong
- 51 Azrock
- 52 Centiva by International Floors of America
- 53 Ceres
- 54 Colbond
- 55 Congoleum
- 56 CSSI Resilient Surfacing
- 57 Domco
- 58 Endura Flooring
- 59 Flexco
- 60 Forbo
- 61 Johnsonite
- 62 Kentile
- 63 Lonseal Flooring
- 64 Mannington
- 65 MAPEI
- 66 Marley-Flexco
- 67 Maxxon Corp
- 68 Mondo USA
- 69 Pacific Polymers International
- 70 R.C. Musson Rubber Co
- 71 Roppe
- 72 Tarkett
- 73 Toli
- Rubber Flooring**
- 74 Azrock
- 75 Burke Mercer
- 76 Dodge Regupol
- 77 Endura
- 78 Johnsonite
- 79 Lonseal Flooring
- 80 Marley Flexco
- 81 Nora
- 82 Pawling
- 83 R.C. Musson
- 84 R.C.A. Rubber
- 85 Roppe
- 86 Tulflex
- Laminates, Plastic**
- 87 Abet
- 88 Formica
- 89 Georgia-Pacific
- 90 Nevamar
- 91 Wilsonart International
- Laminate Flooring**
- 92 ABET Laminati
- 93 Arborite
- 94 Bruce Commercial
- 95 Formica Flooring
- 96 Lamin-Art
- 97 Mannington Commercial
- 98 Nevamar
- 99 Pergo
- 100 Pionite
- 101 Wilsonart International
- Carpet Tile/Modular**
- 102 Bentley Mills
- 103 Bonar
- 104 Collins & Aikman
- 105 Flexco
- 106 Interface Flooring Systems
- 107 Lees
- 108 Mannington Commercial
- 109 Milliken Carpet
- 110 Mohawk Industries
- 111 Shaw

Carpet Fibers

- 412 BASF
- 413 DuPont Antron
- 414 Monsanto Contract Fibers
- 415 Wools of New Zealand

Paint/Stains & Finishes

- 416 Benjamin Moore & Co
- 417 Carlisle Coatings & Waterproofing
- 418 Devoe Paint
- 419 DuPont
- 420 Duron Paints & Wallcoverings
- 421 ICI Dulux Paint Centers
- 422 PPG Paints & Coatings
- 423 PROSOCO
- 424 SealMaster
- 425 Sherwin Williams
- 426 Valspar

Broadloom

- 427 Beaulieu
- 428 Bigelow
- 429 Blue Ridge
- 430 Durkan
- 431 Harbinger
- 432 J & J Commercial
- 433 Karastan
- 434 Lees
- 435 Mannington
- 436 Masland
- 437 Milliken
- 438 Mohawk
- 439 Monterey
- 440 Patcraft
- 441 Prince St.
- 442 Shaw

SPECIAL CONSTRUCTION

Air Supported Fabric

- Structures/Cable Systems**
- 443 Air Structures American Technologies
- 444 Birdair
- 445 Cascade Coil Drapery
- 446 Chemfab Corp
- 447 Clamshell Buildings
- 448 DuPont
- 449 Feeney Wire Rope and Rigging
- 450 Kalwall
- 451 Pfeifer Cable Structures
- 452 Seco South
- 453 Shade Concepts
- 454 Sprung Instant Structures
- 455 Structures Unlimited
- 456 Sullivan & Brampton

Security Access & Surveillance

- 457 Ademco
- 458 Alvarado Manufacturing Co
- 459 Automatic Control
- 460 Byan Security
- 461 Checkpoint Systems, Inc
- 462 Controlled Access
- 463 Dynalock Corp
- 464 Essex Industries, Inc
- 465 I-R Security and Safety
- 466 Schlage
- 467 Sensormatic Corp
- 468 Siedle Company
- 469 Von Duprin

MECHANICAL

Plumbing Fixtures

- 470 Acorn Engineering
- 471 American Standard
- 472 Bobrick
- 473 Bradley Corp
- 474 Chicago Faucet
- 475 Curvet USA

- 476 Duravit
- 477 Geberit Manufacturing
- 478 GROHE America
- 479 Haws Corporation
- 480 Kohler
- 481 Kroin
- 482 Rohl
- 483 Sloan Flushmate
- 484 Sloan Valve Company
- 485 Toto USA

Kitchen & Bath Hardware

- 486 Bobrick
- 487 Dornbracht
- 488 Ginger
- 489 Hafele America
- 490 Kohler
- 491 Kroin
- 492 Moen
- 493 Price Pfister
- 494 Rohl
- 495 Sloan Valve Company
- 496 Soho
- 497 Toto USA
- 498 Valli & Valli

CONVEYING SYSTEMS

Elevators/Escalators

- 499 Access Industries
- 500 Atlantic Lifts
- 501 Atlas Elevator
- 502 Concord Elevator
- 503 Fujitec America
- 504 Inclinator Company of America
- 505 Infinite Access
- 506 KONE
- 507 National Wheel-O-Vator
- 508 Otis Elevator
- 509 Pflow
- 510 Schindler Elevator
- 511 Thyssen Dover Elevator
- 512 ThyssenKrupp Elevator

ELECTRICAL

Lighting

- 513 Advent
- 514 Alkco
- 515 Allscape Lighting
- 516 ALS-Architectural Lighting Systems
- 517 Altman Lighting
- 518 American Glass Light
- 519 Architectural Area Lighting
- 520 Ardee
- 521 Artemide
- 522 Baldinger
- 523 Bartco Lighting
- 524 Bega
- 525 Birchwood Lighting
- 526 B-K Lighting
- 527 Boyd Lighting
- 528 Bruck Lighting
- 529 Capri
- 530 Color Kinetics
- 531 Columbia Lighting
- 532 Condaz
- 533 Cooper Lighting
- 534 CSI
- 535 D'ac
- 536 Davis Muller
- 537 Demier & Hamlyn
- 538 Elite Bohemia
- 539 Elliptipar
- 540 ERCO
- 541 Engineered Lighting Products
- 542 ESTILUZ, INC
- 543 Excelline
- 544 FAD Lighting

- 545 Flos
- 546 Focal Point
- 547 Foscarini
- 548 Gardco Lighting
- 549 GE Lighting
- 550 Hadco
- 551 Halo
- 552 Hoffmeister
- 553 Holophane
- 554 Hubbell
- 555 ILEX
- 556 Insight Lighting
- 557 Iris
- 558 Juno
- 559 Kim Lighting
- 560 Lam
- 561 Ledalite
- 562 Leucos USA
- 563 Leviton
- 564 Lightolier
- 565 Litecontrol
- 566 Lithonia
- 567 Lighting Services Inc
- 568 LUCEPLACE USA, Inc
- 569 Lucifer Lighting

Luminis

- 570 Luminis
- 571 Lutrex
- 572 Lutron
- 573 Luxo Corp. US
- 574 Luxo Italiana
- 575 Martin Professional
- 576 Metalumen
- 577 Nessen
- 578 Nora Lighting
- 579 NouVIR Research
- 580 O Luce
- 581 Osram Sylvania
- 582 Peerless
- 583 Phillips Lighting
- 584 Prescolite
- 585 Prisma
- 586 Prudential Lighting
- 587 Rudd
- 588 Selux
- 589 Sirmos
- 590 Specialty
- 591 SPI
- 592 Spring City Electrical Manufacturing Company
- 593 Supervision
- 594 Targetti
- 595 Tech Lighting
- 596 The Watt Stopper
- 597 Unilight
- 598 Vantage Controls
- 599 Visa Lighting
- 600 Winona
- 601 Zumtobel Staff

FURNISHINGS

Furniture Systems

- 602 Allsteel
- 603 American Seating
- 604 Haworth
- 605 Herman Miller
- 606 HON
- 607 KI
- 608 Kimball Office
- 609 Knoll
- 610 Nova
- 611 Paoli
- 612 Steelcase
- 613 Stone Dimensions
- 614 Teknion

Seating

- 615 Allsteel
- 616 American Seating
- 617 Haworth
- 618 Herman Miller
- 619 HON
- 620 Humanscale
- 621 Keilhauer
- 622 KI
- 623 Kimball Office
- 624 Knoll
- 625 Steelcase
- 626 Stylex
- 627 Vitra

Casegoods

- 628 Allsteel
- 629 Bernhardt
- 630 Bretford
- 631 Hale Manufacturing
- 632 Harden Contract
- 633 Haworth
- 634 Herman Miller
- 635 HON
- 636 KI
- 637 Kimball Office
- 638 Knoll
- 639 Meridian
- 640 Paoli
- 641 Steelcase

Outdoor Furniture

- 642 Barlow Tyrie
- 643 Brown Jordan
- 644 Earth Care
- 645 Knoll
- 646 Landscape Forms
- 647 Lloyd Flanders
- 648 McGuire
- 649 Smith & Hawken
- 650 Wabash Valley
- 651 Weatherend
- 652 Woodard

Solid Surfacing

- 653 Avonite
- 654 DuPont Corian
- 655 Formica
- 656 Fountainhead
- 657 Nevamar
- 658 Swanstone
- 659 Wilsonart

Wallcoverings

- 660 Bolta
- 661 The DesignTex Group
- 662 Eurotex
- 663 Genon
- 664 Innovations in Wallcoverings
- 665 J.M. Lynne
- 666 Koroseal
- 667 Lanark
- 668 Maharam
- 669 Wolf Gordon

COMPUTER/SOFTWARE

- 670 @Last Software
- 671 Autodesk
- 672 Autodesk/SSys
- 673 Bentley Systems
- 674 CAD-1
- 675 Datacad
- 676 Graphisoft
- 677 Nemetschek
- 678 Revit Technology
- 679 Wind-2 Software

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MASONRY

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FINISHES

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SPECIAL CONSTRUCTION

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MECHANICAL

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CONVEYING SYSTEMS

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ELECTRICAL

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FURNISHINGS

602	603	604	605	606	607	608	609	610	611	612	613	614	615	616
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COMPUTER/SOFTWARE

670	671
672	673
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676	

I would like to vote for the following suppliers who were not listed

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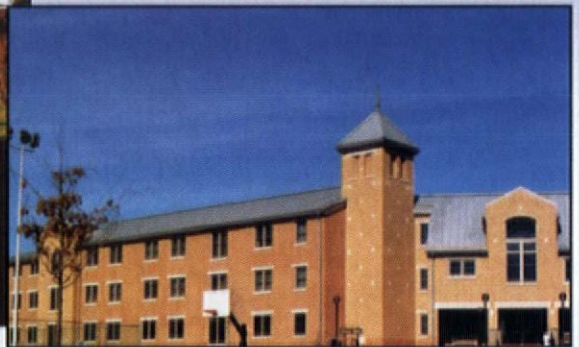
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ANCIENT WISDOM

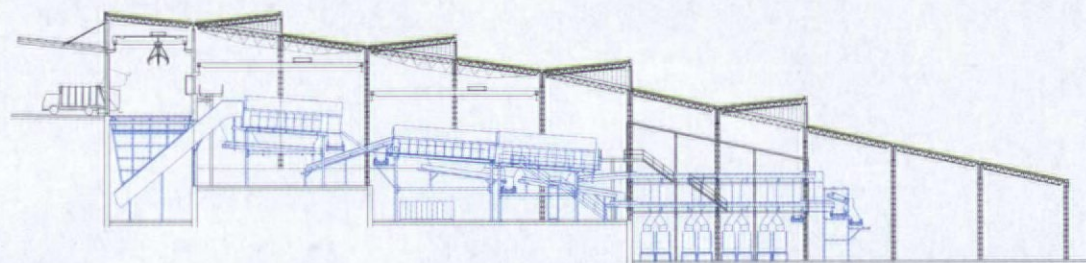
In places where our ancestors suffered extremes of climate and scarce resources, ingenious modes of sustaining human settlement have long informed architectural expression. In the hot deserts of the Yazd region of Iran, for example, ancient towers called *badgir* still capture hot winds and send them through the cool chambers of *ab-anbar*—underground water tanks made of *deimeh*, a mix of chalk, sand, and charcoal powder—to cool adjacent dwellings. In the more temperate city of Hyderabad, Pakistan, brick *pucca* houses have for five centuries been topped with similar “wind scoops” of wood and plaster, which ventilate and cool houses in densely packed neighborhoods.

Modern riffs on the world's ancient, ecologically derived forms—and the building traditions they have spawned—are surprisingly common. Glenn Murcutt and his contemporaries near Sydney, Australia, find inspiration from the aboriginal people in their approaches to building orientation, shading, and cooling (page 70). In the remote Himalayan desert of Ladakh, cultural traditions dating back over a thousand years have taken form in a new Buddhist school (page 78) reminiscent of the *gompas*, stone monasteries that cling to the mountainsides. The flat roofs and citadel-like expression of the new school are obvious connections to the past, but deeper motives lie beneath the surface: the customary use of thermal mass to get through brutal winters, the need for healthful ventilation to cleanse the spirit. This inspiring design seems decidedly of its place, yet it is somehow out of time. Its raw timbers and stone walls remind us that sustainability may be in vogue, but it is the oldest form of high design.

mushrooms on the roof

**ÁBALOS & HERREROS
POSITS AN ARCHITECTURE
OF ECOLOGY.**

BY ANDRÉS FERNÁNDEZ RUBIO



"This season there have been many mushrooms on the roof," explains the guide to the recycling plant at the Valdemingómez city dump on the outskirts of Madrid. In this project, Spanish architects Iñaki Ábalos and Juan Herreros of Ábalos & Herreros (Á&H) demonstrate their creative energy in defense of a "simple, universal, felicitous, cheap, and intense" architecture, as they define it in *A New Naturalism (7 Micromanifestos)*, recently published in the Spanish magazine *2G*. It is architecture conceived as garden.

"The offices that have a planted roof are fresher in the summer," says a worker at the facility about this ecological installation, designed by Á&H with the architect Ángel Jaramillo. The guide takes us to a nearby mountain with panoramic views of the main building, its vibrant inclination into the hillside a spontaneous hug. He adds: "In spring the roof blooms, and it looks beautiful."

The plant at Valdemingómez is perhaps the best example of what the partners describe in the first component of their "micromanifesto," *1, Latent Garden*: "the fusion of nature and artifice; the dissolution of disciplinary boundaries between architecture, art, garden, and philosophy." Since their initial collaboration, Á&H has based its work on a combination of natural and artificial elements that employ building techniques of low environmental impact. The sections in their manifesto have revealing titles: *3, Ecomonumentalism* ("every location has started to be regarded as a landscape, either natural or artificial"); and *5, Hybrid Technique, Mestizo Aesthetic* ("hybrid models in which the accent has begun to be placed on the interaction between natural materials—massive and energetically inert—and highly sophisticated artificial materials—light and energetically active").

The two architects have worked as partners since 1984. Ábalos is a professor at the Madrid School of Architecture and Herreros is faculty chair. They complement their academic pursuits with theoretical work in publications such as *Tower and Office: From Modernist Theories to Contemporary Practice*, a 1992 book that will be published in English this

July by MIT Press, with an appendix updated through September 11, 2001.

Ever since their athletic center at Simancas—a village in Spain's Castilla region that holds the most important archive of the country's royalty in its castle—was chosen for the 1995 exhibition *Light Construction* at the Museum of Modern Art in New York City, their work has progressively infused contemporary Spanish architecture with a significant dose of practical sense, freshness, and a carefree intelligence. Their influence also resonates with optimism; not a blind optimism, but a positive attitude that derives from their educational work, from their attempt to pass on to their pupils an idea of architecture as a source of pleasure rather than promoting the dramatic and heroic role of the modern architect in conflict with the world.

From their perspective, sustainability is not a matter of faith but a poetic tool to interact with the values of contemporary society. In this sense, the architect's search involves a concept of affordable architecture that does not take pleasure in complexities or elaborate details, nor is it elitist; rather, it is "demanding architecture that can be equally as meaningful in Lagos and Quito as in New York City or Düsseldorf" (*6, A New Naturalism*). This environmental compromise can be summarized in one word: "Simplicity," explains Herreros in his office on Madrid's Gran Vía, a main thoroughfare where the frenzy of 1930s Spanish architecture can be seen. Ábalos adds, "Valdemingómez was built for the price of a chicken farm."

SCREWDRIWER ARCHITECTURE

With the sustainability issue on the horizon, and while the debate on what is environmentally correct is clarified, Á&H has been able to produce ecologically concerned works by using relatively simple geometries and materials:

- At Valdemingómez (1996-1999), creepers planted on the roof of the recycling plant and the surface on which they grow replace traditional insulation techniques. The vegetation roof costs the same as an

continued on page 66



Beneath its vast green roof (above), the recycling plant at Valdemingómez houses sorting and processing facilities, offices, workshop rooms, a gallery, and storage. The slope of the roof follows the gravitational nature of the recycling process (facing page), while echoing the hillside into which it is built. Wrapped in a skin of recycled polycarbonate panels, the plant embodies the architects' belief that off-the-shelf and reclaimed materials can produce formally expressive, ecologically responsible buildings.



VALDEMINGÓMEZ RECYCLING PLANT, VALDEMINGÓMEZ, MADRID, SPAIN

CLIENT: Vertresa-RWE Process, Ayuntamiento de Madrid **ARCHITECTS:** Ábalos & Herreros, Madrid, and Ángel Jaramillo, Madrid **PROJECT TEAM:** Aurelie Beriot, Ángel Borrego, Cristina Díaz, David Franco, Auxiliadora Gálvez, Rafael Hernández, Efrén García-Grinda, Pablo Martínez **ENGINEERS:** Obiol y Moya (structural); Servicios Técnicos de Vertresa, Fernando Valledor **CONSULTANTS:** José María Cruz, Pedro José Blanco (installations); Fernando Valero (landscape); Gestalt (computer graphics); Miguel Ángel Rica, José Torras (economic research); Javier Ceballos (environmental impact); Andrés Carbó (geological); Juan Espinosa, Vertresa (technical control) **MODELS:** Jorge Queipo, David Franco, Pablo Martínez **MULTIMEDIA:** Lanatus **SITE MANAGEMENT:** Ábalos & Herreros **PROJECT MANAGEMENT:** Juan Sempere (IMES)

PHOTOGRAPHS BY JORDI BERNADÓ



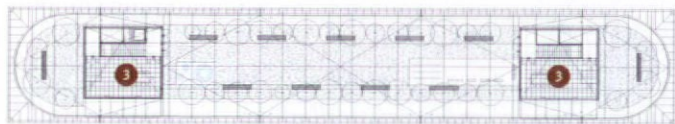
**ADMINISTRATION AND GRADUATE FACILITIES, UNIVERSITY OF
EXTREMADURA, MÉRIDA, BADAJOZ, SPAIN**

CLIENT: Consejería de Educación, Ciencia y Tecnología, Junta de
Extremadura **ARCHITECTS:** Ábalos & Herreros, Madrid **PROJECT TEAM:**
Uriel Fogué, Jacob Hense, Renata Sentkiewicz **ENGINEER:** Obiol y Moya
(structural) **CONSULTANT:** Miguel Lázaro **SITE MANAGEMENT:** Ábalos &
Herreros, Javier Manso, Ángel López

PHOTOGRAPHS BY BLEDA Y ROSA



Graduate classrooms and administrative facilities are housed under a heat-absorbing grass roof at the University of Extremadura in Mérida, Badajoz, Spain. Part of a campus expansion toward the River Guadiana, the three-story, 300-foot-long building (above) is encased in a skin of lattice-work that filters natural light and surrounded by a ring of trees that when mature will serve as a natural layer of protection against the sun. A running track on the roof wraps the edge of the grassy zone and two small penthouses, which hold lounge areas for the staff (facing page).



Roof plan

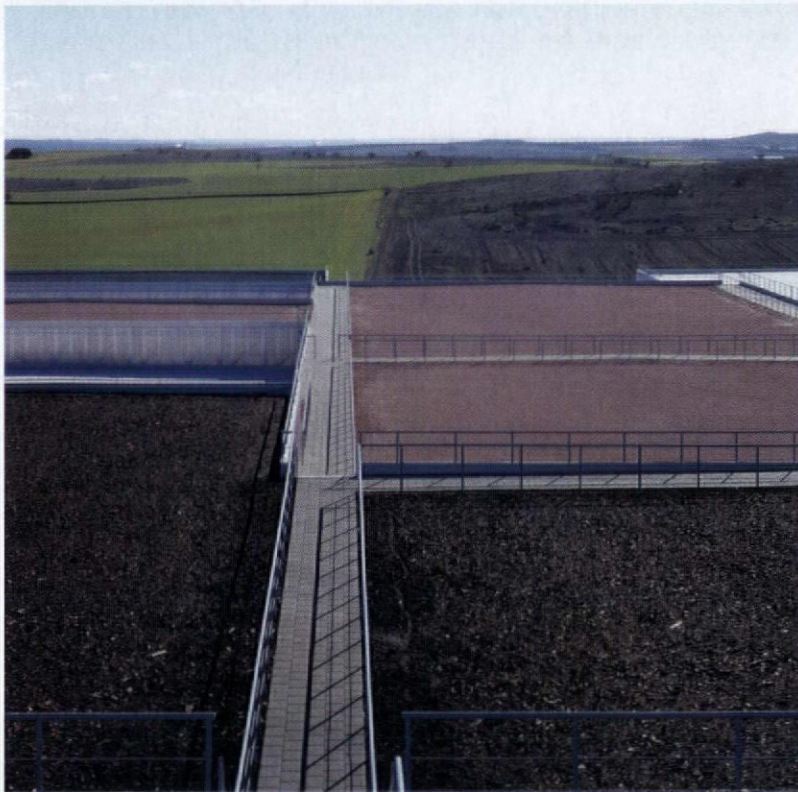
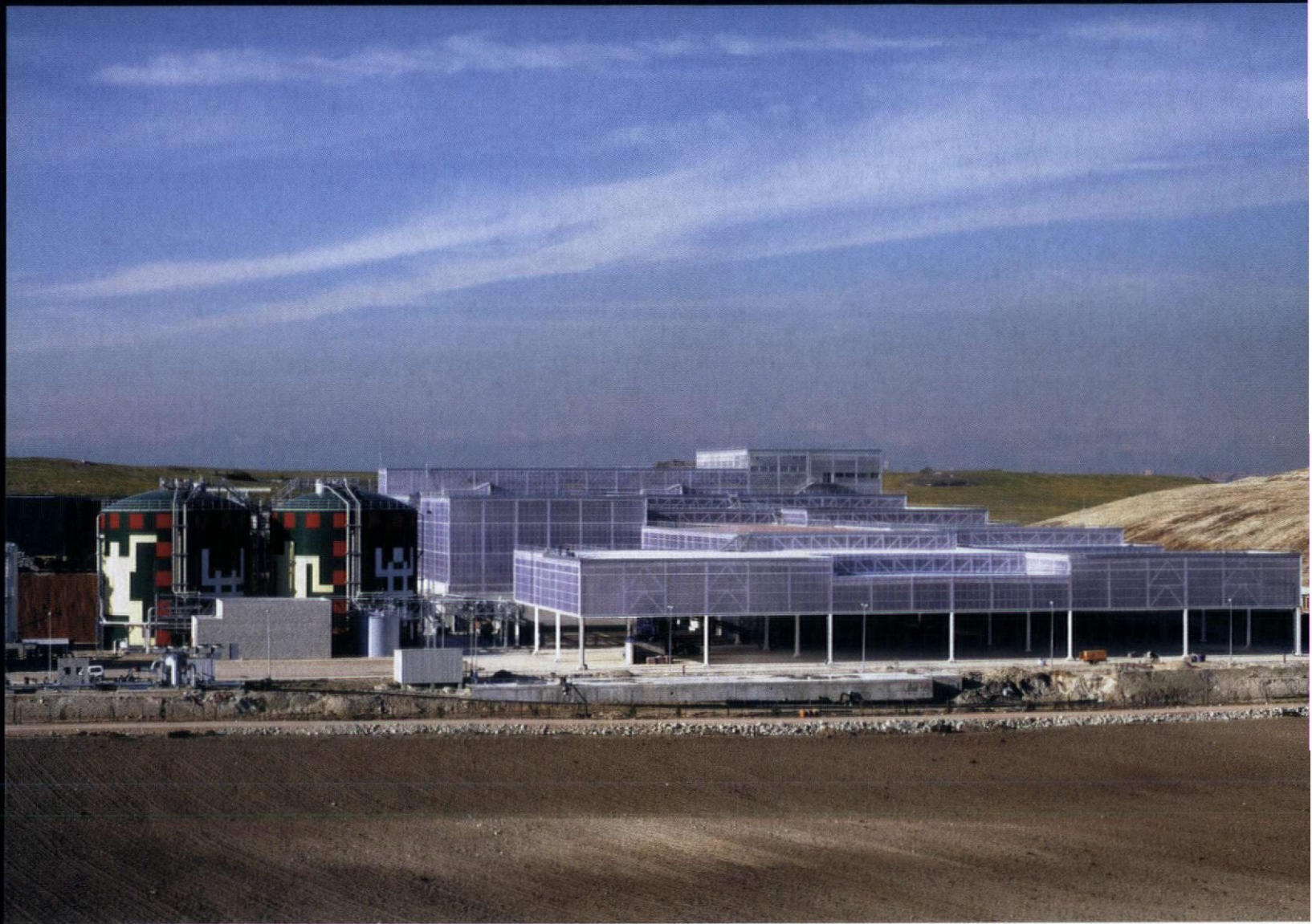


First-floor plan | 40' ^



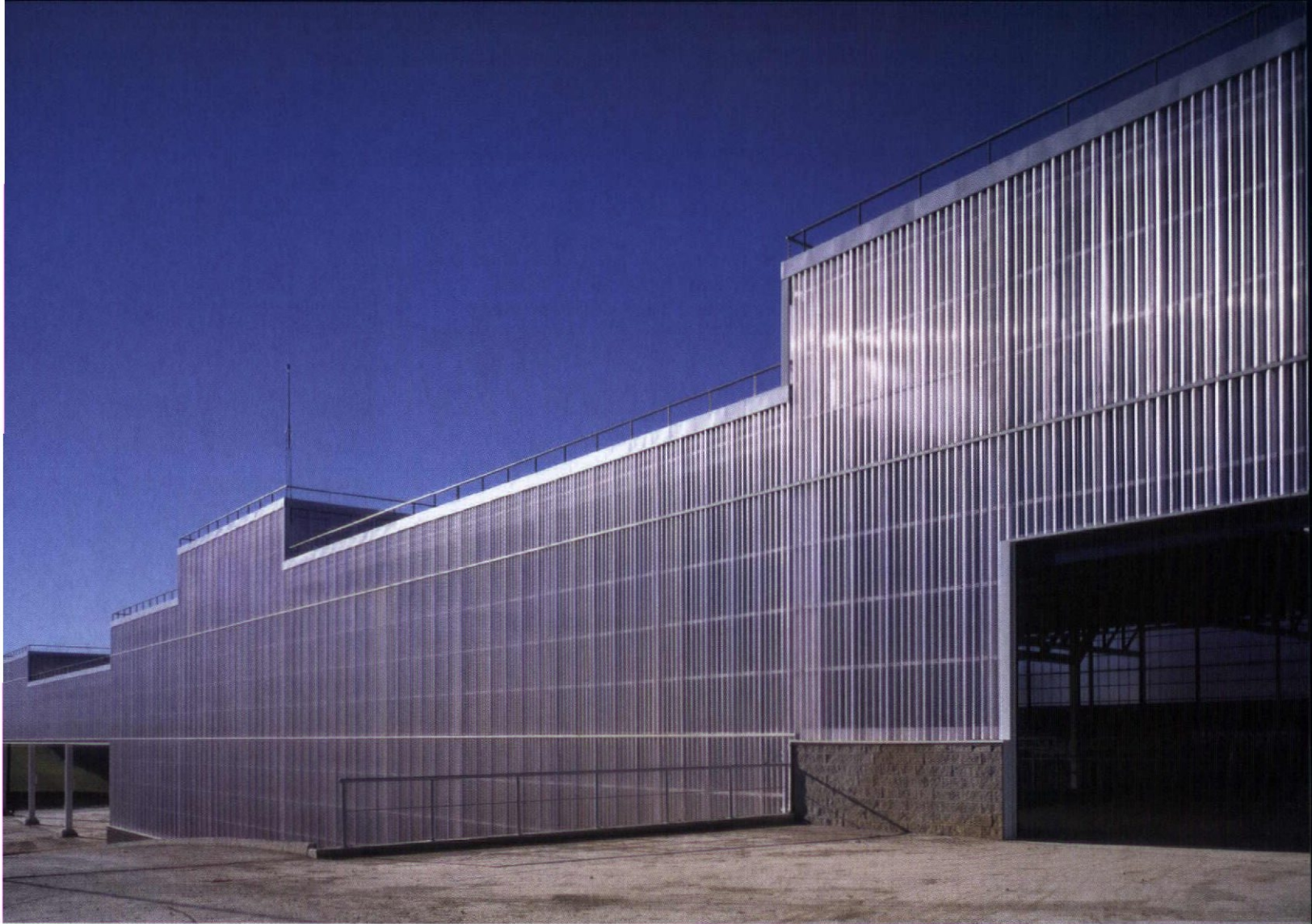
Site plan | 300' ^

- 1 offices
- 2 café
- 3 faculty lounge

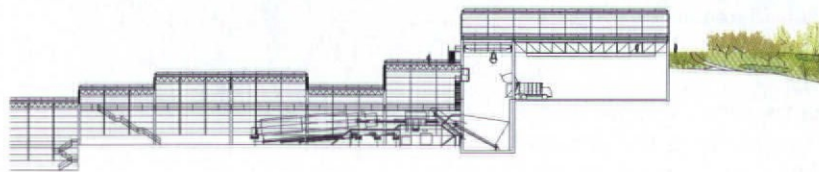


BIOMETHANATION AND COMPOSTING PLANT, PINTO, MADRID, SPAIN
CLIENT: Consejería de Gestión y Desarrollo del Medio Ambiente, Comunidad de Madrid **ARCHITECT:** Ábalos & Herreros, Madrid **PROJECT TEAM:** Renata Sentkiewicz, Wouter Van Daele **CONSULTANTS:** Comsa Medio Ambiente, Urbaser, Dragados (installations); José Torras (economic research); Gestalt (computer graphics)

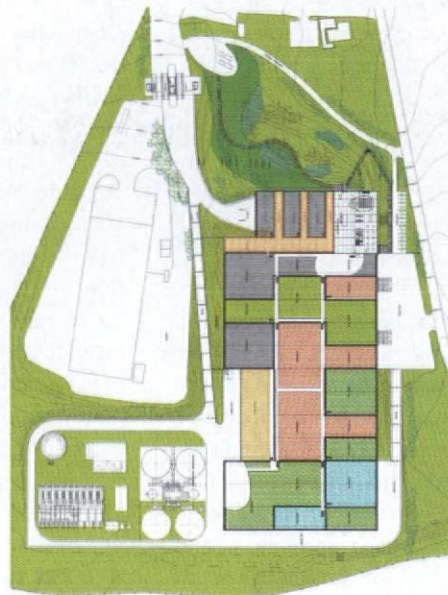
PHOTOGRAPHS BY LUIS ASÍN



To create a unity between the natural and the artificial at the biomethanation and composting plant (facing page, top) in Pinto, Madrid, the architects designed two artificial promontories: From the highway, a large berm rises to the translucent polycarbonate-clad facility, which, in turn, descends eastward in a series of stepped volumes (above), contrasting with the surrounding flatlands. Roof terraces (facing page, bottom) covered in materials such as gravel, lava, and marble chips become “a mosaic garden.” An orientation center affords visitors views of the plant’s inner workings, from the first unloading operation to the storage of recyclable byproducts.



Partial north-south section 50'



Site plan 200'

industrial one, and it excludes polyurethane and polyethylene from the process, both of which are derived from petroleum. The facility is conceived for a 25-year period of working life, after which it will be dismantled and recycled.

- At an administration building and new graduate facilities for the University of Extremadura, at Mérida, Badajoz (1999-2001), an area in Spain that is very cold in winter and very hot in summer, the roof has been designed according to this same principle: With the sun at its zenith, it absorbs 50 percent of the heat. In this case, unlike the more subtle expression at Valdemingómez, the roof is made of a thick layer of grass. On the façades, an artificial system for sun protection made of adjustable lattices is displayed, and once they have grown, the trees planted around the building will act as a natural filter against heat gain. A composition trick relates the color of the window louvers with the color of the trees, creating a sort of green osmosis effect.

- At a biomethanation and composting plant in Pinto, Madrid (2001), a walk on the roof shows how the building is organized as a kind of stepped garden. As in Valdemingómez, one part of the roof is a garden, with 2.5 inches of compost mixed with recycled bricks to maintain humidity. Gravel, lava fragments, and pieces of marble chips cover other parts of the roof, uniting the green of the planted grass with the white and yellow of the other elements. The reflection of light on the translucent polycarbonate walls produces an evanescent effect in the geometry of the complex.

- The PIRS environmental education center and offices in Arico, Tenerife, in the Canary Islands (1999-2001), could serve as a synthesis of various aspects of Á&H's architecture. Its almost figurative character works as a poster, a banner, a signal. The color reacts with the sky and frames a landscape with Mount Teide in the background. Its simple composition is the most outstanding characteristic of the building, which has a bluish appearance from its *trespa* panels (a hard-pressed recycled paper soaked in epoxy resin). The construction process, which did not require any water, was undertaken with prefabricated components, shipped by container to the island, and erected in the middle of the arid site. Finally, the building has an educational function, teaching high school students about recycling processes. (At Valdemingómez and Pinto, there are also educational rooms.)

The leitmotif of all of these works is to convert both contemporary and traditional technical resources into a tool with aesthetic implications. Through commercial techniques

and off-the-shelf products (which the architects regard with Andy Warhol's direct gaze), they ask themselves: What can we do with this?

There is no sophisticated design in the product catalogs. Á&H calls this style "industrial vernacular"; it features the principle of dismantling, which assumes that everything that can be taken apart mechanically can be used for construction. "With a screwdriver and an adjustable wrench, you can take Valdemingómez's plant to your house," says Ábalos. It is a kind of *screwdriver architecture* that, because it can be dismantled, allows its materials to be isolated for recycling. From all the available products shown in catalogs, Á&H have narrowed their focus on one material: polycarbonate, a cheap and recyclable plastic that is translucent and reasonably durable.

AN AMBIENT SOUNDTRACK

Other architects in Madrid have used the word "ambient" to describe the work of Á&H. "It's a wink that refers to a chilled-out, relaxed attitude of letting yourself be influenced by what surrounds you," says Herreros. Their relaxation is a tool to investigate the poetic possibilities of the grittier aspects of the wasteland beyond the outer suburbs. City centers are practically off-limits to architects of their generation, so their "chilled-out" perspective has turned to the suburbs. In one of their most recent works—the unfinished public library in a working-class quarter of Usera—they establish an unexpected dialogue with a vulgar modern building in the vicinity: At dusk, the library shines in gold and pink, the same colors the bullfighter Palomo Linares used to wear in the arena during his glory afternoons in the 1970s. The colors of Linares's favorite *traje de luces* (bullfighting costume) have a corollary in the vertical windows that illuminate the library's façades. And the same occurs with the almost metallic brightness that the building acquires during sunset, a sheen like that of automotive paint. Diffusers placed on the windows modulate sunlight, and large apertures in the main rooms open up to the best views, shielding themselves from the sun with sunshades formed by pivoting fascia panels. The architects, once again, listen to the environment. Their work is easy on the ears and eyes, like an ambient soundtrack: relaxed, unafraid of difference, and free of defensive attitudes. ■

ANDRÉS FERNÁNDEZ RUBIO IS A TRAVEL EDITOR OF THE SPANISH NEWSPAPER *EL PAÍS* AND CONTRIBUTES TO *BAUWELT*, THE GERMAN ARCHITECTURE MAGAZINE.



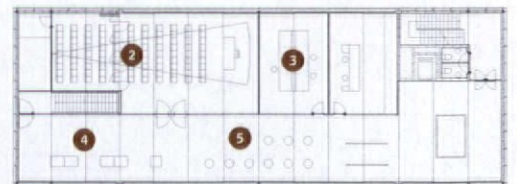
ENVIRONMENTAL EDUCATION CENTER AND OFFICES, ARICO, TENERIFE, SPAIN

CLIENT: Cabildo Insular de Tenerife ARCHITECTS: Ábalos & Herreros, Madrid, and Ángel Jaramillo, Madrid ENGINEER: Obiol y Moya (structural); Luis Jesús Tomás Martínez CONSULTANTS: Jacob Hense (computer graphics); Miguel Ángel Rica (economic research) SITE MANAGEMENT: Ábalos & Herreros, Virgilio Gutiérrez

PHOTOGRAPHS BY BLEDA Y ROSA



Tenerife, the largest of Spain's Canary Islands, is the site of an environmental and educational center called **PIRS** (above and facing page). With former landfill piles, the summit of Mount Teide (the highest in the country), views of the Atlantic, and a major freeway at their disposal, **Ábalos & Herreros** produced a building seemingly both diminutive and out-sized. It is a billboard—emblazoned with supergraphics—but of ambiguous dimensions (below). Its bulk set above ground level and clad in recycled-paper panels (facing page, bottom), the building holds exhibits about the recycling process, a small auditorium, and offices. Louvered walls and a predominantly open ground plane turn the building into an open-air atrium.

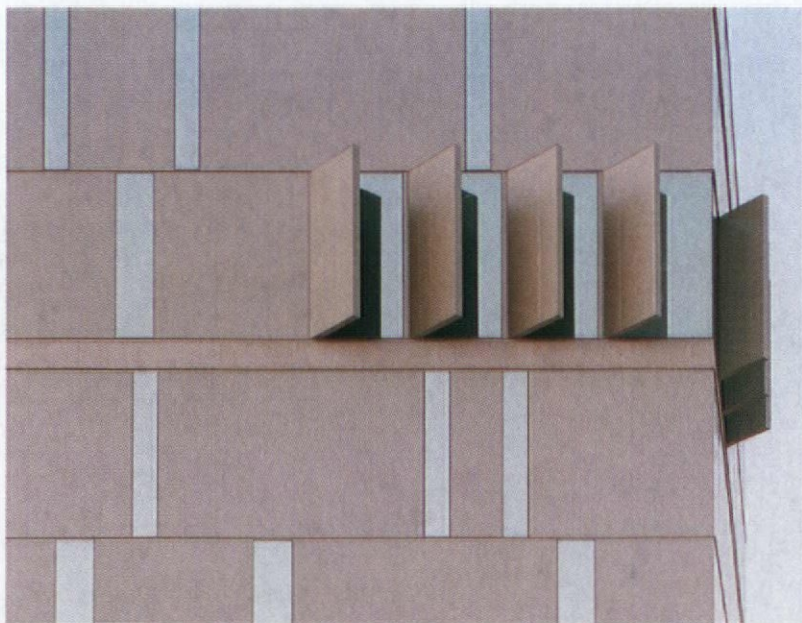


Second-floor plan

- 1 classrooms
- 2 lecture hall
- 3 laboratory
- 4 recycled materials
- 5 gallery



First-floor plan 24'



PUBLIC LIBRARY, USERA, MADRID, SPAIN

CLIENT: Comunidad de Madrid **ARCHITECTS:** Ábalos & Herreros, Madrid, and Ángel Jaramillo **PROJECT TEAM:** Rocío Rein, Pablo Puertas, Miguel Kreisler **ENGINEERS:** José Manuel Sierra, Juan Gómez **CONSULTANTS:** Peter Halley (artist); José Maria Cruz, Pedro José Blanco (installations); Juan José Núñez (economic research); José Torra (surveyor) **MODELS:** Miguel Kreisler, José Alcobeda, Jorge Queipo **SITE MANAGEMENT:** Ábalos & Herreros, Dolores Mifarro

PHOTOGRAPHS BY BLEDA Y ROSA

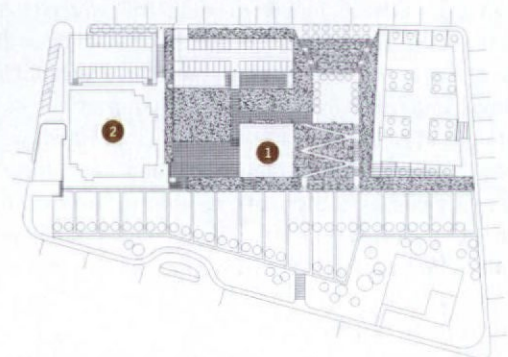


Aiming to reconstitute the disarray of buildings in downtown Usera, Spain, the architects produced a medium-sized tower set into a hillside site that links to adjoining parkland and engages with the existing municipal government building, an otherwise isolated construction, to create an “urbanistic centrality” (above). Inside, a spare layout and controlled light—achieved by pairing vertical fenestration with diffusers and pivoting fascia panels that act as sunshades (facing page, bottom)—cultivate a serene environment. Providing focal points for contemplation, the shuttered apertures frame views of West Madrid, while serigraphed reproductions of classical texts cover interior wall surfaces (facing page, top).

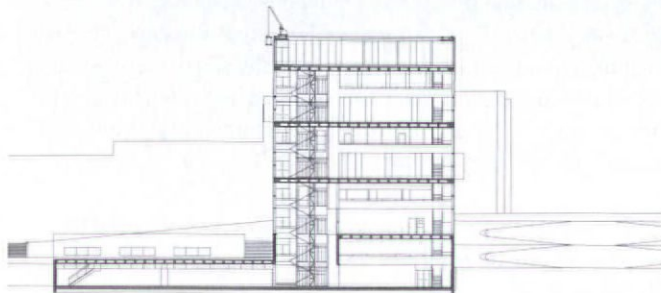


First-floor plan 32' ↘

- 1 library
- 2 municipal building
- 3 entry lobby
- 4 information
- 5 stacks
- 6 children's library
- 7 periodicals



Site plan 65' ↘



East-west section

Murcutt and Company

Australian architects are designing with their ears to the ground. **By Lindsay Johnston**

Any quest for an Australian architectural "style" is a formidable project, as the island continent is the sixth-largest nation in the world, with diverse climatic conditions and significant cultural dialects in its main cities and regions. Yet, there is an identifiable Australian way of thinking about architecture that appears to set it apart from the rest of the world. This way of thinking has been celebrated internationally by the award of the 2002 Pritzker Prize to Glenn Murcutt, who has been largely responsible, through his singular practice and guiding principles, for forging a brand of Australian architecture that emanates from Sydney and rural New South Wales in the southeast of the continent.

Murcutt's contemporaries in this branch of critical regionalism include longtime friend Richard Leplastrier—both are recipients of the Gold Medal of the Royal Australian Institute of Architects (RAIA)—and Peter Stutchbury, one of their leading disciples who heads a younger generation of kindred practitioners. All three are strongly influenced by their early lives and exposure to vernacular buildings.

Murcutt's early experiences living as a child in New Guinea shaped his perceptions of climate and the natural environment. Stutchbury refers often to his childhood on the family farm in outback Cobar, New South Wales, the vagaries of the harsh climate, and the honesty of robust industrial-agricultural structures. Leplastrier has been particularly influenced by his passion for sailing and boat design, having built and raced lightweight skiffs.

While Murcutt's early architectural influences were Mies van der Rohe, Alvar Aalto, and his travels in the Greek Islands, one of the precious bloodlines in this group is Jørn Utzon, for whom Leplastrier worked in the early 1960s in Sydney at the time of the Opera House. Leplastrier also brings the wisdom of traditional Japanese architecture from architect Masuda Tomoya, under whom he studied in Kyoto, as well as his work with celebrated Australian artist and teacher Lloyd Rees. Murcutt's body of work is now well known and widely published. Leplastrier's built works are hidden treasures. Stutchbury has learned from both and has already brought to realization a significant number of buildings that extend the depth of exploration initiated by his mentors.

A READING OF PLACE

Three key facets to this work are, first, a reading of place and site; second, an inherent ecological responsiveness; and, third, virtuosity in technical detailing and execution. When one stands on a rural site with Murcutt, glides along a river in a boat with Leplastrier, or tramps up a hillside with Stutchbury, new insights are revealed about the sun, wind, tides, topography,

temperature, vegetation, geology, waterflow, wildlife, fire, scent, culture, time—essentially, life. When considering a project site, Murcutt produces a site section drawing at least a half mile in either direction, and it must be freehand, espousing the virtue of hand-eye movement and its impact on the creative mind. He respects both the power of the landscape and the wisdom of the indigenous people who have had stewardship over this land for 40,000 years. Throughout his many projects, the reading of place has set up Murcutt's ability to address issues of ecological responsiveness in the design of the building.

One of the greatest contributions Murcutt and, possibly to a greater extent, Leplastrier have made to this regional architecture of Australia is the blurring of inside-outside boundaries. The coastal climate of New South Wales is relatively benign, with winter temperatures seldom, if ever, below freezing and summer temperatures only occasionally reaching 100 degrees. Following white settlement in Australia, early building typologies imported cellular European enclosures. The much written about veranda created the shaded edge. Murcutt has made the whole building into a veranda by introducing operable louvered walls, and Leplastrier has turned buildings inside-out with whole walls that fold away and even roofs that open to the sky. From these premises follow a natural responsiveness to orientation, light penetration and sun control, air-movement patterns and ventilation, thermal mass, and insulation. The buildings can be fine-tuned—just like a boat—often requiring the users to learn how to sail it most effectively. More recent and larger projects are informed by computer-simulation techniques that provide validation of the architect's intuitive strategies for thermal comfort and energy efficiency.

Frugality is also an underlying principle. All of the work is devoid of ostentation. The roots are in rudimentary vernacular sheds and robust industrial structures. The honest use of materials (Murcutt is famous for legitimizing the humble corrugated-iron sheet) has been brought to a level of fine art, with details derived from civil engineering, boilermaking, boat building, and sail rigging, creating buildings like pieces of furniture or delicate jewelry boxes. The linking of materiality to ecology minimizes embedded energy or labor cost, frequently involves use of recycled materials, and allows for disassembly at the end of use. Together, these principles contribute to a wonderful cultural and environmental integrity that set paradigms for wider application.

Three key facets to this work are a reading of place, ecological responsiveness, and technical execution.

Lindsay Johnston is an Irish-born architect and former dean of architecture at the University of Newcastle, Australia, where he organizes the annual Glenn Murcutt International Master Class.

THE MASTER: GLENN MURCUTT

Winner of the Pritzker Prize for 2002, Glenn Murcutt is undoubtedly Australia's best known architect. Despite such reverence, Murcutt has long coveted a relatively low profile, working solo from the conception of a project to construction drawings. Inspired by a saying from the aboriginal people of western Australia—"to touch this earth lightly"—Murcutt's modernist houses float above the land on stilts or slender footings and respond directly to their environmental context. Going beyond aesthetics, his designs use materials that consume as little energy as possible in their manufacture and operation. His houses respond to climatic conditions, modulating how sunlight and wind enter and producing their own shade and ventilation, typically without air conditioning or heating other than a fireplace. Murcutt's early years were spent in New Guinea, where he developed a predilection for simple, primitive architecture, while drawing inspiration from Mies as well as the philosophy of Thoreau.

THE BOAT BUILDER: RICHARD LEPLASTRIER

"There is a growing movement in Australian architecture that stems from a recognition of the uniqueness of this land," said architect Richard Leplastrier in an interview with Australian architectural critic and biographer Philip Drew: "a recognition of the indigenous culture's management of this continent for tens of thousands of years, and that this embodied knowledge forms a powerful cultural base for our future development." Like Murcutt, Leplastrier defers to the landscape and insists on intensive site studies for his largely residential practice. An accomplished sailor and designer of lightweight wooden boats, the elegance and economy of nautical design extends to his architectural work. Another key influence was Jørn Utzon, with whom he worked during the design of the Sydney Opera House. Leplastrier's unique contribution to architecture was recognized with the Royal Australian Institute of Architects (RAIA) Gold Medal in 1999.

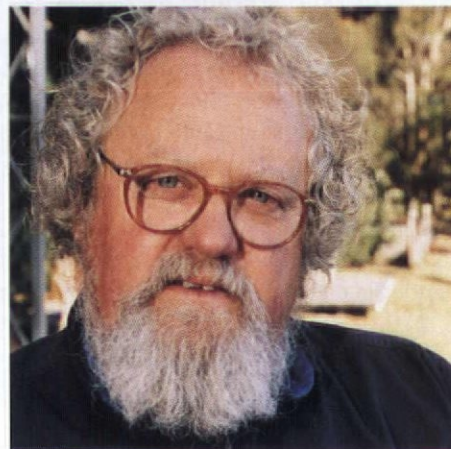
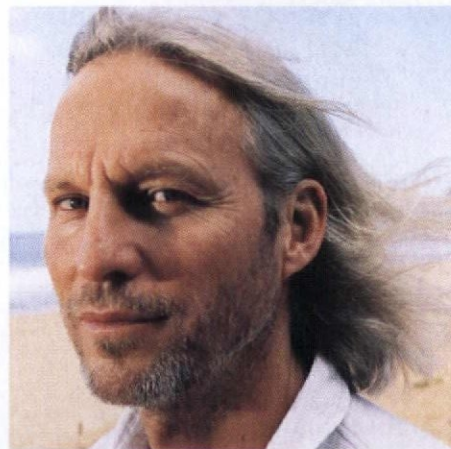
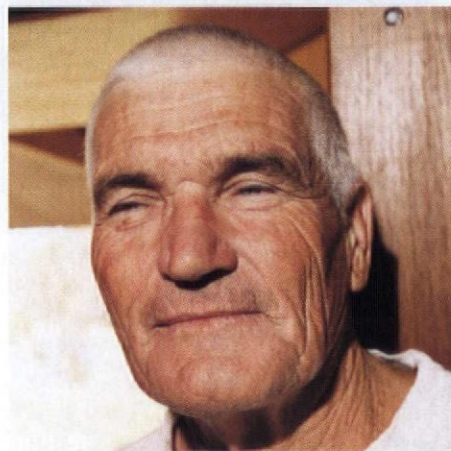
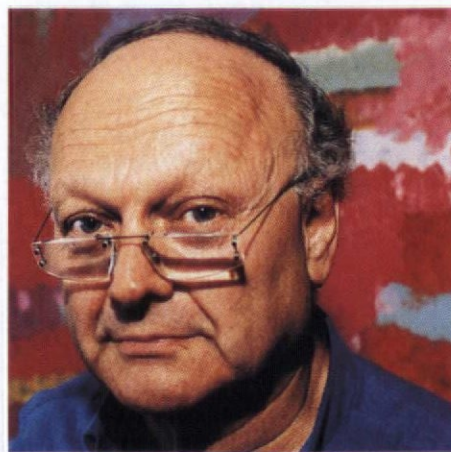
THE NEXT GENERATION: PETER STUTCHBURY

Principal of Sydney-based Stutchbury & Pape, Peter Stutchbury is emerging as one of the leaders of a new generation of Australian architects. The firm's projects, including striking houses around Sydney Harbor, evince an appreciation of the logic and sensitive nature of the Australian landscape. In their projects, which have won dozens of RAIA awards, they seek to reflect connections that are tangible and self-explanatory, interpretations aimed at fostering respect and knowledge of place and person. "In describing architecture, Peter Stutchbury talks of the degrees of freedom, of parameters that confine, restrict, or liberate the designer," said Philip Goad, architecture professor at the University of Melbourne. "The undisguised complexity of Stutchbury's work defies the myth of 'ease' in the landscape. The architecture has wildly different concerns to the urbanity, figuration, and formally driven processes that preoccupy the mainstream architectural world. It would be easy to dismiss this work as luxuriously detached, but one cannot."

THE NEW ARRIVAL: LINDSAY JOHNSTON

Former dean and now professor at the University of Newcastle's architecture school, Lindsay Johnston has translated his study of the vernacular stone cottage clusters of his native Ireland into a fresh reading of the humble timber- and steel-framed structures of rural Australia. Awarded internationally for his houses and for research on, and practice of, environmentally sensitive strategies, he received an RAIA Environment Award for the Four Horizons House (page 76), and a 2000 RAIA Award for achievements in environmental design. A contributing editor on environmental sustainability to *Australian Architectural Review*, he also organizes his university's annual International Master Class with Murcutt.

PORTRAITS BY DIRK WESTPHAL





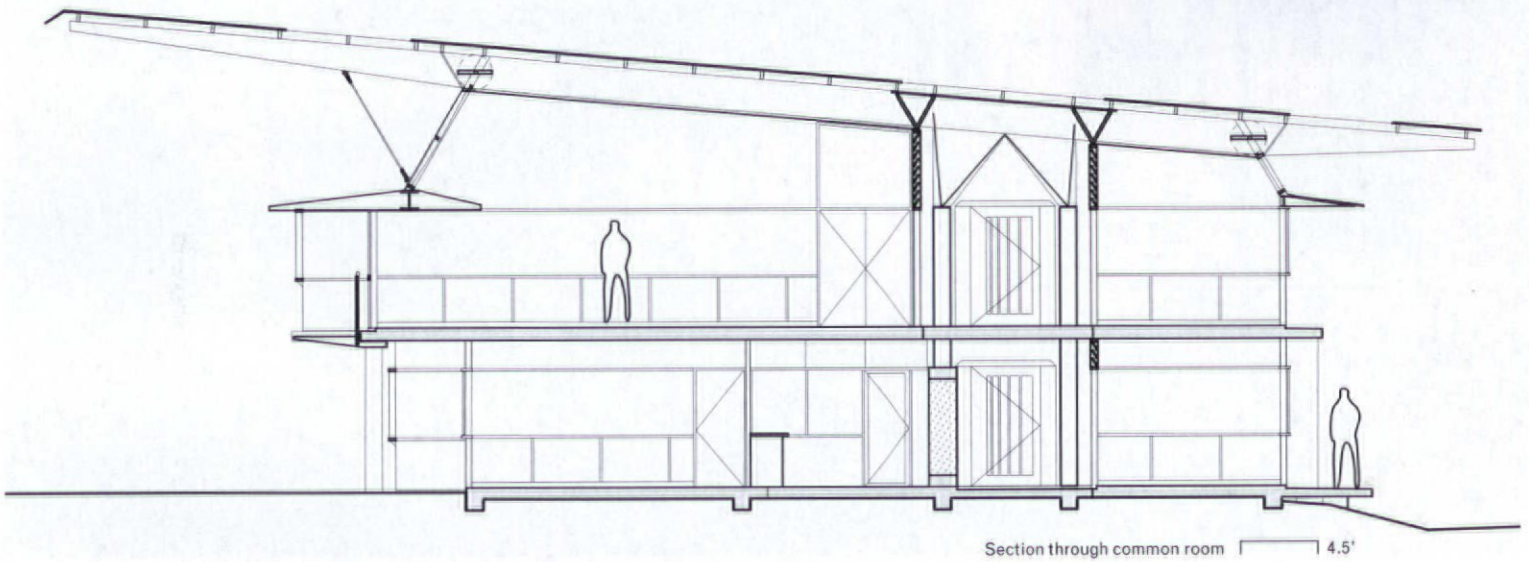
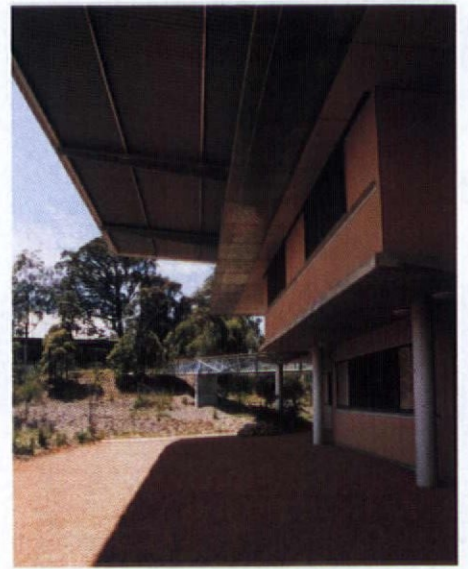
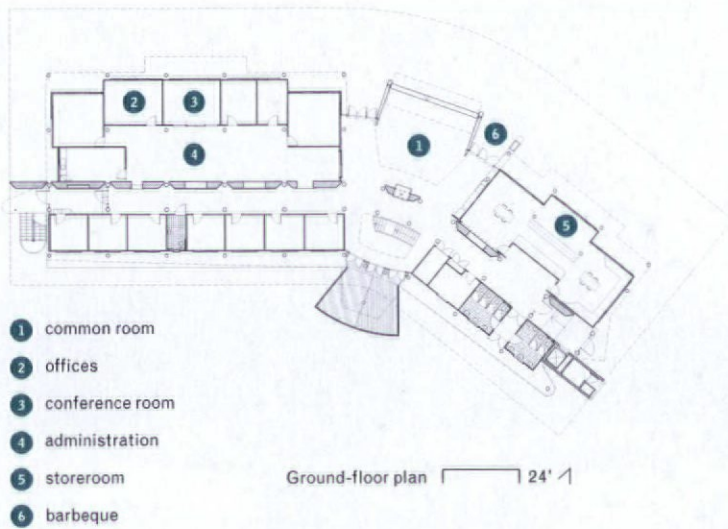
The creation of spaces for groups of various sizes to socialize, like the building's wide corridors (facing page, bottom), was a critical design objective for the aborigines who use the Birabahn Centre. The cantilevered roof plane creates ample shaded edges (above).

BIRABAHN INDIGENOUS CENTRE

Architects Richard Leplastrier, Peter Stutchbury, and Sue Harper won the commission for this building after a competition. Completed in 2001, the building does not reference obvious aboriginal symbolism—organic forms or earthly materiality—but translates the spirit of aboriginal culture into a finely honed, forward-looking building in a contemporary vocabulary.

The architects collaborated on this center with significant input from the aboriginal community, both at the university and in the region. The “big room” at the center of the building was essential for the aborigines. A large fire-station door opens onto this central meeting place, where a fireplace faces north toward a wall of glass doors. It was also a primary concern of the aborigines that the building be open and welcoming. As a result, the wide corridors were conceived to emulate “pathways in the bush,” where people might socialize.

The building needs no air-conditioning, because ventilation travels through the automated louvers in the cavity below the “fly roof,” or double roof plane. This very thin roof is taken to the extreme with overhangs that shade occupants and visitors from the summer sun. Overall, the materials specified in the building have low embodied energy and are easy to disassemble if need be.



BIRABAHN INDIGENOUS CENTRE, THE UNIVERSITY OF NEWCASTLE, NEW SOUTH WALES, AUSTRALIA

ARCHITECT: Richard Leplastrier, Peter Stutchbury, Sue Harper (design architects); Shane Blue, Richard Smith (design team)
LANDSCAPE ARCHITECT: Mim Woodland **ENGINEERS:** Max Irvine (design); Northrop Engineers (structural); GHD Newcastle (electrical) **CONSULTANTS:** Hydrotech (hydraulic); Advanced Environmental Concepts (environmental consultant) **GENERAL CONTRACTOR:** Stronach **INTERIOR DESIGN:** Stutchbury & Pape **AREA:** 17,760 square feet **COST:** \$1.5 million

PHOTOGRAPHS BY DIRK WESTPHAL



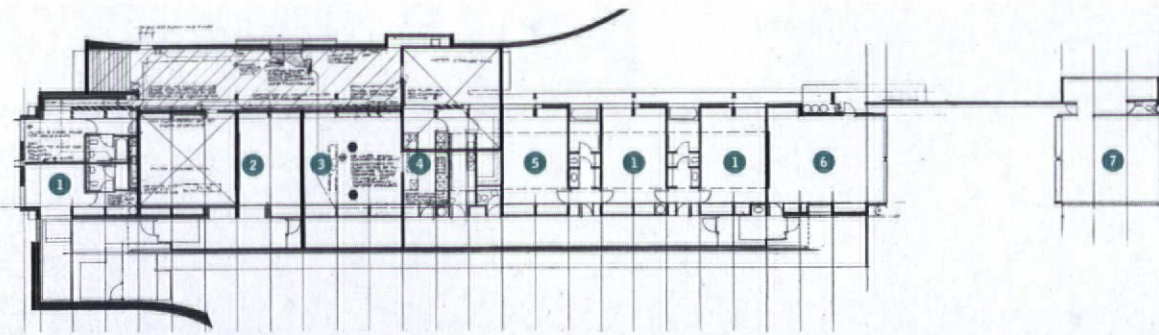
While Murcutt is known for his trademark use of corrugated galvanized steel, he tempers the industrial material with his use of native woods like western red cedar and tallwood and local stone such as Mintaro slate cladding and paving (above). A long corridor transitions through indoor and outdoor spaces (facing page).

BOWRAL HOUSE

Located in the rich farming country of Australia's Southern Highlands, Bowral House, completed in 2000, has a horizontal sweep that echoes the land. With its narrow plan, steel cladding, and Dutch gable roof, it appears at first glance an elegant conflation of barn and trailer home. The form of the roof came about as a result of Murcutt's desire to create a steep pitch for better ventilation and to facilitate rainwater runoff. As in many of his buildings, functionality is thoroughly informed by environmental objectives. The roof pitch and deep overhangs protect windows from sun during summer, but allow it to penetrate in the winter. The floors are made of insulated reinforced concrete, providing good thermal mass.

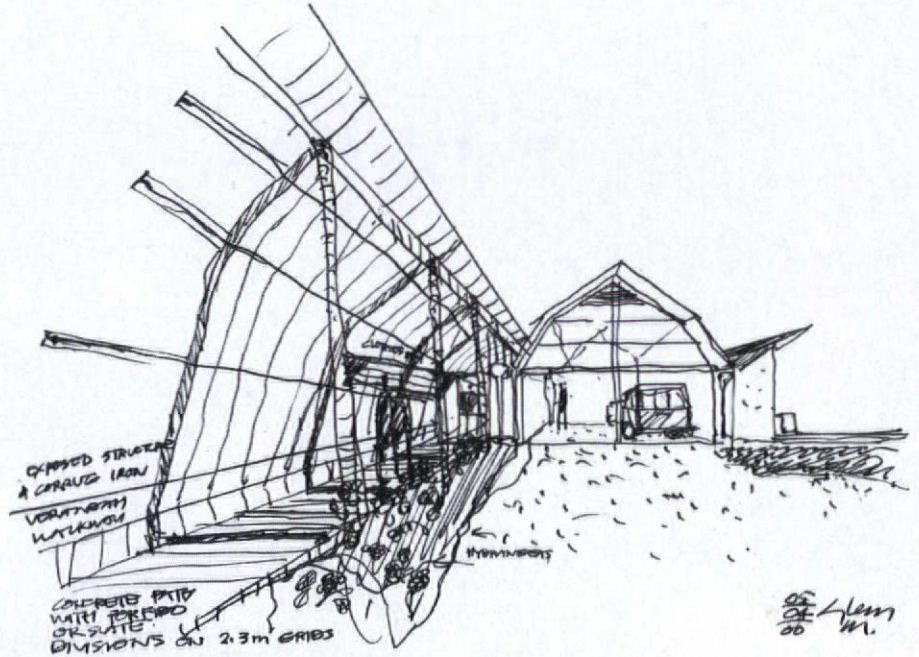
The house comprises an enfilade—five bedrooms and two living rooms—with a parallel 150-foot-long outdoor corridor in a separate steel structure, a curving wall plane that evolves into a roof. The entrance to the house is a deliberate gesture: Shielded from the high winds, visitors must walk the length of the house through the open-air corridor before doubling back into the foyer that begins the enfilade.

Murcutt erodes inside-outside distinctions. Doors slide open between the outside and the kitchen, dining, and sitting rooms. Each door consists of sliding slatted timber screens, insect screens, and glazed panels, giving the rooms a seasonal flexibility.



Basement plan 18'

- 1 bedrooms (above)
- 2 sitting room (above)
- 3 dining room (above)
- 4 kitchen (above)
- 5 music room (above)
- 6 garage
- 7 tractor shed



Perspective study



BOWRAL HOUSE, SOUTHERN HIGHLANDS, NEW SOUTH WALES, AUSTRALIA
ARCHITECT: Glenn Murcutt **LANDSCAPE ARCHITECT:** Sue Barnsley
ENGINEER: James Taylor and Associates (structural and civil)
GENERAL CONTRACTOR: C & C Symonds **AREA:** 8,000 square feet

PHOTOGRAPHS BY ANTHONY BROWELL

SPECIFICATIONS

STRUCTURAL SYSTEM: Antax Steel Fabrications; Woodhill Timber
EXTERIOR CLADDING: Bellambi corrugated galvanized steel; BHP Zinalume roofsheet; Australian Mintaro slate **FLOORING:** Australian Mintaro slate (exterior); Italian Profido stone (interior)
ROOFING: BHP Steel **SOLAR ROOF PANELS:** BP Photovoltaic **WATER STORAGE TANK:** Sydney Fountains Water Forms **ROOF FANS:** Ventaxia
SKYLIGHTS: Velux **METAL DOORS:** Monsoon **WINDOWS:** Lidco
HARDWARE: Madinoz **INTERIOR FINISHES:** Plasterboard (ceiling); sycamore veneer (panels) **PAINTS/STAINS:** Cabot; Sikkens; Murobend; Dulux Ferroder **FURNITURE:** Artek **PLUMBING FIXTURES:** Caroma **LIGHTING:** Iguzzini; Poulsen



For Johnston, the Four Horizons House (facing page) and lodges (above) were an opportunity to combine his interest in sustainable design with ideas from the primitive dwellings that he studied in Ireland. Recurring elements include the double roof (above and facing page, bottom), protective screens (facing page, top), and steel cladding.

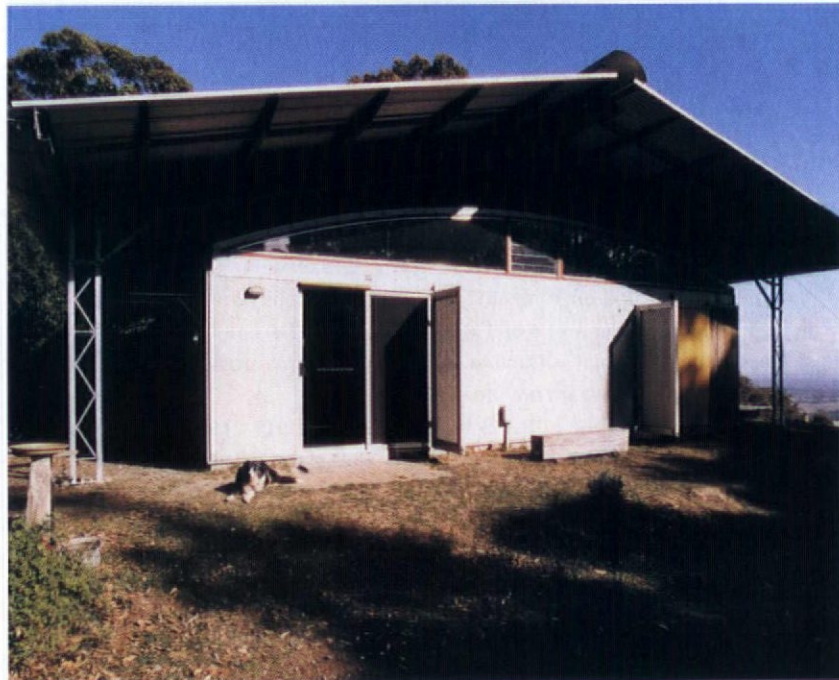
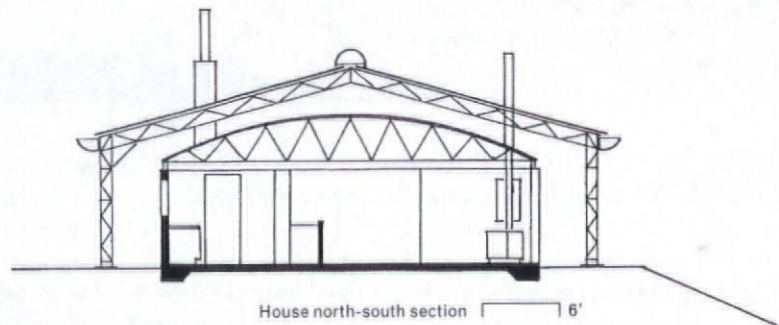
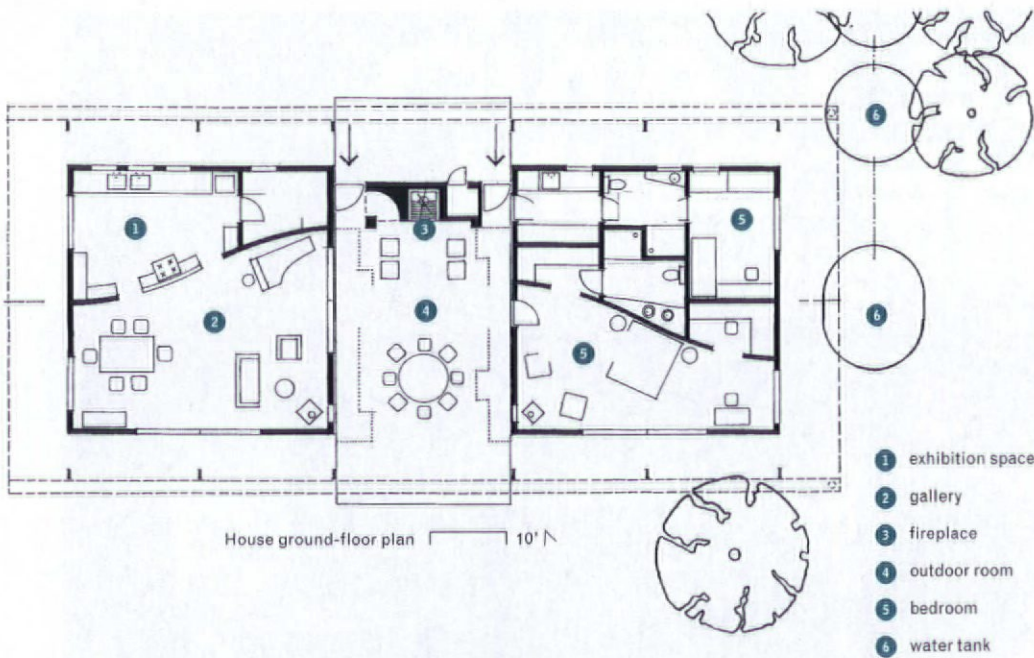
FOUR HORIZONS HOUSE AND LODGES

"It engages bloodlines from the most humble Australian rural structures," Lindsay Johnston says of this private house and inn. Started in 1994 but not completed until 2000, the residence takes a "back-to-first-principles" reading on what is appropriate for a building at 1,400 feet above sea level, on the top of a cliff escarpment in a eucalyptus forest surrounded by a national park with no main utilities.

The double roof common in early Australian architecture—often called a "fly roof" because of its similarity to the fly sheet on a tent—is rediscovered here. The primary roof on the Four Horizons House is an inexpensive standard agricultural steel shed, under which two independent habitable modules are built with their own insulated subroofs. On-site thermal monitoring has confirmed that the fly-roof principle eliminates heat gain from the sun. The large corrugated steel roof and custom-made gutters also facilitate rainwater harvesting, yielding 80,000 gallons per year. Roof overhangs cut off the harsh summer sun, but admit welcome winter rays. Electricity is produced from photovoltaic panels with a generator backup. Telephone and Internet access is by a solar-powered radio connection. Gray water is separated from wastewater and used to irrigate a vegetable garden. "Black water" goes to a traditional nonmechanical septic tank.

Three tourist lodges were completed a few hundred yards from the main house in 2000, with two more slated for the future. Johnston chose the two-story configuration to get views through the forest to the valley below and to minimize the footprints of the buildings. The one-bedroom lodges include galley kitchens and living rooms, with spiral staircases leading to loft-style bedrooms and spacious decks.

Many of the features employed in the main house are repeated in the lodges. On the lodges, however, a double "parasol" roof is used; a primary roof is fixed to the top of custom-designed curved steel trusses with an insulated secondary roof fixed to the underside. Solar electricity is wired underground from the main house.



FOUR HORIZONS HOUSE AND LODGES, QUORROBOLONG, HUNTER VALLEY, NEW SOUTH WALES, AUSTRALIA

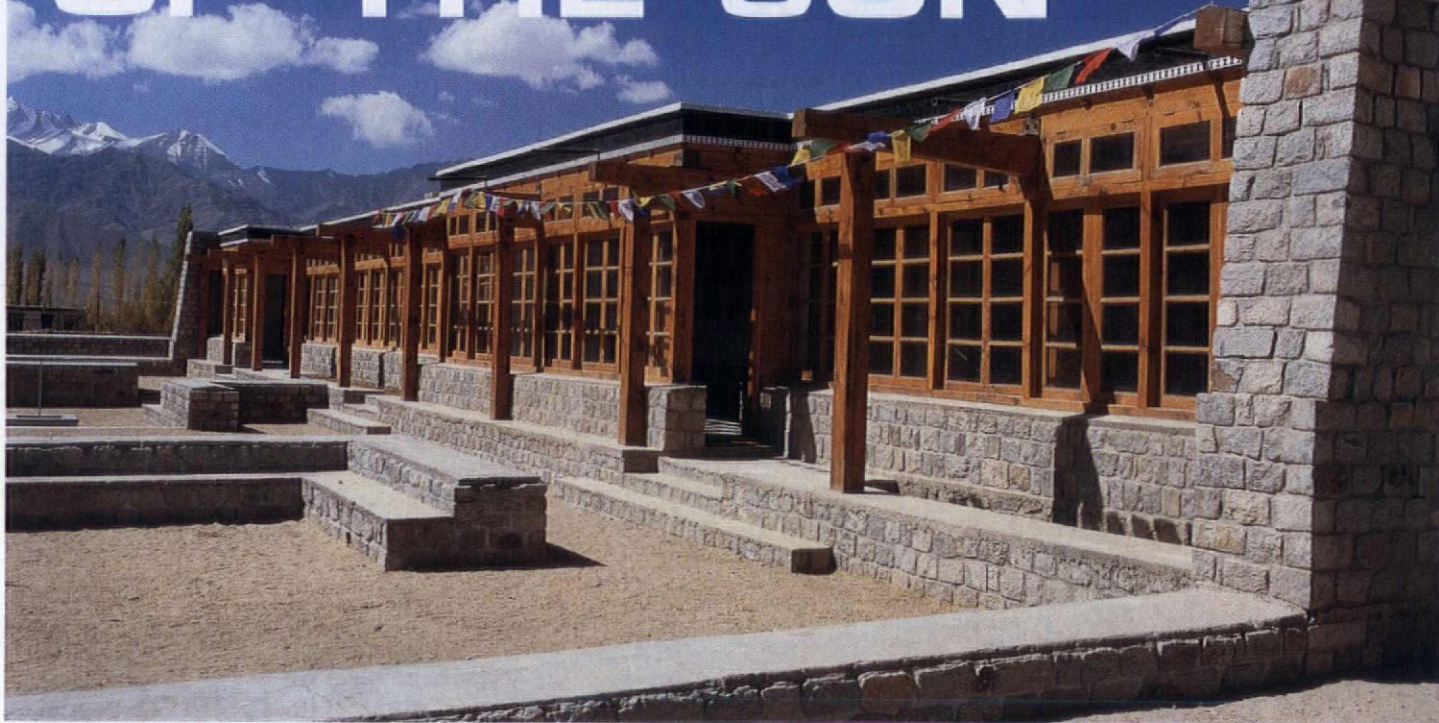
CLIENT/ ARCHITECT/ CONTRACTOR: Lindsay and Su Johnston
ENGINEER: Robert J. White (structural) **CONSULTANTS:** Sunrise Solar (solar); Patrick McElhinney (concrete and masonry tiling); Bruce Fletcher (geotechnical) **INTERIOR DESIGN:** Su Johnston **AREA:** 1,810 square feet (house); 1,800 square feet (outbuildings); 650 square feet (lodges)

PHOTOGRAPHS BY DIRK WESTPHAL

SPECIFICATIONS

STEEL PORTAL FRAMES: Colorpanel **CURVED STEEL TRUSSES:** D.A. & D.J. McKanna **STRUCTURAL STEEL:** BHP **WINDOWS:** Wideline Aluminum; Toronto Glass (gable glazing) **METAL DOORS:** Protection Engineering **FIRE SHUTTERS:** BHP Zinalume downpipe and perforated BHP steel Zinalume Mini Orb **CONCRETE BLOCK:** Boral **METAL CLADDING:** BHP **ROOFING:** BHP **GYPSUM BOARD:** Boral **PAINTS/STAINS:** Muraflex; Murobond; Livos **LIGHTING:** Nelson; Mini Elm Diesel **GENERATOR:** Lister **PHOTOVOLTAICS:** BP Solar **SOLAR WATER HEATER:** Solarhart **RETRACTABLE CANOPIES:** Ferrari Fabrics

IN THE LAND OF THE SUN



A SCHOOL IN THE HIMALAYAS GIVES SUSTAINABLE DEVELOPMENT A LOCAL LOOK. BY JULIA MANDELL

While for Western architects sustainability tends to mean high-tech energy systems and recycled materials, for the developing world the word has much broader implications. It evokes the hope, in this age of rapid globalization, of modernization that is organic, localized, and sustainable. The Druk White Lotus School is an example of that type of development and a testament to how designers can, by concentrating on the specifics of place, produce striking, surprising work.

Shaping the design of the Druk White Lotus School is the extreme environment and sheltered culture of Ladakh, a tiny kingdom in the Himalayas of northern India. Home to the Drukpa line of Buddhism, Ladakh is a high-altitude desert, subject to extreme temperatures and a blazing sun. The school project, initiated by the Ladakhi Buddhist community, was undertaken to create a model of sustainable development, both in building infrastructure and education. The Drukpa Trust, a British nonprofit founded by the head of the Drukpa line, Jigme Pema Wangchen, provided funding and approached Jonathan Rose of Arup Associates, the architectural branch of Arup, and Jim Fleming of Arup Engineers to design the school. When finished, the school, which is being constructed incrementally, will educate and house up to 750 children, as well as serve as a training center for teachers. The nursery and infant school, one of the four courtyards that make up the classroom complex, was completed in 2001.

Situated in the village of Shey, 10 miles from the main town of Leh on a south-sloping site, the stone and timber school relates to traditional buildings of the area, but looks surprisingly modern in the rugged

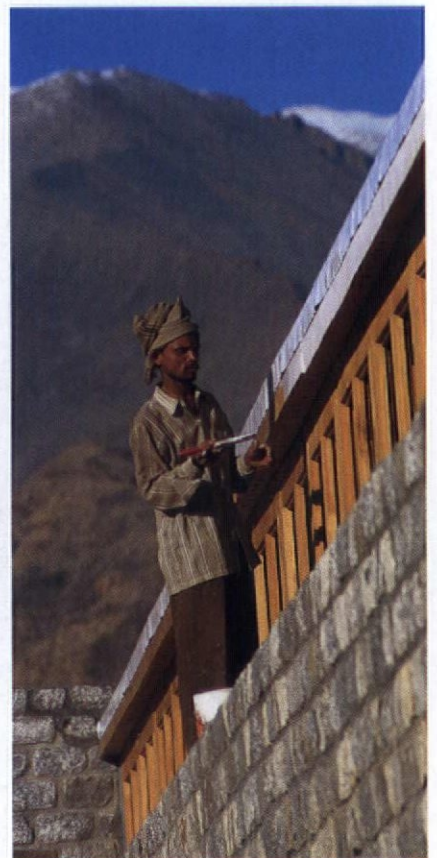
landscape. Local granite collected from the site and dressed by local craftsmen forms the walls. The timber-frame structure flanking the stone walls is load-bearing and designed to withstand earthquakes, always a concern in the region. "Most of the modern construction in Ladakh has been concrete frame, which is very brittle" and would not survive an earthquake, says Rose. He explains that ideally the timber frame would not just protect its inhabitants in such an event, but could provide the community with shelter after the fact.

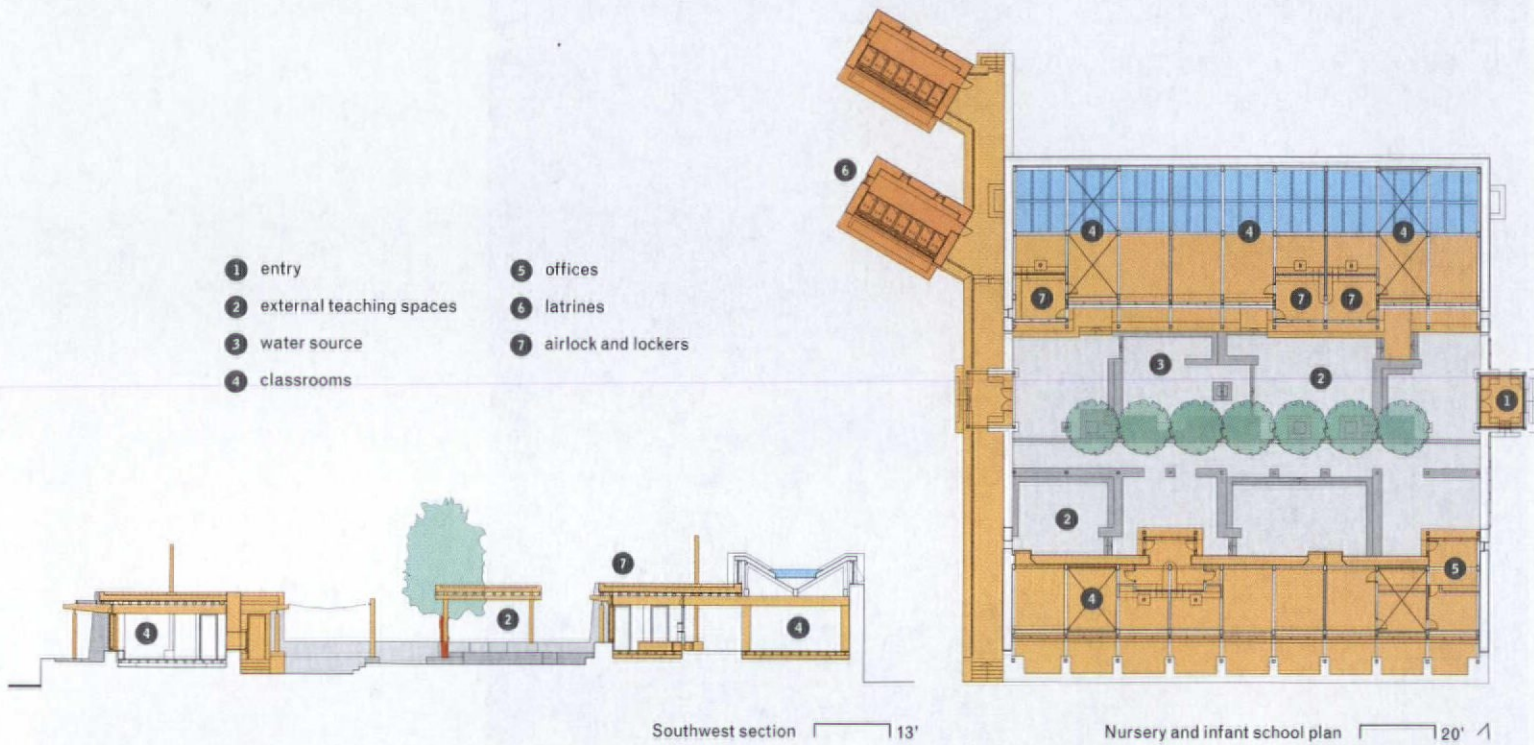
For the project's energy needs, the design team turned to the sun. For heating, the complex relies on passive solar techniques. The daytime school buildings are oriented 30 degrees to the southeast to take full advantage of the morning sun. Each classroom is entered through an atrium that acts as a thermal buffer, and the thick stone walls collect and store heat. In the four residential courtyards, one of which was finished in 2002, Trombe walls heat the dormitories at night, using a greenhouse effect to trap heat under a layer of glass laid over the stone. At night, the heat is released into the building's interior through openings in the glass. Solar cells provide energy to pump water from wells on the site, creating an independent water supply, and a solar version of a composting toilet provides simple, self-contained waste management.

The Druk White Lotus School may seem marginal to Western architects not used to working with Buddhist monks and composting toilets, but for the people of Ladakh, Arup's design provides a solution to a pressing and potentially devastating problem. "It's about more than being made of timber and stone," says Rose. "For development to count here, it has to be accessible and realistic, without committing the Ladakhi's to technologies they can't sustain." ■



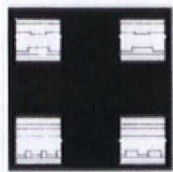
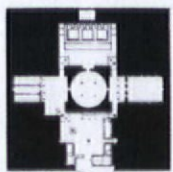
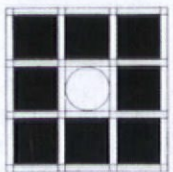
The completed nursery and infant school provides both indoor and outdoor teaching space (facing page). The powerful sunlight plays off the exposed timber beams of the roof structure (left). A Ladakhi laborer paints the roof eave (below).



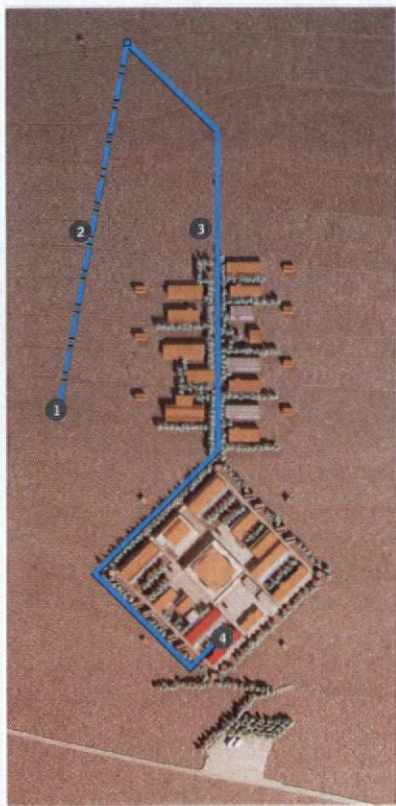


The classroom interiors are spacious and flexible (facing page), while the stonework and timber-framed windows in the courtyard are set off by the omnipresent mountains (below).

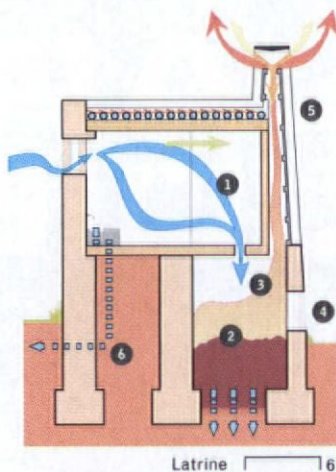




Design diagrams



Master plan 180'



- 1 fresh air
- 2 dry waste
- 3 hot air and moisture
- 4 access door
- 5 metal solar heat collector
- 6 drainage

- 1 solar pump
- 2 pumped water main
- 3 gravity water main
- 4 existing buildings

Situated in a valley overlooked by two Buddhist monasteries on the mountains above, the classroom buildings are arranged in the shape of a mandala, at the behest of the Drukpa Lama. A mandala is an "imaginary palace" contemplated during meditation that has a number of variations and specific meanings. The school plan employs the mandala's nine-square grid, central circle, and cruciform axes. The plan also employs a progression of sacred spaces customary in the design of Buddhist monasteries, each space bringing a visitor symbolically closer to enlightenment. The entry sequence of the school complex leads through a series of thresholds around the central courtyard, until visitors emerge in the center with access to all areas of the school, understanding what was previously hidden. The diagrams of the master plan development (above, left) indicate the combination of these different elements, accompanied by the completed master plan (above), which also shows the water system. One simple and efficient use of solar power is for the ventilated-improved-pit latrines. A passive-pit latrine like any outhouse, this toilet is sided with dark metal that heats the air in the pit, drawing up odors, flies, and moisture and leaving dry waste below, which is then extracted as fertilizer.



DRUK WHITE LOTUS SCHOOL, SHEY, INDIA

CLIENT: The Drukpa Trust **ARCHITECT/ENGINEER:** Arup Associates, London—Tony Broomhead, Omar Diallo, Jim Fleming, Francesca Galeazzi, Ian Grace, David Hsu, Richard Hughes, Karsten Jurkait, Gwenola Kergall, Sean Macintosh, Rory McGowan, Masato Minami, Barbara Payne, Roland Reinardy, Dorothee Richter, Jonathan Rose, Stephen Setford, Gopi Shan, Caroline Sohie, Stefan Waldhauser, Malcolm Wallace (project team) **CONSTRUCTION MANAGEMENT:** The Druk Pema Karpo Education Society

PHOTOGRAPHS BY ROLAND REINARDY AND CAROLINE SOHIE

SOLAR STUDIES

A REHABILITATED 1950S BUILDING IN SAN FRANCISCO OFFERS LESSONS IN LIGHT AND AIR. BY SALLY B. WOODBRIDGE





In the years since its founding in Oakland in 1907, the California College of Arts & Crafts (CCAC) has added new disciplines to keep pace with changes in the fields of art and design. In 1985, mainly in response to student demand for an architecture program, the college leased a building in San Francisco's South-of-Market district, where dwindling industrial activity had emptied buildings suitable for arts enterprises. Ten years later, CCAC had bought two nearby buildings from the Greyhound Bus Company. Designed by Skidmore, Owings & Merrill in 1951, the smaller structure had housed offices and the larger one had been a bus repair and maintenance garage. A monument from the technological heyday of the postwar era, the garage contained an unobstructed space 400 feet long, 150 feet wide, and 30 feet high.

The college proceeded to remodel the smaller building, to which it moved in 1996. For architects Tanner Leddy Maytum Stacy (now Leddy Maytum Stacy Architects) and the engineers at Arup, converting the garage a few years later to an educational plant was far from simple. The cavernous concrete and curtain-wall structure was not insulated or heated. It had been soaking the site with toxic waste from bus repair work since its inception, and after the 1989 Loma Prieta earthquake caused the land beneath the building to subside 6 inches, it became evident that the structure would require significant seismic retrofitting to withstand future quakes. No less challenging was finding an affordable heating system. (The local climate does not require cooling.) The cost of a conventional forced-air system for the huge space was prohibitive. Replacing skylights and blocking much of the original single-pane industrial sash might have helped increase thermal performance, but these interventions would have darkened the interior and destroyed visual aspects of the original architecture. Instead, William Leddy and Marsha Maytum, partners in charge of the design, explored cost-effective, energy-efficient alternatives with Arup.

Success came in the form of a solar thermal system, which California's energy code permits for an adaptive reuse project if it can be shown to perform as well as conventional means. Arup designed a code-compliant system by maintaining a year-round base temperature of 65 degrees Fahrenheit. The system uses high-efficiency rooftop solar collectors to deliver hot water to a radiant floor slab. (The new slab also capped the contaminated existing floor, which was

cleaned beforehand.) A 30-foot-high water-storage tank prominently located in the student café holds hot water collected during the day for nighttime distribution; it also serves as an intentional reminder of the building's sustainable heating system.

To stabilize the structure, Arup created an elegant seismic system that can also be seen and understood by the building's occupants. The lateral system of exposed steel tubes enables the existing structure to resist horizontal seismic forces. The three diaphragm trusses that were added to the ceiling, and span the width of the building, are attached at each end to a chevron-shaped brace at the building perimeter. The use of a single connecting node allows viewers to see how seismic loads are resisted. Other chevron brace-frames set at the center of the existing three-pinned arches transmit horizontal forces to the ground through steel tubes that form triangular arches. The overall effect of the 400-foot-long skeletal frame—its nave and side aisles enclosed by walls of glass—recalls the spatial drama of late Gothic churches.

The studio walls lining the nave are used to display current work for students and faculty to review. The groups of people gesturing at images on the walls also attract the attention of passersby and support interdisciplinary communication in a casual way that is hard to encourage in conventional buildings with studios walled off from corridors. Although the hard surfaces promote a lively interior, acoustic insulation of recycled paper, which was sprayed on the ceiling, dampens the sound.

Those in charge of the building's reincarnation deserve high praise for both renewing its dramatic interior for an appropriate use and reducing its energy consumption by 60 percent below California code requirements. The reliance on natural resources to create a well-tempered environment and maintain abundant daylight has also given the college a rare opportunity to use its physical setting to support the goals of progressive education in the arts and design. ■

SINCE 1974, SALLY B. WOODBRIDGE HAS BEEN A CONTRIBUTOR TO ARCHITECTURAL MAGAZINES SUCH AS *PROGRESSIVE ARCHITECTURE*, *ARCHITECTURAL DIGEST*, AND *LANDSCAPE ARCHITECTURE* AND AN AUTHOR OF NUMEROUS BOOKS, INCLUDING *JOHN GALEN HOWARD AND THE UNIVERSITY OF CALIFORNIA* (UNIVERSITY OF CALIFORNIA PRESS, 2002).



The building's teaching spaces (above) were designed for flexibility. Three bays on the south side of the former Greyhound Bus maintenance facility are occupied by two-story pods, with enclosed workshops below and open studios for graduate students above. The bays on the north side have one-story, open studios of a more temporary nature, and are mainly used for painting and drawing. The variety of paths and overlooks into the studios where disciplines share space promotes student interaction (facing page, left). The architects retained as much of the 50-year-old structure as possible, including its concrete piers (facing page, right).

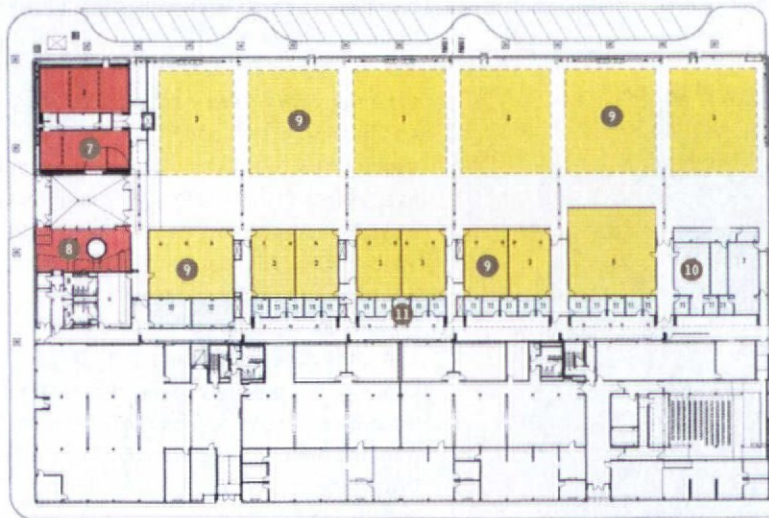
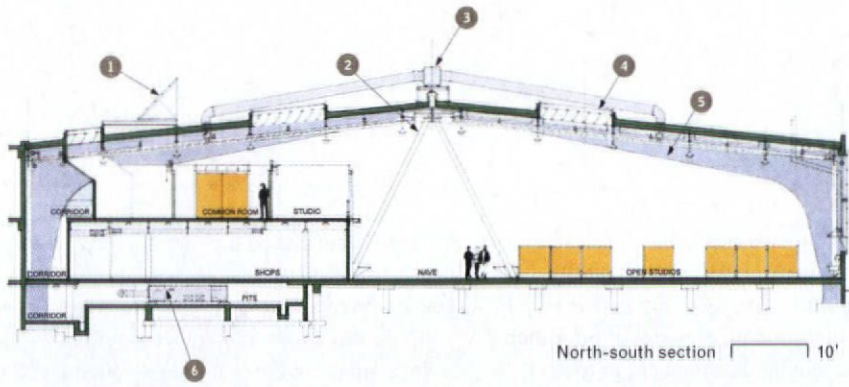
CALIFORNIA COLLEGE OF ARTS & CRAFTS, MONTGOMERY CAMPUS, SAN FRANCISCO

CLIENT: California College of Arts & Crafts **ARCHITECT:** Tanner Leddy Maytum Stacy Architects, San Francisco--William Leddy (design principal); Marsha Maytum (managing principal); Tom Monahan (project architect); Gayle Tsern-Strang, Timothy Gratkowski, David Eisenman, Gassia Salibian (project team); John Fatzinger, Risa Boyer (models) **ENGINEERS:** Arup (structural, M/E/P); KCA Engineers (civil) **CONSULTANTS:** Charles M. Salter Associates (acoustical); Architectural Lighting Design (lighting); Jensen & Macy Architects (first-floor studio partitions) **GENERAL CONTRACTOR:** Oliver & Company **CONSTRUCTION MANAGER:** Hassan Afrookteh **AREA:** 90,000 square feet

PHOTOGRAPHS BY RICHARD BARNES

SPECIFICATIONS

ALUMINUM STOREFRONT: Vistawall **LOCKSETS:** Schlage **EXIT DEVICES:** Von Duprin **SPRAYED CEILING INSULATION:** International Cellulose **STAIR AND WALL PANELS:** Medite **TACK PANELS:** Homasote **PLUMBING FIXTURES:** American Standard



Ground-floor plan | 20' ^

- 1 solar panels
- 2 inverted V-bracing
- 3 roof-mounted AHU providing tempered fresh air to open space
- 4 skylights
- 5 arches
- 6 heating and ventilation units for enclosed classroom spaces
- 7 gallery
- 8 café
- 9 studio
- 10 classroom
- 11 offices



>practice

continued from page 49

Each architecture student interacts with the lab at some point, whether doing research at the graduate level or taking undergraduate courses in sustainable technology. "No student would leave the institution without being able to walk you through the space and tell

you about it," says Loftness.

Carnegie Mellon's approach facilitates partnerships with manufacturers to investigate sustainable technology, a model of operation common in scientific disciplines, but rare in architectural education. "It has been unbelievably rich as a learning environment, not just

for our students and faculty, but also for the professionals from all over the country who come with their clients to test the technology," Loftness declares. "Ideally we would have the federal government build a half-dozen labs at different universities in different climates so that people could work with regional solutions for environmental quality."

STANDARDIZING GREEN STUDIES

As these programs and others like them explore new avenues for architectural education, educators and reformers are discussing ways to incorporate these various approaches into national education standards. The National Architecture Accreditation Board (NAAB), the Association of Collegiate Schools of Architecture (ACSA), and the AIA's Committee on the Environment are all debating different ways to promote, document, and quantify efforts in sustainability education. One of the most important questions for those involved in this process is to what degree standardization is needed. "One of the fundamental principles of sustainability is diversity," says Jean Gardner, architecture professor at Parsons School of Design and a member of the ACSA Task Force on Sustainable Design. "The point is not to develop something uniform, but to give teachers the tools to adapt their own ideas and programs."

Efforts to resolve this issue are underway. The NAAB is currently debating whether sustainability will be a required criterion for school accreditation, or just optional subject matter that can be assessed using the current set of standards. The AIA's Committee on the Environment would like to establish a national rating system for all architectural schools, so that there can be a public assessment of each school's commitment to sustainability in its curriculum. These issues will also be the focus of the 2003 Teacher's Seminar this June, an annual conference sponsored jointly by the ASCA and AIA.

With schools branching out in their curricula and collateral organizations reaching to welcome them, sustainable education is slowly gaining a foothold. As individualized approaches are undertaken and encouraged, diverse and localized educational programming may become the rule rather than the exception. ■

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> BILL DUNSTER ARCHITECTS ZEDFACTORY / BEDZED / SUTTON, ENGLAND

How does green become mainstream? Architect Bill Dunster has meditated on this theme for most of his professional life; the result of his deliberations is a revolutionary housing complex outside of Sutton, England, called BedZED.

The catchy name stands for Beddington Zero Energy Development, which says a lot about the site's agenda. This is a "carbon-neutral complex," an urban infrastructure that generates enough heat and power from renewable sources within its borders to offset consumption of imported fossil fuel. But the real

seduction lies elsewhere: BedZED is a pleasant place to live. The 82 conventional maisonettes and 18 live-work units that make up the development are flooded with daylight and have a loftlike aesthetic. Though confined to a small floor plate, almost every apartment has a garden. The uninitiated would never guess this land was formerly used for sewage treatment.

"We're trying to create a completely new image for green living, away from the beards and the sandals, and make it very 'city,'" explains Dunster, whose firm is currently based at the

BedZED site. "We're also making it so easy and convenient to lead a green lifestyle that you don't have to think about it; you just default to it." Indeed, most of the people who have purchased BedZED units since the first ones were completed about a year ago appreciated the design and architecture first and foremost, not to mention the cost. (A one bedroom runs about \$170,000—a reasonable price tag considering the property lies within commuting distance of London.) "The fact that it is green was a secondary issue," says Dunster.

> specifications green design



BedZED presents more than an extraordinary example of sustainable design; it is also a "serious study in high-density, contemporary urban living," says Bill Dunster. The development's real success, however, is its appeal to the homebuyer without an environmental agenda. At BedZED, sunny, modish interiors (bottom right) and other amenities

BEHIND THE SCENES

The development's contemporary profile, however, has not compromised its environmental strategy. "A sunny, super-insulated, carefully ventilated cave" is Dunster's slightly oxymoronic description of the BedZED design. Basically, the "cave" maximizes **thermal mass**, making the structure itself capable of weekly levels of **heat storage**. "It is more efficient to store heat in large thermally massive surfaces than it is to spend your kilowatt-hours injecting it into the air," the architect explains. Controlling heat loss/gain starts with about a foot of various types of insulation for all external walls, ceilings, and floors. Low-maintenance **sedum roofs** on the uppermost surface and **grass-covered patios** on the

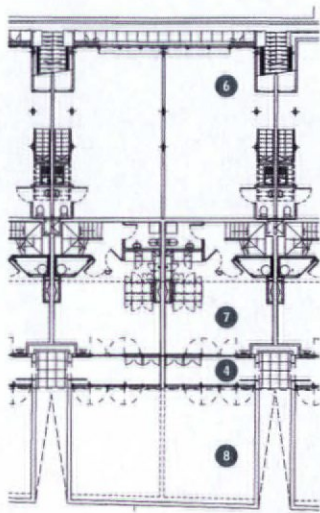
second and third floors (bedded with a foot of topsoil) provide a **passive cooling strategy** for the interiors below.

Orienting 75 percent of the buildings' heavily fenestrated façades within 15 degrees of due south also helps capture sunlight for conduction. On the south-facing side, two double-glazed layers encase the sunroom attached to each apartment, creating in effect a **quadruple glazing system**. Triple-glazed windows dress the east, west, and north façades, as well as the skylights. This thermally massive construction pays off: "**Passive solar gain** is responsible for between 20 and 30 percent of a typical apartment's winter space-heating needs," says Dunster, who notes that because

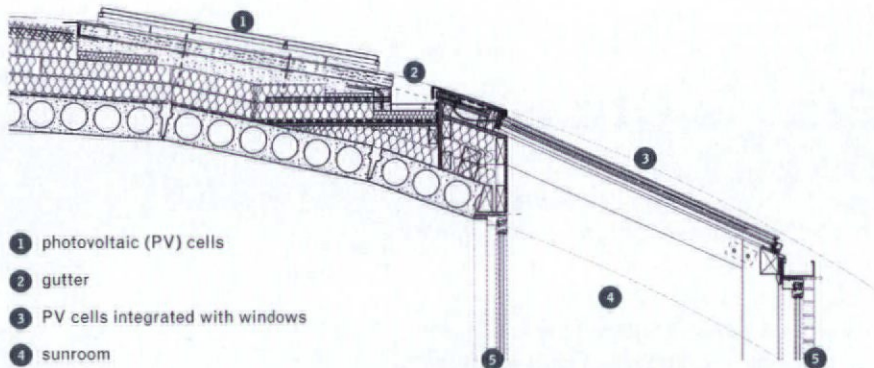
of overheating, high levels of passive solar energy are inefficient without such construction.

Continuous strips of **photo-voltaic (PV) cells** on the roof, as well as PV panels integrated into the double-glazed sealed window and **tilted skylight units** on the south-facing façade, generate additional solar power. Pooled with an on-site 130-kilowatt, wood-fueled, **combined-heat-and-power station**, the sun provides enough energy to meet the daily needs of residents. The site even supports 40 electric cars, each traveling about 10,000 miles per year, and during summer months, the development exports power back to the grid. (It imports slightly in the winter, so overall use balances out, says Dunster.)

BedZED owes much of its technical innovation to Dunster, who teamed up with suppliers to design many of the required material and structural components: "The building-physics strategy demanded certain things that do not exist in the market," he says, obviously frustrated by this fact. "Most companies have absolutely no vision and no environmental-social concern." For example, **wind-driven heat-recovery ventilation units**, designed in conjunction with engineering consultant Arup, deliver two interior air changes per hour, preheating incoming fresh air with outgoing stale air without the use of electrical fans. The movement caused by falling cold air from the roof and rising



Partial ground-floor plan 14' ^



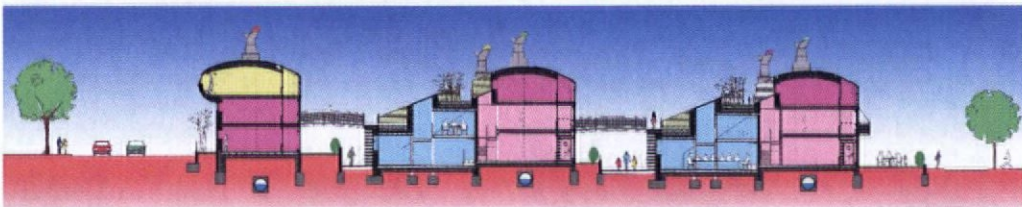
Typical section at south-facing roof 1.5'

- 1 photovoltaic (PV) cells
- 2 gutter
- 3 PV cells integrated with windows
- 4 sunroom
- 5 double-glazed windows
- 6 workspace
- 7 living space
- 8 garden

BEDZED, SUTTON, ENGLAND

CLIENT: The Peabody Trust, in partnership with the BioRegional Development Group **ARCHITECT:** Bill Dunster Architects ZEDfactory, Sutton England **ENGINEERS:** Arup (M/E/P); Ellis & Moore (structural) **CONSULTANTS:** Gardiner & Theobold (cost estimates) **CONSTRUCTION MANAGER:** Gardiner & Theobold **AREA:** 112,000 square feet **COST:** \$25.1 million (includes residences and infrastructure)

PHOTOGRAPHS BY RAF MAKDA, EXCEPT AS NOTED



like sod patios exist beside, and even contribute to, the green design. Photovoltaic cells and sedum roofs (facing page, top left) blend with the traditional materials of brick and wood-framed windows. The ventilation system, on the other hand, becomes an obvious design element, its colorful vanes waving like celebratory streamers.

internal hot air helps circulate air throughout the interior.

THE BIG PICTURE

In spite of these advances, Dunster contends that low-energy design alone does not qualify a building as green. "There is no point in designing low-energy offices if you have to drive 25 miles in your car to get there," he says, adding that a third of an average British family's annual carbon emissions result from commuting and private car use. The real solution depends on a comprehensive master plan involving everything from building materials to on-site amenities.

Materials specified for the BedZED development incorporated bioregionalist principles intended

to stimulate the local economy and reduce pollution from transportation. All brick, concrete aggregate, plasterboard, and topsoil and 80 percent of the timber were sourced within 35 miles of the site. The team used certified hardwood approved by the Forest Stewardship Council, an international organization that promotes responsible forest management, for the exterior carpentry and bridges, and half of all site materials were recycled or reclaimed, including paving, structural steel, and most of the interior carpentry. The development also collects rainwater and treats all of its sewage and gray water on site.

The development includes important amenities and is located within walking or biking distance

of others. Residents needn't commute; those that don't occupy a live/work unit have access to the site's 16,000 additional square feet of office workspace. A daycare center has been included in the BedZED master plan, as has a café and sports facilities. Other necessities not located within its borders sit just outside: There are three schools within a mile, a train station within three-tenths of a mile, and two bus routes within 500 feet.

"A lot of people marginalize this as a study in green technologies," says Dunster. "It is actually a serious study in high-density, contemporary urban living." The architect's design—of BedZED, as well as other projects like the Earth Centre in Doncaster, England—approaches these ideas

with playful, appealing forms that celebrate their function, "producing in the process a new architectural expression," says Dunster. "But it is too far away from what many people perceive as architecture, because they don't share the values that created it in the first place."

The architectural establishment may have given this project "the swerve," but the popular press has given it big headlines. Ultimately, this is fine by Dunster; the populace is his client, and a seemingly satisfied one at that. Most of BedZED's apartments have sold, leaving the architect and his team to concentrate on the 230-unit sustainable community planned for a nearby site.

EMILIE W. SOMMERHOFF

Utility Poles and Prairie Grass

> RDG / IOWA ASSOCIATION OF MUNICIPAL UTILITIES TRAINING FACILITY / ANKENY, IOWA

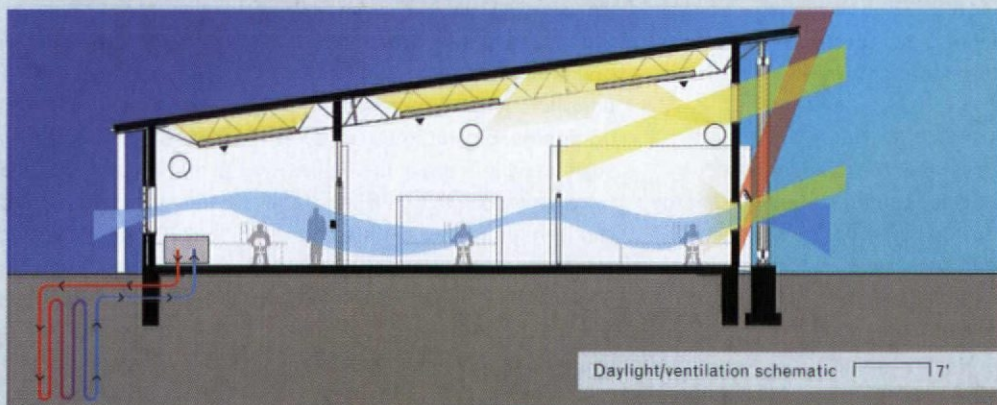
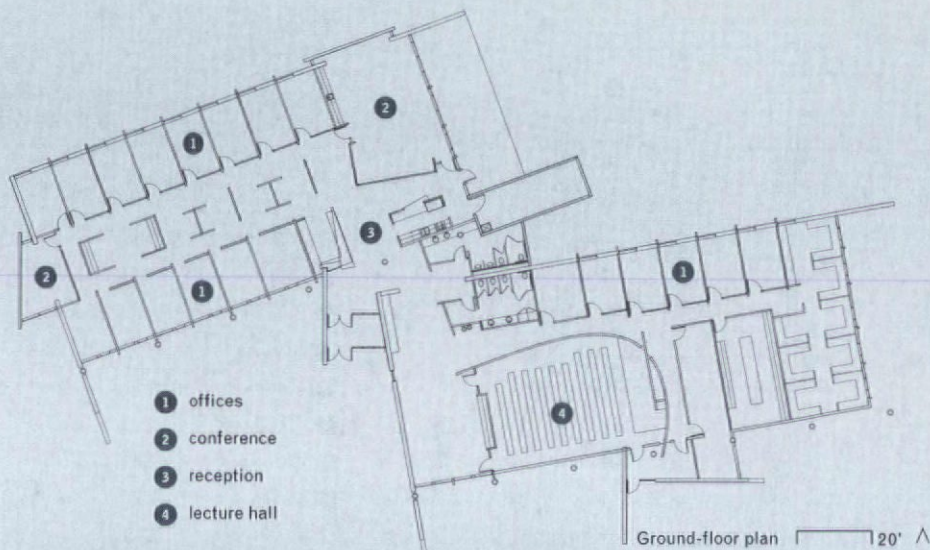
Occupying a transitional moment between restored tall-grass prairie and a grid of power poles, an office and training facility for utility workers near Des Moines synthesizes the centuries-old story of its Midwestern land: the sod huts of early settlers, the agrarian grid imposed on a rambling open plain, even modern sprawl. Drawing from historical building patterns and the Jeffersonian axes, Des Moines-based RDG delineates a truly prairie-style experiment in sustainable design.

As seen in traditional farmsteads, the north and west façades serve as windbreak to buffer winter gusts; the southern exposure welcomes the sun. Modified by topographic determinants like water runoff for a new **septic wetlands**, this east-west axis organizes the facility in plan and elevation. The result is a massing of two simple sheds set on a slight rise. At about 11 feet, their eave height will peek just slightly over the stalks of native big bluestem grass planted on the site to restore the natural prairie.

AGRARIAN MOTIF

To effectively shield the northwest breezes, the north and west walls feature **tinted concrete block with raked joints**. Elsewhere, simple stud framing is clad with a natural gray **cement-board siding** made from recycled waste wood and Portland cement, accented by **exposed rods and turnbuckles** to improve wind loading on a few structural bays. Holding up a southern beam line are **rough-hewn wood columns** that mediate eloquently between the natural and developed spheres—are they trees or the ubiquitous utility pole?

It doesn't really matter. "We just wanted to keep the materials as honest as possible, much as farmers would, or as utility folks would do with their buildings," says RDG design partner Kevin Nordmeyer. The approach also reduced cradle-to-grave impact. For example, the unfinished **Galvalume** roof structure and flashings simplify future recycling. Other "closed-



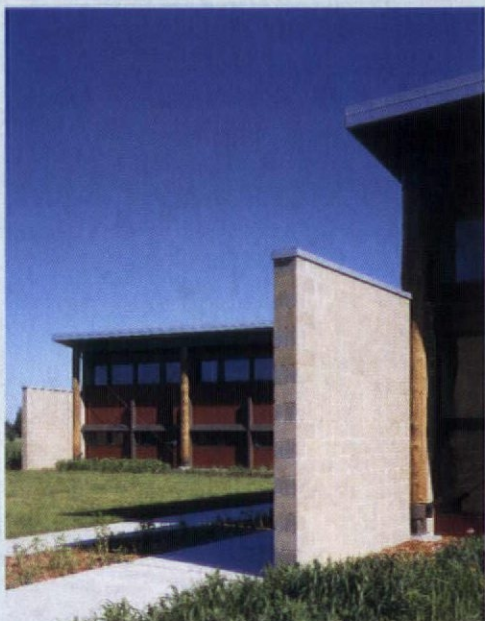
Dozens of wells were drilled on the site for a ground-source heat pump to heat and cool the buildings. Other mechanical systems, such as the enthalpy energy-recovery wheel that tempers outside ventilation air and the water-conserving low-flow toilets, make the facility lean and efficient. It costs two-thirds less to operate than a similar building in this climate, says the client.

loop" materials abound, such as **recycled concrete**, recyclable carpeting, and roof insulation from reclaimed extruded polystyrene.

ENERGY SYSTEMS

Orientation and fenestration produce a bright,

open-plan interior, painted white in part to recall the whitewashed interiors of early sod huts on the plains. "The building is 96 percent daylight, including storage rooms and a large auditorium," says Nordmeyer. Office and common areas frame vistas of the sky and the landscape. To control



Rods and turnbuckles help brace open façades (left), and rough-hewn columns support the southern beam line (center). High-bay windows flood the whitewashed interior with daylight, and a lower rank of windows offers views to occupants seated in private and open offices (right). The casework is made of formaldehyde-free particleboard.

glare, east-west exposure is minimal, and two levels of windows are employed—high-bays overhead for **daylighting** and a second rank below eye level “so that when you’re sitting at your desk, you can see outside.” Deep overhangs and seasonal **light baffles** on the southern façade control direct sunlight. The expected active energy-conservation systems (many recommended by Minnetonka, Minnesota-based energy consultant Weidt Group) are in ample evidence: **occupancy sensors**, photosensors, time clocks, and **dimnable fluorescent fixtures**.

Mechanically, the facility’s connection to the land is indeed literal. Below grade, a **ground-source heat pump** transfers heat to cool or warm interior spaces. (The geothermal installation cost \$25,000 more than a typical rooftop system, but it offered an attractive three-year payback.) Because site conservation was the project’s focus, a horizontal loop of piping, which would require that much of the site be excavated, was ruled out in favor of a **vertical-loop** arrangement of 38 wells drilled to about 250 feet below grade.

In fact, the urge to minimize grading and conserve the site’s natural features dictated numerous design moves and construction methods. The architects specified that excavation fill be used for new wetlands, siltation ponds, and a wetlands septic system—a biological

approach that treats building wastewater on site. The contractor tilled donated compost into graded embankments to create the **siltation ponds**, and the architect secured variances for parking and driveway designs that allow **natural infiltration** and drainage into the wetlands. The carefully restored tall-grass prairie helps prevent soil erosion by wind and water, while also creating habitat and reintroducing native plant species depleted by years of agriculture.

LEED OR FOLLOW?

Ironically, the site-conservation techniques run counter to recommendations from the U.S. Green Building Council’s widely used **LEED Rating System** (see page 45): The project, which predates the LEED program, took farmland out of production and impinged on natural wetlands—both Green Building Council no-nos. Yet, the project saved the site from planned warehouses and surface parking and from runoff that was silting into the existing wetlands, “restoring the property to what it was like 150 years ago, when it was taking care of itself,” says Nordmeyer. Thus, the demonstration project—with its panorama of coneflowers, goldenrod, and compass plant blooming in the spring—offers insight into the widely leveled criticism that LEED ratings don’t travel well. **C.C. SULLIVAN**

IOWA ASSOCIATION OF MUNICIPAL UTILITIES TRAINING FACILITY, ANKENY, IOWA

CLIENT: Iowa Association of Municipal Utilities
ARCHITECT: RDG, Des Moines—David Dulaney (principal); Kevin Nordmeyer (designer); Rich Gardner (landscape architect) **ENGINEERS:** James Wilson (structural); Alvine and Associates (M/E/P); Gjersvik & Associates (civil) **CONSULTANTS:** Weidt Group (energy); Stecker Harmsen (cost); Polk County Conservation Board (planning); Prairie Roots Restoration (plantings) **GENERAL CONTRACTOR:** Story Construction **AREA:** 13,500 square feet **COST:** \$1.9 million

PHOTOGRAPHS BY ASSASSI

SPECIFICATIONS

JOISTS: Vulcraft **CONCRETE BLOCK:** Rhino Materials
CEMENT-BOARD SIDING: Viroc, Allied Building Products **ROOFING:** Berridge, Firestone
INSULATION: Icynene **WINDOWS:** Pella **DOORS:** Curries, Weyerhaeuser **LOCKSETS:** Sargent **HINGES:** McKinney **CLOSERS/EXIT DEVICES:** Sargent
ACOUSTICAL PANELS: Tectum **PAINTS/STAINS:** ICI Devoe **CARPET:** Blue Ridge Commercial **SEATING:** KI **LIGHTING:** Lithonia, Stonco, Cooper **LIGHTING CONTROLS:** Wattstopper **PLUMBING FIXTURES:** Kohler **HEAT PUMPS:** Water Furnace **ENERGY RECOVERY:** Green Deck **ELECTRICAL SYSTEMS:** Cutler-Hammer **FIRE ALARMS:** Simplex

> specifications audiovisual

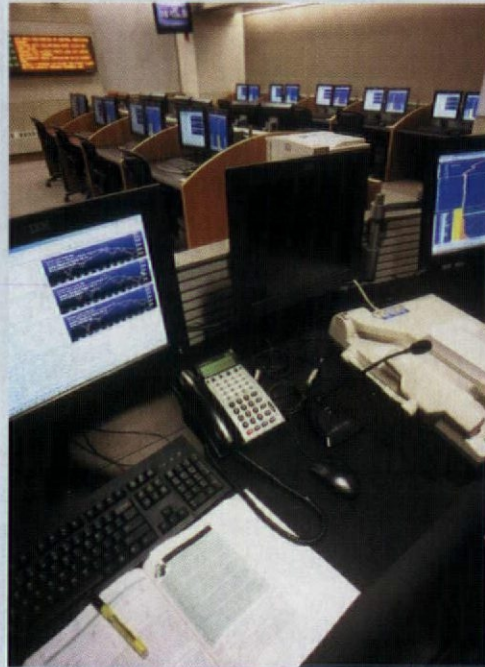
Bryant College in Smithfield, Rhode Island, recently saw the completion of the George E. Bello Center for Information and Technology. Gwathmey Siegel & Associates designed this 72,000-square-foot building to include a state-of-the-art mock trading floor that can support real-time financial-market data feeds and complex analytical software. Working with systems integrator HB Communications and multimedia consultants Shen, Milsom & Wilke, the team selected furniture and cabinetry and determined where the cable pathways, electrical floor boxes, and structural elements would be located.

The focal point of the high-tech installation is a large teaching workstation with a Crestron (www.crestron.com) 15-inch touch-screen user interface that can control up to five computer devices and an electronic document camera by Samsung (www.samsung.com), which, much like a scanner, captures images, then

projects them onto the screen. A BeyerDynamic (www.beyerdynamic.com) miniature gooseneck microphone is supplemented by a speech-reinforcement system that includes a wireless microphone system by Sennheiser (www.sennheiser.com) and headsets for the hearing impaired. There are 16 Tannoy (www.tannoy.com) speakers flush-mounted in the ceiling.

This room has multiple capabilities as a computer classroom, a video-conference site, an audio-conference site, an overflow room, or a multimedia presentation space. Likewise, many of the audiovisual components are flexible enough to be used in less complex settings such as distance-learning sites or conference rooms.

For information on these companies, circle 250 on page 97.



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architecture's product review

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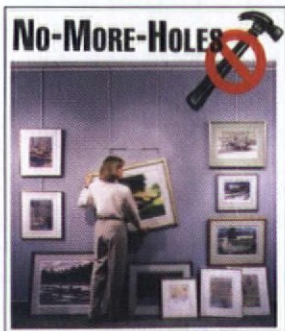
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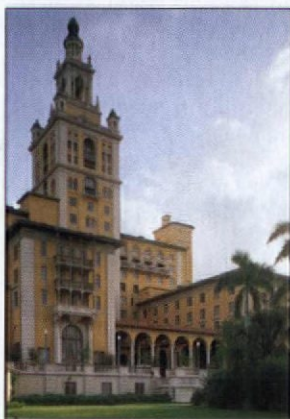
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As architects striving to determine our role in creating a sustainable future, we might take inspiration from a vision of what the alternative would look like. This image of an urban landfill at the perimeter of Mexico City was captured by German photographer Andreas Gursky in 2002. A recent study by the U.S. Environmental Protection Agency indicates that construction and demolition in the United States contributes roughly 55 million tons of landfill waste per year. The shanties visible amid the rubble in Gursky's image offer a glimmer of the possibilities for renewal, as they give new life to the detritus created by the unmindful use of materials. **ANNA HOLTZMAN**



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