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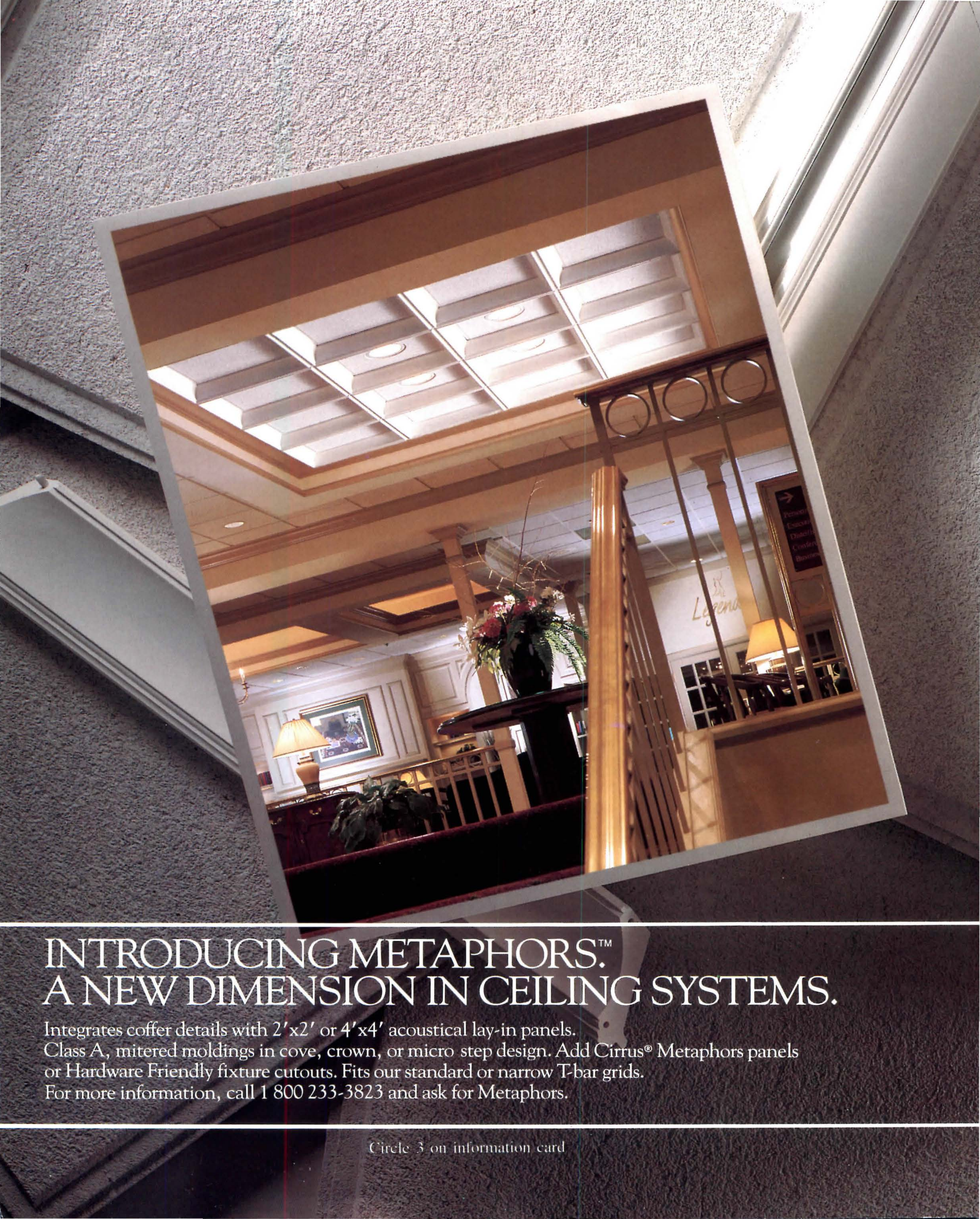
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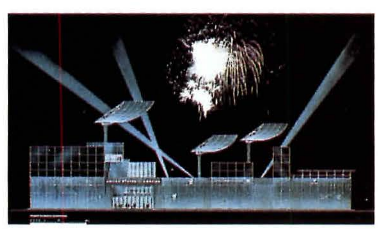
Shame in Spain

THIS MONTH, EXPO '92 OPENS IN SEVILLE, SPAIN, TO HONOR THE 500TH ANNIVERSARY of Columbus's voyage to America and the newly formed European Economic Community. Like other international expositions of the past—London's Great Exhibition of 1851, Chicago's Columbian Exposition of 1893, Paris's Exposition Universelle of 1900—Expo '92's message will be conveyed through the pavilions of different nations. Tadao Ando's huge wooden structure for Japan and Nicholas Grimshaw's high-tech building for Britain are two examples. Sadly, the U.S. hasn't made such a commitment to this country's architects, despite our vast pool of design talent. Instead, the United States Information Agency (USIA), the federal overseer of the U.S. pavilion, has pulled two geodesic domes out of storage and plunked them down on one of the fair's most prominent sites. This recycled assemblage hardly seems what President Bush meant when he wrote to Bruce Gelb, former USIA director, maintaining, "The U.S. will have an exhibition that represents the energy and genius of our people." The agency originally responded to Bush's mandate by organizing a design competition in 1989. An advisory panel narrowed 73 entries down to nine finalists and ranked Antoine Predock's poetic interpretation of "America the Beautiful" (bottom) as the best design. However, the panel members were subsequently overruled by Gelb, who preferred their second choice, a Modernist group of buildings by Los Angeles architect Barton Myers, which included seafaring imagery recalling Columbus, such as a waterwall and three sun-tracking sails (center).

Originally, the USIA intended to fund the pavilion through a combination of public and private contributions. The agency's major stumbling block was Congress, which refused funding in 1989, and finally relented a year later to allocate $13 million for the project in June 1990. By that time, inflation, currency fluctuations, and scarcity of labor and materials had driven up the price of construction, calling for a much larger budget. To make matters worse, the sizable corporate sponsorship anticipated by USIA never materialized. As a result of delays and budget cuts, Myers' scheme was severely altered to include only the waterwall and sails (top). Disappointed with the government's lack of support, Myers decided his name could no longer be associated with the pavilion and shifted design responsibility to his Spanish associate, Carlos Langdon, who revised the original scheme to incorporate the USIA's Twin Peaks addition of recycled domes.



U.S. pavilion at Expo '92 (top) will feature only the waterwall and sails of Barton Myers' winning competition entry (center). Antoine Predock's scheme (above) was ranked first by the USIA jury.

Sadly, the U.S. pavilion reinforces this country's negative stereotype abroad: we're broke, we're lazy, and we don't care about our own culture. For architects, it's another example of the all-too-common design competition rip-off and the government's lack of commitment to architectural quality. But hope springs eternal: it's an election year, and architects are being offered a chance to elect officials more sensitive to their needs.

Ironically, it is the U.S. private sector that is showcasing some of the country's best architectural talents in Europe. The projects have just been completed outside Paris, at Disney's new entertainment complex, Euro-Disney. ■

—DEBORAH K. DIETSCH

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Wheelchair bias

At least 90 percent of the costs required for compliance with the Americans with Disabilities Act are to provide wheelchair accessibility. Yet only 2 percent of the handicapped use wheelchairs, according to The National Council on the Handicapped. It is not fair to do more for 2 percent than is done for the other 98 percent. Maybe it's easier for bureaucrats to find ways to help wheelchair users than to find ways to help the blind, the deaf, and other disabled citizens. The rules are just not fair to all people with disabilities.

Raleigh Daniel
Standard Properties, Inc.
Washington, D.C.

Dangerous design

The first three featured houses in your February issue are missing guardrails on the stairs. Surely ARCHITECTURE isn't trying to tell young architects that they are more likely to achieve professional recognition by thumbing their noses at the building codes and designing spaces that are dangerous to their occupants? No matter how visually attractive the results, it is irresponsible to encourage this type of professional negligence. No wonder many people look on architects as irresponsible dreamers!

Rosemary Muller, AIA
Muller & Associates
Oakland, California

Edge city admonitions

The article "Cities on the Edge" in the December issue (pages 45-47) is an audacious venture into land use planning by people who apparently have little concept of the connection of man to the natural environment. The article should screech to a halt at its basic premise—that the automobile is the ultimate mode of transportation. In North America, the presence of the automobile, though merely a flash in time, has wreaked the greatest environmental havoc since the last glacier.

As a landscape architect, I protest the glo- rification of the fact that our culture is being strung out along the freeway at great environmental cost, with little redeeming artisti value, at the expense of unprecedented con- sumption of natural resources, all motivate by the promise of short-term profit. To sug- gest that the 20-year trend toward automo- bile-oriented development with meager, con trived green spaces surrounded by asphalt i paradise falls short of my vision of huma possibilities in the 21st century.

Robert McNamara, ASL
Syracuse, New Yor

To consider edge cities completely, one mus also consider the revolution in telecommuni cation and computers. Video conferencing voice mail, fax, modem connections, and E mail all make the need for being there in pe son less necessary. Edge cities depend on th automobile for existence, but every yea more business is conducted without the pa ticipants ever leaving home. Add to this th need to lessen our dependence on cars for health and ecological reasons, and it's not hard to imagine edge cities like Tysons Corner ending up as modern-day ghost towns. As goes the automobile, so goes the edge city. Personally I hope they both, eventually, go away.

Andrew S. Weber
Wiss, Janney, Elstner Associates
Emeryville, California

Kieran and Timberlake's article "Paradise Regained" (December 1991, pages 48-51) was extremely well-researched and thought-provoking. Their cutting-edge stance on the beleaguered suburbs is as refreshing as it is gutsy. It's time architects assert what we know to be the true values of suburbia: to pave as much of the landscape as possible, to separate society by economic class and race, and, most importantly, to support General Motors.

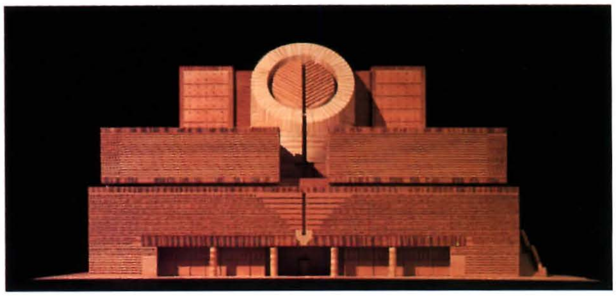
Julie E. Gabrielli
Duke Srygley Associates Architects
Baltimore, Maryland

April 8-10: Georgia Institute of Technology Education Workshop on Building Safety. Contact: Georgia Tech, (404) 894-2547.
April 13-16: National Building Envelope Symposium, Plano, Texas. Contact: Phyllis French, (713) 440-8284.
April 22: Deadline for the Municipal Art Society's Centennial Design Competition: "Reinvent New York: Ideas for the 21st Century." Contact: Anne Reilly Fahim, (212) 935-3960.
April 29-30: Symposium for architects, interior designers, and facility managers specializing in commercial projects. The Washington Design Center, Washington D.C. Contact: (202) 554-5053.
Through April 30: "Small Firms, Great Projects," exhibit on display at the American Institute of Architects, San Francisco Chapter. Contact: Liz Muffeny, (415) 362-3948.
May 1: Deadline for submittals for the Bard Awards for Excellence in Architecture and Urban Design, sponsored by the City Club of New York. Contact: (212) 921-9870.
May 5: "The Reality of Innovation: A Critique of the Building Process," symposium at the Cooper Union, New York City. Contact: Robin Auchincloss, (718) 472-8038.
May 6-8: Lightfair International at the Jacob Javits Convention Center in New York City. Contact: Carole Carley, (404) 220-2115.
May 6-9: "Sacred Trusts V," conference on historic churches, synagogues, and religious structures, in Baltimore, Maryland. Contact Diane Cohen, (215) 546-1288.
Through May 11: "The Once and Future Park," exhibition on park design at The Walker Art Center. Contact: (612) 375-7618.
May 14-15: "Universal Design: Access to Daily Living," conference in New York City. Contact: Joanne Creveling, (212) 755-8500.
May 15: "Evolution of the Restoration Process: New Directions," symposium at AIA headquarters in Washington, D.C. Contact: Lynne Lewicki, (202) 626-7467.
May 14-18: Chicago International Art Exposition at Donnelly International Hall. Contact Carol Rosofsky, (312) 787-6858.

NEWS

Sexual Politics in L.A. ▪ Social Idealism in Chicago ▪ Boston Architects Retrench ▪ Zoning New York City

Yerba Buena Schemes Unveiled in San Francisco



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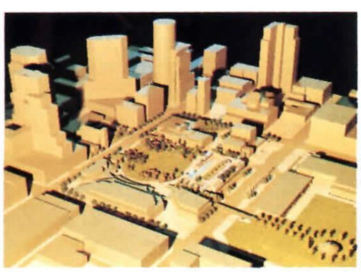
RARELY HAS THE ADAGE "GOOD THINGS come to those who wait" been more evident than in the Yerba Buena Gardens development taking shape in San Francisco. After years of frustration, the city is set to receive the most significant cultural center to be built in the U.S. since New York's Lincoln Center, designed by a team of internationally renowned architects. With several of the projects rising nearby, Romaldo Giurgola, James Stewart Polshek, Fumihiko Maki, James Ingo Freed, and Ugo Fruh (project architect for Mario Botta) outlined their visions for the 87-acre development during a public forum, held February 23 at San Francisco's Moscone Center.

The site of Yerba Buena has little in common with the popular image of San Francisco: its large blocks have no contact with the water, no views (except of nearby office towers), and—significantly for San Francisco—no conflict between topography and the underlying street grid. Its new buildings represent Modernism inflected by a concern for context.

Giurgola's task is to create the Esplanade Garden that provides a major public focus for the district. Among its many elements are a spring-fed waterfall over terraces of Sierra Nevada granite, a monument to Martin Luther King, Jr., and—its boldest statement—a simple, central oval of grass.

Flanking this public space, the Center for the Arts will be housed in two buildings, a multipurpose complex of galleries, video theaters, offices, and staging areas designed by Japanese architect Fumihiko Maki, and a 750-seat theater by James Stewart Polshek (ARCHITECTURE, March 1992, page 76).

CARL WILMINGTON



PERRETTI & PARK PICTURES

Yerba Buena Gardens site (top) and model of new 87-acre development (above). 1. Botta's revised Museum of Modern Art. 2. Center for the Arts cultural complex by Polshek and Maki (left in photo). 3. Freed's One Park Center office building.

Maki's building is a microcosm of the entire Yerba Buena effort: a meeting ground, workshop, and presentation space for some 200 regional cultural groups. Flexibility was one of the key ingredients of Maki's complex, and its spaces yield fluidly from one to another. Polshek explained that the goal of his theater design was to symbolically represent all the pieces of the play: a giant black box for the audience, a tall white box for the actors, and a lower form articulating the space between.

The original Botta-designed San Francisco Museum of Modern Art, its halo of fig trees surrounding a central skylight, created a stir when it was unveiled in 1990. Intended to mediate the relation between the building and the sky, the trees ultimately proved impractical, Fruh explained. They have since been replaced by an elliptical form whose patterning will appear as a giant eye at the center of the building (top left).

The final project presented at the forum was Freed's One Park Center office building (top right), which will provide revenues to finance the public improvements. The mid-rise tower, Freed explained, is intended to link the low-rise arts buildings and business district, and will serve as a marker on the city's southern skyline.

The overall scheme for the Yerba Buena site includes hotels, offices, market-rate and subsidized housing, a Mexican museum, and other recreational, educational, and cultural facilities that were missing from the February discussion. One can't help wonder whether the low block across the esplanade from the arts center, now designated simply as a retail and entertainment complex, will receive the same attention as the arts complex.

Nevertheless, at a cost of more than $1 billion, Yerba Buena will be the largest public mixed-use development in California history. That this high profile complex is happening during a recession is a statement of faith in the local economy. And that it is happening downtown is a reaffirmation of urban values nationwide. —DAVID MOFFAT

David Moffat is the associate editor of Traditional Dwellings and Settlements Review.

DETAILS

The team of **Kohn Pedersen Fox Associates** and **BOOR/A Architects** won a competition to design Portland, Oregon's 602,000-square-foot federal courthouse. In addition to the Getty Center, **Richard Meier and Partners** is currently designing a second U.S. project, the 60,000-square-foot headquarters for Swissair in Melville, New York. **O. Jack Mitchell**, who served as director of the School of Architecture at Rice University, died of a heart attack on February 18. Berkeley architecture professor **Spiro Kostof**, who died December 7, 1991, was posthumously awarded the 1992 Topaz Medallion for Excellence in Architectural Education by the AIA/Association of Collegiate Schools of Architecture. New Zealand-born **Peter Rowe**, who joined the faculty of Harvard's Graduate School of Design in 1985, has been named GSD dean. The New Jersey Performing Arts Center unveiled a scheme by **Barton Myers Associates** (below) for its $65 million complex in Newark, New Jersey, to begin construction in June 1993. **Robert A.M. Stern**'s Neo-Georgian design for the University of Virginia's Darden School of Business (bottom) was recently selected over schemes by **Allan Greenberg** and **Kallmann, McKinnell & Wood**. Stern was also recently elected to serve a three-year term on the Walt Disney Company's board of directors.

MARK LOHMAN

NEW JERSEY PERFORMING ARTS CENTER, BARTON MYERS ASSOCIATES

DARDEN SCHOOL OF BUSINESS, UNIVERSITY OF VIRGINIA, ROBERT A.M. STERN ARCHITECTS

California Architects Discuss Sexual Politics

ANY DOUBTS ABOUT THE HEALTH OF THE women's movement in architecture were dispelled by the end of "Broadening the Discourse," the fifth annual conference of California Women in Environmental Design (CWED), held in Santa Monica in February. From professional networking to feminist politics, the three-day event addressed the social, environmental, and practical concerns of up to 200 participants. The meeting was cosponsored by the Los Angeles-based Association for Women in Architecture; an accompanying exhibit showcased the work of California women.

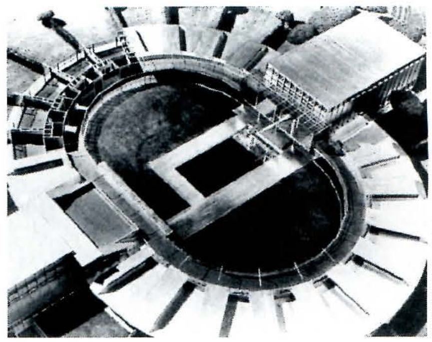
Conference workshops ranged from discussions of feminist issues ("Herstory") to purely practical advice ("Successful Marketing Techniques"). A session entitled "Architectural Design Theory, Education, and Practice" included presentations by four female practitioners who also teach. The discussion that followed centered on familiar debates over context versus autonomous form, and elitism versus social relevancy, and failed to address how these matters relate to women.

Similarly, "Art and Architecture: Connections and Intersections," produced debate over whether architects should consider themselves artists. Thom Mayne, Michael Graves, and Frank Gehry were held up as models of artistic success, but, surprisingly, these all-male examples did not elicit the obvious feminist response. Instead, artist Alexis Smith wondered whether architecture was so impoverished a profession that its practitioners needed to believe they were artists in order to be good.

But women's issues caught fire in the symposium entitled "Women in Environmental Design—Reconsidering Feminist Issues." Jacqueline Leavitt, a planner and associate professor at UCLA's Graduate School of Architecture and Urban Planning, opened with a review of the feminist movement since the late 1960s and its impact on her own work. Graphic designer Sheila Levrant de Bretteville, the winner of CWED's annual Parthena Award (established by San Francisco architect Beverly Willis in 1990 to honor California women in environmental design), presented her work, which includes the founding in 1973 of the Women's Building and Women's Graphic Center in Los Angeles. Susana Torre, chair of the Environmental Studies Department at Parsons School of Design and principal of New York-based Susana Torre and Associ ates, maintained that the insertion of femi nism into the mainstream of architectura theory and history is essential.

In "Women and Political Power," Stat Assemblywoman Gwen Moore, a Los Angele Democrat, outlined current legislation de signed to help minorities and women. Moor described a sex discrimination complain against the office of the state architect, clearl no surprise to members of the audience. Sh closed with a suggestion that CWED becom a source of expert advice for legislators, an encouraged the organization to become mor politically active, which echoed the confer ence's message: in politics and professionalism women are setting an example for the desig professions as a whole. —JUDITH SHEIN

Judith Sheine is an architect who practices and teaches in Los Angeles.



COURTESY MOMA

International Style Reprise

A recreation of the Museum of Modern Art's 1932 show, "Modern Architecture—International Exhibition," which introduced America to the sleek profiles of the European avant-garde, opened last month at Columbia University. Eleven models from the original exhibition were reconstructed, including Mies van der Rohe's Tugendhat House, Le Corbusier's Villa Savoye, and Walter Gropius's Bauhaus School. Photographs depicting Richard J. Neutra's 1927 Ring Plan Schools (above) have also been reproduced. Since few artifacts of Philip Johnson's and Henry-Russell Hitchcock's show have survived, MoMA Curator Terence Riley carefully documented the reprise. The show will remain at Columbia's Arthur Ross Architecture Gallery through May 2.

Socially Conscious Architecture in Chicago

HEDRICH-BLESSING

FOR AT LEAST TWO DECADES, AMERICAN AR-chitecture has been beating a steady retreat from the social idealism that once topped the agenda of Modernism. And why not, one might ask, given the abject failure of public housing projects such as Pruitt-Igoe in St. Louis? But as the Roaring '80s fade into memory, there has been a rekindling of the flame that once fused architecture and social change. Now, chastened by the failures of Modernism, and perhaps somewhat wiser for the experience, architects merely want to save a little piece of the world, rather than revamp it in its entirety.

This shift was evident in the "All Plans Are Politics" exhibit at the Chicago Merchandise Mart from February 15 to March 15. Organized by the Government Affairs Committee of the Chicago Chapter of the American Institute of Architects, the exhibit did not dwell upon grand schemes to remake society. It focused upon new building types, including shelters for battered women, AIDS hospices, and housing for the homeless. Nothing could have been more refreshing, given the mostly hermetic designs of Deconstructivism, or more relevant, given the changing face of American society. This was back-to-basics architecture, an attempt to return to the first principles of European Modernism before they were lost in the often superficial formalism of the International Style.

"It's not just old hippies" practicing architecture with a social agenda, explains organizer and Chicago architect William Worn, who took the show's title from a 1925 essay on town planning by Le Corbusier. "Serious designers," he contends, "are looking at social problems both from an economic and a design point of view."

The effort worked, even though the Merchandise Mart showroom that hosted the exhibit was an ironic, if not altogether inappropriate, choice. It juxtaposed slick furnishings found for corporate offices with earnest projects intended to aid the poor. But the projects themselves were charged with energy, from the SRO hotel that provides a haven for the poor to the African-American church rebuilt after a disastrous fire. In addition, artist Daniel Peterman's aluminum-can house suggested that the refuse which provides a living for the poor can also be used to shelter them.

Many exhibitions would have stopped there and risked becoming a showcase for different formal approaches to emerging building programs. Wisely, "All Plans Are Politics" went a step further, bringing together social service clients for a one-day conference, where they reminded architects to consult their clients carefully or risk repeating the consequences of well-meaning but naive Modernist designs. The most stirring speaker was Linda Hoke, assistant director for the Legal Center for Disability Rights, who discussed the Americans With Disabilities Act from her wheelchair. "My handicap is the environment and the way you build these buildings," said Hoke, who struggled to enter the Merchandise Mart because a door was too heavy for her to open. "If I can get through the front door, I don't have a handicap."

Yet the weakness of "All Plans Are Politics" was its inability to incite debate among architects, clients, and the public, particularly with regard to the issue of retrofitting—or eliminating—the high-rise housing projects of the Chicago Housing Authority. "It's an honor to be here today with the already-converted," one speaker announced to the audience of architects and social service providers. That shortcoming was largely due to the show's location in the Merchandise Mart, the upper floors of which are closed to the public. But with additional funding secured, the exhibit will play to a wider audience at the Chicago ArchiCenter through early June. There, "All Plans Are Politics" will have further opportunity to remind viewers of its essential lesson: despite the failures of Modernism, opportunities abound for today's architecture to advance the social good. —BLAIR KAMIN

Blair Kamin covers architecture and the arts for the Chicago Tribune.

Included in "All Plans Are Politics" is America's first solar-powered church by Skidmore, Owings & Merrill of Chicago (top and below), and the Harold Washington SRO Apartments (bottom) by Weese Langley Weese Architects. The restored 1917 building on Chicago's north side accommodates 70 low-income residents.

HEDRICH-BLESSING

WAYNE CABLE/CABLE PHOTOS

Boston Architects Adjust to New Markets

"NO MORE DINOSAURS," IS HOW AN ARCHITECT disenchanted with the booming 1980s describes the way Boston firms have adjusted to the downslide. In the year since the city's architects reached the nadir of the recession, its surviving firms have beaten a frazzled exit from the age of megadevelopment to an era of infrastructure and institutions.

The architects who will greet their peers at this year's AIA convention in June have forsaken the speculative skyscrapers of the 1980s perforce. With giant firms such as Jung/Brannen or Graham Gund halved, the survivors have retreated to the 1970s, if not the 1870s, when the urban undertaking of the Back Bay filled architects' drafting boards.

Clients that studded the city with behemoths such as Philip Johnson's International Place I and II (now rising), or the smaller, overwrought 222 Berkeley Street by Robert A.M. Stern, have been swept away with the S&L sweepstakes. Current buildings eschew the skybound to slot into more contextual designs. From the South End (Gund's Boston Ballet) to the Back Bay (CBT's 116 Huntington Avenue) to Cambridge (TAC's Taubman Building), the palette is brick; the style is background.

Walkways and open space abound. The new Post Office Square by architects Ellenzweig Associates and landscape architects Halverson Company parallels the fine grooming of the Southwest Corridor, a linear park linking the South End with Back Bay. Similarly, the remake of the 1959 Prudential complex, beginning with an arcade by Sikes Jennings Kelly & Brewer of Houston (ARCHITECTURE, November 1991, page 46), disowns its auto-age outlines for a walkable environ.

If penny-pinching times have downed most megaprojects, the $6 billion infrastructure of the Central Artery proceeds apace. Although the grandiose project, masterminded by engineers Bechtel/Parsons Brinck-

Wallace, Floyd, Associates' operations contro center (top) for the Central Artery Tunnel Project. Vent Building No. 7 (above) by Wallace, Floyd, Associates and Stull & Lee.

Tsoi/Kobus & Associates' administration/laboratory (top left, right in photo) and maintenance/warehouse complex for the Massachusetts Water Resources Authority will be constructed on Deer Island in Boston Harbor. In addition, the firm is renovating the historic Deer Island pumping station (left) as a visitors center that will exhibit state-of-the-art wastewater treatment facilities.

erhoff, reflects a superscale mode that one architect calls "neo-bureaucratic," it is employing several hundred designers to ameliorate the six-lane underground speedster and its grim coil above the city. Even as mass transit and environmental suits continue, architects by the dozens work with architects and planners Wallace, Floyd, Associates to adorn the enterprise. A vast array of piers, vents, and administrative buildings are on and off the drawing boards.

Another $6 billion for harbor-cleaning assigns work to architects; other public projects add to the tally. Courthouse construction, (the Third District Court of Cambridge by Ann Beha Associates); design for the Mass Turnpike (tollbooths by Tise Architects), and Massport and the MBTA's transit work (Leers Weinzapfel's control center, ARCHITECTURE, October 1991, page 29) are under way.

For the rest, Boston architects are taking a deep breath. Some are with new firms, others becoming specialists or scaling down, reports marketing consultant Jill Weber. Some have gone global, working in Taiwan (Sasaki's Taipei Airport), Ireland (BTA's Dublin waterfront), and England (Koetter Kim's London Docklands) in the international contracts that have always fed this coastal city.

"You've reached the Boston Society of Architects and this is our post-recession recording," says the voice of Director Richard Fitzgerald. His greeting may be overly optimistic, but the post-boom public projects do reflect a long and abiding tradition of city-building. —JANE HOLTZ KAY

Future of Zoning in New York City

NEW YORK CITY IS OFTEN THOUGHT OF AS the country's zoning laboratory. The city enacted the first inclusive Zoning Resolution in 1916, and followed with a Comprehensive Amendment in 1961. But, as in all experiments, there has been plenty of room for error; beginning in December 1992, zoning and planning problems will be addressed every four years in a report by New York's City Planning Commission. As part of the prereport review process, a symposium entitled "Planning and Zoning New York City: Yesterday, Today, and Tomorrow," cosponsored by the New York Department of City Planning, and the New York Metropolitan Chapter of the American Planning Association, was held January 30 at New York University.

Columbia professors Richard A. Plunz and Carol Willis, along with MIT professor and architect Roy Strickland, presented the history of zoning in New York and how it has shaped the city. The 1916 resolution divided the city into commercial, residential, and unrestricted areas; zoning defined the maximum building mass and specified "wedding cake" setbacks and towers of unlimited height. In 1961, the Comprehensive Amendment responded to changes in New York—the growth of a white-collar job force and the loss of manufacturing and shipping—and modeled zoning on the International Style tower in the park, epitomized by Mies van der Rohe's Seagram Building.

Skyscraper studies by Hugh Ferris between 1922-25 (above) illustrate th maximum building mass permitted by the 1916 New York zoning law. Norman Marcus (facing page), former counsel to the New York Department of Zoning and Plannin discussed zoning trends over the last 30 years.

Attorney Norman Marcus, former general counsel at the Department of City Planning, called the 806-page amendment a "giant maze" in his presentation, and examined zoning trends of the last 30 years: a commitment to historic preservation; an increase in contextual zoning; the growth of public-private trade-offs; and the gradual increase in discretionary, site-by-site considerations.

What has been conspicuously absent in New York is a comprehensive plan. Without such a scheme, zoning serves as master plan by default. The need for a grand plan was highlighted by speakers who concentrated on zoning's future, presenting alternative scenarios that redress a variety of significant problems. They included incentive zoning, which allows developers to add height for public amenities, a preponderance of specially zoned historic districts, and intractable environmental impact statements.

DOROTHY ALEXANDER

Planning consultant John Shapiro catalogued disjunctions between existing zoning and 1990s needs, including industrial and waterfront development, updated community services, and improvement of low-income areas. While Shapiro noted that the zoning resolution needs a "good, thorough pruning and shaking" to resolve major mismatches, his prescriptions for specific issues were piecemeal and could add to the already overwhelming amendment. In another approach, architect and planner Michael Kwartler advocated a contextual "fine-grained approach," or "kit-of-parts" zoning, based on sets of urban design attributes—from local street uses to particular building conventions—which are already present in the city.

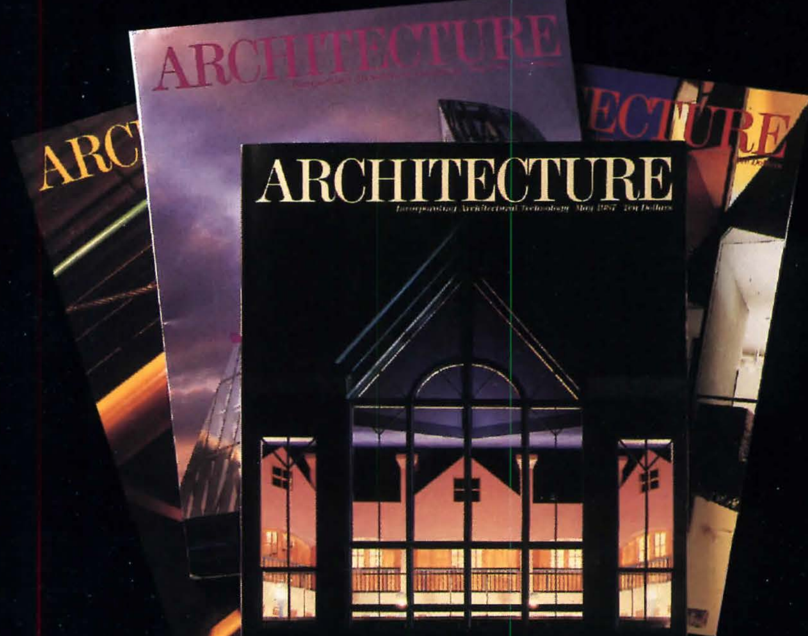
Hunter College planning professor Peter D. Salins presented the most controversial proposal. He suggested returning to the basic principles of zoning in New York: the prevention of specific harms (extreme densities, incongruous juxtapositions), instead of the promotion of specific benefits (a simpler review process; a belief in New York's own economic forces; and a hierarchical zoning format to promote flexibility). Salins suggested eliminating both environmental impact statements and mandatory landmark designations of private property in order to ease the obstacle course to approval for new construction. He also advocated residential, commercial, and less-restrictive districts with overall parameters defining density and bulk. Salins' market-based zoning probably places too much trust in a wholesome, consumer-responsive economy, but his call for simplicity was a welcome relief from the plethora of regulations proposed by other speakers.

Community developer R. Susan Motley discussed how a collaborative, interdependent approach to zoning and planning can create an "equitable" city. Motley never defined the goals or meaning of "equity," but she noted that planning based on market forces has not "proved to produce results that can be defined as equitable."

Whether any of these zoning scenarios are right for the laboratory of New York City—and perhaps the rest of the country—will be evidenced not only in the City Planning Commission's "Planning and Zoning Report," issued in December, but in New York City's long-term changes. All that is clear right now is that those changes can take many directions. —ANDREA MONFRIED

Andrea Monfried is deputy editor of Oculus, *the magazine of the New York Chapter of the AIA.*

Architects Agree there's no Equal*



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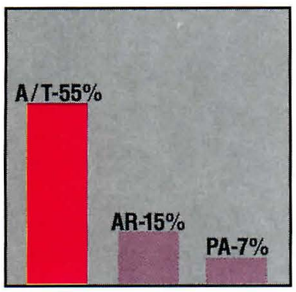

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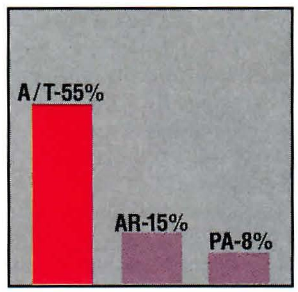

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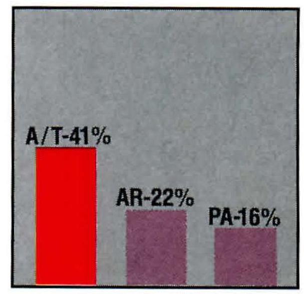

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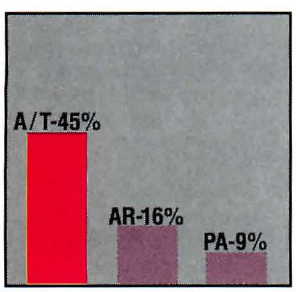

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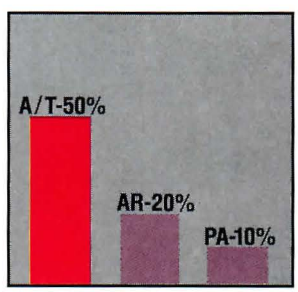

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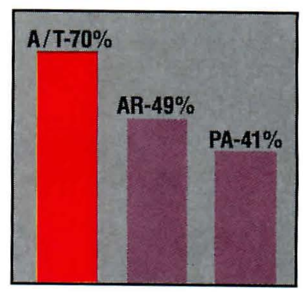

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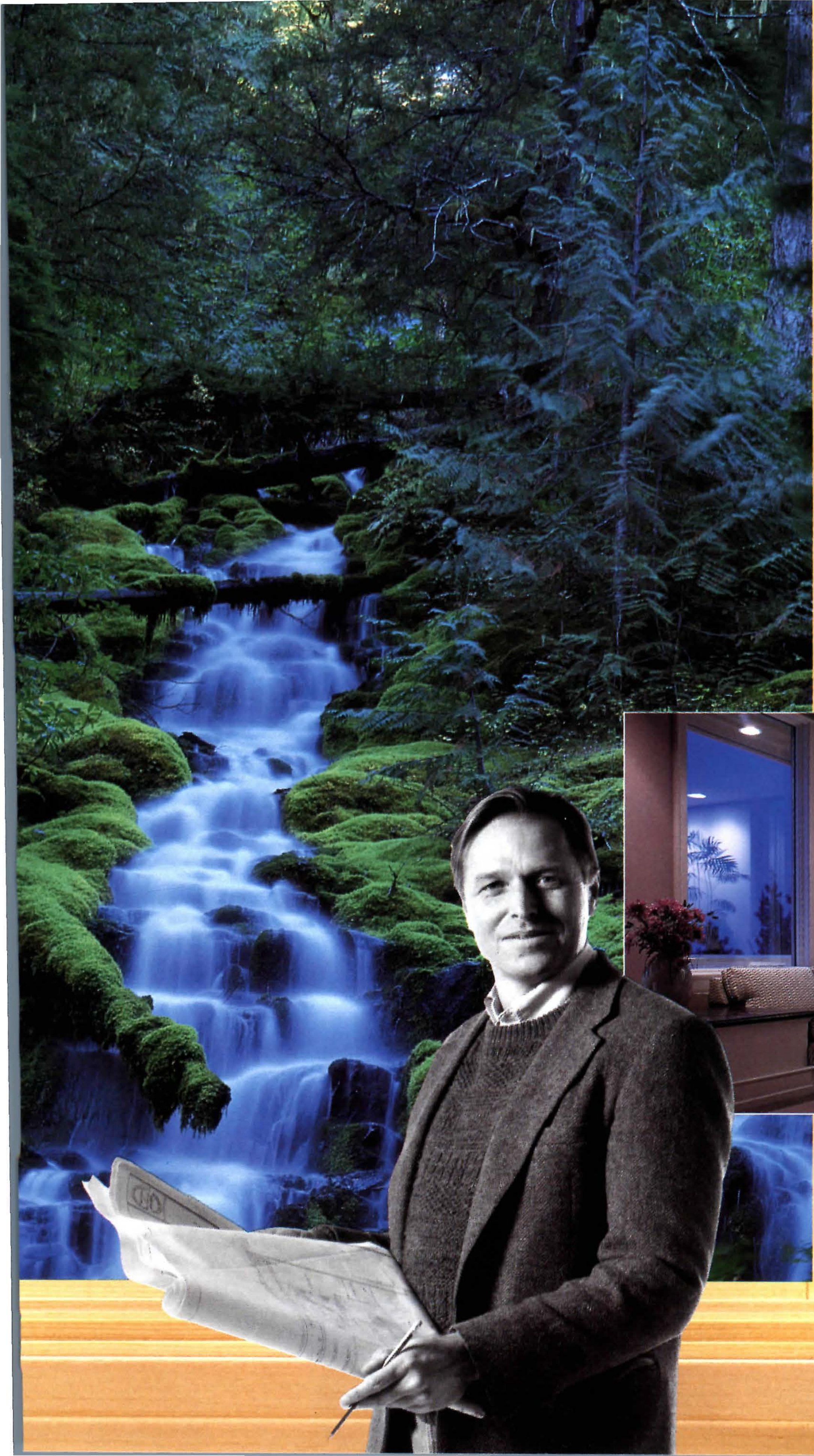
A/T–ARCHITECTURE/Technology
AR–Architectural Record
PA–Progressive Architecture

1992 AIA Fellowships Announced

A RECORD NUMBER OF ARCHITECTS WILL BE inducted into the AIA College of Fellows this June at the national convention in Boston. Topping last year's list by 33, the 123 fellows are selected for their exceptional contributions to design, education, leadership, or public service. This year's group includes five women, five African Americans, three Asian Americans, and two Hispanics. The inductees include:

James G. Alexander, Boston, Massachusetts
Dorman D. Anderson, Seattle, Washington
Bruce P. Arneill, Glastonbury, Connecticut
Donald C. Axon, Los Angeles, California
Howard J. Backen, San Francisco, California
Shalom Baranes, Washington, D.C.
Carol Ross Barney, Chicago, Illinois
John R. Birge, Omaha, Nebraska
Frederick Bland, New York, New York
Friedrich K.M. Bohm, Columbus, Ohio
Michael E. Bolinger, Baltimore, Maryland
Clyde A. Brady, III, Orlando, Florida
Joel Brand, Houston, Texas
Daniel R. Brents, Houston, Texas
Stanford R. Britt, Washington, D.C.
Woodlief Fulmore Brown, Abilene, Texas
Harvey John Bryan, Belmont, Massachusetts
Robert E. Bryant, Washington, D.C.
Edward M. Burke, Seattle, Washington
James E. Burlage, San Francisco, California
Paul Spencer Byard, New York, New York
Robert Campbell, Cambridge, Massachusetts
Horace Seay Cantrell, Jr., Indianapolis, Indiana
Chris Carson, San Antonio, Texas
Lawrence Chaffin, Jr., Los Angeles, California
Wing T. Chao, Burbank, California
L. William Chapin, II, Rochester, New York
Frederick Lee Christensen, Salinas, California
Fred W. Clarke, III, New Haven, Connecticut
Charles B. Croft, Austin, Texas
Gary M. Cunningham, Dallas, Texas
Fernand W. Dahan, Rockville, Maryland
George N. Daniels, Salt Lake City, Utah
Gita Dev, San Francisco, California
Suzanne DiGeronimo, Paramus, New Jersey
William M. Dikis, Des Moines, Iowa
Michael A. Dobbins, Birmingham, Alabama
Jimmy Cal Doche, Amarillo, Texas
Milford Wayne Donaldson, San Diego, Calif.
William R. Dutcher, Berkeley, California
Dale R. Ellickson, Atlanta, Georgia
Scott Ellinwood, Ventura, California
Lawrence Enyart, Phoenix, Arizona
Ralph Folland Evans, Salt Lake City, Utah
David Jay Flood, Santa Monica, California
Bernardo Fort-Brescia, Coral Gables, Florida
Charles E. Garrison, Carbondale, Illinois
Wilmot G. Gilland, Eugene, Oregon
Cary C. Goodman, Kansas City, Missouri
John P. Goodman, Manlius, New York
Lee Roy Hahnfeld, Fort Worth, Texas
Stanley I. Hallet, Washington, D.C.
Gerald J. Hallissy, Flushing, New York
Robert L. Hamill, Jr., Boise, Idaho
D. Kirk Hamilton, Bellaire, Texas
Perry A. Haviland, Oakland, California
Charles R. Heuer, Medford, Massachusetts
David Hoffman, Austin, Texas
John J. Hoffmann, North Haven, Connecticut
Major L. Holland, Tuskegee, Alabama
Jess Holmes, Las Vegas, Nevada
Robert Y.C. Hsiung, Boston, Massachusetts
Rufus R. Hughes, II, Atlanta, Georgia

continued on page 3



1992 Fellows *continued from page 34*

Robert E. Hull, Seattle, Washington
Edwin J. Johnson, Dallas, Texas
Kirby M. Keahey, Houston, Texas
Dennis M. King, Southfield, Michigan
Ballard Harry Thurston Kirk, Columbus, Ohio
Ronald A. Krueck, Chicago, Illinois
James Oleg Kruhly, Philadelphia, Pennsylvania
James I. Lammers, Falcon Heights, Minnesota
Gregory W. Landahl, Chicago, Illinois
T. Jerry Lawrence, Tacoma, Washington
M. David Lee, Brookline, Massachusetts
Todd Lee, Boston, Massachusetts
Gene Leedy, Winter Haven, Florida
Herbert W. Levy, Philadelphia, Pennsylvania
Harry A. MacEwen, Tampa, Florida
Gary J. Mahaffey, Minneapolis, Minnesota
Marvin John Malecha, Pomona, California
Don Clifford Miles, Seattle, Washington
Lionel B. Morrison, Dallas, Texas
Eric Owen Moss, Culver City, California
Perry King Neubauer,
Cambridge, Massachusetts
W.O. Neuhaus, III, Houston, Texas
Lawrence J. O'Donnell, Deerfield, Illinois
Elizabeth Seward Padjen,
Topsfield, Massachusetts
Richard W. Payne, Houston, Texas
Gerard W. Peer, Charlotte, North Carolina
Andrew Perez, III, San Antonio, Texas
Robert W. Peters, Albuquerque, New Mexico
Anthony C. Platt, Cambridge, Massachusetts
Raymond G. Post, Jr., Baton Rouge, Louisiana
Donald Prowler, Philadelphia, Pennsylvania
Craig E. Rafferty, St. Paul, Minnesota
Jefferson B. Riley, Essex, Connecticut
C. David Robinson, Sausalito, California
Byron F. Romanowitz, Lexington, Kentucky
Martha L. Rothman, Boston, Massachusetts
William W. Rupe, Glendale, Missouri
Der Scutt, New York, New York
Jerome J. Sincoff, St. Louis, Missouri
Laurinda Spear, Coral Gables, Florida
Alfred Meichel Staehli, Portland, Oregon
Ralph Steinglass, New York, New York
Michael Stepner, San Diego, California
Robert Michael Swatt, San Francisco, Calif.
Virginia Ward Tanzmann, Los Angeles, Cal
Logic Tobola, II, Houston, Texas
Thomas P. Turner, Charlotte, North Carolir
Thomas C. Van Housen,
Minneapolis, Minnesota
Johannes Van Tilburg,
Santa Monica, California
C. Gregory Walsh, Santa Monica, Californi
Lloyd G. Walter, Jr.,
Winston-Salem, North Carolina
I. Donald Weston, Brooklyn, New York
James H. Wheeler, Jr., Abilene, Texas
Tod Culpan Williams, New York, New Yor
Peter Kurt Woerner, New Haven, Connectic
Francis Michael Wong, Seattle, Washingtor
David Geoffrey Woodcock,
College Station, Texas
Robert S. Woodhurst, III, Augusta, Georgi
Stanford Woodhurst, Jr., Augusta, Georgia
Peter Jay Zweig, Houston, Texas

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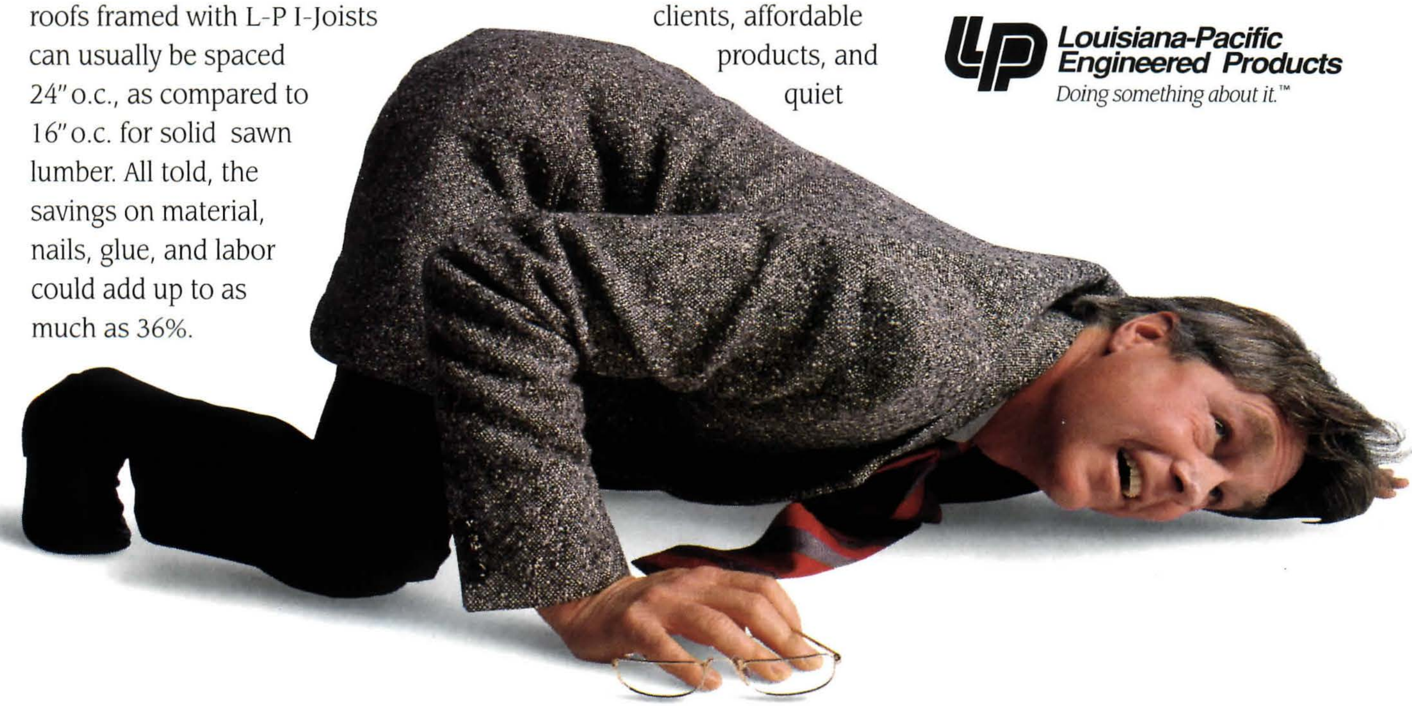

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Boston Society of Architects Awards

A RIGOROUS COMMITMENT TO CONTEXT and detail characterizes the 14 projects selected last fall to receive the Boston Society of Architects 1991 Design Honor Awards. The jury, which comprised New York-based architect Charles Gwathmey, *Architectural Record* Editor Stephen Kliment, and AIA President-elect Susan Maxman, created an urban-infrastructure category to recognize a pair of new Boston landmarks: Post Office Square Park by Ellenzweig Associates, and Leers Weinzapfel Associates' Park Street Station pavilions. The jury awarded architecture that borrows elements from the New England vernacular and animates the urban setting, such as the Hynes Convention Center by Kallmann, McKinnell & Wood and William Rawn's Charlestown Navy Yard housing. They praised the strong compositions of Kyu Sung Woo's Whanki Museum and the Coastal Cement Headquarters by HMFH Architects, as well as the tautness of Robert Luchetti's Sausalito's house (pages 68-73). —K.S.

STEVE ROSENTHAL

Honor Award Winner
Charlestown Navy Yard Rowhouses
Charlestown, Massachusetts
William Rawn Associates

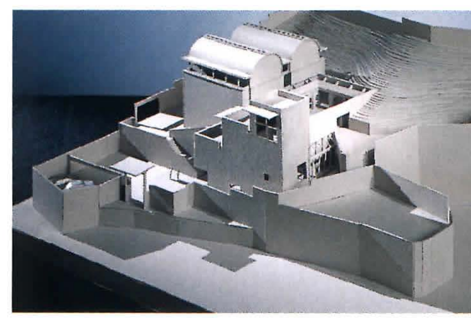
Honor Award Winner
Hynes Convention Center
Boston, Massachusetts
Kallmann, McKinnell & Wood Architects

RICHARD BARNES

Honor Award Winner
Luchetti House
Sausalito, California
Robert Luchetti Associates

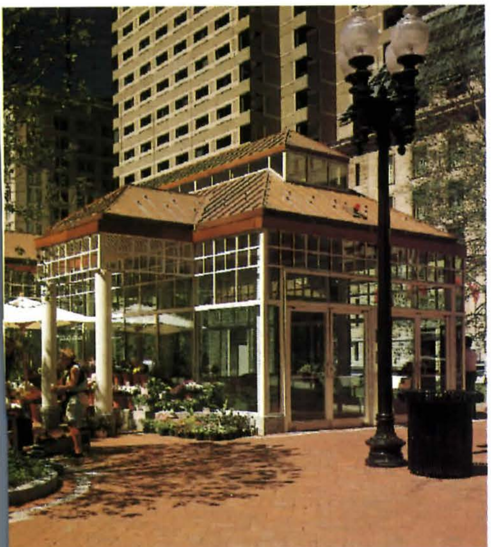
JEFF GOLDBERG/ESTO

Honor Award Winner
Firehouse Civic Center
Newburyport, Massachusetts
Schwartz/Silver Architects



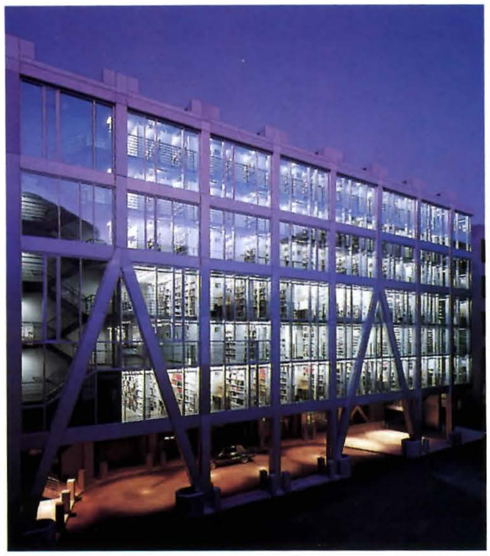
Honor Award Winner
Whanki Museum
Seoul, Korea
Kyu Sung Woo Architect

Honor Award Winner
Tufts University Science & Technology Cent
Medford, Massachusetts
Cannon Architects



CHUCK CHOI

Special Award for Urban Infastructure
Post Office Square Park
Boston, Massachusetts
Ellenzweig Asssociates, Architects



AKER PHOTOGRAPHY

Certificate of Merit
MIT Library of Art, Architecture, and Planning
Cambridge, Massachusetts
Schwartz/Siver Architects

Certificate of Merit
1150 18th Street, N.W.
Washington, D.C.
Hisaka and Associates, Architects

RICHARD MANDELKORN PHOTOGRAPHY

Special Award for Urban Infastructure
Park Street Station Entry and Exit Structure
Boston, Massachusetts
Leers, Weinzapfel Associates, Architects

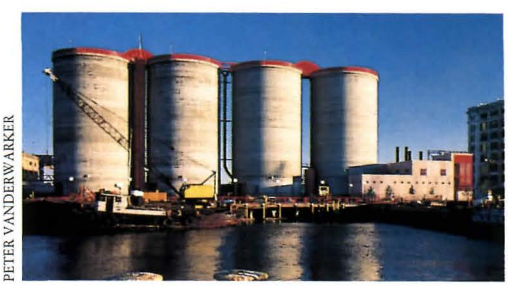
MICK HALES

Certificate of Merit
Massachusetts College of Art Dormitory
Boston, Massachusetts
Stein & Associates

Certificate of Merit
Woo House
Cambridge, Massachusetts
Kyu Sung Woo Architect

PETER VANDERWARKER

Certificate of Merit
Grainger Observatory
Exeter, New Hampshire
Leers, Weinzapfel Associates, Architects



Certificate of Merit
Coastal Cement Headquarters and Terminal
Boston, Massachusetts
HMFH Architects

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DID THEIR SHOPPI

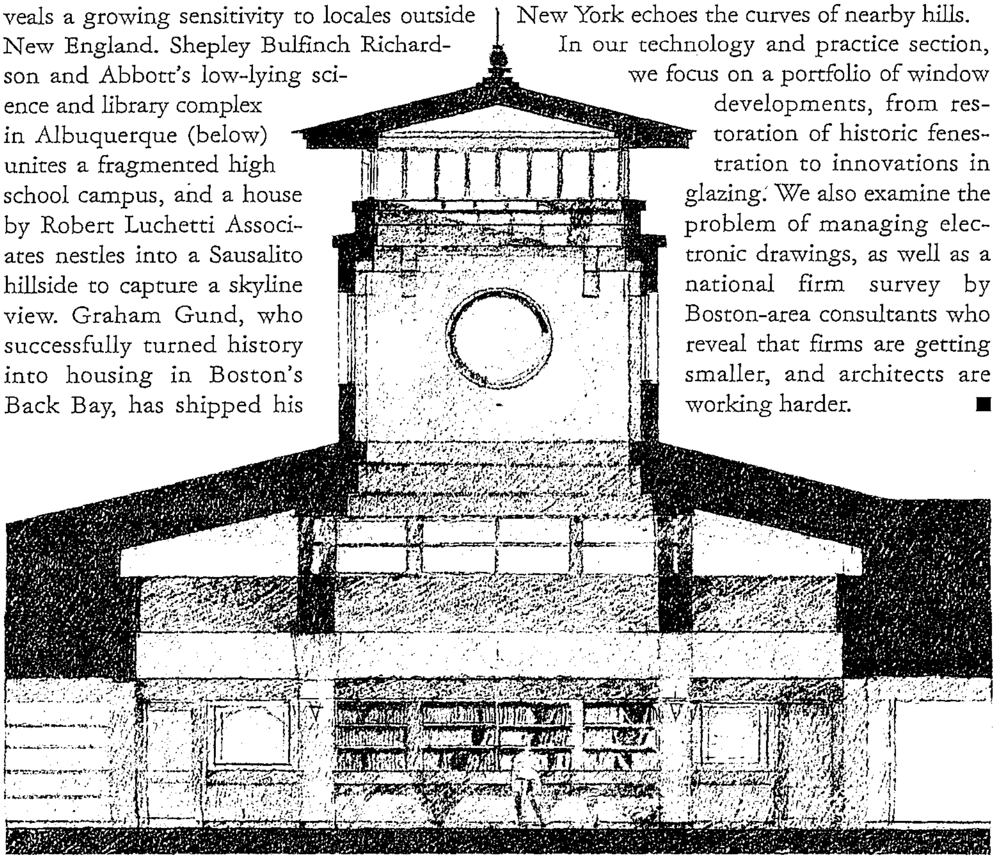
Bow String Steel J
Mall of America
Bloomington, Mi

Boston Exports

FROM JUNE 18-21, THE AIA CONVENTION WILL BE HELD IN BOSTON, A CITY whose recession-torn economy has sent local architects scurrying out of town in search of lucrative commissions. But this export of talent has long been a Boston tradition. From 1979 to 1991, the Boston Society of Architects held an annual Boston Exports competition, recognizing the best out-of-town buildings by local firms. The contest was recently incorporated into a larger awards program, since designing buildings elsewhere has become standard practice for Boston firms. According to BSA Director Richard Fitzgerald, the recessionary years have sent local architects not only outside New England, but outside the U.S. "New generations of Boston architects view the world as a much smaller market than did their predecessors," Fitzgerald contends.

Our selection of new Boston exports reveals a growing sensitivity to locales outside New England. Shepley Bulfinch Richardson and Abbott's low-lying science and library complex in Albuquerque (below) unites a fragmented high school campus, and a house by Robert Luchetti Associates nestles into a Sausalito hillside to capture a skyline view. Graham Gund, who successfully turned history into housing in Boston's Back Bay, has shipped his talents south to Washington, D.C., transforming a former department store into a new magnet for the capital's commercial core. Cambridge Seven Associates' laboratory for Rice University in Houston pays homage to the buildings and plan by Boston ancestor Ralph Adams Cram. Closer to Boston, Perry Dean Rogers' colorful elevations for a U.S. Postal Service facility in Reading enliven a blue-collar community; Schwartz/Silver's volumetric house in upstate New York echoes the curves of nearby hills.

In our technology and practice section, we focus on a portfolio of window developments, from restoration of historic fenestration to innovations in glazing. We also examine the problem of managing electronic drawings, as well as a national firm survey by Boston-area consultants who reveal that firms are getting smaller, and architects are working harder. ■



ALBUQUERQUE ACADEMY LIBRARY, SHEPLEY BULFINCH RICHARDSON AND ABBOTT

Library and Science Center
Albuquerque Academy
Albuquerque, New Mexico
Shepley Bulfinch Richardson and Abbott

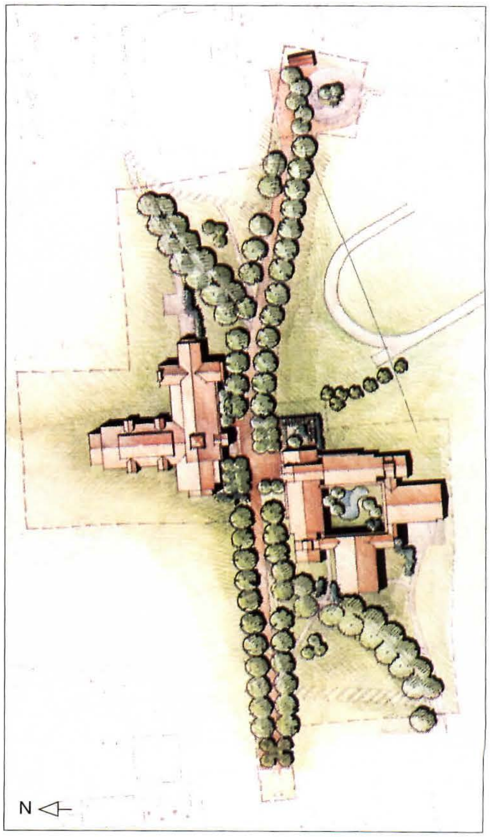
Academic Calm

VISITORS TO THE ALBUQUERQUE ACADEMY OCCASIONally have to remind themselves that they are in New Mexico rather than in New England. Red brick buildings with pitched roofs and small courtyards cluster along tree-lined paths that wind through acres of rich green lawn. Cars are banished, and a mood of academic calm prevails. And at the center of campus stands a new library and science complex, designed by the venerable Boston firm Shepley Bulfinch Richardson and Abbott (SBRA). Only the rugged Sandia Mountains to the east, or the miles of windblown desert to the west, reassert the spirit of New Mexico.

Albuquerque Academy was founded in 1955 by a handful of parents searching for an alternative high school for their bright, ambitious sons. For the first few years, students met in the basement of an Episcopal church, under the supervision of a parish priest. Rancher and financier Albert Simms, the uncle of one student, was so impressed by the fledgling school that he donated nearly 14,000 acres of land in the Sandia foothills as an endowment. The academy moved to its present location, in Albuquerque's Northeast Heights, in the mid-1960s, and became co-ed. It has been living off the land ever since. The enrollment has grown to 900, and there is talk of someday admitting boarding students.

All school buildings were originally perched at the top of a hill, overlooking miles of blossoming subdivisions. In 1983, a middle school (grades 6-8) was constructed at the bottom of the hill, nearly half a mile away. The trustees believed that separating the two schools would permit each to develop at its own pace. But middle schoolers complained about having to trudge uphill for meals and sports, and older students missed talking with younger ones. Despite the best intentions, the campus was becoming Balkanized.

So the trustees commissioned a master plan from SBRA that would unify the campus by eliminating interior streets and placing a new library and science complex midway between the upper and middle schools. As the only two academic buildings visited by all students, they would



Looking east, the cascading roofs of the Albuquerque Academy library appear to mimic the peaks of the nearby Sandia Mountains (these pages). The science building (far left and right in site plan), which comprises four wings that surround a central courtyard, sits across a broad, paved plaza from the library. The two buildings create a new academic and social center for the campus.

create a social and intellectual hub for the entire campus.

The two new buildings, which opened last year, face one another across a broad, paved plaza, with the library tower serving as the school's new landmark. Yet, unlike the earlier buildings, which turned their backs on the desert, these structures reach out to embrace the landscape. Their long, low-lying wings owe much to Frank Lloyd Wright, and are approachable and reassuring, particularly for middle schoolers.

The library sits on a north-south axis, with its main reading room and study lounges offering panoramic views of mountains and mesas to the east and west. School officials maintain that the deep overhangs and arcades make the building one of the most energy efficient on campus. The science building, chunkier and less assertive than its neighbor, pinwheels four classroom and laboratory wings around a central courtyard that serves as a desert demonstration garden. "We wanted the new buildings to blend in with the existing ones," says Headmaster Robert Bovinette. "But we also wanted the architecture to make its own statement."

The statement is polyglot at best. The buildings are clad in brick, with Spanish Colonial roof tiles and simulated post-and-beam portals. While the horizontal lines and broad sheltering roofs are Wrightian in profile, they lack the master's distinctive lightness and fluidity. And some details are simply clumsy, such as the boxy columns that form the portals and arcades.

Yet, if the exterior detailing and massing is awkwarc the interiors of both buildings are, for the most part, low key and welcoming. With 45,000 square feet housing projected 90,000 volumes, the new library outshine those of many small colleges. The main reading room ex udes a genuine civic quality, even though it is used onl by students, faculty, and friends of the school. Stacks an study tables occupy most of the central space, which i bracketed by more intimate study lounges and semina rooms. The wood trim resembles a simplified version o the work of Greene and Greene, particularly in the foye and the study alcoves along the perimeter of the building The light, from lofty clerestories, is exceptional, as are th views of the landscape.

The only question is whether in the long run such grand room will attract or intimidate young students. Al though the jury is still out, Bovinette says that he is opti mistic. "With a grand space, we hope to make a state ment to students that coming here is not a typical hig school experience."

The library's public spaces are arranged on one leve with storage relegated below and an elegant boardroor located just above the reference wing. The school encour ages its students to think of the library as simply one lin in a global information network. As in most new librarie at colleges and universities, the card catalog is compute ized, and video display terminals are everywhere. Trad tional forms and materials notwithstanding, this is a l

The new library (top and facing page) is arranged on a north-south axis, offering panoramic views of mountains and mesas. The main reading room (far left) terminates in a sunny alcove with large windows. Library entrance (left), recalls Stick Style architecture, but is rendered in steel and concrete. The tower forms a campus landmark.

brary for the Information Age.

The science building, by comparison, appears austere and considerably more rigid. It houses 14 classrooms and 11 laboratories, arranged by discipline (biology, physics, and chemistry) into four low wings that frame an interior courtyard. Biology is the introductory science for most students, so its labs and classrooms, located in the western wing, are closest to the middle school at the bottom of the hill. Like the library, the new science building consolidates facilities that had previously been scattered across the campus. Not only does this approach eliminate costly duplication of equipment, but, by being positioned across from the library, the new building symbolically reinforces the connection between the sciences and the liberal arts.

Although it is currently underused, the science building is larger and better equipped than those found on many college campuses. Designed to serve a projected enrollment of 1,200 students, roughly one third of the 55,000-square-foot structure is now given over to foreign language classes.

Whereas the plan of the library seems fluid—even slightly unbuttoned—the science building reflects the crisp organization of its disciplines. Classrooms and laboratories are arranged along long, wide corridors, although for safety reasons, the two types of rooms are always separated. All rooms are flooded with natural light, with private faculty offices located at the ends of the corridors.

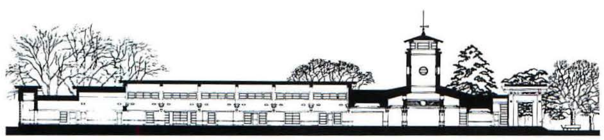
The library's interiors are clean and functional rather than ingratiating. The three-story entry lobby, with it swinging pendulum, conveys some of the qualities of shopping mall atrium, and the corridors look like corridors everywhere.

But the central courtyard, which contains a combina tion laboratory and demonstration garden for dese plants of the Southwest, has already become a popula gathering space for students and faculty. As part of it long-range master plan, the academy plans to plant ap proximately 100 acres of the campus, bringing back na tive grasses and rehabilitating a natural arroyo that cu through the property. By controlling erosion and invad plants, the academy hopes to eventually recreate a nativ desert landscape like the one that flourished on this si hundreds of years ago.

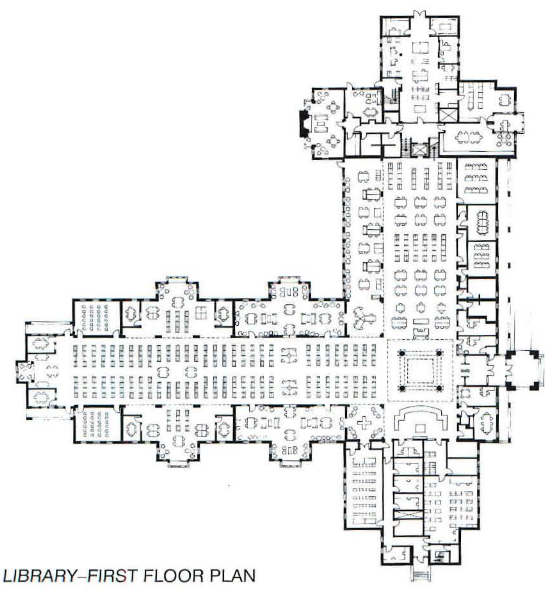
The library and science buildings are more successf in pulling the campus together visually and functional than they are in the particulars of their eclectic archite ture. Instead of clustered, introverted buildings, separate by half a mile of grass and trees, Albuquerque Academ now boasts a graceful tree-lined mall at its center, with handsome plaza. Like all new public spaces, this type town square will have to be monitored, and modified o casionally, in order to function as the school intends. B there is no doubt that over the next several years, t space designed by Boston architects will become the ce ter of the growing Southwestern campus.

—DAVID DILLO

The science building frames the south side of the new academic plaza (facing page). Its east end (top) contains a conference room and patio used by faculty and staff. The central garden courtyard (left) offers a microcosm of the desert environments of the Southwest, and will *serve as a laboratory* for the restoration of the original campus landscape.

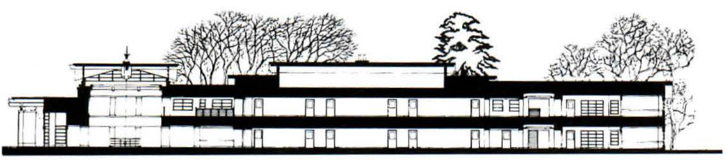


SECTION THROUGH LIBRARY

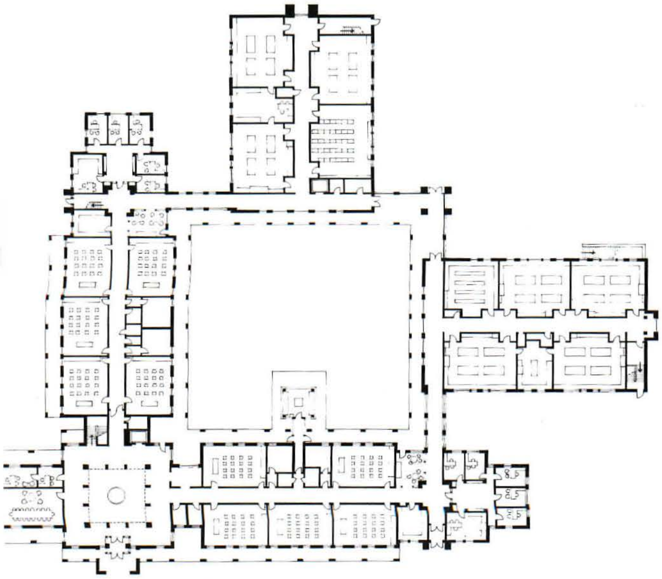


LIBRARY–FIRST FLOOR PLAN

Library's main reading room and foyer (top and right) are finished with traditional wood details, reminiscent of Greene and Greene and other Arts and Crafts architects. Lobby of the science building features three-story atrium (facing page, top right) and patterned floor tiles (facing page, top left).



ECTION THROUGH SCIENCE CENTER



IENCE CENTER–FIRST FLOOR PLAN

LIBRARY AND SCIENCE CENTER
ALBUQUERQUE ACADEMY
ALBUQUERQUE, NEW MEXICO

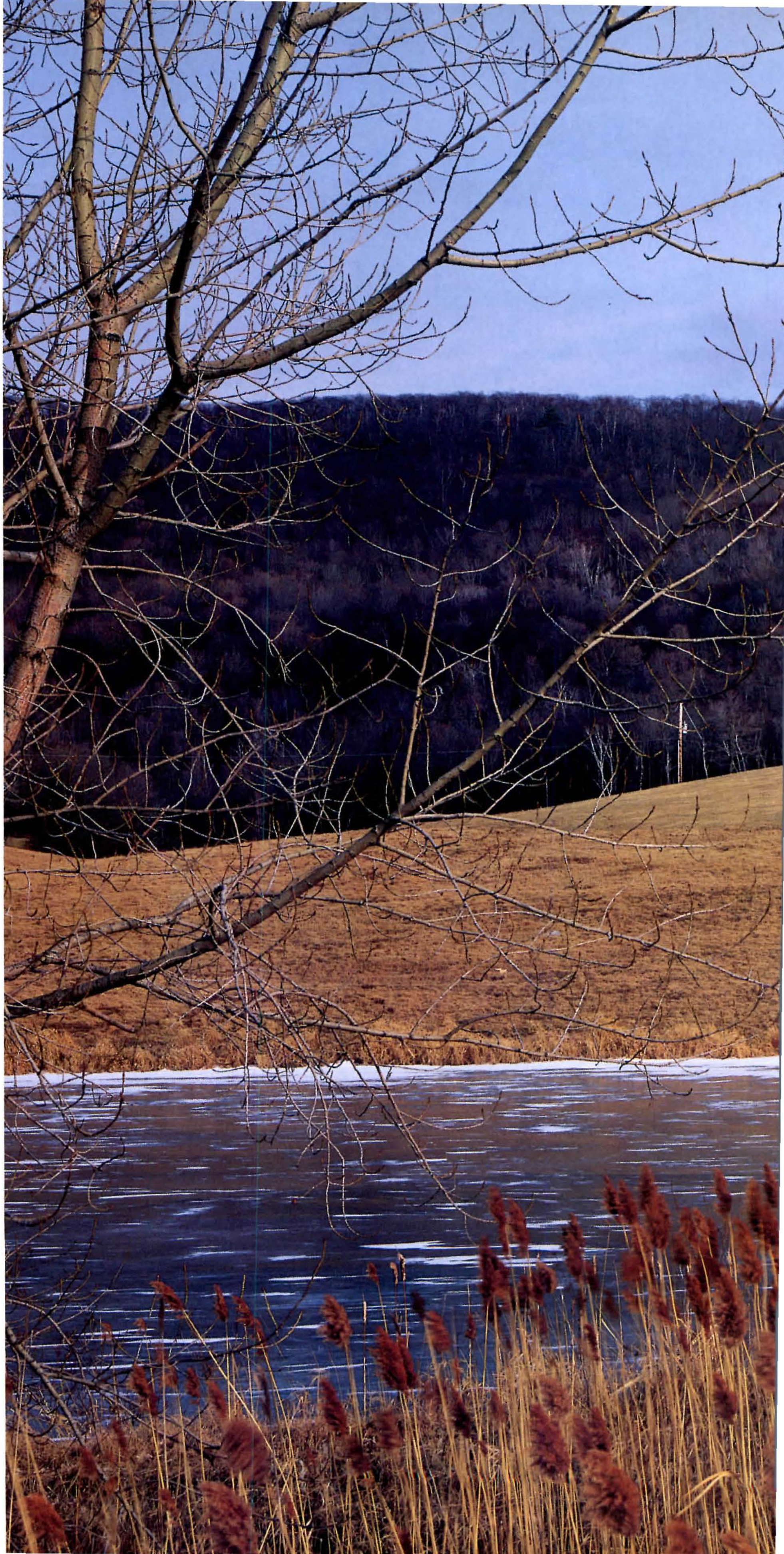
ARCHITECT: Shepley Bulfinch Richardson and Abbott, Boston, Massachusetts—Geoffrey T. Freeman (principal-in-charge); James F. Hunnewell, Jr. (project architect); Alexander Howe (project designer); Kevin Triplett, Bart Lawrence (job captains)
ASSOCIATE ARCHITECT: Van H. Gilbert, Architect, Albuquerque, New Mexico
LANDSCAPE ARCHITECT: Morrow and Company
ENGINEERS: Foley and Buhl Engineering (structural); Bridgers & Paxton Consulting Engineers (mechanical); Telcon Engineering (electrical); Bohannan-Huston (civil); Sergent Hanskins & Beckwith (geotechnical)
Estimating: Balis & Company
GENERAL CONTRACTOR: Bradbury & Stamm Construction
COST: $13.5 million—$125 per square foot
PHOTOGRAPHER: Robert Reck

Lazarus House
Copake, New York
Schwartz/Silver Architects

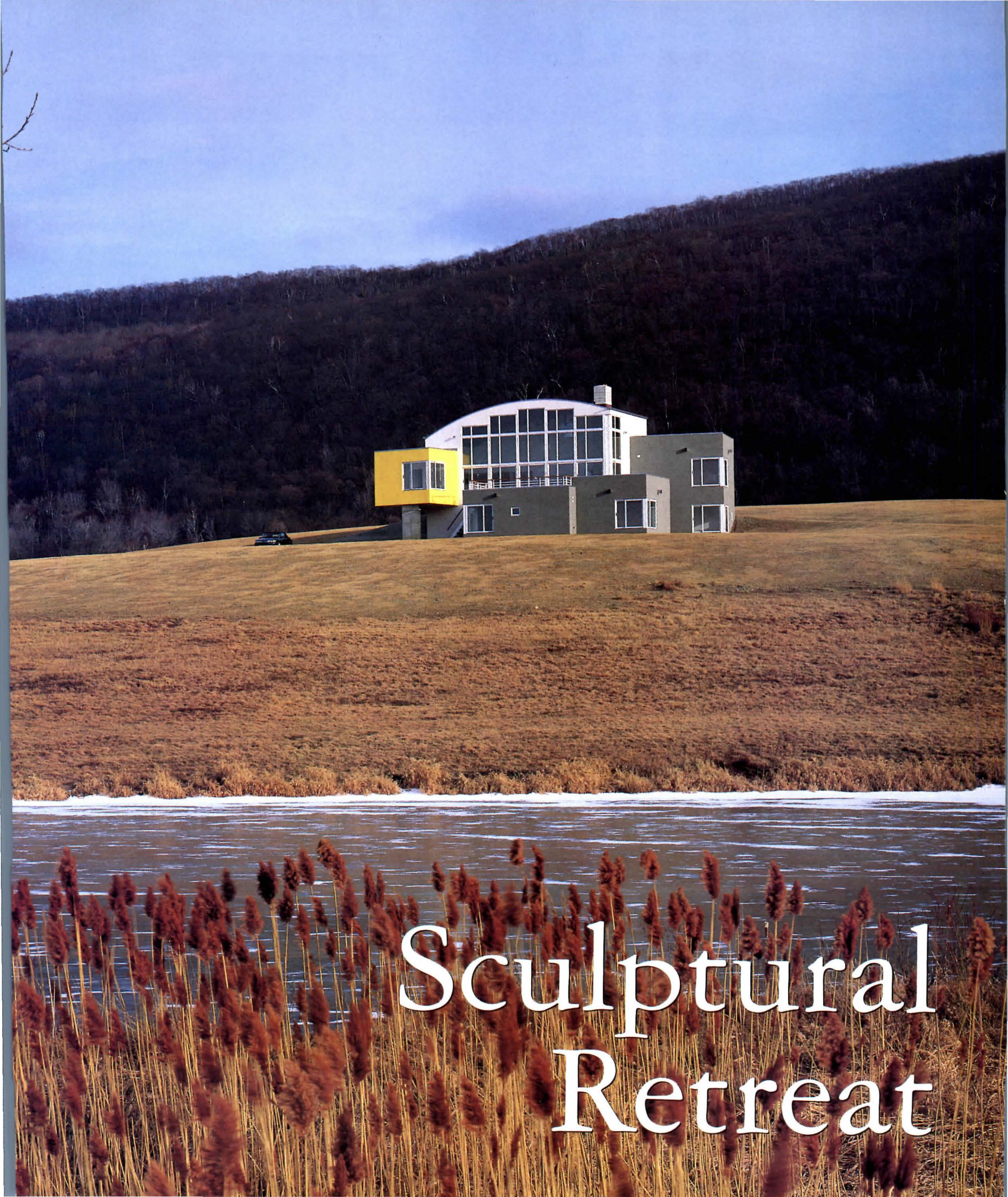
"WE WANTED A HOUSE THAT WOULD PROvide each of us with a measure of privacy, and a sense of community," explains Steven Lazarus of his charge to Schwartz/Silver Architects to design a retreat in upstate New York for his extended family. Warren Schwartz's 3,600-square-foot design seems the very embodiment of Lazarus's wishes: a sheltering, large communal space, around which are clustered secluded quarters for each family member. But it breaks new ground for the architects in its soaring volumes and segmented profile. Rarely have Schwartz/Silver's design skills, which tend to focus on tight urban sites, been given free rein in the landscape.

The site for the vacation house, a 15-acre hilltop of a former farm in Copake, New York, was chosen not only for its natural beauty but its proximity to the cultural centers of New York City (two hours south) and Lenox, Massachusetts (half an hour northeast). The retreat allows Chicago couple Steven and Arlene Lazarus and their three sons (a musician, an entertainment attorney, and a theater director) to gather together over weekends and vacations and partake in their shared interest in the arts.

Emphasizing the family orientation of the house, Schwartz describes his composition as a "hen and her chicks." Indeed, the structure appears to roost upon the gently rolling site, its vaulted living space surrounded by four cubic bedrooms snuggled around its base. Although the architect rendered the sculpted, abstract ensemble without a trace of rustic sentimentality, he arranged each element to sympathize with the landscape. The northeast side of the house nestles into a knoll; its small windows create a private face against the hills of the Taconic State Park, which are echoed in the curved profile of the roof. On the western elevation, a broad smile of windows along the living area offers expansive views of the Catskill Mountains to the east, and the corners of the son's bedrooms are fitted in sliding glass doors to offer direct access



West elevation from pond (facing page) reveals ground-floor bedrooms, upper-story living area, and guest bedroom on concrete pier. Curved roof form echoes rolling hills of the Taconic State Park to the east.



Sculptural Retreat

o the surrounding open fields.

The architect countered the country-house stereotype by inverting the typical house section, as he did in his own residence n Tanglewood, Massachusetts, where living spaces are placed on the top floor with bed-ooms underneath (ARCHITECTURE, March 1990, page 95). "This arrangement allows he volumes and the roof forms of the living paces to become more expressive, because here are no spaces above them," Schwartz xplains. The first level of the Lazarus House s devoted to a trio of self-contained bed-oom-bathroom suites. Oriented around a nudroom cum foyer off the garage, these paces are nearly monastic in their spare, imple detailing. Rather than cap the rooms vith flat, planar surfaces, however, Schwartz ave the illusion of extra height by exposing heir structural framework of fir ceiling afters and plywood sheathing above.

Early in the design stage, the Lazarus amily expressed a desire for a building with he character of an 18th-century farmhouse, pdated for the 1990s. Schwartz complied by esigning a "great room," whose vaulted ex-anse, supported by a tautly exposed struc-ure, evokes both modernity and a barnlike olume. Forty-two feet long, 22 feet wide, and 22 feet high at the apex of its vaulted ceiling, the living space is spanned by five beams, each composed of two Douglas fir 3 by 12s bolted together. The midspan of each beam is punctuated by a king post, consisting of two 3 by 12s connected by half-inch steel plate sandwiched between the paired members. Angled out from each king post into the beam above are narrow strips of black-painted steel that create a series of inverted trusses. The slender steel against the heavy timber appears to lighten the structure, suggesting wings lifted in flight.

Schwartz treated the great room as an urban loft with combined living and dining functions. At the north end, he inserted a kitchen, from which a guest bedroom awkwardly extends, and to the south positioned a massive fireplace faced in native granite, with a bluestone hearth and mantel. He flanked the east side of the chimney with a tall cherry bookcase, which supports a loft reached by a wooden ladder. This "crow's nest," as Schwartz calls it, affords commanding views of the great room and its expressive structure, a place to work at a desk concealed behind the chimney mass, and access to the master bedroom and a secluded rooftop deck at the southern end of the house.

Schwartz admits that the most challenging aspect of the design was the exterior color, since the budget did not permit stone—the client's first choice. The building is covered in synthetic stucco, which simulates masonry and allows virtually any color to be integrated into the mix. To study the effect of colors on each element, the architect hung large sheets of colored synthetic stucco on the exterior walls. The family rejected all-white and all-gray schemes as too stark and bunkerlike, and autumnal colors as too specific to a particular season. The final, variegated scheme ties the central communal space to the site with gray elements at its base that allude to the earth. This arrangement expresses the client's preference for a farmhouse in its evocation of white clapboard perched on a stone base. Schwartz, however,

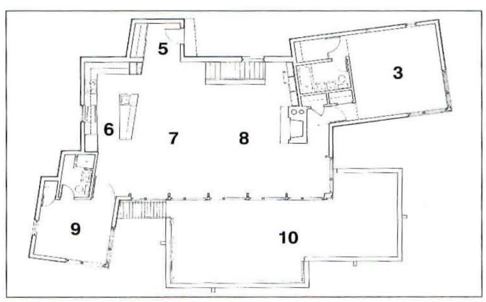
Northwest elevation (facing page, top) is distinguished by concrete-pier-supported guest wing and first-floor bedrooms. Northeast elevation (facing page, bottom), which greets visitors, is private, with few windows. *Southeast elevation (top left) houses* entrance to upper-level living spaces, while south elevation (top right) is dominated by bedroom wings topped with decks.

avoids any literal recall of local precedents by interrupting the neutral tones with a sunny yellow block raised on a concrete pier (nicknamed "chick-on-a-stick"). The color differentiates the function of this space—a guest bedroom that doubles as a small study—from its earthbound neighbors.

The Lazarus House marks a departure for Schwartz/Silver, whose portfolio has largely focused on urban infill and commercial and institutional projects, such as the Wheeler School Library (ARCHITECTURE, July 1990, pages 78-81). Although it shares the structural exuberance of the firm's previous buildings, such as the Newburyport Firehouse Center (ARCHITECTURE, November 1991, pages 74-79), the house is more sculptural than these projects, and its exposed structure is limited to the ceilings of the living area and bedrooms.

"Houses are different from institutions in that they are ultimately personal," notes Schwartz, "and they can be as different from each other as people are." But Schwartz/Silver hasn't completely forsaken its contextual roots: the sculptural freedom of the Lazarus House responds at every turn to the cues in the landscape. ■

—*MICHAEL J. CROSBIE*



SECOND FLOOR PLAN

FIRST FLOOR PLAN

1 GARAGE
2 OCCASIONAL ROOM
3 BEDROOM
4 MUD ROOM
5 ENTRY
6 KITCHEN
7 DINING ROOM
8 LIVING ROOM
9 GUEST ROOM
10 DECK

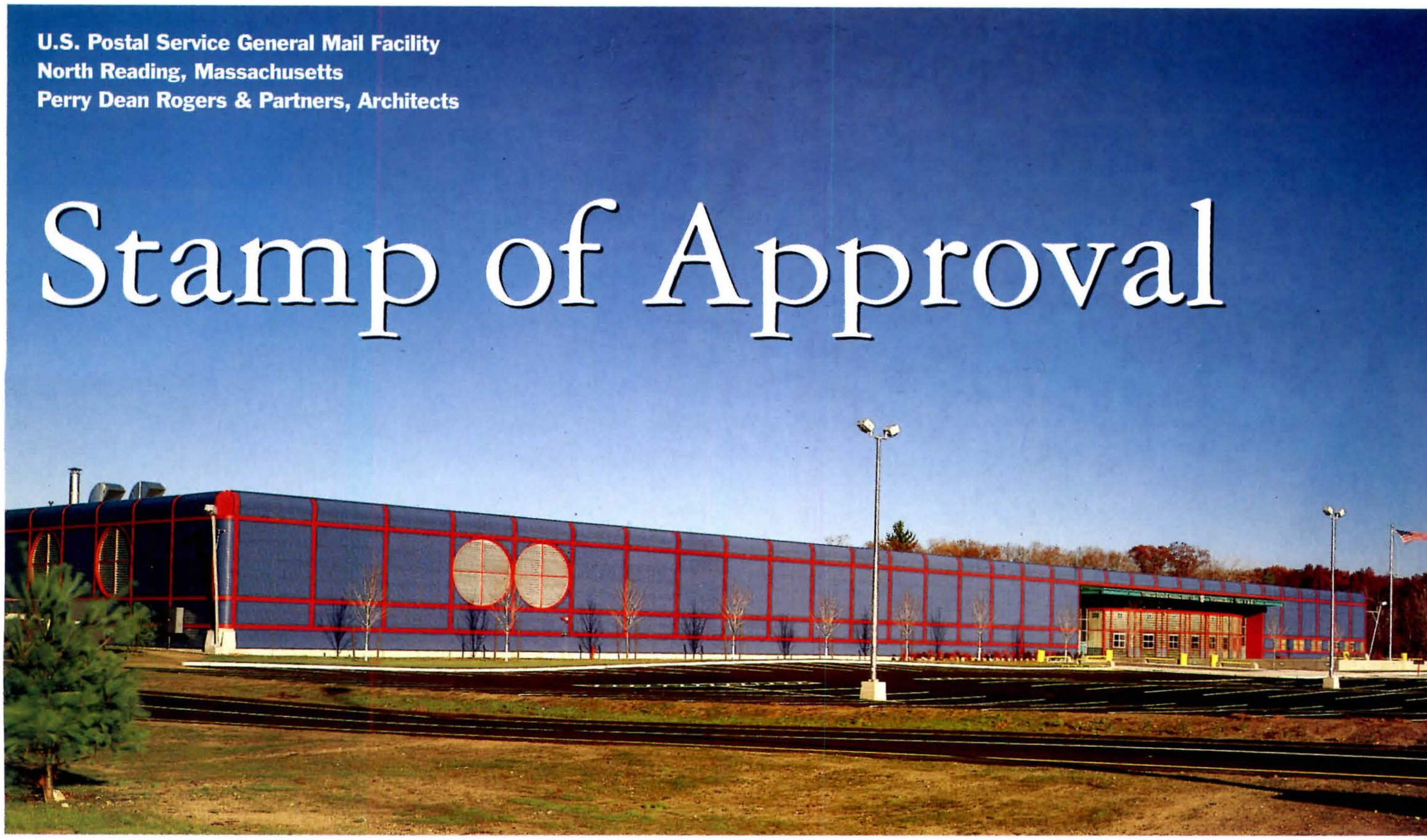
Second-story great room houses a cherry-clad kitchen and dining area (above) at its north end. Living area (facing page) is terminated by stone fireplace and cherry bookcase. Ladder leads to loft and outdoor deck. Vaulted roof is supported by timber beams, kingposts, and inverted steel trusses. Master bedroom suite (top plan) and rooftop deck are located behind fireplace; other decks top first-floor bedrooms.

LAZARUS HOUSE
COPAKE, NEW YORK

ARCHITECT: Schwartz/Silver Architects, Boston, Massachusetts—Warren Schwartz, Robert Silver, Tim Downing, Elise Gispan, Leo Chow, Jim McQueen (design team)
ENGINEERS: Charles Charloff (structural)
GENERAL CONTRACTOR: David Haust, Quadresign
PHOTOGRAPHER: Peter Aaron/Esto

U.S. Postal Service General Mail Facility
North Reading, Massachusetts
Perry Dean Rogers & Partners, Architects

Stamp of Approval



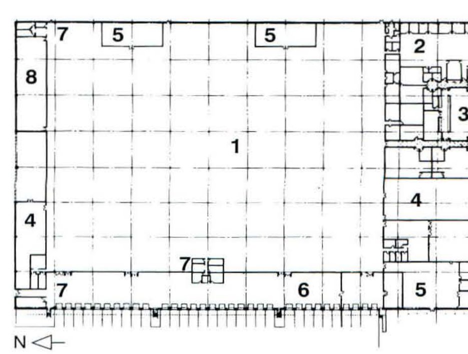
EACH DAY, THE U.S. POSTAL SERVICE'S General Mail Facility in North Reading, Massachusetts, sorts 2.5 million pieces of mail and routes them to 49 branch post offices around the Boston metropolitan area. "It is the wholesale arm of the Postal Service," explains principal Francis McGuire of Perry Dean Rogers & Partners. "You can't even buy a stamp there."

The vast factory-for-mail is located on a seedy commercial strip that cuts through North Reading, a blue-collar community 20 miles north of Boston. Evidence of New England's depressed economy is close by: a boarded-up discount store sits in front of the mail facility, its parking lot sprouting weeds. Indeed, the 250,000-square-foot building seems to be the one bright spot in the neighborhood: it literally glows. Of the three 8-hour shifts that operate the facility daily, the largest and loudest occurs in the wee hours of the morning, so the architects purposefully placed the employee cafeteria right up at the building's entrance. "The real life of this building goes on at night," McGuire explains. "We designed glass-block walls because we wanted a beacon."

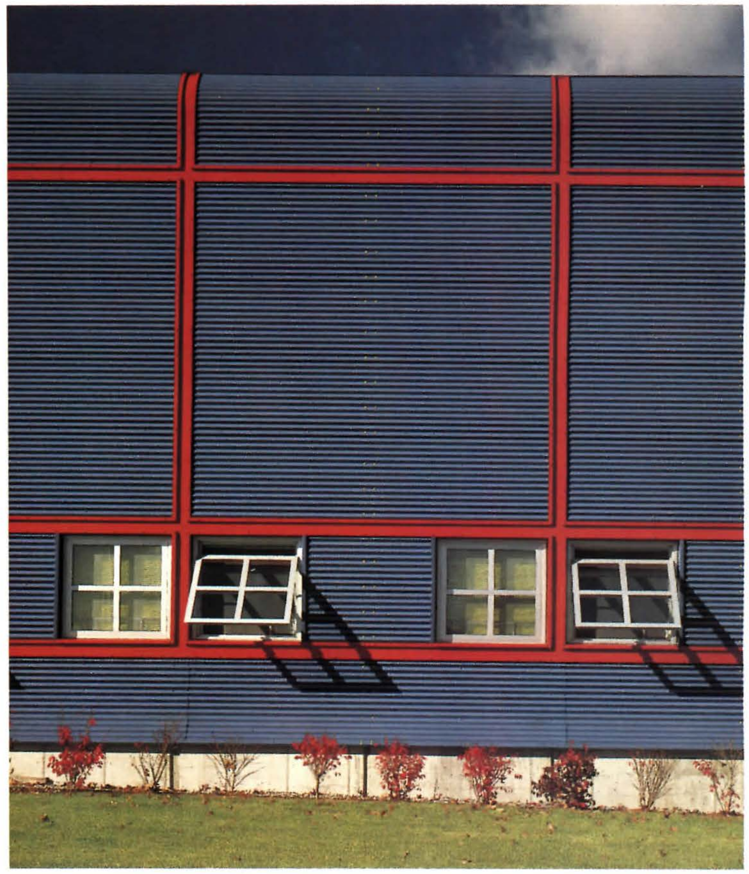
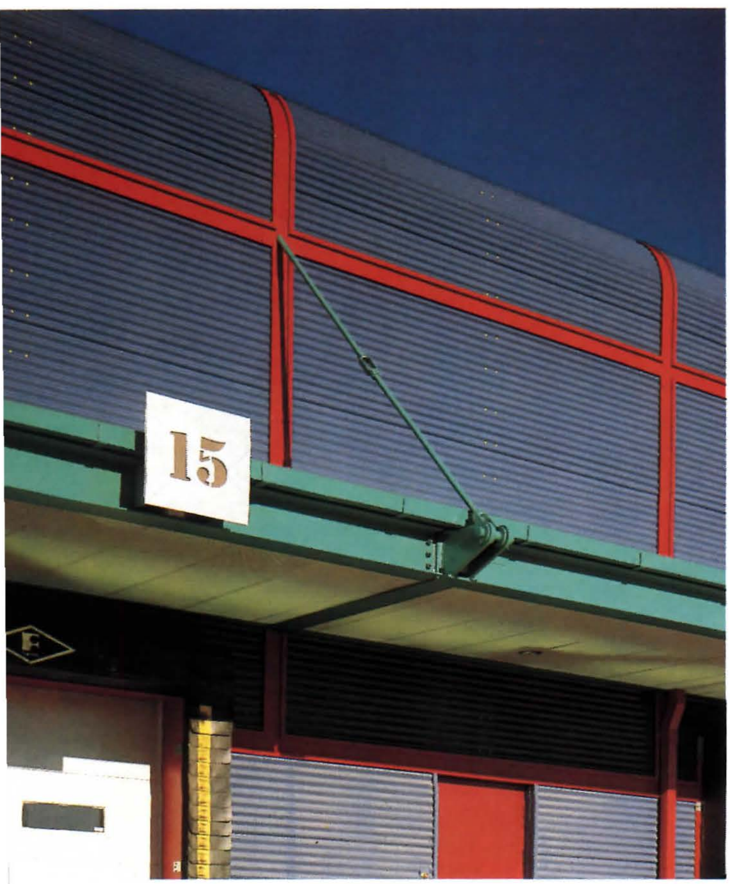
McGuire and principal Peter Ringenbach *claim that the client had no preconceived notions* about the building's exterior. "The Postal Service gives you criteria for maintenance and cost," says Ringenbach, "and they will let you design virtually anything as long as you meet those criteria." The architects specified an inexpensive metal system, from what they call the "low end of the catalog," and convinced Postal Service representatives that it would work by showing them the system installed in a car rental agency nearby. But McGuire and Ringenbach combined the system's off-the-shelf components in unusual ways.

Like many of Perry Dean Rogers' projects, the exterior elevates common industrial building components into an uncommon profile, making what McGuire calls a "big, dumb building," into "something special with nuts-and-bolts materials." Corrugated galvanized-steel panels, for example, are oriented so that their ribs are horizontal (the material is most often used vertically) and coated with a metal flake paint that gives the panels depth. At the building's top and bottom, the metal bends "to demonstrate the material's flexibility," notes McGuire. The panels are affixed with hexagonal-head sheet-metal screws that have been painted yellow to contrast with the blue surfaces. C-channel ribs, painted a vibrant red, cover joints and add another

Exterior details (facing page) were designed to elevate the one-story mail facility. South elevation (above) is divided by ribs of steel into cornice, window, and base (facing page, top right), which flairs out over concrete wall. Facade of corrugated galvanized steel panels is interrupted with translucent glass blocks and clear glass windows for the cafeteria (facing page, top left). Canopy over loading dock (facing page, bottom left) contrasts with ribs and incorporates illuminated dock numbers. HVAC exhausts through middle band (facing page, bottom right).



1 WORKROOM
2 OFFICE
3 CAFETERIA
4 STORAGE
5 MECHANICAL
6 LOADING DOCK
7 VENDING AREA
8 COMPUTER ROOM


ES POSTAL SERVICE


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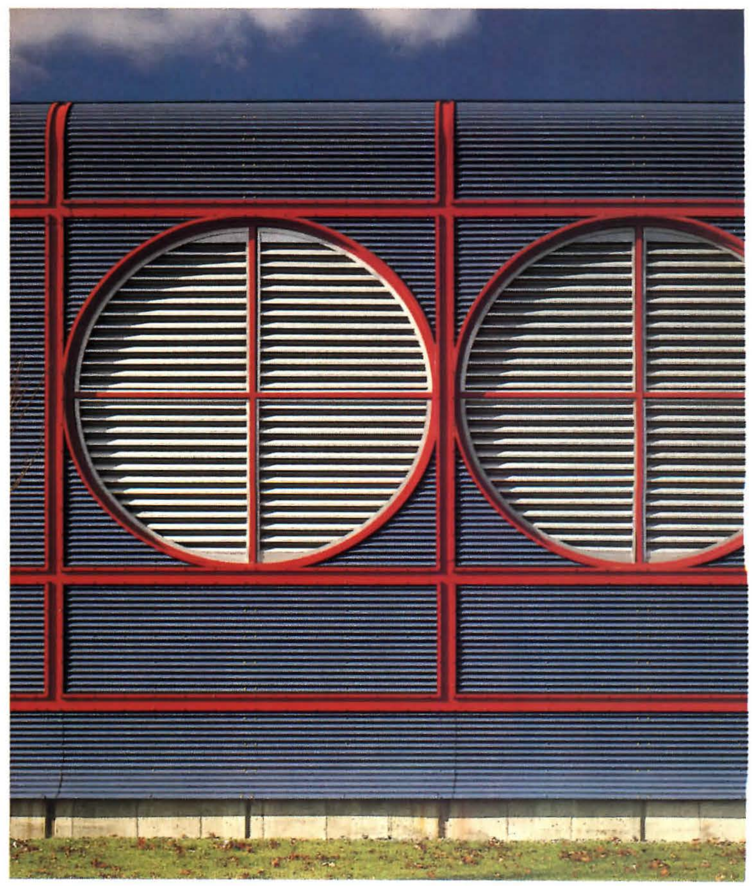


layer to the building's surface. Over the loading dock, a green steel-framed canopy with corrugated fiberglass sheets is supported from above with steel rods and turnbuckles.

Nearly 90 percent of the building's area is devoted to processing mail. "We had a number of meetings with the Postal Service to determine the flow of the mail," says Ringenbach. As a result, the architects organized the building's steel structure on a 50-foot-square bay, which is, according to Ringenbach, a Postal Service standard and the best spacing to accommodate the various sizes of mail-sorting equipment.

Elsewhere, Postal Service standards are more comically affirmed. The required distinction between workers and supervisors is expressed as a Shaker-like arrangement of separate-but-equal entrances, one for employees and another for management, that bracket the cafeteria's curved glass wall. Once inside, circulation areas are separated—the only zones shared by all personnel are the cafeteria and work floor. The interior reflects the same nuts-and-bolts esthetic of the exterior. On the work floor, the architects affixed drinking fountains, electrical boxes, time clocks, fire extinguishers, and signs onto columns to control the proliferation of fixtures and equipment along the walls.

Because the work floor comprises 5 acres and the cafeteria is located on the building's south edge, the architects positioned vending areas at the northeast and northwest corners of the building, and near the loading dock on the west side. Identified and screened by brightly painted metal grillwork, the vending areas add splashes of color in this vast space, and eliminate the need for employees to leave the workroom for a break.

The roof's bar joists, located 24 feet above the floor, are exposed in the main workroom. In the cafeteria, circulation areas, and offices, ceilings suspended from the joists create more intimate 10-foot-high spaces. McGuire points out that this is a more cost-effective way to achieve varying ceiling heights than combining structural systems.

The postal facility has definitely attracted local attention. Shortly after the building opened, a station wagon pulled up in front of it and a woman jumped out. "Can we shop here?" she asked, mistaking the colorful, metal-clad structure for a new mall. When informed that the new building was a mail-sorting facility, she frowned and observed, "It's awfully cheery for a post office." ■

—Michael J. Crosbie

South elevation features separate-but-equal entrances—one for employees (above left), another for management (above right)—that flank employee cafeteria. Clerestory windows are shaded by deep awning (above) that extends over curved glass-block wall. Inside, mechanical equipment is exposed, and central supply duct (facing page) forms the body of a huge "dragonfly" with translucent wings that filter the cafeteria's downlighting.

U.S. POSTAL SERVICE GENERAL MAIL FACILITY
NORTH READING, MASSACHUSETTS

ARCHITECT: Perry Dean Rogers & Partners, Boston, Massachusetts—Francis D. McGuire, AIA, Peter A. Ringenbach, AIA (principals); William Harris, Thomas McCarty, Paul Viccica, Douglas Dick, Thomas Greene, Herbert Everett, Gretchen Neeley (project team)
U.S. POSTAL SERVICE PROJECT MANAGER: The Sverdrup Corporation
LANDSCAPE ARCHITECT: Carol Johnson & Associates
ENGINEERS: LeMessurier Consultants (structural); BR+A Consulting Engineers (HVAC); McCarron, Hufnagle & Brent (electrical); R.W. Sullivan (plumbing/fire protection); Bryant Associates (civil)
LIGHTING DESIGN: Jerry Kugler Associates
COST CONSULTANT: Hanscomb Associates, Inc.
GENERAL CONTRACTOR: The George Hyman Construction Company
PHOTOGRAPHER: Steve Rosenthal

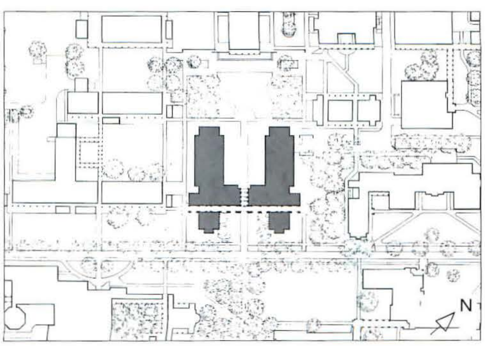
George R. Brown Hall
Rice University
Houston, Texas
Cambridge Seven Associates

WITH THE NEW GEORGE R. BROWN HALL AT Houston's Rice University, Cambridge Seven Associates has forged a Boston connection that spans the 20th century. The architects' new bioscience and bioengineering laboratory and office building, constructed on a prominent site at the heart of the 83-year-old private university, reclaims the Beaux-Arts spirit of Boston architect Ralph Adams Cram's original 1910 campus plan.

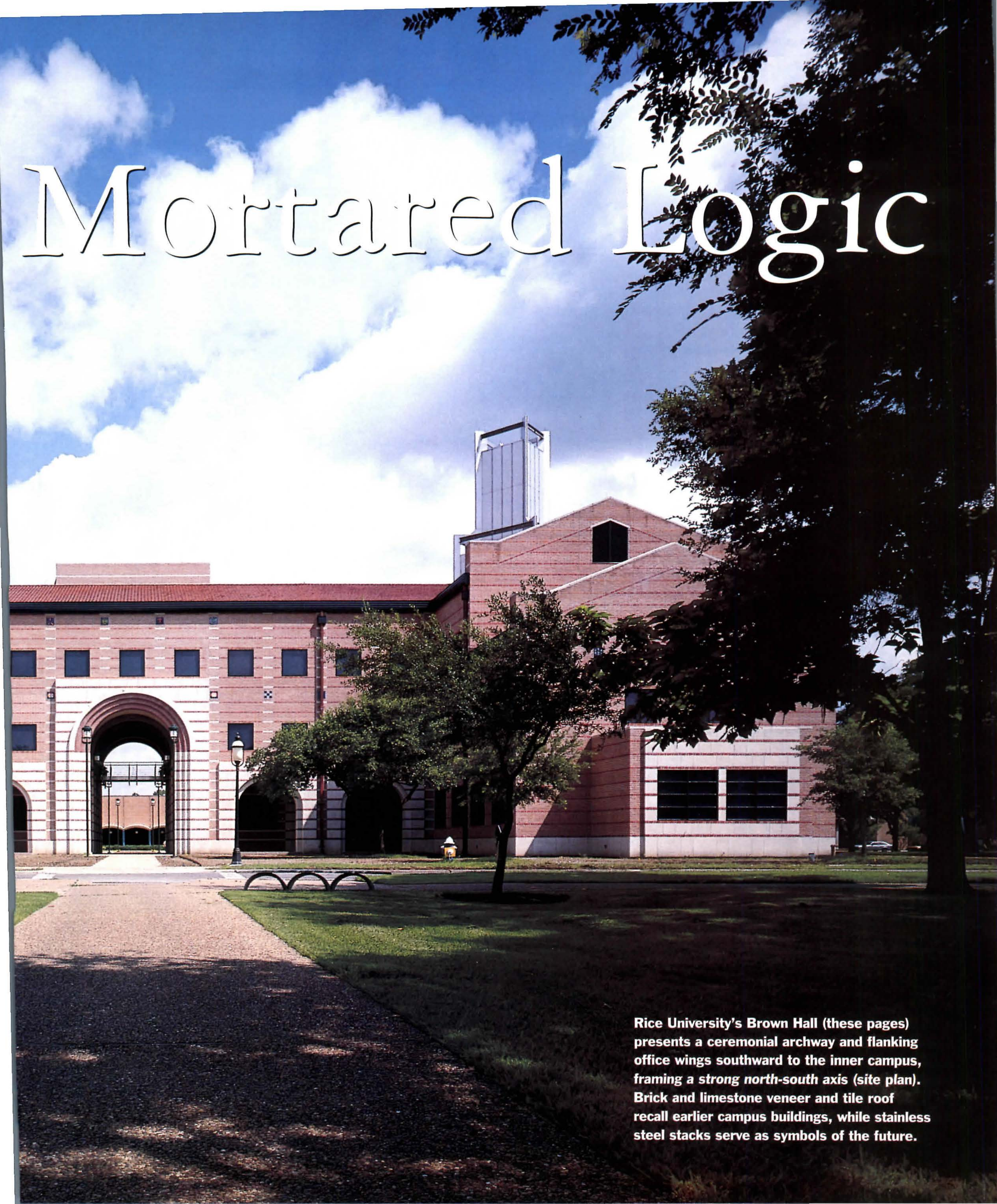
The laboratory's symmetrical arrangement of paired wings fronts Rice's 1.5-mile east-west campus drive, straddling a broad, north-south cross axis with a grand archway. The building's massing, ground-floor arcade, and fat-mortared brick and limestone facades pay homage to nearby Lovett Hall, the university's Italianate administration building designed by Cram, Goodhue, and Ferguson in 1910. "Brown Hall blends into a collection of existing buildings," explains design principal Charles Redmon. "It doesn't carry any Cambridge Seven signature."

A 1964 graduate of the Rice School of Architecture, Redmon returned to the campus 25 years later at the behest of university President George Rupp to fulfill a goal more akin to building on Ivy League campuses than in the heart of Texas. Rather than staking out new territory, Cambridge Seven treated Brown Hall as infill to complete the '50s and '60s "Motel Modernist" buildings of the school's science and engineering complex. Toward that goal, Redmon adopted the scale of the original buildings and their materials, pulling details from elsewhere on campus to create a sense of place.

While evocative of Cram, the new lab expresses a contemporary idiom that sympathizes with 1980s campus buildings by Cesar Pelli and James Stirling. Redmon, working



Mortared Logic



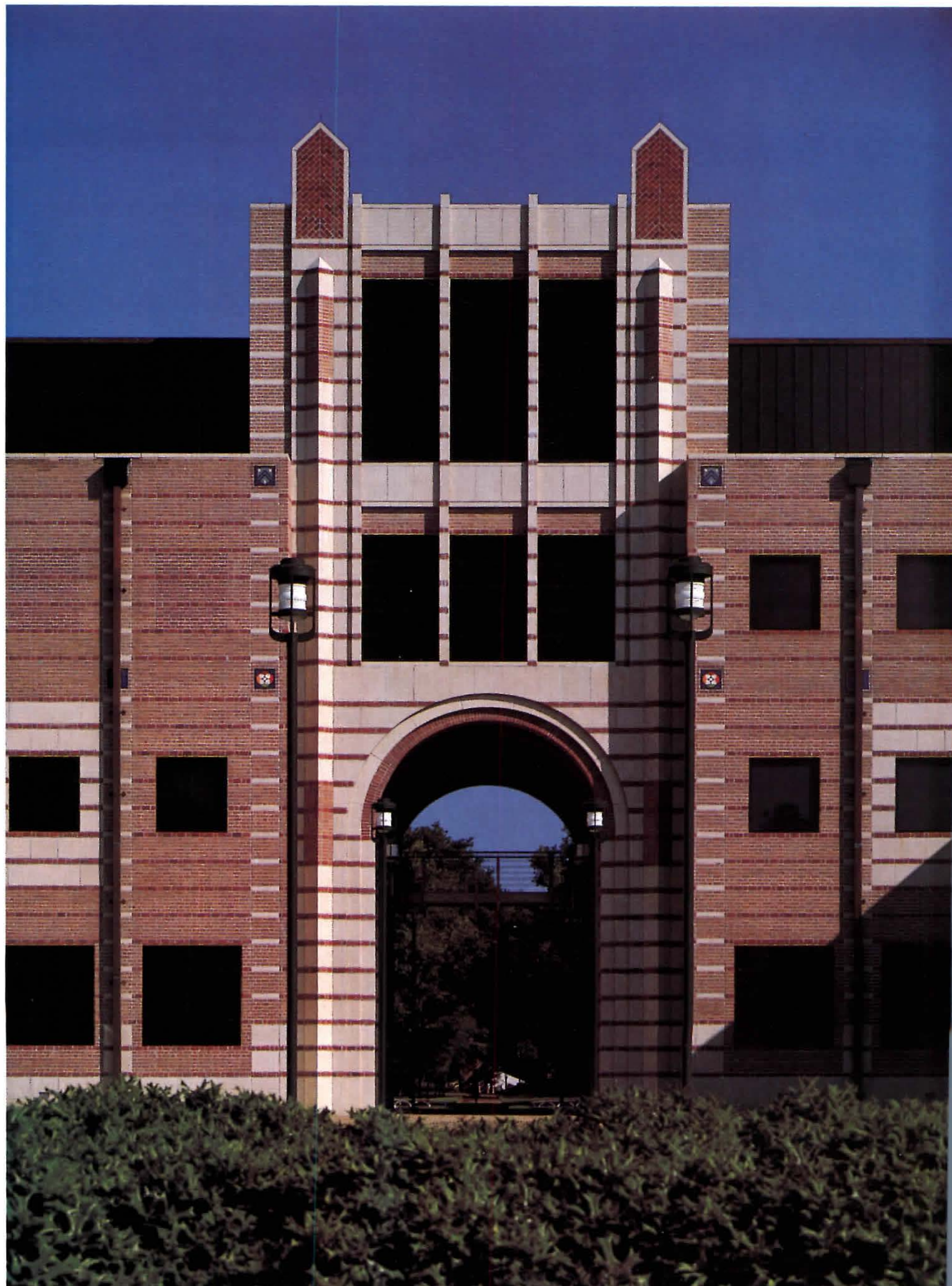
Rice University's Brown Hall (these pages) presents a ceremonial archway and flanking office wings southward to the inner campus, *framing a strong north-south axis (site plan).* Brick and limestone veneer and tile roof recall earlier campus buildings, while stainless steel stacks serve as symbols of the future.

with local associates RWS Architects, overlaid his historically inspired form with a rigorously ordered system of brick and limestone banding and spare, punched windows. This formal logic alludes to Brown Hall's high-tech purpose, and its lightweight steel structure with brick veneer clearly differentiates the building from Cram's load-bearing masonry construction. Redmon also resurrected the quirky tendency, prevalent in Cram's and William Ward Watkin's 1920s structures, of applying icons that describe the disciplines housed within. Eighteen-inch-square glazed-tile medallions pepper Brown Hall's surface, and specially pressed bricks, imprinted with a DNA-like double-helix pattern, are strung along at eye level to relieve the mechanistic order of the veneer.

Inside, Brown Hall is more machine than architecture, composed almost entirely of functional but uninspired corridors of labs. The 54,000 square feet of laboratories clearly dominate the northern two-thirds of the building, projecting from an east-west circulation spine. Protruding toward the south are two smaller wings that contain 12,000 square feet of faculty offices.

The building hums eerily inside and out from the constant rush of an exclusively fresh-air ventilation system and 125 exhaust hoods. Pushing so much air through stainless steel ducts required a mechanical plant one-sixth the size of that for the rest of the campus. To eject so much exhaust, the architects pierced the red clay-tiled roofs of the building with an oversized pair of acid-etched, stainless steel stacks.

Soaring more than 30 feet above the roof ridge, the stacks of Brown Hall are instant landmarks on campus. Over time, the steel projections will age to fit in as appropriate 21st-century companions to other Rice University towers, including the first "bell tower" on campus, an ornamented exhaust stack on Cram, Goodhue, and Ferguson's 1912 Mechanical Laboratory and Power House. Moreover, the stacks, though controversial among Rice faculty, express the raw energy coursing through Brown Hall, heavy-metal barometers of scientific research behind the stately repose of the building's masonry skin.

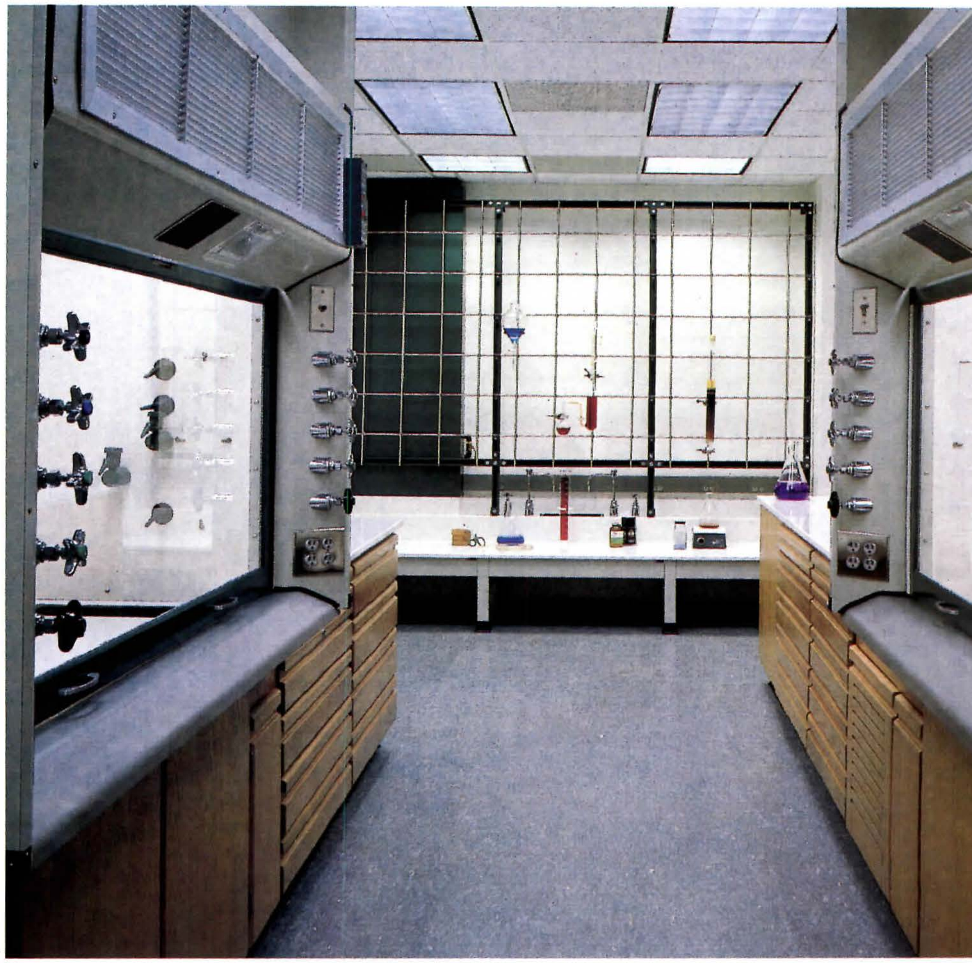


Laboratory wings frame the building's north courtyard (top); offices project to the south (facing page). Nearby 1910 Lovett Hall inspired Cambridge Seven to create a stripped-down Beaux-Arts centerpiece (right), which, combined with multilayered massing *(facing page), softens the lab warehouse.*

Over time, such a workmanlike building will likely gain admirers for the way it promotes development of Rice's current master plan, designed by Cesar Pelli in 1983. Pelli adopted Cram's principles, and took into account 73 years' development and a new western flank of campus, anchored by Ricardo Bofill's recently completed Shepherd School of Music. "We have designed two mirror-image buildings on either side of the north-south axis that Pelli called out in his plan," maintains Redmon. "They're now connected by a monumental arch. We preserved the view and created four new spaces out of an almost sacred, but really too large, open space."

In seeking inspiration from Cram's venerated Lovett Hall, the architects danced through a potential architectural minefield. Today's university budgets are tighter than ever, construction methods have changed, and the building's program dictated nothing more sublime than a metal shed. And for scientists, style is often one more needless distraction. But this is also Rice University, where, despite a lapse in planning in the decades after World War II, Cram's 1910 call for space-making and scale resonates today. In embracing these principles, Cambridge Seven developed an unlikely hybrid that promotes groundbreaking scientific inquiry, while preserving the campus order. ■

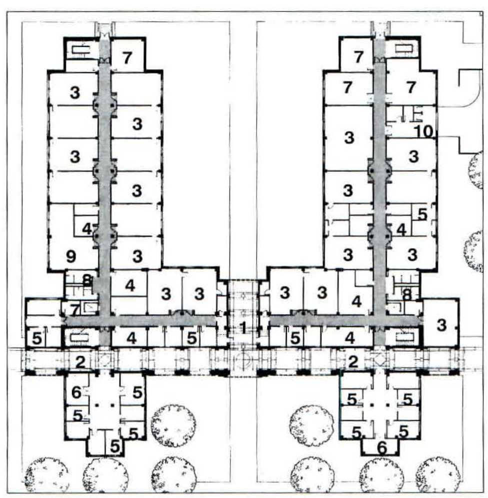
—Ray Don Tilley



Organization is neatly divided between labs, offices, and various sciences (plans). Spacious, well-lit labs (above) accommodate widely ranging work depicted by glazed-tile icons (facing page, top). A futuristic stainless steel bridge (facing page, bottom right) interrupts historically sensitive arcades (facing page, bottom left).

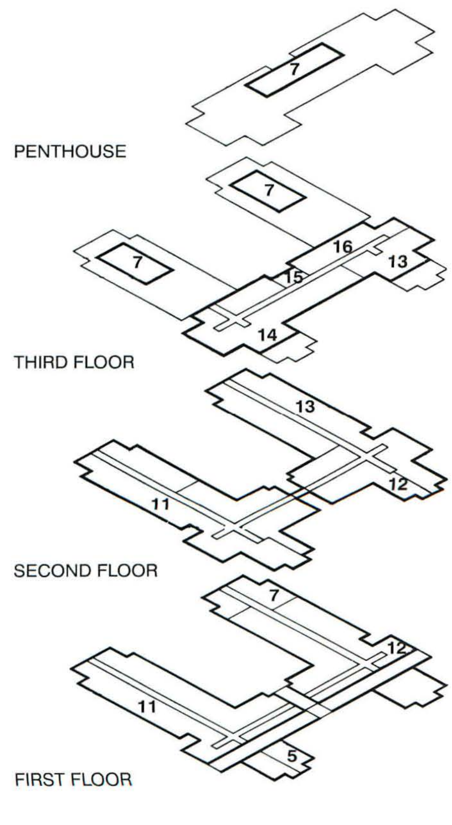
GEORGE R. BROWN HALL
RICE UNIVERSITY, HOUSTON, TEXAS

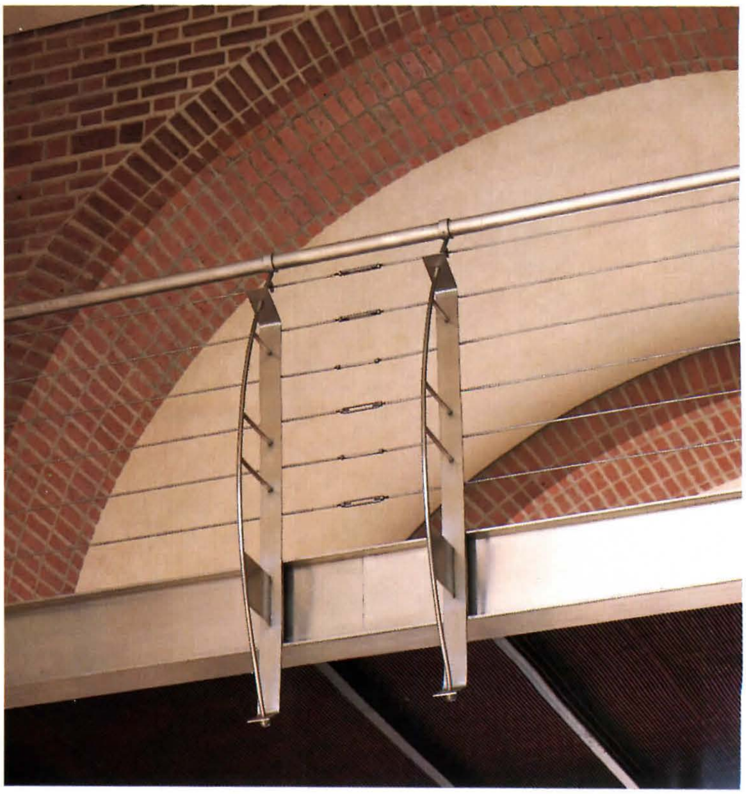
ARCHITECT: Cambridge Seven Associates, Cambridge, Massachusetts—Charles Redmon (principal-in-charge); Dana Miller Baker (project manager); Chan Byun, Aija Jundi, Robb Wilkinson (design team)
ASSOCIATE ARCHITECT: RWS Architects, Houston, Texas
LANDSCAPE ARCHITECT: Sasaki Associates
ENGINEERS: Walter P. Moore & Associates (structural, civil); CHP & Associates (mechanical/electrical)
CONSULTANTS: Earl Walls Associates (laboratory); Sherrill Environmental Consultants (owner's representative)
GENERAL CONTRACTOR: The Lott Group
COST: $16 million—$148/square foot
PHOTOGRAPHER: Joe Aker, Aker Photography



FIRST FLOOR PLAN

1 SALLY PORT
2 ARCADE
3 LABORATORY
4 LAB SUPPORT SPACE
5 OFFICE
6 CONFERENCE ROOM
7 MECHANICAL
8 TOILET
9 INSTRUMENT ROOM
10 SERVICE DOCK
11 CELL & DEVELOPMENT BIOLOGY
12 BIOENGINEERING
13 ORGANIC CHEMISTRY
14 BASIC MEDICAL SCIENCE
15 INSTITUTE LOUNGE
16 ANIMAL SUITE





Luchetti House
Sausalito, California
Robert Luchetti Associates

"WE ARE HERE BECAUSE OF THE VIEW," EXplains architect Robert Luchetti of the Sausalito house he designed for his brother and sister-in-law. Luchetti is only stating the obvious. The house, tucked into a hillside that faces Alcatraz, Angel Island, the Bay Bridge, and the San Francisco skyline, addresses some of the most dramatic scenery in America. At night, through a wall of south-facing windows, a visitor beholds the Bay Bridge as a chain of lights against the inky sky and water. By day, the fog rolls in over Sausalito's green hills like a fast-moving cloud.

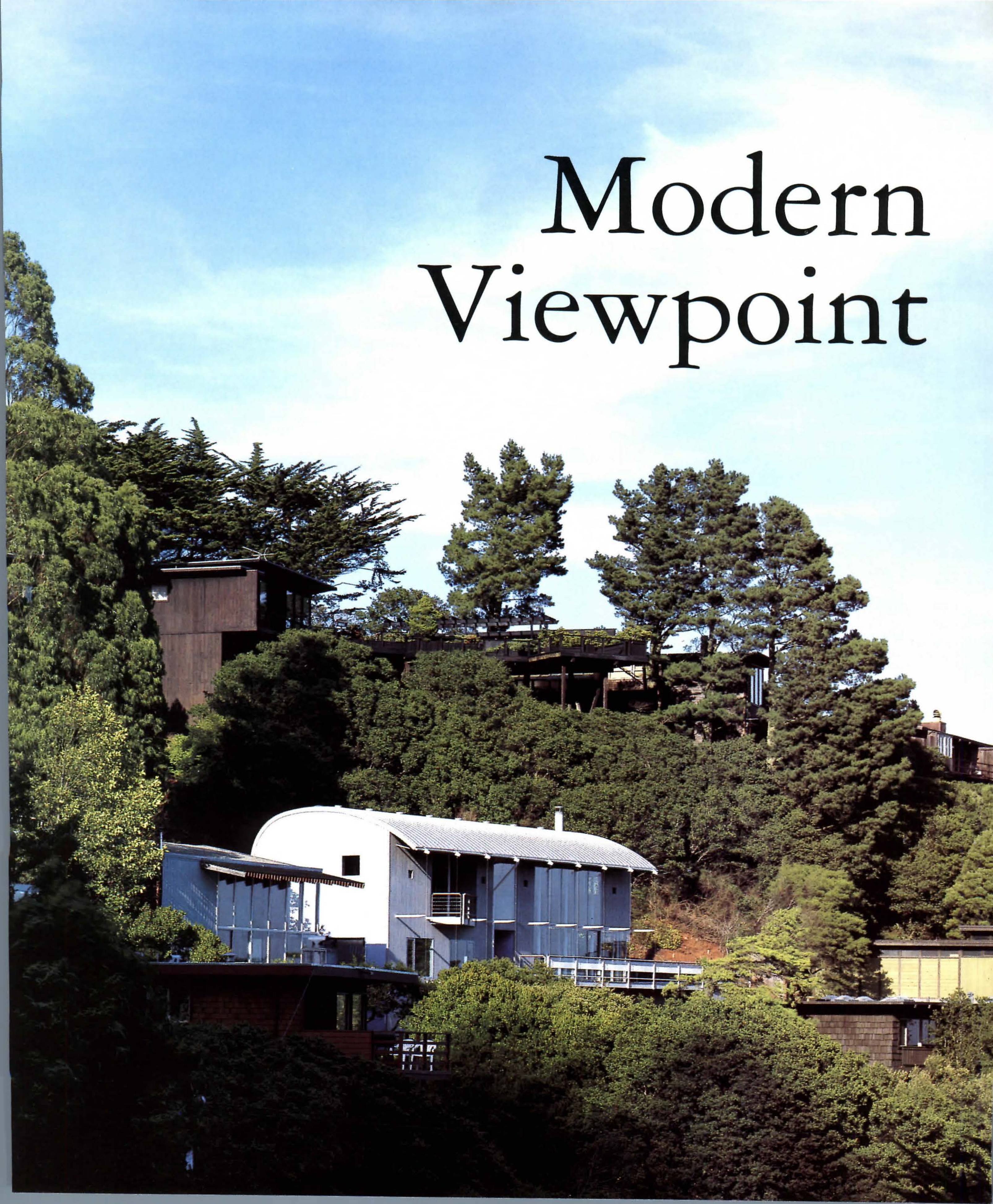
How do you best design a house to take in the best of all possible views? Luchetti started with a 1950s redwood split-level, purchased in 1982 by Peter and Emily Luchetti (he's an economist, she's a celebrated San Francisco pastry chef). The architect raised the roof—literally—to 22½ feet, pulled it over nine asymmetrical bowstring trusses, and supported the assembly with tapered steel columns. This tall, curved volume, what Luchetti calls the "loaf of bread," runs 65 feet along a Sausalito ridge from east to west. Separated by an off-center entrance stair and foyer, the eastern portion of the "loaf" contains a two-story living/dining room, while its western volume includes bedrooms on the first floor and a master suite above. At the northern and eastern perimeters, the architect wrapped a one-story addition containing a kitchen and breakfast pavilion.

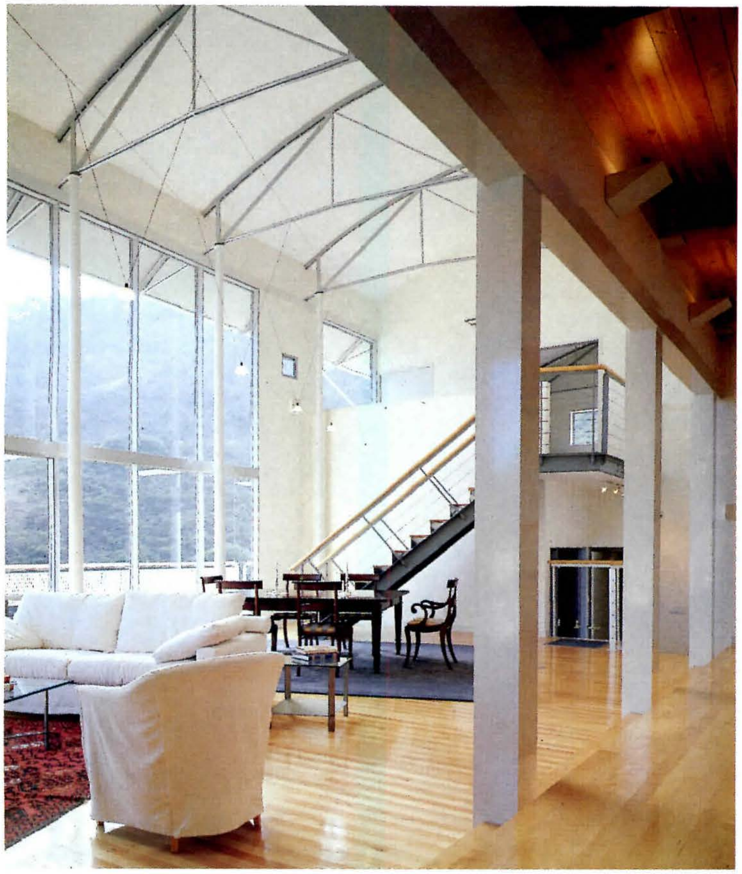
Because the best view is due south, and the linear house actually follows a slightly northeast-southwest axis to fit the hillside, Luchetti tilted the built-in bed, the stair to the master bedroom, the breakfast pavilion, and the fireplace 22 degrees off the main axis to afford their users the best view. These components are thus angled against the windows, adding an element of excitement beneath the softly curved ceiling.

Luchetti is a California native who studied architecture in the 1970s at Harvard, and now runs an eight-person firm in Cambridge, Massachusetts; but he has not forgotten the vagaries of the California sun. He glazed the south-facing wall in tall, wide panes of glass, held in place by a steel frame, which provides the thinnest possible mullions for the least interruption of the panorama. But, although the 3,100-square-foot house includes 782

Vaulted roof overhang shields south-facing windows (facing page). A deck wraps the main volume, with breakfast pavilion and stainless steel-clad fireplace tilted off axis (top left). Louvered redwood screen protects entrance from wind and master bedroom has its own balcony (bottom left).

Modern Viewpoint





square feet of glass, Luchetti shielded his clients from the intense rays of the afternoon summer sun by enclosing, rather than glazing, the upper portion of the southeasternmost corner, and projecting the roof 4 feet over the southern elevation.

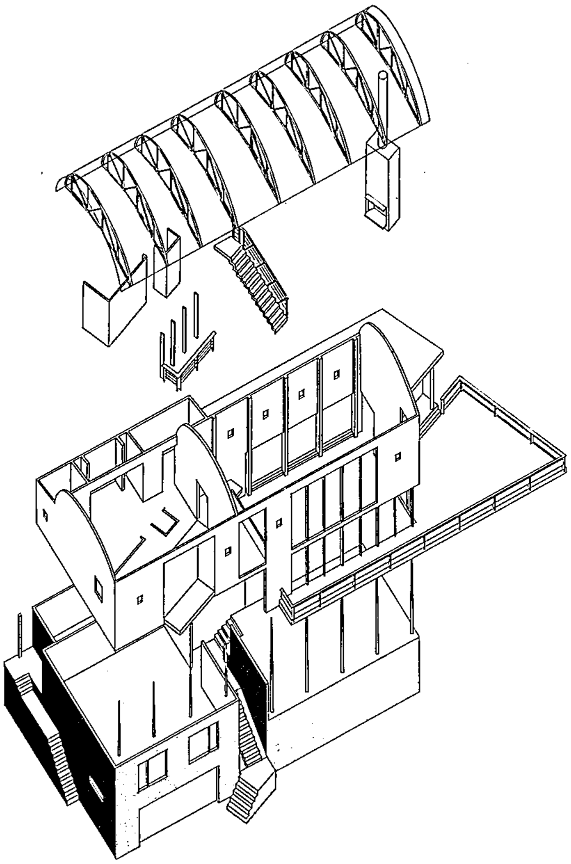
From the edge of that overhang, Luchetti tied the roof in place with nine sailboat cables that extend from the edge, through a steel bracket and the mahogany railing of a deck, which wraps the south and east sides of the house. These cables, which attach to the facade below the deck, were intended to stabilize the overhang during high winds that often sweep across the headlands to the bay. But the engineering of the main structure is so sound that the cables are in fact not functional; they tension the building envelope so that the roof, though constructed of standing steam steel over plywood, resembles a billowing sail.

The cables, complete with turnbuckles, are part of Luchetti's nautical vocabulary for this Marin County dwelling: all the crosspieces along the interior stair and exterior deck railings are stainless steel marine cable, and the tapered steel columns appear mastlike. Luchetti explains that the sailboat forms arise from a mix of inspirations—the nautical imagery of early Modernism, his own daysailer, and the house's dramatic waterfront views. "Sausalito is very 'pneumatic,'" the architect explains. "The house is about wind, lightness, and air."

Luchettti tempered the industrial quality of his basic structur with rich materials outside and in. The exterior is clad in gray-stained vertical redwood and cedar tongue-and-groove siding, with medium-density-overlay plywood covering the westernmost wall and walls of the entry stair. Inside, the fireplace is clad in California granite with a redwood mantelpiece. The kitchen, a 12-foot-wide "lean-to" at the back of the house, features a ceiling that slopes from 9 feet where it meets the living room to 7 where it tucks into the hillside. It includes stainless steel and marble countertops (for pastry-making) and rich woods—hemlock ceiling supported by Douglas fir beams, maple cabinets and floor, mahogany bar. The floor in the living/dining area is enriched by alternating planks of oak and maple.

To separate the master bedroom and bath, Luchetti, whose firm designs office workstations for Steelcase, created an ingenious freestanding mahogany, maple, and etched glass partition, with a bed built into one side, a bathroom into the other. Facing its own slid-

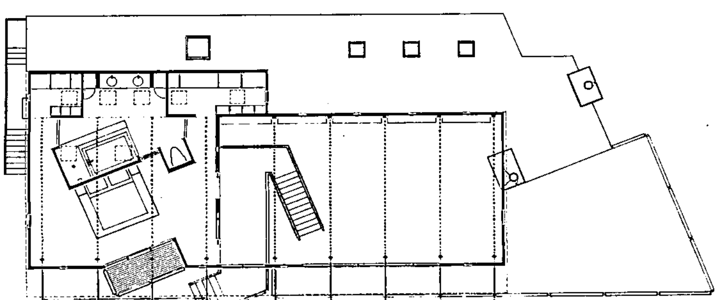
Tapered steel columns support asymmetrical bowstring trusses in living room (facing page). Alternating maple and oak plank comprise flooring of the living/dining area (top left); stair leads to master bedroom. Handrails (bottom left) are maple, supported b stainless steel balusters and steel cables.



ing glass window wall and balcony, the bed, elevated on a maple platform and built among shelves and drawers in an alcove of the partition, faces due south. The partition's private north side is clad in marble and outfitted with a shower stall, tub, and toilet. This roofless, doorless bathroom is entirely private, simply by virtue of the freestanding partition, which transforms a corner into a self-contained room.

Luchetti professes a diverse collection of inspirations ranging from Filippo Brunelleschi's Foundling Hospital in Florence to Le Corbusier's Villa Savoye and the functional industrial designs of Jean Prouvé. An avid historian and traveler, he contends that nothing in his brother's house is new, that the nature of good architecture is combining what one has observed and studied into an original assembly. Indeed, there is no heavy-handed symbolism or identifiable historical borrowing in Luchetti's structure. His wedding of aerodynamic forms in steel and glass with woods and earthy finishes works on the subconscious, just as the position of the house to capture the view seems uncontrived and natural. "The primary experience I'm after," Luchetti intones, "is an initial, unconscious response—you don't have to 'read' into the building. It feels like it belongs here." ■

—HEIDI LANDECKER

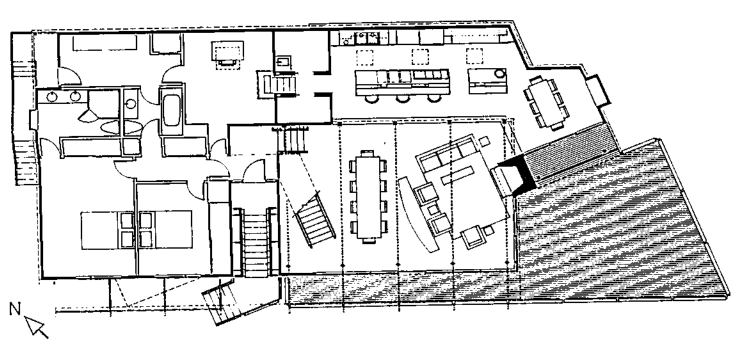


SECOND LEVEL

LUCHETTI HOUSE
SAUSALITO, CALIFORNIA

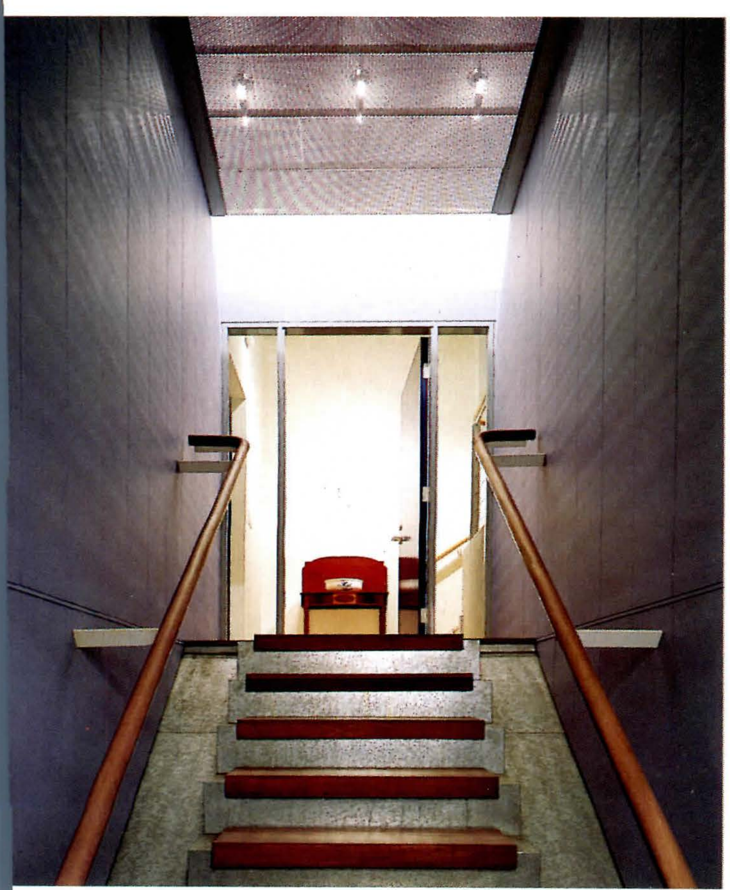
ARCHITECT: Robert Luchetti Associates, Cambridge, Massachusetts—Robert Luchetti (project principal); Michael Tingley (project architect); Ellen Fortin, Kurt Bodden, Bill Cromar, Marianne Kwok, Andrew Minson (design team); Ralph Bierschwale, Santiago Perez (presentation drawings); Robert Luchetti, Kurt Bodden, Gregg Draudt (custom furniture)
ENGINEER: Charles Chaloff Consulting Engineers (structural)
CONSULTANTS: Peter Coxe (lighting); James E. Gui (technical specifications)
GENERAL CONTRACTOR: Midstate Construction
COST: $400,000—$127/square foot
PHOTOGRAPHER: Richard Barnes

Wood partition separates bed (facing page, top left) and bathroom (facing page, bottom right). View from bedroom to living area reveals *punched windows* along north elevation (facing page, top right). Entrance staircase (facing page, bottom left) features mahogany treads, galvanized steel risers, and perforated metal ceiling.



FIRST LEVEL






The Lansburgh
Washington, D.C.
Graham Gund Architects

Capital Gains

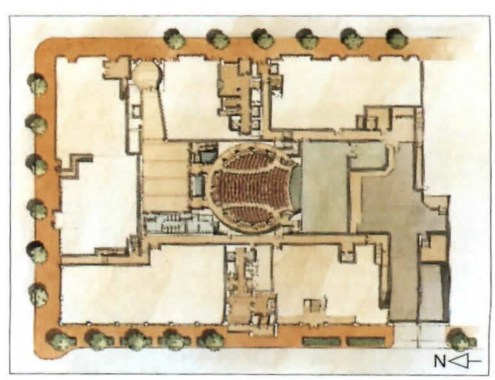
ALTHOUGH THE PENNSYLVANIA AVENUE DEvelopment Corporation (PADC) was established by Congress 20 years ago to restore America's Main Street to its former glory, the quasi-public agency has, over the past six years, begun to improve Washington's commercial core. Its latest effort is the Lansburgh, the third completed housing component in the fledgling residential neighborhood known as Pennsylvania Quarter. Located one block north of Pennsylvania Avenue, behind Hartman Cox's Market Square (ARCHITECTURE, April 1990, pages 58-63), the Lansburgh occupies three-fourths of a square block bound by 7th and 8th Streets N.W., in the heart of the capital's once-thriving retail district.

In 1987, Graham Gund Architects won a major design-build competition to redevelop the parcel, which called for incorporating the facades of a pair of historic buildings and the abandoned Lansburgh & Brother Department Store, for which the new complex is named. Paired with Gund's own development arm, the Gunwyn Company, the Cambridge, Massachusetts-based architect beat five local teams for the $55 million project. Gund's scheme diverged from those of the other competitors in both program and design. Eschewing conventional developer logic, he proposed no office space. While PADC's prospectus required a minimum of 225 residential units, the Boston architect proposed 369 apartments set atop street-level retail, a 447-seat below-grade theater with support space, and a 7,200-square-foot health club for residents.

In spite of its proximity to Pennsylvania Avenue and the capital's landmarks, Gund did not treat his complex as a prominent building on an important site, but as a support structure that echoes the scale of its commercial surroundings. "The logic was to create a building strong enough to coexist with its monumental neighbors, but at the same time capture a street rhythm and express its residential functions," explains Gund.

Although the architect incorporated three historic structures into his design—the original Lansburgh department store, the 1882 Busch building, and the 1918 S.S. Kresge Five and Dime Store—he deliberately chose contrast over imitation (see related technology

Along 7th Street, Washington's former premier shopping corridor, Gund recreated a lively streetscape (facing page). The restored terra-cotta-clad Lansburgh Department Store anchors the site's northwest corner (top).



GROUND FLOOR PLAN

article, page 85). On the western edge, Gund allowed the terra-cotta-clad department store's highly articulated facade, with its parade of arched bays and tall windows, to take center stage. The architect's two-story addition atop the original Lansburgh is set back and understated to lessen its visual impact.

The northern elevation, where Gund faced the task of incorporating the historic facades of the Busch building and the Kresge, posed a more complex design challenge. For the six-story Busch building, Gund crowned the original dark red brick building with a new two-story addition, repeating the same brick as the original, but incorporating bold new details. Unfortunately, this overpowering new addition, combined with the Busch building's overscaled cornice, creates an awkward massing for the overall composition. Ironically, the two-story Kresge to the east more successfully supports Gund's nine-story addition, and appears as a storefront added to the base of a new building.

Gund's true signature is found around the corner on 7th Street, in a series of 11-story brick bays. Ornamental details, brick patterns, vertical massing, and a variegated roofline work together to create a lively streetscape and residential expression. Here, unconstrained by existing facades, Gund recalls the 19th-century rowhouses of Logan Circle, a once-grand residential area approximately 14 blocks to the northwest, with asymmetry, projecting bays, and multiple entrances.

A courtyard at the center of the block ties the complex together. All the facades fronting this landscaped core are new. Rather than attempting to repeat the various street elevations, Gund chose to relate the courtyard facades to one another and clad the surfaces primarily in light brick and precast concrete.

Compared with the exuberance of the exterior, the interior arrangement of the U-shaped apartment block is straightforward and pragmatic. However, the individual apartments are deliberately idiosyncratic in their layout and fenestration. (The Lansburgh marketing brochure boasts that no two are exactly alike.) In the renovated department store, Gund took advantage of the differing floor heights and the large windows that punctuate its terra-cotta-clad facade. In the new wing, the architect similarly varied floor-to-ceiling heights, carved out duplexes and incorporated balconies and bays.

The Lansburgh is Postmodern to its core. Although that movement is maligned these days, Gund successfully captures many of its more positive elements. References to Washington's brick, variegated scale, and indigenous 19th-century architecture are appropriate choices for this linchpin of a transitional residential neighborhood.

—Lynn Nesmith

To the north, Gund incorporated three historic buildings (facing page, left to right): the 1918 Kresge, the 1882 Busch, and the Lansburgh. Copper marquee announces the theater (bottom left); canopy signals the apartment entrance (center left); variegated elements define new block's roofline (top).


BOYCE & LEWIS SHOES
BOYCE & LEWIS SHOES

EAST–WEST SECTION

THE LANSBURGH
WASHINGTON, D.C.

ARCHITECT: Graham Gund Architects, Cambridge, Massachusetts—Graham Gund (principal); William Erickson (project architect); Mary Horst, Monica Sidor, Randy Doi, Michael Perera, Rick Panciera, David Perry (design team); John Prokos, Alec Holser (theater design team)
ASSOCIATE ARCHITECT: Bryant & Bryant
LANDSCAPE ARCHITECT: Halvorson Company
ENGINEERS: LeMessurier Consultants (structural); H.C. Yu & Associates (mechanical/electrical); Cervantes and Associates (civil)
CONSULTANTS: Oehrlein & Associates (preservation); Theater Projects (theater); Klepper, Marshal & King (acoustics); Schnabel (geotechnical); Lerch-Bates (elevators); Howell Binkley (lighting); Derek McLane (set design)
GENERAL CONTRACTOR: Omni Construction
COST: $55 million—$85/square foot
PHOTOGRAPHER: Jeff Goldberg/Esto

The U-shaped complex wraps a landscaped courtyard (center left) that sits atop the Shakespeare Theatre (section). The intimate 447-seat theater features raked orchestra seating (facing page) and a curving colonnade with uplights that frames box tiers (above). The original Lansburgh's *high ceilings* allowed Gund to incorporate trademark architectural details, such as overscaled brackets (bottom left), in the apartment building's west lobby.

Technology & Practice info

Information on building construction, professional development, and events

California Convention Addresses Roofing Issues

METAL ROOF DECK CORROSION, ASBESTOS egulations, and tile roofing technology were mong the topics addressed at the 105th nnual National Roofing Contractors Associ-tion (NRCA) convention held in Anaheim, California, last February. The recent discov-ry of severely corroded metal roof decks was he focus of a panel of researchers who under-cored the pitfalls of moisture infiltration in oofing insulation. According to Timothy Walzak, a metallurgist at the University of Western Ontario, when water pene-rates a metal roofing system, oxy-en, heat, industrial pollutants, and he chemicals found in some insu-ting materials accelerate corrosion. ene Dupuis, a Madison, Wiscon-in-based engineer who has tested he corrosion rates of different types f insulation, stated that the pheno-c foam insulation manufactured y Manville Roofing Systems in the id-1980s aggressively corrodes rime-coated decks when subjected extreme heat and moisture. Man-ille announced at the convention that it ould no longer manufacture such foam prod-cts, known for their high fire-rating, due to e high cost of making the production pro-ss CFC-free. To retard corrosion, Walzak ad-ised specifying decks that have been galva-nized or coated with an aluminum zinc alloy.

During a briefing on the asbestos regulations established by the Occupational Safety and Health Agency (OSHA) and the Environmental Protection Agency (EPA), NRCA staff member Carl Good asserted that "roofing is not asbestos abatement." According to Good, the EPA's views on what roofing materials and conditions are potentially hazardous have given rise to conflicting information on removal procedures. Good also noted that, despite evidence that the air quality on numerous job sites meets OSHA standards, roofing contractors are required to conduct air monitoring. Good warned roofers that despite the October 1991 decision by the U.S. Court of Appeals Fifth Circuit to overturn the EPA's ban on most asbestos-containing products, some states and building owners require the use of asbestos-free materials in many instances.

Timothy Davey, president of Davey Roofing in Irvine, California, presented appropriate underlayment materials, fasteners, and examples of flashing and perimeter details for concrete and clay tile roofing installations. Frank Jenkins of J.M. Montgomery Roofing Company in Miami, Florida, discussed mortar-set tile applications on low-slope roofs in Florida.

Products introduced at the show include Carlisle SynTec's New Generation HP Fasteners, Fibre-Chem's asbestos-free Carolina Slate roofing shingles, and SBS Premium, a reinforced modified-bitumen roofing membrane by Firestone Building Products. —K.S.

recent increase in re-roofing jobs has vealed corroded metal decks (below left) as e cause. Metal hooks help resist wind up-t in tile roofs (below right). Carlisle SynTec's P Fasteners (above) are used to secure eel, wood, or structural concrete roof decks.

ED CASTLE

AIA Stages ADA Videoconference

ON FEBRUARY 6, AT 1 P.M. EASTERN STANDARD Time, more than 5,500 design and construction professionals from Florida to Alaska tuned in to the first of three videoconferences on the Americans with Disabilities Act (ADA). The series, "Opening All Doors: Understanding the Americans with Disabilities Act," was developed by AIA and the Public Broadcasting Service's Adult Learning Satellite Service.

The three-hour show, broadcast at 215 sites nationwide, included a live panel discussion (above) with ADA experts, a videotaped building accessibility survey, and dramatizations of the barriers that the law is attempting to overcome. During the videoconference, panelists fielded questions posed by the national audience via telephone and facsimile. Site leaders continued the discourse locally among participants after the program ended.

The first segment provided an introduction to the law. The second segment, broadcast March 18, focused on accessible design. The third, airing April 21, will examine enforcement and liability issues.

"Opening All Doors" is AIA's first venture into this high-tech educational format. The medium was selected, explains AIA Vice President Richard W. Hobbs, "to reach as many architects and allied professionals as quickly as possible." AIA is planning video programs on other subjects, and is investigating a fiber-optics network to transmit centrally stored educational videotapes from AIA headquarters to local components on command. —N.B.S.

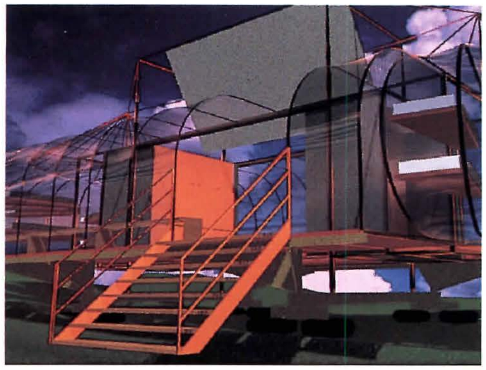
A/E/C Systems Show Promises Integration

THE ANNUAL EXTRAVAGANZA OF THE A/E/C Systems show and its concurrent conferences will take over the Dallas Convention Center from June 8 to 12. Nearly 100 tutorials, seminars, and panels will address wide-ranging topics of CADD networks, facility management, and documents automation.

Several symposia will share the week's spotlight. The AIA will hold a one-day conference on "CAD—The Medium of Exchange," exploring issues, problems, and opportunities of sharing electronic information with clients. At the second annual symposium on "Computer Integration of the Building Industry," experts will discuss coordinating data and applications throughout a building's life cycle. Other conferences will focus on computer-aided facility management, specifications, and presentations.

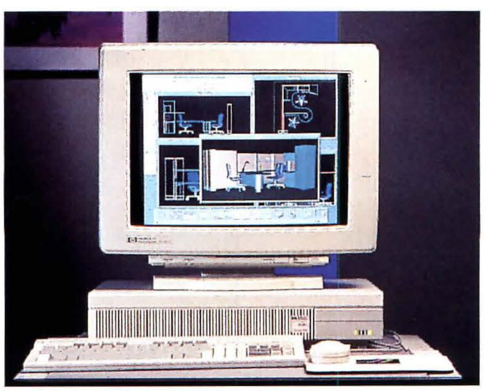
Hundreds of exhibitors will demonstrate innovative products developed over the past year. One important trend is to integrate design and construction information in building databases. ASG, producer of architectural applications for AutoCad, recently merged with Vertex Design, maker of building product databases and details. At A/E/C Systems, the company will demonstrate the combination of these two software families. Alias Sonata, an integrated design modeler from Europe, will be shown with new features including site topography, improved rendering capabilities, and multiuser access on a heterogeneous network. Softdesk will promote integration through its new Productivity Tools, with word processor, spreadsheet, and calculator accessible from AutoCad. FM:Systems' new version of FM:Space-Management provides automatic updates to a facility database from graphic changes within AutoCad or Cadvance. To dramatize the power of integration, Intergraph will demonstrate a complete design cycle for a building renovation, with an emphasis on sharing data among disciplines.

Helping the move toward integration is Microsoft Window's graphical user interface, which, when implemented fully, allows information transfer between PC applications, similar to those enjoyed by Macintosh users. Isicad's Cadvance for Windows, for example, allows CADD data sharing between rendering, word processing, database, and desktop publishing programs.



A fold-out field hospital (above) designed by Kees van der Giessen of the Amsterdam School of Architecture illustrates new 24-bit color capabilities of Modern Medium's RenderStar, including full color transparency.

Enter Computer's new NovaJet 300 DPI color inkjet plotter (above) produces 256 colors at up to E size.



Intergraph's MicroStation, already available on a variety of platforms, now runs on Hewlett-Packard's Apollo 9000 Series 700 workstations (above).

Most exhibitors will demonstrate additions and improvements. Electronic Product Information Corporation (EPIC, formerly Architectural Synthesis) will show Computer Intelligent Details and Specifications for custom windows. Graphisoft's new version of ArchiCAD will focus on improvements in 2D drafting and 3D modeling. Landcadd will illustrate CADpanion with walk-throughs and AutoCad utilities. The National Institute of Building Sciences will exhibit its newest Construction Criteria Base compact disc, including product information and demonstration programs.

Management software should also be prevalent at the show. Data-Basics' Interoffice Communications module, added to its AEMAS Plus accounting/project management program, will provide data transfer and coordination between distant offices. The new version of Micro/CFMS, Harper and Shuman's financial project management software, will enable architects to employ the reporting tools of the Oracle database manager. ACCI Business Systems' new version of Project Management/Accounting System will feature integrated color business graphics and check printing modules. Primavera's new version of SureTrak Project Scheduler will include budgeting and cash-flow projections.

The trend in hardware is to large-format, high-speed, low-cost printers. Pacific Data Products' new inkjet ProTracer, for example, plots up to C-size drawings at laser quality and speed. Raster Graphics will demonstrate its new color electrostatic plotter with a writing speed of up to 6 inches per second. Roland Digital Group will show a new A-E size rollerbed pen/pencil plotter and the larger, faster, vinyl-cutting CAMM-1/24. And Houston Instrument will exhibit its DMP-160 series of pen plotters, designed for unattended plotting.

In workstations, architects should look for entry-level machines with greater power and higher-power machines with lower price and familiar software. Accugraph's MountainTop, Intergraph's MicroStation, and Autodesk's AutoCad will run on HP's series 700 workstations. AutoCad will also be available for Silicon Graphics' new IRIS Indigo computer. Nth Graphics' Nth PortableGL will make Silicon Graphics software run on Sun SPARCstations. For more information about A/E/C Systems, call (800) 451-1196 or (203) 666-6097. —B.J.

ndependent Surveys Reveal Firm Values

HILE THE ASSETS AND PROFITS OF ARCHI-cture, engineering, and environmental rvice firms have steadily declined, their em-oyees are working harder than ever, accord-g to a 1992 nationwide survey of 139 firms cently published by Mark Zweig & Associ-es, a Natick, Massachusetts-based manage-ent consulting firm. Firm value, an ap-raisal of a practice's financial condition, has ropped an average of 26 percent since 1989. he survey also revealed that the percentage firms projecting no growth or a decline in ture revenue and profits had risen from 20 ercent in 1989 to 25 percent 1991. However, value per mployee (the ratio of firm lue to staff size) is up nearly 0 percent over the last three ears. Fred White, Zweig & ssociates' vice president and rector of research, points ut that this indicator of in-eased productivity means mployees in downsized of-ces are working harder on e projects they still have.

Not all the survey results recast a bleak outlook. Some rms have still managed to crease their financial hold-gs over the last three years. lthough the survey failed to nd any distinction of firm lue by region, the age, size, d focus of its services proved be influential determinants a practice's current finan-al status. Despite the aver-e decline, results from the rvey also reveal that, person r person, smaller firms and younger firms ith the exception of those founded in the st five years) generally had a higher value an larger and older firms. According to ark Zweig, firms can influence some con-l over their value, and a key factor in in-easing it is by positioning a practice in a ique niche market for the 90s.

The results of another recent Zweig & ssociates' survey of more than 350 American sign and engineering firm principals pro-le insight to their attitudes about manag-g a practice. The poll revealed that the rrent leadership of design firms is still pre-dominantly homogeneous. Of those surveyed, more than 95 percent are white and an equal percentage are male. The median annual in-come of surveyed principals is $75,000. Their average age is 49.

In terms of attitudes about business prac-tices, 44 percent of those polled maintained that it is "better to cut back costs " when the economy is bad, while 32 percent felt it is better to "spend money on marketing and key staff." Boosting profits may not lie overseas. More than half of respondents felt interna-tional work is "okay for some firms, but not for us." An additional 14 per-cent believed foreign work is a "mistake for most firms," while 30 percent view it as a "great market." Nearly 60 percent of the principals questioned had worked for a competing firm, and in re-gard to recruiting practices, only 35 percent found raiding competitors for outside talent to be unethical. Nepotism ap-pears to be prevalent among architects. More than half of those questioned indicated a relative had worked for the firm at some time.

When asked what form of leadership is most likely to make a firm profitable and successful, principals were al-most evenly divided between joint partnerships, a single decision maker, and an oper-ating board. However, there was greater consensus among principals when asked if they alone should assume specific leadership roles. Sixty-nine percent expressed the opinion that they should be exclusively responsible for firm management, and 59 percent thought only principals should quote fees and conduct contract negotiations.

Although many of the findings in the two surveys are pessimistic, 65 percent of respon-dents claimed they are "very satisfied" with their career choice, one third are "fairly satis-fied," while only 2 percent are "not very satis-fied." More than 75 percent state they "would follow essentially the same career path." ■

—M.S.H.

Principal Facts

96 percent of architects surveyed work more than 40 hours per week

92 percent are married, but most spend more time with their firm than with their spouse

26 percent feel some of their fellow principals are just coasting to retirement

42 percent worked for a competing firm

53 percent are a company founder

60 percent have a company car

84 percent have a private office

EcoWatch

Architects often find it difficult to balance site development and wetlands preservation; the federal government's difficulty in defining wetlands has not helped the situation. In 1989, the Environmental Protection Agency (EPA) attempted to consolidate federal regulations for such fragile ecosystems—which were previously defined by four separate federal agencies—into one set of criteria, the "Federal Manual for Delineating Wetlands." However, continuing confusion over the revised but ambiguous guidelines led the federal government to propose changes to the EPA manual last August. Field tests conducted by the agency, based on the proposed revisions, would reportedly open development to 30 to 80 percent of the sites currently classified as preserved wetlands, contradicting President Bush's "no net loss" wetlands policy. Current debate centers around adding certain plant species to existing soil type criteria. Proposed reforms would also increase the annual period a site must be submerged to constitute a wetland, from at least 7 days of continuous water coverage to 15 days. The EPA accepted public comment (not considered for its first manual) on its proposed revisions through January 1992. The agency, inundated with more than 80,000 responses, is now reviewing the suggestions, and will ultimately publish a new manual. Independent testing of the proposed regulations is now likely to be mandated by Congress, probably delaying any final version of the manual before 1993.

—M.S.H.

S.C. DELANEY / EPA

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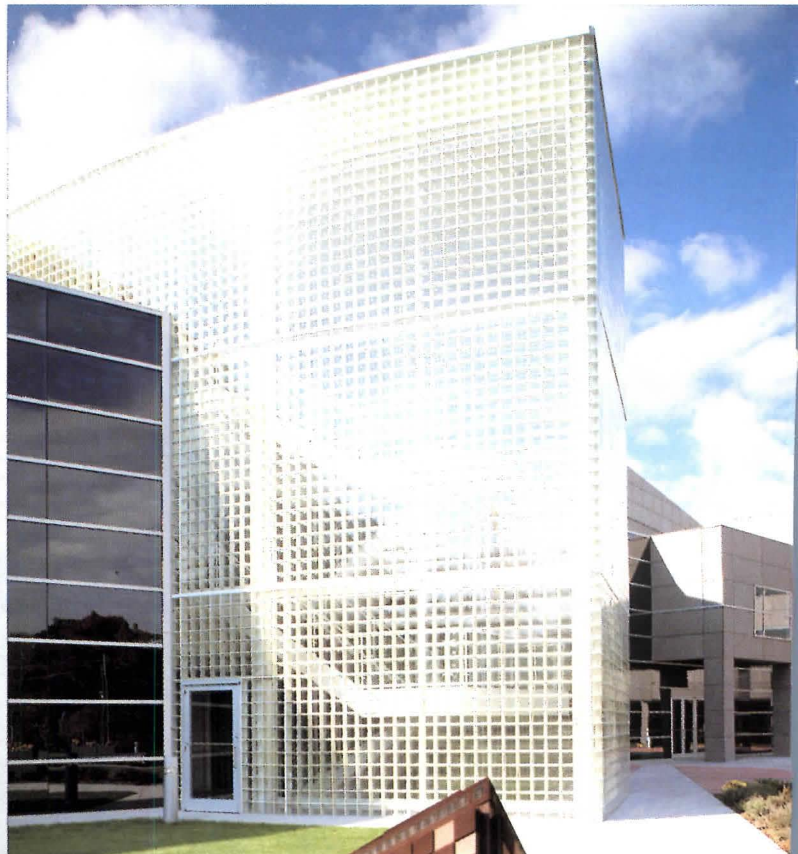
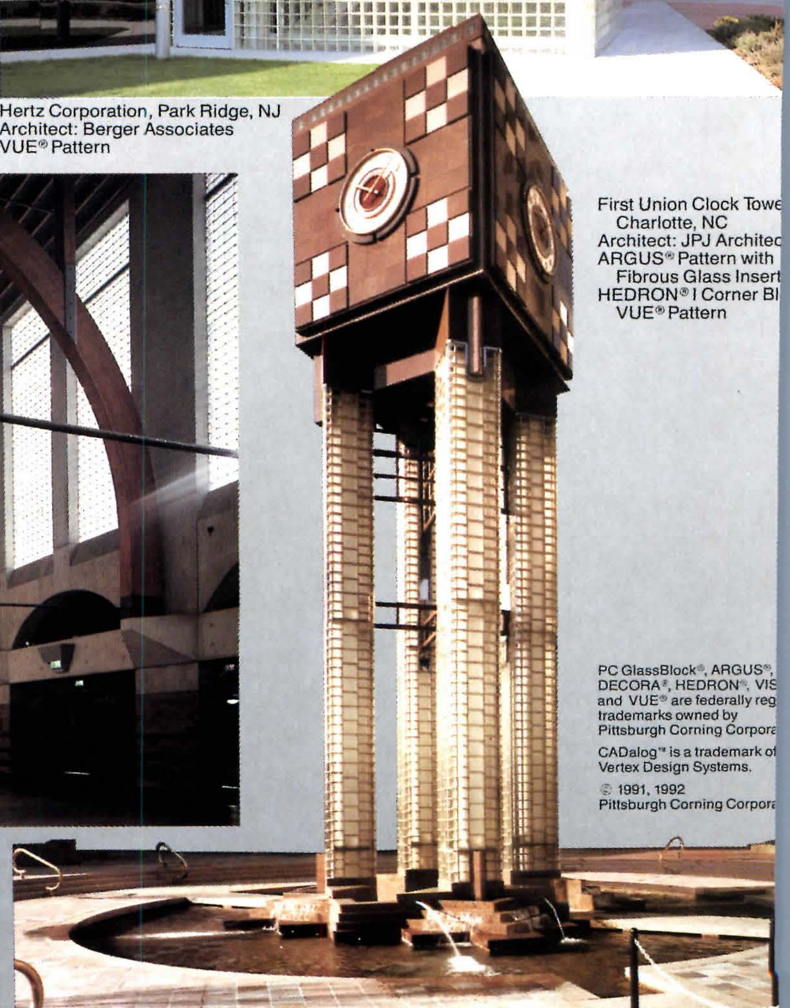
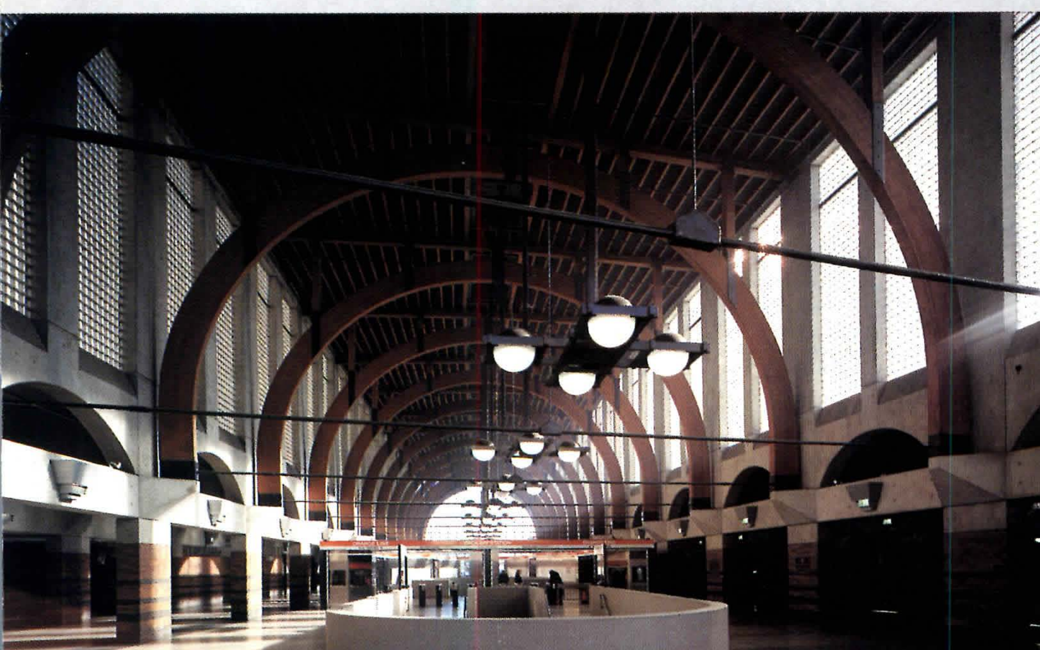


Hertz Corporation, Park Ridge, NJ
Architect: Berger Associates
VUE® Pattern



First Union Clock Towe
Charlotte, NC
Architect: JPJ Architec
ARGUS® Pattern with
Fibrous Glass Insert
HEDRON® I Corner Bl
VUE® Pattern



MBTA Back Bay/South End Station, Boston, MA
Architect: Kallman, McKinnell and Wood/Bond Ryder Associated Architects
VUE® Pattern & VISTABRIK® Solid Glass Block

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Bracing History

Connecting new construction with old buildings requires structural ingenuity.

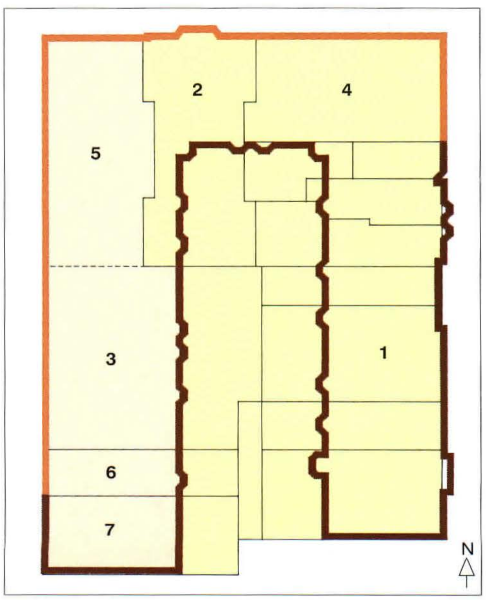
WHEN PRESERVING HISTORIC STRUCTURES, most architects either restore an old building to its former glory, adapt an existing shell to a new use, or incorporate an older facade into a new addition. In designing the Lansburgh, a mixed-use complex in downtown Washington, D.C. (pages 74-79), Graham Gund Architects was called upon to accomplish all three tasks within a block of the city's commercial core.

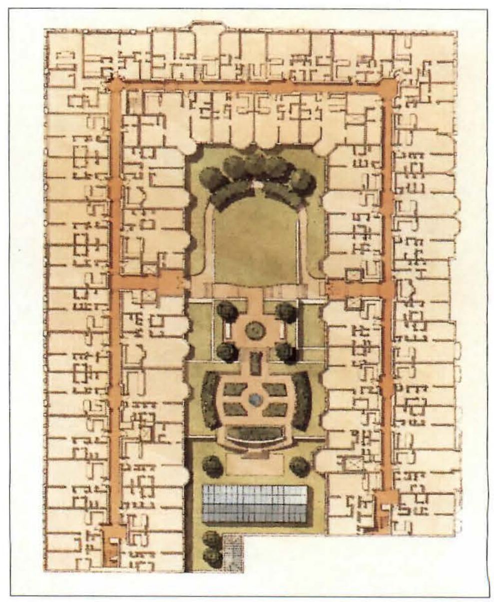
Working with Cambridge, Massachusetts-based structural engineers LeMessurier Consultants, Gund deftly wove old and new into a cohesive new structure that fills three-fourths of a city block north of Pennsylvania Avenue between 7th and 8th Streets N.W. But salvaging the site's hodgepodge of commercial structures, which date from 1863 to 1954, required an intricate bracing system to support existing buildings during construction. An elaborate new foundation now supports the historic buildings, an 11-story apartment addition, a 447-seat below-grade theater, and five levels of underground parking. A Metro subway tube running along the eastern boundary of the site further complicated the construction and excavation process.

Preservation parameters

LANSBURGH & BROTHER DEPARTMENT STORE was originally housed in an 1880s building on 7th Street and grew to cover almost the entire block before it closed in 1973. The centerpiece of the complex, which gave the new apartment building its name, was an early 20th-century, terra-cotta-clad structure located on the western half of the block. The original retail complex also included a row of storefronts along the site's eastern edge that date from the late 19th century and the 1882 Busch building, a six-story masonry structure that defined the northern edge. Anchoring the block's northeast corner, but not part of the department store, was the 1918 S.S. Kresge Five and Dime Store.

The site's interwoven buildings were diverse in structural integrity and historical significance. Graham Gund's proposal called for renovating the original Lansburgh's

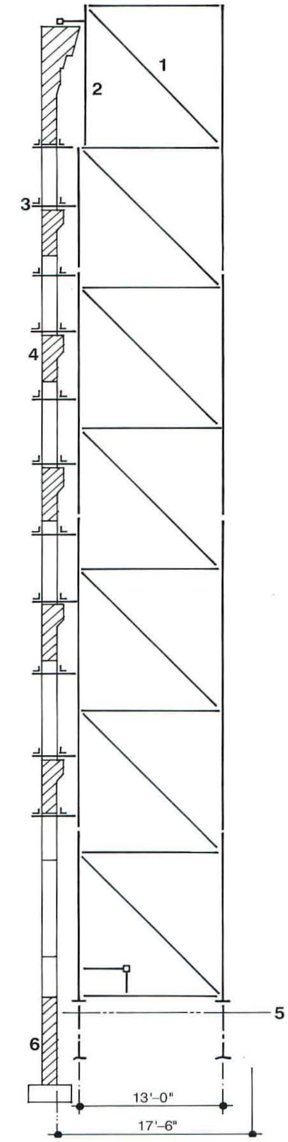




RESTORED HISTORIC FACADES
EXISTING STRUCTURE INTEGRATED INTO NEW PROJECT
DEMOLISHED
NEW FACADE

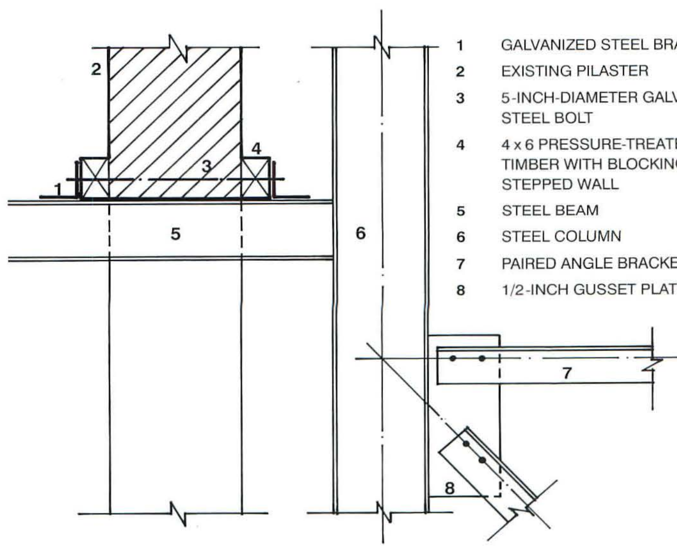
1 ORIGINAL LANSBURGH & BROTHER STORE (1882)
2 BUSCH BUILDING (1882)
3 LANSBURGH & BROTHER STORE (1916)
4 KRESGE BUILDING (1918)
5 LANSBURGH & BROTHER STORE (1924)
6 LANSBURGH & BROTHER ADDITION (1941)
7 LANSBURGH & BROTHER STORAGE BUILDING (1954)

The architects blended new construction with a variety of preservation approaches (site plan, above left). A web of sophisticated foundations and temporary bracing systems was constructed to support historic north-facing facades and renovated terra-cotta-clad building along the western boundary of the site (top). The rear of the original Lansburgh was demolished to make room for a central courtyard (plan above).



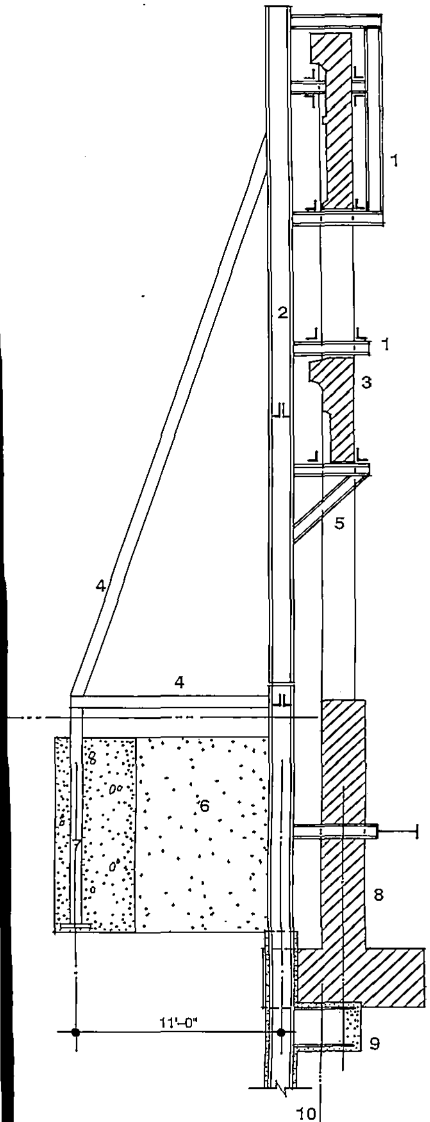
1 PAIRED ANGLE BRACKET BEAM
2 STEEL BEAM
3 TYPICAL WALL BRACE
4 EXISTING FACADE
5 FINISHED GRADE
6 FOUNDATION

TRUSS SECTION (BUSCH BUILDING)



1 GALVANIZED STEEL BRACKET
2 EXISTING PILASTER
3 5-INCH-DIAMETER GALVANIZE STEEL BOLT
4 4 x 6 PRESSURE-TREATED TIMBER WITH BLOCKING FOR STEPPED WALL
5 STEEL BEAM
6 STEEL COLUMN
7 PAIRED ANGLE BRACKET BEA
8 1/2-INCH GUSSET PLATE

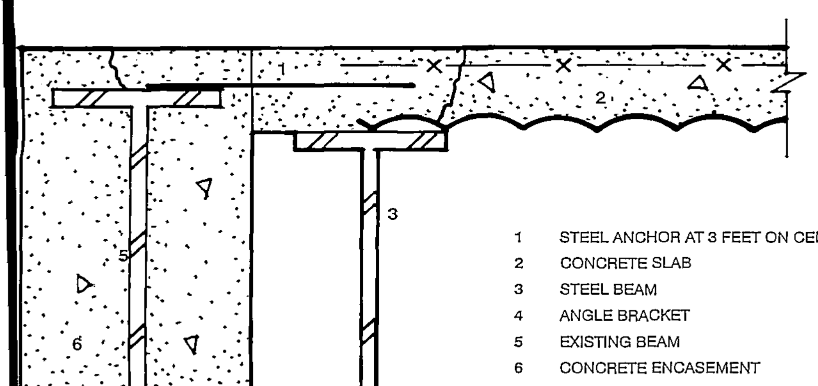
WALL BRACING DETAIL (BUSCH BUILDING)



1 STEEL BRACKET
2 STEEL COLUMN
3 EXISTING FACADE
4 STEEL BRACE
5 ANGLED SUPPORT BRACKET
6 BACKFILL
7 SHEAR STUD
8 EXISTING FOUNDATION
9 CONCRETE-ENCASED BRACKET
10 PROPERTY LINE

RUSS SECTION (KRESGE BUILDING)

Temporary bracing was installed to support the Busch and Kresge facades while the buildings were demolished and the site excavated (facing page photo). Steel trusswork (facing page, top section) supported the Busch facade. A typical wall detail (facing page, bottom) illustrates the connection (left) between the historic facade and temporary structure. The facade was anchored to the new permanent steel structure with paired angled brackets (detail, below).



1 STEEL ANCHOR AT 3 FEET ON CENTER
2 CONCRETE SLAB
3 STEEL BEAM
4 ANGLE BRACKET
5 EXISTING BEAM
6 CONCRETE ENCASEMENT

ERMANENT ANCHORING DETAIL (KRESGE BUILDING)

terra-cotta facade and two thirds of the building, but demolishing its rear to carve out a central courtyard. The scheme preserved only the facades of the six-story Busch building, which contained a wooden structural system, and the adjacent two-story Kresge store. The row of eight 19th-century stores along 7th Street was replaced with new construction; the storefronts had been so altered over the years that their historic architectural integrity had been lost.

Although its facade gave the Lansburgh a monolithic appearance, its 229-foot-long 8th Street elevation was actually composed of four different buildings, each with a different structural system. The oldest component, completed in 1916 and located in the middle of the block, was framed in structural steel. The northernmost component, completed in 1924, was composed of cast-in-place concrete beams and slabs. A one-bay extension to the south of the 1916 structure was also constructed of concrete, but featured a one-way rib system. The latest addition, a 1954 storage facility originally clad in simple concrete block, rather than ornate terra-cotta, was erected as a hybrid structure of steel columns and beams with cast concrete floors.

Gund gutted the preserved portion of the Lansburgh, and clad the remaining structure, which measures 65 feet deep, with a new facade fronting a landscaped courtyard. This nonload-bearing brick and precast concrete wall is supported by structural steel angles at every floor level. To add more apartments, the architect removed the original roof and developed a lightweight steel framing system to support two additional floors above the original six. "We had to determine whether the original structure could carry the additional load," explains structural engineer and project manager Rolf Andersson of LeMessurier Consultants. "Since it was a department store with public occupancy," he points out, "the original building was constructed to support a higher live load than an apartment building." Where original columns were insufficiently braced to support the three additional floors, steel reinforcement plates were added.

In addition to renovating the original Lansburgh structure, Gund worked with LeMessurier Consultants to develop an elaborate retaining wall (both temporary and permanent) and a continuous thick-slab mat foundation approximately 50 feet below street level to support five levels of subterranean functions. Although the new complex rises 11 stories, the excavation of its tight urban site and the demands for temporary structural systems for the historic facades represented the toughest challenges for the structural engineers.

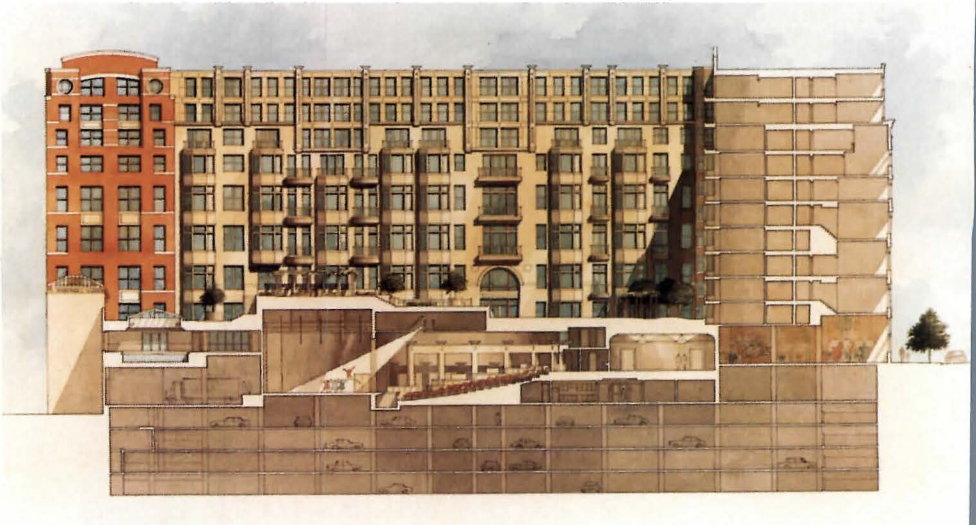
Facade support

DURING THE EXCAVATION, A NUMBER OF different foundation bracing solutions were developed to support the historic facades along the northern and eastern edges of the complex, the renovated Lansburgh structure, and adjacent buildings. The facades of the Busch and Kresge buildings directly abutted the new foundation walls and had to be supported vertically and laterally during excavation and construction.

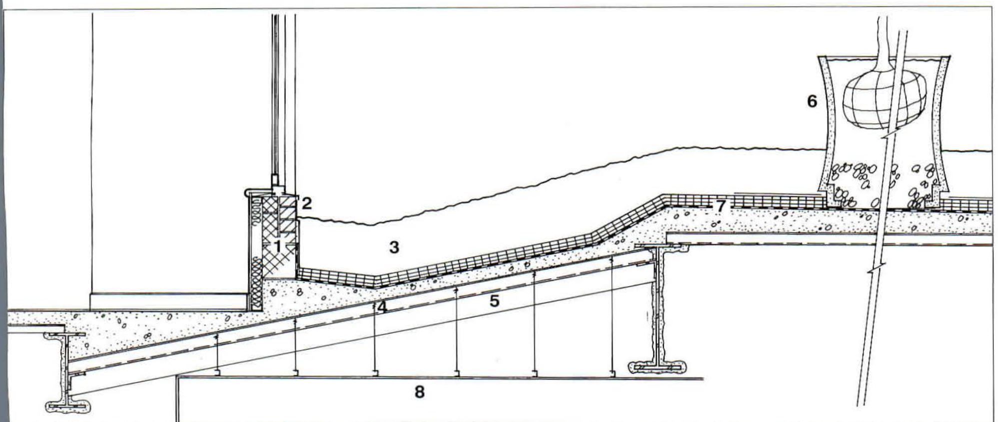
The architects stabilized the 100-foot-tall brick facade of the Busch building during construction by underpinning it with intermittent concrete piers, which were tied back for lateral stability and reinforced to support the temporary structural steel bracing system that rose above grade.

To preserve the Kresge's two-story facade, they dismantled and stored the building's Art Deco stainless steel storefront and reconstructed it after the new 9-story brick addition was completed. To brace the masonry and terra-cotta facade that remained in place during construction, the engineers fabricated structural steel soldier piles with heavy wooden boards lining the sides of the excavation. A 45-foot-long subway air shaft located in the sidewalk adjacent to the Kresge store precluded tiebacks under 7th Street and required an extensive internal bracing system for the facade. Accordingly, the structural engineers developed a system of piers that also functioned as bracket piles to support the weight of the facade itself. "The character of the temporary bracing was similar for both the Busch and Kresge facades," states Andersson. "The difference was that the taller facade required bigger members and deeper trusses."

The new central courtyard sits atop a 447-seat theater, loading dock, 7,200-square-foot health club crowned with a skylight, and four levels of parking (section, right). The stepped terraces provide a series of outdoor rooms for the landscaped courtyard (top right). Long-span members support the stepped decks (facing page, top), which accommodate various heights of the theater functions below (section, facing page). The architects also incorporated sloped decking and precast concrete tree planters (detail section, facing page center).



SECTION LOOKING WEST



SECTION OF SLOPED STEEL DECKING

1 CONCRETE RETAINING WALL
2 BRICK RETAINING WALL
3 SOIL BED
4 SLOPED DECKING
5 SLOPED STEEL BEAM
6 PRECAST CONCRETE TREE PLANTER
7 MEMBRANE
8 SUSPENDED CEILING

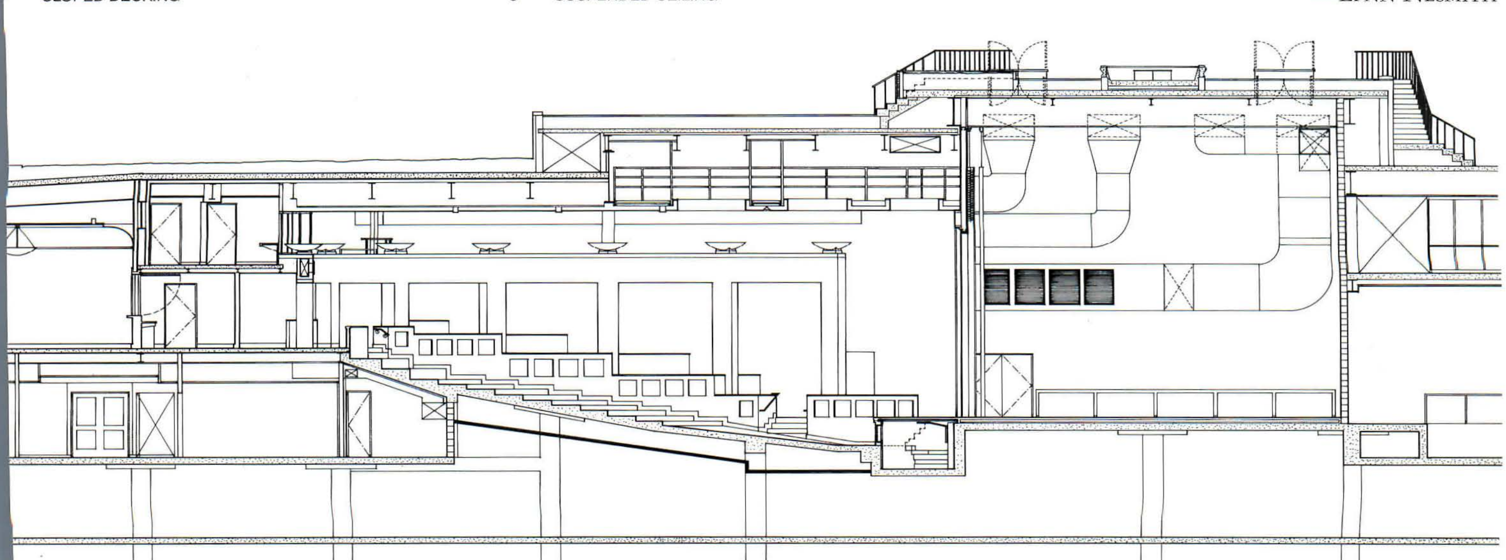
Along the southern boundary of the block, a row of existing turn of the century stores, which are not part of the new Lansburgh complex, required stabilization during construction to minimize the impact of ground movement and settlement. A 1917 four-story building at the southeast corner was underpinned and supported by tiebacks. At the party wall between the 1954 Lansburgh storage building and the adjacent 1904 building, earth retention was accomplished with a tangential pile wall with the piles tied back under the existing Lansburgh to anchor the site's southwest corner.

Underground construction

ANOTHER MAJOR STRUCTURAL CHALLENGE facing the architects was the integration of the 447-seat Shakespeare Theatre and support space for the acting company, as well as a health club and large loading dock below the courtyard. Set atop four levels of underground parking, the theater is a horseshoe-shaped space formed in cast-in-place concrete with sloping seating. The heavy load of the courtyard above the theater and the requirement that the interior space be column-free dictated an extremely strong steel framing system, according to Andersson.

To create a 60-foot, column-free space, the engineers installed a 6-foot-deep plate girder spanning the theater and introduced heavy transfer members to shift theater loads over the appropriate columns in the garage below. Gund stepped terraces in the courtyard to conform to the theater's changing profile and to accommodate lighting, rigging, and control booth. ■

—LYNN NESMITH



SECTION LOOKING EAST

Preserving Historic Windows

A guide to stabilizing, repairing, and replacing older fenestration.

WINDOWS, THOSE TRANSPARENT BARRIERS poised between indoors and out, are essential to defining architectural character. As "Windows through Time," a travelling exhibition of historic windows illustrates (bottom), the evolution of this critical building component displays a breadth of technological and stylistic change. Windows are therefore a key element in successfully preserving historic structures, whether through stabilization, repair, or replacement.

Since 1976, when tax incentives for historic preservation were first established, architects and owners have been guided by national standards that outline a hierarchy of window rehabilitation strategies. The U.S. Department of the Interior's guidelines have been influenced by strong regional or local ordinances and regulatory agencies, such as the New York City Landmarks Preservation Commission, which spell out specific expectations for historic properties. According to the guidelines, architects should strive to "identify, retain, and preserve" the functional and decorative features of windows, and, wherever possible, protect and maintain existing window fabric. Architects' adherence to the guidelines has finally caught the attention of manufacturers, spawning a wealth of new products that respond to the federal government's preservation recommendations.

In October, "Windows through Time: An Exhibit of Historic American Windows" (bottom) opens at the New York State Museum in Albany. Windows on display reveal a variety of muntin profiles (facing page).

But too many owners and architects are impatient with the time-consuming demands of preservation, forfeiting valuable historic resources in favor of the expediency of window replacement. Careful evaluation by the architect can reveal that preservation of existing windows may actually be more cost-effective, simpler to execute, and, with modifications, achieve significantly improved thermal performance.

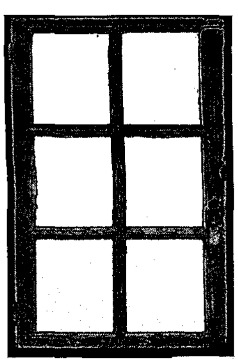
Assessing historic windows

AT THE BEGINNING OF A PRESERVATION PROJECT, experienced architects document historic windows, research photography of original installations, and assess whether existing windows can be repaired. Virginia-based preservation consultant James Massey, for example, conducted a window-by-window survey when restoring historic 1838 Mead Hall at Drew University in Madison, New Jersey. Based on the manageable scale, historic significance, and good condition of the windows, Massey and James Whildin, Jr., of Spillman Farmer Architects in Bethlehem, Pennsylvania, elected to repair 80 percent of the Greek Revival mansion's windows.

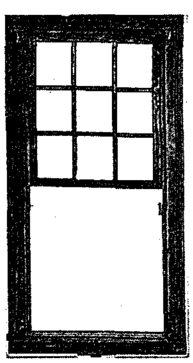
Mead Hall was only a two-story building, however; not every historic rehabilitation requires such absolute vigilance. Charles Fisher, a specialist with the Preservation Assistance Division of the National Park Service, suggests that the assessment and intervention strategy for a 30-story building might be less stringent than for a small-scale building. According to Fisher, windows on lower floors of a high rise might be repaired, mid-level windows replaced, and top-floor windows replicated. And windows on side elevations, Fisher admits, may be handled differently from those on primary facades. "There is no one solution for a building," he contends.

Architecture firms that specialize in preservation, such as Mesick Cohen Waite Architects of Albany, New York, develop detailed assessment documents tailored to each job, specifying the condition and suggested improvement for each window. For the 1919 Kellum Wing of New York City's Tweed Courthouse, for example, Mesick Cohen Waite prepared assessment documents that described the condition of the windows, including exploded isometric drawings that carefully detailed each window element. The documents included computations of winter heat loss and summer heat gain from both infiltration and conductive heat transfer, with an economic analysis of the thermal improvements from alternatives such as weatherstripping or insulated glass.

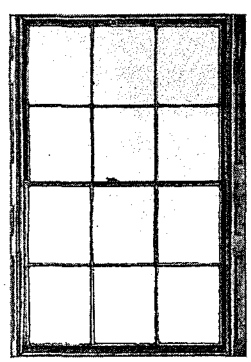
This completed survey, noted on a numbered schedule and tied to a floor plan, was then added to construction documents, resurfacing in greater detail as a window restoration schedule. The initial effort influ-



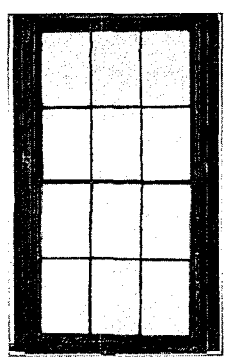
EARLY 18TH-CENTURY RESIDENTIAL CASEMENT



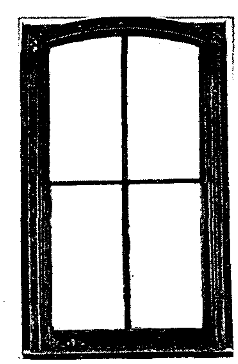
1760s GEORGIAN RESIDENTIAL



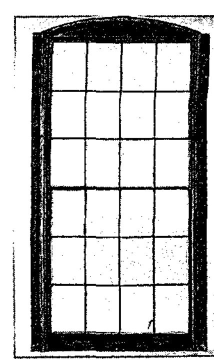
1820s HIGH FEDERAL RESIDENTIAL



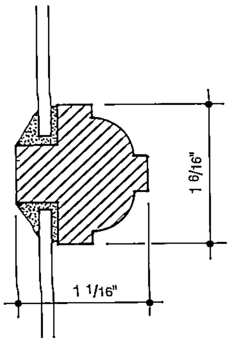
1840s GREEK REVIVAL COMMERCIAL



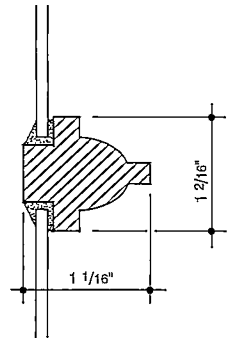
1860s ITALIANATE RESIDENTIAL



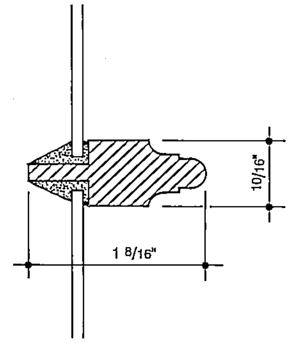
1870s INDUSTRIAL



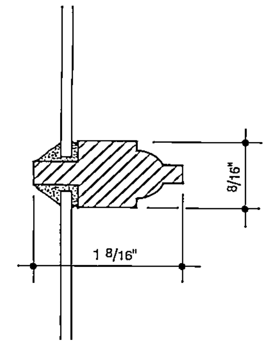
740s WOOD MUNTIN



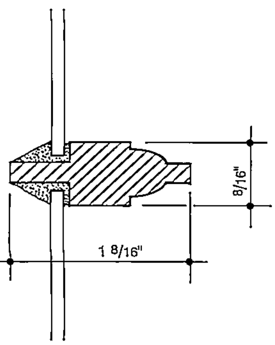
1760s WOOD MUNTIN



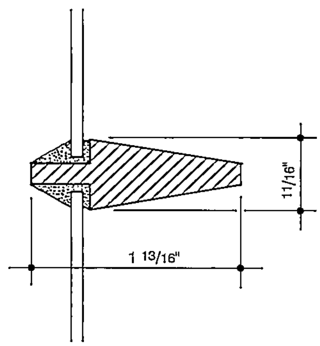
1823s WOOD MUNTIN



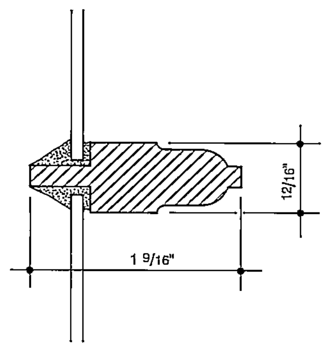
1835s WOOD MUNTIN



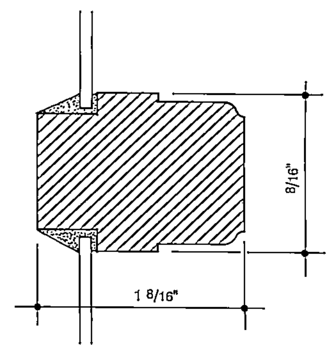
345 WOOD MUNTIN



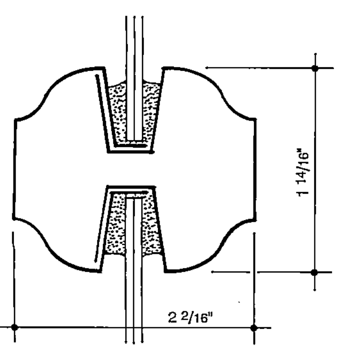
1850s WOOD MUNTIN



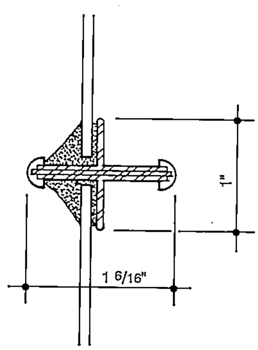
1870s WOOD MUNTIN



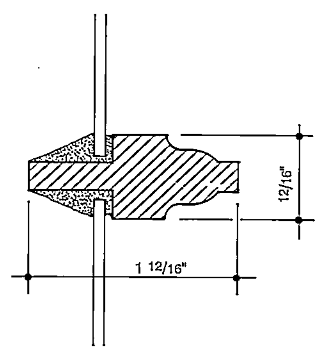
1879 WOOD MUNTIN



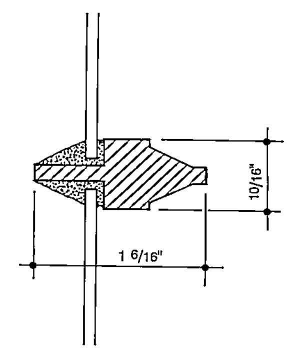
)05 HOLLOW-CORE METAL MUNTIN



1911 STEEL MUNTIN

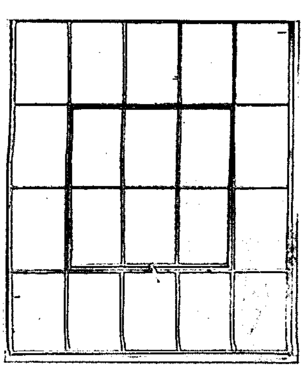


1915 WOOD MUNTIN

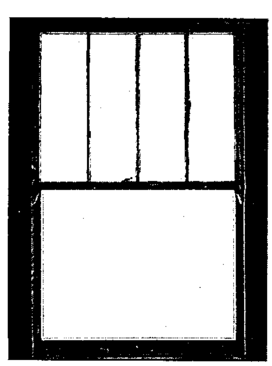


1932 WOOD MUNTIN

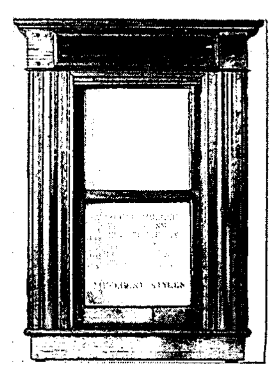
)5 HOLLOW-CORE METAL



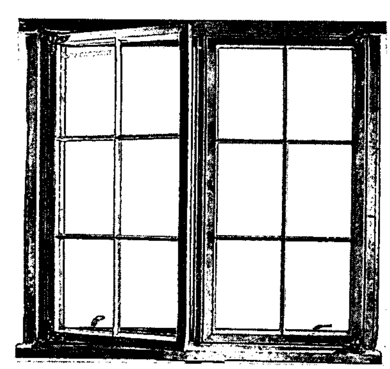
1911 INDUSTRIAL STEEL



1915 ARTS AND CRAFTS RESIDENTIAL



1920s RESIDENTIAL WITH ROLLER SCREEN



1930s RESIDENTIAL CASEMENT

enced the design decisions for the project as a whole and served as the basis for the window rehabilitation portion of the project.

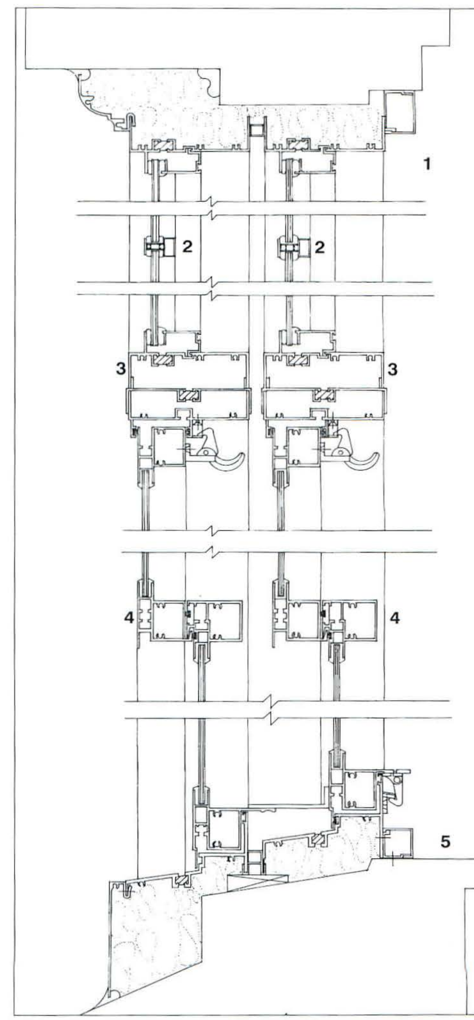
Thermal improvement similarly affected the renovation of Boston's 1901 Isabella Stewart Gardner Museum, recently undertaken by Boston-based Ann Beha Associates (facing page). According to the firm's vice president, Pamela Hawkes, windows were the "weak links" in the museum's envelope. After careful assessment, including consideration of mahogany storm windows, the architect and client agreed on a multilayered approach that called for installing storm sashes within existing openings. A combination of solutions, including polycarbonate sheet glazing and a heat-controlling film in dual, 1-inch insulated glass, combined to modify light infiltration and help control climate. Assessment pointed out the value of retaining historic interior blinds, which vary from carved wood to bamboo.

Software analysis

EVALUATING THE DISPOSITION OF WINdows is now being aided by computer programs designed for government agencies controlling many properties, such as the General Services Administration or the Department of the Army. One such model, a computerized resource management program called ResourcePlanMaker, was designed by John Cullinane, senior architect of the Advisory Council on Historic Preservation, in the office of the Secretary of the Interior. For large-scale assessments, such as a window survey for the United States Military Academy at West Point, New York, Cullinane's program guides the decision maker through a step-by-step cost analysis, advising both window replacement and retrofit.

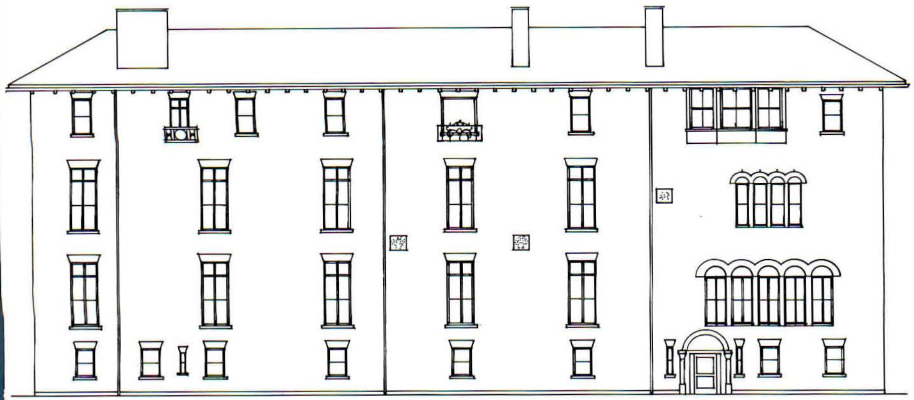
John Myers, Director of the Center for Architectural Conservation at Georgia Institute of Technology's College of Agriculture in Atlanta, developed another computer program that, like Cullinane's, is available to architects and owners. In Myers's system, the user assesses age, style, materials, configuration (whether double-hung or casement), and individual window component conditions (from rotting sills to missing sash). Once the assessment is complete, the software produces a hierarchical listing of windows, indicating the type of treatment—whether repair or replacement—each should receive. For example, Myers's program might recommend that one window be replaced with an exact replica, or it might propose that another is an intrusion and should be removed.

Accurate replication of existing wood windows was just one of several requirements in the renovation of Boston's Mather School (top). Perry Dean Rogers & Partners specified double units of thermally isolated aluminum frames for both thermal efficiency and soundproofing, since the school is located along an airport flight path. All units were manufactured by Graham Architectural Products to match opening conditions and existing frames (above). Fixed transoms surmount operable double-hung sash (section); spring-loaded latches were specified for easy operation. For security, plexiglass was chosen for all grade-level windows. In certain locations, where ornate stonework around the window opening prevented installing frames, plexiglass was cut to shape and mounted directly to the stone.



DOUBLE-HUNG WINDOW SECTION

1 HEAD
2 MUNTIN
3 TRANSOM BAR
4 MEETING RAIL
5 SILL



WEST ELEVATION

NORTH ELEVATION

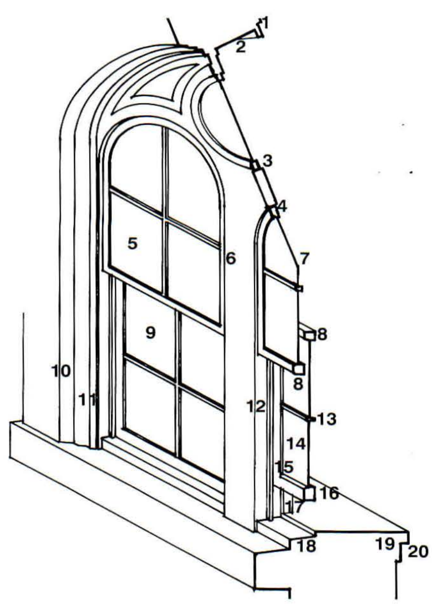
WINDOW SCHEDULE

FIRST FLOOR LEVEL IDENTIFICATION			PRINCIPAL SASH					INTERIOR TREATMENT			EXTERIOR TREATMENT			NOTES
No.	Location	Size W x H	Type	Oper-able	Upper/ Lower Sash	Sill/ W. strip	Hard-ware	Exist. Storm	New Type Glazing	Window Treatment	Exist. Storm	New Type/ Glazing	Sec. Grille	
1W1	Security		DH	Y				F		AC shade	-	-		no work
1W2	Security		DH	Y				F		AC shade	-	-		no work
1W3	Chinese Area	1'-3" x 5'-0"	F LDG	-				-		wood screen paper shade	-	B1/ LOWE		
1W4	Palace Road entrance	3'-0" x 3'-0"	DH W					-			-	B1/ LOWE		
1W5	Palace Road door	-	P					-			-			no work
1W6	Palace Road door	3'-0" x 3'-0"	DH W					-			-	B1/ LOWE		
1W7	Chinese Area	1'-3" x 5'-0"	F LDG	-				-		wood screen paper shade	-	B1/ LOWE		
1W8	West Cloister	3'-4" x 5'-0"	DH W	Y	UF3+MS add		RP lock	-			DH MF (X)	A2/SX SCR	Y	
1W9	West Cloister	3'-4" x 5'-0"	DH W	-				UF3			DH MF (X)	A1/SX	Y	
1W10	West Cloister	3'-4" x 5'-0"	DH W	-	UF3+MS add		RP lock	-			DH MF (X)	A1/SX	Y	
1W11	West Cloister	3'-4" x 5'-0"	DH W	-	UF3+MS add			-			DH MF (X)	A1/SX	Y	
1W12	Toilet (MacKnight)	1'-3" x 3'-4"	DH W	Y	UF3+MS add			-			-	A2/SX SCR	Y	
1W13	MacKnight Room	3'-6" x 5'-0"	DH W	Y				-	-	blind	DH MF (X)	A2/SX SCR	Y	
1W14	MacKnight Room	3'-6" x 5'-0"	DH W	-				MF UF3	-	blind	-	A1/SX	Y	
1E1	Yellow Room	1'-9" x 5'-0"	DH	Y				-	MF UF3	shade	DH MF	A2/[illegible]	[illegible]	loose sash stop
		[illegible]	DH	Y	UF[illegible]MS									

Abbreviations

AC	Air-conditioning
BB	Bamboo shades
BL	Blinds
BR	Bottom rail
C	Curtains
CN	Consolidate
CW	Casement window
DH	Double-hung
DP	Double pane
EXT	Exterior (facing outdoors)
F	Fill
FX	Fixed
IG	Insulating glass
INT	Interior (facing gallery)
L	Louver system for shading
LB	Louver box
LDG	Leaded glass
LF	Left
LOWE	Low-emissivity glass
LT	Light
M	Muntin
MF	Metal frame
MJ	Mortise joint
MR	Meeting rail
MS	Museum shade
N	No
P	Plexiglass
R	Replace
RA	Reattatch
RP	Repair
RT	Right
SCR	Screen
SF	Solar film
SP	Single pane
STG	Stained glass
SV	Solar veil
SX	Saflex
TP	Triple pane
TR	Transom
UF3	UV filter plexiglass
W	Wood
WSTR	Weatherstripping
(X)	Remove
(#)	Number of items

oston's Ann Beha Associates approached he recent window upgrading of the Isabella tewart Gardner Museum (top) with a indow-by-window schedule (above) for the ariety of glazing systems among its eleva- ons, from operable casement to fixed tained glass. Wherever possible, steel- ashed storm windows with narrow stiles and ails were installed on the exterior. But at ements such as the complex ogee arches here stone tracery blocked access to nestration (right), the architects opted for interior storm with aluminum sash. ithout degrading light quality, ultraviolet ght infiltration into the museum was itigated by single-sheet polycarbonate azing, dual-pane low-E glazing, and nylon reen shading. A triple-layer glazing system lass, polycarbonate, and storm sash) events condensation.



1. TRIM
2. SOFFIT
3. FIXED SASH
4. TOP RAIL
5. UPPER SASH
6. MULLION
7. LIGHT
8. MEETING RAIL
9. LOWER SASH
10. OUTSIDE CASING
11. OUTSIDE LINING
12. JAMB
13. MUNTIN
14. STILE
15. PARTING BEAD
16. BOTTOM RAIL
17. STOP
18. SILL
19. STOOL
20. APRON

Repairing wood and steel windows

WOOD FENESTRATION OFTEN APPEARS SERIously deteriorated, but may in fact only need a good cleaning. Age may even offer an advantage: the dense heartwoods of pine or cypress, prevalent throughout this country 100 years ago, may actually last another century. The life expectancy of recent-growth soft woods, which are often used in today's windows, is much shorter.

Deterioration of wood windows begins at installation. Rainwater and condensation play havoc throughout the life of wood windows, and rot, encouraged by recurrent moisture and peeling paint, turns solid wood to dust. But if rotting is localized, its progress can be chemically retarded, and the voids in damaged wood can be filled with epoxy consolidants, sanded, and repainted.

Window repair, rather than replacement, is the strategy undertaken by the AIA Foundation and Mesick Cohen Waite in restoring the Octagon (ARCHITECTURE, November 1991, page 93). Although some windows were replaced in the 1960s, 49 of the original 52 windows, which date from 1799-1801, are being taken apart, consolidated with epoxies, and reinstalled.

Steel sash windows can be repaired just as effectively, although the process is more specialized. Rusting metal windows tend to be relegated to the recycling plant, but careful investigation often reveals that rust can be scraped off and the window cleaned. Products such as patching compounds (used in automobile body repair), plumber's epoxy, and even mixtures of steel fibers in epoxy binders can be applied to build up a deteriorated steel sash.

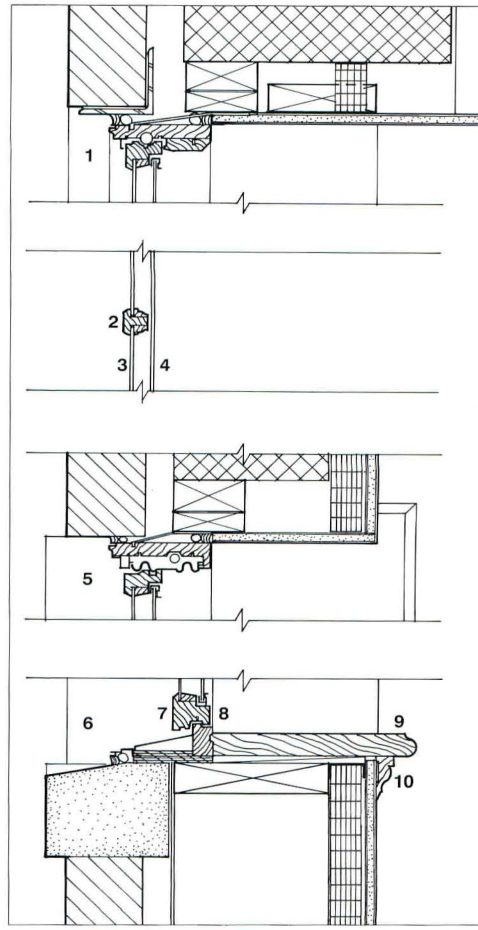
Where steel sash is irreparable, its surrounding metal frame may be intact. Good subframes, like good bone structure, helped Boston architect Peter Ringenbach of Perry Dean Rogers & Partners as he reconstructed the face of Boston University's Stone Science Center. Ringenbach grafted new, 5/8-inch insulated clear glazing in replacement steel sash into the old frames. Although he considered a less expensive aluminum sash, steel allowed a narrower profile, in keeping with the 1946 building's historic appearance.

Preservation through maintenance

UNGLAMOROUS TASKS SUCH AS CLEANING, coating, sealing, or fine-tuning have always been regarded as the owner's purview, yet they may present opportunities for architects to help clients manage the ongoing life of rehabilitation projects.

JEFF GOLDBERG / ESTO PHOTOS

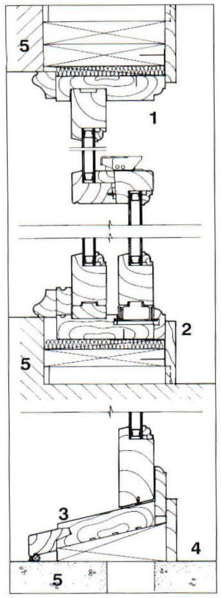
More than 600 double-hung windows that pivot for ease of cleaning were specified for the recent rehabilitation of Washington, D.C.'s 1924 Mayflower Hotel (top and above). Project architect Bruce Hayes of Oldham & Seltz, with preservation consultant James Massey, specified Pella windows, which had been installed in an earlier renovation. Since then, Pella had developed a true divided light sash (section, above right) with a narrow muntin for its trademark aluminum-covered stock. Storm sash was relegated to the interior of the hotel, which is listed in the National Register of Historic Places.



DOUBLE-HUNG WINDOW SECTION

1 HEAD
2 MUNTIN
3 TRUE DIVIDED LIGHT
4 STORM SASH
5 JAMB
6 SILL
7 ALUMINUM-CLAD EXTERIOR
8 PAINTED INTERIOR
9 WOOD STOOL
10 WOOD APRON

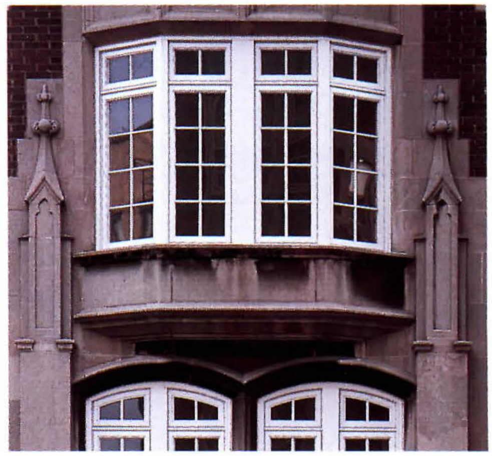
When fire destroyed the roof at Mead Hall at Drew University in Madison, New Jersey, most original lower windows survived (right). A survey determined which windows required repair, which needed partial sash replacement, and which had to be totally replaced. Camden Millwork provided wood replacement sash (facing page, bottom left) to replicate originals; impact of new window fabric was mitigated by placing new sash in original frames. Interior view shows new window and original trim (facing page, bottom center). Exterior view (facing page, bottom right) shows completed restoration.

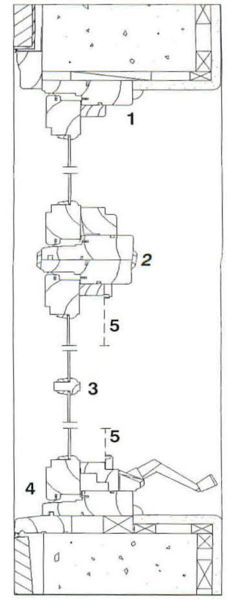


SINGLE-HUNG
WINDOW SECTION

1 HEAD
2 JAMB
3 SILL
4 INTERIOR TRIM
5 EXISTING MATERIAL

n 1912, when Daniel Burnham designed the Polk-Wells Building (top) in Chicago, he could iot have imagined that the office building vould receive renewed life as apartments. In he decades following the building's construcion, its wood windows were replaced with iccurate replicas. The landmark was revitalzed in 1990, at which time Weathershield rovided about 400 single-hung units (above nd section, above right), in which the lower ash moves and the upper sash remains ixed, to replace the existing ones. The new vindows were painted to match the originals. ustom-profile brick molds and mullion overs completed the rehabilitation work.





CASEMENT WINDOW
SECTION

1 HEAD
2 MULLION
3 MUNTIN
4 SILL
5 SCREEN OR STORM

Like many older urban structures, Cyril Court (top), a twin-towered Chicago building from the 1920s, included a variety of fenestration: double-hung windows, round-topped casements, transoms, and bay windows projecting 15 degrees. In a recent renovation, the 360 original windows, which had severely deteriorated, were replaced with either custom (above) or stock windows supplied by Marvin Windows. Consistent with the Department of the Interior's rehabilitation guidelines, all units featured true divided lights (section, above right). Storm panels and screens were installed on the interior to avoid compromising the exterior elevation.

Caulking compound, for example, eventually fails around window frames, allowing air infiltration. As the New York Landmarks Conservancy, a private nonprofit preservation organization, points out, variations in expansion between wall and window will eventually break this line of environmental defense, although more movement typically occurs in aluminum windows than in either wood or steel. Periodically repairing caulking produces significant energy savings for clients.

Hardware, including locks and latches, sash balances, and hinges, wears out over time. Historic renovation journals commonly list companies specializing in replication hardware; the architectural salvage market is another source. Sometimes, however, the culprit is simply too many layers of paint choking a perfectly good historic hinge into passivity. Detective work and some elbow grease can save time and money.

For enhanced thermal performance, windows may be reglazed or retrofitted with shading devices. It is possible, if expensive, to replace individual single panes in historic wood sash with insulated double glazing. Retrofitting a steel sash with insulated panes is more difficult, since older metal frames with elegantly thin muntins often cannot support the additional weight of new glass. Commercial storm panels, whether wood or metal, can be custom fabricated to match existing windows. In projects where the budget precludes a storm panel with true muntins, an interior version, more simply glazed, may be considered.

Replacement products

WHEN SMALL-SCALE STABILIZATION IS IMpossible, when repair or partial replacement strategies fail, or when deterioration has advanced beyond repair, existing windows must be replaced, a task made easier through a widening range of products.

Today, manufacturers such as Pella, Marvin, Hope, Camden, Graham, Weathershield, and others produce true multipaned windows, match existing exterior profiles, and replicate unusual window shapes. Susan Marvin, vice president of sales and marketing of Marvin Windows, echoes other manufacturers when she states that the retrofit market is growing, influenced by preservationists, architects, and clients. Although her company was predisposed toward meeting customer's specifications, Marvin says, "We saw more people with special needs approach us to solve their problems. As the market grew, we grew with it." As a result of this increasing demand, more window manufacturers offer lines of replacement products appropriate for the rehabilitation market.

Preservation resources

ARCHITECTS FACING THE TASK OF REPAIRING or replacing historic windows should consult the array of resources now available. The *Window Handbook* and *The Window Workbook* are available from the Historic Preservation Education Foundation, Washington, D.C. The handbook compiles the Department of the Interior's "Tech Notes" and includes Charles Fisher's own tract, "Rehabilitating Windows in Historic Buildings: An Overview." The National Park Service's Preservation Assistance Division holds technical seminars that address issues of window restoration, as does the Association for Preservation Technology, based in Fredericksburg, Virginia. Through the National Trust for Historic Preservation, the New York Landmarks Conservancy has just released *Repairing Old and Historic Windows, A Manual for Architects and Owners* (Preservation Press). Copies of the Secretary of the Interior's Standards for Rehabilitation are available through the Park Service or through individual state historic preservation offices. ■

—ROBERT A. IVY, JR

New Glazing Systems

Technical advances expand the design possibilities of glass.

GLASS APPLICATIONS ARE ADVANCING FASTER than any other single building technology. New glazings systems are no longer defined by simple glass types, but by layered fenestration comprising glass sheets, tints, coatings, and intermediate bonding layers and insulated spaces that respond to a particular building's orientation. Although recent advances in window glazings have focused on improving energy performance (see pages 105-107), blocking heat transfer has also reduced daylight. However, several technological breakthroughs promise to overcome these limitations and open new windows of design opportunities for architects.

Manufacturers have just begun to exploit the design potential of laminated glass interlayers. Colored products are now available (bottom left), and laminated panels are being developed to create opaque or transparent panes by electrically scattering particles between the glass (bottom right). Such panels hold the greatest potential energy savings for glazings, since their translucence can be controlled to adjust to changes in temperature and daylight.

Laminated glass has been available for decades, offering soundproofing and shatter-resistance superior to single-pane or even tempered glass. But the polyvinyl butyral (PVB) interlayer that bonds the glass sheets is only now being exploited for its esthetic potential. Manufacturers are discovering that such interlayers can also add color, patterns, and texture to glass without compromising acoustics, safety, and adhesion. They are also experimenting with PVB interlayers and polymers placed in the insulating space between sheets of glass to create glazings with improved performance properties and characteristics not associated with conventional glass. The next generation of glazings, now on the verge of commercial production, are "smart" windows that automatically adjust their translucence, in response to changing lighting and temperature conditions.

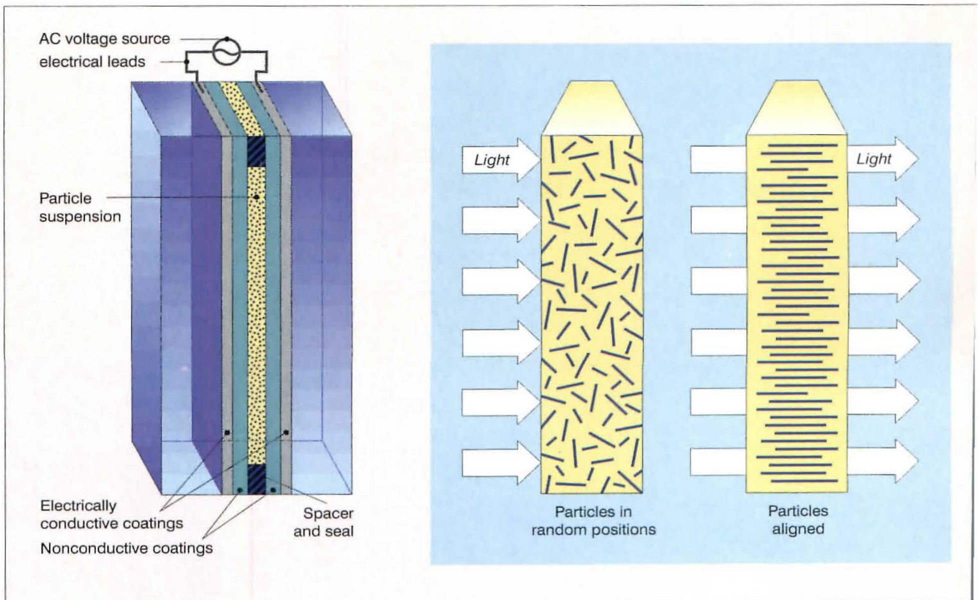
Fire safety

PUBLIC SPACES SUCH AS ATRIUMS, LOBBIES, and corridors are areas where natural light and a high degree of visibility are desirable, but they often require partitions for fire safety. Traditionally, wire glass and translucent ceramics, including glass block, have been th only glazing options available to provide adequate fire protection for enclosing emergency egress stairs and hallways, and their use is severely limited by existing codes. Preservation projects present even more diffi- culties for architects wishing to meet current fire codes without destroying the integrity o the historic fabric (pages 90-96).

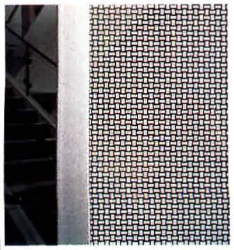
Fortunately, new glazing developments ar breaking through such fire-safety separation constraints. Seattle-based Technical Glass Products, for example, recently introduced FireLite, a ceramic glass that is transparent and eliminates the wire mesh previously required to obtain a fire-safe rating. An unfore seen preservation-related benefit of this glass stems from the slight visual distortion of its medium-grade product line, which simulates the wavy surface appearance of historic float glass. It can therefore be installed in older buildings to comply with currently establishe safety codes. And the 3/16-inch thickness of FireLite allows the glass to be fitted within the dimensions of standard fire-rated frames.

While wire glass, glass block, and improved ceramics provide a physical barrier to

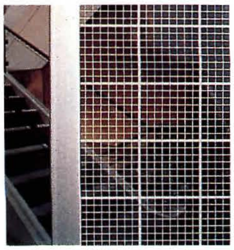
COURTESY MONSANTO



ELECTROCHROMIC PANEL

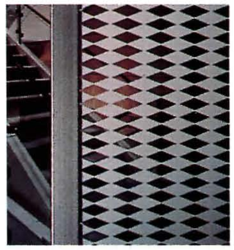


WEAVE



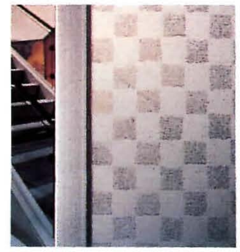
GRID

LINES



DIAMOND

WISP



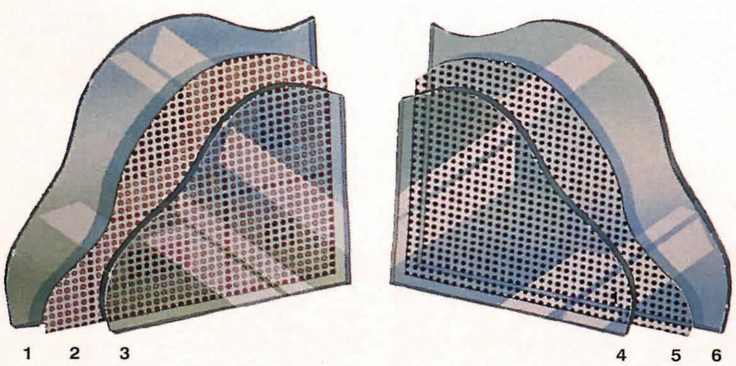
RICE PAPER SQUARES

flames and smoke, they fail to provide much insulation against heat radiation. Combustion of flammable surfaces and furnishings can still be sparked from heat radiating through spaces physically separated by glass. Therefore, to achieve a fire-rated enclosure, model fire codes still restrict the allowable percentage and size of glass. To achieve a 60-minute fire-rating, for example, individual panes cannot exceed 9 square feet and, when combined with one another, must not constitute more than 25 percent of the wall area to be fire-rated. However, a Los Angeles-based glazing manufacturer, Eich Corporation, has recently developed a clear, water-based polymer sandwiched between two layers of glass in a fire-rated frame. This assembly, with single panels manufactured in dimensions up to 4 by 7 feet, provides up to 90-minute protection for unlimited glass coverage. Heat is dissipated by water in the gel, which, after boiling, subsequently turns the polymer into a layer that insulates against radiant heat. Both FireLite's ceramic glazing and Eich's system reportedly have passed tests that exceed model fire code restrictions. They are now accepted by many local code officials in lieu of standards established on the basis of wire-glass performance.

Security glazing

ELECTRONIC SIGNALS ORIGINATING FROM nearby external sources such as radar installations can inadvertently sabotage stored data or be used covertly to obtain confidential information. Blocking these signals has become an increasing security concern among building occupants who rely on computerized systems, and until recently, such blocking could only be accomplished by wire-mesh glazing. Shielding sensitive computer equipment has been accomplished by designing a metal-lined cubicle or enclosure surrounded with a continuous metal screen within perimeter walls, doors, floors, windows, and ceilings—an assembly known as a Faraday cage. Pilkington Glass has recently introduced Datastop, a transparent glass without wire mesh that allows daylight and unobstructed visibility into secure areas. The glass pane's outward-facing surface reflects electronic signals by means of layered coatings. The glass must also be electrically connected to a metal window frame surrounded by a metal screen

For interior applications, newly developed textured glass panels (top row) are manufactured by laminating thin materials between sheet glass layers. Textured glass offers esthetic variety with varying degrees of light transmittance and privacy. For opacity in one direction and clear visibility in the other, ContraVision's panels are printed with dot patterns on both sides of the plastic interlayer that laminates the outer sheets of glass to one another (bottom left). A screen of black dots appears as an evenly tinted translucent glass panel when viewed from the interior (below), while a dot pattern printed in any other color combination on the opposite side appears solid and opaque when aligned with the black-dot matrix (bottom). Usually, less than half the surface area of the glass is actually screened by the dots. The percentage of light transmittance provided by such glazing treatments equals the percentage of glass left unobstructed by the dot pattern. The optical illusion of opacity is created when the colored-dot side of the glass is illuminated by supplemental lighting at least 30 percent brighter than lighting on the transparent side.



1 INWARD-FACING GLASS SHEET
2 LAMINATED INTERLAYER WITH BLACK-DOT MATRIX ALLOWS VISIBILITY
3 OUTWARD-FACING GLASS SHEET
4 INWARD-FACING GLASS SHEET
5 LAMINATED INTERLAYER WITH WHITE OR COLORED DOT SCREEN TO CREATE OPACITY
6 OUTWARD-FACING GLASS SHEET

OT MATRIX PANELS

Only 45 percent of the solar spectrum consists of visible light (below). The remainder of sunlight is composed of ultraviolet and infrared wavelengths, which are invisible but produce heat. To provide maximum daylight in conjunction with minimal heat gains, spectrally selective glazings mark the latest development in energy-conserving fenestration systems since the advent of low-E coatings. They are designed to block as much of the invisible, or heat-producing, portion of the solar spectrum as possible by reflecting or absorbing it (bottom left), while allowing most of the visible light to be transmitted to interiors (bottom right). A newly emerging value for measuring glazing's improved spectral selective properties, often referred to as a "coolness index" by manufacturers, describes the ratio between the glazing's visible light transmittance and its shading coefficient.

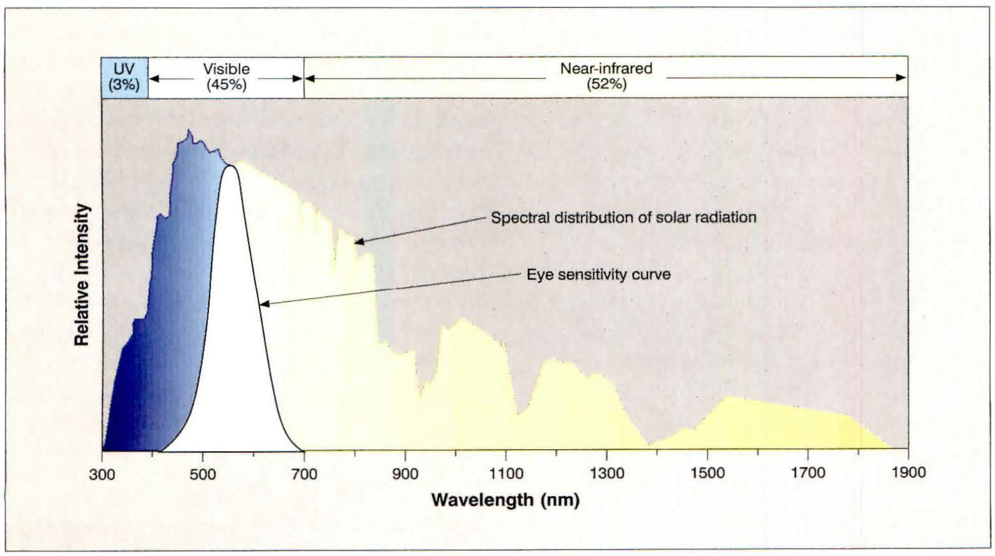
along its entire perimeter. The manufacturer claims the uniquely coated glass panes, available in a range of colors as well as laminated or double-glazed configurations for exterior applications, offer solar control and thermal insulation properties comparable to conventional high-performance windows.

Laminated glass

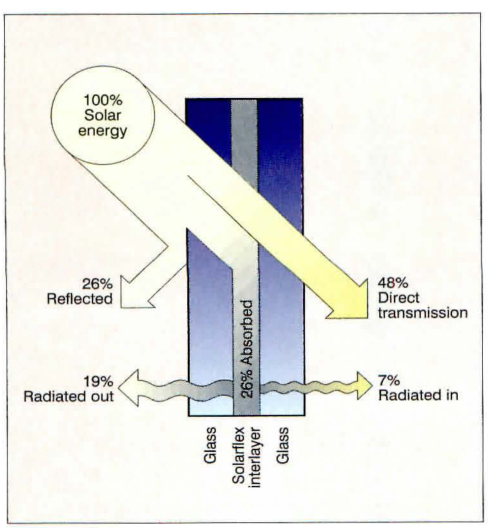
VIEWS AND DAYLIGHT MAY BE COMPROMISED when clients eschew glass for its lack of privacy. However, one inventive solution to this dilemma allows light to penetrate while screening occupants from view. Contravision, produced by Cesar Colors in association with DuPont, comprises two laminated glass panes with a plastic interlayer. The plastic is printed on one side with a black-dot screen, which admits light while allowing observers to see through what appears as tinted glass. The other side of the plastic is printed with a colored dot screen, making the glass appear opaque to viewers on that side. Certain conditions are necessary to create the desired optical illusion. The technique requires the opaque side of the glass to be lighted at least 30 percent more than the transparent side (daylight is normally as much as 70 percent brighter than indoor illumination). Under proper lighting, the glazing's dot screen appears as an even tint from a distance of approximately 5 feet.

A dot screen covering 46 percent of the glass is most commonly specified, offering the best balance between transmission and privacy. However, the percentage can be adjusted for either greater privacy at closer distances or for increased transparency. Like tinted glass, the dot matrix also acts to reduce light transmission.

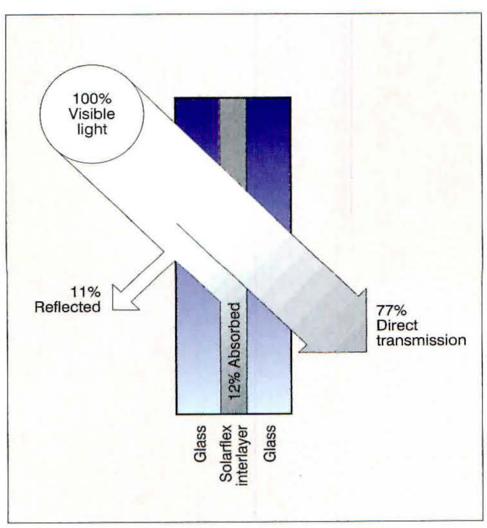
For purely esthetic effects, textured and colored laminated glass interlayers are also now available from several companies, including Cesar Colors. Dlubak, a Pennsylvania-based fabricating firm, for example, offers panels with rice paper, fabric, and other thin materials sandwiched between glass panels. Monsanto recently introduced Saflex Opticolor, a line of laminated glass products available in translucent colors. Clear or tinted laminated glass interlayers are now also being fabricated to screen invisible infrared and ultraviolet wavelengths (which contribute only to heat) without compromising visible daylight transmittance. Monsanto's Solarflex is one example of many recently introduced "spectrally selective" products that are emerging as the newest developments in energy-saving glazing technologies to be offered by manufacturers.



SOLAR SPECTRUM



HEAT TRANSMITTANCE



LIGHT TRANSMITTANCE

Selecting daylight

VISIBLE LIGHT CONSTITUTES ONLY ABOUT 50 percent of the solar spectrum. Ultraviolet and infrared wavelengths account for the remaining half of sunlight, which provides heat. All sunlight must be either reflected, absorbed, or transmitted through building fenestration. Tints and reflective coatings effectively reduce heat, but do so at the expense of blocking a percentage of visible light, increasing the need for supplemental interior lighting. First commercially available in the 1980s, low-E (low-emissivity) coatings and films helped revolutionize window insulation performance by reflecting the high infrared portion of the solar spectrum (ARCHITECTURE, August 1990, pages 95-98). They also block the penetration of ultraviole light, which constitutes only 2 percent of sunlight, but accounts for up to 60 percent of the spectrum that contributes to the fading of interior furnishings and fabrics. The latest commercially available developments in energy efficient glazings are "spectrally selective" curtain walls and windows that push the principles of low-E technology a step further. By filtering the wavelengths of light allowed o penetrate the building envelope, these glazings are designed to achieve an optimal balance of daylight and heat transfer for the building's region, orientation, and heating and cooling needs.

For commercial and residential buildings n warm climates, the best windows would et in all the visible daylight without any of he heat gain, reducing the energy required o artificially cool and illuminate the interior. The best spectrally selective glazings can be fine-tuned" with thin-film coatings, insulated ayers, and certain colors (shades of green and lue are naturally selective for visible light, vhereas bronze, browns, and grays are not), o transmit up to four times as much dayght as dark tinted glazings. Spectrally selecive glazings also offer equal or better solar eat control than traditional glazing.

In specifying spectrally selective glazings, rchitects need to become familiar with the efinition of "Ke-value," a ratio calculated by ividing the percentage of visible light transnittance by the glazing's shading coefficient. Ke-values are beginning to appear in manuacturers' literature as indicators of "coolness." Clear glass, which fails to screen any of he solar spectrum (letting in roughly equal mounts of visible and invisible light), has a Ke-value of 1.0. The best spectrally selective lazing, which could allow all visible light nd no invisible light to penetrate its surface, ould be rated with a Ke-value of 2.0. Any gher value would distort the neutral color visible daylight, just as tinted glass does. he best commercially available glazings toay can achieve a Ke-value above 1.5.

nart windows

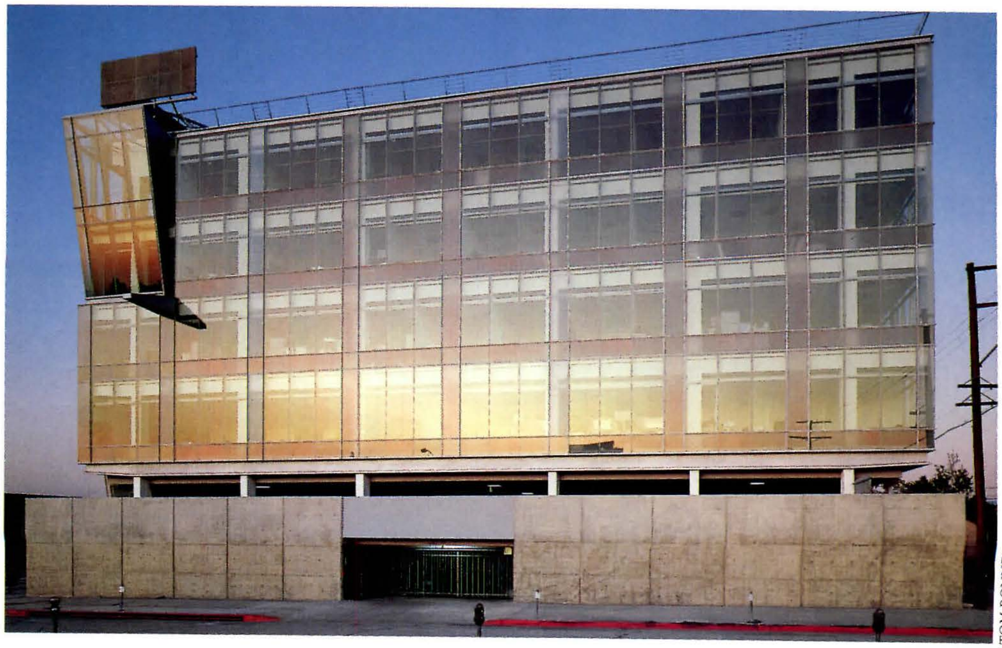
HILE SPECTRALLY SELECTIVE GLAZINGS ark an advance in the refinement of overall indow performance, they cannot adapt to aily and seasonal fluctuations in a building's ghting, heating, and cooling loads. Some nerging glazing technologies are overcoming ch limitations, and may become commonace in the 1990s, according to Stephen lkowitz, research director of the U.S. Dertment of Energy's Lawrence Berkeley boratory in Berkeley, California.

Such dynamic glazings, or "smart windows," respond to constantly changing climatic conditions. They consist of passive glazings, which alter translucence in response to temperature or light fluctuations, and active glazings, which are automatically controlled by electricity. This year, Suntek, an Albuquerque, New Mexico-based firm, anticipates introducing the first commercially available thermochromic panel—glazing that changes in response to temperature. The company's panels utilize Cloud Gel, a heat-sensitive polymer-based water solution, sandwiched between an insulated glass unit that alters its percentage of light transmission when temperatures rise or fall. Day Chahroudi, Suntek's research director, points out that the most appropriate application of the product will be for skylights, not windows, since controlling heat rather than glare

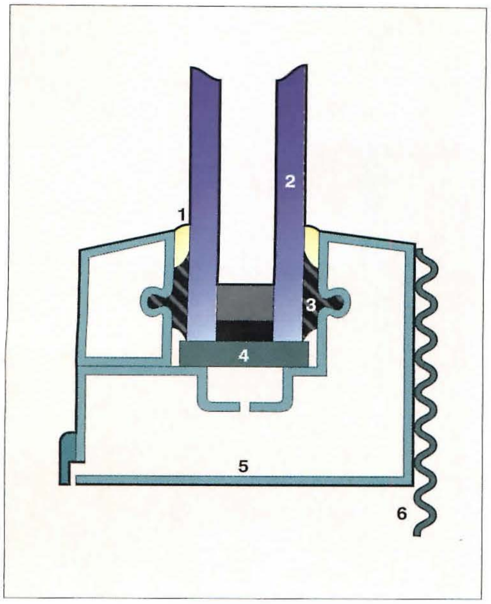
Spectrally selective glazings provide energy savings by reducing cooling loads for commercial and warm-climate residential buildings. Dark tints such as gray, brown, and bronze reduce heat at the expense of visible light. Blue and green tints are the most naturally selective for daylight and, when used in conjunction with insulated glazings and low-E coatings, *provide optimal* spectral selectivity. PPG's newly developed aqua-colored Azurlite, installed in an Englewood, Colorado, office building (below left) and Libbey-Owens-Ford's EverGreen, installed at the Chattanooga Airport in Tennessee (below right), are recent examples of glass developed for spectral selectivity. The Salick Health Building's all-glass curtain wall (bottom) in Los Angeles is constructed with Monsanto's Solarflex, a clear, spectrally selective laminated glass interlayer.

COURTESY PPG

COURTESY LIBBEY-OWENS-FORD

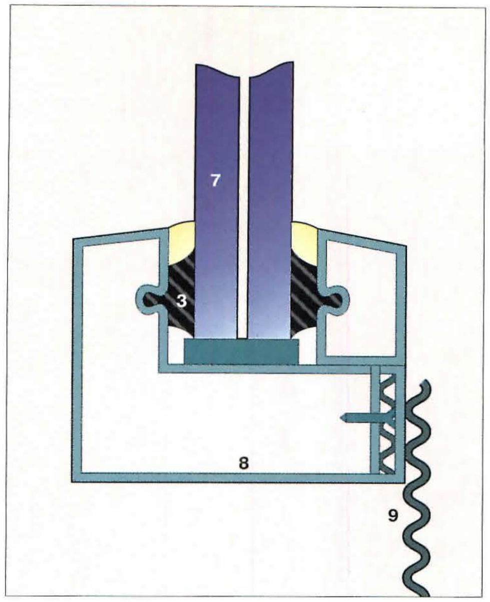


TOM BONNER



TYPICAL EXTERIOR GLAZING SYSTEM

1 SILICONE
2 INSULATED GLAZING
3 CONDUCTING GASKET
4 SETTING BLOCK
5 ALUMINUM FRAME



TYPICAL INTERIOR SCREENING

6 CONNECTION TO WALL SCREENING
7 LAMINATED GLASS
8 METAL FRAME
9 WALL SCREEN

Windows with a wire mesh were once required to block the interference of electromagnetic waves from sources such as radar, which can illegally tap into restricted computer data. Stray radio-wave signals can also accidentally corrupt electronically stored information. Clear or tinted glass coatings now perform the same function. Insulated glass panes for exterior applications (above left) or laminated sheets for interior panels (above right) must also be placed in a metal frame and attached to an electrically charged metal screen to be effective. Similarly, wire mesh or translucent ceramics were once the only glazing option for fire-rated partitions. Now, comparable fire protection is offered by a clear ceramic panel or by a glazing system that sandwiches a water-based gel between sheets of glass (below) for flame and radiant heat protection.

TOM BONNER

or visibility is the overriding concern for overhead glazing applications. Glass that automatically alters its tint in response to light intensity, a process known as photochromic technology, has already been successfully used to make sunglasses and car windows.

But actively operated glazings hold the most promise for widespread architectural applications, according to Selkowitz, although he predicts they are still several years away from commercial production. These glazings, known as electrochromics, change their optical clarity by means of an electrical current passed through an interlayer of microscopic particles. These particles can be aligned for optical clarity or dispersed in a random pattern to create a translucent panel. Of all the prospective switchable glazings, electrochromics offer the greatest degree of balanced control in response to both temperature and light fluctuations, and therefore offer the most versatility in adjusting to both interior lighting and cooling needs.

Varilite, a glass panel manufactured until recently by Sunnyvale, California-based Taliq Corporation, reveals the future potential of electrochromics. Wired like a conventional light fixture, these glass panels are capable o switching from an opaque to a transparent surface by aligning liquid crystals (controlle by standard, 120-volt alternating current) between two layers of laminated glass. Whe power is switched off, the crystals scatter in random directions, diffusing light and thereby causing the glass panel to become temporarily translucent. Varilite has had limited commercial success, however. Although ideal for temporary privacy and glar control, the panels provide no energy savings, require constant electricity to achieve transparency, and have proved prohibitively expensive. (In fact, Taliq stopped producin them earlier this year.) However, a Woodbury, New York-based firm, Research Frontiers, is currently developing another panel using similar liquid-crystal techniques.

Researchers hope to produce a marketab electrochromic panel requiring current only when changing, not maintaining, transparency. Ideally, levels of shading in betwee the two extremes could also be controlled. Manufacturers must overcome hurdles asso ated with haziness, size limitation, and mass production of prototypes. But Selkowitz pr dicts that once such changeable glazings ar available, they will radically alter the way architects design not only glazed openings but the entire building envelope.

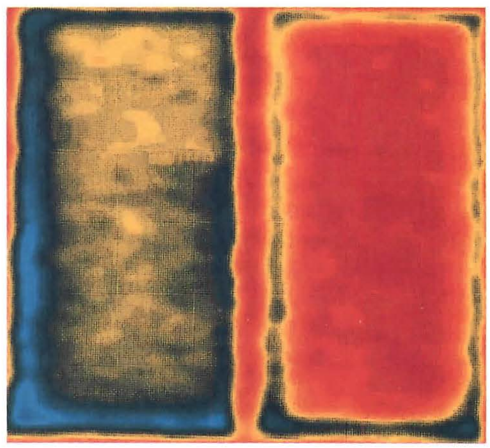
—MARC S. HARRIMA

Evaluating Window Performance

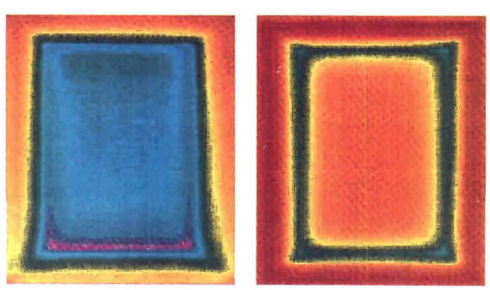
A new standard helps architects compare energy savings of windows.

WINDOW TECHNOLOGY HAS ADVANCED DRAmatically in recent years. Architects have seen the introduction of a wide range of energy-saving features, from heat-reflective, low-emissivity coatings and low-conductivity gas-filled windows, to advanced "warm-edge" spacers and new designs for insulated frames (ARCHITECTURE, August 1990, pages 95-98). As energy performance has improved, however, specifying windows and understanding their impact on heating and cooling loads have become more complex. The biggest challenge in estimating energy performance stems from the differences between the insulating properties of the window frame, the center of the glazing, and the glazing edge, which is defined as the $2^{1}/_{2}$-inch-wide perimeter band of the window pane near the frame. But now a national standard for comparing the thermal performance of different glazing systems has the potential to make the architect's task easier. This new rating system, currently under development, aims to create a fair and accurate means of comparing the thermal performance of windows.

Prior to the 1980s, the most efficient ommonly available windows—with two layrs of glass separated by a dead air space—chieved an R-value of approximately 2, about he same as the R-values of their frames. Most major window manufacturers list both nsulating values, or R-values, and thermal ransmittance values, or U-values, which are xpressed as reciprocals of one another.) Toay, low-E, argon-filled glazings are readily vailable, providing insulation values up to -4 (U-value of 0.25), and superglazings are vailable with R-values as high as 8 (U-value f 0.12). The problem with these high-perrmance windows is that, in most cases, the -values of their frames have not increased, nd their glazing edges may provide even wer insulation values than the frames. As a sult, the rate of heat loss through a stanrd insulated window may be about the me at the center of the glass and at the glazg edges, but high-performance windows ten lose more heat at their edges than at eir centers. A common and highly visible result of the relatively poor insulation of glazing edges is a band of condensation formed around the perimeter of the glass, which results from its lower temperature. When the effects of the glazing edges are factored in, the rate of thermal transmittance of the entire window is considerably higher than it is at the glazing center.



Side-by-side windows may appear identical (top), but differences are apparent in thermographic images (above). With a very high-efficiency window (above right), proportionally more heat loss occurs through the edges. The difference in heat loss through center and edge is even greater between R-2 (below left) and R-8 (below right) windows.

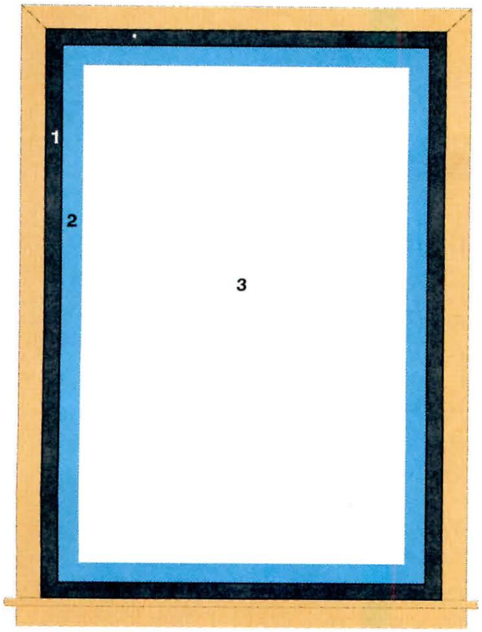


SOURCE: LAWRENCE BERKELEY LAB

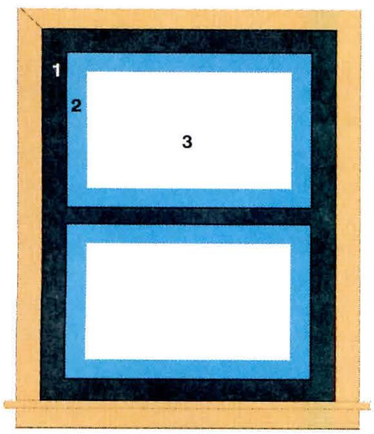
The number of true divided lights in a window also critically effects its energy performance, since each division proportionally increases the edge area by separating the glazing into multiple individual panes. For a small window with divided lights, the glazing edge area can even exceed the center-of-glass area. Therefore, measuring the U-value (or the R-value) of a specific area of a glass pane is not an accurate indicator of the entire assembly's insulating abilities. Moreover, manufacturers' literature lists up to five different values for the heat flow through a window—a U-value each for the frame, center-of-glass, glass edge, combined total of glass, and the thermal transmittance of the complete fenestration system.

Computerized evaluations

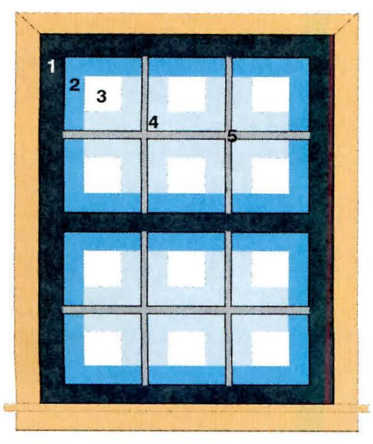
TO BETTER CHARACTERIZE WHOLE WINdow performance, researchers at Lawrence Berkeley Laboratory in Berkeley, California, have developed a computer program called Window (the current version is Window 3.1, although Window 4.0 will be released this summer), which calculates both average, or "unit" U-values (which describe the thermal transmittance of the entire system) and center-of-glass U-values. With high-performance glazings, these unit U-values provide a more realistic measurement of a window's actual energy performance. Another program, Frame (current version 2.2, with 3.0 expected this summer), developed by Enermodal Engineering of Waterloo, Ontario, calculates the thermal transmittance of the glazing edge and frame portions of a window. The output of these two computer programs can be combined to provide an accurate picture of the total heat transmittance through windows.



COMMERCIAL WINDOW



DOUBLE-HUNG WINDOW



WINDOW WITH DIVIDED LIGHTS

1	FRAME
2	GLAZING EDGE (2.5 INCHES)
3	CENTER OF GLASS
4	DIVIDER EDGE (2.5 INCHES)
5	DIVIDER

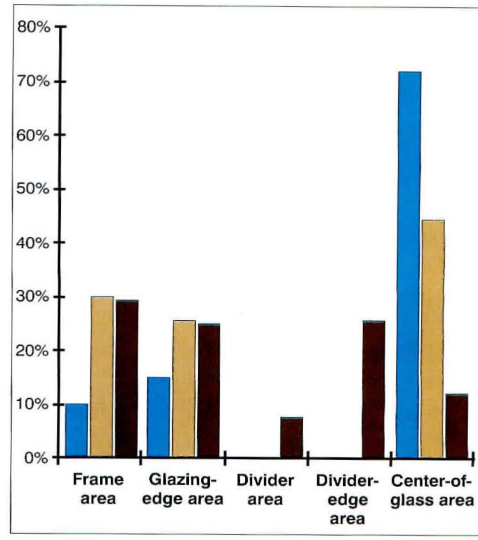
While these programs have existed since 1988, manufacturers have not uniformly applied them to calculating their products' energy performance. Nationally distributed manufacturers, such as Andersen, Marvin, and Pella, have taken advantage of Window 3.1 since 1990, but others have been slower to follow suit. And even when manufacturers use the Window computer program to calculate unit U-values, there is no industry or government standard for reporting the data, and no verification through testing has been required to validate manufacturers' claims.

New standards

WHEN INDIVIDUAL STATES AND THE U.S. Congress began proposing legislation to mandate a rating system for comparing energy performance, the industry realized the necessity of devising its own voluntary rating system. Varying rating systems and standards from different states could seriously impede marketing or create confusion among specifiers. Manufacturers therefore took the lead in developing a national rating system.

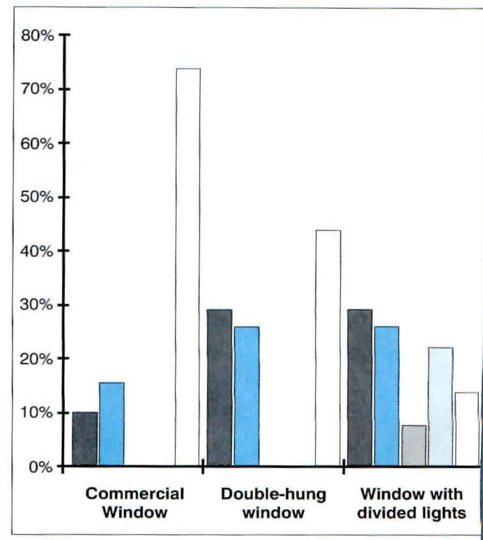
In June 1989, at a Vancouver meeting of the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), a group of window manufacturers, researchers, builders, state energy officials, and consumer advocates assembled to lay the groundwork for the National Fenestration Rating Council (NFRC). "The only way we are going to address these problems and keep the federal government from developing a monster," noted building products consultant Christopher Mathis, now administrative director of the NFRC, "is for us all to work together and beat them to the punch." In December 1989, NFRC held its first formal meeting in Orlando, Florida, and the organization has been working at a rapid pace ever since to develop comprehensive testing procedures and standards.

The NFRC's goal is straightforward: to create a fair, accurate standard for comparing window performance. NFRC therefore set up three committees, with the ratings, codes, and standards committee identifying potential users of NFRC ratings, determining their needs, and developing a consistent format. The technical committee develops the actual standards and testing procedures, through subcommittees for U-values, optical properties, solar heat gain, air infiltration, durability, and condensation resistance. Finally, a public relations committee is developing a plan for communicating the format and purpose of the rating system to consumers. NFRC recognizes



HEAT LOSS AS PERCENTAGE OF WINDOW AREA

- COMMERCIAL WINDOW
- DOUBLE-HUNG WINDOW
- WINDOW WITH DIVIDED LIGHTS



HEAT LOSS BY WINDOW TYPE (AS PERCENTAGE)

- FRAME AREA
- GLAZING-EDGE AREA
- DIVIDER AREA
- DIVIDER-EDGE AREA
- CENTER-OF-GLASS AREA

Total heat loss through a window is dependen on the proportions of frame area, glazing-edge area, and center-of-glass area (graph, top). In a large, undivided commercial window (top left), the center-of-glass compo- nent accounts for the largest area by far, while residential double-hung window (cente left) and residential window with true dividec lights (bottom left) actually have less center- of-glass area than frame, glazing-edge, or divider divider-edge areas (graph above).

that even the most well-meaning program will fail unless it is clearly understood by architects and consumers.

The result of the NFRC's activities will be the systematic labeling of all windows. Like appliance ratings, window ratings will provide a way to quickly compare the energy performance of different windows based on a single value determined by standardized tests.

U-value procedures

NFRC'S FIRST PRIORITY IS TO ACCURATELY measure thermal transmittance (U-value). While U-value and R-value are interchangeable (as reciprocals), U-value is the preferred measurement because it refers directly to the rate of heat flow through a material. Performance-based energy codes tend to work with U-values because they focus on total heat loss (or gain) of a building envelope. Similarly, product testing laboratories generally work with U-values because they can directly measure heat flow. Thus, rather than perpetuate the more complicated R-values, the NFRC hopes to educate window consumers to become familiar with U-values. By mid-1991, just a year and a half after NFRC's first meeting, the U-value testing procedure was adopted: "NFRC 100-91: Procedure for Determining Fenestration Product Thermal Properties (Currently Limited to U-values)." This procedure utilizes the two computer packages described above: Window determines U-values of the glazing, and Frame calculates U-values of the frame. These values are then combined to produce a single U-value for the window as a whole.

Each window manufacturer may offer a variety of products including casements, double- and single-hung vertical sliders, horizontal sliders, awning windows, fixed glazing, skylights, and various combinations of glass doors. Each product line is listed by the NFRC according to two specific model sizes: one representing a typical residential window, and the other representing a typical commercial window (see table, top right). NFRC creates a matrix of all the possible combinations of glazing spacings, gas-fills, low-E coatings, and other options for each product (center right). The two model sizes for each product in the matrix are then evaluated according to computer simulations to determine their respective U-values.

From this computer-generated matrix, a manufacturer selects its products with the highest and lowest U-values and tests them under standardized conditions at a certified testing laboratory. If the difference between the calculated and the actual measured thermal performance values falls within a carefully defined range, the computed U-values for the entire product matrix are accepted. Once the computer-determined values for the product line are accepted according to this testing procedure, the manufacturer chooses the applicable U-value for each product and then labels each model. To ensure that the labels contain properly computed and tested values, the NFRC reserves the right to audit any product carrying its rating system.

NFRC Fenestration Products Model Sizes

	Model Size† AA	Model Size† BB
Vertical Slider	36 x 60	48 x 72
Horizontal Slider	60 x 36	72 x 48
Casement	24 x 48	30 x 60
Awning	48 x 24	40 x 40
Fixed (includes nonstandard shapes)	48 x 48	48 x 72
Single door with frame	38 x 82	40 x 96
Double and multiple doors	72 x 82	72 x 96
Glazed wall systems (site-built windows)	72 x 82	80 x 80
Skylights and sloped glazings	24 x 48	48 x 48
Greenhouse/garden	60 x 36	72 x 48
Dual action	36 x 60	48 x 72
Pivoted	48 x 48	48 x 72

† Size in inches (width x height)

Source: NFRC 100-91: Procedure for Determining Fenestration Product Thermal Properties (Currently Limited to U-values)

Sample Product Matrix

Thermally broken aluminum horizontal slider

Glazing Options	Representative U-values Size AA (60"x36")	Size BB (72"x48")
1/4-inch IG, air, muntins	0.76	0.72
1/4-inch IG, air	0.68	0.64
1/2-inch IG, air	0.61	0.55
1/2-inch IG, gas	0.58	0.52
1/2-inch IG, gas, low-E	0.50	0.46

National Fenestration Rating Council ™ — Accredited Certification Program

AAA Fenestration Company

Manufacturer stipulates that these ratings were determined in accordance with NFRC 100-91.

U-value	A	5' x 3'	0.00	Model #1500 Horizontal Slider
U-value	B	6' x 4'	0.00	

NFRC ratings are determined for a fixed set of environmental conditions and may not be appropriate for determining seasonal energy performance. For additional information contact: NFRC, 962 Wayne Avenue, Suite 750, Silver Spring, MD 20910; Phone: (301) 589-NFRC, Fax: (301) 588-0854.

Different standard window sizes are used in the NFRC U-value calculation, depending on the type of window (top). AA indicates the standard residential size, and BB indicates the standard commercial size. U-value is calculated for each window configuration (for example, 1/2-inch space with gas-fill and low-E) in a particular product line for the standard residential and commercial sizes (above center), and then the NFRC label (above) is generated and affixed to the window.

NFRC labeling

AS EARLY AS MID-1992, ARCHITECTS AND consumers in some parts of the country can expect to see NFRC window thermal efficiency labels on most of the windows sold (at least from the larger manufacturers). A number of states will be requiring the labels on all windows sold. Although the NFRC label does not serve as a "stamp of approval" to indicate a window has passed any minimum performance requirements, several states have taken the initiative of mandating the rating system as a common basis of measurement for determining compliance with their individually established window energy standards. California, Oregon, Idaho, Washington, Minnesota, and Alaska have already taken steps to adopt the NFRC thermal performance ratings. California will implement the entire NFRC rating and labeling system for fenestration products by July 1, 1993, with U-value labels required on many products as early as July 1,1992. Oregon and Minnesota began requiring the NFRC U-value ratings in January, with labels and product performance certification required as they become available. The other states each have their own schedule for adopting the performance ratings, and more states are adopting the program as it develops.

Although the NFRC has made considerable progress, its greatest challenges still lie ahead. Rating the thermal transmission of windows is fairly straightforward compared with the other aspects of window performance the organization must address. Establishing consistent standards for rating solar heat gain, for example, which apply to the highly varied climates in the U.S., will be particularly difficult and are not expected for another year or two. For more information, contact the National Fenestration Rating Council in Silver Spring, Maryland, (301) 589-6372. ■

—ALEX WILSON

Managing Electronic Drawings

Software for organizing CADD files helps design teams share drawings.

WHEN WORKING ON A PROJECT, FEW ARCHITECTS file their drawings with the precision of a public library. But arranging sheets in strict order and instituting checkout processes, due dates, and security passes for borrowers are becoming increasingly common procedures in firms faced with the complexities of electronic drawings. Although small firms with stand-alone computer systems may operate smoothly without such formalities, practices with computer networks, especially large ones, must develop management procedures to make order out of potential chaos.

Much of the software that helps to organize graphic information can be added on to core CADD programs such as Intergraph's MicroStation and Auto-desk's AutoCad. These add-ons allow designers to name, file, distribute, plot, redline, and archive electronic drawings. In addition, project managers who are unfamiliar with CADD can take advantage of supervisory functions to monitor drawing progress. Drawing management, in the broadest sense, encompasses a range of filing and viewing functions.

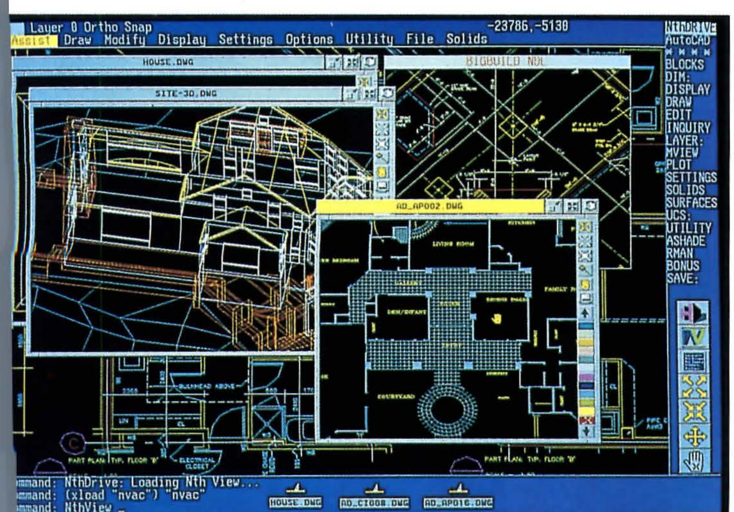
Drawing managers

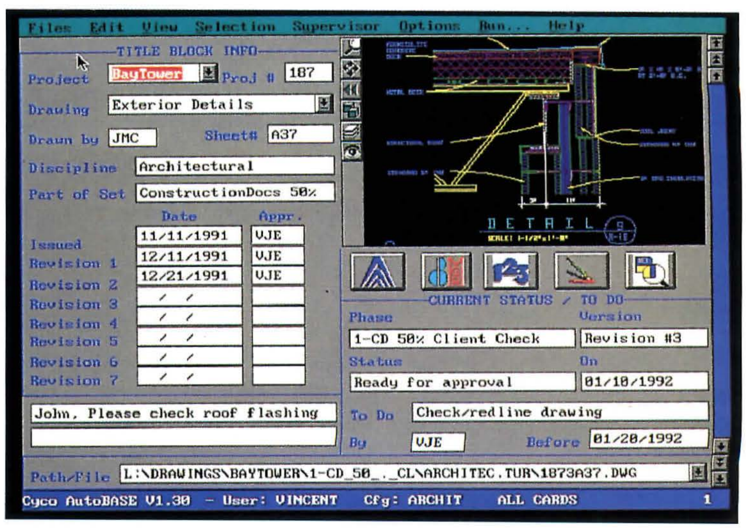
FOR FIRMS ON NETWORKS, THE PERSONAL computer is no longer personal. A central computer or file server is frequently the hub of their drawing and software storage. Depending on the system, individuals work either from centralized files or drawings that are downloaded into their workstations. Because it is electronically possible for two people to inadvertently work on the same drawing at the same time, it is critical that procedures be established to avoid conflicts and multiple originals. Most drawing management systems provide relatively friendly graphic interfaces to buffer architects from the complexities of their computer's operating system. According to Terry Wohlers, a Fort Collins, Colorado-based consultant, these systems also help designers keep track of their files in a network. "The productivity benefit of CADD," he claims, "isn't in creating original geometry, but in revising old geometry. If you lose files, you might as well bring back drawing boards."

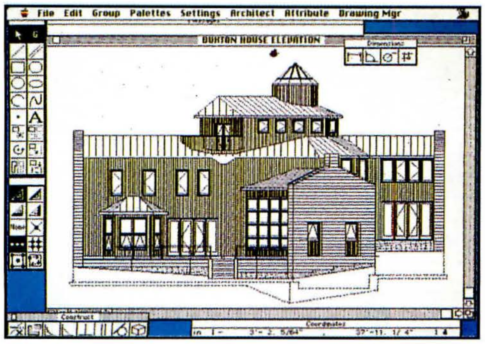
One of the most popular management programs is Cyco International's AutoManager WorkFlow (formerly AutoBase). This system creates a database of all the drawings on a network that CADD supervisors manipulate through on-screen "index cards." A card can contain as many as 128 fields of information, including the name of the drawing, its location, creator, revision and approval status, and a thumbnail view of it. A supervisor can then browse through and modify the cards, thus tracking drafters' progress from outside the complicated and slow-moving CADD environment. The database manager, which is compatible with the popular dBase software, facilitates keyword searches and generates reports, such as a drawing's status. Security features protect the drawings from unauthorized editing.

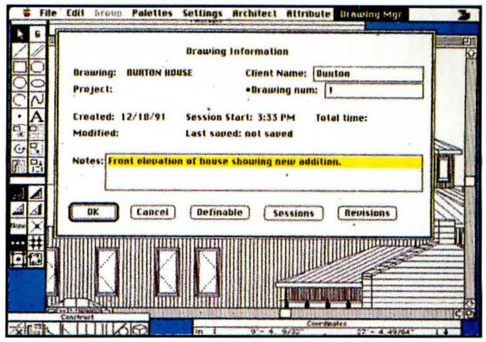
Protecting against errors is especially important for designers who are new to CADD, according to AM WorkFlow user Michael Zwijacz, vice president of computer services at Paul O. Finwall and Associates, Architects and Planners, in San Francisco. "Novices are more likely to damage or delete files accidentally," he says, "and shielding them from DOS reduces their time spent housekeeping. The beauty of AM WorkFlow is that you can see all your drawings and details quickly, attach notes to them, and automatically file them in the right subdirectory." Zwijacz adds, "when you keep track of drawings from for-

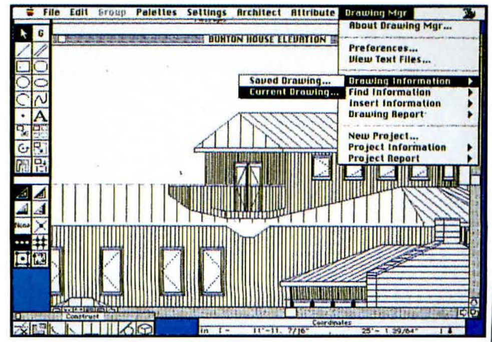
With help from the icon-based interface of Nth View/AC from Nth Graphics (below left) users can locate files on a network and view multiple AutoCad files and scanned drawings. AutoManager WorkFlow (below right), formerly called AutoBase, displays a drawing and its status data. CADD managers can review drawings and generate reports without having to work in AutoCad.











Very few drawing management programs are available for the Macintosh, primarily because the graphic nature of the computer's operating system facilitates organization and encourages ongoing file maintenance. One program for the Mac is VersaCAD's Drawing Manager, which tracks the time spent on each drawing and records other types of information regarding drawing status, such as revision dates and notes. Drafters can attach notes as reminders and search for drawings by keyword. An elevation (above) by architect Richard White of Burnstown, Ontario, is shown overlaid by a dialog box for data entry (above center) and a menu of management options (above right).

mer projects, you boost productivity in future ones." He also has found that the program's automatic daily archiving procedure saves valuable time. "We used to spend 30 minutes per day backing up the day's work, so our network has paid for itself."

Drawing Manager by Nehalem Bay, with an interface that integrates it seamlessly into a Novell network, emphasizes drawing security, making it very difficult for drafters to delete files accidentally. Because every drawing exists redundantly at both the file server and a workstation (until backup time, when old versions are removed), office work continues uninterrupted even if the file server crashes. Drawing Manager also maintains "audit trails" of who spends how much time on each drawing or document.

DMS Pro, from The van der Roest Group, enables a manager to link a set of documents from a variety of applications and to route them automatically to a sequence of individuals on the network who, in turn, review, edit, approve, and process the documents. Auto-EDMS, from ACS Telecom, is one of the oldest and most comprehensive of the drawing management systems. It manages files in a variety of formats for networked CADD users and can plot drawings without loading AutoCad. The newest version is easier to use and customize. Other programs that provide management functions include AutoLOG, CAD_MIS, CMS, DCS, and I/NFM (See software sources, facing page).

Viewing software

WHILE PERFORMING FILE MANAGEMENT functions, computer users usually "see" drawings as lists of abstract file names. But it is often helpful to see the files' contents as well. With viewing software, a user can display (but not modify) a drawing that was created in AutoCad, for example, without knowing or even owning AutoCad. The viewer can zoom in and out, pan around, and even turn layers on and off. These programs usually display drawings much faster than the originating CADD software, and they allow the exchange of drawings between unlike systems.

Architect Fred Kalvelage of Tewhill & Kalvelage in Omaha, Nebraska, has found the viewing capabilities of PC-based Drawing Librarian useful in sharing files with engineering consultants. His firm runs Accugraph's CADD software, and he translates drawings into the common DXF format for the engineers. "In the past," he explains, "I had no way to see the result of this translation before sending the disk to the consultant. I was never sure whether it worked until it was successfully brought up on their equipment. Now, even though I don't have AutoCad, Drawing Librarian allows me to look at the AutoCad drawings in both the DXF format that comes out of our system and in the DWG format that comes back from the consultant. It also makes translations from DWG to DXF."

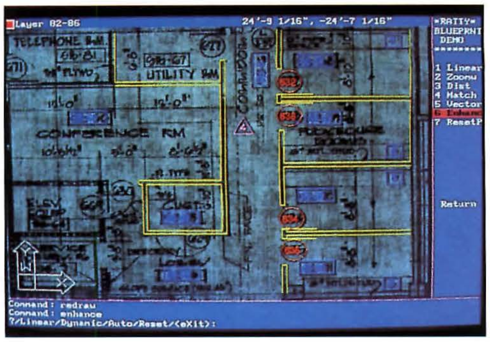
A few systems have extended this capability. AutoLook for Sun SPARCstations and the equivalent AutoAccess for PCs display views of 3D models and allow users to rotate them interactively. Intergraph's MicroStation Review provides access to 2D and 3D files and all associated reference files, including renderings for presentations, databases for access to nongraphic information, and 2D drawings for generating check plots. By viewing models in 3D, managers can check for interference such as conflicts between structural and mechanical systems. Other programs that permit manipulation of 3D models without CADD include AutoSight Access and DesignScout.

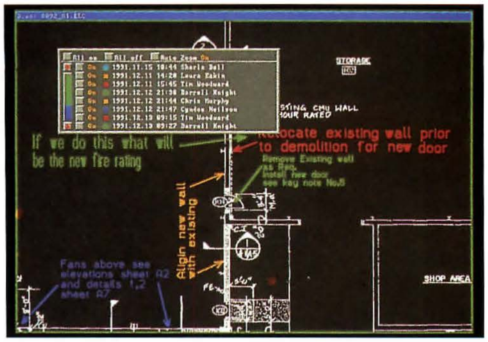
Redlining capabilities

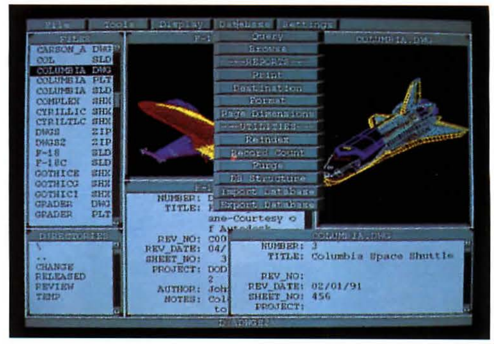
VIEWING SOFTWARE MAKES ELECTRONIC drawings accessible to project managers who may not have the time or interest to learn CADD. Many programs also include a simple set of drawing tools, so that a supervisor can redline the drawing without first plotting it. Later, a drafter can change the CADD file to reflect the edits.

Slick! 386 provides redlining with analysis tools that enable the reviewer to measure lengths and slopes where the dimensions are absent. This software is far simpler than AutoCad and can run on modest PCs. Slick! 386 user Jack Camroux, a technologist with Pulsearch of Calgary, Alberta, explains, "Anyone in our organization can view an AutoCad drawing to spot-check progress on a project. They don't need an expensive workstation, and they don't need to know AutoCad's complicated command structure." Markups are saved as a file to import into the AutoCad drawing as a separate layer. Other systems with redlining are FastLook, MicroStation Review, Nth View/AC, and TechEdit.

Redlining capabilities are not new, according to Katherine Panchyk, the CADD system manager of a New York-based structural engineering firm, Weidlinger Associates. She and Richard Panchyk, also of Weidlinger, have coauthored *The CADD Department: A Guide to Its Successful Organization and Management*. Their firm has accommodated redlining for years by simply assigning one CADD layer to guidelines and markups. On this layer the engineers draw sketches and write notes to the drafters; the layer is turned off during final plotting. This method, however, requires that the engineers be familiar with the CADD software.







Management software

INCREASINGLY, THE FUNCTIONS OF VIEWING and managing drawings are being combined. For example, Image Systems Technology offers ViewBase, CAD Overlay GS, and other applications, collectively known as Rasterware. These systems manage the filing, editing, redlining, and printing of scanned images. CAD Overlay GS displays scanned gray-scale images as a photographic backdrop. The designer can merge these raster-based scanned images and vector-based CADD drawings within AutoCad and reconstruct a CADD model by tracing over the image.

Many CADD applications include their own management systems to maintain the drawings they generate. The Vertex Detailer's dBase-compatible manager helps locate and retrieve details from a large and customizable library. The user can browse the database or find specific details by searching by keyword, CSI division number, or previously attached labels. The details previewed may then be brought into AutoCad. As a reference for specification writers, the database can also list all the detail's components.

Other systems that combine viewing and database management include AutoEDMS, AutoLook, AutoVue, NovaManage, Retreeve Plus, RxEDM, Sightseer, SirlinView, Slick! 386, and Synergis Network FileManager.

Network glue

VIEWING AND MANAGEMENT SOFTWARE may be seen as Band-Aid solutions to CADD and operating systems' lack of designer-friendly filing and retrieval capabilities. According to consultant Wohlers, the situation is unlikely to change soon. "Ideally," he says, "CADD companies will address this issue so that third parties don't further complicate the installation and support. But for now, this software is the glue that bonds CADD software to networks."

But CADD management involves more than handling computers. Kenneth Chow, of Isaac-Renton Architects in Vancouver, British Columbia, developed his own procedures before drawing management software was available. He stresses that there is a need for conventions, but he also urges flexibility. "Since people are the ultimate controllers of information," he claims, "it is the management of people, rather than the management of information, that's important. Conventions for organizing drawings are important to ensure consistency; but unless the whole team supports it, no standard imposed from on high will succeed." And developing cohesion in a design team is one management skill that has yet to be automated. ■

—B.J. NOVITSKI

CAD Overlay GS from Image Systems (above left) displays a hybrid raster/vector image of a scanned blueprint with walls added in AutoCad. RxEDM (above center), from Expert Graphics, manages drawings on a network to help with filing, editing, scanning, plotting, and redlining. Here, remodeling notes are overlaid on a scanned image of an existing building plan. Slick! 386 (above right) from CADsystems Unlimited includes special functions that aid in report and proposal production. A designer can export plot files to database management or desktop publishing software, thus combining graphics with text and tabular information.

Sources for Drawing Management Systems Software

The ASG/Vertex Detailer
ASG
(415) 332-2123

AutoEDMS
ACS Telecom
(301) 325-3055

AutoLOG
SeCAD
(305) 266-4434

AutoLook
Visual Software
(213) 466-0552

AutoManager WorkFlow
Cyco International
(404) 634-3302

AutoSight Access
AutoSight Inc.
(407) 242-5865

AutoVue
Cimmetry Systems Incorporated
(800) 361-1904

CAD_MIS
Pluris, Inc.
(919) 781-8642

CAD Overlay GS
ViewBase
Image Systems Technology, Inc.
(518) 283-8783

CMS
DCS
Workgroup Technologies Corp.
(617) 895-1500

DesignScout
StereoCAD, Inc.
(408) 446-9012

DMS Pro
The van der Roest Group, Inc.
(714) 542-2201

Drawing Librarian
SoftSource
(206) 676-0999

Drawing Manager
Nehalem Bay
(503) 228-8680

FastLook
Kamel Software, Inc.
(407) 366-1172

I/NFM (Network File Manager)
MicroStation Review
Intergraph Corp.
(800) 826-3515

Intelli-CADD
Intelligent Images
(301) 345-5544

NovaManage
Novacad
(617) 221-0300

Nth View/AC
Nth Graphics
(512) 832-1944
(800) 624-7552

Retreeve Plus
Auto-Scan Systems
(404) 231-1052

RxEDM
Expert Graphics, Inc.
(800) 648-7249

Sightseer
Station Software, Inc.
(215) 444-4061

SirlinView
Sirlin Computer Corp.
(603) 437-0727

Slick! 386
CADsystems Unltd.
(408) 562-5762

Synergis Network FileManager
Synergis Software
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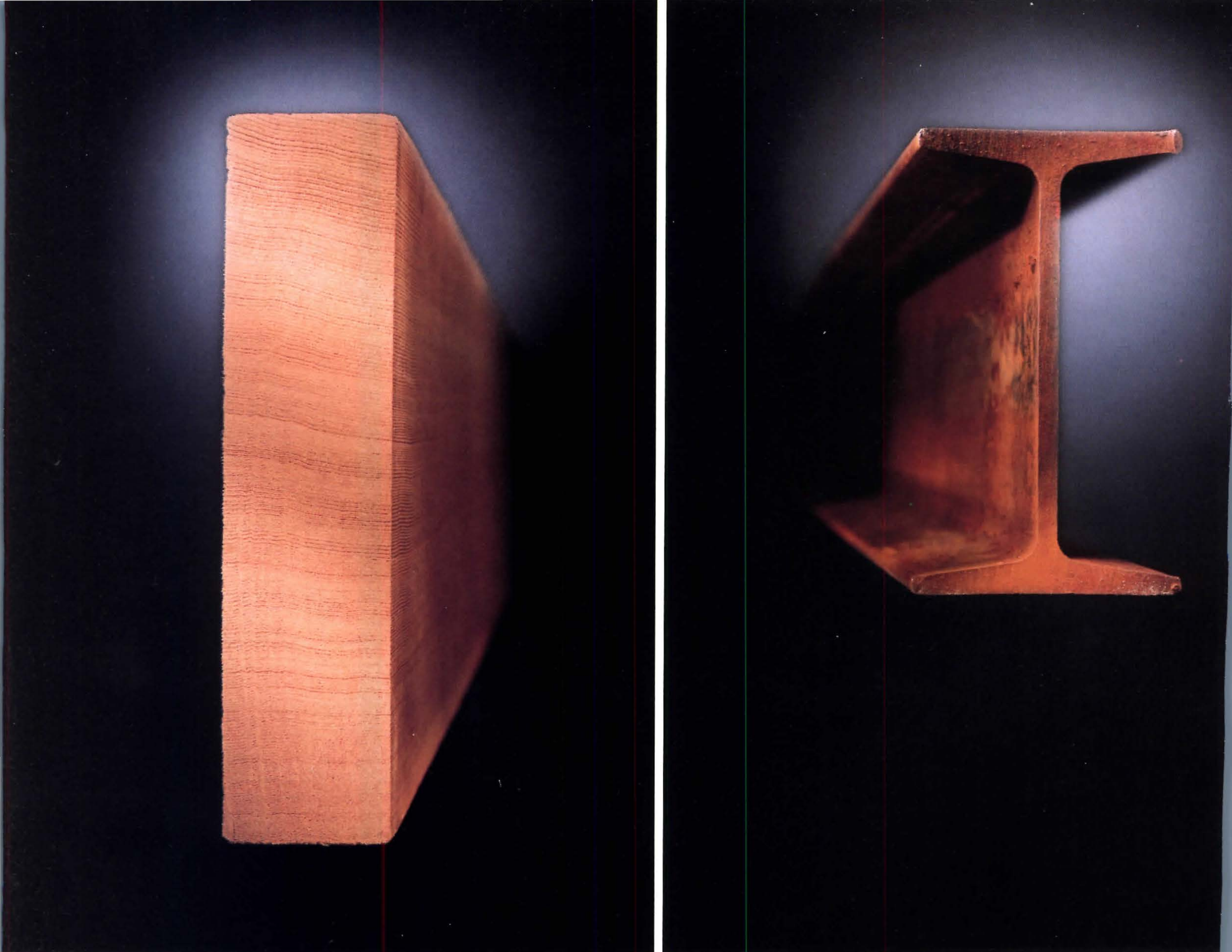
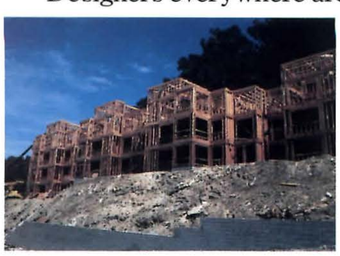


WHICH IS A STEAL?

Hopefully, you picked the one on the left. Because the fact is, Western wood is the real "steal" in multi-story construction up to four stories.

Designers everywhere are discovering they can lower costs framing with naturally resilient wood. And we're not just talking lower material costs. Western woods are easily modified on-site, making wood-frame construction quicker in all types of weather.



Wood-frame construction delivers cost-effectiveness in high density areas and difficult terrain.

The move from steel to wood is only natural. After all, no other material can match wood's warmth and beauty or wood-frame construction's design flexibility and lower costs.

But don't just take our word for it, look around. Award-winning wood-frame buildings are popping up all over the country in multi-story projects like office buildings, senior care centers and hotels. In fact, virtually any low-rise structure up to four stories can be framed in versatile Western wood.

So send for our free packet on wood-frame construction, chock-full of design specs, code provisions and revealing case studies. Simply mark the reader service card or fax us your name and address at the number below. And start stealing our ideas on wood-frame construction.

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Hardwood Floors

Plank systems, stains, and sealers offer durable surfaces.

1

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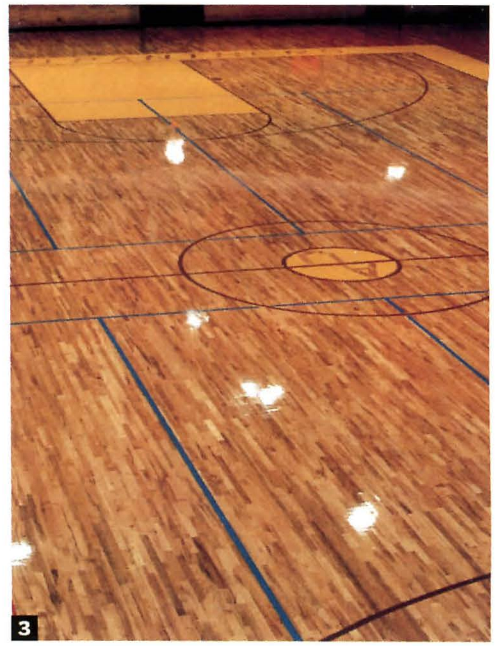

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. Bruce Hardwood 'loors features a rethane surface or stain and wax nish. Circle 401 on nformation card.

. For wood floors, onaKemi USA roduces a line of tains, sealers, and aterborne finishes at comply with OC emission regutions. Circle 402 n information card.

. Connor Aga anufactures wood oors for high-rformance athletic cilities and ultipurpose rooms. rcle 403 on formation card.

Kentucky Wood oors offers four rder patterns to company its

4

5

6

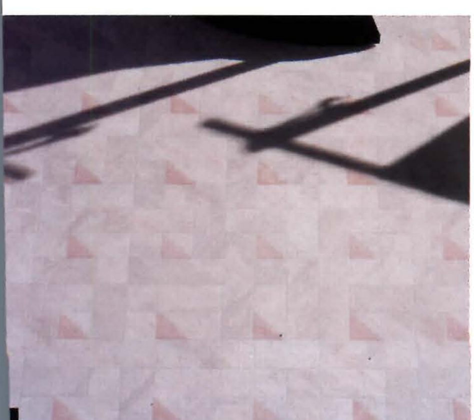
hardwood strip and plank systems. The borders are suitable for residential or commercial applications. Circle 404 on information card.

5. The Uniquely Australian Corporation's flooring incorporates jarrah and karri hardwoods, which are native to Australia. Both of these woods are comparable in density to North American hickory. Circle 405 on information card.

6. Harris-Tarkett produces a line of prefinished laminated flooring products in five woods and 12 colors. Circle 406 on information card.

Resilient Flooring

Rubber and vinyl surfaces reduce wear and increase safety.



1. Armstrong World Industries has added a terrazzolike pattern in 15 color combinations to its Medintech line of solid vinyl commercial sheet flooring. Circle 407 on information card.

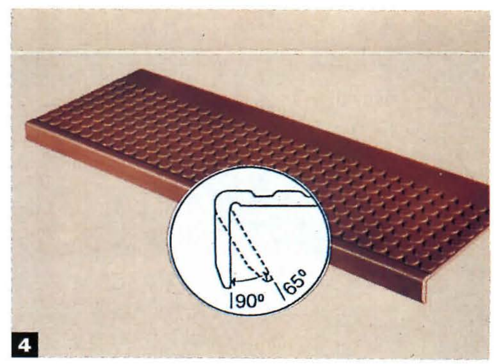
2. Azrock Industries manufactures a textured vinyl composition tile designed to reduce slippage. Circle 408 on information card.

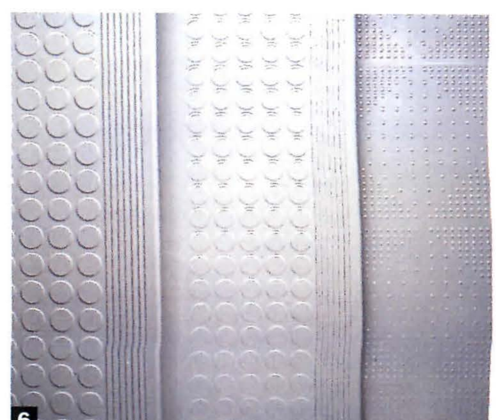
3. Available in seven designs and 23 color combinations, the Endurance line of sheet vinyl flooring by Congoleum is designed to resist stains and mildew. Circle 409 on information card.

4. The R.C. Musson Rubber Company produces stair treads with raised disks that minimize slippage, and angled return nosings that provide a tight fit. Circle 410 on information card.

5. Mannington Mills' CustomSpec vinyl flooring is available in 6- and 12-foot widths. All seams are chemically welded for added adhesion and to resist accumulation of dirt. Circle 411 on information card.

6. VPI has introduced a line of rubber tile with raised disks or dots and a matching rubber wall base. Circle 412 on information card.





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New Wallcoverings

Textures and patterns soften residential and commercial interiors.

1. Manufactured by Koroseal, the Tatami Collection of textured vinyl wallcoverings is treated with antimicrobials to resist mildew and bacteria. Circle 413 on information card.
2. The six different patterns in J.M. Lynne's Geodesy collection of printed vinyl wallcoverings are derived from the textures of stone, slate, and marble. Circle 414 on information card.
3. Forbo Industries produces Vizcaya, a textured vinyl wallcovering available in a variety of colors. Circle 415 on information card.
4. Intended to look like weathered stone, the Guard Carlsbad collection by Columbus Coated Fabrics is produced in 10 color combinations. Circle 416 on information card.
5. Motif Designs has introduced Parallels II, an expanded collection of striped wallcoverings including 16 patterns and 95 color combinations. Circle 417 on information card.
6. Intended for residential settings, the Bourbon wallcovering by Brunschwig & Fils is one of more than 36 patterns in the Feather Your Nest collection. Circle 418 on information card. ■


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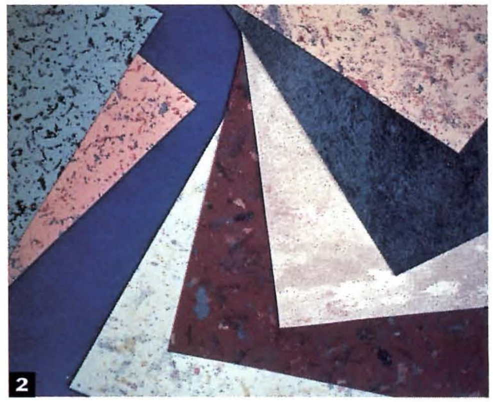
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The manufacturers listed below were advertisers in last month's issue who are anxious to provide you with their latest product information and literature for your planning needs. To receive this information, circle the appropriate numbers on the self-addressed, postage-paid response card. For product information and literature from advertisers in this issue of ARCHITECTURE, circle the appropriate numbers shown on the advertisements.

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Neat file

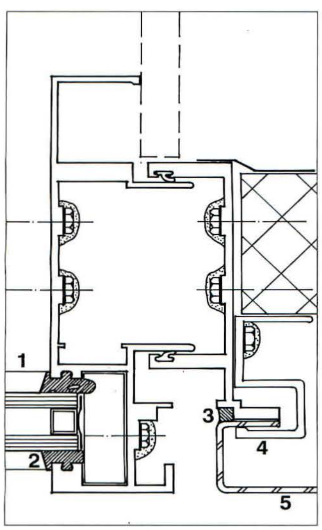
ARCHITECTURE's "No Excuses After This" information exchange

Glazing *CSI Division 08800*

Laminated versus Tempered Glass

When specifying glass types for large commercial or institutional projects, architects should consider construction schedules. If building codes allow either laminated or tempered glass, our selection is based on weighing delivery time against the strength of the material. If the construction schedule is tight, we prefer laminated glass because it requires less time to fabricate and can be field-cut, thus eliminating the need to assemble special sizes or shapes. In comparison, tempered glass cannot be field-cut, because doing so would weaken the material's strength. And since it must be specially ordered and made to size, the delivery time required for tempered glass is usually longer. However, if strength is the primary factor in material selection, tempered glass offers much higher tolerances than comparable thicknesses of laminated glass.

Samuel J. Herpin, AIA
Bradley Miremont Blewster & Associates
Baton Rouge, Louisiana



GLAZING PANEL SECTION

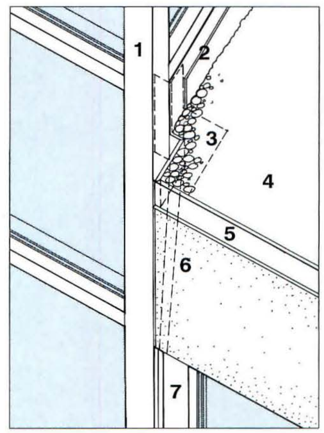
1 GLAZING
2 NEOPRENE GASKET
3 SILICONE SEALANT
4 EXTRUDED ALUMINUM PANEL CLIP
5 FORMED STAINLESS STEEL COLUMN-COVER PANEL

Integrated Glazing

In contrast to conventional glazing, which is installed in a curtain wall after the window framing is in place, unitized glazing systems offer the advantage of assembling the curtain wall off-site and installing it as a single unit. Erecting these types of systems requires less time than installing conventional glazing, and the quality and finish of the glass and panels are more uniform. The glass gasketing system of unitized glazing is neoprene (left), which does not retain dirt like site-installed silicone wet seals. Unitized glazing systems also feature concealed interlocking gaskets for abutting panels, which eliminate the need to caulk between panels.

Bill Caskey, AIA
CRSS Architects
Irvine, California

Flashing *CSI Division 07600*



ROOF EDGE DETAIL

1 STOREFRONT
2 ALUMINUM COUNTERFLASHING
3 FLASHING
4 ROOFING
5 ROOF EDGING
6 SLOPED ALUMINUM OVERLAPPING FLASHING AND ROOF EDGING
7 1.5-INCH-WIDE REVEAL

Flashing Concealment

On a recent project, we designed a row of clerestory windows with clear anodized aluminum frames that intersect the roof deck (left). Because the flashing between the deck and the clerestory can be easily seen, we concealed it with counterflashing made of the same clear anodized aluminum as the window frame. The flashing therefore appears as an extension of the clerestory frame, and is less noticeable than ordinary steel or copper flashing. To conceal the flashing where the building face abuts the vertical clerestory frame, a 1 1/2-inch reveal separates the frame from the building face and allows the flashing to be placed behind the frame.

Buddy Branham, AIA
Nix, Mann and Associates
Atlanta, Georgia

Flashing Samples and Drawings

Flashing is often unappreciated because it's hidden. It's an irritation for masons, door and window installers, and framers, who often overlap it the wrong way or fail to finish flashing corners properly. To help architects understand how flashing is constructed, our office has created a binder file of flashing samples, cut into 8 1/2-by-11-inch sheets, including information on gauge, available sizes, manufacturers, and cost. Flashing typically consists of copper, lead-coated copper, or aluminum (painted or anodized), but plastic and rubber flashing are also available. The sample book can be taken to the job site during inspections to compare the flashing being installed to the sample specified. Conventional section drawings of flashing can be misleading. To avoid installation problems, flashing details should be drawn in isometric form showing methods of lapping, end conditions, and dimensions.

Ryszard Szczypek, AIA
Tai Soo Kim Partners
Hartford, Connecticut

Architects are encouraged to contribute their NEAT *ideas, including drawings, sketches, and photographs, for publication. Send the submissions to:* NEAT *File, Michael J. Crosbie, 47 Grandview Terrace, Essex, Connecticut 06426, or by fax (202) 828-0825.*

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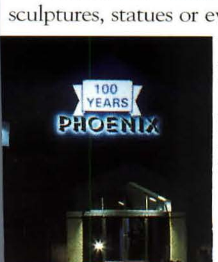

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